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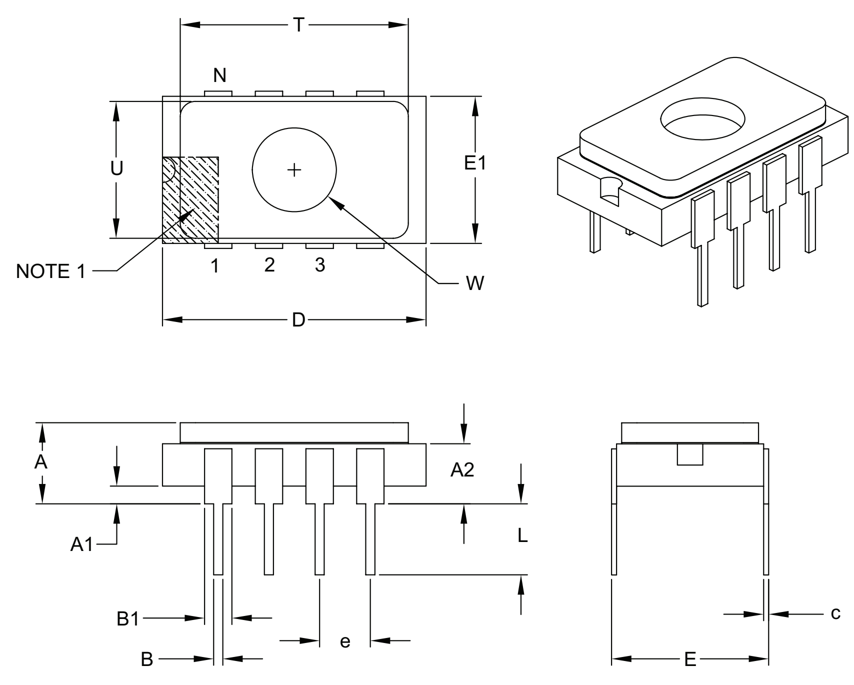
SIDEBRAZE

8-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	.100 BSC		
Top to Seating Plane	A	.085	–	.200
Top of Body to Seating Plane	A2	.103	–	.143
Standoff	A1	.025	–	.070
Package Width	E1	.280	–	.310
Overall Length	D	.500	–	.540
Tip to Seating Plane	L	.125	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	B1	.045	–	.065
Lower Lead Width	B	.015	–	.022
Overall Row Spacing §	E	.300	–	.325
Window Diameter	W	.161	–	.171
Lid Length	T	.440	–	.460
Lid Width	U	.260	–	.280

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-083B

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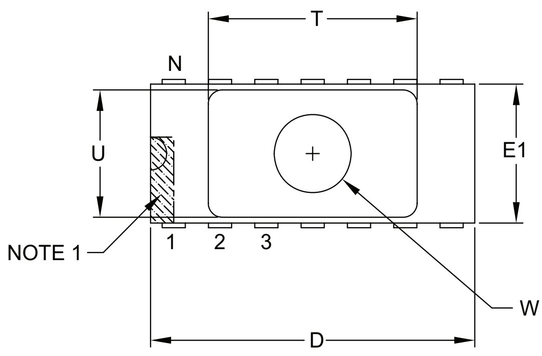
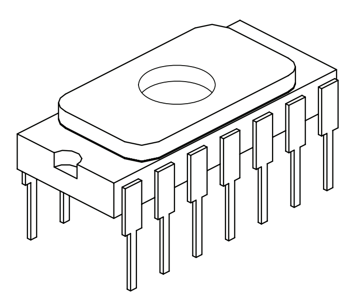
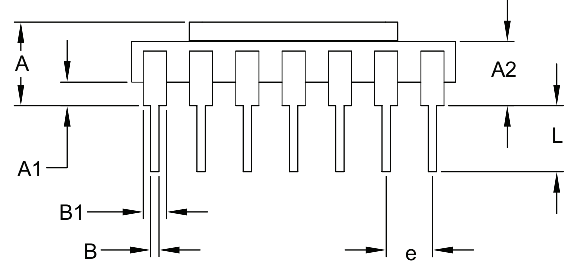
Package Outlines and Dimensions

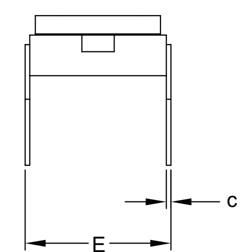
14-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging









Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	.100 BSC		
Top to Seating Plane	A	.085	–	.200
Top of Body to Seating Plane	A2	.100	–	.140
Standoff	A1	.025	–	.070
Package Width	E1	.280	–	.310
Overall Length	D	.693	–	.770
Tip to Seating Plane	L	.125	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	B1	.045	–	.065
Lower Lead Width	B	.015	–	.022
Overall Row Spacing §	E	.300	–	.325
Window Diameter	W	.161	–	.171
Lid Length	T	.440	–	.460
Lid Width	U	.260	–	.280

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

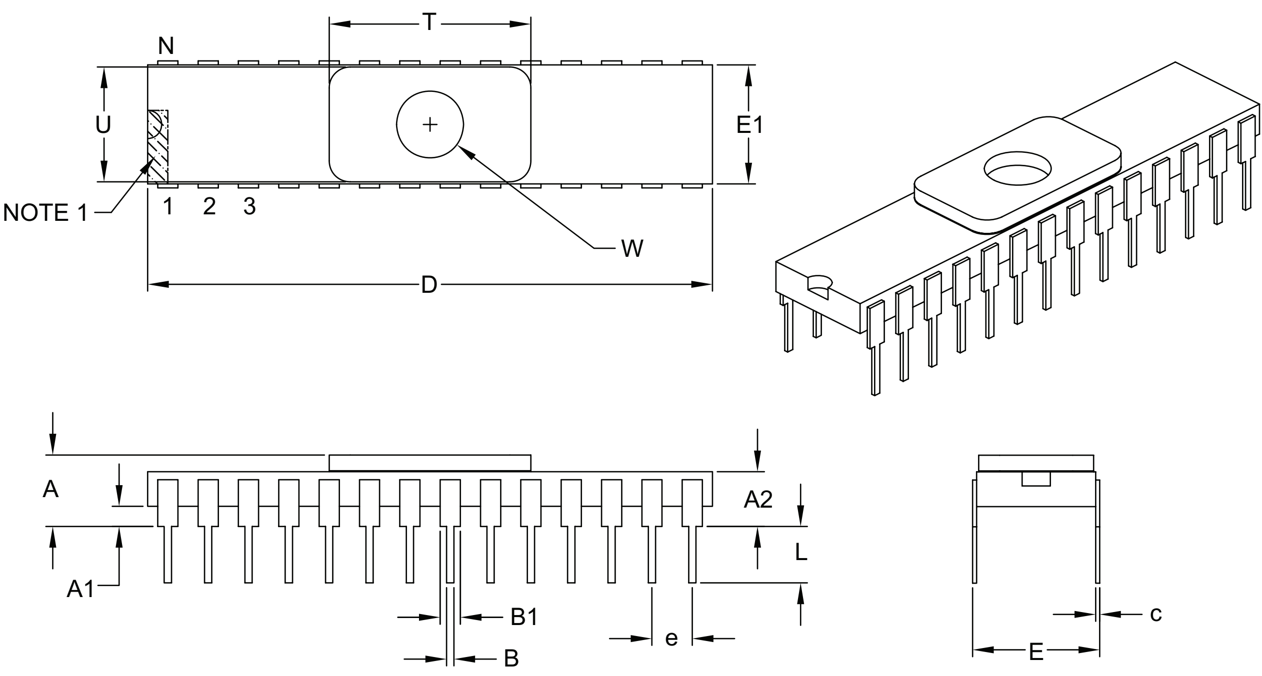
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-107B

Package Outlines and Dimensions

28-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	.085	–	.200
Top of Body to Seating Plane	A2	.115	–	.155
Standoff	A1	.025	–	.070
Package Width	E1	.280	–	.310
Overall Length	D	1.380	–	1.420
Tip to Seating Plane	L	.125	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	B1	.045	–	.065
Lower Lead Width	B	.015	–	.022
Overall Row Spacing §	E	.300	–	.325
Window Diameter	W	.161	–	.171
Lid Length	T	.490	–	.510
Lid Width	U	.275	–	.295

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-084B

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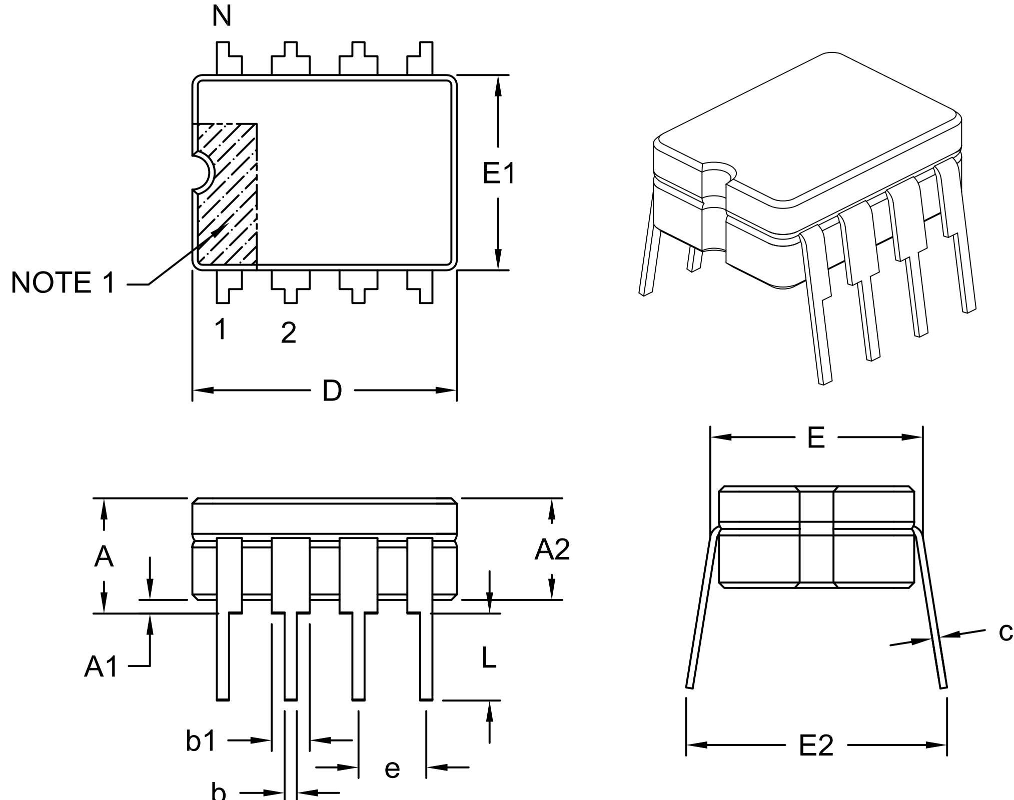
CERDIP

8-Lead Ceramic Dual In-Line (JA) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.320
Ceramic Pkg. Width	E1	.230	.248	.300
Overall Length	D	.370	.380	.400
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.314	-	.410

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-001C

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8-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.320
Ceramic Pkg. Width	E1	.230	.248	.300
Overall Length	D	.370	.380	.400
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.314	-	.410
Window Diameter	W	.267	.270	.273

Notes:

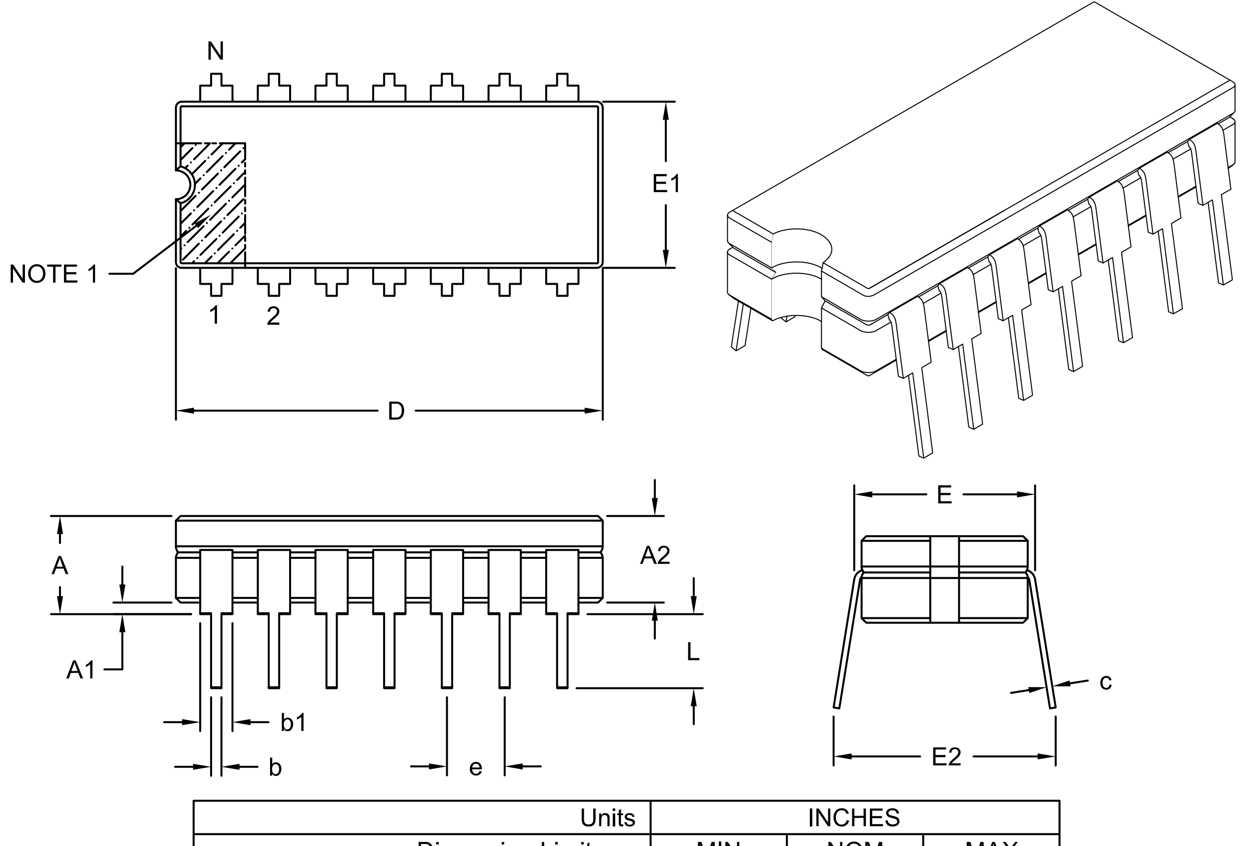
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-027C

14-Lead Ceramic Dual In-Line (JD) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder-to-Shoulder Width	E	.290	-	.325
Ceramic Pkg. Width	E1	.230	.288	.300
Overall Length	D	.740	.760	.780
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.320	-	.410

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-002C

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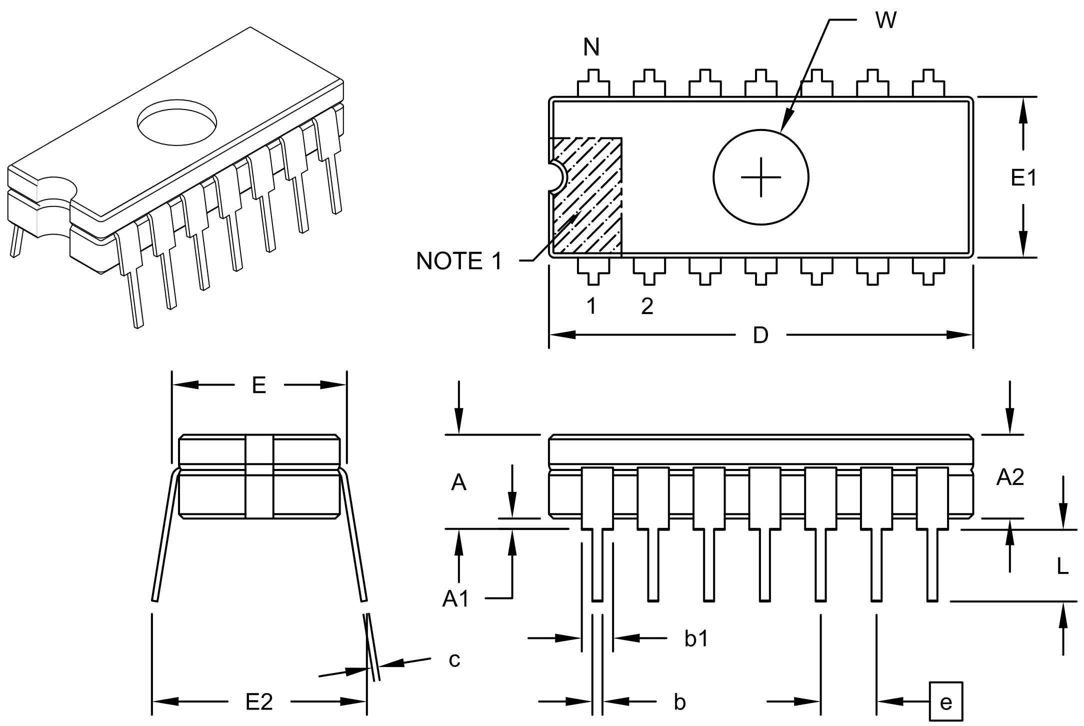
Package Outlines and Dimensions

14-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.325
Ceramic Pkg. Width	E1	.230	.288	.300
Overall Length	D	.740	.760	.780
Window Diameter	W	.125	.170	.210
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.320	-	.410

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-099C

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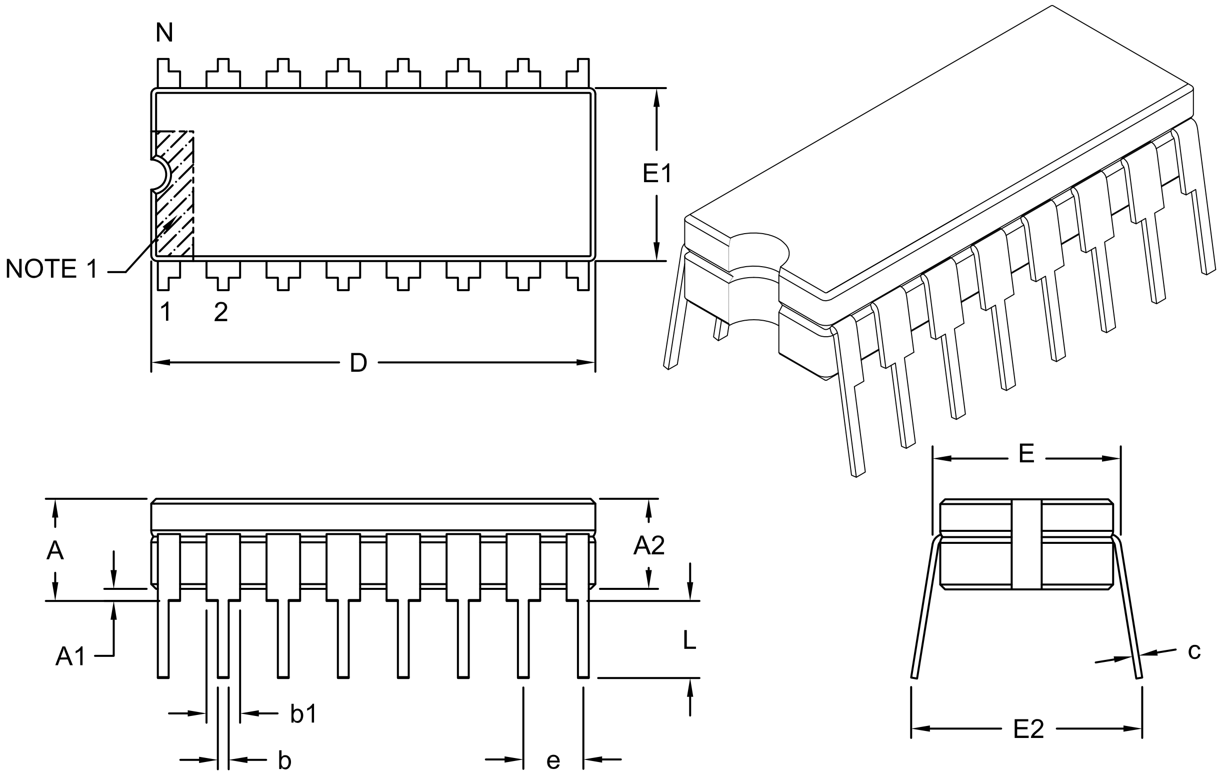
16-Lead Ceramic Dual In-Line (JE) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.325
Ceramic Pkg. Width	E1	.245	.288	.300
Overall Length	D	.740	.760	.780
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.320	-	.410

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-003C

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18-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	18		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.308	-	.325
Ceramic Pkg. Width	E1	.280	.288	.296
Overall Length	D	.882	.890	.910
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.014
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.325	-	.410
Window Width	W1	.130	.140	.150
Window Length	W2	.190	.200	.210

Notes:

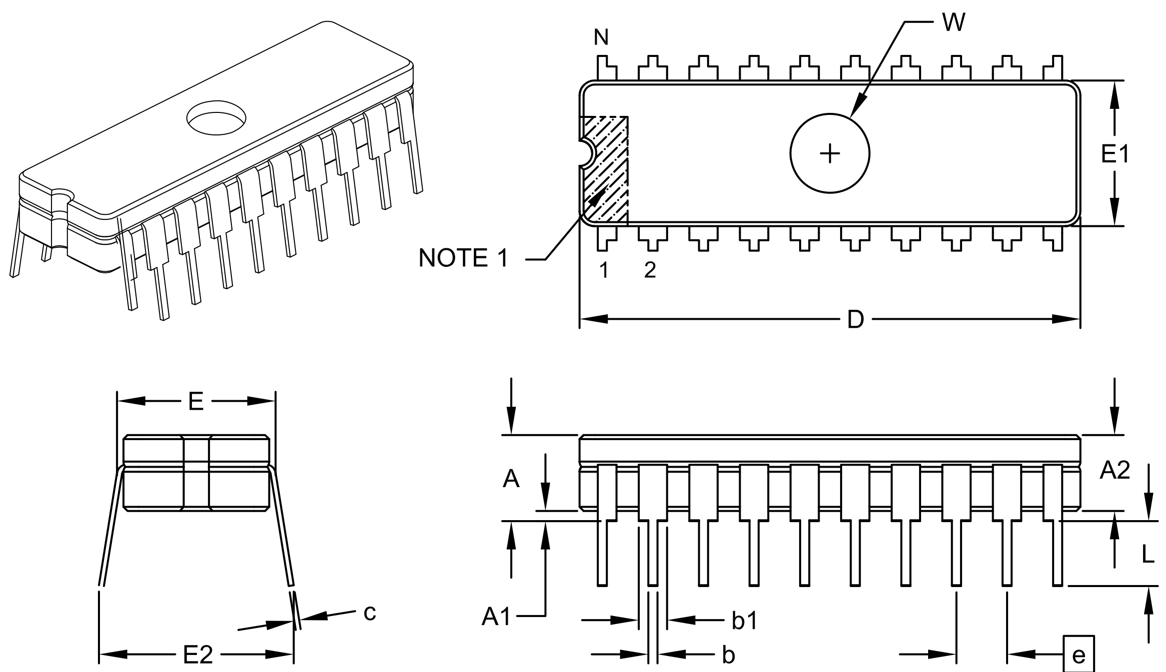
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-010C

20-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.308	-	.325
Ceramic Package Width	E1	.280	.288	.296
Overall Length	D	.942	.950	.970
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.014
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.325	-	.410
Window Diameter	W	.167	.170	.173

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-115C

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Package Outlines and Dimensions

24-Lead Ceramic Dual In-Line (JG) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Pkg. Width	E1	.510	.520	.540
Overall Length	D	1.240	1.250	1.270
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-004C

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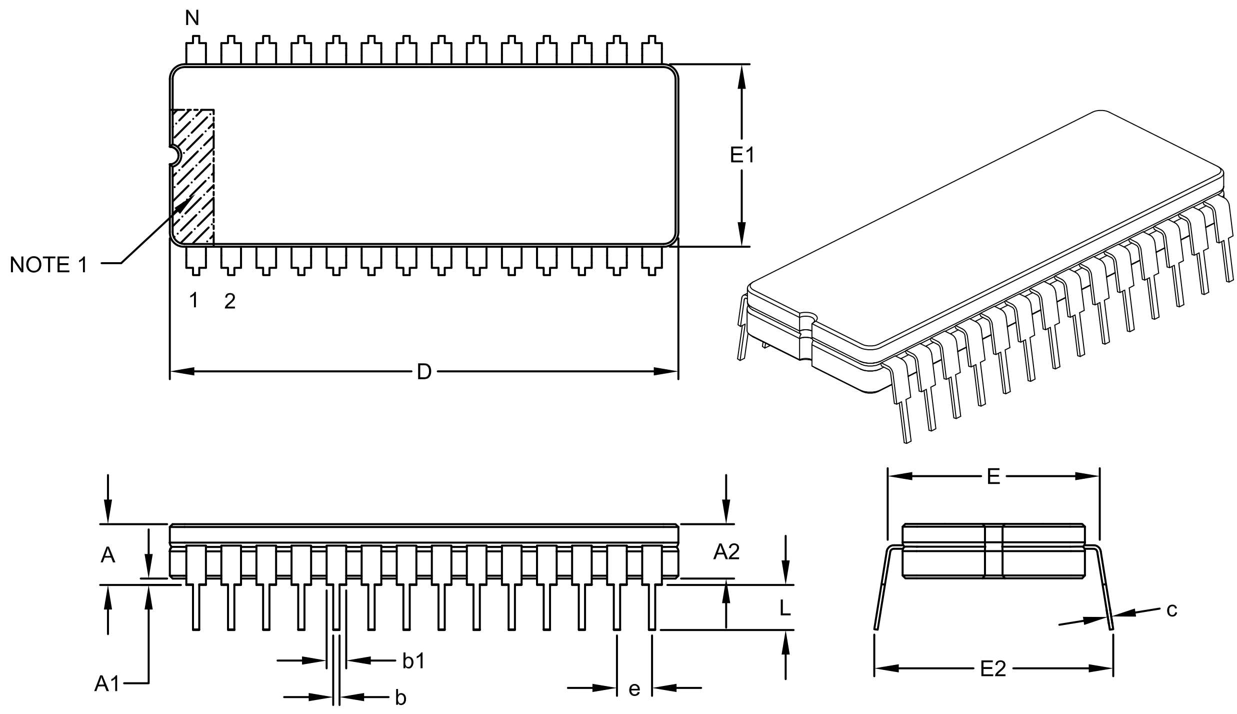
28-Lead Ceramic Dual In-Line (JN) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Pkg. Width	E1	.510	.520	.540
Overall Length	D	1.440	1.450	1.470
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

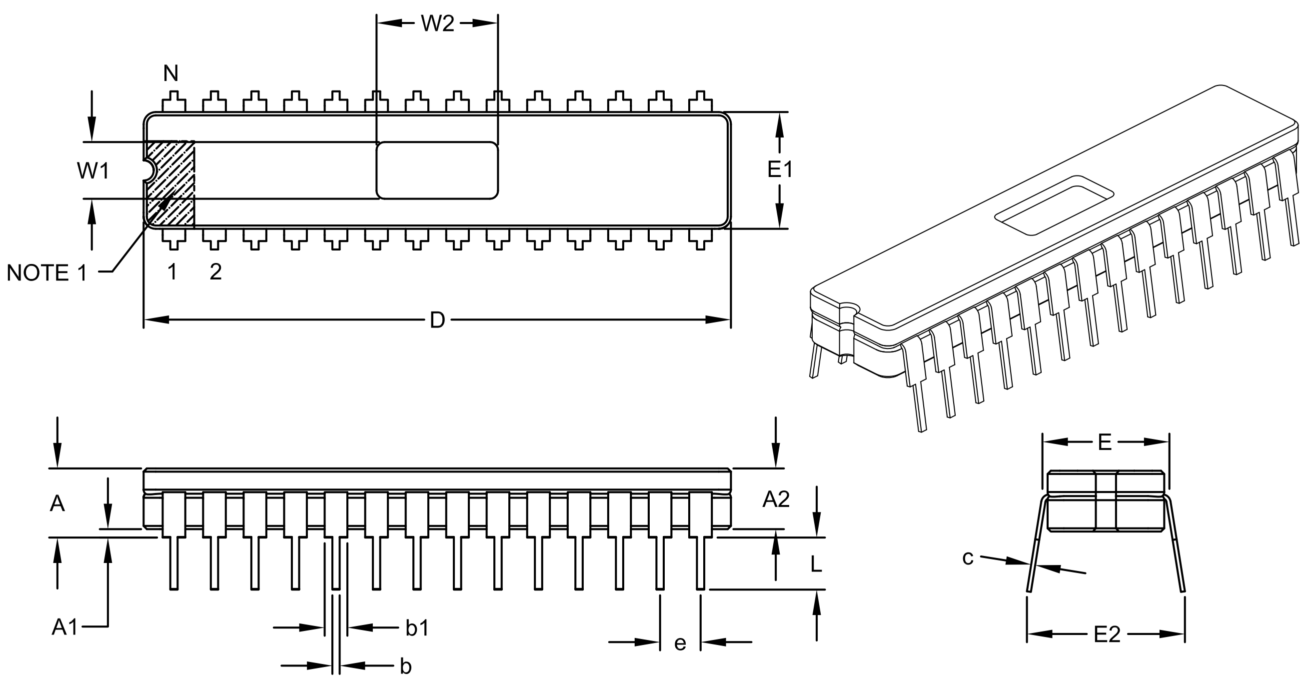
Microchip Technology Drawing No. C04-006C

© 2016 Microchip Technology Inc.

Package Outlines and Dimensions

28-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.200
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.308	-	.325
Ceramic Package Width	E1	.280	.288	.296
Overall Length	D	1.442	1.450	1.470
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.014
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.325	-	.410
Window Width	W1	.130	.140	.150
Window Length	W2	.290	.300	.310

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-080C

28-Lead Ceramic Dual In-Line with Window (JW) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Package Width	E1	.510	.520	.540
Overall Length	D	1.440	1.450	1.470
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710
Window Diameter	W	.270	.280	.290

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-013C

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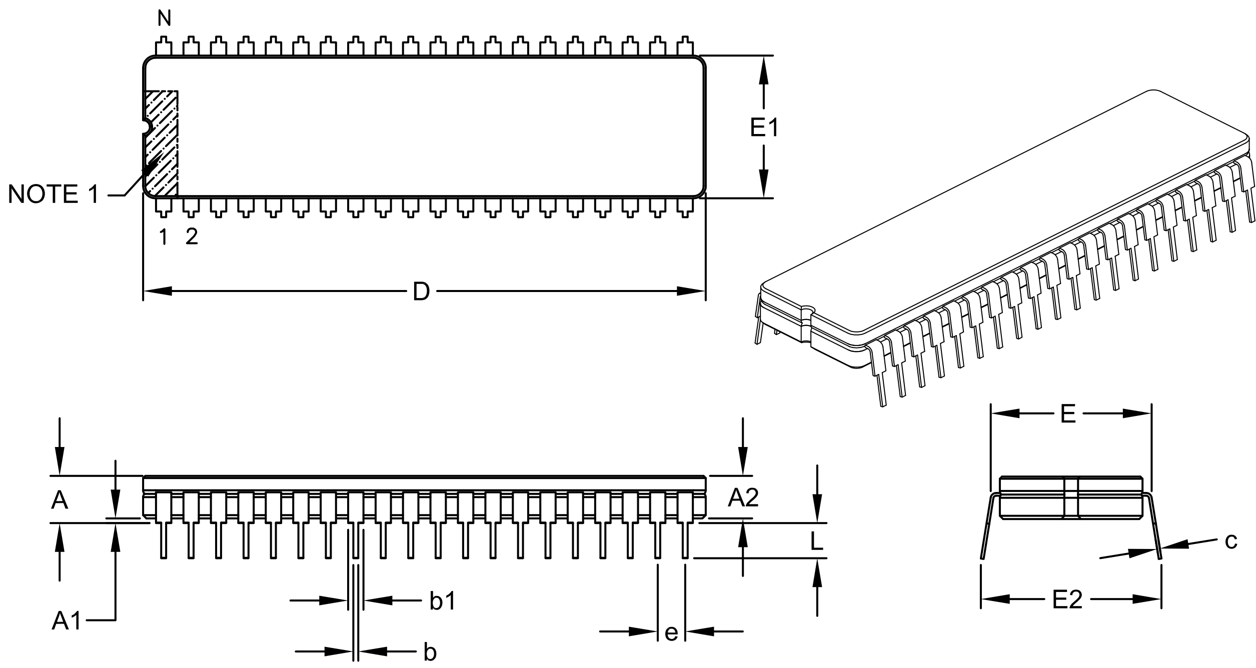
Package Outlines and Dimensions

40-Lead Ceramic Dual In-Line (JK) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	40		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Package Width	E1	.510	.520	.540
Overall Length	D	2.030	2.050	2.070
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-008C

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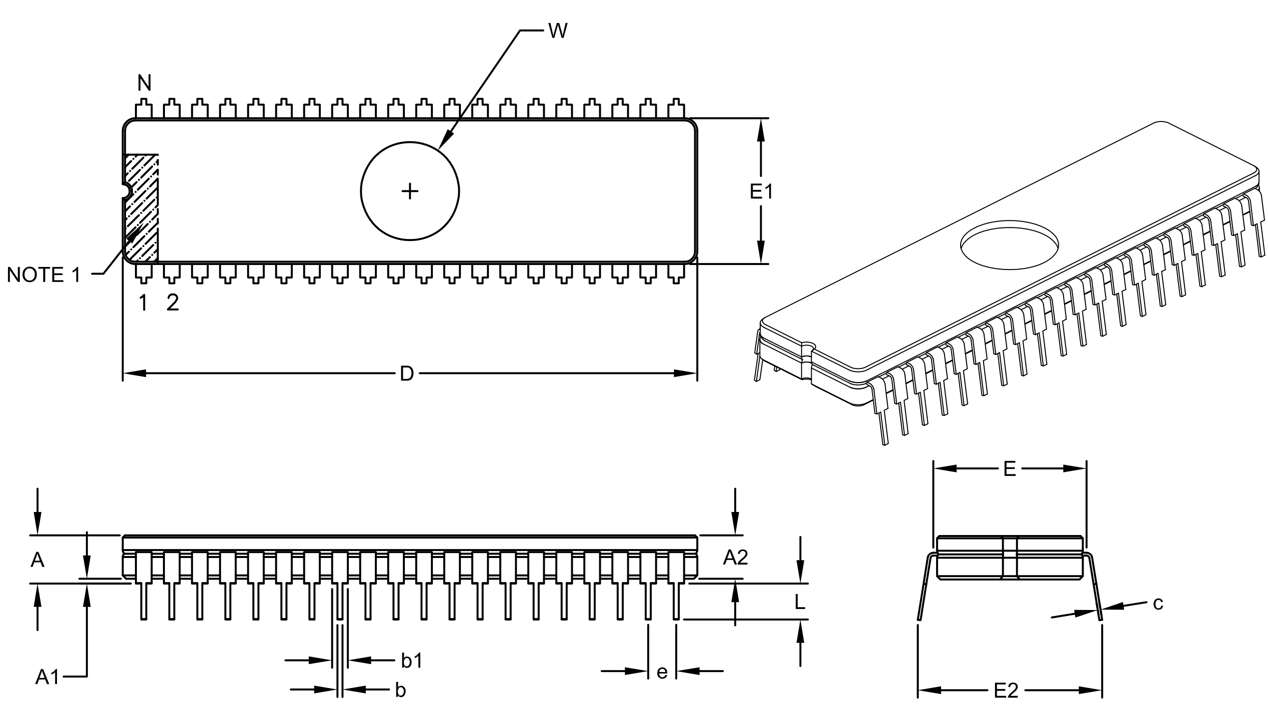
40-Lead Ceramic Dual In-Line with Window (JW) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		40	
Pitch	e		.100 BSC	
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Package Width	E1	.510	.520	.583
Overall Length	D	2.030	2.050	2.070
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710
Window Diameter	W	.340	.350	.360

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-014C

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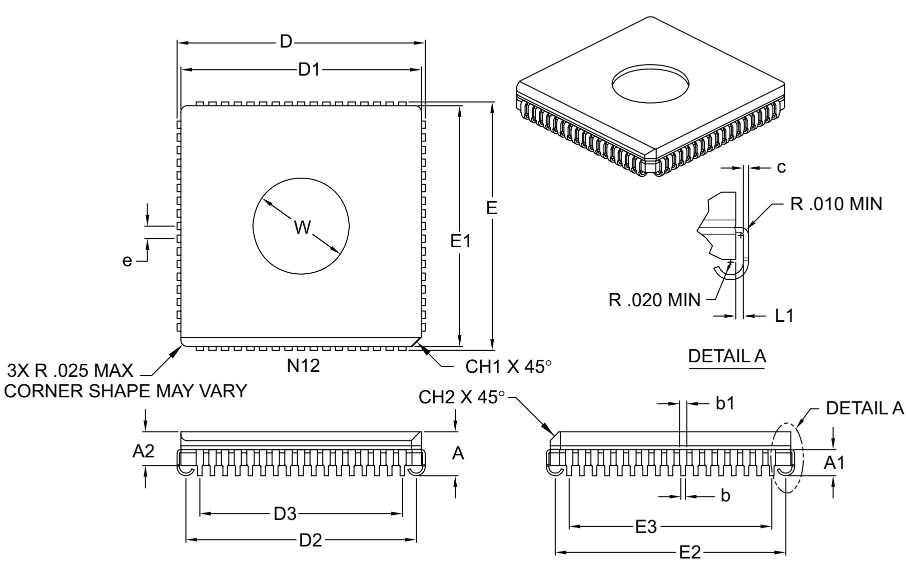
CERQUAD

68-Lead Ceramic Leaded (CL) Chip Carrier with Window – Square [CERQUAD]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		68	
Pitch	e		.050 BSC	
Overall Height	A	.155	.172	.190
Package Thickness	A2		.132 REF	
Lead Height	A1	0.90	.100	.120
Side Chamfer	CH2		.035 REF	
Corner Chamfer	CH1		.040 REF	
Overall Package Width	E	.985	.990	.995
Overall Package Length	D	.985	.990	.995
Ceramic Package Width	E1	.930	.950	.965
Ceramic Package Length	D1	.930	.950	.965
Overall Lead Centers	E3		.800 REF	
Overall Lead Centers	D3		.800 REF	
Footprint Width	E2	.880	.910	.940
Footprint Length	D2	.880	.910	.940
Lead Length	L1	.006	–	–
Lead Thickness	c	.006	.007	.010
Upper Lead Width	b1	.026	.029	.032
Lower Lead Width	b	.017	.019	.021
Window Diameter	W	.370	.380	.390

Notes:

1. Dimensions D1 and E1 do not include glass protrusion. These protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-097B

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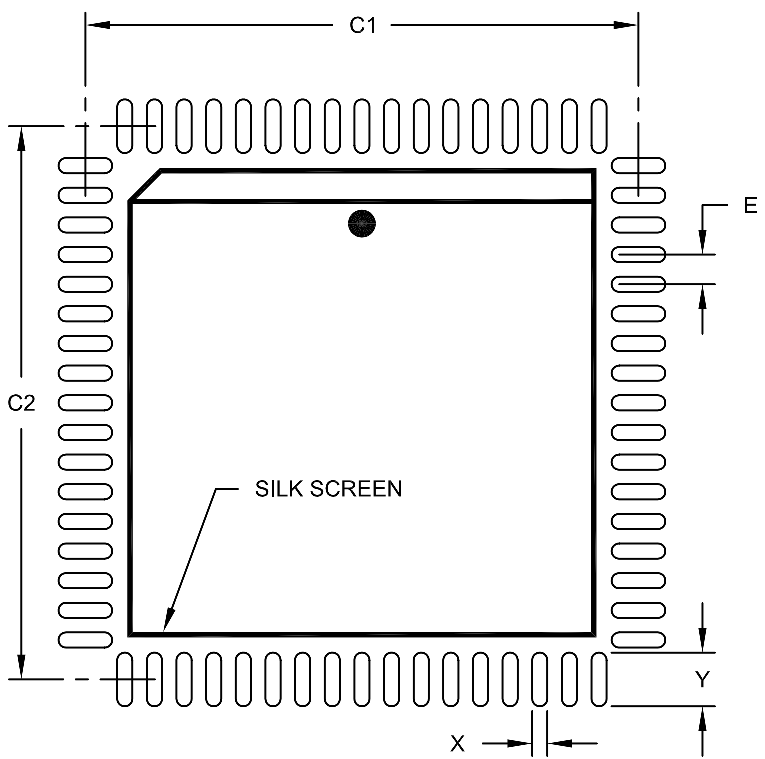
68-Lead Ceramic Leaded (CL) Chip Carrier with Window - Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	.050 BSC		
Contact Pad Spacing	C1		.933	
Contact Pad Spacing	C2		.933	
Contact Pad Width (X68)	X1			.026
Contact Pad Length (X68)	Y1			.091

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2097A

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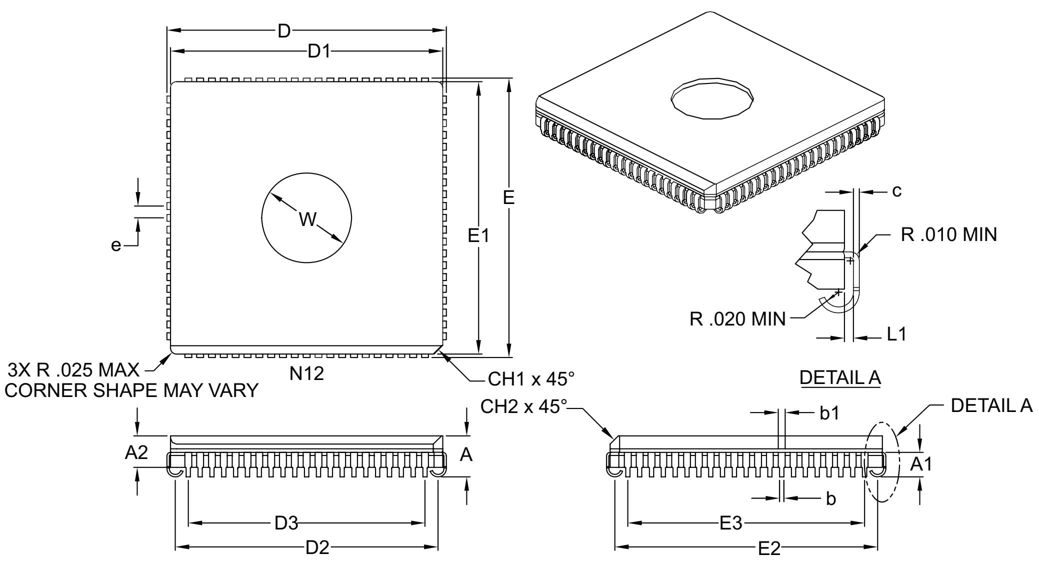
84-Lead Ceramic Leaded (CL) Chip Carrier with Window – Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		84	
Pitch	e		.050 BSC	
Overall Height	A	.155	.172	.190
Package Thickness	A2		.132 REF	
Lead Height	A1	0.90	.100	.120
Side Chamfer	CH2		.035 REF	
Corner Chamfer	CH1		.040 REF	
Overall Package Width	E	1.185	1.190	1.195
Overall Package Length	D	1.185	1.190	1.195
Ceramic Package Width	E1	1.130	1.150	1.165
Ceramic Package Length	D1	1.130	1.150	1.165
Overall Lead Centers	E3		1.00 REF	
Overall Lead Centers	D3		1.00 REF	
Footprint Width	E2	1.080	1.110	1.140
Footprint Length	D2	1.080	1.110	1.140
Lead Length	L1	.006	–	–
Lead Thickness	c	.006	.007	.010
Lower Lead Width	b	.017	.019	.021
Upper Lead Width	b1	.026	.029	.032
Window Diameter	W	.395	.400	.405

Notes:

1. Dimensions D1 and E1 do not include glass protrusion. These protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-112B

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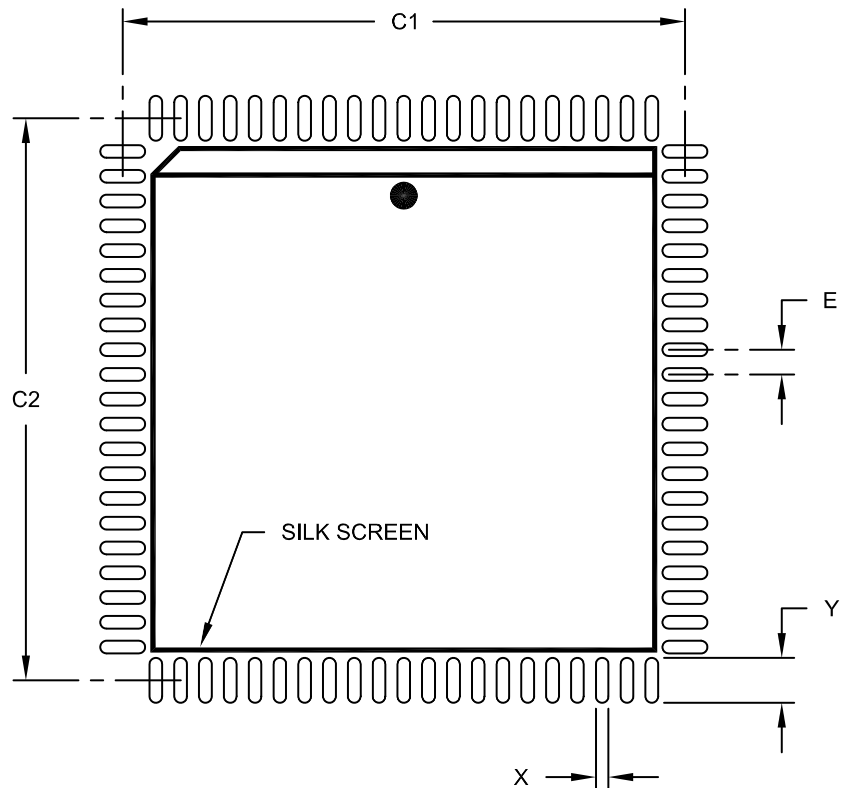
84-Lead Ceramic Leaded (CL) Chip Carrier with Window - Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.050	
Contact Pad Spacing	C1		1.134	
Contact Pad Spacing	C2		1.134	
Contact Pad Width (X84)	X			.026
Contact Pad Length (X84)	Y			.091

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2112A

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NOTES:

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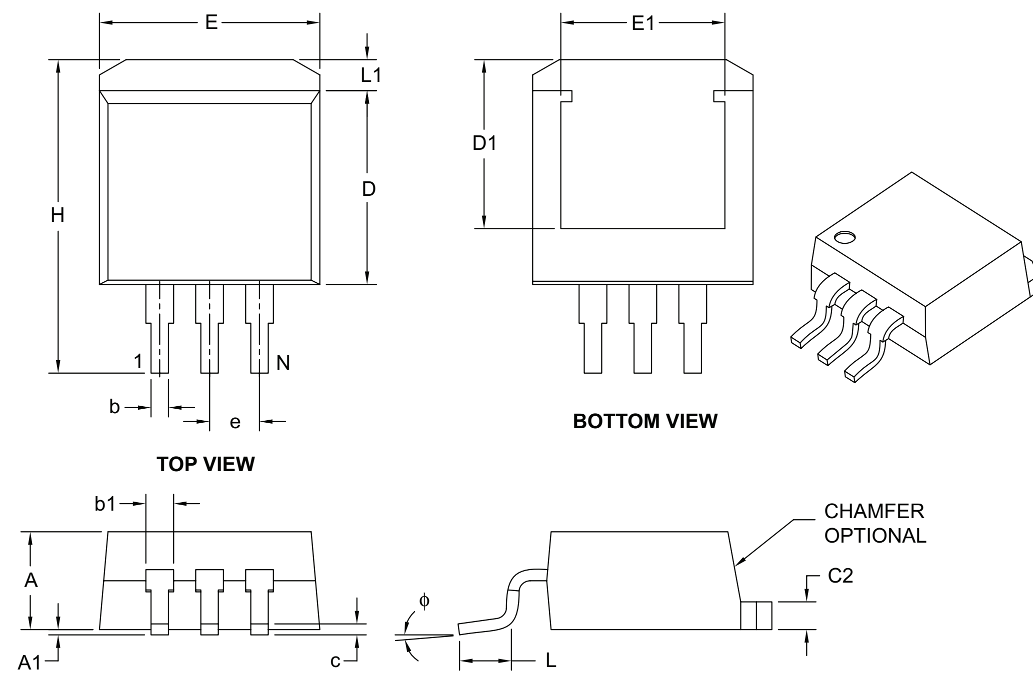
DDPAK

3-Lead Plastic (EB) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	3		
Pitch	e	.100 BSC		
Overall Height	A	.160	–	.190
Standoff §	A1	.000	–	.010
Overall Width	E	.380	–	.420
Exposed Pad Width	E1	.245	–	–
Molded Package Length	D	.330	–	.380
Overall Length	H	.549	–	.625
Exposed Pad Length	D1	.270	–	–
Lead Thickness	c	.014	–	.029
Pad Thickness	C2	.045	–	.065
Lower Lead Width	b	.020	–	.039
Upper Lead Width	b1	.045	–	.070
Foot Length	L	.068	–	.110
Pad Length	L1	–	–	.067
Foot Angle	φ	0°	–	8°

Notes:

1. § Significant Characteristic.
2. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-011B

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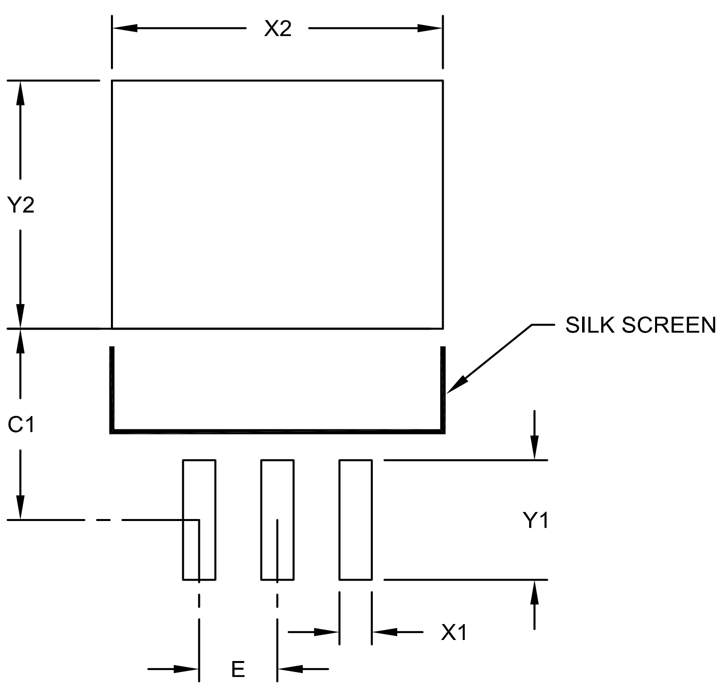
3-Lead Plastic (EB) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	.100 BSC		
Pad Width	X2			.423
Pad Length	Y2			.327
Contact Pad Spacing	C1		.252	
Contact Pad Width (X3)	X1			.041
Contact Pad Length (X3)	Y1			.157

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2011A

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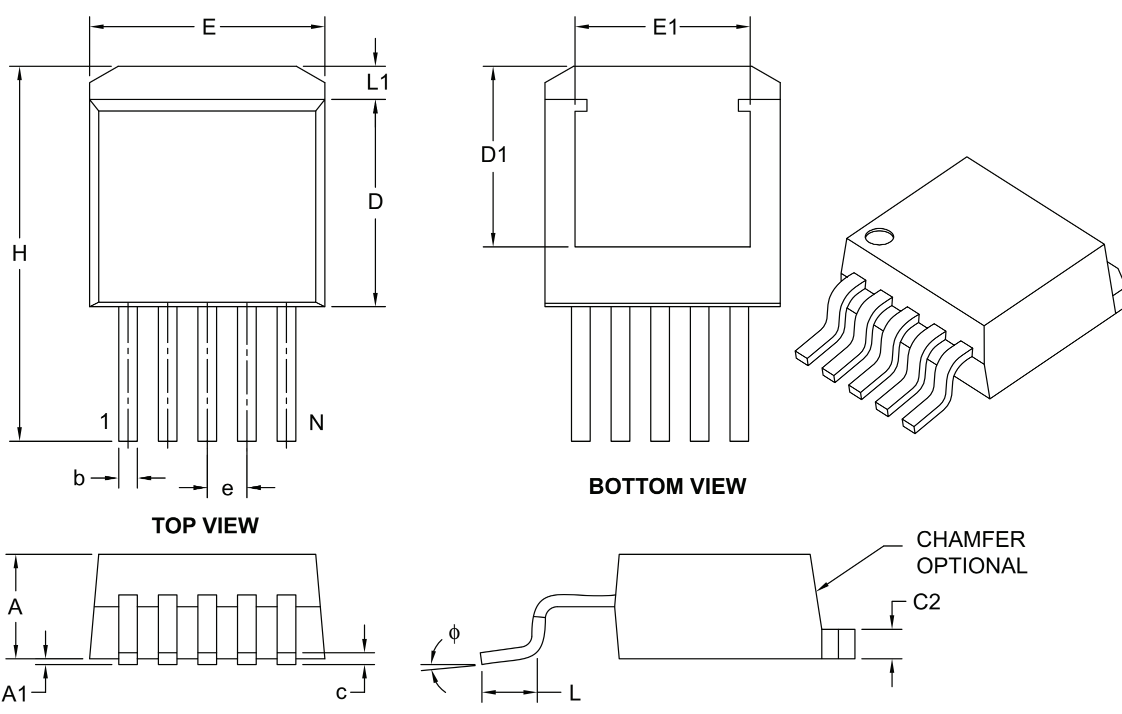
5-Lead Plastic (ET) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	5		
Pitch	e	.067 BSC		
Overall Height	A	.160	–	.190
Standoff §	A1	.000	–	.010
Overall Width	E	.380	–	.420
Exposed Pad Width	E1	.245	–	–
Molded Package Length	D	.330	–	.380
Overall Length	H	.549	–	.625
Exposed Pad Length	D1	.270	–	–
Lead Thickness	c	.014	–	.029
Pad Thickness	C2	.045	–	.065
Lead Width	b	.020	–	.039
Foot Length	L	.068	–	.110
Pad Length	L1	–	–	.067
Foot Angle	φ	0°	–	8°

Notes:

1. § Significant Characteristic.
2. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-012B

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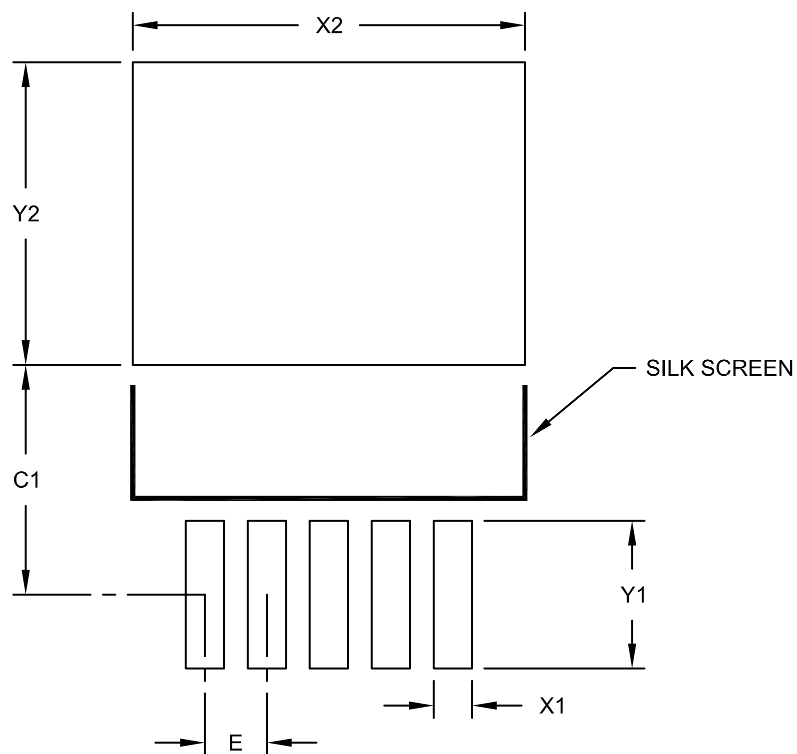
5-Lead Plastic (ET) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.067 BSC	
Optional Center Pad Width	X2			.423
Optional Center Pad Length	Y2			.327
Contact Pad Spacing	C1		.248	
Contact Pad Width (X5)	X1			.041
Contact Pad Length (X5)	Y1			.159

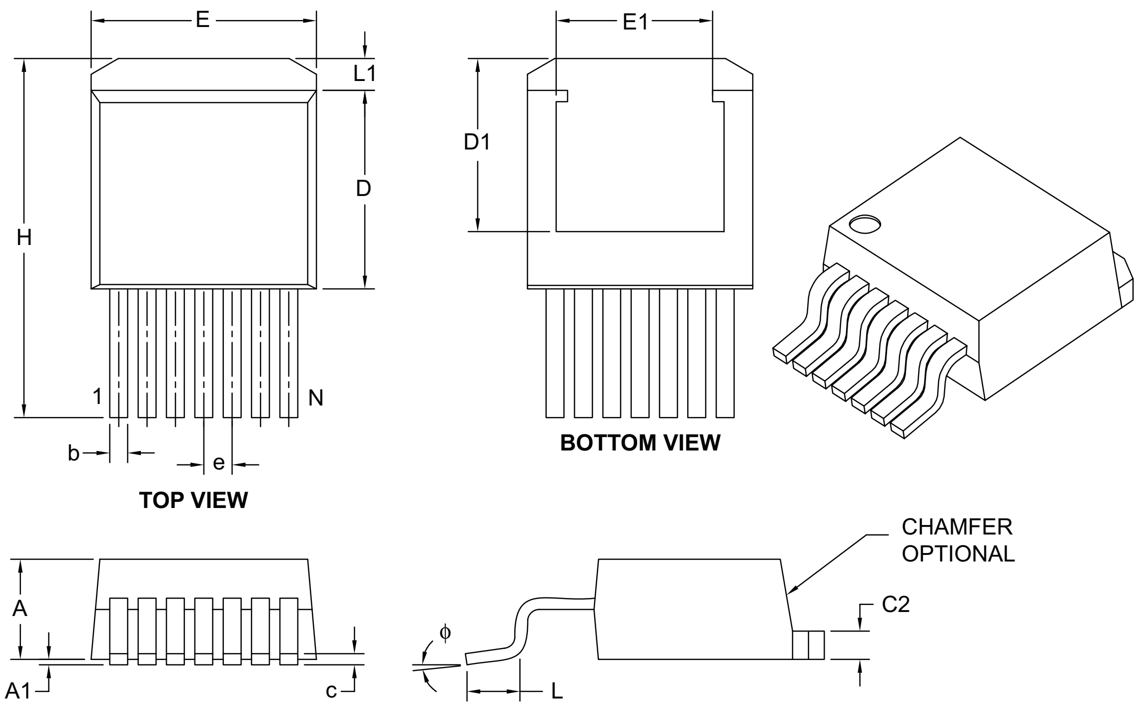
Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2012A

7-Lead Plastic (EK) [DDPAK]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	7		
Pitch	e	.050 BSC		
Overall Height	A	.160	–	.190
Standoff §	A1	.000	–	.010
Overall Width	E	.380	–	.420
Exposed Pad Width	E1	.245	–	–
Molded Package Length	D	.330	–	.380
Overall Length	H	.549	–	.625
Exposed Pad Length	D1	.270	–	–
Lead Thickness	c	.014	–	.029
Pad Thickness	C2	.045	–	.065
Lead Width	b	.020	–	.037
Foot Length	L	.068	–	.110
Pad Length	L1	–	–	.067
Foot Angle	ϕ	0°	–	8°

Notes:

1. § Significant Characteristic.
2. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-015B

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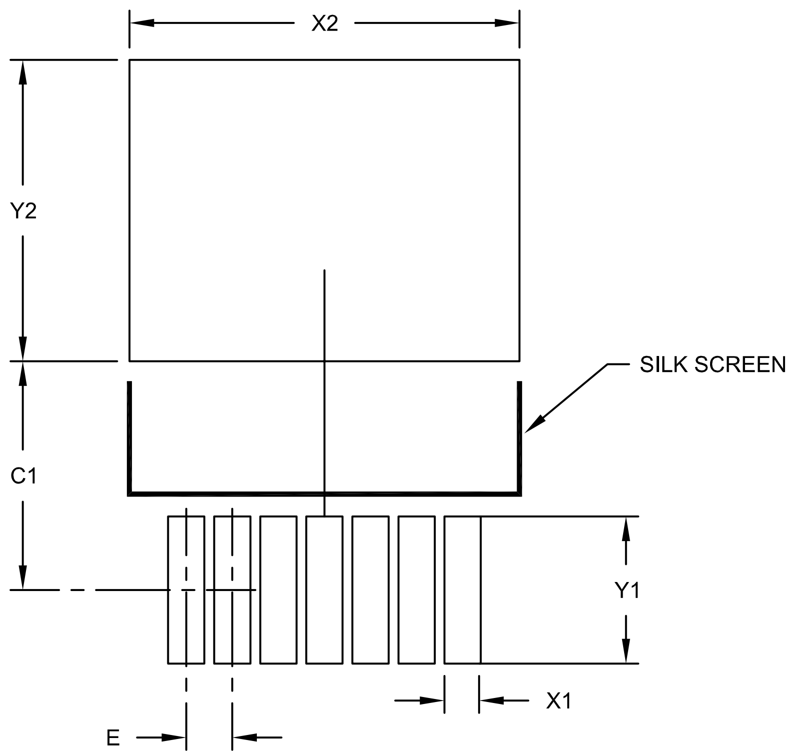
Footprint Outlines and Dimensions

7-Lead Plastic (EK) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	.050 BSC		
Optional Center Pad Width	X2			.423
Optional Center Pad Length	Y2			.327
Contact Pad Spacing	C1		.248	
Contact Pad Width (X7)	X1			.039
Contact Pad Length (X7)	Y1			.159

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2015B

NOTES:

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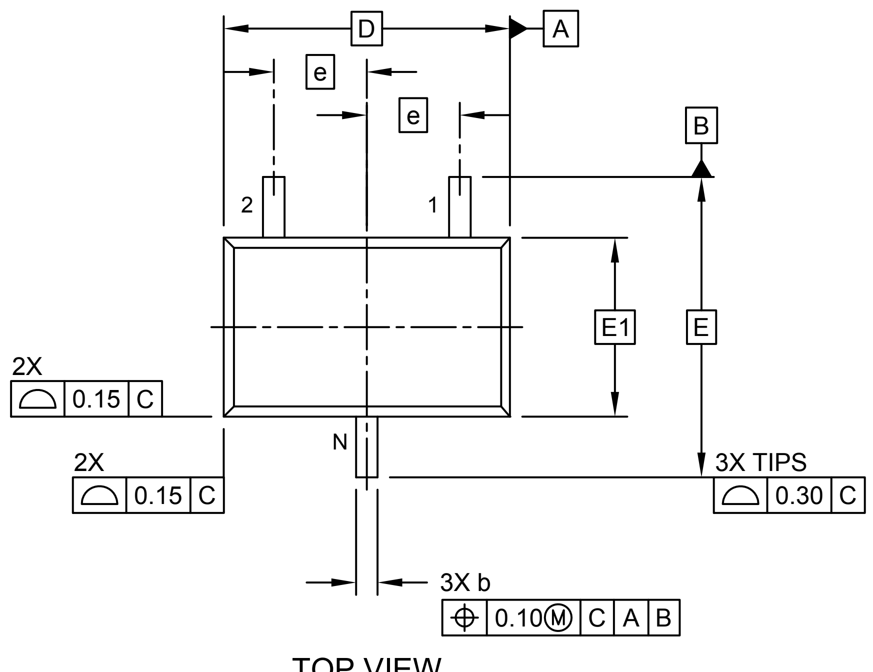
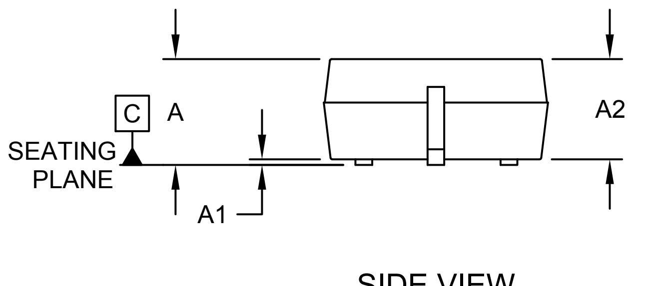
SC70

3-Lead Plastic Small Outline Transistor (LB) [SC70]

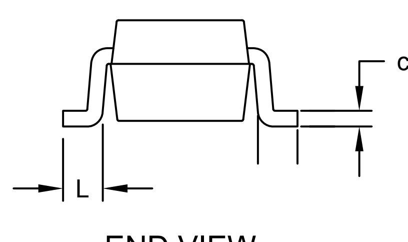
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW



END VIEW

Microchip Technology Drawing C04-060C Sheet 1 of 2

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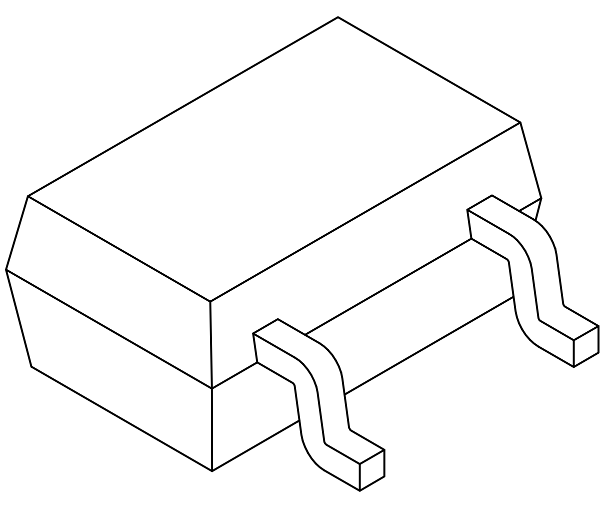
3-Lead Plastic Small Outline Transistor (LB) [SC70]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		3	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	-	1.10
Standoff	A1	0.00	-	0.10
Molded Package Thickness	A2	0.80	-	1.00
Overall Length	D		2.00 BSC	
Exposed Pad Length	D2	2.50	2.60	2.70
Overall Width	E		2.10 BSC	
Exposed Pad Width	E1		1.25 BSC	
Terminal Width	b	0.15	-	0.40
Terminal Length	L	0.10	0.20	0.46
Lead Thickness	c	0.20	-	0.26

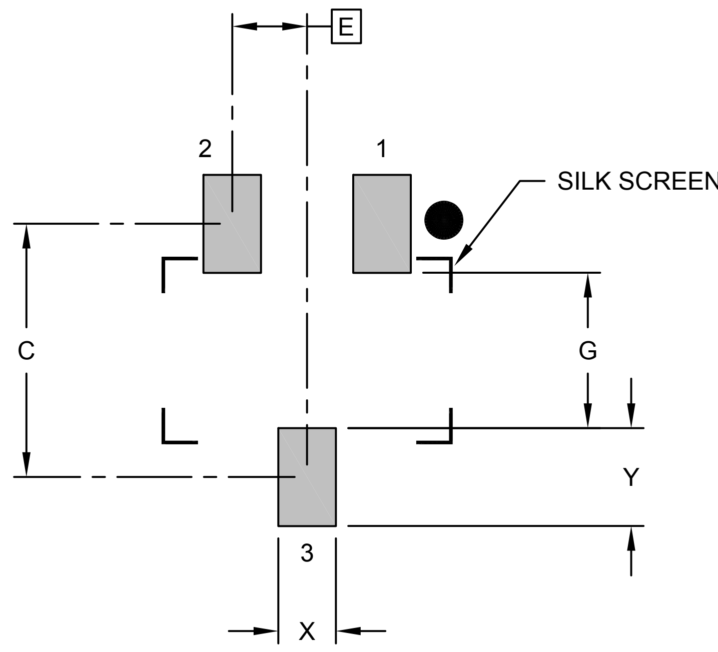
Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-060C Sheet 2 of 2

3-Lead Plastic Small Outline Transistor (LB) [SC70]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		2.20	
Contact Pad Width	X			0.50
Contact Pad Length	Y			0.85
Distance Between Pads	G	1.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2060B

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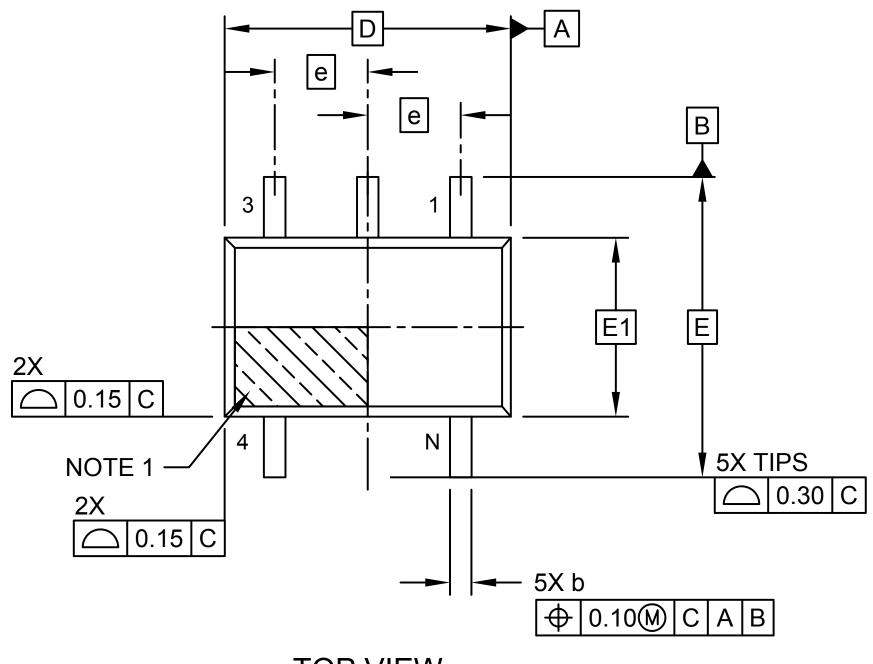
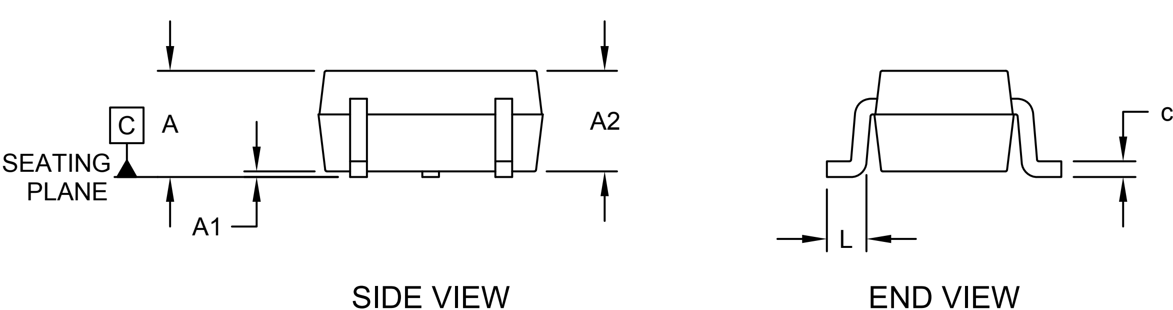
5-Lead Plastic Small Outline Transistor (LT) [SC70]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

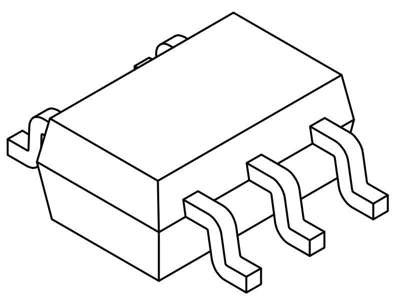




Microchip Technology Drawing C04-061D Sheet 1 of 2

5-Lead Plastic Small Outline Transistor (LT) [SC70]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		5	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	-	1.10
Standoff	A1	0.00	-	0.10
Molded Package Thickness	A2	0.80	-	1.00
Overall Length	D		2.00 BSC	
Exposed Pad Length	D2	2.50	2.60	2.70
Overall Width	E		2.10 BSC	
Exposed Pad Width	E1		1.25 BSC	
Terminal Width	b	0.15	-	0.40
Terminal Length	L	0.10	0.20	0.46
Lead Thickness	c	0.08	-	0.26

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-061D Sheet 2 of 2

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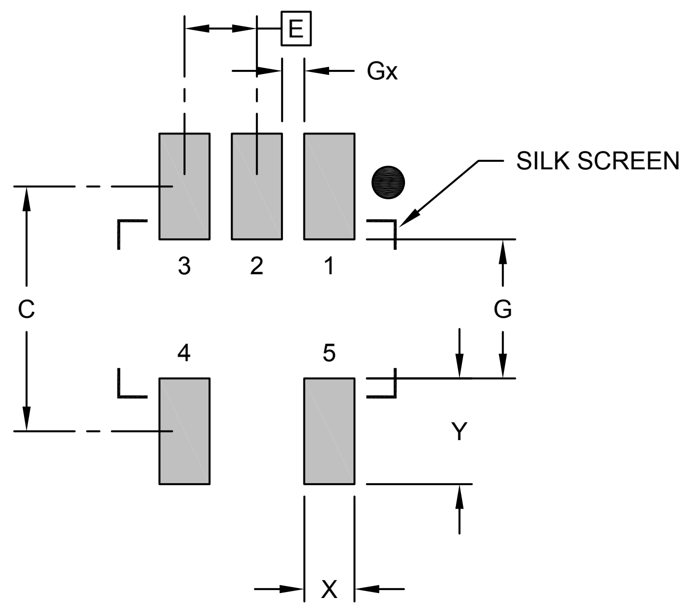
5-Lead Plastic Small Outline Transistor (LT) [SC70]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		2.20	
Contact Pad Width	X			0.45
Contact Pad Length	Y			0.95
Distance Between Pads	G	1.25		
Distance Between Pads	Gx	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2061B

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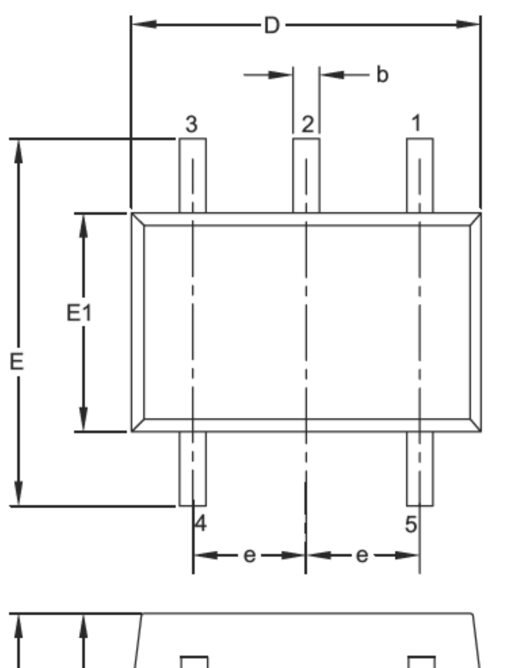
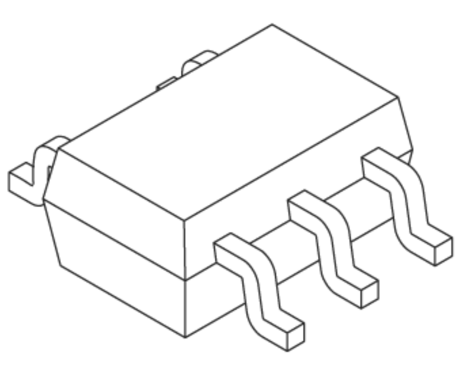
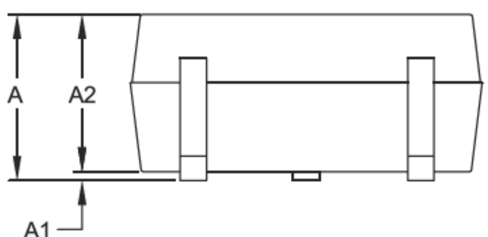
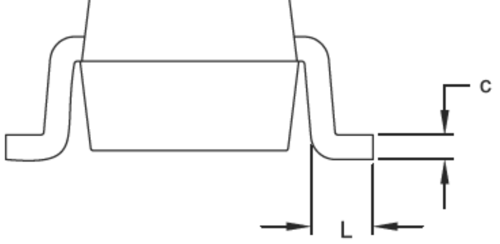
5-Lead Plastic Small Outine Transistor (LTY) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging









	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		5	
Pitch	e		0.65 BSC	
Overall Height	A	0.80		1.10
Molded Package Thickness	A2	0.80		1.00
Standoff	A1	0.00		0.10
Overall Width	E	1.80	2.10	2.40
Molded Package Width	E1	1.15	1.25	1.35
Overall Length	D	1.80	2.00	2.25
Foot Length	L	0.10	0.20	0.46
Lead Thickness	c	0.08		0.26
Lead Width	b	0.15		0.40

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04 061B

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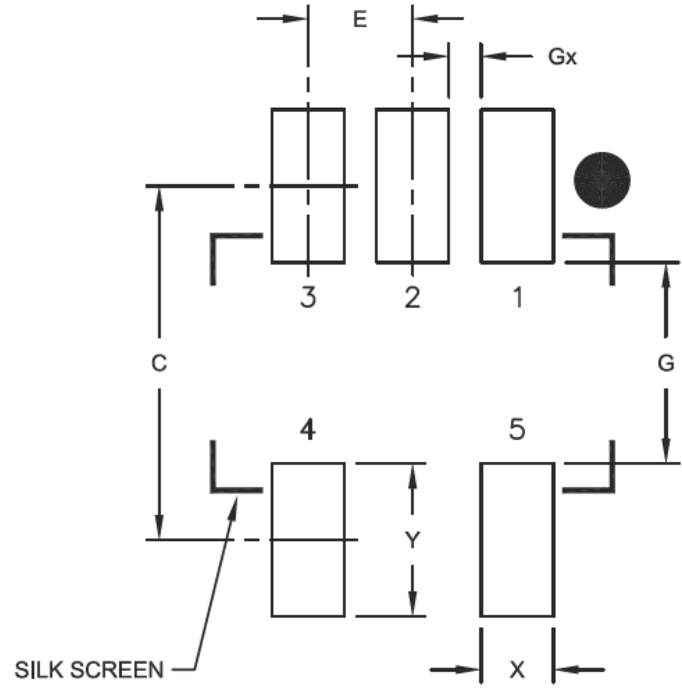
5-Lead Plastic Small Outine Transistor (LTY) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		2.20	
Contact Pad Width	X			0.45
Contact Pad Length	Y			0.95
Distance Between Pads	G	1.25		
Distance Between Pads	Gx	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2061A

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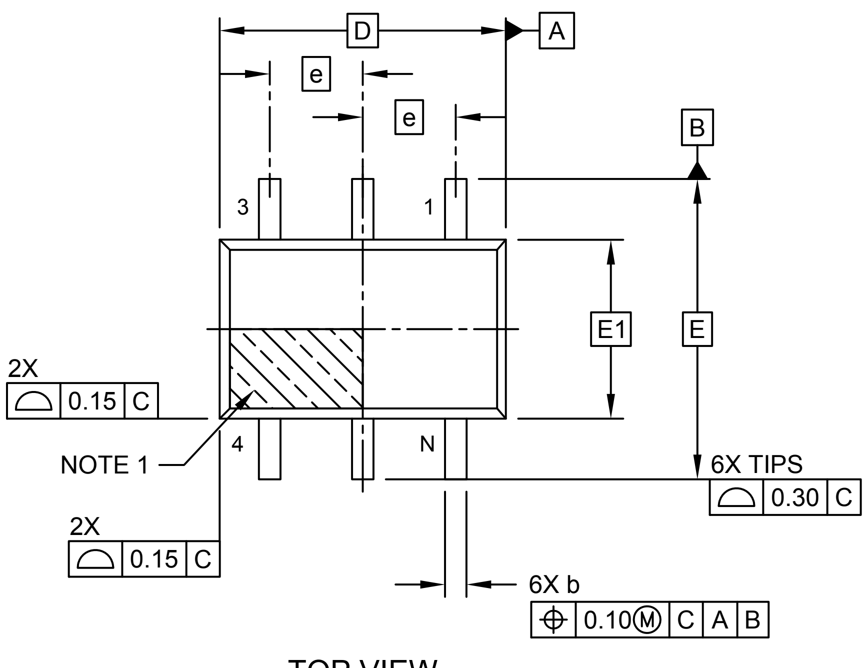
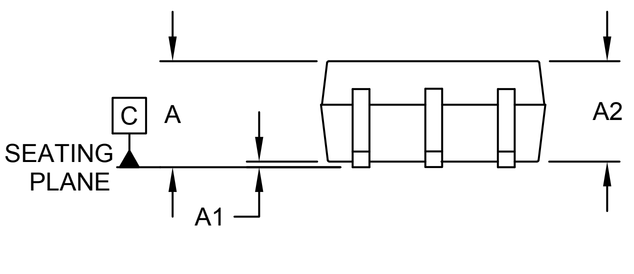
6-Lead Plastic Small Outline Transistor (LT) [SC70]

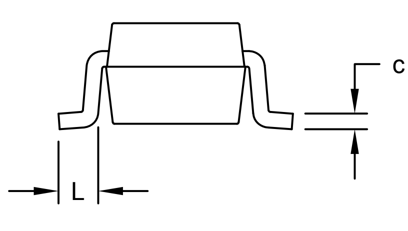
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW



END VIEW

Microchip Technology Drawing C04-151B Sheet 1 of 2

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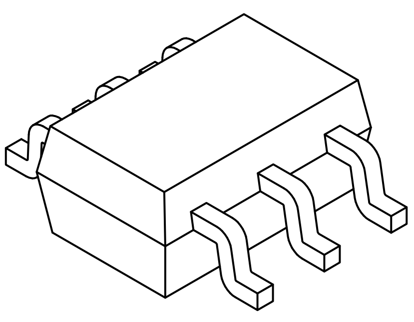
6-Lead Plastic Small Outline Transistor (LT) [SC70]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		6	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	-	1.10
Standoff	A1	0.00	-	0.10
Molded Package Thickness	A2	0.80	0.90	1.00
Overall Length	D		2.00 BSC	
Exposed Pad Length	D2	2.50	2.60	2.70
Overall Width	E		2.10 BSC	
Exposed Pad Width	E1		1.25 BSC	
Terminal Width	b	0.15	-	0.30
Terminal Length	L	0.10	0.20	0.46
Lead Thickness	c	0.08	-	0.22

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M

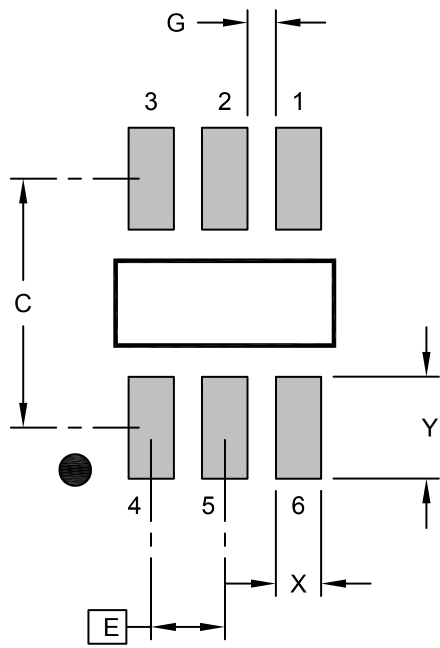
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-151B Sheet 2 of 2

6-Lead Plastic Small Outline Transistor (LT) [SC70]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		2.20	
Contact Pad Width (X6)	X			0.40
Contact Pad Length (X6)	Y			0.90
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2151B

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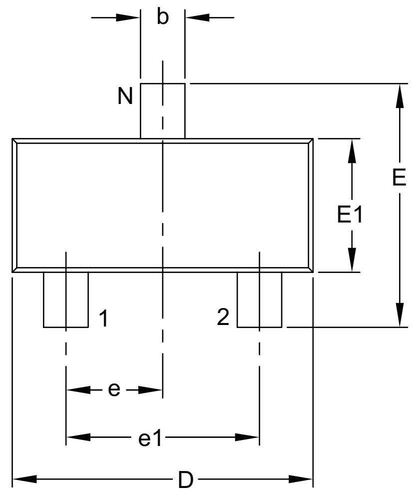
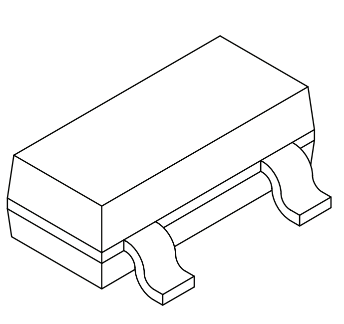
SOT-23

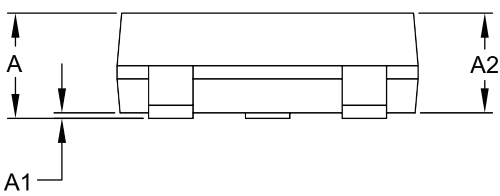
Package Outlines and Dimensions

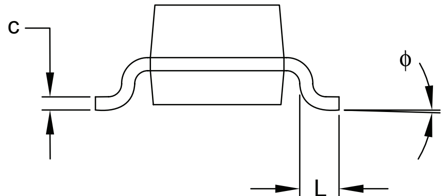
3-Lead Plastic Small Outline Transistor (NB) [SOT-23]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging









Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		3	
Lead Pitch	e		0.95 BSC	
Outside Lead Pitch	e1		1.90 BSC	
Overall Height	A	0.89	–	1.12
Molded Package Thickness	A2	0.79	0.95	1.02
Standoff	A1	0.01	–	0.10
Overall Width	E	2.10	–	2.64
Molded Package Width	E1	1.16	1.30	1.40
Overall Length	D	2.67	2.90	3.05
Foot Length	L	0.13	0.50	0.60
Foot Angle	ϕ	0°	–	10°
Lead Thickness	c	0.08	–	0.20
Lead Width	b	0.30	–	0.54

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-104B

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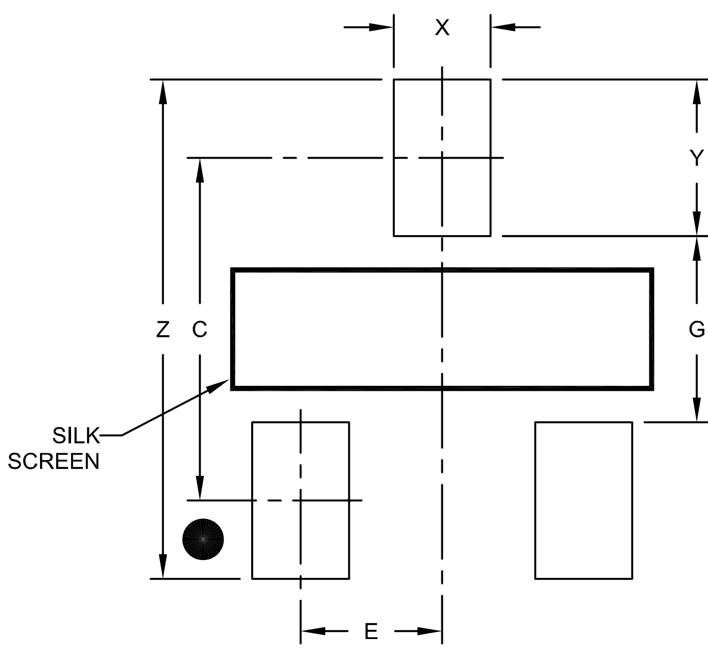
Footprint Outlines and Dimensions

3-Lead Plastic Small Outline Transistor (NB) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.30	
Contact Pad Width (X3)	X			0.65
Contact Pad Length (X3)	Y			1.05
Distance Between Pads	G	1.25		
Overall Width	Z			3.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2104A

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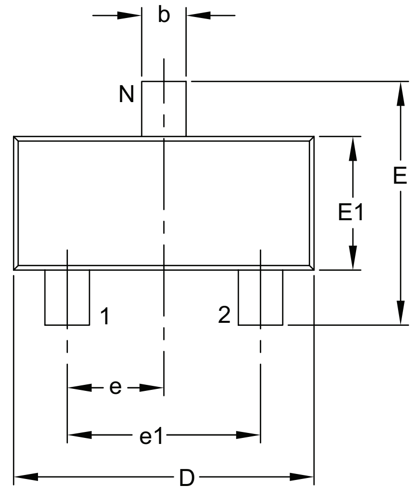
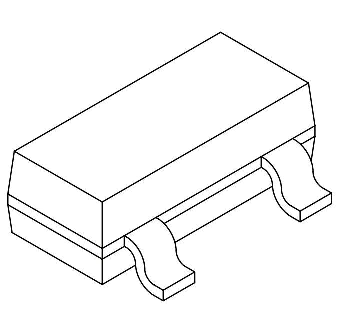
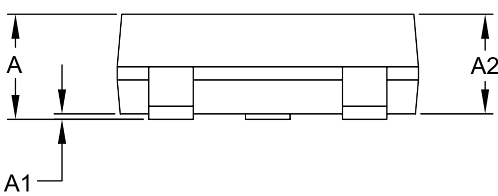
Package Outlines and Dimensions

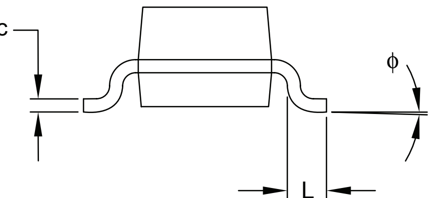
3-Lead Plastic Small Outline Transistor (TT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging









Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		3	
Lead Pitch	e		0.95 BSC	
Outside Lead Pitch	e1		1.90 BSC	
Overall Height	A	0.89	–	1.12
Molded Package Thickness	A2	0.79	0.95	1.02
Standoff	A1	0.01	–	0.10
Overall Width	E	2.10	–	2.64
Molded Package Width	E1	1.16	1.30	1.40
Overall Length	D	2.67	2.90	3.05
Foot Length	L	0.13	0.50	0.60
Foot Angle	ϕ	0°	–	10°
Lead Thickness	c	0.08	–	0.20
Lead Width	b	0.30	–	0.54

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-104B

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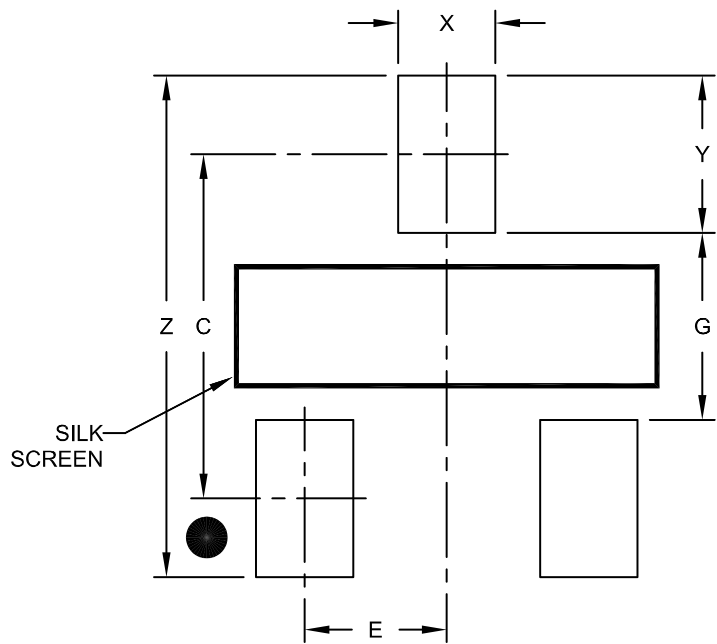
3-Lead Plastic Small Outline Transistor (TT) [SOT-23]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.95 BSC	
Contact Pad Spacing	C		2.30	
Contact Pad Width (X3)	X			0.65
Contact Pad Length (X3)	Y			1.05
Distance Between Pads	G	1.25		
Overall Width	Z			3.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2104A

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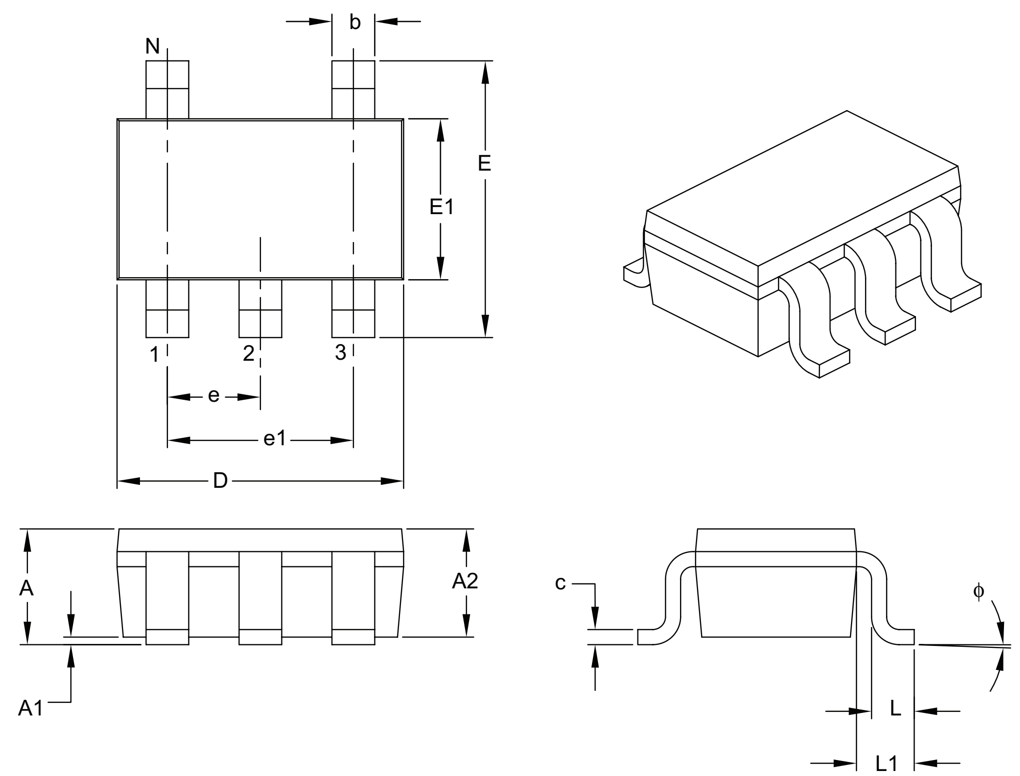
5-Lead Plastic Small Outline Transistor (CT) [SOT-23]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	5		
Lead Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.90	–	1.45
Molded Package Thickness	A2	0.89	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.20	–	3.20
Molded Package Width	E1	1.30	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.10	–	0.60
Footprint	L1	0.35	–	0.80
Foot Angle	ϕ	0°	–	30°
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.20	–	0.51

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-091B

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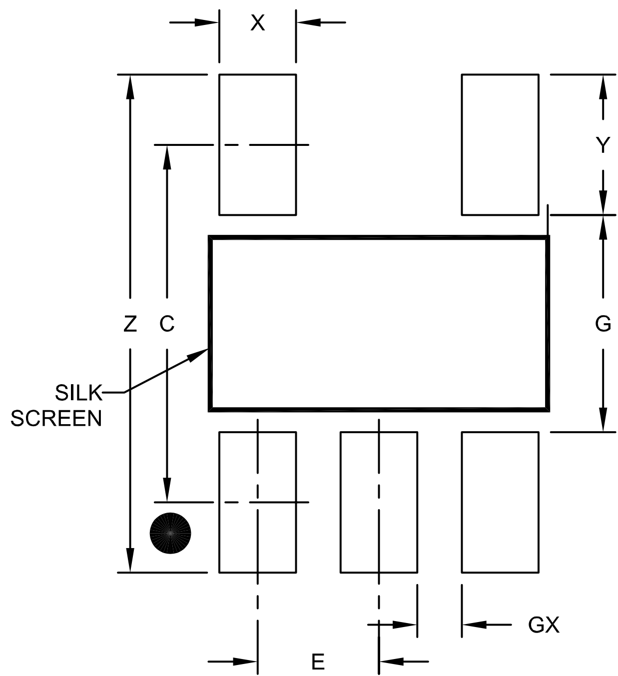
Footprint Outlines and Dimensions

5-Lead Plastic Small Outline Transistor (CT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.95 BSC	
Contact Pad Spacing	C		2.80	
Contact Pad Width (X5)	X			0.60
Contact Pad Length (X5)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2091A

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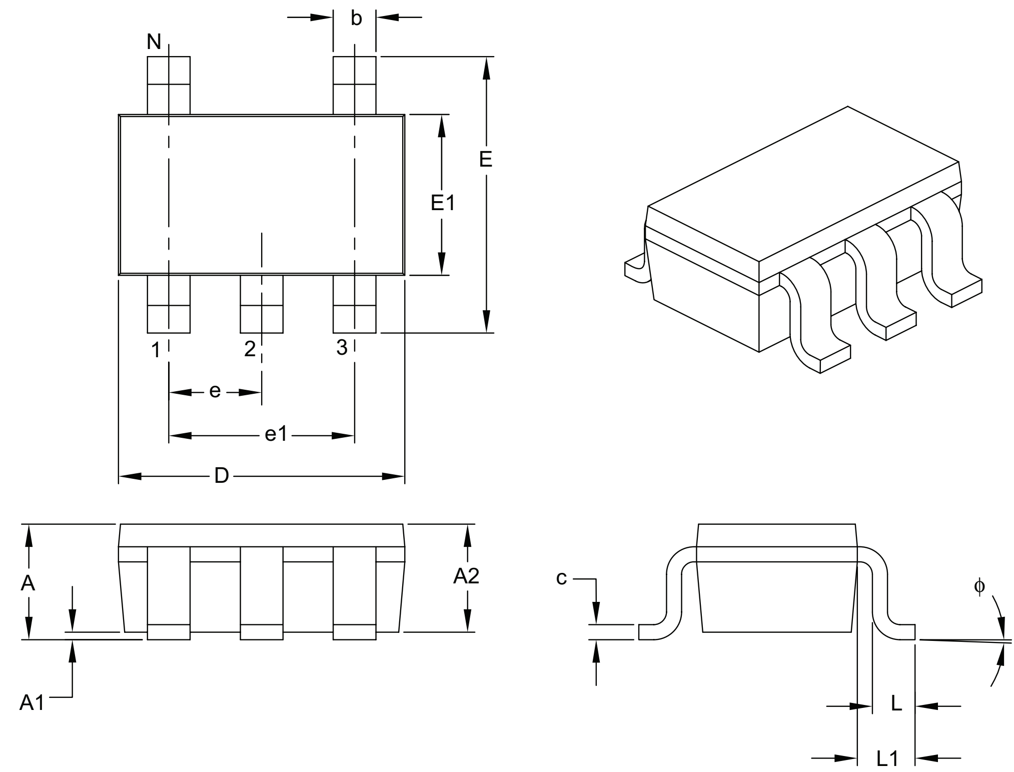
5-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		5	
Lead Pitch	e		0.95 BSC	
Outside Lead Pitch	e1		1.90 BSC	
Overall Height	A	0.90	–	1.45
Molded Package Thickness	A2	0.89	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.20	–	3.20
Molded Package Width	E1	1.30	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.10	–	0.60
Footprint	L1	0.35	–	0.80
Foot Angle	ϕ	0°	–	30°
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.20	–	0.51

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-091B

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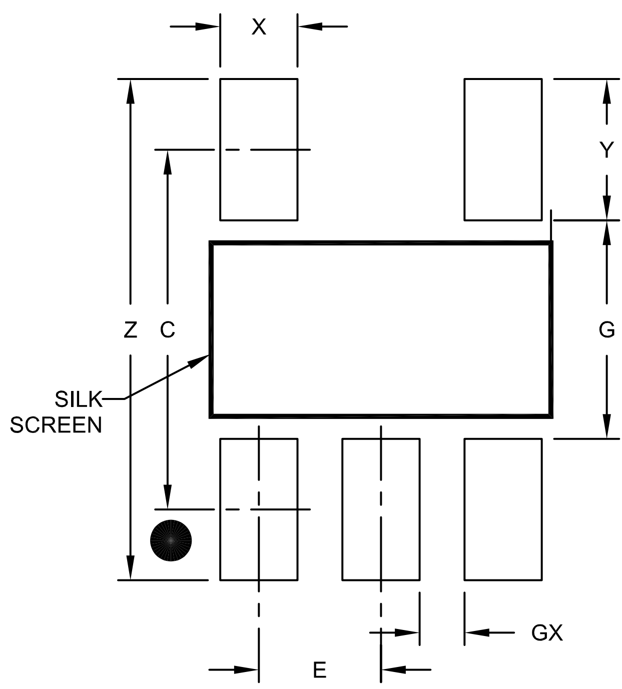
5-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.95 BSC	
Contact Pad Spacing	C		2.80	
Contact Pad Width (X5)	X			0.60
Contact Pad Length (X5)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2091A

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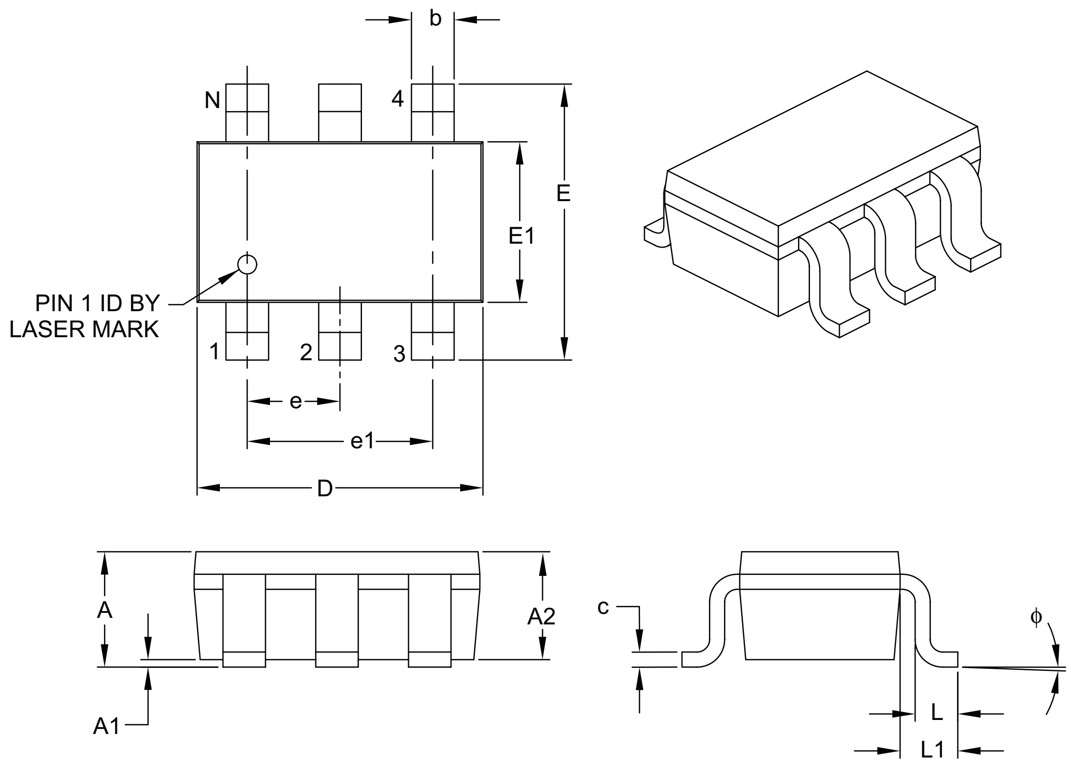
Package Outlines and Dimensions

6-Lead Plastic Small Outline Transistor (CH) [SOT-23]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.90	–	1.45
Molded Package Thickness	A2	0.89	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.20	–	3.20
Molded Package Width	E1	1.30	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.10	–	0.60
Footprint	L1	0.35	–	0.80
Foot Angle	ϕ	0°	–	30°
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.20	–	0.51

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-028B

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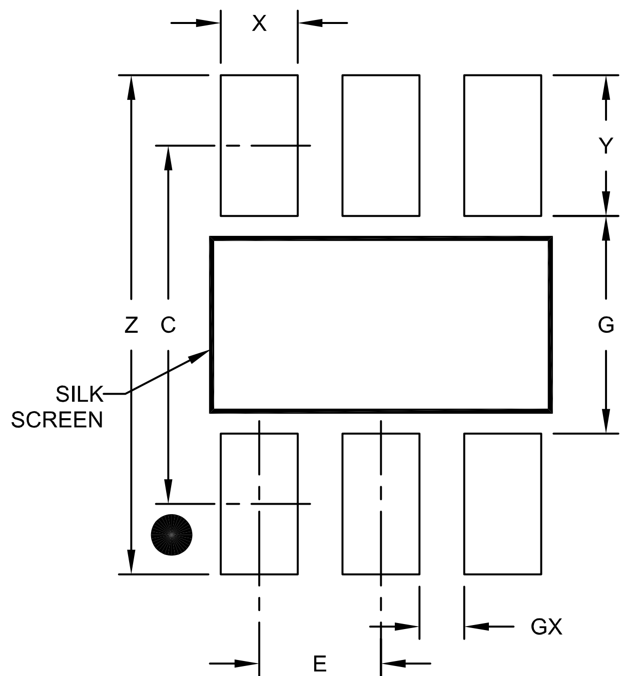
Footprint Outlines and Dimensions

6-Lead Plastic Small Outline Transistor (CH) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.80	
Contact Pad Width (X6)	X			0.60
Contact Pad Length (X6)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

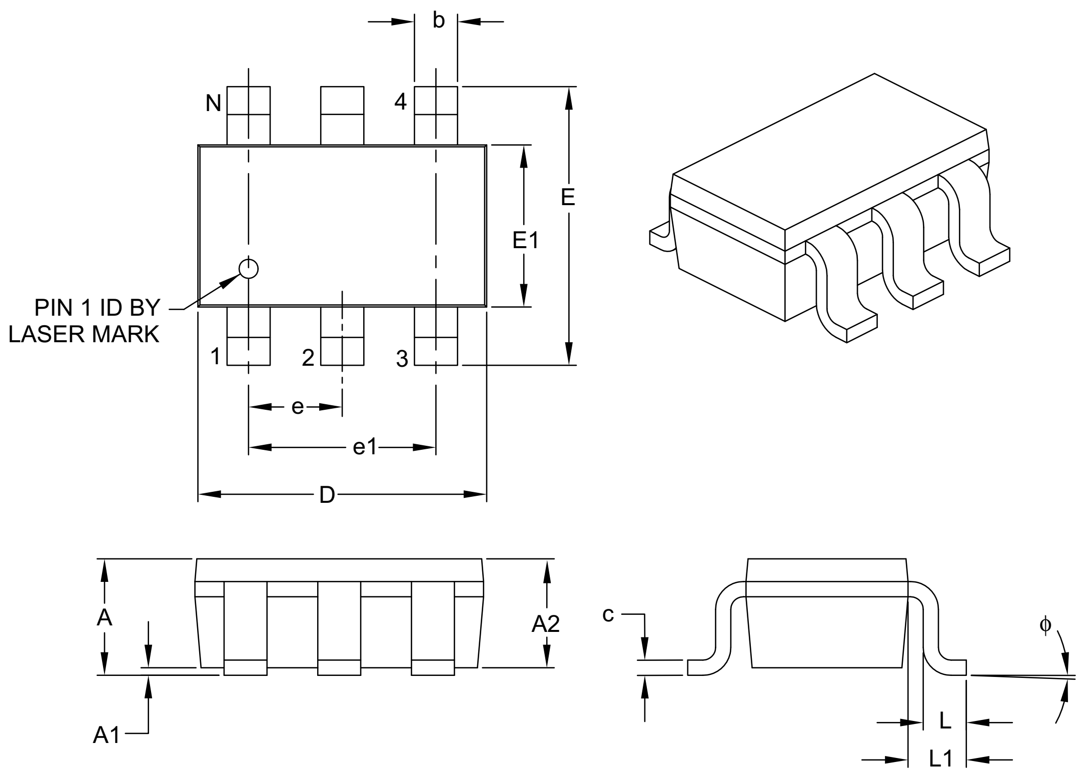
1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2028A

6-Lead Plastic Small Outline Transistor (CHY) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.90	–	1.45
Molded Package Thickness	A2	0.89	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.20	–	3.20
Molded Package Width	E1	1.30	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.10	–	0.60
Footprint	L1	0.35	–	0.80
Foot Angle	ϕ	0°	–	30°
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.20	–	0.51

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-028B

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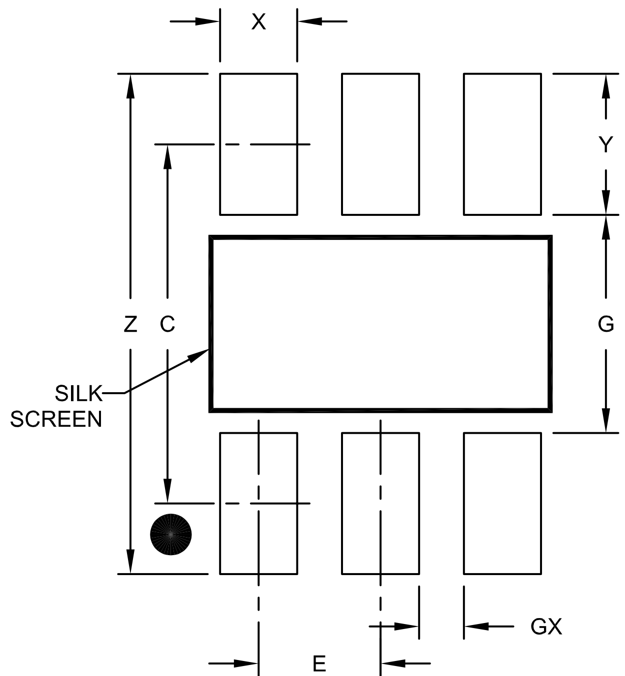
6-Lead Plastic Small Outline Transistor (CHY) [SOT-23]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.80	
Contact Pad Width (X6)	X			0.60
Contact Pad Length (X6)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2028A

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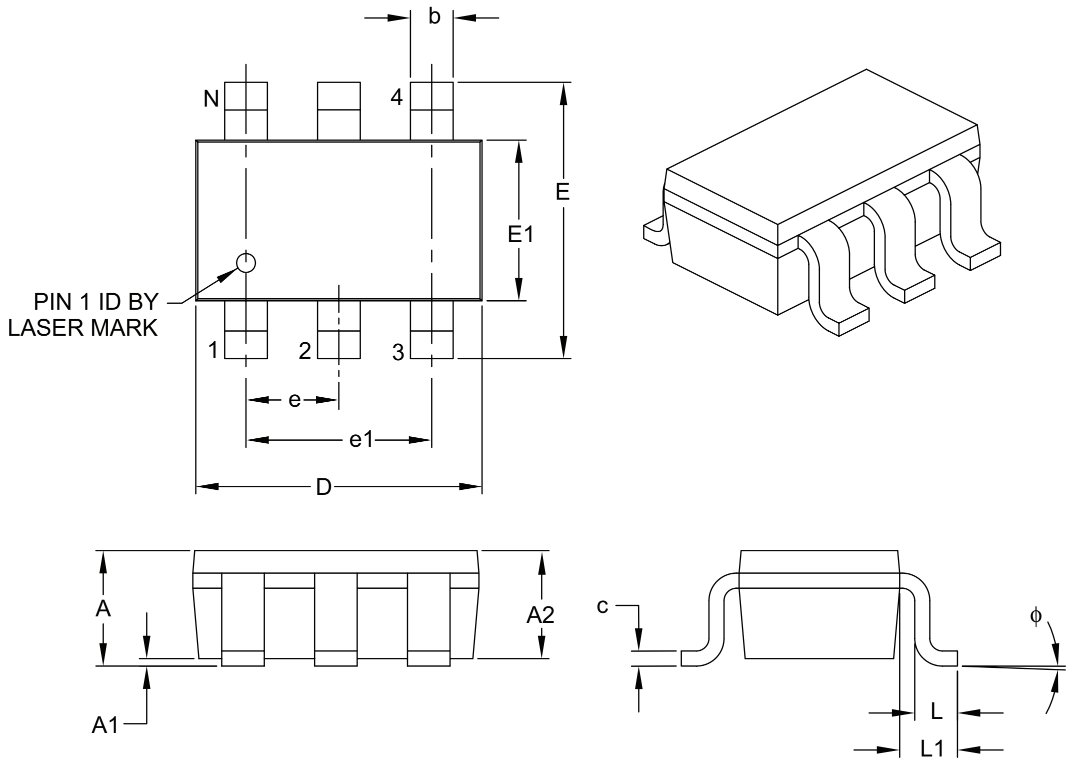
6-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.95 BSC		
Outside Lead Pitch	e1	1.90 BSC		
Overall Height	A	0.90	–	1.45
Molded Package Thickness	A2	0.89	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.20	–	3.20
Molded Package Width	E1	1.30	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.10	–	0.60
Footprint	L1	0.35	–	0.80
Foot Angle	φ	0°	–	30°
Lead Thickness	c	0.08	–	0.26
Lead Width	b	0.20	–	0.51

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-028B

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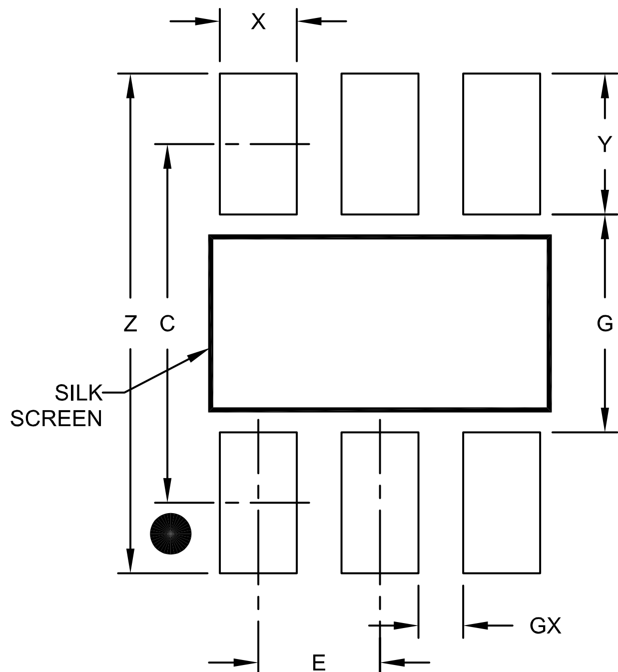
6-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.80	
Contact Pad Width (X6)	X			0.60
Contact Pad Length (X6)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

 BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2028A

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NOTES:

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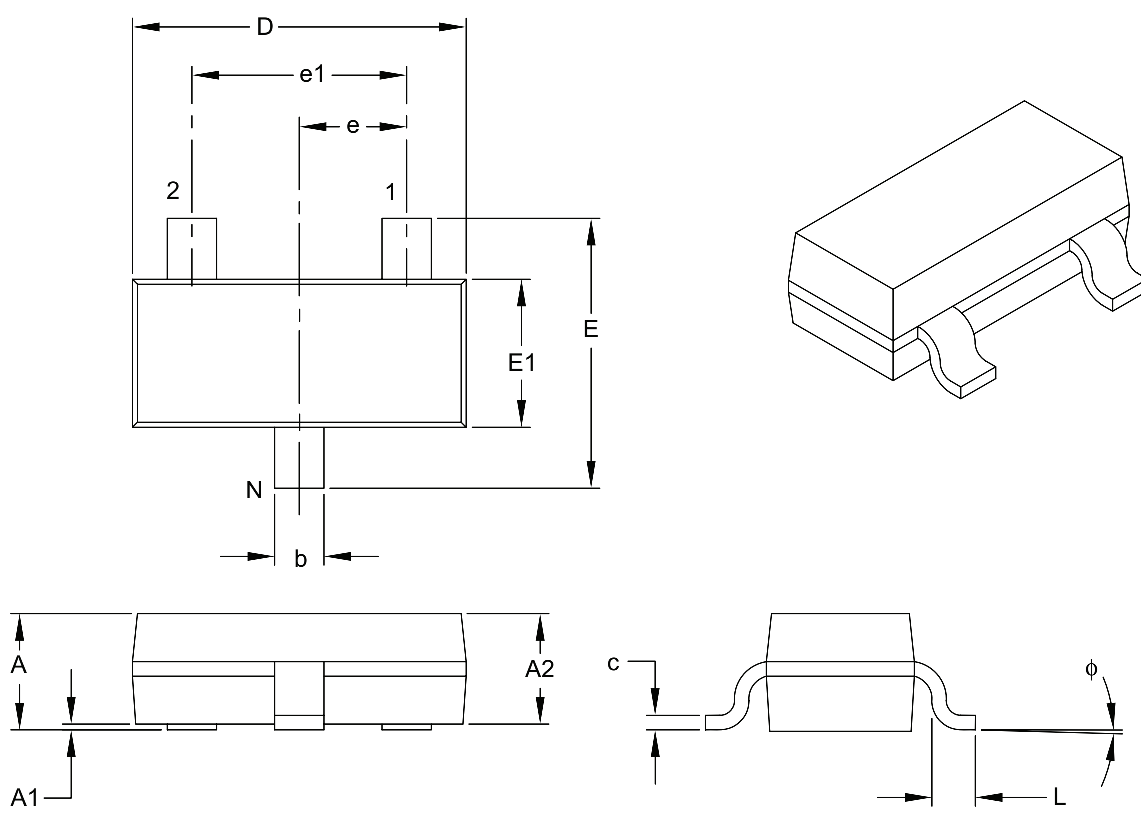
SOT-23A

3-Lead Plastic Small Outline Transistor (CB) [SOT-23A]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		3	
Lead Pitch	e		0.95 BSC	
Outside Lead Pitch	e1		1.90 BSC	
Overall Height	A	0.89	–	1.45
Molded Package Thickness	A2	0.90	–	1.30
Standoff	A1	0.00	–	0.15
Overall Width	E	2.10	–	3.00
Molded Package Width	E1	1.20	–	1.80
Overall Length	D	2.70	–	3.10
Foot Length	L	0.15	–	0.60
Foot Angle	ϕ	0°	–	30°
Lead Thickness	c	0.09	–	0.26
Lead Width	b	0.30	–	0.51

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-130B

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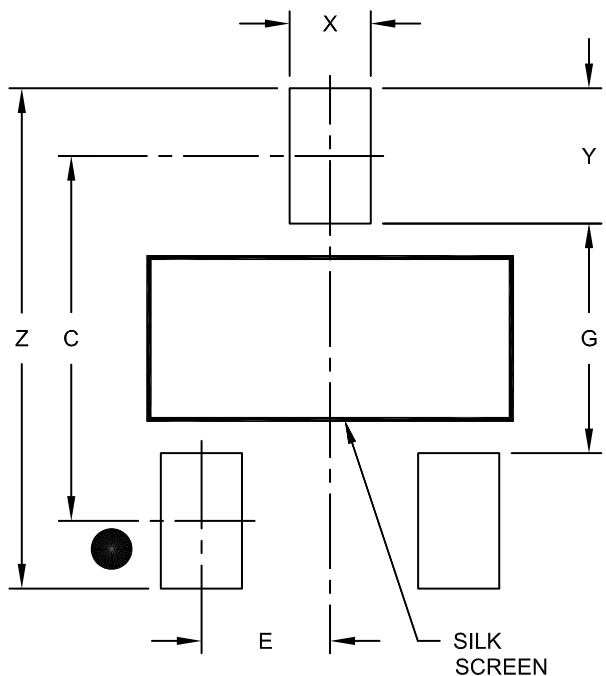
3-Lead Plastic Small Outline Transistor (CB) [SOT-23A]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Contact Pad Spacing	C		2.70	
Contact Pad Width (X3)	X			0.60
Contact Pad Length (X3)	Y			1.00
Distance Between Pads	G	1.70		
Overall Width	Z			3.70

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2130A

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NOTES:

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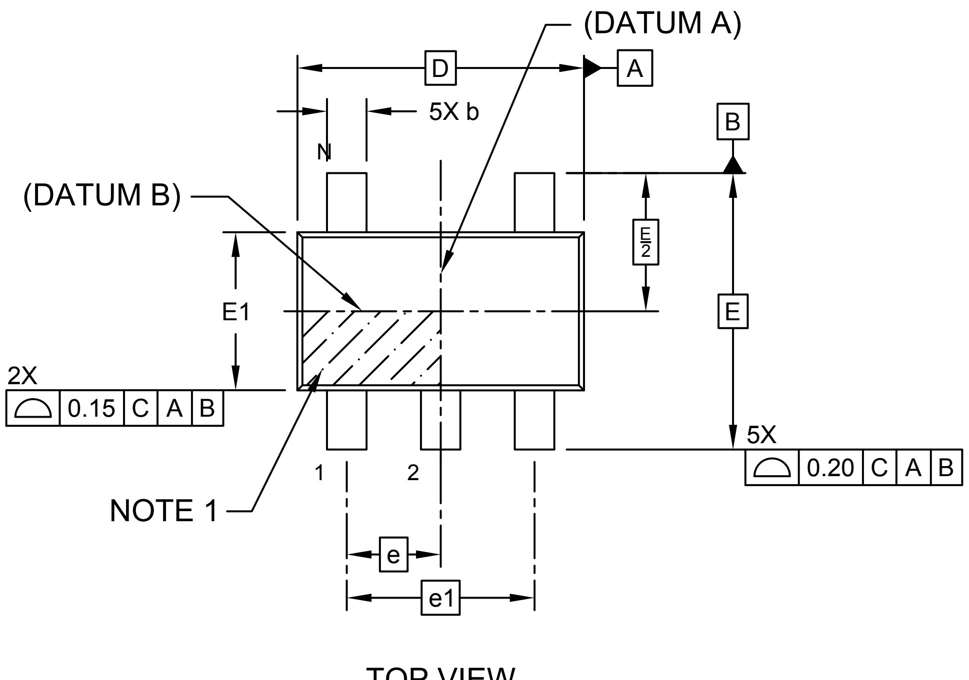
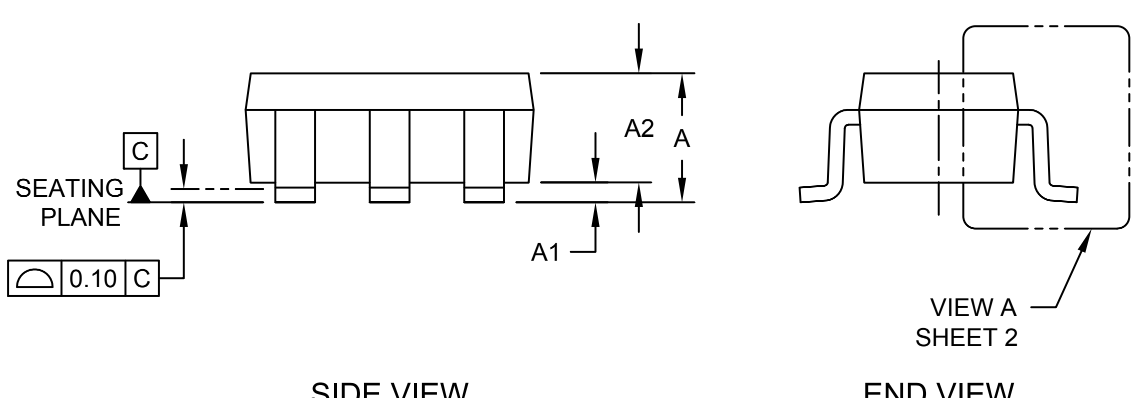
SOT-25

5L Plastic Small Outline Transistor Package (5A) - [SOT-25]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Microchip Technology Drawing C04-389A Sheet 1 of 2

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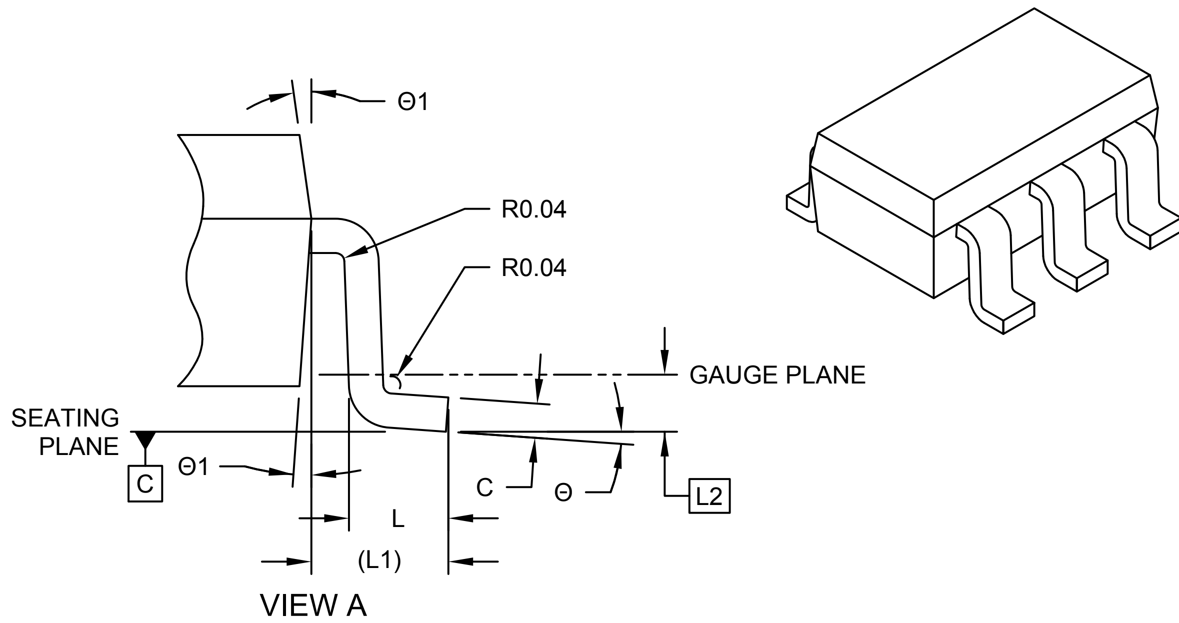
5L Plastic Small Outline Transistor Package (5A) - [SOT-25]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		5	
Pitch	e		0.95 BSC	
Overall Pitch	e1		1.90 BSC	
Overall Height	A	-	-	1.30
Standoff	A1	0.20	-	-
Molded Package Height	A2	1.00	1.10	1.20
Molded Package Length	D		2.90 BSC	
Overall Width	E		2.80 BSC	
Molded Package Width	E1	1.50	1.60	1.80
Foot Length	L	0.20	-	-
Footprint	(L1)		0.61 REF	
Seating Plane to Gauge Plane	L2		0.25 BSC	
Lead Width	b	0.35	0.40	0.50
Lead Thickness	c	0.10	0.15	0.25
Foot Angle	Θ	0°	4°	8°
Mold Draft Angle	Θ1	5°	10°	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area if used.
2. Dimensioning and tolerancing per ASME Y14.5M

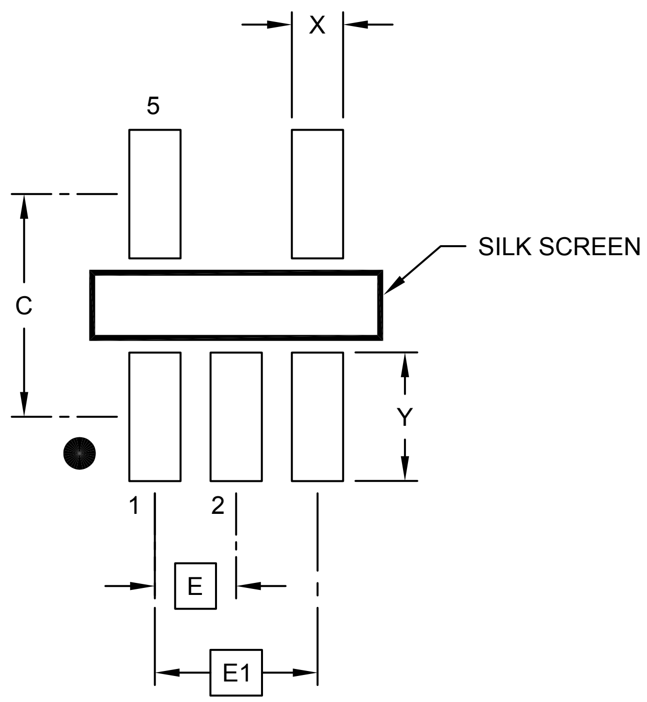
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-389A Sheet 2 of 2

5L Plastic Small Outline Transistor Package (5A) - [SOT-25]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.95 BSC		
Overall Pitch	E1	1.90 BSC		
Contact Width	X		0.60	
Contact Pad Length	Y		1.05	
Contact Pad Spacing	C		2.60	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2389A

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SOT-89

3-Lead Plastic Small Outline Transistor (MB) - [SOT-89]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

OPTIONAL BACKSIDE PATTERNS —
PARTS MAY BE SUPPLIED WITH
ANY PATTERN SHOWN

Microchip Technology Drawing C04-029C Sheet 1 of 2

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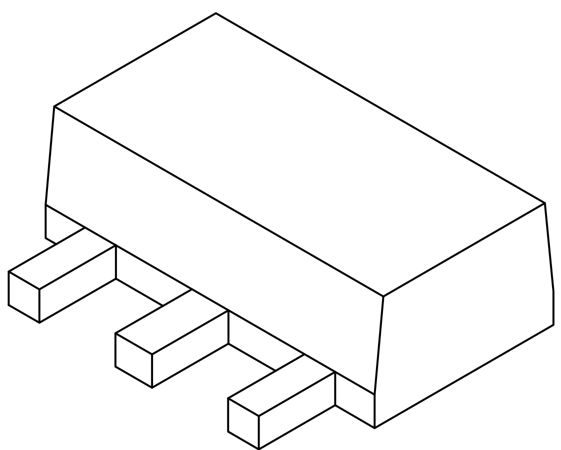
3-Lead Plastic Small Outline Transistor (MB) - [SOT-89]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N		3	
Pitch	e		1.50 BSC	
Outside Lead Pitch	e1		3.00 BSC	
Overall Height	A	1.40	1.50	1.60
Overall Width	H	3.94	4.10	4.25
Molded Package Width at Base	E		2.50 BSC	
Molded Package Width at Top	E1	2.13	2.20	2.29
Overall Length	D		4.50 BSC	
Tab Length (Option A)	D1A	1.63	1.73	1.83
Tab Length (Option B)	D1B	1.40	1.60	1.75
Tab Length (Option C)	D1C	1.62	1.73	1.83
Foot Length	L	0.79	1.10	1.20
Lead Thickness	c	0.35	0.40	0.44
Lead 2 Width	b	0.41	0.50	0.56
Leads 1 & 3 Width	b1	0.36	0.42	0.48

Notes:

1. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-029C Sheet 2 of 2

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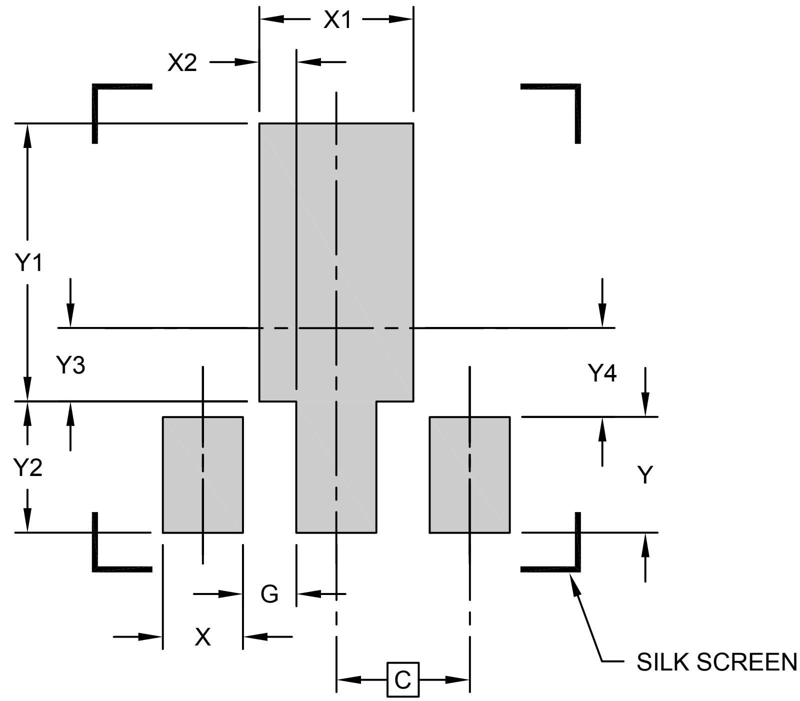
3-Lead Plastic Small Outline Transistor (MB) - [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units	MILLIMETERS		
Dimension Limits	MIN	NOM	MAX
C		1.50 (BSC)	
X (3 PLACES)		0.900	
X1		1.733	
X2 (2 PLACES)		0.416	
G (2 PLACES)		0.600	
Y (2 PLACES)		1.300	
Y1		3.125	
Y2		1.475	
Y3		0.825	
Y4		1.000	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2029C

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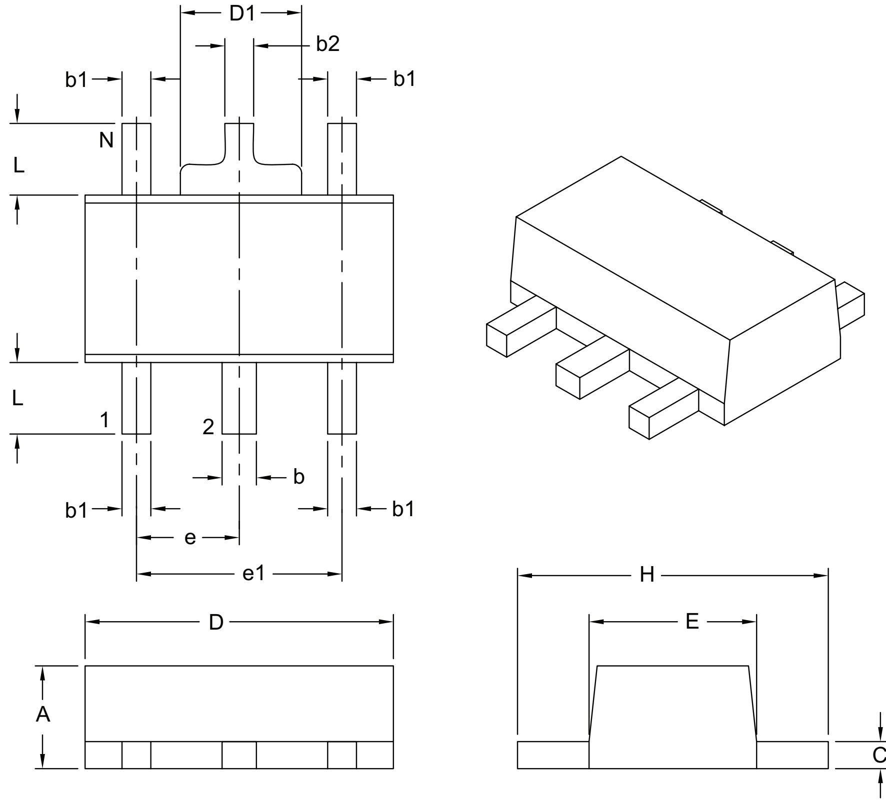
Package Outlines and Dimensions

5-Lead Plastic Small Outline Transistor Header (MT) [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS	
	Dimension Limits	MIN	MAX
Number of Leads	N	5	
Lead Pitch	e	1.50 BSC	
Outside Lead Pitch	e1	3.00 BSC	
Overall Height	A	1.40	1.60
Overall Width	H	3.94	4.50
Molded Package Width	E	2.29	2.60
Overall Length	D	4.40	4.60
Tab Width	D1	1.40	1.83
Foot Length	L	0.80	1.20
Lead Thickness	c	0.35	0.44
Lead 2 Width	b	0.41	0.56
Leads 1, 3, 4 & 5 Width	b1	0.36	0.48
Tab Lead Width	b2	0.32	0.48

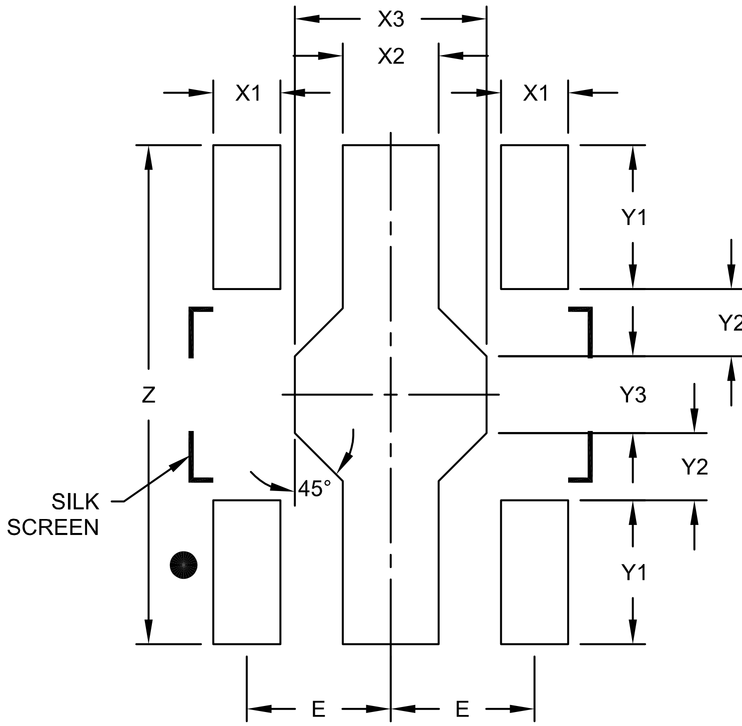
Notes:
1. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-030B

5-Lead Plastic Small Outline Transistor Header (MT) [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		1.50 BSC	
Contact Pad Width (X4)	X1			0.70
Contact Pad Width	X2		1.00	
Contact Pad Width	X3		2.00	
Contact Pad Length (X4)	Y1		1.50	
Contact Pad Length (X2)	Y2		0.70	
Contact Pad Length	Y3		0.80	
Overall Length	Z		5.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2030C

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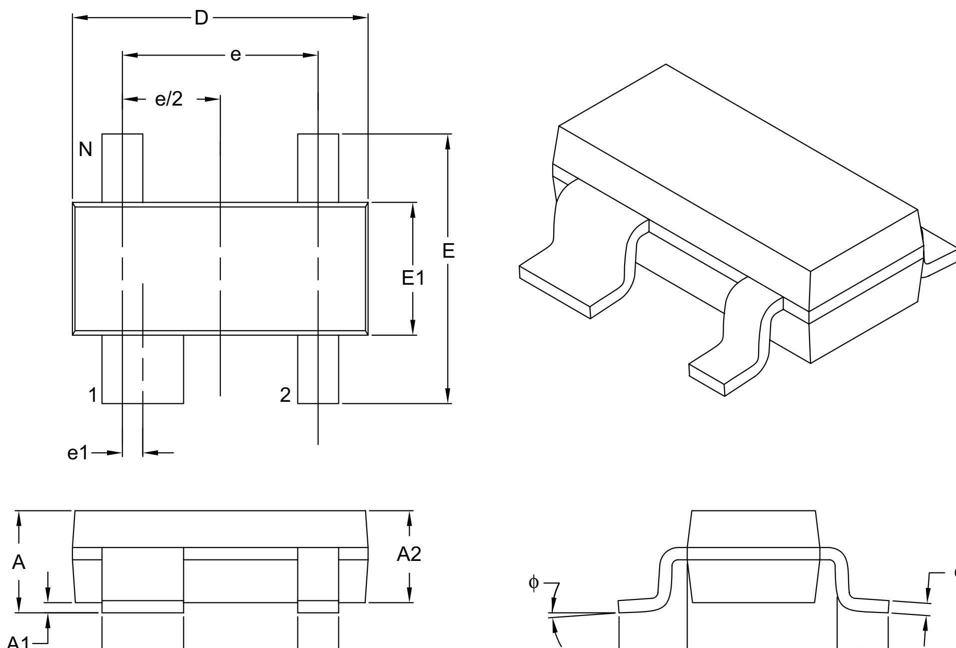
SOT-143

4-Lead Plastic Small Outline Transistor (RC) [SOT-143]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		4	
Pitch	e		1.92 BSC	
Lead 1 Offset	e1		0.20 BSC	
Overall Height	A	0.80	–	1.22
Molded Package Thickness	A2	0.75	0.90	1.07
Standoff §	A1	0.01	–	0.15
Overall Width	E	2.10	–	2.64
Molded Package Width	E1	1.20	1.30	1.40
Overall Length	D	2.67	2.90	3.05
Foot Length	L	0.13	0.50	0.60
Footprint	L1		0.54 REF	
Foot Angle	φ	0°	–	8°
Lead Thickness	c	0.08	–	0.20
Lead 1 Width	b1	0.76	–	0.94
Leads 2, 3 & 4 Width	b	0.30	–	0.54

Notes:

1. § Significant Characteristic.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-031B

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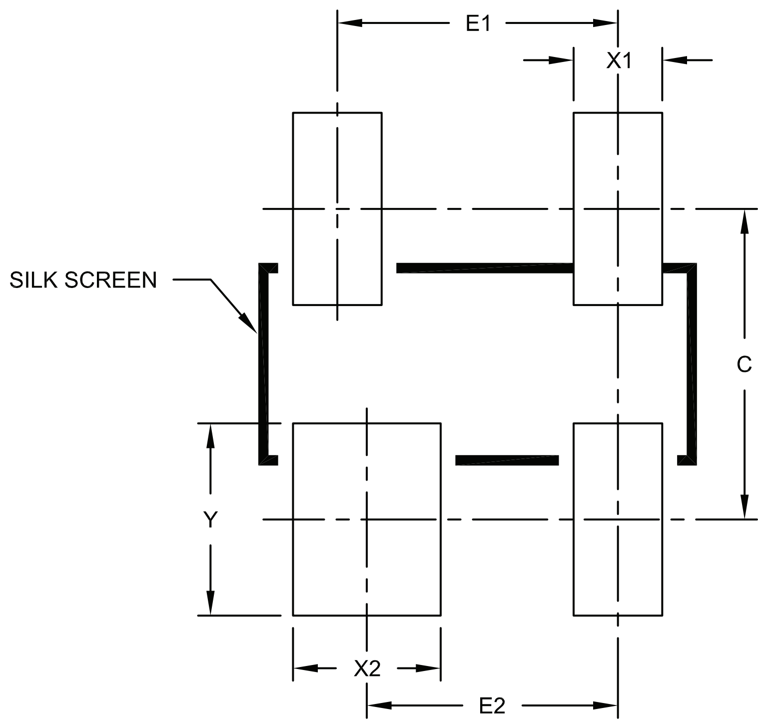
Footprint Outlines and Dimensions

4-Lead Plastic Small Outline Transistor (RC) [SOT-143]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E1	1.90 BSC		
Contact Pitch	E2	1.60 BSC		
Contact Width	X1			0.60
Contact Width	X2			1.00
Contact Length	Y			1.30
Contact Pad Spacing	C		2.10	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2031A

NOTES:

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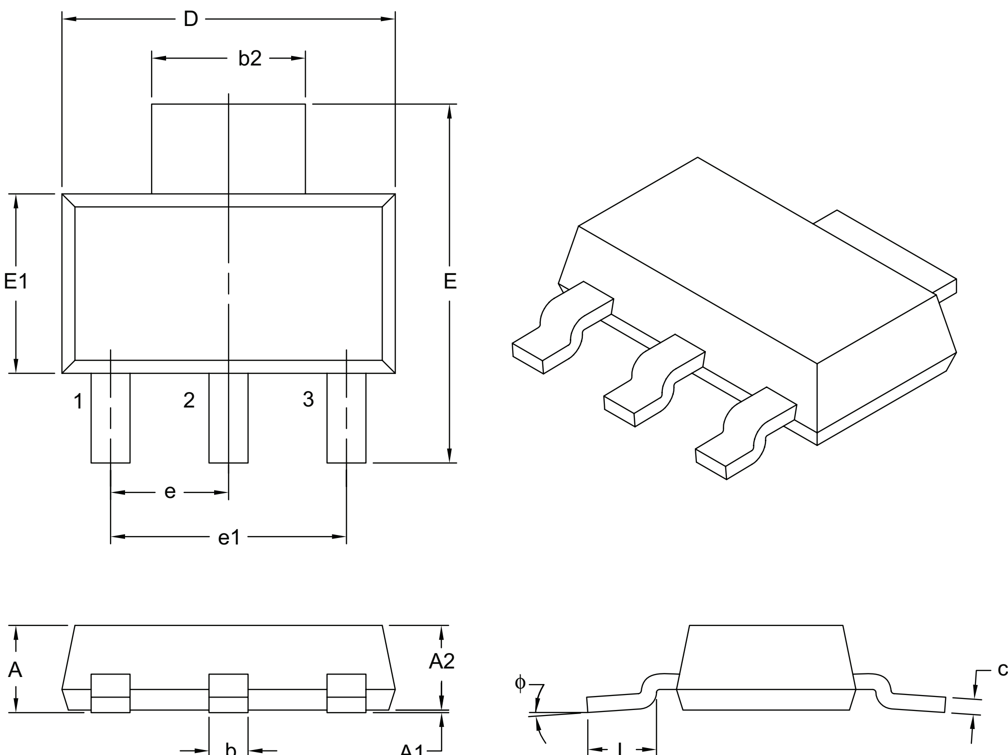
SOT-223

3-Lead Plastic Small Outline Transistor (DB) [SOT-223]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N	3		
Lead Pitch	e	2.30 BSC		
Outside Lead Pitch	e1	4.60 BSC		
Overall Height	A	–	–	1.80
Standoff	A1	0.02	–	0.10
Molded Package Height	A2	1.50	1.60	1.70
Overall Width	E	6.70	7.00	7.30
Molded Package Width	E1	3.30	3.50	3.70
Overall Length	D	6.30	6.50	6.70
Lead Thickness	c	0.23	0.30	0.35
Lead Width	b	0.60	0.76	0.84
Tab Lead Width	b2	2.90	3.00	3.10
Foot Length	L	0.75	–	–
Lead Angle	ϕ	0°	–	10°

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-032B

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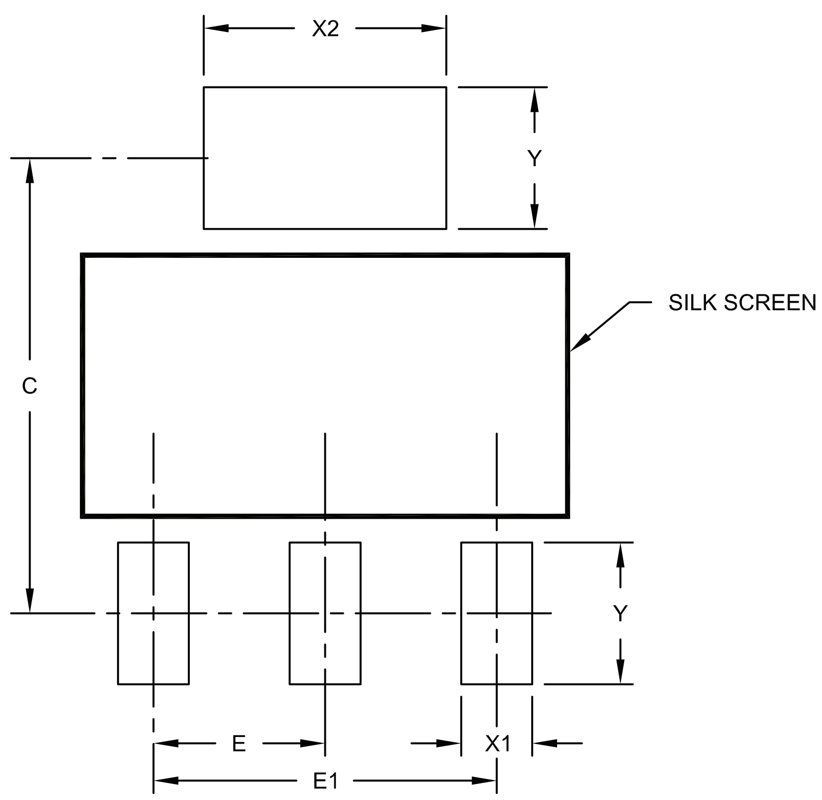
3-Lead Plastic Small Outline Transistor (DB) [SOT-223]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		2.30 BSC	
Overall Pitch	E1		4.60 BSC	
Contact Pad Spacing	C		6.10	
Contact Pad Width	X1			0.95
Contact Pad Width	X2			3.25
Contact Pad Length	Y			1.90

Notes:

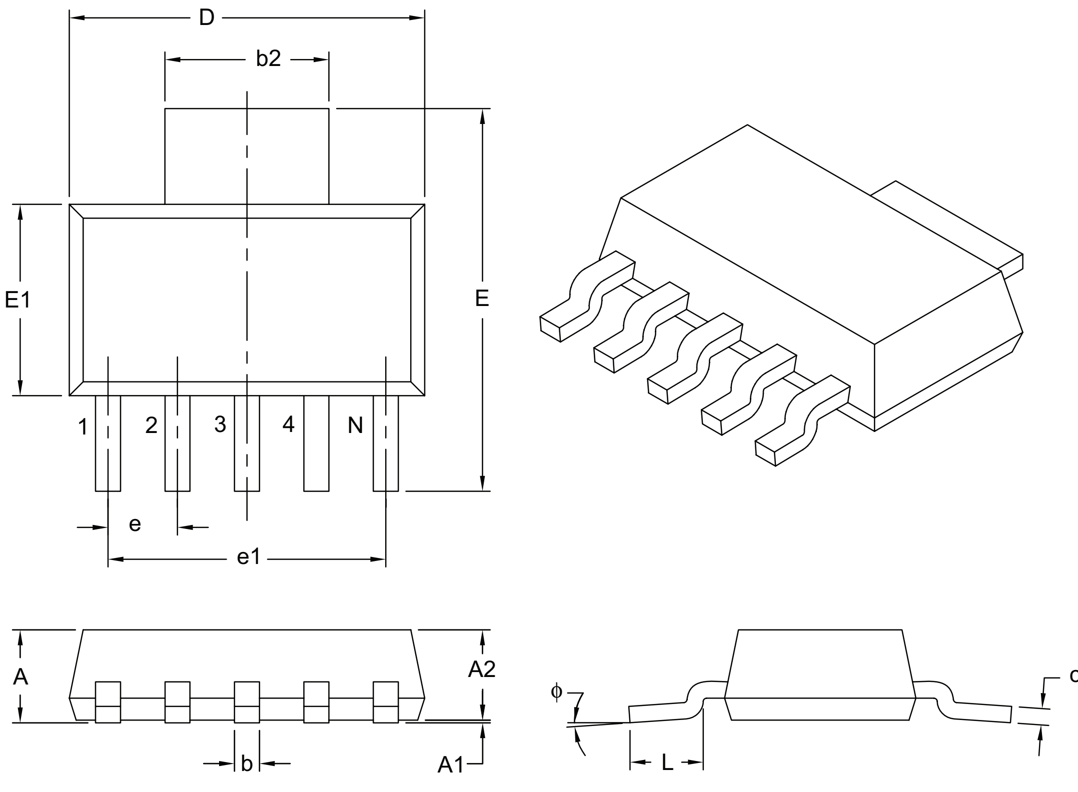
1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2032A

5-Lead Plastic Small Outline Transistor (DC) [SOT-223]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N		5	
Lead Pitch	e		1.27 BSC	
Outside Lead Pitch	e1		5.08 BSC	
Overall Height	A	–	–	1.80
Standoff	A1	0.02	0.06	0.10
Molded Package Height	A2	1.55	1.60	1.65
Overall Width	E	6.86	7.00	7.26
Molded Package Width	E1	3.45	3.50	3.55
Overall Length	D	6.45	6.50	6.55
Lead Thickness	c	0.24	0.28	0.32
Lead Width	b	0.41	0.457	0.51
Tab Lead Width	b2	2.95	3.00	3.05
Foot Length	L	0.91	–	1.14
Lead Angle	ϕ	0°	4°	8°

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-137B

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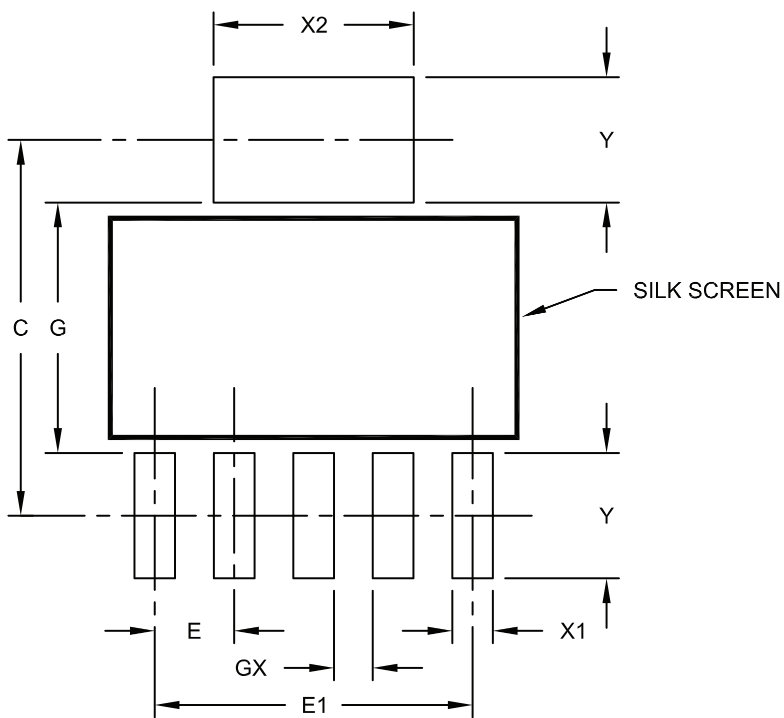
5-Lead Plastic Small Outline Transistor (DC) [SOT-223]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Pad Pitch	E		1.27 BSC	
Overall Pad Pitch	E1		5.08 BSC	
Pad Spacing	C		6.00	
Pad Width	X1			0.65
Pad Width	X2			3.20
Pad Length	Y			2.00
Distance Between Pads	G	4.00		
Distance Between Pads	GX	0.62		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2137A

NOTES:

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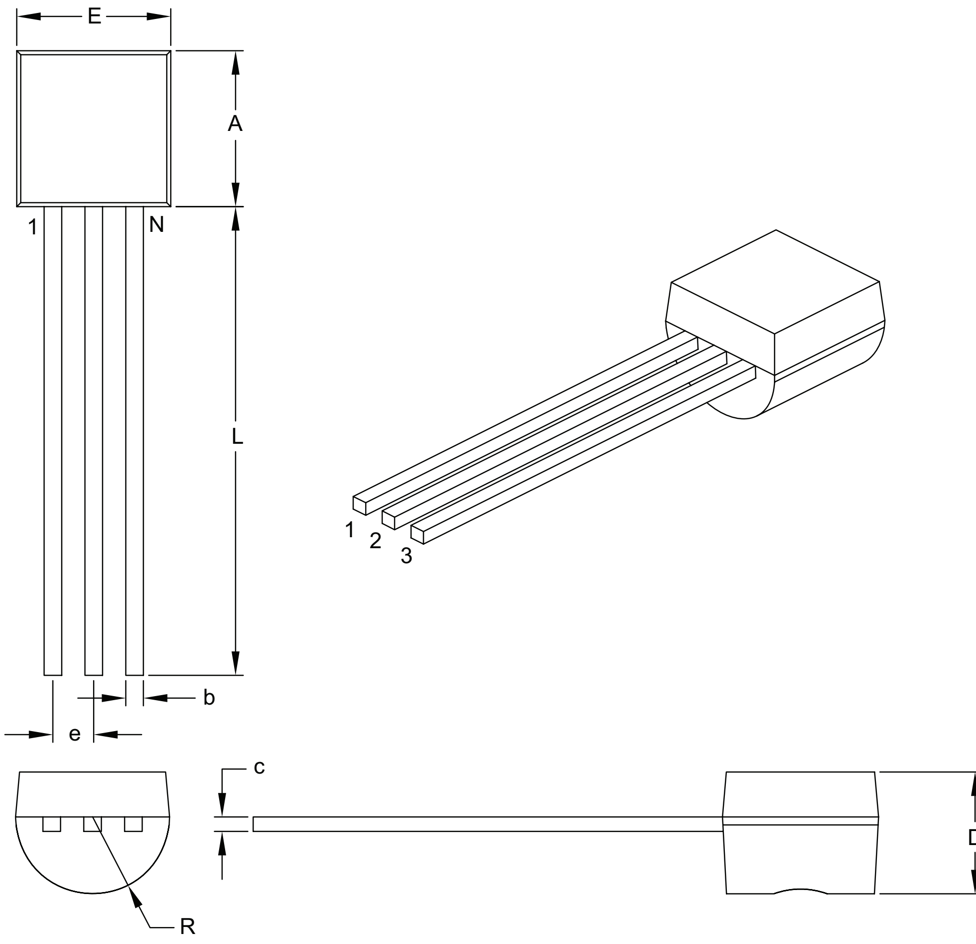
TO-92

3-Lead Plastic Transistor Outline (TO) [TO-92]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES	
Dimension Limits		MIN	MAX
Number of Pins	N	3	
Pitch	e	.050 BSC	
Bottom to Package Flat	D	.125	.165
Overall Width	E	.175	.205
Overall Length	A	.170	.210
Molded Package Radius	R	.080	.105
Tip to Seating Plane	L	.500	–
Lead Thickness	c	.014	.021
Lead Width	b	.014	.022

Notes:

1. Dimensions A and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-101B

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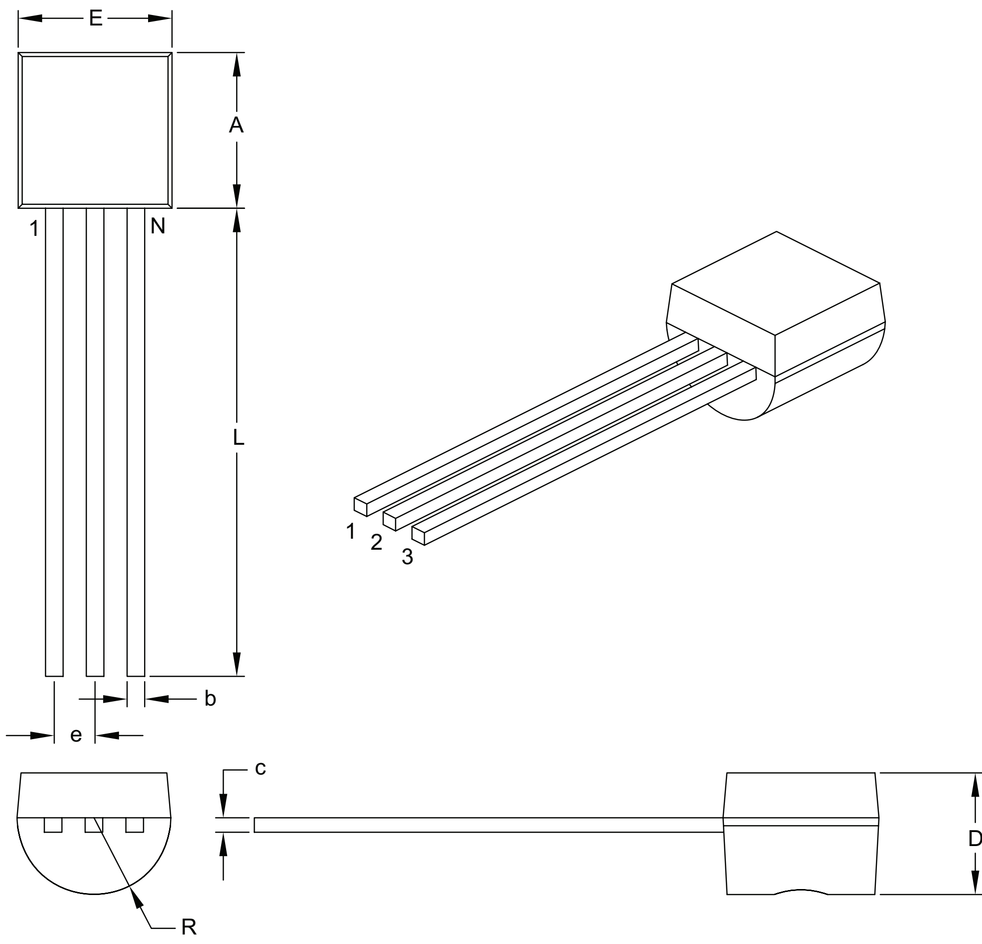
Package Outlines and Dimensions

3-Lead Plastic Transistor Outline (ZB) [TO-92]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES	
Dimension Limits		MIN	MAX
Number of Pins	N	3	
Pitch	e	.050 BSC	
Bottom to Package Flat	D	.125	.165
Overall Width	E	.175	.205
Overall Length	A	.170	.210
Molded Package Radius	R	.080	.105
Tip to Seating Plane	L	.500	–
Lead Thickness	c	.014	.021
Lead Width	b	.014	.022

Notes:

1. Dimensions A and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-101B

NOTES:

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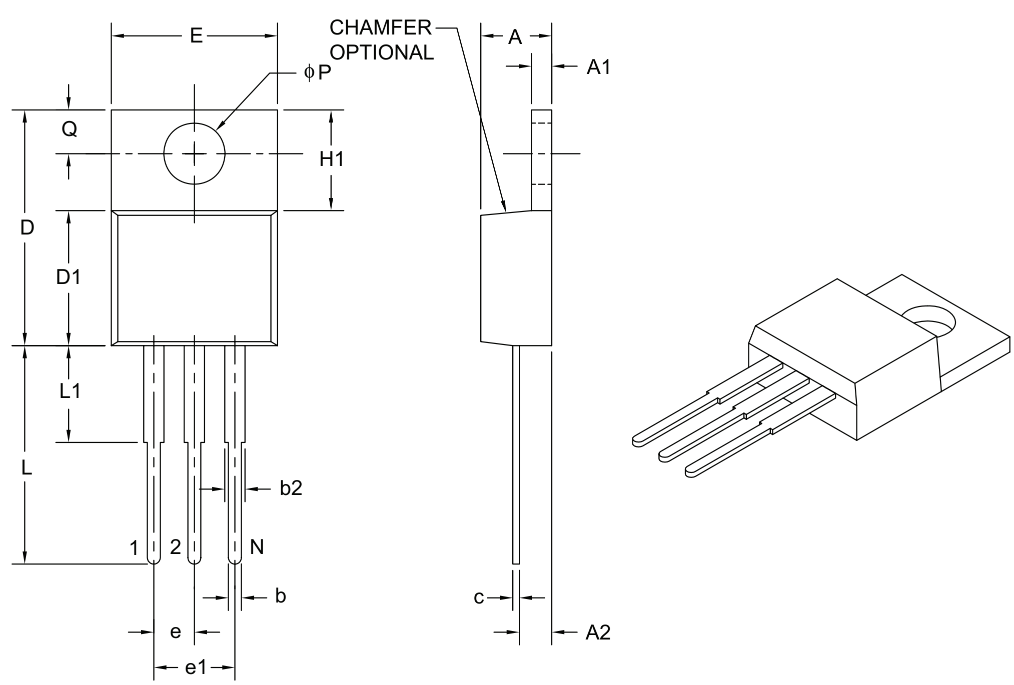
TO-220

3-Lead Plastic Transistor Outline (AB) [TO-220]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	3		
Pitch	e	.100 BSC		
Overall Pin Pitch	e1	.200 BSC		
Overall Height	A	.140	–	.190
Tab Thickness	A1	.020	–	.055
Base to Lead	A2	.080	–	.115
Overall Width	E	.357	–	.420
Mounting Hole Center	Q	.100	–	.120
Overall Length	D	.560	–	.650
Molded Package Length	D1	.330	–	.355
Tab Length	H1	.230	–	.270
Mounting Hole Diameter	φP	.139	–	.156
Lead Length	L	.500	–	.580
Lead Shoulder	L1	–	–	.250
Lead Thickness	c	.012	–	.024
Lead Width	b	.015	.027	.040
Shoulder Width	b2	.045	.057	.070

Notes:

1. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-034B

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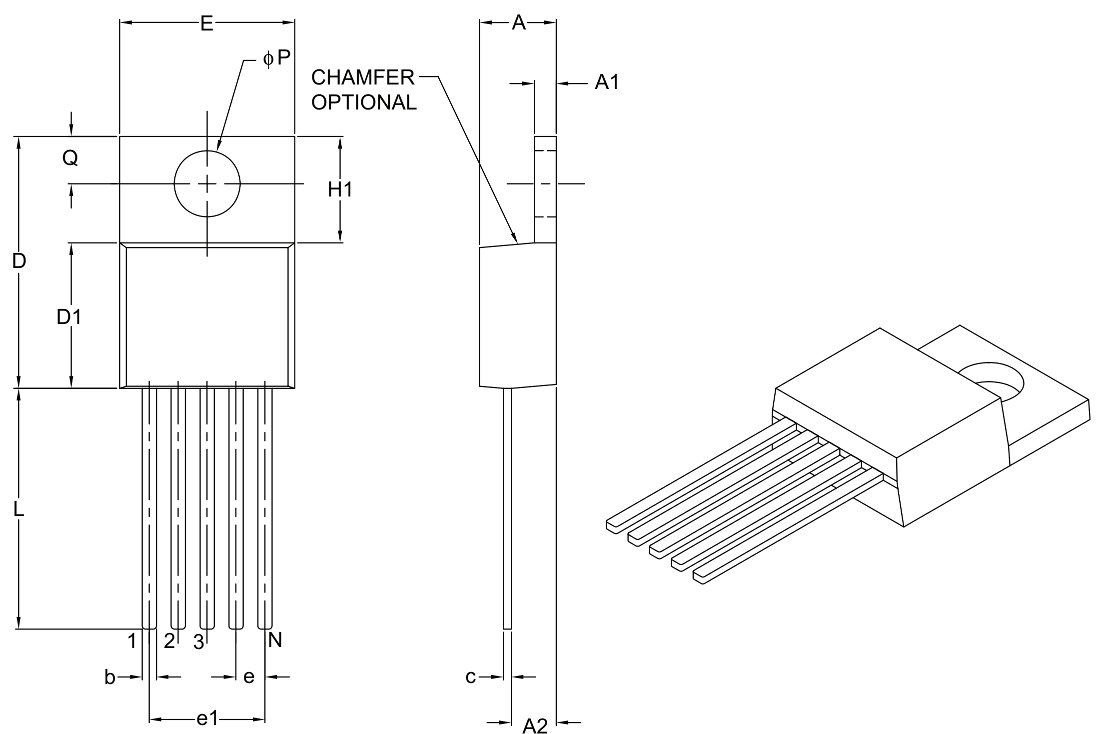
Package Outlines and Dimensions

5-Lead Plastic Transistor Outline (AT) [TO-220]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		5	
Pitch	e		.067 BSC	
Overall Pin Pitch	e1		.268 BSC	
Overall Height	A	.140	–	.190
Overall Width	E	.380	–	.420
Overall Length	D	.560	–	.650
Molded Package Length	D1	.330	–	.355
Tab Length	H1	.204	–	.293
Tab Thickness	A1	.020	–	.055
Mounting Hole Center	Q	.100	–	.120
Mounting Hole Diameter	φP	.139	–	.156
Lead Length	L	.482	–	.590
Base to Bottom of Lead	A2	.080	–	.115
Lead Thickness	c	.012	–	.025
Lead Width	b	.015	.027	.040

Notes:

1. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-036B

NOTES:

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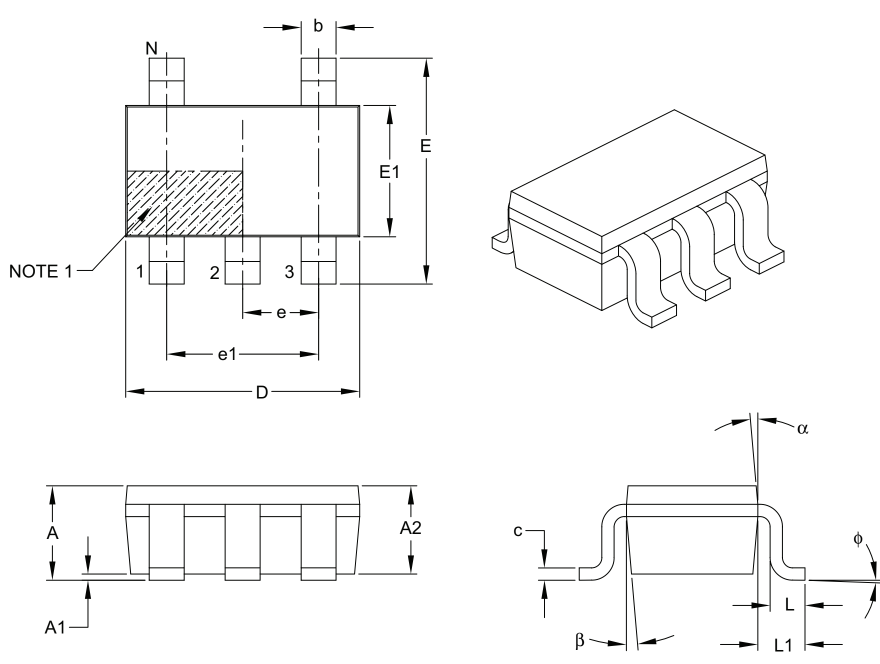
TSOT

Package Outlines and Dimensions

5-Lead Plastic Thin Small Outline Transistor (OS) [TSOT]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N		5	
Lead Pitch	e		0.95 BSC	
Outside Lead Pitch	e1		1.90 BSC	
Overall Height	A	–	–	1.10
Molded Package Thickness	A2	0.70	0.90	1.00
Standoff	A1	0.00	–	0.10
Overall Width	E		2.80 BSC	
Molded Package Width	E1		1.60 BSC	
Overall Length	D		2.90 BSC	
Foot Length	L	0.30	0.45	0.60
Footprint	L1		0.60 REF	
Foot Angle	ϕ	0°	4°	8°
Lead Thickness	c	0.08	–	0.20
Lead Width	b	0.30	–	0.50
Mold Draft Angle Top	α	4°	10°	12°
Mold Draft Angle Bottom	β	4°	10°	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-128B

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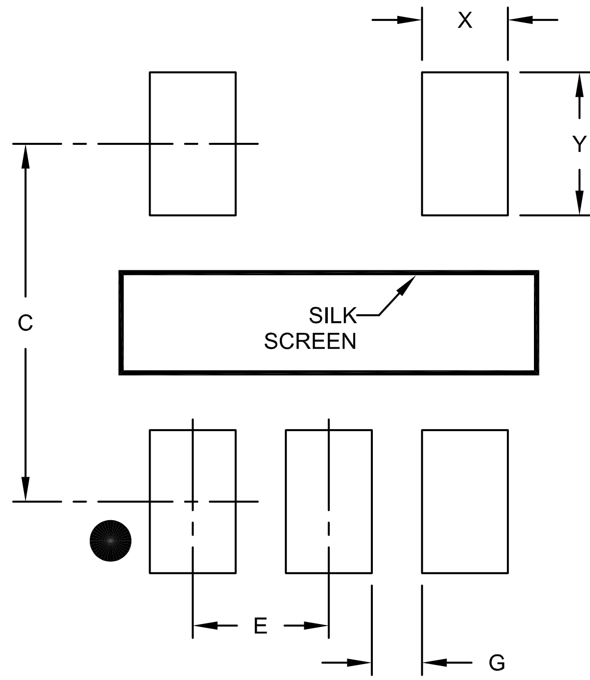
Footprint Outlines and Dimensions

5-Lead Plastic Thin Small Outline Transistor (OS) [TSOT]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS	
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.95 BSC	
Contact Pad Spacing	C		2.80	
Contact Pad Width (X5)	X			0.60
Contact Pad Length (X5)	Y			1.10
Distance Between Pads	G	0.35		

Notes:

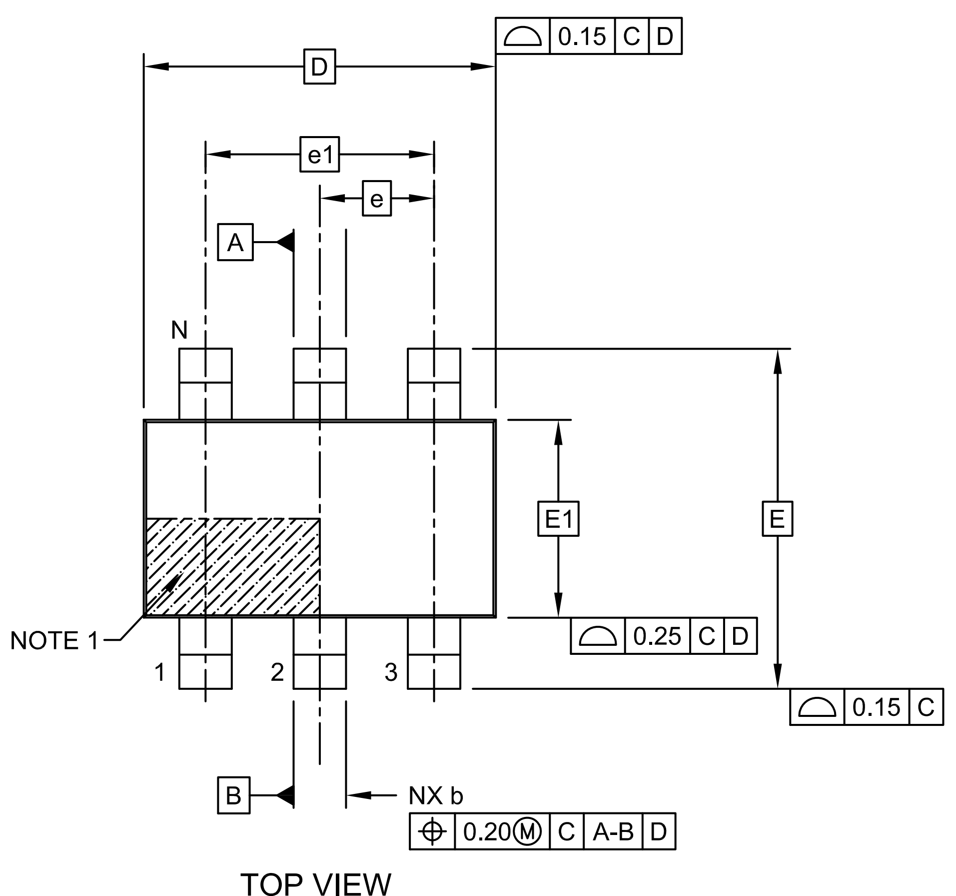
1. Dimensioning and tolerancing per ASME Y14.5M

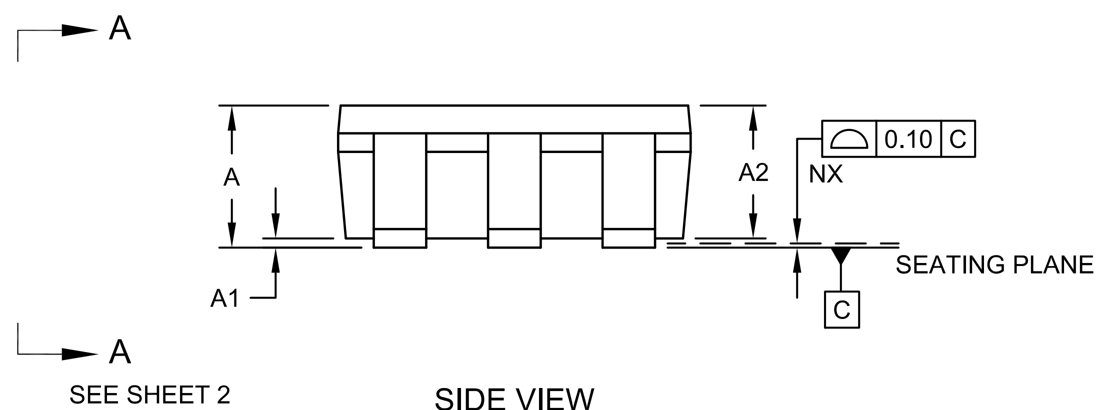
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2128A

6-Lead Thin Small Outline Transistor (OS) [TSOT]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Microchip Technology Drawing C04-141A Sheet 1 of 2

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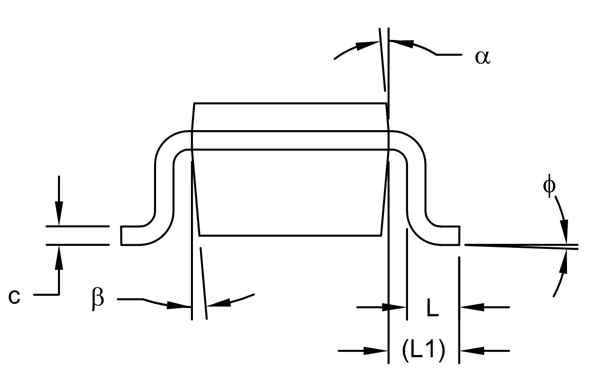
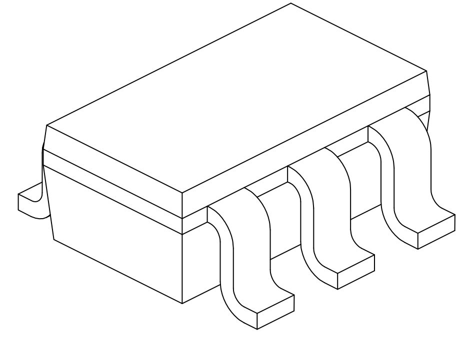
Package Outlines and Dimensions

6-Lead Thin Small Outline Transistor (OS) [TSOT]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





VIEW A-A

	Units	MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Leads	N		6	
Lead Pitch	e		0.95 BSC	
Outside Lead Pitch	e1		1.90 BSC	
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.70	0.90	1.00
Standoff	A1	0.00	-	0.10
Overall Width	E		2.80 BSC	
Molded Package Width	E1		1.60 BSC	
Overall Length	D		2.90 BSC	
Foot Length	L	0.30	0.45	0.60
Footprint	L1		0.60 REF	
Foot Angle	φ	0°	4°	8°
Lead Thickness	c	0.08	-	0.20
Lead Width	θ	0.30	-	0.50
Mold Draft Angle Top	α	4°	10°	12°
Mold Draft Angle Botton	β	4°	10°	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-141A Sheet 2 of 2

NOTES:

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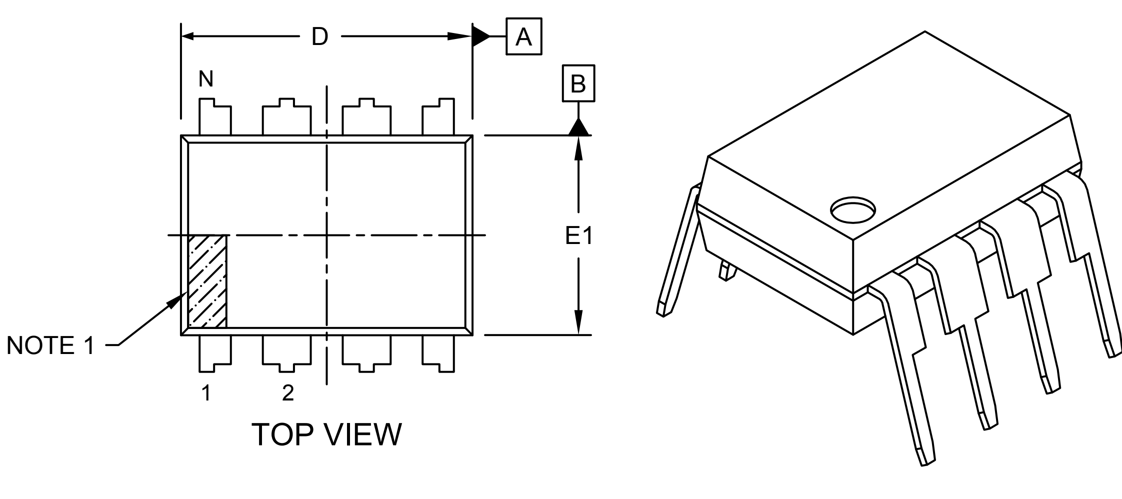
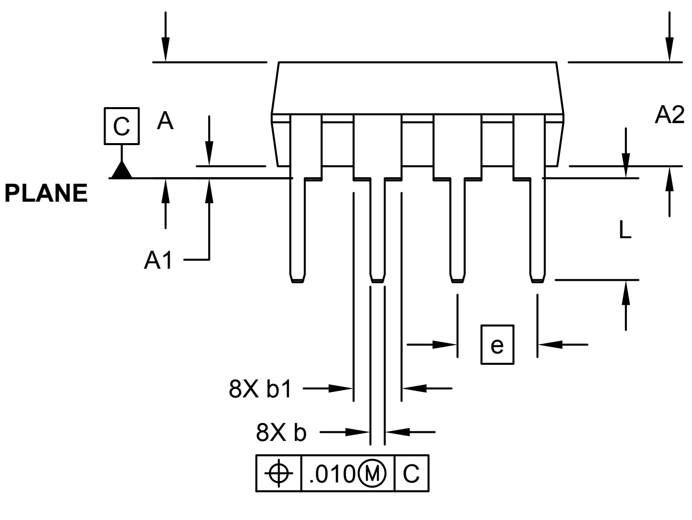
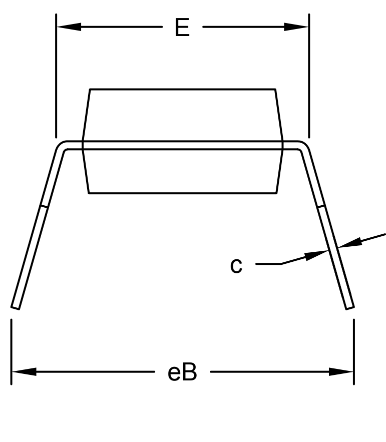
PDIP

8-Lead Plastic Dual In-Line (P) - 300 mil Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing No. C04-018D Sheet 1 of 2

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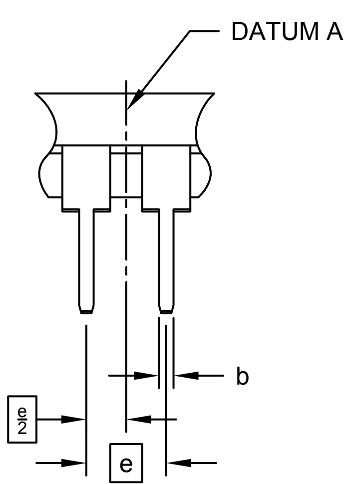
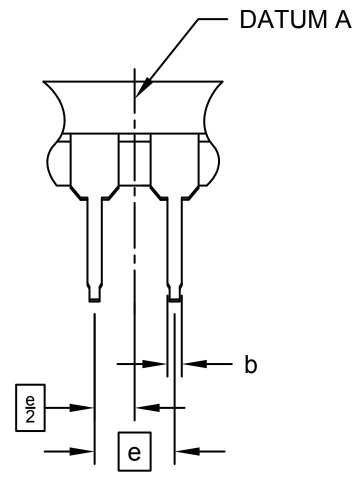
Package Outlines and Dimensions

8-Lead Plastic Dual In-Line (P) - 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	-	-
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.348	.365	.400
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	-	-	.430

Notes:

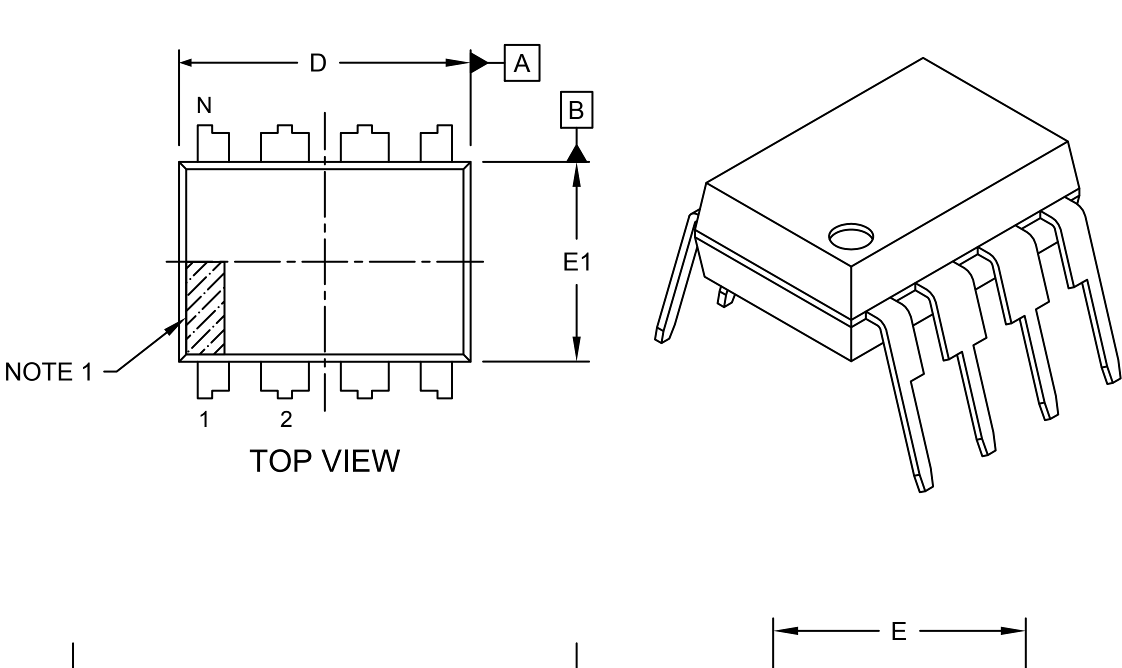
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M

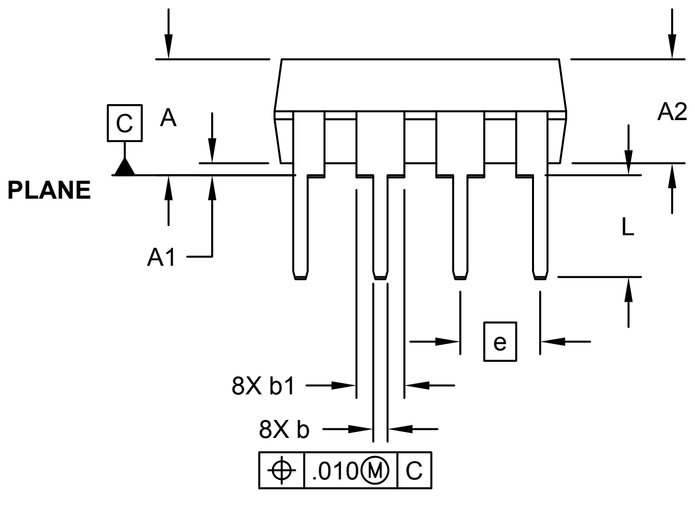
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

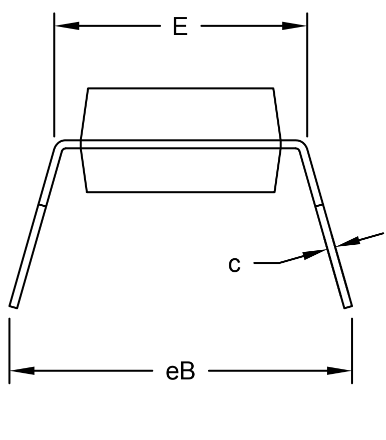
Microchip Technology Drawing No. C04-018D Sheet 2 of 2

8-Lead Plastic Dual In-Line (PA) - 300 mil Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing No. C04-018D Sheet 1 of 2

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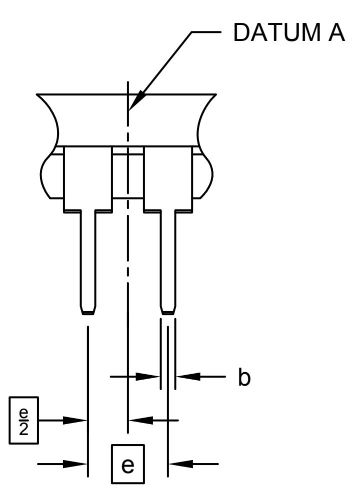
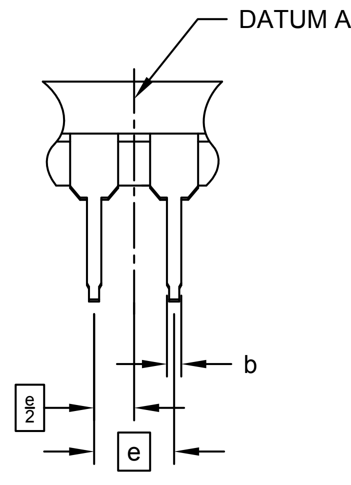
8-Lead Plastic Dual In-Line (PA) - 300 mil Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

ALTERNATE LEAD DESIGN
(VENDOR DEPENDENT)





Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	.100 BSC		
Top to Seating Plane	A	-	-	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	-	-
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.348	.365	.400
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	-	-	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-018D Sheet 2 of 2

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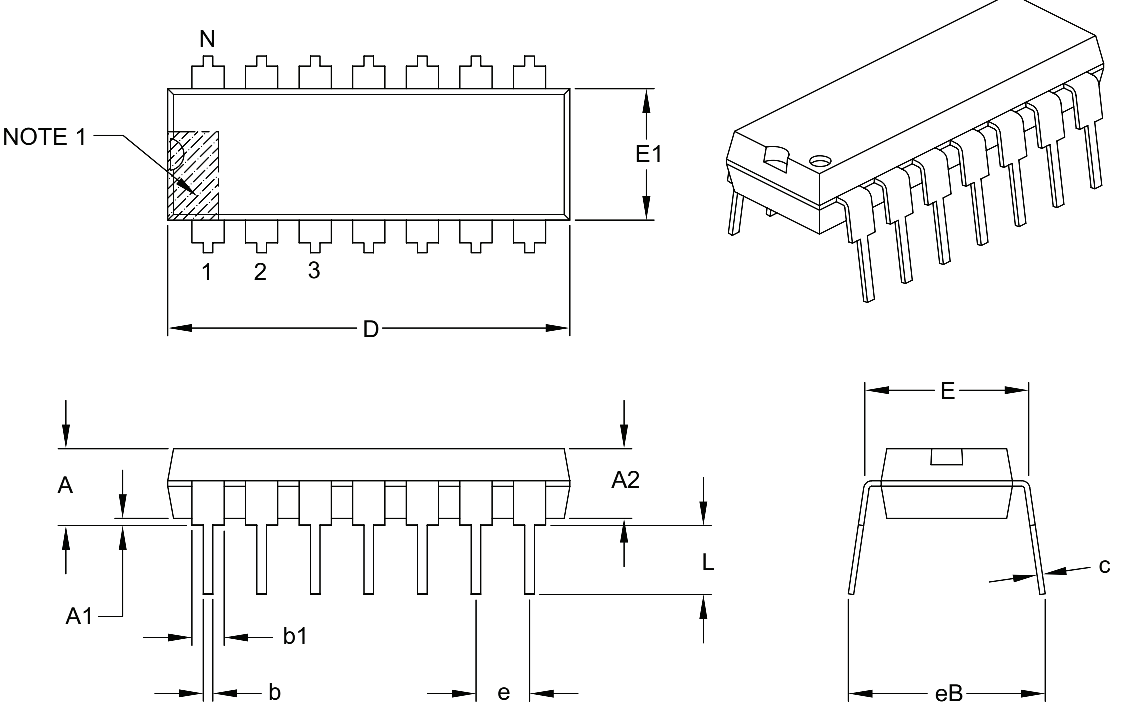
Package Outlines and Dimensions

14-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



		Units	INCHES	
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		14	
Pitch	e		.100 BSC	
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.735	.750	.775
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-005B

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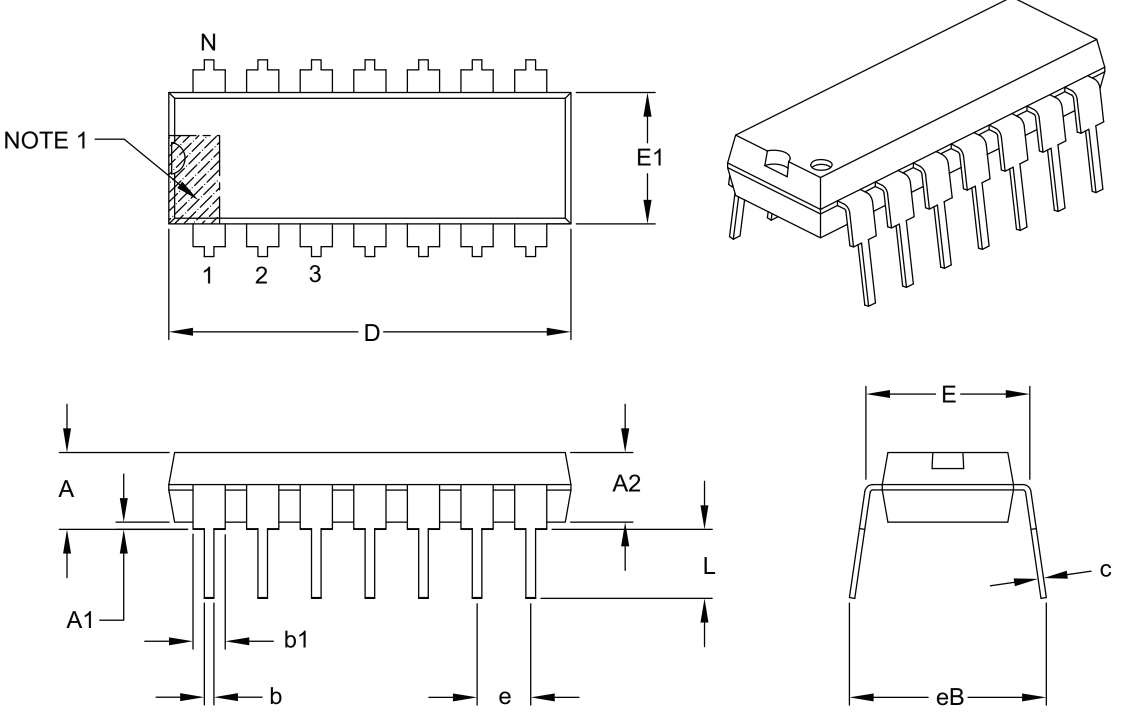
14-Lead Plastic Dual In-Line (PD) – 300 mil Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.735	.750	.775
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

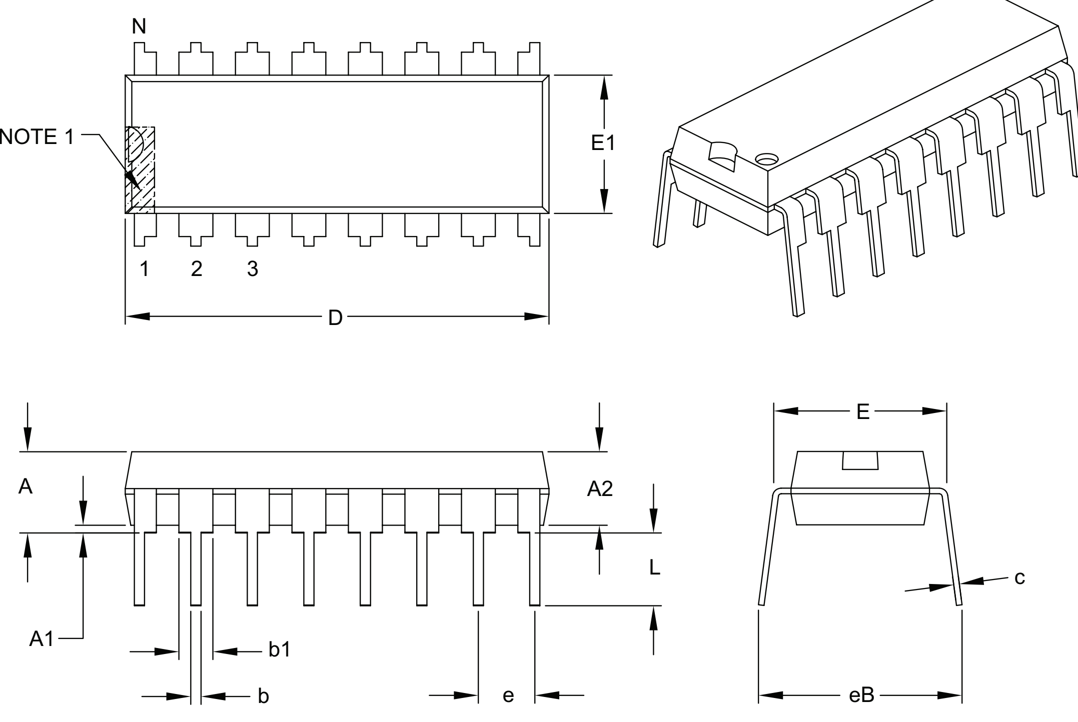
Notes:

1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-005B

16-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.735	.755	.775
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-017B

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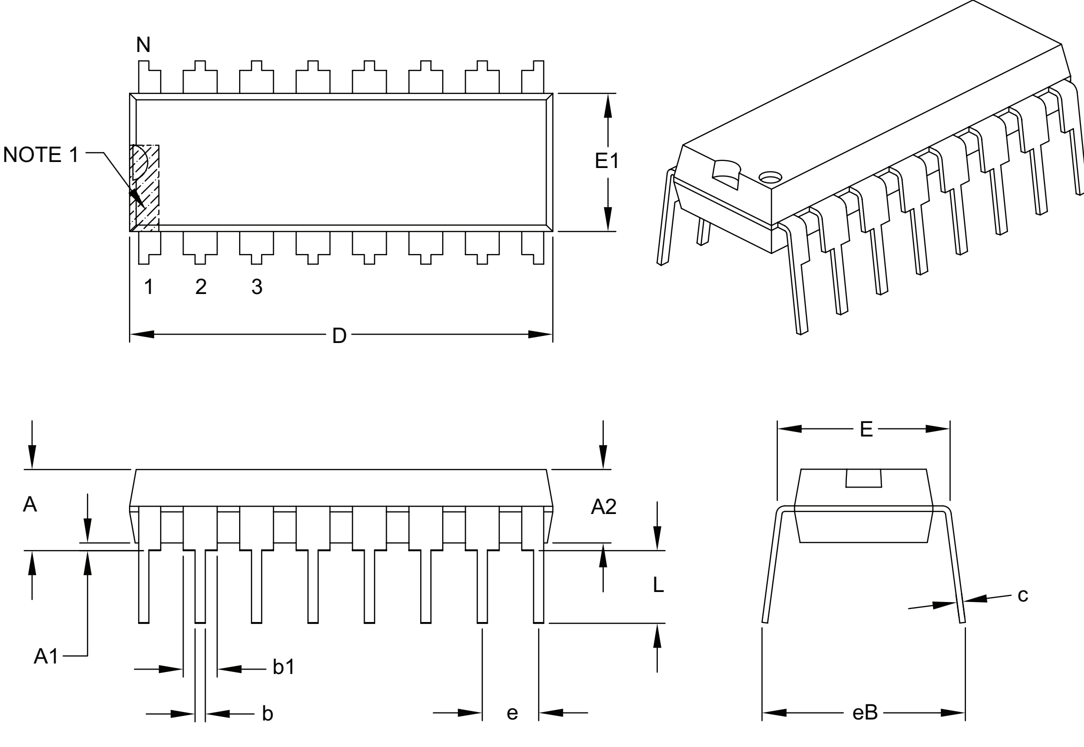
Package Outlines and Dimensions

16-Lead Plastic Dual In-Line (PE) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		.100 BSC	
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.735	.755	.775
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-017B

18-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	18		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.300	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.880	.900	.920
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.014
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-007B

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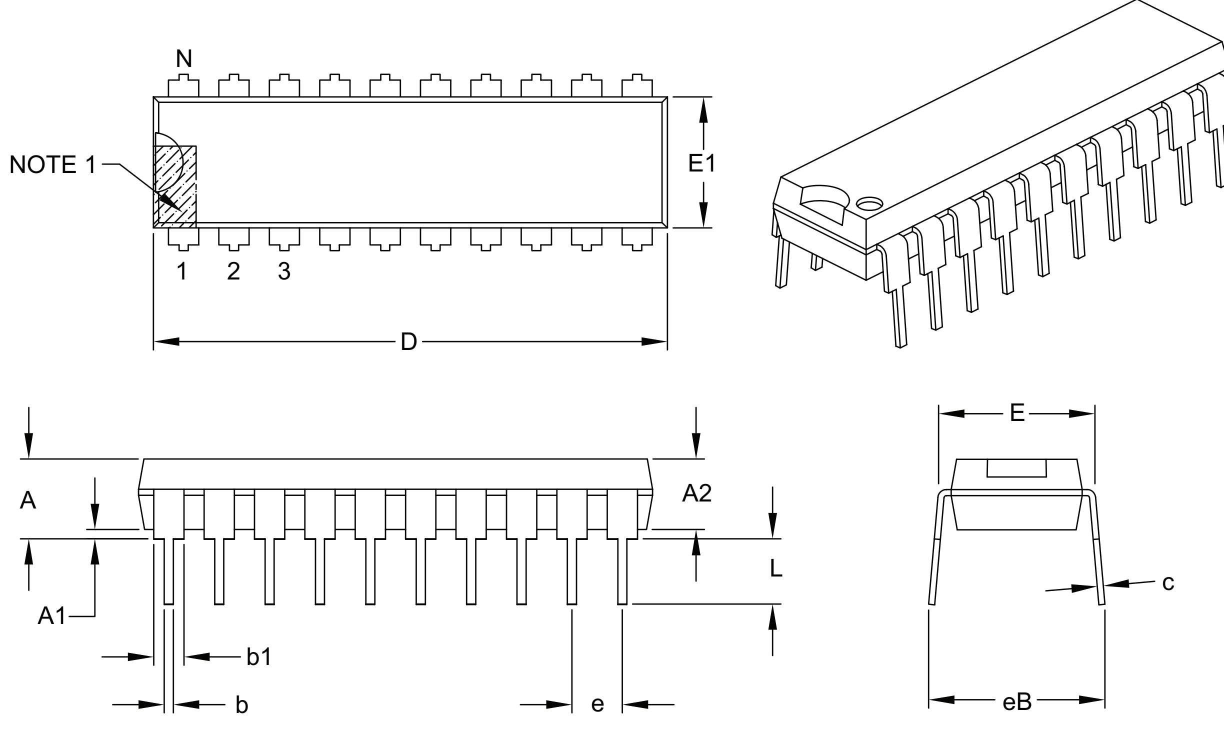
Package Outlines and Dimensions

20-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		20	
Pitch	e		.100 BSC	
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.300	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.980	1.030	1.060
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

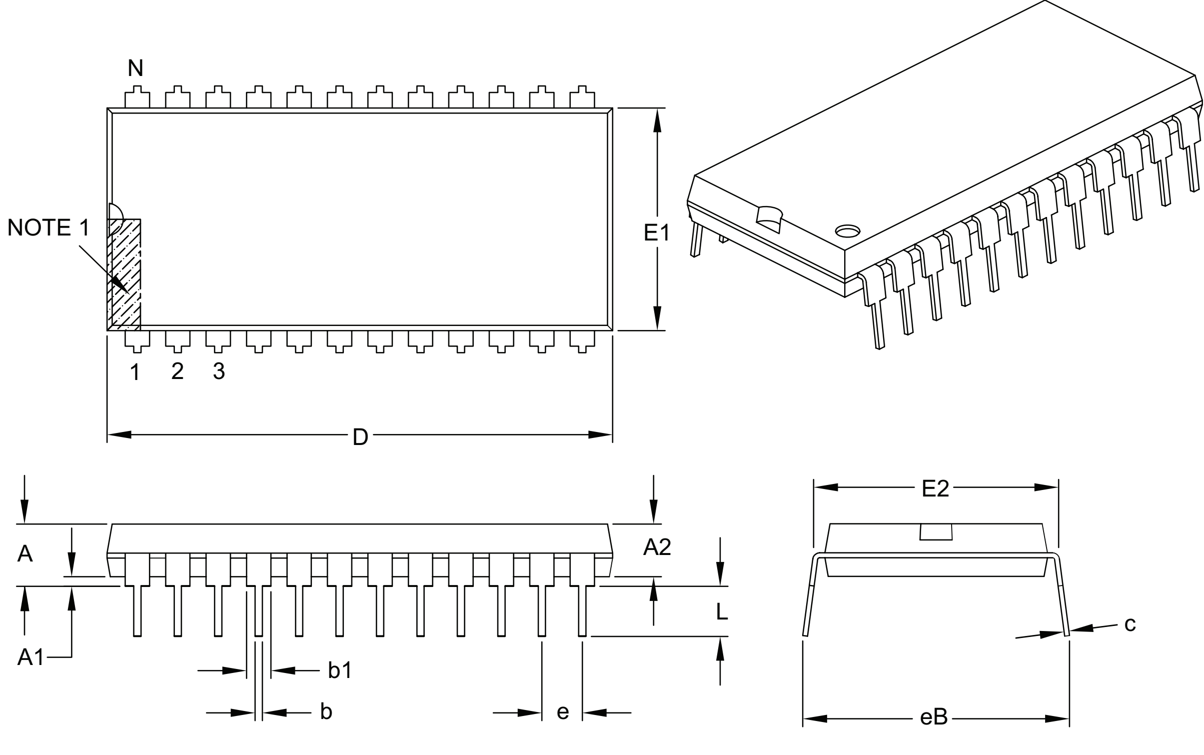
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-019B

24-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.150	–	1.290
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.022
Overall Row Spacing §	eB	–	–	.700

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-081B

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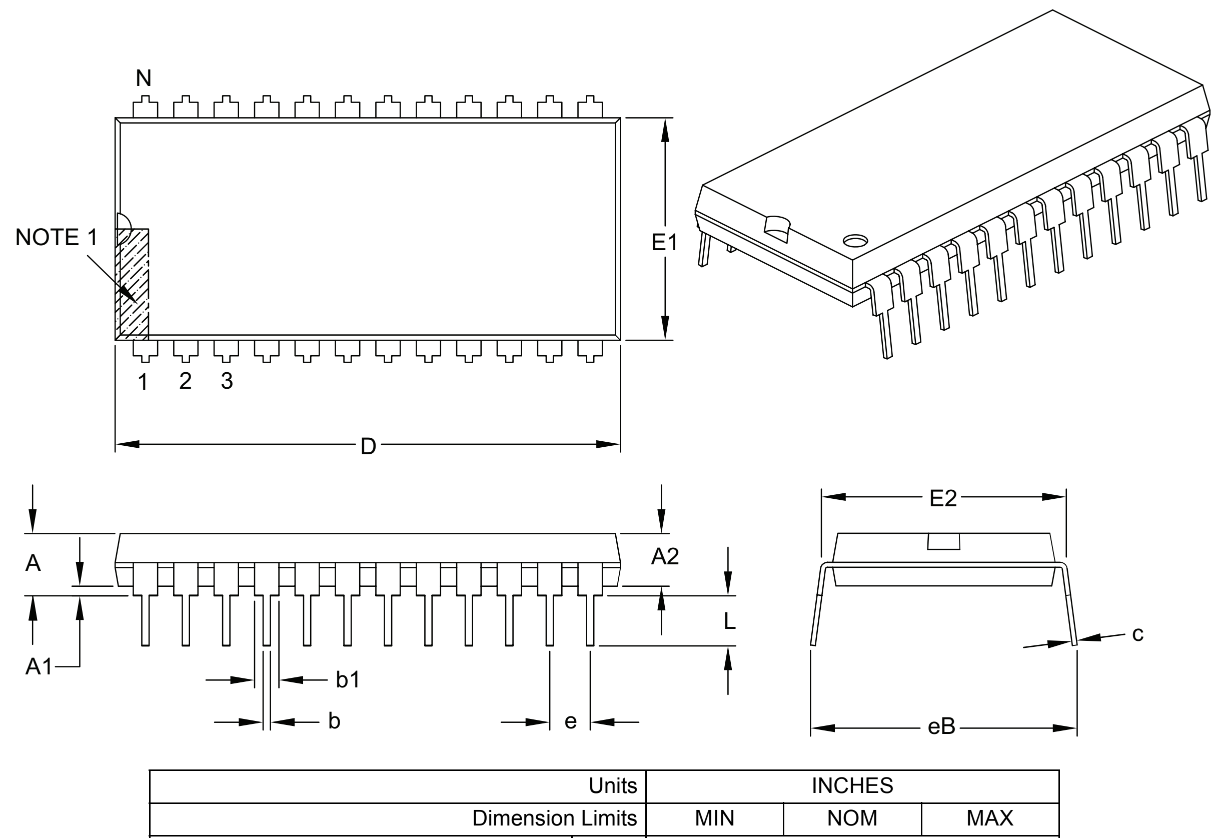
24-Lead Plastic Dual In-Line (PG) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.150	–	1.290
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.022
Overall Row Spacing §	eB	–	–	.700

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

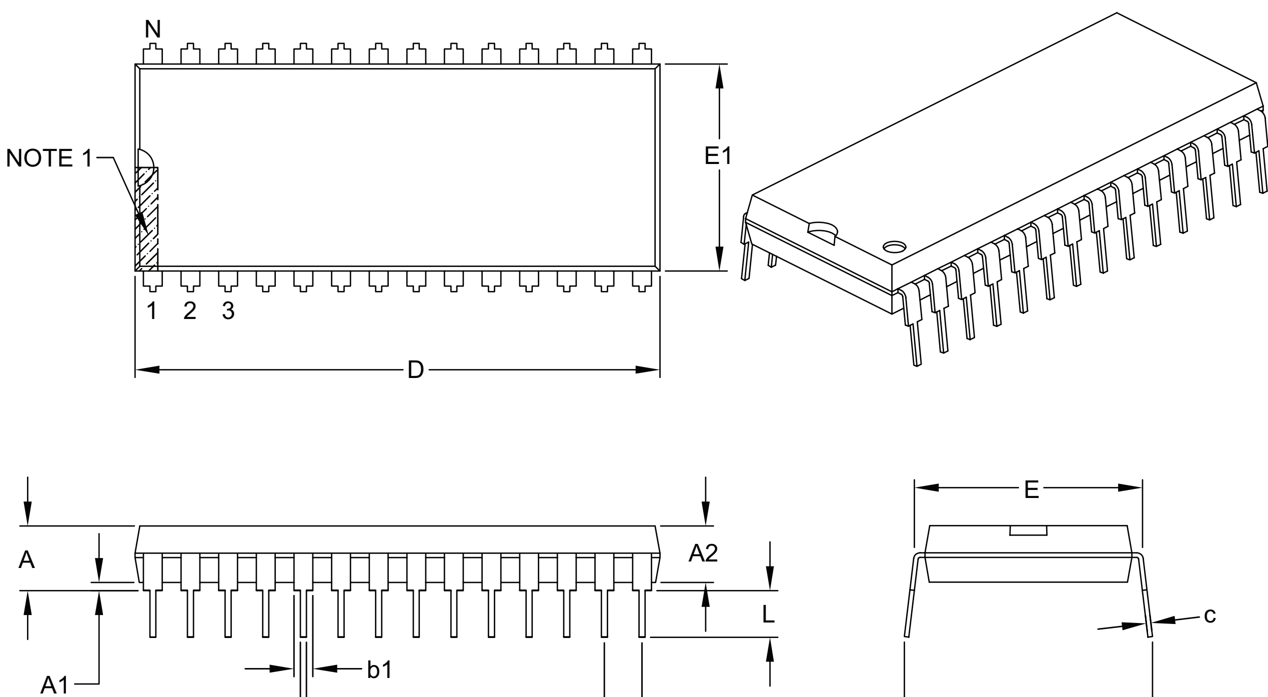
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-081B

© 2016 Microchip Technology Inc.

28-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.380	–	1.565
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.022
Overall Row Spacing §	eB	–	–	.700

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-079B

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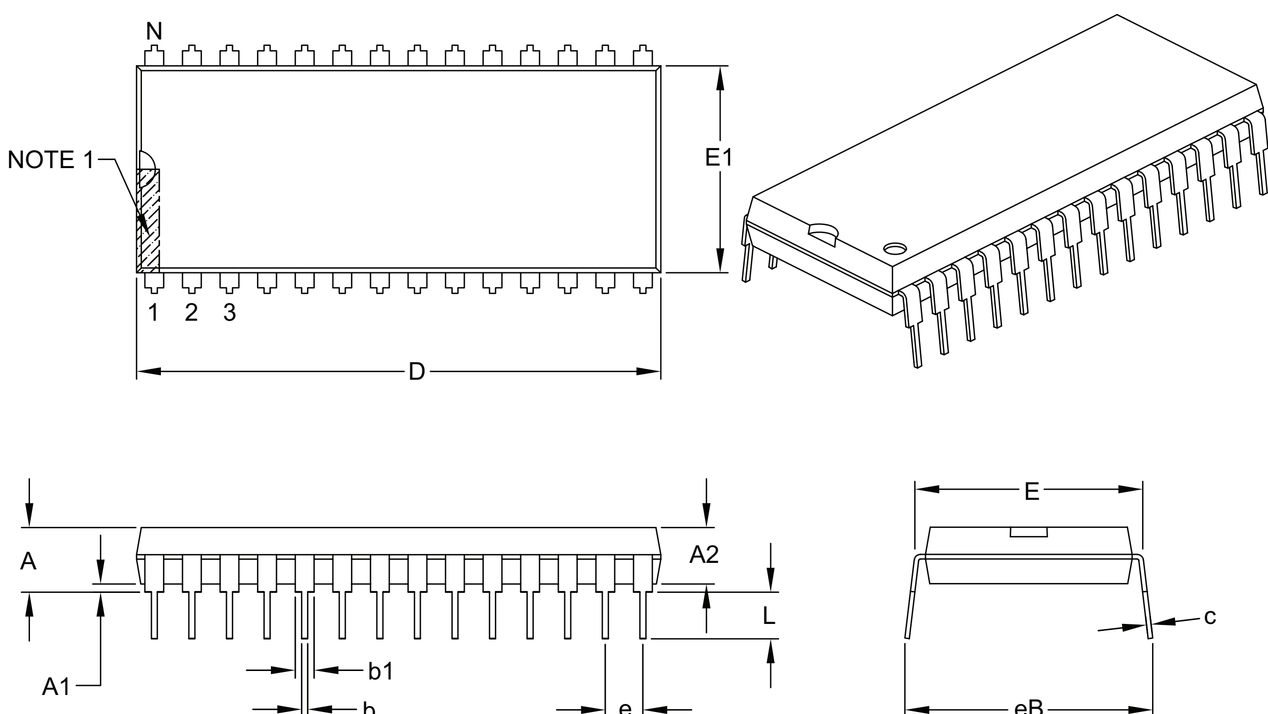
Package Outlines and Dimensions

28-Lead Plastic Dual In-Line (PI) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.380	–	1.565
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.022
Overall Row Spacing §	eB	–	–	.700

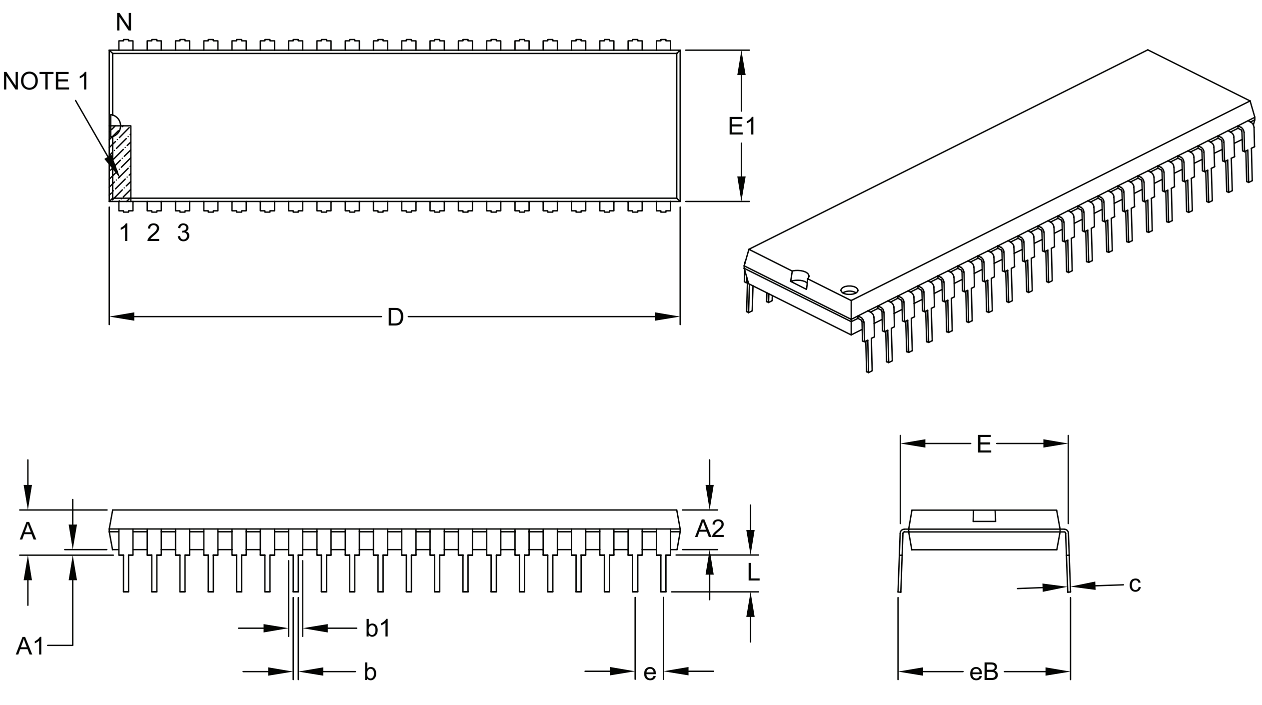
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-079B

40-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	40		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.980	–	2.095
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.023
Overall Row Spacing §	eB	–	–	.700

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-016B

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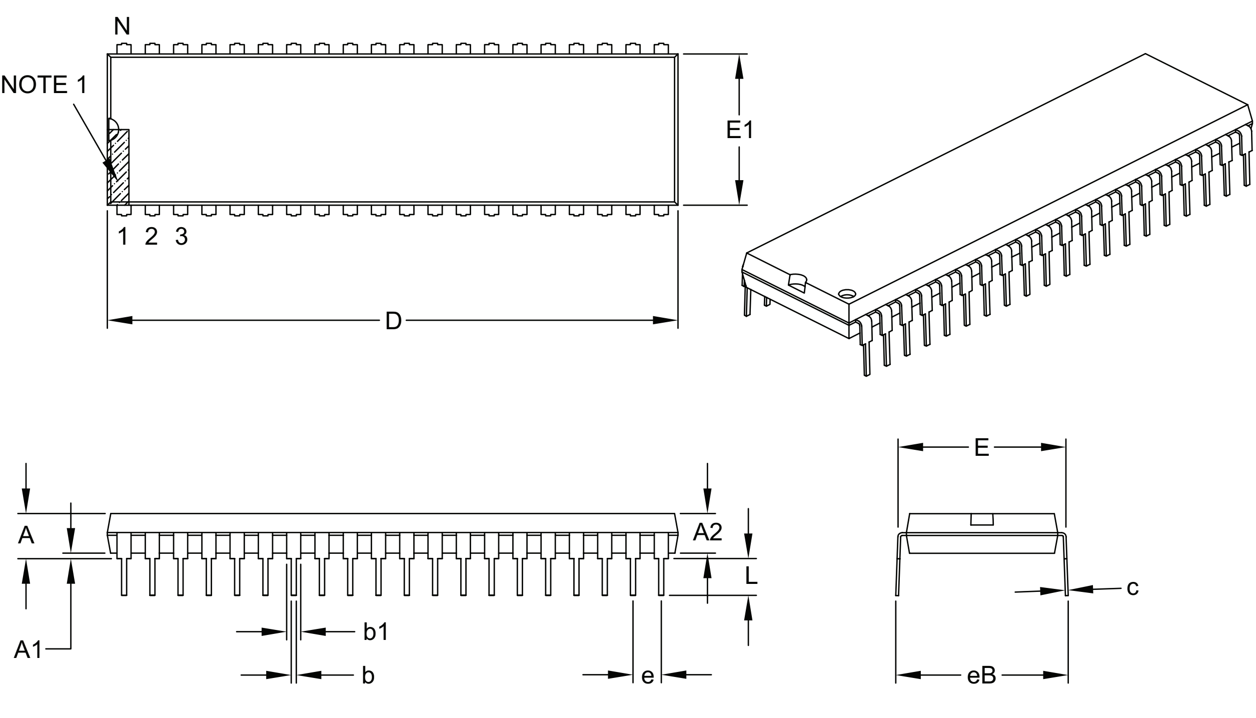
Package Outlines and Dimensions

40-Lead Plastic Dual In-Line (PL) – 600 mil Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	40		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.250
Molded Package Thickness	A2	.125	–	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.590	–	.625
Molded Package Width	E1	.485	–	.580
Overall Length	D	1.980	–	2.095
Tip to Seating Plane	L	.115	–	.200
Lead Thickness	c	.008	–	.015
Upper Lead Width	b1	.030	–	.070
Lower Lead Width	b	.014	–	.023
Overall Row Spacing §	eB	–	–	.700

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

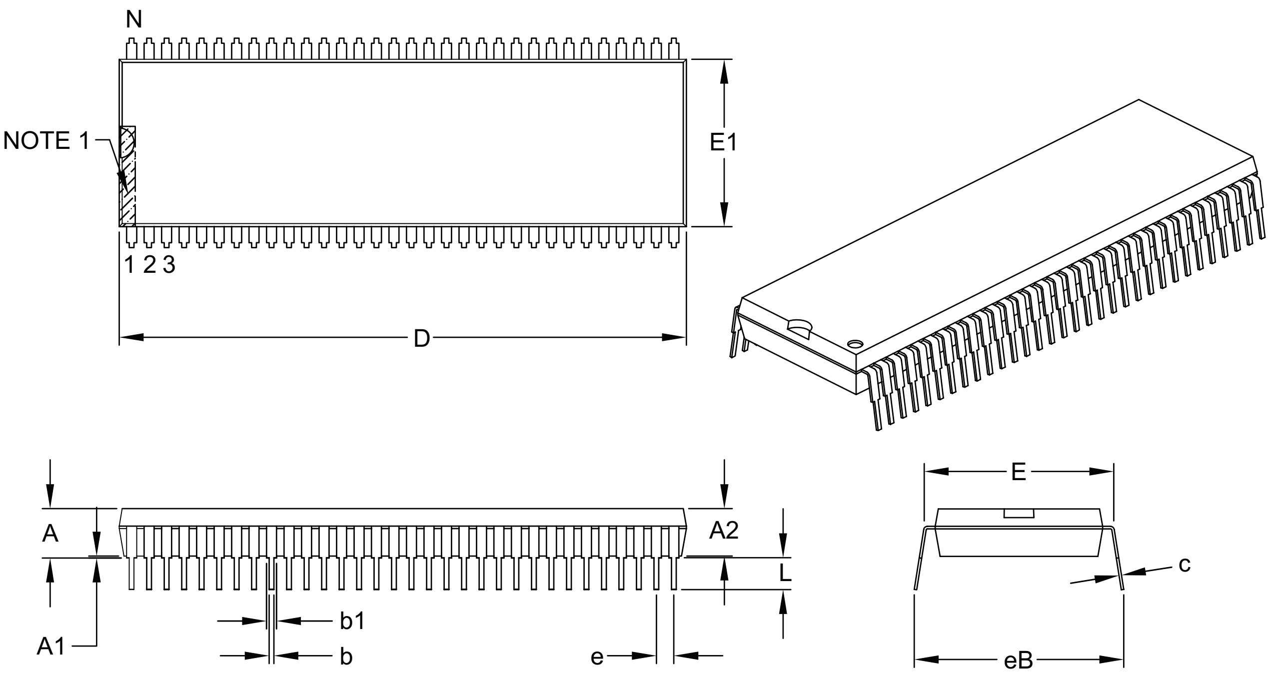
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-016B

© 2016 Microchip Technology Inc.

64-Lead Shrink Plastic Dual In-Line (SP) – 750 mil Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	64		
Pitch	e	.070 BSC		
Top to Seating Plane	A	–	–	.200
Molded Package Thickness	A2	.120	.150	.180
Base to Seating Plane	A1	.020	–	–
Shoulder to Shoulder Width	E	.750	–	.785
Molded Package Width	E1	.650	.670	.690
Overall Length	D	2.260	2.270	2.280
Tip to Seating Plane	L	.100	.130	.150
Lead Thickness	c	.009	.010	.015
Upper Lead Width	b1	.035	.040	.045
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.880

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

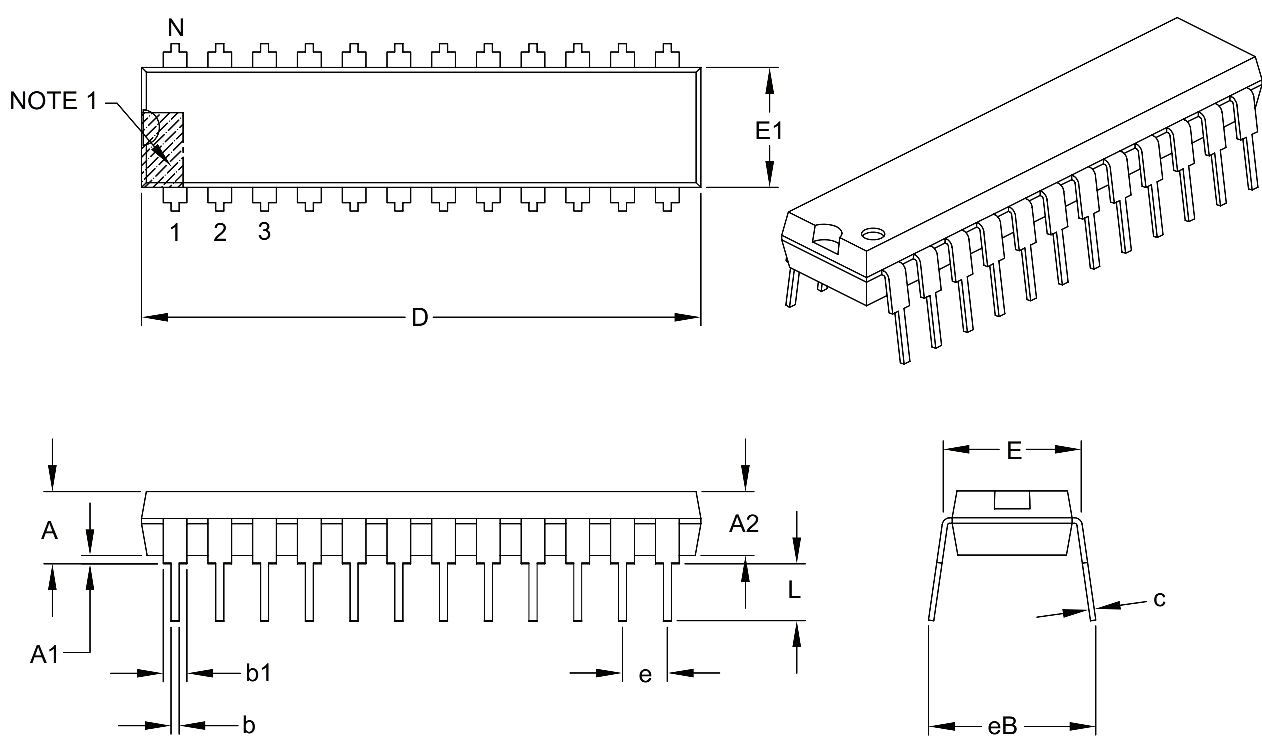
Microchip Technology Drawing C04-090B

© 2016 Microchip Technology Inc.

SPDIP

24-Lead Skinny Plastic Dual In-Line (PF) – 300 mil Body [SPDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		24	
Pitch	e		.100 BSC	
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.280	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	1.155	1.250	1.280
Tip to Seating Plane	L	.115	.130	.160
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.023
Overall Row Spacing §	eB	–	–	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-043B

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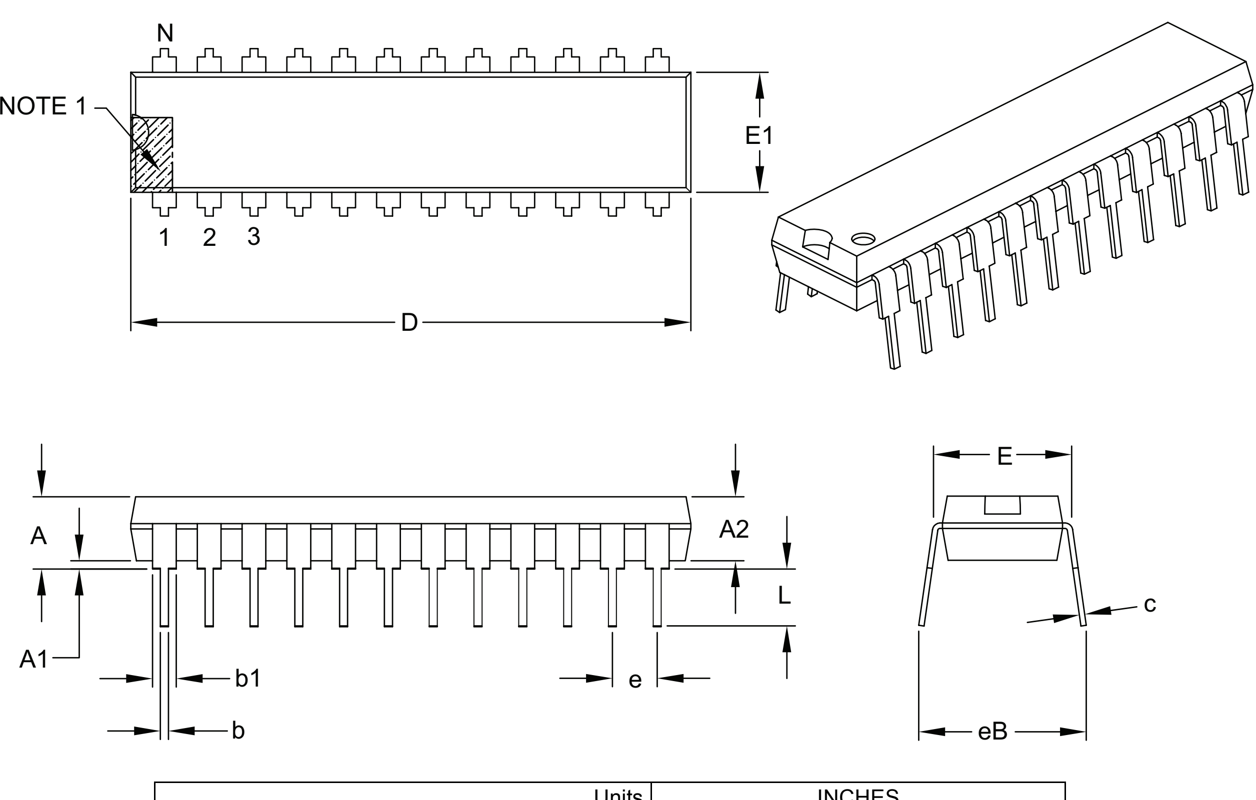
24-Lead Skinny Plastic Dual In-Line (SP) – 300 mil Body [SPDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.280	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	1.155	1.250	1.280
Tip to Seating Plane	L	.115	.130	.160
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.023
Overall Row Spacing §	eB	–	–	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-043B

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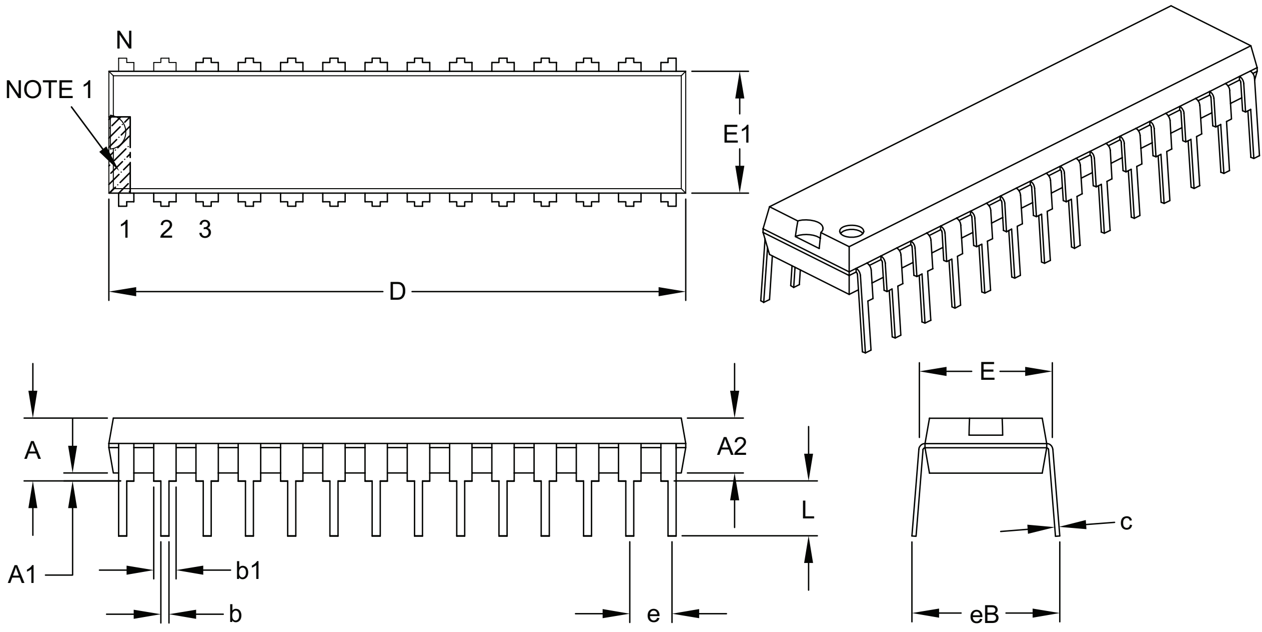
28-Lead Skinny Plastic Dual In-Line (PJ) – 300 mil Body [SPDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.200
Molded Package Thickness	A2	.120	.135	.150
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.335
Molded Package Width	E1	.240	.285	.295
Overall Length	D	1.345	1.365	1.400
Tip to Seating Plane	L	.110	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.050	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-070B

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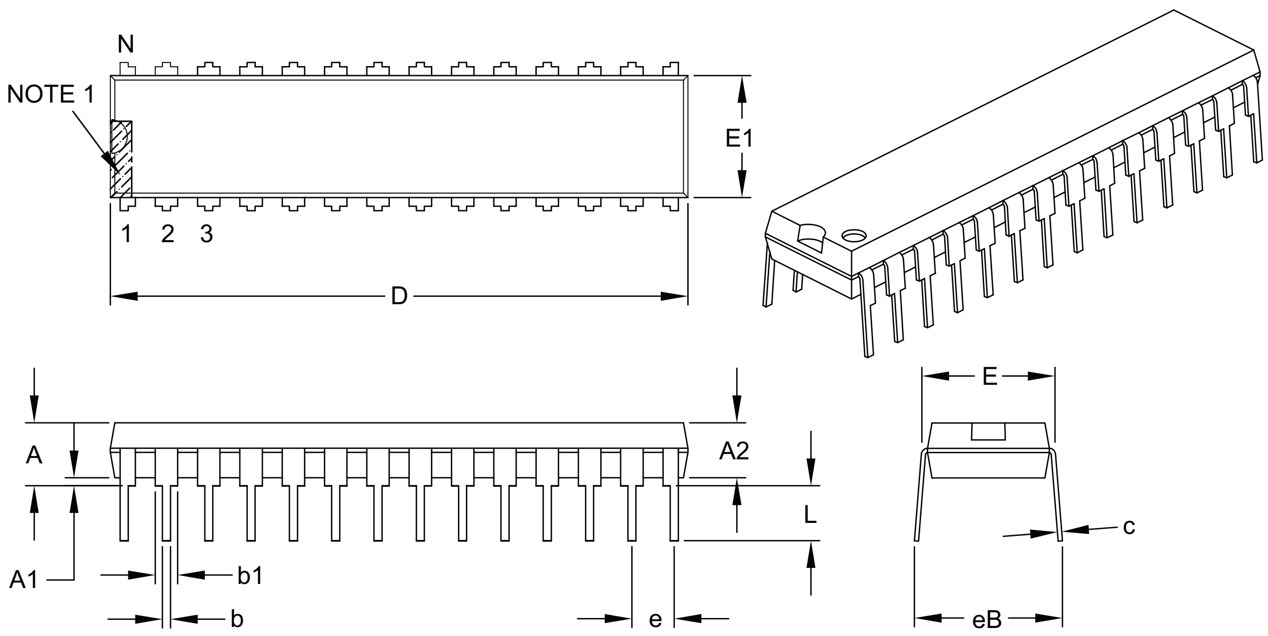
Package Outlines and Dimensions

28-Lead Skinny Plastic Dual In-Line (SP) – 300 mil Body [SPDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.200
Molded Package Thickness	A2	.120	.135	.150
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.335
Molded Package Width	E1	.240	.285	.295
Overall Length	D	1.345	1.365	1.400
Tip to Seating Plane	L	.110	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.050	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-070B

NOTES:

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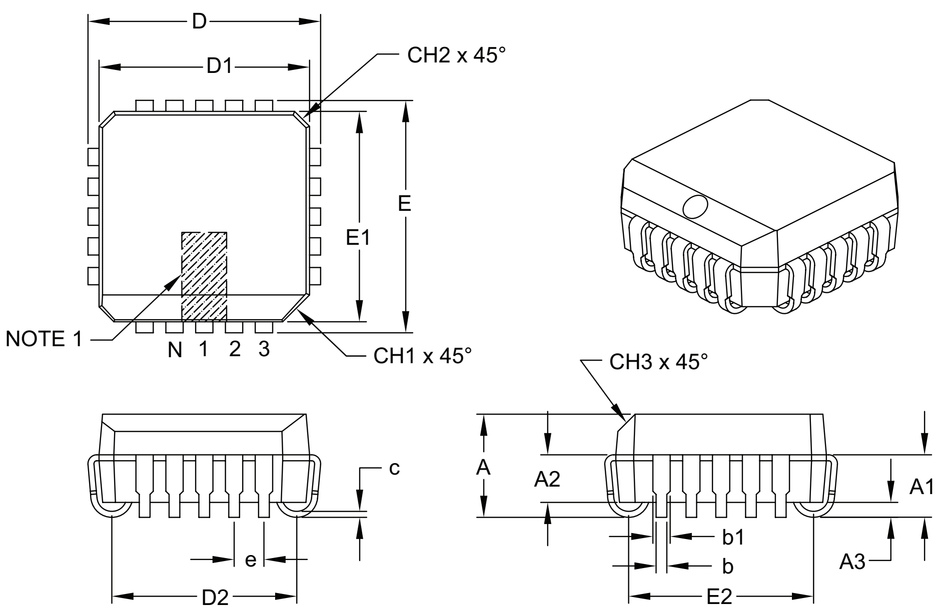
PLCC

20-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		20	
Pitch	e		.050	
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.385	.390	.395
Overall Length	D	.385	.390	.395
Molded Package Width	E1	.350	.353	.356
Molded Package Length	D1	.350	.353	.356
Footprint Width	E2	.282	.310	.338
Footprint Length	D2	.282	.310	.338
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-064B

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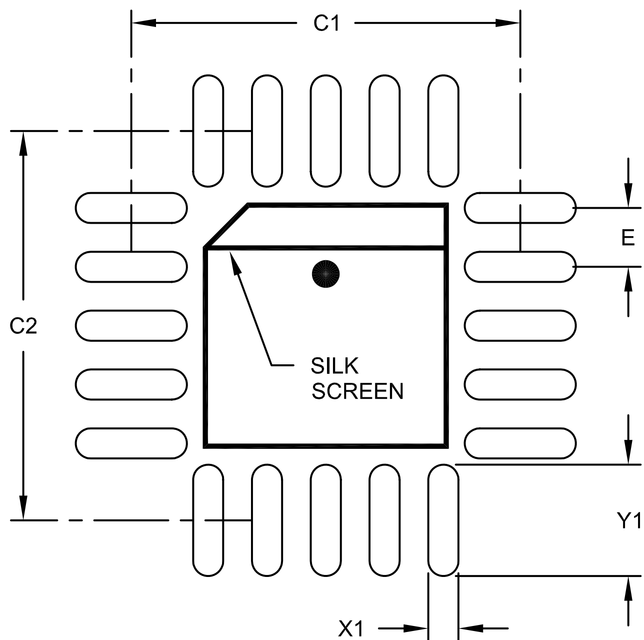
20-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.331	
Contact Pad Spacing	C2		.331	
Contact Pad Width (X20)	X1			.026
Contact Pad Length (X20)	Y1			.094

Notes:

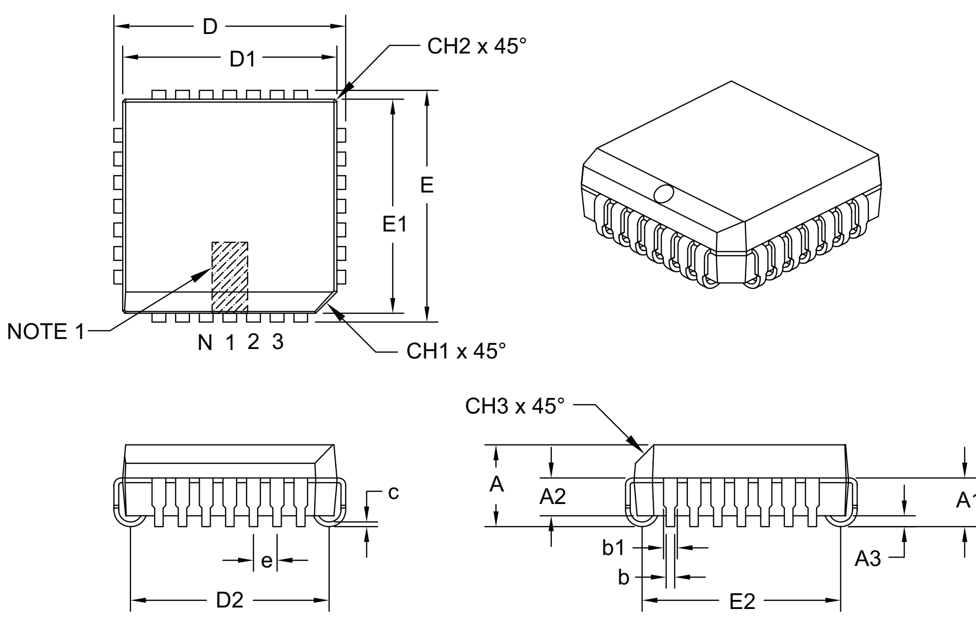
1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2064A

28-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		.050	
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.485	.490	.495
Overall Length	D	.485	.490	.495
Molded Package Width	E1	.450	.453	.456
Molded Package Length	D1	.450	.453	.456
Footprint Width	E2	.382	.410	.438
Footprint Length	D2	.382	.410	.438
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-026B

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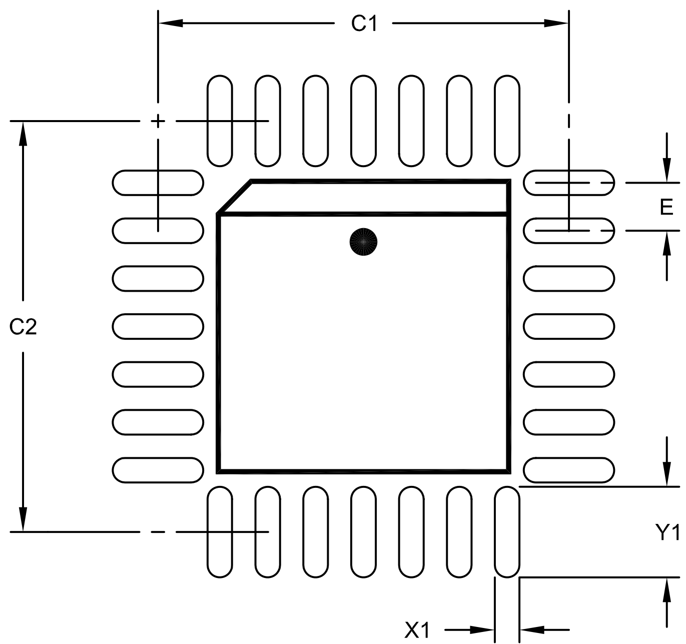
Footprint Outlines and Dimensions

28-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.429	
Contact Pad Spacing	C2		.429	
Contact Pad Width (X28)	X1			.026
Contact Pad Length (X28)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

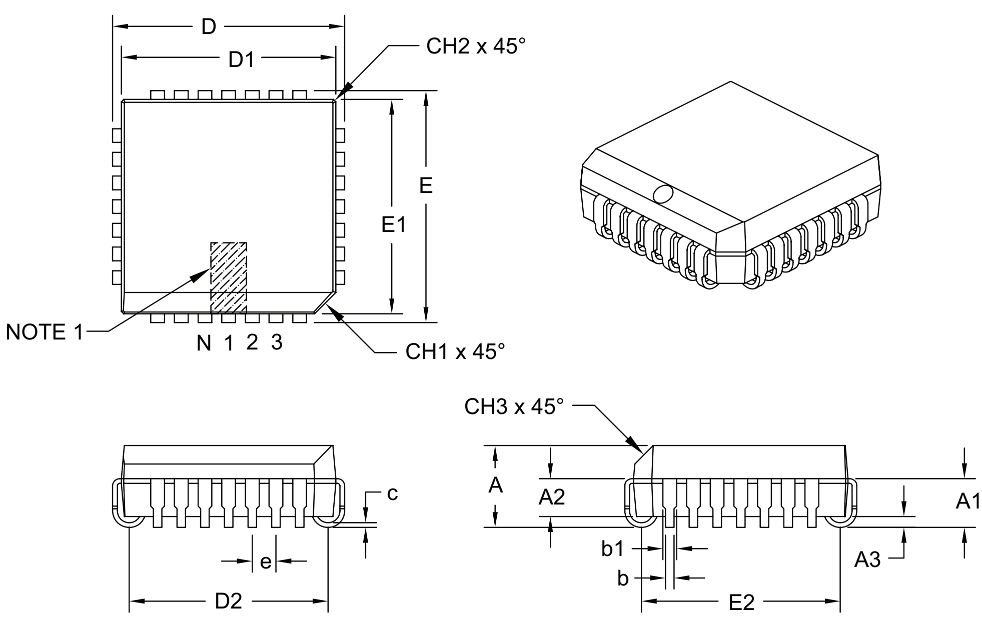
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2026A

© 2016 Microchip Technology Inc.

28-Lead Plastic Leaded Chip Carrier (LI) – Square [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	.050		
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.485	.490	.495
Overall Length	D	.485	.490	.495
Molded Package Width	E1	.450	.453	.456
Molded Package Length	D1	.450	.453	.456
Footprint Width	E2	.382	.410	.438
Footprint Length	D2	.382	.410	.438
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-026B

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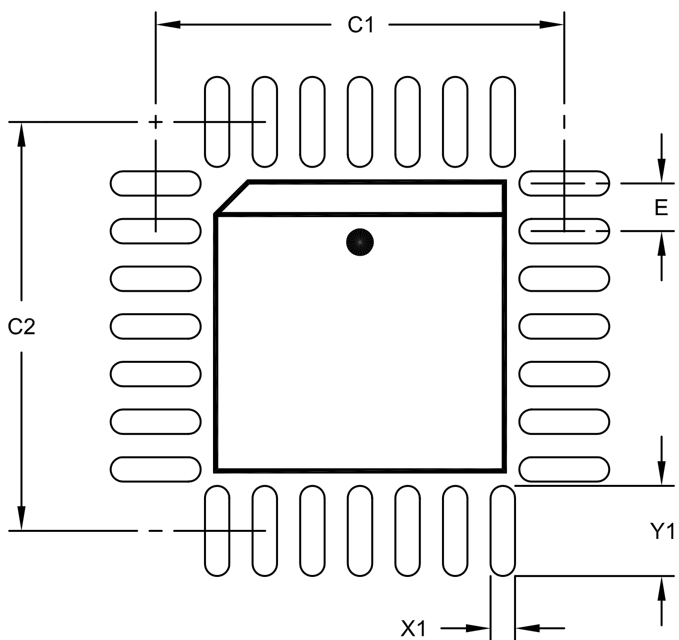
Footprint Outlines and Dimensions

28-Lead Plastic Leaded Chip Carrier (LI) - Square [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	.050 BSC		
Contact Pad Spacing	C1		.429	
Contact Pad Spacing	C2		.429	
Contact Pad Width (X28)	X1			.026
Contact Pad Length (X28)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2026A

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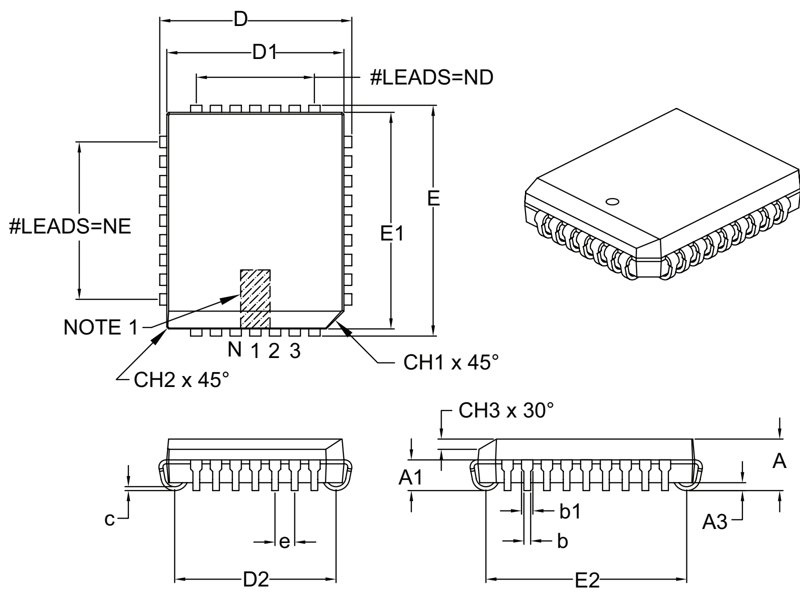
32-Lead Plastic Leaded Chip Carrier (L) – Rectangle [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	32		
Pitch	e	.050		
Pins along Length	ND	7		
Pins along Width	NE	9		
Overall Height	A	.125	–	.140
Contact Height	A1	.060	–	.095
Standoff §	A3	.015	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer Height	CH3	.023	–	.029
Overall Length	D	.485	–	.495
Overall Width	E	.585	–	.595
Molded Package Length	D1	.447	–	.453
Molded Package Width	E1	.547	–	.553
Footprint Length	D2	.376	–	.446
Footprint Width	E2	.476	–	.546
Lead Thickness	c	.008	–	.013
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-023B

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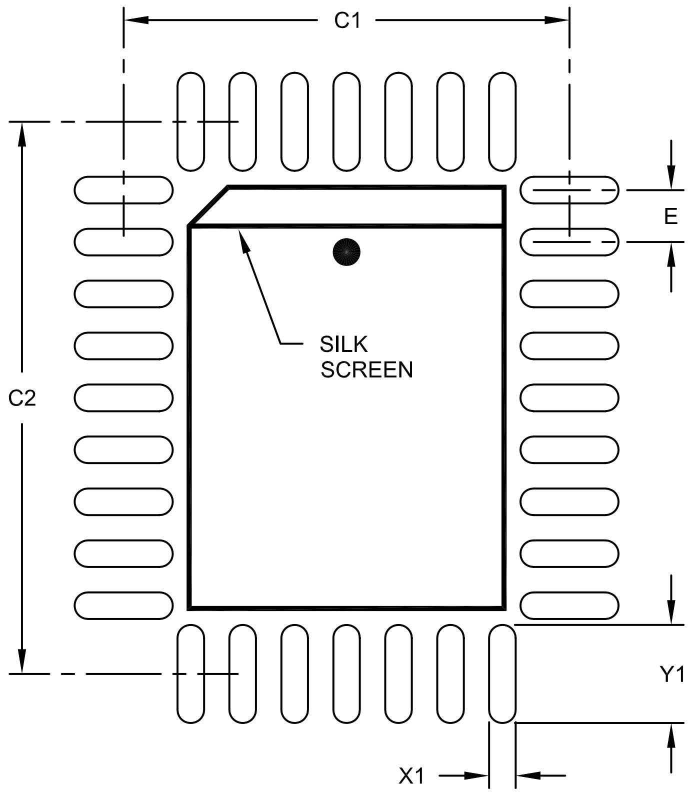
Footprint Outlines and Dimensions

32-Lead Plastic Leaded Chip Carrier (L) - Rectangle [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	.050 BSC		
Contact Pad Spacing	C1		.429	
Contact Pad Spacing	C2		.531	
Contact Pad Width (X32)	X1			,026
Contact Pad Length (X32)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

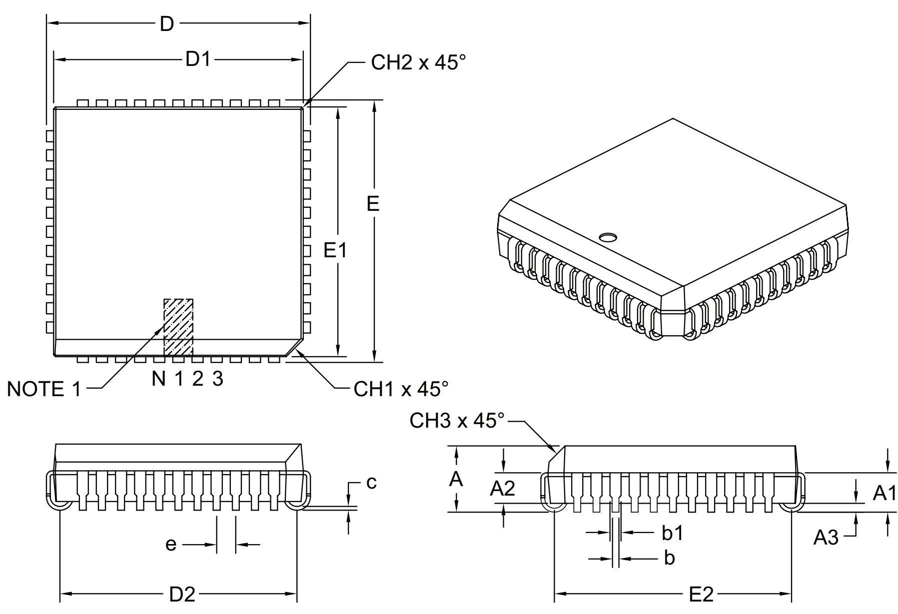
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2023A

Package Outlines and Dimensions

44-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		44	
Pitch	e		.050	
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.685	.690	.695
Overall Length	D	.685	.690	.695
Molded Package Width	E1	.650	.653	.656
Molded Package Length	D1	.650	.653	.656
Footprint Width	E2	.582	.610	.638
Footprint Length	D2	.582	.610	.638
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-048B

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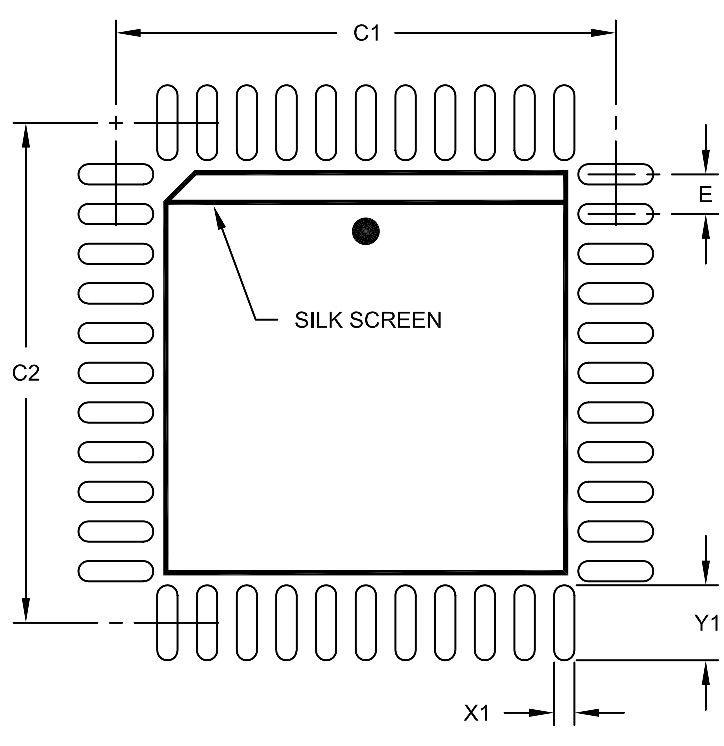
44-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	INCHES		
Dimension	Limits	MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.630	
Contact Pad Spacing	C2		.630	
Contact Pad Width (X44)	X1			.026
Contact Pad Length (X44)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

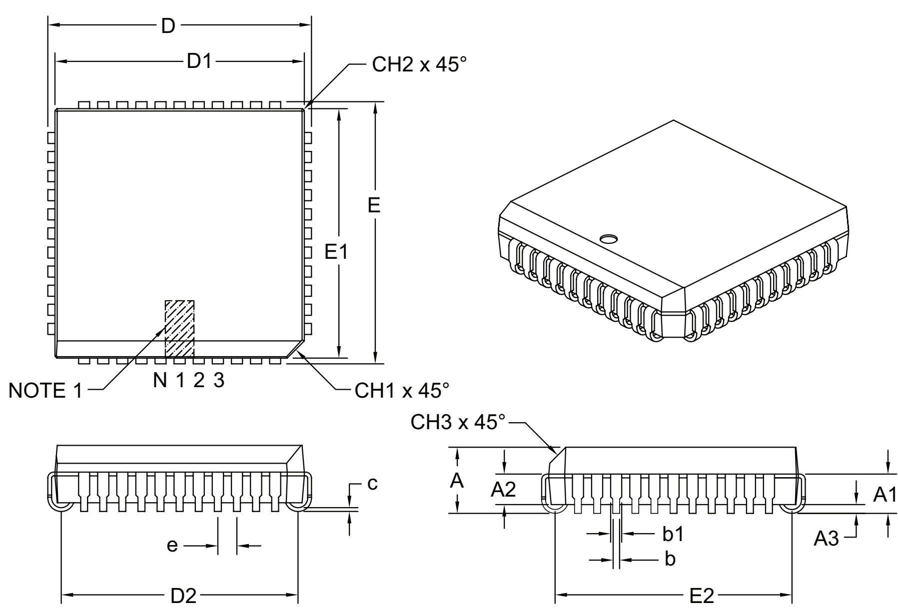
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2048A

© 2016 Microchip Technology Inc.

44-Lead Plastic Leaded Chip Carrier (LW) – Square [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	44		
Pitch	e	.050		
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.685	.690	.695
Overall Length	D	.685	.690	.695
Molded Package Width	E1	.650	.653	.656
Molded Package Length	D1	.650	.653	.656
Footprint Width	E2	.582	.610	.638
Footprint Length	D2	.582	.610	.638
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

Notes:

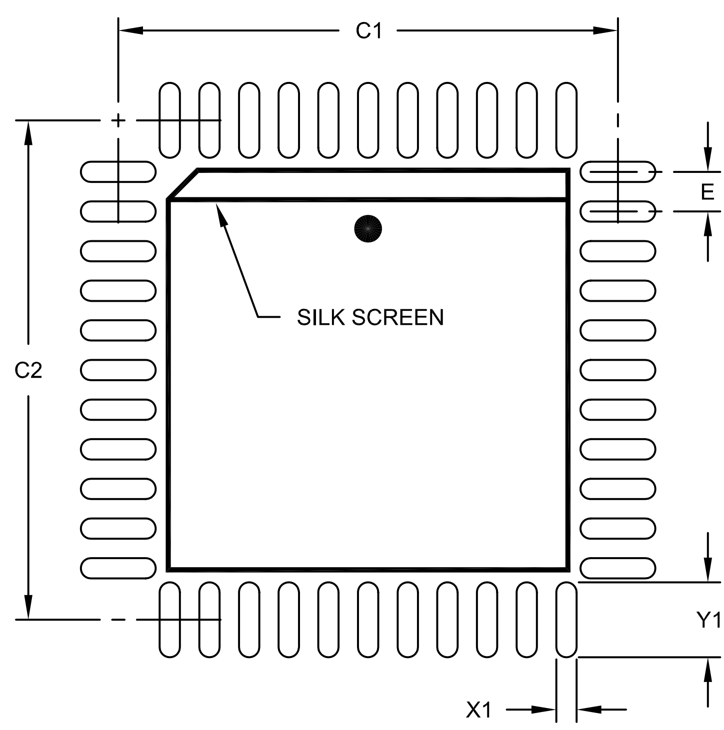
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-048B

© 2016 Microchip Technology Inc.

44-Lead Plastic Leaded Chip Carrier (LW) – Square [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension	Limits	MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.630	
Contact Pad Spacing	C2		.630	
Contact Pad Width (X44)	X1			.026
Contact Pad Length (X44)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

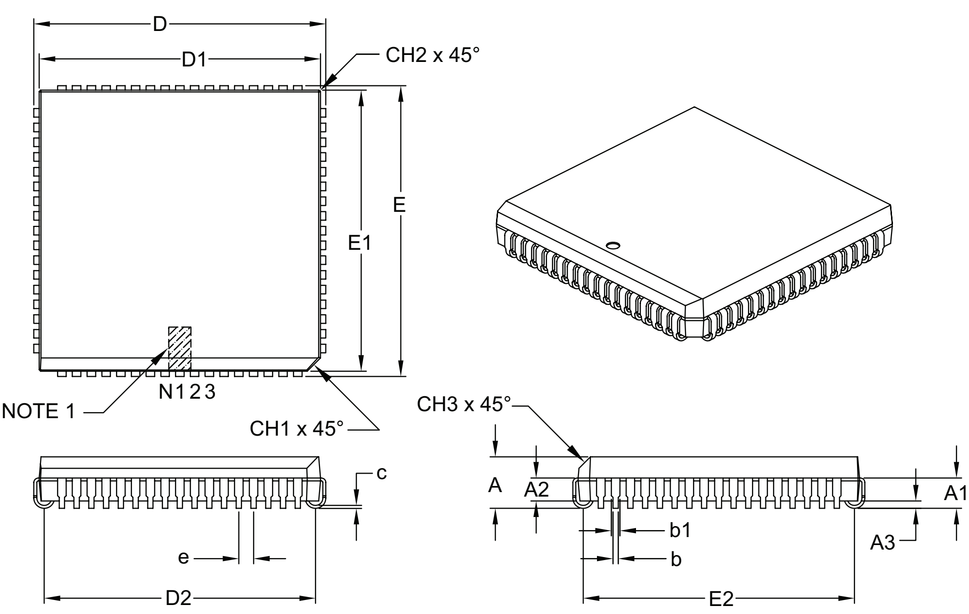
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2048A

Package Outlines and Dimensions

68-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	68		
Pitch	e	.050		
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.985	.990	.995
Overall Length	D	.985	.990	.995
Molded Package Width	E1	.950	.954	.958
Molded Package Length	D1	.950	.954	.958
Footprint Width	E2	.882	.910	.938
Footprint Length	D2	.882	.910	.938
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-049B

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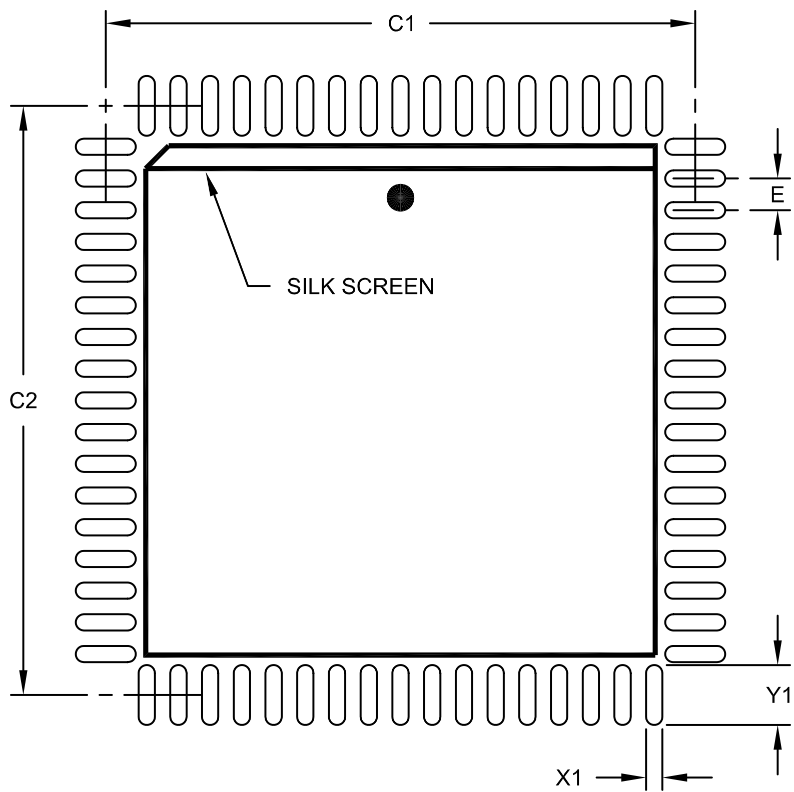
68-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	.050 BSC		
Contact Pad Spacing	C1		.929	
Contact Pad Spacing	C2		.929	
Contact Pad Width (X68)	X1			.026
Contact Pad Length (X68)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2049A

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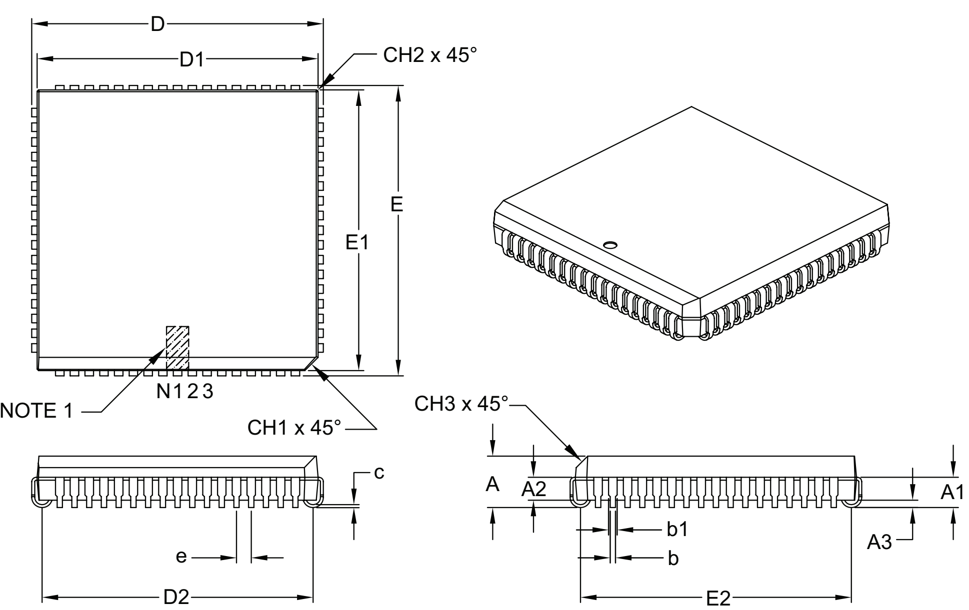
Package Outlines and Dimensions

68-Lead Plastic Leaded Chip Carrier (LS) – Square [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		68	
Pitch	e		.050	
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.985	.990	.995
Overall Length	D	.985	.990	.995
Molded Package Width	E1	.950	.954	.958
Molded Package Length	D1	.950	.954	.958
Footprint Width	E2	.882	.910	.938
Footprint Length	D2	.882	.910	.938
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-049B

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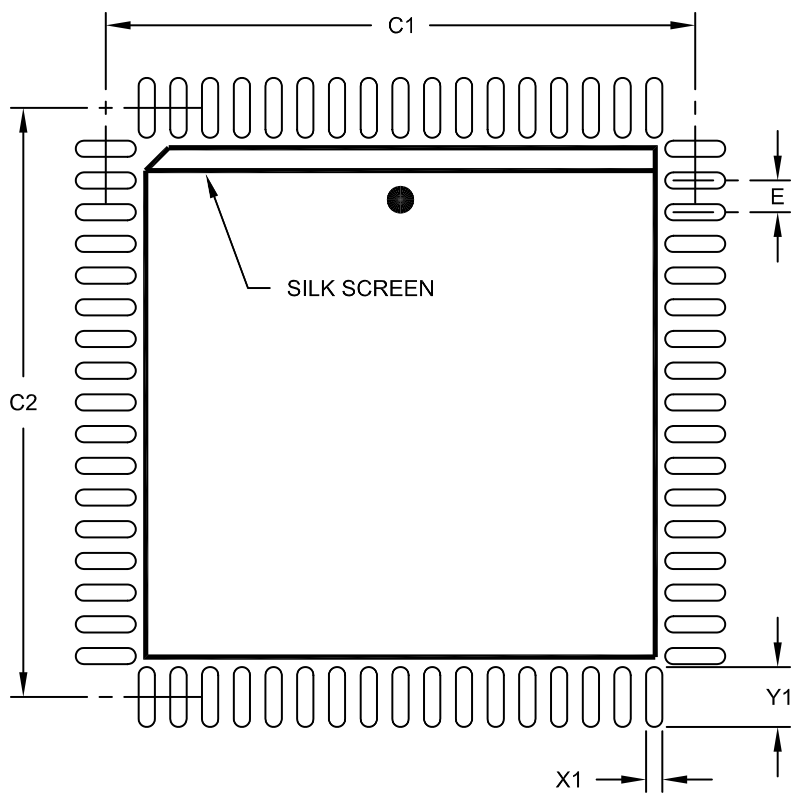
68-Lead Plastic Leaded Chip Carrier (LS) - Square [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	.050 BSC		
Contact Pad Spacing	C1		.929	
Contact Pad Spacing	C2		.929	
Contact Pad Width (X68)	X1			.026
Contact Pad Length (X68)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2049A

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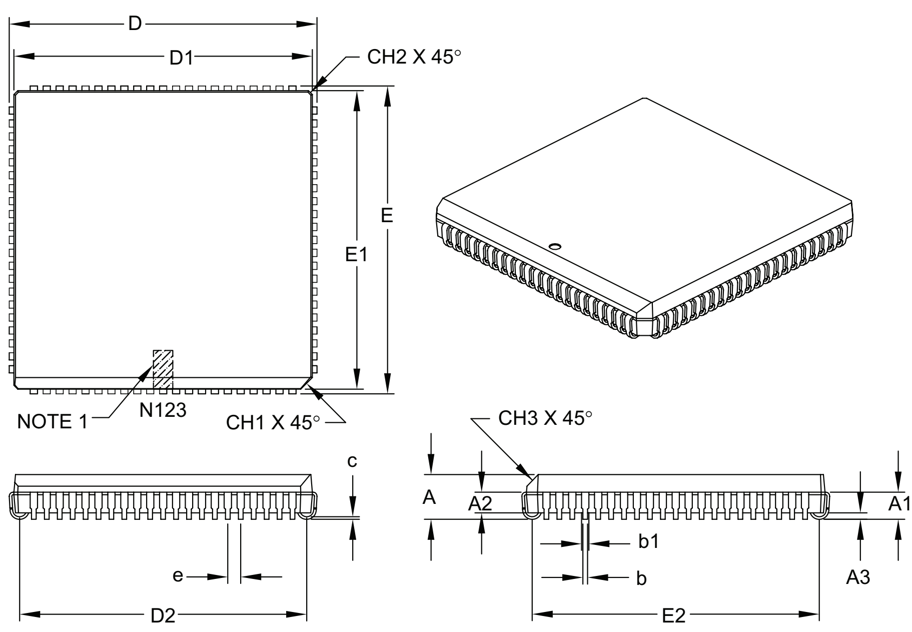
84-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		84	
Pitch	e		.050	
Overall Height	A	.165	.172	.200
Contact Height	A1	.090	.105	.130
Molded Package to Contact	A2	.059	–	.080
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	1.185	1.190	1.195
Overall Length	D	1.185	1.190	1.195
Molded Package Width	E1	1.150	1.154	1.158
Molded Package Length	D1	1.150	1.154	1.158
Footprint Width	E2	1.082	1.110	1.138
Footprint Length	D2	1.082	1.110	1.138
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Microchip Technology Drawing C04-093B

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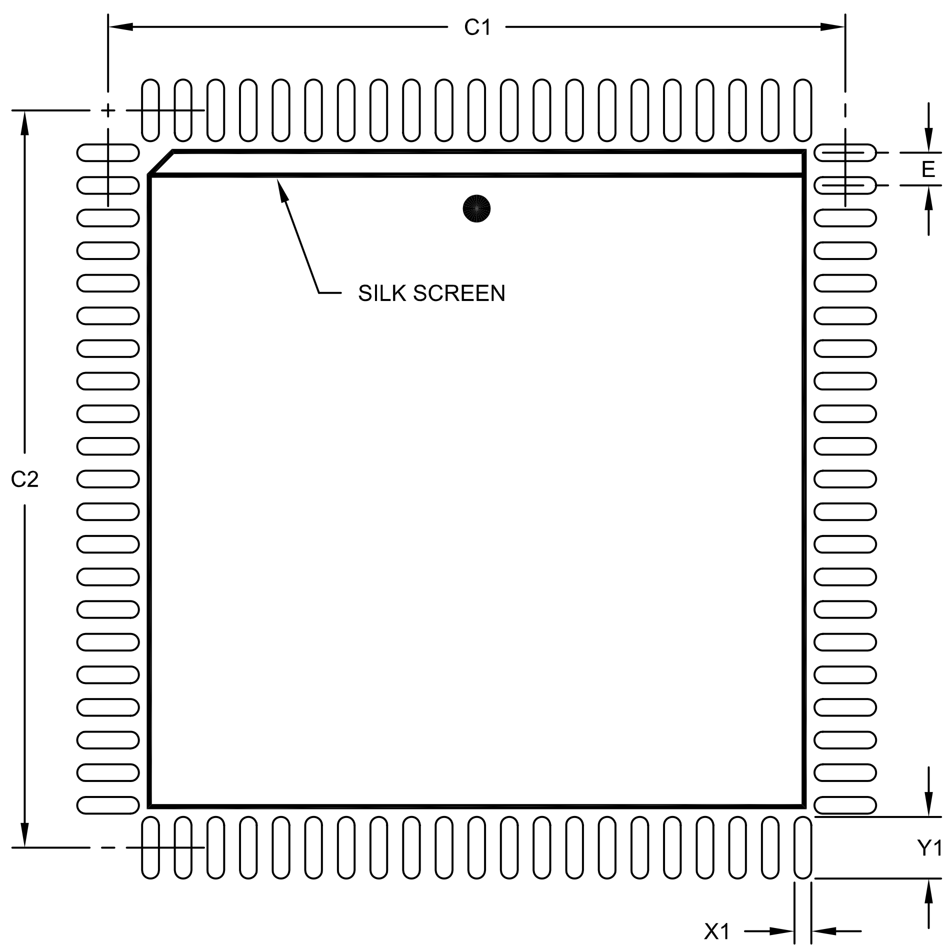
84-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	.050 BSC		
Contact Pad Spacing	C1		1.130	
Contact Pad Spacing	C2		1.130	
Contact Pad Width (X84)	X1			.026
Contact Pad Length (X84)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2093A

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NOTES:

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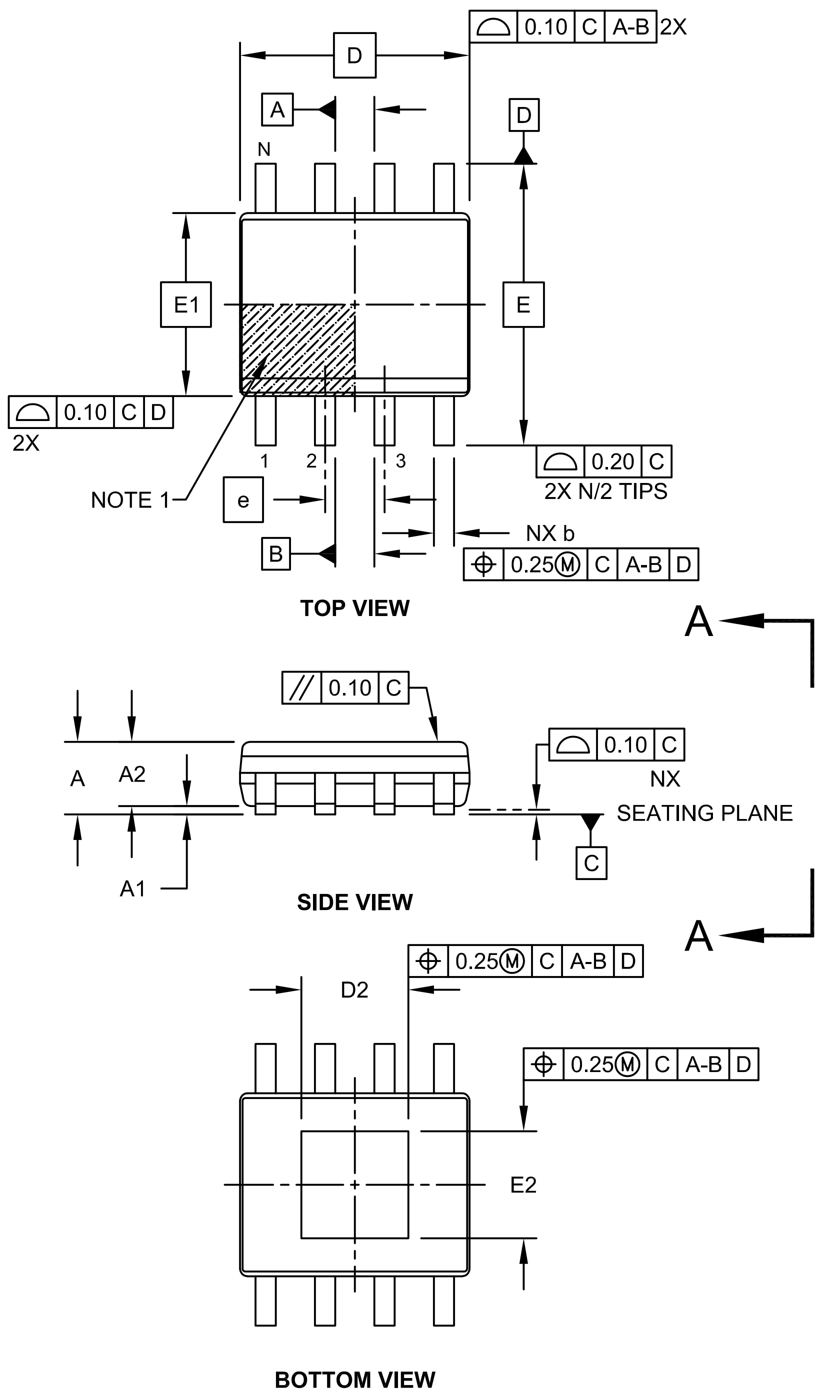
SOP

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing No. C04-121A Sheet 1 of 2

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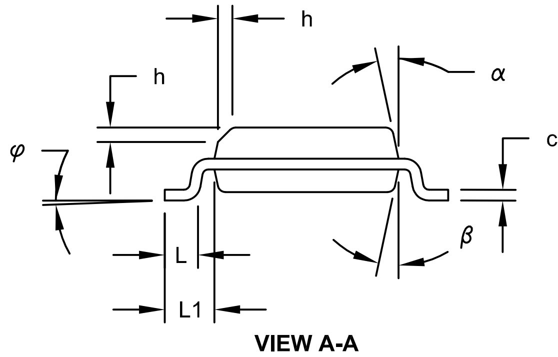
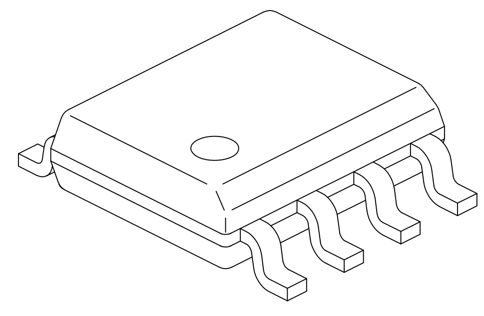
Package Outlines and Dimensions

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		1.27	
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.00	-	0.15
Overall Width	E	5.80	6.00	6.20
Molded Package Width	E1	3.80	3.90	4.00
Overall Length	D	4.70	4.90	5.10
Exposed Pad Width	E2	2.19	2.29	2.39
Exposed Pad Length	D2	2.19	2.29	2.39
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04	1.04	1.04
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.17	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

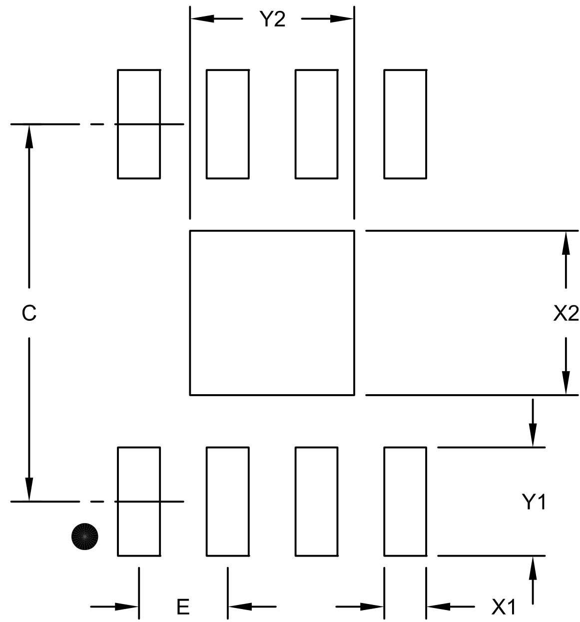
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-121A Sheet 2 of 2

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		5.40	
Contact Pad Width (X8)	X1			0.60
Contact Pad Length (X8)	Y1			1.55
Exposed Pad Width	X2			2.35
Exposed Pad Length	Y2			2.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2121A

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SOIC

8-Lead Small Outline Integrated Circuit (7HX) - .150 In. (3.90 mm) Body [SOIC] With 1.65x1.65 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D A B N E/2 (DATUM A) (DATUM B) NOTE 1 E1 E
2X 0.10 C B
2X 0.05 C A 1 2
2X 0.20 C A
8X b 0.25(M) C A B
e
TOP VIEW

SEE DETAIL A
h h H
END VIEW

C A A2 SEATING PLANE A1
16X 0.08 C
SIDE VIEW

D2 1 2 E2 N
BOTTOM VIEW

Microchip Technology Drawing C04-423A Sheet 1 of 2

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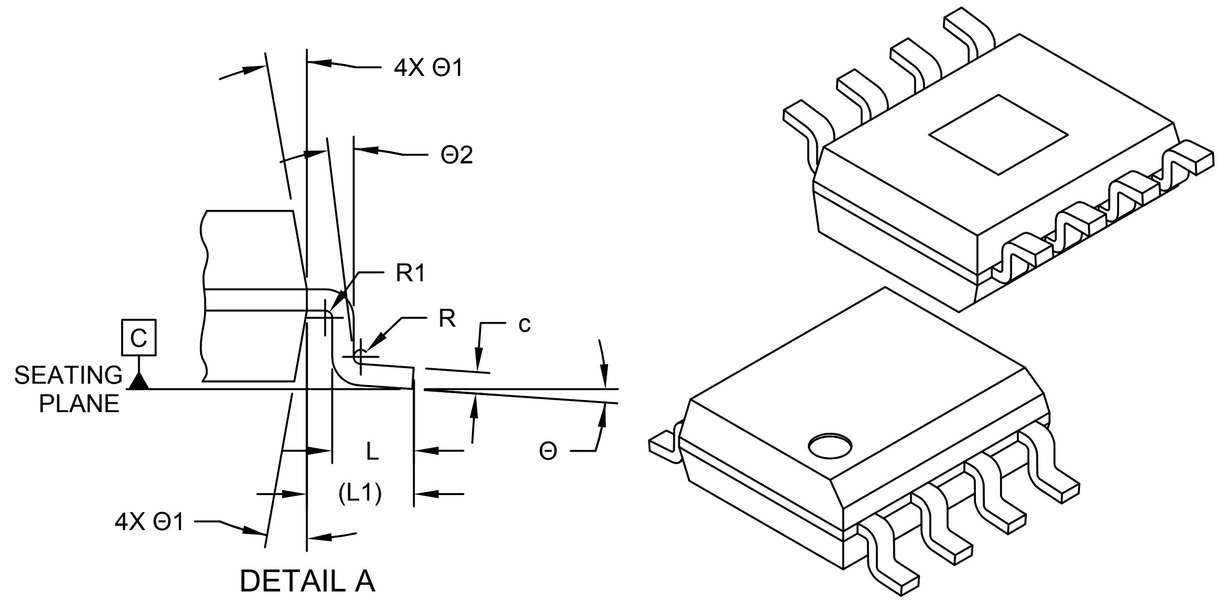
8-Lead Small Outline Integrated Circuit (7HX) - .150 In. (3.90 mm) Body [SOIC] With 1.65x1.65 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	-	-	1.70
Molded Package Thickness	A2	1.25	1.45	-
Standoff §	A1	0.00	-	0.15
Overall Width	E		6.00 BSC	
Molded Package Width	E1		3.90 BSC	
Overall Length	D		4.85 BSC	
Exposed Pad Width	E2	1.65	-	-
Exposed Pad Length	D2	1.65	-	-
Chamfer (Optional)	h	0.38	-	-
Foot Length	L	0.40	0.71	1.27
Footprint	L1		1.04 REF	
Lead Thickness	c	0.10	-	0.25
Lead Width	b	0.31	-	0.51
Foot Angle	Θ	0°	-	8°
Lead Angle	Θ2	0°	-	-
Mold Draft Angle	Θ1	0°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

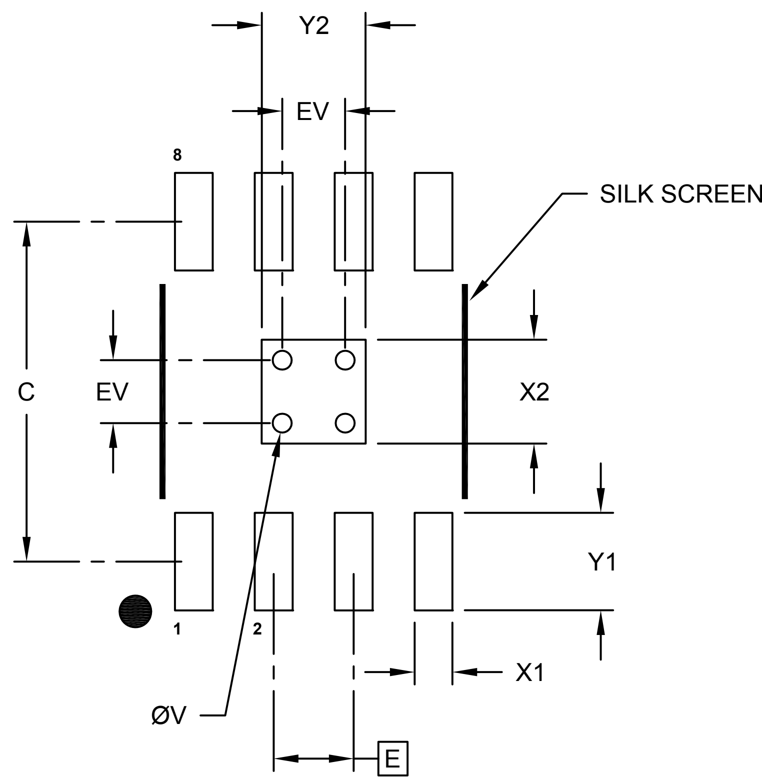
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-423A Sheet 2 of 2

8-Lead Small Outline Integrated Circuit (7HX) - .150 In. (3.90 mm) Body [SOIC]
With 1.65x1.65 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Optional Center Pad Width	X2	1.65		
Optional Center Pad Length	Y2	2.65		
Contact Pad Spacing	C		5.40	
Contact Pad Width (X20)	X1			0.60
Contact Pad Length (X20)	Y1			1.55
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2423A

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8-Lead Small Outline Integrated Circuit (5DX) - .150 In. (3.90 mm) Body [SOIC] With 3.30x2.41 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
E/2
(DATUM A)
(DATUM B)
NOTE 1
E1
E
2X
0.10 C B
2X
0.10 C A
1 2
2X
0.20 C A
8X b
0.25(M) C A B
e
TOP VIEW

SEE DETAIL A
h
h
H
END VIEW

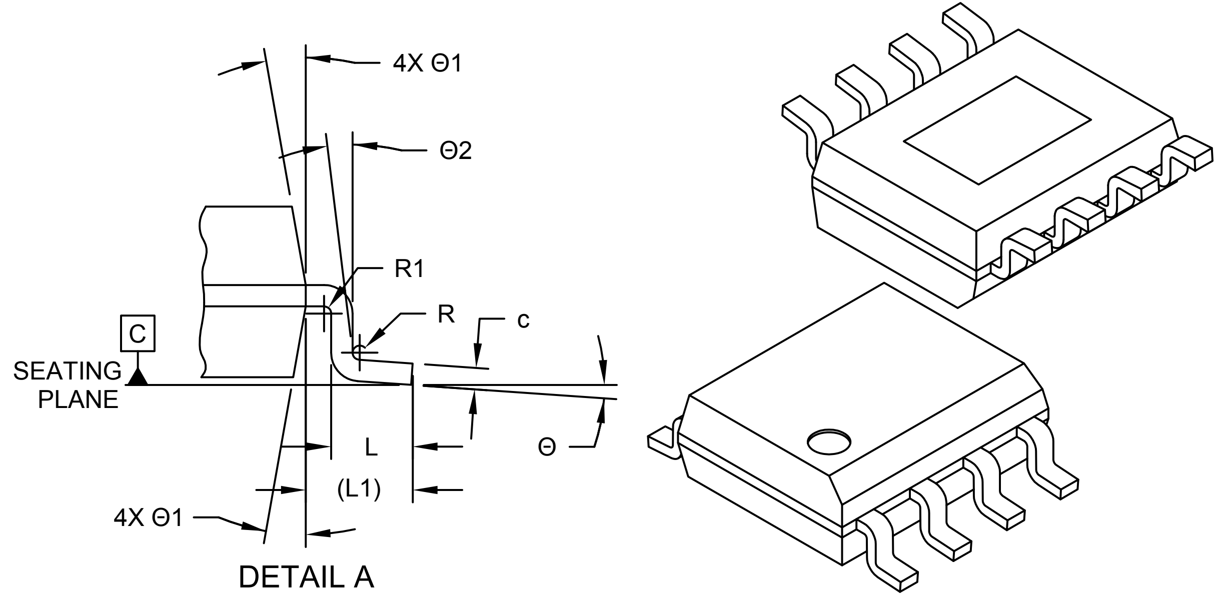
C
A A2
SEATING PLANE
A1
SIDE VIEW
16X
0.08 C

D2
1 2
E2
N
BOTTOM VIEW

Microchip Technology Drawing C04-419A Sheet 1 of 2

8-Lead Small Outline Integrated Circuit (5DX) - .150 In. (3.90 mm) Body [SOIC] With 3.30x2.41 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	1.70
Molded Package Thickness	A2	1.25	1.45	-
Standoff §	A1	0.00	-	0.15
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	4.90 BSC		
Exposed Pad Width	E2	1.78	-	-
Exposed Pad Length	D2	2.67	-	-
Chamfer (Optional)	h	0.15	-	-
Foot Length	L	0.40	0.71	1.27
Footprint	L1	1.04 REF		
Lead Thickness	c	0.10	-	0.25
Lead Width	b	0.31	-	0.51
Foot Angle	Θ	0°	-	8°
Lead Angle	Θ2	0°	-	-
Mold Draft Angle	Θ1	0°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-419A Sheet 2 of 2

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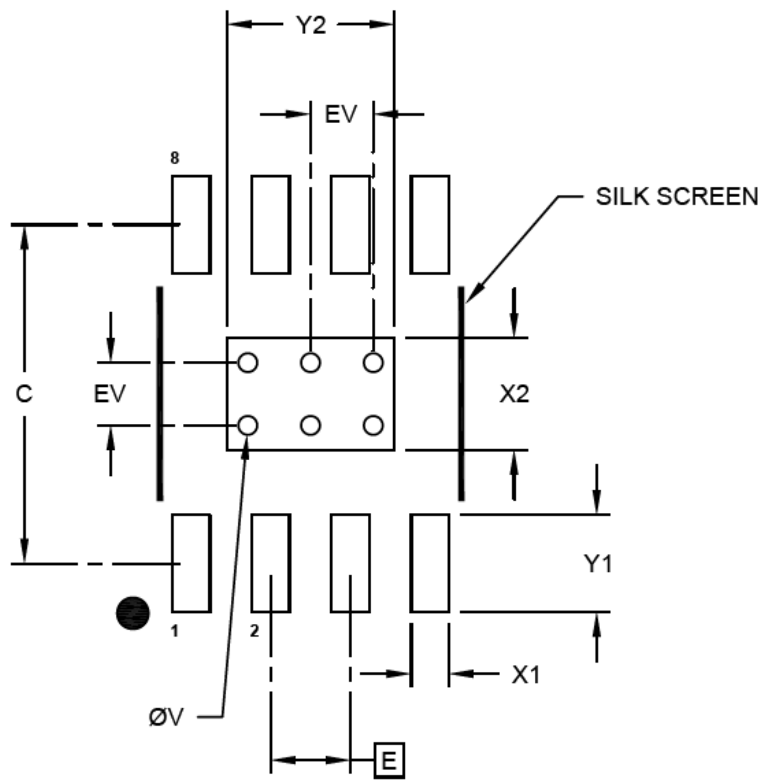
8-Lead Small Outline Integrated Circuit (5DX) - .150 In. (3.90 mm) Body [SOIC] With 3.30x2.41 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Optional Center Pad Width	X2	1.78		
Optional Center Pad Length	Y2	2.67		
Contact Pad Spacing	C		5.40	
Contact Pad Width (X20)	X1			0.60
Contact Pad Length (X20)	Y1			1.55
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2419A

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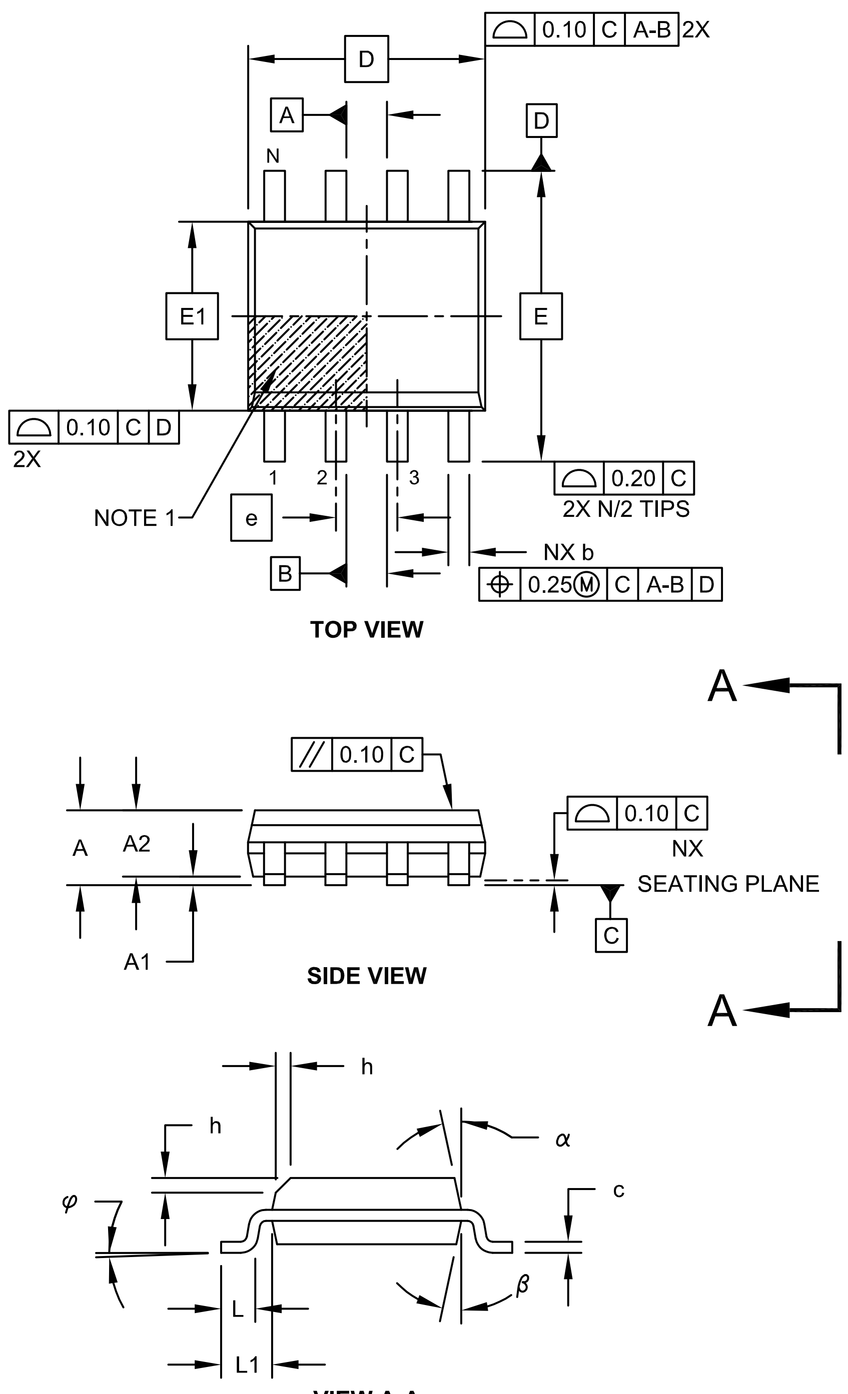
8-Lead Plastic Small Outline (SN) - Narrow, 3.90 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing No. C04-057C Sheet 1 of 2

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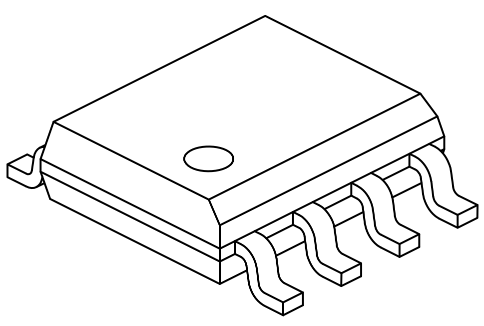
8-Lead Plastic Small Outline (SN) - Narrow, 3.90 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	4.90 BSC		
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04 REF		
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.17	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

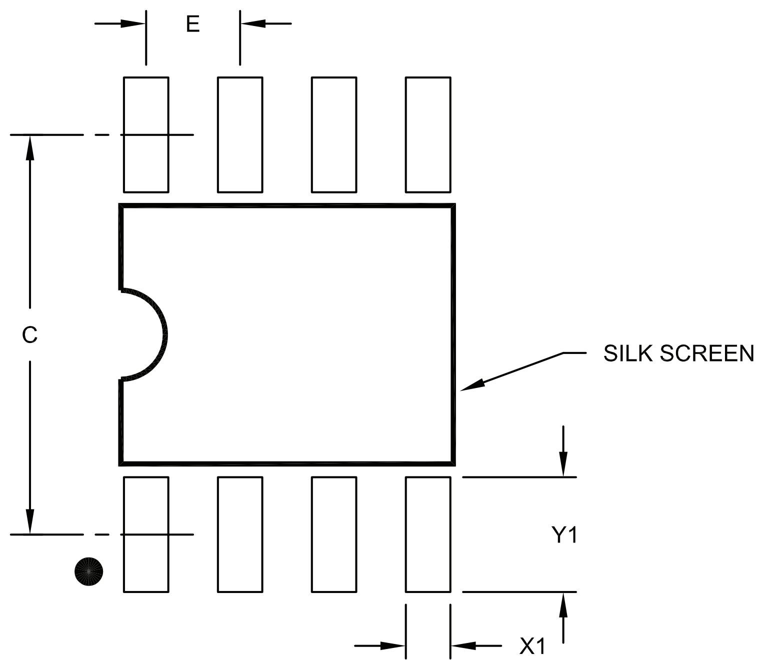
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-057C Sheet 2 of 2

8-Lead Plastic Small Outline (SN) – Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		5.40	
Contact Pad Width (X8)	X1			0.60
Contact Pad Length (X8)	Y1			1.55

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2057A

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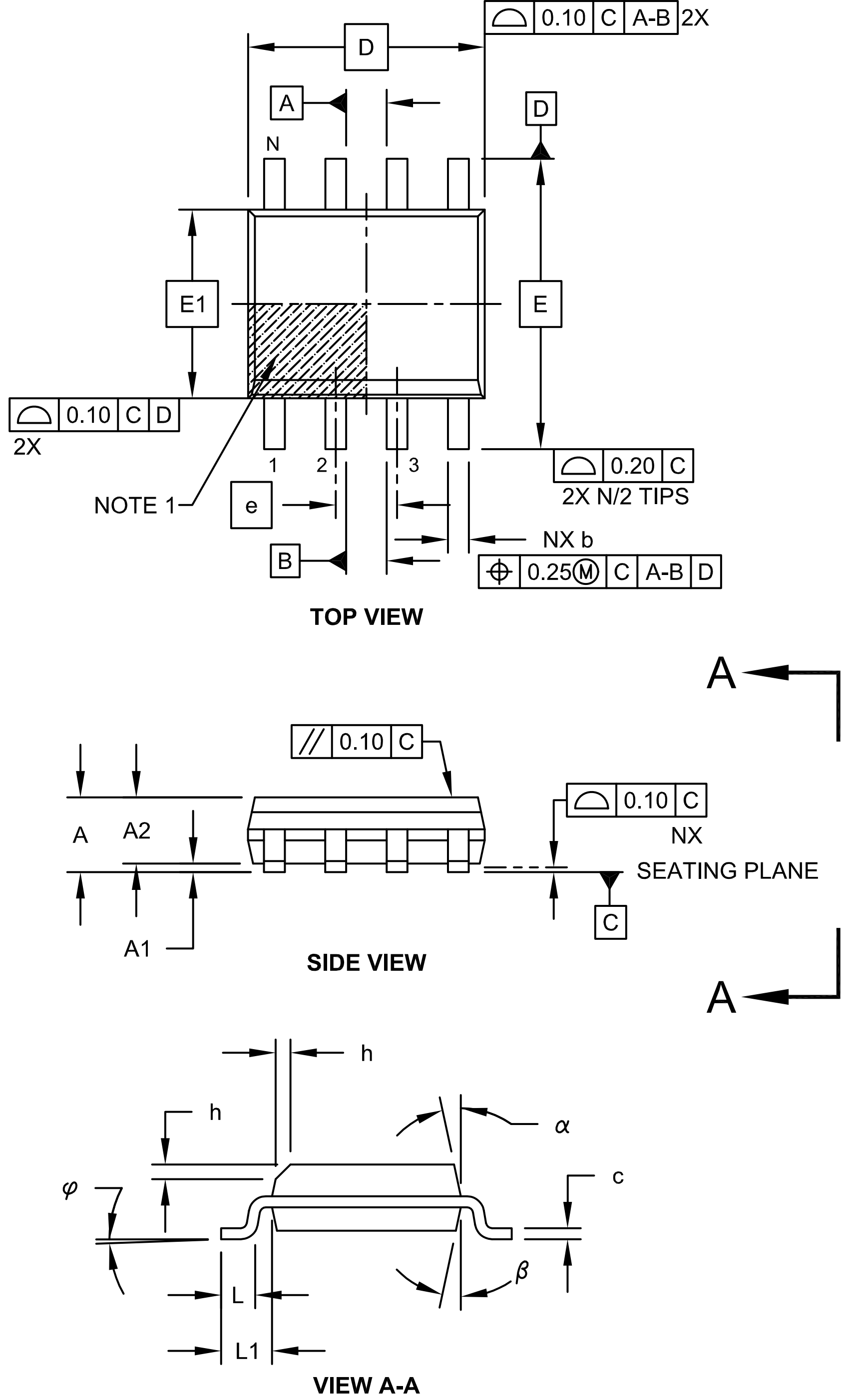
8-Lead Plastic Small Outline (OA) - Narrow, 3.90 mm Body [SOIC]

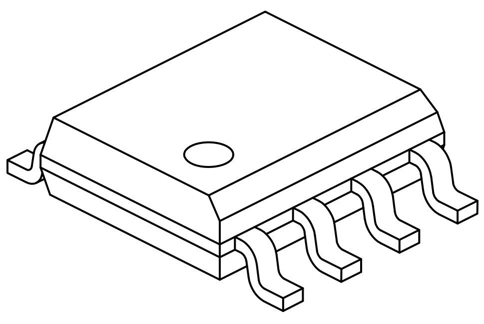
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing No. C04-057C Sheet 1 of 2

8-Lead Plastic Small Outline (OA) - Narrow, 3.90 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	4.90 BSC		
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04 REF		
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.17	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-057C Sheet 2 of 2

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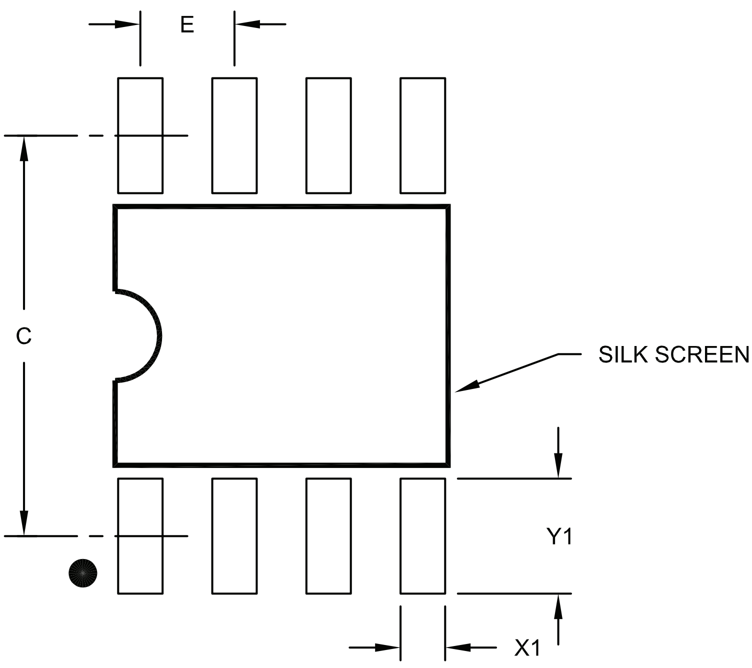
Footprint Outlines and Dimensions

8-Lead Plastic Small Outline (OA) – Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		5.40	
Contact Pad Width (X8)	X1			0.60
Contact Pad Length (X8)	Y1			1.55

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2057A

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing No. C04-162B Sheet 1 of 2

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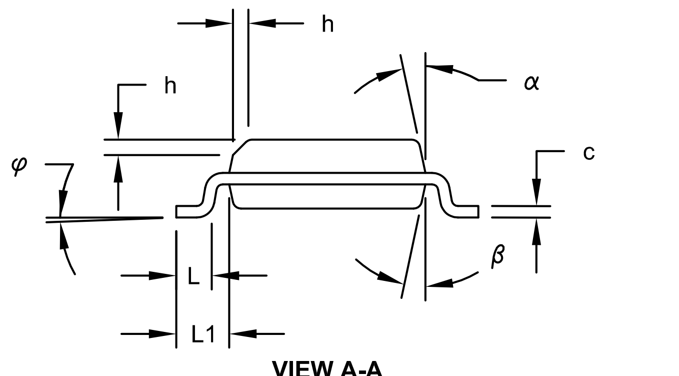
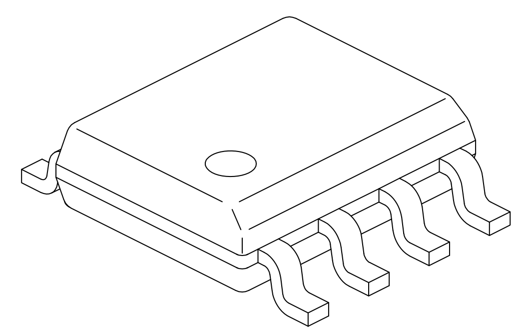
8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.15
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	4.90 BSC		
Exposed Pad Width	E2	2.19	2.29	2.39
Exposed Pad Length	D2	2.19	2.29	2.39
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04 REF		
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.17	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-162B Sheet 2 of 2

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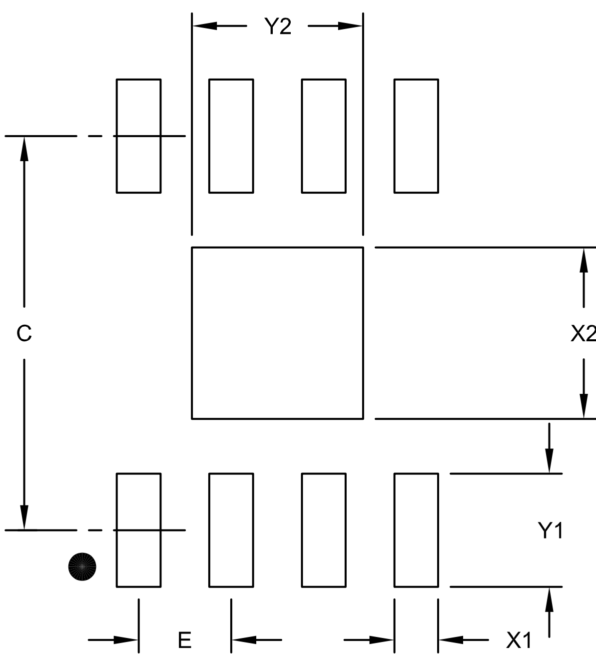
8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		5.40	
Contact Pad Width (X8)	X1			0.60
Contact Pad Length (X8)	Y1			1.55
Exposed Pad Width	X2			2.35
Exposed Pad Length	Y2			2.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2162A

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14-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
0.10 C A-B 2X
A NOTE 5
N
D
E1
E
2X
0.10 C D
NOTE 1
1 2 3
0.20 C
2X N/2 TIPS
e
NX b
0.25 M C A-B D
B NOTE 5

TOP VIEW

0.10 C
A
0.10 C
NX
A A2
SEATING PLANE
C
A1

SIDE VIEW

A

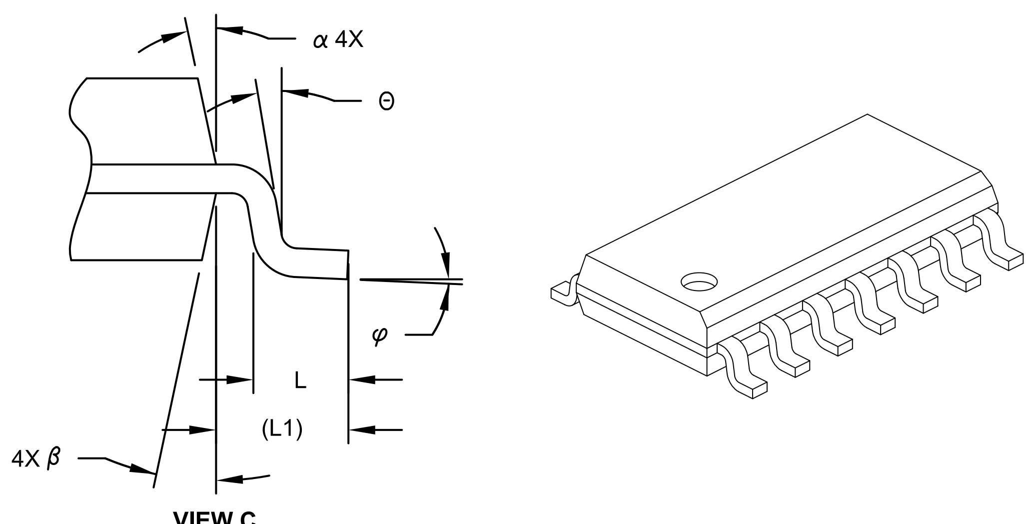
h
h
c
H
SEE VIEW C

VIEW A-A

Microchip Technology Drawing No. C04-065C Sheet 1 of 2

14-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		14	
Pitch	e		1.27 BSC	
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E		6.00 BSC	
Molded Package Width	E1		3.90 BSC	
Overall Length	D		8.65 BSC	
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1		1.04 REF	
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.10	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-065C Sheet 2 of 2

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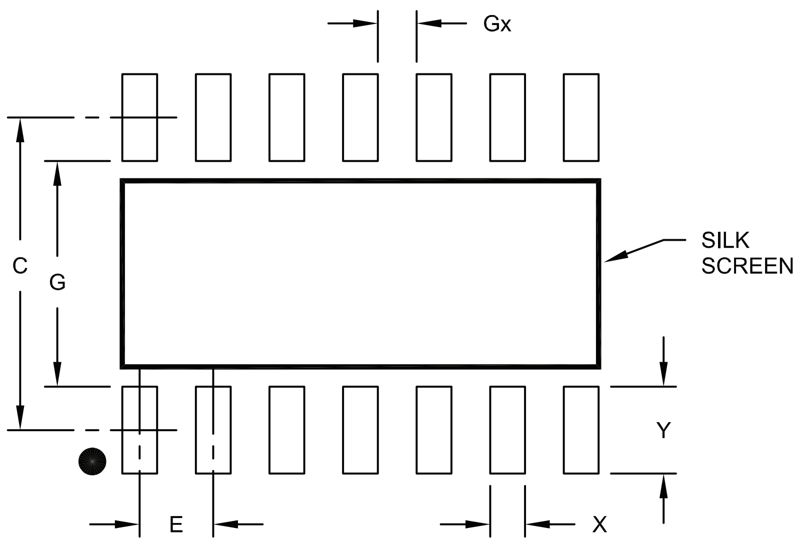
14-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		5.40	
Contact Pad Width	X			0.60
Contact Pad Length	Y			1.50
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	3.90		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2065A

14-Lead Plastic Small Outline (OD) - Narrow, 3.90 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

VIEW A-A

Microchip Technology Drawing No. C04-065C Sheet 1 of 2

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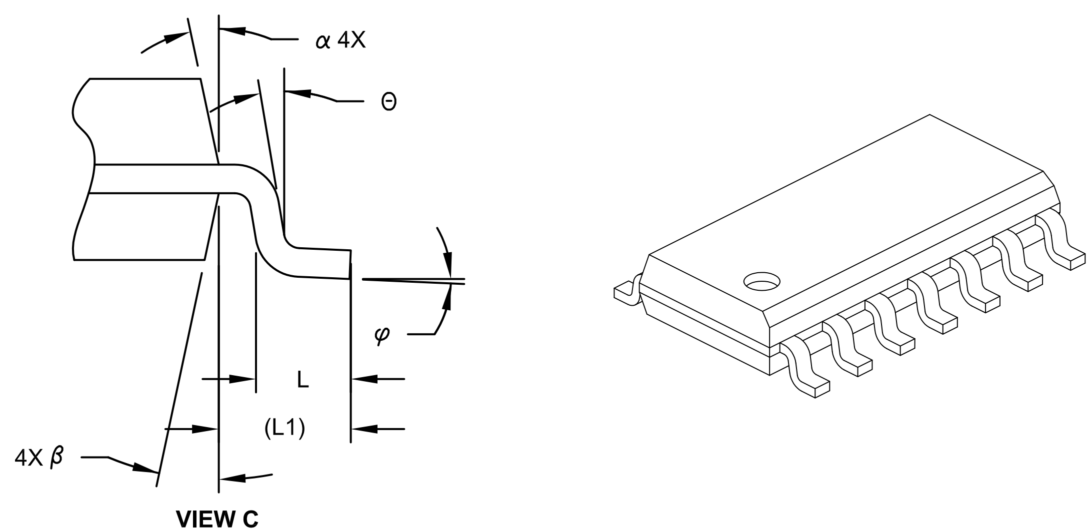
14-Lead Plastic Small Outline (OD) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	8.65 BSC		
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.10	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-065C Sheet 2 of 2

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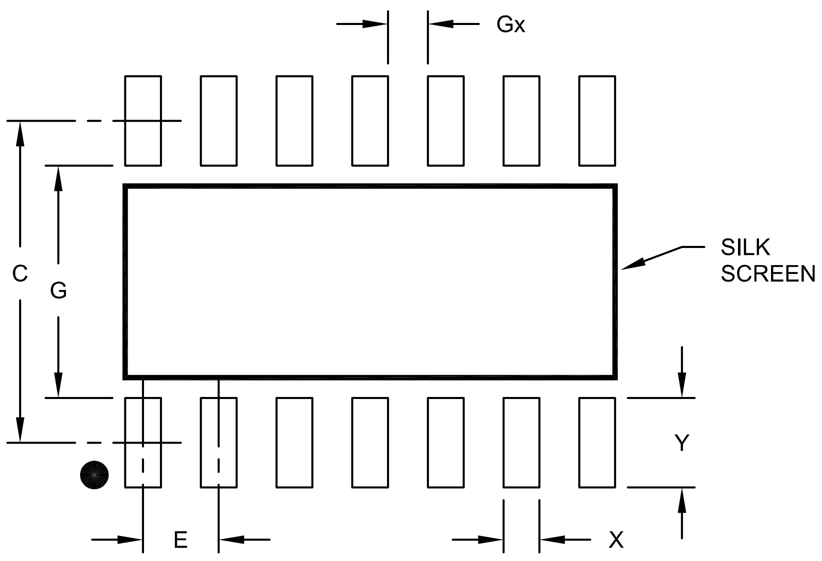
14-Lead Plastic Small Outline (OD) – Narrow, 3.90 mm Body [SOIC] Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		5.40	
Contact Pad Width	X			0.60
Contact Pad Length	Y			1.50
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	3.90		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2065A

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16-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
0.10 C A-B 2X
A NOTE 5
N
D
E1
E
2X
0.10 C D
NOTE 1
1 2 3
0.20 C
2X N/2 TIPS
e
NX b
0.25Ⓜ C A-B D
B NOTE 5

TOP VIEW

0.10 C
A
A A2
0.10 C
NX
SEATING PLANE
C
A1

SIDE VIEW

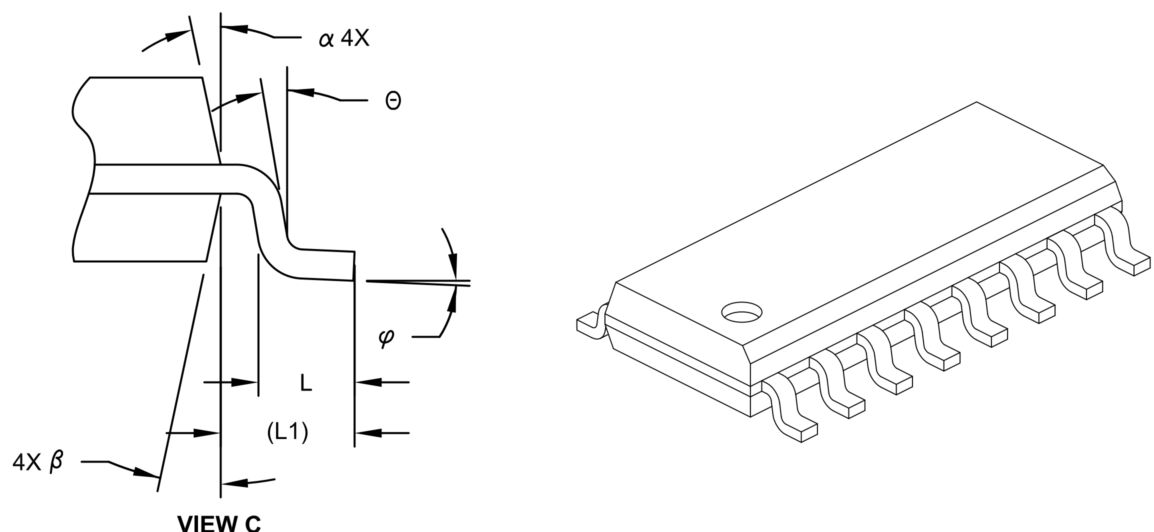
A
h
h
c
H
SEE VIEW C

VIEW A-A

Microchip Technology Drawing No. C04-108C Sheet 1 of 2

16-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		1.27 BSC	
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E		6.00 BSC	
Molded Package Width	E1		3.90 BSC	
Overall Length	D		9.90 BSC	
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1		1.04 REF	
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.10	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-108C Sheet 2 of 2

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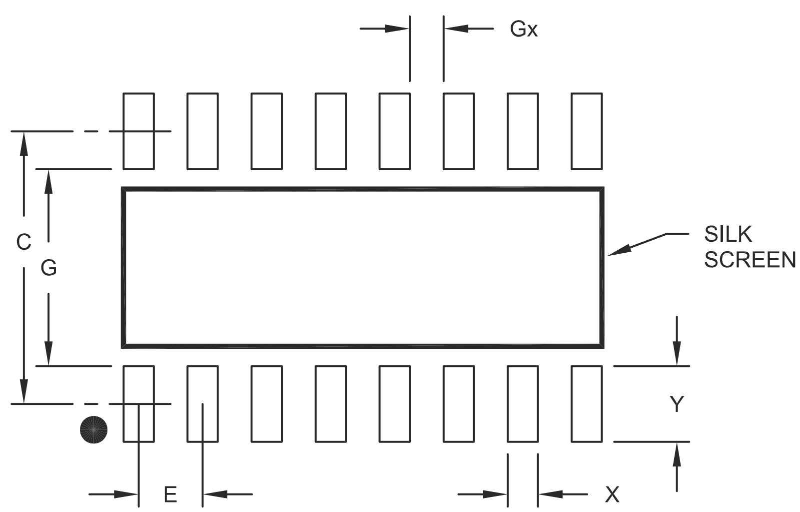
Footprint Outlines and Dimensions

16-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Contact Pad Spacing	C		5.40	
Contact Pad Width	X			0.60
Contact Pad Length	Y			1.50
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	3.90		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2108A

16-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-102C Sheet 1 of 2

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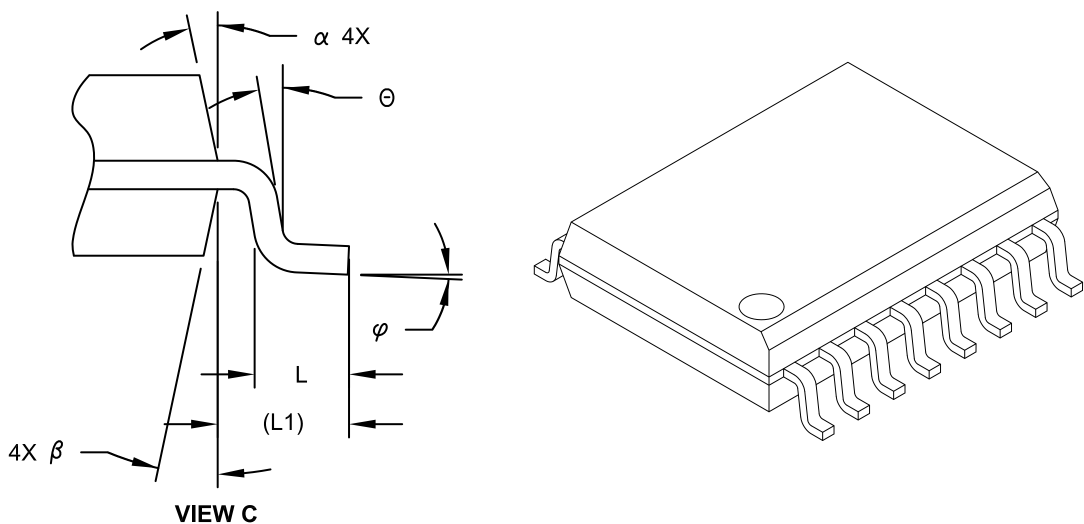
16-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	10.30 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-102C Sheet 2 of 2

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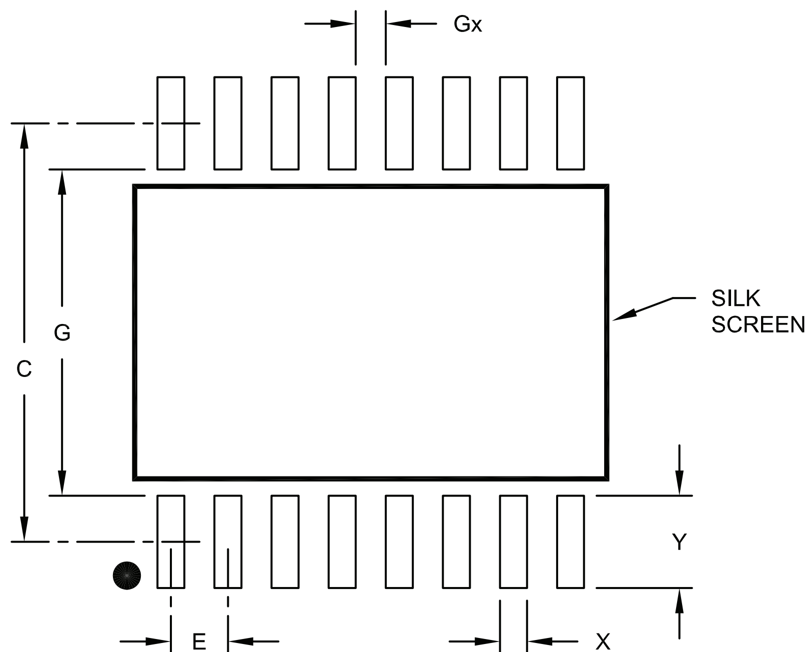
16-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC] Land Pattern

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.30	
Contact Pad Width	X			0.60
Contact Pad Length	Y			2.05
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2102A

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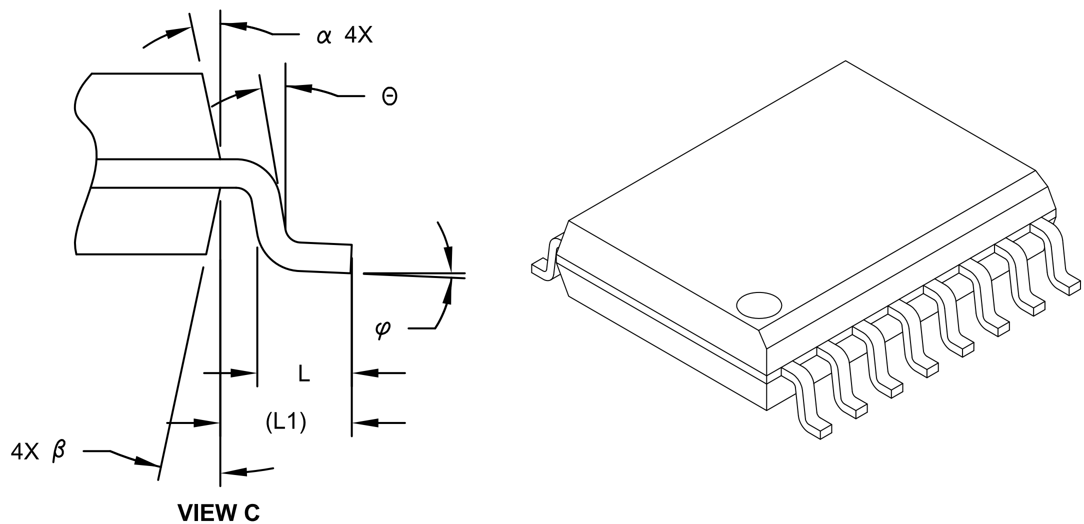
16-Lead Plastic Small Outline (OE) - Wide, 7.50 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-102C Sheet 1 of 2

16-Lead Plastic Small Outline (OE) - Wide, 7.50 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	10.30 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-102C Sheet 2 of 2

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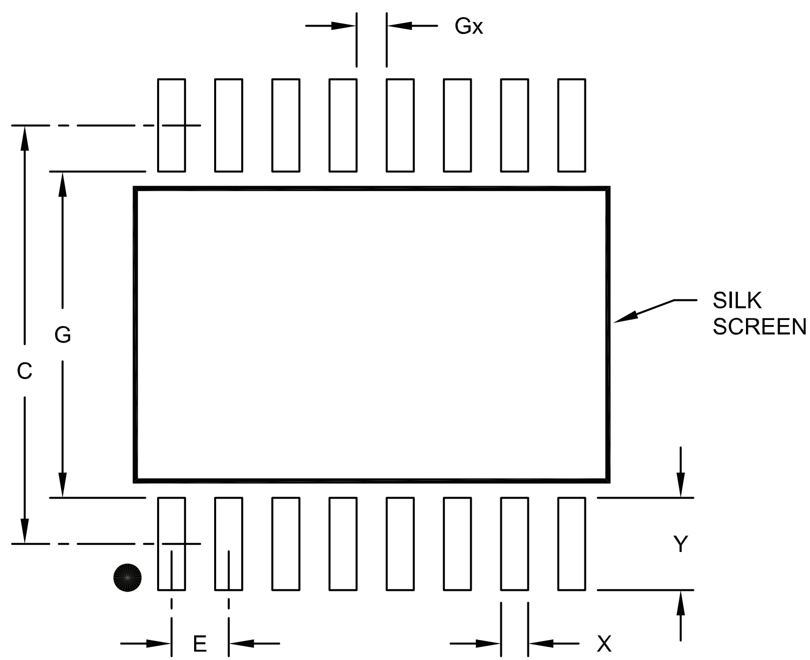
16-Lead Plastic Small Outline (OE) – Wide, 7.50 mm Body [SOIC] Land Pattern

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.30	
Contact Pad Width	X			0.60
Contact Pad Length	Y			2.05
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.25		

Notes:

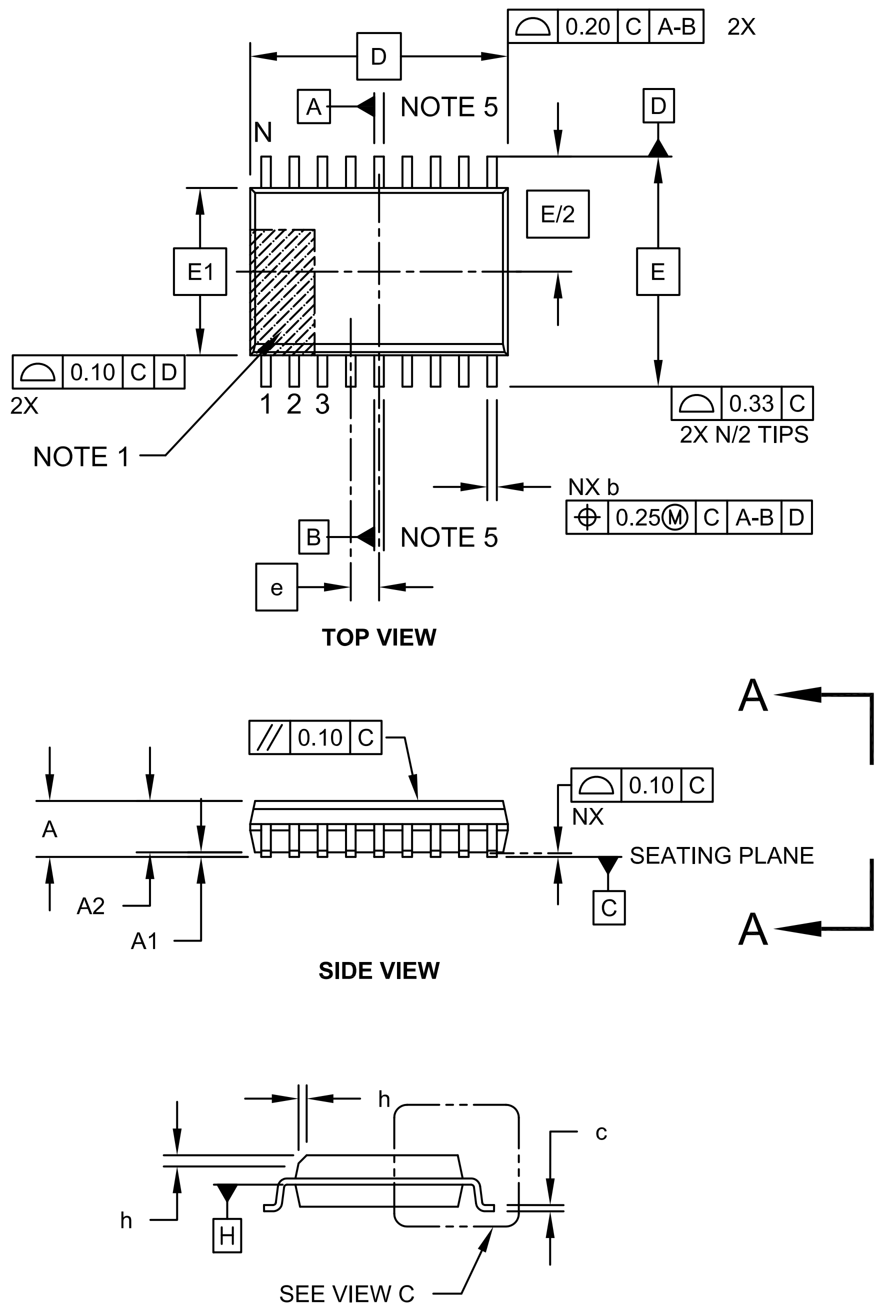
1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2102A

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-051C Sheet 1 of 2

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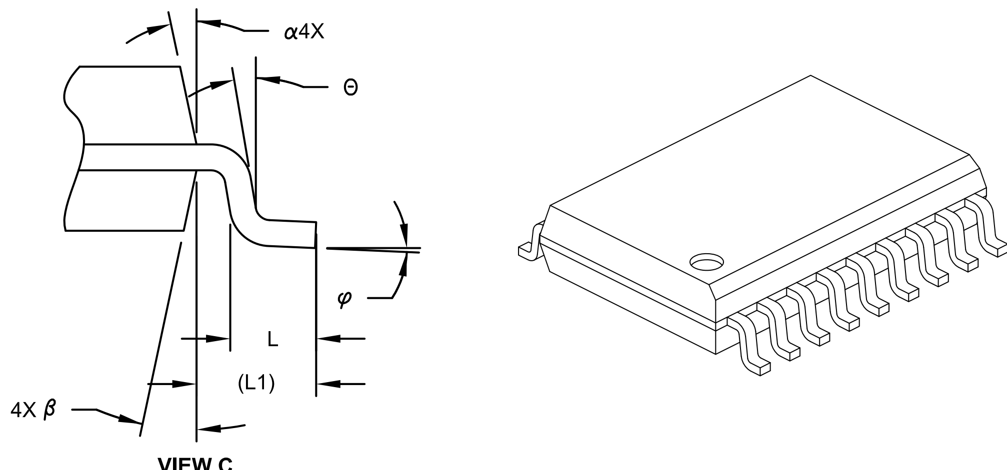
18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	18		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	11.55 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-051C Sheet 2 of 2

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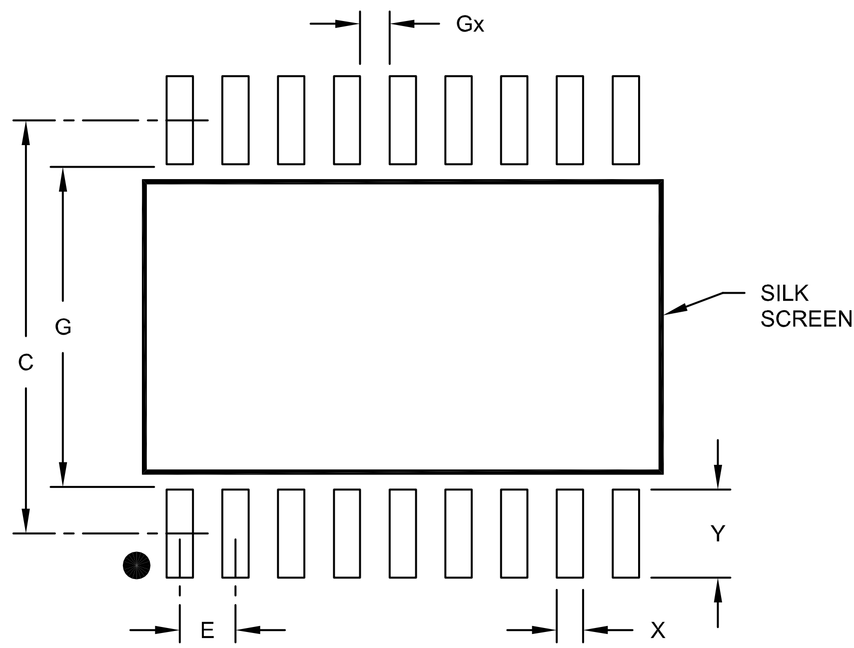
18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.40	
Contact Pad Width	X			0.60
Contact Pad Length	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2051A

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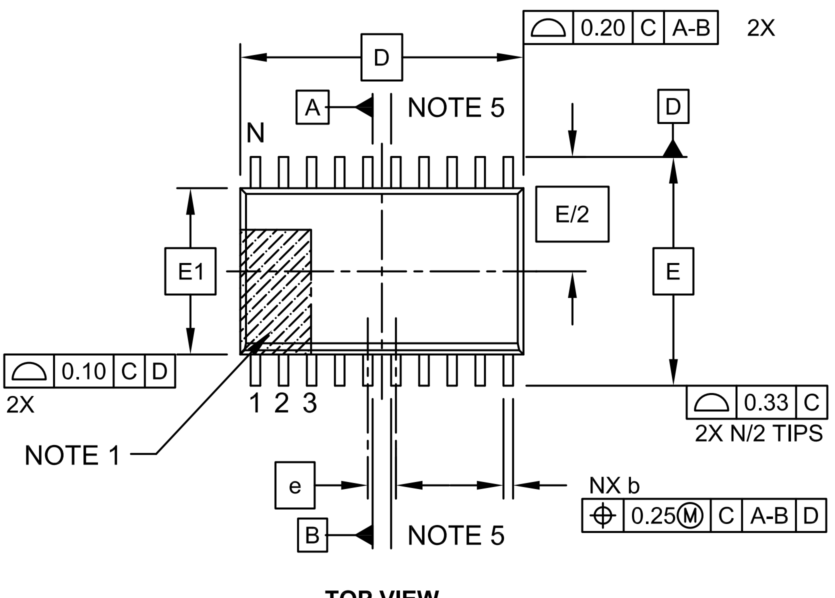
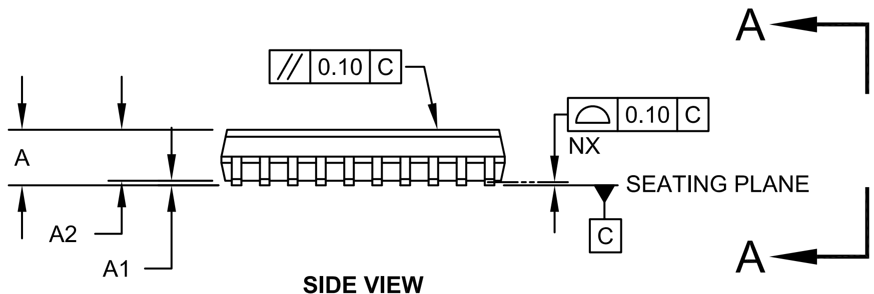
20-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

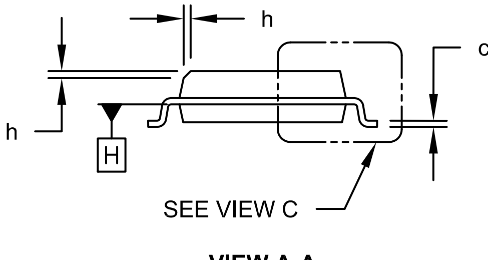
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW

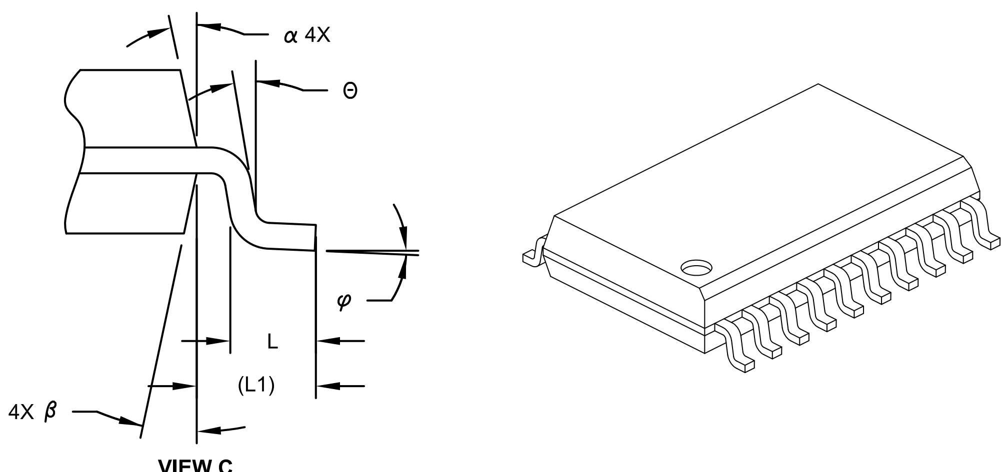


VIEW A-A

Microchip Technology Drawing C04-094C Sheet 1 of 2

20-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	12.80 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-094C Sheet 2 of 2

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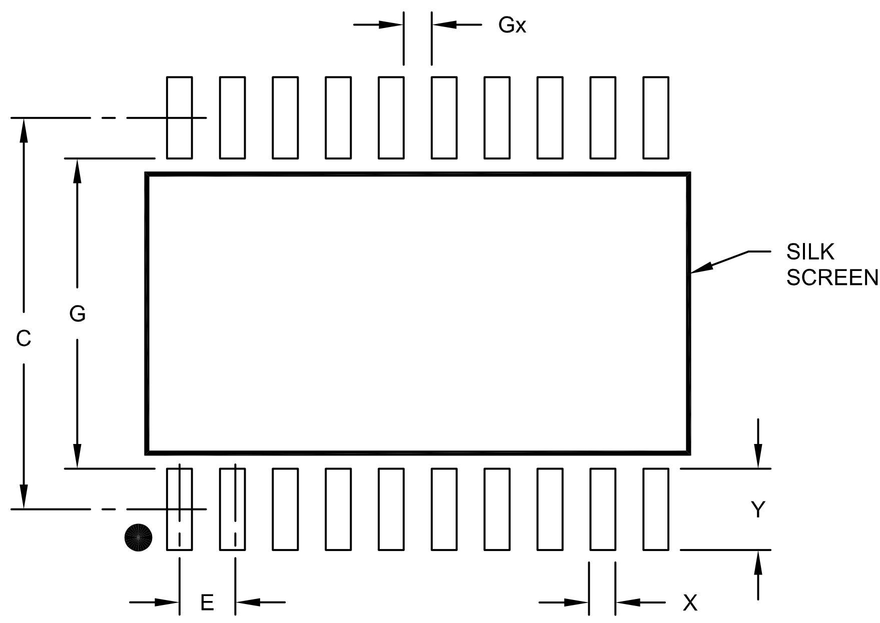
20-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.40	
Contact Pad Width (X20)	X			0.60
Contact Pad Length (X20)	Y			1.95
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.45		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2094A

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24-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
0.20 C A-B 2X
A NOTE 5
N
D
E/2
E1
E
0.10 C D
2X
1 2 3
0.33 C
2X N/2 TIPS
NOTE 1
e
NX b
0.25 Ⓜ C A-B D
B NOTE 5

TOP VIEW

A
0.10 C
0.10 C
NX
A
SEATING PLANE
C
A2
A1
A

SIDE VIEW

h
c
h
H
SEE VIEW C

VIEW A-A

Microchip Technology Drawing C04-025C Sheet 1 of 2

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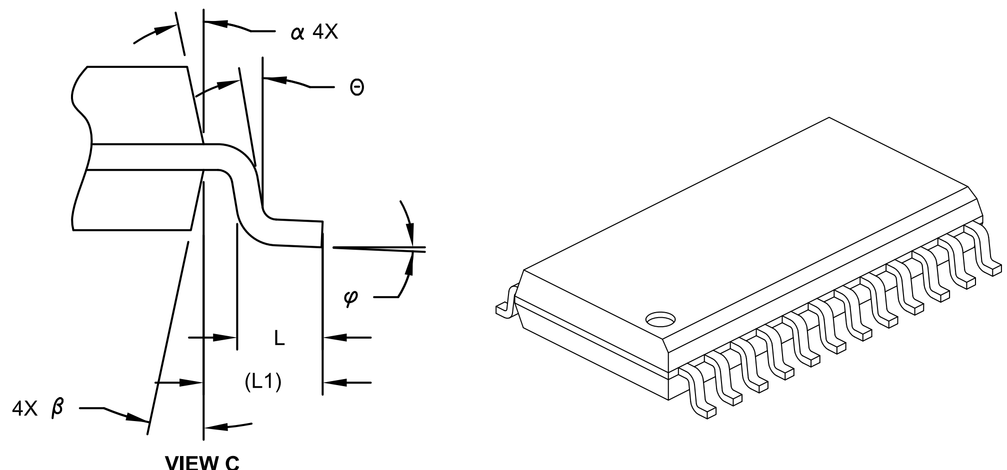
24-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	15.40 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-025C Sheet 2 of 2

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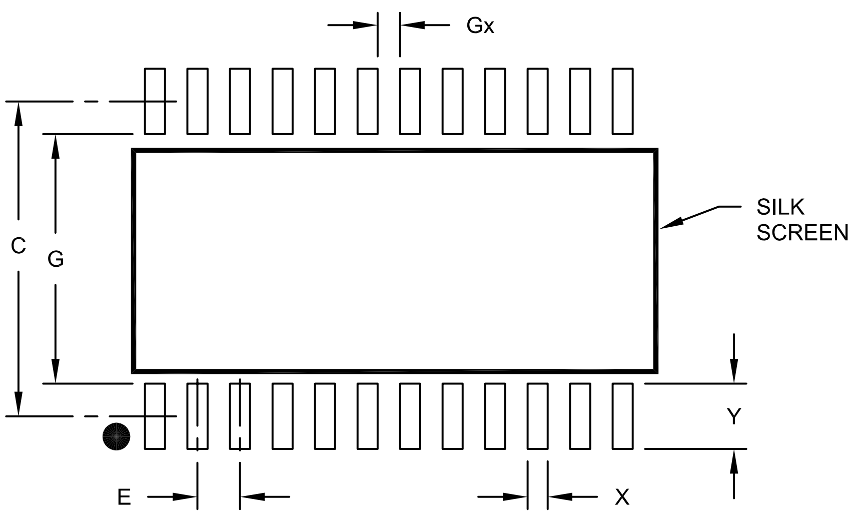
24-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.40	
Contact Pad Width (X24)	X			0.60
Contact Pad Length (X24)	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2025A

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Package Outlines and Dimensions

24-Lead Plastic Small Outline (OG) - Wide, 7.50 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
0.20 C A-B 2X
A NOTE 5
N
D
E/2
E1
E
0.10 C D
2X
1 2 3
0.33 C
2X N/2 TIPS
NOTE 1
e
NX b
0.25Ⓜ C A-B D
B NOTE 5

TOP VIEW

A
0.10 C
0.10 C
NX
A
SEATING PLANE
C
A2
A1
A

SIDE VIEW

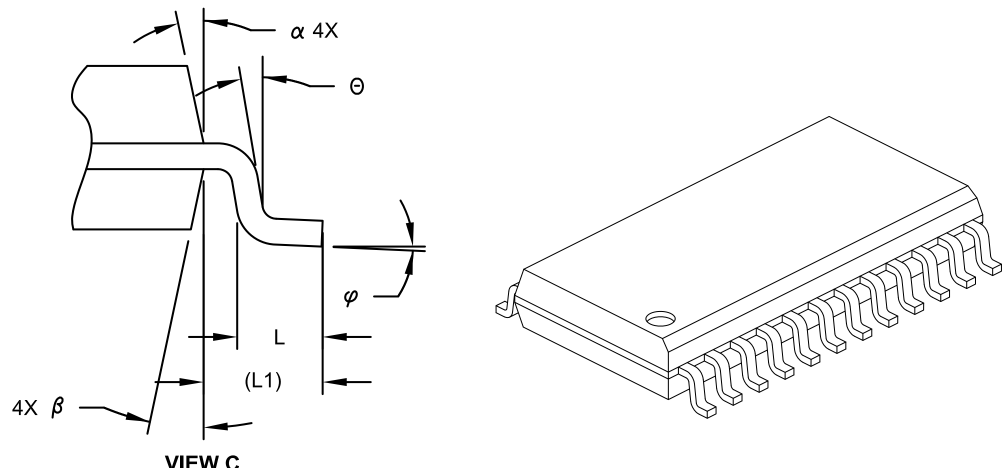
h
c
h
H
SEE VIEW C

VIEW A-A

Microchip Technology Drawing C04-025C Sheet 1 of 2

24-Lead Plastic Small Outline (OG) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	15.40 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-025C Sheet 2 of 2

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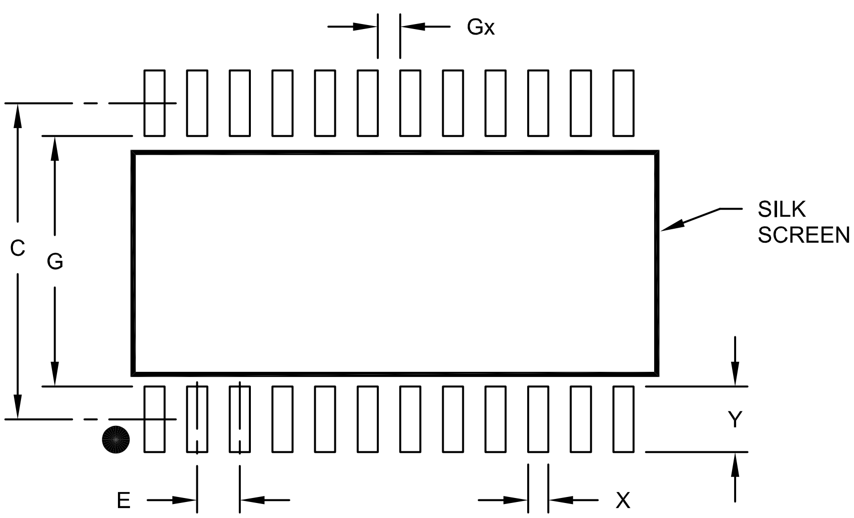
24-Lead Plastic Small Outline (OG) – Wide, 7.50 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.40	
Contact Pad Width (X24)	X			0.60
Contact Pad Length (X24)	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2025A

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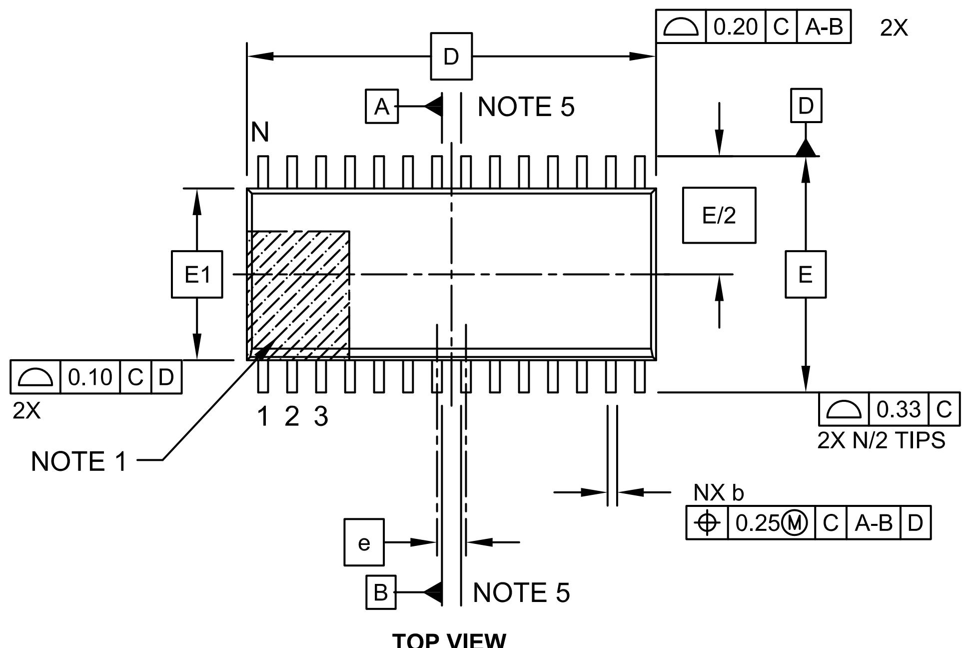
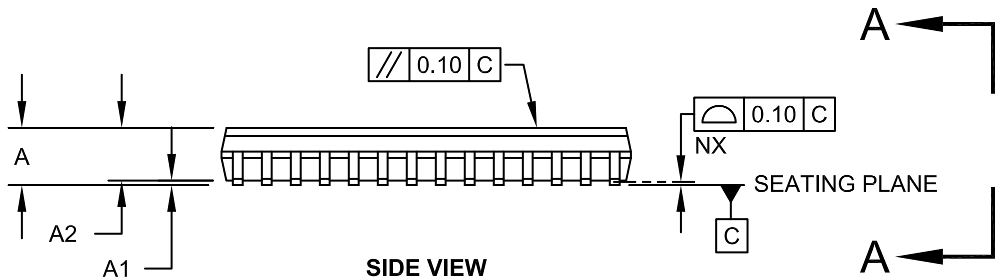
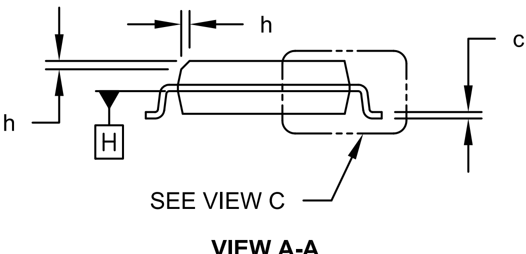
28-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-052C Sheet 1 of 2

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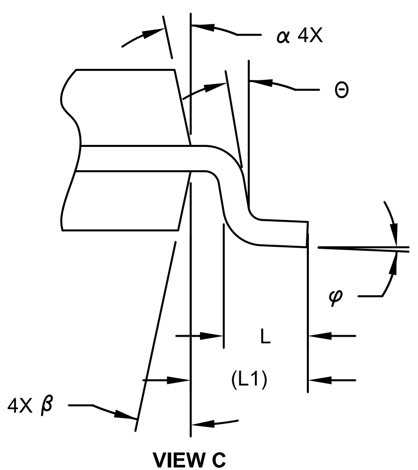
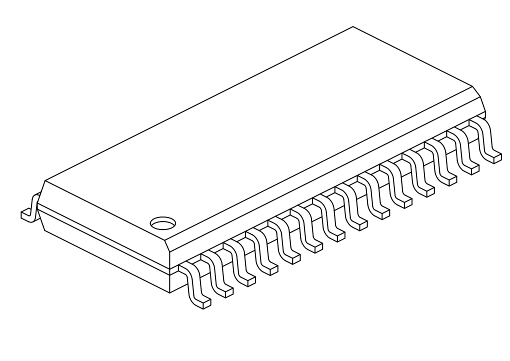
28-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		1.27 BSC	
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E		10.30 BSC	
Molded Package Width	E1		7.50 BSC	
Overall Length	D		17.90 BSC	
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1		1.40 REF	
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.18	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing C04-052C Sheet 2 of 2

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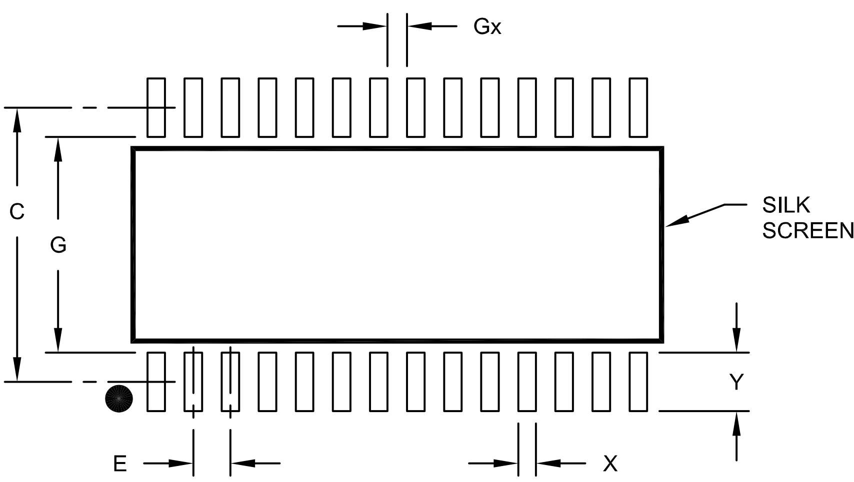
28-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.40	
Contact Pad Width (X28)	X			0.60
Contact Pad Length (X28)	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2052A

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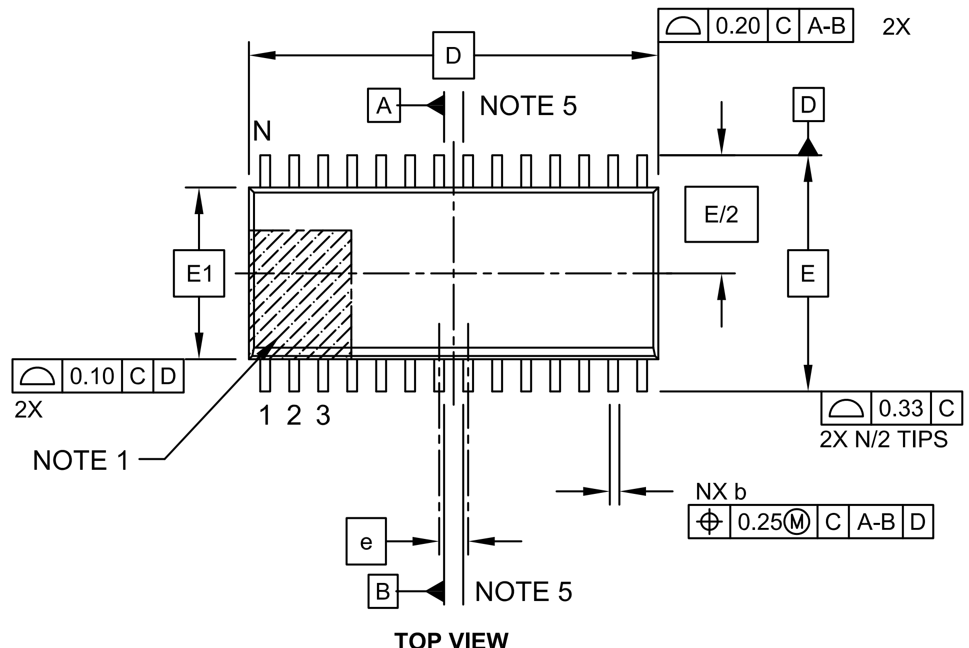
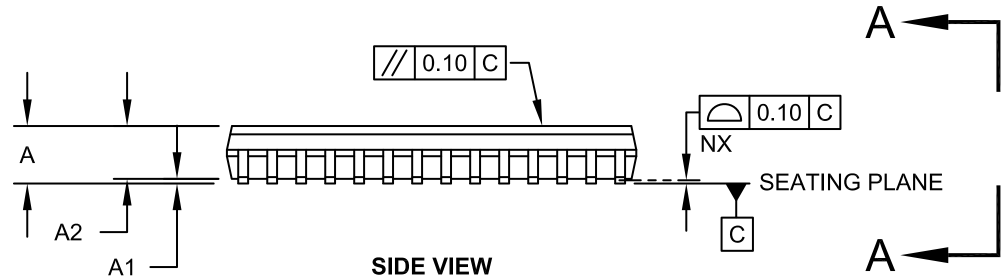
28-Lead Plastic Small Outline (OI) - Wide, 7.50 mm Body [SOIC]

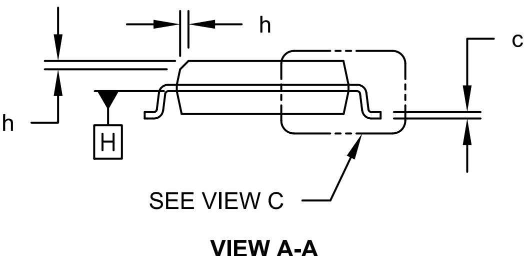
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW

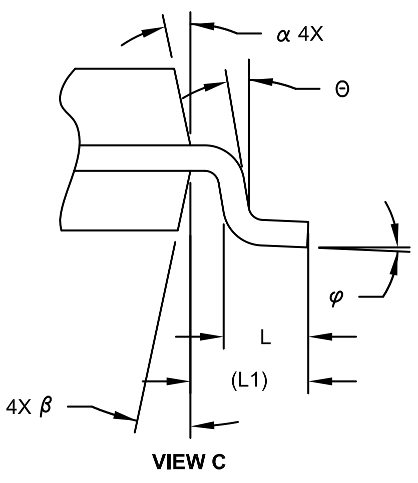


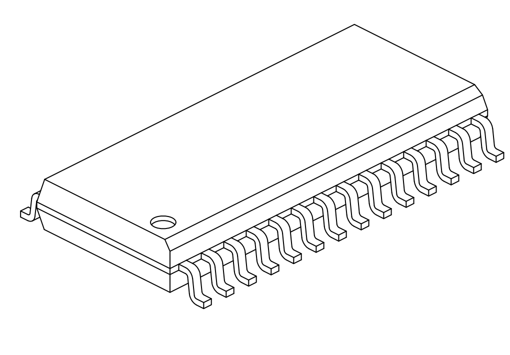
VIEW A-A

Microchip Technology Drawing C04-052C Sheet 1 of 2

28-Lead Plastic Small Outline (OI) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	17.90 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.18	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing C04-052C Sheet 2 of 2

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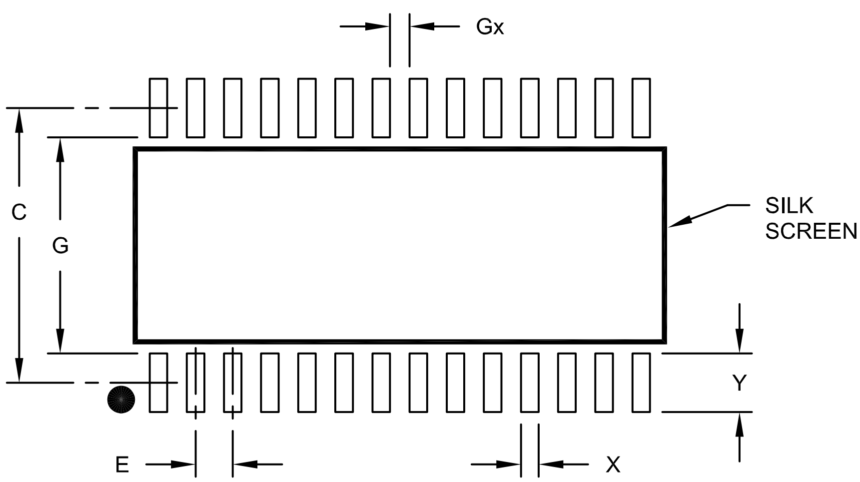
Footprint Outlines and Dimensions

28-Lead Plastic Small Outline (OI) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		9.40	
Contact Pad Width (X28)	X			0.60
Contact Pad Length (X28)	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2052A

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NOTES:

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SOIJ

8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
0.10 C A-B 2X
A
D
N
E/2
E1/2
E1
E
0.10 C D
NOTE 1
1
2
N/2
2X N/2 TIPS
0.20 C
e/2
e
B
NXb
0.25 Ⓜ C A-B D

TOP VIEW

0.10 C
A
A
A2
0.10 C
SEATING PLANE
A
A1
C

SIDE VIEW

θ2
θ1
θ3
c
L

VIEW A-A

Microchip Technology Drawing C04-056C Sheet 1 of 2

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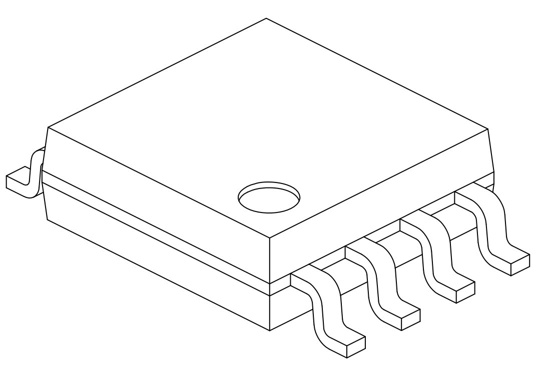
8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	1.77	-	2.03
Standoff §	A1	0.05		0.25
Molded Package Thickness	A2	1.75	-	1.98
Overall Width	E		7.94 BSC	
Molded Package Width	E1		5.25 BSC	
Overall Length	D		5.26 BSC	
Foot Length	L	0.51	-	0.76
Lead Thickness	c	0.15	-	0.25
Lead Width	b	0.36	-	0.51
Mold Draft Angle	Θ1	-	-	15°
Lead Angle	Θ2	0°	-	8°
Foot Angle	Θ3	0°	-	8°

Notes:

1. SOIJ, JEITA/EIAJ Standard, Formerly called SOIC
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25mm per side.

Microchip Technology Drawing No. C04-056C Sheet 2 of 2

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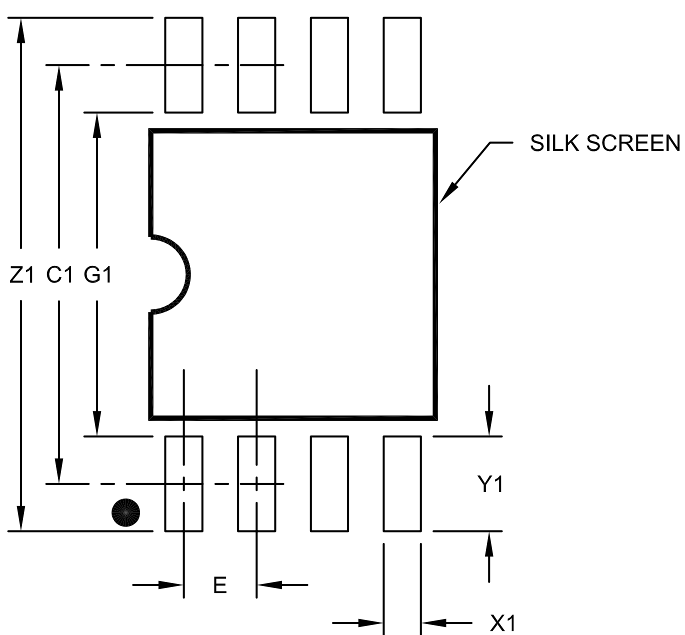
8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Overall Width	Z1			9.00
Contact Pad Spacing	C1		7.30	
Contact Pad Width (X8)	X1			0.65
Contact Pad Length (X8)	Y1			1.70
Distance Between Pads	G1	5.60		
Distance Between Pads	G	0.62		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2056C

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DFN

6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) - 2x2x0.9mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-120C Sheet 1 of 2

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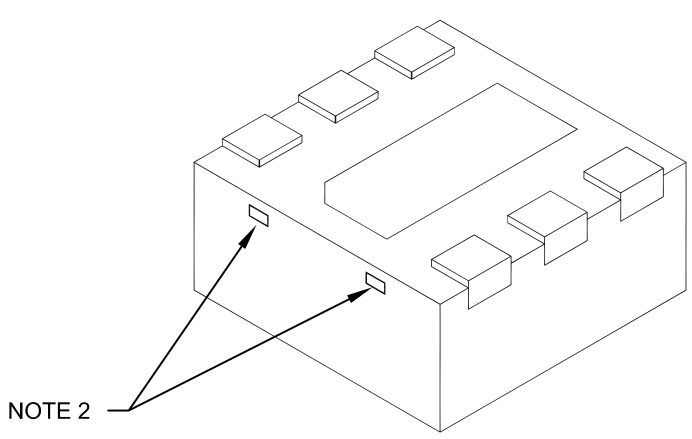
6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) - 2x2x0.9mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		6	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		2.00 BSC	
Overall Width	E		2.00 BSC	
Exposed Pad Length	D2	1.50	1.60	1.70
Exposed Pad Width	E2	0.90	1.00	1.10
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-120C Sheet 2 of 2

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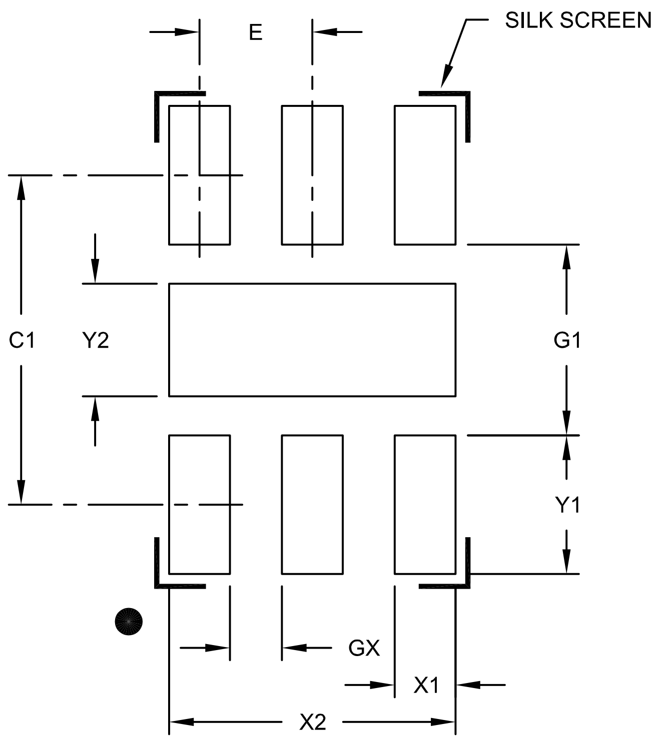
6-Lead Plastic Dual Flat, No Lead Package (MA) - 2x2x0.9mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	Y2			1.00
Optional Center Pad Length	X2			1.70
Contact Pad Spacing	C1		2.10	
Contact Pad Width (X6)	X1			0.35
Contact Pad Length (X6)	Y1			0.65
Distance Between Pads	GX	0.20		
Distance Between Pads	G1	1.10		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2120A

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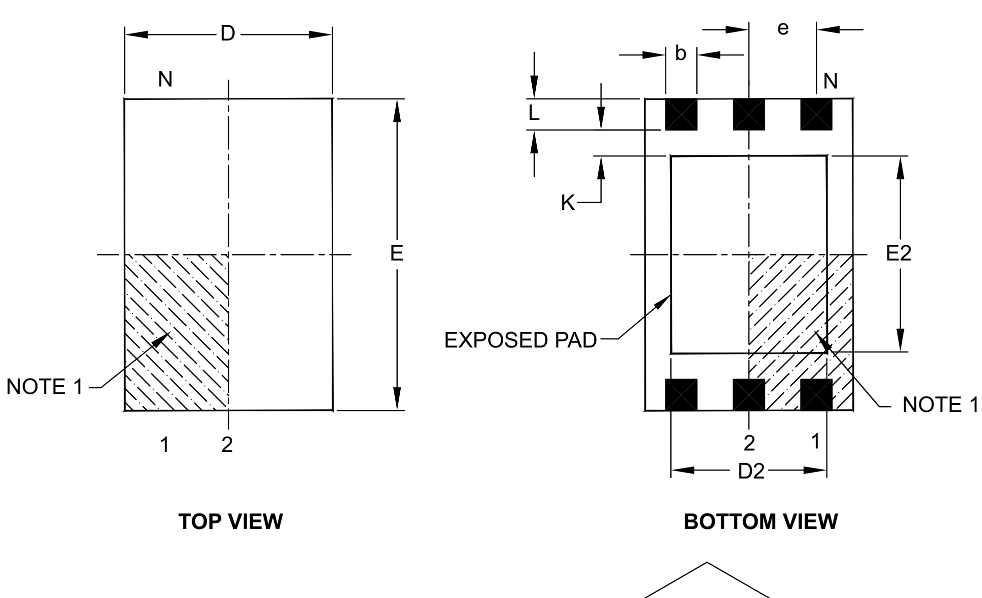
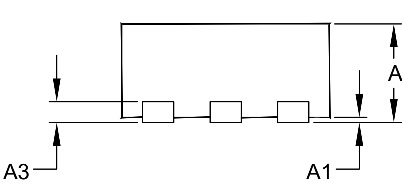
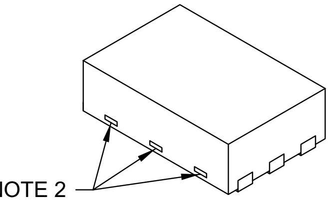
6-Lead Plastic Dual Flat, No Lead Package (ME) – 2x3x0.9 mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		6	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		2.00 BSC	
Overall Width	E		3.00 BSC	
Exposed Pad Length	D2	1.40	–	1.60
Exposed Pad Width	E2	1.80	–	2.00
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.20	0.30	0.40
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

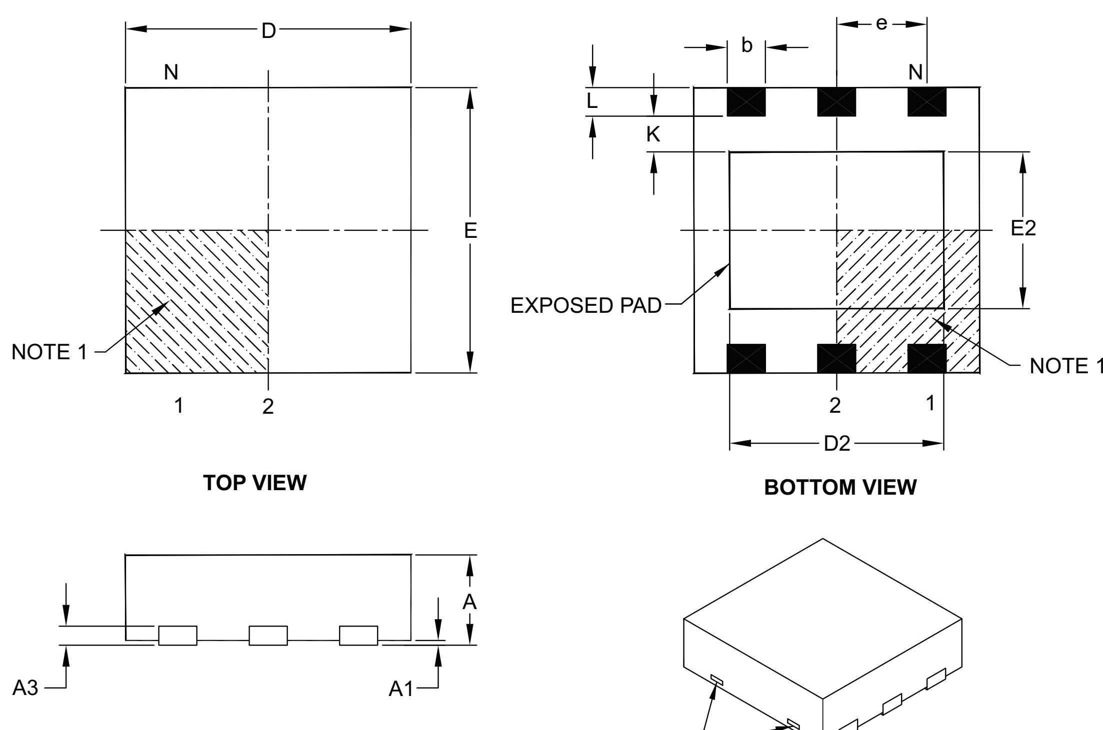
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-134A

6-Lead Plastic Dual Flat, No Lead Package (MH) – 3x3x0.9 mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		6	
Pitch	e		0.95 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		3.00 BSC	
Overall Width	E		3.00 BSC	
Exposed Pad Length	D2	0.00	–	2.25
Exposed Pad Width	E2	0.00	–	1.65
Contact Width	b	0.30	0.40	0.45
Contact Length	L	0.20	0.30	0.45
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-135A

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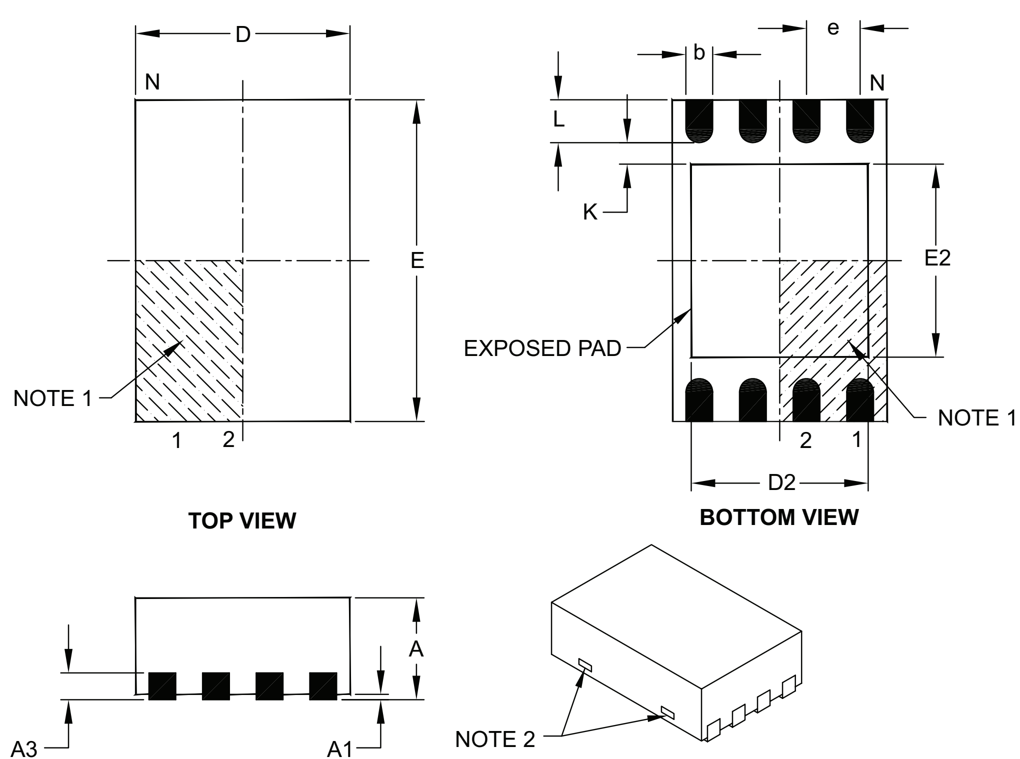
Package Outlines and Dimensions

8-Lead Plastic Dual Flat, No Lead Package (MC) – 2x3x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		2.00 BSC	
Overall Width	E		3.00 BSC	
Exposed Pad Length	D2	1.30	–	1.55
Exposed Pad Width	E2	1.50	–	1.75
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.
    REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-123C

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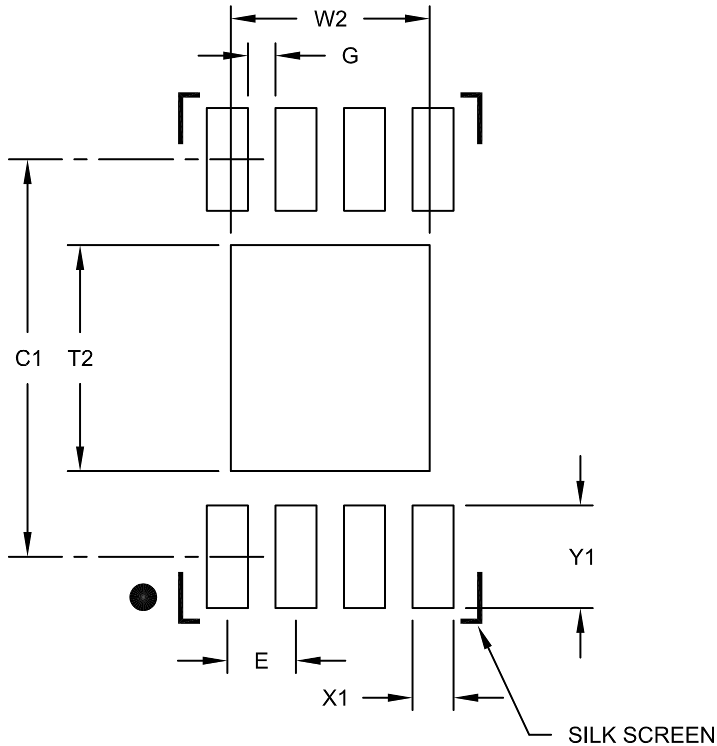
8-Lead Plastic Dual Flat, No Lead Package (MC) - 2x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			1.45
Optional Center Pad Length	T2			1.75
Contact Pad Spacing	C1		2.90	
Contact Pad Width (X8)	X1			0.30
Contact Pad Length (X8)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2123B

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8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SEATING PLANE

BOTTOM VIEW

Microchip Technology Drawing No. C04-062C Sheet 1 of 2

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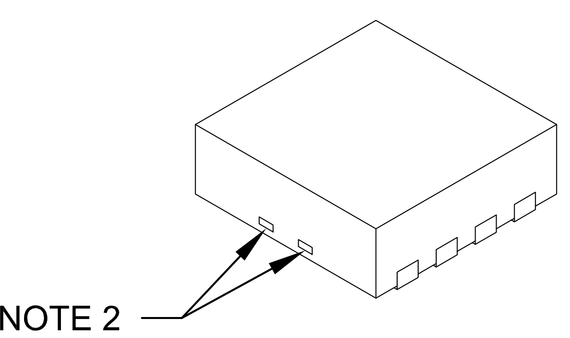
8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	3.00 BSC		
Exposed Pad Width	E2	1.34	-	1.60
Overall Width	E	3.00 BSC		
Exposed Pad Length	D2	1.60	-	2.40
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.20	0.30	0.55
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-062C Sheet 2 of 2

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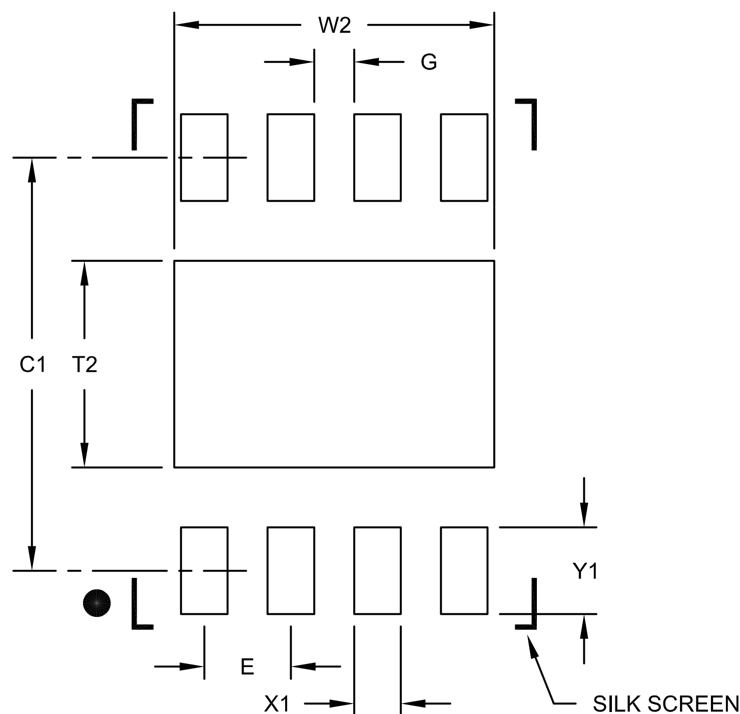
Footprint Outlines and Dimensions

8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	W2			2.40
Optional Center Pad Length	T2			1.55
Contact Pad Spacing	C1		3.10	
Contact Pad Width (X8)	X1			0.35
Contact Pad Length (X8)	Y1			0.65
Distance Between Pads	G	0.30		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2062B

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8-Lead Plastic Dual Flat, No Lead Package (MD) – 4x4x0.9 mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-131E Sheet 1 of 2

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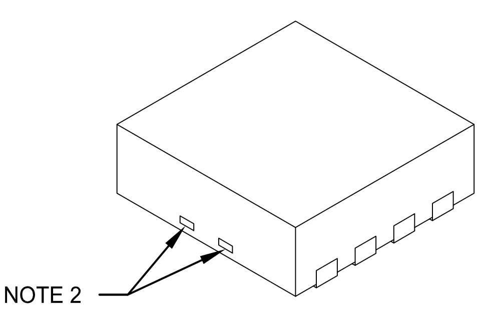
Package Outlines and Dimensions

8-Lead Plastic Dual Flat, No Lead Package (MD) – 4x4x0.9 mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.80 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		4.00 BSC	
Exposed Pad Width	E2	2.60	2.70	2.80
Overall Width	E		4.00 BSC	
Exposed Pad Length	D2	3.40	3.50	3.60
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-131E Sheet 2 of 2

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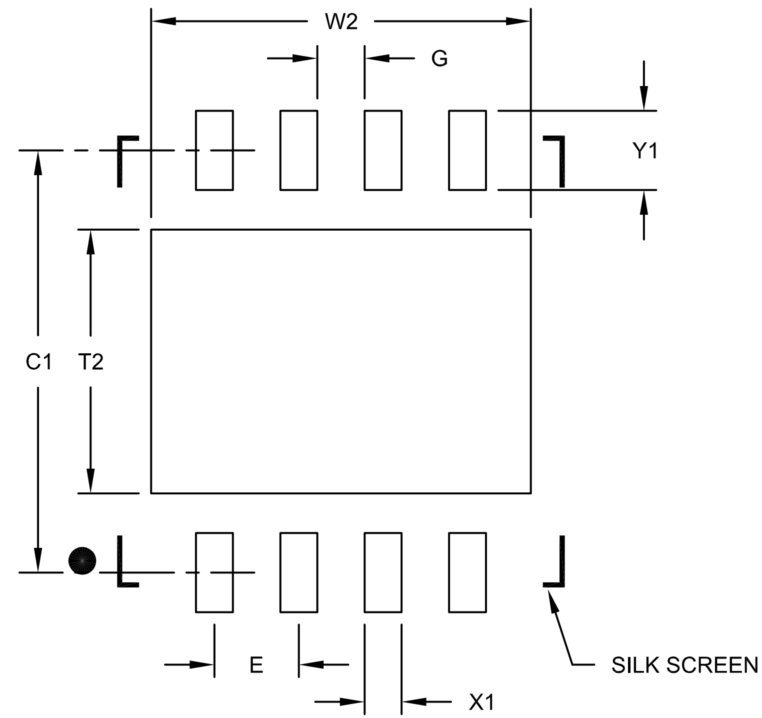
8-Lead Plastic Dual Flat, No Lead Package (MD) - 4x4x0.9 mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Optional Center Pad Width	W2			3.60
Optional Center Pad Length	T2			2.50
Contact Pad Spacing	C1		4.00	
Contact Pad Width (X8)	X1			0.35
Contact Pad Length (X8)	Y1			0.75
Distance Between Pads	G	0.45		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2131C

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10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing No. C04-063C Sheet 1 of 2

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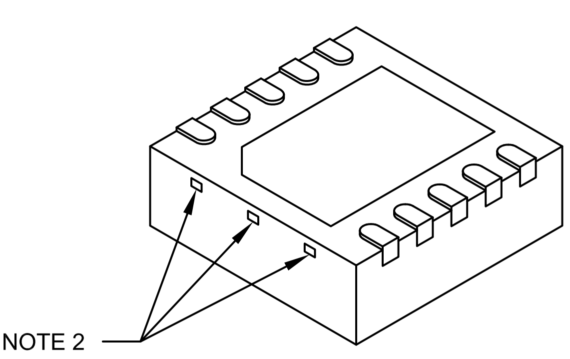
10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		10	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	2.15	2.35	2.45
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.40	1.50	1.75
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-063C Sheet 2 of 2

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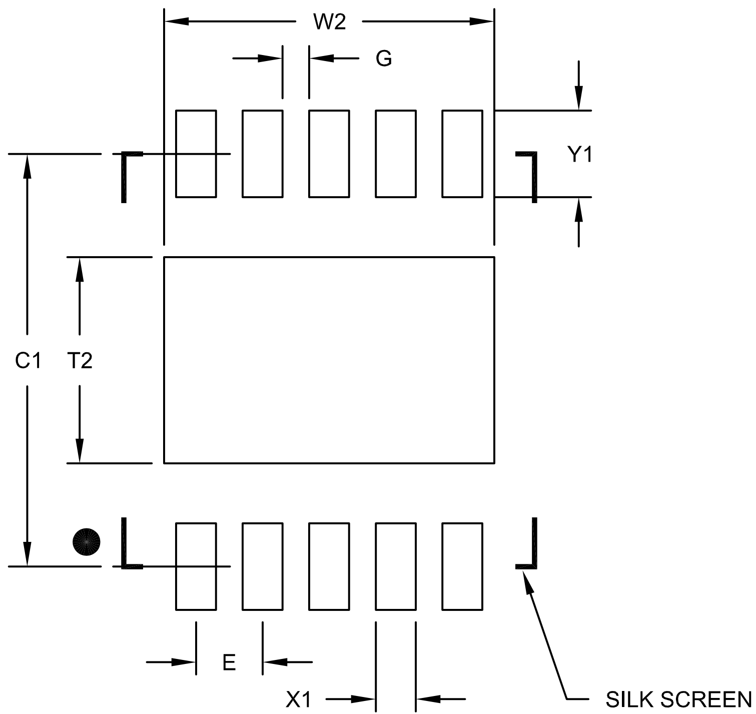
10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			2.48
Optional Center Pad Length	T2			1.55
Contact Pad Spacing	C1		3.10	
Contact Pad Width (X10)	X1			0.30
Contact Pad Length (X10)	Y1			0.65
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2063B

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NOTES:

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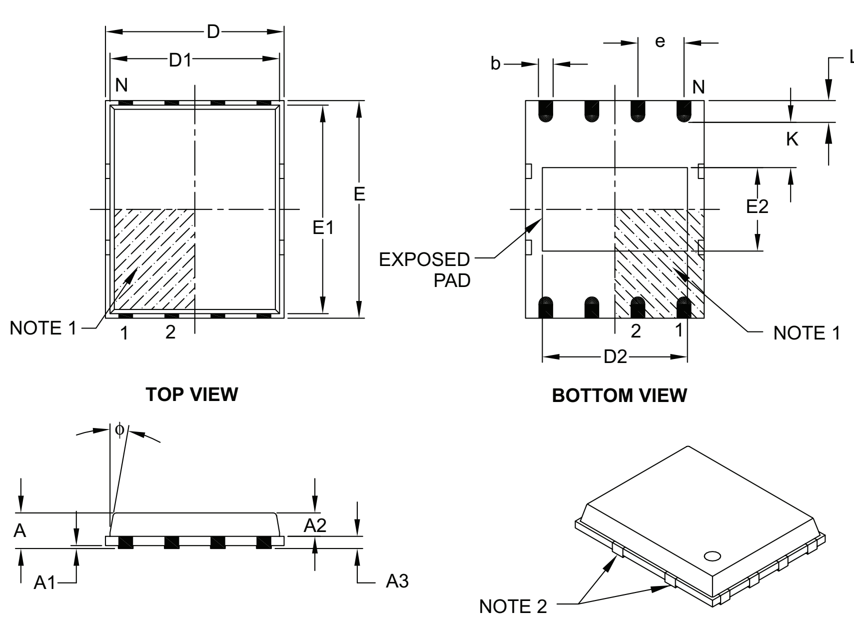
DFN-S

8-Lead Plastic Dual Flat, No Lead Package (MF) – 6x5 mm Body [DFN-S] PUNCH SINGULATED

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	–	0.85	1.00
Molded Package Thickness	A2	–	0.65	0.80
Standoff	A1	0.00	0.01	0.05
Base Thickness	A3		0.20 REF	
Overall Length	D		4.92 BSC	
Molded Package Length	D1		4.67 BSC	
Exposed Pad Length	D2	3.85	4.00	4.15
Overall Width	E		5.99 BSC	
Molded Package Width	E1		5.74 BSC	
Exposed Pad Width	E2	2.16	2.31	2.46
Contact Width	b	0.35	0.40	0.47
Contact Length	L	0.50	0.60	0.75
Contact-to-Exposed Pad	K	0.20	–	–
Model Draft Angle Top	φ	–	–	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-113B

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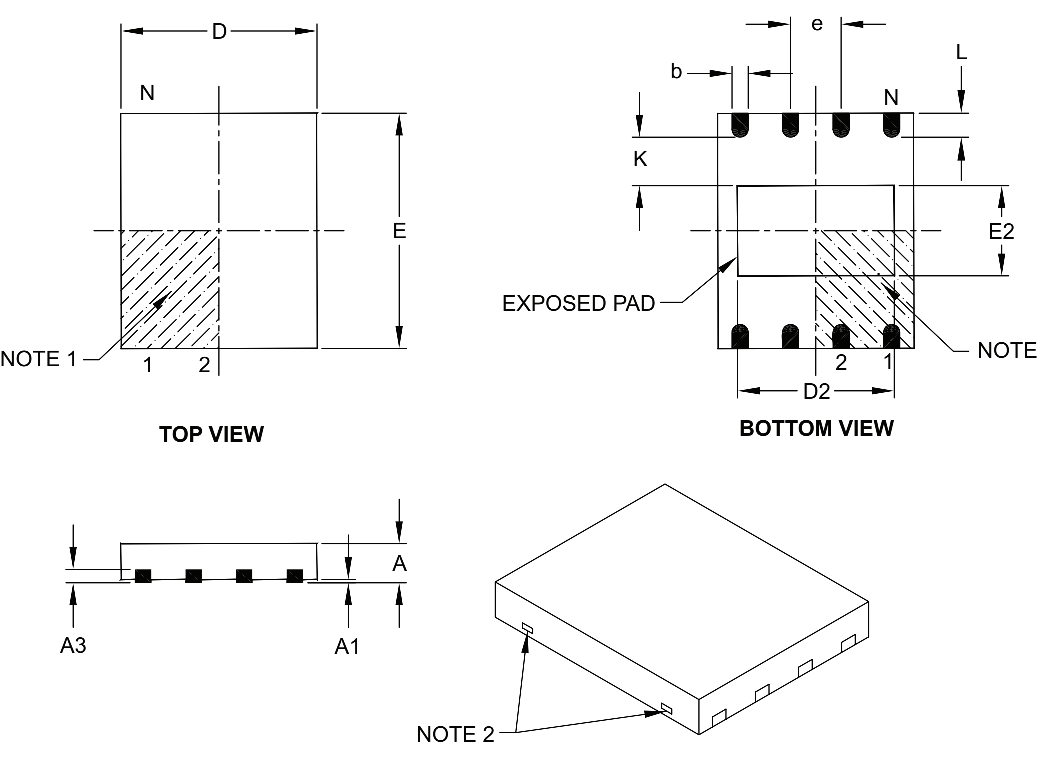
Package Outlines and Dimensions

8-Lead Plastic Dual Flat, No Lead Package (MF) – 6x5 mm Body [DFN-S]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



		Units	MILLIMETERS	
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	0.80	0.85	1.00
Standoff	A1	0.00	0.01	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		5.00 BSC	
Overall Width	E		6.00 BSC	
Exposed Pad Length	D2	3.90	4.00	4.10
Exposed Pad Width	E2	2.20	2.30	2.40
Contact Width	b	0.35	0.40	0.48
Contact Length	L	0.50	0.60	0.75
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

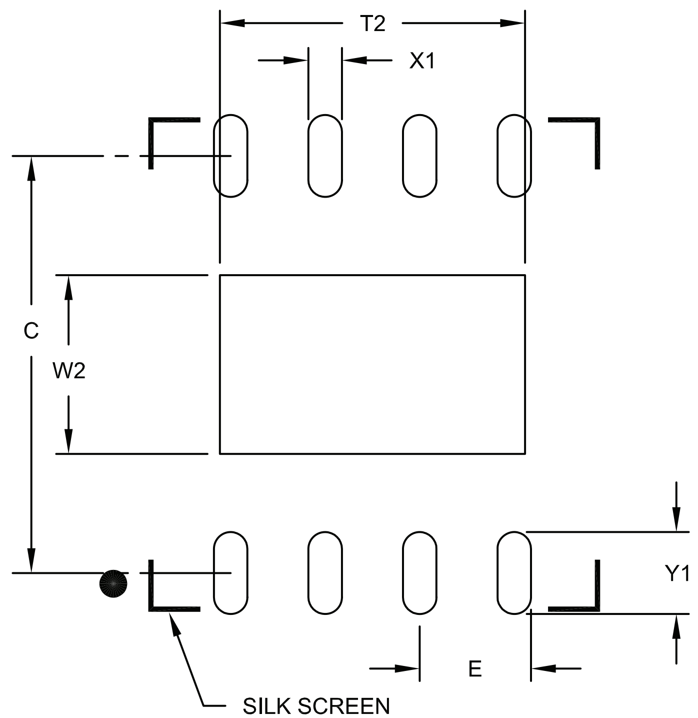
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

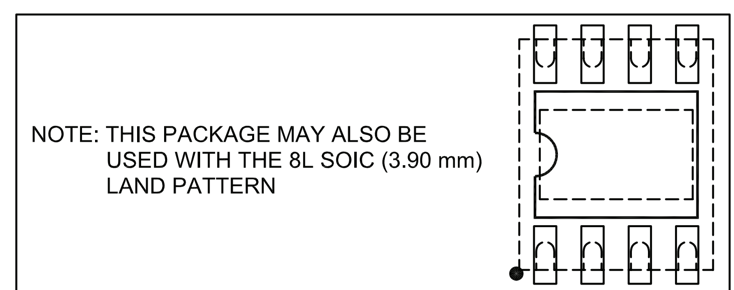
Microchip Technology Drawing C04-122B

8-Lead Plastic Dual Flat, No Lead Package (MF) - 6x5 mm Body [DFN-S]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN



	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Optional Center Pad Width	W2			2.40
Optional Center Pad Length	T2			4.10
Contact Pad Spacing	C		5.60	
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.10

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2122A

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PDFN

8-Lead Power Dual Flatpack No Lead Package (MF) – 5x6x1.0 mm Body [PDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-188B Sheet 1 of 2

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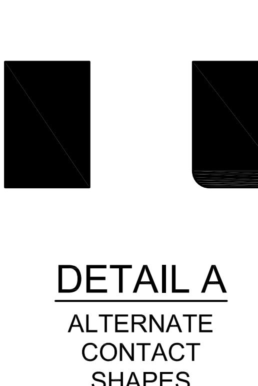
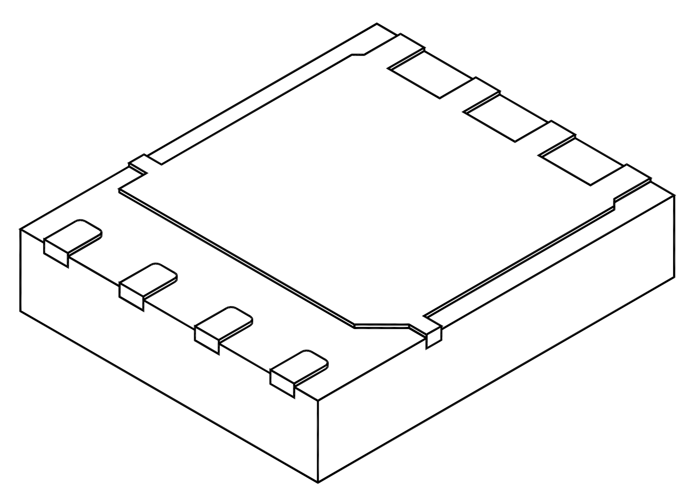
8-Lead Power Dual Flatpack No Lead Package (MF) – 5x6x1.0 mm Body [PDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





	Units	MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	0.80	1.00	1.03
Standoff	A1	0.00	-	0.05
Terminal Thickness	(A3)		0.20 REF	
Overall Length	D		5.00 BSC	
Overall Width	E		6.00 BSC	
Exposed Pad length	D2	4.27	4.42	4.52
Exposed Pad Width	E2	3.87	4.02	4.12
Tab Width	E3	0.20	0.25	0.30
Terminal Width	b	0.36	0.41	0.46
Terminal Length	L	0.51	0.61	0.71
Terminal to Exposed Pad	K	0.71	0.76	0.81

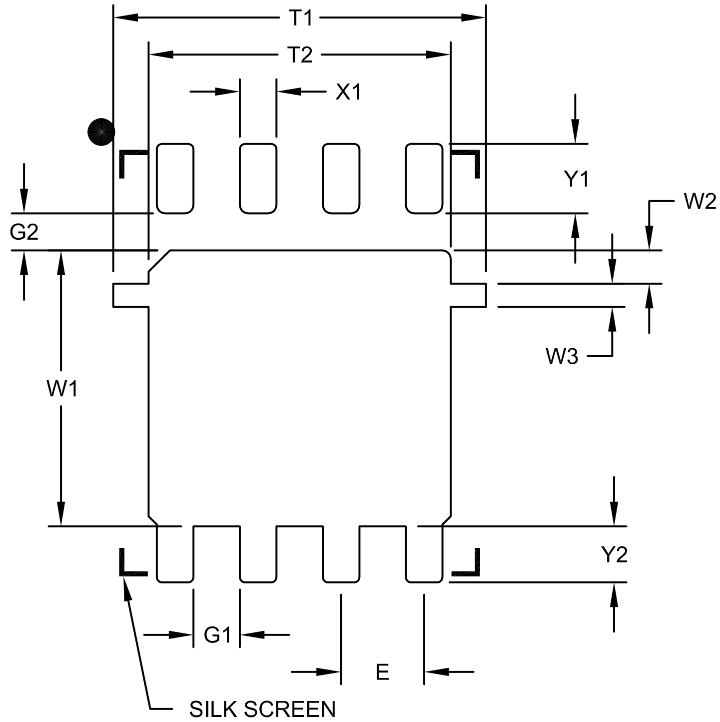
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Package dimension does not include mold flash, protrusions, burrs or metal smearing.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-188B Sheet 2 of 2

8-Lead Power Dual Flatpack No Lead Package (MF) – 5x6x1.0 mm Body [PDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Center Pad Width	W1			4.22
Pad Edge to Tab	W2		0.51	
Tab Width	W3		0.35	
Center Pad Length With Tabs	T1			5.70
Center Pad Length	T2			4.62
Distance Between Terminals	G1	0.71		
Terminal To Center Pad (X4)	G2	0.57		
Terminal Pad Width (X8)	X1			0.56
Terminal Pad Length (X4)	Y1			1.06
Terminal Pad Length (X8)	Y2			0.86

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2188A

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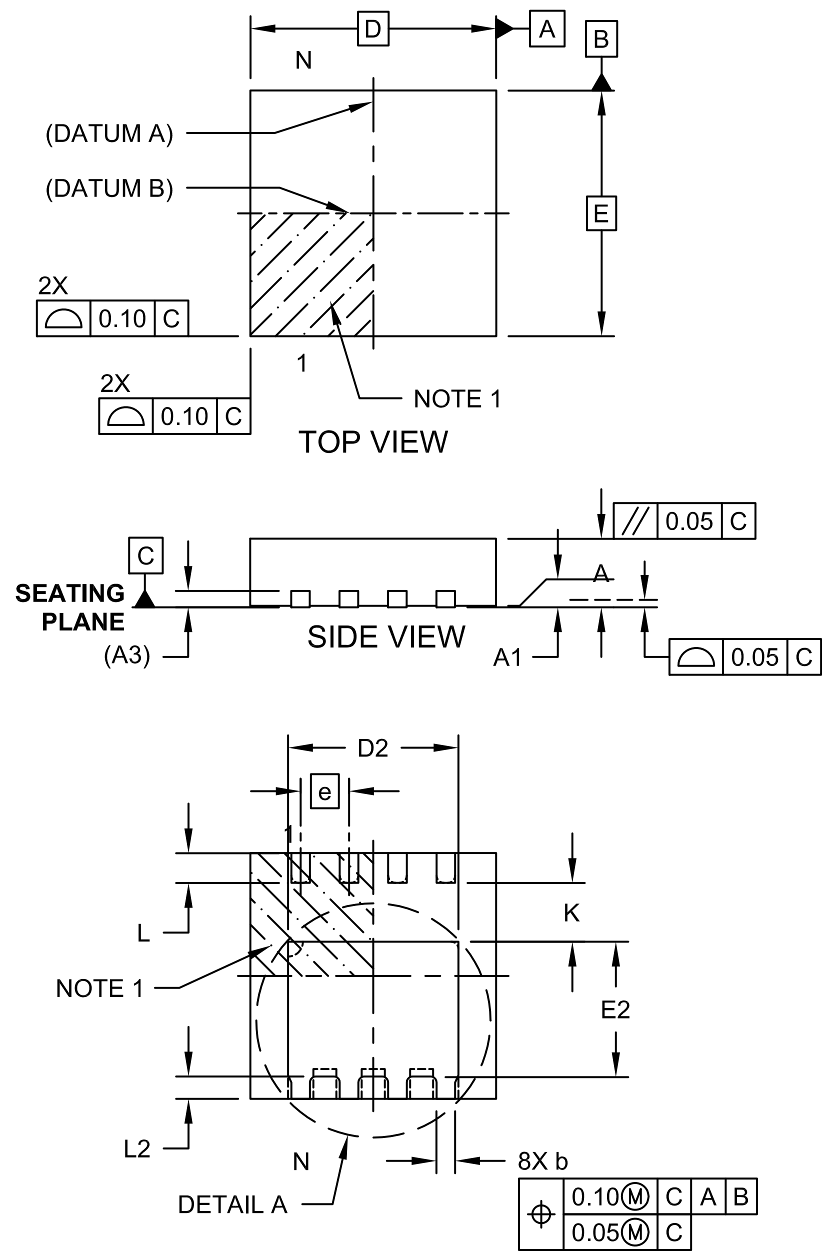
8-Lead Power Dual Flatpack No Lead Package (LC) – 3.3x3.3x1.0 mm Body [PDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-195A Sheet 1 of 2

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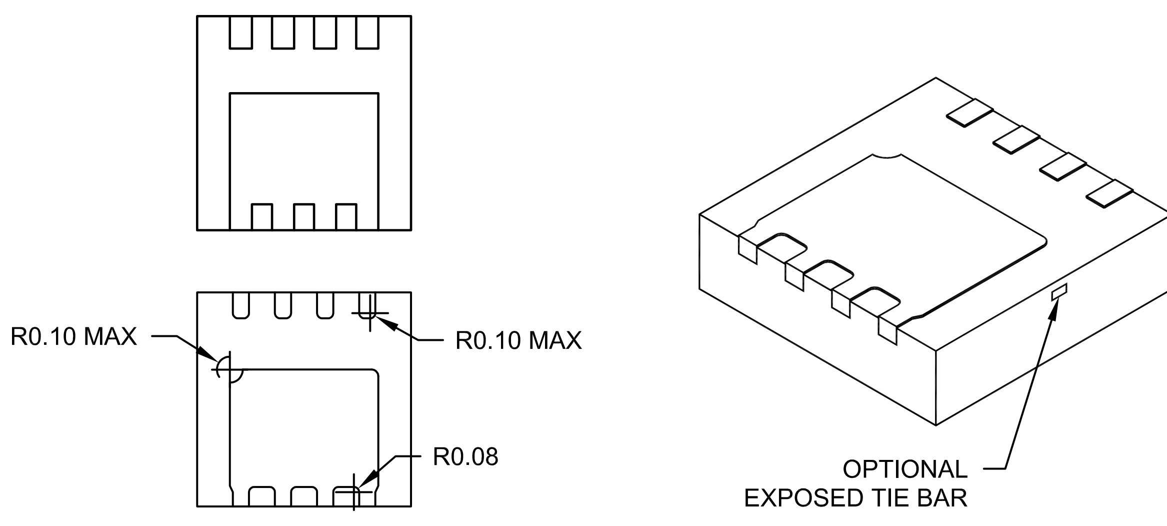
8-Lead Power Dual Flatpack No Lead Package (LC) – 3.3x3.3x1.0 mm Body [PDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	1.00	1.03
Standoff	A1	0.00	-	0.05
Terminal Thickness	(A3)		0.20 REF	
Overall Length	D		3.30 BSC	
Overall Width	E		3.30 BSC	
Exposed Pad length	D2	2.14	2.29	2.39
Exposed Pad Width	E2	1.66	1.81	1.91
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Terminal Length	L2	0.30	-	0.40
Terminal to Exposed Pad	K	0.60	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars.
3. Package is saw singulated.
4. Package dimension does not include mold flash, protrusions, burrs or metal smearing.
5. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-195A Sheet 2 of 2

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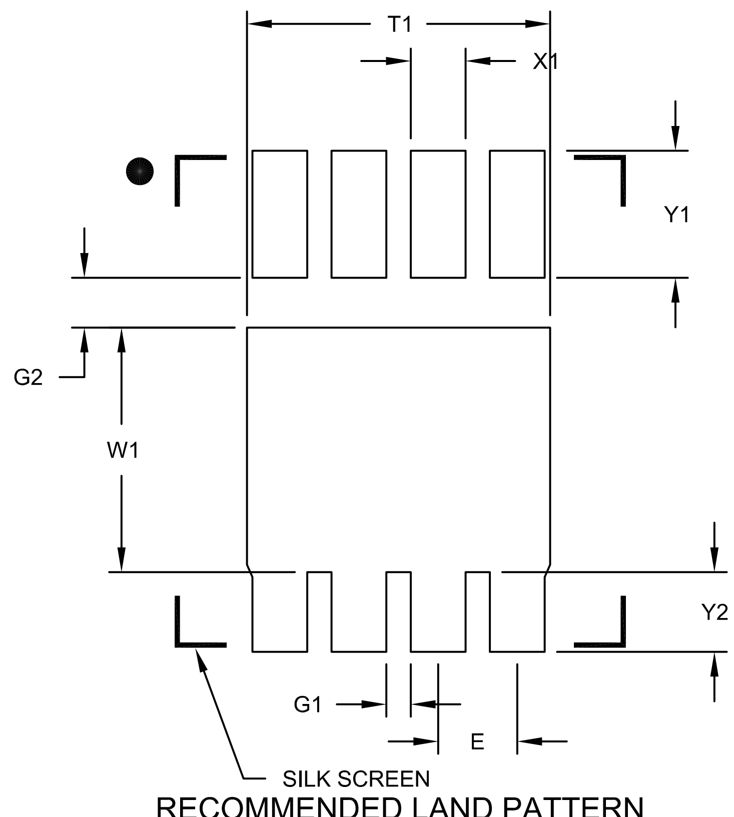
Footprint Outlines and Dimensions

8-Lead Power Dual Flatpack No Lead Package (LC) – 3.3x3.3x1.0 mm Body [PDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Center Pad Width	W1			2.01
Center Pad Length	T1			2.49
Distance Between Terminals	G1	0.20		
Terminal Edge to Center Pad	G2	0.41		
Terminal Pad Width (X8)	X1			0.45
Terminal Pad Length (X4)	Y1			1.05
Terminal Pad Length (X8)	Y2			0.66

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2195A

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NOTES:

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TDFN

6-Lead Plastic Thin Dual Flat, No Lead Package (MY) – 2x2x0.8 mm Body [TDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-078A Sheet 1 of 2

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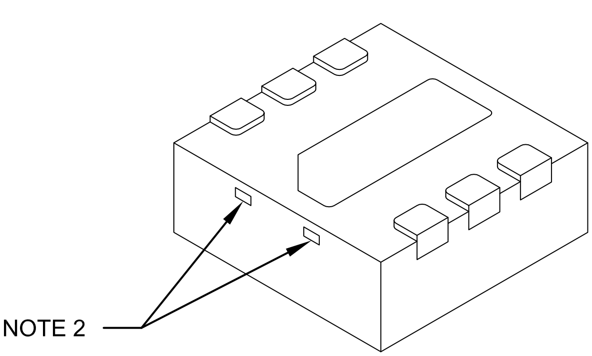
Package Outlines and Dimensions

6-Lead Plastic Thin Dual Flat, No Lead Package (MY) – 2x2x0.8 mm Body [TDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		6	
Pitch	e		0.50 BSC	
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		2.00 BSC	
Exposed Pad Width	E2	0.55	0.60	0.65
Overall Length	D		2.00 BSC	
Exposed Pad Length	D2	1.55	1.60	1.65
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-078A Sheet 2 of 2

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6-Lead Plastic Thin Dual Flat, No Lead Package (MYY) – 2x2x0.8 mm Body [TDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A B
N
(DATUM A)
(DATUM B)
E
2X
0.15 C
2X
0.15 C
1 2
NOTE 1

TOP VIEW

0.10 C
A
SEATING PLANE
C
(A3)
A1
6X
0.08 C

SIDE VIEW

D2
0.10Ⓜ C A B
NOTE 1
0.10Ⓜ C A B
(DATUM B)
E2
6X K
(DATUM A)
e
6X L
6X b
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-078A Sheet 1 of 2

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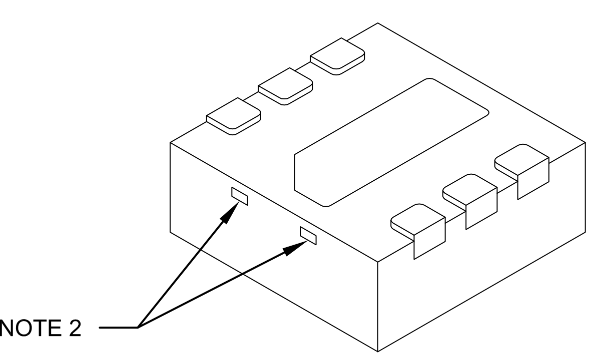
6-Lead Plastic Thin Dual Flat, No Lead Package (MYY) – 2x2x0.8 mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.50 BSC		
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	2.00 BSC		
Exposed Pad Width	E2	0.55	0.60	0.65
Overall Length	D	2.00 BSC		
Exposed Pad Length	D2	1.55	1.60	1.65
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-078A Sheet 2 of 2

8-Lead Plastic Dual Flat, No Lead Package (MN) – 2x3x0.8 mm Body [TDFN] With 1.4x1.3 mm Exposed Pad (JEDEC Package type WDFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing No. C04-129-MN Rev E Sheet 1 of 2

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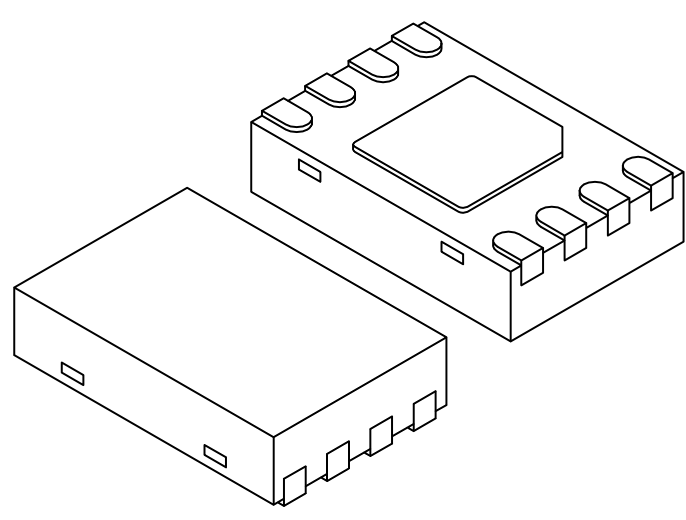
8-Lead Plastic Dual Flat, No Lead Package (MN) – 2x3x0.8 mm Body [TDFN] With 1.4x1.3 mm Exposed Pad (JEDEC Package type WDFN)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		2.00 BSC	
Overall Width	E		3.00 BSC	
Exposed Pad Length	D2	1.35	1.40	1.45
Exposed Pad Width	E2	1.25	1.30	1.35
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.25	0.30	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

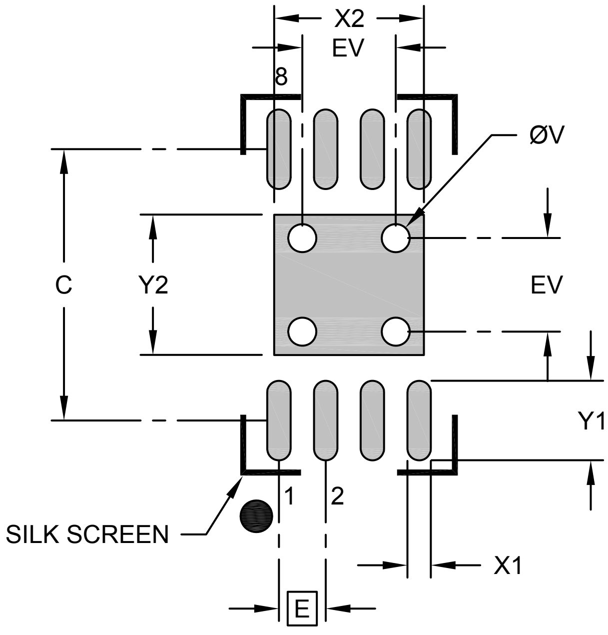
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-129-MN Rev E Sheet 2 of 2

8-Lead Plastic Dual Flat, No Lead Package (MN) – 2x3x0.8 mm Body [TDFN]
With 1.4x1.3 mm Exposed Pad (JEDEC Package type WDFN)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			1.60
Optional Center Pad Length	Y2			1.50
Contact Pad Spacing	C		2.90	
Contact Pad Width (X8)	X1			0.25
Contact Pad Length (X8)	Y1			0.85
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing No. C04-129-MN Rev. B

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8-Lead Plastic Dual Flat, No Lead Package (MNY) – 2x3x0.8 mm Body [TDFN] With 1.4x1.3 mm Exposed Pad (JEDEC Package type WDFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing No. C04-129-MNY Rev E Sheet 1 of 2

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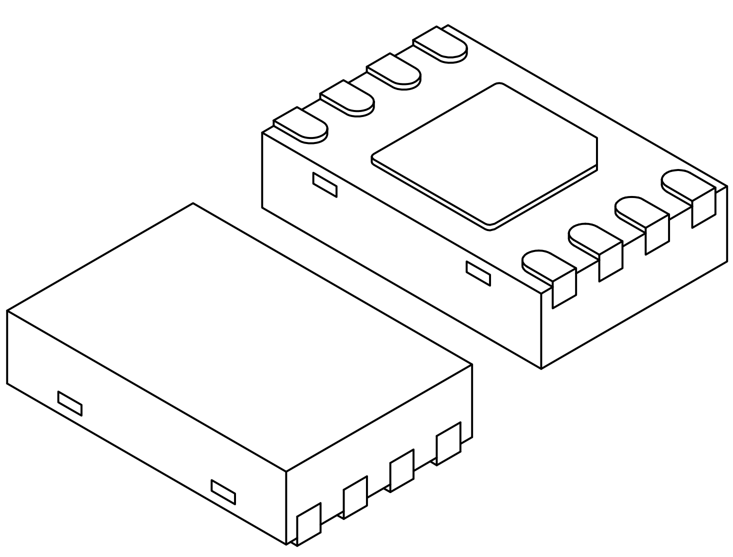
8-Lead Plastic Dual Flat, No Lead Package (MNY) – 2x3x0.8 mm Body [TDFN] With 1.4x1.3 mm Exposed Pad (JEDEC Package type WDFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		2.00 BSC	
Overall Width	E		3.00 BSC	
Exposed Pad Length	D2	1.35	1.40	1.45
Exposed Pad Width	E2	1.25	1.30	1.35
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.25	0.30	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-129-MNY Rev E Sheet 2 of 2

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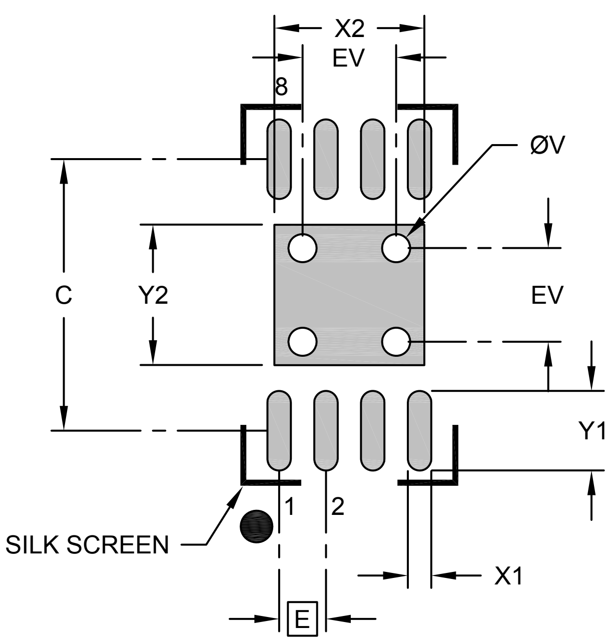
Footprint Outlines and Dimensions

8-Lead Plastic Dual Flat, No Lead Package (MNY) – 2x3x0.8 mm Body [TDFN] With 1.4x1.3 mm Exposed Pad (JEDEC Package type WDFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			1.60
Optional Center Pad Length	Y2			1.50
Contact Pad Spacing	C		2.90	
Contact Pad Width (X8)	X1			0.25
Contact Pad Length (X8)	Y1			0.85
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing No. C04-129-MNY Rev. B

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10-Lead Thin Plastic Dual Flat, No Lead Package (MN) - 3x3x0.8mm Body [TDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
E
NOTE 1
2X
0.15 C
1 2
2X
0.15 C

TOP VIEW

A
0.10 C
SEATING PLANE
C
(A3)
A1
10X
0.08 C

SIDE VIEW

D2
1 2
NOTE 1
(DATUM A)
EXPOSED PAD
(DATUM B)
E2
10X K
10X L
N
e
10X b
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-185A Sheet 1 of 2

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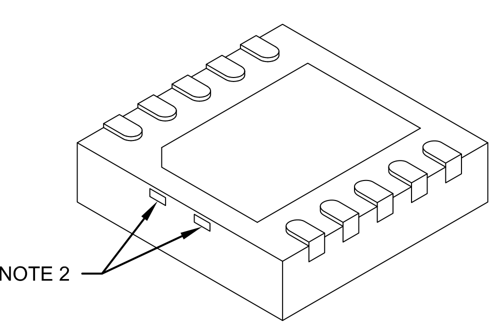
Package Outlines and Dimensions

10-Lead Thin Plastic Dual Flat, No Lead Package (MN) - 3x3x0.8mm Body [TDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		10	
Pitch	e		0.50 BSC	
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	2.20	2.30	2.35
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.55	1.65	1.70
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-0185A Sheet 2 of 2

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NOTES:

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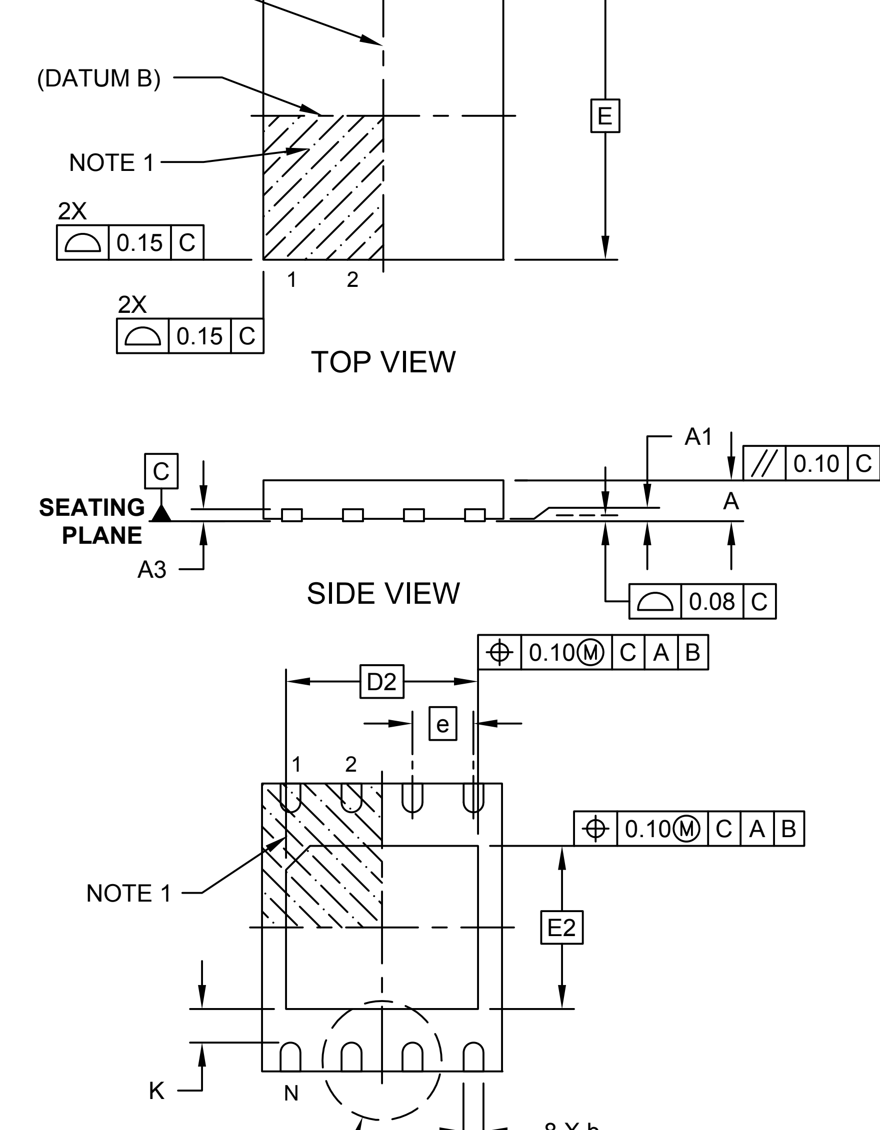
TDFN-S

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [TDFN-S]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-210B Sheet 1 of 2

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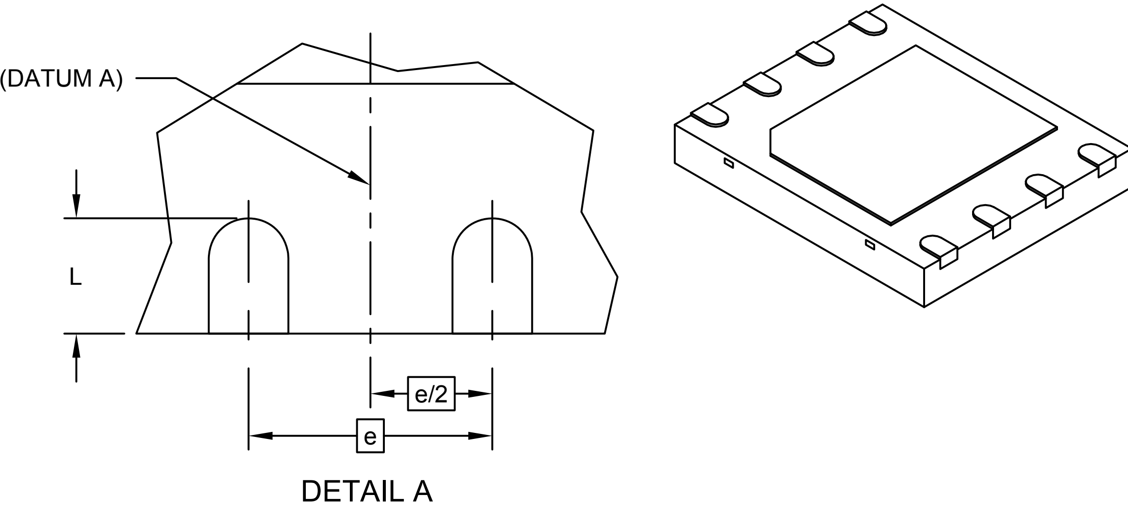
8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [TDFN-S]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	D		5.00 BSC	
Exposed Pad Width	D2		4.00 BSC	
Overall Length	E		6.00 BSC	
Exposed Pad Length	E2		3.40 BSC	
Terminal Width	b	0.35	0.42	0.48
Terminal Length	L	0.50	0.60	0.70
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-210B Sheet 2 of 2

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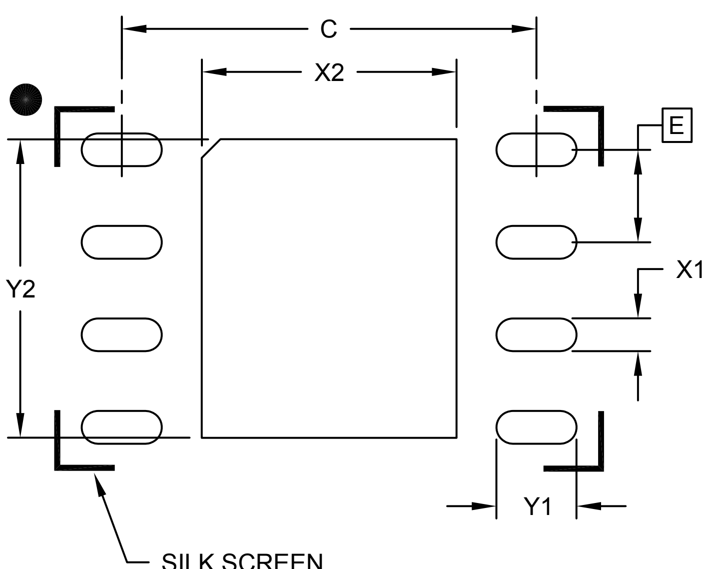
8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [TDFN-S]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Optional Center Pad Width	X2			3.50
Optional Center Pad Length	Y2			4.10
Contact Pad Spacing	C		5.70	
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.10

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2210A

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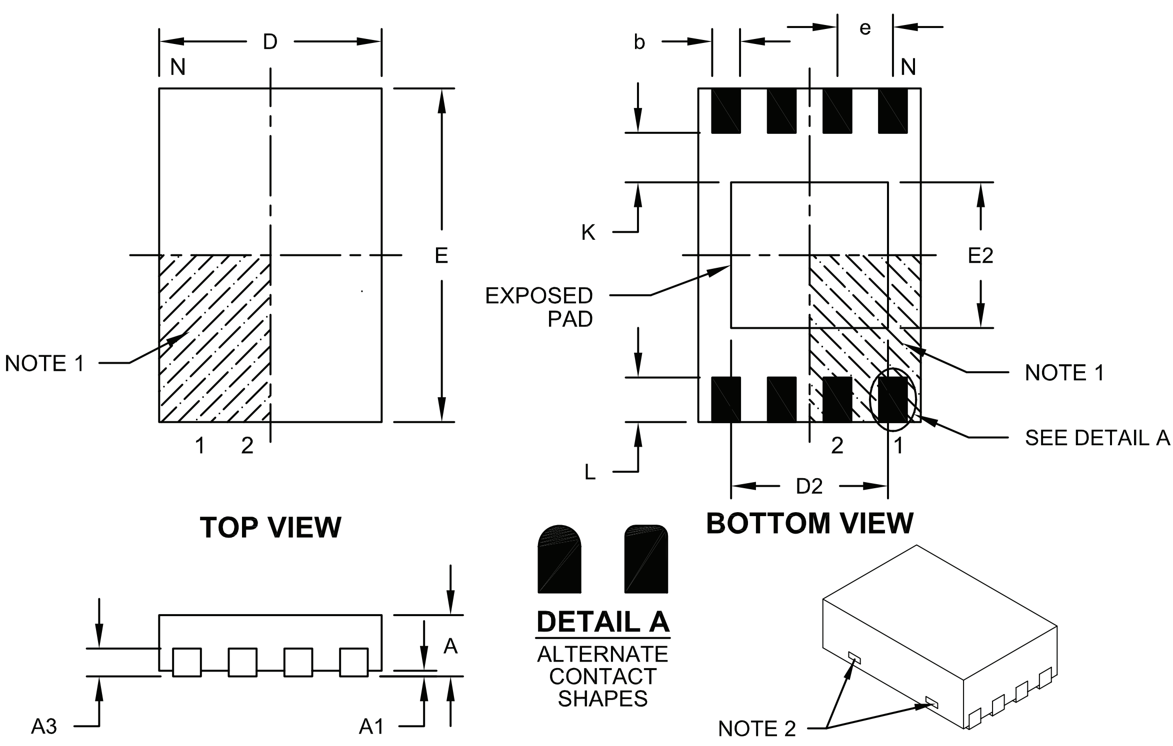
UDFN

8-Lead Plastic Dual Flat, No Lead Package (MU) – 2x3x0.5 mm Body [UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.45	0.50	0.55
Standoff	A1			0.07
Contact Thickness	A3		0.127 REF	
Overall Length	D	1.95	2.00	2.05
Overall Width	E	2.95	3.00	3.05
Exposed Pad Length	D2	1.30	1.40	1.50
Exposed Pad Width	E2	1.20	1.30	1.40
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.25	0.30	0.35
Contact-to-Exposed Pad	K		0.55 REF	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-136B

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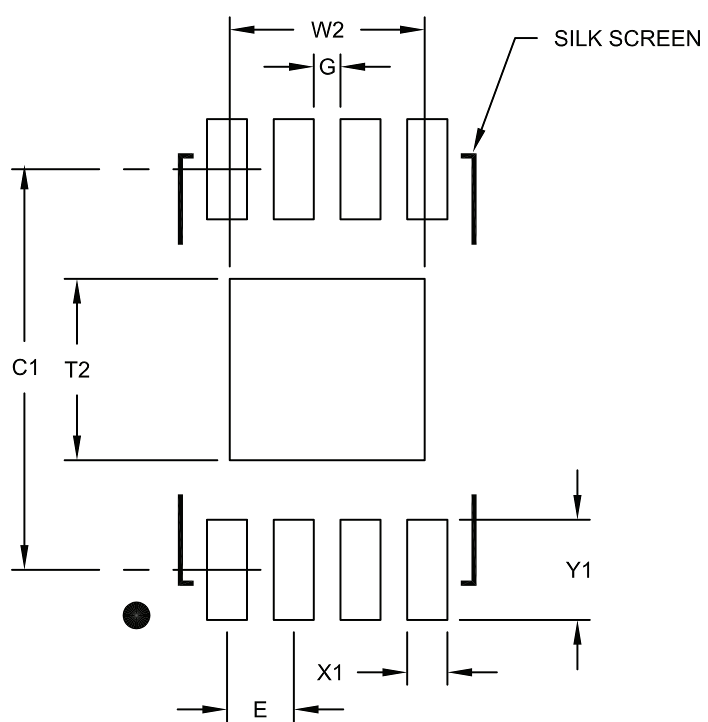
8-Lead Plastic Dual Flat, No Lead Package (MU) – 2x3x0.5 mm Body [UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			1.46
Optional Center Pad Length	T2			1.36
Contact Pad Spacing	C1		3.00	
Contact Pad Width (X8)	X1			0.30
Contact Pad Length (X8)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

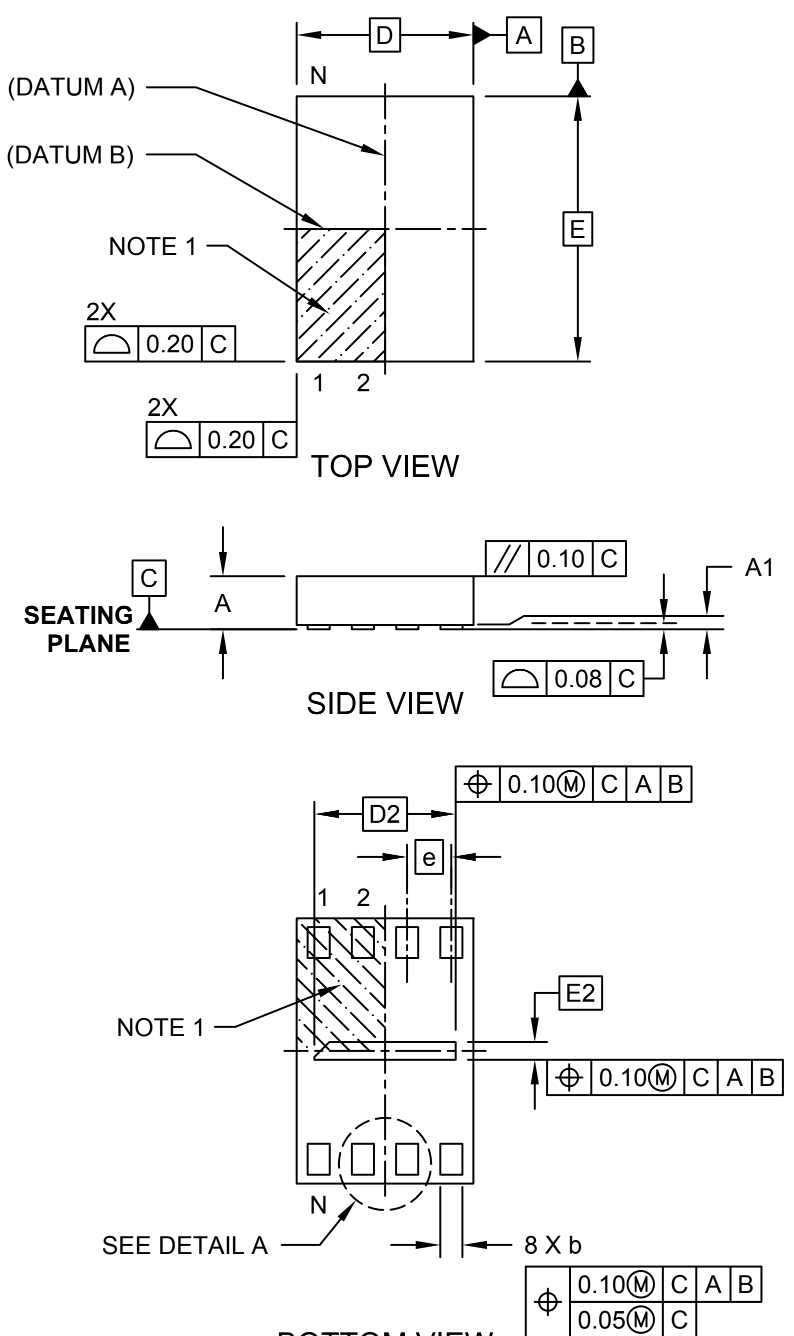
1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2136A

8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) - 2x3 mm Body [USON] [Also called UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-203C [NP] Sheet 1 of 2

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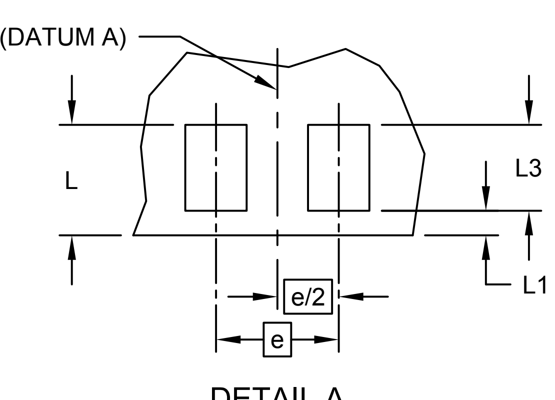
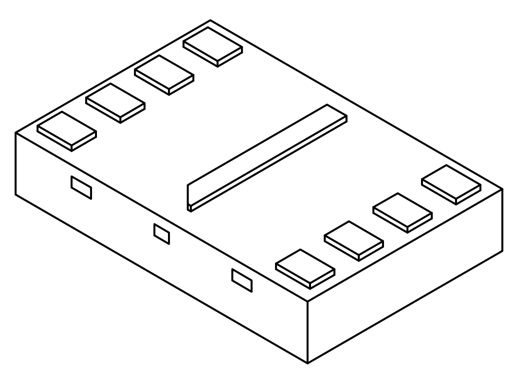
8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) - 2x3 mm Body [USON] [Also called UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.45	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Overall Width	D		2.00 BSC	
Exposed Pad Width	D2	1.50	1.60	1.70
Overall Length	E		3.00 BSC	
Exposed Pad Length	E2	0.10	0.20	0.30
Terminal Width	b	0.20	0.25	0.30
Package Edge to Terminal Edge	L	0.40	0.45	0.50
Package Edge to Terminal Edge	L1	—	0.10	—
Terminal Length	L3	0.30	0.35	0.40

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-203C [NP] Sheet 2 of 2

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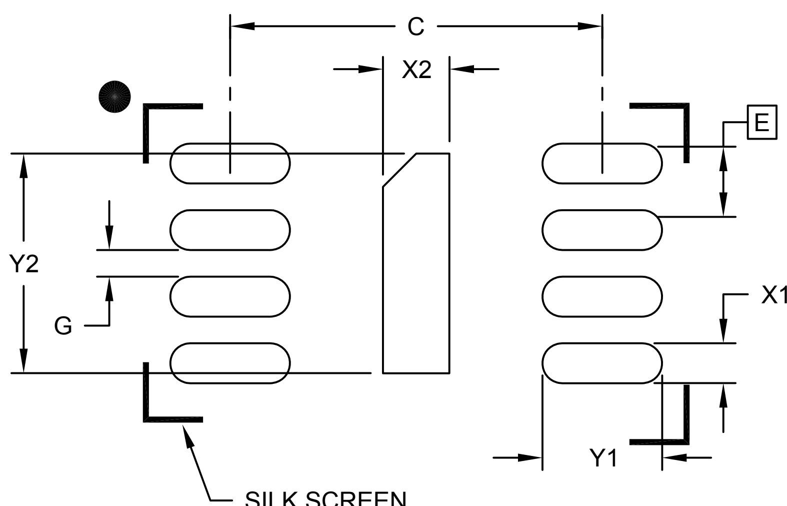
8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) - 2x3 mm Body [USON] [Also called UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Terminal Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			0.25
Optional Center Pad Length	Y2			1.65
Terminal Pad Spacing	C		2.80	
Terminal Pad Width (X8)	X1			0.30
Terminal Pad Length (X8)	Y1			0.90
Mininum Between Terminal Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2203B [NP]

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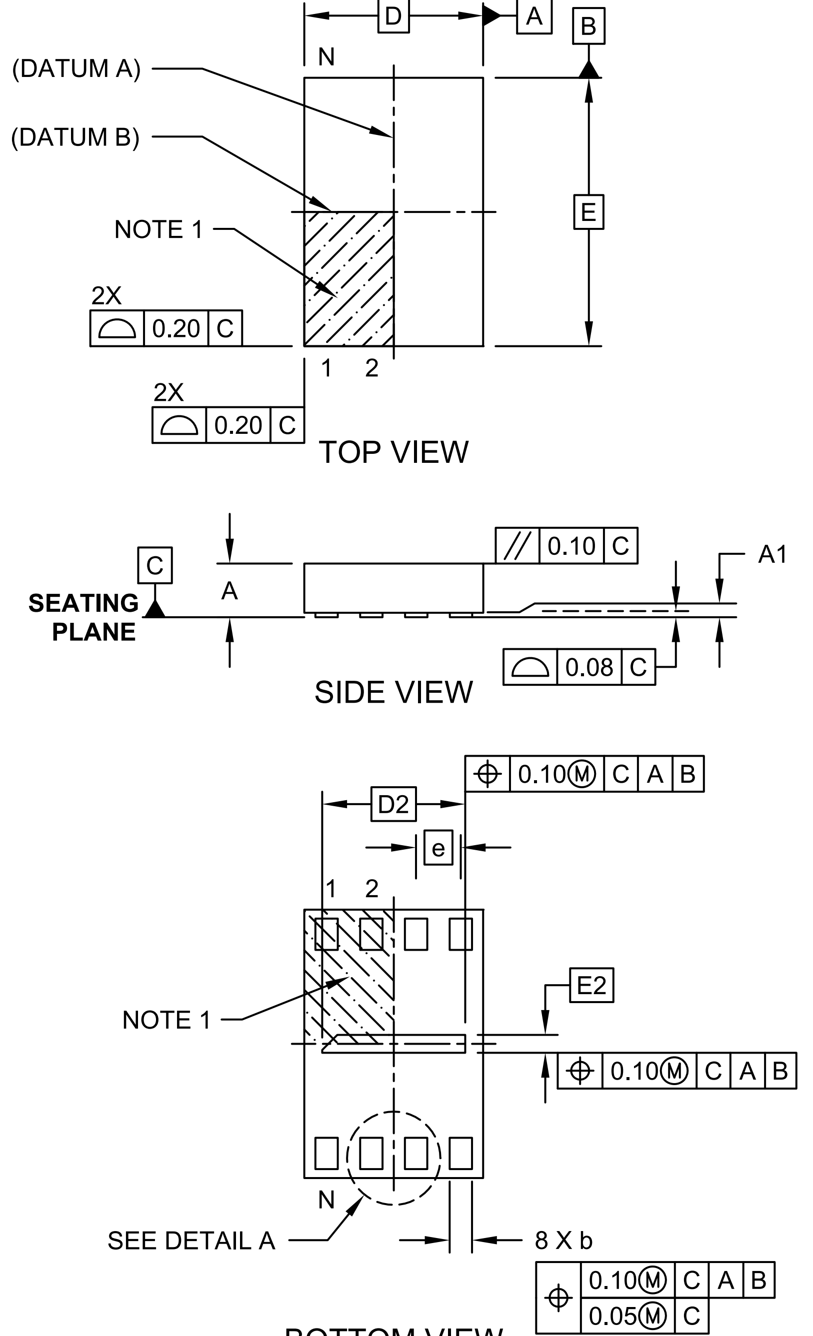
8-Lead Plastic Ultra Thin Small Outline No Lead Package (PRX) - 2x3 mm Body [USON] [Also called UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-203C [PRX] Sheet 1 of 2

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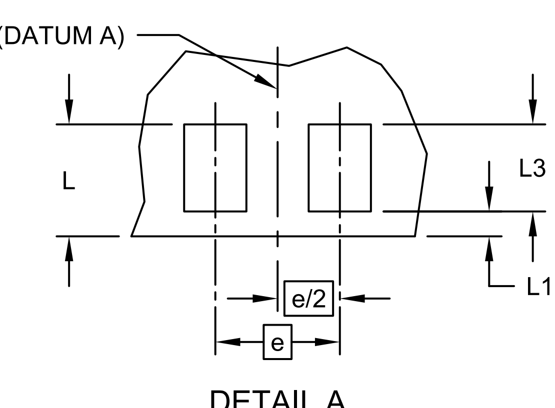
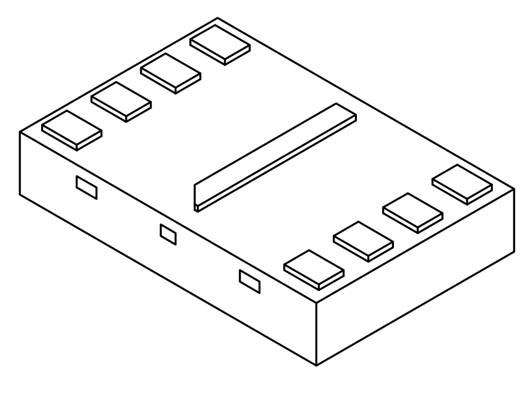
8-Lead Plastic Ultra Thin Small Outline No Lead Package (PRX) - 2x3 mm Body [USON] [Also called UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.45	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Overall Width	D		2.00 BSC	
Exposed Pad Width	D2	1.50	1.60	1.70
Overall Length	E		3.00 BSC	
Exposed Pad Length	E2	0.10	0.20	0.30
Terminal Width	b	0.20	0.25	0.30
Package Edge to Terminal Edge	L	0.40	0.45	0.50
Package Edge to Terminal Edge	L1	—	0.10	—
Terminal Length	L3	0.30	0.35	0.40

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-203C [PRX] Sheet 2 of 2

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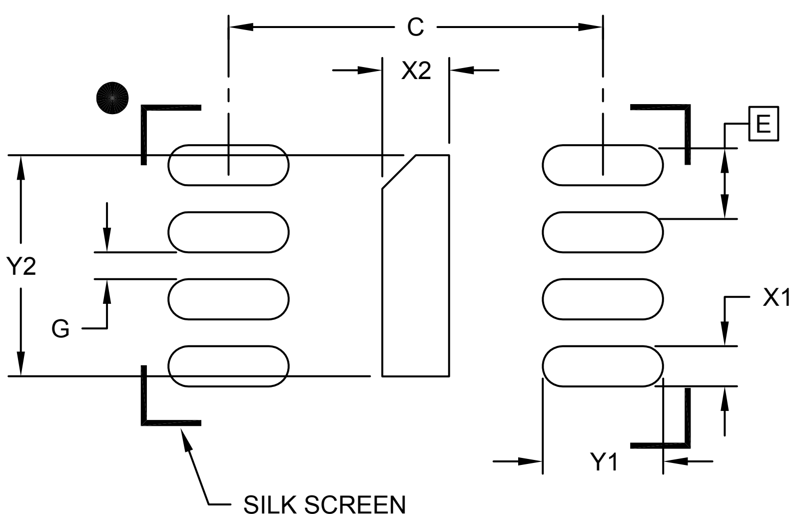
8-Lead Plastic Ultra Thin Small Outline No Lead Package (PRX) - 2x3 mm Body [USON] [Also called UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Terminal Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			0.30
Optional Center Pad Length	Y2			1.70
Terminal Pad Spacing	C		2.80	
Terminal Pad Width (X8)	X1			0.30
Terminal Pad Length (X8)	Y1			0.90
Mininum Between Terminal Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2203B [PRX]

8-Lead Ultra Thin Plastic Dual Flat, No Lead Package (RF) - 3x3x0.50 mm Body [UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-254A Sheet 1 of 2

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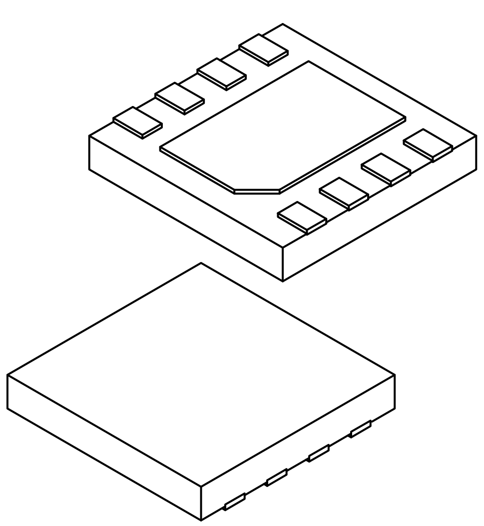
8-Lead Ultra Thin Plastic Dual Flat, No Lead Package (RF) - 3x3x0.50 mm Body [UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N	8		
Pitch	e	0.65 BSC		
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3	0.065 REF		
Overall Width	E	3.00 BSC		
Exposed Pad Width	E2	1.40	1.50	1.60
Overall Length	D	3.00 BSC		
Exposed Pad Length	D2	2.20	2.30	2.40
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.35	0.45	0.55
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-254A Sheet 2 of 2

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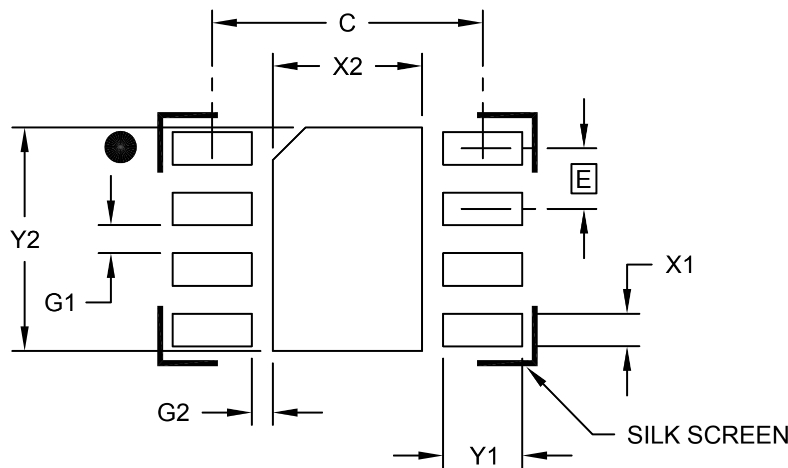
8-Lead Ultra Thin Plastic Dual Flat, No Lead Package (RF) - 3x3x0.50 mm Body [UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	X2			1.60
Optional Center Pad Length	Y2			2.40
Contact Pad Spacing	C		2.90	
Contact Pad Width (X8)	X1			0.35
Contact Pad Length (X8)	Y1			0.85
Contact Pad to Contact Pad (X6)	G1	0.20		
Contact Pad to Center Pad (X8)	G2	0.30		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2254A

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10-Lead Ultra-thin Dual Flatpack No-Lead (NA[Y]) – 3x3x0.5 mm Body [UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D A B N (DATUM A) (DATUM B) E 2X 0.05 A B 1 2X 0.05 A B

TOP VIEW

0.05 C C SEATING PLANE (A3) A A1 10X 0.05 C

SIDE VIEW

D2 e 1 (DATUM A) (DATUM B) E2 K L N 10 X b 0.10Ⓜ C A B 0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-194A Sheet 1 of 2

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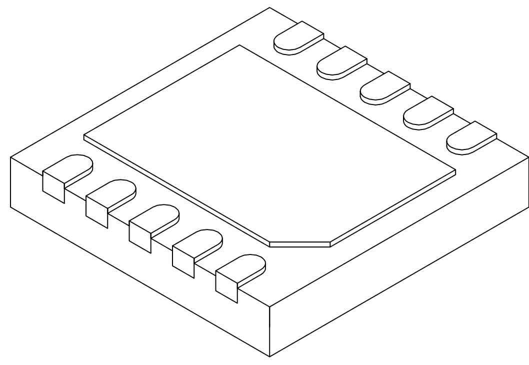
10-Lead Ultra-thin Dual Flatpack No-Lead (NA[Y]) – 3x3x0.5 mm Body [UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Pins	N		10	
Pitch	e		0.50 BSC	
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	-	0.05
Overall Length	D		3.00 BSC	
Overall Width	E		3.00 BSC	
Exposed Pad Length	D2	2.40	2.50	2.60
Exposed Pad Width	E2	1.70	1.80	1.90
Terminal Thickness	(A3)		0.127 REF	
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
2. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-194A Sheet 2 of 2

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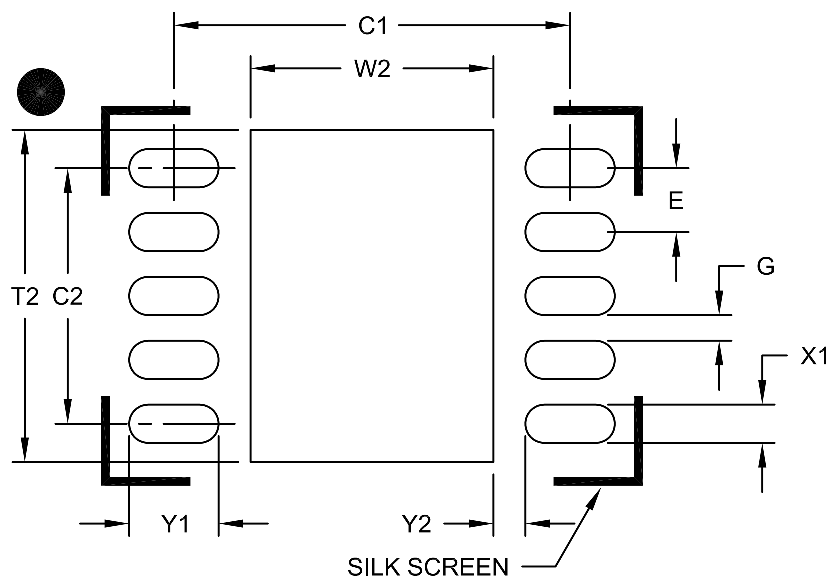
10-Lead Ultra-thin Dual Flatpack, No Lead Package (NA[Y]) - 3x3 mm Body (UDFN)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Terminal Pitch	E		0.50 BSC	
Optional Center Pad Width	W2			1.90
Optional Center Pad Length	T2			2.60
Terminal Pad Spacing	C1		3.10	
Terminal Pad Spacing	C2		2.00	
Terminal Pad Width (X10)	X1			0.30
Terminal Pad Length (X10)	Y1			0.70
Terminal Pad to Center (X10)	Y2	0.25		
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2194A

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NOTES:

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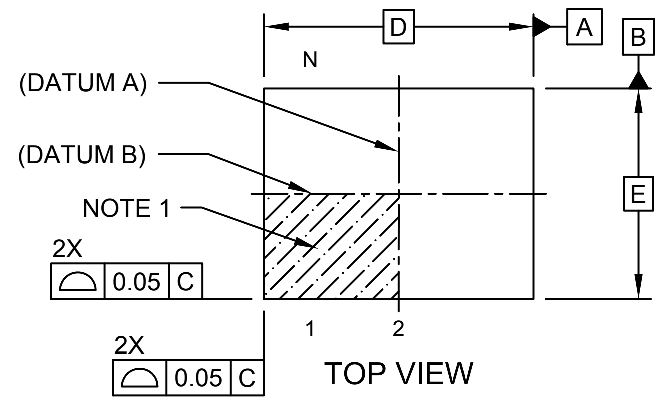
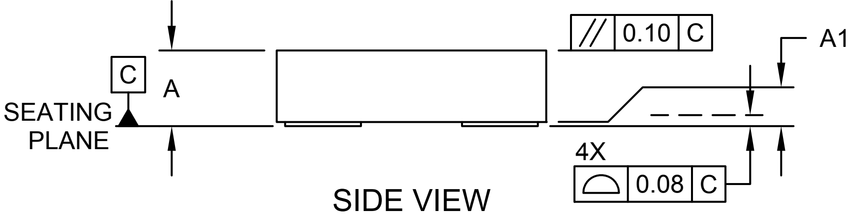
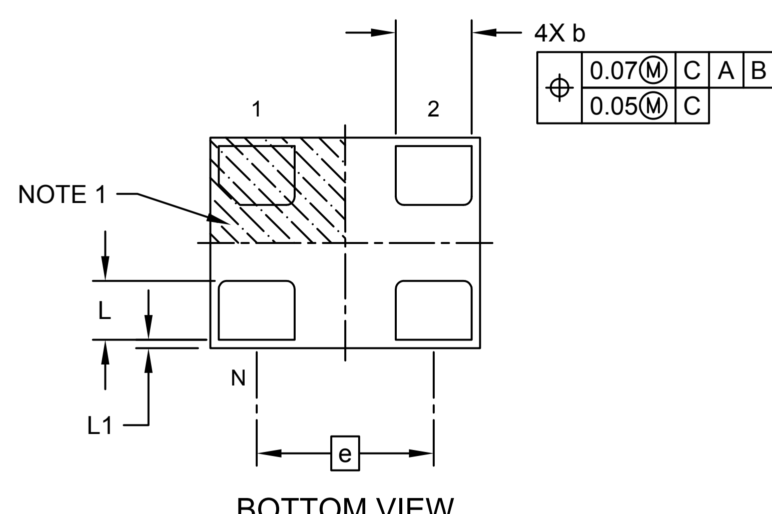
VDFN

4-Lead Very Thin Plastic Dual Flatpack No-Lead (H4A) - 3.2x2.5 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-1006A Sheet 1 of 2

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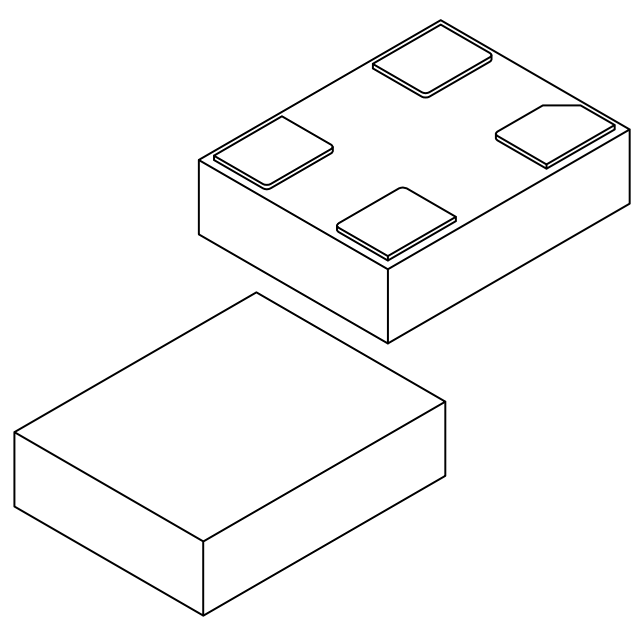
4-Lead Very Thin Plastic Dual Flatpack No-Lead (H4A) - 3.2x2.5 mm Body [VDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		4	
Pitch	e		2.10 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Overall Length	D		3.20 BSC	
Overall Width	E		2.50 BSC	
Terminal Width	b	0.85	0.90	0.95
Terminal Length	L	0.65	0.70	0.75
Terminal Pullback	L1		0.10 REF	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

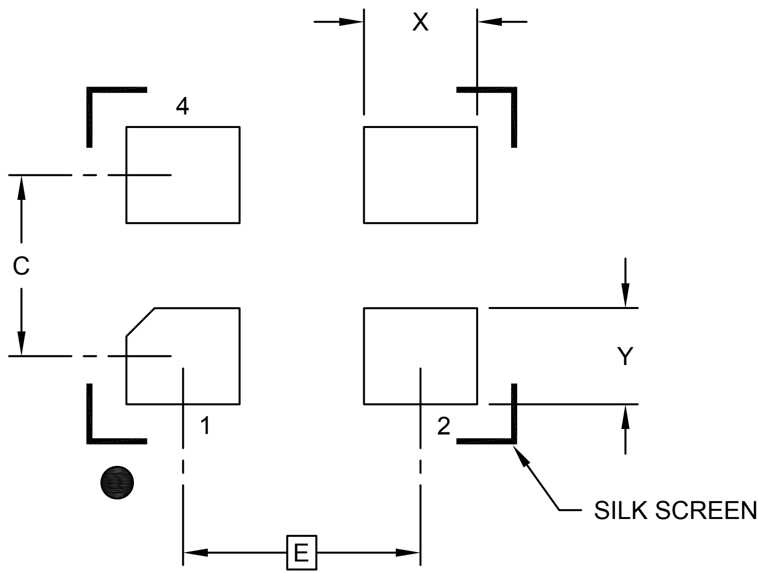
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1006A Sheet 2 of 2

4-Lead Very Thin Plastic Dual Flatpack No-Lead (H4A) - 3.2x2.5 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	2.10 BSC		
Contact Pad Spacing	C		1.60	
Contact Pad Width (X4)	X			1.00
Contact Pad Length (X4)	Y			0.85

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3006A

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6-Lead Very Thin Dual Flatpack No-Leads (J7A) - 2.5x2.0 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-1005A Sheet 1 of 2

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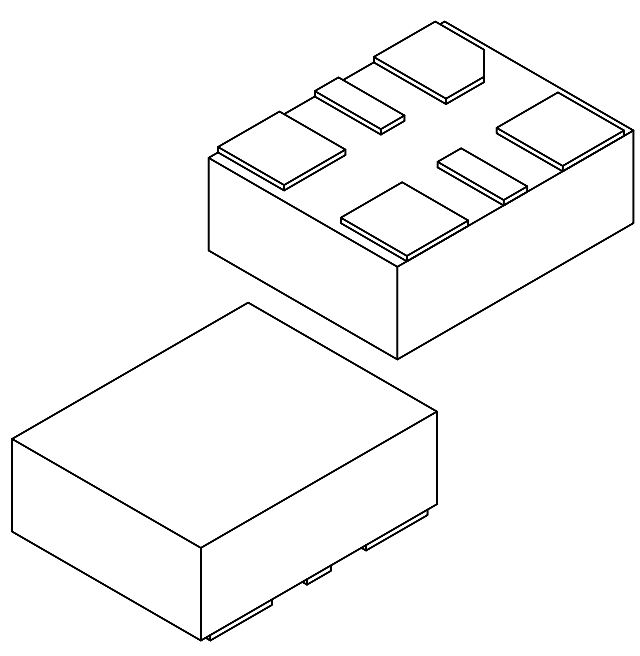
6-Lead Very Thin Dual Flatpack No-Leads (J7A) - 2.5x2.0 mm Body [VDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		6	
Pitch	e		0.825 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Overall Length	D		2.50 BSC	
Overall Width	E		2.00 BSC	
Terminal Width	b1	0.60	0.65	0.70
Terminal Width	b2	0.20	0.25	0.30
Terminal Length	L1	0.60	0.70	0.80
Terminal Length	L2	0.665	0.765	0.865

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1005A Sheet 2 of 2

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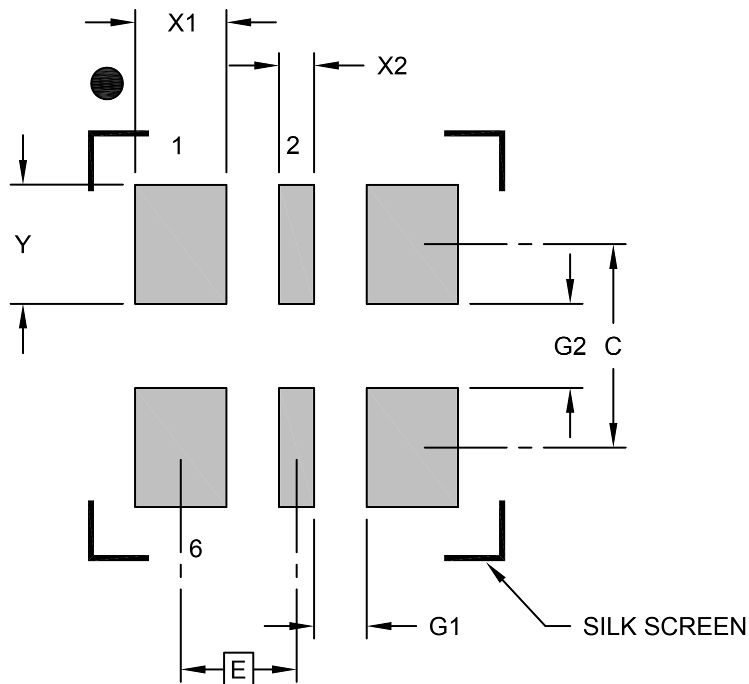
6-Lead Very Thin Dual Flatpack No-Leads (J7A) - 2.5x2.0 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.825 BSC		
Contact Pad Width (X4)	X1			0.65
Contact Pad Width (X2)	X2			0.25
Contact Pad Length (X6)	Y			0.85
Contact Pad Spacing	C		1.45	
Space Between Contacts (X4)	G1	0.38		
Space Between Contacts (X3)	G2	0.60		

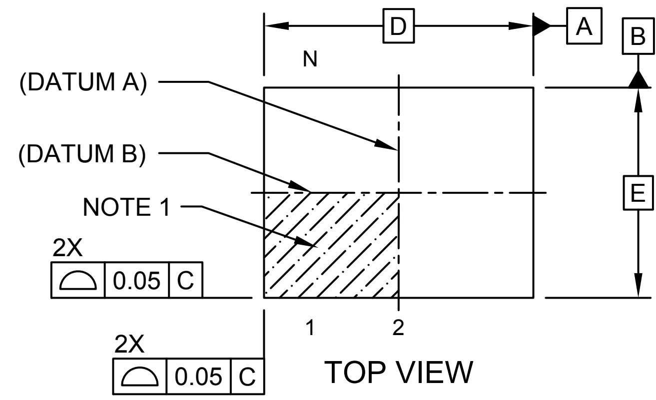
Notes:

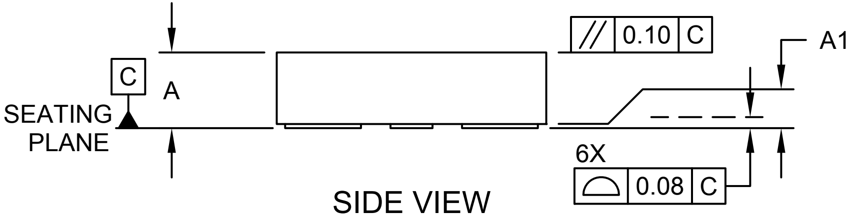
1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

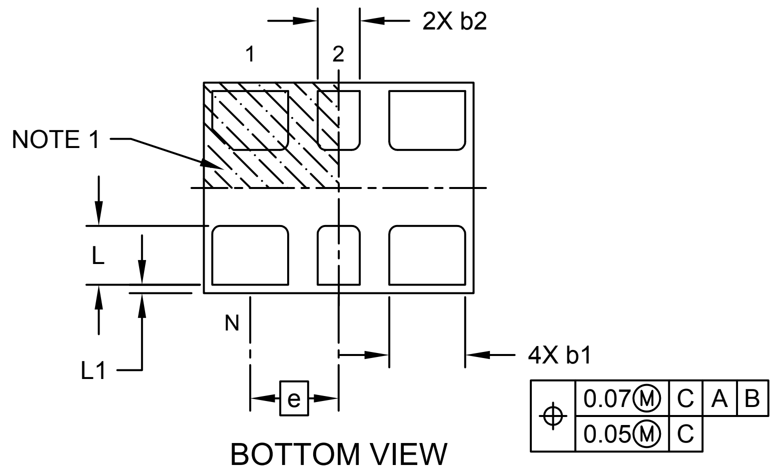
Microchip Technology Drawing C04-3005A

6-Lead Very Thin Plastic Dual Flatpack No-Lead (H5A) - 3.2x2.5 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-1007A Sheet 1 of 2

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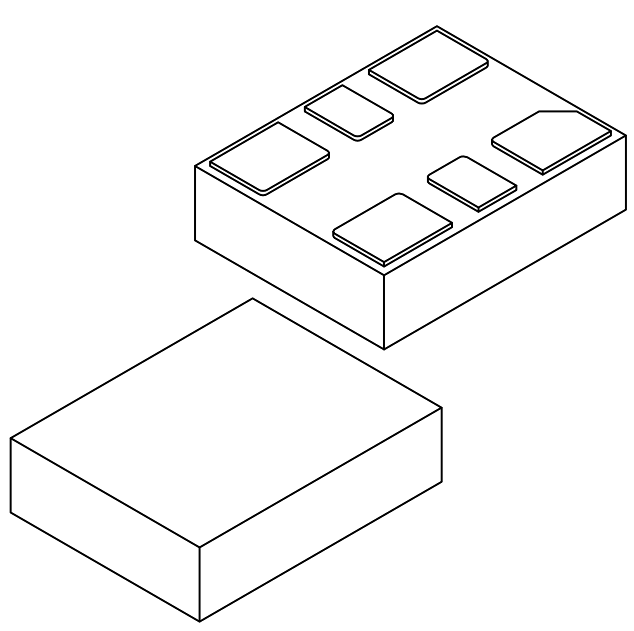
6-Lead Very Thin Plastic Dual Flatpack No-Lead (H5A) - 3.2x2.5 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		6	
Pitch	e		1.05 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Overall Length	D		3.20 BSC	
Overall Width	E		2.50 BSC	
Terminal Width	b1	0.85	0.90	0.95
Terminal Width	b2	0.45	0.50	0.55
Terminal Length	L	0.65	0.70	0.75
Terminal Pullback	L1		0.10 REF	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1007A Sheet 2 of 2

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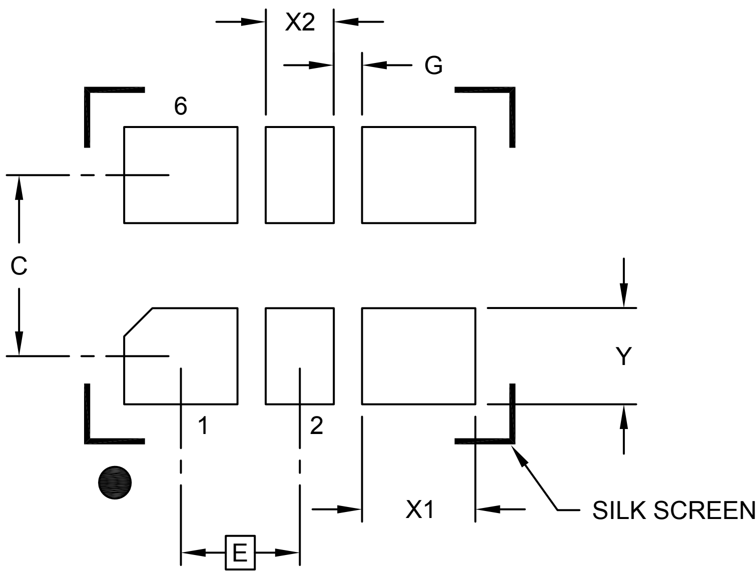
6-Lead Very Thin Plastic Dual Flatpack No-Lead (H5A) - 3.2x2.5 mm Body [VDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.05 BSC		
Contact Pad Spacing	C		1.60	
Contact Pad Width (X4)	X1			1.00
Contact Pad Width (X2)	X2			0.60
Contact Pad Length (X6)	Y			0.85
Space Between Contacts (X4)	G1	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3007A

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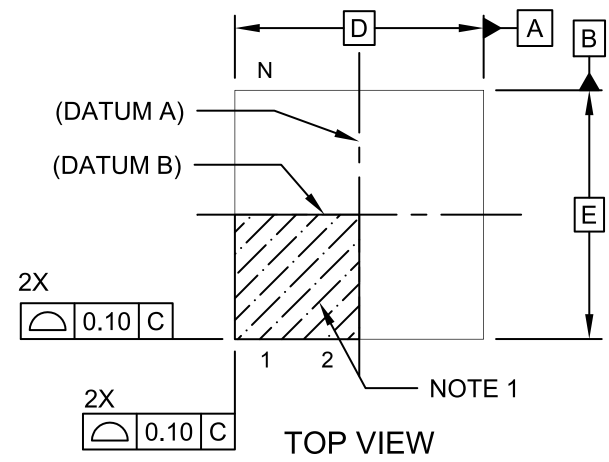
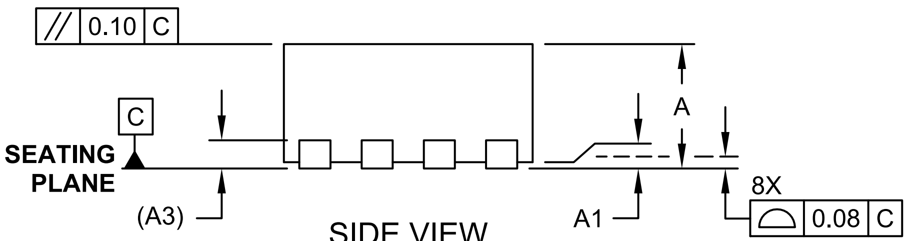
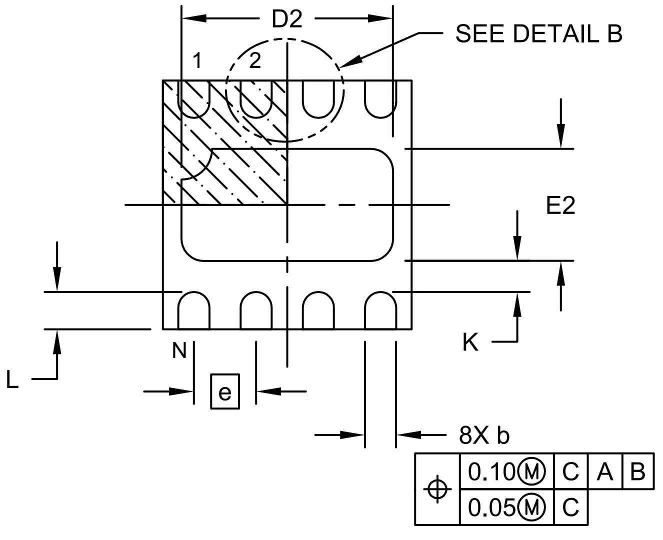
8-Lead Very Thin Flat, Dual No Lead Package (LZ) - 2x2 mm Body [VDFN] With 0.55 mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-198B Sheet 1 of

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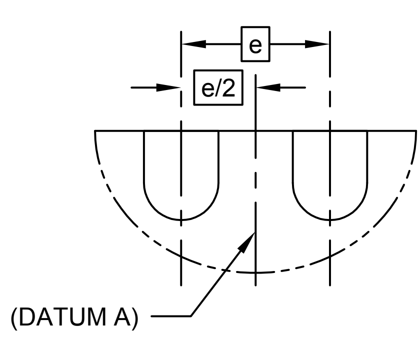
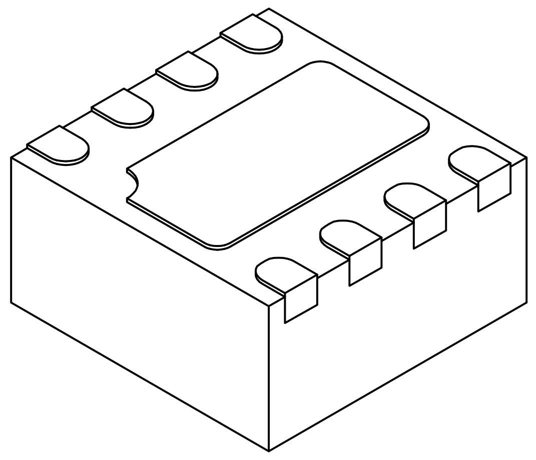
8-Lead Very Thin Flat, Dual No Lead Package (LZ) - 2x2 mm Body [VDFN] With 0.55 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





DETAIL B

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness (REF)	(A3)		0.20 (REF)	
Overall Width	D		2.00 BSC	
Exposed Pad Width	D2	1.55	1.70	1.80
Overall Length	E		2.00 BSC	
Exposed Pad Length	E2	0.75	0.90	1.00
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.20	0.30	0.40
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-198B Sheet 2 of 2

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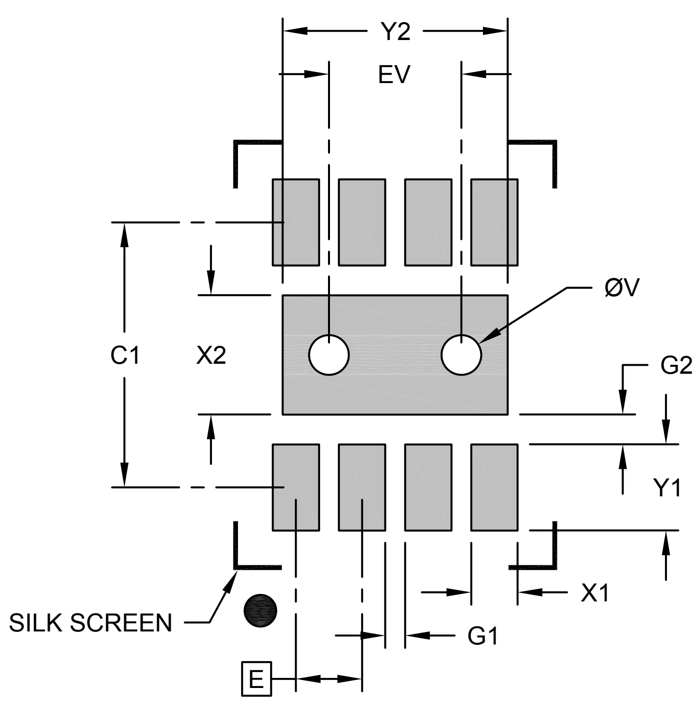
8-Lead Very Thin Flat, Dual No Lead Package (LZ) - 2x2 mm Body [VDFN] With 0.55 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W1			1.70
Optional Center Pad Length	T2			0.90
Contact Pad Spacing	C1		2.00	
Contact Pad Width (X28)	X1			0.35
Contact Pad Length (X28)	Y1			0.65
Distance Between Pads	G1	0.15		
Distance Between Pads	G2	0.23		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing No. C04-2198C

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8-Lead Very Thin Plastic Dual Flat, No Lead Package (8Q) - 2x3 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
1 2
NOTE 1
E
(DATUM B)
(DATUM A)
2X
0.10 C
2X
0.10 C
N
TOP VIEW

0.10 C
A1
C
A
SEATING PLANE
8X
0.08 C
(A3)
SIDE VIEW

0.10 Ⓜ C A B
D2
e/2
N
0.10 Ⓜ C A B
L
E2
K
NOTE 1
1 2
8X b
e
0.10 Ⓜ C A B
0.05 Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-382A Sheet 1 of 2

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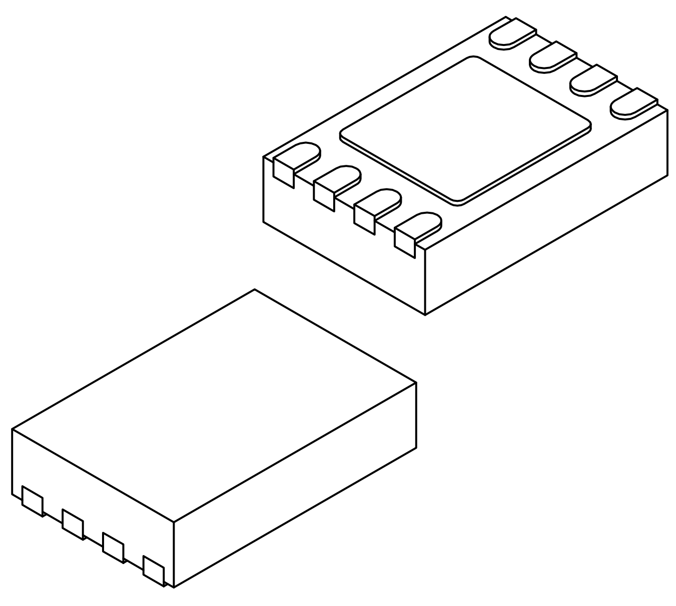
Package Outlines and Dimensions

8-Lead Very Thin Plastic Dual Flat, No Lead Package (8Q) - 2x3 mm Body [VDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.20 REF	
Overall Length	D		2.00 BSC	
Exposed Pad Length	D2	1.40	1.50	1.60
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.60	1.70	1.80
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

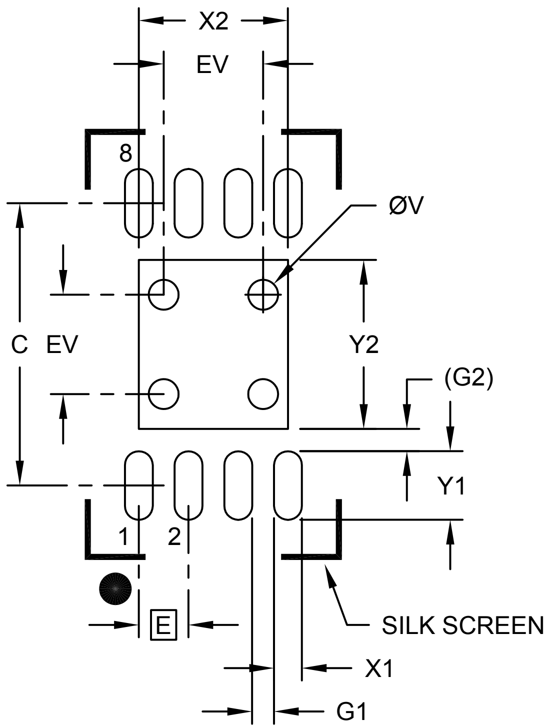
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-382A Sheet 2 of 2

Footprint Outlines and Dimensions

8-Lead Very Thin Plastic Dual Flat, No Lead Package (8Q) - 2x3 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			1.50
Optional Center Pad Length	Y2			1.70
Contact Pad Spacing	C		2.84	
Contact Pad Width (X8)	X1			0.28
Contact Pad Length (X8)	Y1			0.69
Space Between Pads	G1	0.20		
Contact Pad to Center Pad (X8)	(G2)		0.225 REF	
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2382A

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8-Lead Very Thin Plastic Dual Flat, No Lead (9U) - 6x5 mm Body [VDFN] With Dual Exposed Pads

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
2X
0.10 C
N
(DATUM A)
(DATUM B)
NOTE 1
E
E/4
1
2
D/4
2X
0.10 C
TOP VIEW

C
SEATING PLANE
A
A3
0.10 C
A1
8X
0.08 C
SIDE VIEW

e
(K4)
2X
0.10Ⓜ C A B
2X D2
1
2
4X (K1)
2X
0.10Ⓜ C A B
8X L
NOTE 1
2X E2
4X (K2)
N
(K3)
8X b
0.10Ⓜ C A B
0.05Ⓜ C
e/2
BOTTOM VIEW

Microchip Technology Drawing C04-413A Sheet 1 of 2

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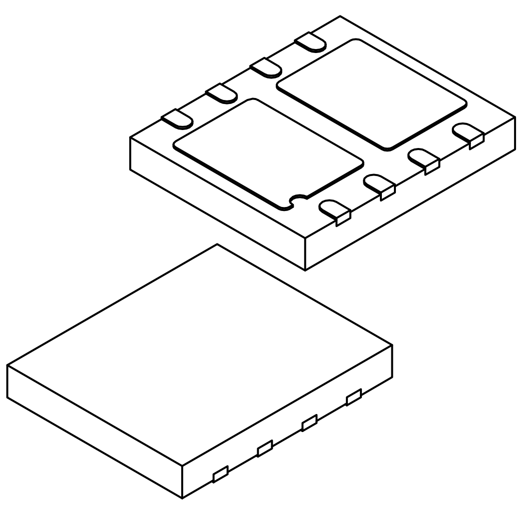
8-Lead Very Thin Plastic Dual Flat, No Lead (9U) - 6x5 mm Body [VDFN] With Dual Exposed Pads

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Length	D		6.00 BSC	
Exposed Pad Length (X2)	D2	2.25	2.35	2.45
Overall Width	E		5.00 BSC	
Exposed Pad Width (X2)	E2	3.15	3.25	3.35
Terminal Width	b	0.35	0.40	0.45
Terminal Length	L	0.55	0.60	0.65
Terminal to Exposed Pad (X4)	K1		0.35 REF	
Terminal to Exposed Pad (X4)	K2		0.20 REF	
Molded Package Edge to Exposed Pad	K3		0.35 REF	
Exposed Pad to Exposed Pad	K4		0.60 REF	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-413A Sheet 2 of 2

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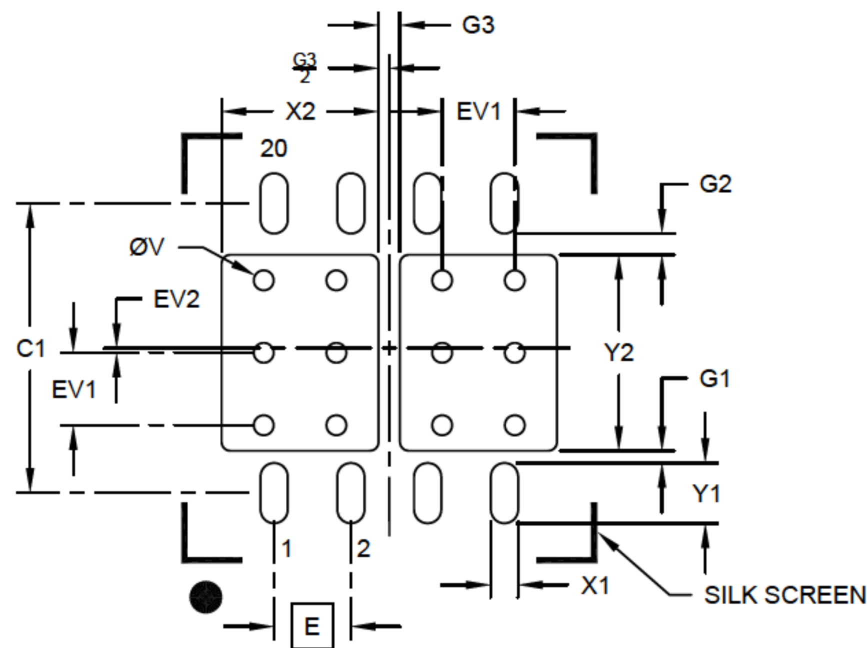
8-Lead Very Thin Plastic Dual Flat, No Lead (9U) - 6x5 mm Body [VDFN] With Dual Exposed Pads

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Optional Center Pad Width (X2)	X2			2.60
Optional Center Pad Length	Y2			3.25
Contact Pad Spacing	C1		4.80	
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			0.80
Contact Pad to Center Pad (X4)	G1	0.20		
Contact Pad to Center Pad (X4)	G2	0.35		
Center Pad to Center Pad	G3		0.35	
Thermal Via Diameter (X12)	V		0.33	
Thermal Via Pitch	EV1		1.20	
Thermal Via Offset	EV2		0.08	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2413A

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10-Lead Very Thin Plastic Dual Flat, No Lead Package (9R) - 2.5x2.0 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-332B Sheet 1 of 2

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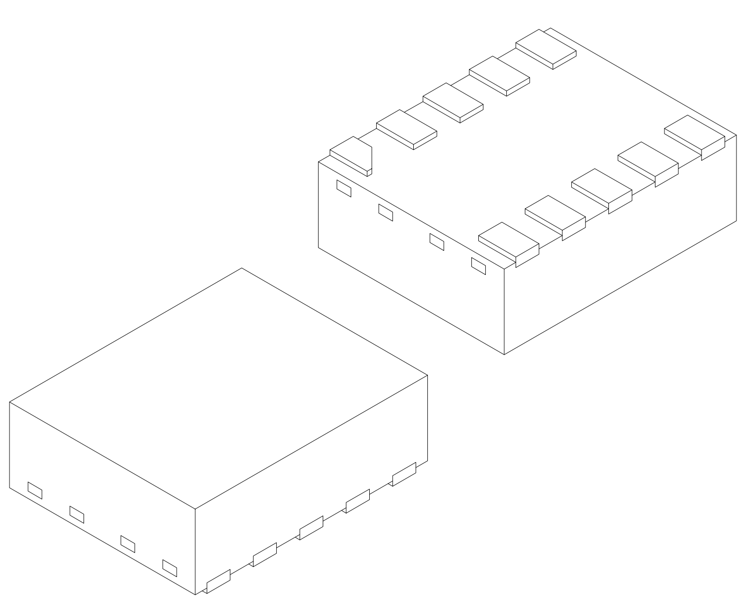
Package Outlines and Dimensions

10-Lead Very Thin Plastic Dual Flat, No Lead Package (9R) - 2.5x2.0 mm Body [VDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		10	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.10 REF	
Overall Length	D		2.50 BSC	
Overall Width	E		2.00 BSC	
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.40	0.50

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-332B Sheet 2 of 2

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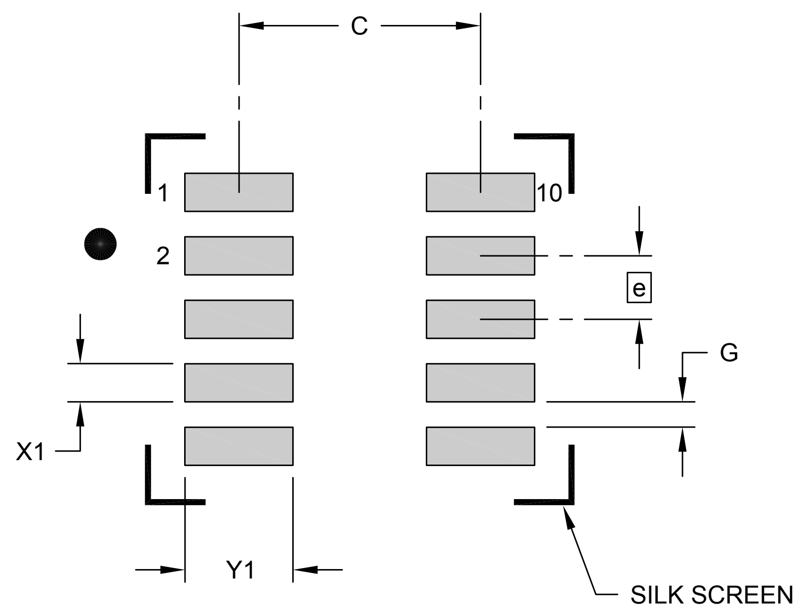
10-Lead Very Thin Plastic Dual Flat, No Lead Package (9R) - 2.5x2.0 mm Body [VDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C		1.90	
Contact Pad Width (X10)	X1			0.30
Contact Pad Length (X10)	Y1			0.85
Contact Pad to Center Pad (X10)	G1	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2332A

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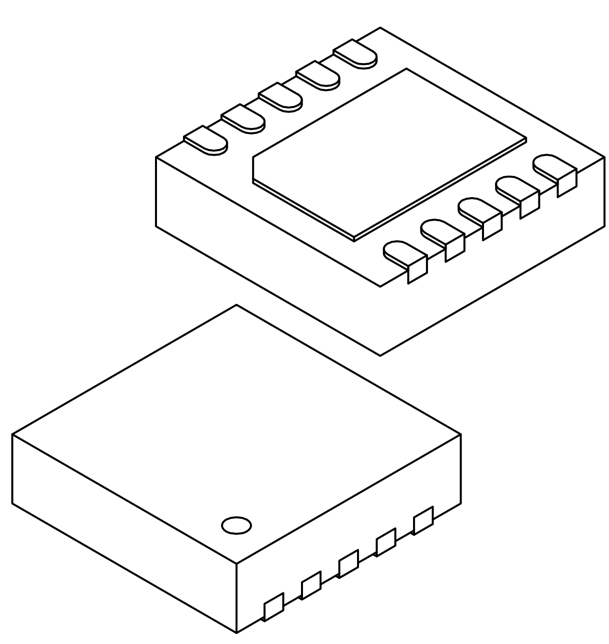
10-Lead Very Thin Plastic Dual Flat, No Lead Package (9Q) - 3x3 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-206A Sheet 1 of 2

10-Lead Very Thin Plastic Dual Flat, No Lead Package (9Q) - 3x3 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		10	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.20 REF	
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	2.20	2.30	2.40
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.50	1.60	1.70
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K	0.25	0.30	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

    REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-206A Sheet 2 of 2

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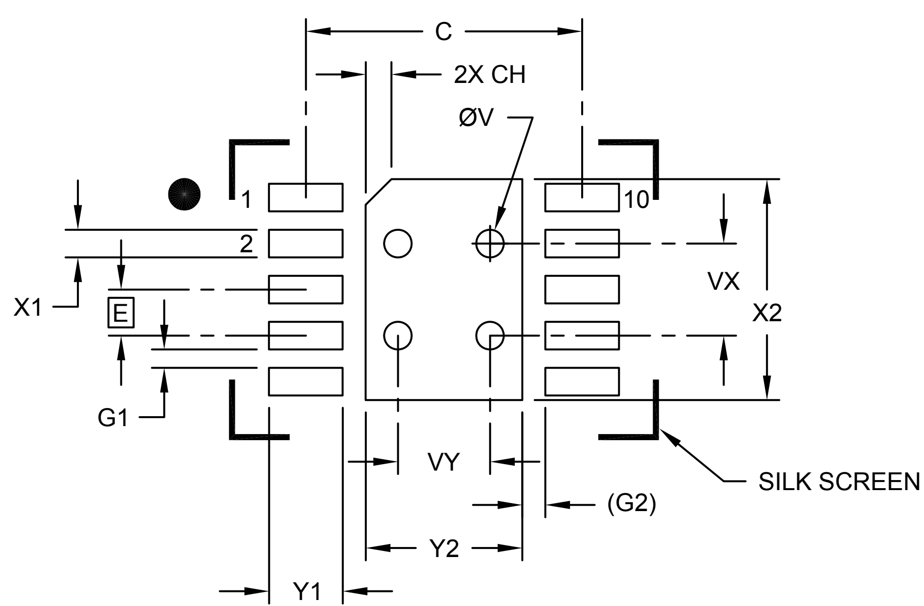
10-Lead Very Thin Plastic Dual Flat, No Lead Package (9Q) - 3x3 mm Body [VDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	Y2			1.70
Optional Center Pad Length	X2			2.40
Contact Pad Spacing	C		3.00	
Center Pad Chamfer	CH		0.28	
Contact Pad Width (X10)	X1			0.30
Contact Pad Length (X10)	Y1			0.80
Contact Pad to Contact Pad (X8)	G1	0.20		
Contact Pad to Center Pad (X10)	G2	0.25 REF		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	VX		1.00	
Thermal Via Pitch	VY		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerances, for reference only.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2206A

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11-Lead Very Thin Plastic Dual Flat, No Lead Package (K4A) - 6x5 mm Body [VDFN] With Dual Fused Exposed Pads

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
E
NOTE 1
2X
0.20 C
1 2
2X
0.20 C
TOP VIEW

C
SEATING PLANE
A
(A3)
0.10 C
A1
11X
0.08 C
SIDE VIEW

0.05Ⓜ C A B
D2
1 2
11X L
PIN 1 INDEX
CH 0.40 X 45°
11X b
0.10Ⓜ C A B
0.05Ⓜ C
K
2X
E2
e_1
0.05Ⓜ C A B
N
E3
e_2
BOTTOM VIEW

Microchip Technology Drawing C04-1197A Sheet 1 of 2

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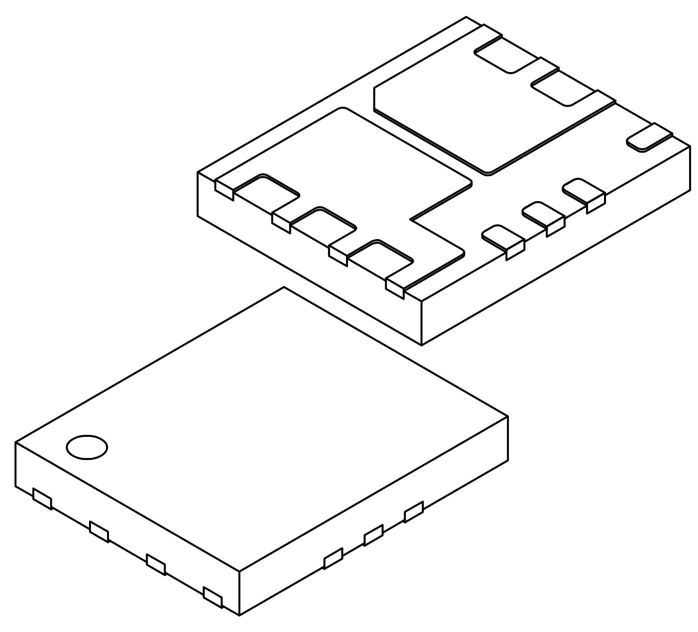
11-Lead Very Thin Plastic Dual Flat, No Lead Package (K4A) - 6x5 mm Body [VDFN] With Dual Fused Exposed Pads

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		11	
Pitch	e_1		0.90 BSC	
Pitch	e_2		1.27 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.203 REF	
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	2.89	2.94	2.99
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	2.13	2.18	2.23
Exposed Pad Width	E3	0.69	0.74	0.79
Terminal Width	b	0.35	0.40	0.50
Terminal Length	L	0.55	0.60	0.65
Spacing Between Exposed Pads	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1197A Sheet 2 of 2

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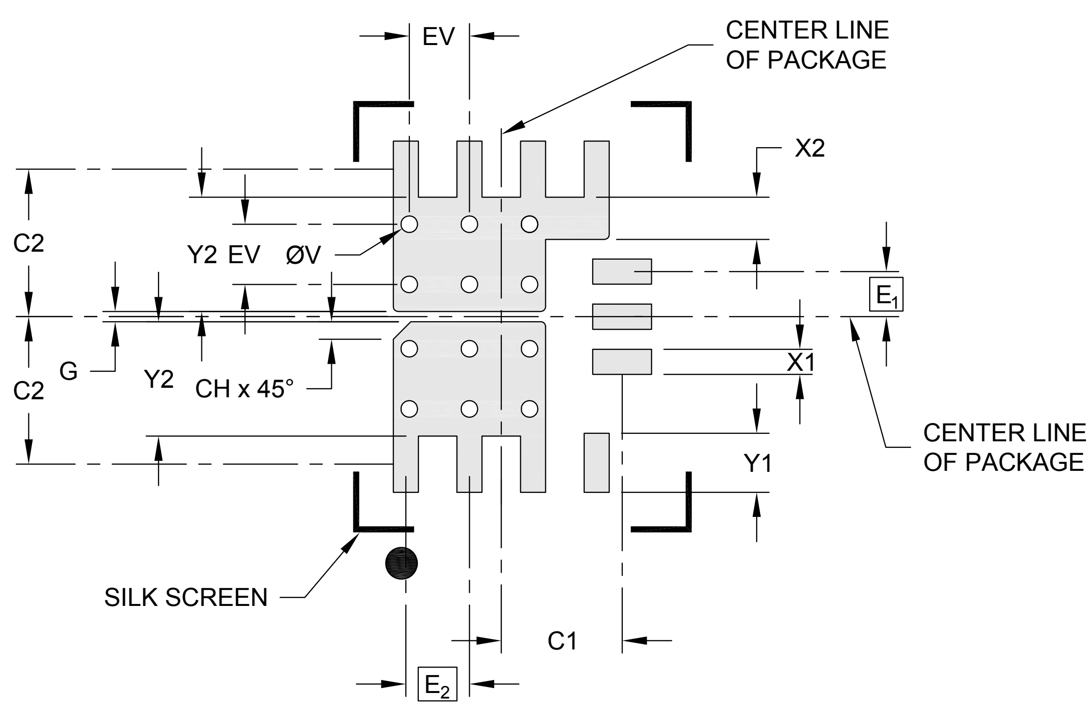
11-Lead Very Thin Plastic Dual Flat, No Lead Package (K4A) - 6x5 mm Body [VDFN] With Dual Fused Exposed Pads

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E_1		0.90 BSC	
Contact Pitch	E_2		1.27 BSC	
Contact Pad Width (X11)	X1			0.50
Center Pad Width	X2			0.84
Contact Pad Length (X11)	Y1			0.80
Center Pad Length	Y2			2.28
Package Center to Contact Center	C1		2.41	
Package Center to Contact Center	C2		2.94	
Center Pad Chamfer	CH		0.35	
Spacing Between Exposed Pads	G	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3197A

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Package Outlines and Dimensions

14-Lead Very Thin Plastic Quad Flat, No Lead Package (JHA) - 4.5x3.0 mm Body [VDFN] With Dimpled Wettable Flanks

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

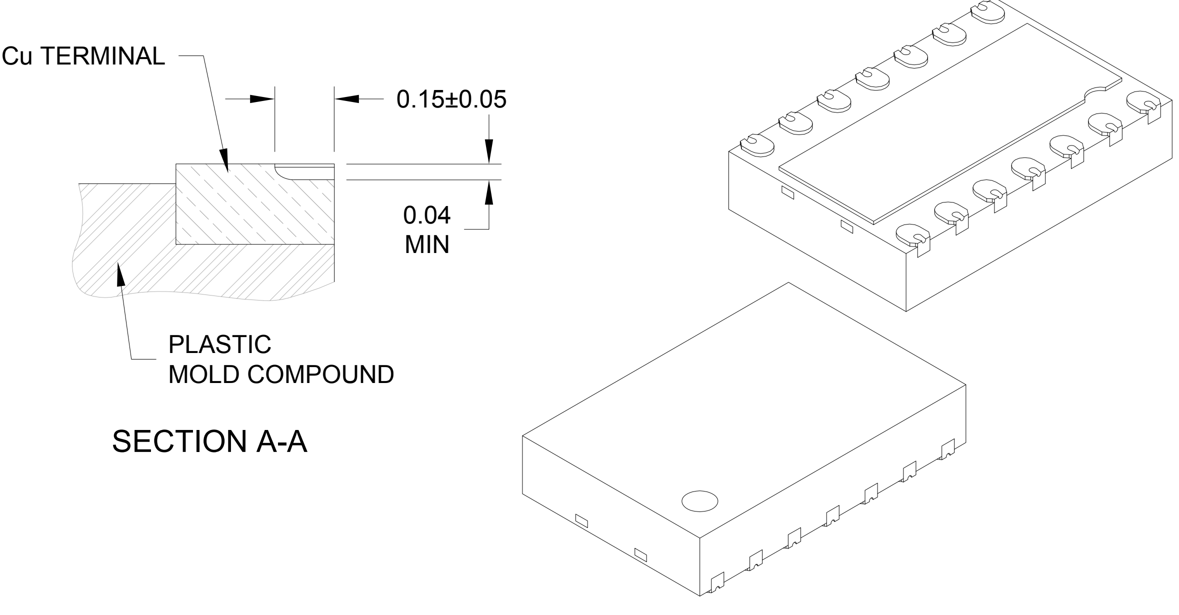
SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-1198A Sheet 1 of 2

14-Lead Very Thin Plastic Quad Flat, No Lead Package (JHA) - 4.5x3.0 mm Body [VDFN] With Dimpled Wettable Flanks

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		14	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.203 REF	
Overall Length	D		4.50 BSC	
Exposed Pad Length	D2	4.15	4.20	4.25
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.55	1.60	1.65
Terminal Width	b	0.29	0.32	0.35
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K		0.30 REF	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1198A Sheet 2 of 2

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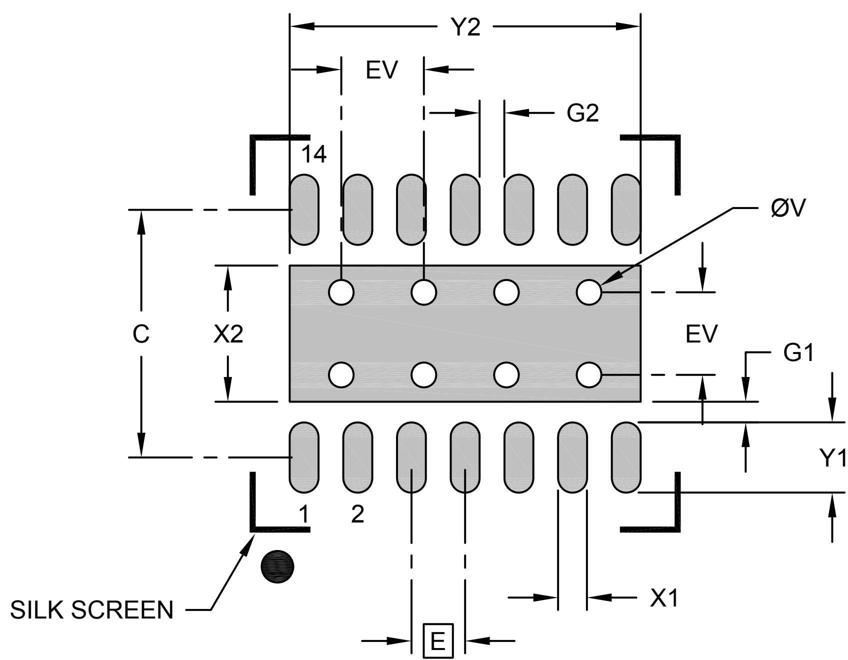
14-Lead Very Thin Plastic Quad Flat, No Lead Package (JHA) - 4.5x3.0 mm Body [VDFN] With Dimpled Wettable Flanks

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	X2			1.65
Optional Center Pad Length	Y2			4.25
Contact Pad Spacing	C		3.00	
Contact Pad Width (X14)	X1			0.35
Contact Pad Length (X14)	Y1			0.85
Contact Pad to Center Pad (X14)	G1	0.25		
Spacing Between Contacts (X12)	G1	0.30		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3198A

NOTES:

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WDFN

8-Lead Very, Very Thin Plastic Dual Flat, No Lead Package (RW) - 2x2 mm Body [WDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
E
NOTE 1
2X
0.05 C
1 2
2X
0.05 C
TOP VIEW
0.05 C
(A3)
C
A
SEATING PLANE
0.05 C
SIDE VIEW
A1
D2
2X CH
1 2
NOTE 1
0.05Ⓜ C A B
E2
(K)
L
N
8X b
e
0.10Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-261A Sheet 1 of 2

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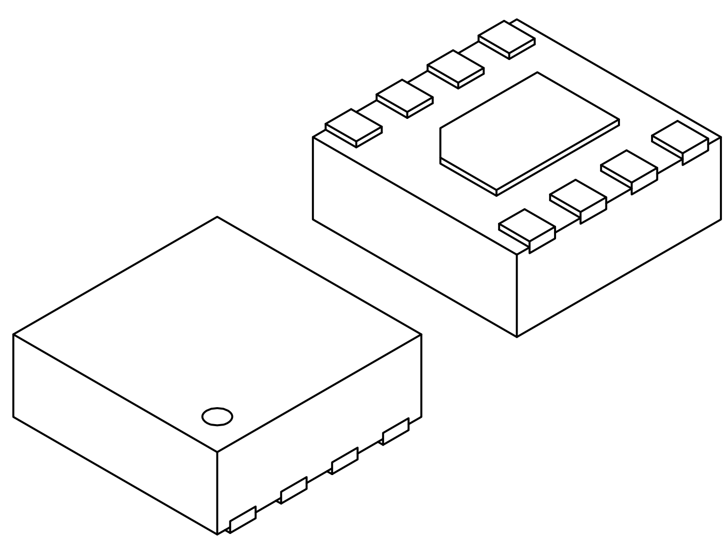
8-Lead Very, Very Thin Plastic Dual Flat, No Lead Package (RW) - 2x2 mm Body [WDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.10 REF	
Overall Width	E		2.00 BSC	
Exposed Pad Width	E2	0.70	0.80	0.90
Overall Length	D		2.00 BSC	
Exposed Pad Length	D2	1.10	1.20	1.30
Exposed Pad Chamfer	CH	-	0.25	-
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.25	0.30	0.35
Terminal-to-Exposed-Pad	(K)	0.30	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

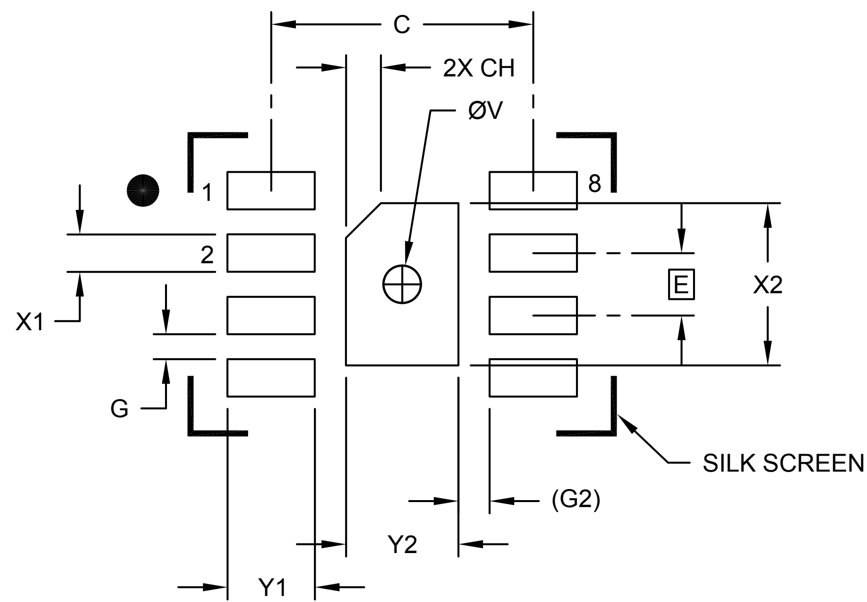
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-261A Sheet 2 of 2

8-Lead Very, Very Thin Plastic Dual Flat, No Lead Package (RW) - 2x2 mm Body [WDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	Y2			0.90
Optional Center Pad Length	X2			1.30
Contact Pad Spacing	C		2.10	
Center Pad Chamfer	CH		0.28	
Contact Pad Width (X8)	X1			0.30
Contact Pad Length (X8)	Y1			0.70
Contact Pad to Contact Pad (X6)	G1	0.20		
Contact Pad to Center Pad (X8)	G1		0.25 REF	
Thermal Via Diameter	V		0.30	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerances, for reference only.

Microchip Technology Drawing C04-2261A

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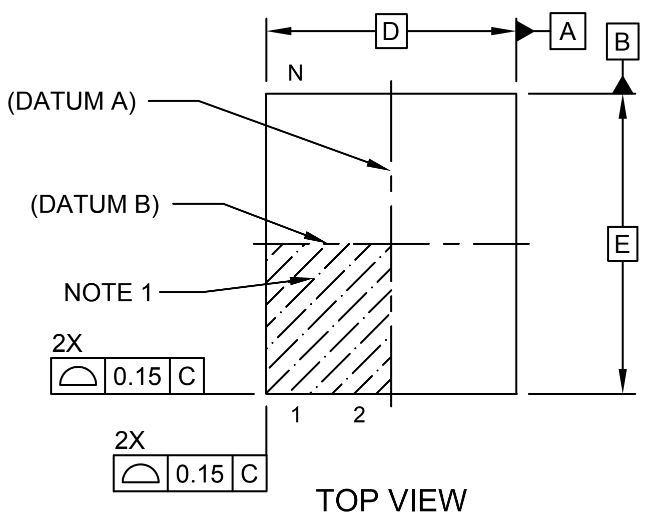
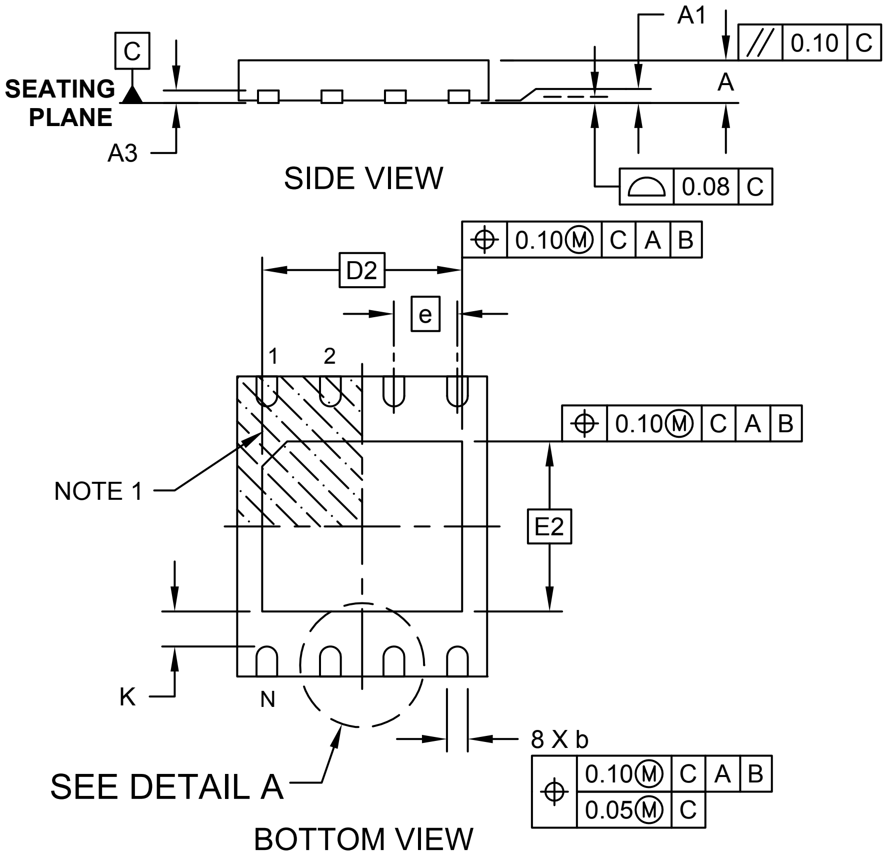
8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [WDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

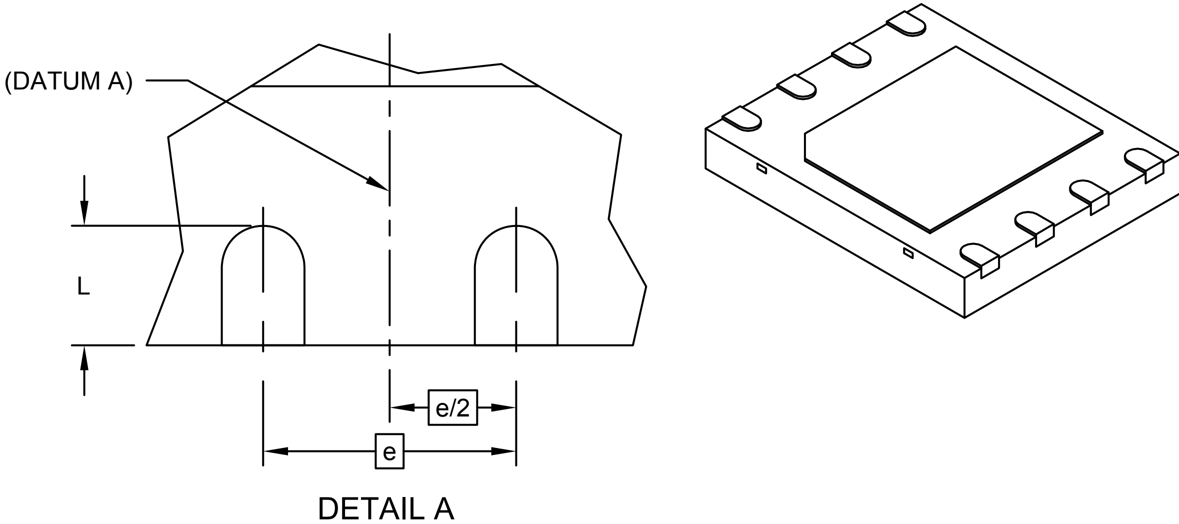




Microchip Technology Drawing C04-210B Sheet 1 of 2

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [WDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	D		5.00 BSC	
Exposed Pad Width	D2		4.00 BSC	
Overall Length	E		6.00 BSC	
Exposed Pad Length	E2		3.40 BSC	
Terminal Width	b	0.35	0.42	0.48
Terminal Length	L	0.50	0.60	0.70
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-210B Sheet 2 of 2

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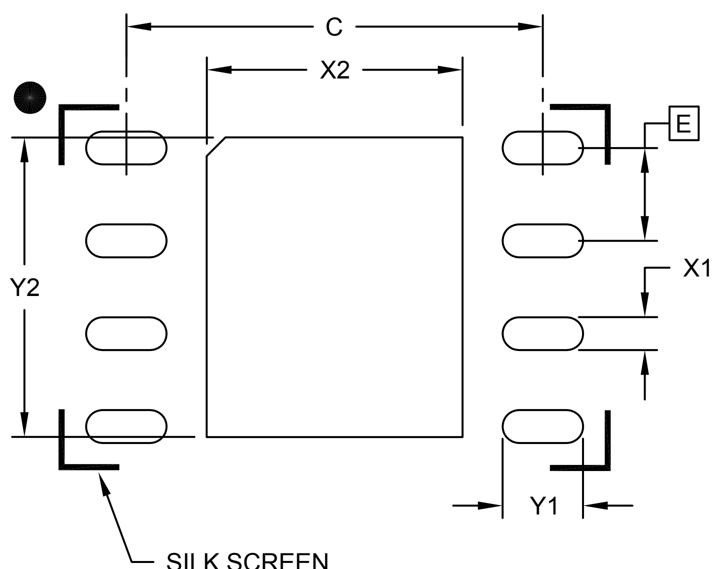
Footprint Outlines and Dimensions

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [WDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Optional Center Pad Width	X2			3.50
Optional Center Pad Length	Y2			4.10
Contact Pad Spacing	C		5.70	
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.10

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2210A

8-Lead Very, Very Thin Small Outline No-Lead (MN) - 6x8 mm Body [WDFN] (Also Called WSON)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
E
NOTE 1
2X
0.15 C
1 2
2X
0.15 C

TOP VIEW

C
SEATING PLANE
A3
0.10 C
A1
0.08 C

SIDE VIEW

0.10 M C A B
D2
1 2
NOTE 1
0.10 M C A B
E2
(DATUM B)
(DATUM A)
N
L
8X K
b
e
0.07 M C A B
0.05 M C

BOTTOM VIEW

Microchip Technology Drawing C04-172A Sheet 1 of 2

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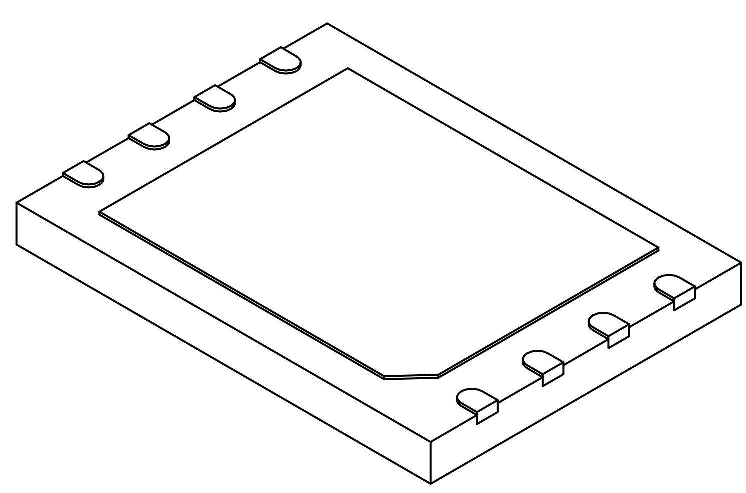
8-Lead Very, Very Thin Small Outline No-Lead (MN) - 6x8 mm Body [WDFN] (Also Called WSON)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		8.00 BSC	
Exposed Pad Width	E2		6.00 BSC	
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2		4.80 BSC	
Terminal Width	b	0.35	0.40	0.45
Terminal Length	L	0.45	0.50	0.55
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Terminal 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

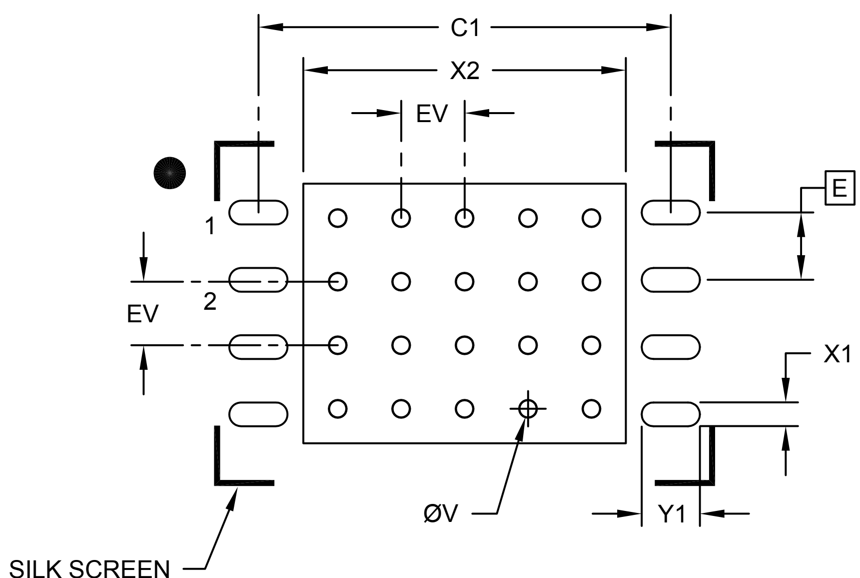
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-172A Sheet 2 of 2

8-Lead Very, Very Thin Small Ourtline No-Lead (MN) - 6x8 mm Body [WDFN] (Also Called WSON)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Optional Center Pad Width	X2			6.10
Optional Center Pad Length	Y2			4.90
Contact Pad Spacing	C1		7.80	
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			0.95
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2172A

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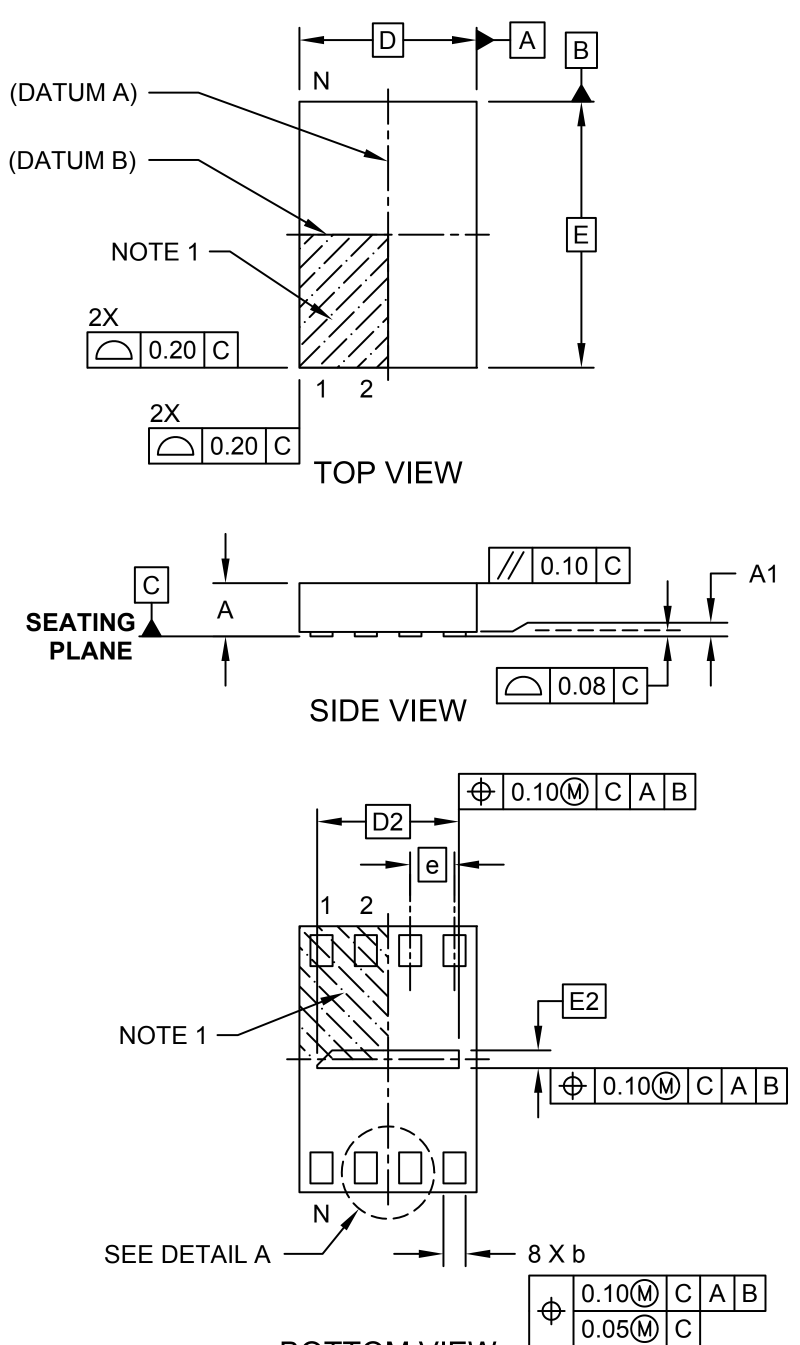
USON

8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) - 2x3 mm Body [USON] [Also called UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-203C [NP] Sheet 1 of 2

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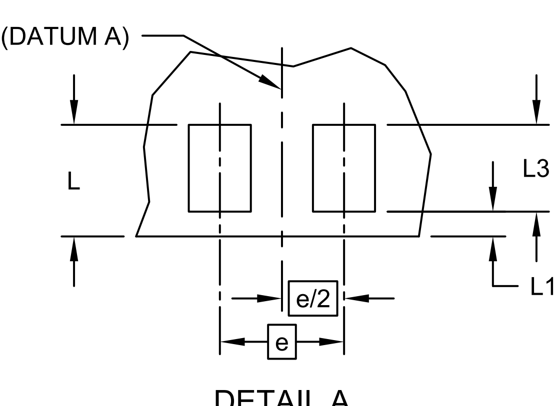
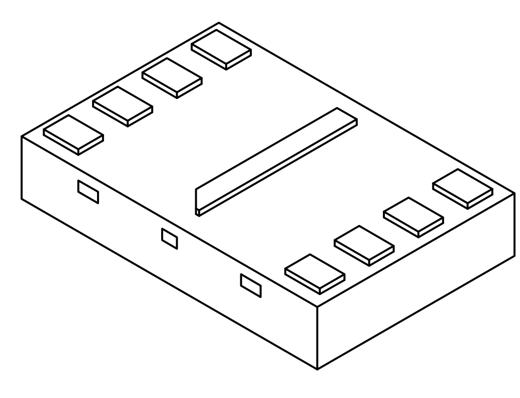
Package Outlines and Dimensions

8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) - 2x3 mm Body [USON] [Also called UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.45	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Overall Width	D		2.00 BSC	
Exposed Pad Width	D2	1.50	1.60	1.70
Overall Length	E		3.00 BSC	
Exposed Pad Length	E2	0.10	0.20	0.30
Terminal Width	b	0.20	0.25	0.30
Package Edge to Terminal Edge	L	0.40	0.45	0.50
Package Edge to Terminal Edge	L1	—	0.10	—
Terminal Length	L3	0.30	0.35	0.40

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

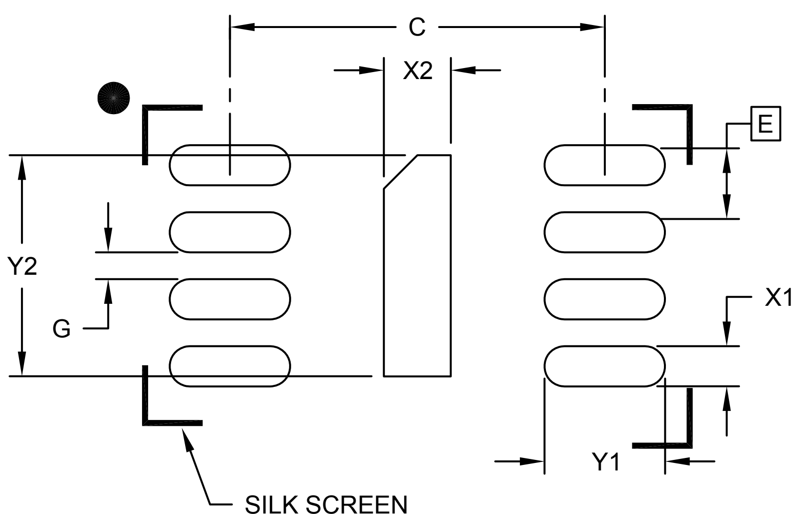
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-203C [NP] Sheet 2 of 2

8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) - 2x3 mm Body [USON] [Also called UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Terminal Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			0.25
Optional Center Pad Length	Y2			1.65
Terminal Pad Spacing	C		2.80	
Terminal Pad Width (X8)	X1			0.30
Terminal Pad Length (X8)	Y1			0.90
Mininum Between Terminal Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2203B [NP]

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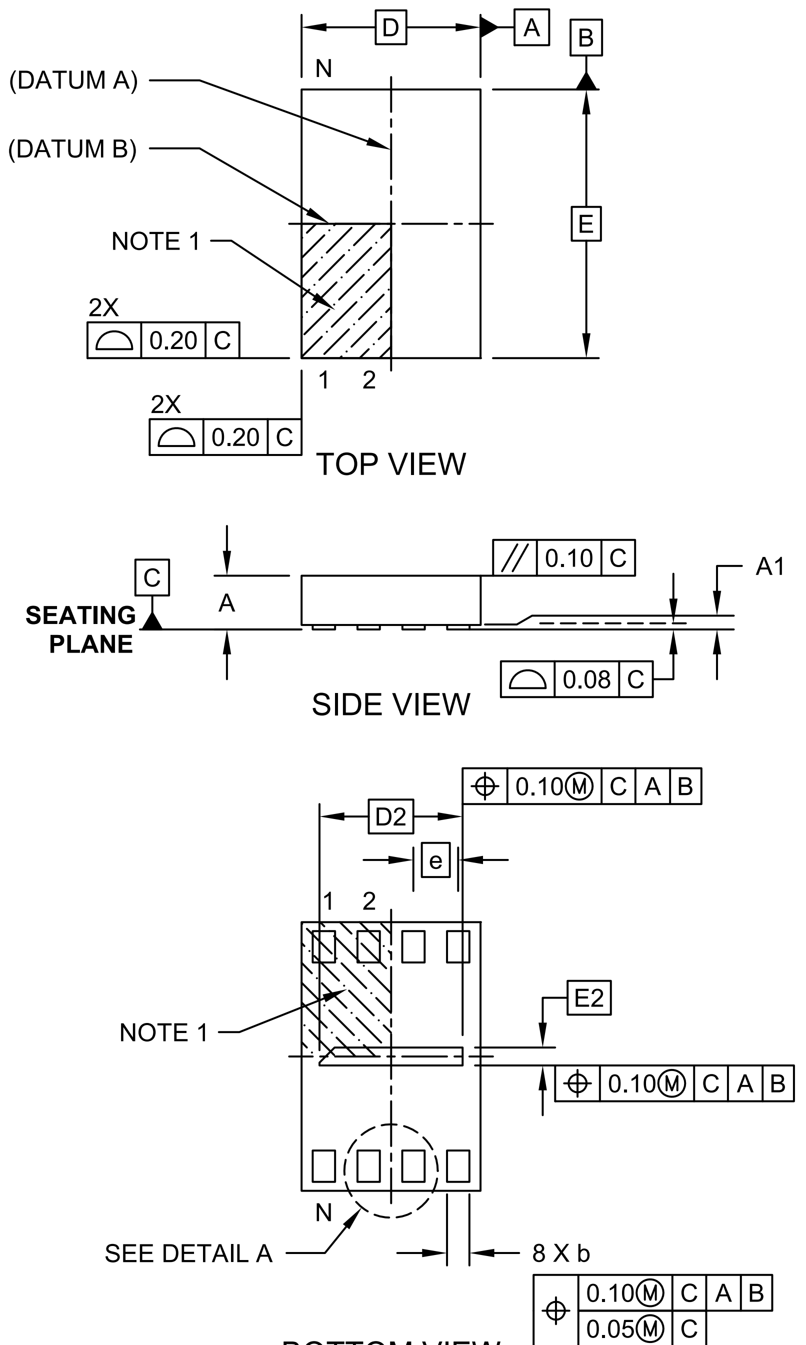
8-Lead Plastic Ultra Thin Small Outline No Lead Package (PRX) - 2x3 mm Body [USON] [Also called UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-203C [PRX] Sheet 1 of 2

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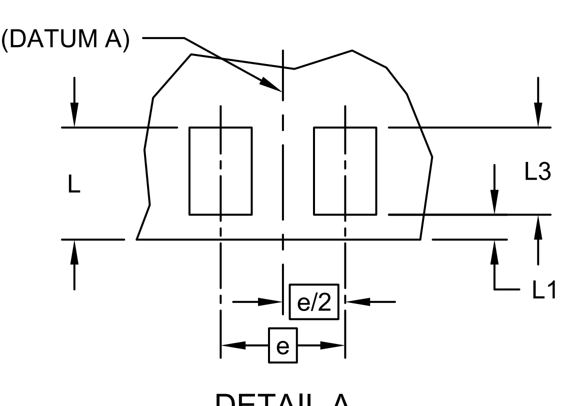
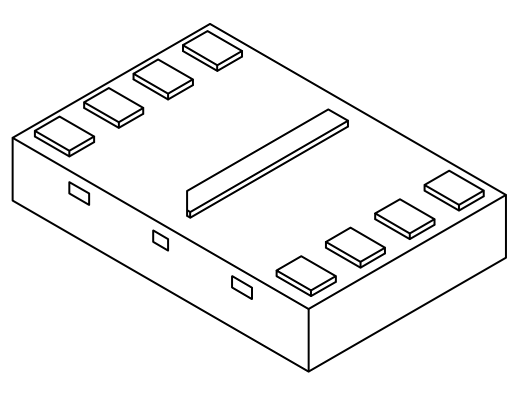
8-Lead Plastic Ultra Thin Small Outline No Lead Package (PRX) - 2x3 mm Body [USON] [Also called UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.45	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Overall Width	D		2.00 BSC	
Exposed Pad Width	D2	1.50	1.60	1.70
Overall Length	E		3.00 BSC	
Exposed Pad Length	E2	0.10	0.20	0.30
Terminal Width	b	0.20	0.25	0.30
Package Edge to Terminal Edge	L	0.40	0.45	0.50
Package Edge to Terminal Edge	L1	—	0.10	—
Terminal Length	L3	0.30	0.35	0.40

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-203C [PRX] Sheet 2 of 2

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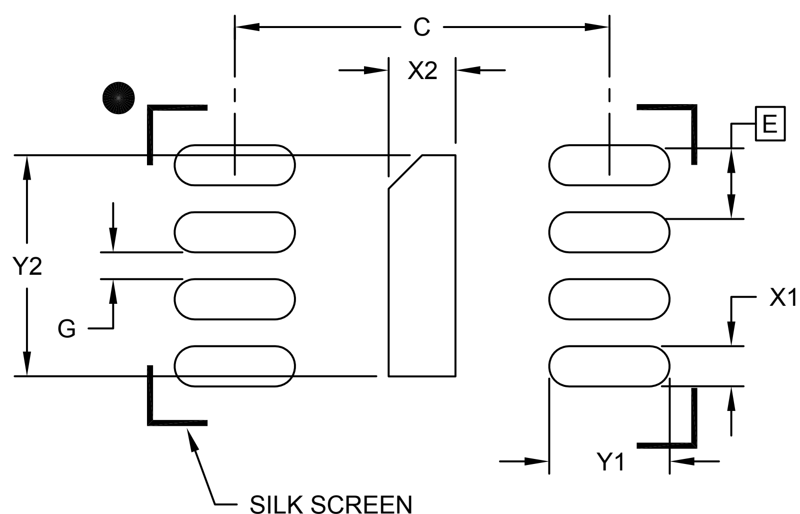
8-Lead Plastic Ultra Thin Small Outline No Lead Package (PRX) - 2x3 mm Body [USON] [Also called UDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Terminal Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			0.30
Optional Center Pad Length	Y2			1.70
Terminal Pad Spacing	C		2.80	
Terminal Pad Width (X8)	X1			0.30
Terminal Pad Length (X8)	Y1			0.90
Mininum Between Terminal Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2203B [PRX]

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8-Terminal Plastic Ultra Thin Dual Flat No Lead Package (UB) - 4x3x0.55 mm Body [UDFN (USON)]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-271A Sheet 1 of 2

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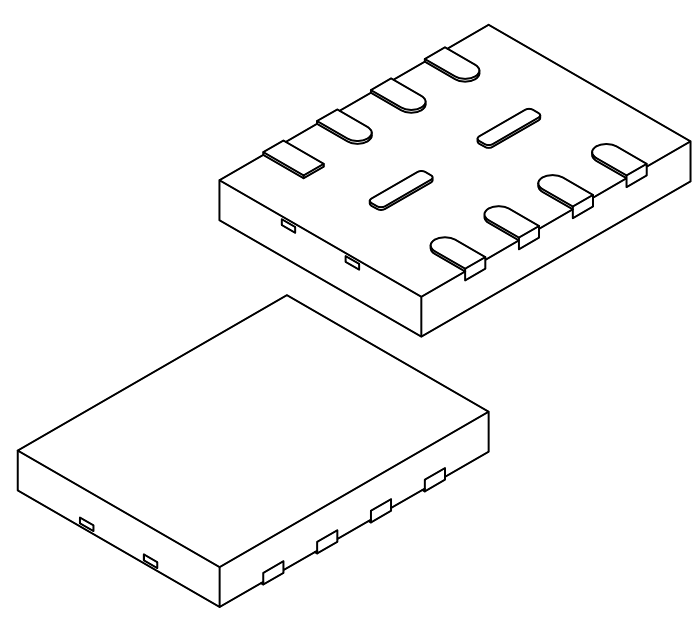
8-Terminal Plastic Ultra Thin Dual Flat No Lead Package (UB) - 4x3x0.55 mm Body [UDFN (USON)]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.80 BSC	
Overall Height	A	0.45	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.127 REF	
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	0.17	0.20	0.23
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	0.77	0.80	0.83
Distance Between Exposed Pads	D3	0.77	0.80	0.83
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.55	0.60	0.65
Terminal-to-Exposed-Pad	K	0.70	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-271A Sheet 2 of 2

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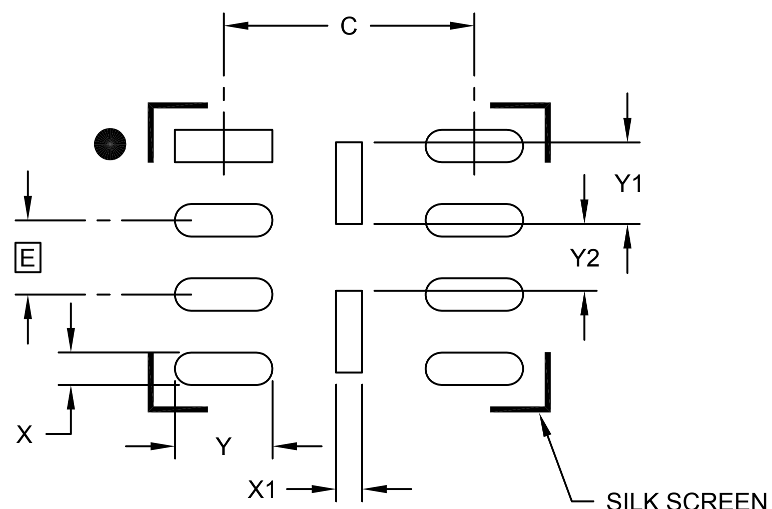
8-Terminal Plastic Ultra Thin Dual Flat No Lead Package (UB) - 4x3x0.55 mm Body [UDFN (USON)]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Optional Center Pad Width	X1			0.28
Center Pad Length (X2)	Y1			0.88
Center Pad Spacing	Y2	0.72		
Contact Pad Spacing	C		2.70	
Contact Pad Width (X8)	X			0.35
Contact Pad Length (X8)	Y			1.05

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2271A

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WSON

8-Lead Very, Very Thin Small Outline No-Lead (MN) - 6x8 mm Body [WDFN] (Also Called WSON)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
E
NOTE 1
2X
0.15 C
1 2
2X
0.15 C
TOP VIEW

C
SEATING PLANE
0.10 C
A1
A3
0.08 C
SIDE VIEW

0.10Ⓜ C A B
D2
1 2
NOTE 1
0.10Ⓜ C A B
E2
(DATUM B)
(DATUM A)
L
N
8X K
b
e
0.07Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-172A Sheet 1 of 2

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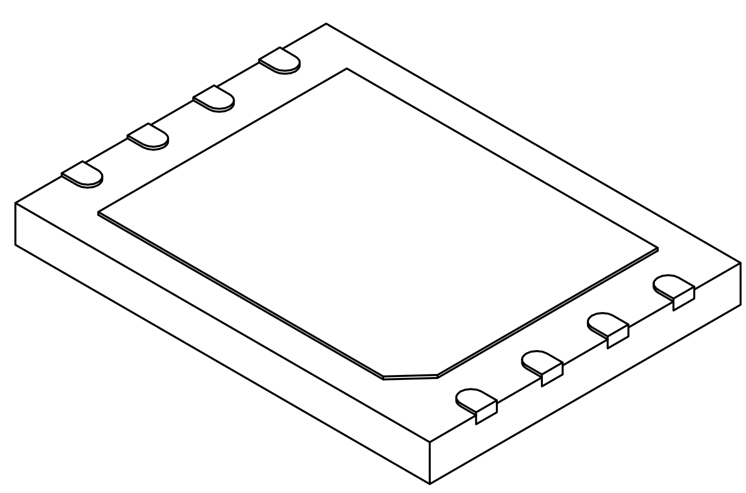
Package Outlines and Dimensions

8-Lead Very, Very Thin Small Outline No-Lead (MN) - 6x8 mm Body [WDFN] (Also Called WSON)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		8.00 BSC	
Exposed Pad Width	E2		6.00 BSC	
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2		4.80 BSC	
Terminal Width	b	0.35	0.40	0.45
Terminal Length	L	0.45	0.50	0.55
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Terminal 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

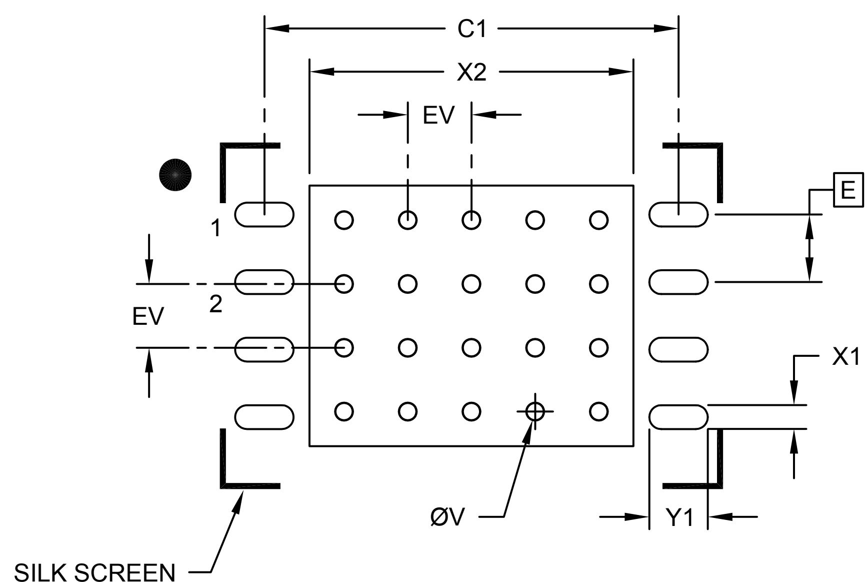
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-172A Sheet 2 of 2

8-Lead Very, Very Thin Small Ourtline No-Lead (MN) - 6x8 mm Body [WDFN] (Also Called WSON)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Optional Center Pad Width	X2			6.10
Optional Center Pad Length	Y2			4.90
Contact Pad Spacing	C1		7.80	
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			0.95
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2172A

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Package Outlines and Dimensions

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [WDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
E
NOTE 1
2X
0.15 C
1 2
2X
0.15 C
TOP VIEW

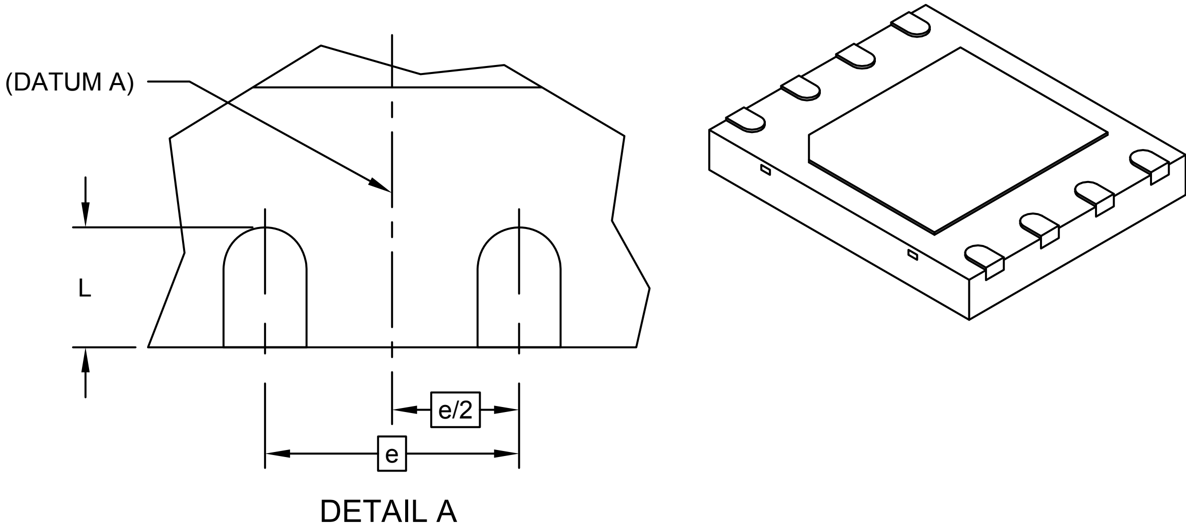
A1
0.10 C
C
SEATING PLANE
A
A3
SIDE VIEW
0.08 C

0.10Ⓜ C A B
D2
e
1 2
0.10Ⓜ C A B
NOTE 1
E2
K
N
8 X b
SEE DETAIL A
0.10Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-210B Sheet 1 of 2

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [WDFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N	8		
Pitch	e	1.27 BSC		
Overall Height	A	0.70	0.75	0.80
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3	0.20 REF		
Overall Width	D	5.00 BSC		
Exposed Pad Width	D2	4.00 BSC		
Overall Length	E	6.00 BSC		
Exposed Pad Length	E2	3.40 BSC		
Terminal Width	b	0.35	0.42	0.48
Terminal Length	L	0.50	0.60	0.70
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-210B Sheet 2 of 2

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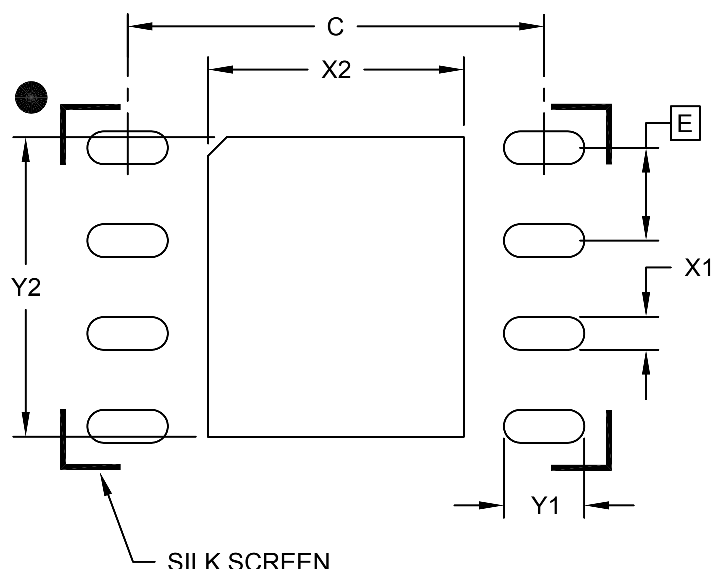
Footprint Outlines and Dimensions

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [WDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Optional Center Pad Width	X2			3.50
Optional Center Pad Length	Y2			4.10
Contact Pad Spacing	C		5.70	
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.10

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2210A

NOTES:

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XSON

8-Lead Extremely Thin Small Outline No-Leads (NF) – 2x2x0.45 mm Body [XSON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
E
NOTE 1
2X
0.20 C
1 2
2X
0.20 C

TOP VIEW

0.10 C
A1
C
A
SEATING PLANE
8X
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
1 2
NOTE 1
0.10Ⓜ C A B
E2
L
K
L1
N
e
8X b
e/2
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-205A Sheet 1 of 2

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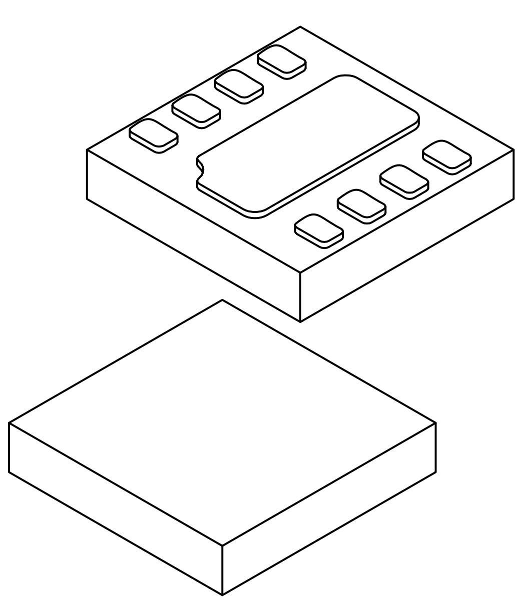
8-Lead Extremely Thin Small Outline No-Leads (NF) – 2x2x0.45 mm Body [XSON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.40 BSC	
Overall Height	A	0.40	0.45	0.50
Standoff	A1	—	—	0.05
Terminal Length	L	0.325	0.375	0.425
Pull Back	L1	—	—	0.075
Overall Length	D		2.00 BSC	
Overall Width	E		2.00 BSC	
Exposed Pad Length	D2	1.55	1.60	1.65
Exposed Pad Width	E2	0.70	0.75	0.80
Terminal Width	b	0.15	0.20	0.25
Terminal to Exposed Pad	K	0.20	—	—

Notes:

1. Terminal 1 visual index feature may vary, but must be located within the hatched area.
2. Exact shape at each corner may vary.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-205A Sheet 2 of 2

8-Lead Extremely Thin Small Outline No-Leads (QX8E) – 2x2x0.45 mm Body [XSON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-205A Sheet 1 of 2

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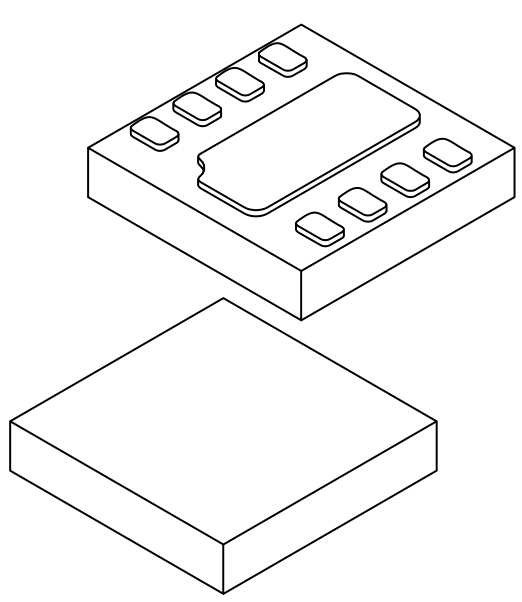
8-Lead Extremely Thin Small Outline No-Leads (QX8E) – 2x2x0.45 mm Body [XSON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.40 BSC	
Overall Height	A	0.40	0.45	0.50
Standoff	A1	—	—	0.05
Terminal Length	L	0.325	0.375	0.425
Pull Back	L1	—	—	0.075
Overall Length	D		2.00 BSC	
Overall Width	E		2.00 BSC	
Exposed Pad Length	D2	1.55	1.60	1.65
Exposed Pad Width	E2	0.70	0.75	0.80
Terminal Width	b	0.15	0.20	0.25
Terminal to Exposed Pad	K	0.20	—	—

Notes:
1. Terminal 1 visual index feature may vary, but must be located within the hatched area.
2. Exact shape at each corner may vary.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-205A Sheet 2 of 2

NOTES:

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X2SON

6-Lead Plastic Super Thin Small Outline No Lead (NR) - 1.5x1.5x0.4 mm Body [X2SON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-215A Sheet 1 of 2

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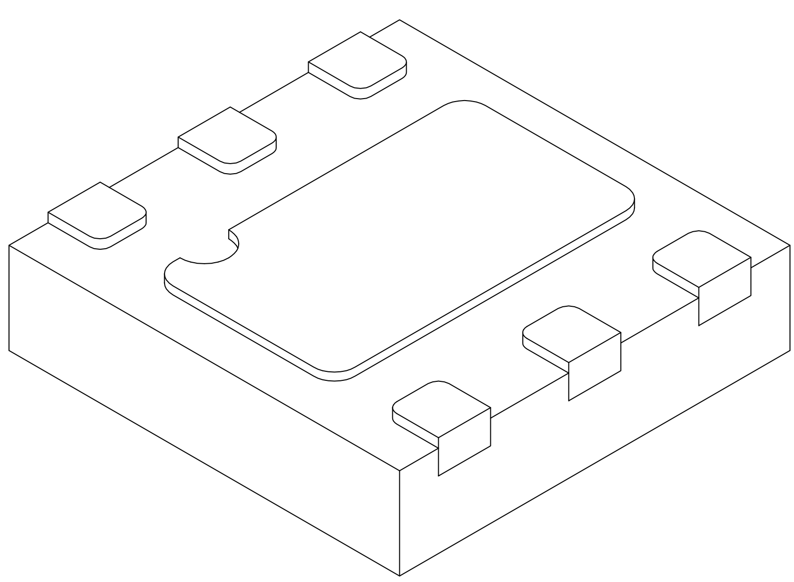
Package Outlines and Dimensions

6-Lead Plastic Super Thin Small Outline No Lead (NR) - 1.5x1.5x0.4 mm Body [X2SON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		6	
Pitch	e		0.50 BSC	
Overall Height	A	0.30	0.35	0.40
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.127 REF	
Overall Width	E		1.50 BSC	
Exposed Pad Width	E2	0.65	0.70	0.75
Overall Length	D		1.50 BSC	
Exposed Pad Length	D2	1.15	1.20	1.25
Terminal Width	b	0.15	0.20	0.25
Terminal Length	L	0.150	0.200	0.250
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-215A Sheet 2 of 2

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8-Lead Plastic Super-Thin Dual Small Outline No-Lead (8X) - 1.5x1.5 mm Body [X2SON] With 1.2x0.7 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-338A Sheet 1 of 2

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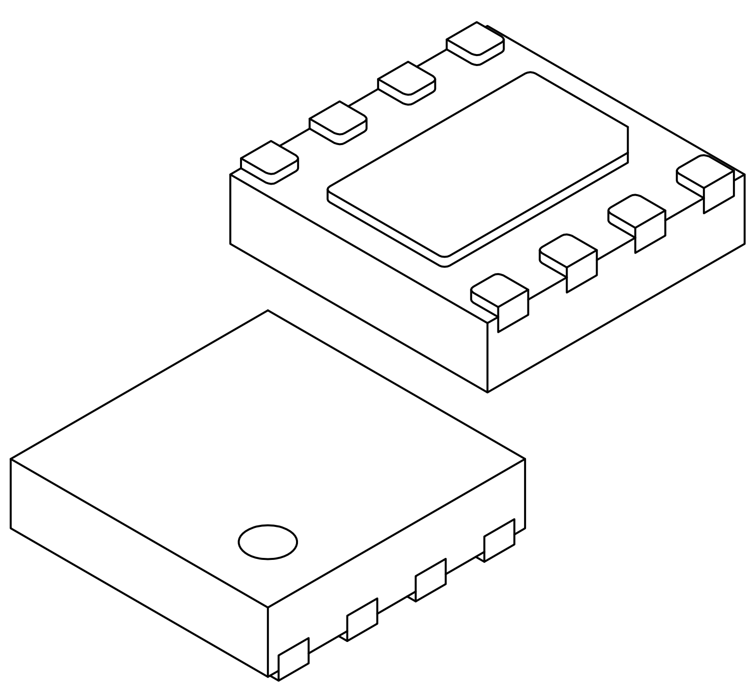
Package Outlines and Dimensions

8-Lead Plastic Super-Thin Dual Small Outline No-Lead (8X) - 1.5x1.5 mm Body [X2SON] With 1.2x0.7 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.40 BSC	
Overall Height	A	0.30	0.35	0.40
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.127 REF	
Overall Width	E		1.50 BSC	
Exposed Pad Width	E2	0.65	0.70	0.75
Overall Length	D		1.50 BSC	
Exposed Pad Length	D2	1.15	1.20	1.25
Exposed Pad Corner Chamfer	CH	-	0.15	-
Terminal Width	b	0.125	0.175	0.225
Terminal Length	L	0.125	0.175	0.225
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

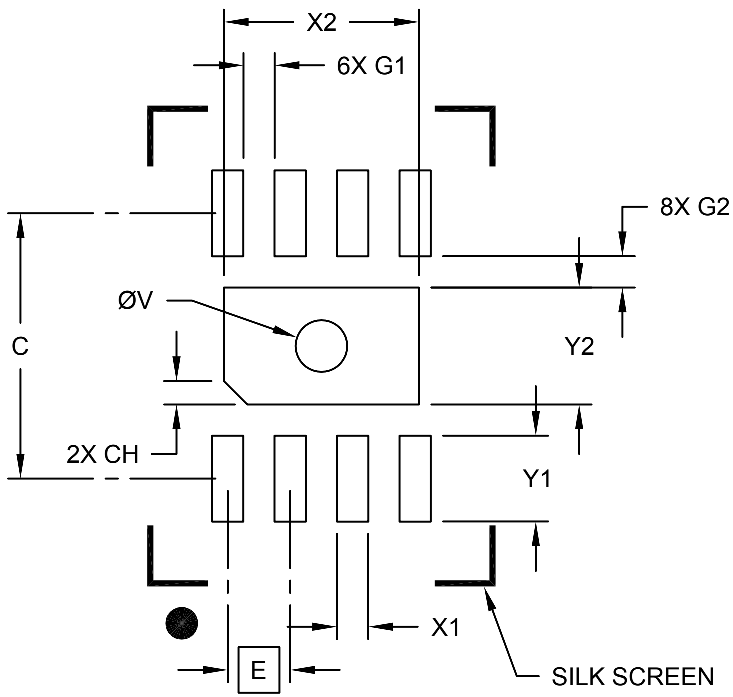
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-338A Sheet 2 of 2

8-Lead Plastic Super-Thin Dual Small Outline No-Lead (8X) - 1.5x1.5 mm Body [X2SON] With 1.2x0.7 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Optional Center Pad Width	X2			1.25
Optional Center Pad Length	Y2			0.75
Optional Center Pad Chamfer (X2)	CH		0.15	
Contact Pad Spacing	C		1.70	
Contact Pad Width (X8)	X1			0.20
Contact Pad Length (X8)	Y1			0.55
Contact Pad to Pad (X6)	G1	0.20		
Contact Pad to Center Pad (X8)	G2	0.20		
Thermal Via Diameter	V		0.33	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2338A

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Package Outlines and Dimensions

8-Terminal Super-Thin Plastic Small Outline, No Lead Package (NR) - 2x2x0.4 mm (Max) Body [X2SON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
E
NOTE 1
2X
0.10 C
1 2
2X
0.10 C
TOP VIEW

// 0.10 C
A1
C
A
SEATING
PLANE
8X
0.08 C
SIDE VIEW

0.10Ⓜ C A B
D2
NOTES 1 & 2
1 2
0.10Ⓜ C A B
L2
E2
8X K
8X L
N
8X b
0.08Ⓜ C A B
0.05Ⓜ C
e/2
e
BOTTOM VIEW

Microchip Technology Drawing C04-201-NR-A Sheet 1 of 2

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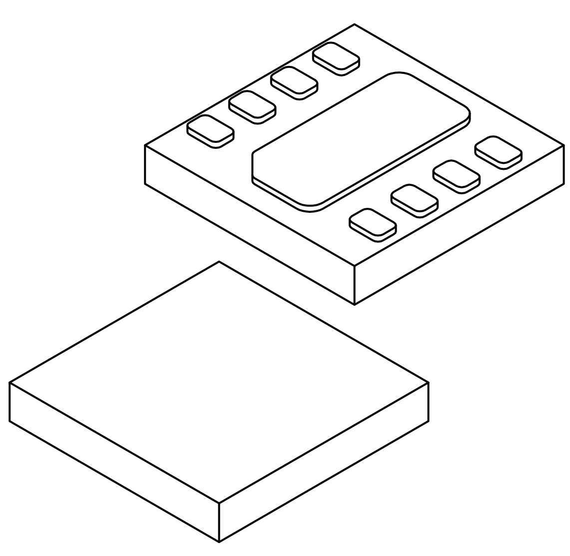
8-Terminal Super-Thin Plastic Small Outline, No Lead Package (NR) - 2x2x0.4 mm (Max) Body [X2SON]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.40 BSC	
Overall Height	A	0.34	0.37	0.40
Standoff	A1	0.00	0.02	0.05
Overall Width	E		2.00 BSC	
Exposed Pad Width	E2	0.70	0.75	0.80
Overall Length	D		2.00 BSC	
Exposed Pad Length	D2	1.55	1.60	1.65
Terminal Width	b	0.15	0.20	0.25
Terminal Length	L	0.25	0.30	0.35
Terminal Center-to-Center	L2		1.55 BSC	
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Pin 1 index on exposed pad may be curved indentation or 45° chamfer
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-201-NR-A Sheet 2 of 2

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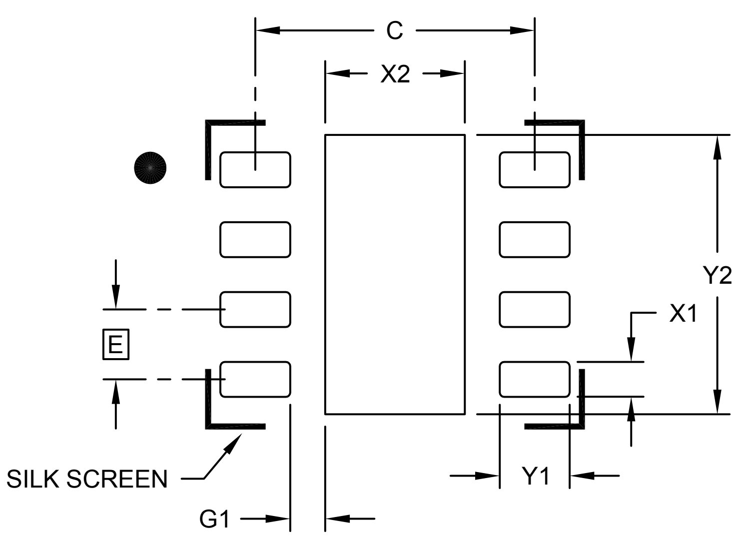
Footprint Outlines and Dimensions

8-Terminal Super-Thin, No Lead Package (NR) - 2x2x0.4 mm (Max) Body [X2SON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Optional Center Pad Width	X2			0.80
Optional Center Pad Length	Y2			1.60
Contact Pad Spacing	C		1.60	
Contact Pad Width (X8)	X1			0.20
Contact Pad Length (X8)	Y1			0.40
Contact Pad to Center Pad (X8)	G1	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2201-NR-A

8-Terminal Super-Thin Plastic Small Outline, No Lead Package (XX8E) - 2x2x0.4 mm (Max) Body [X2SON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
E
NOTE 1
2X
0.10 C
1 2
2X
0.10 C
TOP VIEW

0.10 C
A1
C
A
SEATING PLANE
8X
0.08 C
SIDE VIEW

0.10Ⓜ C A B
D2
NOTES 1 & 2
1 2
0.10Ⓜ C A B
L2
E2
8X K
8X L
N
8X b
0.08Ⓜ C A B
0.05Ⓜ C
e/2
e
BOTTOM VIEW

Microchip Technology Drawing C04-201-XX8E-A Sheet 1 of 2

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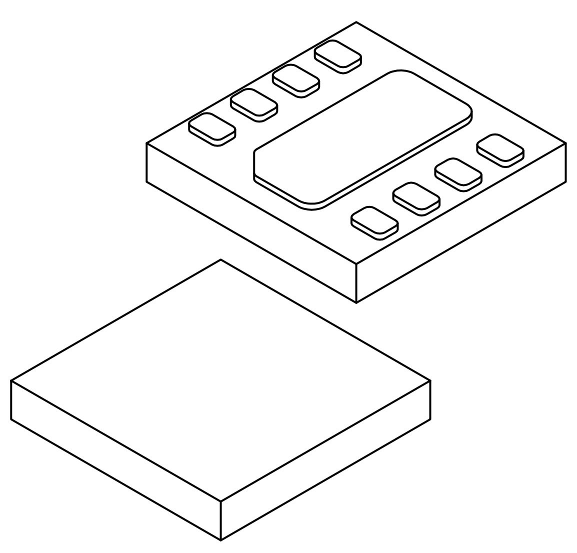
8-Terminal Super-Thin Plastic Small Outline, No Lead Package (XX8E) - 2x2x0.4 mm (Max) Body [X2SON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.40 BSC	
Overall Height	A	0.34	0.37	0.40
Standoff	A1	0.00	0.02	0.05
Overall Width	E		2.00 BSC	
Exposed Pad Width	E2	0.70	0.75	0.80
Overall Length	D		2.00 BSC	
Exposed Pad Length	D2	1.55	1.60	1.65
Terminal Width	b	0.15	0.20	0.25
Terminal Length	L	0.25	0.30	0.35
Terminal Center-to-Center	L2		1.55 BSC	
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Pin 1 index on exposed pad may be curved indentation or 45° chamfer
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

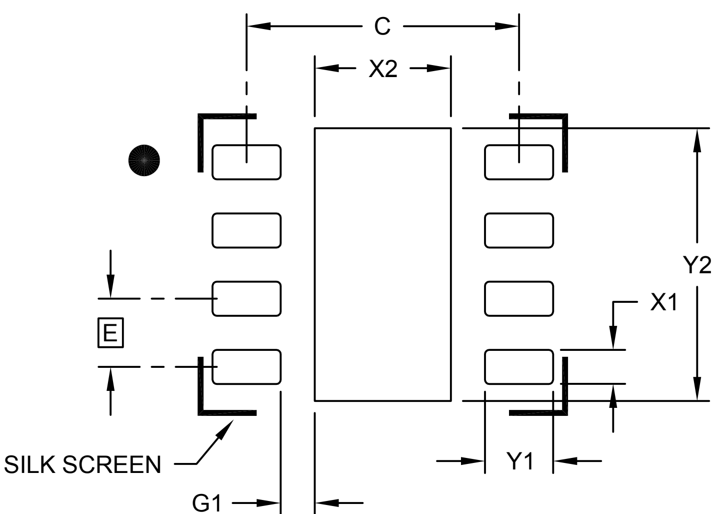
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-201-XX8E-A Sheet 2 of 2

8-Terminal Super-Thin, No Lead Package (XX8E) - 2x2x0.4 mm (Max) Body [X2SON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Optional Center Pad Width	X2			0.80
Optional Center Pad Length	Y2			1.60
Contact Pad Spacing	C		1.60	
Contact Pad Width (X8)	X1			0.20
Contact Pad Length (X8)	Y1			0.40
Contact Pad to Center Pad (X8)	G1	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2201-XX8E-A

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QFN

16-Lead Plastic Quad Flat, No Lead Package (NG) - 3x3x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
NOTE 1
N
1
2
E
(DATUM B)
2X
0.10 C
2X
0.10 C
(DATUM A)

TOP VIEW

0.10 C
C
SEATING PLANE
A
(A3)
A1
16X
0.08 C

SIDE VIEW

D2
(DATUM B)
(DATUM A)
e/2
E2
e
2
1
K
N
L
NOTE 1
16X b
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-197A Sheet 1 of 2

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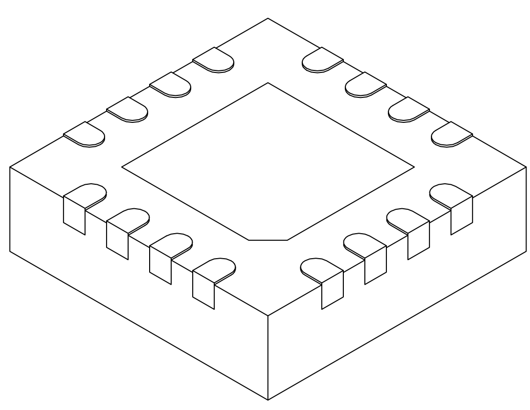
16-Lead Plastic Quad Flat, No Lead Package (NG) - 3x3x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.55	1.70	1.80
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.55	1.70	1.80
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.20	0.30	0.40
Terminal-to-Exposed Pad	K	0.20	-	-

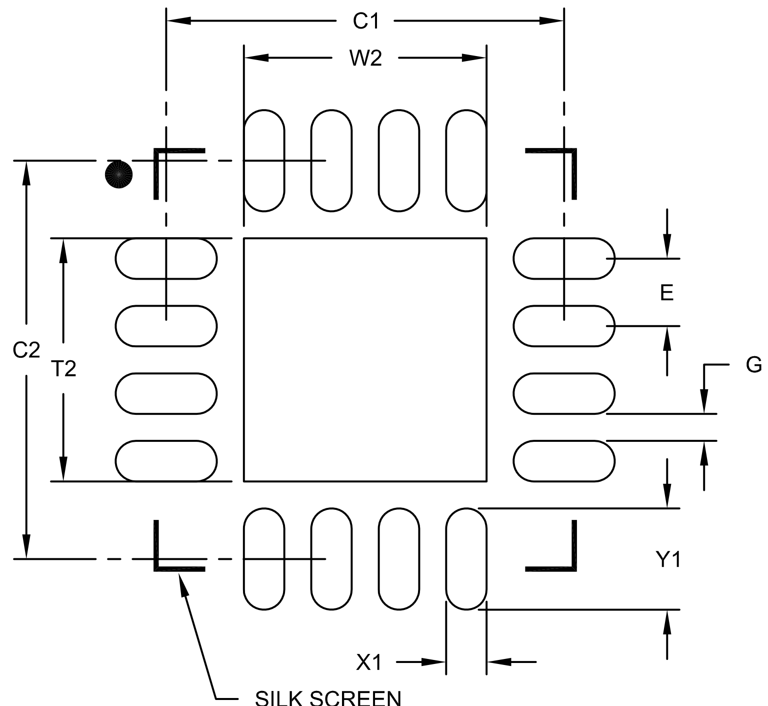
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-197A Sheet 2 of 2

16-Lead Plastic Quad Flat, No Lead Package (NG) – 3x3x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			1.80
Optional Center Pad Length	T2			1.80
Contact Pad Spacing	C1		2.95	
Contact Pad Spacing	C2		2.95	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2197A

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Package Outlines and Dimensions

16-Lead Plastic Quad Flat, No Lead Package (MG) - 3x3x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D A B E 2 1 N NOTE 1 2X 0.15 C 2X 0.15 C

TOP VIEW

0.10 C A SEATING PLANE C (A3) A1 16X 0.08 C

(DATUM B) D2 0.10Ⓜ C A B N NOTE 1 1 (DATUM A) 0.10Ⓜ C A B 2 E2 e K L 16X b 0.10Ⓜ C A B 0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-142A Sheet 1 of 2

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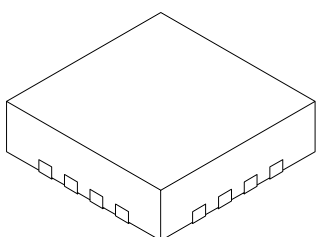
16-Lead Plastic Quad Flat, No Lead Package (MG) - 3x3x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.00	1.10	1.50
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.00	1.10	1.50
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.25	0.35	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-142A Sheet 2 of 2

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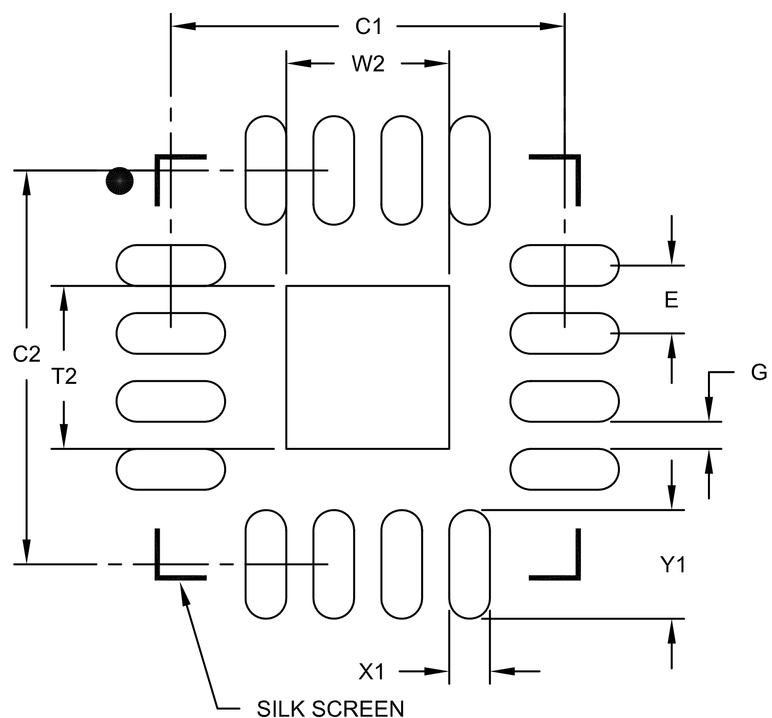
16-Lead Plastic Quad Flat, No Lead Package (MG) – 3x3x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			1.20
Optional Center Pad Length	T2			1.20
Contact Pad Spacing	C1		2.90	
Contact Pad Spacing	C2		2.90	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.80
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2142A

16-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4x0.9mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.15 C
2X
0.15 C

TOP VIEW

0.10 C
C
A
A1
SEATING PLANE
(A3)
16X
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
e/2
2
1
NOTE 1
K
N
0.40
16X b
e
0.10Ⓜ C A B

BOTTOM VIEW

Microchip Technology Drawing C04-127D Sheet 1 of 2

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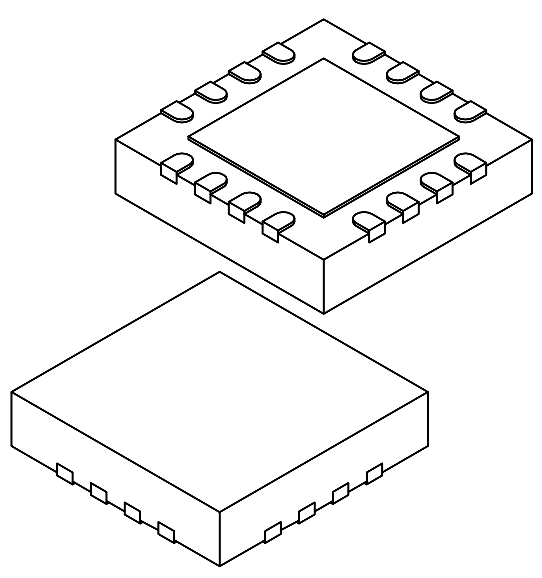
16-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4x0.9mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.50	2.65	2.80
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.50	2.65	2.80
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-127D Sheet 2 of 2

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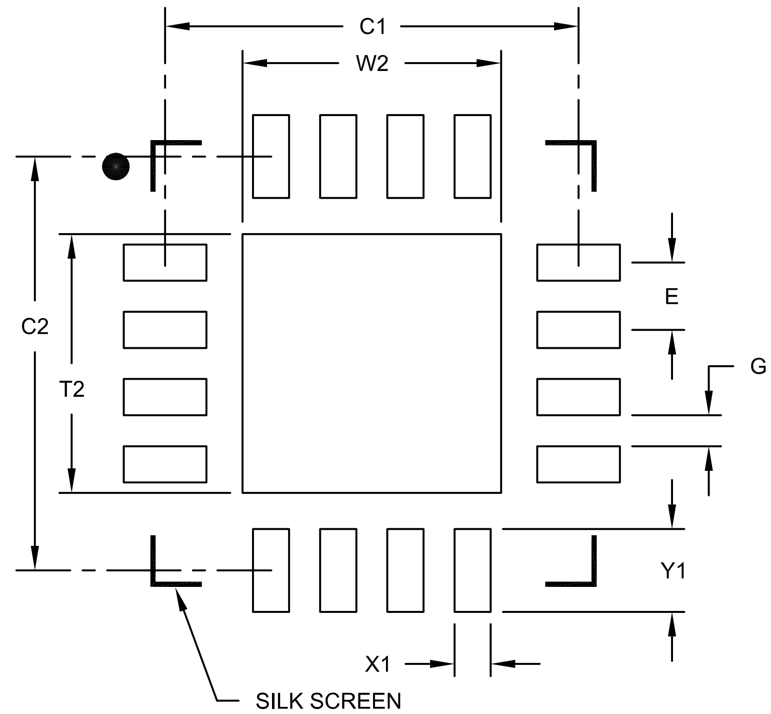
16-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4x0.9mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	W2			2.50
Optional Center Pad Length	T2			2.50
Contact Pad Spacing	C1		4.00	
Contact Pad Spacing	C2		4.00	
Contact Pad Width (X28)	X1			0.35
Contact Pad Length (X28)	Y1			0.80
Distance Between Pads	G	0.30		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2127A

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16-Lead Plastic Quad Flat, No Lead Package (8E) - 4x4x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.20 C
2X
0.20 C
TOP VIEW

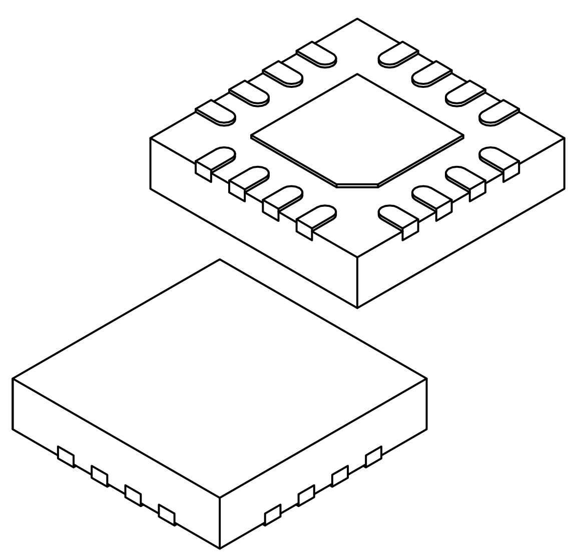
0.10 C
A1
C
A
SEATING PLANE
(A3)
SIDE VIEW
16X
0.08 C

0.10 Ⓜ C A B
D2
(16X K)
0.10 Ⓜ C A B
E2
e/2
2
1
16X L
N
16X b
e
0.10 Ⓜ C A B
0.05 Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-259B Sheet 1 of 2

16-Lead Plastic Quad Flat, No Lead Package (8E) - 4x4x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.87	0.95
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	1.95	2.05	2.15
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	1.95	2.05	2.15
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.45	0.55	0.65
Terminal-to-Exposed-Pad	K		0.425 REF	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-259B Sheet 2 of 2

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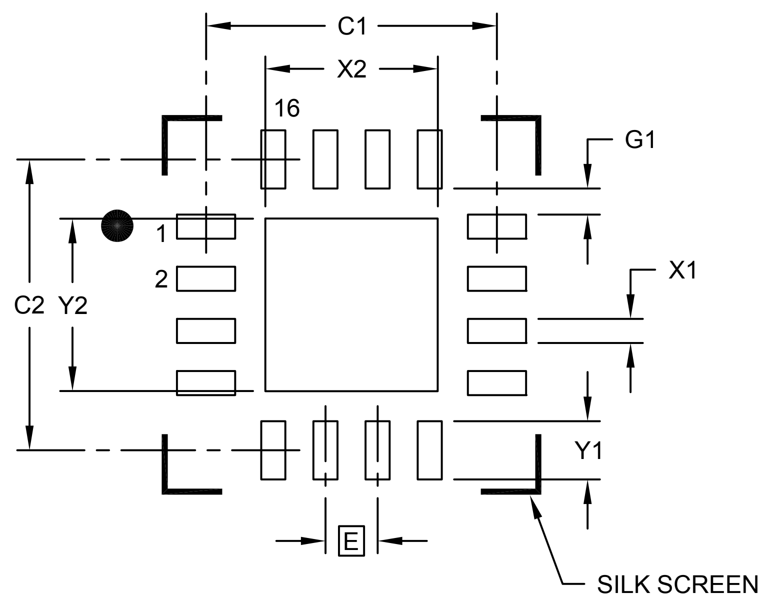
Footprint Outlines and Dimensions

16-Lead Plastic Quad Flat, No Lead Package (8E) - 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	X2			2.15
Optional Center Pad Length	Y2			2.15
Contact Pad Spacing	C1		3.625	
Contact Pad Spacing	C2		3.625	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.725
Contact Pad to Center Pad (X16)	G1	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2259A

16-Lead Plastic Quad Flat, No Lead Package (FX) - 4x4x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.15 C
2X
0.10 C
TOP VIEW
0.10 C
A1
C
A
SEATING PLANE
(A3)
SIDE VIEW
16X
0.08 C
0.10 M C A B
D2
16X K
0.10 M C A B
E2
2
1
e/2
16X L
16X L1
N
16X b
e
0.10 M C A B
BOTTOM VIEW

Microchip Technology Drawing C04-262A Sheet 1 of 2

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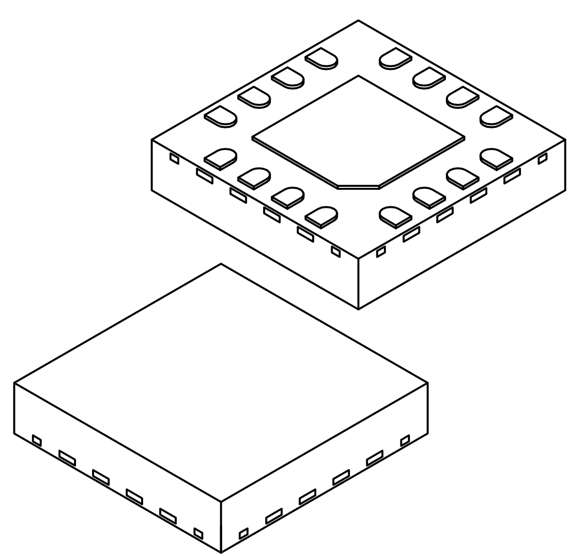
16-Lead Plastic Quad Flat, No Lead Package (FX) - 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		0.65 BSC	
Overall Height	A	0.85	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	1.95	2.05	2.15
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	1.95	2.05	2.15
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.45	0.55	0.65
Pull Back	L1	—	—	0.15
Terminal-to-Exposed-Pad	K	0.20	—	—

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-262A Sheet 2 of 2

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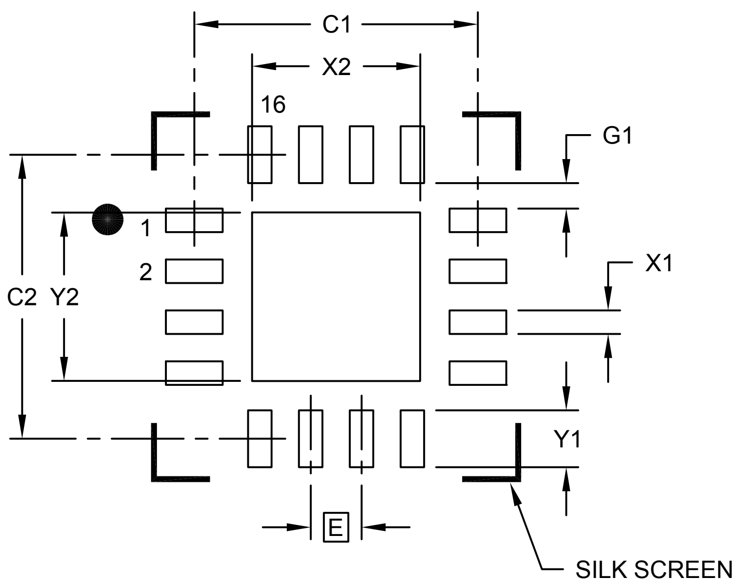
16-Lead Plastic Quad Flat, No Lead Package (FX) - 4x4x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	X2			2.15
Optional Center Pad Length	Y2			2.15
Contact Pad Spacing	C1		3.625	
Contact Pad Spacing	C2		3.625	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.725
Contact Pad to Center Pad (X16)	G1	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2262A

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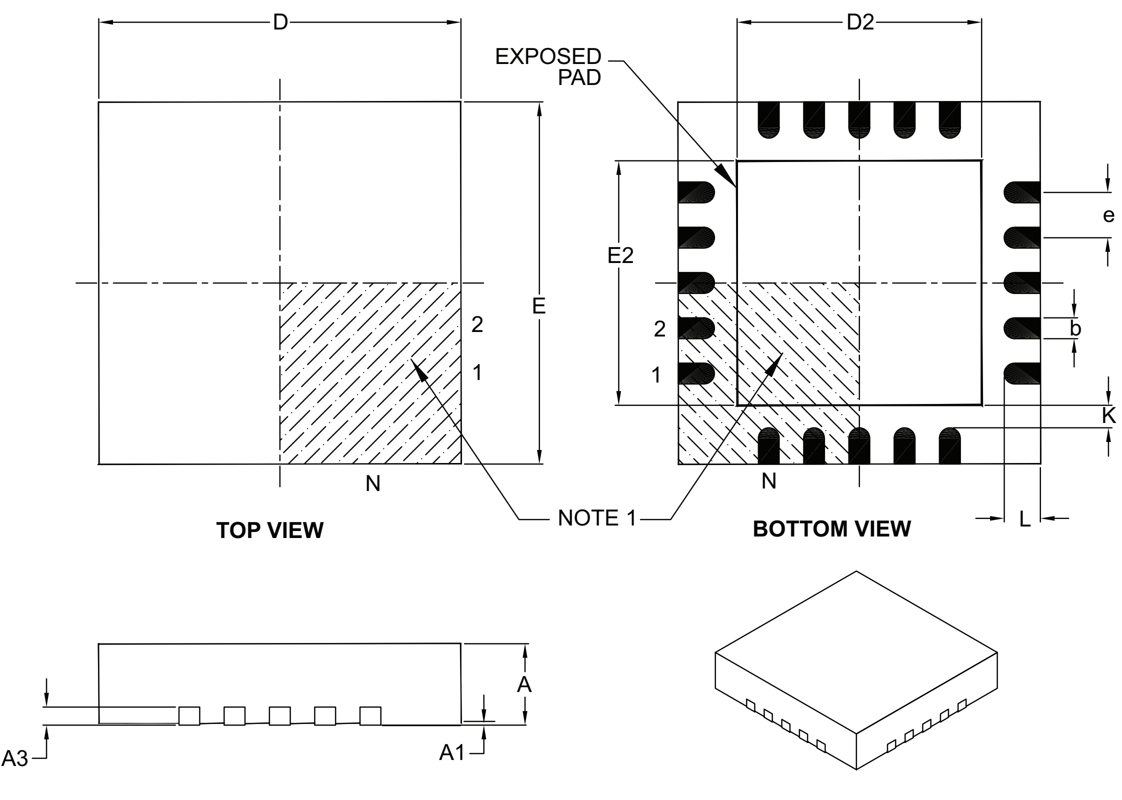
20-Lead Plastic Quad Flat, No Lead Package (ML) – 4x4x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		20	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.60	2.70	2.80
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.60	2.70	2.80
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

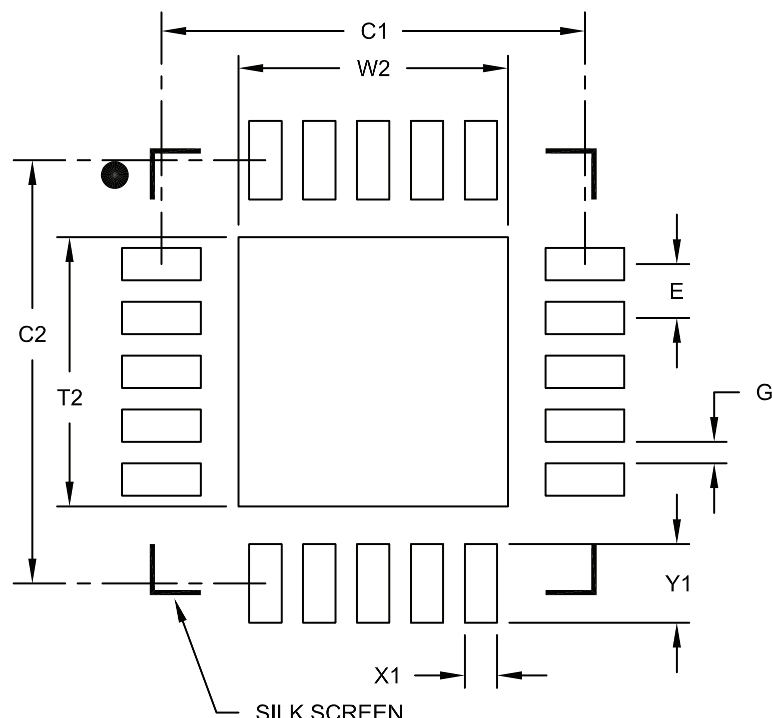
    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

    REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-126B

20-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4 mm Body [QFN]
With 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			2.50
Optional Center Pad Length	T2			2.50
Contact Pad Spacing	C1		3.93	
Contact Pad Spacing	C2		3.93	
Contact Pad Width	X1			0.30
Contact Pad Length	Y1			0.73
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2126A

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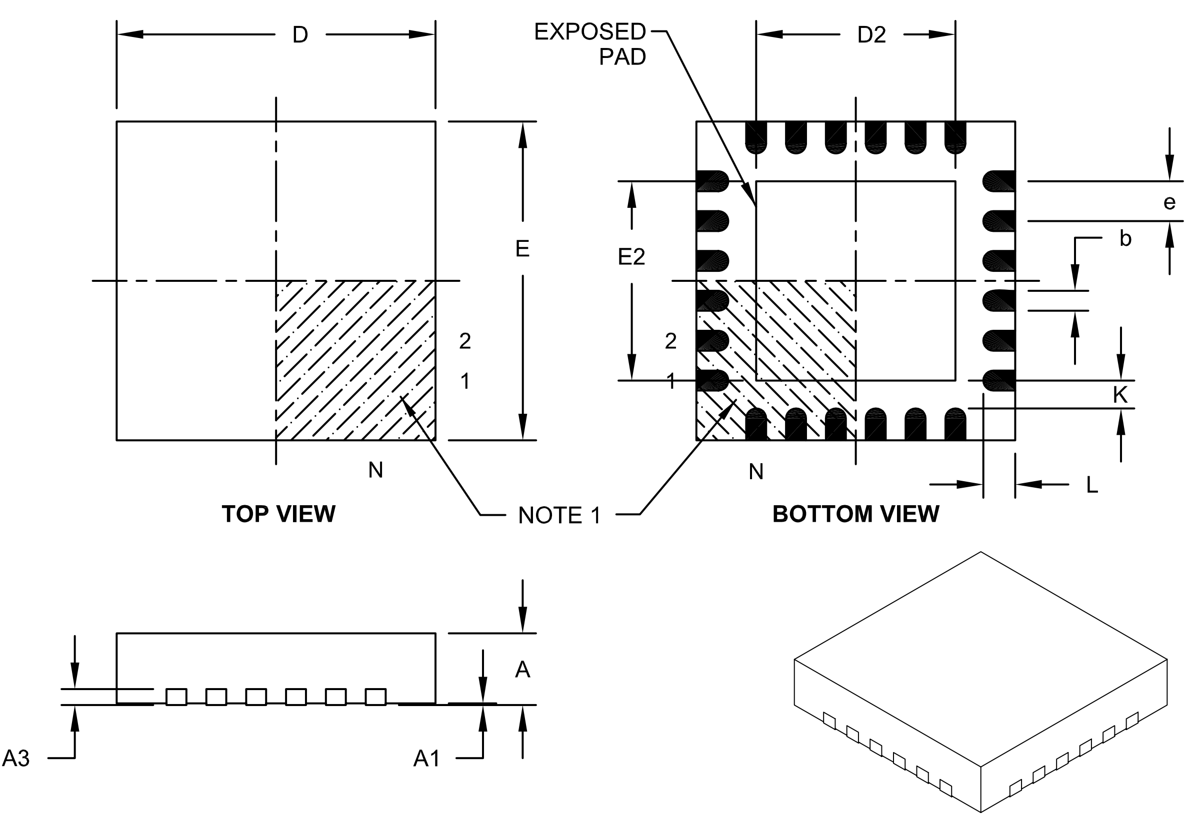
24-Lead Plastic Quad Flat, No Lead Package (MJ) – 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		24	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.40	2.50	2.60
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.40	2.50	2.60
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

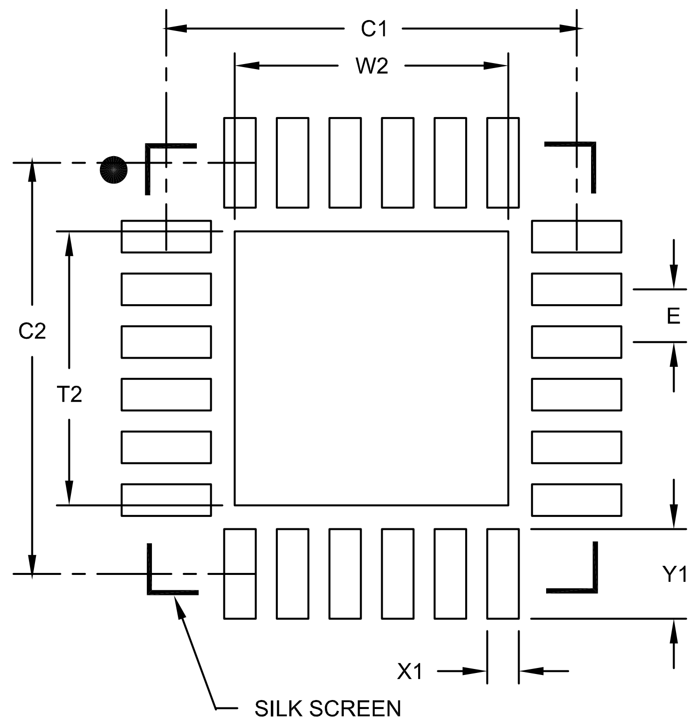
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-143A

24-Lead Plastic Quad Flat, No Lead Package (MJ) - 4x4 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	W2			2.60
Optional Center Pad Length	T2			2.60
Contact Pad Spacing	C1		3.90	
Contact Pad Spacing	C2		3.90	
Contact Pad Width	X1			0.30
Contact Pad Length	Y1			0.85

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2143B

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24-Lead Plastic Quad Flat, No Lead Package (RU) - 4x4 mm Body [QFN] With 2.5x2.5 mm Exposed Pad; Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

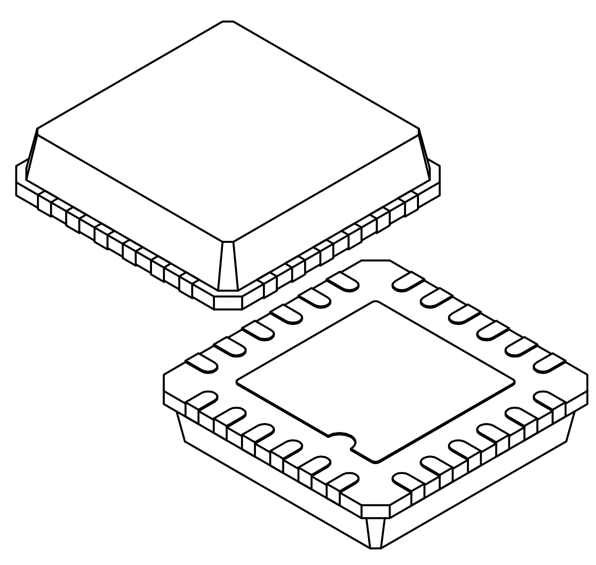
SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-225A Sheet 1 of 2

24-Lead Plastic Quad Flat, No Lead Package (RU) - 4x4 mm Body [QFN] With 2.5x2.5 mm Exposed Pad; Punch Singulated

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Terminal Thickness	(A3)	0.20 REF		
Overall Width	E	4.00 BSC		
Molded Top Width	E1	3.75 BSC		
Exposed Pad Width	E2	2.40	2.50	2.60
Overall Length	D	4.00 BSC		
Molded Top Length	D1	3.75 BSC		
Exposed Pad Length	D2	2.40	2.50	2.60
Corner Chamfer	P	0.24	0.42	0.60
Terminal Width	b	0.18	0.23	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-
Mold Draft Angle	θ	0°	-	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-225A Sheet 2 of 2

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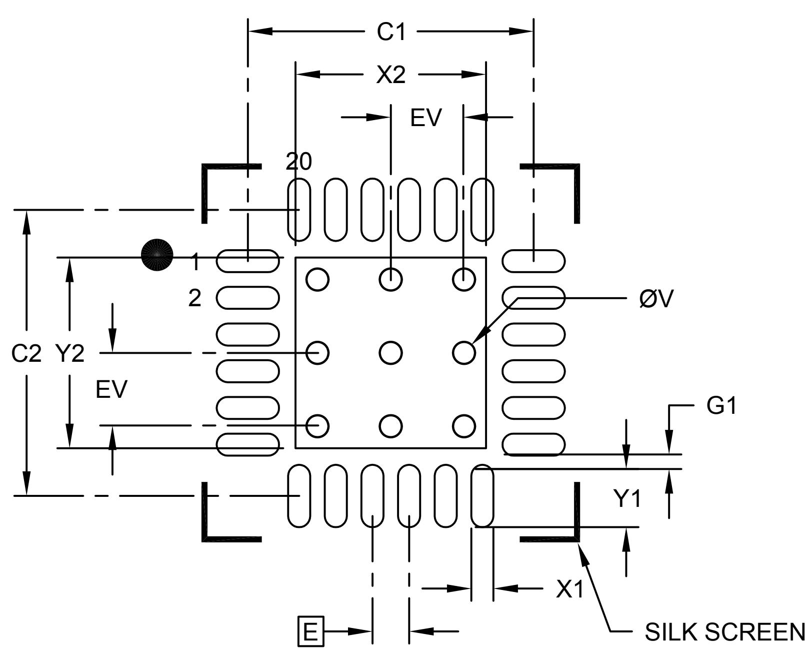
24-Lead Plastic Quad Flat, No Lead Package (RU) - 4x4 mm Body [QFN] With 2.5x2.5 mm Exposed Pad; Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			2.60
Optional Center Pad Length	Y2			2.60
Contact Pad Spacing	C1		3.90	
Contact Pad Spacing	C2		3.90	
Contact Pad Width (X20)	X1			0.30
Contact Pad Length (X20)	Y1			0.85
Contact Pad to Center Pad (X20)	G1	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2225A

24-Lead Plastic Quad Flat, No Lead Package (LY) – 5x5x1.0 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-364A Sheet 1 of 2

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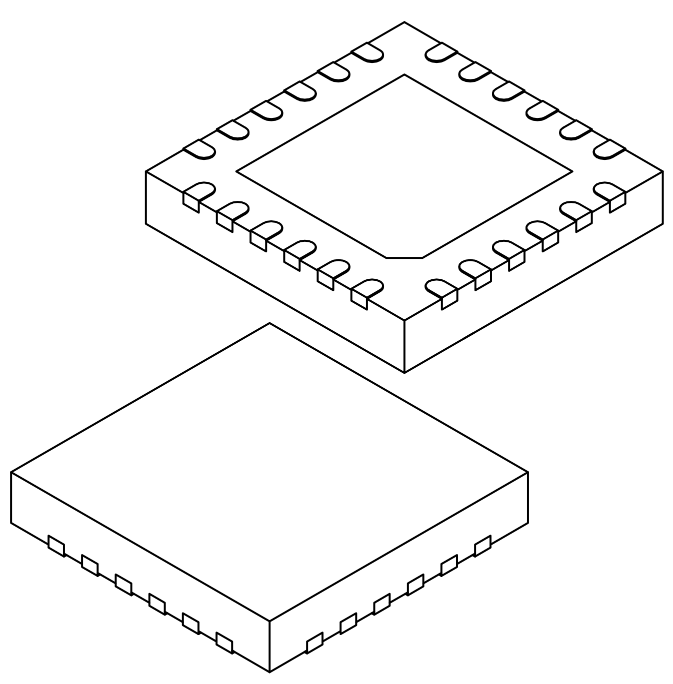
Package Outlines and Dimensions

24-Lead Plastic Quad Flat, No Lead Package (LY) – 5x5x1.0 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N	24		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)	0.20 REF		
Overall Width	E	5.00 BSC		
Exposed Pad Width	E2	3.20	3.25	3.30
Overall Length	D	5.00 BSC		
Exposed Pad Length	D2	3.20	3.25	3.30
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed Pad	K	0.20	-	-

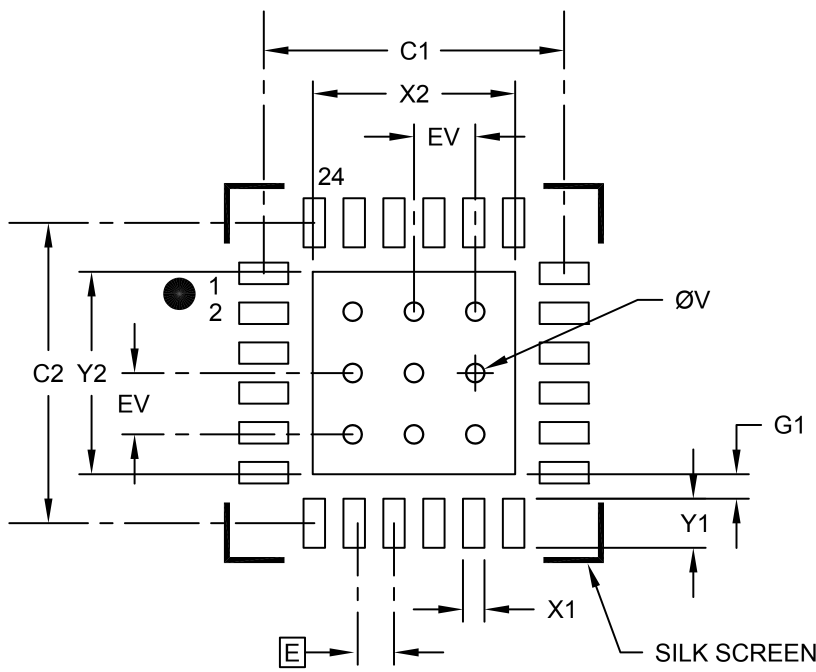
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-364A Sheet 2 of 2

24-Lead Plastic Quad Flat, No Lead Package (LY) – 5x5x1.0 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Center Pad Width	X2			3.30
Center Pad Length	Y2			3.30
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X24)	X1			0.35
Contact Pad Length (X24)	Y1			0.80
Contact Pad to Center Pad (X24)	G1	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2364A

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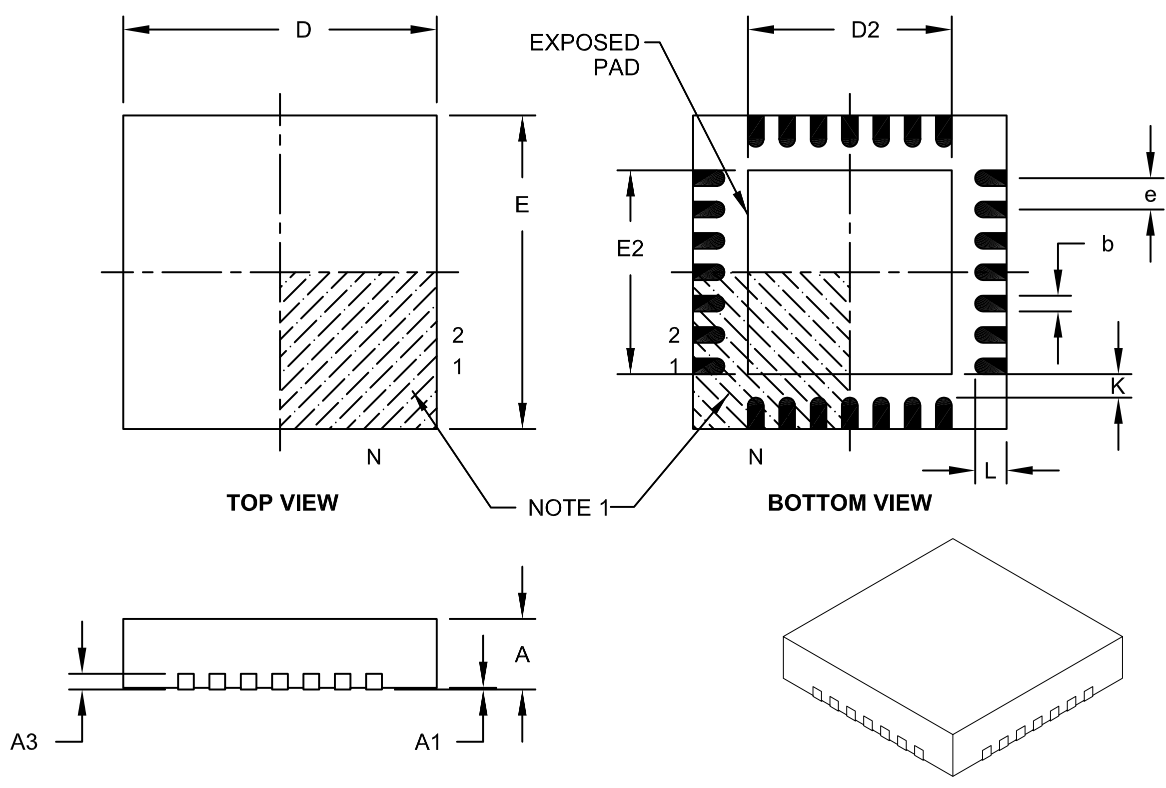
28-Lead Plastic Quad Flat, No Lead Package (MK) – 4x4x0.9 mm Body [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.40 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.50	2.60	2.70
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.50	2.60	2.70
Contact Width	b	0.17	0.20	0.25
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

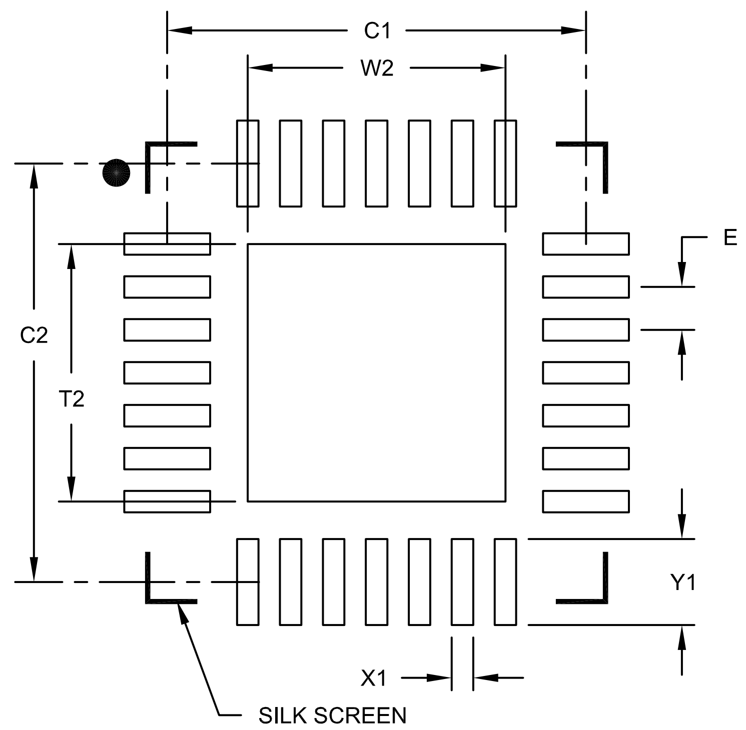
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-144A

28-Lead Plastic Quad Flat, No Lead Package (MK) – 4x4x0.9 mm Body [QFN] Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Optional Center Pad Width	W2			2.40
Optional Center Pad Length	T2			2.40
Contact Pad Spacing	C1		3.90	
Contact Pad Spacing	C2		3.90	
Contact Pad Width	X1			0.20
Contact Pad Length	Y1			0.80

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2144A

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28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-140C Sheet 1 of 2

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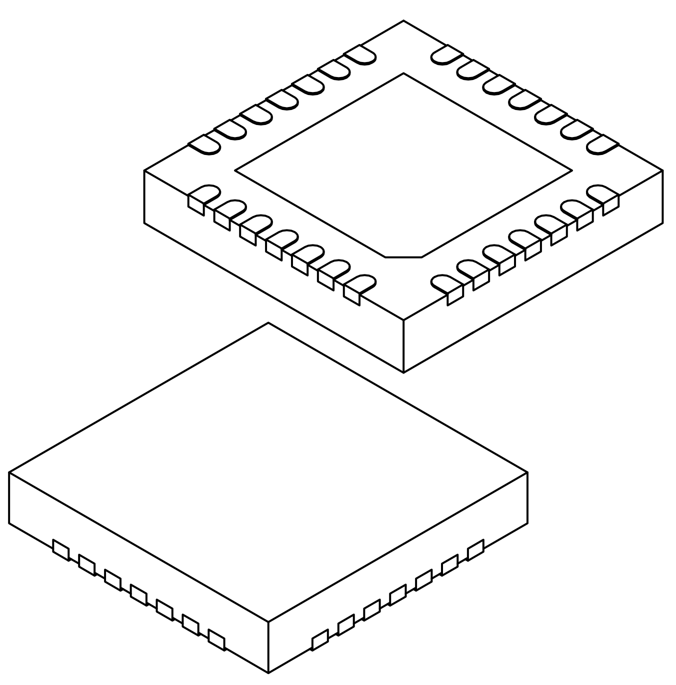
28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.15	3.25	3.35
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.15	3.25	3.35
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.35	0.40	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-140C Sheet 2 of 2

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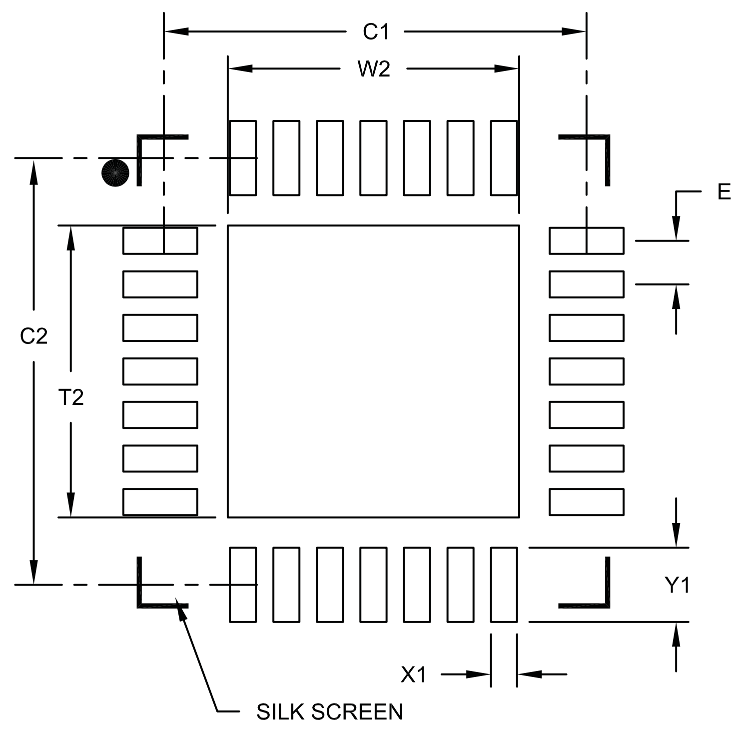
28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5 mm Body [QFN] Land Pattern With 0.55 mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	W2			3.35
Optional Center Pad Length	T2			3.35
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X28)	X1			0.30
Contact Pad Length (X28)	Y1			0.85

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2140A

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28-Lead Plastic Quad Flat, No Lead Package (MQY) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-140C Sheet 1 of 2

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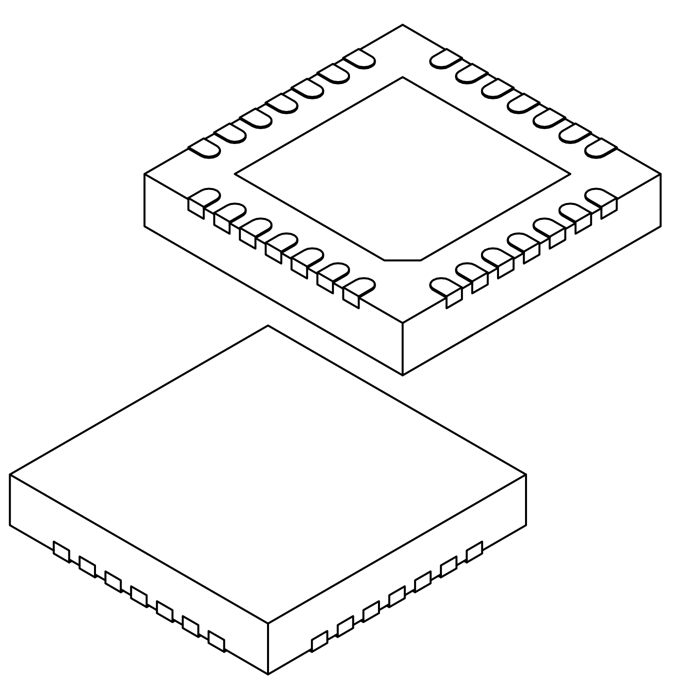
Package Outlines and Dimensions

28-Lead Plastic Quad Flat, No Lead Package (MQY) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.15	3.25	3.35
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.15	3.25	3.35
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.35	0.40	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-140C Sheet 2 of 2

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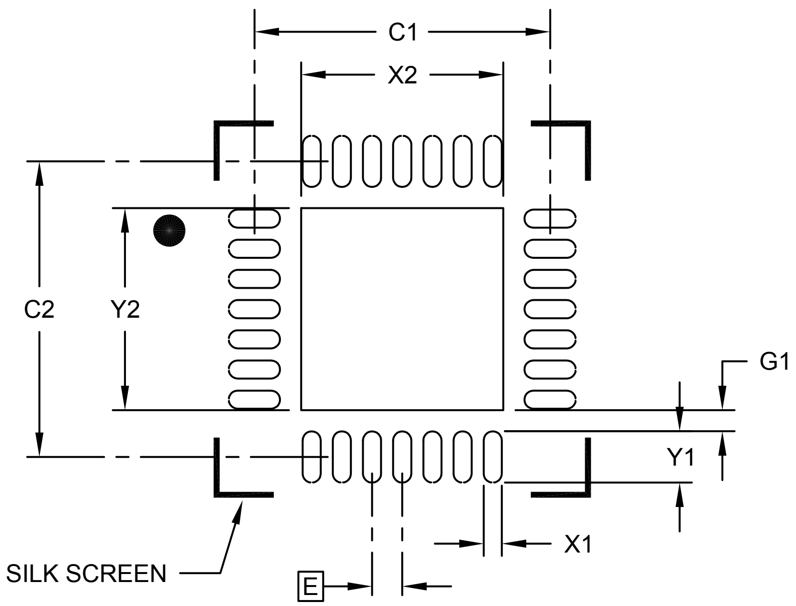
28-Lead Plastic Quad Flat, No Lead Package (MQY) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	W2			3.35
Optional Center Pad Length	T2			3.35
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X28)	X1			0.30
Contact Pad Length (X28)	Y1			0.85
Contact Pad Length (X28)	G1	0.35		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2140A

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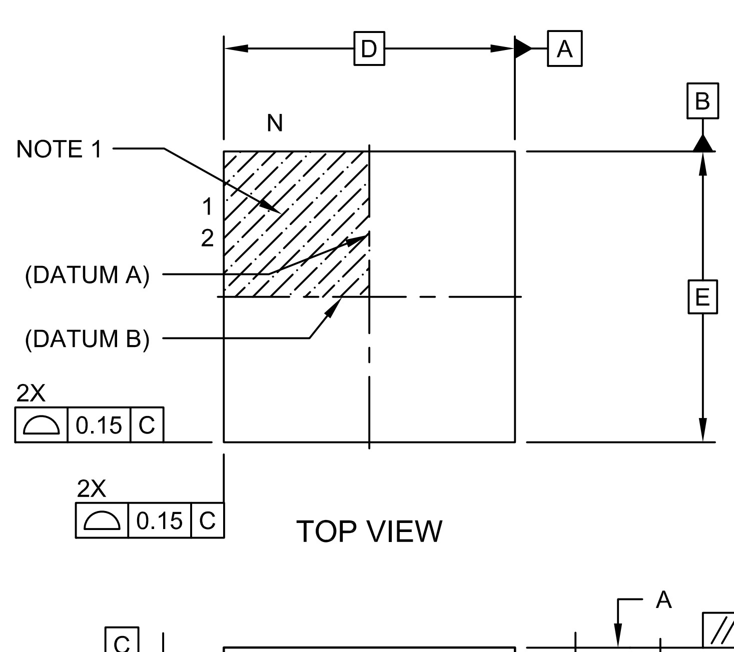
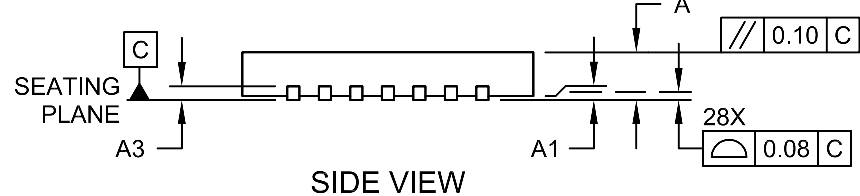
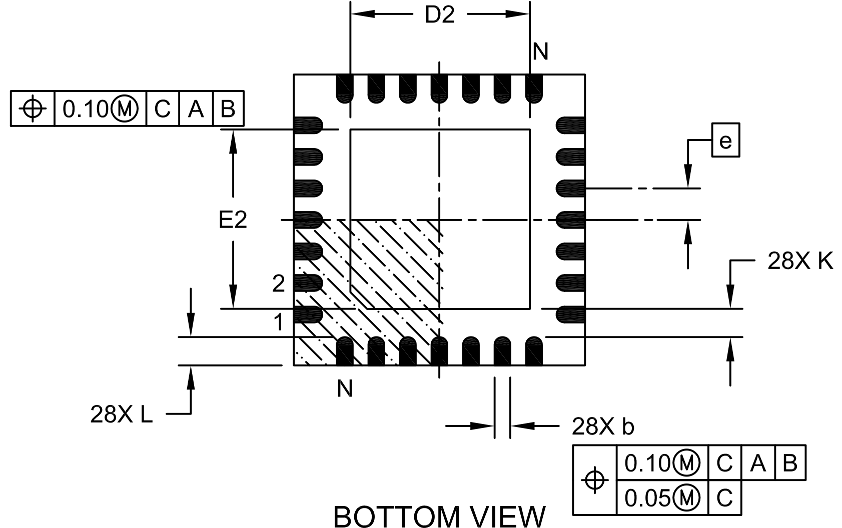
28-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6 mm Body [QFN] With 0.55 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-105C Sheet 1 of 2

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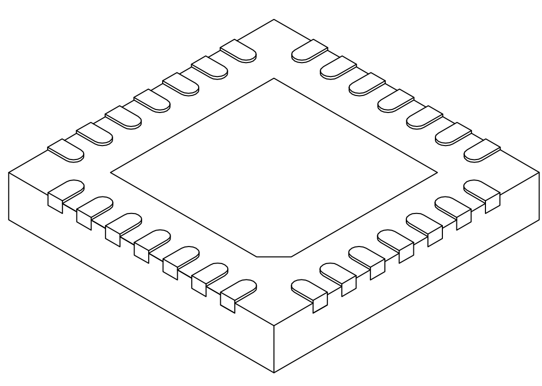
28-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6 mm Body [QFN] With 0.55 mm Terminal Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3	0.20 REF		
Overall Width	E	6.00 BSC		
Exposed Pad Width	E2	3.65	3.70	4.20
Overall Length	D	6.00 BSC		
Exposed Pad Length	D2	3.65	3.70	4.20
Terminal Width	b	0.23	0.30	0.35
Terminal Length	L	0.50	0.55	0.70
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-105C Sheet 2 of 2

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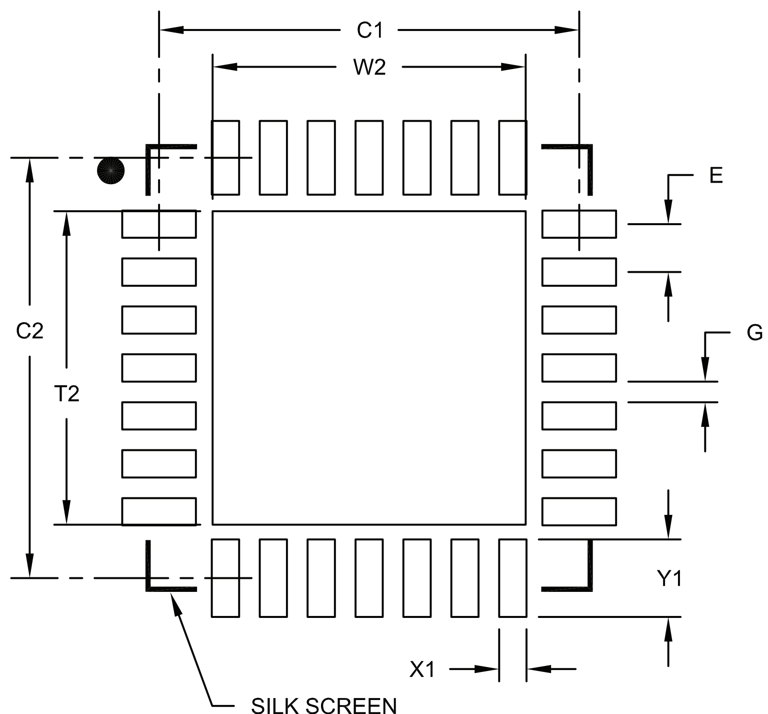
28-Lead Plastic Quad Flat, No Lead Package (ML) – 6x6 mm Body [QFN] with 0.55 mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	W2			4.25
Optional Center Pad Length	T2			4.25
Contact Pad Spacing	C1		5.70	
Contact Pad Spacing	C2		5.70	
Contact Pad Width (X28)	X1			0.37
Contact Pad Length (X28)	Y1			1.00
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2105A

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32-Lead Plastic Quad Flat, No Lead Package (3E) - 5x5 mm Body [QFN], 0.40 mm Terminals With 3.3x3.3 Exposed Pad; Punch Singulated, Dimpled Terminals

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-240A Sheet 1 of 2

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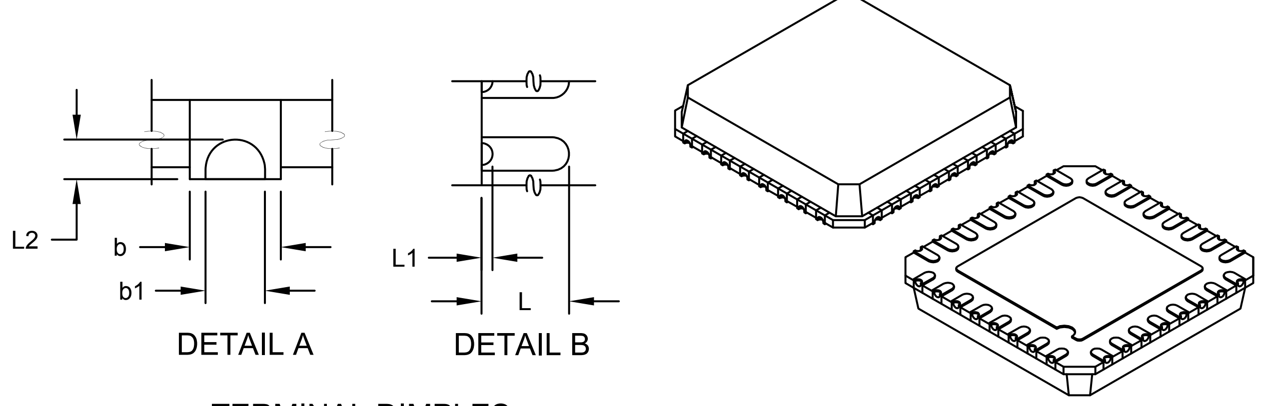
32-Lead Plastic Quad Flat, No Lead Package (3E) - 5x5 mm Body [QFN], 0.40 mm Terminals With 3.3x3.3 Exposed Pad; Punch Singulated, Dimpled Terminals

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TERMINAL DIMPLES

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		32	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Terminal Thickness	(A3)		0.20 REF	
Overall Width	E		5.00 BSC	
Molded Top Width	E1		4.75 BSC	
Exposed Pad Width	E2	3.20	3.30	3.40
Overall Length	D		5.00 BSC	
Molded Top Length	D1		4.75 BSC	
Exposed Pad Length	D2	3.20	3.30	3.40
Corner Chamfer	P	0.24	0.42	0.60
Terminal Width	b	0.20	0.25	0.30
Terminal Dimple Width	b1	0.10	0.15	0.20
Terminal Length	L	0.30	0.40	0.50
Terminal Dimple Length (side)	L1	0.05	0.15	0.25
Terminal Dimple Length (bottom)	L2	0.05	0.10	0.15
Terminal-to-Exposed-Pad	K	0.20	-	-
Mold Draft Angle	θ	0°	-	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-240A Sheet 2 of 2

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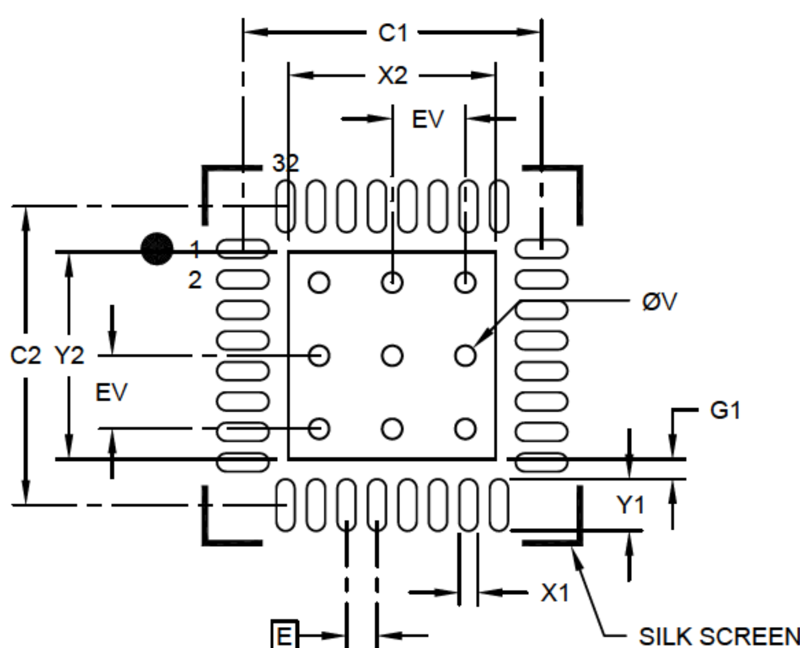
32-Lead Plastic Quad Flat, No Lead Package (3E) - 5x5 mm Body [QFN], 0.40 mm Terminals With 3.3x3.3 Exposed Pad; Punch Singulated, Dimpled Terminals

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			3.40
Optional Center Pad Length	Y2			3.40
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X32)	X1			0.30
Contact Pad Length (X32)	Y1			0.85
Contact Pad to Center Pad (X32)	G1	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2240A

© 2016 Microchip Technology Inc.

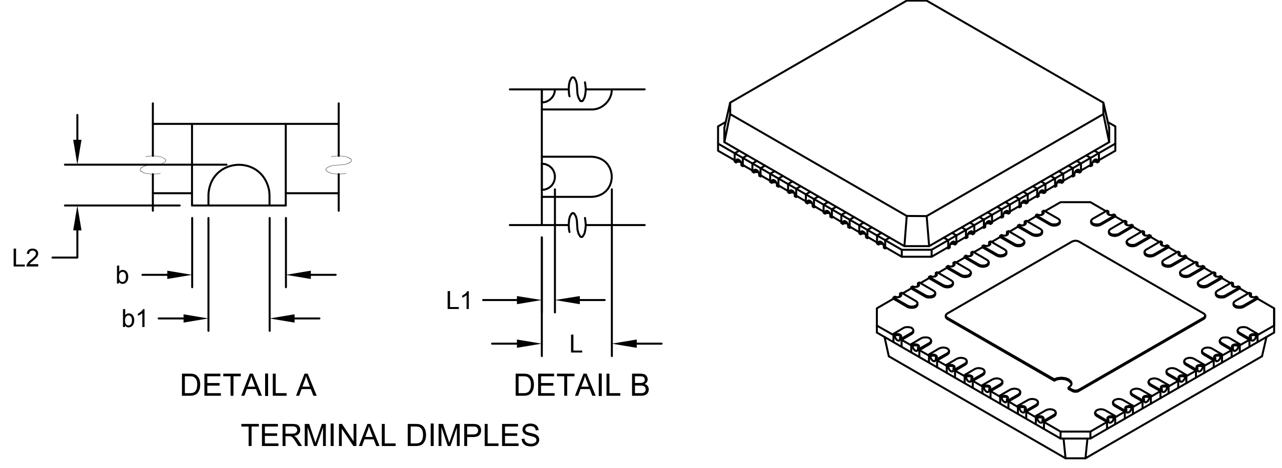
36-Lead Plastic Quad Flat, No Lead Package (4E) - 6x6 mm Body [QFN] With 3.7x3.7 mm Exposed Pad; Punch Singulated, 0.40 mm Dimpled Terminals

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-241A Sheet 1 of 2

36-Lead Plastic Quad Flat, No Lead Package (4E) - 6x6 mm Body [QFN] With 3.7x3.7 mm Exposed Pad; Punch Singulated, 0.40 mm Dimpled Terminals

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminasl	N		36	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Terminal Thickness	(A3)		0.20 REF	
Overall Width	E		6.00 BSC	
Molded Top Width	E1		5.75 BSC	
Exposed Pad Width	E2	3.60	3.70	3.80
Overall Length	D		6.00 BSC	
Molded Top Length	D1		5.75 BSC	
Exposed Pad Length	D2	3.60	3.70	3.80
Corner Chamfer	P	0.24	0.42	0.60
Terminal Width	b	0.20	0.25	0.30
Terminal Dimple Width	b1	0.10	0.15	0.20
Terminal Length	L	0.30	0.40	0.50
Terminal Dimple Length (side)	L1	0.05	0.15	0.25
Terminal Dimple Length (bottom)	L2	0.05	0.10	0.15
Terminal-to-Exposed-Pad	K	0.20	-	-
Mold Draft Angle	θ	0°	-	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-241A Sheet 2 of 2

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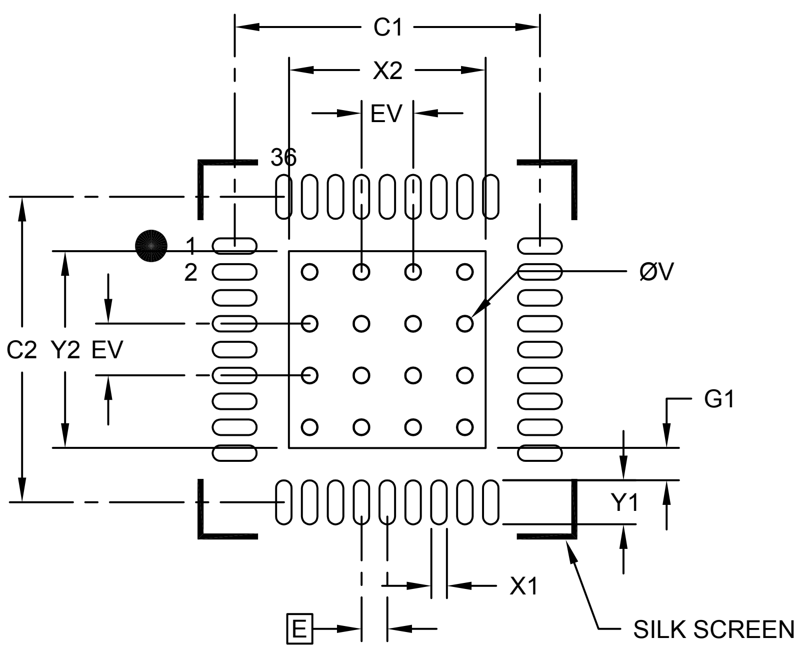
Footprint Outlines and Dimensions

36-Lead Plastic Quad Flat, No Lead Package (4E) - 6x6 mm Body [QFN] With 3.7x3.7 mm Exposed Pad; Punch Singulated, 0.40 mm Dimpled Terminals

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			3.80
Optional Center Pad Length	Y2			3.80
Contact Pad Spacing	C1		5.90	
Contact Pad Spacing	C2		5.90	
Contact Pad Width (X36)	X1			0.30
Contact Pad Length (X36)	Y1			0.85
Contact Pad to Center Pad (X32)	G1	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2241A

40-Lead Plastic Quad Flat, No Lead Package (RR) - 6x6 mm Body [QFN] With 4.1x4.1 mm Exposed Pad; Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-229A Sheet 1 of 2

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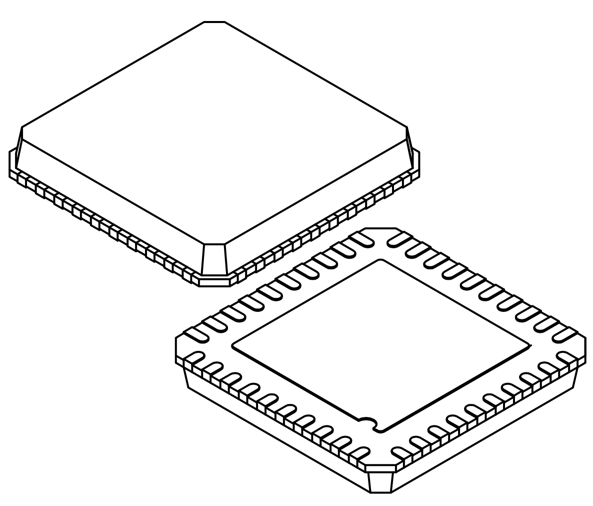
40-Lead Plastic Quad Flat, No Lead Package (RR) - 6x6 mm Body [QFN] With 4.1x4.1 mm Exposed Pad; Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		40	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Terminal Thickness	(A3)		0.20 REF	
Overall Width	E		6.00 BSC	
Molded Top Width	E1		5.75 BSC	
Exposed Pad Width	E2	4.00	4.10	4.20
Overall Length	D		6.00 BSC	
Molded Top Length	D1		5.75 BSC	
Exposed Pad Length	D2	4.00	4.10	4.20
Corner Chamfer	P	0.24	0.42	0.60
Terminal Width	b	0.18	0.23	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-
Mold Draft Angle	θ	0°	-	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-229A Sheet 2 of 2

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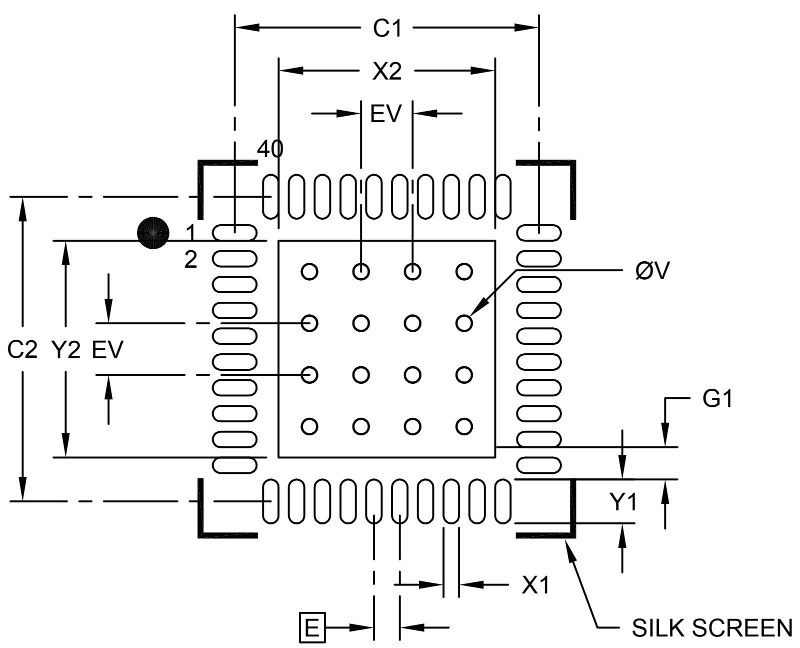
40-Lead Plastic Quad Flat, No Lead Package (RR) - 6x6 mm Body [QFN] With 4.1x4.1mm Exposed Pad; Punch Singulated

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			4.20
Optional Center Pad Length	Y2			4.20
Contact Pad Spacing	C1		5.90	
Contact Pad Spacing	C2		5.90	
Contact Pad Width (X40)	X1			0.30
Contact Pad Length (X40)	Y1			0.85
Contact Pad to Center Pad (X40)	G1	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be "filled" or "tented" to avoid solder loss during reflow process

Microchip Technology Drawing C04-2229B

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40-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6x0.9mm Body [QFN] With 0.40mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D A B E 2 1 N 2X 0.15 C 2X 0.15 C

TOP VIEW

NOTE 1

SEATING PLANE C (A3) A A1 0.10 C 40X 0.08 C

D2 0.10 Ⓜ C A B N 1 2 (DATUM B) e E2 e/2 NOTE 1 K L 40X b 0.10 Ⓜ C A B 0.05 Ⓜ C (DATUM A)

BOTTOM VIEW

Microchip Technology Drawing C04-0118D Sheet 1 of 2

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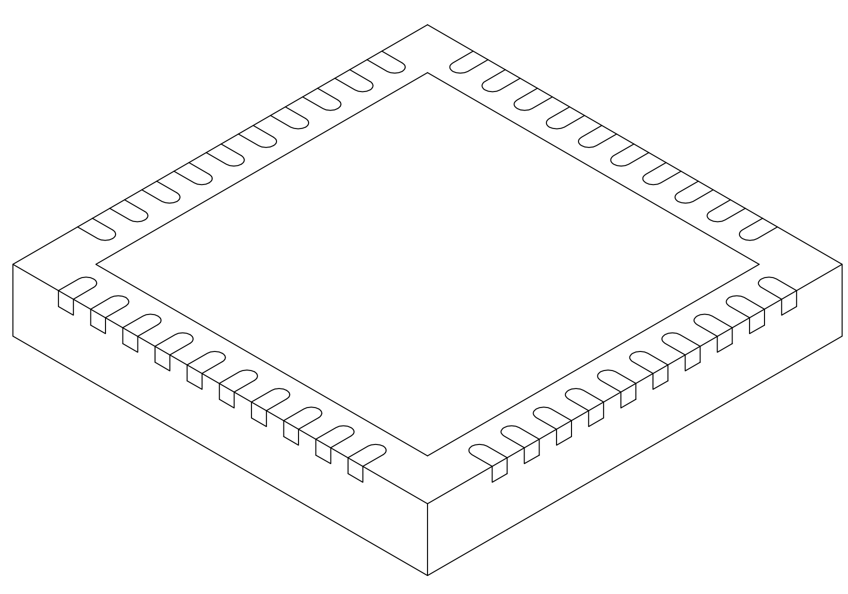
40-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6x0.9mm Body [QFN] With 0.40mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		40	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	4.50	4.65	4.80
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	4.50	4.65	4.80
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-118D Sheet 2 of 2

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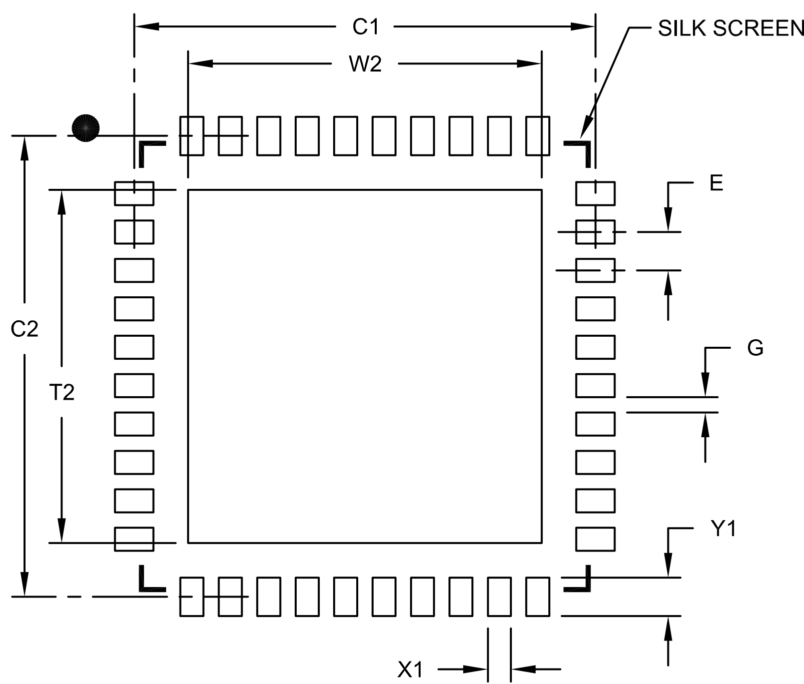
Footprint Outlines and Dimensions

40-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6x0.9mm Body [QFN]
With 0.40mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	W2			4.60
Optional Center Pad Length	T2			4.60
Contact Pad Spacing	C1		6.00	
Contact Pad Spacing	C2		6.00	
Contact Pad Width (X40)	X1			0.30
Contact Pad Length (X40)	Y1			0.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2118A

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40-Lead Plastic Quad Flat, No Lead Package (MP) - 5x5 mm Body [QFN]
With 3.5x3.5 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-047-001A Sheet 1 of 2

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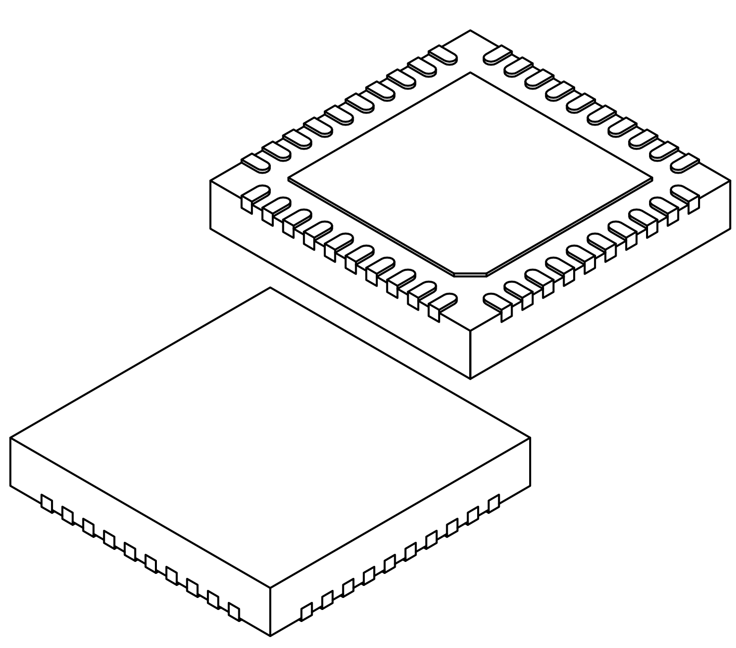
40-Lead Plastic Quad Flat, No Lead Package (MP) - 5x5 mm Body [QFN] With 3.5x3.5 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		40	
Pitch	e		0.40 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2		3.50 BSC	
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2		3.50 BSC	
Terminal Width	b	0.17	0.20	0.25
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-047-001A Sheet 2 of 2

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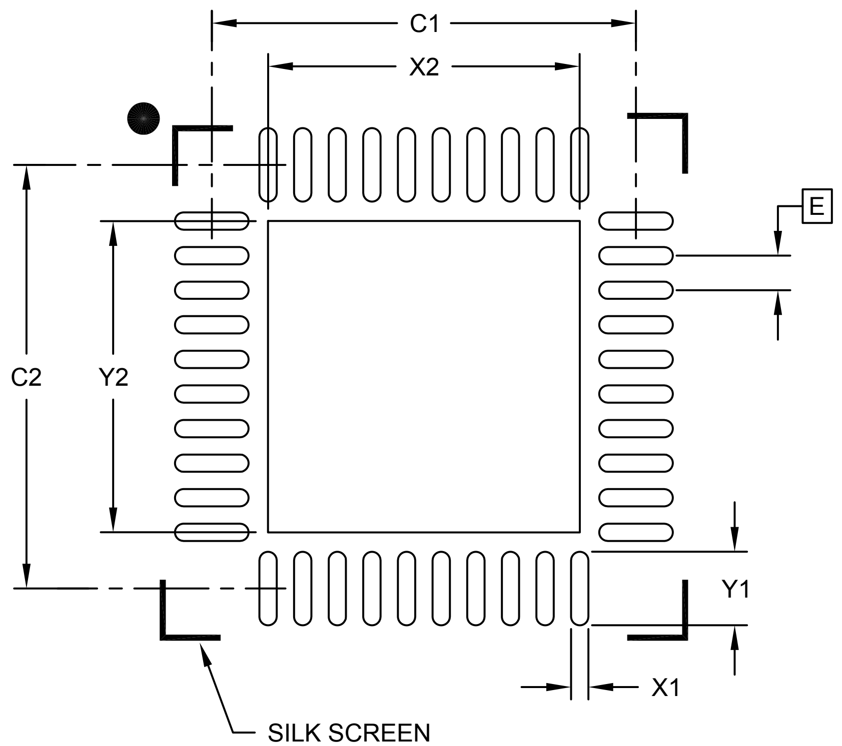
40-Lead Plastic Quad Flat, No Lead Package (MP) - 5x5 mm Body [QFN]
With 3.5x3.5 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Optional Center Pad Width	X2			3.60
Optional Center Pad Length	Y2			3.60
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X40)	X1			0.20
Contact Pad Length (X40)	Y1			0.85

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2047-001A

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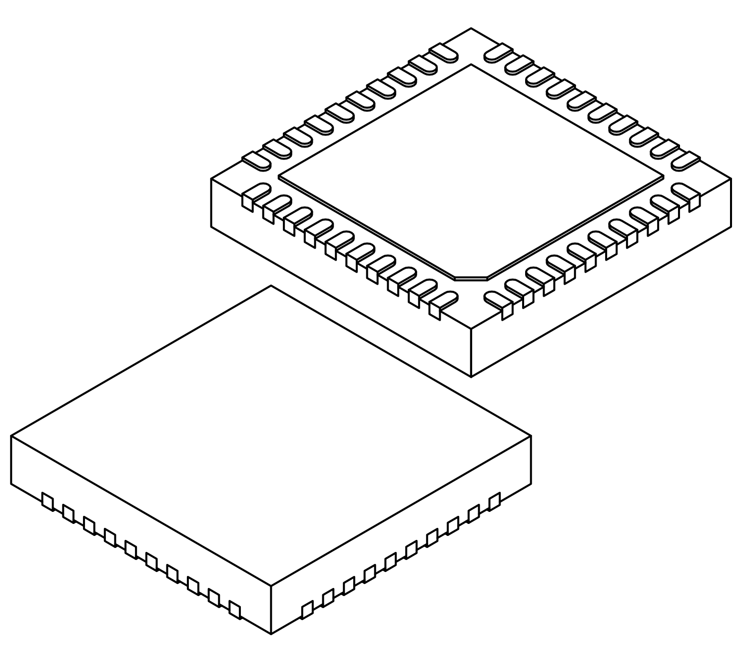
40-Lead Plastic Quad Flat, No Lead Package (MP) - 5x5 mm Body [QFN]
With 3.7x3.7 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-047-002A Sheet 1 of 2

40-Lead Plastic Quad Flat, No Lead Package (MP) - 5x5 mm Body [QFN] With 3.7x3.7 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		40	
Pitch	e		0.40 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2		3.70 BSC	
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2		3.70 BSC	
Terminal Width	b	0.15	0.20	0.25
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-047-002A Sheet 2 of 2

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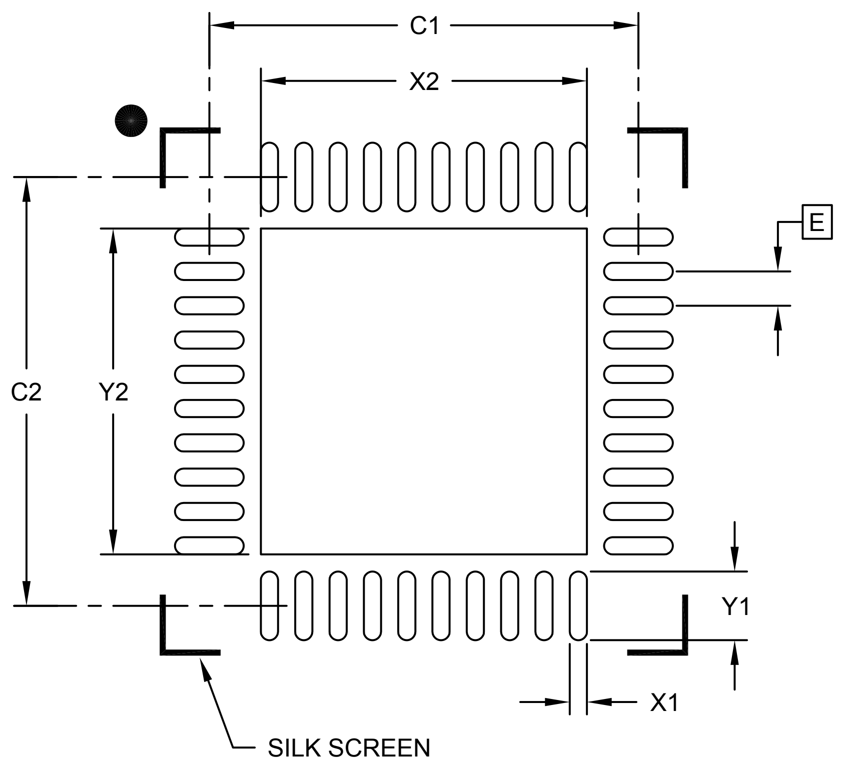
40-Lead Plastic Quad Flat, No Lead Package (MP) - 5x5 mm Body [QFN] With 3.7x3.7 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Optional Center Pad Width	X2			3.80
Optional Center Pad Length	Y2			3.80
Contact Pad Spacing	C1		5.00	
Contact Pad Spacing	C2		5.00	
Contact Pad Width (X40)	X1			0.20
Contact Pad Length (X40)	Y1			0.80

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2047-002A

44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-103D Sheet 1 of 2

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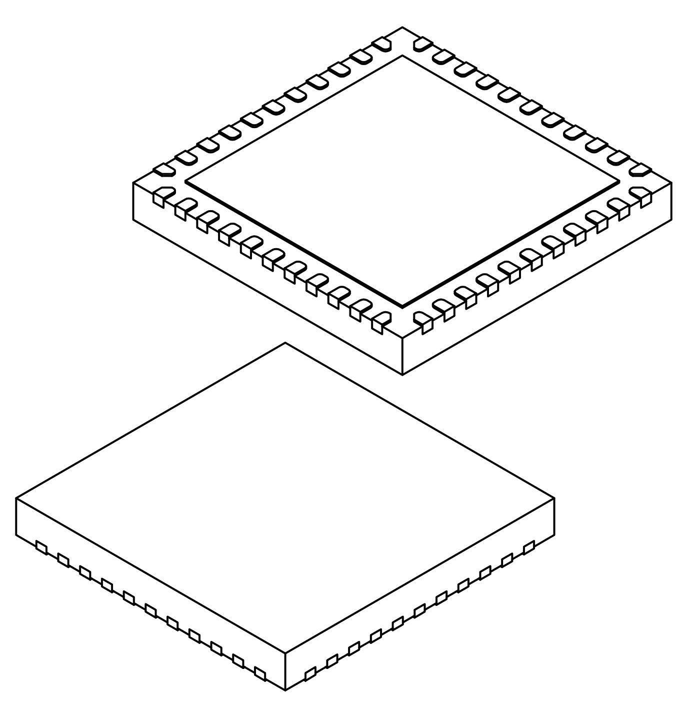
44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN or VQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		44	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		8.00 BSC	
Exposed Pad Width	E2	6.25	6.45	6.60
Overall Length	D		8.00 BSC	
Exposed Pad Length	D2	6.25	6.45	6.60
Terminal Width	b	0.20	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-103D Sheet 2 of 2

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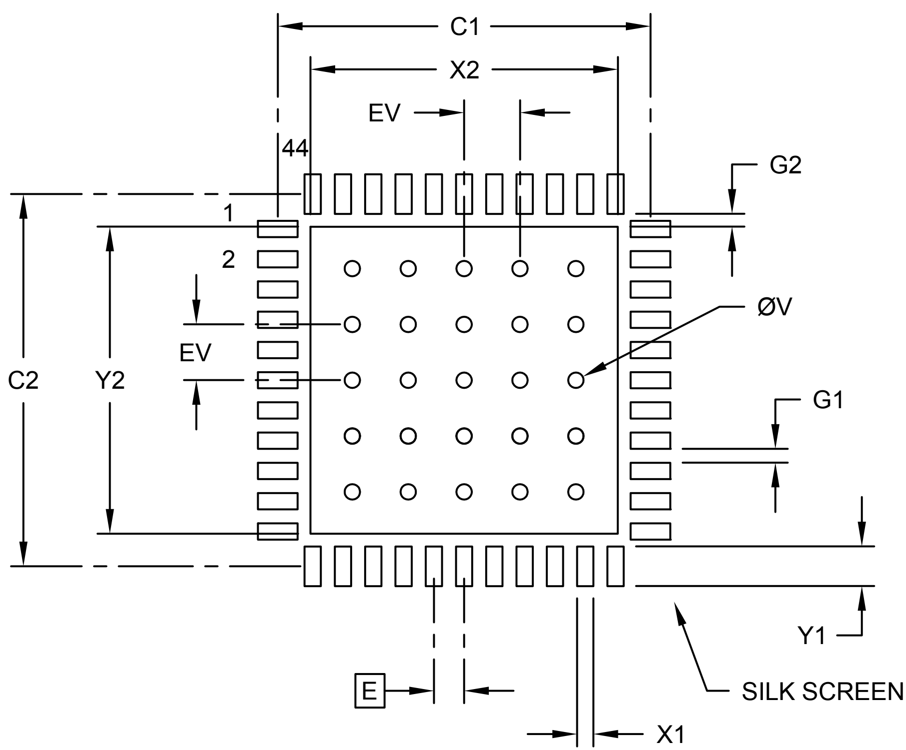
44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	X2			6.60
Optional Center Pad Length	Y2			6.60
Contact Pad Spacing	C1		8.00	
Contact Pad Spacing	C2		8.00	
Contact Pad Width (X44)	X1			0.35
Contact Pad Length (X44)	Y1			0.85
Contact Pad to Contact Pad (X40)	G1	0.30		
Contact Pad to Center Pad (X44)	G2	0.28		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing No. C04-2103C

© 2016 Microchip Technology Inc.

48-Lead Plastic Quad Flat, No Lead Package (5E) - 7x7 mm Body [QFN] With 5.1x5.1 mm Exposed Pad; Punch Singulated, 0.40 mm Dimpled Terminals

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
4X
0.10 C
N
1
2
NOTE 1
E
(DATUM B)
(DATUM A)
E1
2X
0.10 C
2X
0.10 C
D1
TOP VIEW

A
Θ
SEE DETAIL A
C
0.10 C
SEATING PLANE
A2
48X
0.08 C
A1
(A3)
SIDE VIEW

4X P
0.10Ⓜ C A B
D2
4X P
0.10Ⓜ C A B
E2
SEE DETAIL B
NX K
2
1
N
48X L
e/2
e
48X b
0.10Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-363A Sheet 1 of 2

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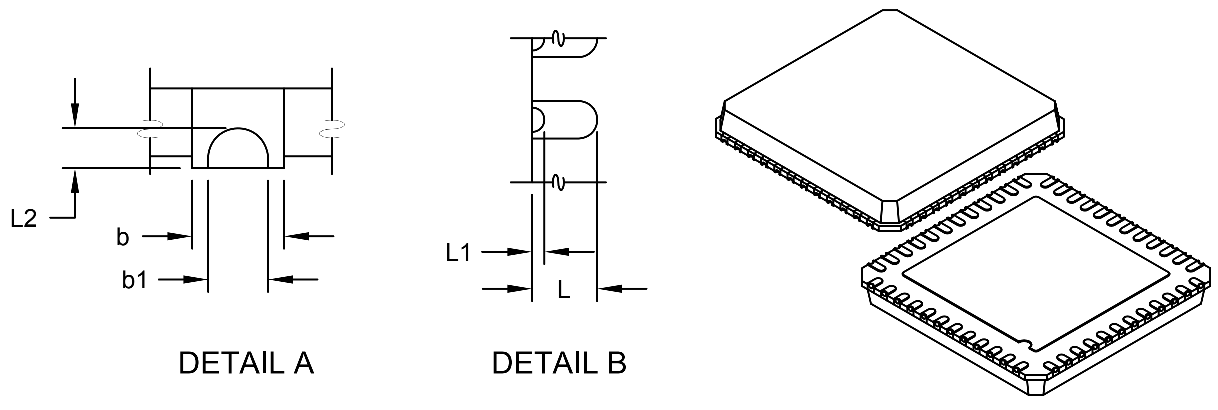
48-Lead Plastic Quad Flat, No Lead Package (5E) - 7x7 mm Body [QFN] With 5.1x5.1 mm Exposed Pad; Punch Singulated, 0.40 mm Dimpled Terminals

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		48	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Terminal Thickness	(A3)		0.20 REF	
Overall Width	E		7.00 BSC	
Molded Top Width	E1		6.75 BSC	
Exposed Pad Width	E2	5.00	5.10	5.20
Overall Length	D		7.00 BSC	
Molded Top Length	D1		6.75 BSC	
Exposed Pad Length	D2	5.00	5.10	5.20
Corner Chamfer	P	0.24	0.42	0.60
Terminal Width	b	0.20	0.25	0.30
Terminal Dimple Width	b1	0.10	0.15	0.20
Terminal Length	L	0.30	0.40	0.50
Terminal Dimple Length (side)	L1	0.05	0.15	0.25
Terminal Dimple Length (bottom)	L2	0.05	0.10	0.15
Terminal-to-Exposed-Pad	K	0.20	-	-
Mold Draft Angle	θ	0°	-	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-363A Sheet 2 of 2

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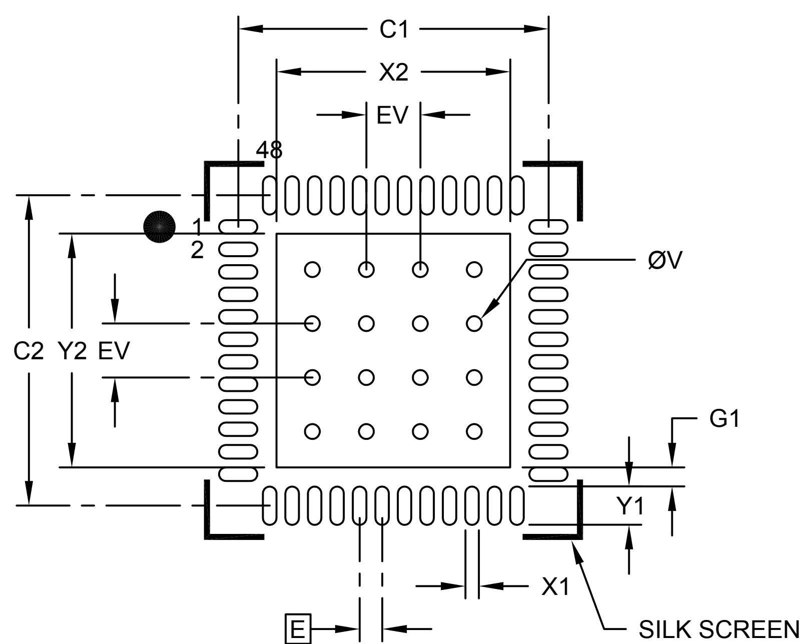
48-Lead Plastic Quad Flat, No Lead Package (5E) - 7x7 mm Body [QFN] With 5.1x5.1 mm Exposed Pad; Punch Singulated, 0.40 mm Dimpled Terminals

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			5.20
Optional Center Pad Length	Y2			5.20
Contact Pad Spacing	C1		6.90	
Contact Pad Spacing	C2		6.90	
Contact Pad Width (X48)	X1			0.30
Contact Pad Length (X48)	Y1			0.85
Contact Pad to Center Pad (X44)	G1	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2363A

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64-Lead Very Thin Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [VQFN]
With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

9.00
A
B
NOTE 1
N
1
2
9.00
(DATUM B)
(DATUM A)
2X
0.25 C
2X
0.25 C
TOP VIEW

C
SEATING PLANE
A
(A3)
0.10 C
A1
64X
0.08 C
SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
NOTE 1
K
2
1
N
L
64X b
e/2
0.10Ⓜ C A B
0.05Ⓜ C
e
BOTTOM VIEW

Microchip Technology Drawing C04-149D [MR] Sheet 1 of 2

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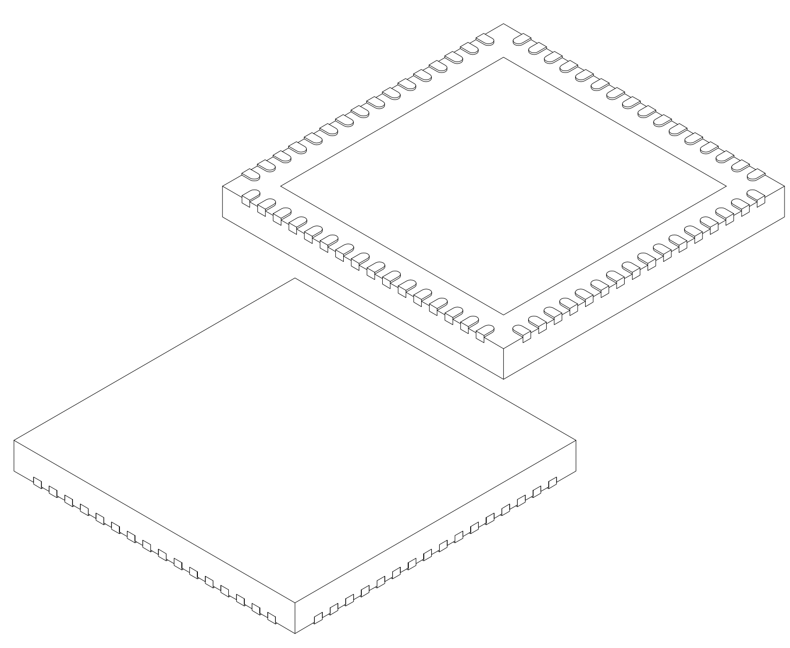
**64-Lead Very Thin Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [VQFN]
With 7.15 x 7.15 Exposed Pad [Also called QFN]**

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		64	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		9.00 BSC	
Exposed Pad Width	E2	7.05	7.15	7.25
Overall Length	D		9.00 BSC	
Exposed Pad Length	D2	7.05	7.15	7.25
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-149D [MR] Sheet 2 of 2

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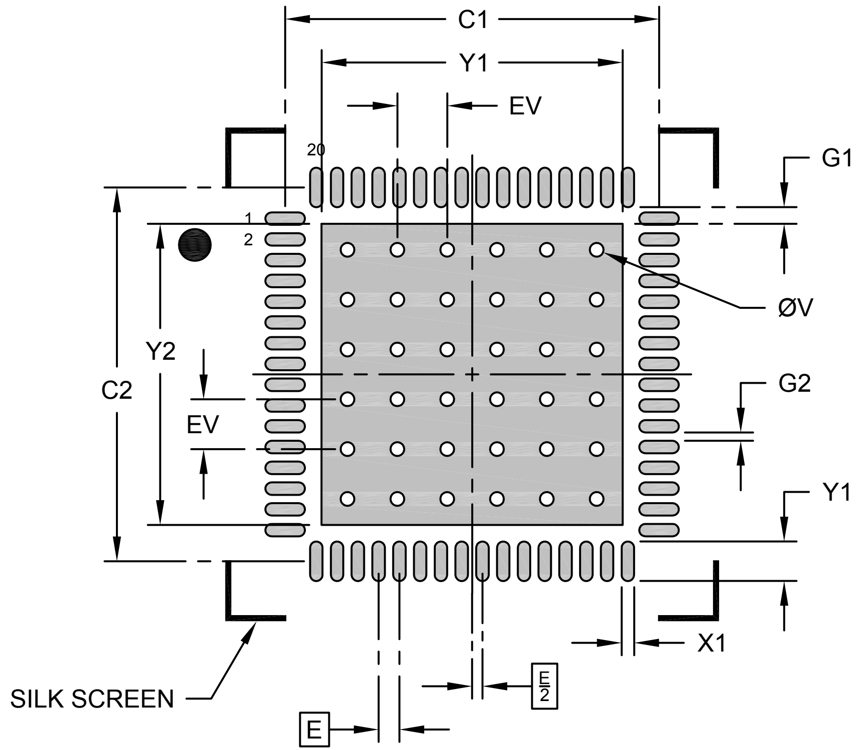
64-Lead Very Thin Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [VQFN]
With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			7.25
Optional Center Pad Length	Y2			7.25
Contact Pad Spacing	C1		9.00	
Contact Pad Spacing	C2		9.00	
Contact Pad Width (X64)	X1			0.30
Contact Pad Length (X64)	Y1			0.95
Contact Pad to Center Pad (X64)	G1	0.40		
Spacing Between Contact Pads (X60)	G2	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2149C [MR]

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64-Lead Very Thin Plastic Quad Flat, No Lead Package (R4X) – 9x9x0.9 mm Body [VQFN] With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

NOTE 1
9.00
A
B
N
1
2
9.00
(DATUM B)
(DATUM A)
2X
0.25 C
2X
0.25 C
TOP VIEW

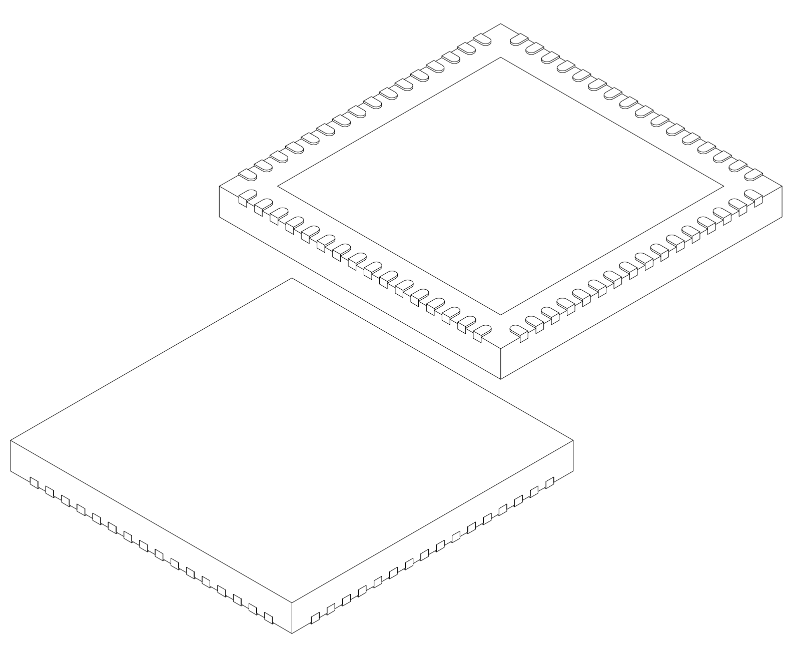
C
SEATING PLANE
A
(A3)
SIDE VIEW
0.10 C
A1
64X
0.08 C

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
NOTE 1
K
2
1
N
L
64X b
e/2
0.10Ⓜ C A B
0.05Ⓜ C
e
BOTTOM VIEW

Microchip Technology Drawing C04-149D [R4X] Sheet 1 of 2

64-Lead Very Thin Plastic Quad Flat, No Lead Package (R4X) – 9x9x0.9 mm Body [VQFN]
With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		64	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		9.00 BSC	
Exposed Pad Width	E2	7.05	7.15	7.25
Overall Length	D		9.00 BSC	
Exposed Pad Length	D2	7.05	7.15	7.25
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-149D [R4X] Sheet 2 of 2

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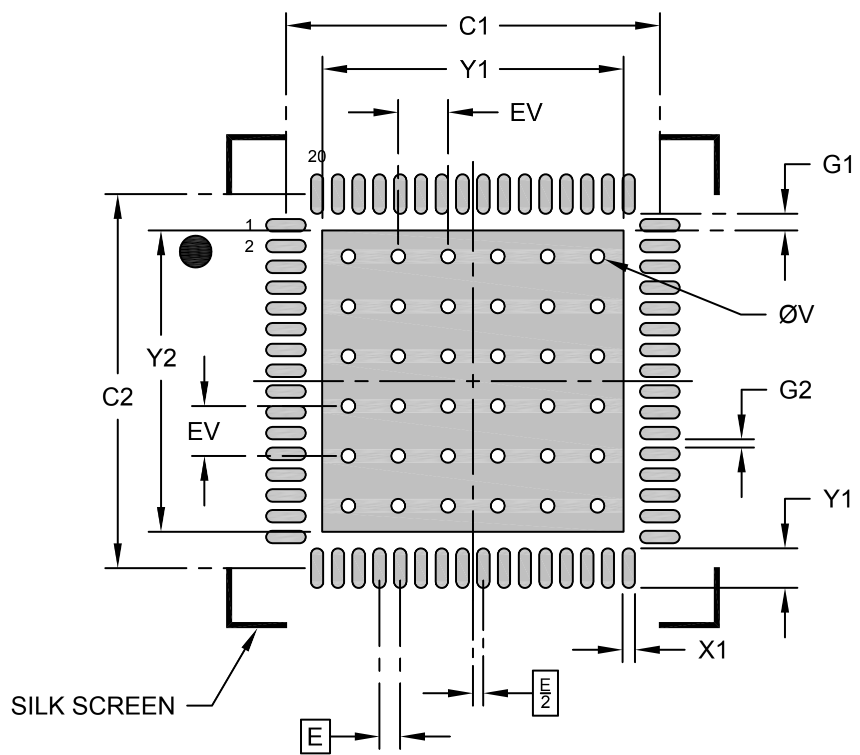
64-Lead Very Thin Plastic Quad Flat, No Lead Package (R4X) – 9x9x0.9 mm Body [VQFN] With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			7.25
Optional Center Pad Length	Y2			7.25
Contact Pad Spacing	C1		9.00	
Contact Pad Spacing	C2		9.00	
Contact Pad Width (X64)	X1			0.30
Contact Pad Length (X64)	Y1			0.95
Contact Pad to Center Pad (X64)	G1	0.40		
Spacing Between Contact Pads (X60)	G2	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2149C [R4X]

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64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body with 5.40 x 5.40 Exposed Pad [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D A B E 2 1 N 0.25 C 0.25 C NOTE 1

TOP VIEW

SEATING PLANE C (A3) A 0.10 C A1 64X 0.08 C

D2 0.10Ⓜ C A B N 1 2 0.10Ⓜ C A B (DATUM B) e E2 e/2 NOTE 1 (DATUM A) K L 64X b 0.10Ⓜ C A B 0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-154A Sheet 1 of 2

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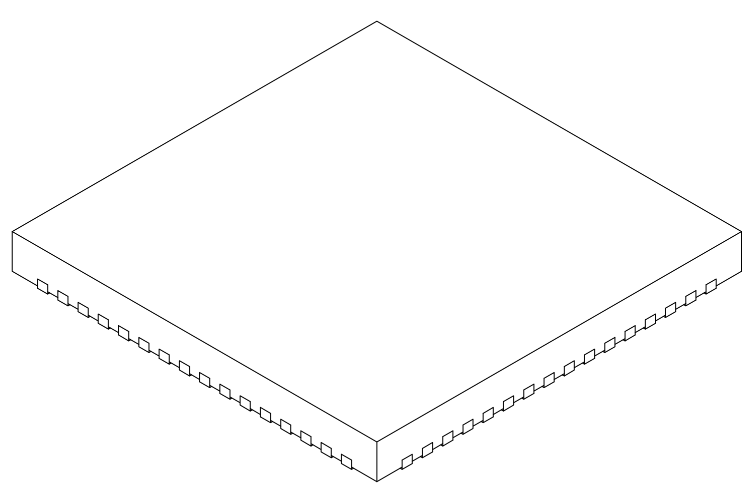
64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body with 5.40 x 5.40 Exposed Pad [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		64	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		9.00 BSC	
Exposed Pad Width	E2	5.30	5.40	5.50
Overall Length	D		9.00 BSC	
Exposed Pad Length	D2	5.30	5.40	5.50
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

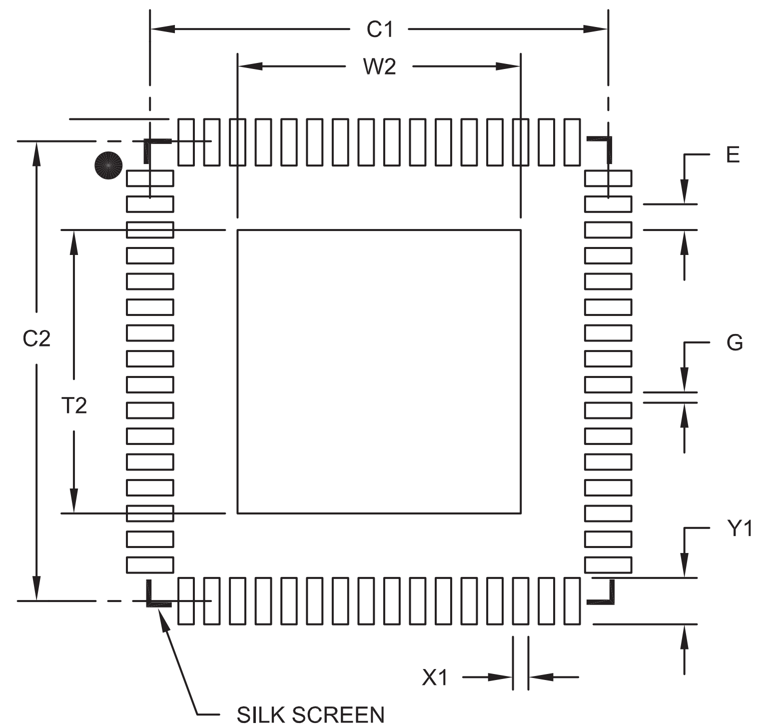
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-154A Sheet 2 of 2

64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN]
With 0.40 mm Contact Length and 5.40x5.40mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			5.50
Optional Center Pad Length	T2			5.50
Contact Pad Spacing	C1		8.90	
Contact Pad Spacing	C2		8.90	
Contact Pad Width (X64)	X1			0.30
Contact Pad Length (X64)	Y1			0.85
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2154A

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64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN]
With 7.70 x 7.70 Exposed Pad [QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
1
2
NOTE 1
E
(DATUM B)
(DATUM A)
2X
0.25 C
2X
0.25 C

TOP VIEW

A
C
SEATING PLANE
A3
0.10 C
A1
64X
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
e/2
NOTE 1
2
1
N
K
L
64X b
e
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-213B Sheet 1 of 2

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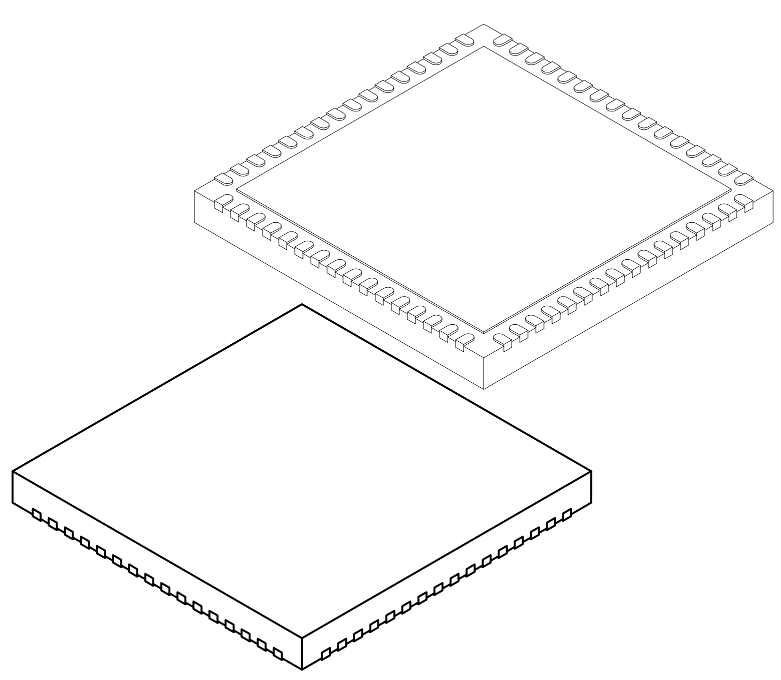
64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN] With 7.70 x 7.70 Exposed Pad [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		64	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		9.00 BSC	
Exposed Pad Width	E2	7.60	7.70	7.80
Overall Length	D		9.00 BSC	
Exposed Pad Length	D2	7.60	7.70	7.80
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-213B Sheet 2 of 2

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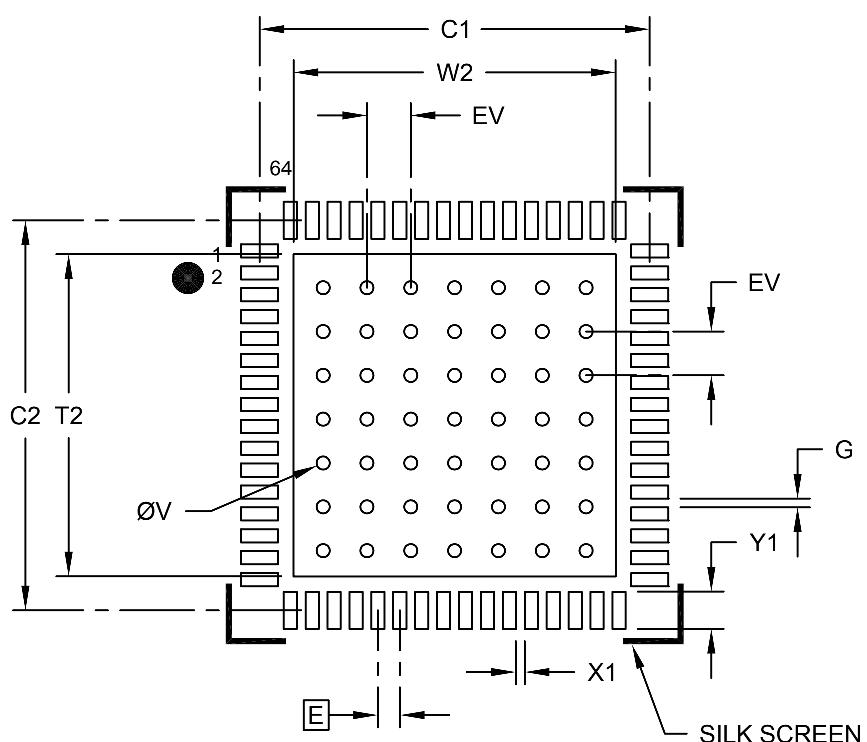
64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN]
With 0.40 mm Contact Length and 7.70x7.70mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	W2			7.50
Optional Center Pad Length	T2			7.50
Contact Pad Spacing	C1		8.90	
Contact Pad Spacing	C2		8.90	
Contact Pad Width (X20)	X1			0.30
Contact Pad Length (X20)	Y1			0.90
Contact Pad to Center Pad (X20)	G	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing No. C04-2213B

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64-Terminal Plastic Quad Flat Pack, No Lead (RG) 9x9x0.9 mm Body [QFN]
Saw Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-260A Sheet 1 of 2

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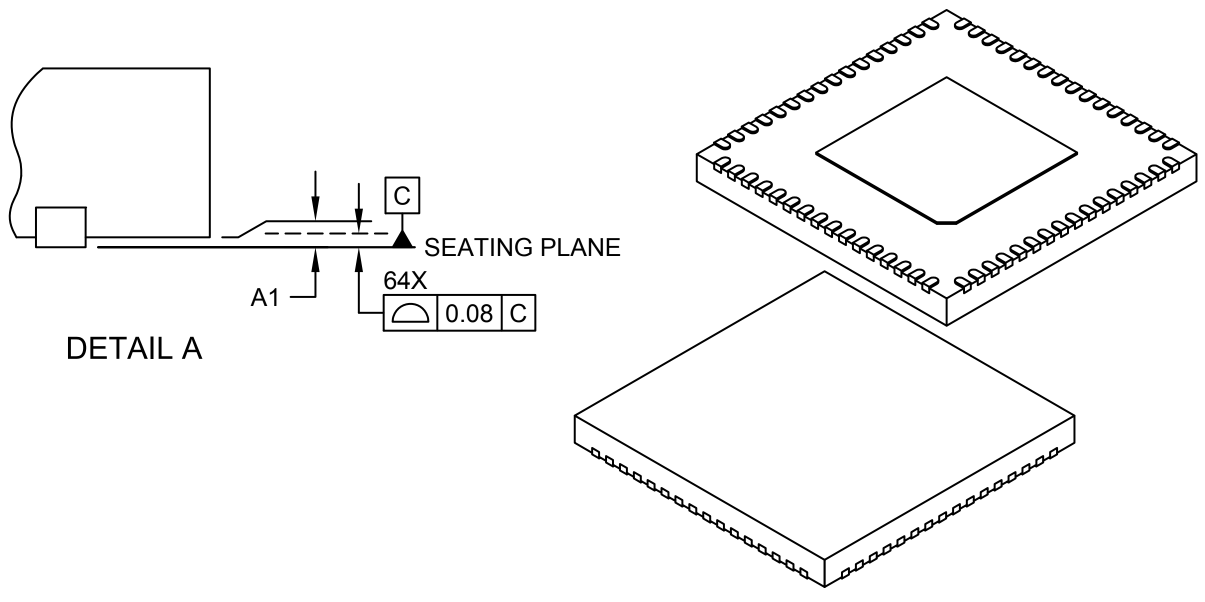
64-Terminal Plastic Quad Flat Pack, No Lead (RG) 9x9x0.9 mm Body [QFN] Saw Singulated

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		64	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Standoff	A3		0.20 REF	
Overall Width	E		9.00 BSC	
Exposed Pad Width	E2	4.60	4.70	4.80
Overall Length	D		9.00 BSC	
Exposed Pad Length	D2	4.60	4.70	4.80
Terminal Width	b	0.15	0.20	0.25
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K		1.755 REF	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

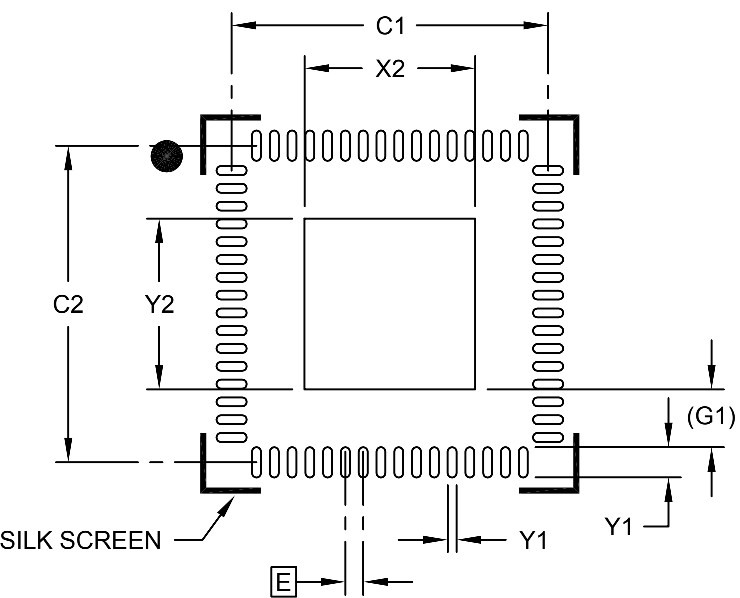
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-260A Sheet 2 of 2

64-Lead Very Thin Plastic Quad Flat, No Lead Package (RG) - 9x9x1.0 mm Body [QFN]
4.7x4.7 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			4.80
Optional Center Pad Length	Y2			4.80
Contact Pad Spacing	C1		8.90	
Contact Pad Spacing	C2		8.90	
Contact Pad Width (X64)	X1			0.25
Contact Pad Length (X64)	Y1			0.85
Contact Pad to Center Pad (X64)	G1		1.625 REF	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2260A

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72-Lead Plastic Quad Flat, No Lead Package (6E) - 10x10 mm Body [VQFN] 6.0x6.0 mm Exposed Pad; Punch Singulated, Dimpled Terminals (Also called QFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-243B Sheet 1 of 2

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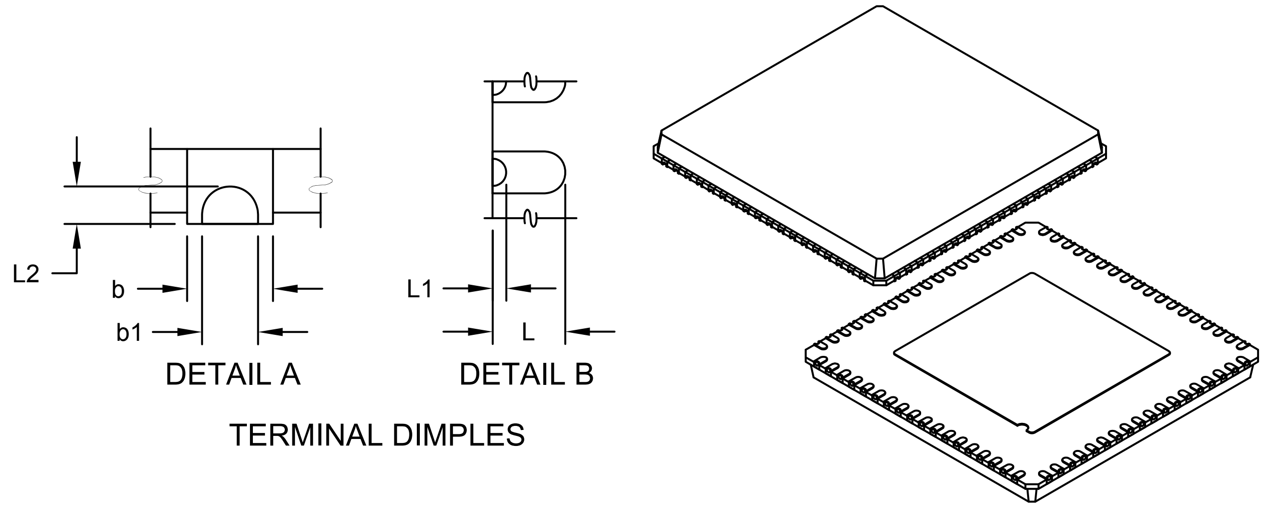
72-Lead Plastic Quad Flat, No Lead Package (6E) - 10x10 mm Body [VQFN] 6.0x6.0 mm Exposed Pad; Punch Singulated, Dimpled Terminals (Also called QFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		72	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Terminal Thickness	A3		0.20 REF	
Overall Width	E		10.00 BSC	
Molded Top Width	E1		9.75 BSC	
Exposed Pad Width	E2	5.90	6.00	6.10
Overall Length	D		10.00 BSC	
Molded Top Length	D1		9.75 BSC	
Exposed Pad Length	D2	5.90	6.00	6.10
Corner Chamfer	P	0.24	0.42	0.60
Terminal Width	b	0.18	0.23	0.30
Terminal Dimple Width	b1	0.10	0.15	0.20
Terminal Length	L	0.30	0.40	0.50
Terminal Dimple Length (side)	L1	0.05	0.15	0.25
Terminal Dimple Length (bottom)	L2	0.05	0.10	0.15
Terminal-to-Exposed-Pad	K	0.20	-	-
Mold Draft Angle	θ	0°	-	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is puch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-243B Sheet 2 of 2

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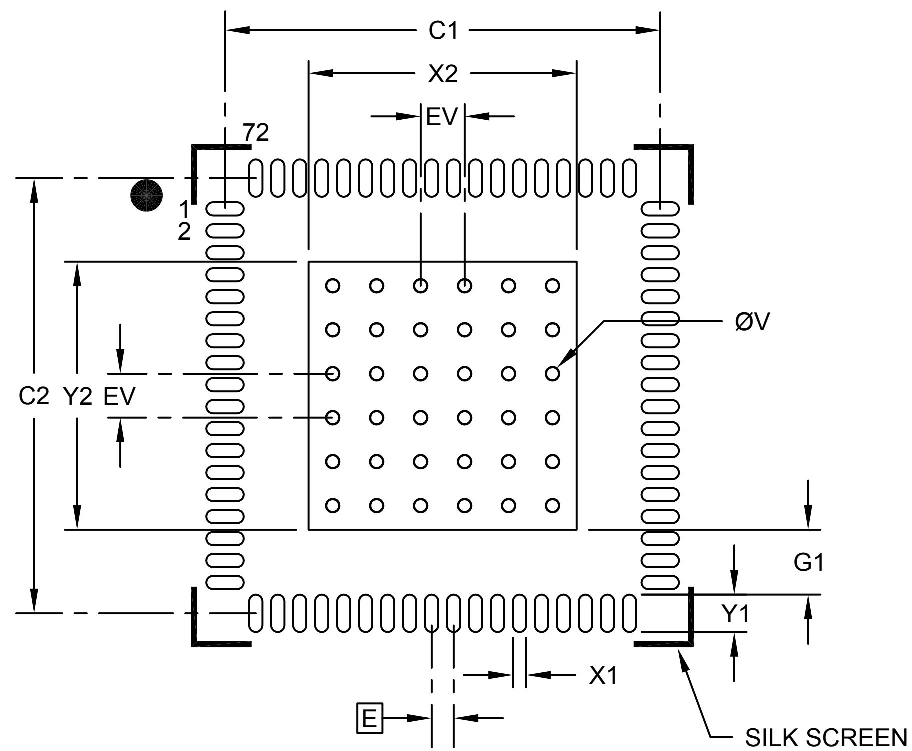
72-Lead Plastic Quad Flat, No Lead Package (6E) - 10x10 mm Body [VQFN] 6.0x6.0 mm Exposed Pad; Punch Singulated, Dimpled Terminals (Also called QFN)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			6.10
Optional Center Pad Length	Y2			6.10
Contact Pad Spacing	C1		9.90	
Contact Pad Spacing	C2		9.90	
Contact Pad Width (X72)	X1			0.30
Contact Pad Length (X72)	Y1			0.85
Contact Pad to Center Pad (X72)	G1	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be "filled" or "tented" to avoid solder loss during reflow process

Microchip Technology Drawing C04-2243B

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NOTES:

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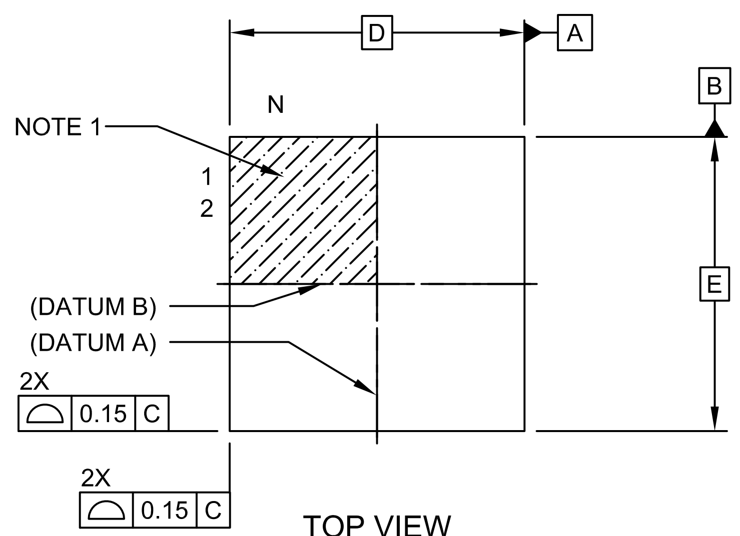
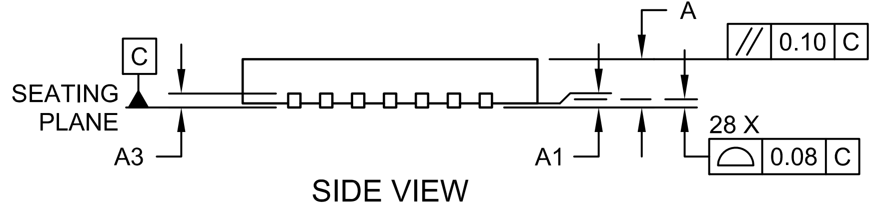
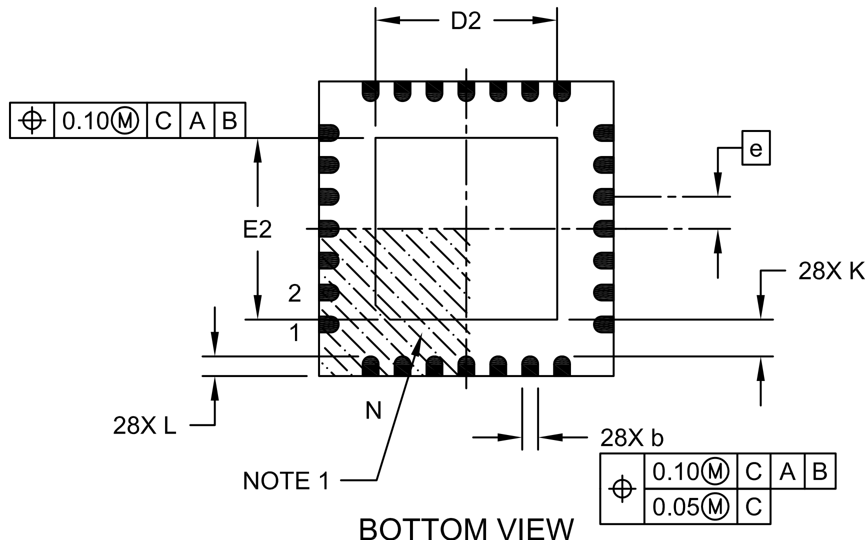
QFN-S

28-Lead Plastic Quad Flat, No Lead Package (MM) - 6x6x0.9mm Body [QFN-S] With 0.40 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-124C Sheet 1 of 2

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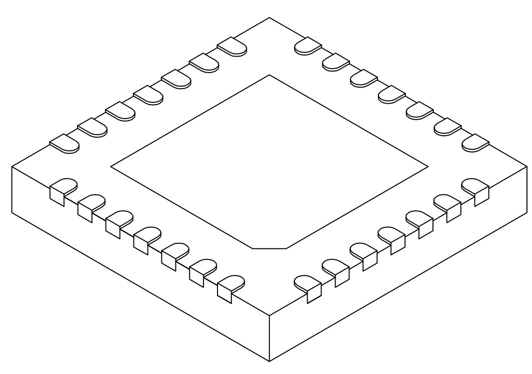
28-Lead Plastic Quad Flat, No Lead Package (MM) - 6x6x0.9mm Body [QFN-S] With 0.40 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	3.65	3.70	4.70
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	3.65	3.70	4.70
Terminal Width	b	0.23	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

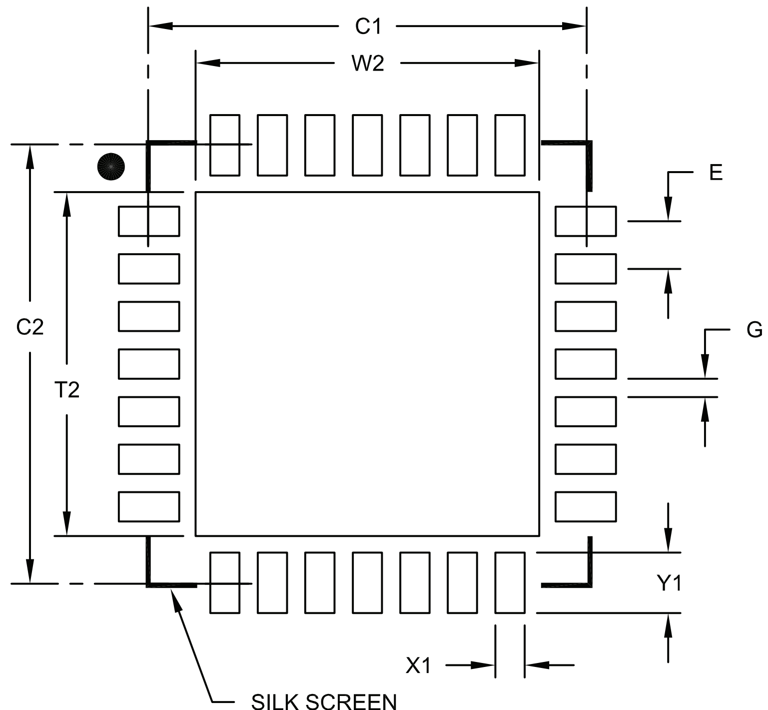
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-124C Sheet 2 of 2

28-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN-S] with 0.40 mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	W2			4.70
Optional Center Pad Length	T2			4.70
Contact Pad Spacing	C1		6.00	
Contact Pad Spacing	C2		6.00	
Contact Pad Width (X28)	X1			0.40
Contact Pad Length (X28)	Y1			0.85
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2124A

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MQFN

20-Lead More Thin Plastic Quad Flat, No Lead Package (NU) - 5x5x1.0 mm Body [MQFN] - (Also called VQFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-186A Sheet 1 of 2

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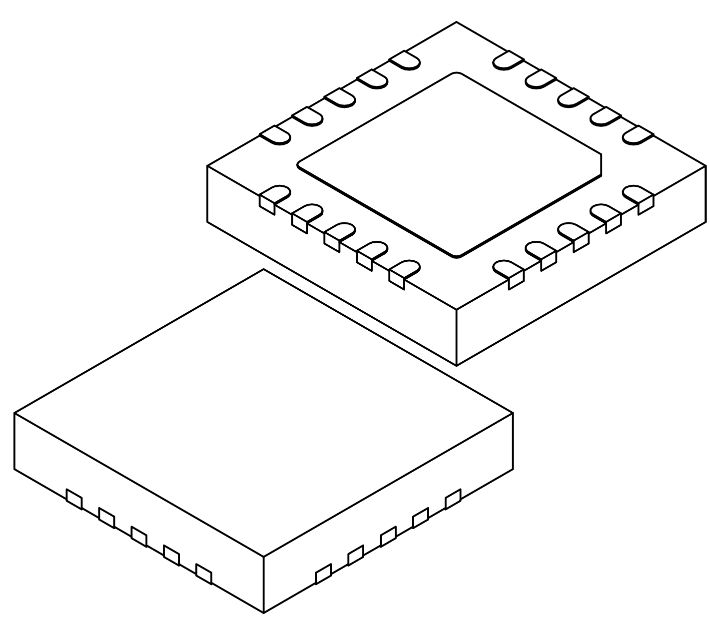
20-Lead More Thin Plastic Quad Flat, No Lead Package (NU) - 5x5x1.0 mm Body [MQFN] - (Also called VQFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		20	
Pitch	e		0.65 BSC	
Overall Height	A	0.90	0.95	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.15	3.25	3.35
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.15	3.25	3.35
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

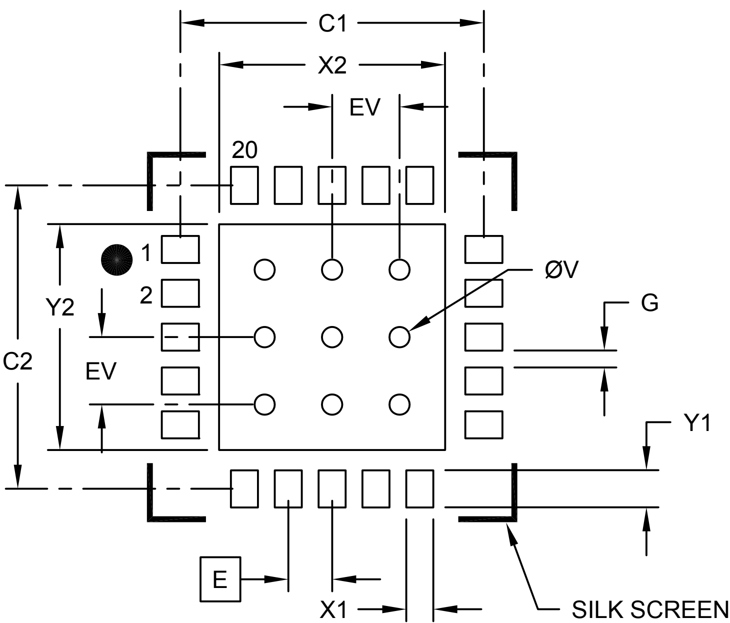
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-186A Sheet 2 of 2

20-Lead More Thin Plastic Quad Flat, No Lead Package (NU) - 5x5x1.0 mm Body [MQFN] - (Also called VQFN)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	W2			3.35
Optional Center Pad Length	T2			3.35
Contact Pad Spacing	C1		4.50	
Contact Pad Spacing	C2		4.50	
Contact Pad Width (X20)	X1			0.40
Contact Pad Length (X20)	Y1			0.55
Distance Between Pads	G	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-286B

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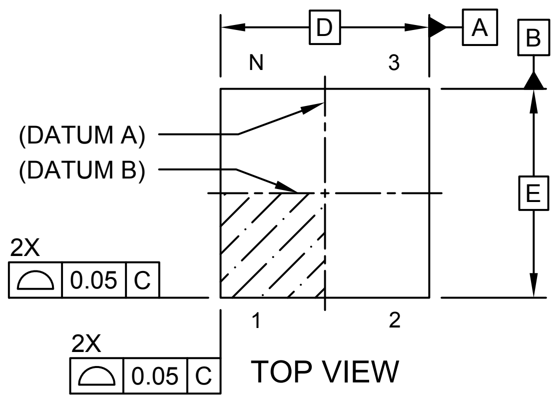
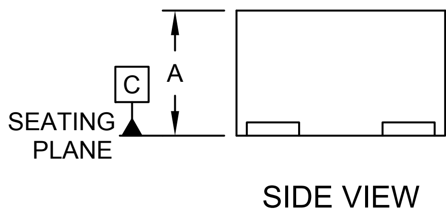
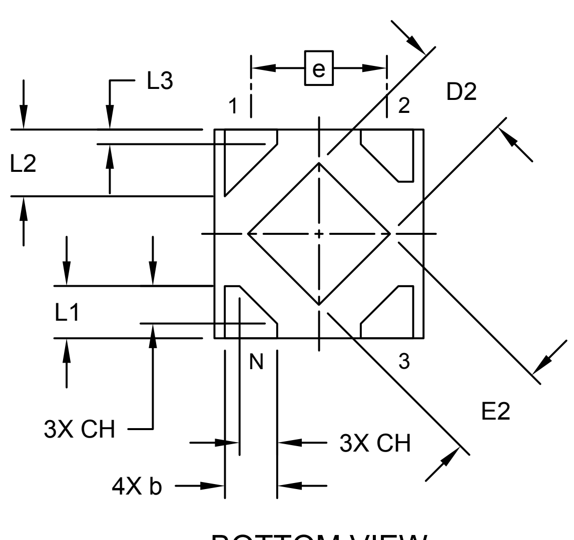
UQFN

4-Lead Plastic Ultra Thin Quad Flatpack No-Leads (5X) - 1x1x0.6mm [UQFN] (Formerly USPQ-4B04)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-393B Sheet 1 of 2

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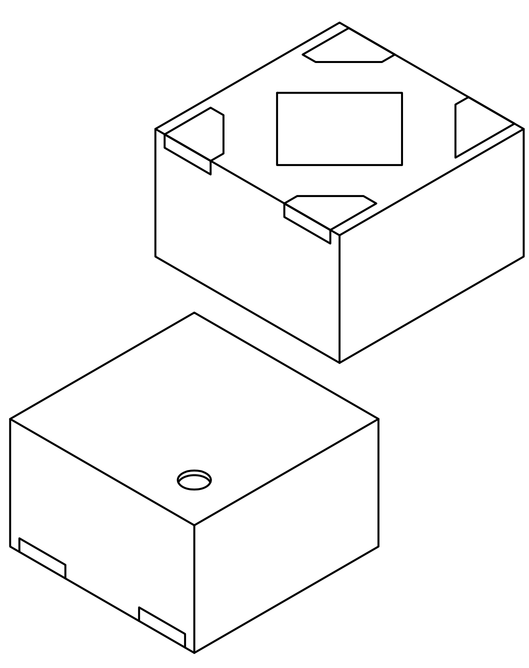
4-Lead Plastic Ultra Thin Quad Flatpack No-Leads (5X) - 1x1x0.6mm [UQFN] (Formerly USPQ-4B04)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		4	
Pitch	e		0.65 BSC	
Overall Height	A	-	-	0.60
Overall Width	E		1.00 BSC	
Exposed Pad Width	E2	0.43	0.48	0.53
Overall Length	D		1.00 BSC	
Exposed Pad Length	D2	0.43	0.48	0.53
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L1	0.20	0.25	0.30
Terminal Length	L2	0.27	0.32	0.37
-	L3	0.02	0.07	0.12
Terminal Chamfer	CH	-	0.18	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-393B Sheet 2 of 2

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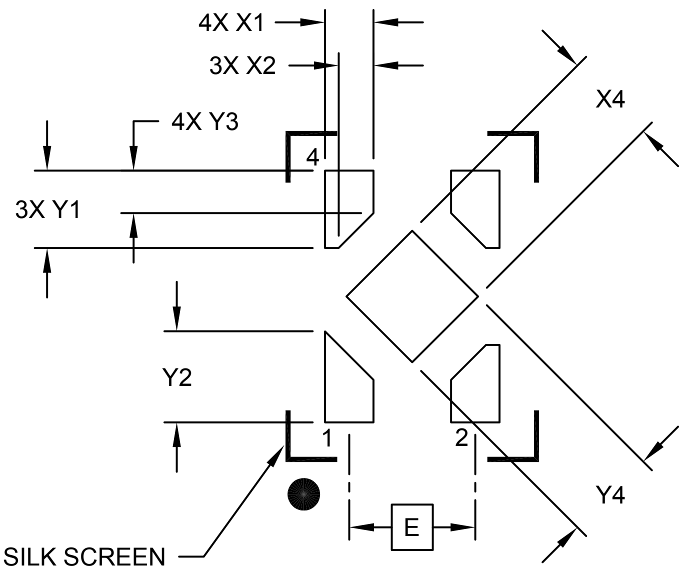
4-Lead Plastic Ultra Thin Quad Flatpack No-Leads (5X) - 1x1x0.6mm [UQFN] (Formerly USPQ-4B04)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units	MILLIMETERS		
Dimension Limits	MIN	NOM	MAX
E	0.65 BSC		
X1		0.25	
X2		0.18	
X4		0.48	
Y1		0.40	
Y2		0.47	
Y3		0.22	
Y4		0.48	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2393B

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10-Lead Ultra Thin Plastic Quad Flat, No Lead Package (2V) - 1.3x1.8x0.6 mm Body [UQFN] Chip-On-Lead

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

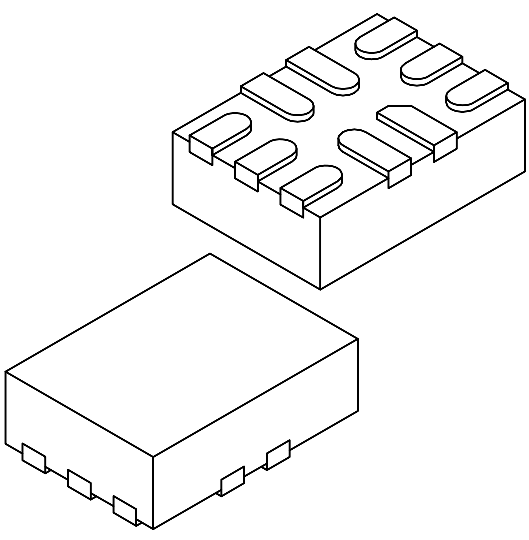
SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-386A Sheet 1 of 2

10-Lead Ultra Thin Plastic Quad Flat, No Lead Package (2V) - 1.3x1.8x0.6 mm Body [UQFN] Chip-On-Lead

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		10	
Pitch	e		0.40 BSC	
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.127 REF	
Overall Length	D		1.30 BSC	
Overall Width	E		1.80 BSC	
Terminal Width	b	0.15	0.20	0.25
Terminal Length	L	0.35	0.40	0.45
Terminal Length	L1	0.45	0.50	0.55

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-386A Sheet 2 of 2

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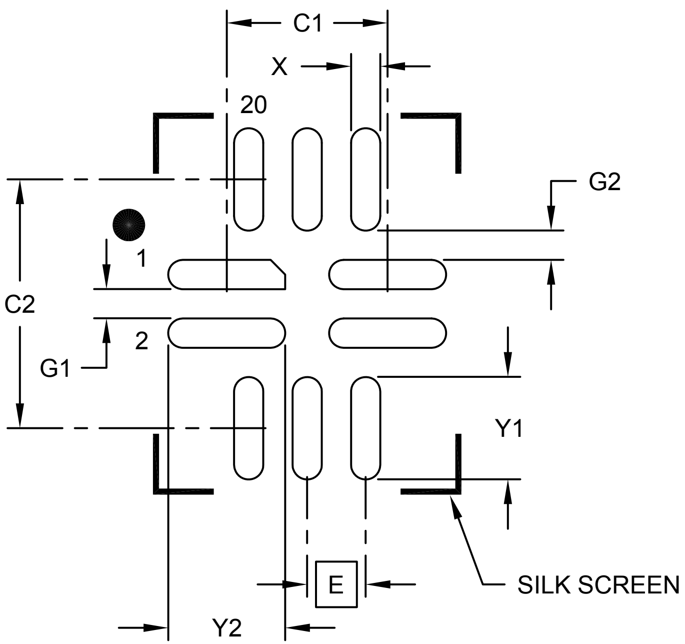
10-Lead Ultra Thin Plastic Quad Flat, No Lead Package (2V) - 1.3x1.8x0.6 mm Body [UQFN] Chip-On-Lead

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Contact Pad Spacing	C1		1.10	
Contact Pad Spacing	C2		1.70	
Contact Pad Width (X10)	X			0.20
Contact Pad Length (X6)	Y1			0.70
Contact Pad Length (X4)	Y2			0.80
Contact Pad to Pad (X6)	G1	0.20		
Contact Pad to Pad (X4)	G2	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2386A

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10-Lead Ultra Thin Plastic Quad Flat, No Lead Package (3V) - 1.6x2.1 mm Body [UQFN] Chip-On-Lead

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-379A Sheet 1 of 2

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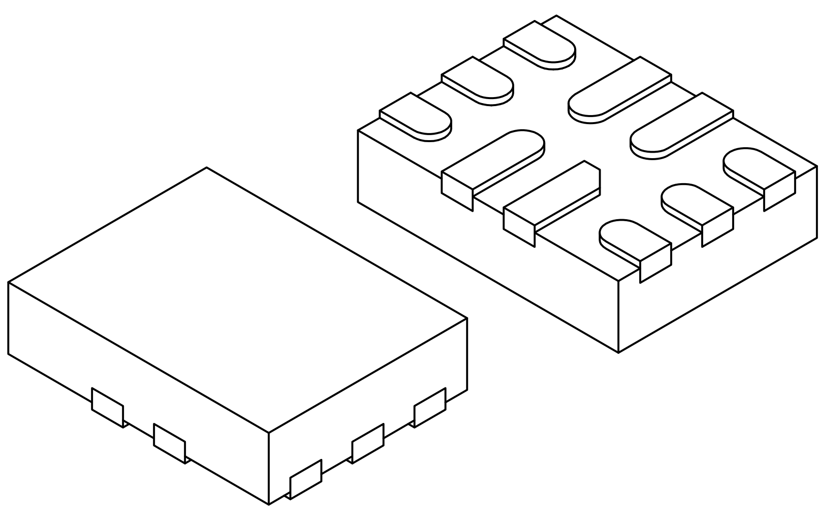
10-Lead Ultra Thin Plastic Quad Flat, No Lead Package (3V) - 1.6x2.1 mm Body [UQFN] Chip-On-Lead

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		10	
Pitch	e		0.50 BSC	
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.127 REF	
Overall Width	E		2.10 BSC	
Overall Length	D		1.60 BSC	
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L1	0.35	0.40	0.45
Terminal Length	L2	0.60	0.65	0.70
Terminal Clearance	K1	0.20	-	-
Terminal Clearance	K2	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-379A Sheet 2 of 2

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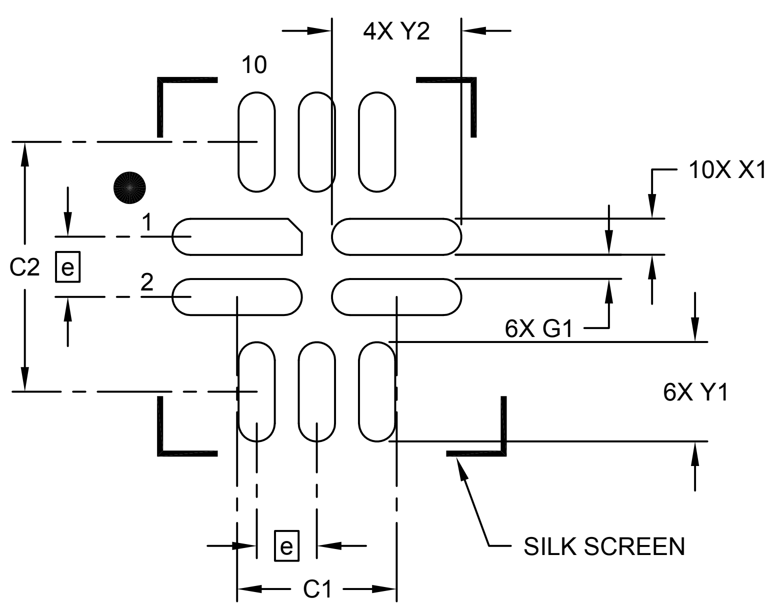
10-Lead Ultra Thin Plastic Quad Flat, No Lead Package (3V) - 1.6x2.1 mm Body [UQFN] Chip-On-Lead

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		1.325	
Contact Pad Spacing	C2		2.075	
Contact Pad Width (X10)	X1			0.30
Contact Pad Length (X6)	Y1			0.825
Contact Pad Length (X4)	Y2			1.075
Contact Pad to Center Pad (X6)	G1	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2379A

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Package Outlines and Dimensions

16-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) - 2.5x2.5x0.6mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.15 C
2X
0.15 C
TOP VIEW

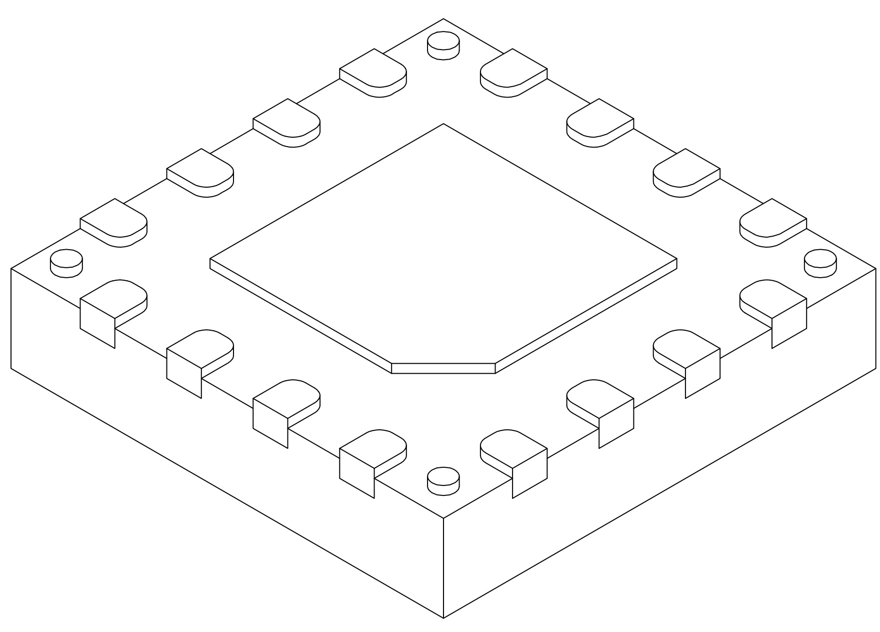
0.10 C
C
SEATING PLANE
A
(A3)
A1
0.075 C
SIDE VIEW

0.16
4x Ø0.13
D2
0.10Ⓜ C A B
0.16
0.10Ⓜ C A B
e
E2
2
e/2
1
K
NOTE 1
L
N
16X b
0.10Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-216A Sheet 1 of 2

16-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) - 2.5x2.5x0.6mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		16	
Pitch	e		0.50 BSC	
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.15 REF	
Overall Width	E		2.50 BSC	
Exposed Pad Width	E2	1.30	1.35	1.40
Overall Length	D		2.50 BSC	
Exposed Pad Length	D2	1.30	1.35	1.40
Terminal Width	b	0.15	0.20	0.25
Terminal Length	L	0.175	0.225	0.275
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-216A Sheet 2 of 2

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Package Outlines and Dimensions

16-Lead Ultra Thin Quad Flat Pack, No Lead (MV) - 3x3x0.50 mm Body (UQFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-211A Sheet 1 of 2

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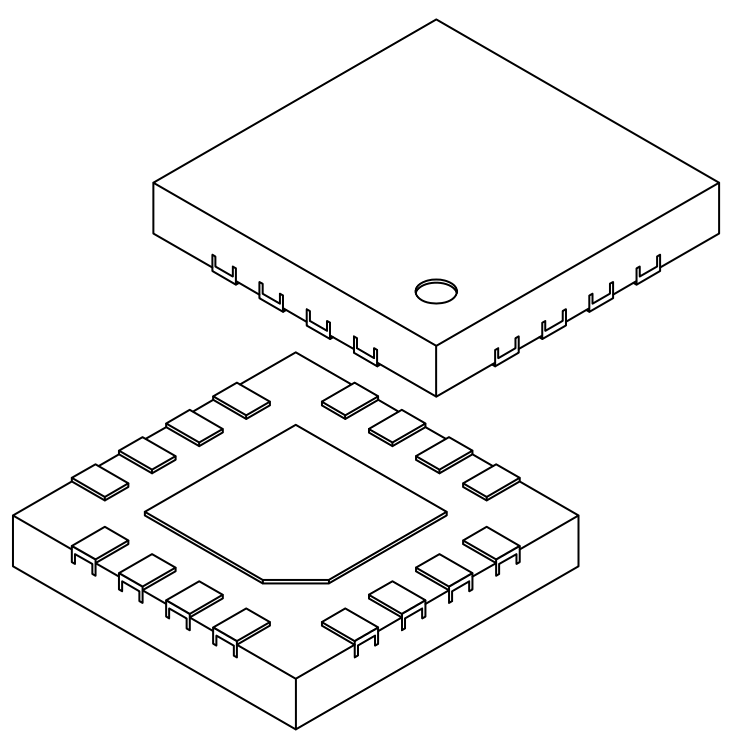
16-Lead Ultra Thin Quad Flat Pack, No Lead (MV) - 3x3x0.50 mm Body (UQFN)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		0.50 BSC	
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.15 REF	
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.50	1.60	1.70
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.50	1.60	1.70
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.25	0.35	0.45
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-211A Sheet 2 of 2

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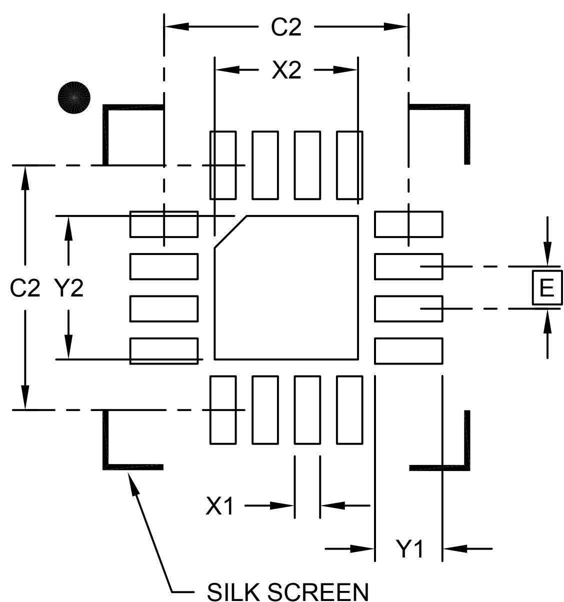
16-Lead Ultra Thin Quad Flat Pack, No Lead (MV) - 3x3x0.50 mm Body (UQFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			1.70
Optional Center Pad Length	Y2			1.70
Contact Pad Spacing	C1		2.90	
Contact Pad Spacing	C2		2.90	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.80

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2211A

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16-Lead Ultra Thin Quad Flat, No Lead Package (UC) - 3x3x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.15 C
2X
0.15 C
TOP VIEW

C
SEATING PLANE
A
(A3)
0.10 C
A1
16X
0.075 C
SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
K
E2
e/2
2
1
NOTE 1
N
16X b
L
e
0.10Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-253A Sheet 1 of 2

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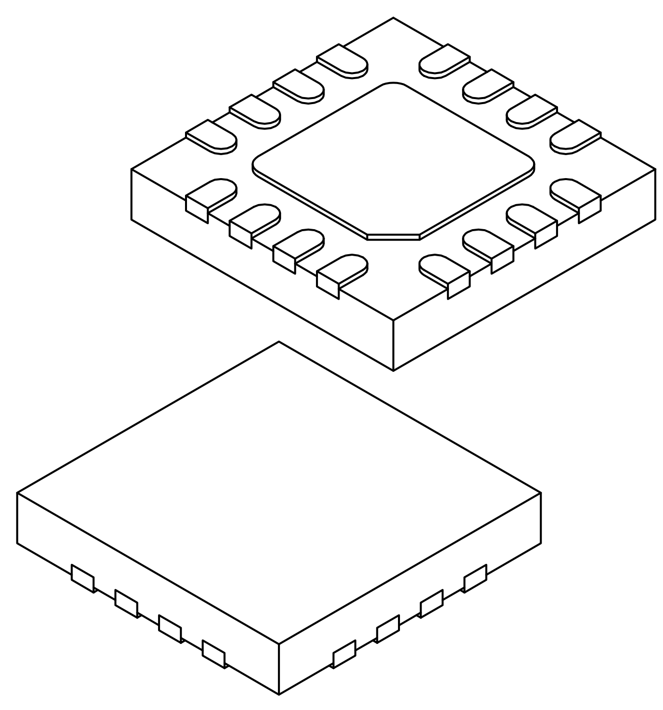
16-Lead Ultra Thin Quad Flat, No Lead Package (UC) - 3x3x0.55 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		16	
Pitch	e		0.50 BSC	
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.15 REF	
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.65	1.70	1.75
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.65	1.70	1.75
Terminal Width (X16)	b	0.20	0.25	0.30
Terminal Length (X16)	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

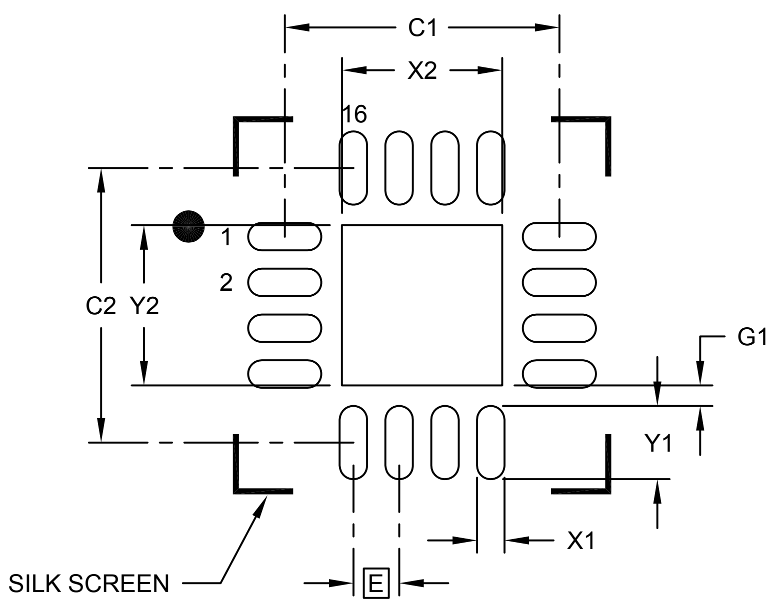
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-253A Sheet 2 of 2

16-Lead Ultra Thin Quad Flat, No Lead Package (UC) - 3x3x0.55 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			1.75
Optional Center Pad Length	Y2			1.75
Contact Pad Spacing	C1		3.00	
Contact Pad Spacing	C2		3.00	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.80
Contact Pad to Center Pad (X16)	G1	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2253A

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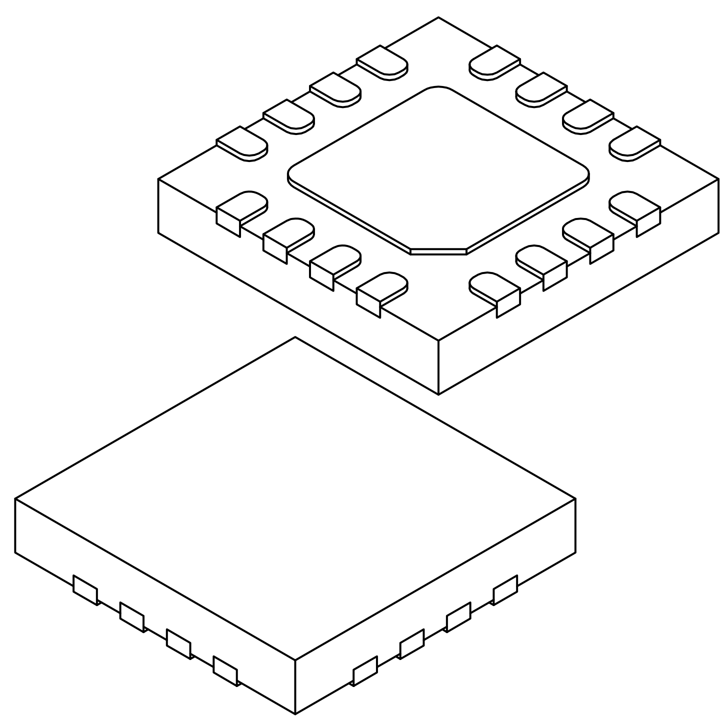
16-Lead Ultra Thin Quad Flat, No Lead Package (UD) - 3x3x0.55 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-217A Sheet 1 of 2

16-Lead Ultra Thin Quad Flat, No Lead Package (UD) - 3x3x0.55 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		16	
Pitch	e		0.50 BSC	
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.15 REF	
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.65	1.70	1.75
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.65	1.70	1.75
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.35	0.40
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-217A Sheet 2 of 2

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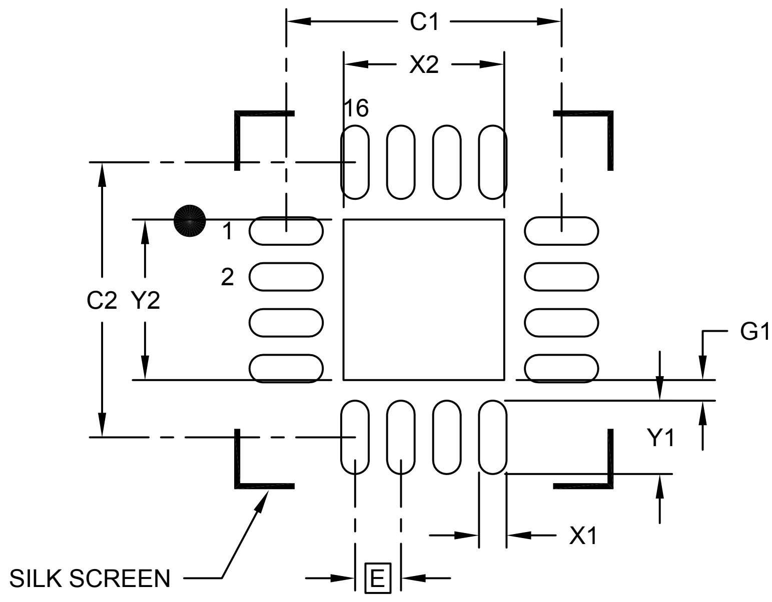
Footprint Outlines and Dimensions

16-Lead Ultra Thin Quad Flat, No Lead Package (UD) - 3x3x0.55 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			1.75
Optional Center Pad Length	Y2			1.75
Contact Pad Spacing	C1		3.00	
Contact Pad Spacing	C2		3.00	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.80
Contact Pad to Center Pad (X16)	G1	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2217A

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16-Lead Ultra Thin Plastic Quad Flat, No Lead Package (JQ) - 4x4x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-257A Sheet 1 of 2

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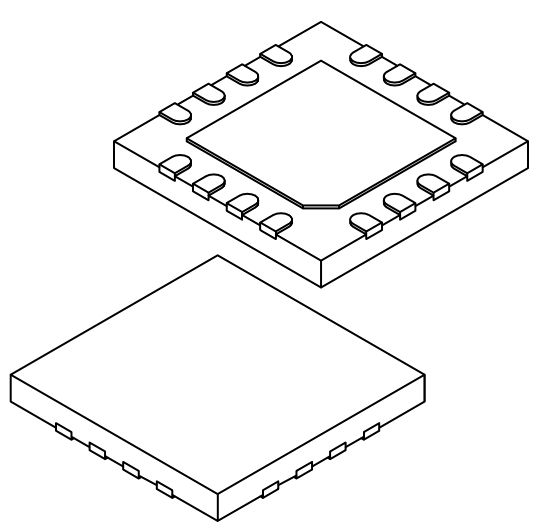
16-Lead Ultra Thin Plastic Quad Flat, No Lead Package (JQ) - 4x4x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	0.65 BSC		
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3	0.127 REF		
Overall Width	E	4.00 BSC		
Exposed Pad Width	E2	2.50	2.60	2.70
Overall Length	D	4.00 BSC		
Exposed Pad Length	D2	2.50	2.60	2.70
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

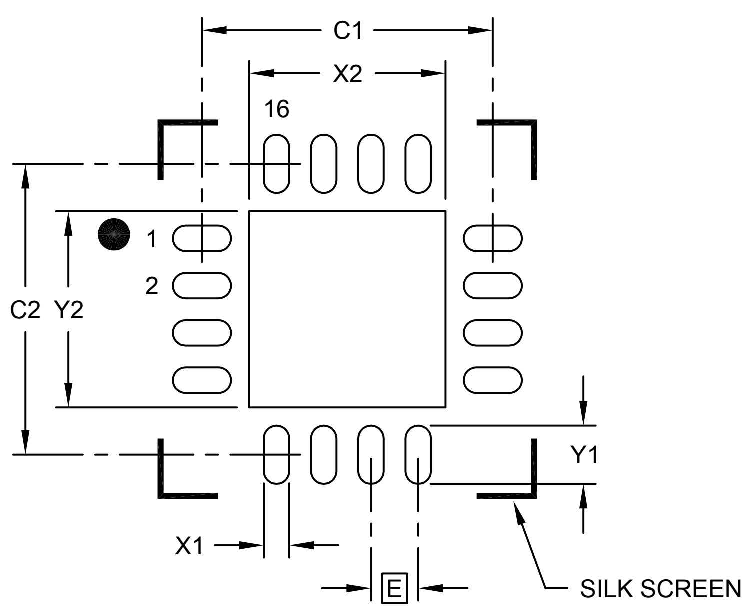
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-257A Sheet 2 of 2

16-Lead Ultra Thin Plastic Quad Flat, No Lead Package (JQ) - 4x4x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	X2			2.70
Optional Center Pad Length	Y2			2.70
Contact Pad Spacing	C1		4.00	
Contact Pad Spacing	C2		4.00	
Contact Pad Width (X16)	X1			0.35
Contact Pad Length (X16)	Y1			0.80

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2257A

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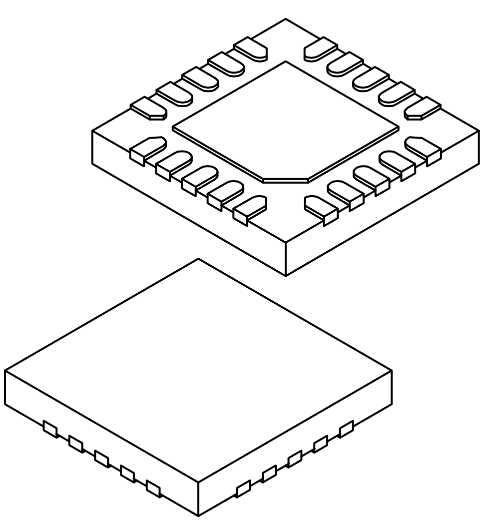
20-Lead Ultra Thin Plastic Quad Flat, No Lead Package (JP) - 3x3x0.50 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-256A Sheet 1 of 2

20-Lead Ultra Thin Plastic Quad Flat, No Lead Package (JP) - 3x3x0.50 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		20	
Pitch	e		0.40	
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.127 REF	
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.65	1.75	1.85
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.65	1.75	1.85
Terminal Width	b	0.15	0.20	0.25
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-256A Sheet 2 of 2

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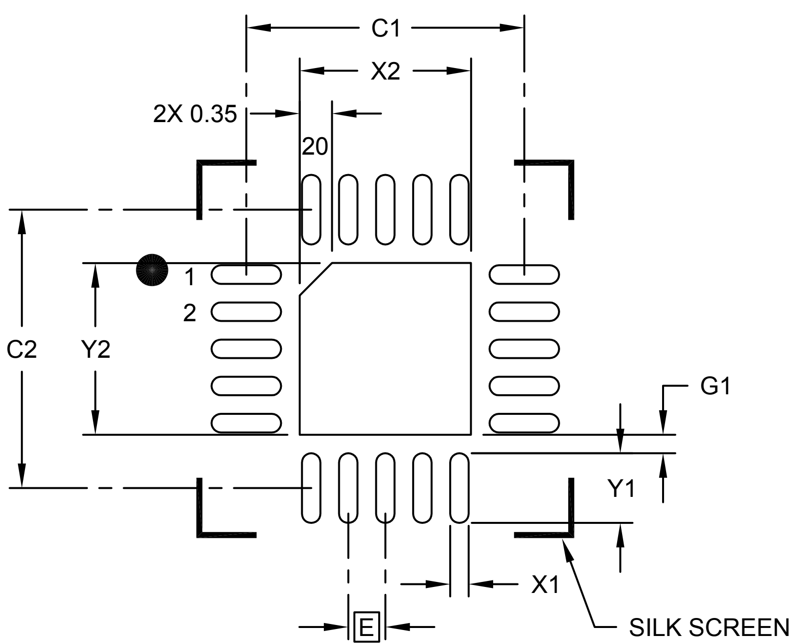
Footprint Outlines and Dimensions

20-Lead Ultra Thin Plastic Quad Flat, No Lead Package (JP) - 3x3x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Optional Center Pad Width	X2			1.85
Optional Center Pad Length	Y2			1.85
Contact Pad Spacing	C1		3.00	
Contact Pad Spacing	C2		3.00	
Contact Pad Width (X20)	X1			0.20
Contact Pad Length (X20)	Y1			0.75
Contact Pad to Center Pad (X20)	G1	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2256A

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Package Outlines and Dimensions

20-Lead Ultra Thin Plastic Quad Flat, No Lead Package (GZ) - 4x4x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.20 C
2X
0.20 C

TOP VIEW

C
SEATING PLANE
A
(A3)
0.10 C
A1
20X
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
L
0.10Ⓜ C A B
E2
2
1
K
NOTE 1
N
e
20X b
0.10Ⓜ C A B

BOTTOM VIEW

Microchip Technology Drawing C04-255A Sheet 1 of 2

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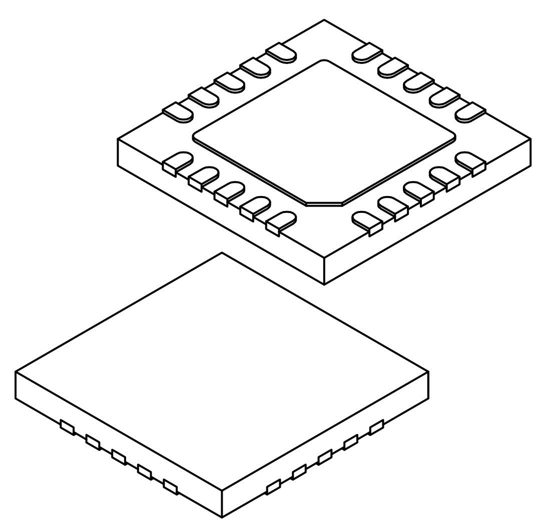
20-Lead Ultra Thin Plastic Quad Flat, No Lead Package (GZ) - 4x4x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		20	
Pitch	e		0.50 BSC	
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.127 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.60	2.70	2.80
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.60	2.70	2.80
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

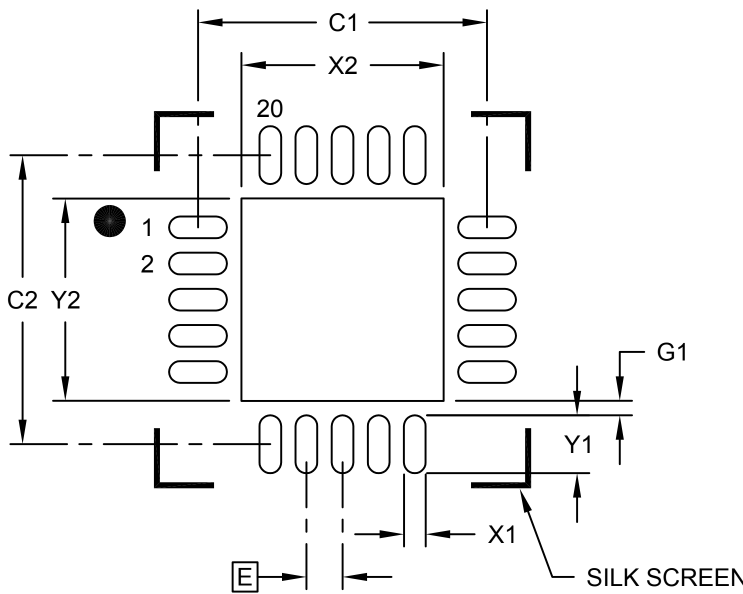
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-255A Sheet 2 of 2

20-Lead Ultra Thin Plastic Quad Flat, No Lead Package (GZ) - 4x4x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			2.80
Optional Center Pad Length	Y2			2.80
Contact Pad Spacing	C1		4.00	
Contact Pad Spacing	C2		4.00	
Contact Pad Width (X20)	X1			0.30
Contact Pad Length (X20)	Y1			0.80
Contact Pad to Center Pad (X20)	G1	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2255A

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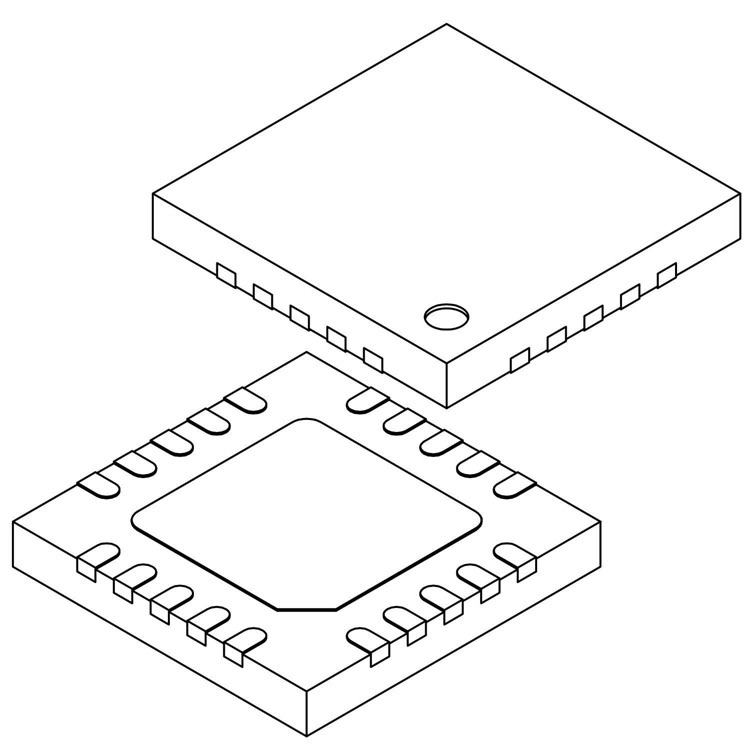
20-Lead Ultra Thin Quad Flat Pack, No Lead (GN) - 4x4x0.55 mm Body (UQFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-252A Sheet 1 of 2

20-Lead Ultra Thin Quad Flat Pack, No Lead (GN) - 4x4x0.55 mm Body (UQFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		20	
Pitch	e		0.50 BSC	
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.15 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.45	2.50	2.55
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.45	2.50	2.55
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-252A Sheet 2 of 2

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28-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 4x4x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
E
2
1
2X 0.10 C
2X 0.10 C
N
NOTE 1
TOP VIEW

A
0.10 C
SEATING PLANE
C
(A3)
A1
28X
0.08 C

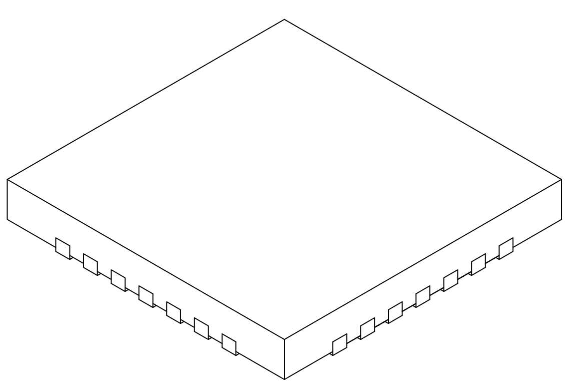
D2
0.10Ⓜ C A B
N
NOTE 1
(DATUM A)
0.10Ⓜ C A B
1
2
e
(DATUM B)
E2
L
K
28X b
0.07Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-152A Sheet 1 of 2

28-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 4x4x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.40 BSC	
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.127 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.55	2.65	2.75
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.55	2.65	2.75
Contact Width	b	0.15	0.20	0.25
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-152A Sheet 2 of 2

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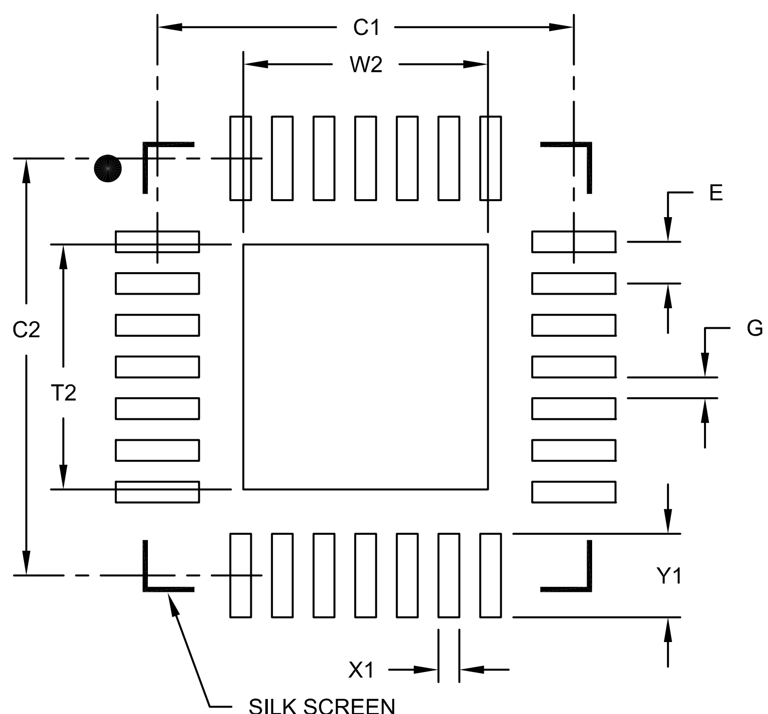
28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (MV) - 4x4 mm Body [UQFN]
With 0.40 mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Optional Center Pad Width	W2			2.35
Optional Center Pad Length	T2			2.35
Contact Pad Spacing	C1		4.00	
Contact Pad Spacing	C2		4.00	
Contact Pad Width (X28)	X1			0.20
Contact Pad Length (X28)	Y1			0.80
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2152A

28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (PW) - 4x4x0.6 mm Body [UQFN] With Corner Anchors

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-333-PW Rev B Sheet 1 of 2

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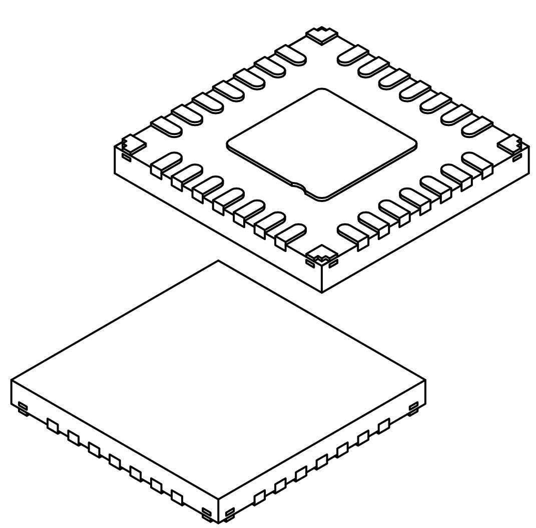
28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (PW) - 4x4x0.6 mm Body [UQFN] With Corner Anchors

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.40 BSC	
Overall Height	A	-	-	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.152 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	1.80	1.90	2.00
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	1.80	1.90	2.00
Terminal Width	b	0.15	0.20	0.25
Corner Anchor Pad	b1	0.40	0.45	0.50
Corner Pad, Metal Free Zone	b2	0.18	0.23	0.28
Terminal Length	L	0.30	0.45	0.50
Terminal-to-Exposed-Pad	K	-	0.60	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

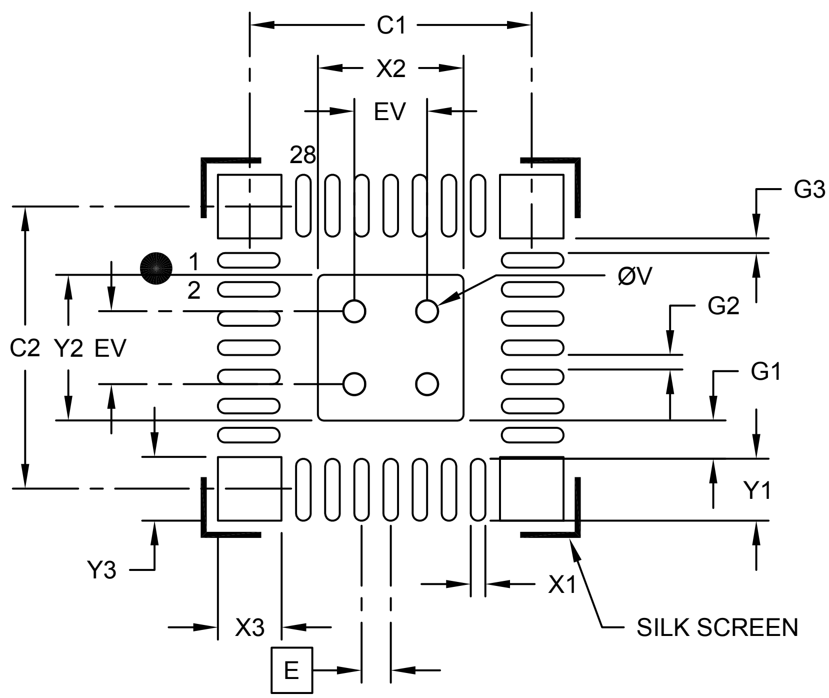
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-333-PW Rev B Sheet 2 of 2

28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (PW) - 4x4x0.6 mm Body [UQFN] With Corner Anchors

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Center Pad Width	X2			2.00
Center Pad Length	Y2			2.00
Contact Pad Spacing	C1		3.90	
Contact Pad Spacing	C2		3.90	
Contact Pad Width (X28)	X1			0.20
Contact Pad Length (X28)	Y1			0.85
Contact Pad to Center Pad (X28)	G1		0.52	
Contact Pad to Pad (X24)	G2	0.20		
Contact Pad to Corner Pad (X8)	G3	0.20		
Corner Anchor Width (X4)	X3			0.78
Corner Anchor Length (X4)	Y3			0.78
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2333-PW Rev B

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28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (M6) - 4x4x0.6 mm Body [UQFN] With Corner Anchors

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.10 C
2X
0.10 C
TOP VIEW

C
SEATING PLANE
A
(A3)
0.10 C
A1
28X
0.08 C
SIDE VIEW

0.10Ⓜ C A B
4x b1
D2
4x b2
4x b2
0.10Ⓜ C A B
E2
e/2
NOTE 1
2
1
K
N
4x b1
L
28X b
e
0.07Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-333-M6 Rev B Sheet 1 of 2

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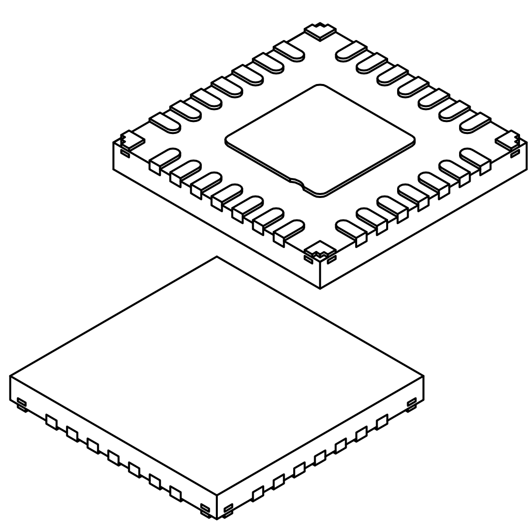
28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (M6) - 4x4x0.6 mm Body [UQFN] With Corner Anchors

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.40 BSC	
Overall Height	A	-	-	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.152 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	1.80	1.90	2.00
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	1.80	1.90	2.00
Terminal Width	b	0.15	0.20	0.25
Corner Anchor Pad	b1	0.40	0.45	0.50
Corner Pad, Metal Free Zone	b2	0.18	0.23	0.28
Terminal Length	L	0.30	0.45	0.50
Terminal-to-Exposed-Pad	K	-	0.60	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-333-M6 Rev A Sheet 2 of 2

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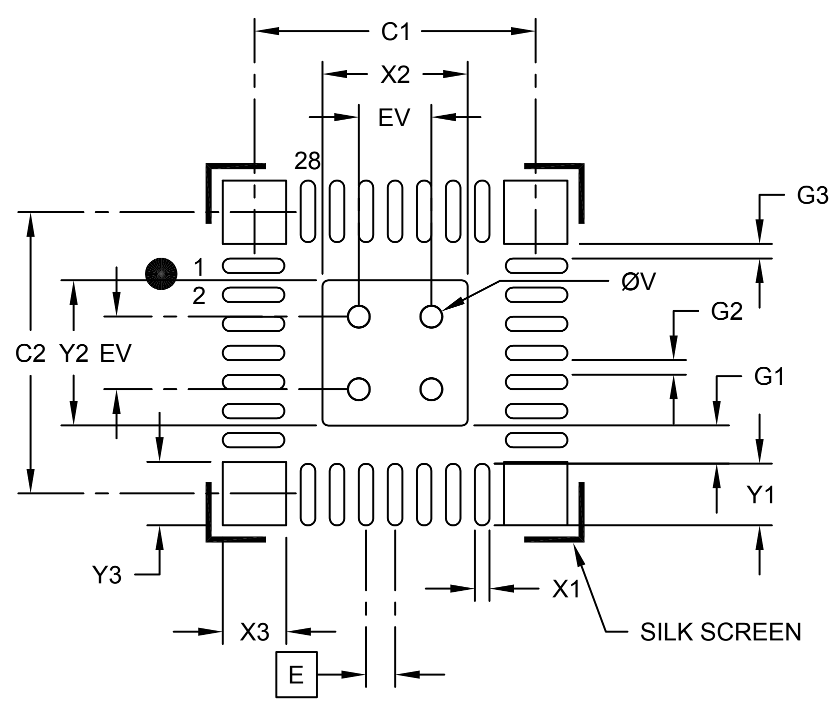
28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (M6) - 4x4x0.6 mm Body [UQFN] With Corner Anchors

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Center Pad Width	X2			2.00
Center Pad Length	Y2			2.00
Contact Pad Spacing	C1		3.90	
Contact Pad Spacing	C2		3.90	
Contact Pad Width (X28)	X1			0.20
Contact Pad Length (X28)	Y1			0.85
Contact Pad to Center Pad (X28)	G1		0.52	
Contact Pad to Pad (X24)	G2	0.20		
Contact Pad to Corner Pad (X8)	G3	0.20		
Corner Anchor Width (X4)	X3			0.78
Corner Anchor Length (X4)	Y3			0.78
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2333-M6 Rev B

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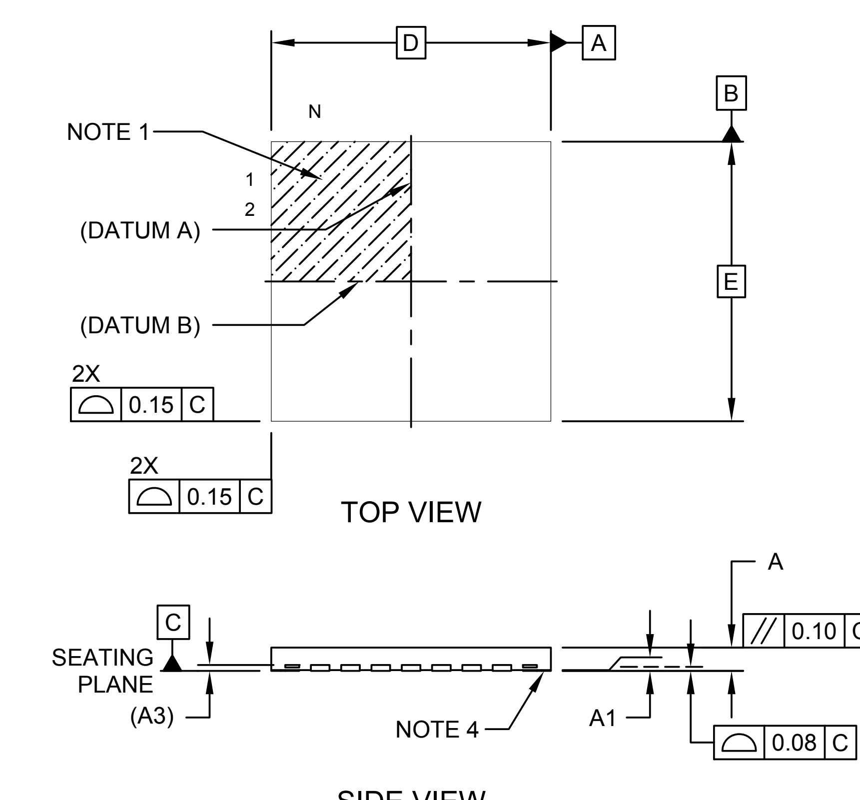
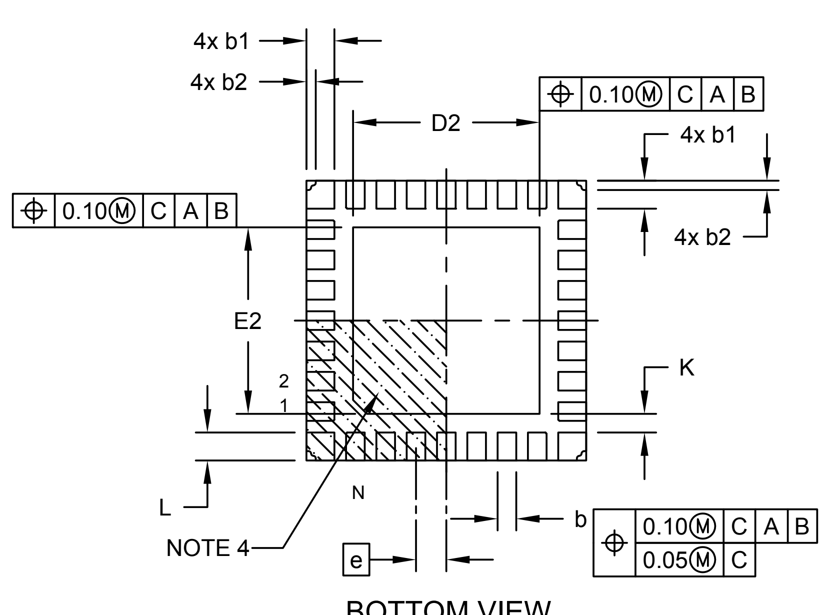
28-Lead Plastic Quad Flat, No Lead Package (MX) - 6x6x0.5mm Body [UQFN]
Ultra-Thin with 0.40 x 0.60 mm Terminal Width/Length and Corner Anchors

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Microchip Technology Drawing C04-0209 Rev C Sheet 1 of 2

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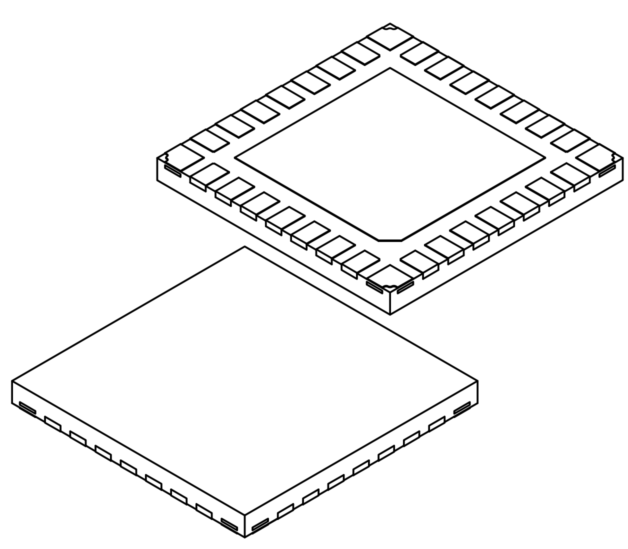
28-Lead Plastic Quad Flat, No Lead Package (MX) - 6x6x0.5mm Body [UQFN]
Ultra-Thin with 0.40 x 0.60 mm Terminal Width/Length and Corner Anchors

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.65 BSC	
Overall Height	A	0.40	0.50	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.127 REF	
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2		4.00	
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2		4.00	
Terminal Width	b	0.35	0.40	0.45
Corner Pad	b1	0.55	0.60	0.65
Corner Pad, Metal Free Zone	b2	0.15	0.20	0.25
Terminal Length	L	0.55	0.60	0.65
Terminal-to-Exposed Pad	K	0.20	-	-

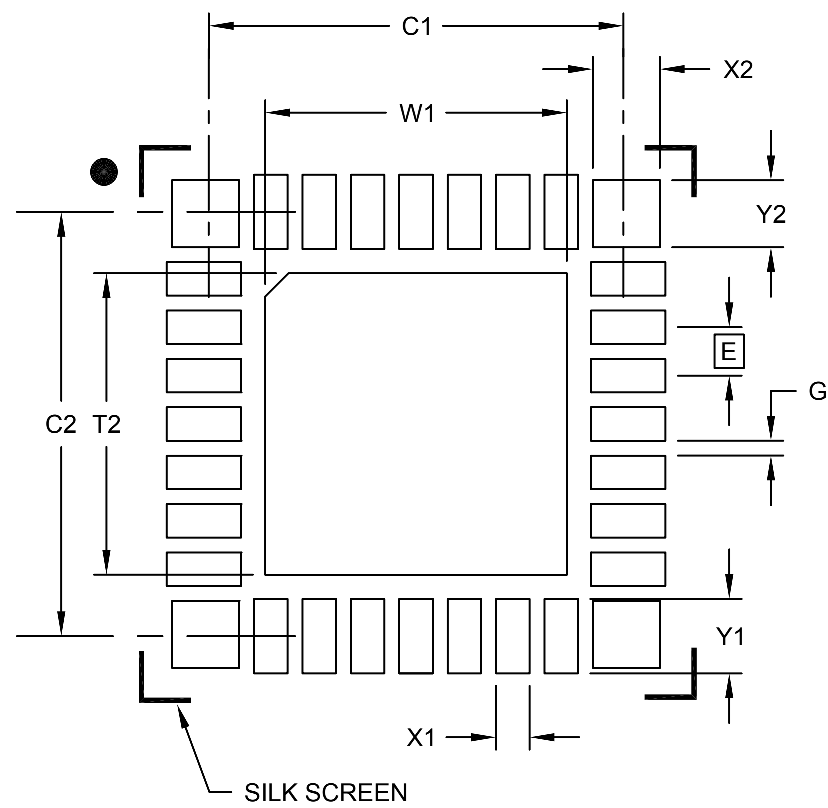
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Outermost portions of corner structures may vary slightly.

Microchip Technology Drawing C04-0209 Rev C Sheet 2 of 2

28-Lead Plastic Quad Flat, No Lead Package (MX) - 6x6 mm Body [UQFN] With 0.60mm Contact Length And Corner Anchors

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	W1			4.05
Optional Center Pad Length	T2			4.05
Contact Pad Spacing	C1		5.70	
Contact Pad Spacing	C2		5.70	
Contact Pad Width (X28)	X1			0.45
Contact Pad Length (X28)	Y1			1.00
Corner Pad Width (X4)	X2			0.90
Corner Pad Length (X4)	Y2			0.90
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2209B

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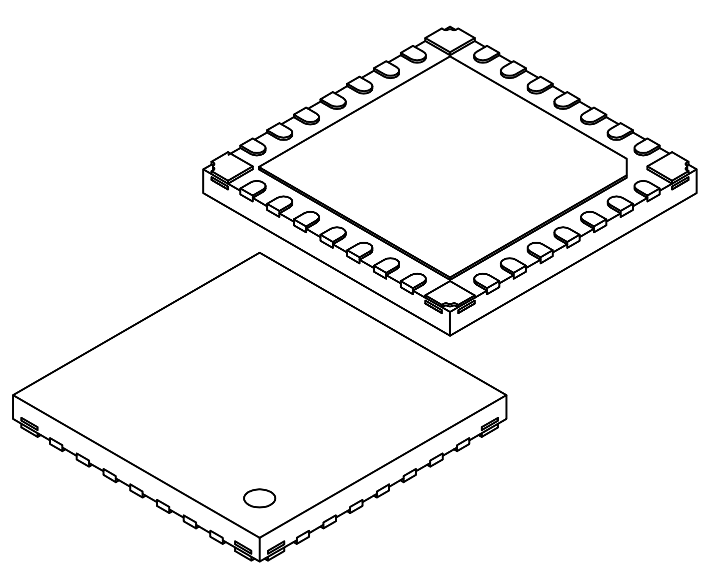
28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (2N) - 6x6x0.55 mm Body [UQFN] With 4.65x4.65 mm Exposed Pad and Corner Anchors

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-385B Sheet 1 of 2

28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (2N) - 6x6x0.55 mm Body [UQFN] With 4.65x4.65 mm Exposed Pad and Corner Anchors

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		28	
Pitch	e		0.65 BSC	
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.127 REF	
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	4.55	4.65	4.75
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	4.55	4.65	4.75
Exposed Pad Corner Chamfer	P	-	0.35	-
Terminal Width	b	0.25	0.30	0.35
Corner Anchor Pad	b1	0.35	0.40	0.43
Corner Pad, Metal Free Zone	b2	0.15	0.20	0.25
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-385B Sheet 2 of 2

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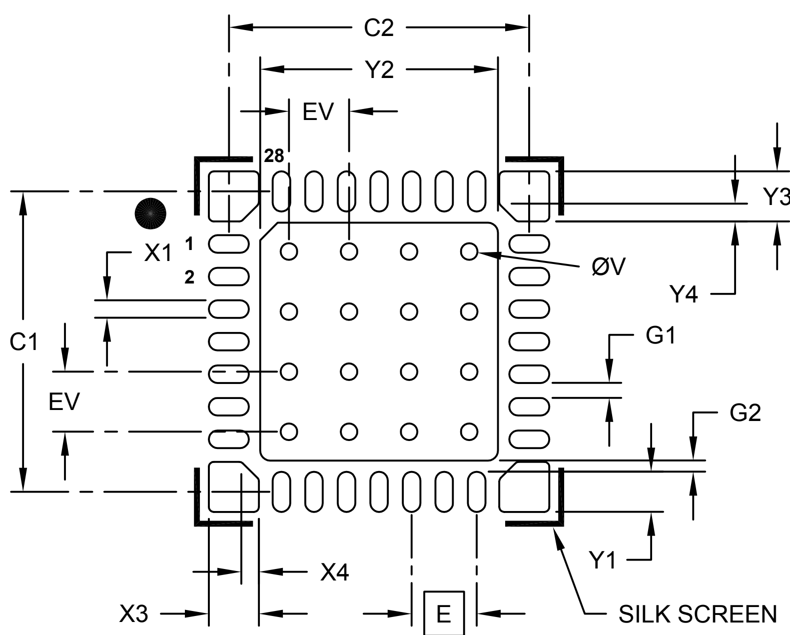
28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (2N) - 6x6x0.55 mm Body [UQFN] With 4.65x4.65 mm Exposed Pad and Corner Anchors

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	X2			4.75
Optional Center Pad Length	Y2			4.75
Contact Pad Spacing	C1		6.00	
Contact Pad Spacing	C2		6.00	
Contact Pad Width (X28)	X1			0.35
Contact Pad Length (X28)	Y1			0.80
Corner Anchor (X4)	X3			1.00
Corner Anchor (X4)	Y3			1.00
Corner Anchor Chamfer (X4)	X4			0.35
Corner Anchor Chamfer (X4)	Y4			0.35
Contact Pad to Pad (X28)	G1	0.20		
Contact Pad to Center Pad (X28)	G2	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2385B

40-Lead Ultra Thin Plastic Quad Flat, No Lead Package (MV) – 5x5x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
E
2
1
N
0.10 C
0.10 C
TOP VIEW
NOTE 1
A
0.10 C
SEATING PLANE
C
(A3)
SIDE VIEW
A1
40X
0.08 C
D2
0.10Ⓜ C A B
N
(DATUM A)
0.10Ⓜ C A B
1
2
e
(DATUM B)
E2
NOTE 1
e/2
K
L
40X b
0.07Ⓜ C A B
0.04Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-156A Sheet 1 of 2

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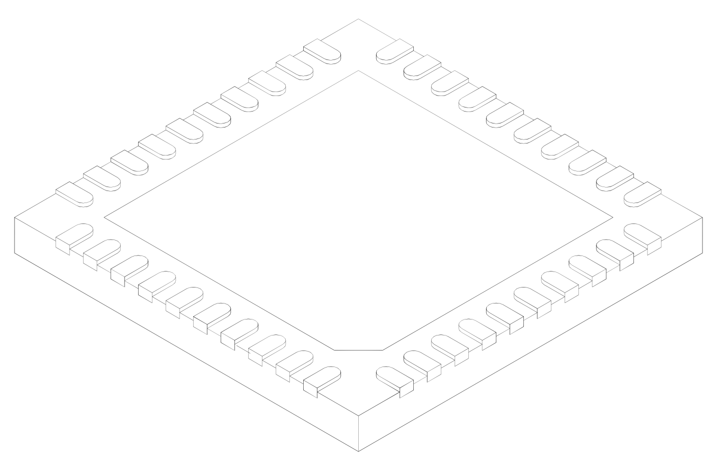
Package Outlines and Dimensions

40-Lead Ultra Thin Plastic Quad Flat, No Lead Package (MV) – 5x5x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		40	
Pitch	e		0.40 BSC	
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.127 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.60	3.70	3.80
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.60	3.70	3.80
Contact Width	b	0.15	0.20	0.25
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

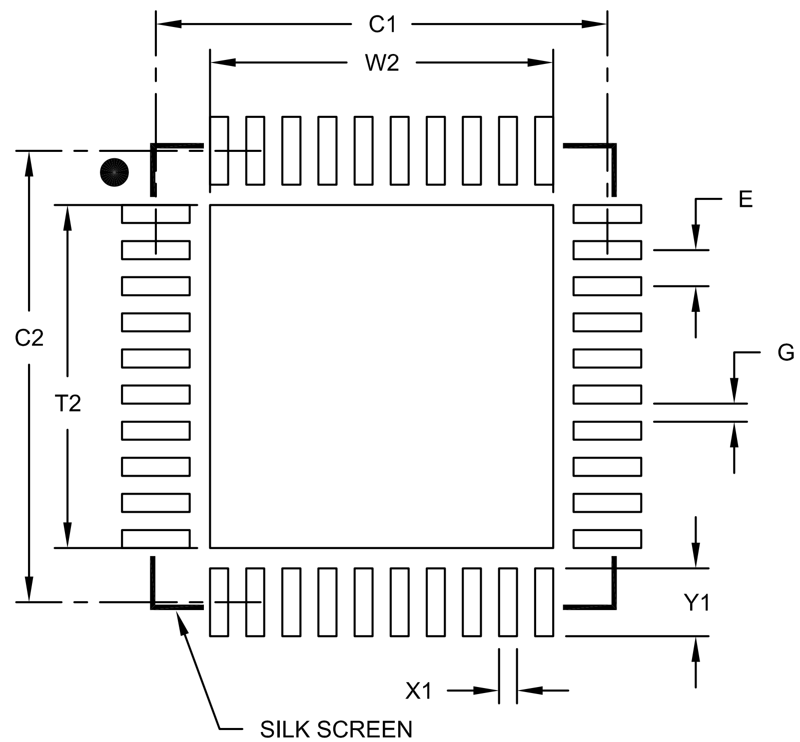
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-156A Sheet 2 of 2

40-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) - 5x5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Optional Center Pad Width	W2			3.80
Optional Center Pad Length	T2			3.80
Contact Pad Spacing	C1		5.00	
Contact Pad Spacing	C2		5.00	
Contact Pad Width (X40)	X1			0.20
Contact Pad Length (X40)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2156B

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48-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 6x6x0.5 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
E
2
1
2X
0.10 C
2X
0.10 C
N
NOTE 1
TOP VIEW

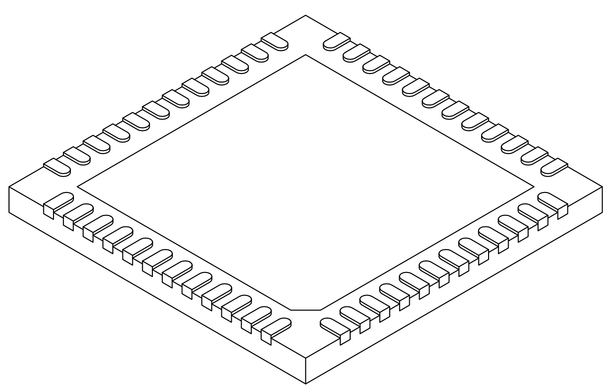
A
0.10 C
SEATING PLANE
C
(A3)
A1
48X
0.08 C

D2
0.10Ⓜ C A B
N
NOTE 1
0.10Ⓜ C A B
1
2
(DATUM B)
e
E2
e/2
(DATUM A)
L
K
48X b
0.07Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-153A Sheet 1 of 2

48-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 6x6x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		48	
Pitch	e		0.40 BSC	
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.127 REF	
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	4.45	4.60	4.75
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	4.45	4.60	4.75
Contact Width	b	0.15	0.20	0.25
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-153A Sheet 2 of 2

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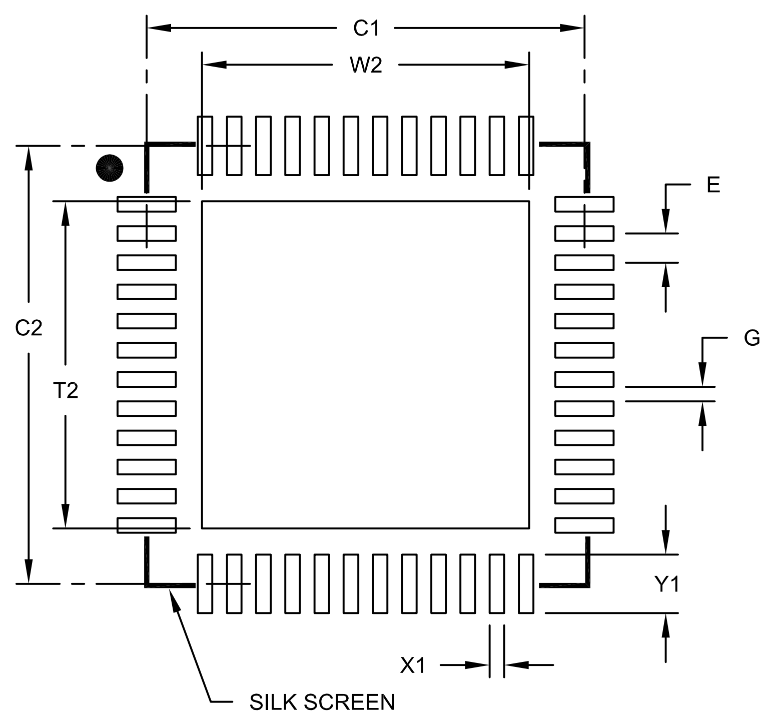
48-Lead Ultra Thin Plastic Quad Flat, No Lead Package (MV) - 6x6 mm Body [UQFN]
With 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Optional Center Pad Width	W2			4.45
Optional Center Pad Length	T2			4.45
Contact Pad Spacing	C1		6.00	
Contact Pad Spacing	C2		6.00	
Contact Pad Width (X28)	X1			0.20
Contact Pad Length (X28)	Y1			0.80
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2153A

NOTES:

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VQFN

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12-Lead Very Thin Plastic Quad Flat, No Lead Package (UL) - 4x4 mm Body [VQFN] SMSC Legacy KP [SQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.20 C
2X
0.20 C

TOP VIEW

0.10 C
A1
C
A
SEATING PLANE
(A3)
12X
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
2
E2
1
12X K
NOTE 1
N
12X b
0.10Ⓜ C A B
0.05Ⓜ C
L
e

BOTTOM VIEW

Microchip Technology Drawing C04-308A Sheet 1 of 2

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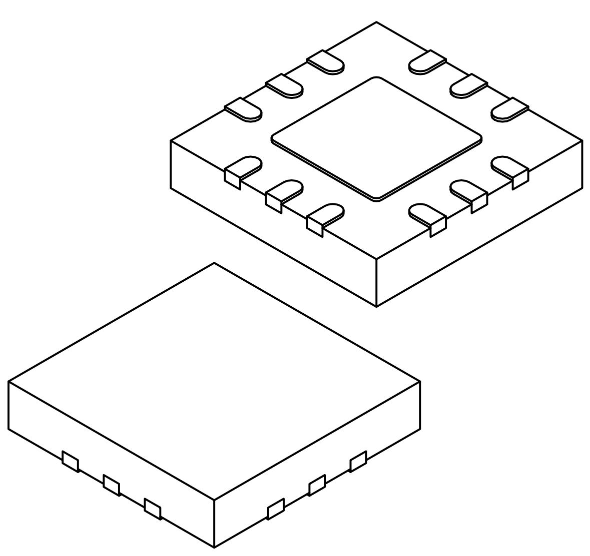
12-Lead Very Thin Plastic Quad Flat, No Lead Package (UL) - 4x4 mm Body [VQFN] SMSC Legacy KP [SQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		12	
Pitch	e		0.80 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.00	2.10	2.20
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.00	2.10	2.20
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.40	0.50	0.60
Terminal-to-Exposed-Pad	K	0.35	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

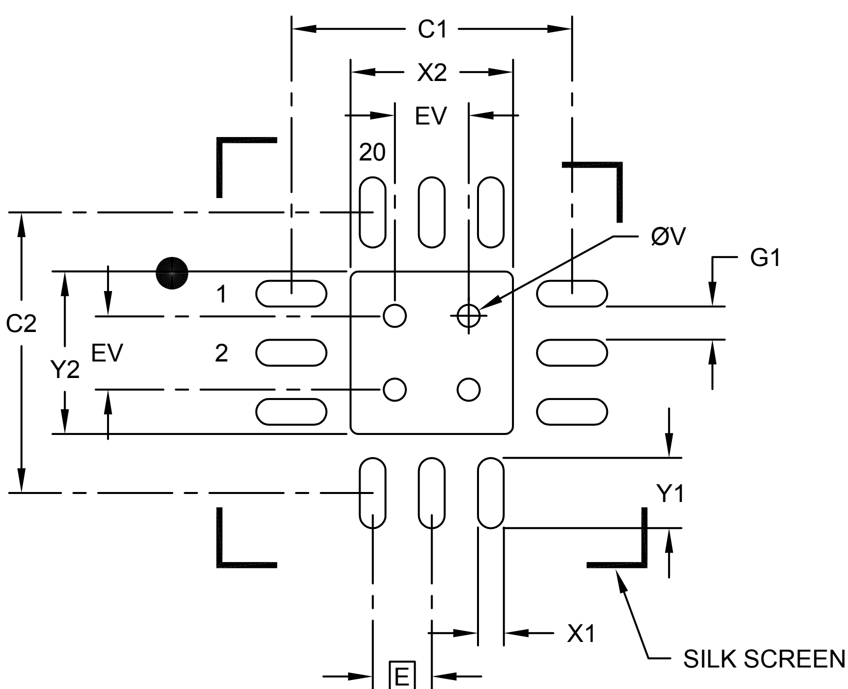
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-308A Sheet 2 of 2

12-Lead Very Thin Plastic Quad Flat, No Lead Package (UL) - 4x4 mm Body [VQFN] SMSC Legacy KP [SQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Optional Center Pad Width	X2			2.20
Optional Center Pad Length	Y2			2.20
Contact Pad Spacing	C1		4.00	
Contact Pad Spacing	C2		4.00	
Contact Pad Width (X12)	X1			0.37
Contact Pad Length (X12)	Y1			0.95
Contact Pad to Center Pad (X12)	G1	0.45		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2308A

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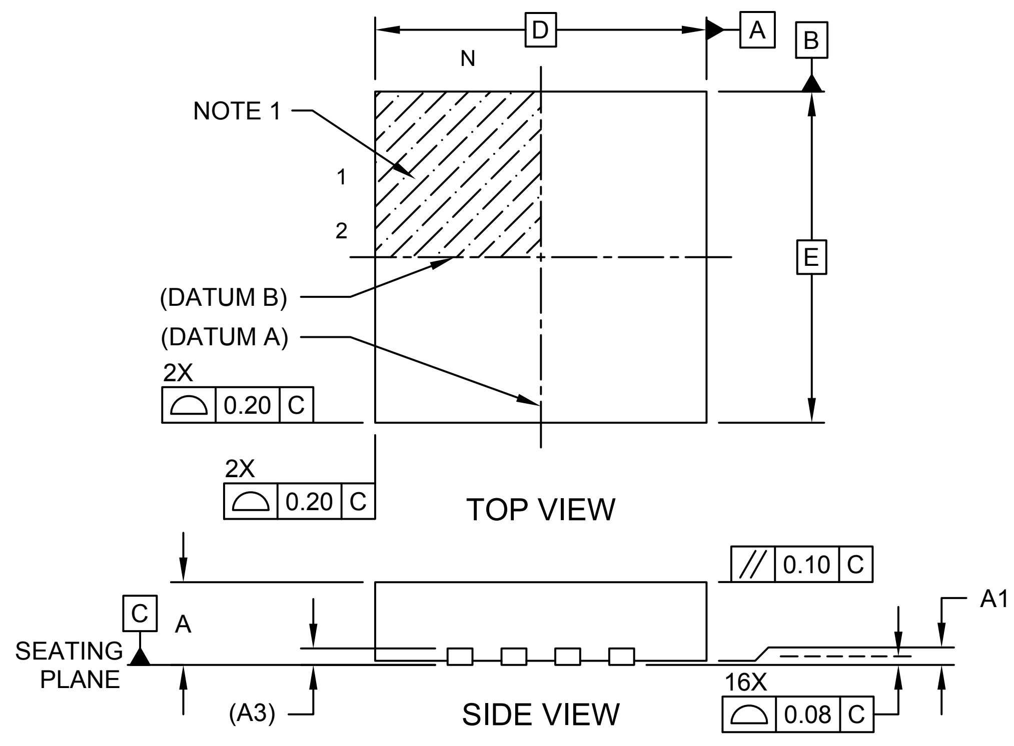
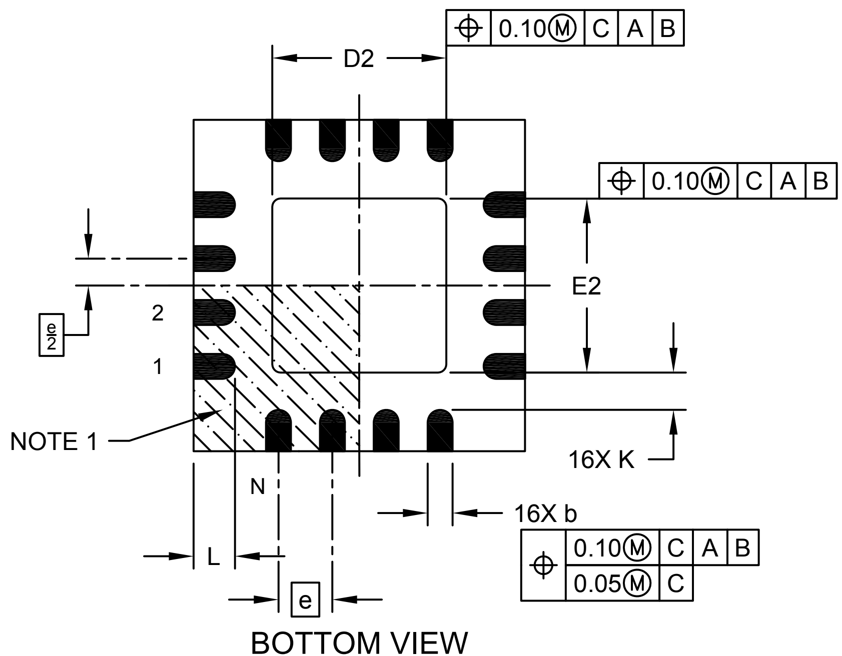
16-Lead Very Thin Plastic Quad Flat, No Lead Package (AP) - 4x4 mm Body [VQFN] SMSC Legacy AP [SQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

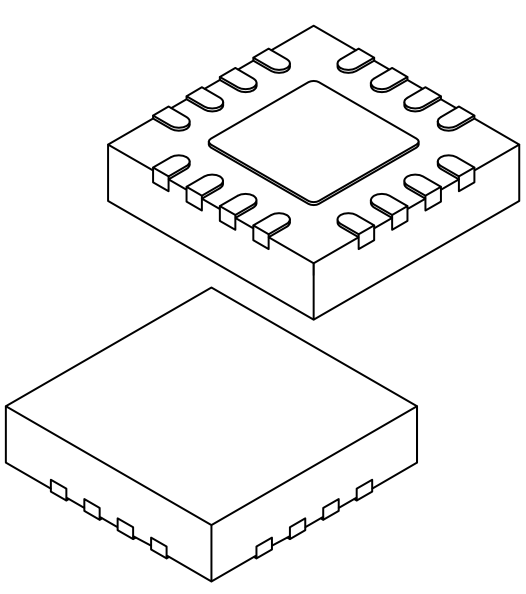




Microchip Technology Drawing C04-381A Sheet 1 of 2

16-Lead Very Thin Plastic Quad Flat, No Lead Package (AP) - 4x4 mm Body [VQFN] SMSC Legacy AP [SQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		16	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.00	2.10	2.20
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.00	2.10	2.20
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.40	0.50	0.60
Terminal-to-Exposed-Pad	K	0.35	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-381A Sheet 2 of 2

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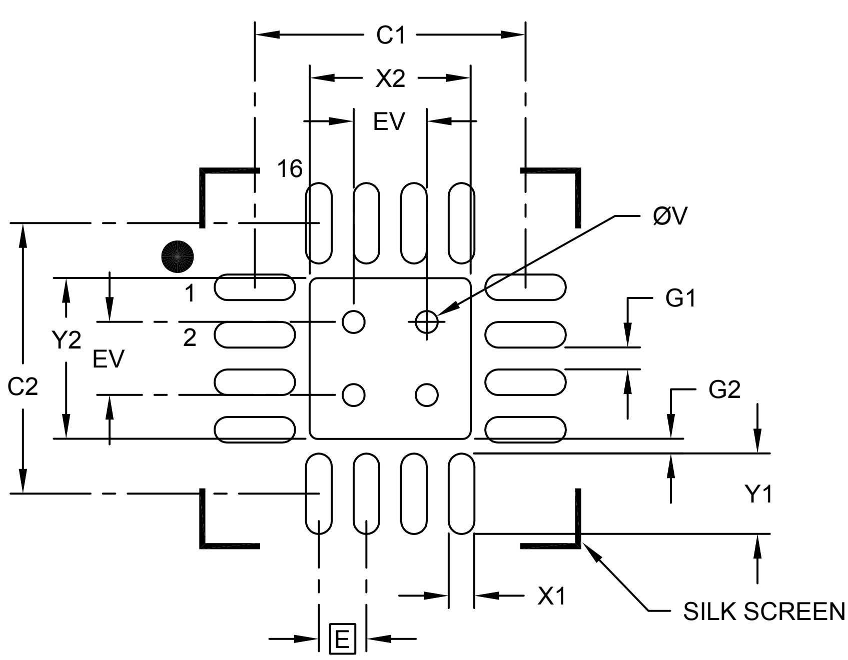
16-Lead Very Thin Plastic Quad Flat, No Lead Package (AP) - 4x4 mm Body [VQFN] SMSC Legacy AP [SQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	X2			2.20
Optional Center Pad Length	Y2			2.20
Contact Pad Spacing	C1		3.70	
Contact Pad Spacing	C2		3.70	
Contact Pad Width (X16)	X1			0.37
Contact Pad Length (X16)	Y1		0.79	1.10
Space Between Pads	G1	0.30		
Contact Pad to Center Pad (X16)	G2	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2381A

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16-Lead Very Thin Quad Flat, No Lead Package (7E) - 4x4 mm Body [VQFN] With 2.1x2.1 mm Exposed Pad; Punch Singulated; Dimpled Terminals

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-362B Sheet 1 of 2

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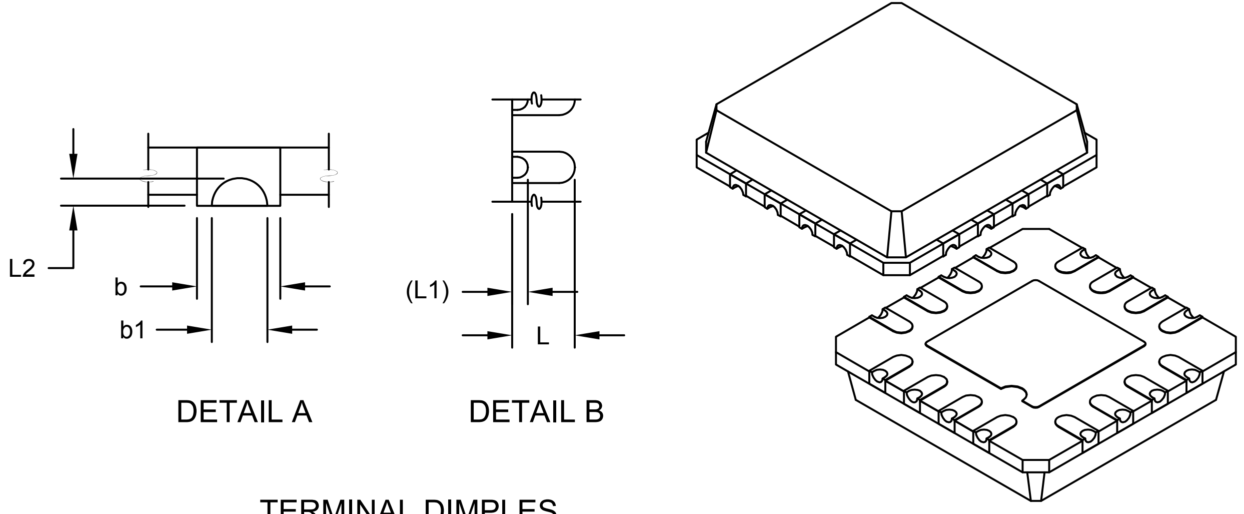
16-Lead Very Thin Quad Flat, No Lead Package (7E) - 4x4 mm Body [VQFN] With 2.1x2.1 mm Exposed Pad; Punch Singulated; Dimpled Terminals

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TERMINAL DIMPLES

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Terminal Thickness	(A3)		0.20 REF	
Overall Width	E		4.00 BSC	
Molded Top Width	E1		3.75 BSC	
Exposed Pad Width	E2	2.00	2.10	2.20
Overall Length	D		4.00 BSC	
Molded Top Length	D1		3.75 BSC	
Exposed Pad Length	D2	2.00	2.10	2.20
Corner Chamfer	P	-	-	0.60
Terminal Width	b	0.25	0.30	0.35
Terminal Dimple Width	b1	0.15	0.20	0.25
Terminal Length	L	0.50	0.60	0.75
Terminal Dimple Length	L1		0.15 REF	
Terminal Dimple Depth	L2	0.05	0.10	0.15
Terminal-to-Exposed-Pad	K	0.20	-	-
Mold Draft Angle	θ	0°	-	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-362B Sheet 2 of 2

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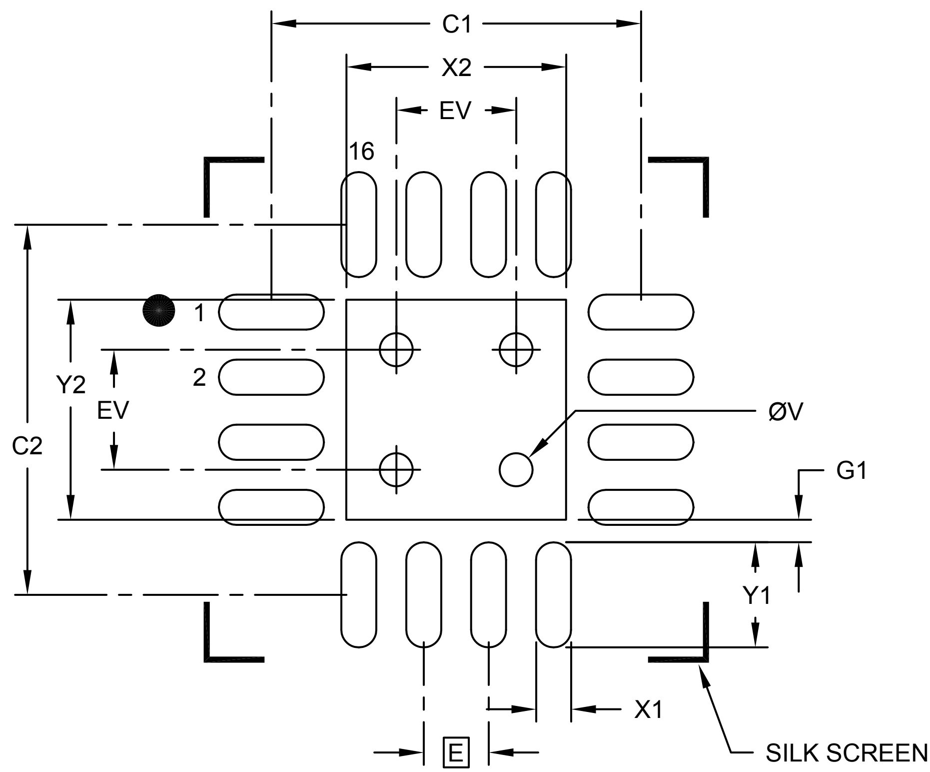
16-Lead Very Thin Quad Flat, No Lead Package (7E) - 4x4 mm Body [VQFN]
With 2.1x2.1 mm Exposed Pad; Punch Singulated; Dimpled Terminals

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	X2			2.20
Optional Center Pad Length	Y2			2.20
Contact Pad Spacing	C1		3.70	
Contact Pad Spacing	C2		3.70	
Contact Pad Width (X16)	X1			0.35
Contact Pad Length (X16)	Y1			1.05
Contact Pad to Center Pad (X16)	G1	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2362A

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16-Lead Plastic Quad Flat, No Lead Package (8N) - 3x3x1.0 mm Body [VQFN] Wettable Flanks (Stepped), 0.35 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

NOTE 1
D
A
B
N
1
2
E
(DATUM B)
(DATUM A)
2X
0.20 C
2X
0.20 C

TOP VIEW

SEE DETAIL A
C
SEATING PLANE

SIDE VIEW

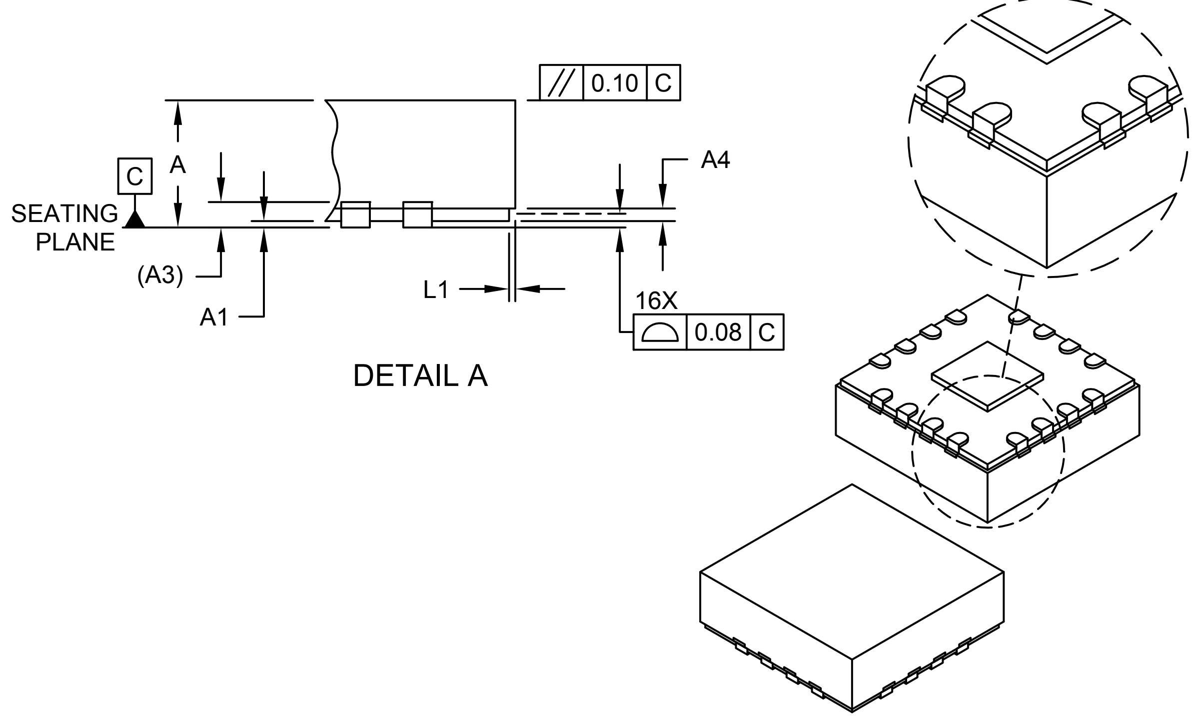
L
D2
0.10Ⓜ C A B
0.10Ⓜ C A B
E2
e/2
2
1
K
NOTE 1
N
16X b
0.10Ⓜ C A B
0.05Ⓜ C
e

BOTTOM VIEW

Microchip Technology Drawing C04-404B Sheet 1 of 2

16-Lead Plastic Quad Flat, No Lead Package (8N) - 3x3x1.0 mm Body [VQFN] Wettable Flanks (Stepped), 0.35 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		16	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Step Height	A4	0.05	0.12	0.19
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.00	1.10	1.50
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.00	1.10	1.50
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.25	0.35	0.45
Step Length	L1	0.035	0.060	0.085
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

    REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-404B Sheet 2 of 2

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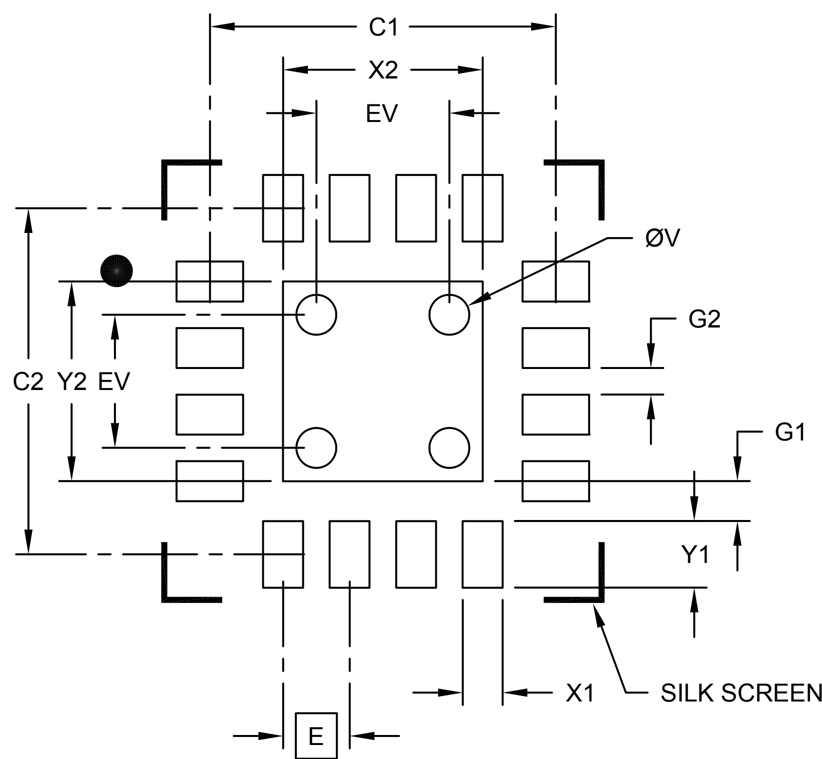
16-Lead Plastic Quad Flat, No Lead Package (8N) - 3x3x1.0 mm Body [VQFN] Wettable Flanks (Stepped), 0.35 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			1.50
Optional Center Pad Length	Y2			1.50
Contact Pad Spacing	C1		2.60	
Contact Pad Spacing	C2		2.60	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.50
Contact Pad to Center Pad (X16)	G1	0.30		
Contact Pad to Contact Pad (X12)	G2	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2404A

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16-Lead Plastic Quad Flat, No Lead Package (7N) - 4x4x1.0 mm Body [VQFN] Wettable Flanks (Stepped), 0.40 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

NOTE 1
D
A
B
N
1
2
E
(DATUM B)
(DATUM A)
2X
0.20 C
2X
0.20 C
TOP VIEW

SEE DETAIL A
C
SEATING PLANE
SIDE VIEW

L
D2
0.10Ⓜ C A B
0.10Ⓜ C A B
E2
$\frac{e}{2}$
2
1
K
NOTE 1
N
16X b
e
0.10Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-403B Sheet 1 of 2

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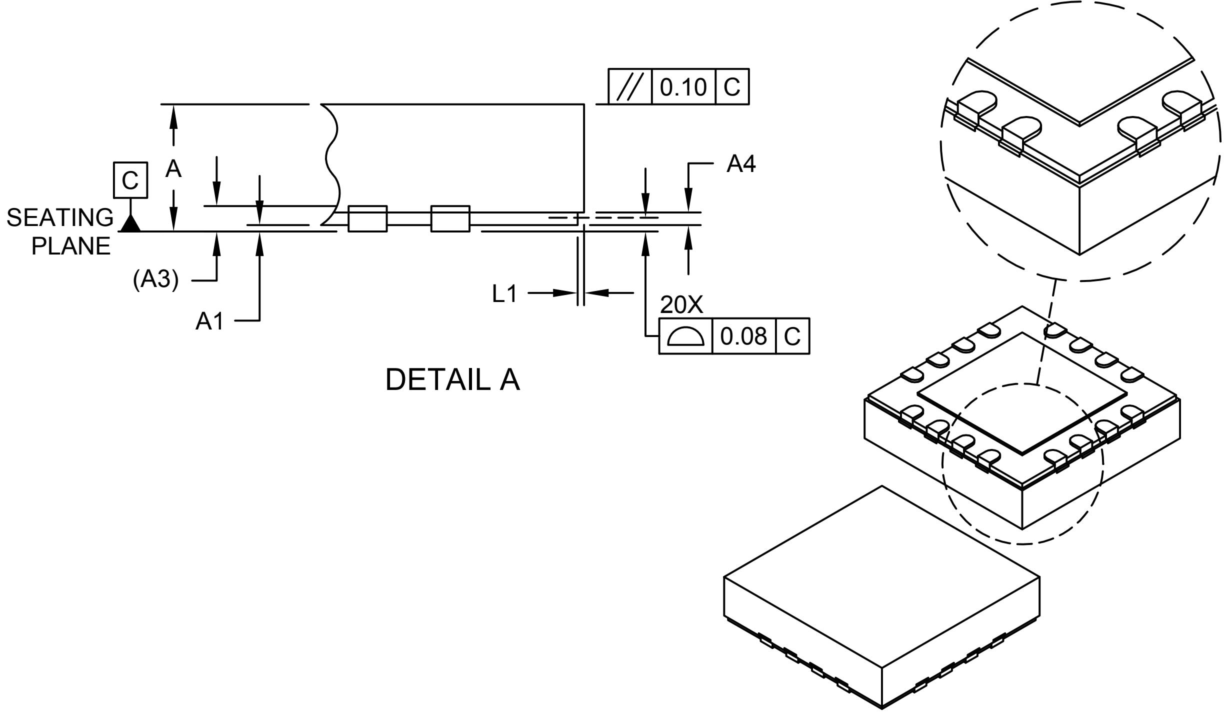
16-Lead Plastic Quad Flat, No Lead Package (7N) - 4x4x1.0 mm Body [VQFN] Wettable Flanks (Stepped), 0.40 mm Terminal Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		16	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Step Height	A4	0.05	0.12	0.19
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.50	2.65	2.80
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.50	2.65	2.80
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Step Length	L1	0.035	0.060	0.085
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-403B Sheet 2 of 2

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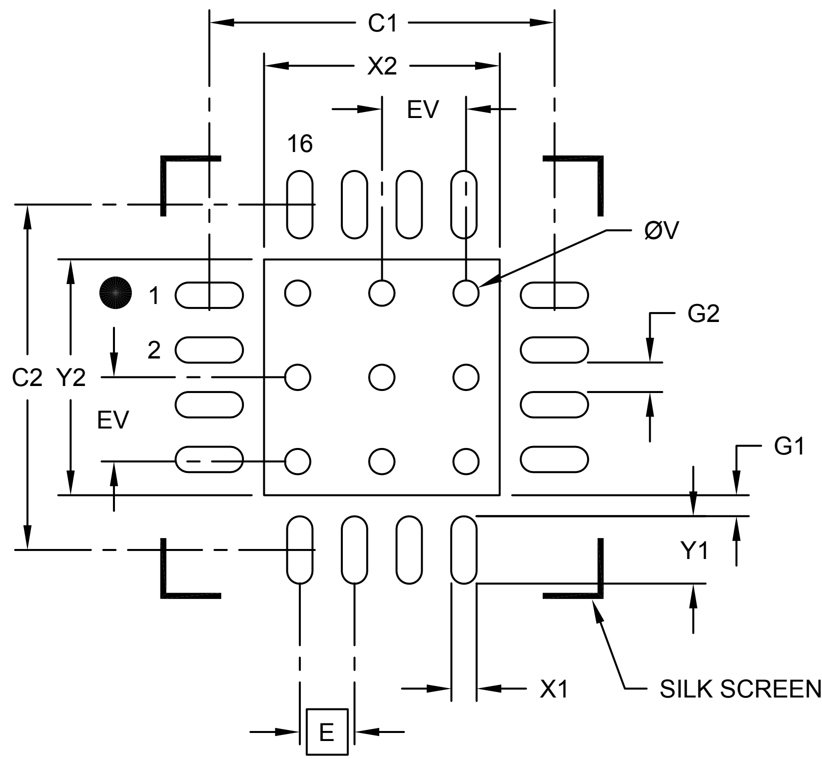
16-Lead Plastic Quad Flat, No Lead Package (7N) - 4x4x1.0 mm Body [VQFN] Wettable Flanks (Stepped), 0.40 mm Terminal Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	X2			2.80
Optional Center Pad Length	Y2			2.80
Contact Pad Spacing	C1		4.10	
Contact Pad Spacing	C2		4.10	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.80
Contact Pad to Center Pad (X16)	G1	0.25		
Contact Pad to Contact Pad (X12)	G2	0.35		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2403A

© 2016 Microchip Technology Inc.

20-Lead Very Thin Plastic Quad Flat, No Lead Package (LXX) - 3x3x0.9 mm Body [VQFN] Internal Flip Chip, No Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

NOTE 1
N
1
2
D
A
B
E
(DATUM B)
(DATUM A)
2X 0.05 C
2X 0.05 C
TOP VIEW

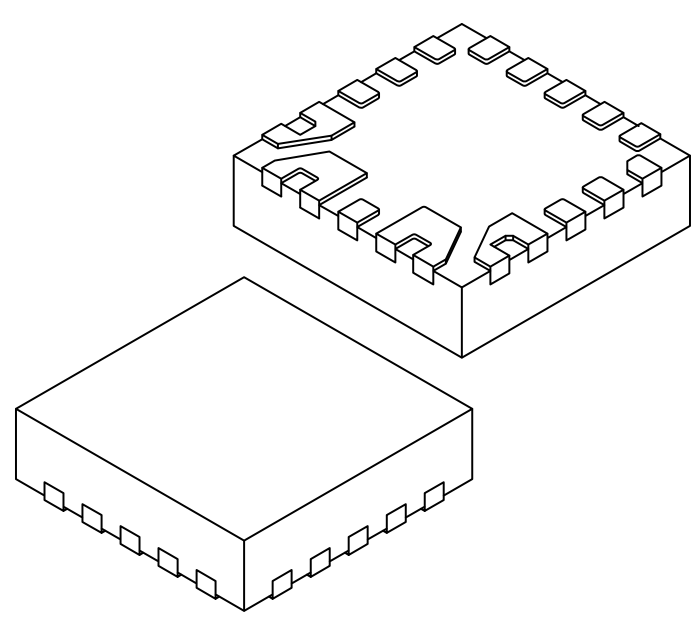
C
A
SEATING PLANE
(A3)
0.10 C
A1
20X 0.08 C
SIDE VIEW

L5
L4
6 7 9 10
5 4 2 1
11 12
L2
L3
L
TERMINAL 1 INDEX CHAMFER
N
e
20X b
0.08Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-421A Sheet 1 of 2

20-Lead Very Thin Plastic Quad Flat, No Lead Package (LXX) - 3x3x0.9 mm Body [VQFN] Internal Flip Chip, No Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		20	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.203 REF	
Overall Length	D		3.00 BSC	
Overall Width	E		3.00 BSC	
Terminal Length	L	0.25	0.30	0.35
Terminal Length	L2	0.58	0.63	0.68
Terminal Length	L3	0.33	0.38	0.43
Terminal Length	L4	0.41	0.46	0.51
Terminal Length	L5	0.16	0.21	0.26
Terminal Width	b	0.20	0.25	0.30

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-421A Sheet 1 of 2

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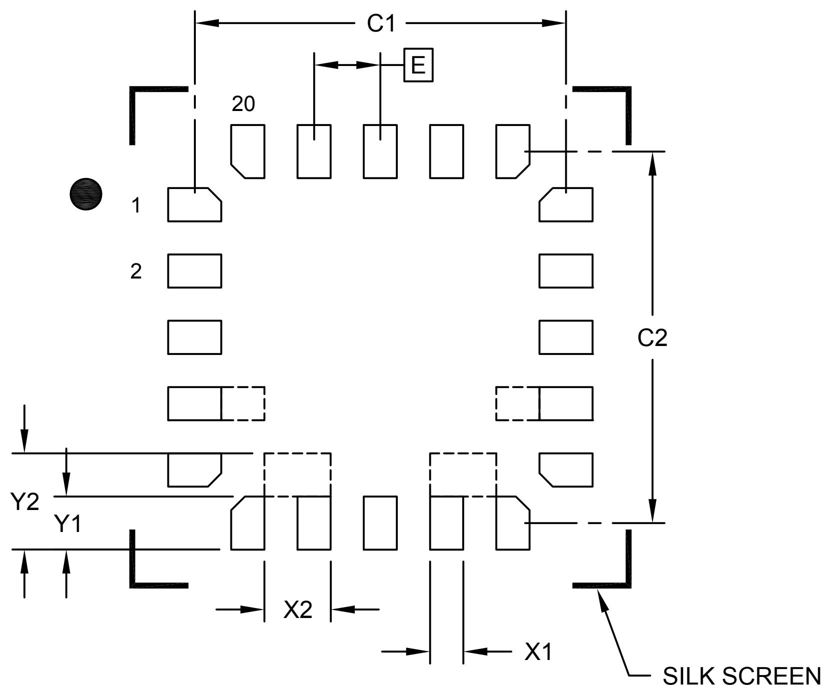
20-Lead Very Thin Plastic Quad Flat, No Lead Package (LXX) - 3x3x0.9 mm Body [VQFN] Internal Flip Chip, No Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Contact Pad Spacing	C1		2.80	
Contact Pad Spacing	C2		2.80	
Contact Pad Width (X20)	X1			0.27
Contact Pad Length (X20)	Y1			0.42
Optional Extended Pad Width (X2)	X2			0.52
Optional Extended Pad Length (X4)	Y2			0.75

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2421A

Footprint Outlines and Dimensions

20-Lead Plastic Quad Flat, No Lead Package (ML) – 5x5x1.0 mm Body [VQFN] With 0.40 mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.20 C
2X
0.20 C

TOP VIEW

C
SEATING PLANE
A
(A3)
0.10 C
A1
20X
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
2
1
NOTE 1
K
N
L
20X b
e
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-139C (ML) Sheet 1 of 2

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20-Lead Plastic Quad Flat, No Lead Package (6N) - 4x4x1.0 mm Body [VQFN] Wettable Flanks (Stepped), 0.40 mm Terminal Length

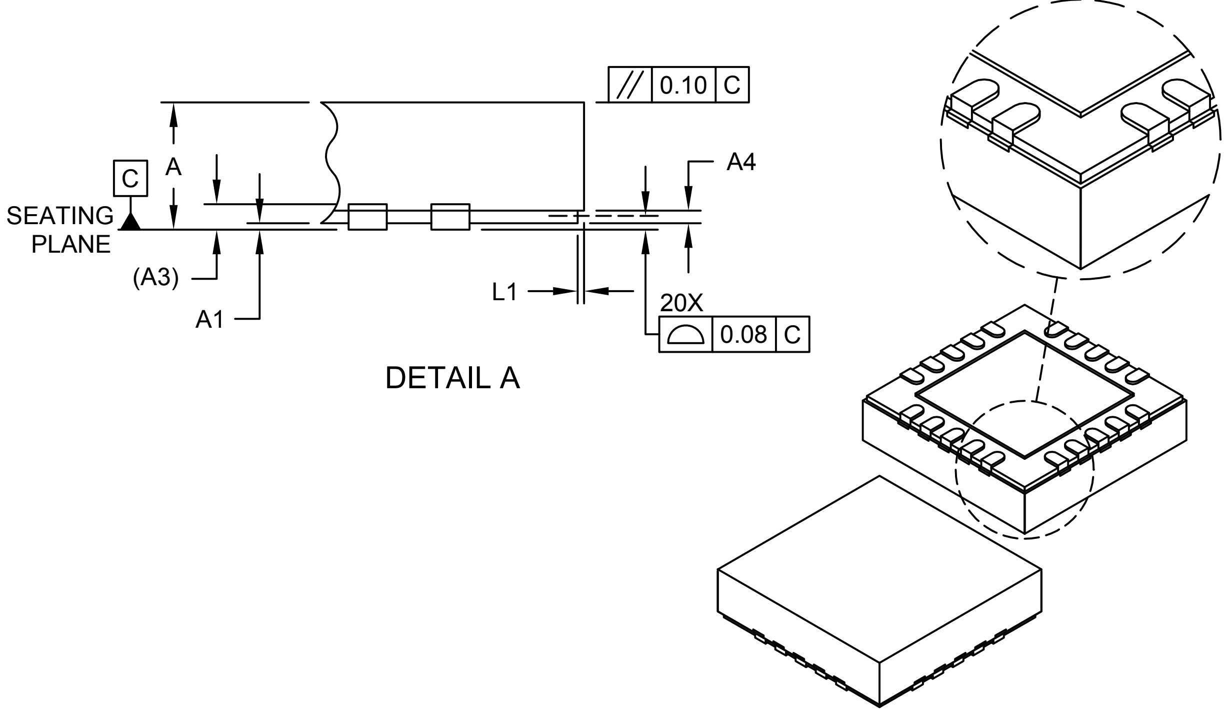
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-402B Sheet 1 of 2

© 2016 Microchip Technology Inc.

20-Lead Plastic Quad Flat, No Lead Package (6N) - 4x4x1.0 mm Body [VQFN] Wettable Flanks (Stepped), 0.40 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		20	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Step Height	A4	0.05	0.12	0.19
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.60	2.70	2.80
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.60	2.70	2.80
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Step Length	L1	0.035	0.060	0.085
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-402B Sheet 2 of 2

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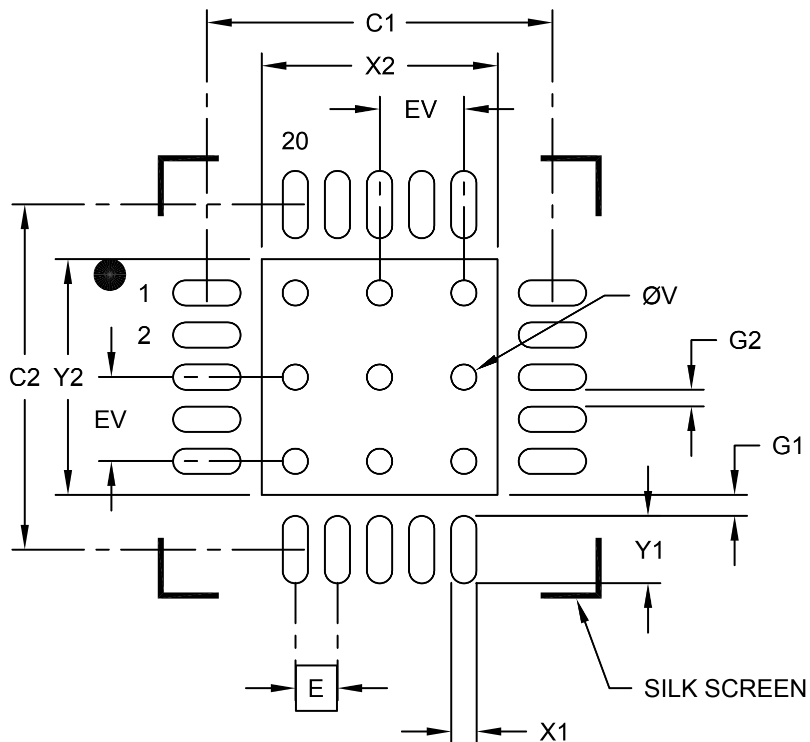
20-Lead Plastic Quad Flat, No Lead Package (6N) - 4x4x1.0 mm Body [VQFN] Wettable Flanks (Stepped), 0.40 mm Terminal Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			2.80
Optional Center Pad Length	Y2			2.80
Contact Pad Spacing	C1		4.10	
Contact Pad Spacing	C2		4.10	
Contact Pad Width (X20)	X1			0.30
Contact Pad Length (X20)	Y1			0.80
Contact Pad to Center Pad (X20)	G1	0.25		
Contact Pad to Contact Pad (X16)	G2	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2402A

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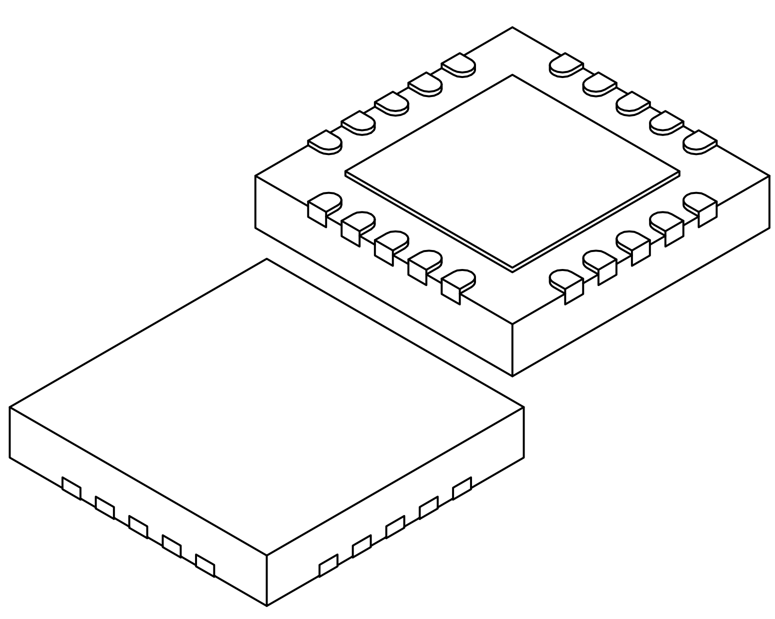
20-Lead Plastic Quad Flat, No Lead Package (ML) – 5x5x1.0 mm Body [VQFN] With 0.40 mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		20	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	(A3)		0.20 REF	
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.15	3.25	3.35
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.15	3.25	3.35
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.35	0.40	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-139C (ML) Sheet 2 of 2

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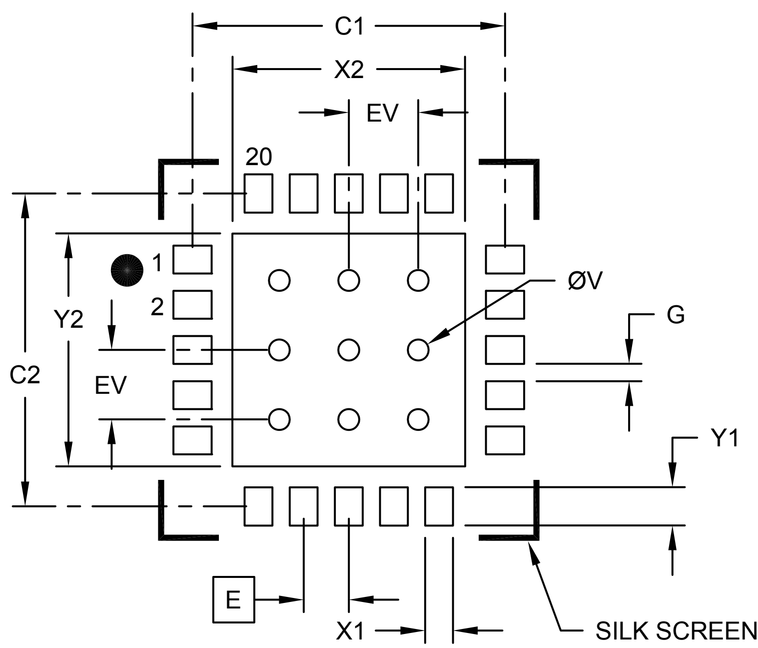
Footprint Outlines and Dimensions

20-Lead Plastic Quad Flat, No Lead Package (ML) – 5x5x1.0 mm Body [VQFN] With 0.40 mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	W2			3.35
Optional Center Pad Length	T2			3.35
Contact Pad Spacing	C1		4.50	
Contact Pad Spacing	C2		4.50	
Contact Pad Width (X20)	X1			0.40
Contact Pad Length (X20)	Y1			0.55
Distance Between Pads	G	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2139B (ML)

20-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x1.0 mm Body [VQFN] With 0.40 mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-139C (MQ) Sheet 1 of 2

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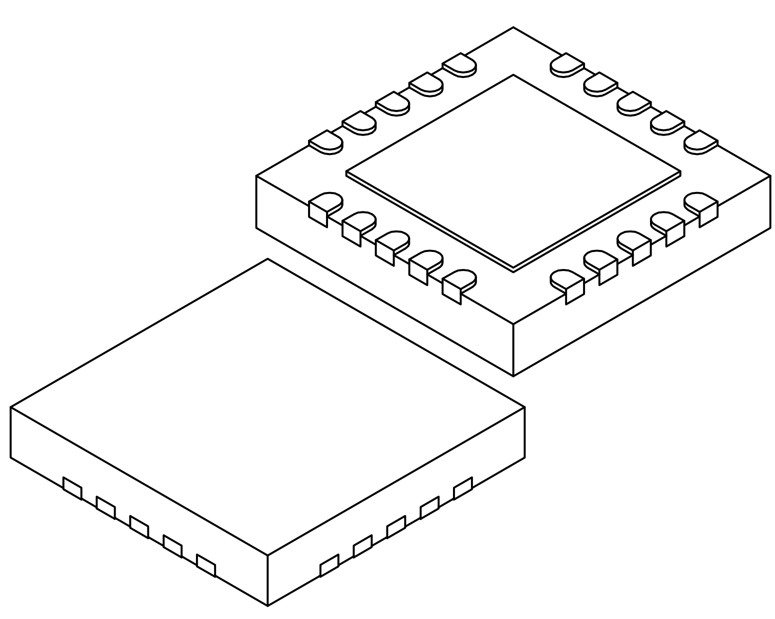
20-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x1.0 mm Body [VQFN] With 0.40 mm Contact Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		20	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	(A3)		0.20 REF	
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.15	3.25	3.35
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.15	3.25	3.35
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.35	0.40	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-139C (MQ) Sheet 2 of 2

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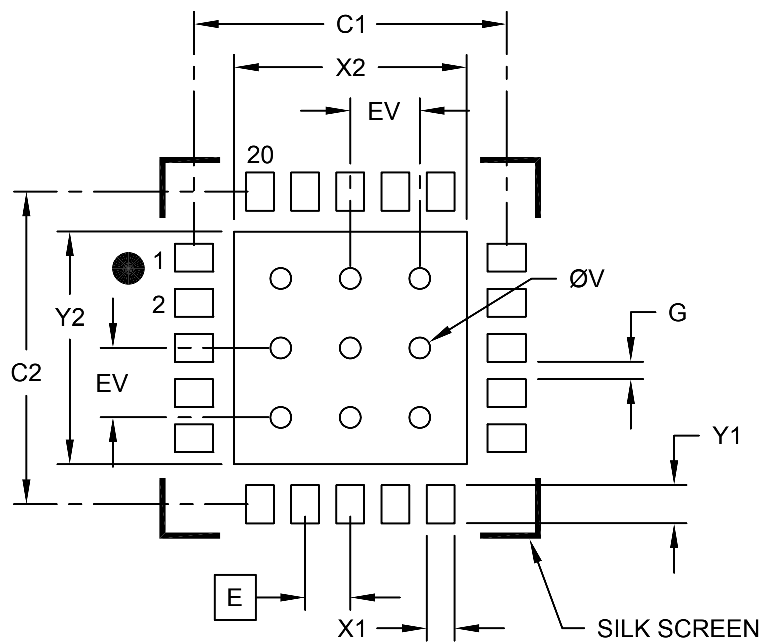
20-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x1.0 mm Body [VQFN] With 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	W2			3.35
Optional Center Pad Length	T2			3.35
Contact Pad Spacing	C1		4.50	
Contact Pad Spacing	C2		4.50	
Contact Pad Width (X20)	X1			0.40
Contact Pad Length (X20)	Y1			0.55
Distance Between Pads	G	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2139B (MQ)

© 2016 Microchip Technology Inc.

24-Lead Very Thin Plastic Quad Flat, No Lead Package (MJ) – 4x4x0.9 mm Body [VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

NOTE 1

N

1

2

(DATUM B)

(DATUM A)

D

A

B

E

2X 0.10 C

2X 0.10 C

TOP VIEW

C

SEATING PLANE

A

(A3)

// 0.10 C

A1

24X 0.08 C

SIDE VIEW

D2

0.10Ⓜ C A B

0.10Ⓜ C A B

E2

e/2

2

1

NOTE 1

N

K

L

24X b

e

0.10Ⓜ C A B

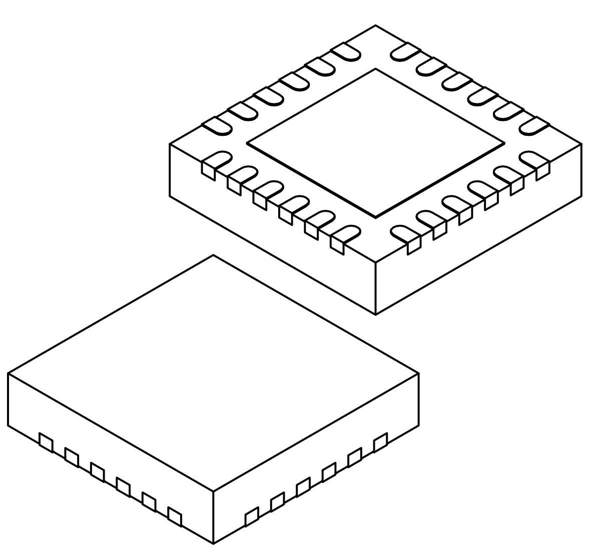
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-143B MJ Sheet 1 of 2

24-Lead Very Thin Plastic Quad Flat, No Lead Package (MJ) – 4x4x0.9 mm Body [VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		24	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.40	2.50	2.60
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.40	2.50	2.60
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-143B MJ Sheet 2 of 2

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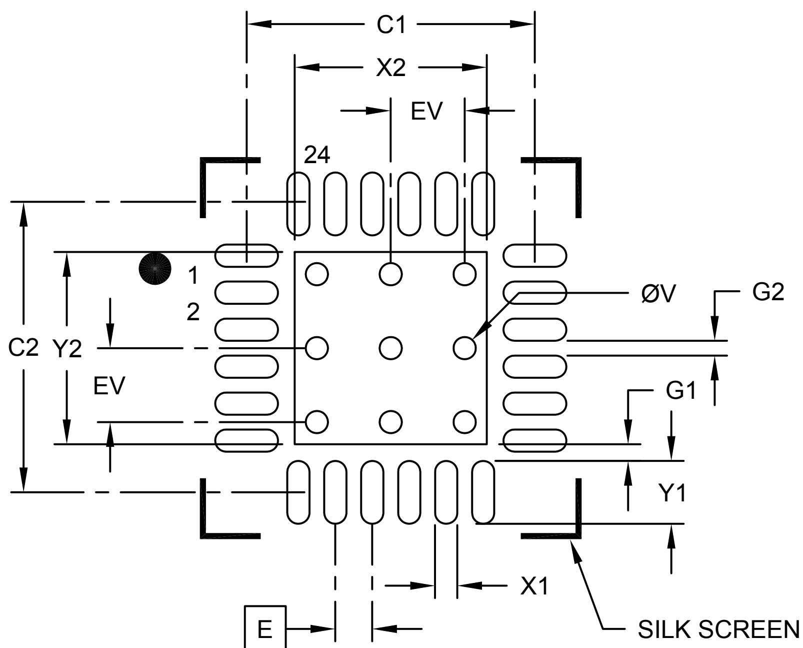
24-Lead Very Thin Plastic Quad Flat, No Lead Package (MJ) – 4x4x0.9 mm Body [VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			2.60
Optional Center Pad Length	Y2			2.60
Contact Pad Spacing	C1		3.90	
Contact Pad Spacing	C2		3.90	
Contact Pad Width (X24)	X1			0.30
Contact Pad Length (X24)	Y1			0.85
Contact Pad to Center Pad (X24)	G1	0.23		
Contact Pad to Contact Pad (X20)	G2	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2143A MJ

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24-Lead Very Thin Plastic Quad Flat, No Lead Package (MJ) – 4x4x0.9 mm Body [VQFN] SMSC Legacy S4QFN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-143B S4QFN Sheet 1 of 2

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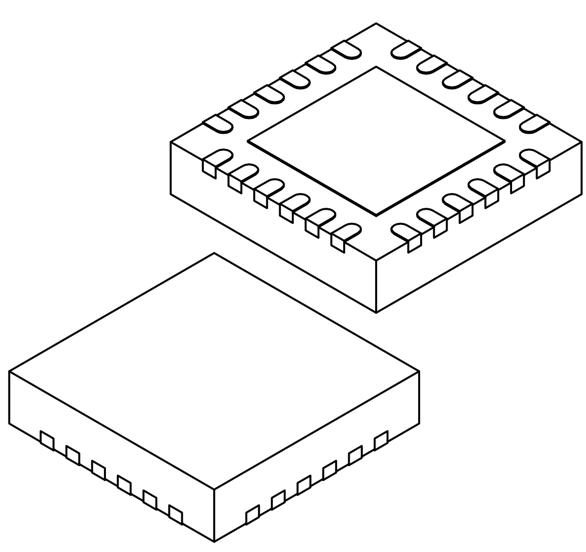
24-Lead Very Thin Plastic Quad Flat, No Lead Package (MJ) – 4x4x0.9 mm Body [VQFN] SMSC Legacy S4QFN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		24	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.40	2.50	2.60
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.40	2.50	2.60
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed Pad	K	0.25	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

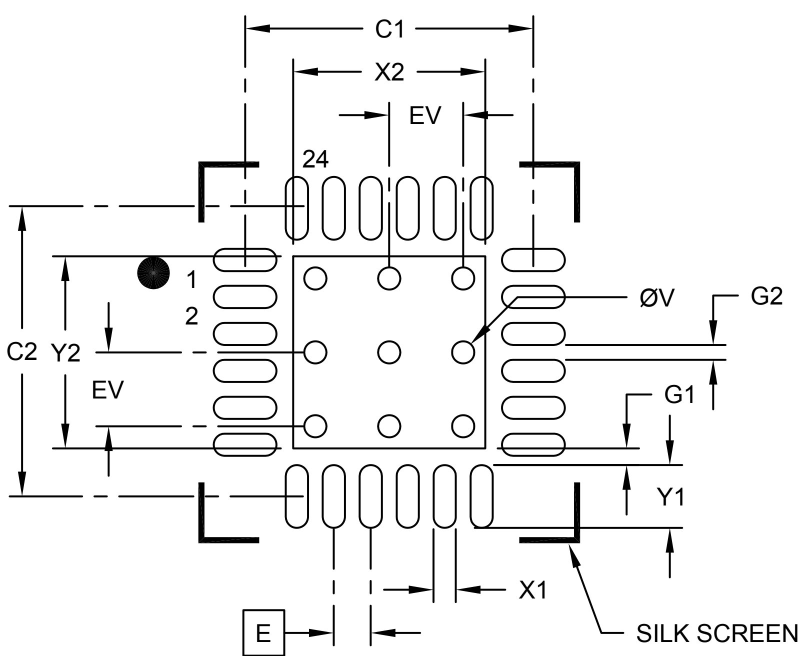
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-143B S4QFN Sheet 2 of 2

24-Lead Very Thin Plastic Quad Flat, No Lead Package (MJ) – 4x4x0.9 mm Body [VQFN] SMSC Legacy S4QFN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			2.60
Optional Center Pad Length	Y2			2.60
Contact Pad Spacing	C1		3.90	
Contact Pad Spacing	C2		3.90	
Contact Pad Width (X24)	X1			0.30
Contact Pad Length (X24)	Y1			0.85
Contact Pad to Center Pad (X24)	G1	0.23		
Contact Pad to Contact Pad (X20)	G2	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2143A S4QFN

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24-Lead Plastic Quad Flat, No Lead Package (LY) – 5x5x1.0 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

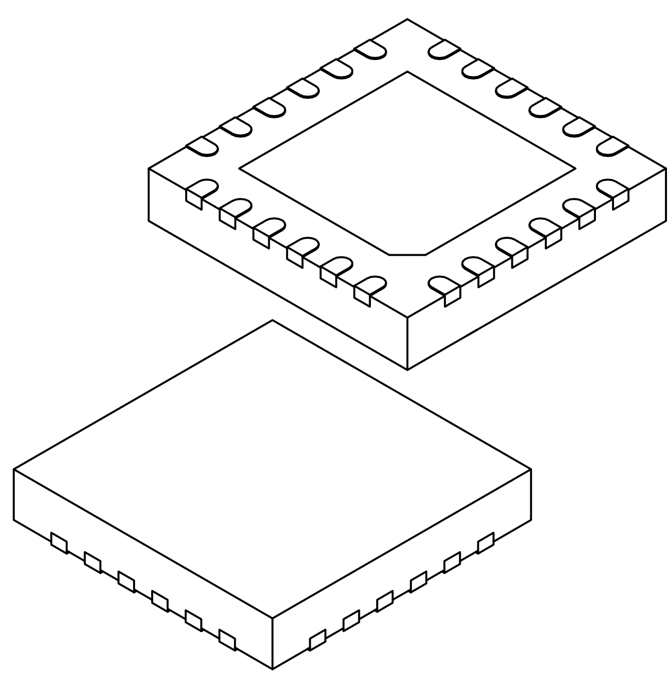
SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-364A Sheet 1 of 2

24-Lead Plastic Quad Flat, No Lead Package (LY) – 5x5x1.0 mm Body [QFN or VQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		24	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.20	3.25	3.30
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.20	3.25	3.30
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-364A Sheet 2 of 2

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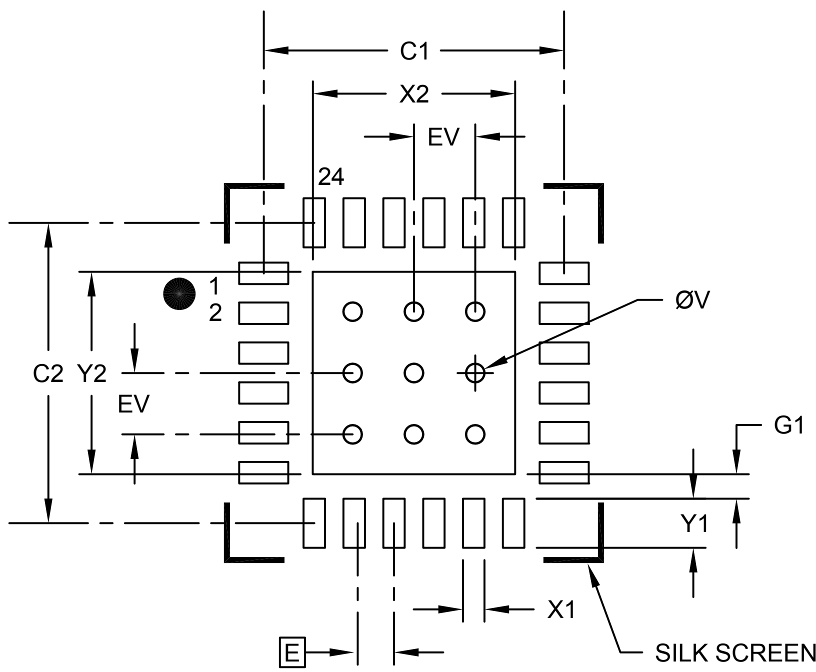
24-Lead Plastic Quad Flat, No Lead Package (LY) – 5x5x1.0 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Center Pad Width	X2			3.30
Center Pad Length	Y2			3.30
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X24)	X1			0.35
Contact Pad Length (X24)	Y1			0.80
Contact Pad to Center Pad (X24)	G1	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2364A

28-Lead Very Thin Plastic Quad Flat Pack, No Lead Package (PV) 5x5 mm Body [VQFN] With Rectangular Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-334A Sheet 1 of 2

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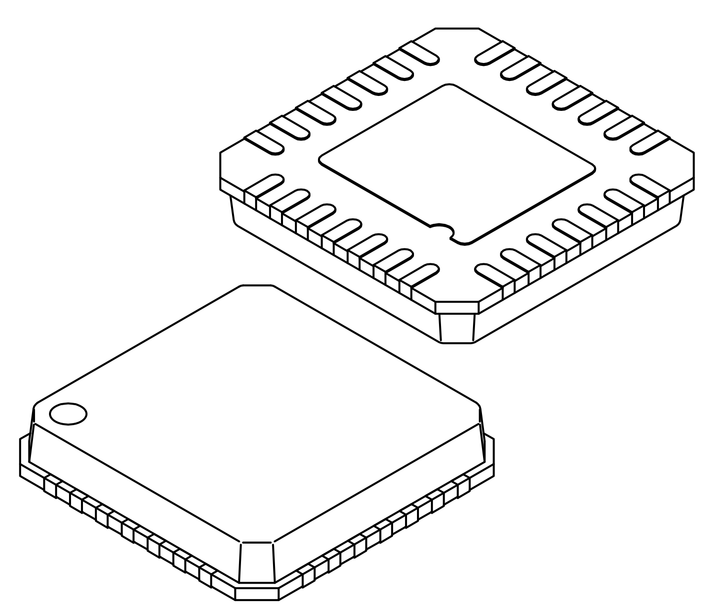
28-Lead Very Thin Plastic Quad Flat Pack, No Lead Package (PV) 5x5 mm Body [VQFN] With Rectangular Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		28	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Terminal Thickness	(A3)		0.20 REF	
Overall Width	D		5.00 BSC	
Molded Cap Width	D1		4.75 BSC	
Exposed Pad Width	D2	2.50	2.60	2.70
Overall Length	E		5.00 BSC	
Molded Cap Length	E1		4.75 BSC	
Exposed Pad Length	E2	2.80	2.90	3.00
Corner Chamfer	CH	0.24	0.42	0.60
Terminal Width	b	0.18	0.23	0.30
Terminal Length	L	0.50	0.60	0.70
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-334A Sheet 2 of 2

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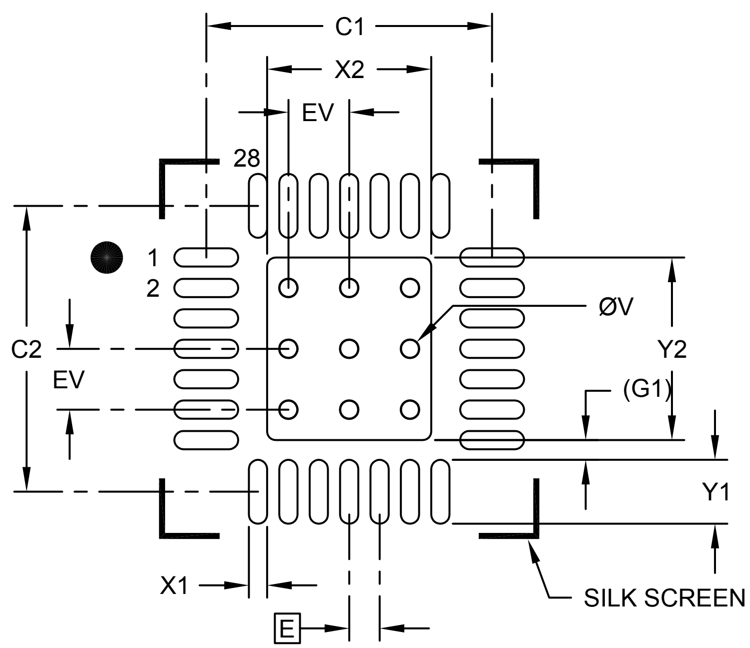
28-Lead Very Thin Plastic Quad Flat, No Lead Package (PV) - 5x5 mm Body [VQFN] With Rectangular Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			2.70
Optional Center Pad Length	Y2			3.00
Contact Pad Spacing	C1		4.70	
Contact Pad Spacing	C2		4.70	
Contact Pad Width (X28)	X1			0.30
Contact Pad Length (X28)	Y1			1.05
Contact Pad to Center Pad (X28)	(G1)	0.475 REF		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2334A

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28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

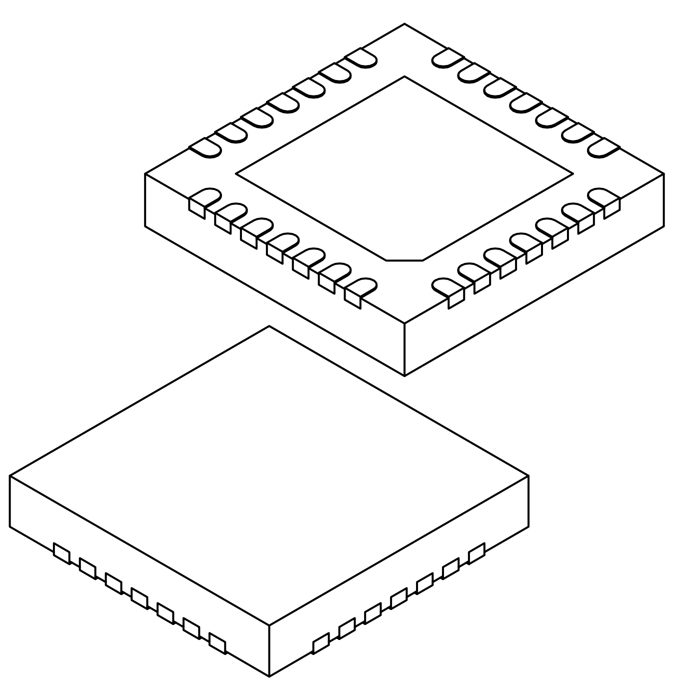
SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-140C Sheet 1 of 2

28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.15	3.25	3.35
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.15	3.25	3.35
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.35	0.40	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-140C Sheet 2 of 2

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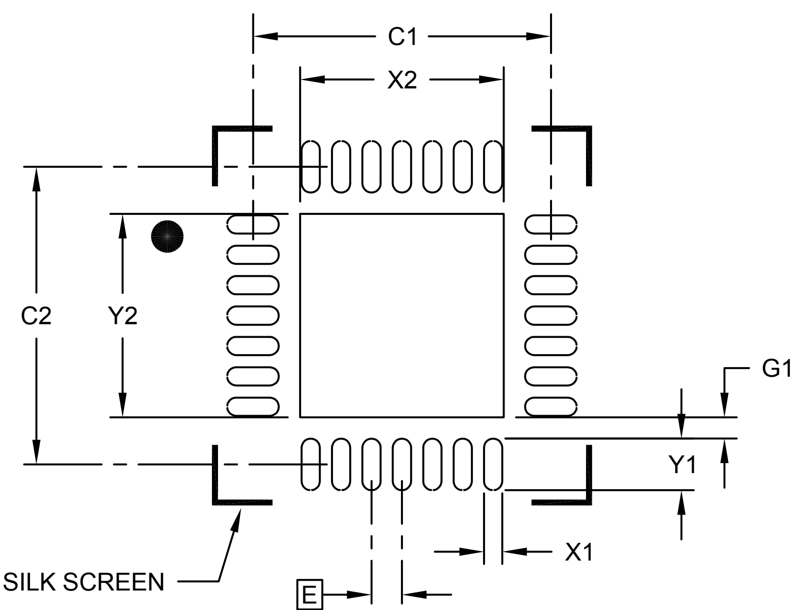
28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			3.35
Optional Center Pad Length	T2			3.35
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X28)	X1			0.30
Contact Pad Length (X28)	Y1			0.85
Contact Pad Length (X28)	G1	0.35		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2140A

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28-Lead Plastic Quad Flat, No Lead Package (MQY) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.10 C
2X
0.10 C
TOP VIEW

C
A
SEATING PLANE
A3
0.10 C
A1
28X
0.08 C
SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
28X K
2
1
NOTE 1
N
28X L
28X b
e
0.10Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-140C Sheet 1 of 2

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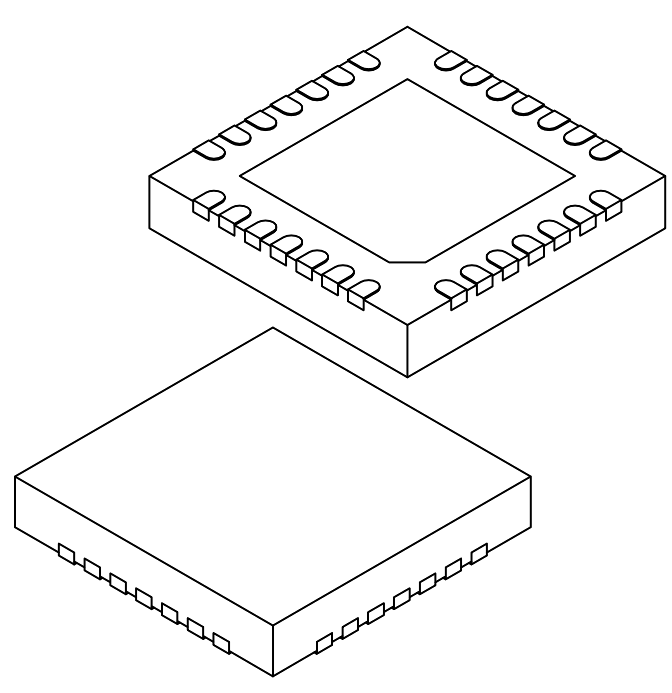
28-Lead Plastic Quad Flat, No Lead Package (MQY) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.15	3.25	3.35
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.15	3.25	3.35
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.35	0.40	0.45
Contact-to-Exposed Pad	K	0.20	-	-

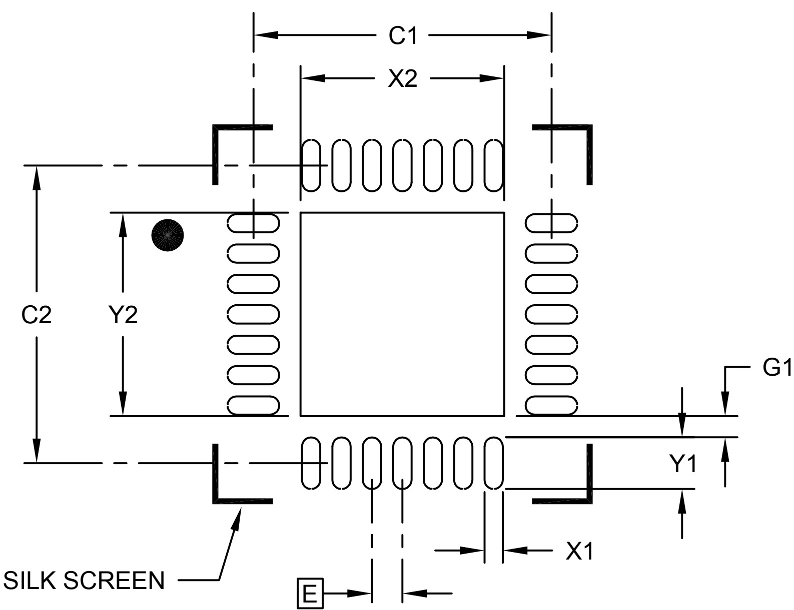
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-140C Sheet 2 of 2

28-Lead Plastic Quad Flat, No Lead Package (MQY) – 5x5x0.9 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	W2			3.35
Optional Center Pad Length	T2			3.35
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X28)	X1			0.30
Contact Pad Length (X28)	Y1			0.85
Contact Pad Length (X28)	G1	0.35		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2140A

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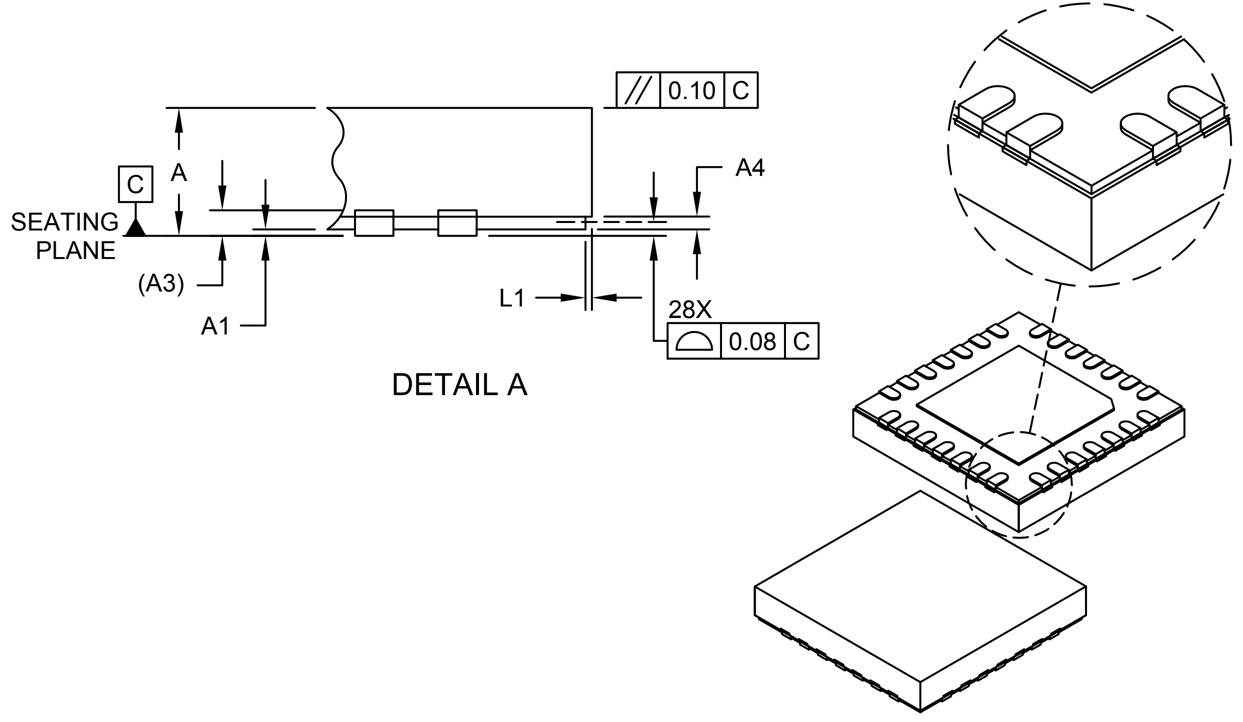
28-Lead Plastic Quad Flat, No Lead Package (5N) - 6x6 mm Body [VQFN] Wettable Flanks (Stepped), 0.55 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-401B Sheet 1 of 2

28-Lead Plastic Quad Flat, No Lead Package (5N) - 6x6 mm Body [VQFN] Wettable Flanks (Stepped), 0.55 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		28	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Step Height	A4	0.05	0.12	0.19
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	3.65	3.70	4.20
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	3.65	3.70	4.20
Terminal Width	b	0.23	0.30	0.35
Terminal Length	L	0.50	0.55	0.70
Step Length	L1	0.035	0.060	0.085
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-401B Sheet 2 of 2

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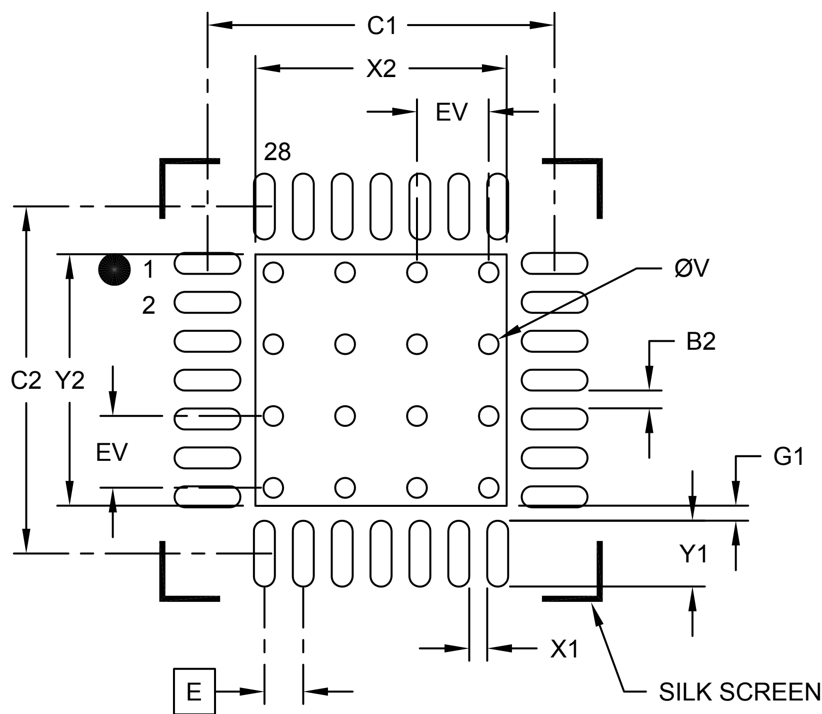
28-Lead Very Thin Plastic Quad Flat, No Lead Package (5N) - 6x6 mm Body [VQFN] Wettable Flanks (Stepped), 0.55 mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	X2			4.20
Optional Center Pad Length	Y2			4.20
Contact Pad Spacing	C1		5.80	
Contact Pad Spacing	C2		5.80	
Contact Pad Width (X28)	X1			0.35
Contact Pad Length (X28)	Y1			1.10
Contact Pad to Center Pad (X28)	G1	0.25		
Contact Pad to Contact Pad (X24)	G2	0.30		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2401A

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28-Lead Very Thin Plastic Quad Flat, No Lead Package (4N) - 6x6x1.0 mm Body [VQFN] 6.45x6.45 mm Exposed Pad, Wettable Flanks (Stepped)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.15 C
2X
0.15 C
TOP VIEW

SEE DETAIL A
C
SEATING PLANE
SIDE VIEW

0.10 M C A B
D2
0.10 M C A B
E2
2
1
K
NOTE 1
N
L
28X b
e
0.10 M C A B
0.05 M C
BOTTOM VIEW

Microchip Technology Drawing C04-400B Sheet 1 of 2

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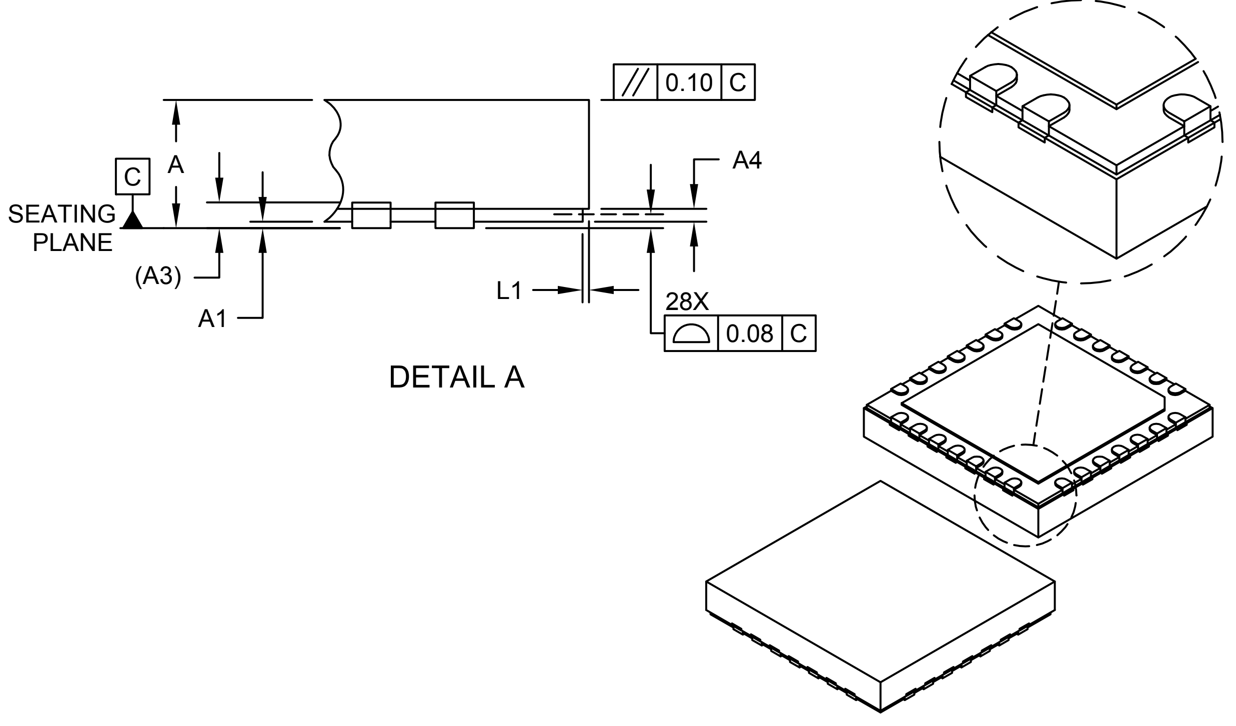
28-Lead Very Thin Plastic Quad Flat, No Lead Package (4N) - 6x6x1.0 mm Body [VQFN] 6.45x6.45 mm Exposed Pad, Wettable Flanks (Stepped)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		28	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Step Height	A4	0.05	0.12	0.19
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	3.65	3.70	4.70
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	3.65	3.70	4.70
Terminal Width	b	0.23	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Step Length	L1	0.035	0.060	0.085
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

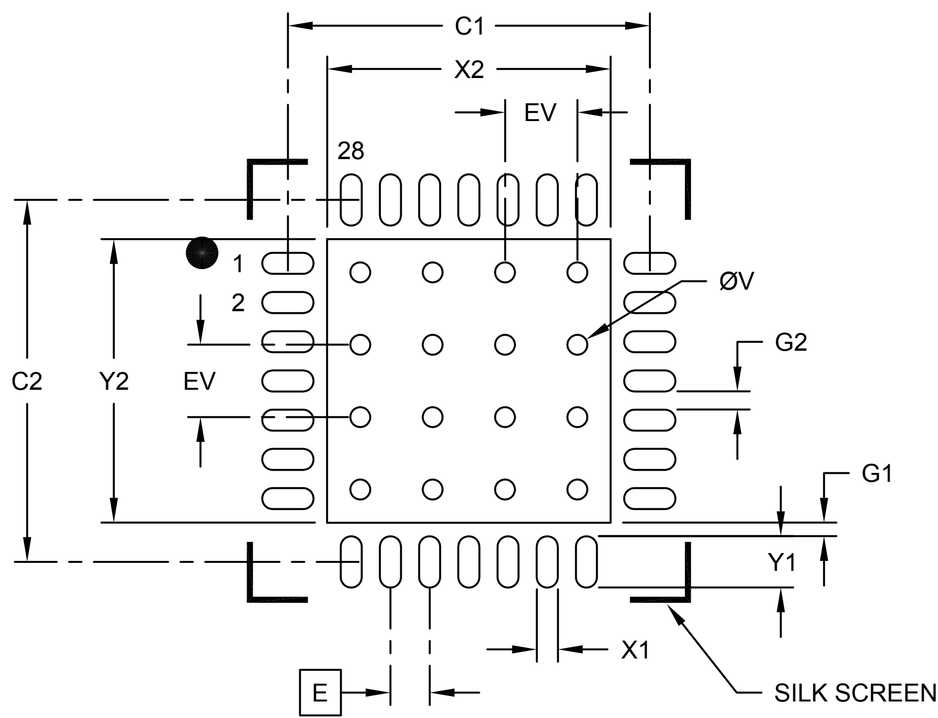
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-400B Sheet 2 of 2

28-Lead Very Thin Plastic Quad Flat, No Lead Package (4N) - 6x6x1.0 mm Body [VQFN] 6.45x6.45 mm Exposed Pad, Wettable Flanks (Stepped)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	X2			4.70
Optional Center Pad Length	Y2			4.70
Contact Pad Spacing	C1		6.00	
Contact Pad Spacing	C2		6.00	
Contact Pad Width (X28)	X1			0.35
Contact Pad Length (X28)	Y1			0.85
Contact Pad to Center Pad (X28)	G1	0.23		
Contact Pad to Contact Pad (X24)	G2	0.30		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		0.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2400A

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32-Lead Very Thin Plastic Quad Flat, No Lead Package (RN) - 5x5 mm Body [VQFN] With 3.3x3.3 mm Exposed Pad, Punch Singulated; Formerly called QFN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D A B
4X 0.10 C
N
1
2
NOTE 1
E1 E
(DATUM B)
(DATUM A)
2X 0.10 C
D1
2X 0.10 C
TOP VIEW

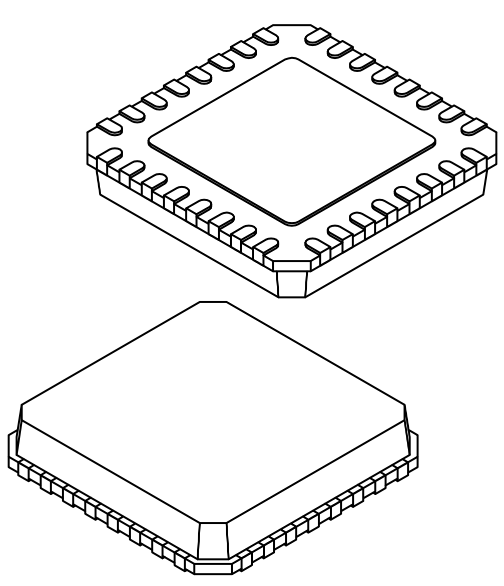
Θ
0.10 C
(A3)
C
A
A2
SEATING PLANE
32X 0.08 C
A1
SIDE VIEW

4X P
0.10Ⓜ C A B
D2
0.10Ⓜ C A B
4X P
E2
e/2
2
1
NOTE 1
N
K
32X L
32X b
e
0.10Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-232A Sheet 1 of 2

32-Lead Very Thin Plastic Quad Flat, No Lead Package (RN) - 5x5 mm Body [VQFN] With 3.3x3.3 mm Exposed Pad, Punch Singulated; Formerly called QFN

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		32	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Terminal Thickness	(A3)		0.20 REF	
Overall Length	D		5.00 BSC	
Mold Cap length	D1		4.75 BSC	
Exposed Pad Length	D2	3.20	3.30	3.40
Overall Width	E		5.00 BSC	
Mold Cap Width	E1		4.75 BSC	
Exposed Pad Width	E2	3.20	3.30	3.40
Chamfer	P	0.24	0.42	0.60
Terminal Width	b	0.18	0.23	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.25	-	-
Mold Draft Angle	Θ	0°	-	14°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-232A Sheet 2 of 2

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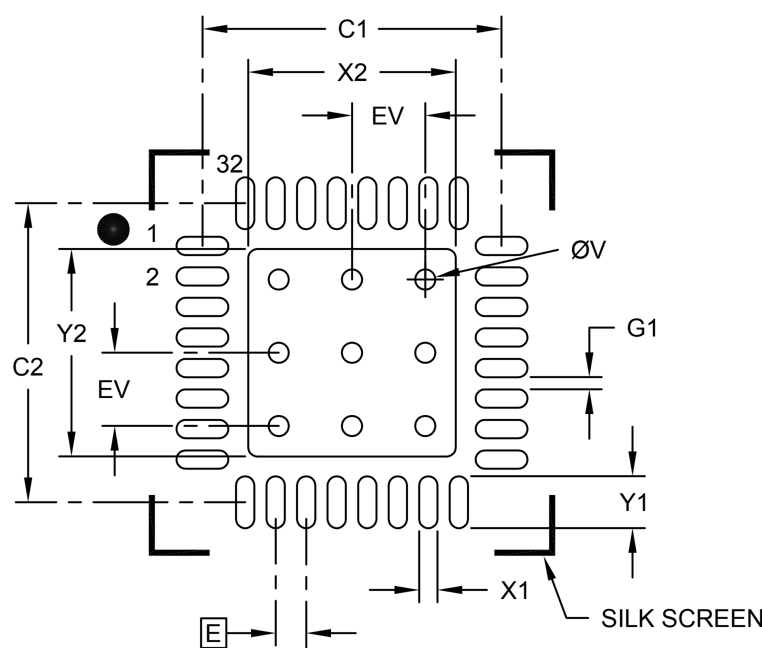
32-Lead Very Thin Plastic Quad Flat, No Lead Package (RN) - 5x5 mm Body [VQFN] With 3.3x3.3 mm Exposed Pad, Punch Singulated; Formerly called QFN

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			3.40
Optional Center Pad Length	Y2			3.40
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X32)	X1			0.30
Contact Pad Length (X32)	Y1			0.85
Space Between Contacts (X28)	G1	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2232A

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32-Lead Very Thin Plastic Quad Flat, No Lead Package (MQ) - 5x5x0.9 mm Body [VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
1
2
NOTE 1
E
(DATUM B)
(DATUM A)
2X
0.20 C
2X
0.20 C

TOP VIEW

0.10 C
(A3)
A1
C
A
SEATING PLANE
32X
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
e/2
2
1
NOTE 1
N
32X K
32X L
32X b
e
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-160B MQ Sheet 1 of 2

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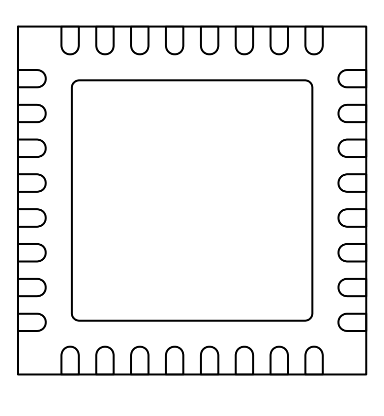
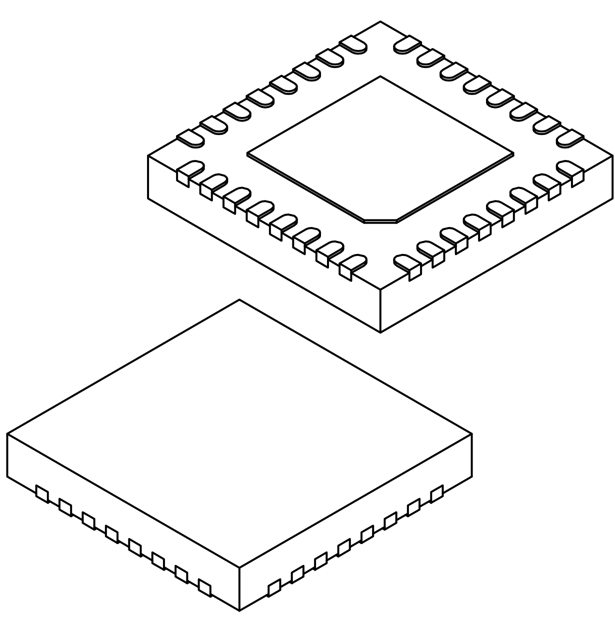
32-Lead Very Thin Plastic Quad Flat, No Lead Package (MQ) - 5x5x0.9 mm Body [VQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		32	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.70	-	3.90
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.70	-	3.90
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

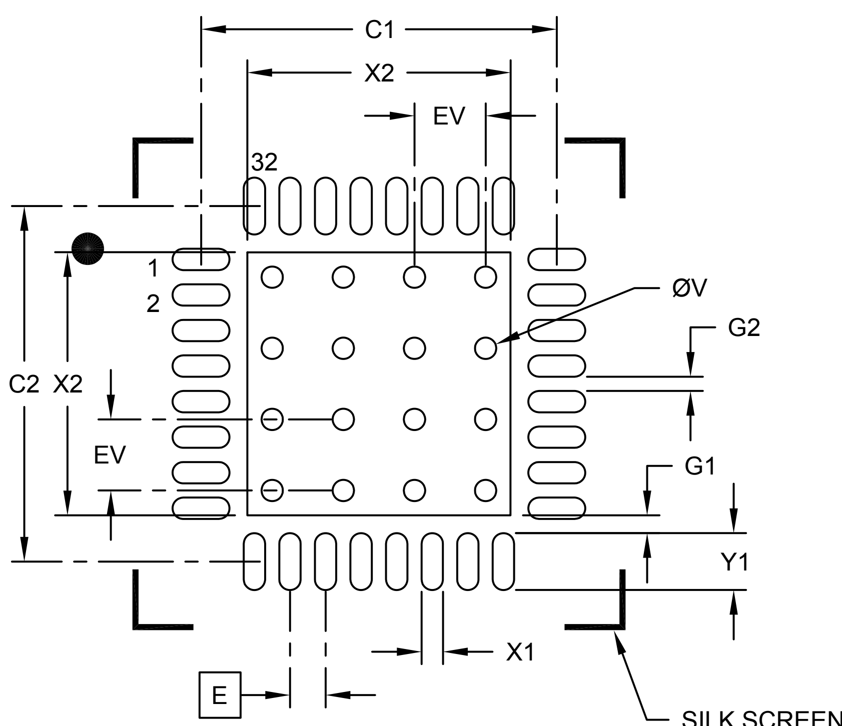
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-160B MQ Sheet 2 of 2

32-Lead Very Thin Plastic Quad Flat, No Lead Package (MQ) - 5x5 mm Body [VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			3.70
Optional Center Pad Length	Y2			3.70
Contact Pad Spacing	C1		5.00	
Contact Pad Spacing	C2		5.00	
Contact Pad Width (X32)	X1			0.30
Contact Pad Length (X32)	Y1			0.80
Contact Pad to Center Pad (X32)	G1	0.25		
Contact Pad to Contactr Pad (X28)	G2	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2160C MQ

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32-Lead Very Thin Plastic Quad Flat, No Lead Package (MQ) - 5x5x0.9 mm Body [VQFN] SMSC LEGACY SQFN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
1
2
NOTE 1
E
(DATUM B)
(DATUM A)
2X 0.20 C
2X 0.20 C

TOP VIEW

(A3)
// 0.10 C
C
A
A1
SEATING PLANE
32X 0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
e/2
2
1
NOTE 1
N
32X K
32X L
32X b
e
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-160B SQFN Sheet 1 of 2

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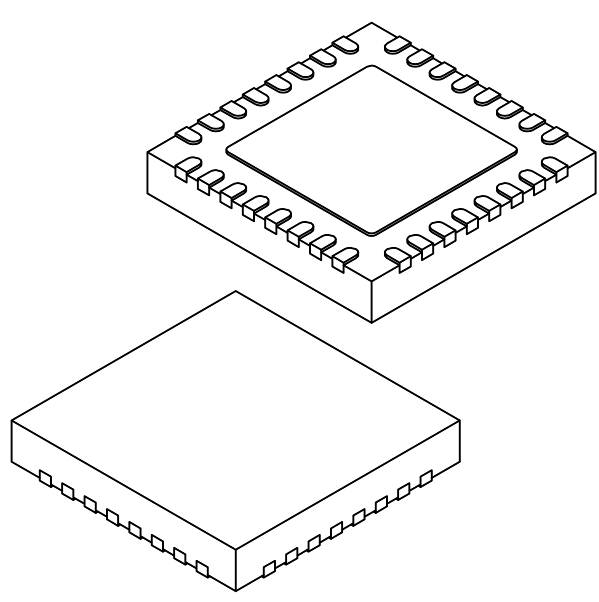
32-Lead Very Thin Plastic Quad Flat, No Lead Package (MQ) - 5x5x0.9 mm Body [VQFN] SMSC LEGACY SQFN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		32	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.20	3.30	3.40
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.20	3.30	3.40
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-160B SQFN Sheet 2 of 2

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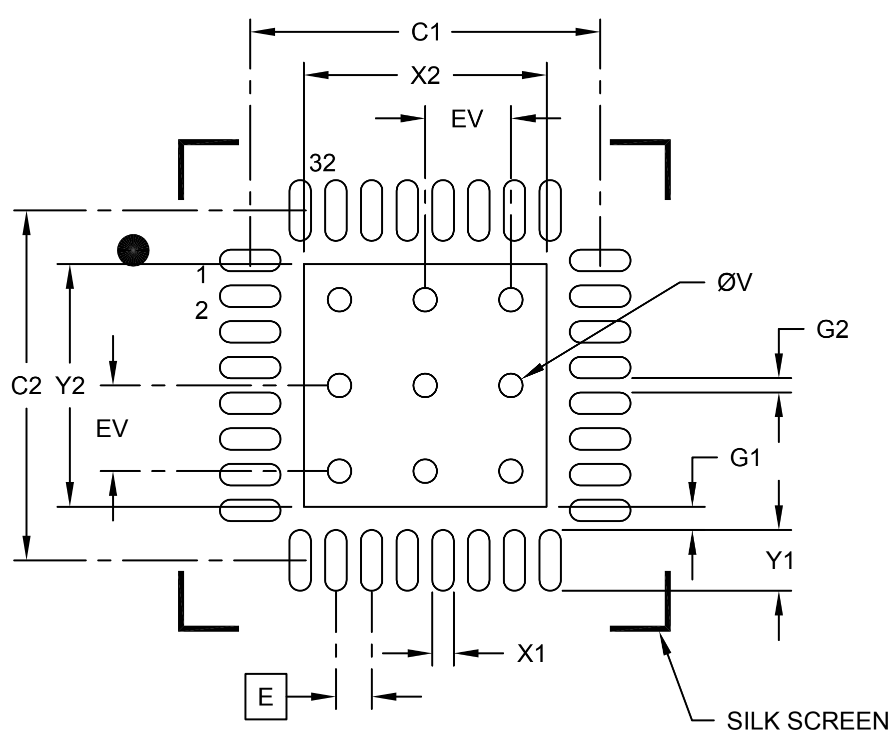
32-Lead Very Thin Plastic Quad Flat, No Lead Package (MQ) - 5x5mm Body [VQFN] SMSC LEGACY SQFN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			3.40
Optional Center Pad Length	Y2			3.40
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X32)	X1			0.30
Contact Pad Length (X32)	Y1			0.85
Contact Pad to Center Pad (X32)	G1	0.33		
Contact Pad to Contactr Pad (X28)	G2	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2160C SQFN

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32-Lead Very Thin Plastic Quad Flat, No Lead Package (P5A) - 5x5x0.9 mm Body [VQFN] With 3.5x3.5 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
1
2
NOTE 1
(DATUM B)
(DATUM A)
E
2X
0.20 C
2X
0.20 C

TOP VIEW

0.10 C
C
A
SEATING PLANE
A1
(A3)
32X
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
e/2
2
1
NOTE 1
N
32X K
32X L
32X b
e
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-1205A Sheet 1 of 2

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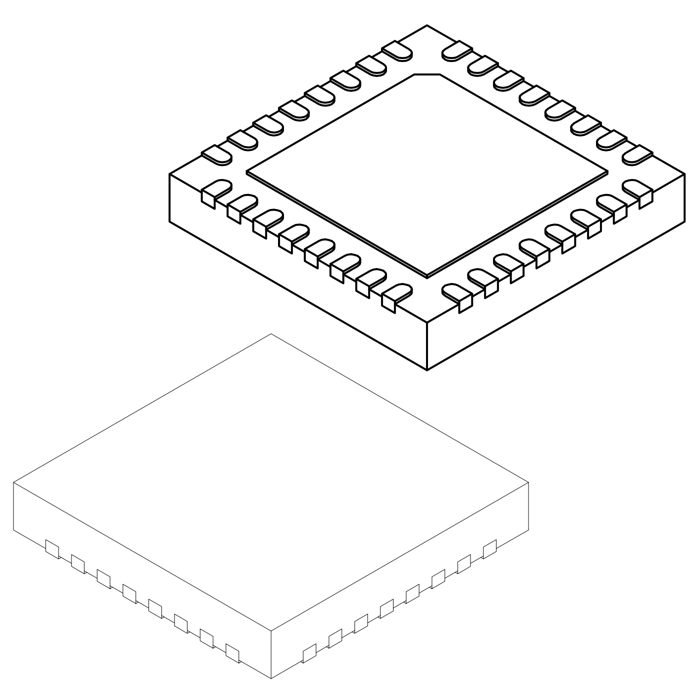
Package Outlines and Dimensions

32-Lead Very Thin Plastic Quad Flat, No Lead Package (P5A) - 5x5x0.9 mm Body [VQFN] With 3.5x3.5 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		32	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.40	3.50	3.60
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.40	3.50	3.60
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

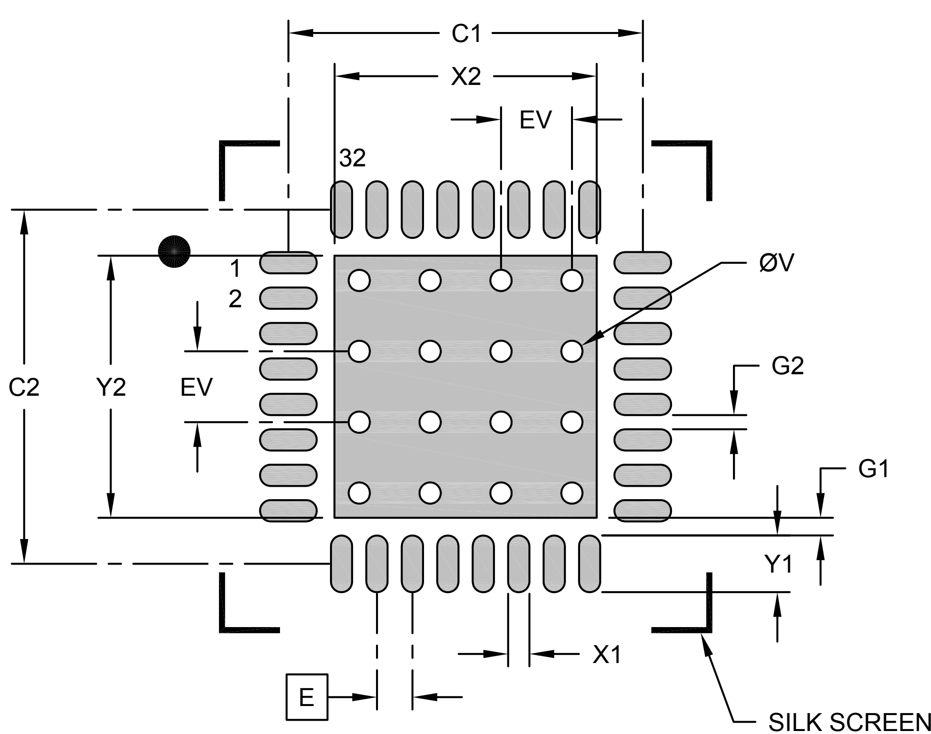
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1205A Sheet 2 of 2

32-Lead Very Thin Plastic Quad Flat, No Lead Package (P5A) - 5x5x0.9 mm Body [VQFN] With 3.5x3.5 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			3.70
Optional Center Pad Length	Y2			3.70
Contact Pad Spacing	C1		5.00	
Contact Pad Spacing	C2		5.00	
Contact Pad Width (X32)	X1			0.30
Contact Pad Length (X32)	Y1			0.80
Contact Pad to Center Pad (X32)	G1	0.25		
Contact Pad to Contactr Pad (X28)	G2	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3205a

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32-Lead Very Thin Plastic Quad Flat, No Lead Package (PHA) - 6x6 mm Body [VQFN] Wettable Flanks, Multiple Exposed Pads

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
NOTE 1
N
1
2
(DATUM B)
(DATUM A)
E
2X
0.15 C
2X
0.15 C
TOP VIEW

(A3)
DETAIL 1
32X
0.08 C
A1
A
0.10 C
SIDE VIEW

K2
K2
D4
D3
D5
K3
E3
D5
DETAIL 2
e/2
K2
E2
2
1
A
32X b
0.10Ⓜ C A B
0.05Ⓜ C
0.10Ⓜ C A B
A
N
NOTE 1
K1
L
e
D2
BOTTOM VIEW

Microchip Technology Drawing C04-1196A Sheet 1 of 2

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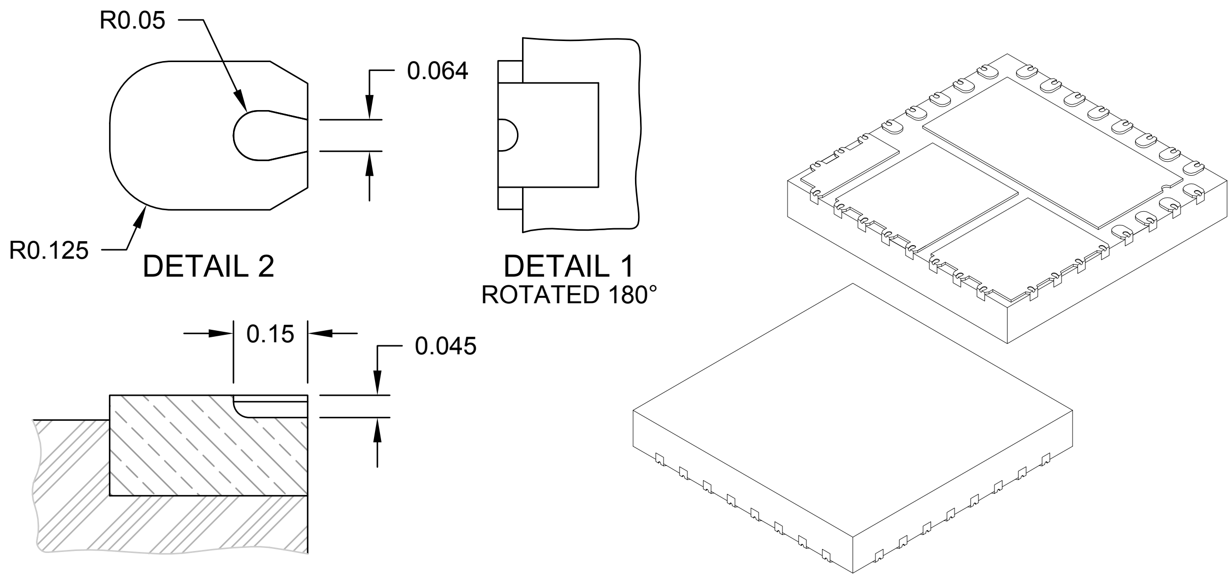
32-Lead Very Thin Plastic Quad Flat, No Lead Package (PHA) - 6x6 mm Body [VQFN] Wettable Flanks, Multiple Exposed Pads

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



SECTION A-A

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		32	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.203 REF	
Overall Length	D		6.00 BSC	
Overall Width	E		6.00 BSC	
Exposed Pad Length	D2	4.70	4.80	4.90
Exposed Pad Width	E2	2.215	2.315	2.415
Exposed Pad Length	D3	1.985	2.085	2.185
Exposed Pad Width	E3	2.545	2.645	2.745
Exposed Pad Length	D4	2.240	2.340	2.440
Exposed Pad Length	D5	0.595	0.695	0.795
Exposed Pad Width	E5	1.895	1.995	2.095
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed Pad	K1	0.20	-	-
Exposed Pad-to-Exposed Pad	K2	0.20	0.26	-
Pacakge Edgel-to-Exposed Pad	K3	0.18	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1196A Sheet 2 of 2

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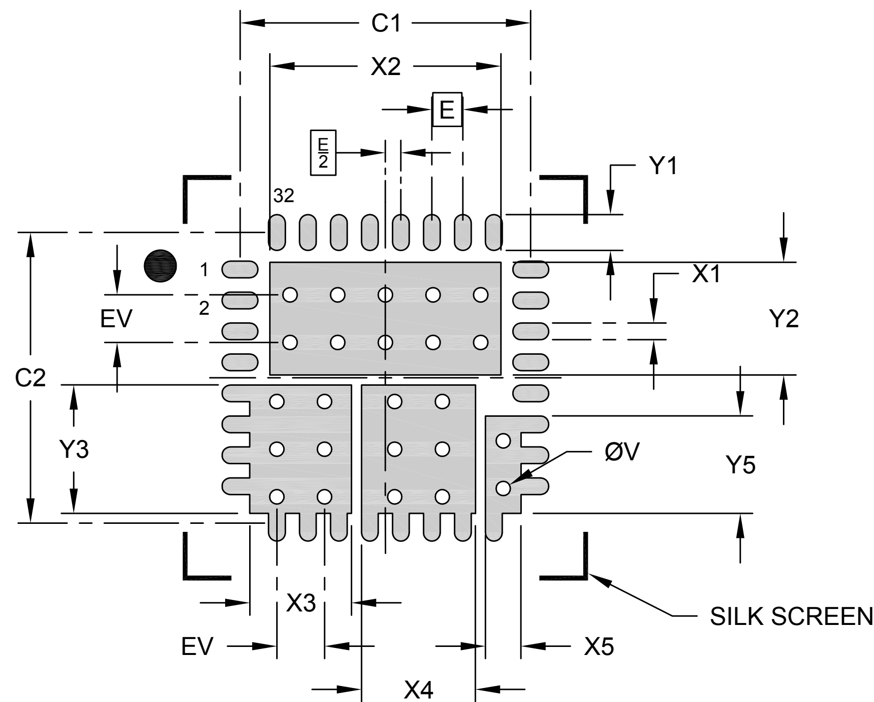
32-Lead Very Thin Plastic Quad Flat, No Lead Package (PHA) - 6x6 mm Body [VQFN] Wettable Flanks, Multiple Exposed Pads

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Width (X32)	X1			0.35
Contact Pad Length (X32)	Y1			0.75
Contact Pad Spacing	C1		6.10	
Contact Pad Spacing	C2		6.10	
Inner Pad Length	X2			4.85
Inner Pad Width	Y2			2.36
Inner Pad Length	X3			2.13
Inner Pad Width	Y3			2.69
Inner Pad Length	X4			2.39
Inner Pad Length	X5			0.74
Inner Pad Width	Y5			2.04
Thermal Via Diameter (X26)	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3196A

36-Terminal Very Thin Plastic Quad Flatpack No-Lead (M2) - 6x6x1.0mm Body [VQFN]
SMSC Legacy "Sawn Quad Flatpack No-Lead [SQFN]"

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-272B-M2 Sheet 1 of 2

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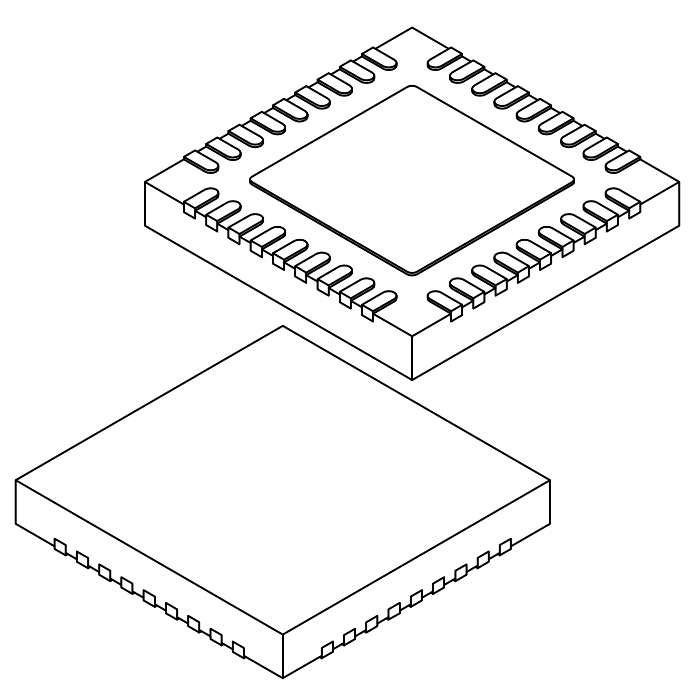
36-Terminal Very Thin Plastic Quad Flatpack No-Lead (M2) - 6x6x1.0mm Body [VQFN] SMSC Legacy "Sawn Quad Flatpack No-Lead [SQFN]"

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		36	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	3.60	3.70	3.80
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	3.60	3.70	3.80
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.50	0.60	0.75
Terminal-to-Exposed-Pad	K	0.45	0.55	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

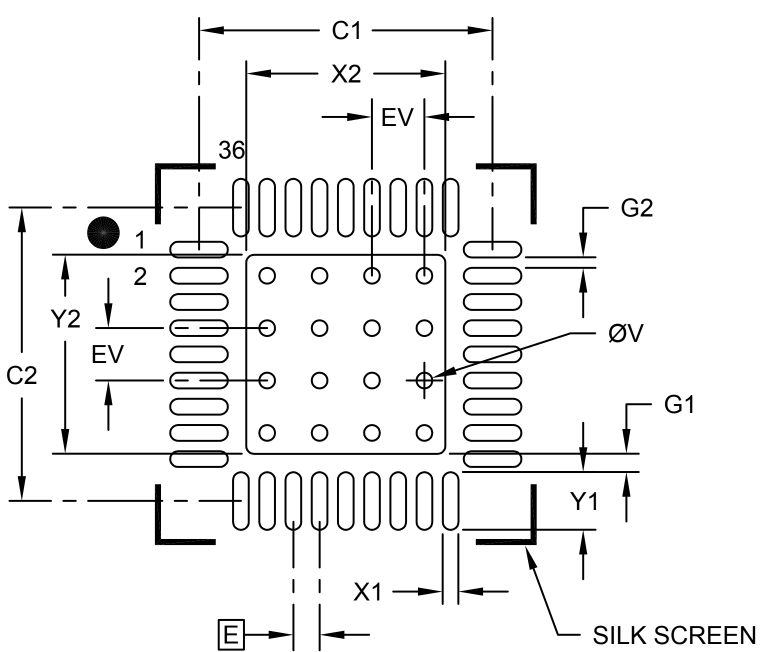
    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

    REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-272B-M2 Sheet 2 of 2

36-Terminal Very Thin Plastic Quad Flatpack No-Lead (M2) - 6x6x0.9 mm Body [VQFN]
SMSC Legacy "Sawn Quad Flatpack No-Lead [SQFN]"

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			3.80
Optional Center Pad Length	Y2			3.80
Contact Pad Spacing	C1		5.60	
Contact Pad Spacing	C2		5.60	
Contact Pad Width (X36)	X1			0.30
Contact Pad Length (X36)	Y1			1.10
Contact Pad to Center Pad (X36)	G1	0.35		
Space Between Contact Pads (X32)	G2	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2272B-M2

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36-Terminal Very Thin Plastic Quad Flatpack No-Lead (AEN) - 6x6x1.0 mm Body [VQFN] SMSC Legacy "Sawn Quad Flatpack No-Lead [SQFN]"

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
NOTE 1
N
1
2
E
(DATUM B)
(DATUM A)
2X
0.10 C
2X
0.10 C
TOP VIEW

C
SEATING PLANE
A
(A3)
0.10 C
A1
36X
0.08 C
SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
2
1
NOTE 1
N
K
L
36X b
e
0.10Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-272B-AEN Sheet 1 of 2

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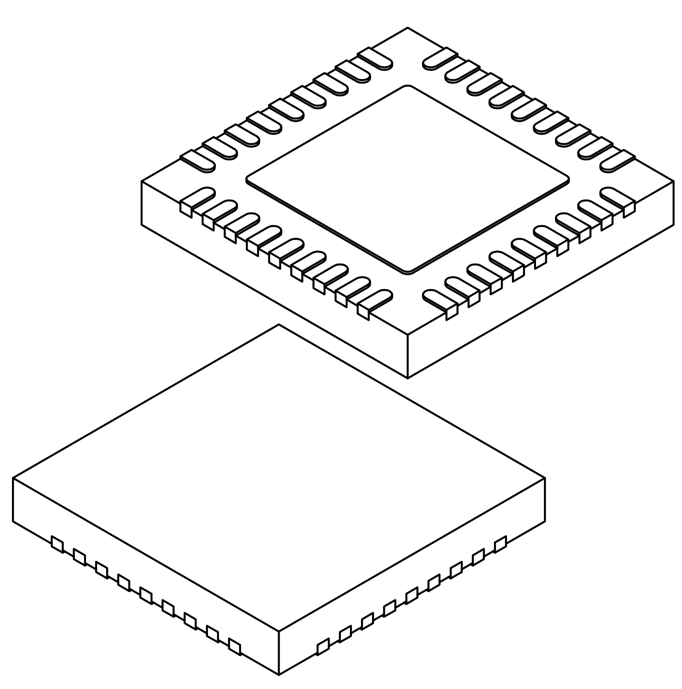
36-Terminal Very Thin Plastic Quad Flatpack No-Lead (AEN) - 6x6x1.0 mm Body [VQFN] SMSC Legacy "Sawn Quad Flatpack No-Lead [SQFN]"

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		36	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	3.60	3.70	3.80
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	3.60	3.70	3.80
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.50	0.60	0.75
Terminal-to-Exposed-Pad	K	0.45	0.55	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-272B-AEN Sheet 2 of 2

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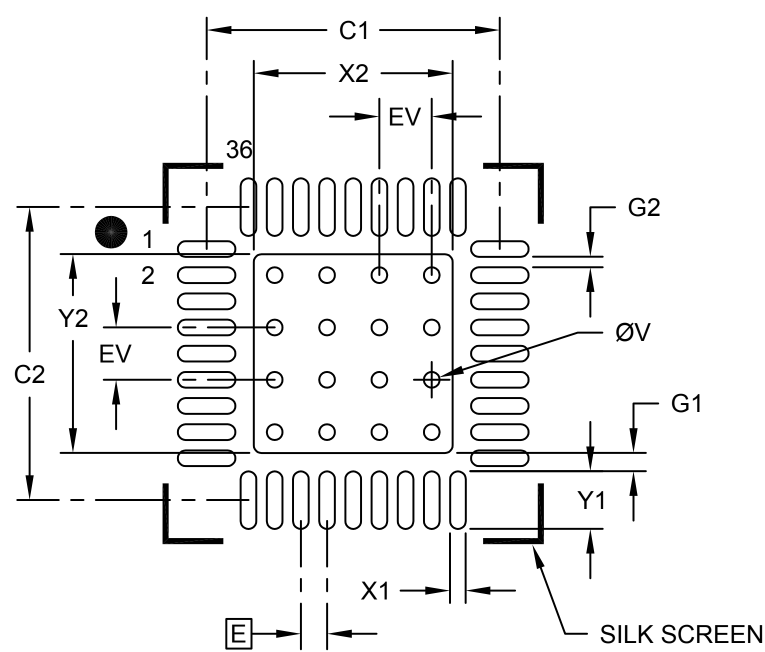
36-Terminal Very Thin Plastic Quad Flatpack No-Lead (AEN) - 6x6x0.9 mm Body [VQFN]
SMSC Legacy "Sawn Quad Flatpack No-Lead [SQFN]"

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			3.80
Optional Center Pad Length	Y2			3.80
Contact Pad Spacing	C1		5.60	
Contact Pad Spacing	C2		5.60	
Contact Pad Width (X36)	X1			0.30
Contact Pad Length (X36)	Y1			1.10
Contact Pad to Center Pad (X36)	G1	0.35		
Space Between Contact Pads (X32)	G2	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2272B-AEN

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40-Lead Very Thin Quad Flat, No Lead Package (NPA) – 5.0x6.5 mm body [VQFN] With Dimpled Wettable Flanks

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-1206A Sheet 1 of 2

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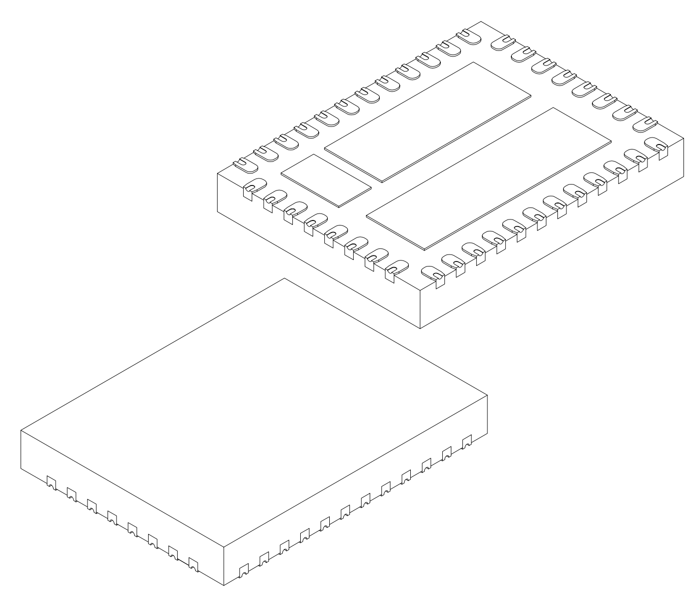
40-Lead Very Thin Quad Flat, No Lead Package (NPA) – 5.0x6.5 mm body [VQFN] With Dimpled Wettable Flanks

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		40	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.203 REF	
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	1.32	1.42	1.52
Overall Width	E		6.50 BSC	
Exposed Pad Width	E2	4.51	4.61	4.71
Exposed Pad Width	E3	3.03	3.13	3.23
Exposed Pad Width	E4	1.26	1.36	1.46
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K1	-	0.409	-
Terminal-to-Exposed-Pad	K2	-	0.505	-
Terminal-to-Exposed-Pad	K3	-	0.363	-
Terminal-to-Exposed-Pad	K4	-	0.595	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1206A Sheet 2 of 2

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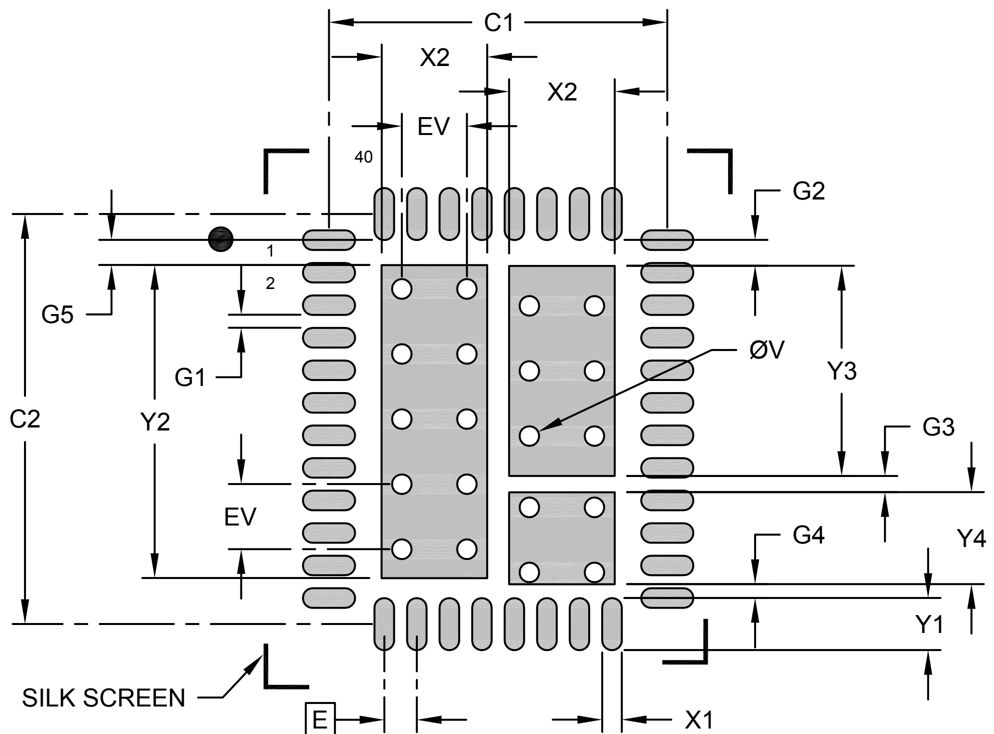
40-Lead Very Thin Quad Flat, No Lead Package (NPA) – 5.0x6.5 mm body [VQFN] With Dimpled Wettable Flanks

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Contact Pad Width (X40)	X1			0.30
Contact Pad Length (X40)	Y1			0.80
Contact Pad Spacing	C1		5.20	
Contact Pad Spacing	C2		6.30	
Exposed Pad Width	X2			1.62
Exposed Pad Length	Y2			4.81
Exposed Pad Length	Y3			3.23
Exposed Pad Length	Y4			1.41
Pad to Pad	G1	0.20		
Pad to Pad	G2	0.40		
Pad to Pad	G3	0.25		
Pad to Pad	G4	0.20		
Pad to Pad	G5	0.38		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3206A

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40-Lead Very Thin Plastic Quad Flat, No Lead Package (PQA) - 6x6 mm Body [VQFN] With 4.1x4.1 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

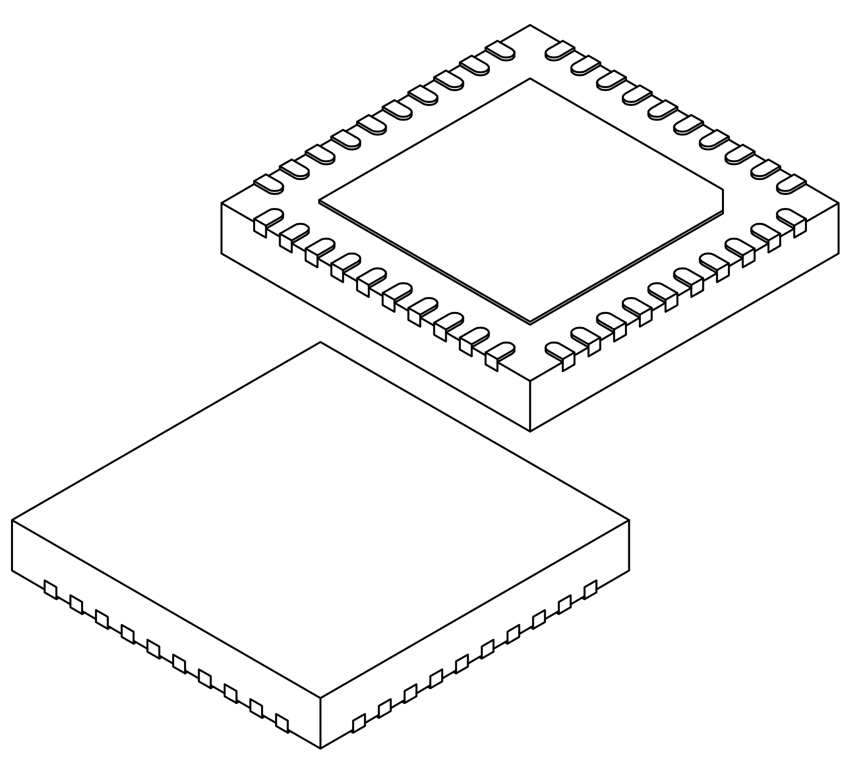
SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-1109A Sheet 1 of 2

40-Lead Very Thin Plastic Quad Flat, No Lead Package (PQA) - 6x6 mm Body [VQFN] With 4.1x4.1 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		40	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.203 REF	
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	4.05	4.10	4.15
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	4.05	4.10	4.15
Terminal Width	b	0.18	0.23	0.28
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1109A Sheet 2 of 2

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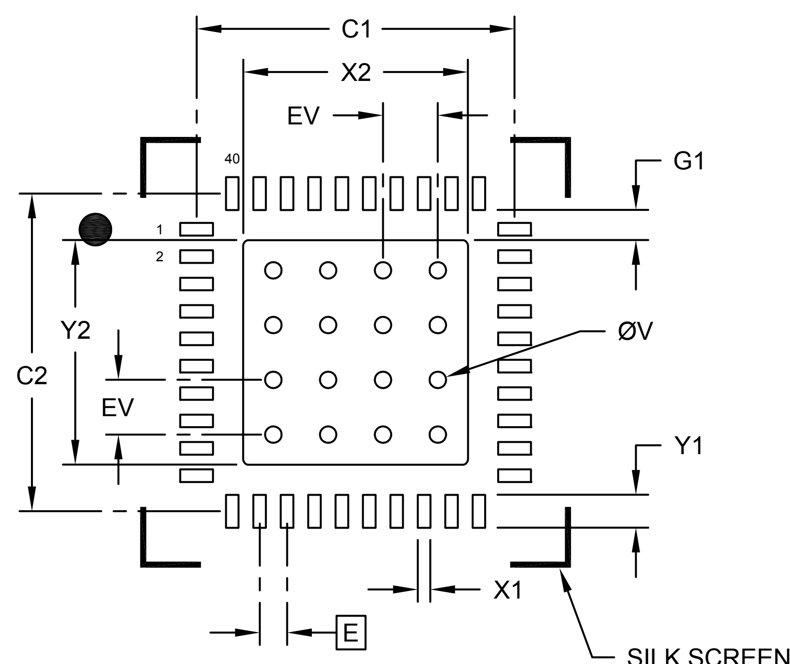
40-Lead Very Thin Plastic Quad Flat, No Lead Package (PQA) - 6x6 mm Body [VQFN] With 4.1x4.1 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Center Pad Width	X2			4.10
Center Pad Length	Y2			4.10
Contact Pad Spacing	C1		5.80	
Contact Pad Spacing	C2		5.80	
Contact Pad Width (X40)	X1			0.23
Contact Pad Length (X40)	Y1			0.60
Contact Pad to Center Pad (X20)	G1	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

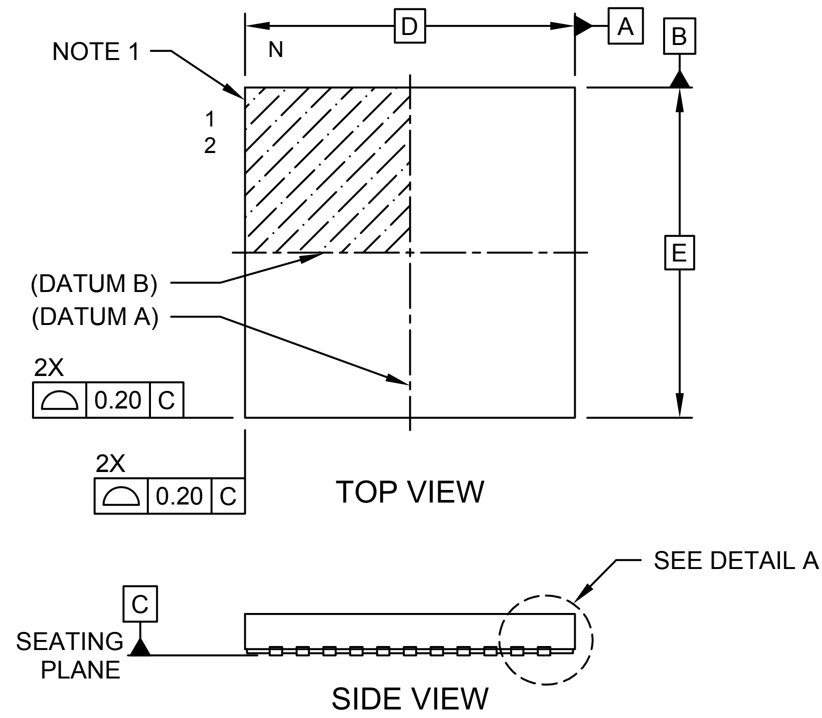
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

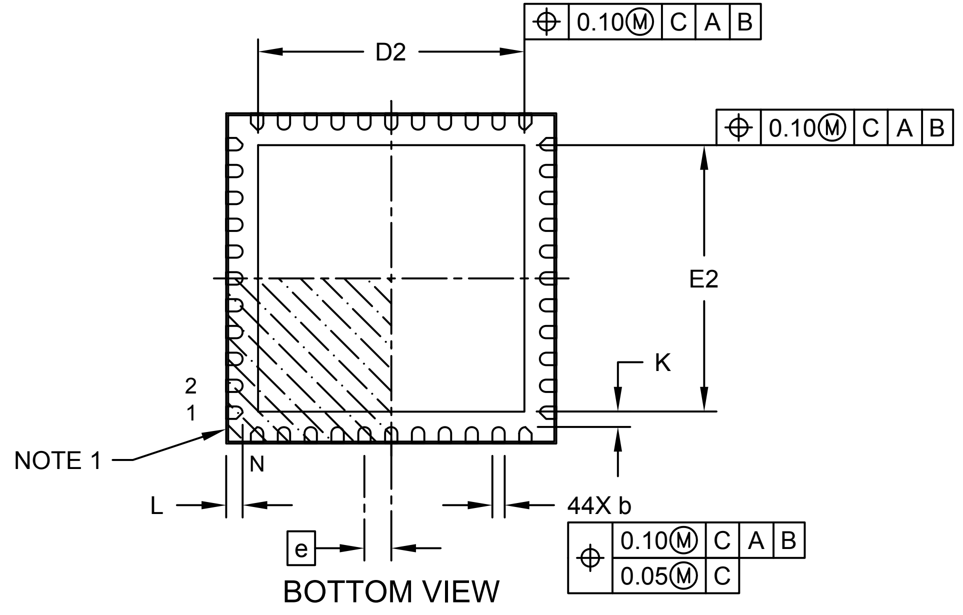
2. For best soldering results, thermal vias should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3109A

44-Lead Very Thin Plastic Quad Flat, No Lead Package (3N) - 8x8x1.0 mm Body [VQFN] With Wettable Flanks (Stepped)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Microchip Technology Drawing C04-399B Sheet 1 of 2

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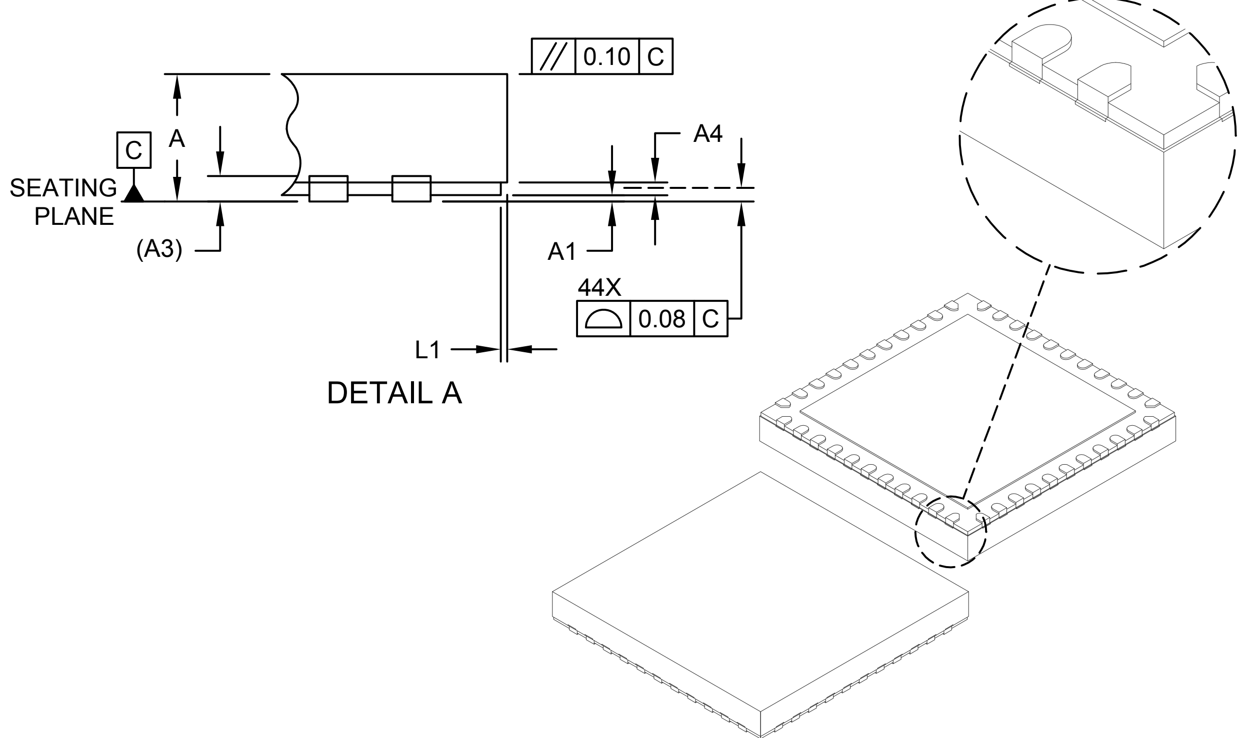
44-Lead Very Thin Plastic Quad Flat, No Lead Package (3N) - 8x8x1.0 mm Body [VQFN] With Wettable Flanks (Stepped)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		44	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Step Height	A4	0.05	0.12	0.19
Overall Length	D		8.00 BSC	
Exposed Pad Length	D2	6.25	6.45	6.60
Overall Width	E		8.00 BSC	
Exposed Pad Width	E2	6.25	6.45	6.60
Terminal Width	b	0.20	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Step Length	L1	0.035	0.060	0.085
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

    REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-399B Sheet 2 of 2

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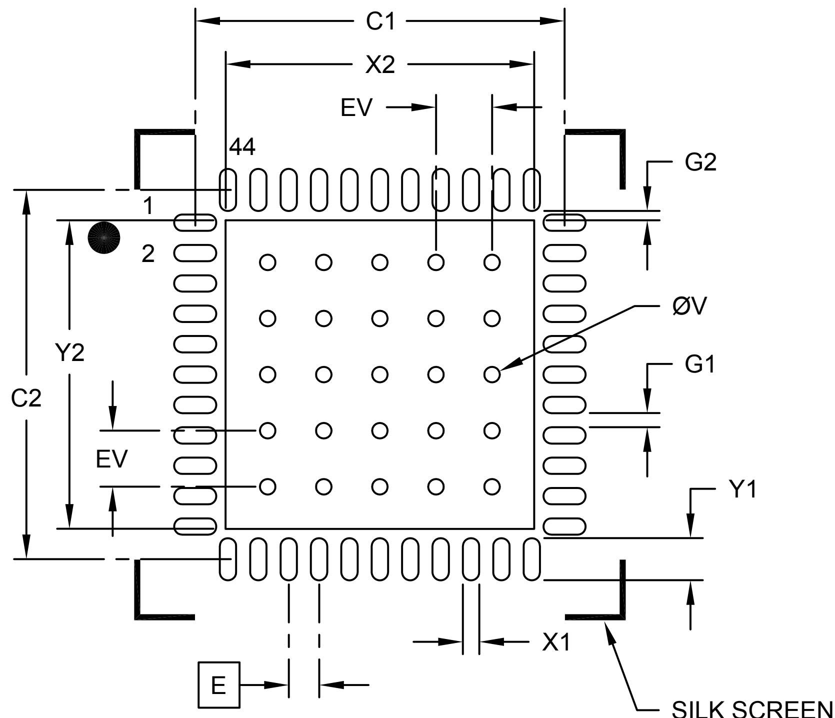
44-Lead Very Thin Plastic Quad Flat, No Lead Package (3N) - 8x8x1.0 mm Body [VQFN] With Wettable Flanks (Stepped)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	X2			6.60
Optional Center Pad Length	Y2			6.60
Contact Pad Spacing	C1		7.90	
Contact Pad Spacing	C2		7.90	
Contact Pad Width (X44)	X1			0.35
Contact Pad Length (X44)	Y1			0.90
Contact Pad to Pad (X40)	G1	0.30		
Contact Pad to Center Pad (X44)	G2	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2399A

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44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.20 C
2X
0.20 C

TOP VIEW

C
SEATING PLANE
A
A3
0.10 C
A1
44X
0.08 C

SIDE VIEW

L
D2
0.10Ⓜ C A B
0.10Ⓜ C A B
E2
K
2
1
NOTE 1
N
44X b
0.07Ⓜ C A B
0.05Ⓜ C
e

BOTTOM VIEW

Microchip Technology Drawing C04-103D Sheet 1 of 2

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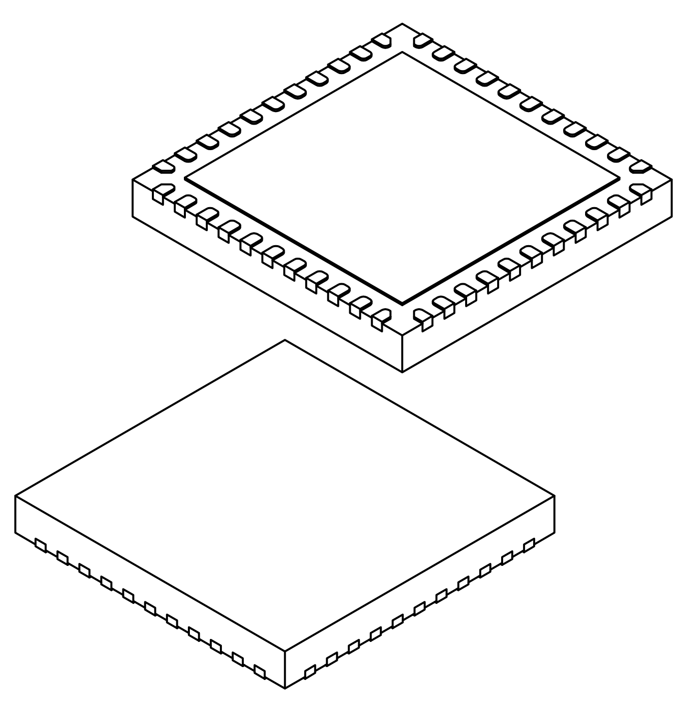
44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		44	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		8.00 BSC	
Exposed Pad Width	E2	6.25	6.45	6.60
Overall Length	D		8.00 BSC	
Exposed Pad Length	D2	6.25	6.45	6.60
Terminal Width	b	0.20	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-103D Sheet 2 of 2

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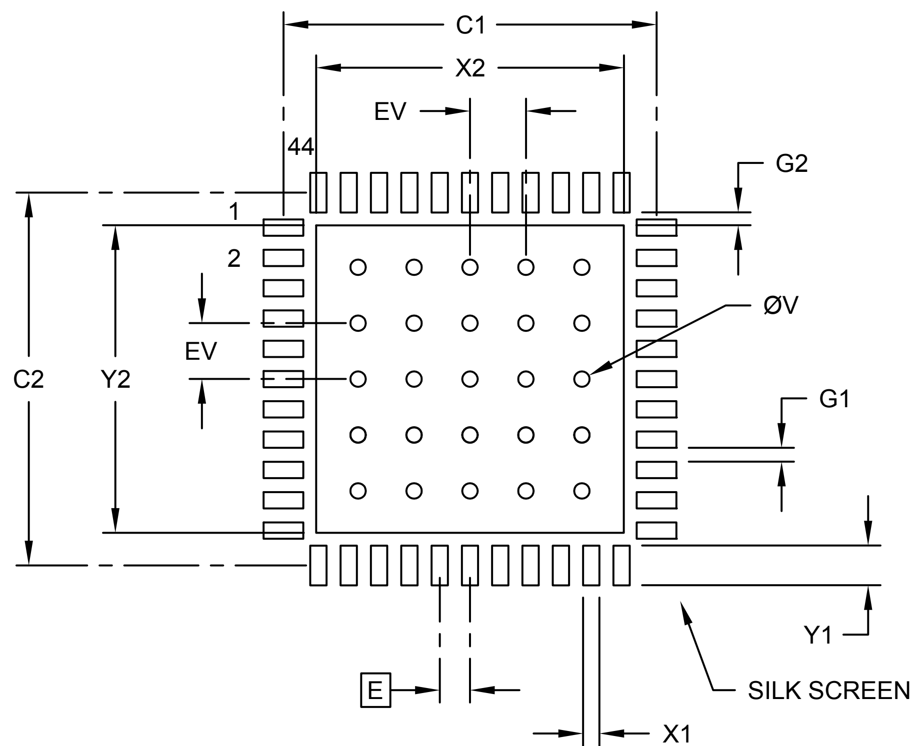
44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN or VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	X2			6.60
Optional Center Pad Length	Y2			6.60
Contact Pad Spacing	C1		8.00	
Contact Pad Spacing	C2		8.00	
Contact Pad Width (X44)	X1			0.35
Contact Pad Length (X44)	Y1			0.85
Contact Pad to Contact Pad (X40)	G1	0.30		
Contact Pad to Center Pad (X44)	G2	0.28		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing No. C04-2103C

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48-Lead Very Thin Quad Flat, No Lead Package [ML] - 7x7x1.0 mm Body [VQFN] With 4.1x4.1 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.10 C
2X
0.10 C

TOP VIEW

C
SEATING PLANE
A
(A3)
0.10 C
A1
48X
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
e/2
2
1
NOTE 1
N
K
L
48X b
e
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-182B [ML] Sheet 1 of 2

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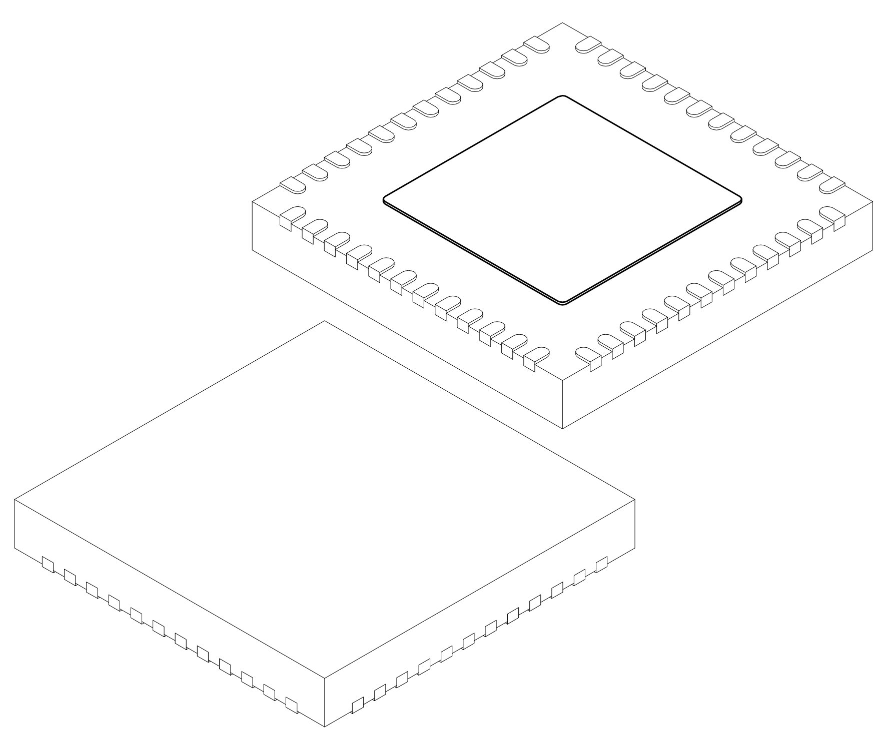
48-Lead Very Thin Quad Flat, No Lead Package [ML] - 7x7x1.0 mm Body [VQFN] With 4.1x4.1 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		48	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Length	D		7.00 BSC	
Exposed Pad Length	D2	4.00	4.10	4.20
Overall Width	E		7.00 BSC	
Exposed Pad Width	E2	4.00	4.10	4.20
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-182B [ML] Sheet 2 of 2

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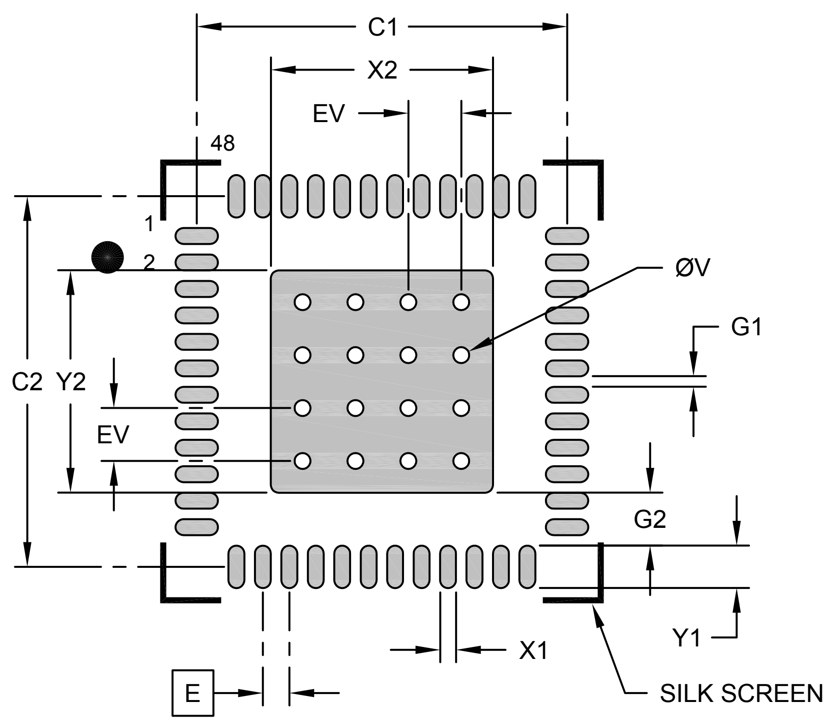
48-Lead Very Thin Quad Flat, No Lead Package [ML] - 7x7x1.0 mm Body [VQFN] With 4.1x4.1 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			4.20
Optional Center Pad Length	Y2			4.20
Contact Pad Spacing	C1		7.00	
Contact Pad Spacing	C2		7.00	
Contact Pad Width (X48)	X1			0.30
Contact Pad Length (X48)	Y1			0.80
Contact Pad to Contact Pad (X44)	G1	0.20		
Contact Pad to Center Pad (X48)	G2	1.00		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2182C [ML]

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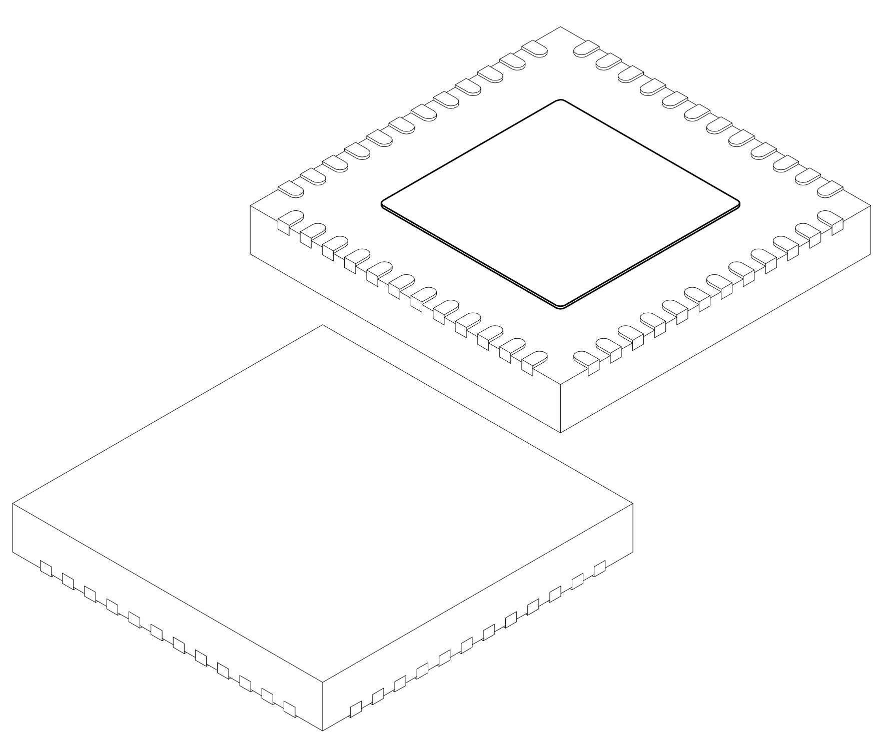
**48-Lead Very Thin Quad Flat, No Lead Package [Y3X] - 7x7x1.0 mm Body [VQFN]
With 4.1x4.1 mm Exposed Pad**

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-182B [Y3X] Sheet 1 of 2

48-Lead Very Thin Quad Flat, No Lead Package [Y3X] - 7x7x1.0 mm Body [VQFN] With 4.1x4.1 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		48	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Length	D		7.00 BSC	
Exposed Pad Length	D2	4.00	4.10	4.20
Overall Width	E		7.00 BSC	
Exposed Pad Width	E2	4.00	4.10	4.20
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-182B [Y3X] Sheet 2 of 2

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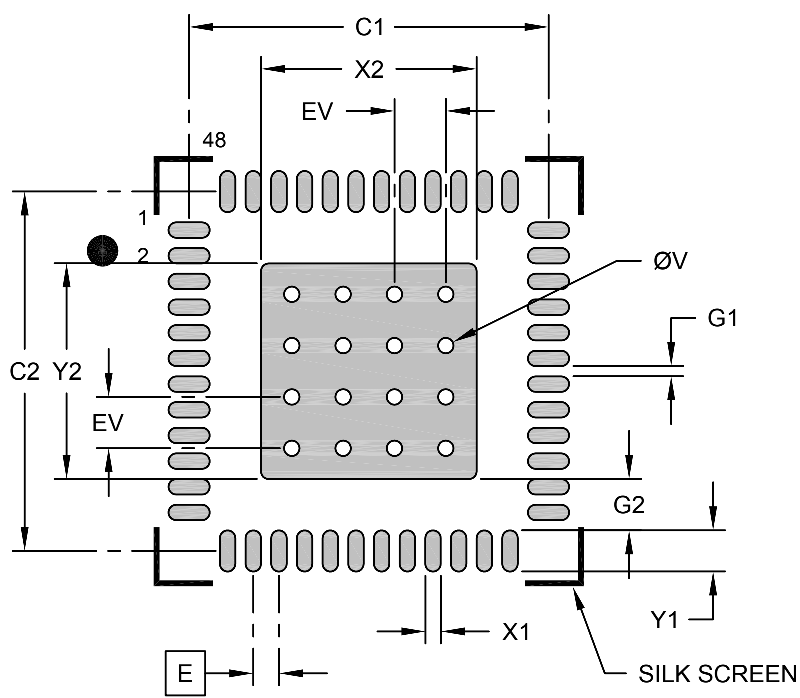
48-Lead Very Thin Quad Flat, No Lead Package [Y3X] - 7x7x1.0 mm Body [VQFN] With 4.1x4.1 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			4.20
Optional Center Pad Length	Y2			4.20
Contact Pad Spacing	C1		7.00	
Contact Pad Spacing	C2		7.00	
Contact Pad Width (X48)	X1			0.30
Contact Pad Length (X48)	Y1			0.80
Contact Pad to Contact Pad (X44)	G1	0.20		
Contact Pad to Center Pad (X48)	G2	1.00		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2182C [Y3X]

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48-Lead Very Thin Quad Flat, No Lead Package [ML] - 7x7x1.0 mm Body [VQFN] With 5.3x5.3 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-431B [ML] Sheet 1 of 2

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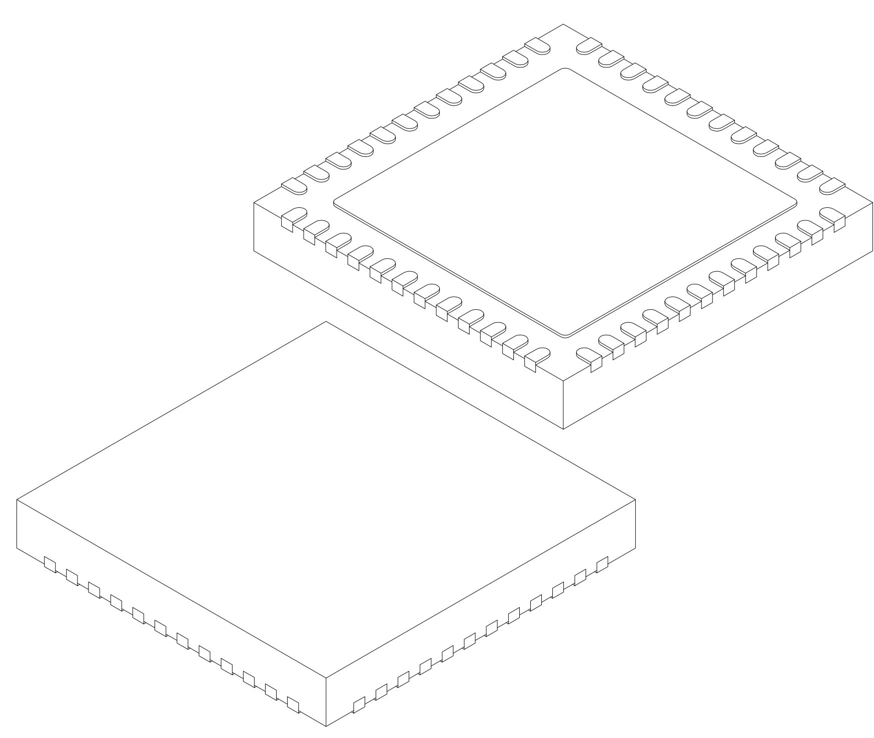
48-Lead Very Thin Quad Flat, No Lead Package [ML] - 7x7x1.0 mm Body [VQFN] With 5.3x5.3 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		48	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Length	D		7.00 BSC	
Exposed Pad Length	D2	5.20	5.30	5.40
Overall Width	E		7.00 BSC	
Exposed Pad Width	E2	5.20	5.30	5.40
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-431B [ML] Sheet 2 of 2

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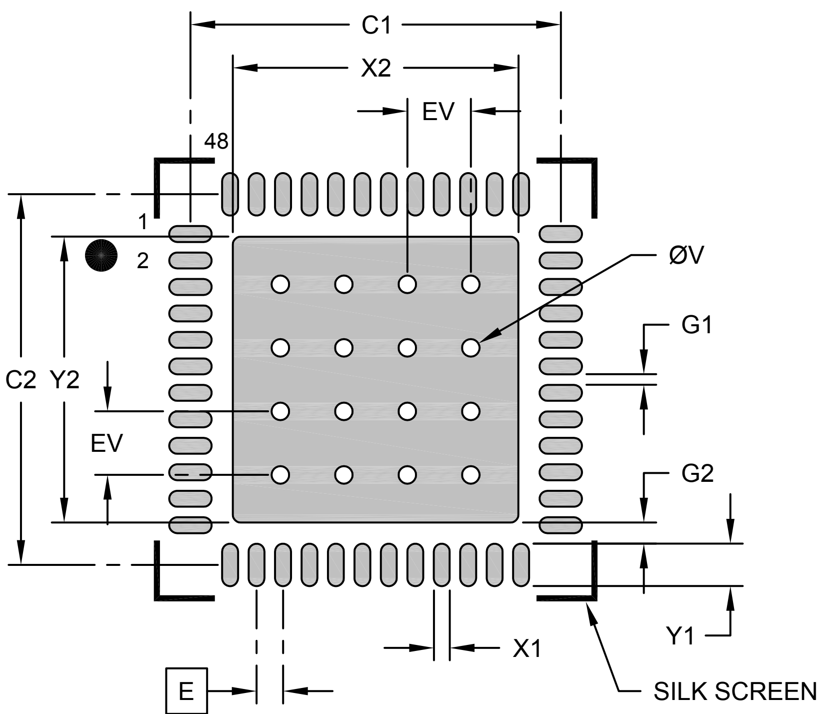
48-Lead Very Thin Quad Flat, No Lead Package [ML] - 7x7x1.0 mm Body [VQFN] With 5.3x5.3 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			5.40
Optional Center Pad Length	Y2			5.40
Contact Pad Spacing	C1		7.00	
Contact Pad Spacing	C2		7.00	
Contact Pad Width (X48)	X1			0.30
Contact Pad Length (X48)	Y1			0.80
Contact Pad to Contact Pad (X44)	G1	0.20		
Contact Pad to Center Pad (X48)	G2	0.40		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2431A [ML]

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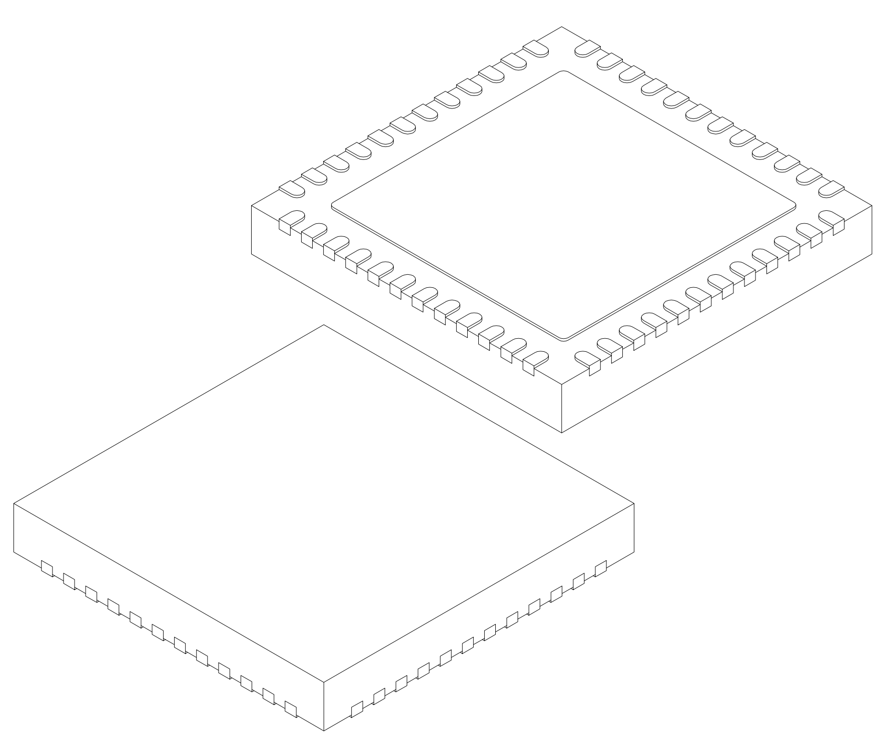
48-Lead Very Thin Quad Flat, No Lead Package [Y9X] - 7x7x1.0 mm Body [VQFN] With 5.3x5.3 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-431B [Y3X] Sheet 1 of 2

48-Lead Very Thin Quad Flat, No Lead Package [Y9X] - 7x7x1.0 mm Body [VQFN] With 5.3x5.3 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		48	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Length	D		7.00 BSC	
Exposed Pad Length	D2	5.20	5.30	5.40
Overall Width	E		7.00 BSC	
Exposed Pad Width	E2	5.20	5.30	5.40
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-431B [Y3X] Sheet 2 of 2

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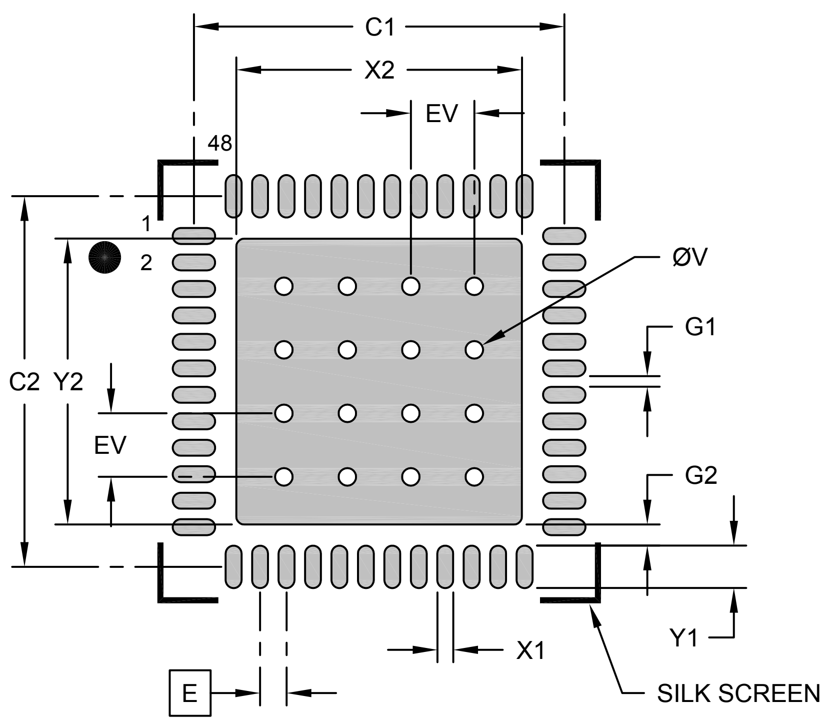
48-Lead Very Thin Quad Flat, No Lead Package [Y9X] - 7x7x1.0 mm Body [VQFN] With 5.3x5.3 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			5.40
Optional Center Pad Length	Y2			5.40
Contact Pad Spacing	C1		7.00	
Contact Pad Spacing	C2		7.00	
Contact Pad Width (X48)	X1			0.30
Contact Pad Length (X48)	Y1			0.80
Contact Pad to Contact Pad (X44)	G1	0.20		
Contact Pad to Center Pad (X48)	G2	0.40		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2431A [Y9X]

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48-Lead Plastic Quad Flat, No Lead Package (RS) - 7x7 mm Body [VQFN] With Exposed Pad; Punch Singulated (AIS Package HZH)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
4X
0.10 C
N
1
2
NOTE 1
E1
E
(DATUM B)
(DATUM A)
2X
0.10 C
2X
0.10 C
D1

TOP VIEW

A
Θ
A2
C
0.10 C
SEATING PLANE
0.08 C
A1
(A3)

SIDE VIEW

4X P
D2
0.10Ⓜ C A B
0.10Ⓜ C A B
4X P
E2
NX K
2
1
N
NX L
e
e/2
48X b
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-223C Sheet 1 of 2

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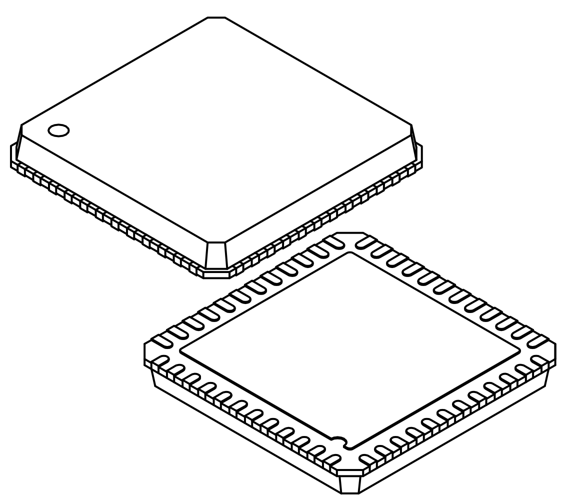
48-Lead Plastic Quad Flat, No Lead Package (RS) - 7x7 mm Body [VQFN] With Exposed Pad; Punch Singulated (AIS Package HZH)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N	48		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Terminal Thickness	(A3)	0.20 REF		
Overall Width	E	7.00 BSC		
Molded Top Width	E1	6.75 BSC		
Exposed Pad Width	E2	(See Exposed Pad Variations)		
Overall Length	D	7.00 BSC		
Molded Top Length	D1	6.75 BSC		
Exposed Pad Length	D2	(See Exposed Pad Variations)		
Corner Chamfer	P	0.24	0.42	0.60
Terminal Width	b	0.18	0.23	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-
Mold Draft Angle	θ	0°	-	12°

Exposed Pad Variations						
Symbol	D2			E2		
Variant	MIN	NOM	MAX	MIN	NOM	MAX
C	4.00	4.10	4.20	4.00	4.10	4.20
G	5.00	5.10	5.20	5.00	5.10	5.20
H	5.20	5.30	5.40	5.20	5.30	5.40
K	5.40	5.50	5.60	5.40	5.50	5.60

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-223C Sheet 2 of 2

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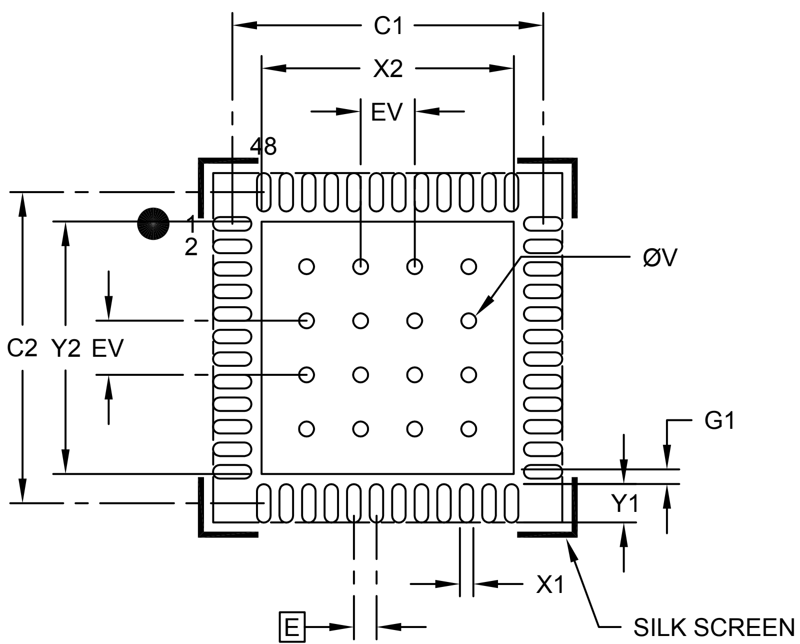
48-Lead Plastic Quad Flat, No Lead Package (RS) - 7x7 mm Body [VQFN]
With Exposed Pad; Punch Singulated (AIS Package HZH)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2	See Center Pad Variations		
Optional Center Pad Length	Y2			
Contact Pad Spacing	C1		6.90	
Contact Pad Spacing	C2		6.90	
Contact Pad Width (X48)	X1			0.30
Contact Pad Length (X48)	Y1			0.85
Contact Pad to Center Pad (X48)	G1	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Center Pad Variations						
Symbol	X2			Y2		
Variant	MIN	NOM	MAX	MIN	NOM	MAX
C			4.20			4.20
G			5.20			5.20
H			5.40			5.40
K			5.60			5.60

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2223B

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48-Lead Very Thin Plastic Quad Flat, No Lead Package (VQ) - 7x7 mm Body [VQFN] With 5.3 mm Exposed Pad; Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
D1
A
B
4X
0.20 C
N
1
2
NOTE 1
(DATUM B)
(DATUM A)
2X
0.20 C
2X
0.20 C
E1
E

TOP VIEW

C
SEATING PLANE
A
A1
Θ
0.10 C
A2
(A3)
48X
0.08 C

SIDE VIEW

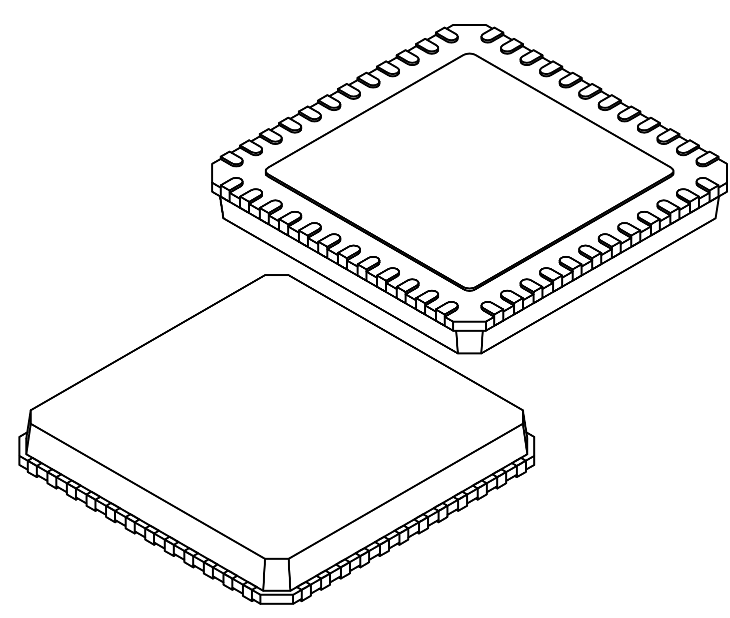
4X P
D2
0.10Ⓜ C A B
4X P
0.10Ⓜ C A B
e/2
E2
NOTE 1
2
1
K
N
L
48X b
e
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-347A Sheet 1 of 2

48-Lead Very Thin Plastic Quad Flat, No Lead Package (VQ) - 7x7 mm Body [VQFN] With 5.3 mm Exposed Pad; Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		48	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Mold Cap Thickness	A2	0.60	0.65	0.70
Terminal Thickness	(A3)		0.20 REF	
Overall Length	D		7.00 BSC	
Mold Cap Length	D1		6.75 BSC	
Exposed Pad Length	D2	5.20	5.30	5.40
Overall Width	E		7.00 BSC	
Mold Cap Width	E1		6.75 BSC	
Exposed Pad Width	E2	5.20	5.30	5.40
Corner Chamfer	P	0.24	0.42	0.60
Terminal Width	b	0.18	0.23	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-
Mold Cap Draft Angle	Θ	0°	-	14°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-347A Sheet 2 of 2

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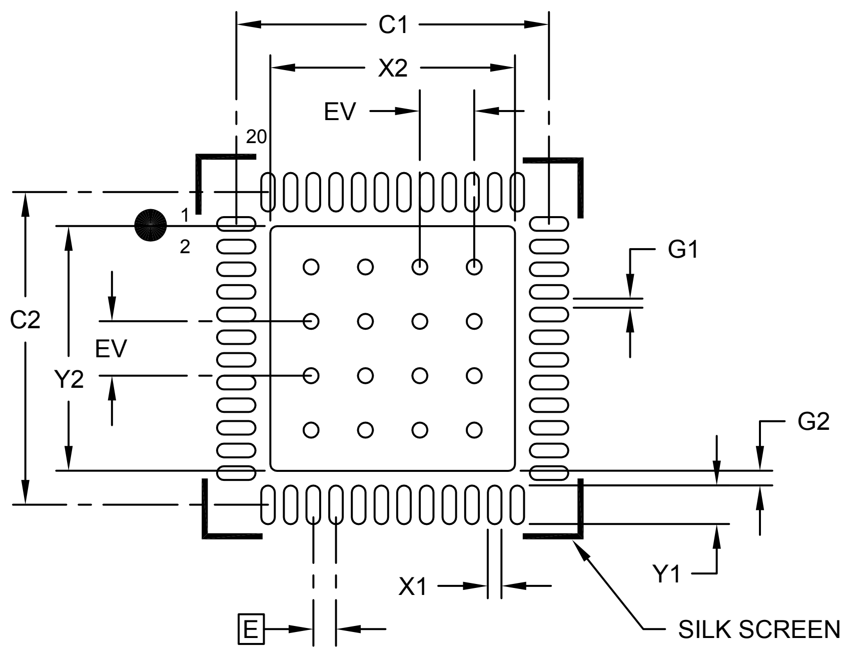
48-Lead Very Thin Plastic Quad Flat, No Lead Package (VQ) - 7x7 mm Body [VQFN] With 5.3 mm Exposed Pad; Punch Singulated

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			5.40
Optional Center Pad Length	Y2			5.40
Contact Pad Spacing	C1		6.90	
Contact Pad Spacing	C2		6.90	
Contact Pad Width (X48)	X1			0.30
Contact Pad Length (X48)	Y1			0.85
Space Between Pads (X44)	G1	0.20		
Contact Pad to Center Pad (X48)	G2	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2347A

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52-Lead Very Thin Plastic Quad Flat, No-Lead Package (8HX) - 8x8 mm Body [\VQFN] With 6.6x6.6 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-430A Sheet 1 of 2

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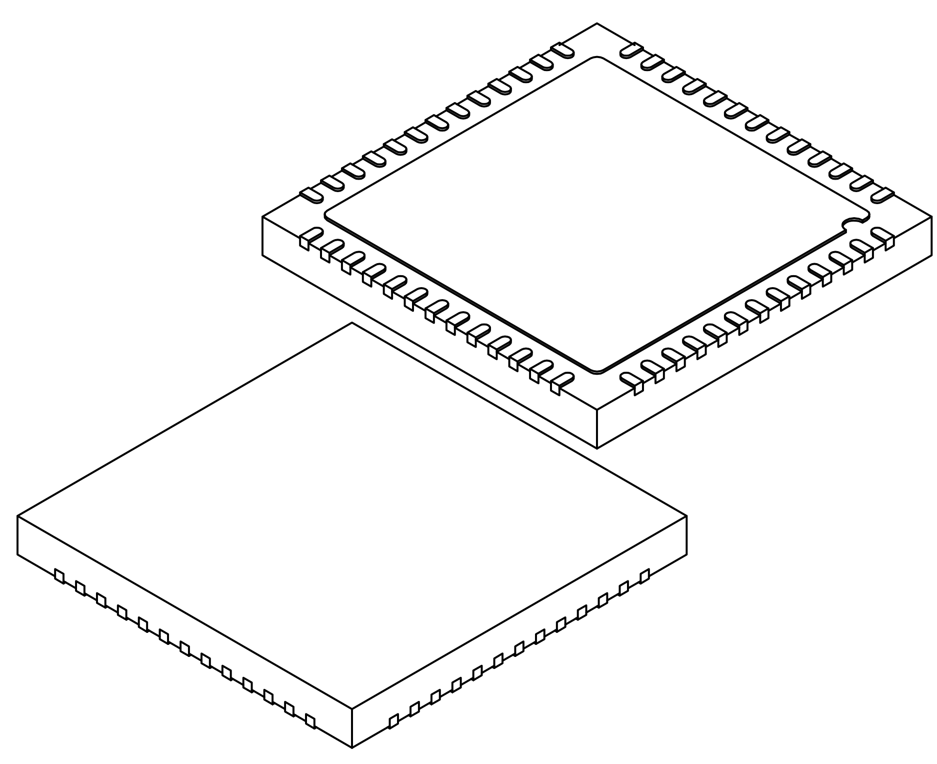
52-Lead Very Thin Plastic Quad Flat, No-Lead Package (8HX) - 8x8 mm Body [\VQFN] With 6.6x6.6 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		52	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Length	D		8.00 BSC	
Exposed Pad Length	D2	6.50	6.60	6.70
Overall Width	E		8.00 BSC	
Exposed Pad Width	E2	6.50	6.60	6.70
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K		0.30 REF	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-430A Sheet 2 of 2

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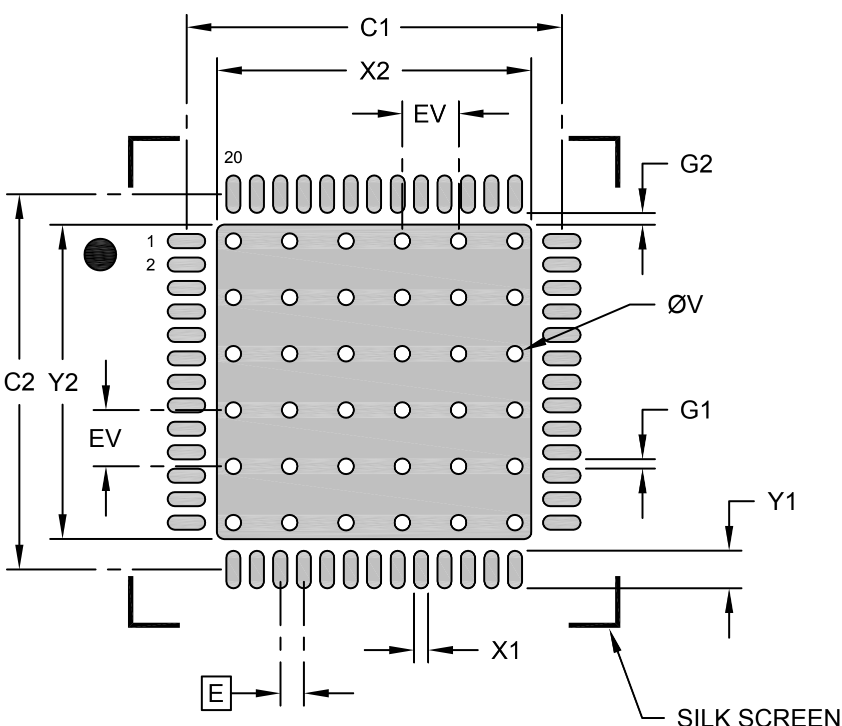
52-Lead Very Thin Plastic Quad Flat, No-Lead Package (8HX) - 8x8 mm Body [\VQFN] With 6.6x6.6 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			6.70
Optional Center Pad Length	Y2			6.70
Contact Pad Spacing	C1		8.00	
Contact Pad Spacing	C2		8.00	
Contact Pad Width (X52)	X1			0.30
Contact Pad Length (X52)	Y1			0.80
Contact Pad to Contact Pad (X48)	G1	0.30		
Contact Pad to Center Pad (X52)	G2	0.25		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2430A

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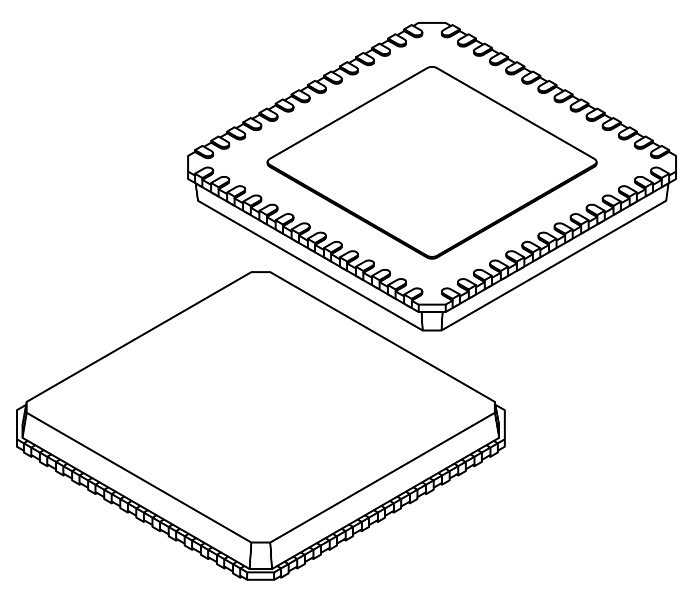
56L Very Thin Quad Flat, No Lead Package (P6) - 8x8 mm Body [VQFN] With 5.2x5.2 mm Exposed Pad; Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-374A Sheet 1 of 2

56L Very Thin Quad Flat, No Lead Package (P6) - 8x8 mm Body [VQFN] With 5.2x5.2 mm Exposed Pad; Punch Singulated

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		56	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Mold Cap Thickness	A2	-	-	0.70
Overall Length	D		8.00 BSC	
Molded Top Length	D1	7.65	7.75	7.85
Exposed Pad Length	D2	5.10	5.20	5.30
Overall Width	E		8.00 BSC	
Molded Top Width	E1	7.65	7.75	7.85
Exposed Pad Width	E2	5.10	5.20	5.30
Terminal Width	b	0.18	0.23	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.70	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-374A Sheet 2 of 2

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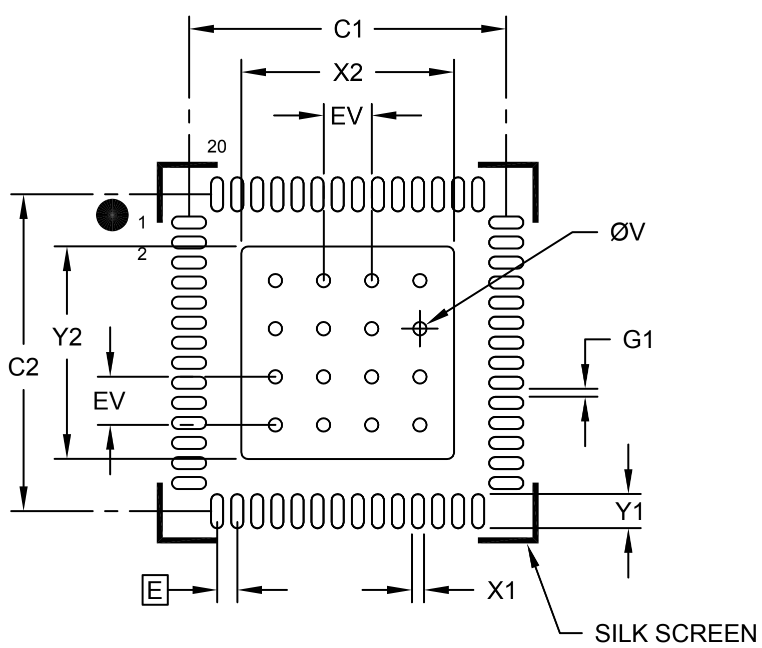
56L Very Thin Quad Flat, No Lead Package (P6) - 8x8 mm Body [VQFN] With 5.2x5.2 mm Exposed Pad; Punch Singulated

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			5.30
Optional Center Pad Length	Y2			5.30
Contact Pad Spacing	C1		7.90	
Contact Pad Spacing	C2		7.90	
Contact Pad Width (X56)	X1			0.30
Contact Pad Length (X56)	Y1			0.85
Contact Pad to Center Pad (X52)	G1	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2374A

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56L Very Thin Quad Flat, No Lead Package (RT) - 8x8 mm Body [VQFN] With 5.9x5.9 mm Exposed Pad; Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-375A Sheet 1 of 2

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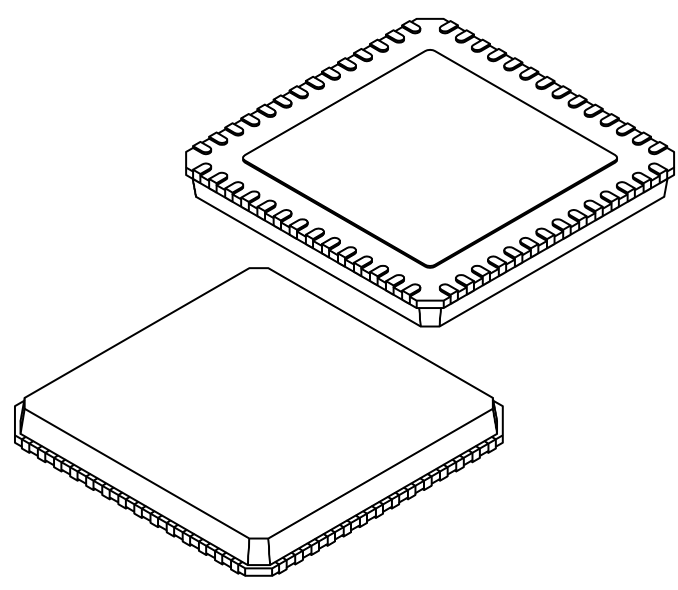
56L Very Thin Quad Flat, No Lead Package (RT) - 8x8 mm Body [VQFN] With 5.9x5.9 mm Exposed Pad; Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		56	
Pitch	e		0.50 BSC	
Overall Height	A	0.70	0.85	1.00
Standoff	A1	0.00	0.02	0.05
Mold Cap Thickness	A2	-	-	0.90
Overall Length	D		8.00 BSC	
Molded Top Length	D1	7.65	7.75	7.85
Exposed Pad Length	D2	5.80	5.90	6.00
Overall Width	E		8.00 BSC	
Molded Top Width	E1	7.65	7.75	7.85
Exposed Pad Width	E2	5.80	5.90	6.00
Terminal Width	b	0.18	0.23	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

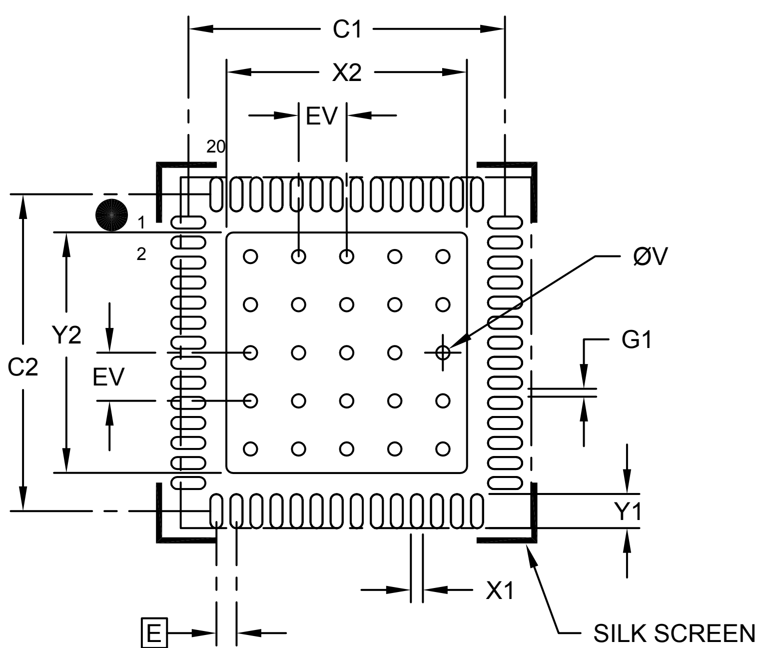
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-375A Sheet 2 of 2

56L Very Thin Quad Flat, No Lead Package (RT) - 8x8 mm Body [VQFN]
With 5.9x5.9 mm Exposed Pad; Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			5.90
Optional Center Pad Length	Y2			5.90
Contact Pad Spacing	C1		7.90	
Contact Pad Spacing	C2		7.90	
Contact Pad Width (X56)	X1			0.28
Contact Pad Length (X56)	Y1			0.69
Contact Pad to Center Pad (X52)	G1	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2375A

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64-Lead Very Thin Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [VQFN]
With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

9.00
A
B
NOTE 1
N
1
2
9.00
(DATUM B)
(DATUM A)
2X
0.25 C
2X
0.25 C
TOP VIEW

C
SEATING PLANE
A
(A3)
0.10 C
A1
64X
0.08 C
SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
NOTE 1
K
2
1
N
L
64X b
e/2
0.10Ⓜ C A B
0.05Ⓜ C
e
BOTTOM VIEW

Microchip Technology Drawing C04-149D [MR] Sheet 1 of 2

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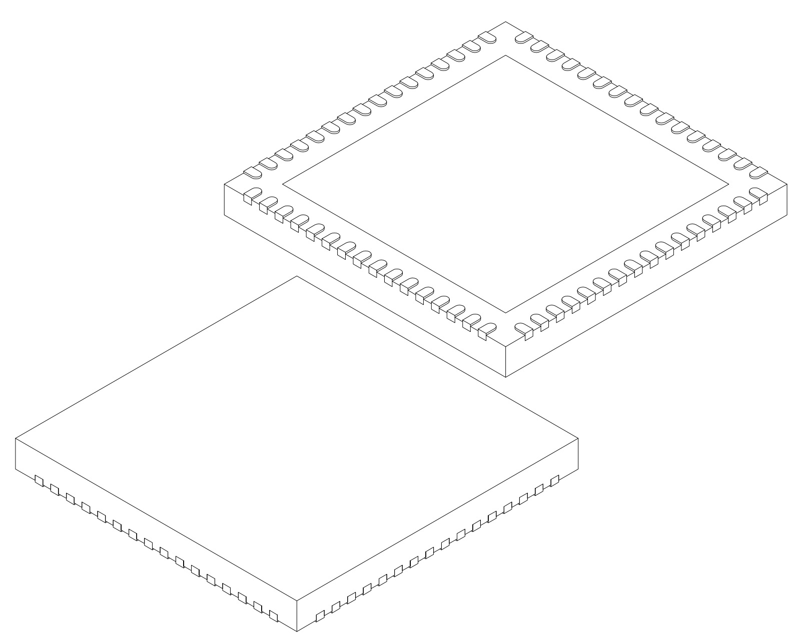
64-Lead Very Thin Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [VQFN] With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		64	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		9.00 BSC	
Exposed Pad Width	E2	7.05	7.15	7.25
Overall Length	D		9.00 BSC	
Exposed Pad Length	D2	7.05	7.15	7.25
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-149D [MR] Sheet 2 of 2

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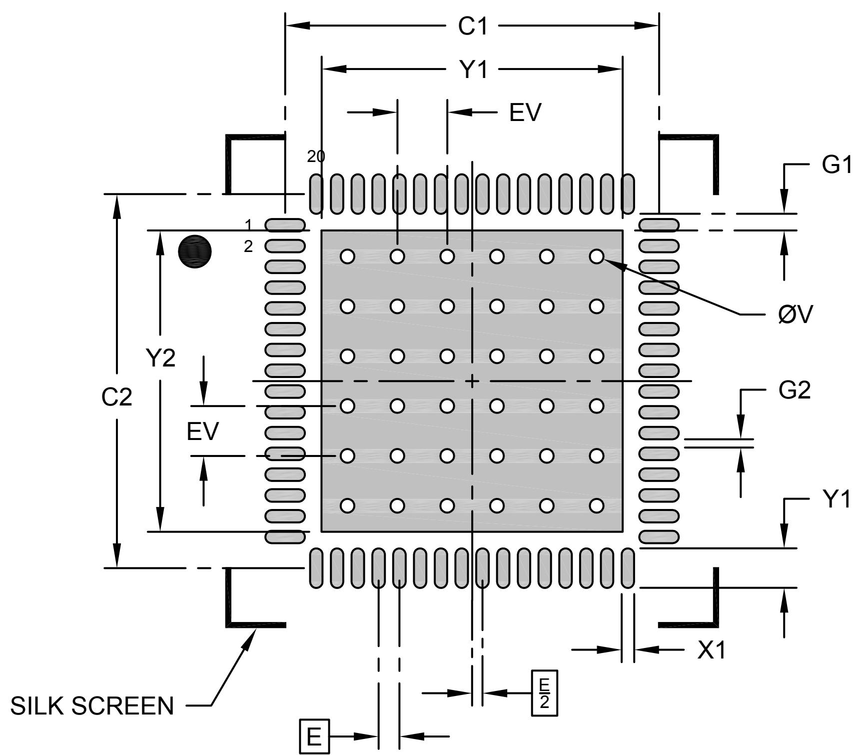
Footprint Outlines and Dimensions

64-Lead Very Thin Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [VQFN] With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			7.25
Optional Center Pad Length	Y2			7.25
Contact Pad Spacing	C1		9.00	
Contact Pad Spacing	C2		9.00	
Contact Pad Width (X64)	X1			0.30
Contact Pad Length (X64)	Y1			0.95
Contact Pad to Center Pad (X64)	G1	0.40		
Spacing Between Contact Pads (X60)	G2	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2149C [MR]

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64-Lead Very Thin Plastic Quad Flat, No Lead Package (R4X) – 9x9x0.9 mm Body [VQFN]
With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-149D [R4X] Sheet 1 of 2

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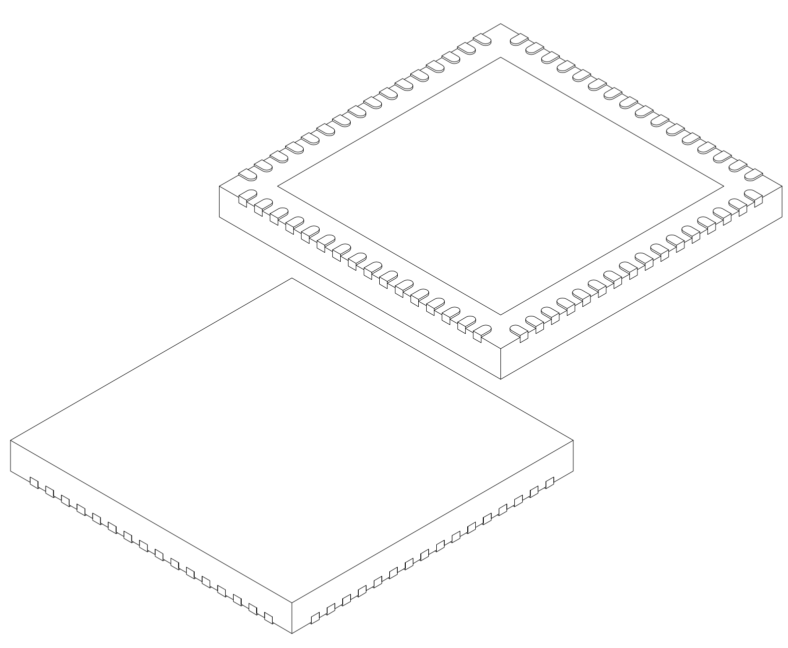
64-Lead Very Thin Plastic Quad Flat, No Lead Package (R4X) – 9x9x0.9 mm Body [VQFN] With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		64	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		9.00 BSC	
Exposed Pad Width	E2	7.05	7.15	7.25
Overall Length	D		9.00 BSC	
Exposed Pad Length	D2	7.05	7.15	7.25
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-149D [R4X] Sheet 2 of 2

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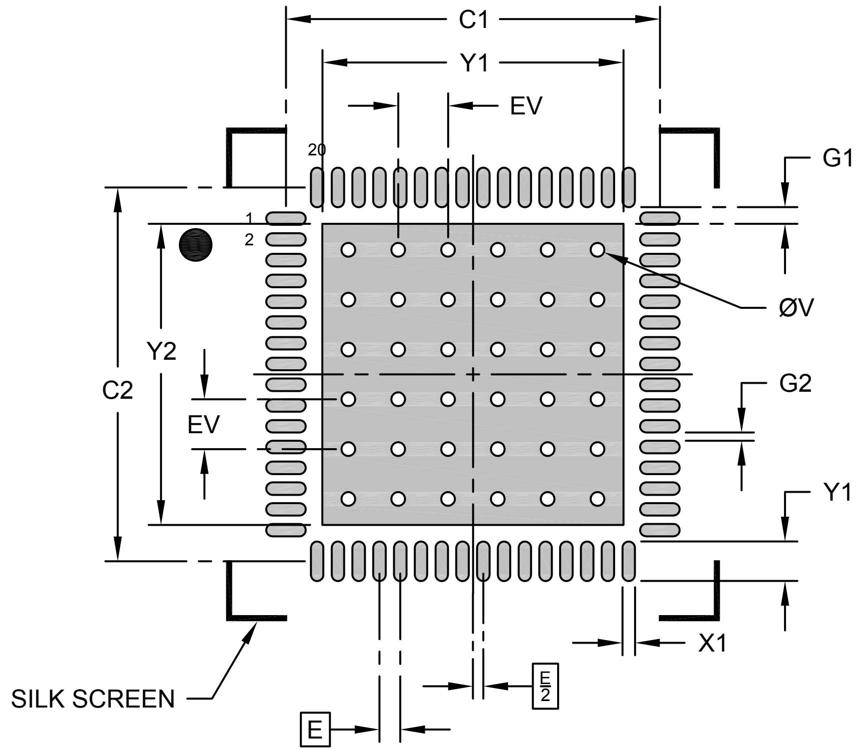
64-Lead Very Thin Plastic Quad Flat, No Lead Package (R4X) – 9x9x0.9 mm Body [VQFN]
With 7.15 x 7.15 Exposed Pad [Also called QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			7.25
Optional Center Pad Length	Y2			7.25
Contact Pad Spacing	C1		9.00	
Contact Pad Spacing	C2		9.00	
Contact Pad Width (X64)	X1			0.30
Contact Pad Length (X64)	Y1			0.95
Contact Pad to Center Pad (X64)	G1	0.40		
Spacing Between Contact Pads (X60)	G2	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2149C [R4X]

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72-Lead Plastic Quad Flat, No Lead Package (NQ) - 10x10x1.0mm Body [VQFN] 6.0x6.0mm Exposed Pad, 0.40mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
1
2
NOTE 1
E
(DATUM B)
(DATUM A)
2X
0.15 C
2X
0.15 C

TOP VIEW

A
C
SEATING PLANE
0.10 C
A1
(A3)
72X
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
0.10Ⓜ C A B
E2
e/2
NOTE 1
2
1
K
N
L
72X b
0.10Ⓜ C A B
0.05Ⓜ C
e

BOTTOM VIEW

Microchip Technology Drawing C04-202A Sheet 1 of 2

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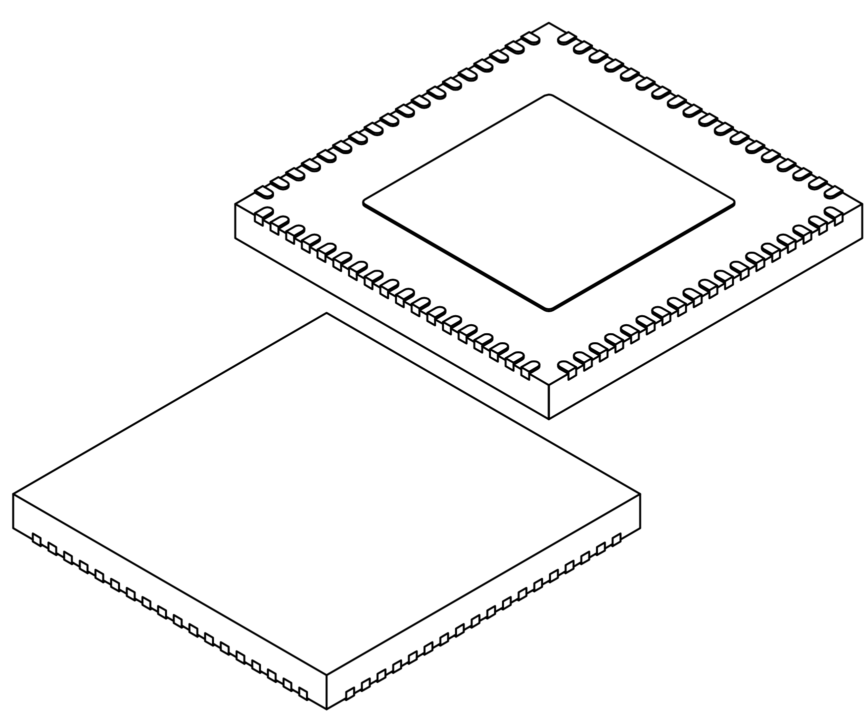
72-Lead Plastic Quad Flat, No Lead Package (NQ) - 10x10x1.0mm Body [VQFN] 6.0x6.0mm Exposed Pad, 0.40mm Terminal Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		72	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		10.00 BSC	
Exposed Pad Width	E2	5.90	6.00	6.10
Overall Length	D		10.00 BSC	
Exposed Pad Length	D2	5.90	6.00	6.10
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	1.50	1.60	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-202A Sheet 2 of 2

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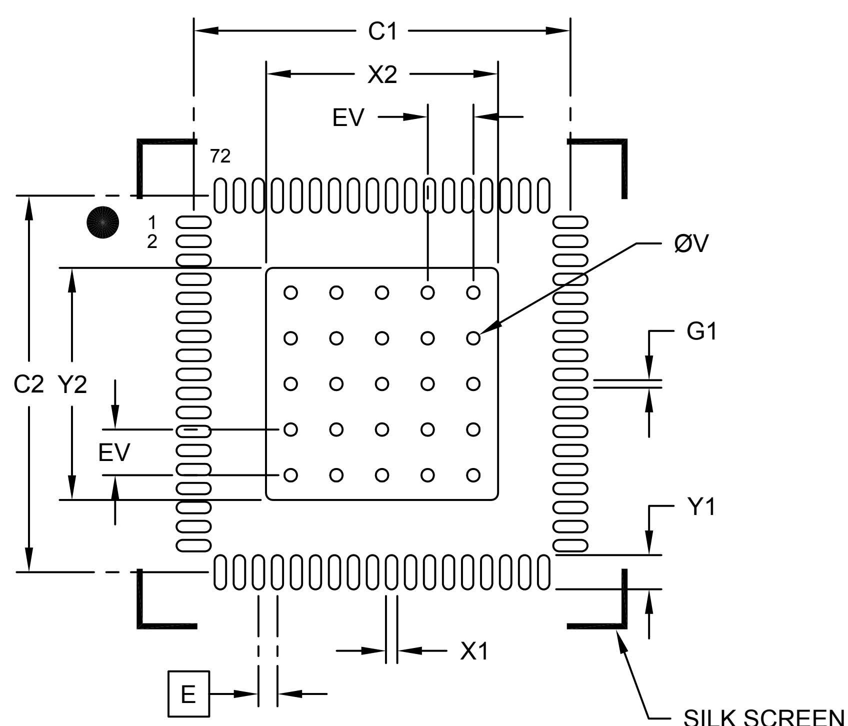
72-Lead Plastic Quad Flat, No Lead Package (NQ) - 10x10x1.0mm Body [VQFN] 6.0x6.0mm Exposed Pad, 0.40mm Terminal Length

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			6.10
Optional Center Pad Length	Y2			6.10
Contact Pad Spacing	C1		9.90	
Contact Pad Spacing	C2		9.90	
Contact Pad Width (X72)	X1			0.30
Contact Pad Length (X72)	Y1			0.90
Contact Pad to Center Pad (X68)	G1	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2202A

72-Lead Plastic Quad Flat, No Lead Package (6E) - 10x10 mm Body [VQFN] 6.0x6.0 mm Exposed Pad; Punch Singulated, Dimpled Terminals (Also called QFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-243B Sheet 1 of 2

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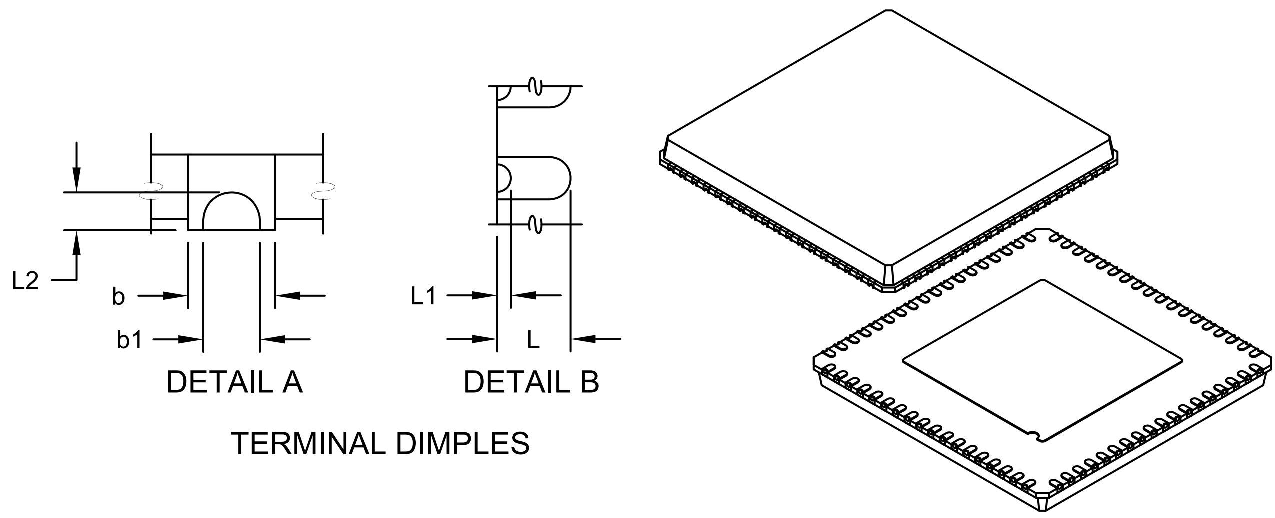
72-Lead Plastic Quad Flat, No Lead Package (6E) - 10x10 mm Body [VQFN] 6.0x6.0 mm Exposed Pad; Punch Singulated, Dimpled Terminals (Also called QFN)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		72	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Terminal Thickness	A3		0.20 REF	
Overall Width	E		10.00 BSC	
Molded Top Width	E1		9.75 BSC	
Exposed Pad Width	E2	5.90	6.00	6.10
Overall Length	D		10.00 BSC	
Molded Top Length	D1		9.75 BSC	
Exposed Pad Length	D2	5.90	6.00	6.10
Corner Chamfer	P	0.24	0.42	0.60
Terminal Width	b	0.18	0.23	0.30
Terminal Dimple Width	b1	0.10	0.15	0.20
Terminal Length	L	0.30	0.40	0.50
Terminal Dimple Length (side)	L1	0.05	0.15	0.25
Terminal Dimple Length (bottom)	L2	0.05	0.10	0.15
Terminal-to-Exposed-Pad	K	0.20	-	-
Mold Draft Angle	θ	0°	-	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is puch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-243B Sheet 2 of 2

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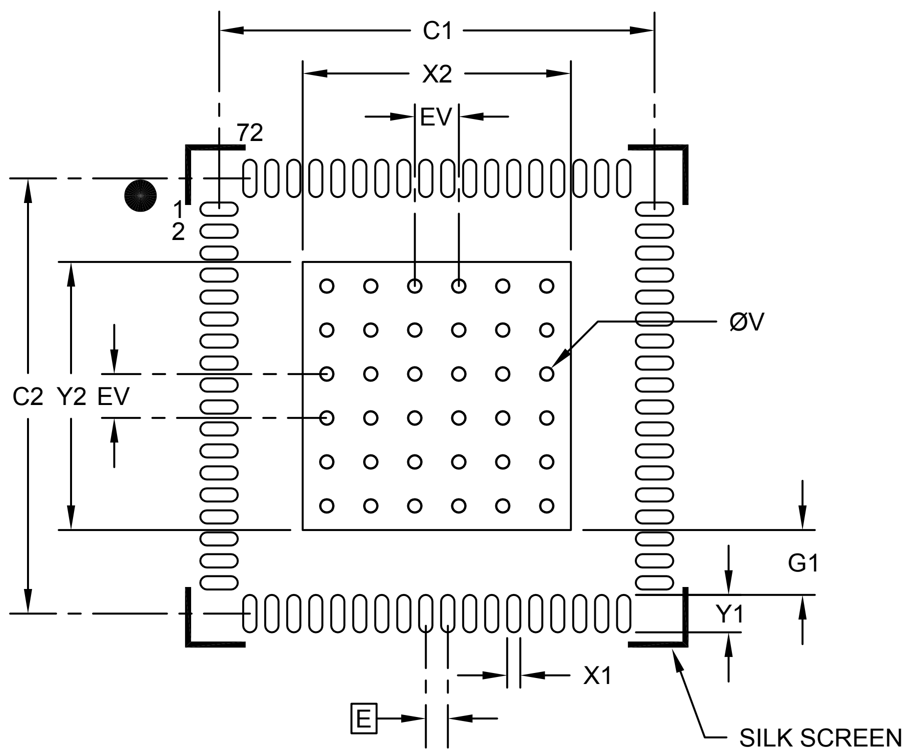
72-Lead Plastic Quad Flat, No Lead Package (6E) - 10x10 mm Body [VQFN]
6.0x6.0 mm Exposed Pad; Punch Singulated, Dimpled Terminals (Also called QFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	X2			6.10
Optional Center Pad Length	Y2			6.10
Contact Pad Spacing	C1		9.90	
Contact Pad Spacing	C2		9.90	
Contact Pad Width (X72)	X1			0.30
Contact Pad Length (X72)	Y1			0.85
Contact Pad to Center Pad (X72)	G1	0.20		
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be "filled" or "tented" to avoid solder loss during reflow process

Microchip Technology Drawing C04-2243B

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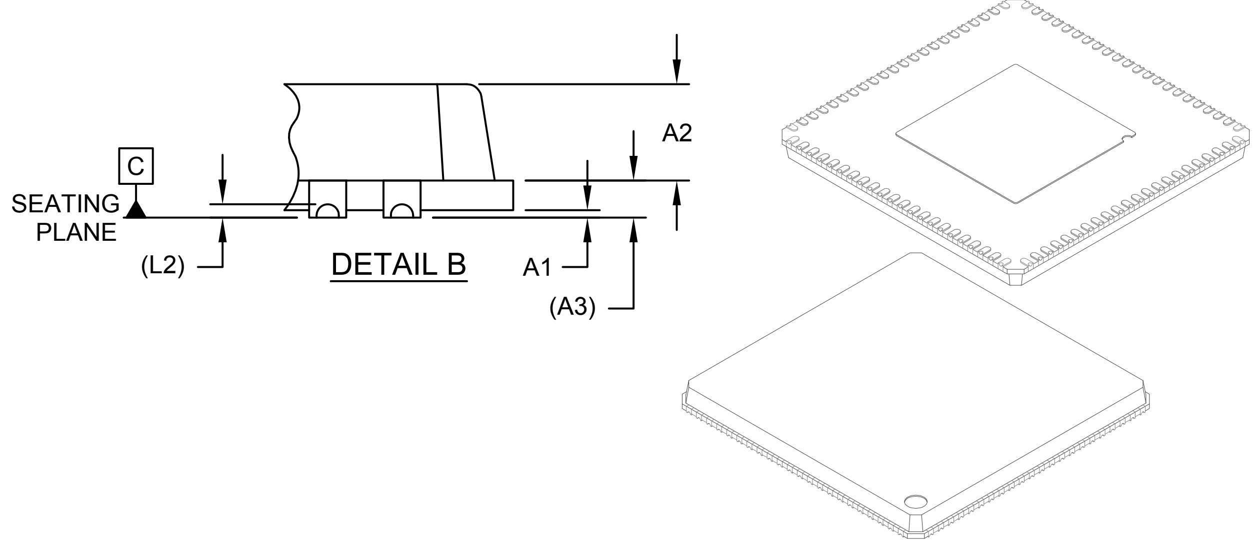
88-Lead Very Thin Plastic Quad Flat, No Lead Package (KB) - 12x12x0.9 mm Body [VQFN] Punch Singlulated, Wettable Flanks, 6.0x6.0mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-388A Sheet 1 of 2

88-Lead Very Thin Plastic Quad Flat, No Lead Package (KB) - 12x12x0.9 mm Body [VQFN] Punch Singlulated, Wettable Flanks, 6.0x6.0mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		88	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.60	0.65	0.70
Base Thickness	A3		0.20 REF	
Overall Length	D		12.00 BSC	
Mold Cap Length	D1		11.75 BSC	
Exposed Pad Length	D2	5.90	6.00	6.10
Overall Width	E		12.00 BSC	
Mold Cap Width	E1		11.75 BSC	
Exposed Pad Width	E2	5.90	6.00	6.10
Terminal Width	b	0.18	0.25	0.30
Dimple Width	b1	0.10	0.15	0.20
Terminal Length	L	0.30	0.40	0.50
Dimple Length	L1	0.05	0.15	0.25
Dimple Height	L2		0.09 REF	
Corner Chamfer	P	0.24	0.42	0.60
Terminal-to-Exposed-Pad	K		2.60 REF	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-388A Sheet 2 of 2

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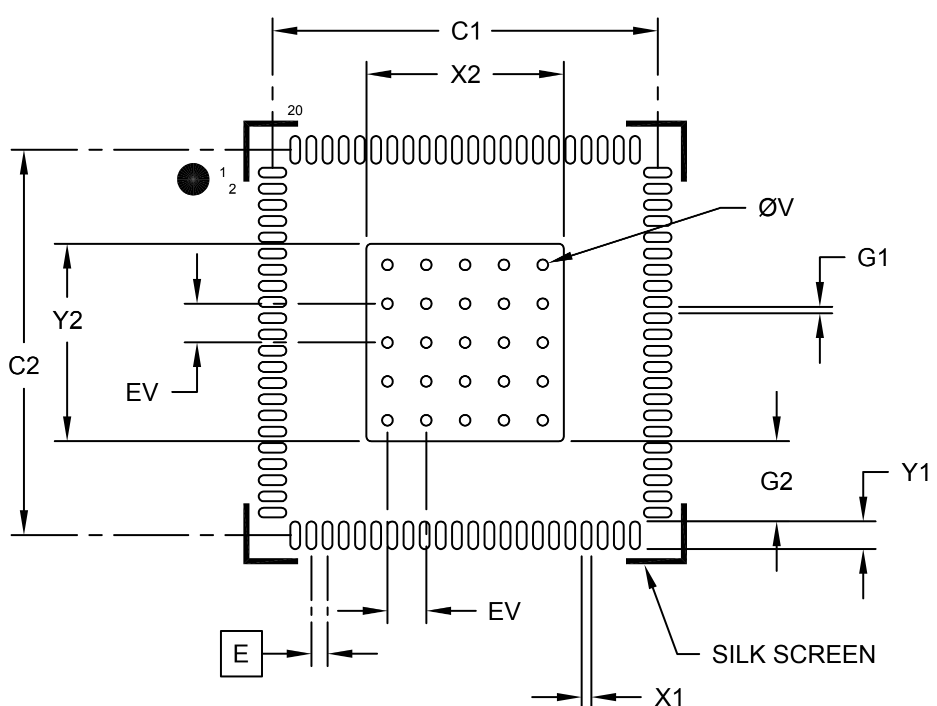
88-Lead Very Thin Plastic Quad Flat, No Lead Package (KB) - 12x12x0.9 mm Body [VQFN] Punch Singlulated, Wettable Flanks, 6.0x6.0mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			6.90
Optional Center Pad Length	Y2			6.90
Contact Pad Spacing	C1		11.90	
Contact Pad Spacing	C2		11.90	
Contact Pad Width (X88)	X1			0.30
Contact Pad Length (X88)	Y1			0.80
Contact Pad to Pad (X84)	G1	0.20		
Contact Pad to Center Pad (X88)	G2		2.48	
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2388A

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132-Lead Very Thin Plastic Quad Flat, No Lead Package (NX) - 10x10x0.9 mm Body [VQFN] Dual Row Terminals, Punch Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

2X 0.10 C
D
A
D1
NOTE 1
A72 B60 B46 A55
B
A1 A2 A3 B1 B2
A54 B45
E1
E
(DATUM B)
(DATUM A)
2X 0.10 C
B15 A18
B31 A37
2X 0.10 C
2X 0.10 C
A19 B16 B30 A36

TOP VIEW

SEE DETAIL C
A
// 0.10 C
0.08 C
C SEATING PLANE

SIDE VIEW

4X P
D2
A19 B16 B30 A36
A18 B15
A37 B31
4X P
SEE DETAIL A
E2
(K)
A3 A2 A1 B2 B1
B45 A54
NOTE 1
NA = 72 NB = 60 B46 A55
SEE DETAIL B

BOTTOM VIEW

Lb
e
e/2
e
La

DETAIL A

Microchip Technology Drawing C04-360A Sheet 1 of 2

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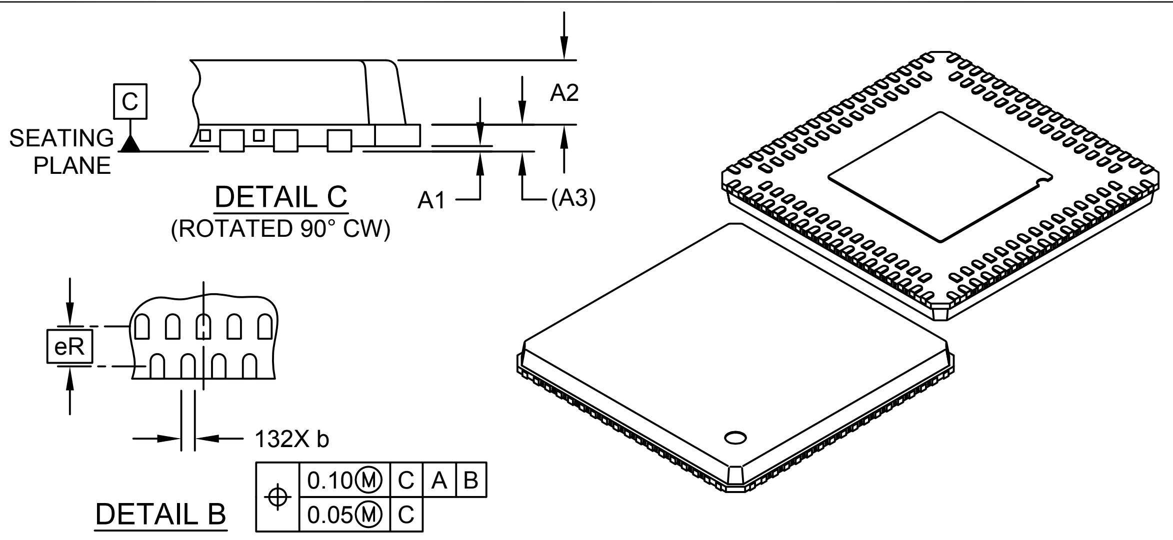
Package Outlines and Dimensions

132-Lead Very Thin Plastic Quad Flat, No Lead Package (NX) - 10x10x0.9 mm Body [VQFN] Dual Row Terminals, Punch Singulated

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		132	
Terminals in Outer Row A	NA		72	
Terminals in Inner Row B	NB		60	
Pitch	e		0.50 BSC	
Pitch Between Rows	eR		0.65 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Mold Cap Height	A2	0.55	0.60	0.65
Base Thickness	A3		0.25 REF	
Overall Length	D		10.00 BSC	
Mold Cap Length	D1		9.73 BSC	
Exposed Pad Length	D2	4.87	4.97	5.07
Overall Width	E		10.00 BSC	
Mold Cap Width	E1		9.73 BSC	
Exposed Pad Width	E2	4.87	4.97	5.07
Terminal Length, Outer Row	La	0.30	0.40	0.50
Terminal Length, Inner Row	Lb	0.30	0.40	0.50
Terminal Width	b	0.18	0.22	0.30
Terminal-to-Exposed-Pad	K		0.20 MIN REF	
Corner Chamfer	P	0.24	0.42	0.60

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is punch singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-360A Sheet 2 of 2

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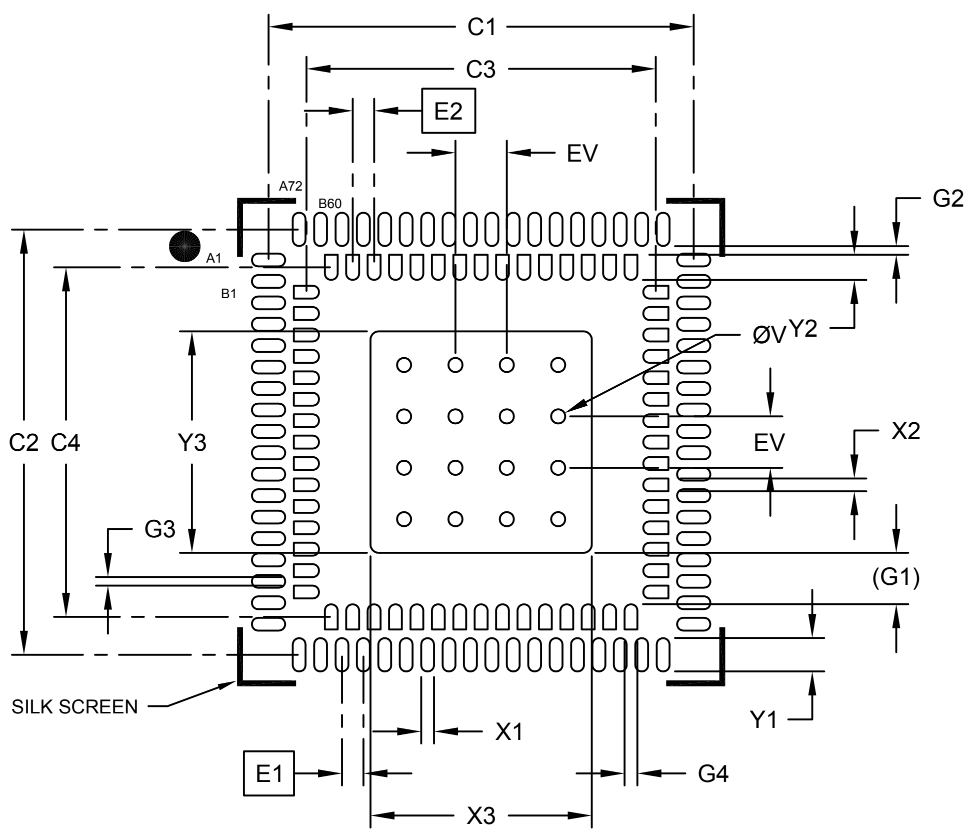
132-Lead Very Thin Plastic Quad Flat, No Lead Package (NX) - 10x10x0.9 mm Body [VQFN] Dual Row Terminals, Punch Singulated

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Outer Contact Pitch	E1	0.50 BSC		
Inner Contact Pitch	E2	0.50 BSC		
Outer Contact Pad Width (X72)	X1			0.30
Inner Contact Pad Width (X60)	X2			0.30
Optional Center Pad Width	X3			5.17
Optional Center Pad Length	Y3			5.17
Outer Contact Pad Spacing	C1		9.93	
Outer Contact Pad Spacing	C2		9.93	
Inner Contact Pad Spacing	C3		8.16	

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Inner Contact Pad Spacing	C4		8.16	
Outer Contact Pad Length (X72)	Y1			0.78
Inner Contact Pad Length (X60)	Y2			0.59
Contact Pad to Center Pad (X60)	G1	1.20 REF		
Inner Pad Row to Outer Pad Row	G2	0.20		
Contact Pad to Contact Pad (X68)	G3	0.20		
Contact Pad to Contact Pad (X56)	G4	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:
1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension. Provided for information only.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2360A

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XQFN

16-Lead Extremely Thin Quad Flat, No Lead Package (NL) - 3x3x0.5mm Body [XQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
(DATUM B)
(DATUM A)
2X
0.15 C
2X
0.15 C
TOP VIEW

C
SEATING PLANE
A
0.10 C
A1
(A3)
SIDE VIEW
0.075 C

0.10Ⓜ C A B
D2
L
0.10Ⓜ C A B
E2
2
1
NOTE 1
N
K
16X b
e/2
e
0.10Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-217A Sheet 1 of 2

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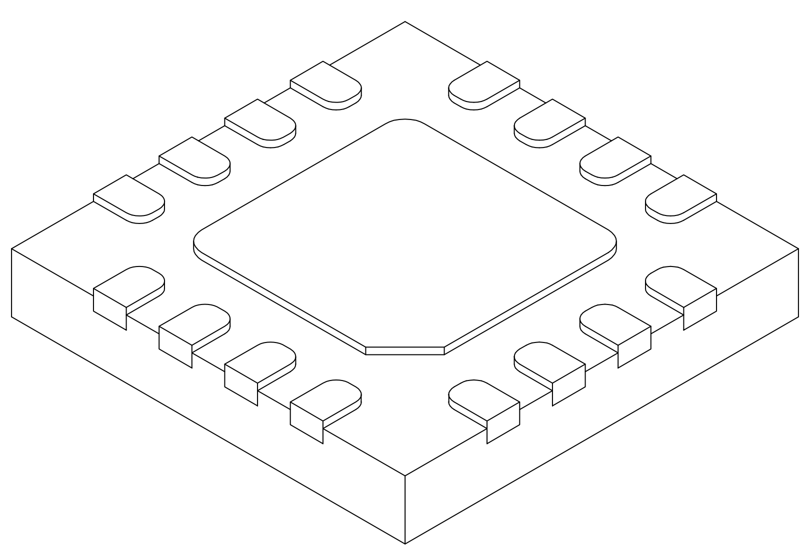
16-Lead Extremely Thin Quad Flat, No Lead Package (NL) - 3x3x0.5mm Body [XQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		16	
Pitch	e		0.50 BSC	
Overall Height	A	0.40	0.45	0.50
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.15 REF	
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.65	1.70	1.75
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.65	1.70	1.75
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.35	0.40
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-217A Sheet 2 of 2

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NOTES:

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X2QFN

10-Lead Super-Thin Plastic Quad Flat, No Lead Package (9X) - 1.5x1.5 mm Body [X2QFN]. 0.75x0.75 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D A B N 1 2 NOTE 1 E (DATUM B) (DATUM A) 2X 0.05 C 2X 0.05 C

TOP VIEW

A1 0.05 C 10X 0.08 C (A3) A C SEATING PLANE

SIDE VIEW

0.05Ⓜ C A B D2 (0.0625) 10X b 0.05Ⓜ C A B 0.03Ⓜ C NOTE 1 E2 2 e/2 e 1 0.05Ⓜ C A B N 10X L 10X K 2X CH

BOTTOM VIEW

Microchip Technology Drawing C04-376A Sheet 1 of 2

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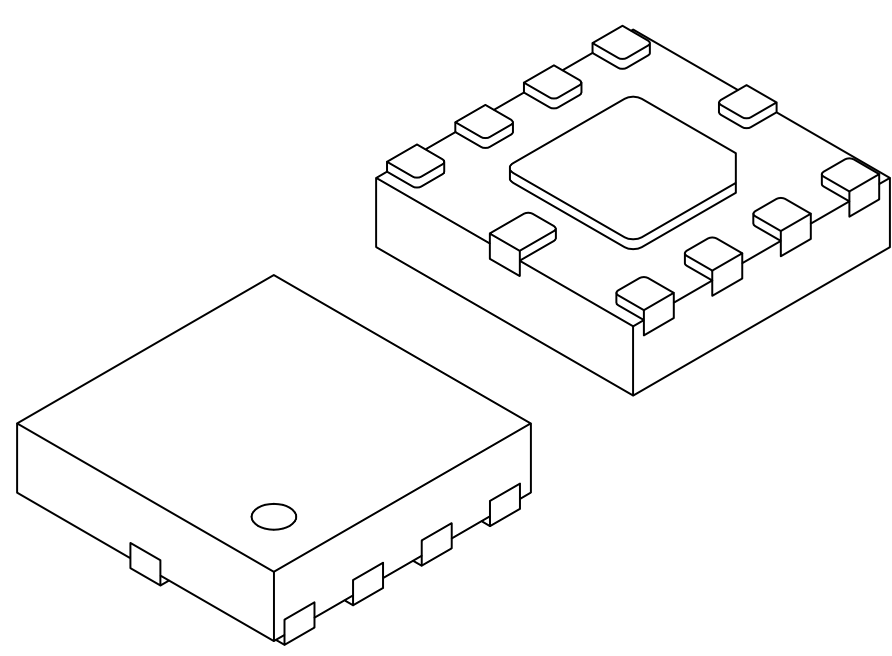
10-Lead Super-Thin Plastic Quad Flat, No Lead Package (9X) - 1.5x1.5 mm Body [X2QFN]. 0.75x0.75 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		10	
Pitch	e		0.40 BSC	
Overall Height	A	0.30	0.35	0.40
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.127 REF	
Overall Width	E		1.50 BSC	
Exposed Pad Width	E2	0.70	0.75	0.80
Overall Length	D		1.50 BSC	
Exposed Pad Length	D2	0.70	0.75	0.80
Exposed Pad Corner Chamfer	CH	-	0.15	-
Terminal Width	b	0.125	0.175	0.225
Terminal Length	L	0.125	0.175	0.225
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-376A Sheet 2 of 2

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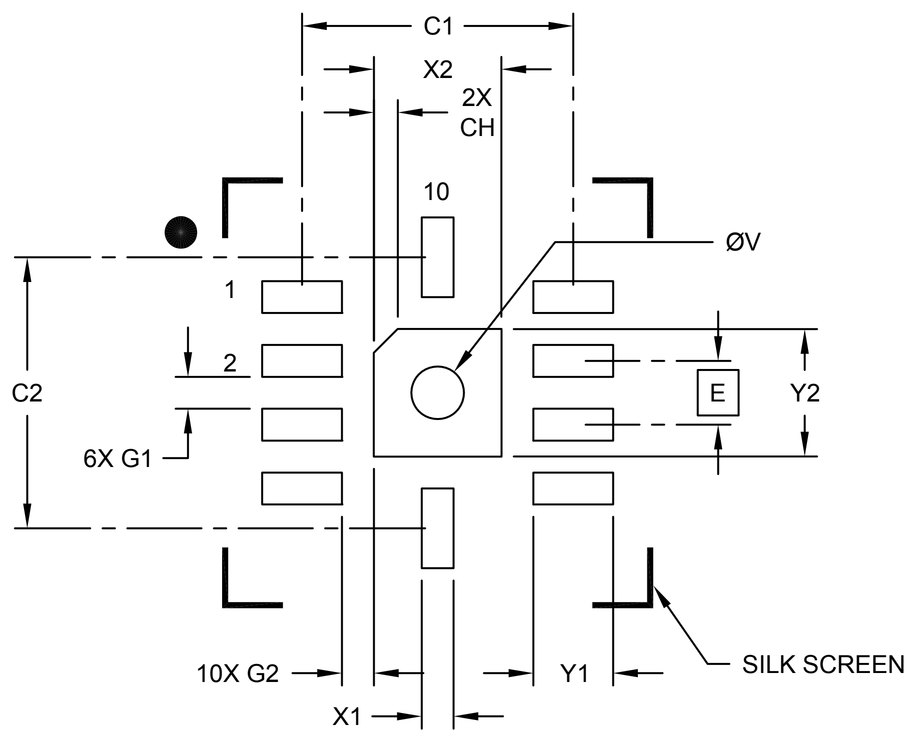
10-Lead Super-Thin Plastic Quad Flat, No Lead Package (9X) - 1.5x1.5 mm Body [X2QFN]. 0.75x0.75 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Optional Center Pad Width	X2			0.80
Optional Center Pad Length	Y2			0.80
Optional Center Pad Corner Chamfer	CH		0.15	
Contact Pad Spacing	C1		1.70	
Contact Pad Spacing	C2		1.70	
Contact Pad Width (X10)	X1			0.20
Contact Pad Length (X10)	Y1			0.50
Contact Pad to Pad (X6)	G1	0.20		
Contact Pad to Center Pad (X10)	G2	0.20		
Thermal Via Diameter	V		0.33	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2376A

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WTLA

20-Terminal Very, Very Thin Leadless Array Package (TW) – 3x3x0.7 mm Body With Exposed Pad [WTLA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
NOTE 1
1
2
E
2X
0.10 C
2X
0.10 C

TOP VIEW

// 0.10 C
A
20X
0.08 C
SEATING PLANE
C
A1

0.10Ⓜ C A B
D2
N
E2
e
e/2
2
1
K
0.10Ⓜ C A B
N
20X L
20X b
0.10Ⓜ C A B
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-184B Sheet 1 of 2

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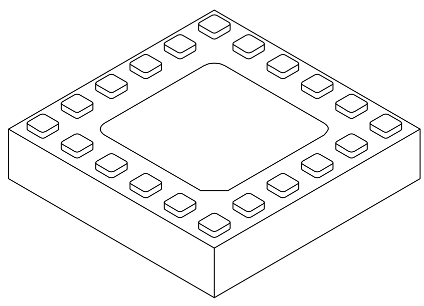
20-Terminal Very, Very Thin Leadless Array Package (TW) – 3x3x0.7 mm Body With Exposed Pad [WTLA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Pins	N		20	
Pitch	e		0.50 BSC	
Overall Height	A	0.60	-	0.70
Standoff	A1	0.025	-	0.075
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.60	1.75	1.90
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.60	1.75	1.90
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-184B Sheet 2 of 2

NOTES:

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VTLA

36-Terminal Very Thin Thermal Leadless Array Package (TL) – 5x5x0.9 mm Body with Exposed Pad [VTLA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
1
2
NOTE 1
E
2X
0.10 C
2X
0.10 C

TOP VIEW

A
0.10 C
36X
0.08 C
SEATING PLANE
C
A1

SIDE VIEW

D2
0.10 M C A B
0.10 M C A B
e
(DATUM A)
E2
(NE-1) x e
e/2
(DATUM B)
2
1
K
N
SEE DETAIL A
(ND-1) x e

BOTTOM VIEW

Microchip Technology Drawing C04-187C Sheet 1 of 2

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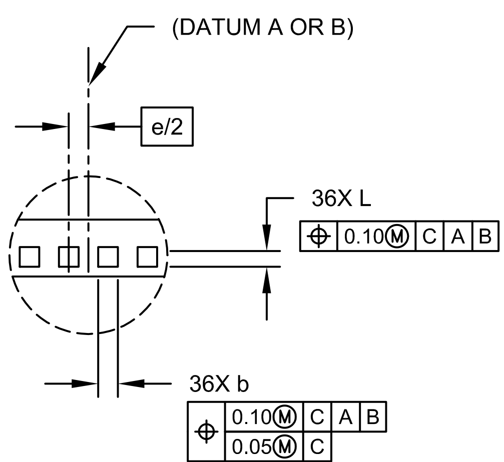
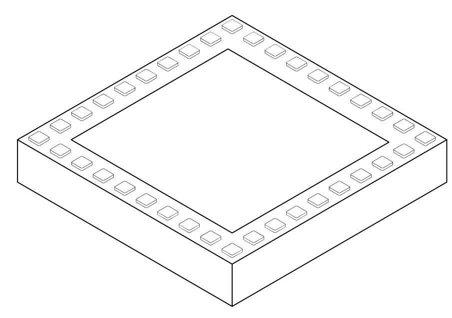
36-Terminal Very Thin Thermal Leadless Array Package (TL) – 5x5x0.9 mm Body with Exposed Pad [VTLA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Units		MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Pins	N		36	
Number of Pins per Side	ND		10	
Number of Pins per Side	NE		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.025	-	0.075
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.60	3.75	3.90
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.60	3.75	3.90
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-187C Sheet 2 of 2

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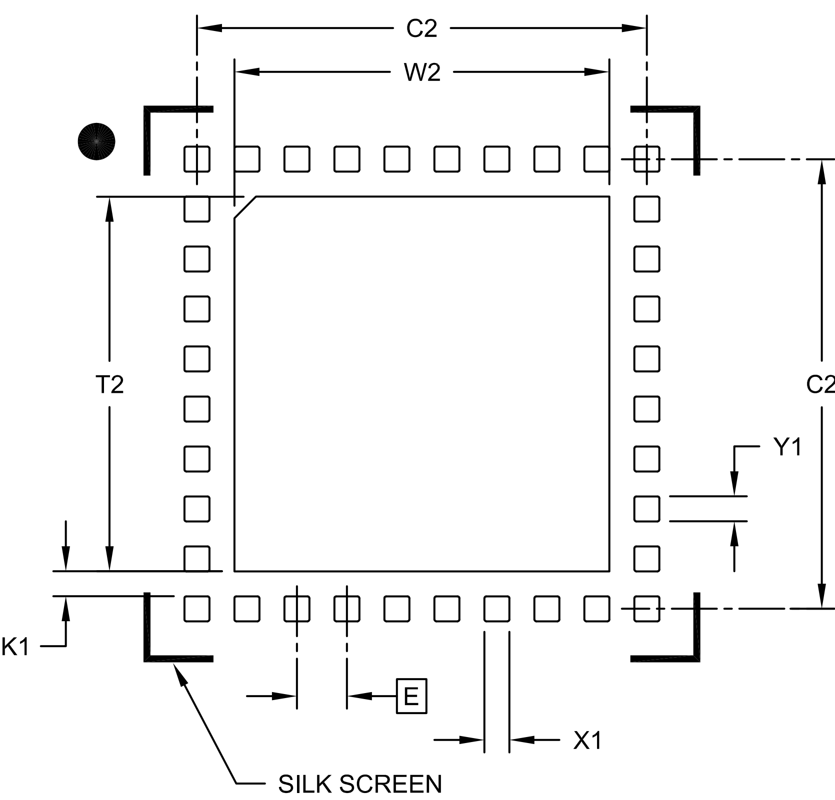
36-Lead Thermal Leadless Array Package (TL) – 5x5x0.9 mm Body with Exposed Pad [VTLA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			3.75
Optional Center Pad Length	T2			3.75
Contact Pad Spacing	C1		4.50	
Contact Pad Spacing	C2		4.50	
Contact Pad Width (X36)	X1			0.25
Contact Pad Length (X36)	Y1			0.25
Distance Between Pads	K1	0.15	0.25	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2187B

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44-Terminal Very Thin Leadless Array Package (TL) – 6x6x0.9 mm Body With Exposed Pad [VTLA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D A B
N
NOTE 1
1
2
E
(DATUM B)
2X 0.20 C
2X 0.20 C
(DATUM A)

TOP VIEW

C
SEATING PLANE
A
0.10 C
A1
0.08 C

SIDE VIEW

0.10Ⓜ C A B
D2
11
22
10
23
0.10Ⓜ C A
DETAIL A
(NE-1) X e
E2
2
1
32
N
33
44X K
(ND-1) X e

BOTTOM VIEW

Microchip Technology Drawing C04-157D Sheet 1 of 2

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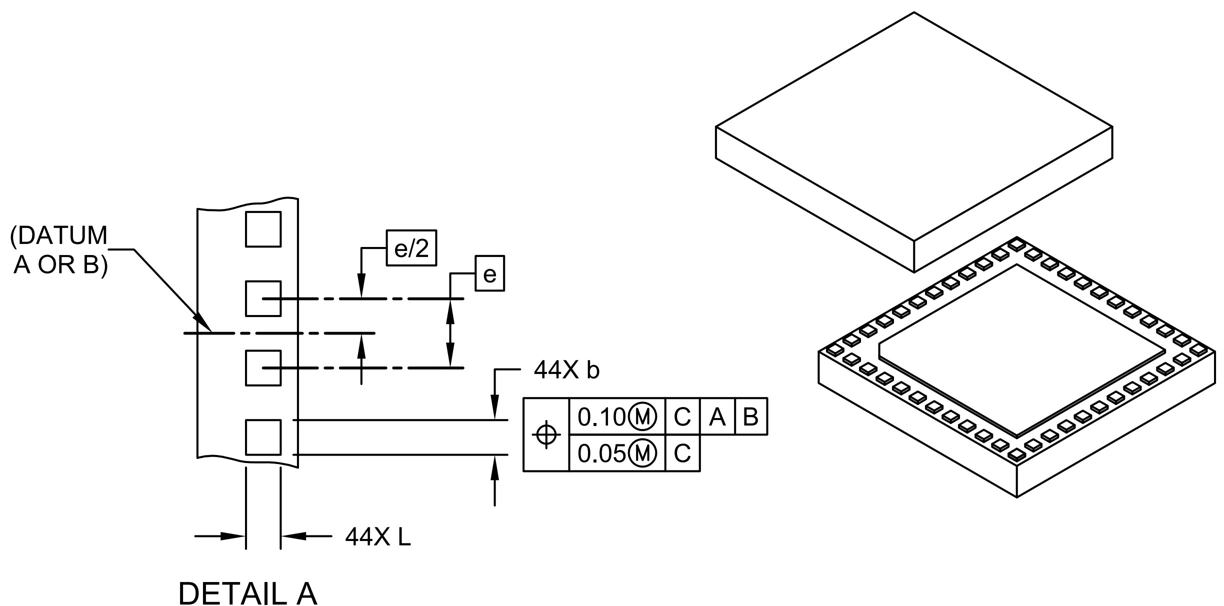
44-Terminal Very Thin Leadless Array Package (TL) – 6x6x0.9 mm Body With Exposed Pad [VTLA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Terminals	N		44	
Number of Terminals per Side	ND		12	
Number of Terminals per Side	NE		10	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.025	-	0.075
Overall Width	E		6.00 BSC	
Exposed Pad Width	E2	4.40	4.55	4.70
Overall Length	D		6.00 BSC	
Exposed Pad Length	D2	4.40	4.55	4.70
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.20	0.25	0.30
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-157D Sheet 2 of 2

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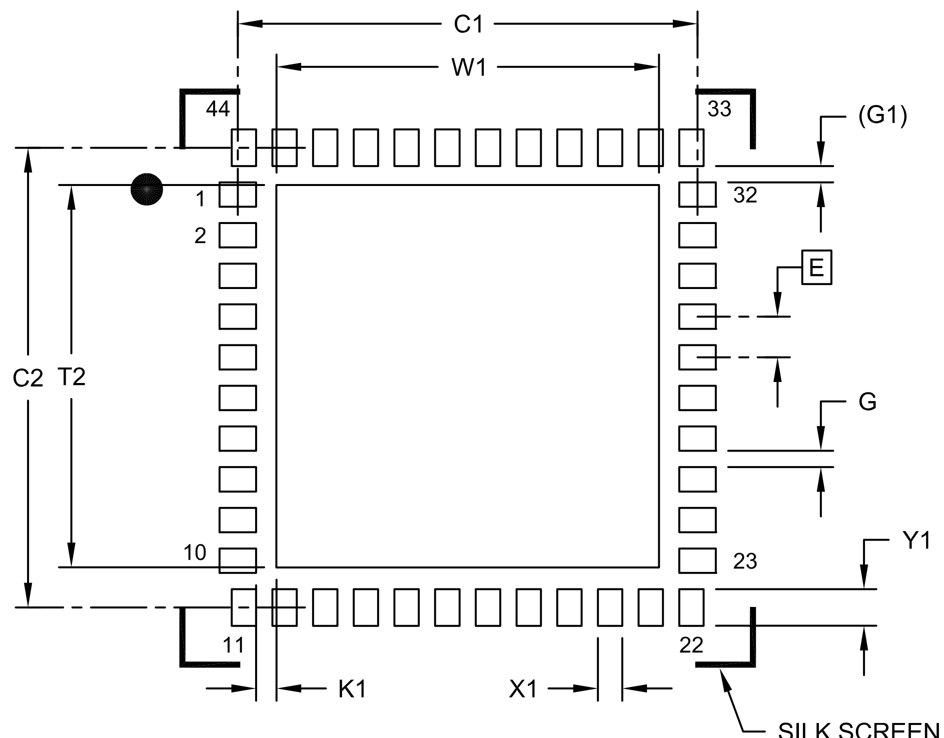
44-Terminal Very Thin Leadless Array Package (TL) – 6x6x0.9 mm Body With Exposed Pad [VTLA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Terminal Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			4.70
Optional Center Pad Length	T2			4.70
Terminal Pad Spacing	C1		5.65	
Terminal Pad Spacing	C2		5.65	
Terminal Pad Width (X44)	X1			0.30
Terminal Pad Length (X44)	Y1			0.45
Distance Between Pads	(G1)	0.20 REF.		
Distance Between Pads	G	0.20		
Distance Between Pads	K1	0.267		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2157A

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124-Terminal Very Thin Leadless Array Package (TL) – 9x9x0.9 mm Body [VTLA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
NOTE 1
(DATUM A)
(DATUM B)
E
2X
0.10 C
2X
0.10 C

TOP VIEW

A
0.10 C
SEATING PLANE
C
A1
124X
0.08 C

SIDE VIEW

0.10 C A B
D2
A17
B14
B28
A34
0.10Ⓜ C A B
A16
A35
B13
B29
e
E2
NOTE 1
B
B
K
B1
B41
A1
A50
A68
B56
B42
A51
SEE DETAIL A
124X b
0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-193A Sheet 1 of 2

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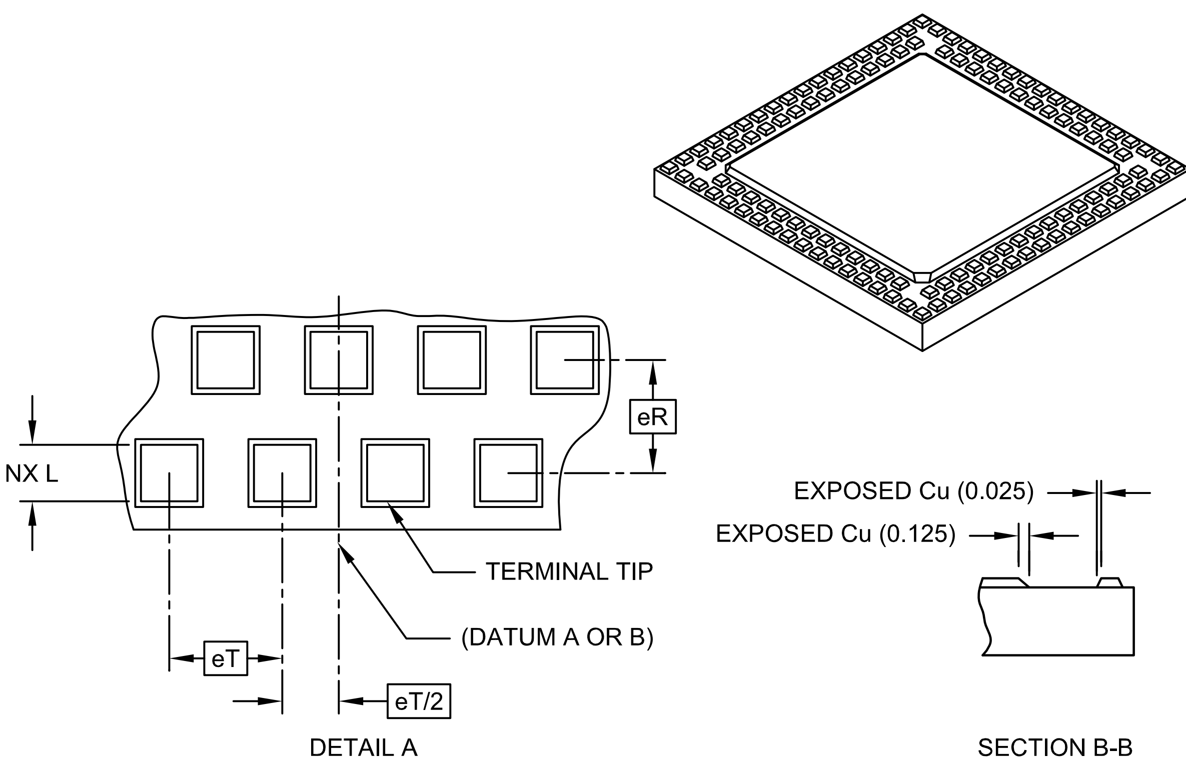
124-Terminal Very Thin Leadless Array Package (TL) – 9x9x0.9 mm Body [VTLA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		124	
Pitch	eT		0.50 BSC	
Pitch (Inner to outer terminal ring)	eR		0.50 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	-	0.05
Overall Width	E		9.00 BSC	
Exposed Pad Width	E2	6.40	6.55	6.70
Overall Length	D		9.00 BSC	
Exposed Pad Length	D2	6.40	6.55	6.70
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-193A Sheet 2 of 2

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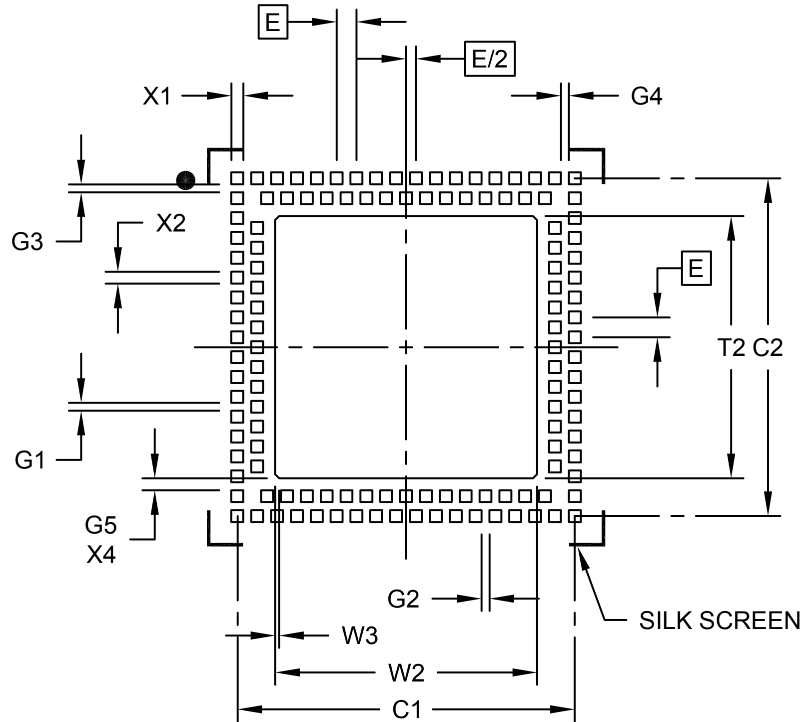
124-Very Thin Leadless Array Package (TL) – 9x9x0.9 mm Body [VTLA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Pad Clearance	G1	0.20		
Pad Clearance	G2	0.20		
Pad Clearance	G3	0.20		
Pad Clearance	G4	0.20		
Contact to Center Pad Clearance (X4)	G5	0.30		
Optional Center Pad Width	T2			6.60
Optional Center Pad Length	W2			6.60
Optional Center Pad Chamfer (X4)	W3		0.10	
Contact Pad Spacing	C1		8.50	
Contact Pad Spacing	C2		8.50	
Contact Pad Width (X124)	X1			0.30
Contact Pad Length (X124)	X2			0.30

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2193A

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MSOP

8-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
2X
0.20 H
D/2
A
D
N
E/2
E1/2
E
E1
NOTE 1
1
2
N/2
0.25 C
B
e
NX b
0.13 Ⓜ C A-B D

TOP VIEW

A
A2
0.10 C
SEATING PLANE
C
A1

SIDE VIEW

H
SEE DETAIL C

END VIEW

Microchip Technology Drawing C04-111C Sheet 1 of 2

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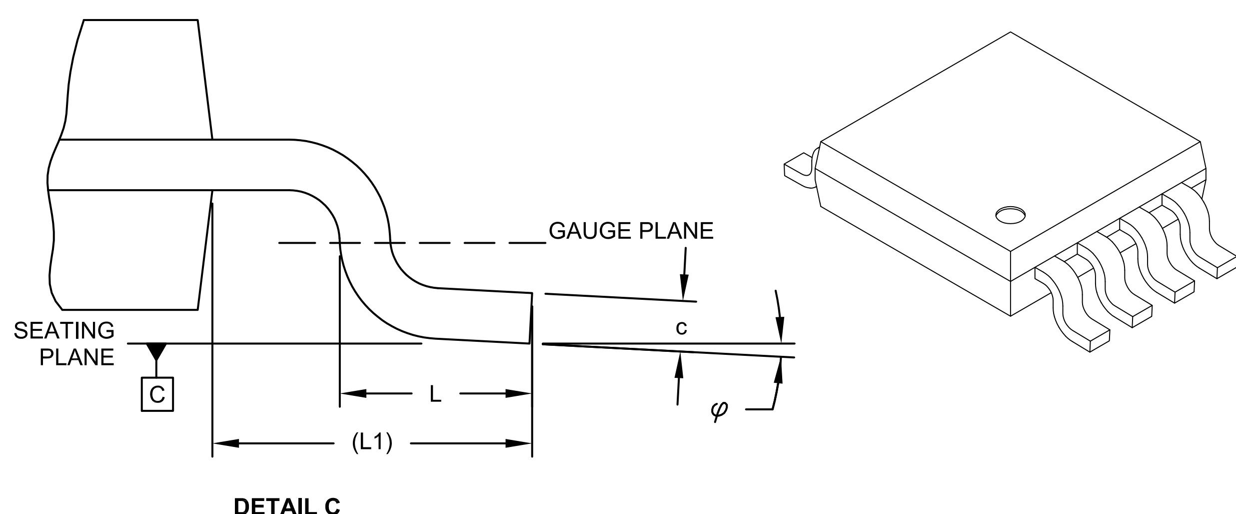
Package Outlines and Dimensions

8-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.65 BSC	
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.75	0.85	0.95
Standoff	A1	0.00	-	0.15
Overall Width	E		4.90 BSC	
Molded Package Width	E1		3.00 BSC	
Overall Length	D		3.00 BSC	
Foot Length	L	0.40	0.60	0.80
Footprint	L1		0.95 REF	
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.08	-	0.23
Lead Width	b	0.22	-	0.40

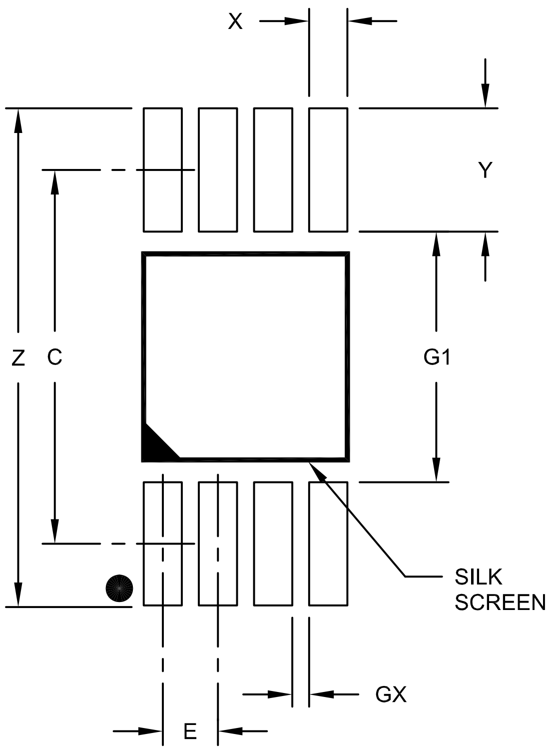
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-111C Sheet 2 of 2

8-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		4.40	
Overall Width	Z			5.85
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.45
Distance Between Pads	G1	2.95		
Distance Between Pads	GX	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2111A

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8-Lead Plastic Micro Small Outline Package (UA) [MSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
2X
0.20 H
D/2
A
D
N
E/2
E1/2
E
E1
NOTE 1
1
2
N/2
0.25 C
B
e
NX b
0.13 M C A-B D

TOP VIEW

A
A2
0.10 C
SEATING PLANE
C
A1

SIDE VIEW

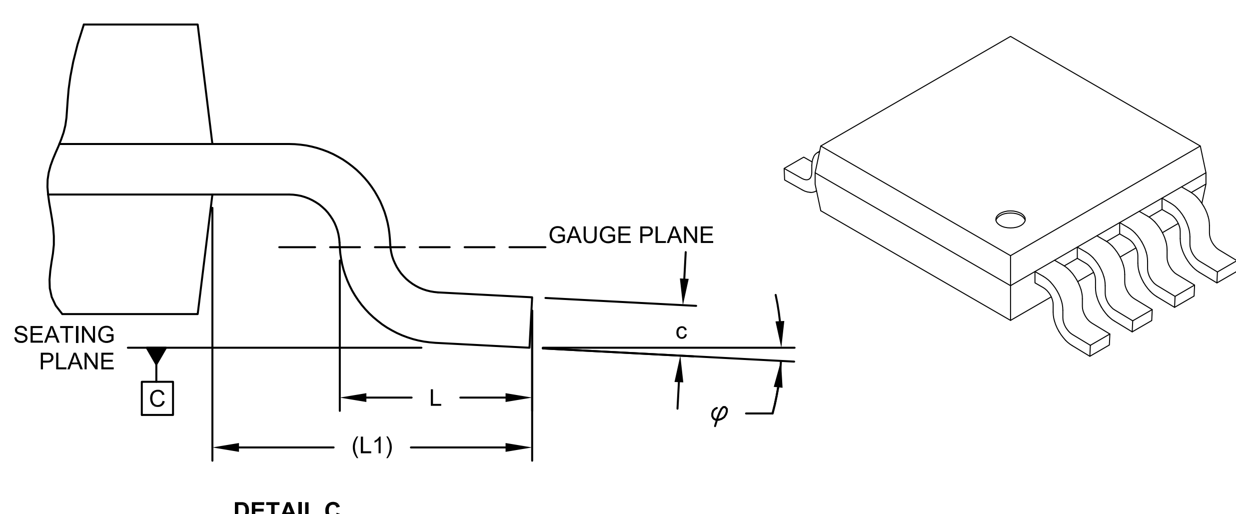
H
SEE DETAIL C

END VIEW

Microchip Technology Drawing C04-111C Sheet 1 of 2

8-Lead Plastic Micro Small Outline Package (UA) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.65 BSC	
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.75	0.85	0.95
Standoff	A1	0.00	-	0.15
Overall Width	E		4.90 BSC	
Molded Package Width	E1		3.00 BSC	
Overall Length	D		3.00 BSC	
Foot Length	L	0.40	0.60	0.80
Footprint	L1		0.95 REF	
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.08	-	0.23
Lead Width	b	0.22	-	0.40

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-111C Sheet 2 of 2

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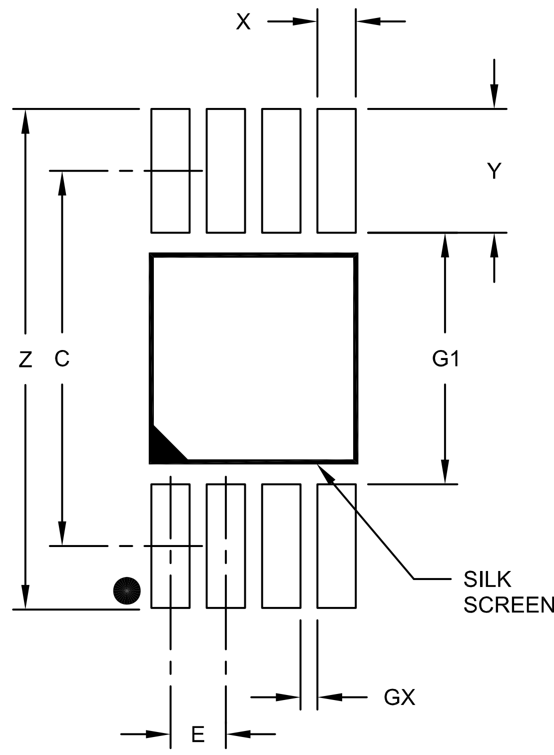
8-Lead Plastic Micro Small Outline Package (UA) [MSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		4.40	
Overall Width	Z			5.85
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.45
Distance Between Pads	G1	2.95		
Distance Between Pads	GX	0.20		

Notes:

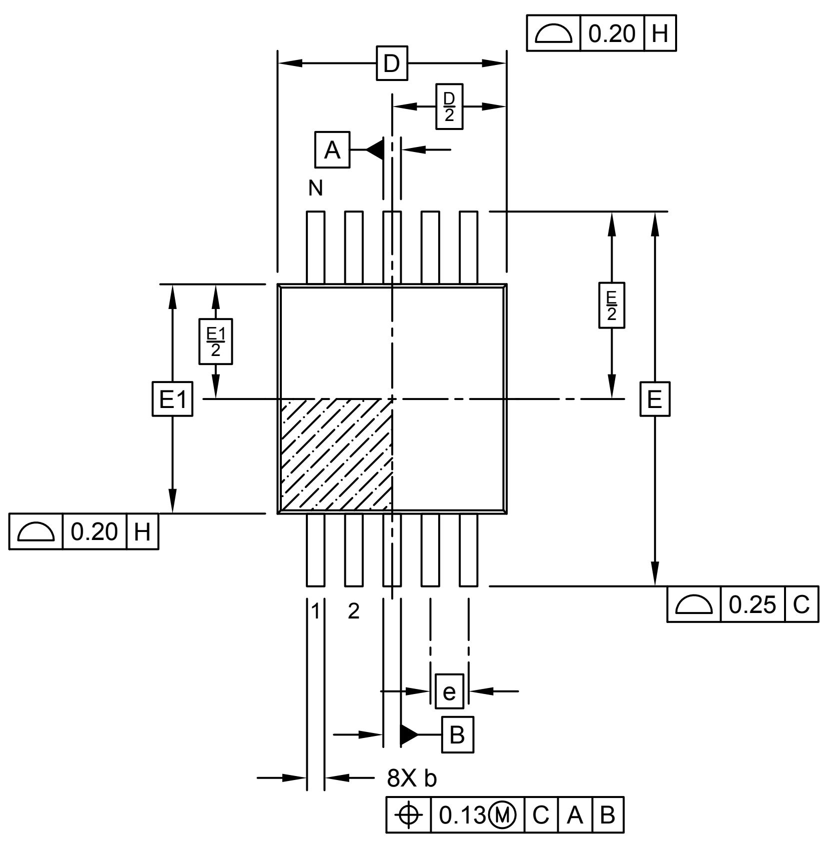
1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

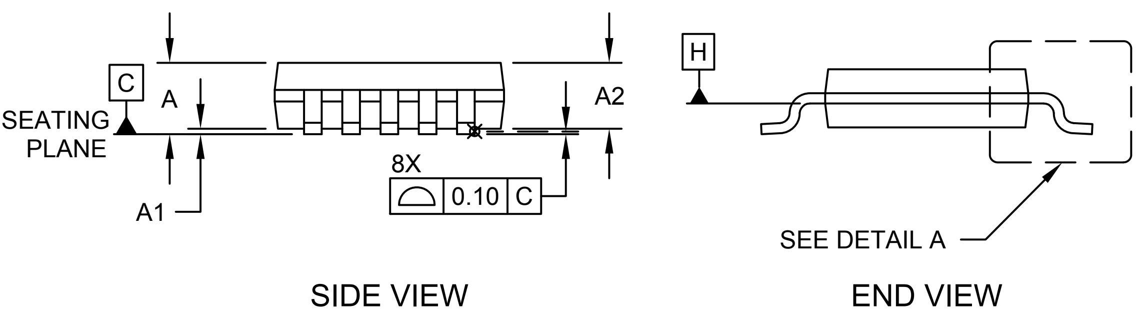
Microchip Technology Drawing No. C04-2111A

10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW

END VIEW

Microchip Technology Drawing C04-021D Sheet 1 of 2

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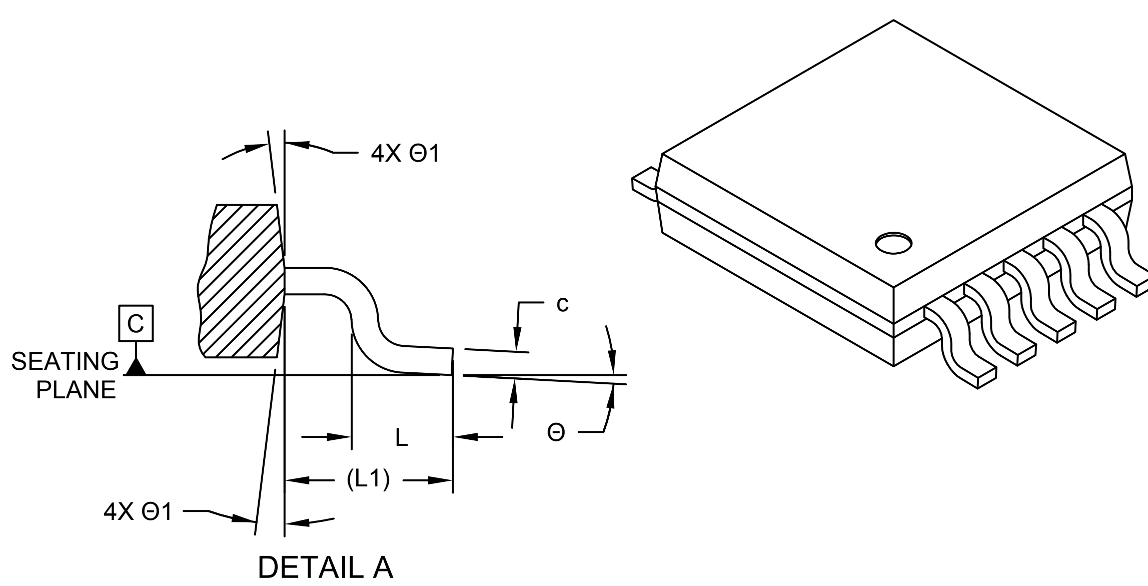
10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		10	
Pitch	e		0.50 BSC	
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.75	0.85	0.95
Standoff	A1	0.00	-	0.15
Overall Width	E		4.90 BSC	
Molded Package Width	E1		3.00 BSC	
Overall Length	D		3.00 BSC	
Foot Length	L	0.40	0.60	0.80
Footprint	L1		0.95 REF	
Mold Draft Angle	Θ	0°	-	8°
Foot Angle	Θ1	5°	-	15°
Lead Thickness	c	0.08	-	0.23
Lead Width	b	0.15	-	0.33

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-021D Sheet 2 of 2

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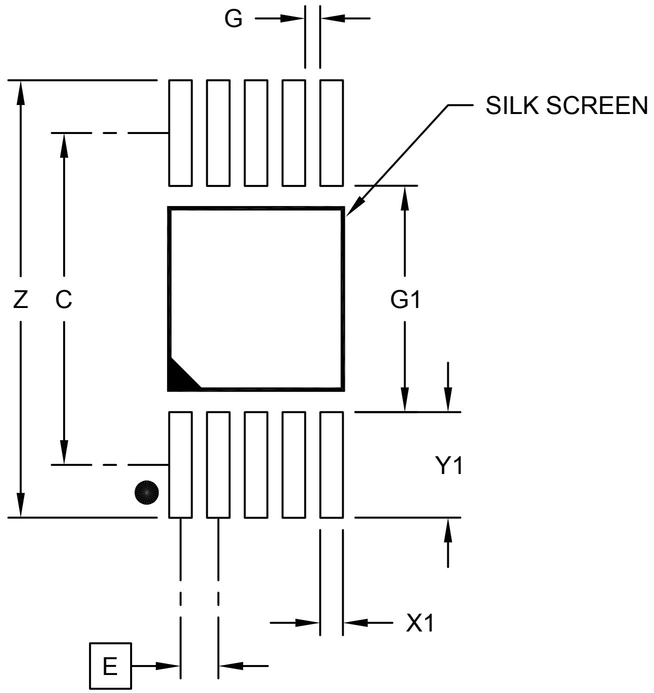
10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C		4.40	
Overall Width	Z			5.80
Contact Pad Width (X10)	X1			0.30
Contact Pad Length (X10)	Y1			1.40
Distance Between Pads (X5)	G1	3.00		
Distance Between Pads (X8)	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2021B

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10-Lead Plastic Micro Small Outline Package (UN) [MSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

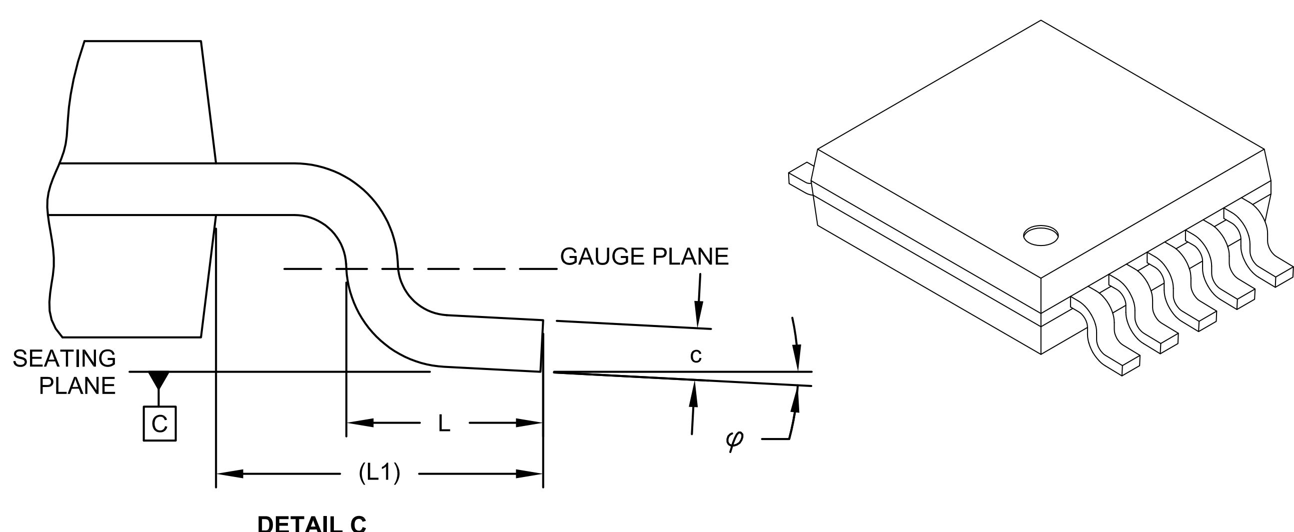
SIDE VIEW

END VIEW

Microchip Technology Drawing C04-021C Sheet 1 of 2

10-Lead Plastic Micro Small Outline Package (UN) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	10		
Pitch	e	0.50 BSC		
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.75	0.85	0.95
Standoff	A1	0.00	-	0.15
Overall Width	E	4.90 BSC		
Molded Package Width	E1	3.00 BSC		
Overall Length	D	3.00 BSC		
Foot Length	L	0.40	0.60	0.80
Footprint	L1	0.95 REF		
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.08	-	0.23
Lead Width	b	0.15	-	0.33

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-021C Sheet 2 of 2

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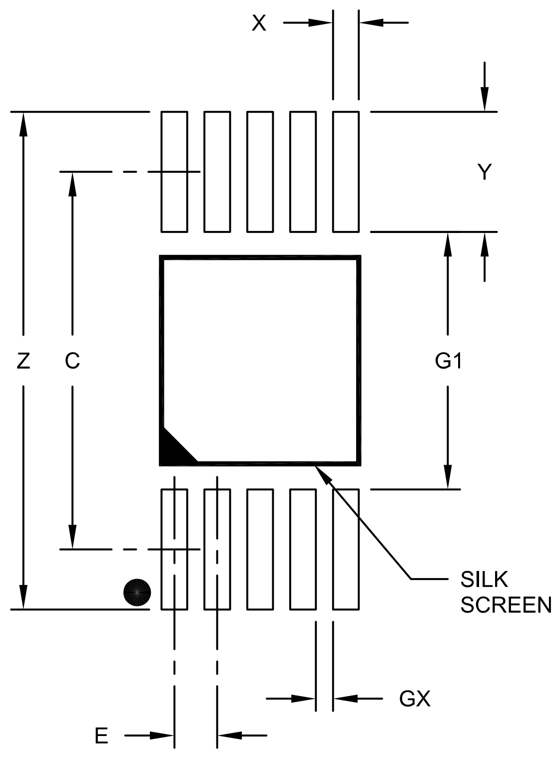
10-Lead Plastic Micro Small Outline Package (UN) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C		4.40	
Overall Width	Z			5.80
Contact Pad Width (X10)	X1			0.30
Contact Pad Length (X10)	Y1			1.40
Distance Between Pads	G1	3.00		
Distance Between Pads	GX	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2021A

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NOTES:

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QSOP

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16-Lead Plastic Shrink Small Outline Narrow Body (QR) - .150" Body [QSOP]
SMSC Legacy "SSOP" Package A2C

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
NOTE 1
E1/2
E1
E
2X
.004 C
2X N/2 TIPS
.008Ⓜ C
1
2
2X
.004 C
e/2
16X b
.007Ⓜ C A B
e

TOP VIEW

A
// .004 C
C
A
A2
.004 C A B
SEATING PLANE
A1
A

SIDE VIEW

h
h
H
SEE DETAIL B SHEET 2

VIEW A—A

Microchip Technology Drawing C04-024D Sheet 1 of 2

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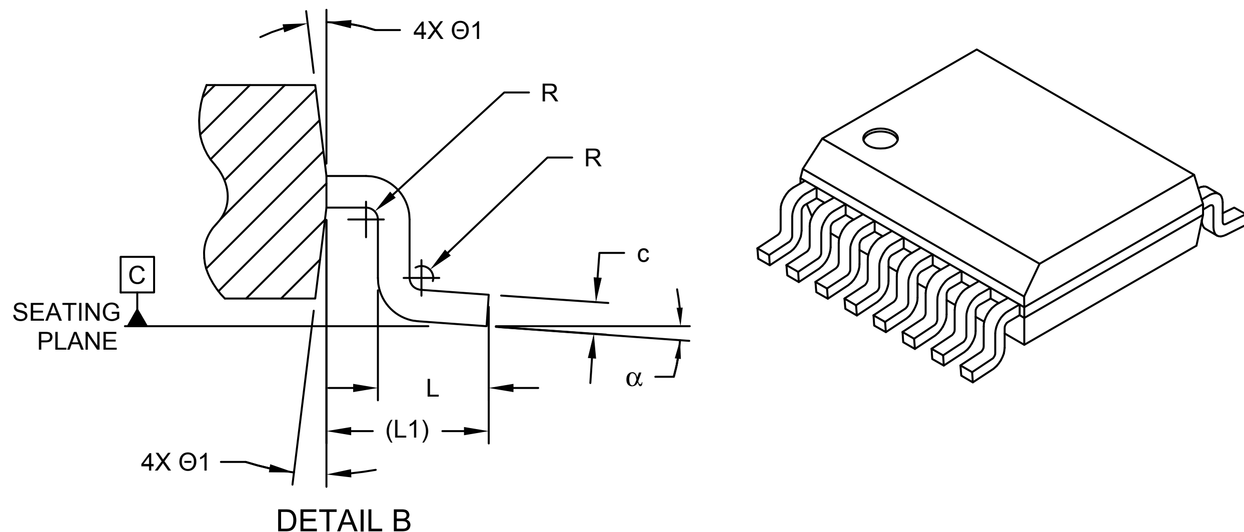
16-Lead Plastic Shrink Small Outline Narrow Body (QR) - .150" Body [QSOP] SMSC Legacy "SSOP" Package A2C

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	INCHES		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	16		
Pitch	e	.025 BSC		
Overall Height	A	.053	-	.069
Standoff §	A1	.004	-	.010
Molded Package Height	A2	.049	-	.065
Overall Width	E	.236 BSC		
Molded Package Width	E1	.154 BSC		
Overall Length	D	.193 BSC		
Chamfer Distance	h	.010	-	.020
Lead Thickness	c	.006	-	.010
Lead Width	b	.008	.010	.012
Lead Bend Radius	R	.003	-	-
Footprint	(L1)	.041 REF		
Foot Length	L	.016	-	0.35
Foot Angle	α	0°	-	8°
Mold Draft Angle	Θ1	5°	-	15°

Notes:

1. Chamfer feature is optional. If it is not present, then a Pin 1 visual index feature must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .006" per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-024D Sheet 2 of 2

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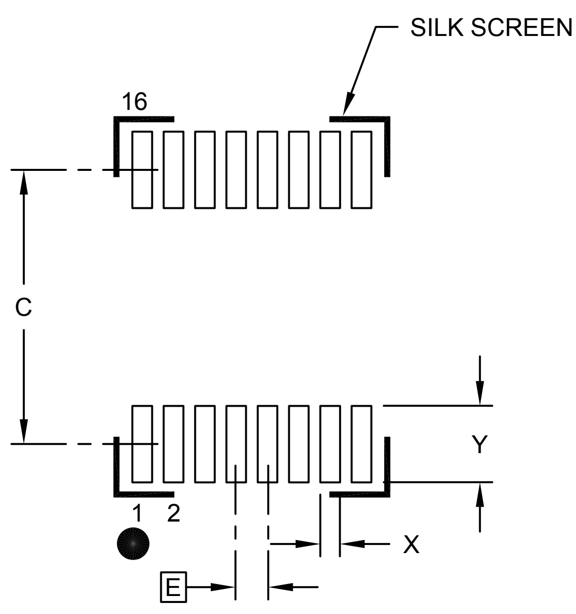
16-Lead Plastic Shrink Small Outline Narrow Body (QR) - .150" Body [QSOP] SMSC Legacy "SSOP" Package A2C

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	.025 BSC		
Contact Pad Spacing	C		.213	
Contact Pad Width (X16)	X			.016
Contact Pad Length (X16)	Y			.061

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2024B

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Package Outlines and Dimensions

24-Lead Plastic Shrink Small Outline Narrow Body (QR) - .150" Body [QSOP] SMSC Legacy "SSOP" Package C2C

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
NOTE 1
E1/2
E1
E
2X
.004 C
2X N/2 TIPS
.008Ⓜ C
1 2
2X
.004 C
e/2
24X b
.007Ⓜ C A B
e

TOP VIEW

A
.004 C
C A A2
.004 C A B
SEATING PLANE
A1
A

SIDE VIEW

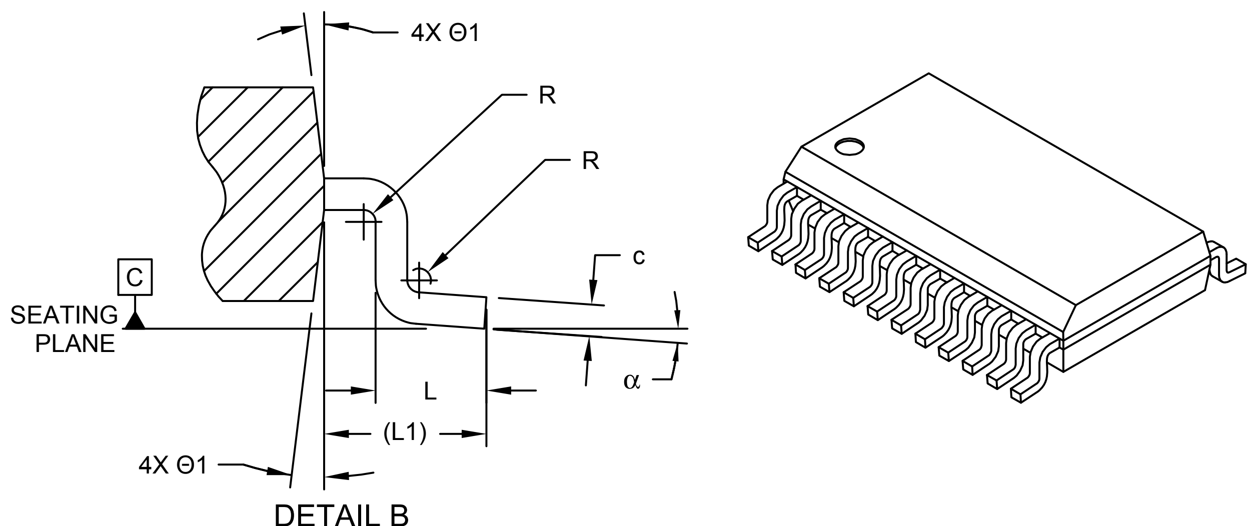
h h
H
SEE DETAIL B SHEET 2

VIEW A—A

Microchip Technology Drawing C04-383A Sheet 1 of 2

24-Lead Plastic Shrink Small Outline Narrow Body (QR) - .150" Body [QSOP] SMSC Legacy "SSOP" Package C2C

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	.025 BSC		
Overall Height	A	.053	-	.069
Standoff §	A1	.004	-	.010
Molded Package Height	A2	.049	-	.065
Overall Width	E	.236 BSC		
Molded Package Width	E1	.154 BSC		
Overall Length	D	.341 BSC		
Chamfer Distance	h	.010	-	.020
Lead Thickness	c	.006	-	.010
Lead Width	b	.008	.010	.012
Lead Bend Radius	R	.003	-	-
Footprint	(L1)	.041 REF		
Foot Length	L	.016	-	.050
Foot Angle	α	0°	-	8°
Mold Draft Angle	Θ1	5°	-	15°

Notes:

1. Chamfer feature is optional. If it is not present, then a Pin 1 visual index feature must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .006" per side.
4. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-383A Sheet 2 of 2

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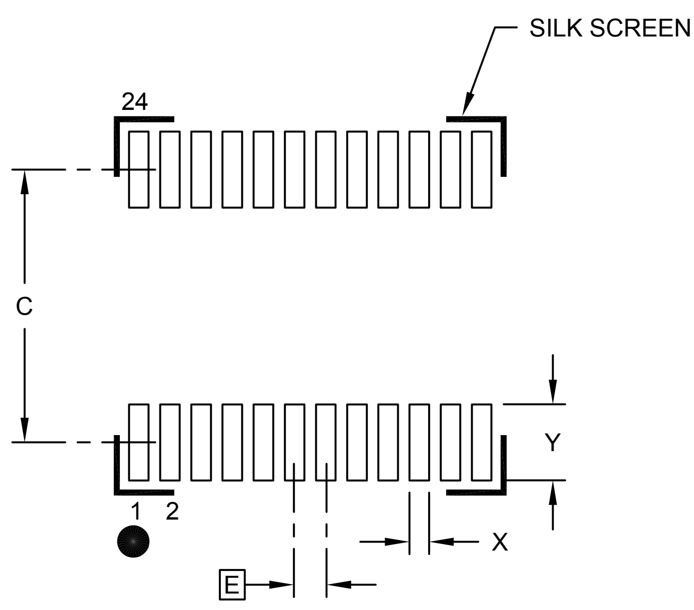
24-Lead Plastic Shrink Small Outline Narrow Body (QR) - .150" Body [QSOP]
SMSC Legacy "SSOP" Package C2C

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.025 BSC	
Contact Pad Spacing	C		.213	
Contact Pad Width (X24)	X			.016
Contact Pad Length (X24)	Y			.061

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2383A

NOTES:

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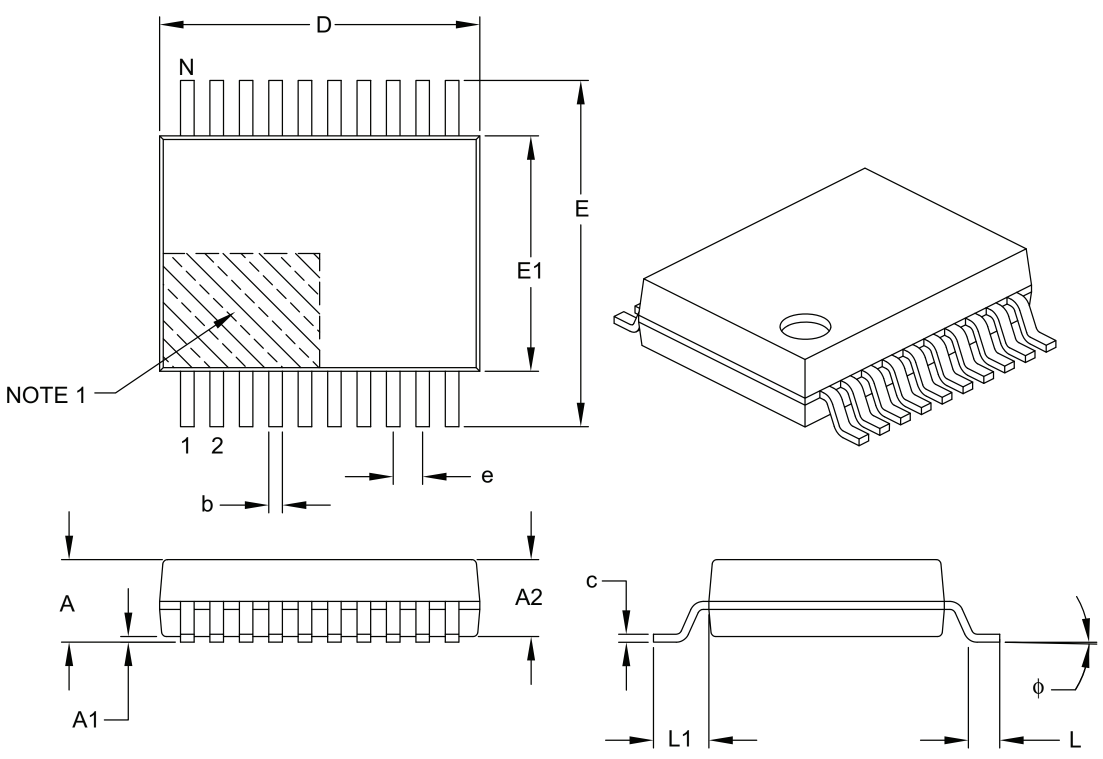
SSOP

Package Outlines and Dimensions

20-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	0.65 BSC		
Overall Height	A	–	–	2.00
Molded Package Thickness	A2	1.65	1.75	1.85
Standoff	A1	0.05	–	–
Overall Width	E	7.40	7.80	8.20
Molded Package Width	E1	5.00	5.30	5.60
Overall Length	D	6.90	7.20	7.50
Foot Length	L	0.55	0.75	0.95
Footprint	L1	1.25 REF		
Lead Thickness	c	0.09	–	0.25
Foot Angle	φ	0°	4°	8°
Lead Width	b	0.22	–	0.38

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-072B

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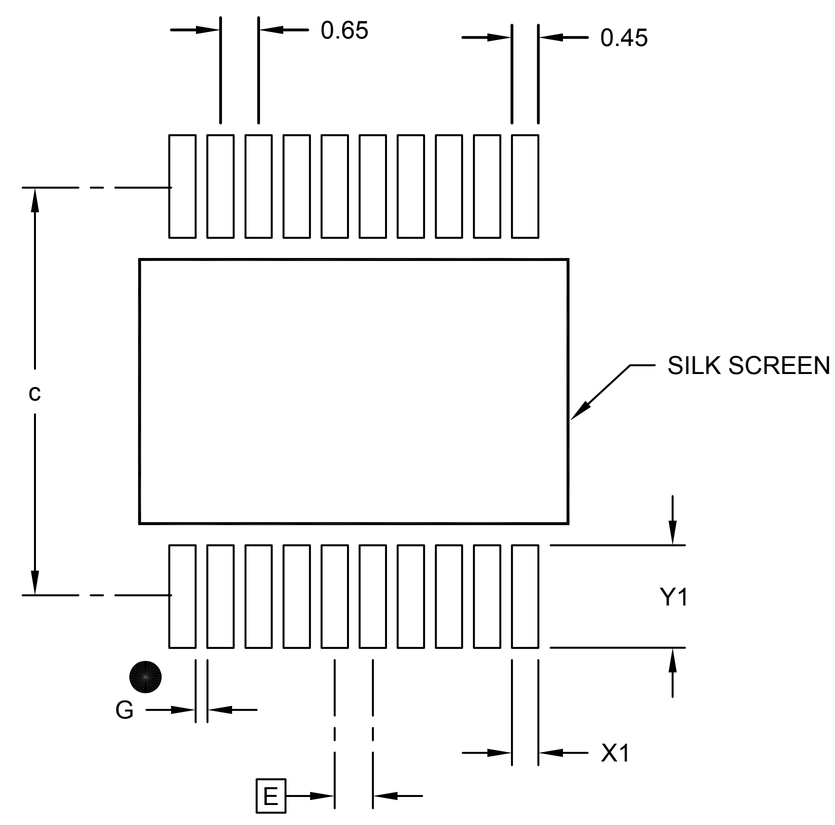
Footprint Outlines and Dimensions

20-Lead Plastic Shrink Small Outline (SS) - 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		7.20	
Contact Pad Width (X20)	X1			0.45
Contact Pad Length (X20)	Y1			1.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

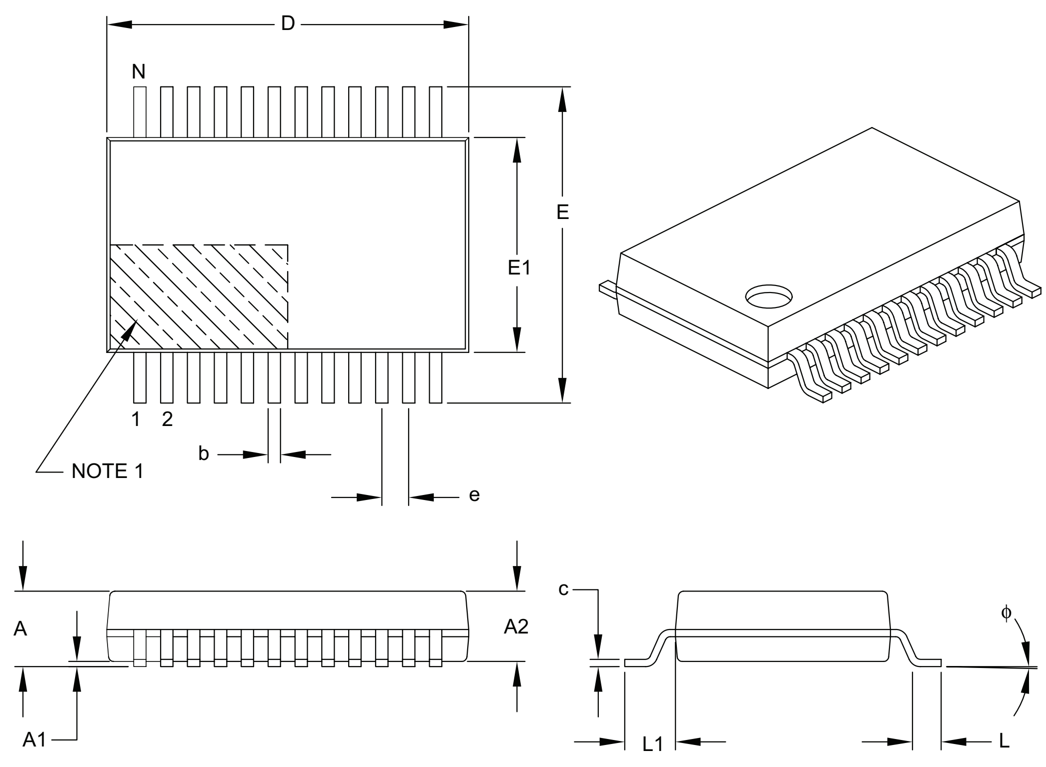
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2072B

Package Outlines and Dimensions

24-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	0.65 BSC		
Overall Height	A	–	–	2.00
Molded Package Thickness	A2	1.65	1.75	1.85
Standoff	A1	0.05	–	–
Overall Width	E	7.40	7.80	8.20
Molded Package Width	E1	5.00	5.30	5.60
Overall Length	D	7.90	8.20	8.50
Foot Length	L	0.55	0.75	0.95
Footprint	L1	1.25 REF		
Lead Thickness	c	0.09	–	0.25
Foot Angle	φ	0°	4°	8°
Lead Width	b	0.22	–	0.38

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-132B

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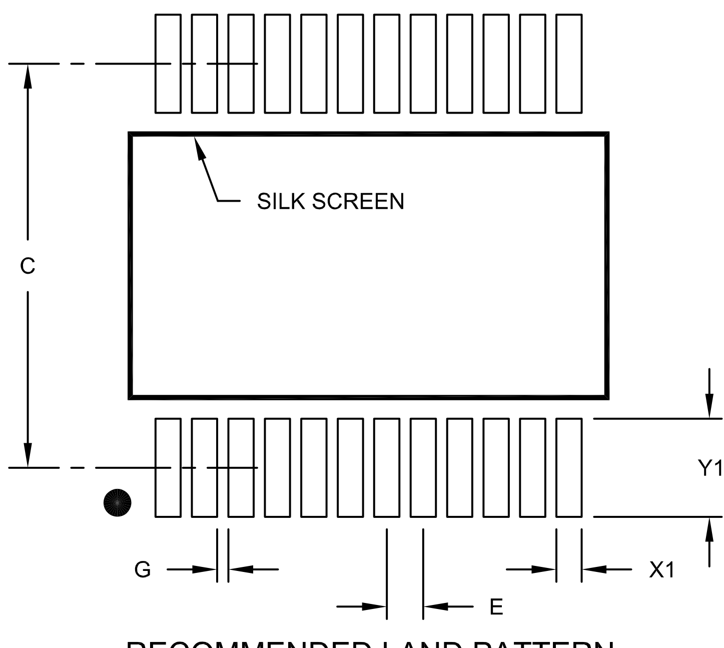
24 Lead Plastic Shrink Small Outline (SS) - 5.30 mm Body [SSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		7.20	
Contact Pad Width (X24)	X1			0.45
Contact Pad Length (X24)	Y1			1.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2132A

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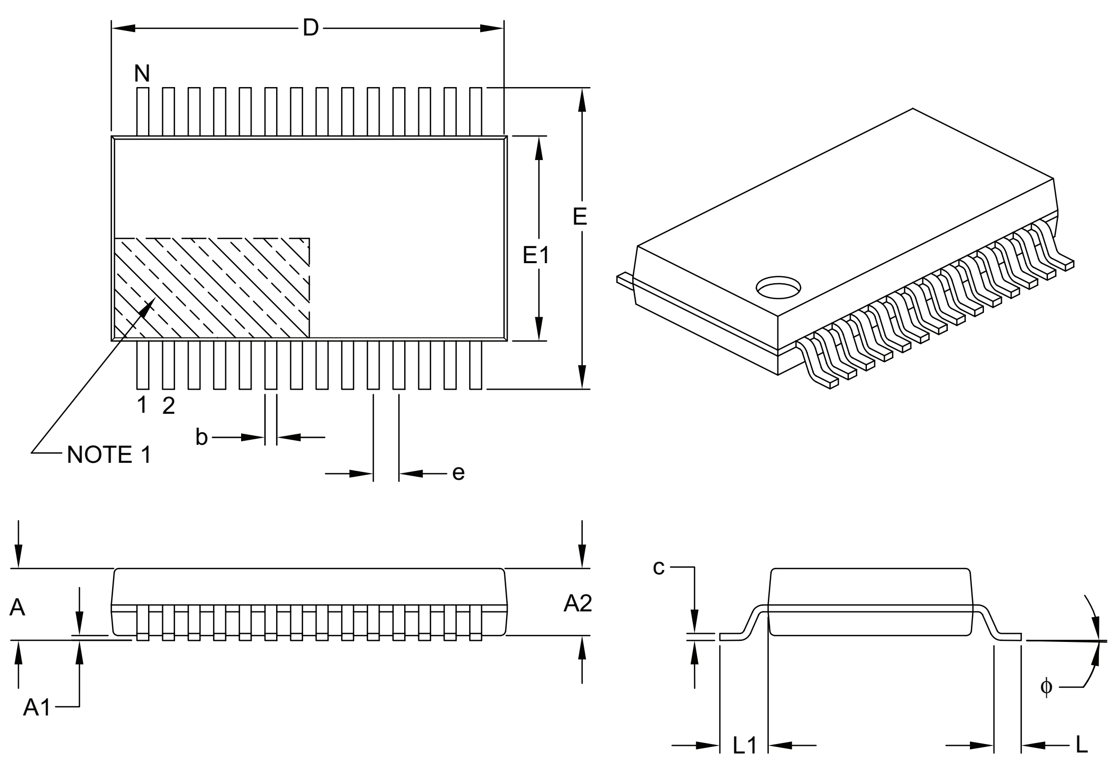
28-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.65 BSC	
Overall Height	A	–	–	2.00
Molded Package Thickness	A2	1.65	1.75	1.85
Standoff	A1	0.05	–	–
Overall Width	E	7.40	7.80	8.20
Molded Package Width	E1	5.00	5.30	5.60
Overall Length	D	9.90	10.20	10.50
Foot Length	L	0.55	0.75	0.95
Footprint	L1		1.25 REF	
Lead Thickness	c	0.09	–	0.25
Foot Angle	φ	0°	4°	8°
Lead Width	b	0.22	–	0.38

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-073B

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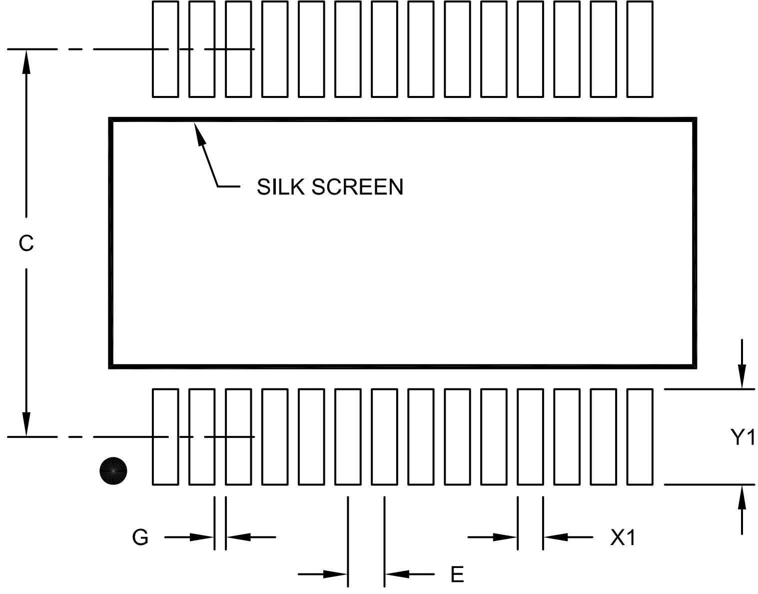
28-Lead Plastic Shrink Small Outline (SS) - 5.30 mm Body [SSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		7.20	
Contact Pad Width (X28)	X1			0.45
Contact Pad Length (X28)	Y1			1.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2073A

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NOTES:

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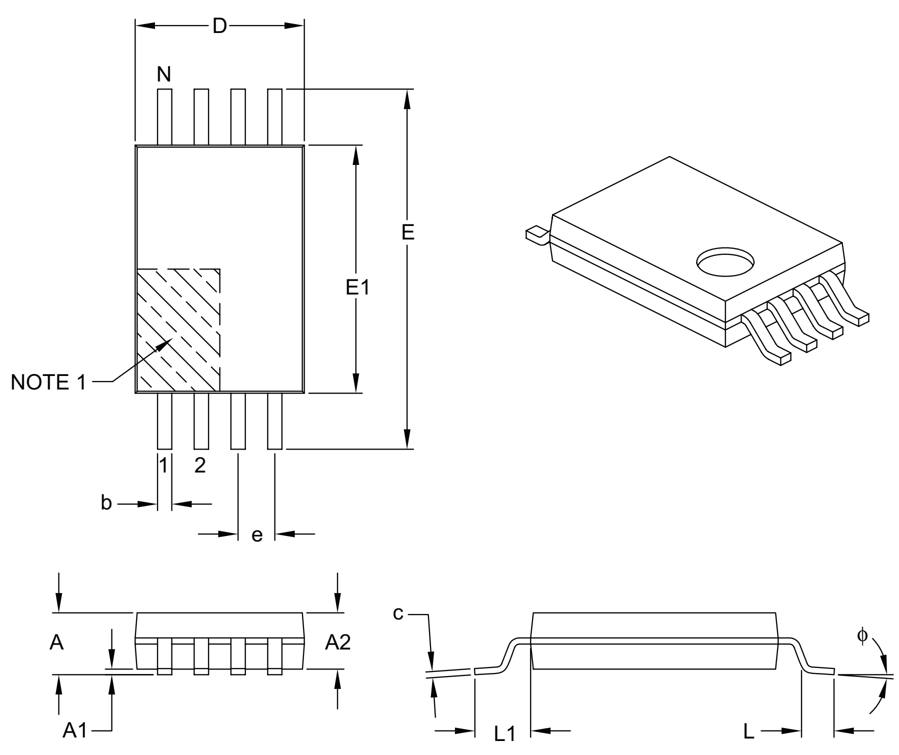
TSSOP

Package Outlines and Dimensions

8-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.65 BSC	
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.80	1.00	1.05
Standoff	A1	0.05	–	0.15
Overall Width	E		6.40 BSC	
Molded Package Width	E1	4.30	4.40	4.50
Molded Package Length	D	2.90	3.00	3.10
Foot Length	L	0.45	0.60	0.75
Footprint	L1		1.00 REF	
Foot Angle	φ	0°	–	8°
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.19	–	0.30

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-086B

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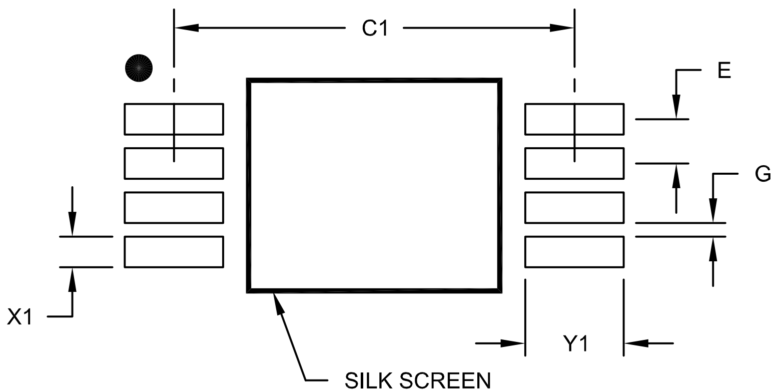
Footprint Outlines and Dimensions

8-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C1		5.90	
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.45
Distance Between Pads	G	0.20		

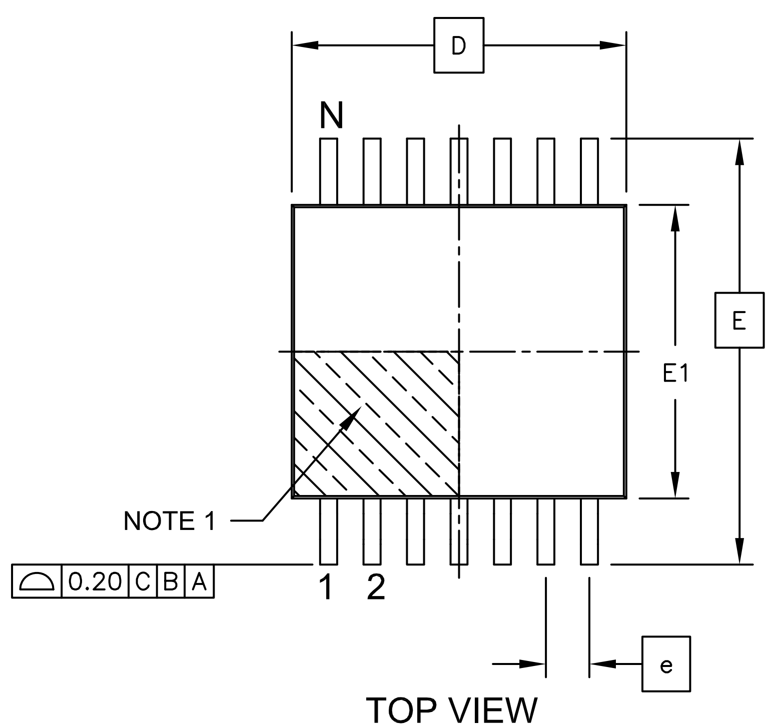
Notes:

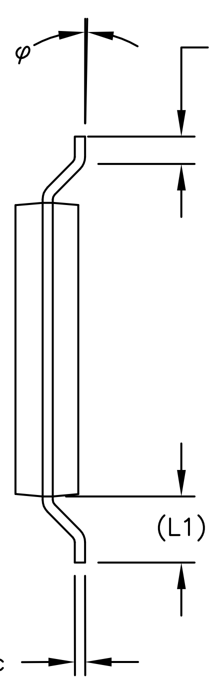
1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

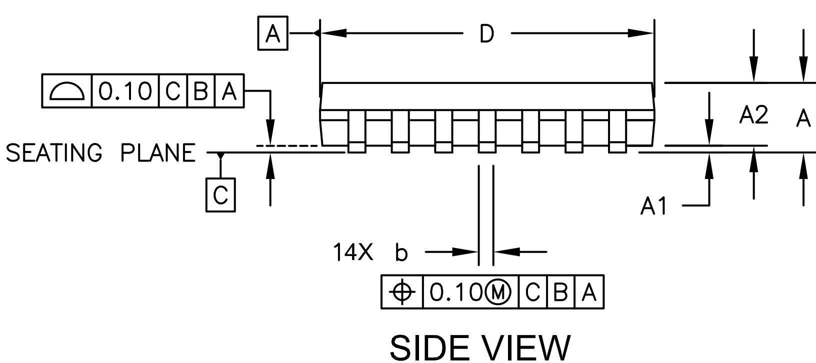
Microchip Technology Drawing No. C04-2086A

14-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-087C Sheet 1 of 2

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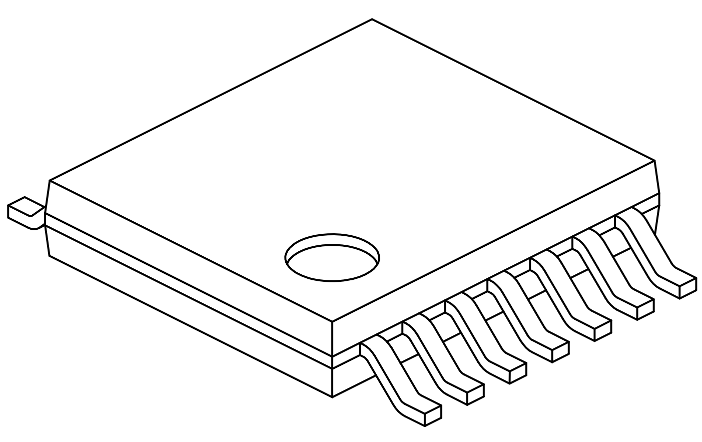
14-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N	14		
Pitch	e	0.65 BSC		
Overall Height	A	-	-	1.20
Molded Package Thickness	A2	0.80	1.00	1.05
Standoff	A1	0.05	-	0.15
Overall Width	E	6.40 BSC		
Molded Package Width	E1	4.30	4.40	4.50
Molded Package Length	D	4.90	5.00	5.10
Foot Length	L	0.45	0.60	0.75
Footprint	(L1)	1.00 REF		
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.19	-	0.30

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M

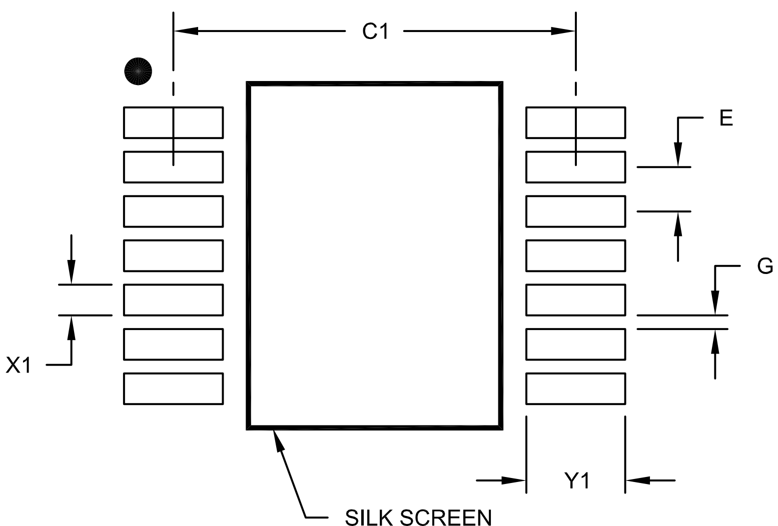
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing No. C04-087C Sheet 2 of 2

14-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Contact Pad Spacing	C1		5.90	
Contact Pad Width (X14)	X1			0.45
Contact Pad Length (X14)	Y1			1.45
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2087A

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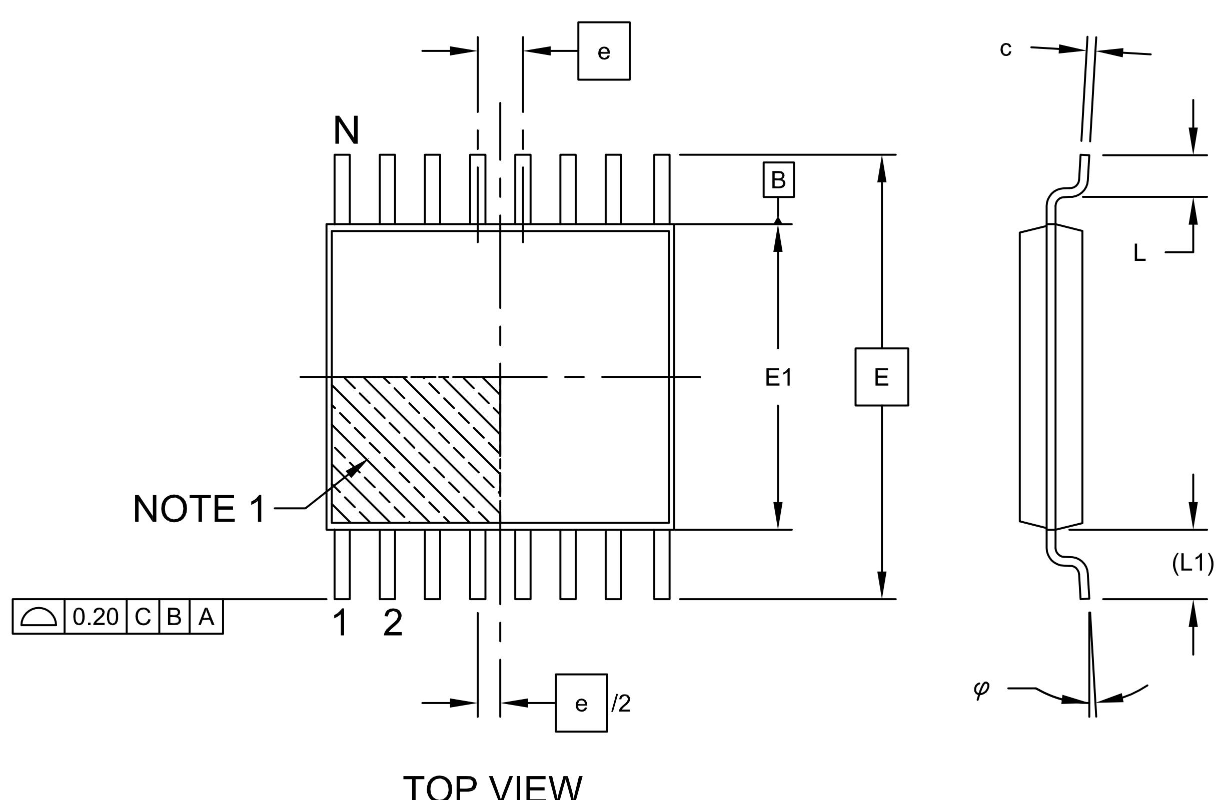
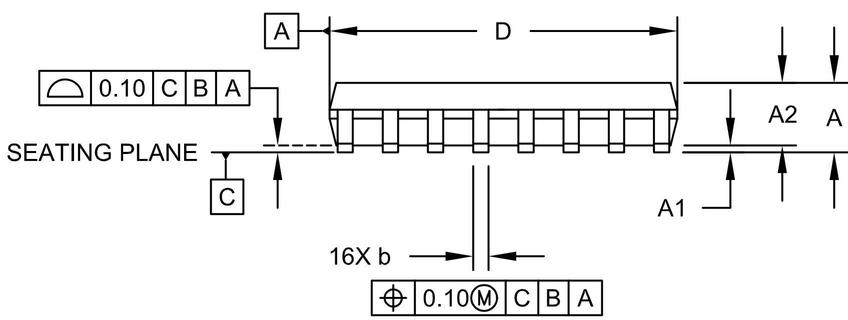
16-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

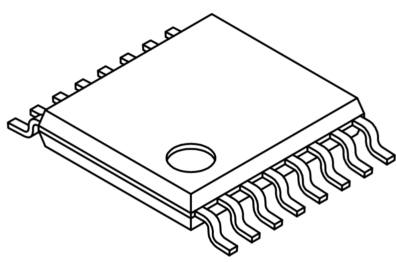




Microchip Technology Drawing C04-068A Sheet 1 of 2

16-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		0.65 BSC	
Overall Height	A	-	-	1.20
Molded Package Thickness	A2	0.80	1.00	1.05
Standoff	A1	0.05	-	0.15
Overall Width	E		6.40 BSC	
Molded Package Width	E1	4.30	4.40	4.50
Molded Package Length	D	4.90	5.00	5.10
Foot Length	L	0.45	0.60	0.75
Footprint	(L1)		1.00 REF	
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.19	-	0.30

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-068A Sheet 2 of 2

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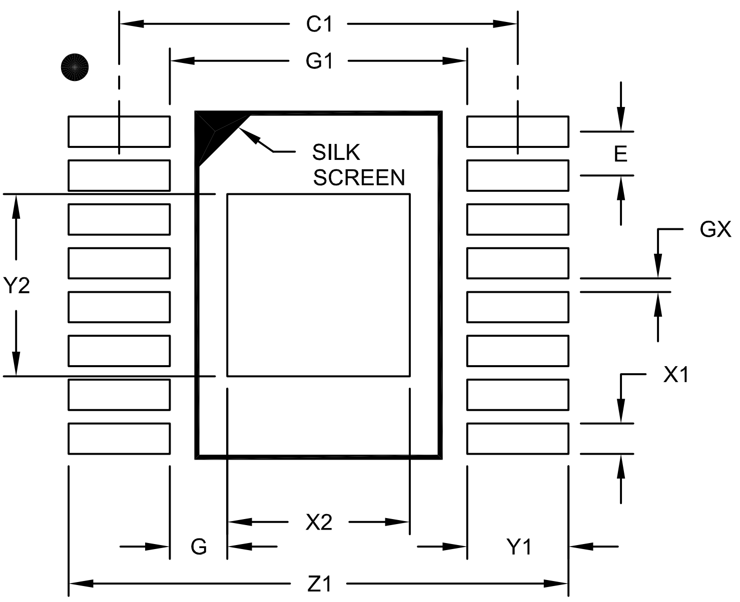
16-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Length	Y2			2.70
Optional Center Pad Width	X2			2.70
Clearance Between Contact Pads	G1	4.40		
Contact Pad To Center Pad	G	0.73		
Contact Pad Spacing	C1		5.90	
Contact Pad Width (X16)	X1			0.45
Contact Pad Length (X16)	Y1			1.50
Distance Between Pads	GX	0.20		
Overall Width	Z1			7.40

Notes:

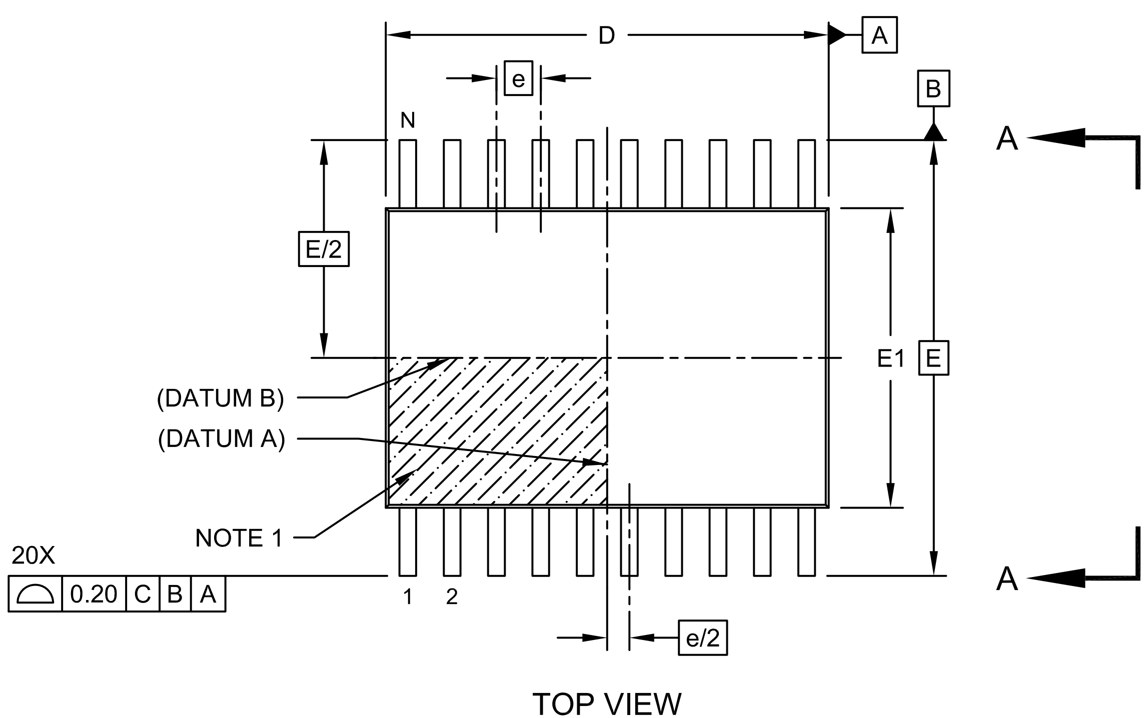
1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

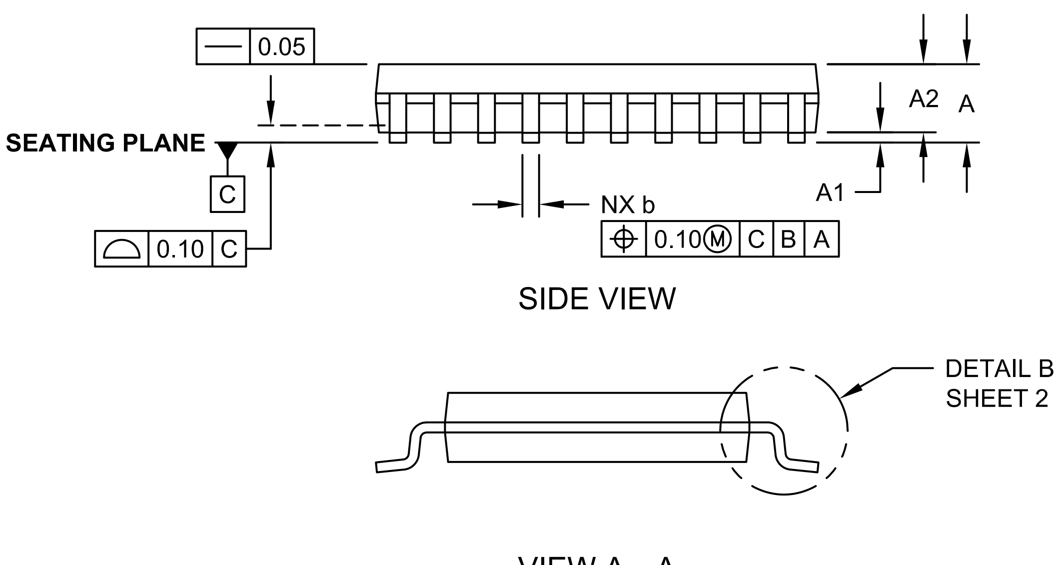
Microchip Technology Drawing No. C04-2068A

20-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW

DETAIL B
SHEET 2

VIEW A—A

Microchip Technology Drawing C04-088C Sheet 1 of 2

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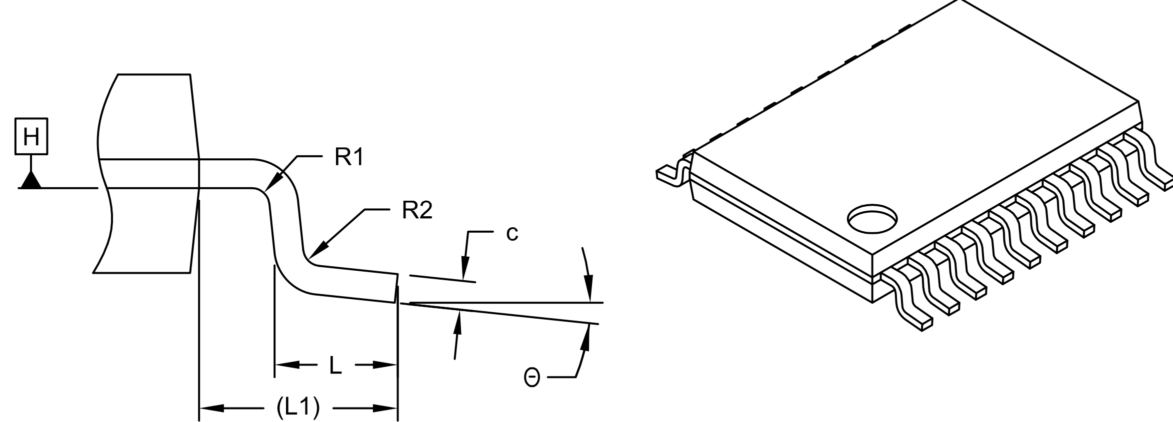
20-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



DETAIL B

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	0.65 BSC		
Overall Height	A	-	-	1.20
Molded Package Thickness	A2	0.80	1.00	1.05
Standoff	A1	0.05	-	0.15
Overall Width	E	6.40 BSC		
Molded Package Width	E1	4.30	4.40	4.50
Molded Package Length	D	6.40	6.50	6.60
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	Θ	0°	-	8°
Lead Width	b	0.19	-	0.30
Lead Thickness	c	0.09	-	0.20
Bend Radius	R1	0.09	-	-
Bend Radius	R2	0.09	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-088C Sheet 2 of 2

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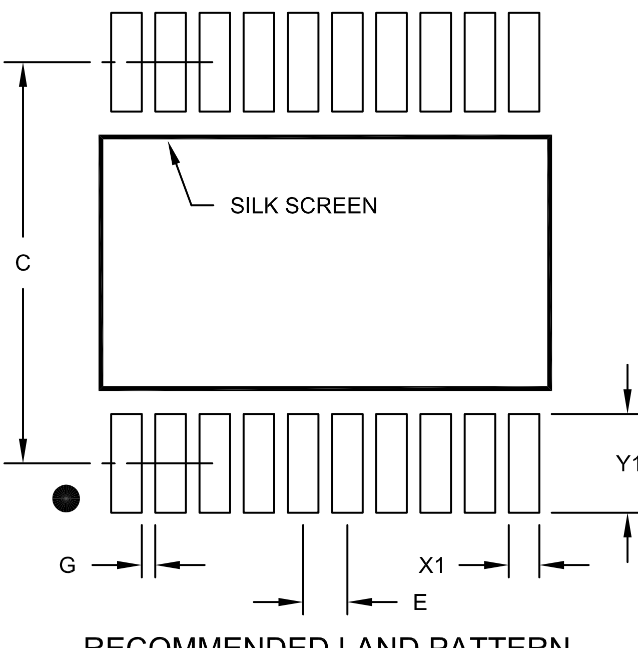
20-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C		5.90	
Contact Pad Width (X20)	X1			0.45
Contact Pad Length (X20)	Y1			1.45
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2088A

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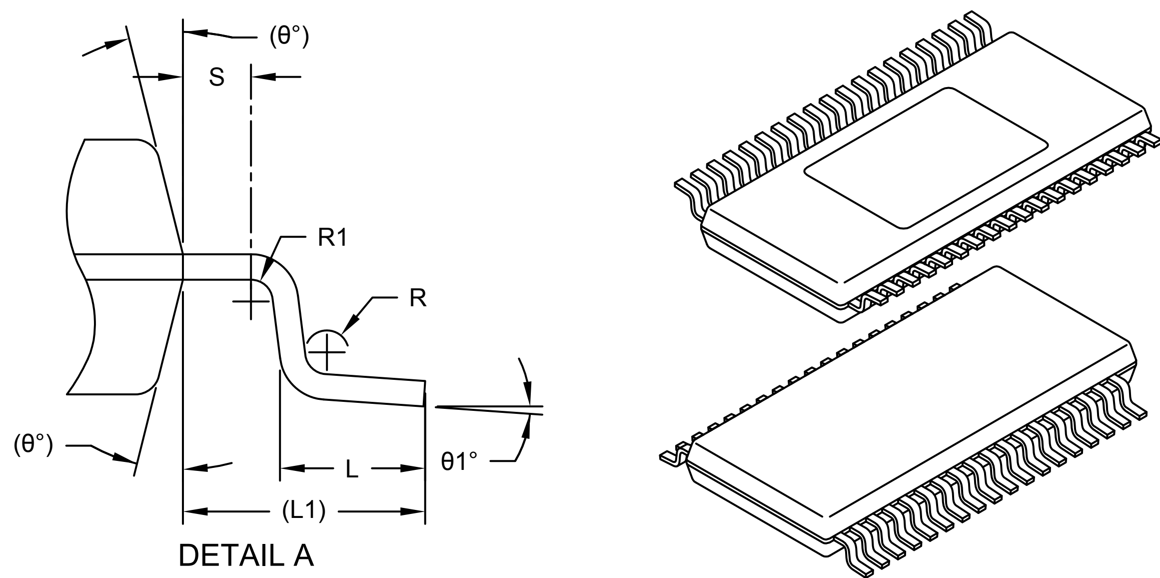
38-Lead Thin Shrink Small Outline Package (SBX) - 4.4 mm Body [TSSOP] With 4.6x 3.2 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-424A Sheet 1 of 2

38-Lead Thin Shrink Small Outline Package (SBX) - 4.4 mm Body [TSSOP] With 4.6x 3.2 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N	38		
Pitch	e	0.50 BSC		
Overall Height	A	-	-	1.10
Standoff	A1	0.05	-	0.15
Terminal Thickness	A2	0.85	0.90	0.95
Overall Length	D	9.60	9.70	9.80
Exposed Pad Length	D1	4.50	4.60	4.70
Overall Width	E	6.40 BSC		
Molded Package Width	E1	4.30	4.40	4.60
Exposed Pad Width	E2	3.10	3.20	3.30
Terminal Width	b	0.17	-	0.27
Terminal Width	c	0.09	-	0.20
Terminal Length	L	0.50	0.60	0.70
Terminal Length	L1	1.00 REF		
Lead Shoulder	S	0.20	-	-
Terminal Foot Angle	θ1	0°	-	8°
Mold Draft Angle	θ	14° REF		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-424A Sheet 2 of 2

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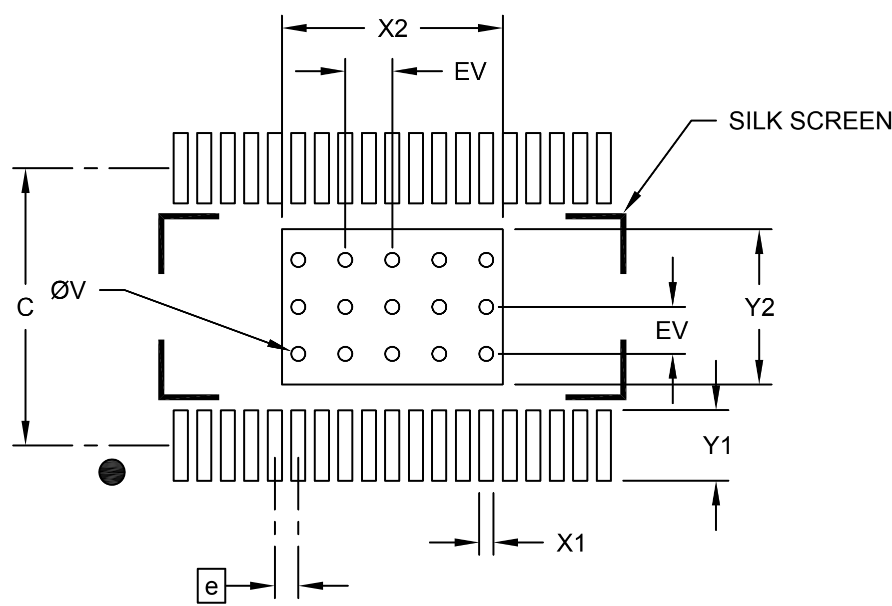
38-Lead Thin Shrink Small Outline Package (SBX) - 4.4 mm Body [TSSOP] With 4.6x 3.2 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Center Pad Width	X2			4.70
Center Pad Length	Y2			3.30
Contact Pad Spacing	C		5.90	
Contact Pad Width (X38)	X1			0.30
Contact Pad Length (X38)	Y1			1.50
Thermal Via Diameter	V		0.30	
Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2424A

NOTES:

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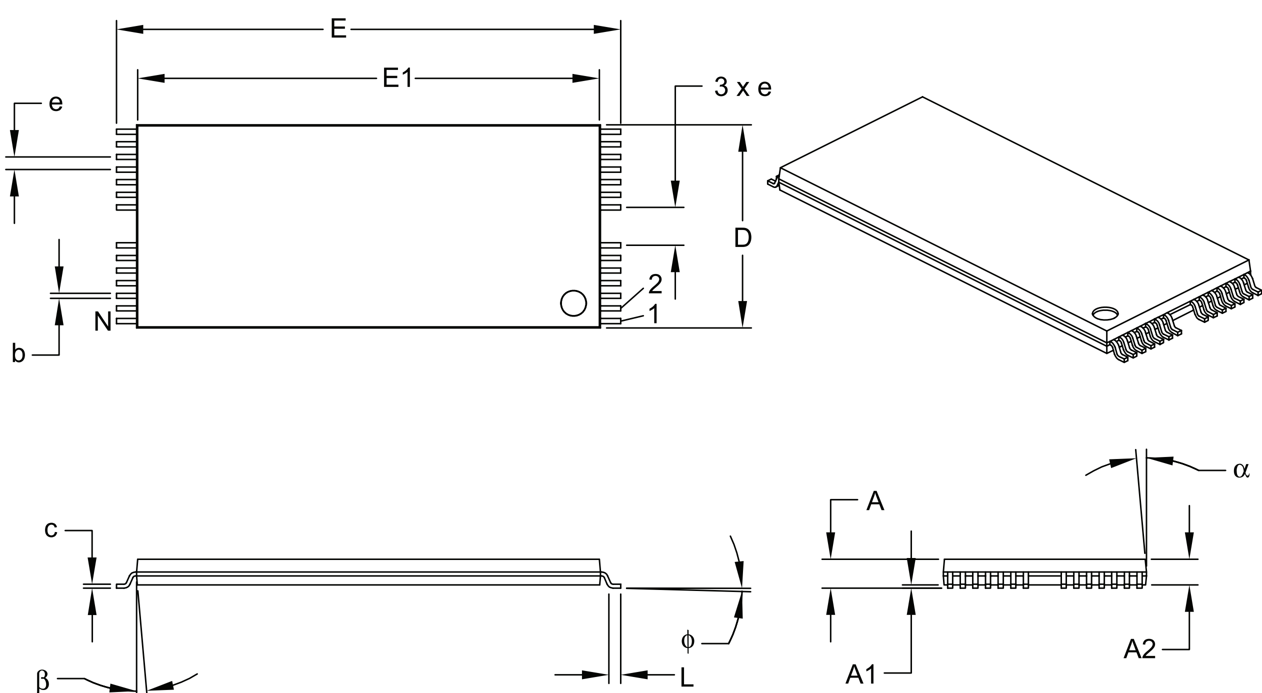
TSOP

28-Lead Plastic Thin Small Outline (TS) – 8x20 mm [TSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.50	
Overall Height	A	0.99	1.14	1.30
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff §	A1	0.05	0.15	0.25
Overall Width	E	19.80	20.00	20.20
Molded Package Width	E1	18.30	18.40	18.50
Molded Package Length	D	7.80	8.00	8.20
Foot Length	L	0.50	0.60	0.70
Foot Angle	φ	0°	4°	8°
Lead Thickness	c	0.10	0.15	0.20
Lead Width	b	0.15	0.20	0.25
Mold Draft Angle Top	α	0°	5°	10°
Mold Draft Angle Bottom	β	0°	5°	10°

Notes:

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. § Significant Characteristic.

Microchip Technology Drawing C04-067B

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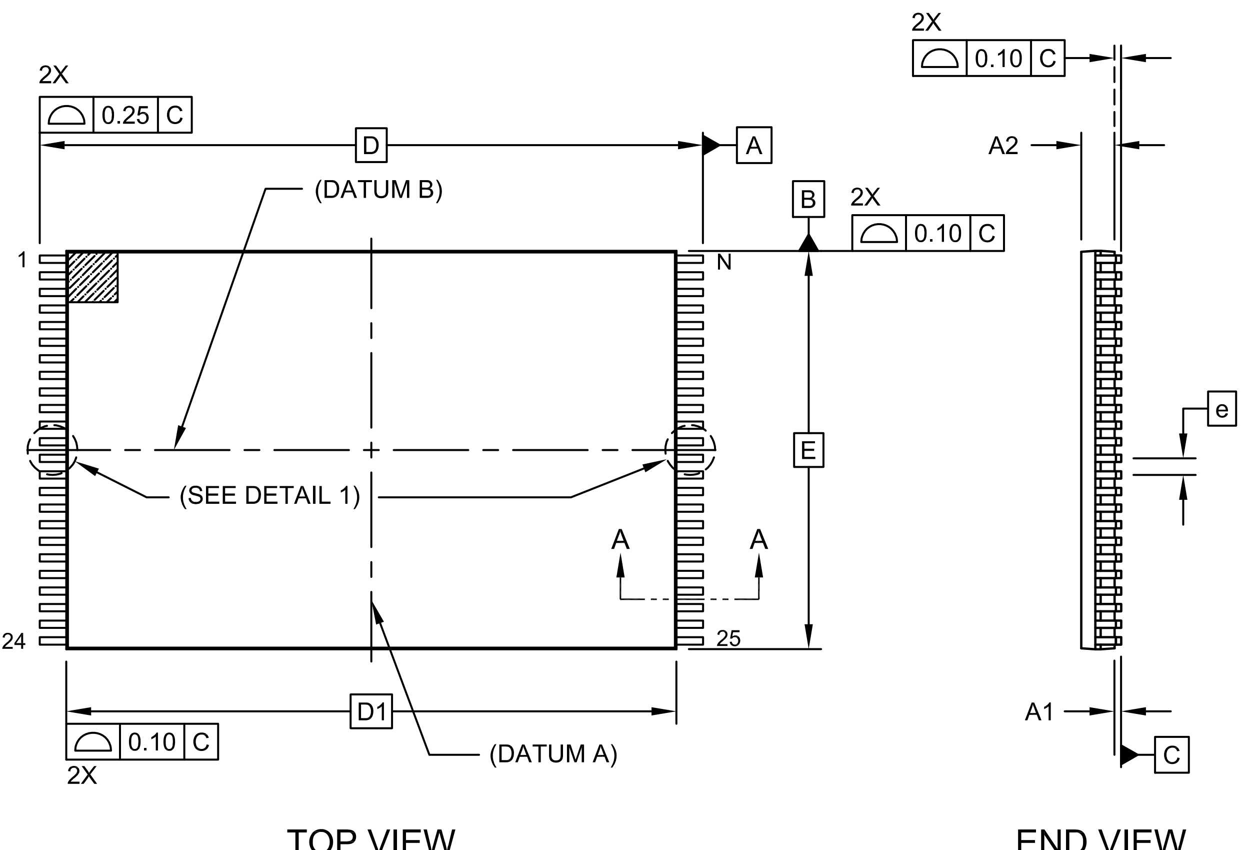
48-LEAD THIN SMALL OUTLINE PACKAGE (TV) - 12x20 mm Body [TSOP]

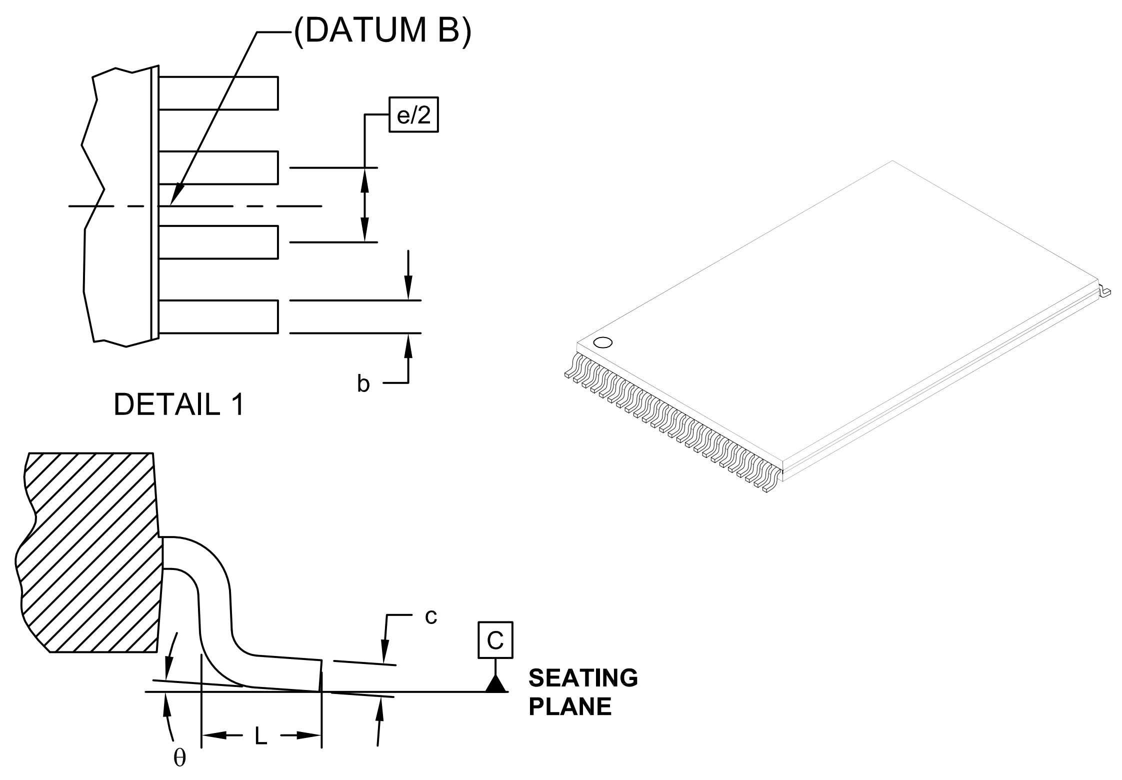
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-177A Sheet 1 of 2

48-LEAD THIN SMALL OUTLINE PACKAGE (TV) - 12x20 mm Body [TSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		48	
Pitch	e		0.50 BSC	
Overall Height	A	-	-	1.20
Standoff	A1	0.05	-	0.15
Molded Package Height	A2	0.95	1.00	1.05
Overall Width	E		12.00 BSC	
Overall Length	D		20.00 BSC	
Molded Package Length	D1		18.40 BSC	
Lead Width	b	0.17	0.22	0.27
Lead Thickness	c	0.10	-	0.21
Lead Length	L	0.50	0.60	0.70
Lead Foot Angle	θ	0°	5°	8°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-177A Sheet 2 of 2

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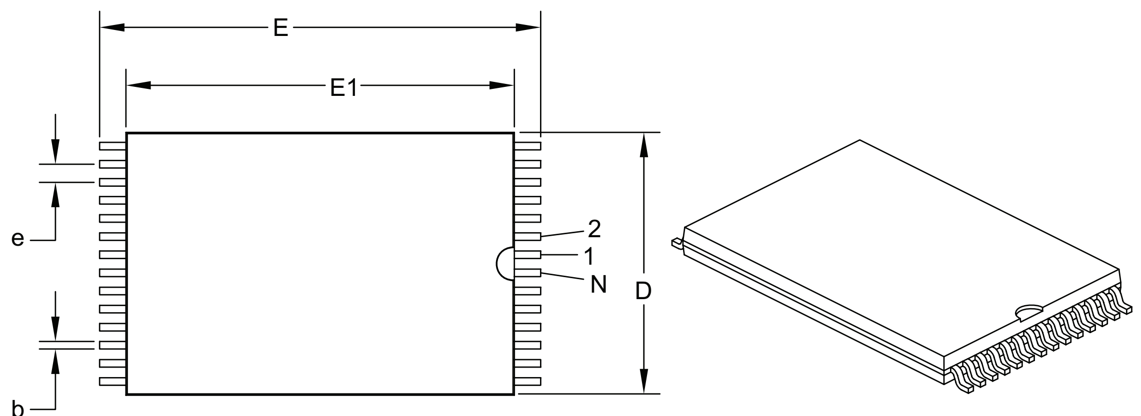
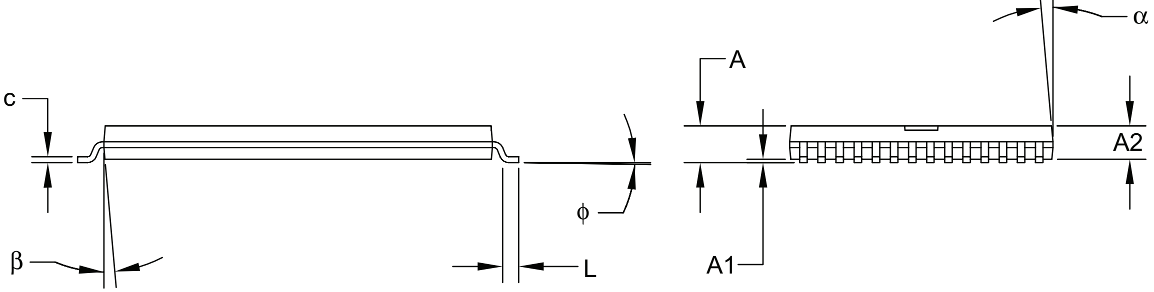
VSOP

28-Lead Plastic Very Small Outline (VS) – 8x13.4 mm Body [VSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.55	
Overall Height	A	0.99	1.14	1.29
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff §	A1	0.05	0.13	0.25
Overall Width	E	13.20	13.40	13.60
Molded Package Width	E1	11.70	11.80	11.90
Molded Package Length	D	7.90	8.00	8.10
Foot Length	L	0.30	0.50	0.70
Foot Angle	φ	0°	3°	5°
Lead Thickness	c	0.14	0.15	0.16
Lead Width	b	0.17	0.20	0.23
Mold Draft Angle Top	α	0°	5°	10°
Mold Draft Angle Bottom	β	0°	5°	10°

Notes:

1. § Significant Characteristic.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.

Microchip Technology Drawing C04-075B

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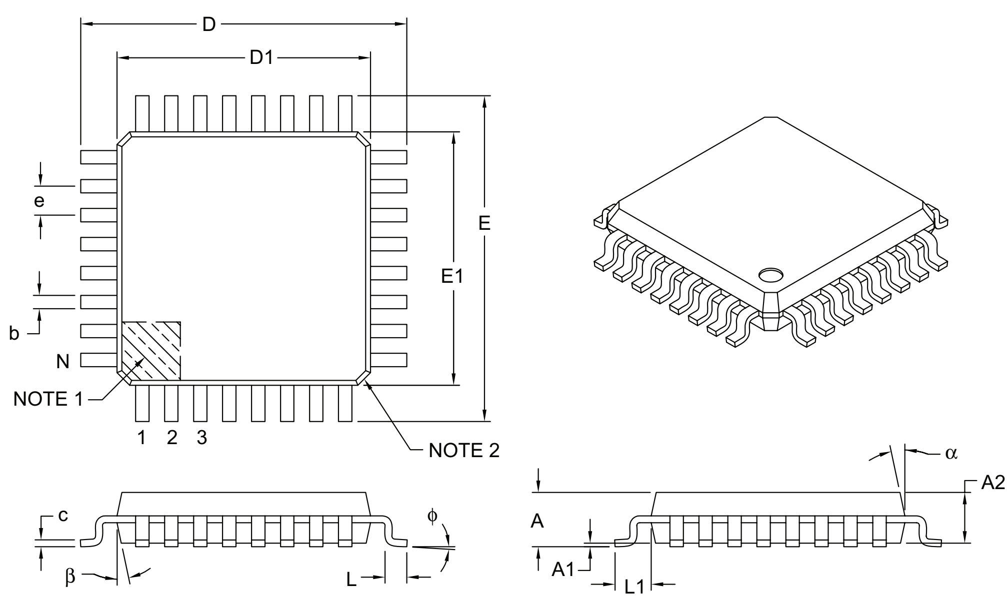
LQFP

Package Outlines and Dimensions

32-Lead Plastic Low-Profile Quad Flatpack (PL) – 7x7x1.4 mm Body, 2.0 mm [LQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N	32		
Lead Pitch	e	0.80 BSC		
Overall Height	A	–	–	1.60
Molded Package Thickness	A2	1.35	1.40	1.45
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	ϕ	0°	3.5°	7°
Overall Width	E	9.00 BSC		
Overall Length	D	9.00 BSC		
Molded Package Width	E1	7.00 BSC		
Molded Package Length	D1	7.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.30	0.37	0.45
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

    REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-045B

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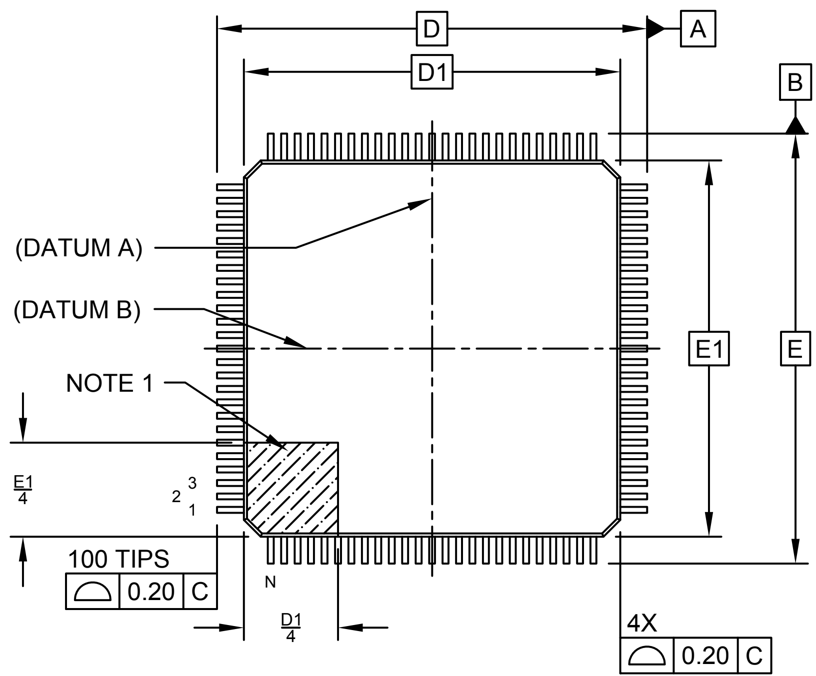
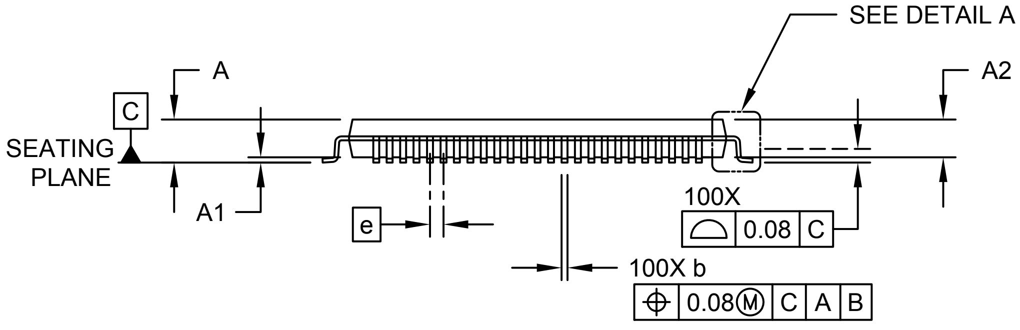
100-Lead Low Profile Quad Flatpack (PL) - 14x14 mm Body [LQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW

Microchip Technology Drawing C04-233A Sheet 1 of 2

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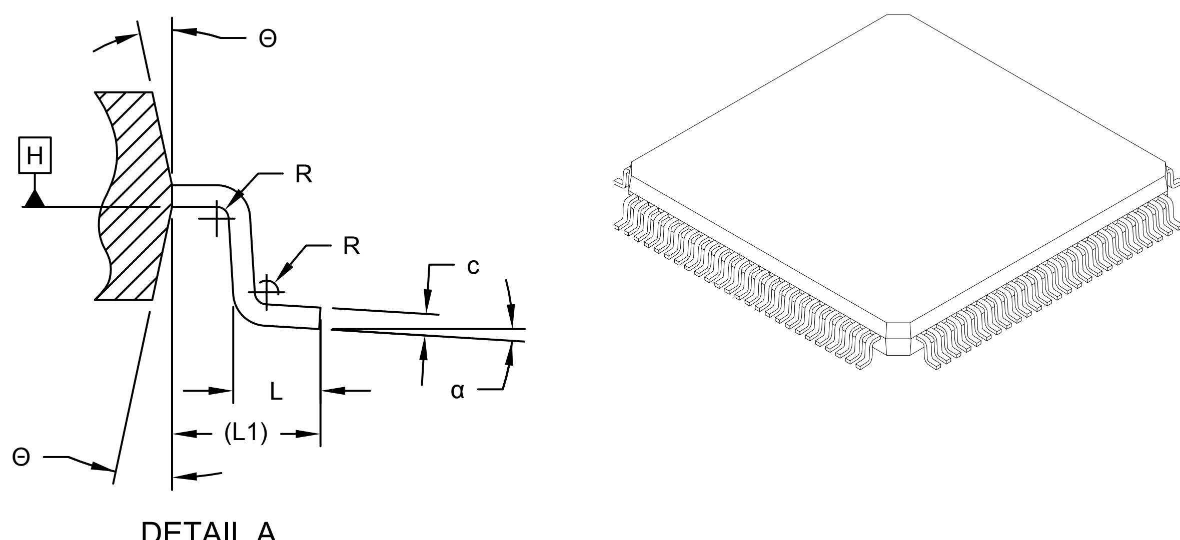
100-Lead Low Profile Quad Flatpack (PL) - 14x14 mm Body [LQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N		100	
Pitch	e		0.50 BSC	
Overall Height	A	-	-	1.60
Standoff	A1	0.05	-	0.15
Molded Package Thickness	A2	1.35	-	1.45
Overall Length	D		16.00 BSC	
Molded Package Length	D1		14.00 BSC	
Overall Width	E		16.00 BSC	
Molded Package Width	E1		14.00 BSC	
Lead Width	b	0.17	0.22	0.27
Lead Thickness	c	0.09	-	0.20
Lead Length	L	0.45	0.60	0.75
Footprint	(L1)		1.00 REF	
Mold Draft Angle	**Θ**	11°	12°	13°
Lead Angle	**α**	0°	3.5°	7°
Bend Radius	**R**	0.08	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-233A Sheet 2 of 2

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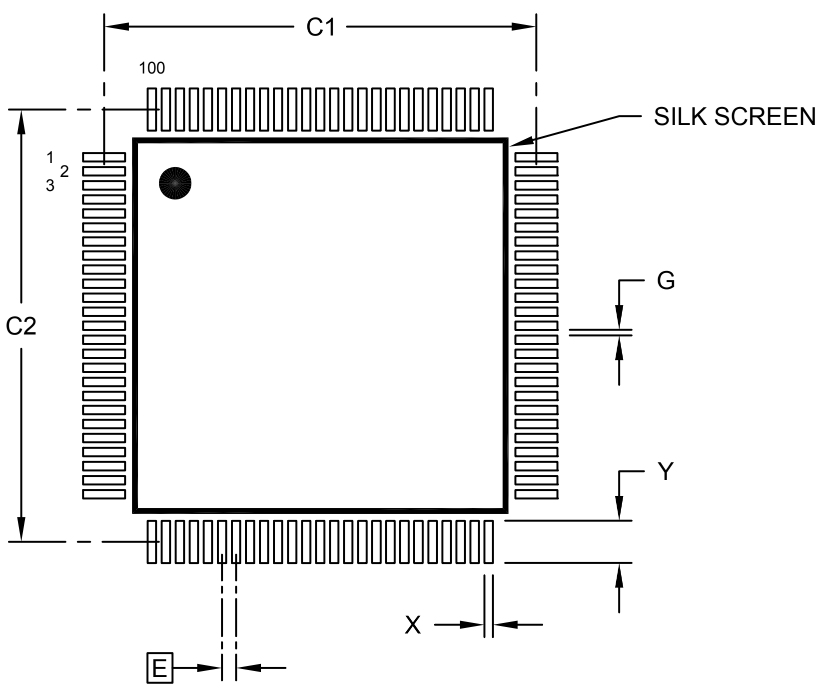
Footprint Outlines and Dimensions

100-Lead Low Profile Quad Flatpack (PL) - 14x14 mm Body [LQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		15.40	
Contact Pad Spacing	C2		15.40	
Contact Pad Width (X100)	X			0.30
Contact Pad Length (X100)	Y			1.50
Space Between Pads	G	0.20		

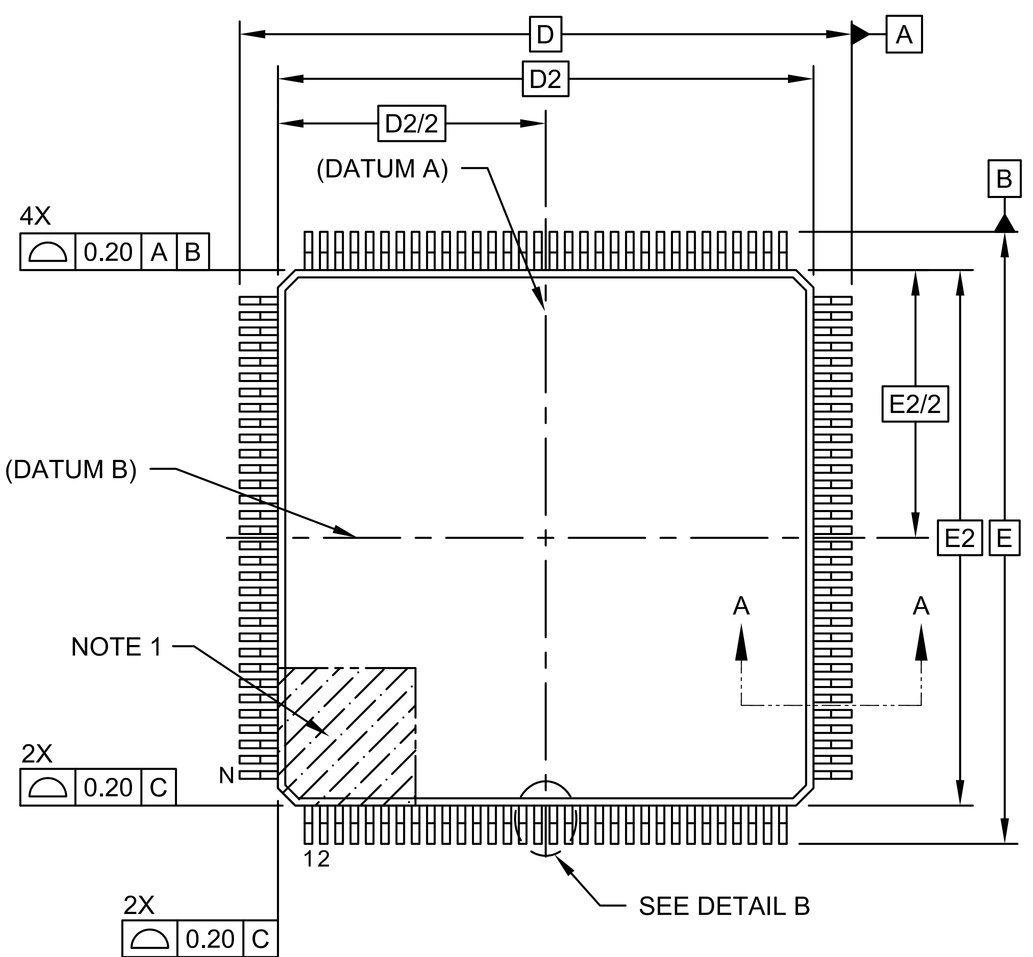
Notes:

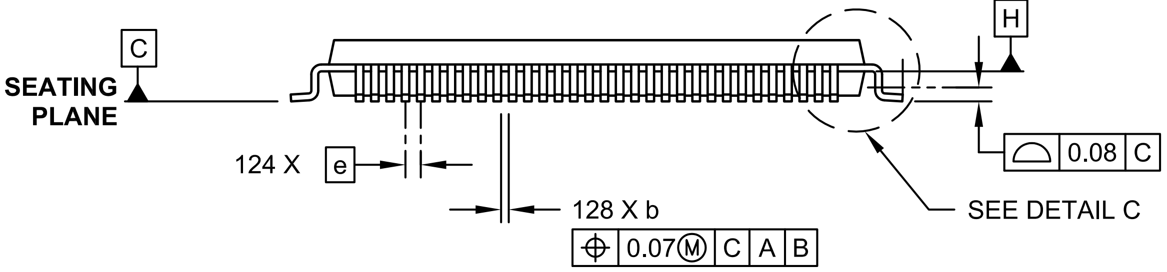
1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2233A

128-Lead Low Profile Plastic Quad Flat Pack (PT) – 14x14x1.4 mm Body [LQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Microchip Technology Drawing C04-058A Sheet 1 of 2

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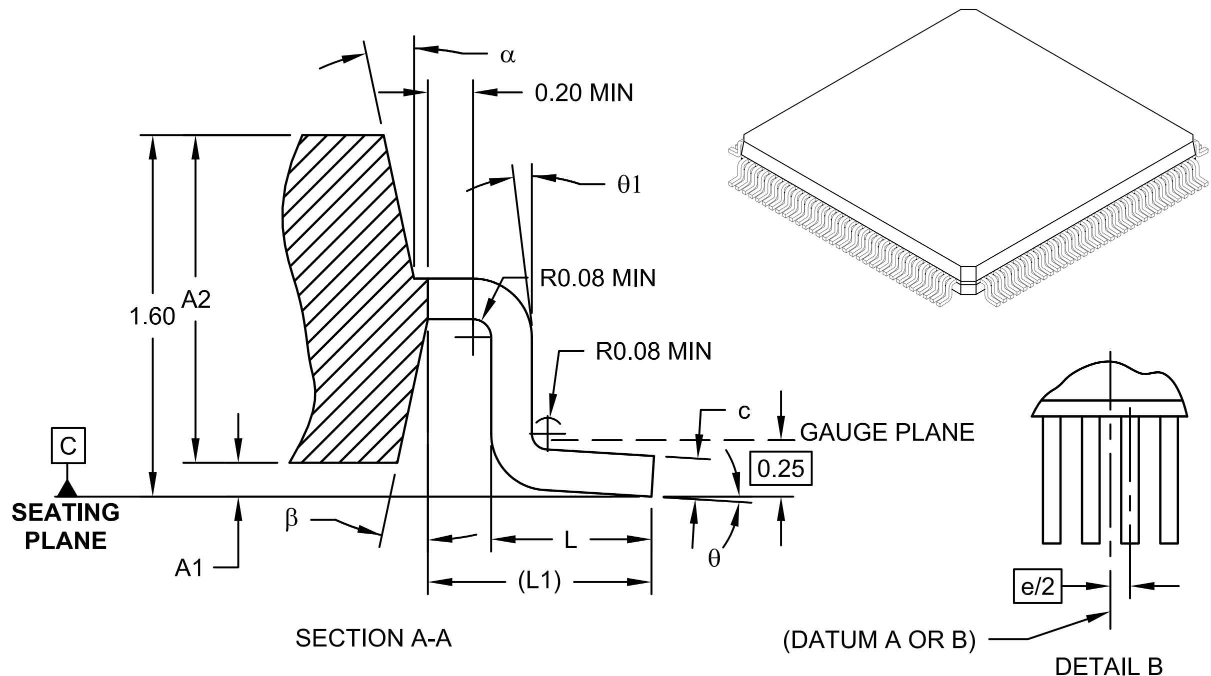
128-Lead Low Profile Plastic Quad Flat Pack (PT) – 14x14x1.4 mm Body [LQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Pins	N		128	
Pitch	e		0.40 BSC	
Overall Height	A	-	-	1.60
Molded PackageThickness	A2	1.35	1.40	1.45
Standoff	A1	0.05	-	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1		1.00 REF	
Lead Angle	θ	0°	-	-
Foot Angle	θ1	0°	3.5°	7°
Overall Width	D		16.00 BSC	
Overall Length	E		16.00 BSC	
Molded Body Width	D1		14.00 BSC	
Molded Body Length	E1		14.00 BSC	
Lead Thickness	c	0.09	-	0.20
Foot Angle	θ	0°	-	-
Mold Draft Angle Top	α	-	-	-
Mold Draft Angle Botton	β	-	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Exact shape at each corner may vary.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-058A Sheet 2 of 2

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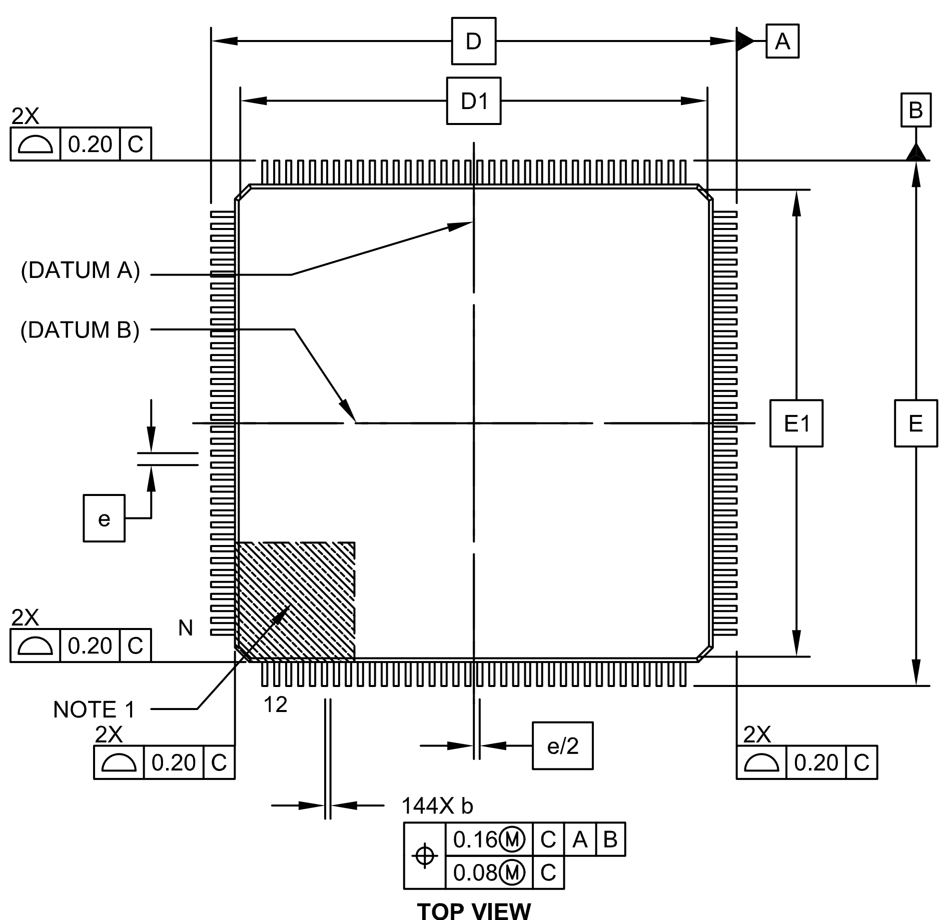
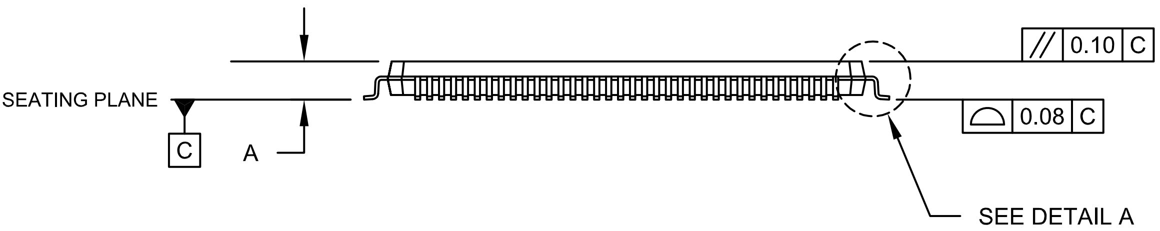
144-Lead Plastic Low Profile Quad Flatpack (PL) – 20x20x1.40 mm Body, with 2.00 mm Footprint [LQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Microchip Technology Drawing C04-044B Sheet 1 of 2

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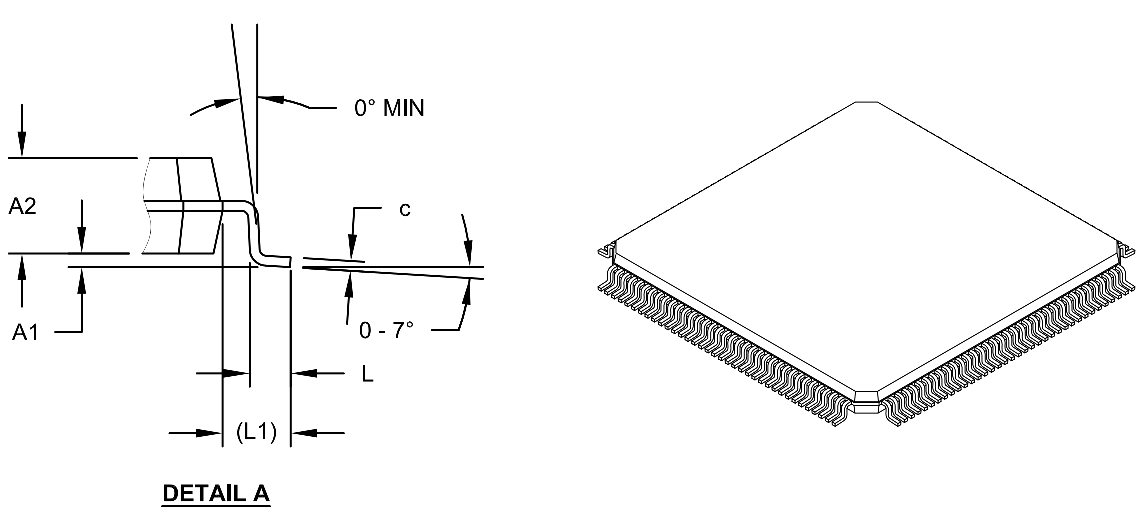
144-Lead Plastic Low Profile Quad Flatpack (PL) – 20x20x1.40 mm Body, with 2.00 mm Footprint [LQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N		144	
Lead Pitch	e		0.50 BSC	
Overall Height	A	-	-	1.60
Molded Package Height	A2	1.35	1.40	1.45
Standoff	A1	0.05	-	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1		1.00 (REF)	
Overall Width	E		22.00 BSC	
Overall Length	D		22.00 BSC	
Molded Body Width	E1		20.00 BSC	
Molded Body Length	D1		20.00 BSC	
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.17	0.22	0.27

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-044B Sheet 2 of 2

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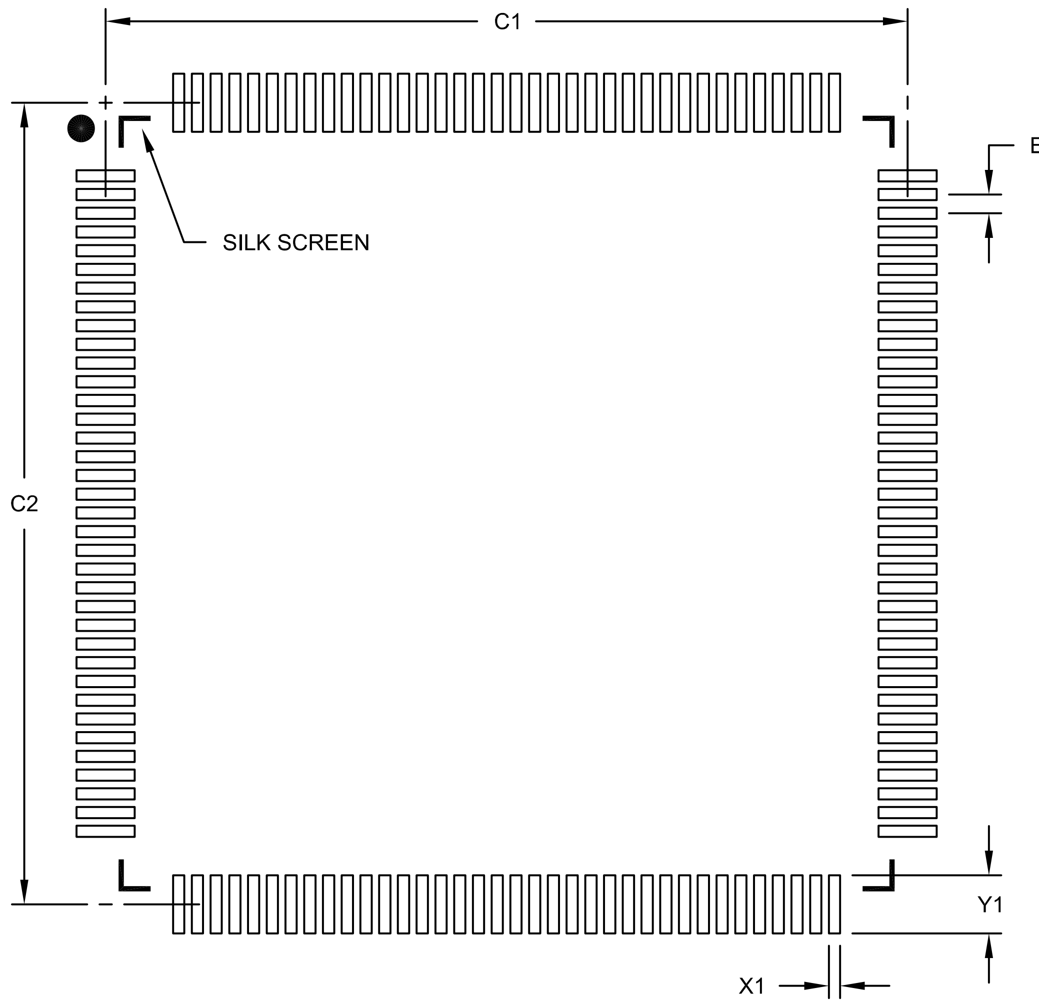
144-Lead Plastic Low Profile Quad Flatpack (PL) - 20x20x1.40 mm Body [LQFP]
2.00 mm Footprint

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		21.40	
Contact Pad Spacing	C2		21.40	
Contact Pad Width (X144)	X1			0.30
Contact Pad Length (X144)	Y1			1.55

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2044B

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176-Lead Low Profile Quad Flat Pack (2J) - 20x20x1.4 mm Body [LQFP] With 7x7 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
D1
D1/2
B
N
NOTE 1
1 2
E1/2
E2
E
E1
(DATUM B)
(DATUM A)
4X
0.20 C
4X
0.20 C
D2

TOP VIEW

SEATING PLANE
C
176X
0.08 C
SEE DETAIL B
(L1)
Θ1
Θ

SIDE VIEW

D3
E3
1 2
NOTE 1
N
SEE DETAIL A
176X b
0.07 Ⓜ C A B

BOTTOM VIEW

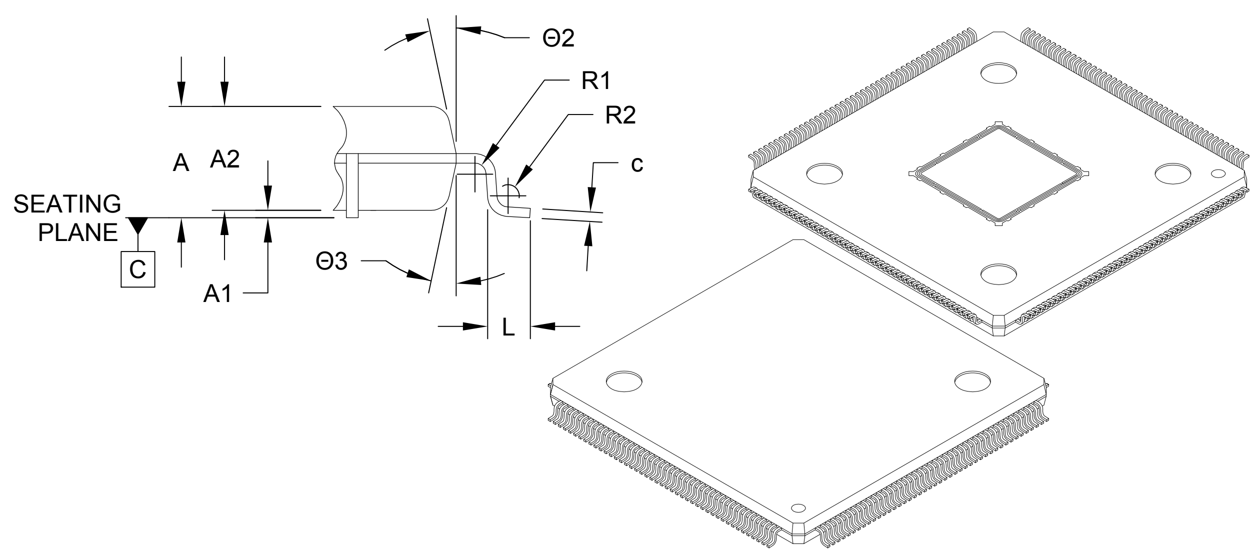
e/2
X
X = A OR B
e

DETAIL A

Microchip Technology Drawing C04-367A Sheet 1 of 2

176-Lead Low Profile Quad Flat Pack (2J) - 20x20x1.4 mm Body [LQFP] With 7x7 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N		176	
Pitch	e		0.40 BSC	
Overall Height	A	-	-	1.60
Standoff	A1	0.05	-	0.15
Molded Package Height	A2	1.35	1.40	1.45
Overall Length	D		22.00 BSC	
Molded Package Length	D1		20.00 BSC	
Overall Lead Pitch	D2		17.20 BSC	
Exposed Pad Length	D3	6.90	7.00	7.10
Overall Width	E		22.00 BSC	
Molded Package Width	E1		20.00 BSC	
Overall Lead Pitch	E2		17.20 BSC	
Exposed Pad Width	E3	6.90	7.00	7.10

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Lead Width	b	0.13	0.16	0.23
Lead Thickness	c	0.09	-	0.20
Lead Length	L	0.45	0.60	0.75
Footprint	(L1)		1.00 REF	
Bend Radius	R1	0.08	-	-
Bend Radius	R2	0.08	-	0.20
Foot Angle	Θ	0°	3.5°	7°
Lead Angle	Θ1	0°	-	-
Mold Draft Angle	Θ2	11°	12°	13°
Mold Draft Angle	Θ3	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D1 and E1 do not include mold protrusion. Allowable Protrusion is 0.25mm per side. D1 and E1 are maximum body size dimensions including mold mismatch.
3. Dimension b does not include dambar protrusion. Allowable dam bar protrusion shall not cause the lead width to exceed the maximum b dimension by more than 0.08mm Dambar cannot be located on the lower radius or the foot. Minimum space between protrusion and adjacent lead is 0.07mm for 0.40mm pitch packages.
4. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-367A Sheet 2 of 2

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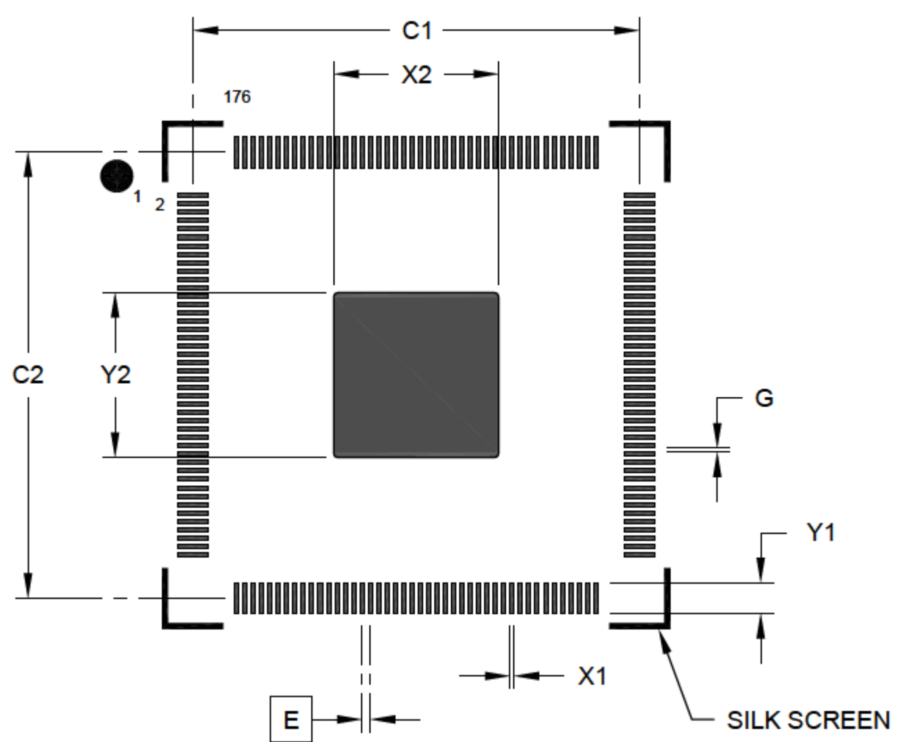
176-Lead Low Profile Quad Flat Pack (2J) - 20x20x1.4 mm Body [LQFP] With 7x7 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Contact Pad Spacing	C1		21.40	
Contact Pad Spacing	C2		21.40	
Contact Pad Width (X176)	X1			0.20
Contact Pad Length (X176)	Y1			1.50
Center Pad Width	X2			7.90
Center Pad Length	Y2			7.90
Contact Pad to Pad (X172)	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2367B

NOTES:

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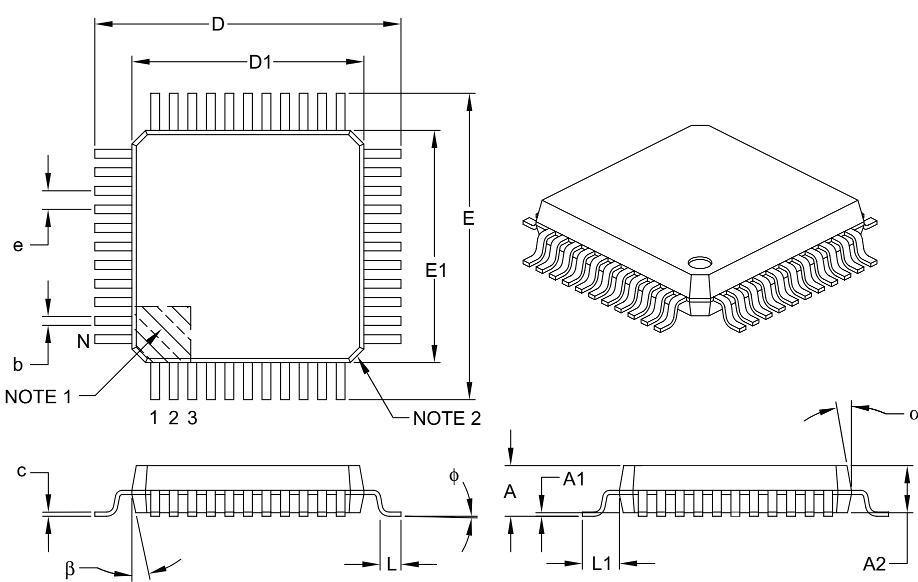
MQFP

44-Lead Plastic Metric Quad Flatpack (KW) – 10x10x2 mm Body, 3.20 mm [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N	44		
Lead Pitch	e	0.80 BSC		
Overall Height	A	–	–	2.45
Molded Package Thickness	A2	1.80	2.00	2.20
Standoff §	A1	0.00	–	0.25
Foot Length	L	0.73	0.88	1.03
Footprint	L1	1.60 REF		
Foot Angle	φ	0°	–	7°
Overall Width	E	13.20 BSC		
Overall Length	D	13.20 BSC		
Molded Package Width	E1	10.00 BSC		
Molded Package Length	D1	10.00 BSC		
Lead Thickness	c	0.11	–	0.23
Lead Width	b	0.29	–	0.45
Mold Draft Angle Top	α	5°	–	16°
Mold Draft Angle Bottom	β	5°	–	16°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. § Significant Characteristic.

Microchip Technology Drawing C04-071B

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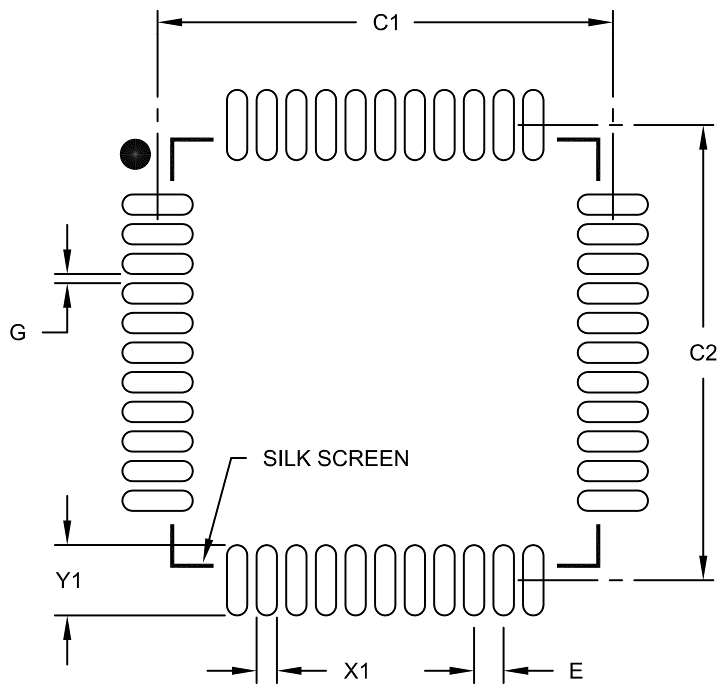
Footprint Outlines and Dimensions

44-Lead Plastic Metric Quad Flatpack (KW) - 10x10x2 mm Body, 3.20 mm Footprint [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.80 BSC	
Contact Pad Spacing	C1		12.30	
Contact Pad Spacing	C2		12.30	
Contact Pad Width (X44)	X1			0.55
Contact Pad Length (X44)	Y1			1.90
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2071B

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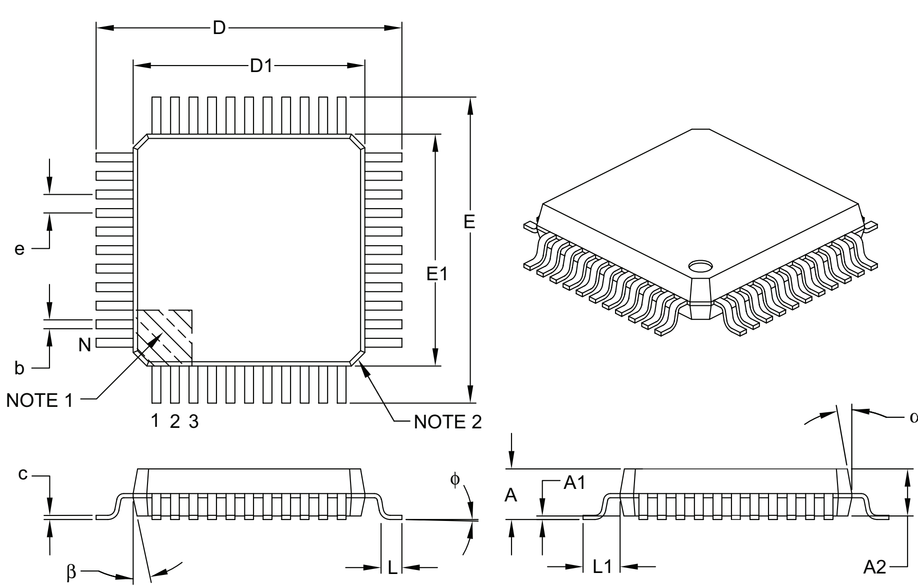
Package Outlines and Dimensions

44-Lead Plastic Metric Quad Flatpack (PQ) – 10x10x2 mm Body, 3.20 mm [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N	44		
Lead Pitch	e	0.80 BSC		
Overall Height	A	–	–	2.45
Molded Package Thickness	A2	1.80	2.00	2.20
Standoff §	A1	0.00	–	0.25
Foot Length	L	0.73	0.88	1.03
Footprint	L1	1.60 REF		
Foot Angle	φ	0°	–	7°
Overall Width	E	13.20 BSC		
Overall Length	D	13.20 BSC		
Molded Package Width	E1	10.00 BSC		
Molded Package Length	D1	10.00 BSC		
Lead Thickness	c	0.11	–	0.23
Lead Width	b	0.29	–	0.45
Mold Draft Angle Top	α	5°	–	16°
Mold Draft Angle Bottom	β	5°	–	16°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. § Significant Characteristic.

Microchip Technology Drawing C04-071B

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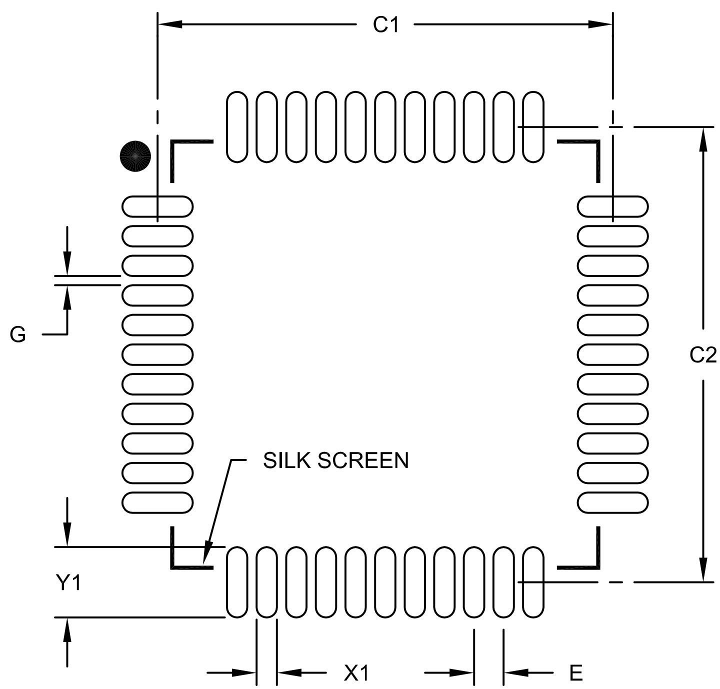
Footprint Outlines and Dimensions

44-Lead Plastic Metric Quad Flatpack (PQ) - 10x10x2 mm Body, 3.20 mm Footprint [MQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Contact Pad Spacing	C1		12.30	
Contact Pad Spacing	C2		12.30	
Contact Pad Width (X44)	X1			0.55
Contact Pad Length (X44)	Y1			1.90
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2071B

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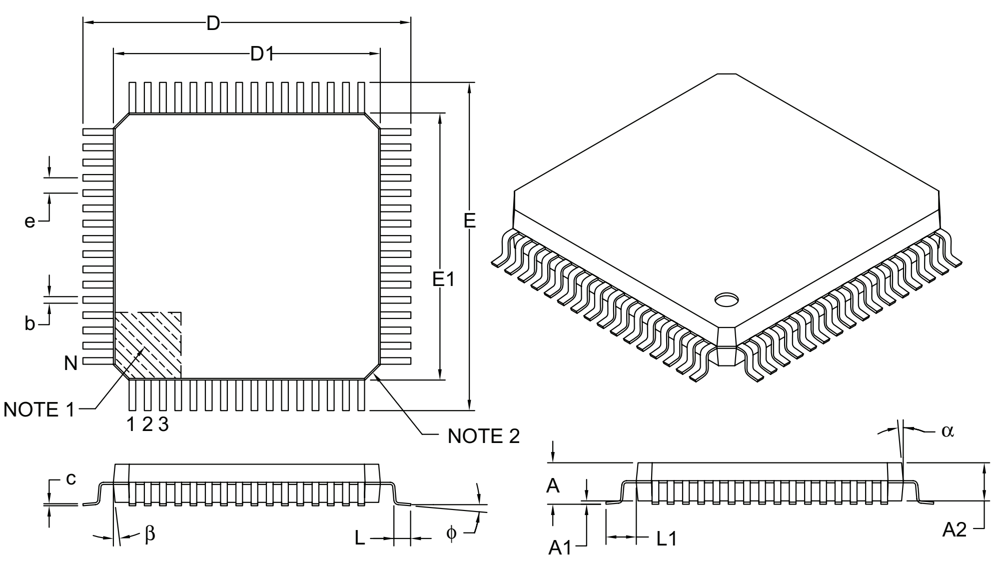
64-Lead Plastic Metric Quad Flatpack (BU) – 14x14x2.7 mm Body, 3.20 mm [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N		64	
Lead Pitch	e		0.80 BSC	
Overall Height	A	–	–	3.15
Molded Package Thickness	A2	2.50	2.70	2.90
Standoff §	A1	0.00	–	0.25
Overall Width	E		17.20 BSC	
Molded Package Width	E1		14.00 BSC	
Overall Length	D		17.20 BSC	
Molded Package Length	D1		14.00 BSC	
Foot Length	L	0.73	0.88	1.03
Footprint	L1		1.60 REF	
Foot Angle	ϕ	0°	–	7°
Lead Thickness	c	0.11	–	0.23
Lead Width	b	0.29	–	0.45
Mold Draft Angle Top	α	5°	–	16°
Mold Draft Angle Bottom	β	5°	–	16°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. § Significant Characteristic.
6. Formerly TelCom PQFP package.

Microchip Technology Drawing C04-022B

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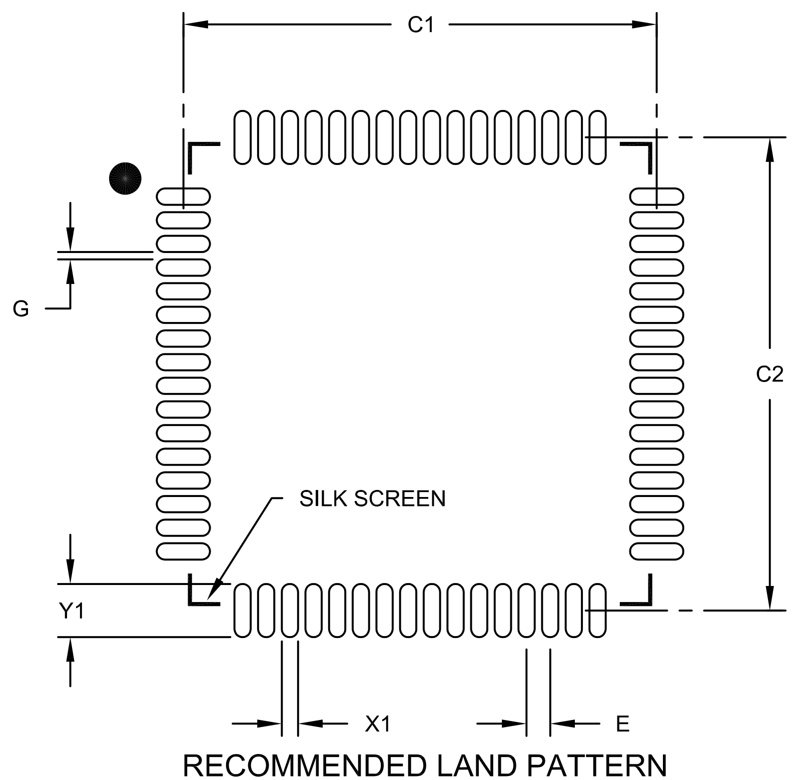
64-Lead Plastic Metric Quad FlatPack (BU) - 14x14x2.7 mm Body 3.20 mm Footprint [MQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.80 BSC	
Contact Pad Spacing	C1		16.10	
Contact Pad Spacing	C2		16.10	
Contact Pad Width (X64)	X1			0.55
Contact Pad Length (X64)	Y1			1.80
Distance Between Pads	G	0.25		

Notes:

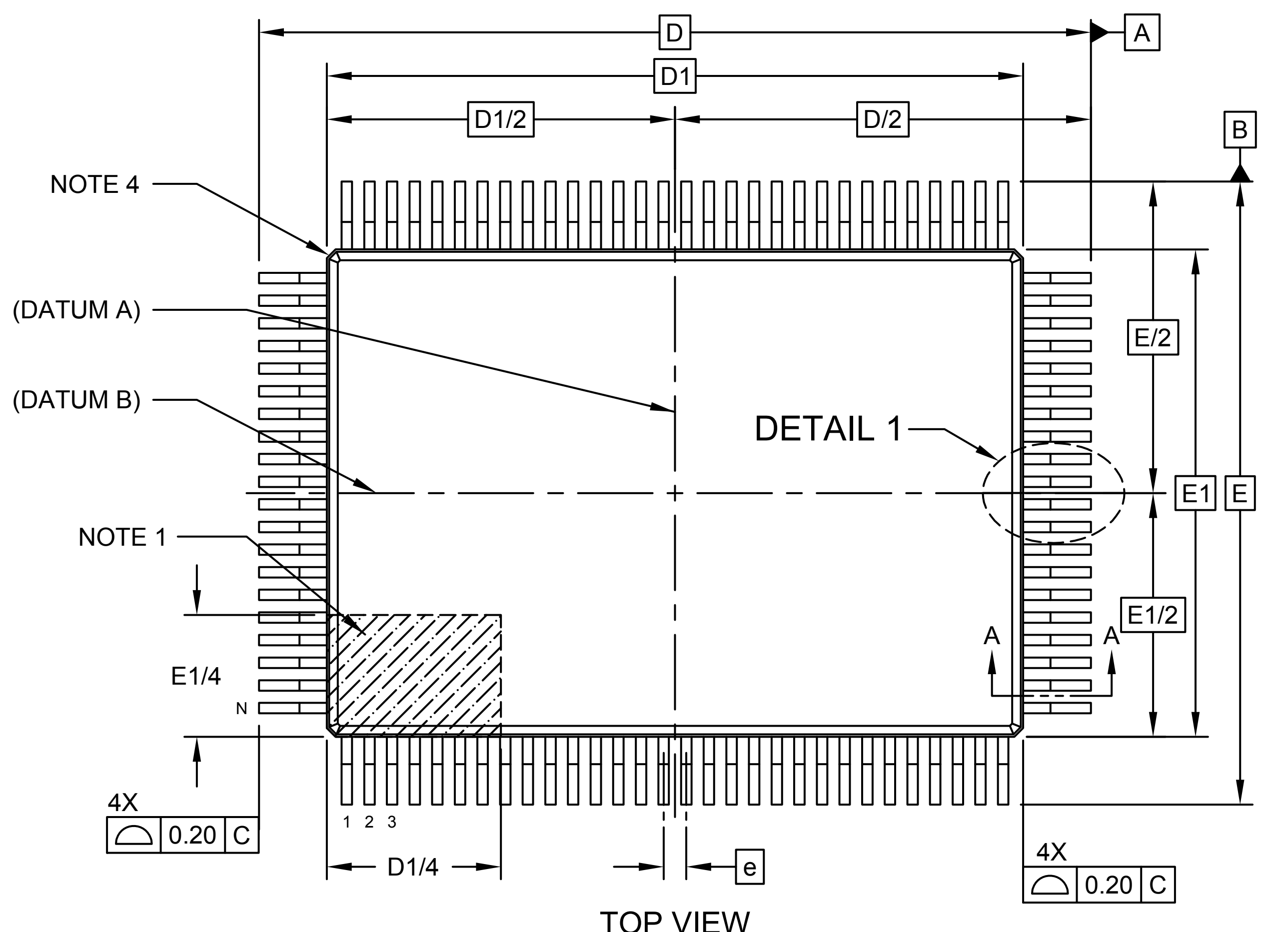
1. Dimensioning and tolerancing per ASME Y14.5M

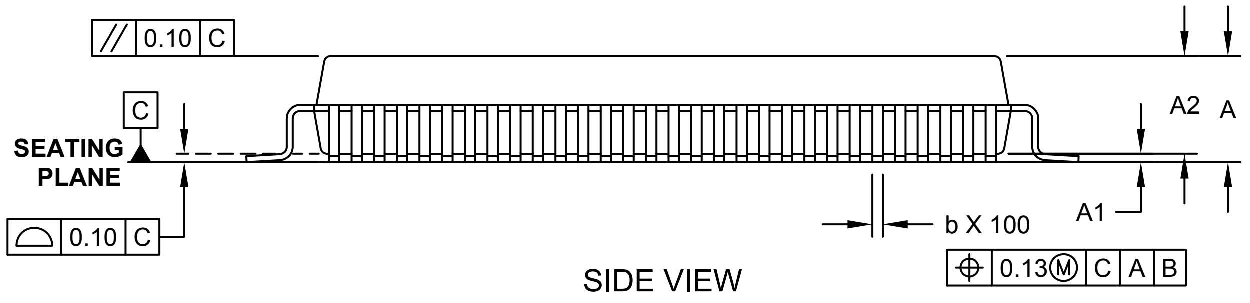
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2022B

100-Lead Plastic Metric Quad Flatpack (PQ) - 14x20 mm Body [MQFP] 3.90 mm Footprint

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Microchip Technology Drawing C04-221A Sheet 1 of 2

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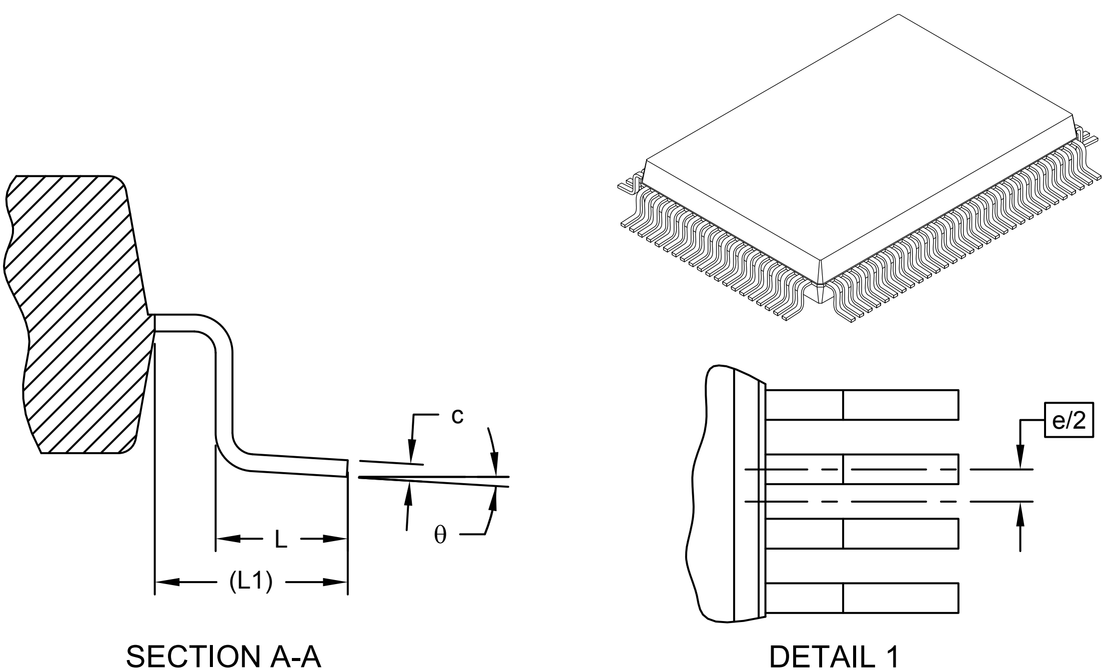
100-Lead Plastic Metric Quad Flatpack (PQ) - 14x20 mm Body [MQFP]
3.90 mm Footprint

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Number of Pins	N		100	
Pitch	e		0.65 BSC	
Overall Height	A	-	-	3.40
Standoff	A1	0.25	-	-
Molded Package Thickness	A2	2.50	2.70	2.90
Overall Length	D		23.20 BSC	
Molded Package Length	D1		20.00 BSC	
Overall Width	E		17.20 BSC	
Molded Package Width	E1		14.00 BSC	
Terminal Width	b	0.22	-	0.40
Terminal Thickness	c	0.11	-	0.23
Terminal Length	L	0.73	0.88	1.03
Footprint	(L1)		1.95 REF	
Foot Angle	θ	0°	3.5°	7°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Exact shape of each corner is optional.
3. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Exact shape of each corner is optional.

Microchip Technology Drawing C04-221A Sheet 2 of 2

256-Lead Plastic Metric Quat Flatpack (PQ) - 28x28x3.40 mm Body [MQFP]
2.60 mm Footprint

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
2X
0.20 C
D2
D2/2
B
2X
0.20 C
E2/2
(DATUM A)
(DATUM B)
E2
E
A
A
NOTE 1
N
2X
0.20 C
1 3
2
2X
0.20 C
SEE DETAIL B
H
C
SEATING PLANE
252 X e
0.08 C
256 X b
0.07 Ⓜ C A B

Microchip Technology Drawing C04-133A Sheet 1 of 2

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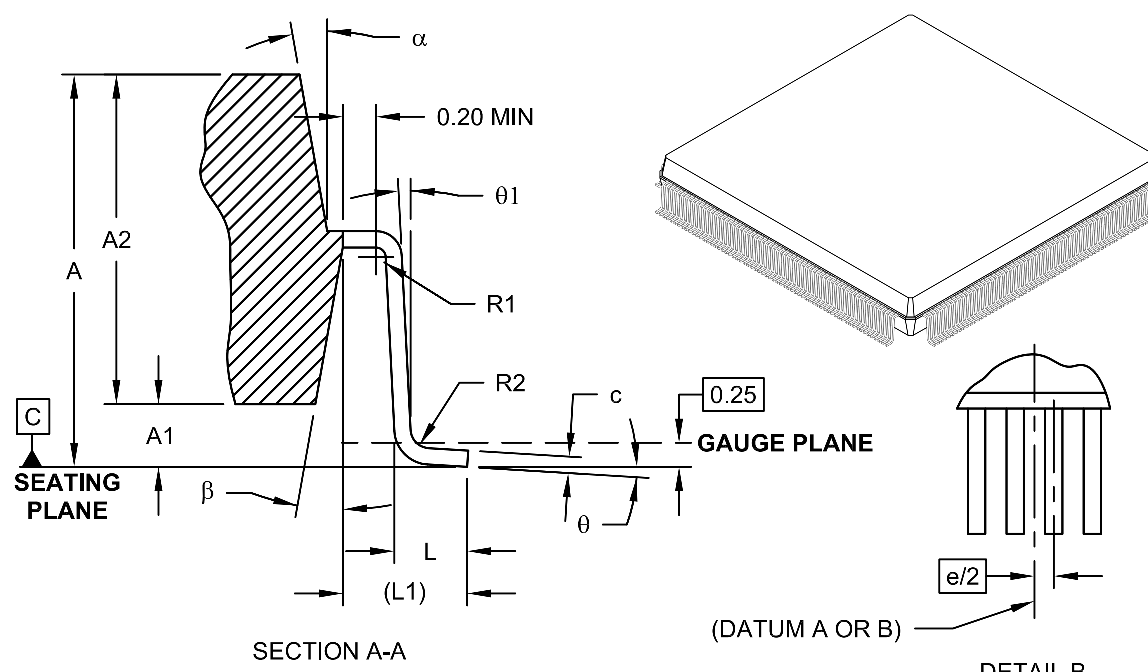
Package Outlines and Dimensions

256-Lead Plastic Metric Quat Flatpack (PQ) - 28x28x3.40 mm Body [MQFP] 2.60 mm Footprint

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N	256		
Lead Pitch	e	0.40 BSC		
Overall Height	A	-	-	4.07
Molded Package Height	A2	3.20	3.40	3.60
Standoff	A1	0.15	0.25	0.35
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.30 (REF)		
Lead Angle	ϕ	0°	3.5°	7°
Foot Angle	$\phi 1$	0°	-	-
Overall Width	E	30.60 BSC		
Overall Length	D	30.60 BSC		
Molded Body Width	E1	28.00 BSC		
Molded Body Length	D1	28.00 BSC		
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.13	-	0.23
Bend Radius	R1	0.08	-	-
Bend Radius	R2	0.25 TYP		
Mold Draft Angle Top	α	9°	-	11°
Mold Draft Angle Botton	β	9°	-	11°

Notes:
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-133A Sheet 2 of 2

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NOTES:

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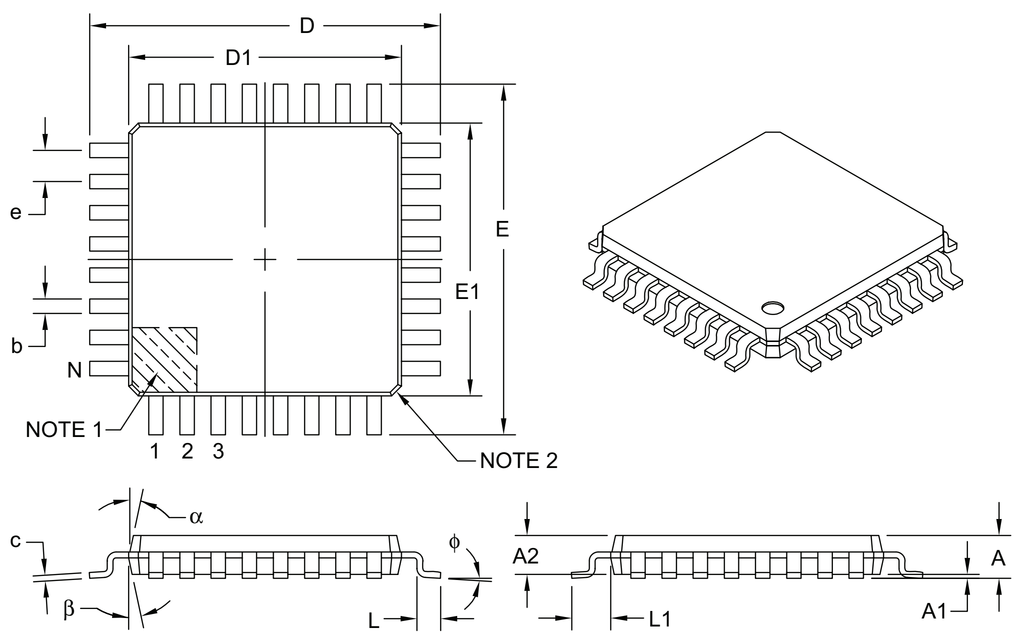
TQFP

32-Lead Plastic Thin Quad Flatpack (PT) – 7x7x1.0 mm Body, 2.00 mm [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N	32		
Lead Pitch	e	0.80 BSC		
Overall Height	A	–	–	1.20
Standoff	A1	0.05	–	0.15
Molded Package Thickness	A2	0.95	1.00	1.05
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	φ	0°	3.5°	7°
Overall Width	E	9.00 BSC		
Overall Length	D	9.00 BSC		
Molded Package Width	E1	7.00 BSC		
Molded Package Length	D1	7.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.30	0.37	0.45
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-074B

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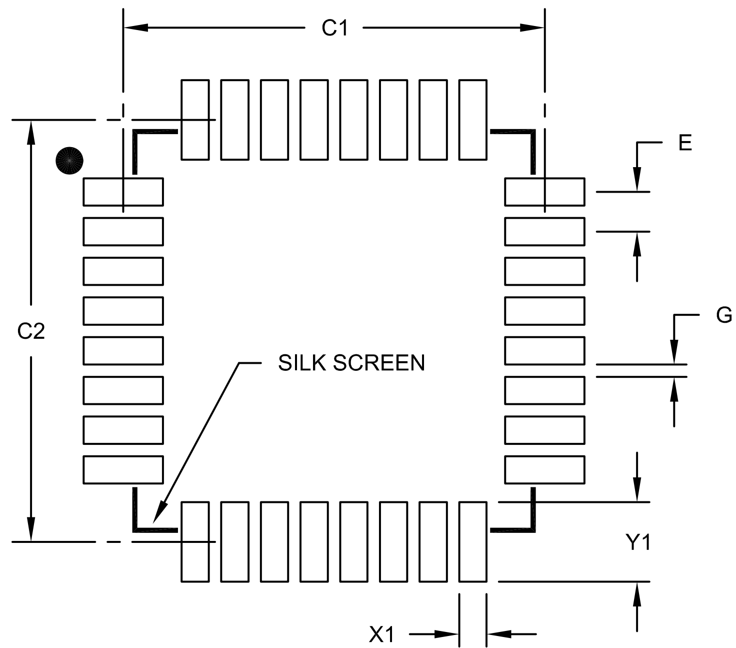
Footprint Outlines and Dimensions

32-Lead Plastic Thin Quad Flatpack (PT) - 7x7x1.0 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Contact Pad Spacing	C1		8.50	
Contact Pad Spacing	C2		8.50	
Contact Pad Width (X28)	X1			0.55
Contact Pad Length (X28)	Y1			1.60
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2074B

44-Lead Plastic Thin Quad Flatpack (PT) - 10x10x1.0 mm Body [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-076C Sheet 1 of 2

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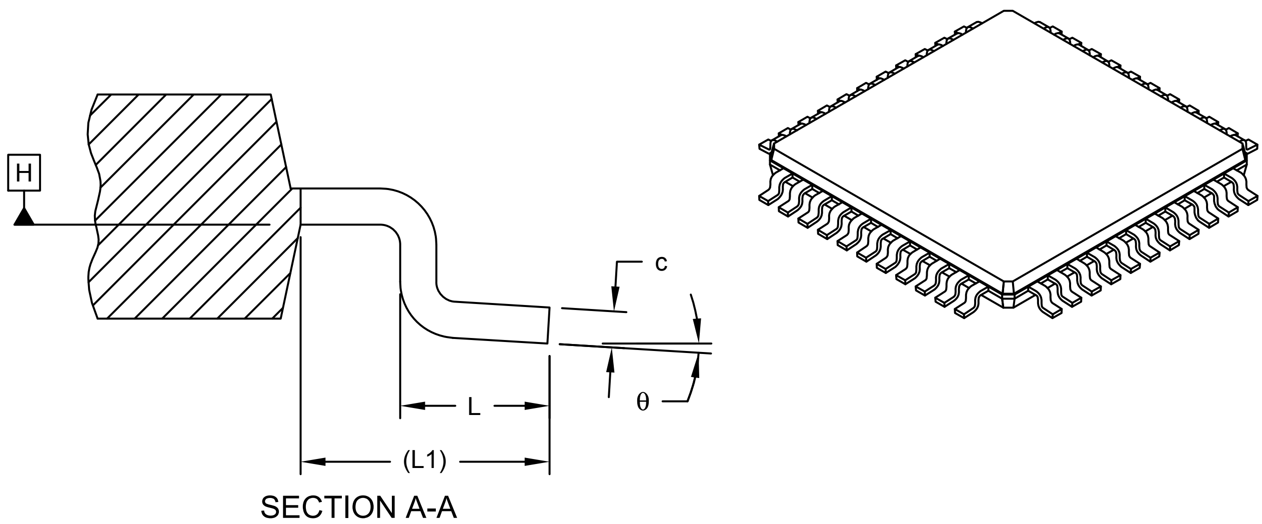
44-Lead Plastic Thin Quad Flatpack (PT) - 10x10x1.0 mm Body [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N	44		
Lead Pitch	e	0.80 BSC		
Overall Height	A	-	-	1.20
Standoff	A1	0.05	-	0.15
Molded Package Thickness	A2	0.95	1.00	1.05
Overall Width	E	12.00 BSC		
Molded Package Width	E1	10.00 BSC		
Overall Length	D	12.00 BSC		
Molded Package Length	D1	10.00 BSC		
Lead Width	b	0.30	0.37	0.45
Lead Thickness	c	0.09	-	0.20
Lead Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	θ	0°	3.5°	7°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Exact shape of each corner is optional.
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-076C Sheet 2 of 2

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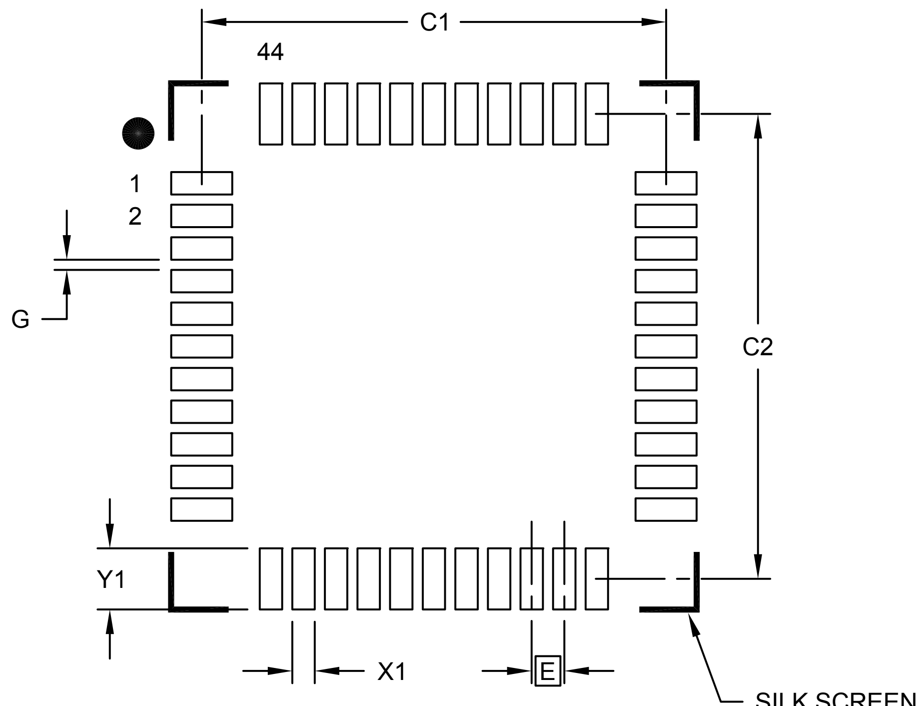
44-Lead Plastic Thin Quad Flatpack (PT) - 10X10X1 mm Body, 2.00 mm Footprint [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Contact Pad Spacing	C1		11.40	
Contact Pad Spacing	C2		11.40	
Contact Pad Width (X44)	X1			0.55
Contact Pad Length (X44)	Y1			1.50
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2076B

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44-Lead Plastic Quad Flatpack (MW) - 10x10x1.0 mm Body [TQFP] With 4.5x4.5 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
D1
B
NOTE 2
(DATUM A)
(DATUM B)
E1
E
NOTE 1
A A
N
2X
0.20 C
1 2 3
2X
0.20 C
4X
0.20 H

TOP VIEW

A
A2
C
0.010 C
SEATING PLANE
0.10 C
A1

SIDE VIEW

D2
1 2
N
E2
44 X b
0.20Ⓜ C A B
e

BOTTOM VIEW

Microchip Technology Drawing C04-220C Sheet 1 of 2

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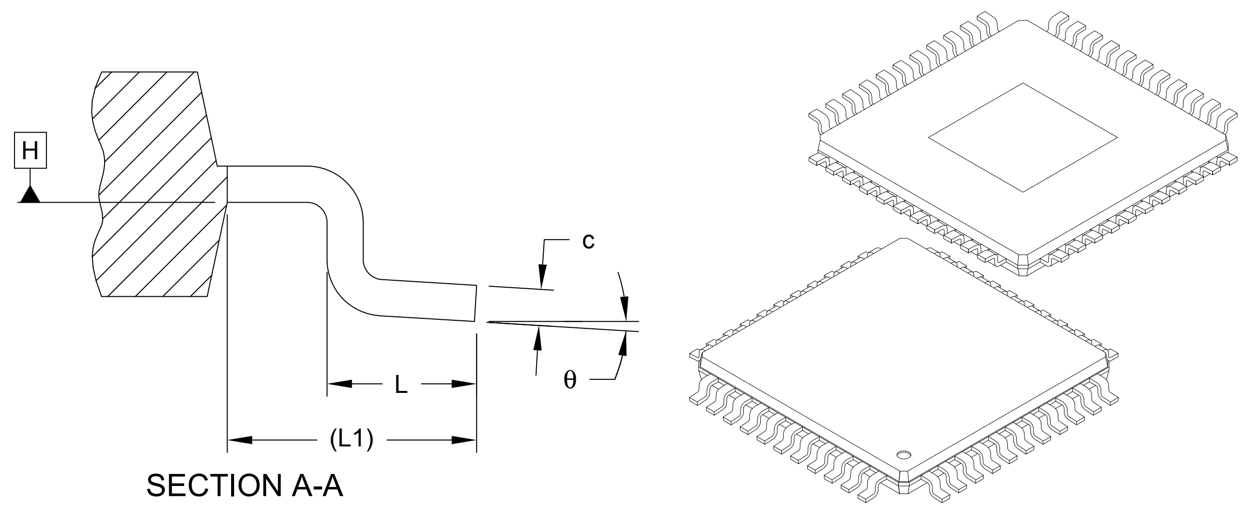
44-Lead Plastic Quad Flatpack (MW) - 10x10x1.0 mm Body [TQFP] With 4.5x4.5 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N		44	
Pitch	e		0.80 BSC	
Overall Height	A	-	-	1.20
Standoff	A1	0.05	-	0.15
Molded Package Thickness	A2	0.95	1.00	1.05
Overall Width	E		12.00 BSC	
Molded Package Width	E1		10.00 BSC	
Exposed Pad Width	E2	4.40	4.50	4.60
Overall Length	D		12.00 BSC	
Molded Package Length	D1		10.00 BSC	
Exposed Pad Length	D2	4.40	4.50	4.60
Lead Width	b	0.30	0.37	0.45
Lead Thickness	c	0.09	-	0.20
Lead Length	L	0.45	0.60	0.75
Footprint	L1		1.00 REF	
Foot Angle	θ	0°	3.5°	7°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Exact shape of each corner is optional.
3. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-220C Sheet 2

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48-Lead Thin Quad Flatpack (PT) - 7x7x1.0 mm Body [TQFP] With Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
D1
D1/2
D
A
B
NOTE 1
E1
E
A
A
E1/2
E1/4
N
48X TIPS
0.20 C A-B D
1 2
4X
0.20 H A-B D
D1/4

TOP VIEW

A
C
SEATING PLANE
0.10 C
H
0.08 C
A2
A1

SIDE VIEW

D2
4X
0.20 H A-B D
1 2
N
4X
0.20
E2
e
48x b
e/2
0.08 Ⓜ C A-B D

TOP VIEW

Microchip Technology Drawing C04-183A Sheet 1 of 2

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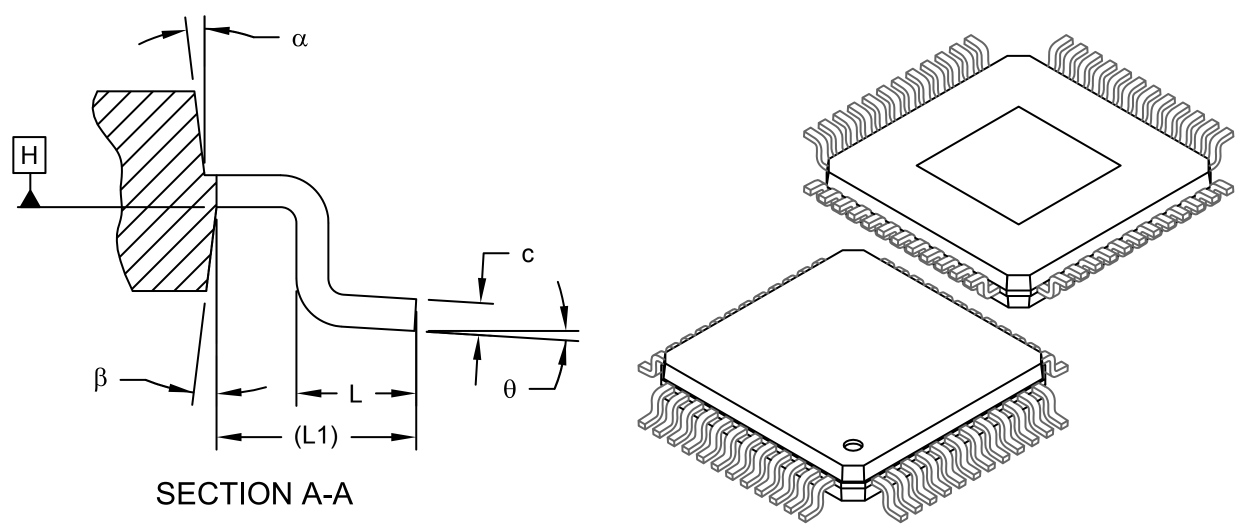
48-Lead Thin Quad Flatpack (PT) - 7x7x1.0 mm Body [TQFP] With Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N		48	
Lead Pitch	e		0.50 BSC	
Overall Height	A	-	-	1.20
Standoff	A1	0.05	-	0.15
Molded Package Thickness	A2	0.95	1.00	1.05
Foot Length	L	0.45	0.60	0.75
Footprint	L1		1.00 REF	
Foot Angle	φ	0°	3.5°	7°
Overall Width	E		9.00 BSC	
Overall Length	D		9.00 BSC	
Molded Package Width	E1		7.00 BSC	
Molded Package Length	D1		7.00 BSC	
Exposed Pad Width	E2		3.50 BSC	
Exposed Pad Length	D2		3.50 BSC	
Lead Thickness	c	0.09	-	0.16
Lead Width	b	0.17	0.22	0.27
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-183A Sheet 2 of 2

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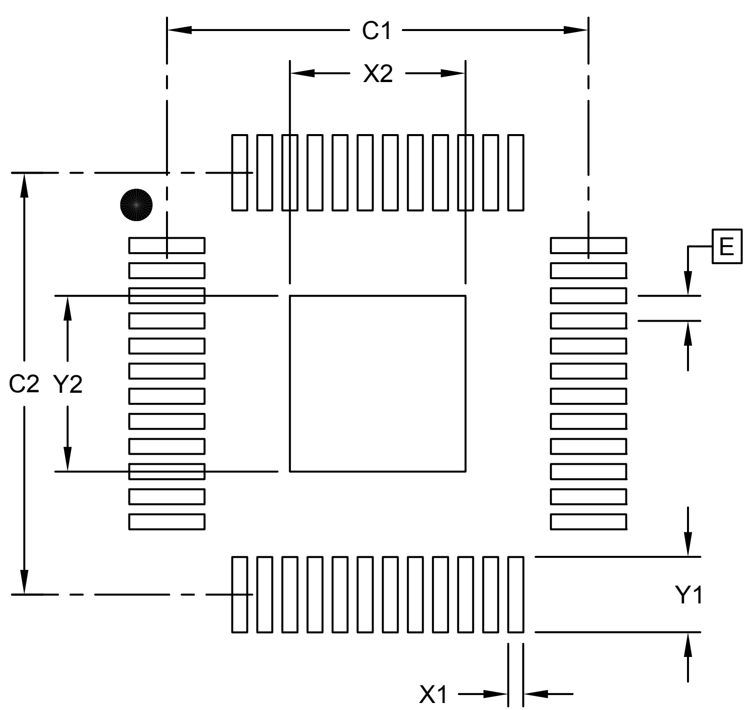
48-Lead Thin Quad Flatpack (PT) - 7x7x1.0 mm Body [TQFP] With Thermal Tab

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Tab Width	X2		3.50	
Optional Center Tab Length	Y2		3.50	
Contact Pad Spacing	C1		8.40	
Contact Pad Spacing	C2		8.40	
Contact Pad Width (X48)	X1			0.30
Contact Pad Length (X48)	Y1			1.50

Notes:

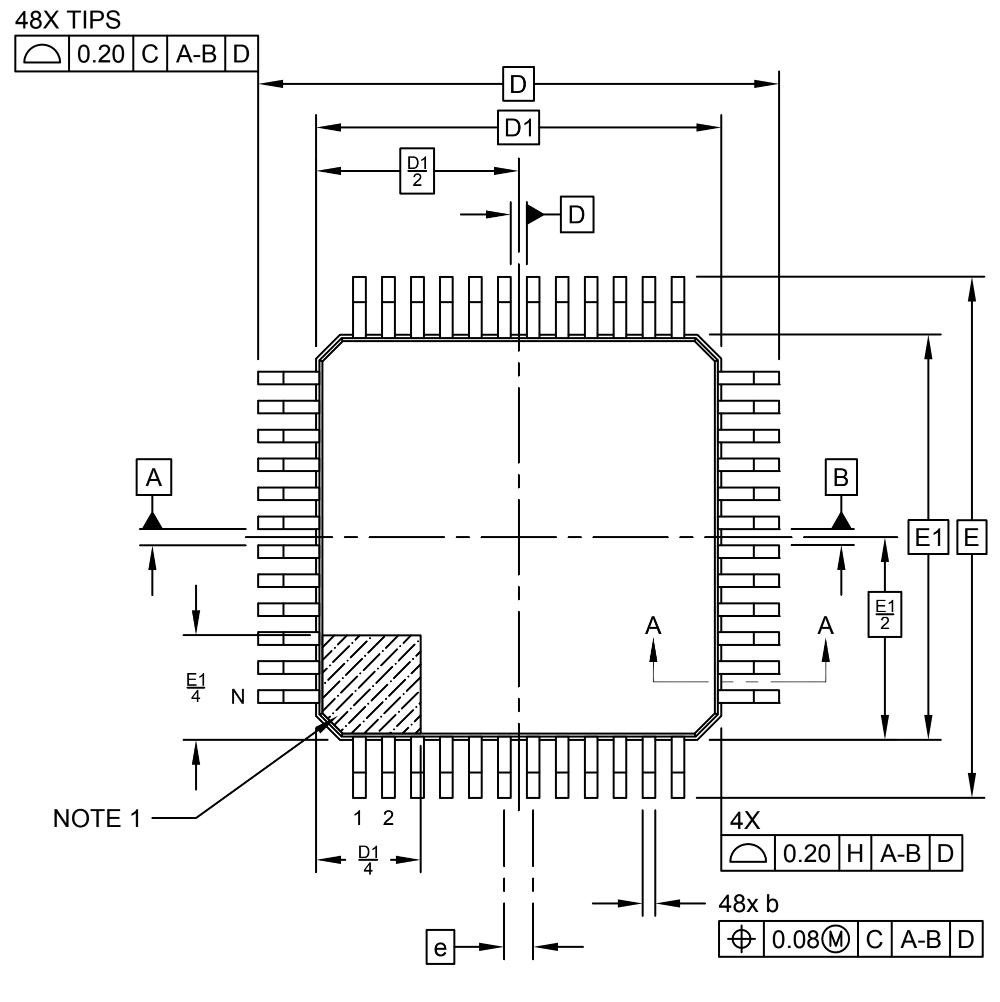
1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

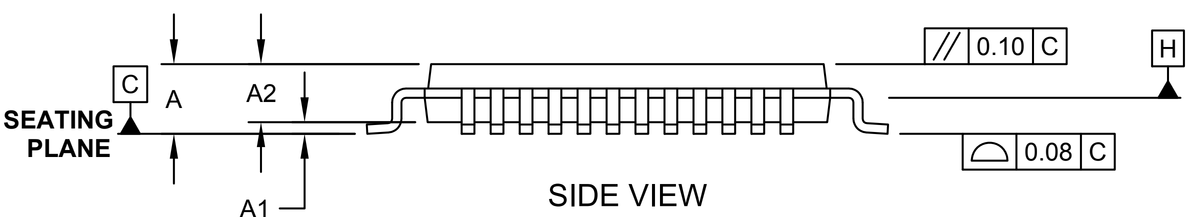
Microchip Technology Drawing No. C04-2183A

48-Lead Thin Quad Flatpack (PT) - 7x7x1.0 mm Body [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW

Microchip Technology Drawing C04-300-PT Rev A Sheet 1 of 2

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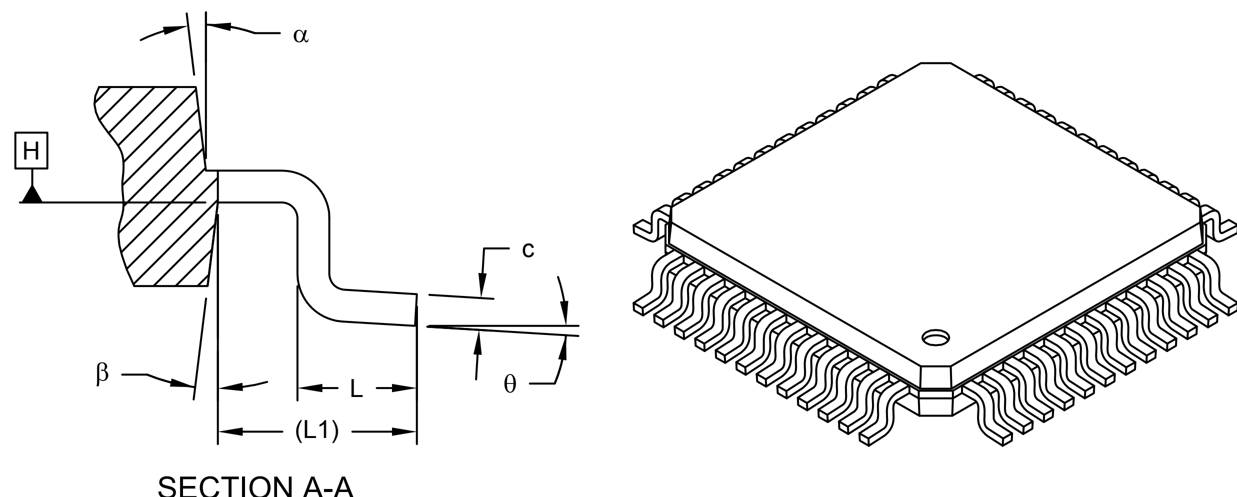
48-Lead Thin Quad Flatpack (PT) - 7x7x1.0 mm Body [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N	48		
Lead Pitch	e	0.50 BSC		
Overall Height	A	-	-	1.20
Standoff	A1	0.05	-	0.15
Molded Package Thickness	A2	0.95	1.00	1.05
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	ϕ	0°	3.5°	7°
Overall Width	E	9.00 BSC		
Overall Length	D	9.00 BSC		
Molded Package Width	E1	7.00 BSC		
Molded Package Length	D1	7.00 BSC		
Lead Thickness	c	0.09	-	0.16
Lead Width	b	0.17	0.22	0.27
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

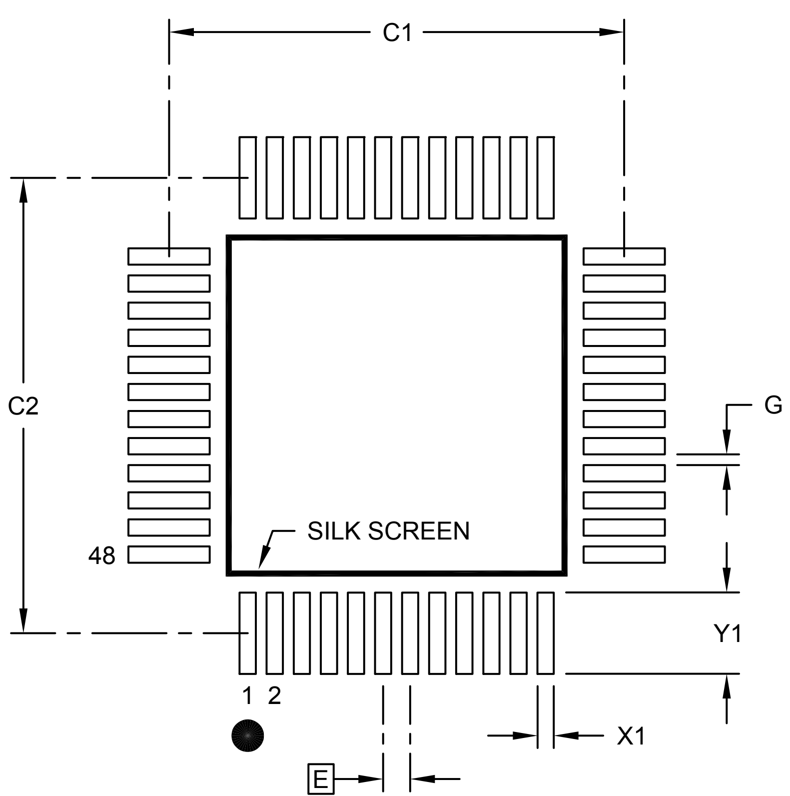
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A-B and D to be determined at center line between leads where leads exit plastic body at datum plane H

Microchip Technology Drawing C04-300-PT Rev A Sheet 2 of 2

48-Lead Thin Quad Flatpack (PT) - 7x7x1.0 mm Body [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		8.40	
Contact Pad Spacing	C2		8.40	
Contact Pad Width (X48)	X1			0.30
Contact Pad Length (X48)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2300-PT Rev A

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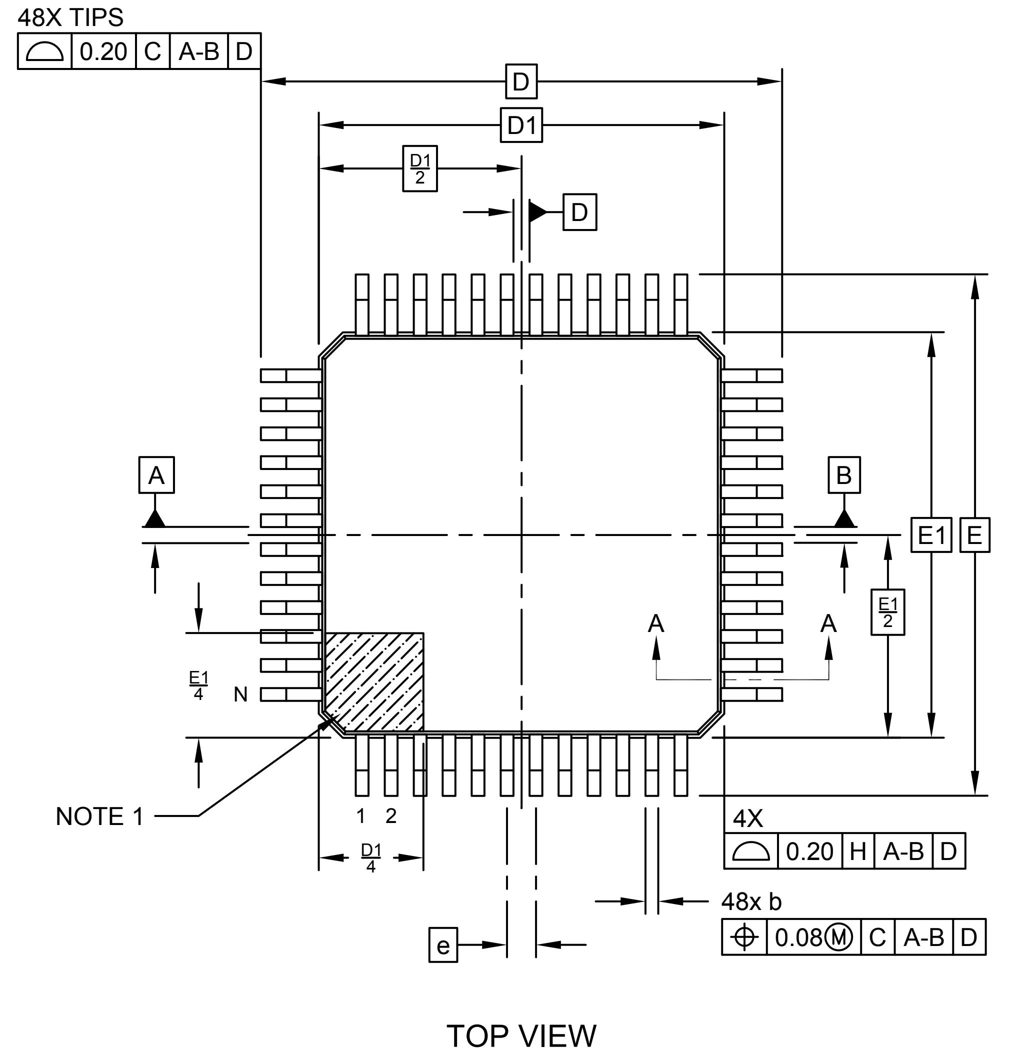
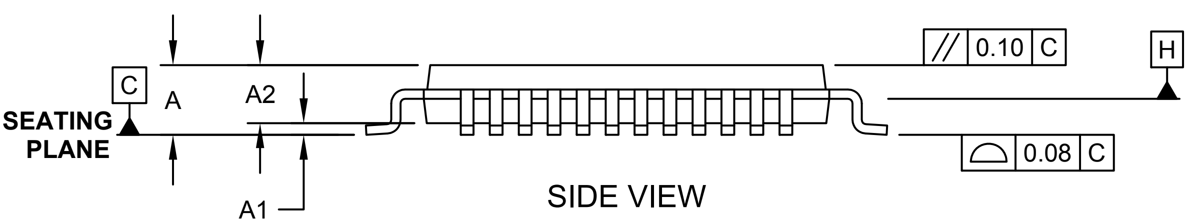
Package Outlines and Dimensions

48-Lead Thin Quad Flatpack (Y8) - 7x7x1.0 mm Body [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

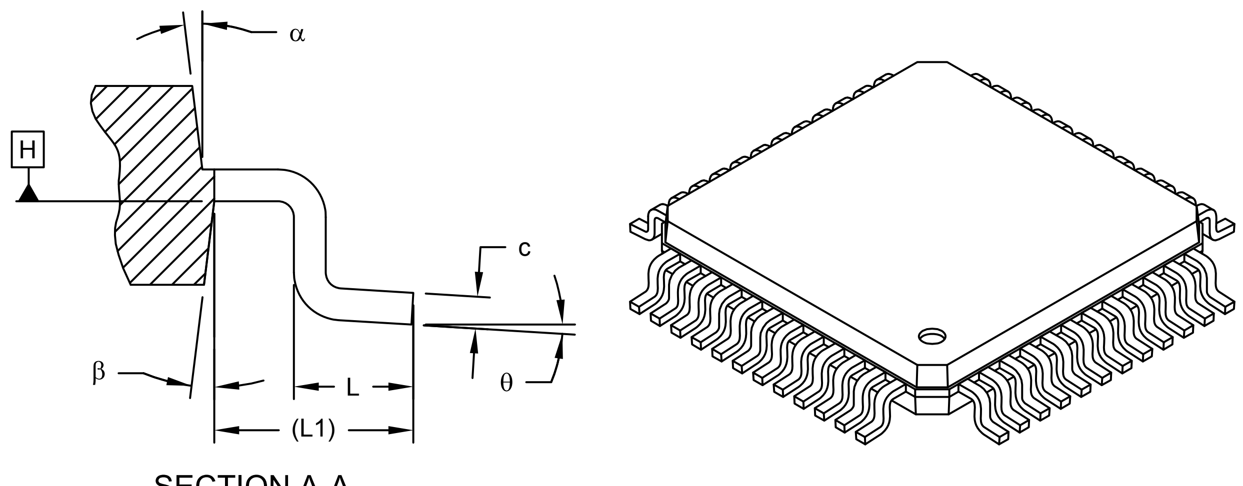




Microchip Technology Drawing C04-300-Y8 Rev A Sheet 1 of 2

48-Lead Thin Quad Flatpack (Y8) - 7x7x1.0 mm Body [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N		48	
Lead Pitch	e		0.50 BSC	
Overall Height	A	-	-	1.20
Standoff	A1	0.05	-	0.15
Molded Package Thickness	A2	0.95	1.00	1.05
Foot Length	L	0.45	0.60	0.75
Footprint	L1		1.00 REF	
Foot Angle	φ	0°	3.5°	7°
Overall Width	E		9.00 BSC	
Overall Length	D		9.00 BSC	
Molded Package Width	E1		7.00 BSC	
Molded Package Length	D1		7.00 BSC	
Lead Thickness	c	0.09	-	0.16
Lead Width	b	0.17	0.22	0.27
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A-B and D to be determined at center line between leads where leads exit plastic body at datum plane H

Microchip Technology Drawing C04-300-Y8 Rev A Sheet 2 of 2

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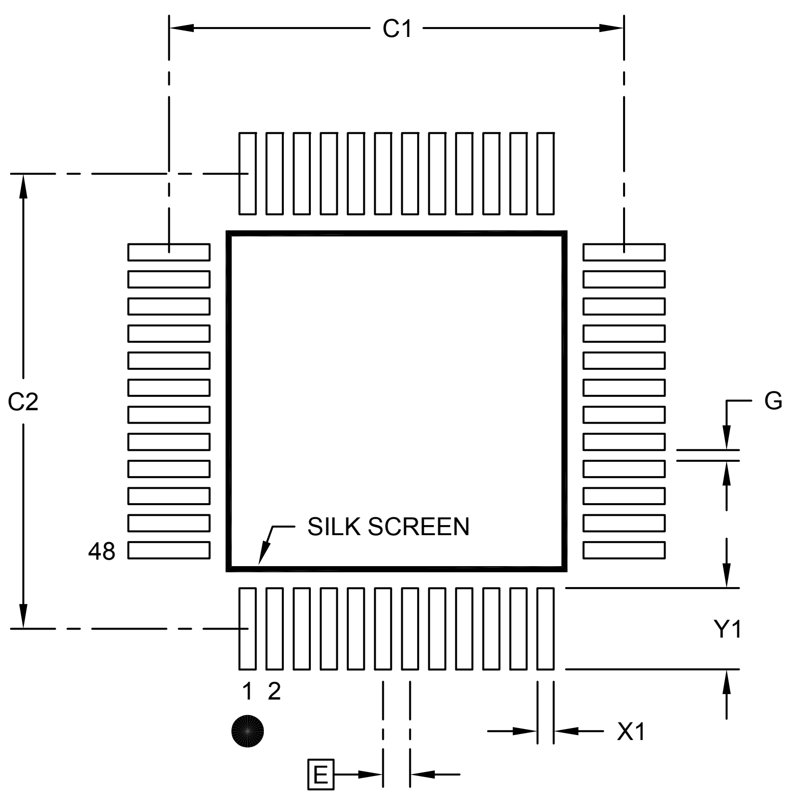
48-Lead Thin Quad Flatpack (Y8) - 7x7x1.0 mm Body [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		8.40	
Contact Pad Spacing	C2		8.40	
Contact Pad Width (X48)	X1			0.30
Contact Pad Length (X48)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2300-Y8 Rev A

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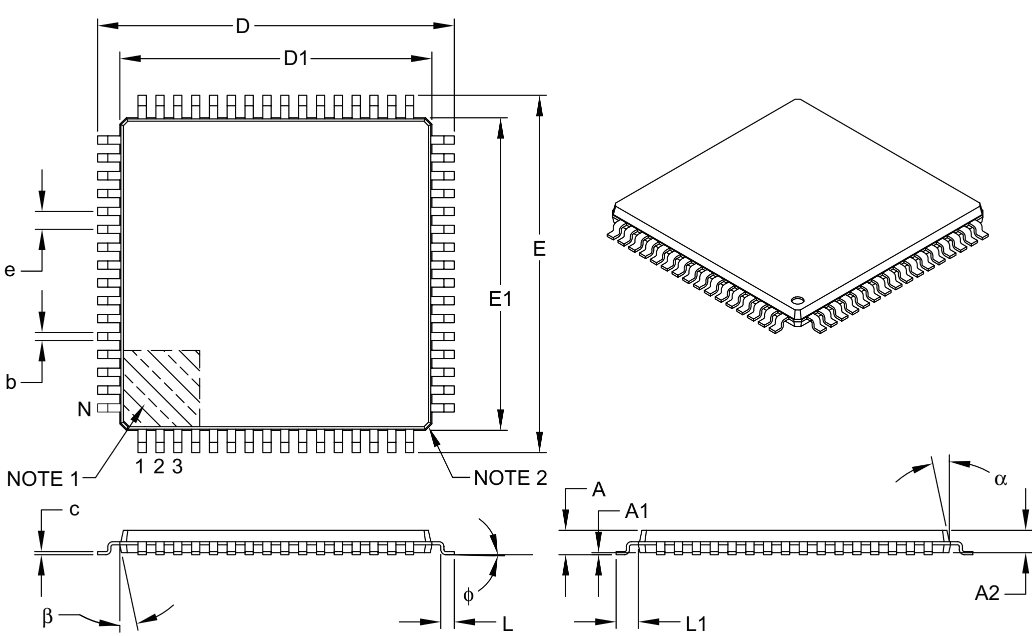
Package Outlines and Dimensions

64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N	64		
Lead Pitch	e	0.80 BSC		
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	φ	0°	3.5°	7°
Overall Width	E	16.00 BSC		
Overall Length	D	16.00 BSC		
Molded Package Width	E1	14.00 BSC		
Molded Package Length	D1	14.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.30	0.37	0.45
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-066B

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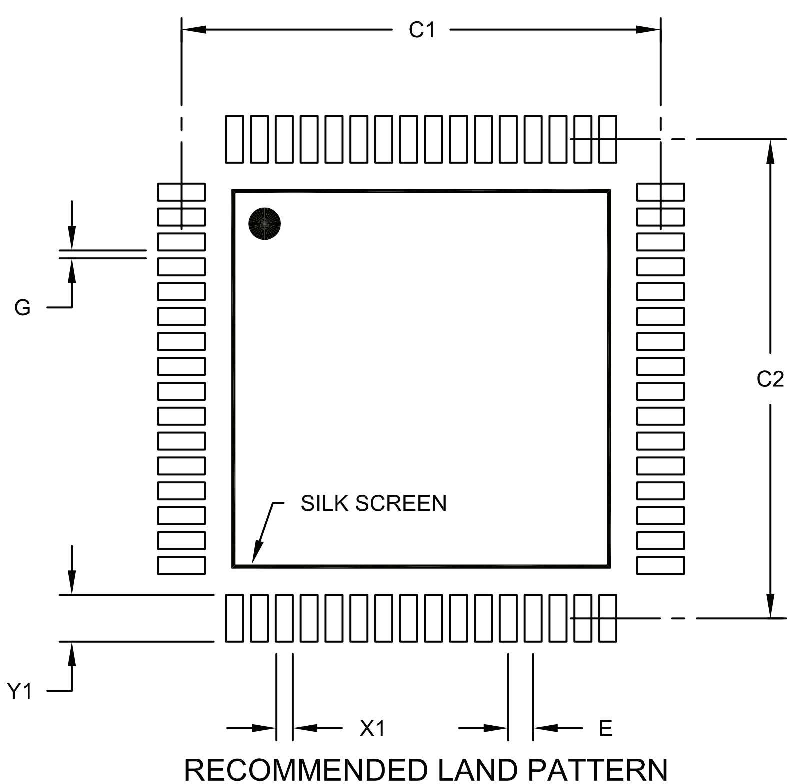
64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.80 BSC	
Contact Pad Spacing	C1		15.40	
Contact Pad Spacing	C2		15.40	
Contact Pad Width (X64)	X1			0.55
Contact Pad Length (X64)	Y1			1.50
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2066A

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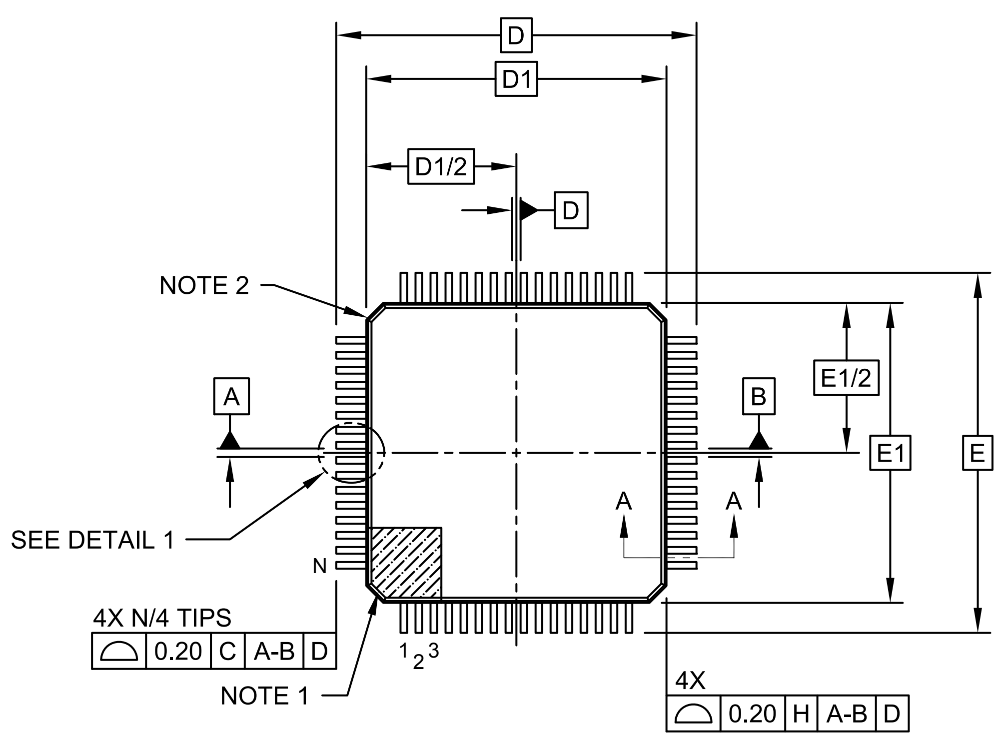
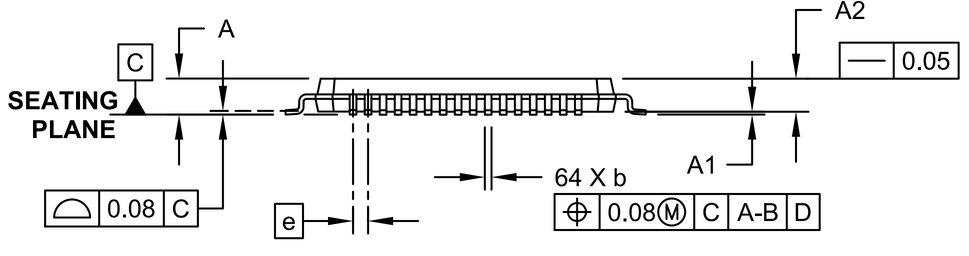
64-Lead Plastic Thin Quad Flatpack (PT)-10x10x1 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW

Microchip Technology Drawing C04-085C Sheet 1 of 2

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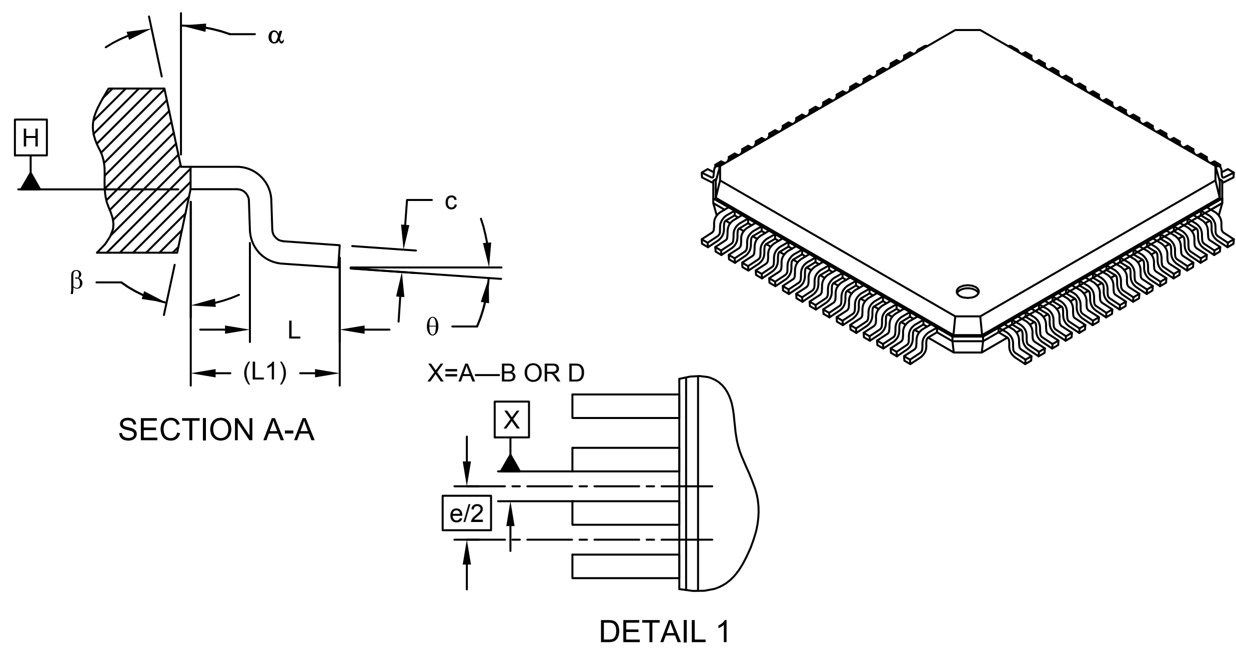
64-Lead Plastic Thin Quad Flatpack (PT)-10x10x1 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N		64	
Lead Pitch	e		0.50 BSC	
Overall Height	A	-	-	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	-	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1		1.00 REF	
Foot Angle	ϕ	0°	3.5°	7°
Overall Width	E		12.00 BSC	
Overall Length	D		12.00 BSC	
Molded Package Width	E1		10.00 BSC	
Molded Package Length	D1		10.00 BSC	
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.17	0.22	0.27
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-085C Sheet 2 of 2

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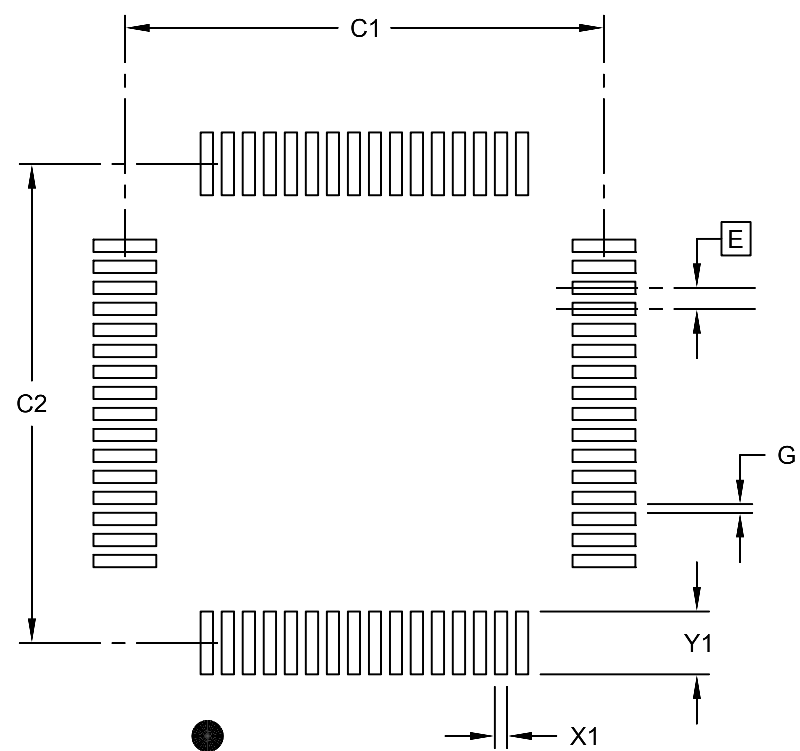
64-Lead Plastic Thin Quad Flatpack (PT)-10x10x1 mm Body, 2.00 mm Footprint [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		11.40	
Contact Pad Spacing	C2		11.40	
Contact Pad Width (X28)	X1			0.30
Contact Pad Length (X28)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2085B Sheet 1 of 1

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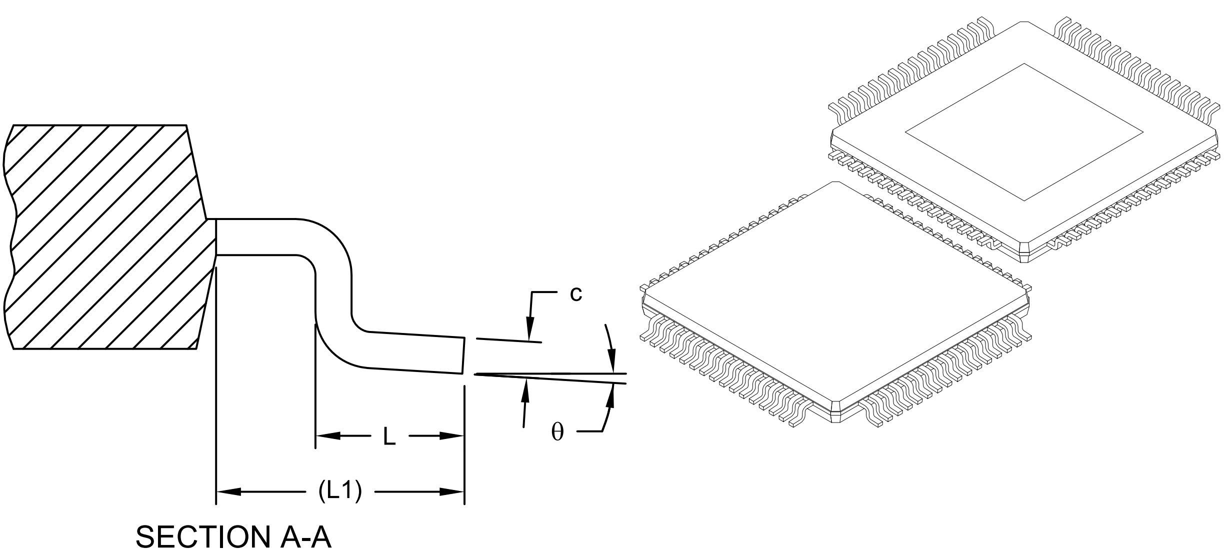
64-Lead Plastic Quad Flatpack (PT) - 10x10x1.0 mm Body [TQFP]
With 6.0x6.0 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-222B Sheet 1 of 2

64-Lead Plastic Quad Flatpack (PT) - 10x10x1.0 mm Body [TQFP] With 6.0x6.0 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		64	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.20
Standoff	A1	0.05	-	0.15
Molded Package Thickness	A2	0.95	1.00	1.05
Overall Width	E		12.00 BSC	
Molded Package Width	E1		10.00 BSC	
Exposed Pad Width	E2	5.90	6.00	6.10
Overall Length	D		12.00 BSC	
Molded Package Length	D1		10.00 BSC	
Exposed Pad Length	D2	5.90	6.00	6.10
Terminal Width	b	0.17	0.22	0.27
Terminal Thickness	c	0.09	-	0.20
Terminal Length	L	0.45	0.60	0.75
Footprint	(L1)		1.00 REF	
Foot Angle	θ	0°	3.5°	7°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Exact shape of each corner is optional.
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-222B Sheet 2 of 2

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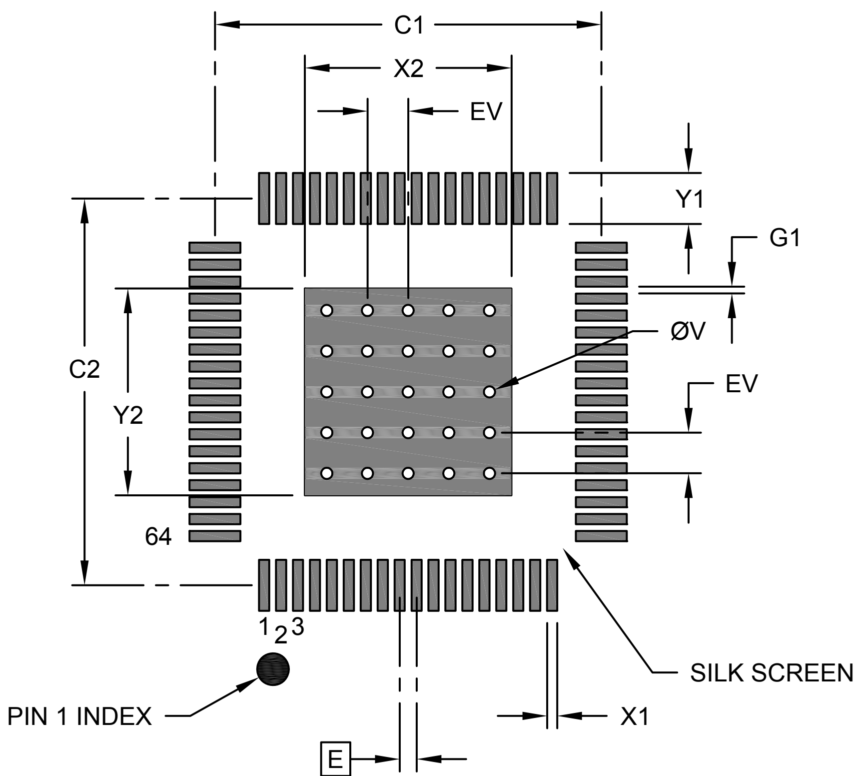
64-Lead Plastic Quad Flatpack (PT) - 10x10x1.0 mm Body [TQFP] With 6.0x6.0 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	X2			6.10
Optional Center Pad Length	Y2			6.10
Contact Pad Spacing	C1		11.40	
Contact Pad Spacing	C2		11.40	
Contact Pad Width (X64)	X1			0.30
Contact Pad Length (X64)	Y1			1.50
Contact Pad to Contact Pad (X60)	G1	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

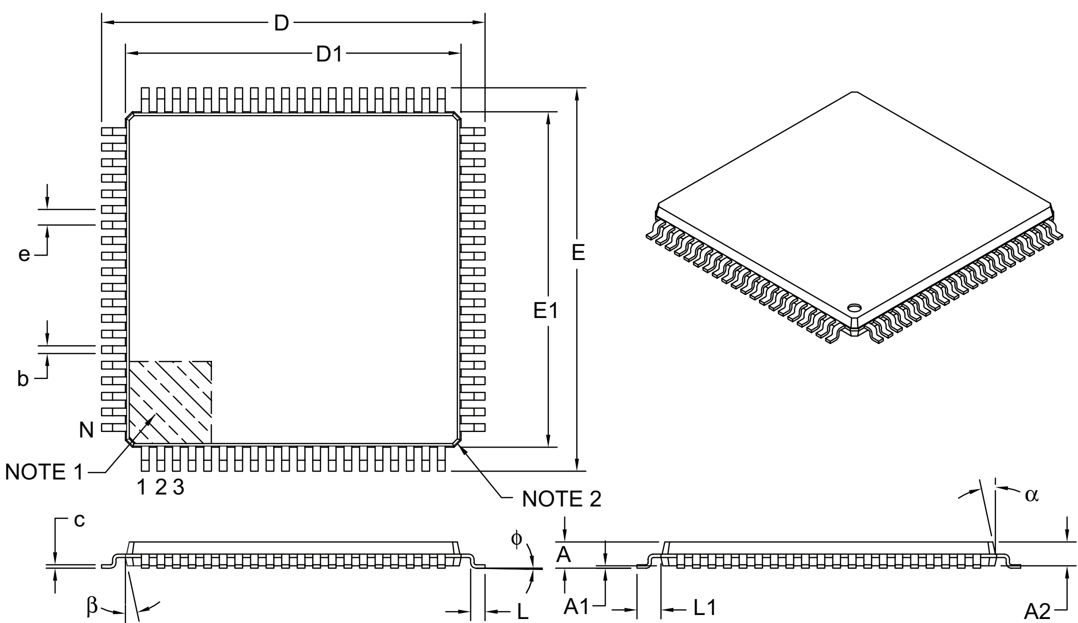
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2222A

Package Outlines and Dimensions

80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N	80		
Lead Pitch	e	0.65 BSC		
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	φ	0°	3.5°	7°
Overall Width	E	16.00 BSC		
Overall Length	D	16.00 BSC		
Molded Package Width	E1	14.00 BSC		
Molded Package Length	D1	14.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.22	0.32	0.38
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

    REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-116B

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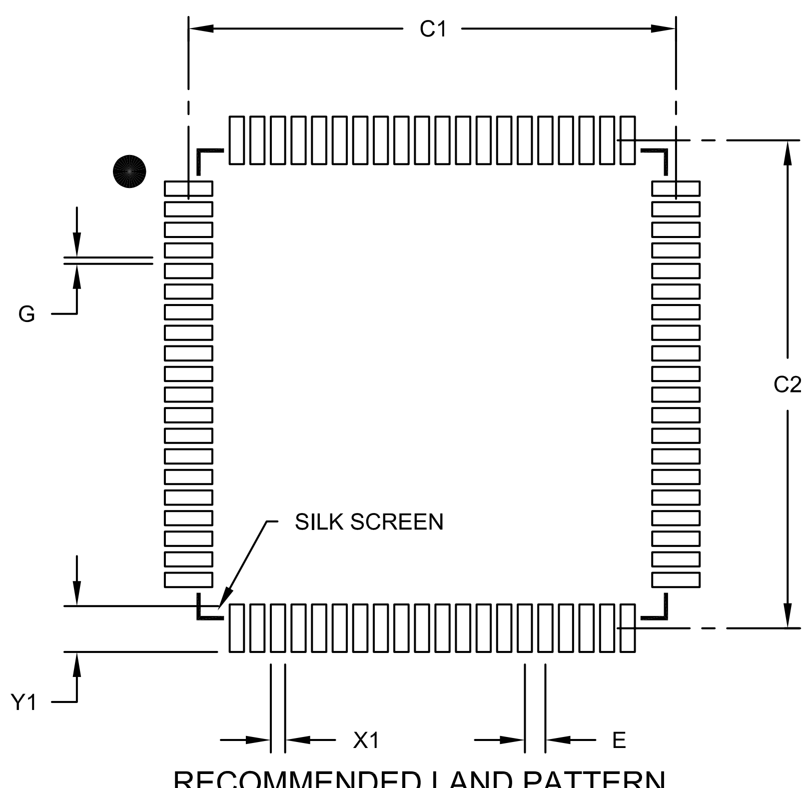
Footprint Outlines and Dimensions

80-Lead Plastic Thin Quad Flatpack (PF) 14x14x1mm Body, 2.00 mm Footprint [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Contact Pad Spacing	C1		15.40	
Contact Pad Spacing	C2		15.40	
Contact Pad Width (X80)	X1			0.45
Contact Pad Length (X80)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2116C

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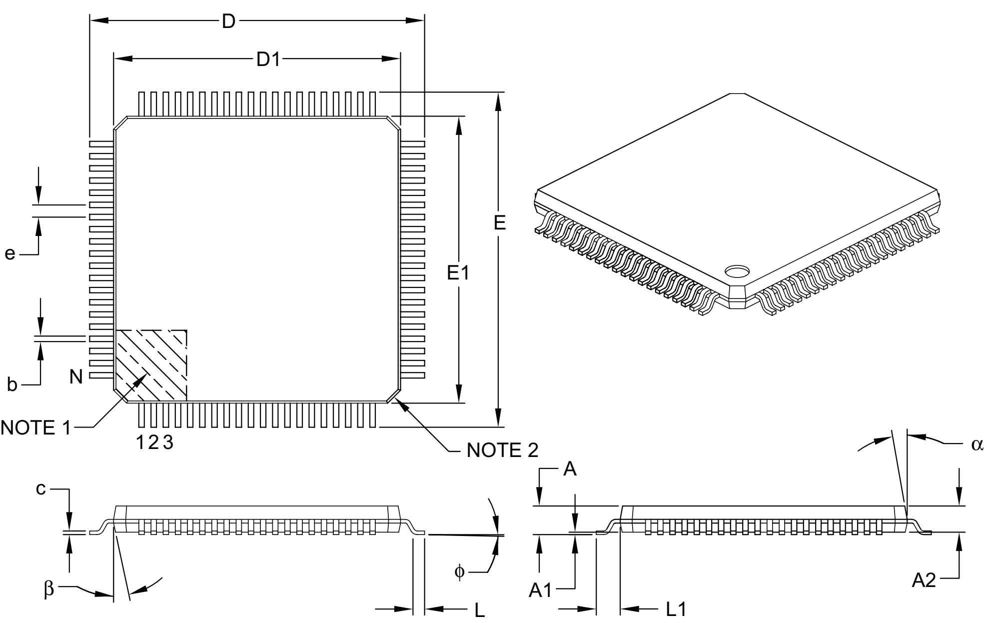
Package Outlines and Dimensions

80-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N		80	
Lead Pitch	e		0.50 BSC	
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1		1.00 REF	
Foot Angle	φ	0°	3.5°	7°
Overall Width	E		14.00 BSC	
Overall Length	D		14.00 BSC	
Molded Package Width	E1		12.00 BSC	
Molded Package Length	D1		12.00 BSC	
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.17	0.22	0.27
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-092B

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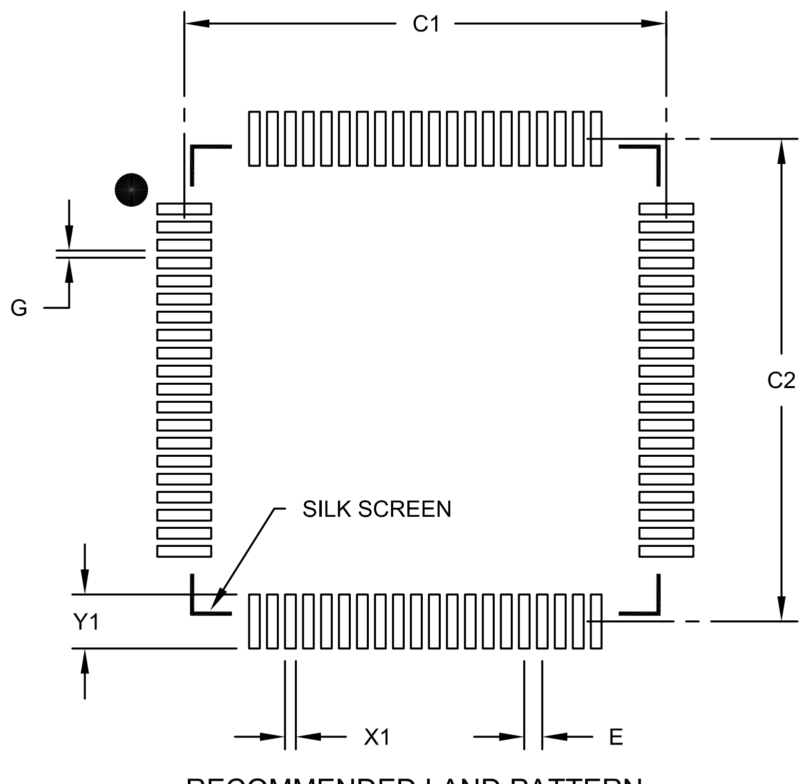
Footprint Outlines and Dimensions

80-Lead Plastic Thin Quad Flatpack (PT) - 12x12x1mm Body, 2.00 mm Footprint [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		13.40	
Contact Pad Spacing	C2		13.40	
Contact Pad Width (X80)	X1			0.30
Contact Pad Length (X80)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

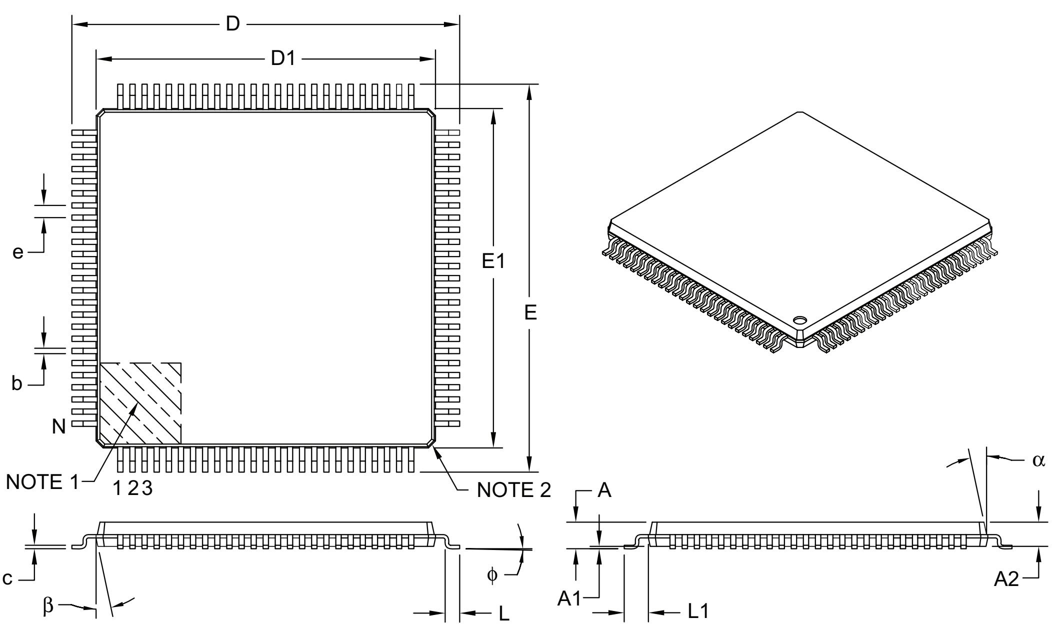
1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2092B

100-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N		100	
Lead Pitch	e		0.50 BSC	
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1		1.00 REF	
Foot Angle	φ	0°	3.5°	7°
Overall Width	E		16.00 BSC	
Overall Length	D		16.00 BSC	
Molded Package Width	E1		14.00 BSC	
Molded Package Length	D1		14.00 BSC	
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.17	0.22	0.27
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-110B

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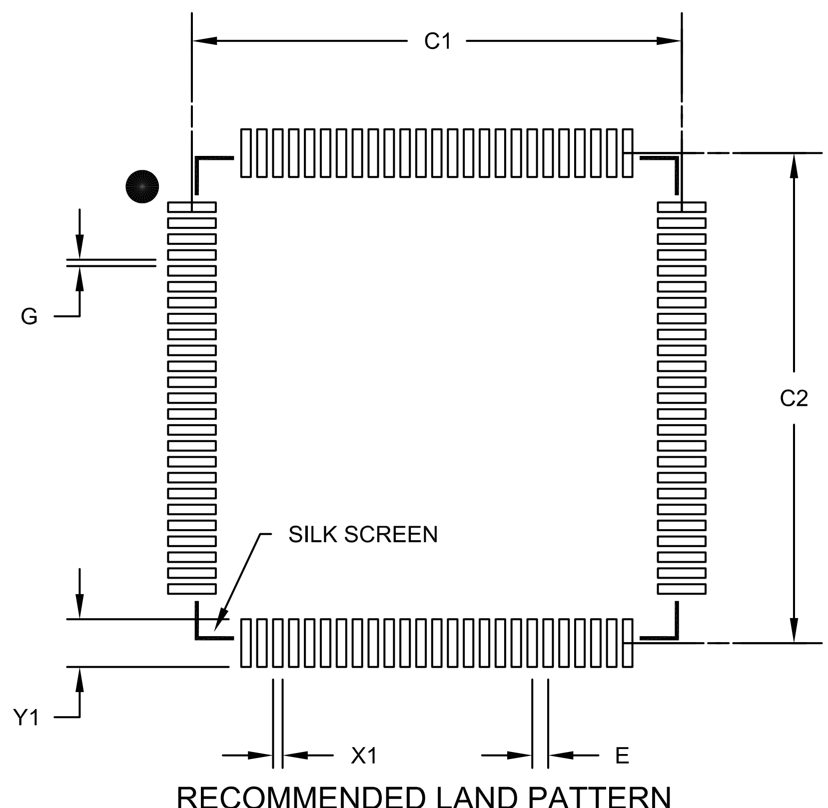
Footprint Outlines and Dimensions

100-Lead Plastic Thin Quad Flatpack (PF) - 14x14x1 mm Body 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Contact Pad Spacing	C1		15.40	
Contact Pad Spacing	C2		15.40	
Contact Pad Width (X100)	X1			0.30
Contact Pad Length (X100)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

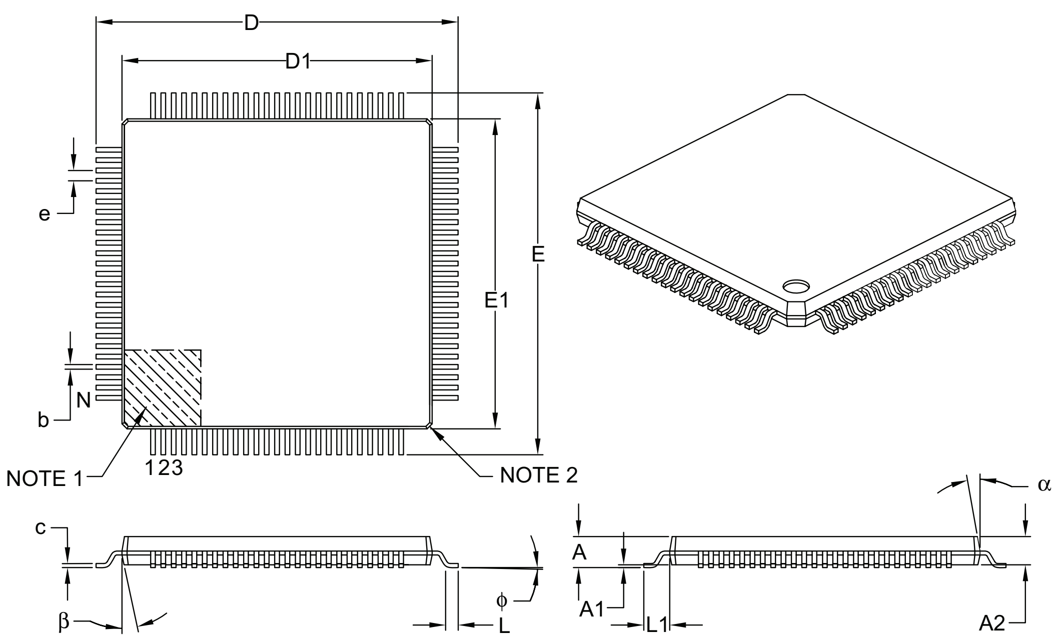
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2110B

Package Outlines and Dimensions

100-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N	100		
Lead Pitch	e	0.40 BSC		
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	φ	0°	3.5°	7°
Overall Width	E	14.00 BSC		
Overall Length	D	14.00 BSC		
Molded Package Width	E1	12.00 BSC		
Molded Package Length	D1	12.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.13	0.18	0.23
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-100B

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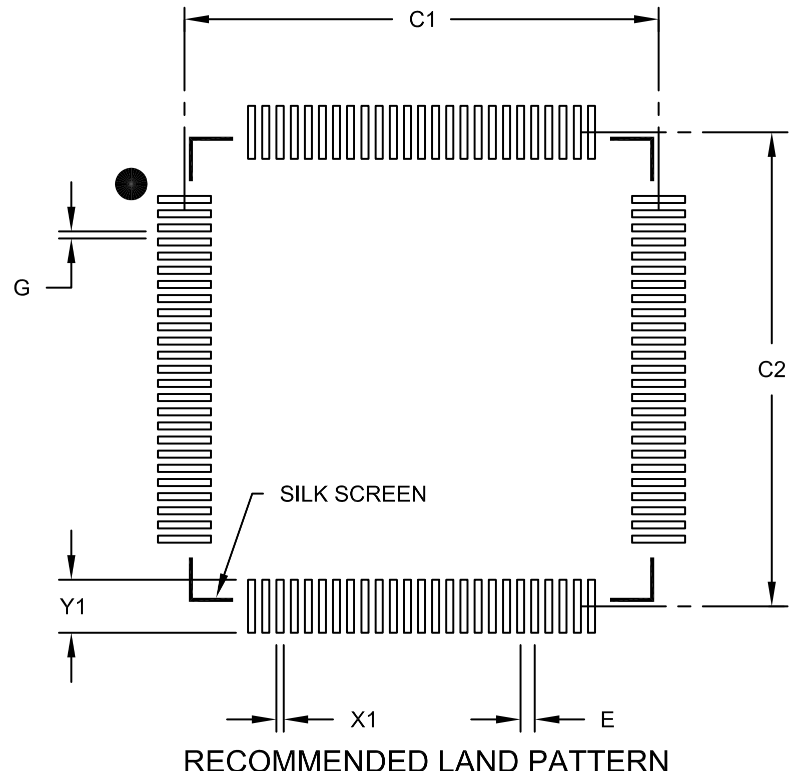
100-Lead Plastic Thin Quad Flatpack (PT)-12x12x1mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Contact Pad Spacing	C1		13.40	
Contact Pad Spacing	C2		13.40	
Contact Pad Width (X100)	X1			0.20
Contact Pad Length (X100)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2100B

128-Lead Plastic Quad Flat, No Lead Package (Z7) - 14x14x1.0 mm Body [TQFP]
With 5.0x5.0 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-226A Sheet 1 of 2

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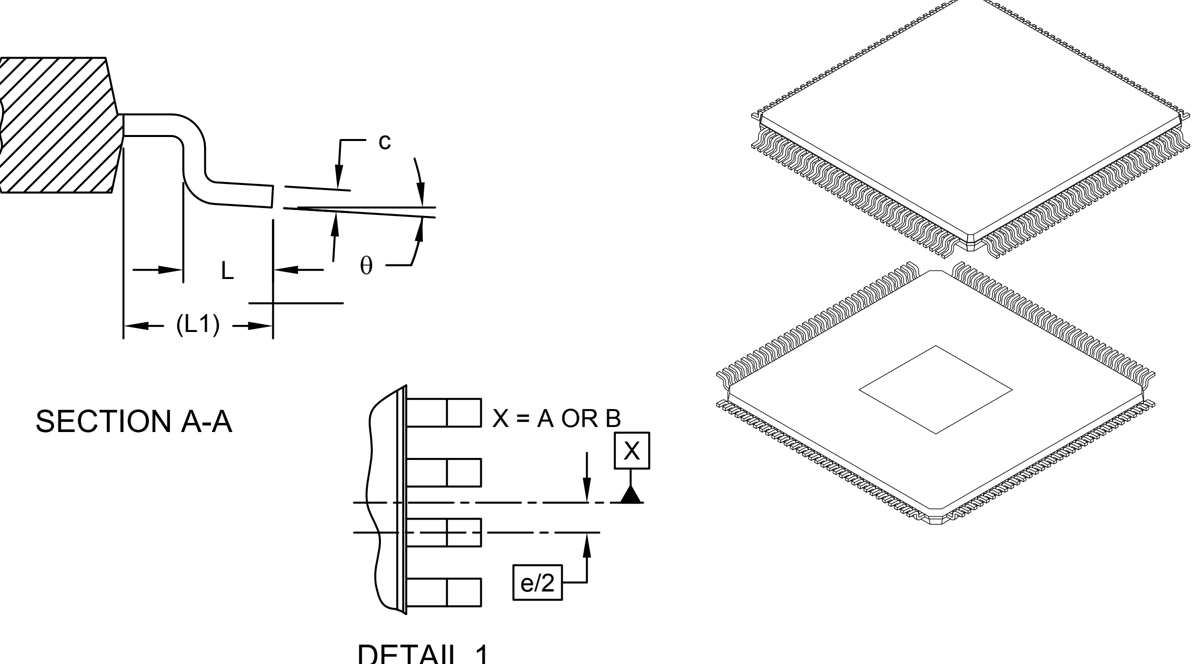
128-Lead Plastic Quad Flat, No Lead Package (Z7) - 14x14x1.0 mm Body [TQFP] With 5.0x5.0 mm Exposed Pad

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		128	
Pitch	e		0.40 BSC	
Overall Height	A	0.80	0.90	1.20
Standoff	A1	0.05	-	0.15
Terminal Thickness	A2	0.95	1.00	1.05
Overall Width	E		16.00 BSC	
Molded Package Width	E1		14.00 BSC	
Exposed Pad Width	E2	4.90	5.00	5.10
Overall Length	D		16.00 BSC	
Molded Package Length	D1		14.00 BSC	
Exposed Pad Length	D2	4.90	5.00	5.10
Terminal Width	b	0.13	0.18	0.23
Terminal Thickness	c	0.09	-	0.20
Terminal Length	L	0.45	0.60	0.75
Footprint	(L1)		1.00 REF	
Foot Angle	θ	0°	3.5°	7°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
3. Exact shape of each corner is optional.

Microchip Technology Drawing C04-226A Sheet 2 of 2

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128-Lead Thin Quad Flatpack (6XX) - 10x10x1.0 mm Body [TQFP]
With 10x10 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-418A Sheet 1 of 2

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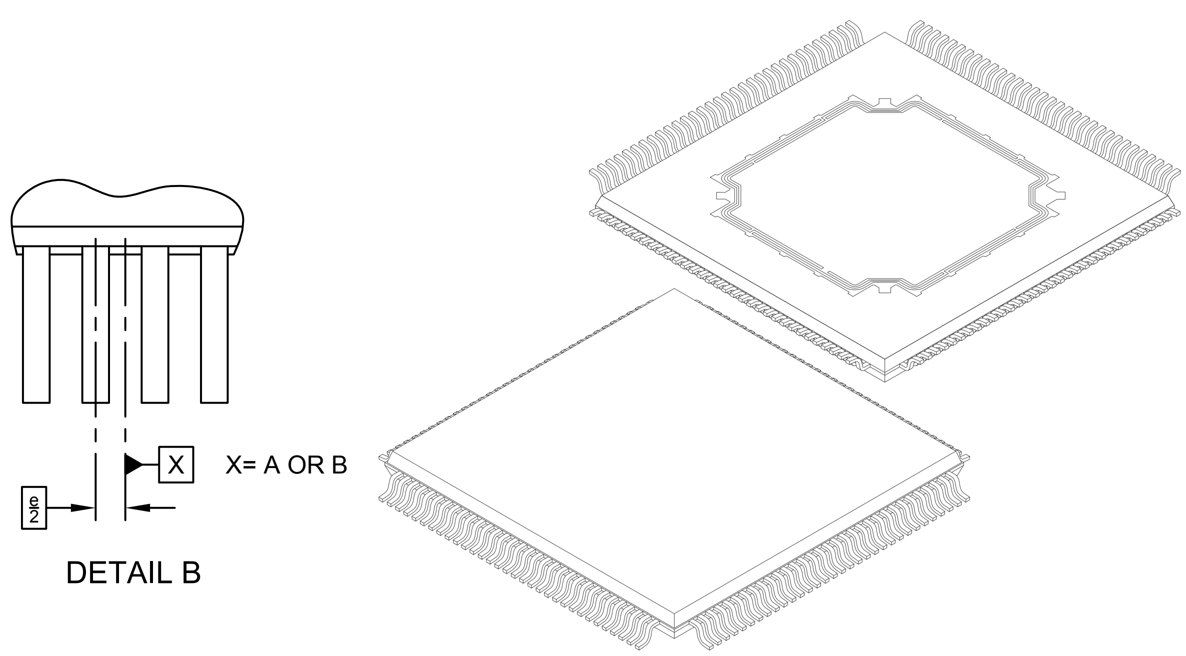
Package Outlines and Dimensions

128-Lead Thin Quad Flatpack (6XX) - 10x10x1.0 mm Body [TQFP] With 10x10 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		128	
Pitch	e		0.40 BSC	
Overall Height	A	-	-	1.20
Standoff	A1	0.05	-	0.15
Molded Package Thickness	A3	0.05	-	0.15
Overall Length	D		16.00 BSC	
Molded Package Length	D1		14.00 BSC	
Exposed Pad Length	D2	9.85	10.00	10.15
Overall Width	E		14.00 BSC	
Molded Package Width	E1		14.00 BSC	
Exposed Pad Width	E2	9.85	10.00	10.15
Terminal Width	b	0.13	0.18	0.23
Terminal Length	L	0.45	0.60	0.75
Footprint	(L1)		1.00 REF	
Footprint Angle	Θ	0°	-	7°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-418A Sheet 2 of 2

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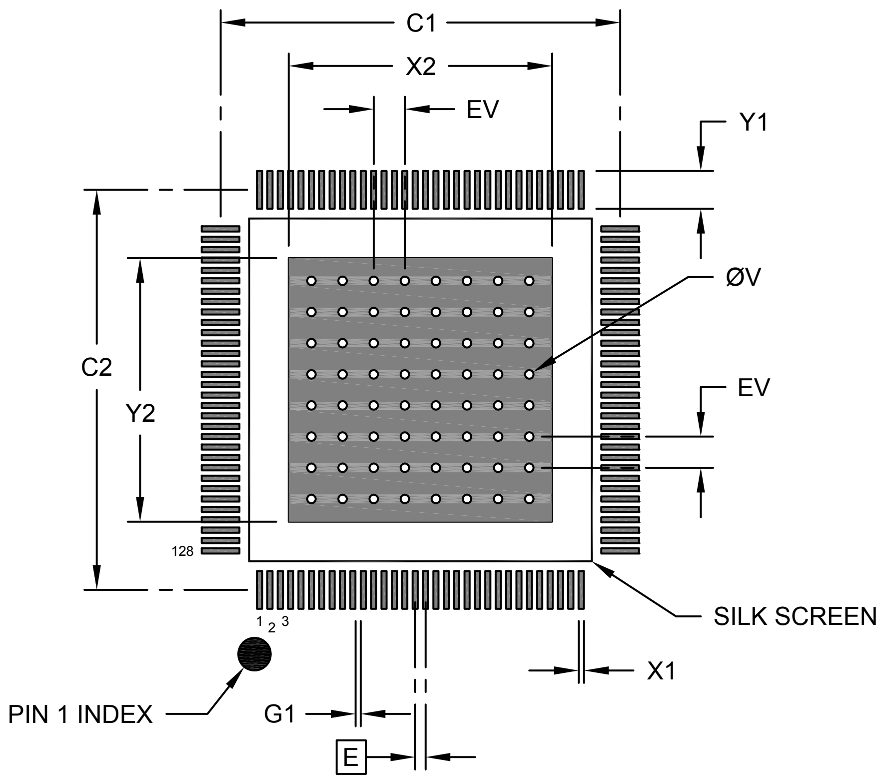
128-Lead Thin Quad Flatpack (6XX) - 10x10x1.0 mm Body [TQFP] With 10x10 mm Exposed Pad

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Center Pad Width	X2			10.50
Center Pad Length	Y2			10.50
Contact Pad Spacing	C1		15.40	
Contact Pad Spacing	C2		15.40	
Contact Pad Width (X128)	X1			0.20
Contact Pad Length (X128)	Y1			1.54
Contact Pad to Contact Pad (X124)	G1	0.20		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2418A

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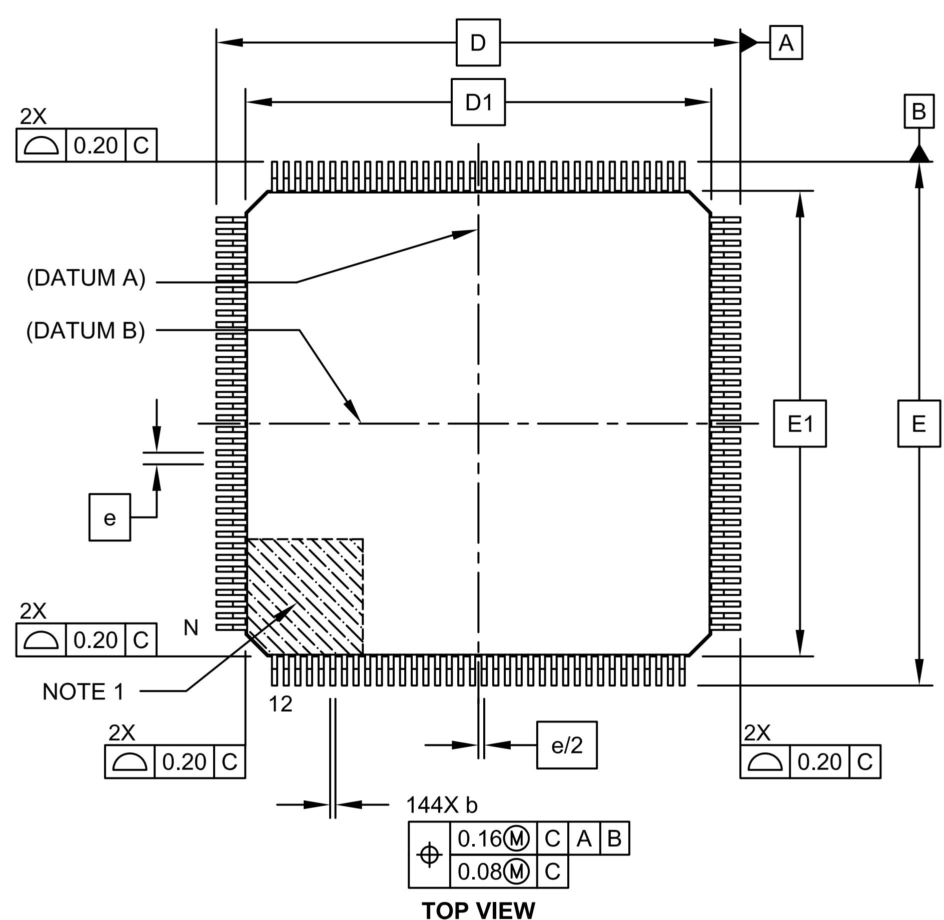
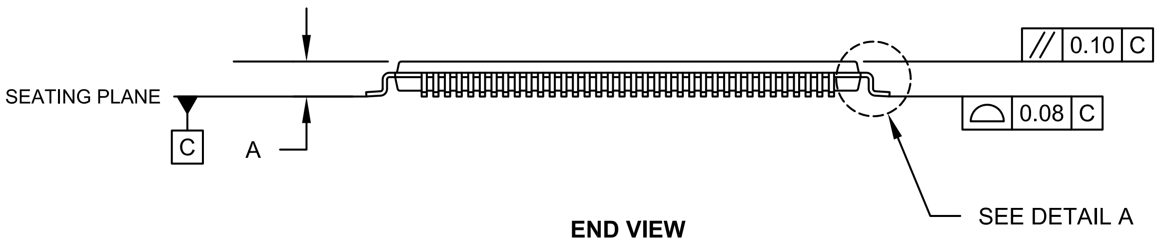
Package Outlines and Dimensions

144-Lead Plastic Thin Quad Flatpack (PH)-16x16x1mm Body, 2.00 mm Footprint [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

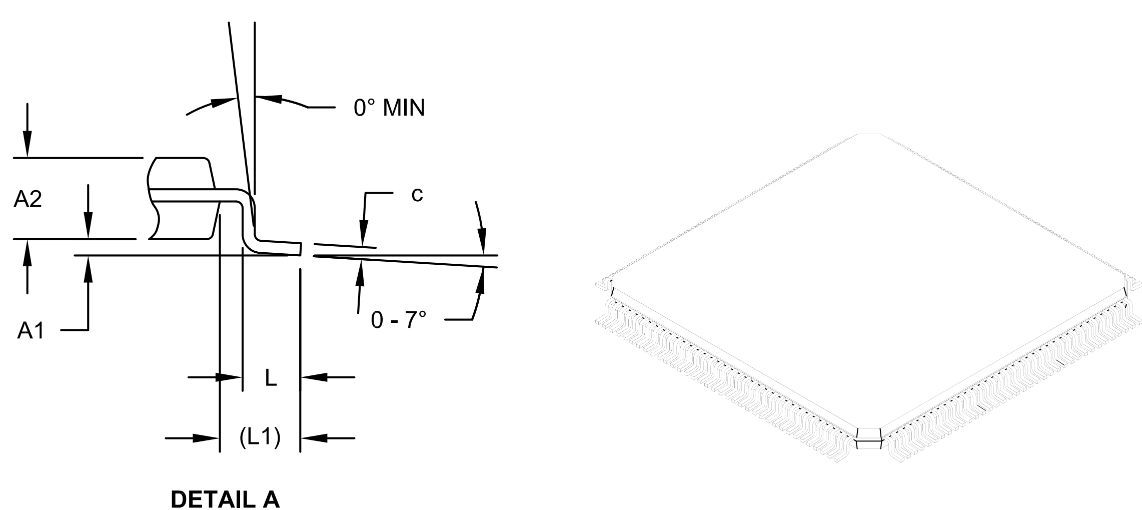




Microchip Technology Drawing C04-155B Sheet 1 of 2

144-Lead Plastic Thin Quad Flatpack (PH) - 16x16x1mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	144		
Lead Pitch	e	0.40 BSC		
Overall Height	A	-	-	1.20
Molded PackageThickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	-	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Overall Width	D	18.00 BSC		
Overall Length	E	18.00 BSC		
Molded Body Width	D1	16.00 BSC		
Molded Body Length	E1	16.00 BSC		
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.13	-	0.23

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-155B Sheet 2 of 2

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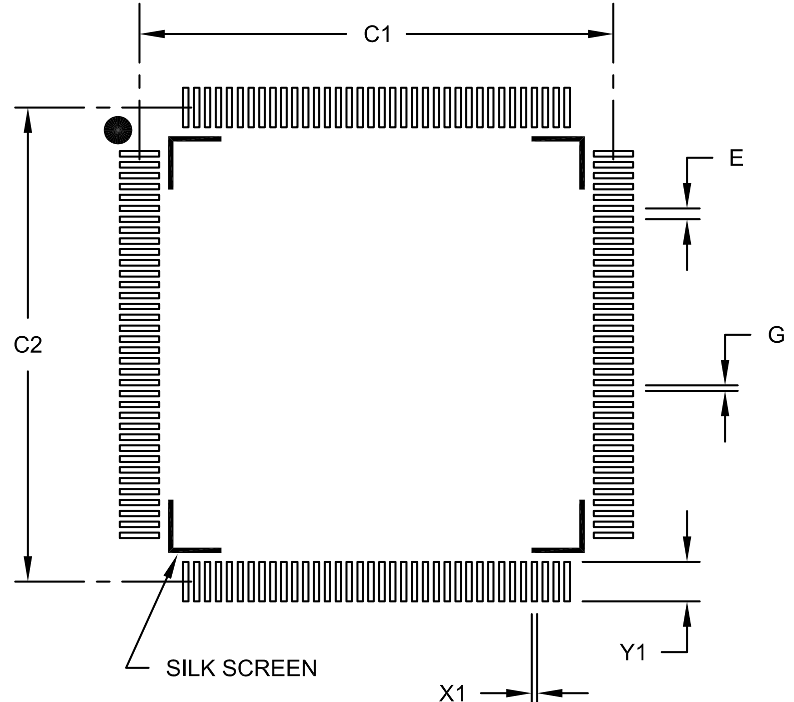
144-Lead Plastic Thin Quad Flat Pack (PH) - 16x16 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Contact Pad Spacing	C1		17.40	
Contact Pad Spacing	C2		17.40	
Contact Pad Width (X144)	X1			0.20
Contact Pad Length (X144)	Y1			1.45
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2155B

NOTES:

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(WL)CSP

4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-6005D Sheet 1 of 2

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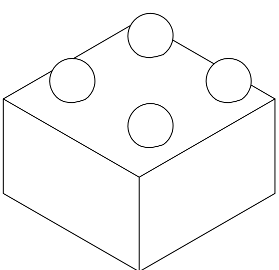
4-Lead Chip Scale Package (CS) - [CSP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Contacts	N		4	
Adjacent Column X-Pitch	E1	0.400 BSC		
Adjacent Row Y-Pitch	D1	0.400 BSC		
Overall Height	A	0.47	0.51	0.55
Die Height	A2	0.33	0.35	0.37
Bump Height	A1	0.14	0.16	0.18
Overall Length	E	NOTE 4		
Overall Width	D	NOTE 4		
Ball Diameter	b	0.18	0.200	0.22

Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please contact our local Microchip representative for specific details.

Microchip Technology Drawing C04-6005D Sheet 2 of 2

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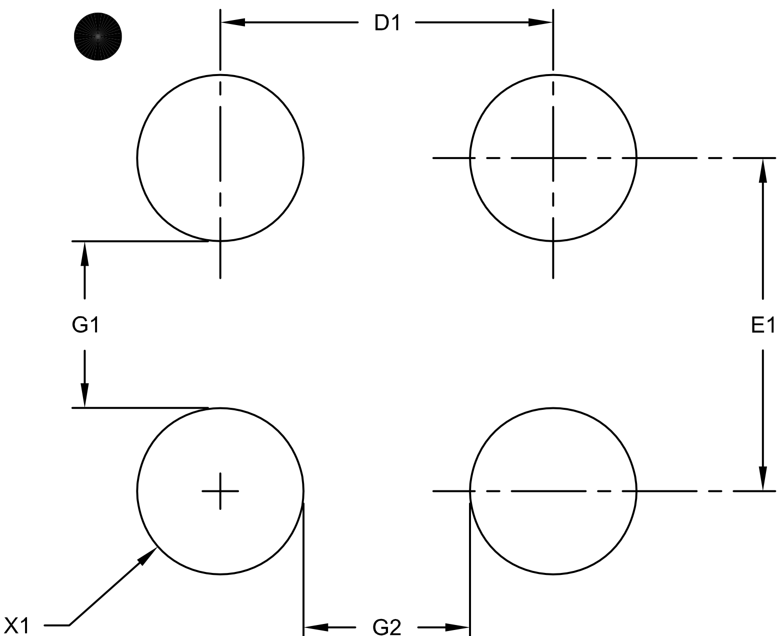
4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Contacts	N		4	
Contact Pad Spacing	E1		0.40	
Contact Pad Spacing	D1		0.40	
Contact Pad Diameter (X4)	X1			0.20
Distance Between Pads	G1	0.24		
Distance Between Pads	G2	0.24		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8005A

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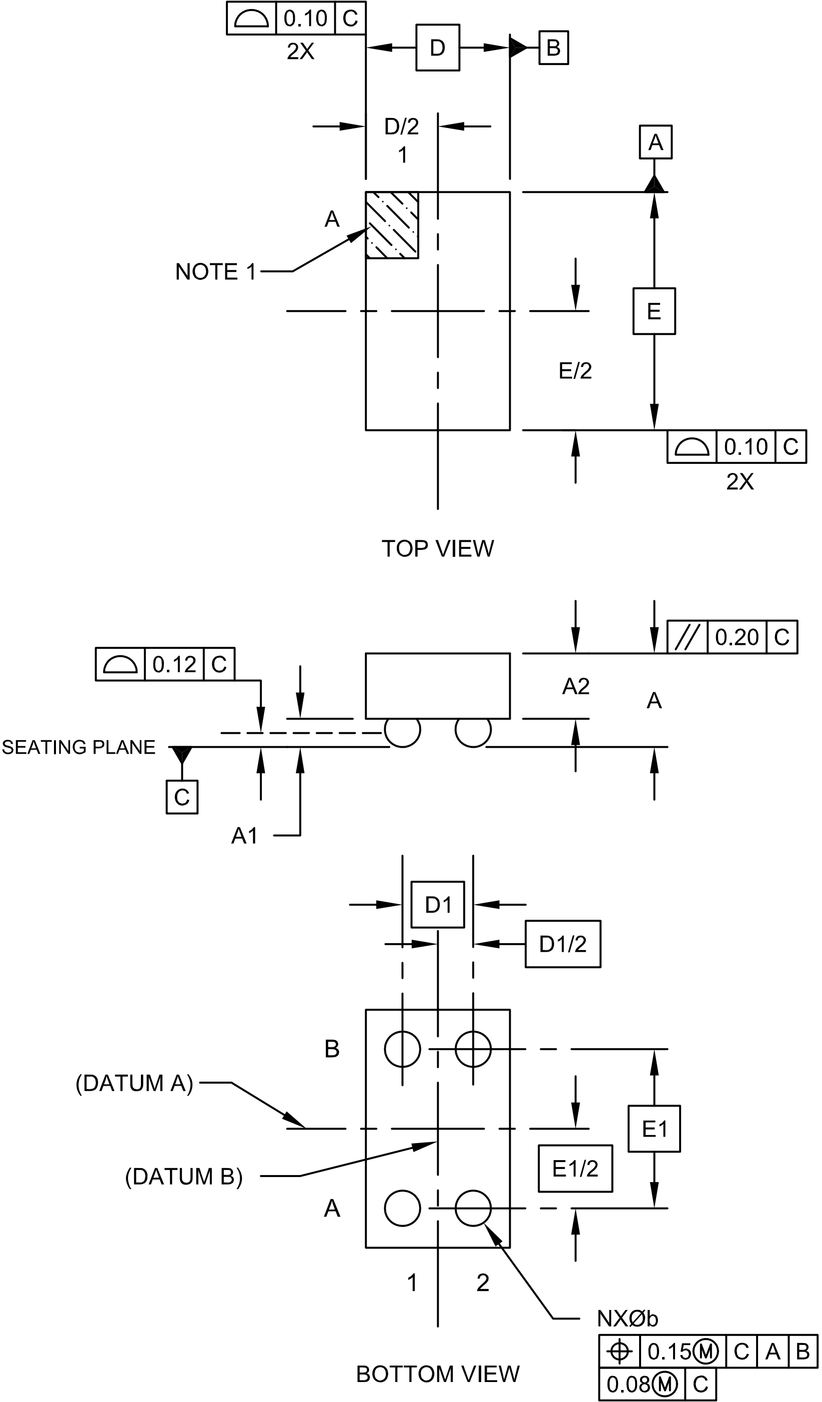
Package Outlines and Dimensions

4-Lead Chip Scale Package (CS) - [CSP]

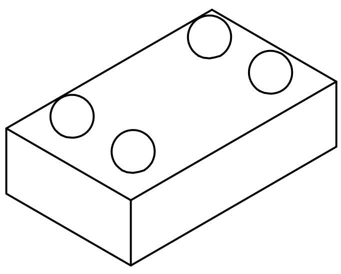
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-6008A Sheet 1 of 2

4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Contacts	N		4	
Adjacent Column X-Pitch	D1	0.400 BSC		
Adjacent Row Y-Pitch	E1	0.900 BSC		
Overall Height	A	0.47	0.51	0.55
Die Height	A2	0.33	0.35	0.37
Bump Height	A1	0.14	0.16	0.18
Overall Width	D	NOTE 4		
Overall Length	E	NOTE 4		
Ball Diameter	b	0.18	0.20	0.22

Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please see the specific Product Data Sheet.

Microchip Technology Drawing C04-6008A Sheet 2 of 2

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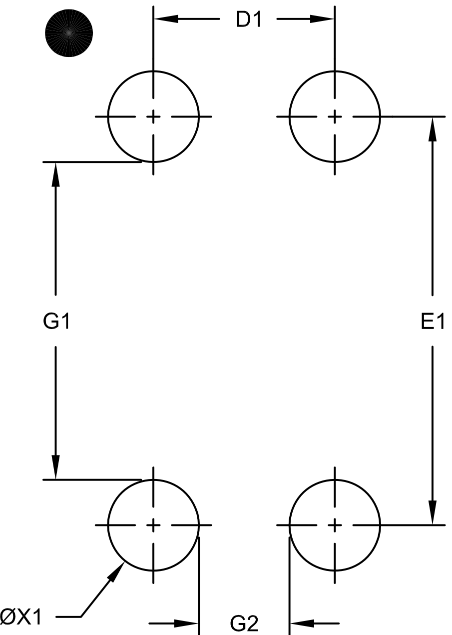
4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Contacts	N		4	
Contact Pad Spacing	D1		0.40	
Contact Pad Spacing	E1		0.90	
Contact Pad Diameter (X4)	ØX1		0.20	
Distance Between Pads	G1		0.70	
Distance Between Pads	G2		0.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8008A

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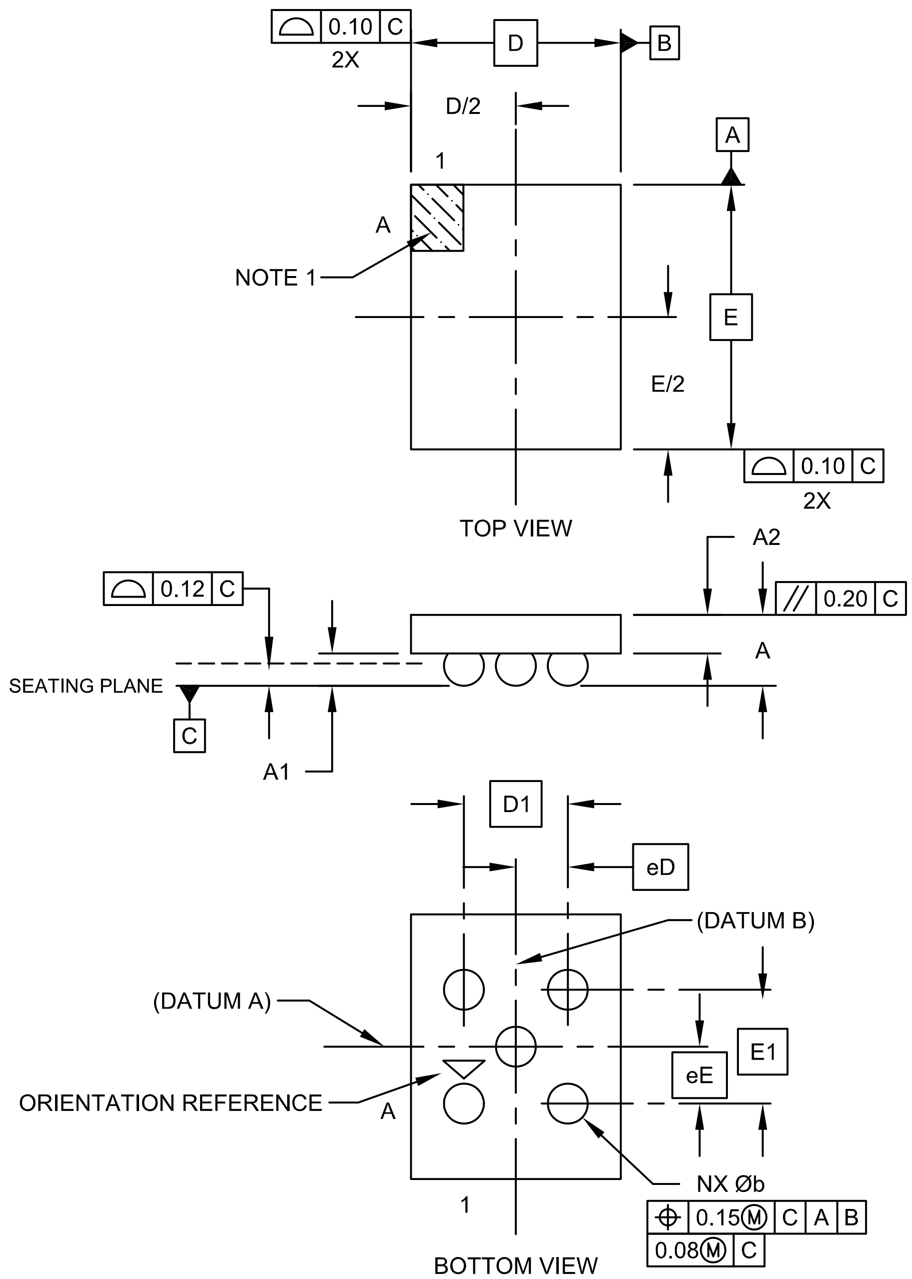
5-Lead Chip Scale Package (CS) - [CSP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-6004D Sheet 1 of 2

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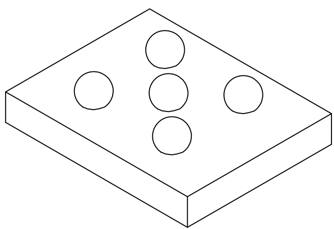
Package Outlines and Dimensions

5-Lead Chip Scale Package (CS) - [CSP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Contacts	N		5	
Adjacent Column X-Pitch	E1	0.570 BSC		
Adjacent Row Y-Pitch	D1	0.520 BSC		
Adjacent Column X-Pitch	eE	0.285 BSC		
Adjacent Row Y-Pitch	eD	0.260 BSC		
Overall Height	A	0.47	0.51	0.55
Die Height	A2	0.33	0.35	0.37
Bump Height	A1	0.14	0.16	0.18
Overall Length	E	NOTE 4		
Overall Width	D	NOTE 4		
Ball Diameter	b	0.18	0.20	0.22

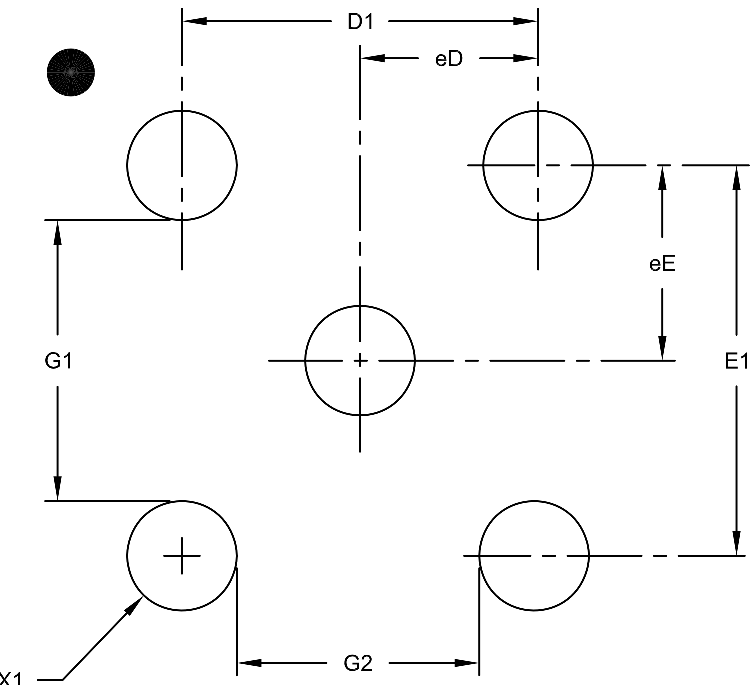
Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please see the specific Product Data Sheet.

Microchip Technology Drawing C04-6004D Sheet 2 of 2

5-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Contacts	N		5	
Contact Pitch Y	eE		0.285	
Contact Pitch X	eD		0.260	
Contact Pad Spacing	E1		0.570	
Contact Pad Spacing	D1		0.520	
Contact Pad Diameter (X5)	X1			0.20
Distance Between Pads	G1	0.41		
Distance Between Pads	G2	0.36		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8004A

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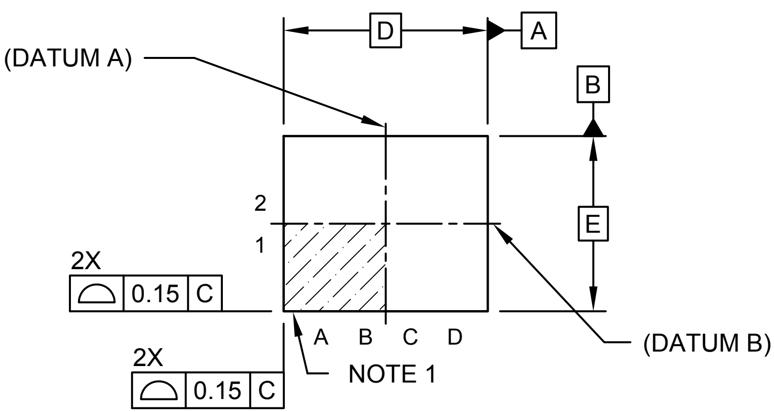
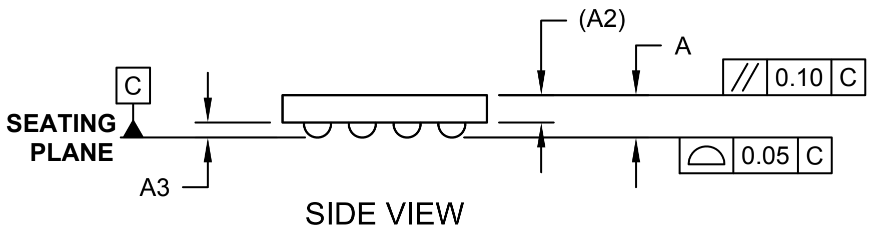
8-Ball Extremely Thin Fine Pitch Wafer Level Chip Scale Package (CS)

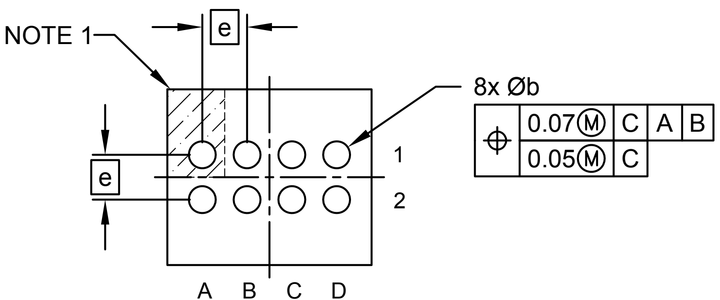
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW

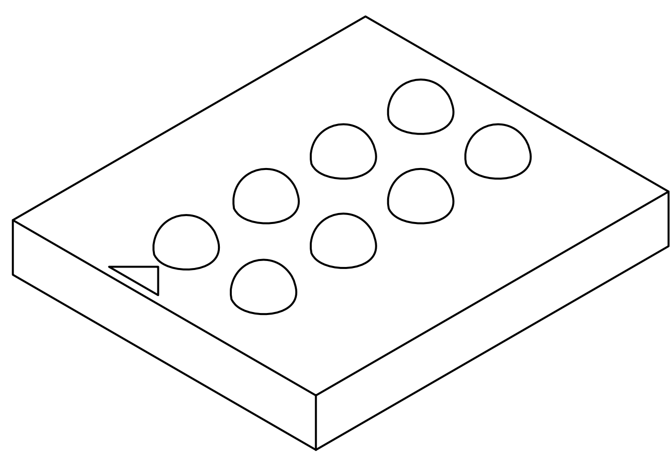


BOTTOM VIEW

Microchip Technology Drawing C04-6022C Sheet 1 of 2

8-Ball Extremely Thin Fine Pitch Wafer Level Chip Scale Package (CS)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Balls	N	8		
Pitch	e	0.50 BSC		
Overall Height	A	0.442	0.472	0.512
Die Thickness	A2	0.30 REF		
Ball Height	A3	0.152	0.167	0.182
Overall Width	D	NOTE 4		
Overall Length	E	NOTE 4		
Ball Diameter	b	0.26	0.30	0.34

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please see the specific Product Data Sheet.

Microchip Technology Drawing C04-6022C Sheet 2 of 2

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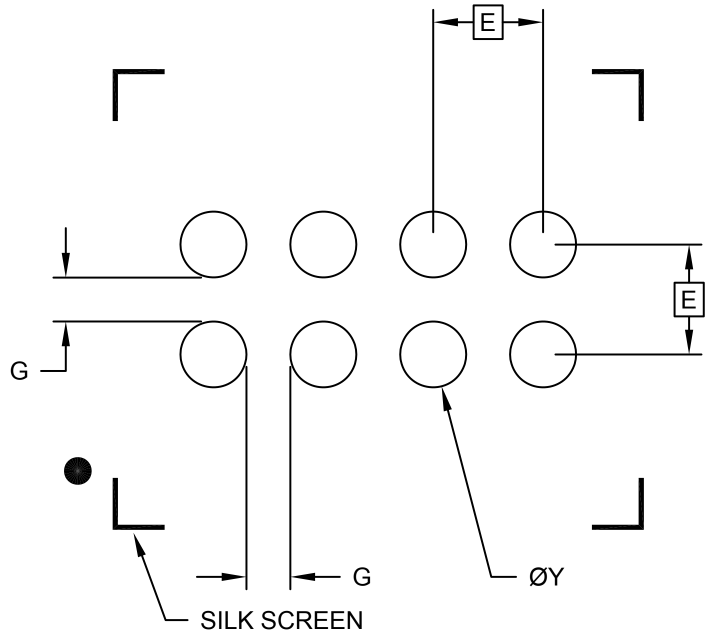
Footprint Outlines and Dimensions

8-Ball Extremely Thin Fine Pitch Wafer Level Chip Scale Package (CS)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Diameter	Y		0.30	
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8022-1A

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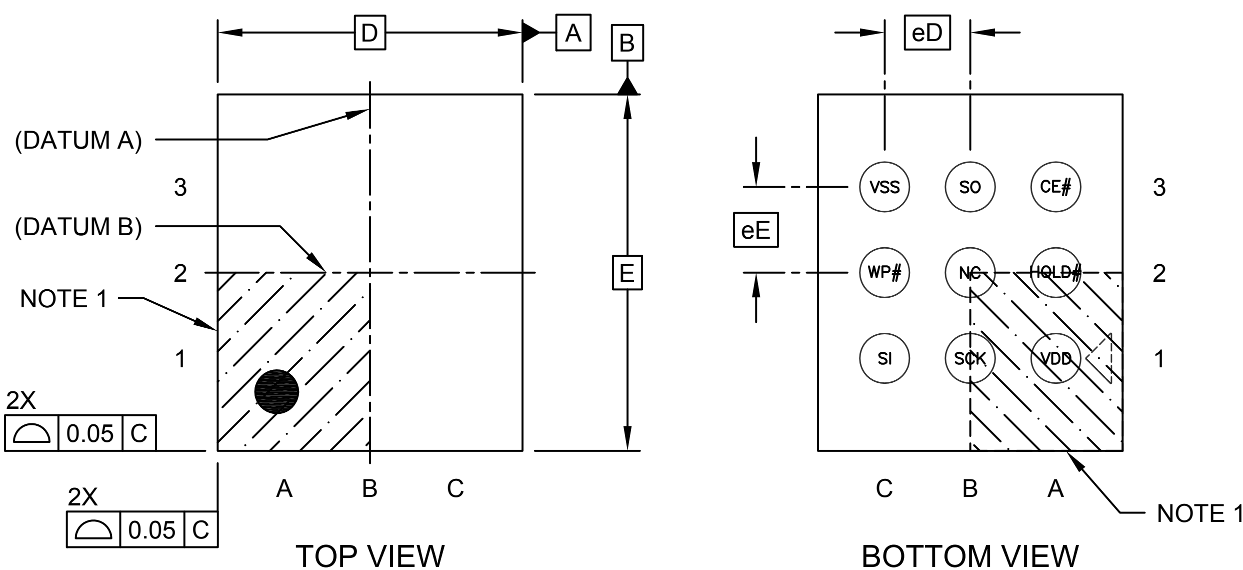
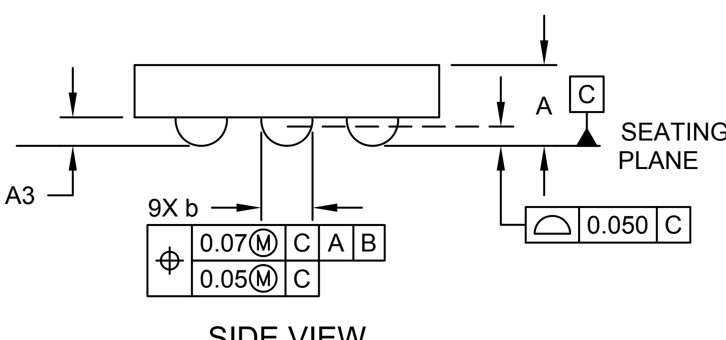
9-Bump Wafer Level Chip Scale Package (CS) - [WLCSP or CSP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Microchip Technology Drawing C04-6035A Sheet 1 of 2

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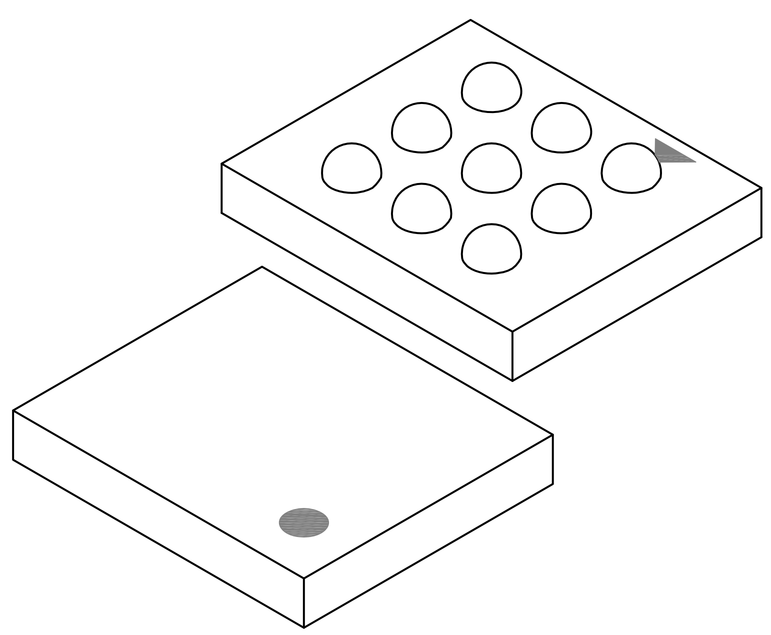
9-Bump Wafer Level Chip Scale Package (CS) - [WLCSP or CSP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Bump Pitch	eD	0.50 BSC		
Bump Pitch	eE	0.50 BSC		
Length	D	NOTE 5		
Width	E	NOTE 5		
Overall Height	A	0.432	0.472	0.512
Bump Height	A3	0.152	0.167	0.182
Bump Diameter	b	0.260	0.300	0.340

Notes:

1. Topside A1 indicator is an engraved figure.
2. Under-fill is recommended for best solder joint reliability.
3. Solder diameter at interface to package body is 300µm (nominal).
4. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Package size varies with specific devices. Please contact your local Microchip representative for specific details.

Microchip Technology Drawing C04-6035A Sheet 2 of 2

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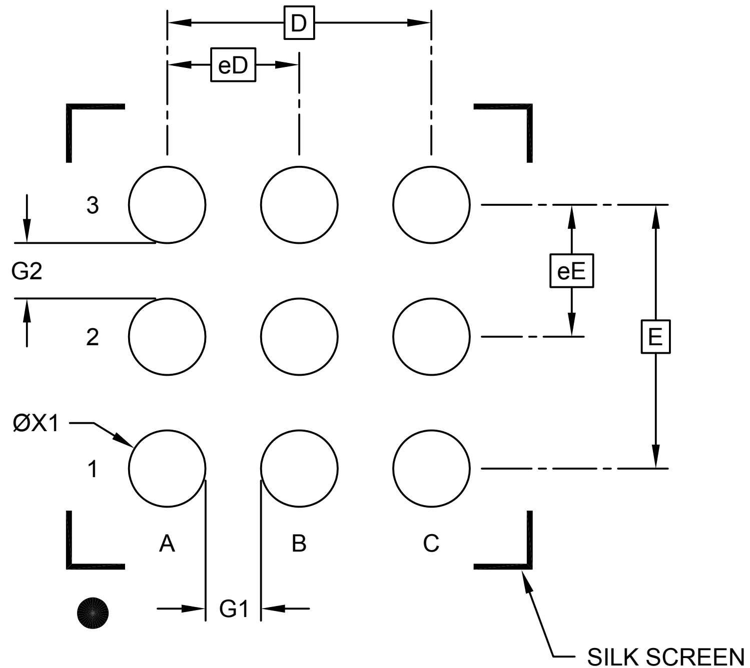
9-Bump Wafer Level Chip Scale Package (CS) - [WLCSP or CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	eD		0.50 BSC	
Contact Pitch	eE		0.50 BSC	
Overall Pitch	D		1.00 BSC	
Overall Pitch	E		1.00 BSC	
Space Between Contacts	G1		0.20	
Space Between Contacts	G2		0.20	
Contact Diameter	ØX1		0.30	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-8035A

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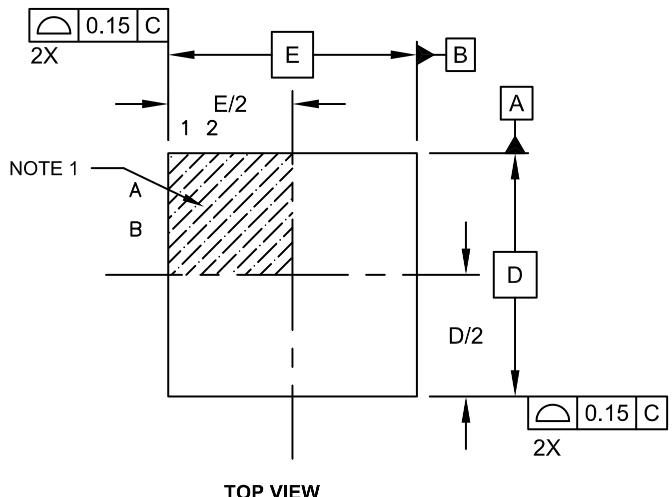
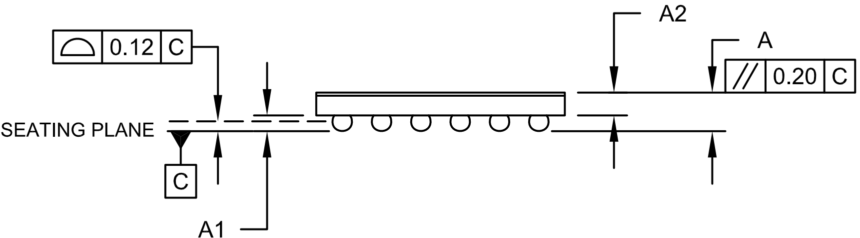
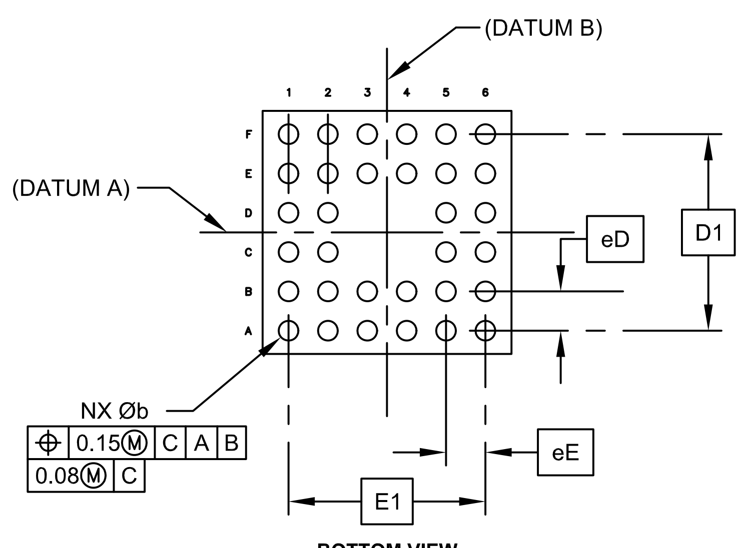
32-Lead Chip Scale Package (CS) - [CSP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



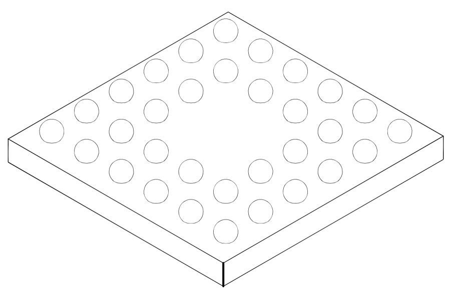




Microchip Technology Drawing C04-6014B Sheet 1 of 2

32-Lead Chip Scale Package (CS) - [CSP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Balls	N		32	
Overall Grid X-Pitch	E1		2.50 BSC	
Overall Grid Y-Pitch	D1		2.50 BSC	
Adjacent Column X-Pitch	eE		0.50 BSC	
Adjacent Row Y-Pitch	eD		0.50 BSC	
Overall Height	A	0.45	0.49	0.53
Bump Height	A1	0.18	0.20	0.22
Die Height	A2	0.27	0.29	0.31
Overall Width	E		NOTE 4	
Overall Length	D		NOTE 4	
Contact Diameter	b	0.23	0.25	0.27

Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please see the specific Product Data Sheet.

Microchip Technology Drawing C04-6014B Sheet 2 of 2

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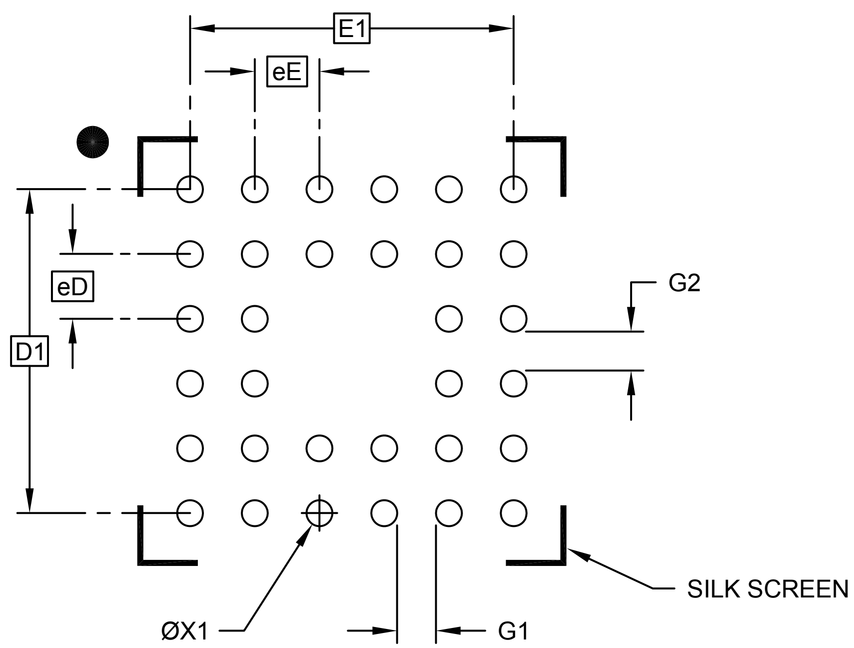
32-Ball Wafer Level Chip Scale Package (CS) - [CSP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	eD	0.50 BSC		
Contact Pitch	eE	0.50 BSC		
Overall Pitch	D1	2.50 BSC		
Overall Pitch	E1	2.50 BSC		
Space Between Contacts	G1		0.30	
Space Between Contacts	G2		0.30	
Contact Diameter	ØX1		0.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-8014A

NOTES:

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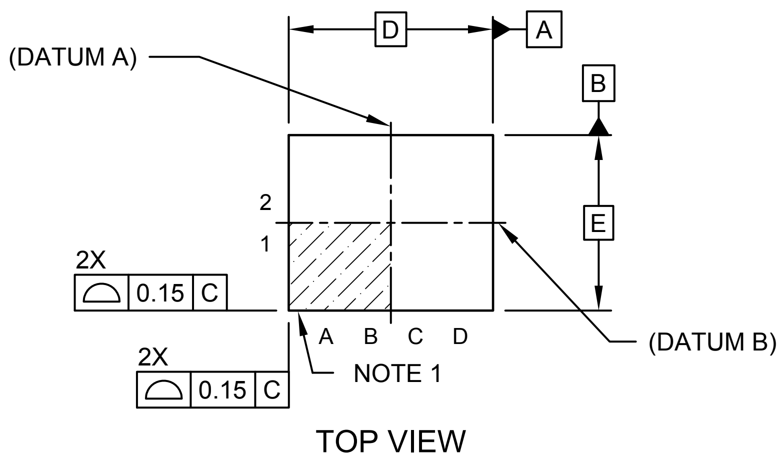
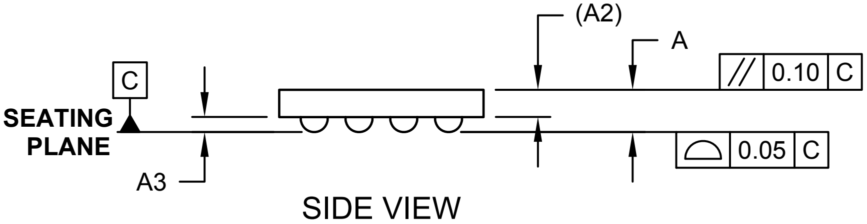
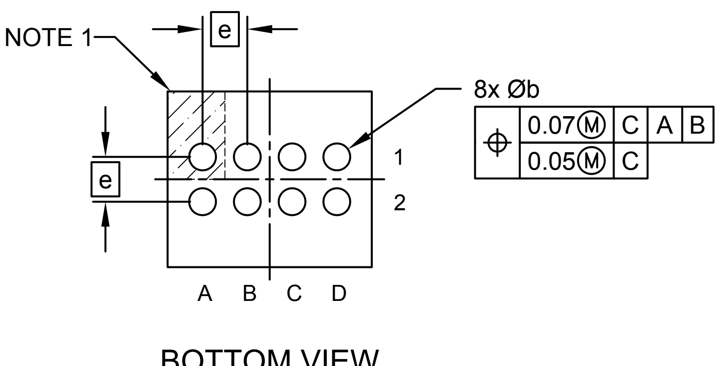
WLCSP

8-Bump Extremely Thin Fine Pitch Wafer Level Chip Scale Package (CS)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-6022D Sheet 1 of 2

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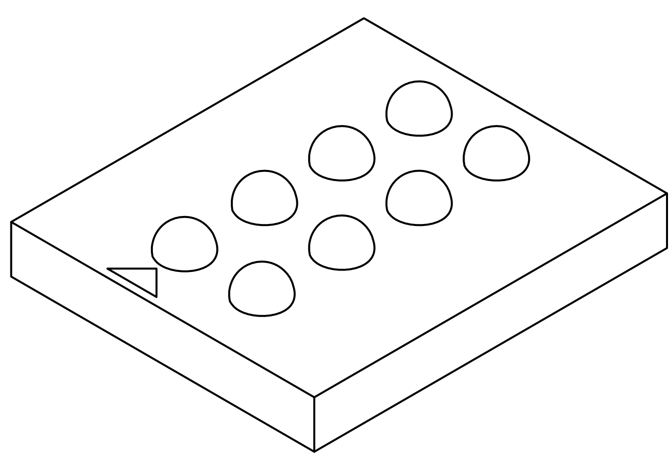
8-Bump Extremely Thin Fine Pitch Wafer Level Chip Scale Package (CS)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Bumps	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.442	0.472	0.512
Die Thickness	A2		0.30 REF	
Bump Height	A3	0.145	0.160	0.175
Overall Width	D		NOTE 4	
Overall Length	E		NOTE 4	
Bump Diameter	b	0.26	0.30	0.34

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please see the specific Product Data Sheet.

Microchip Technology Drawing C04-6022D Sheet 2 of 2

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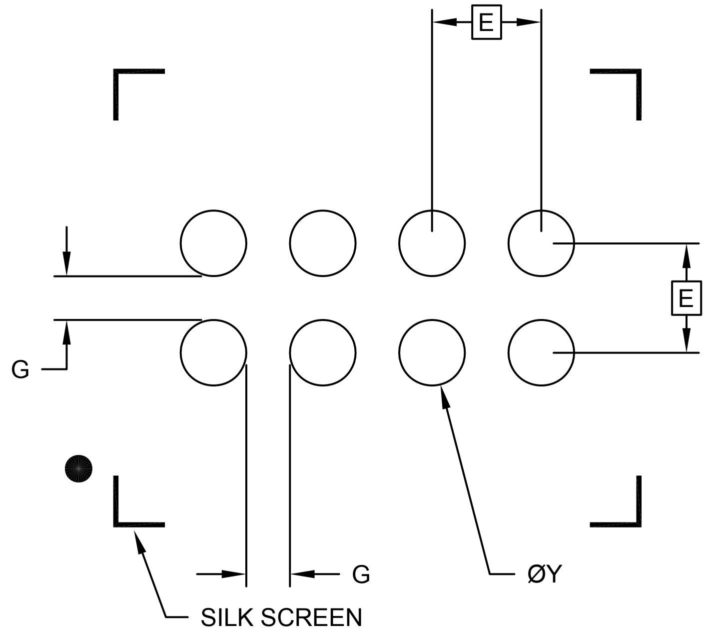
8-Bump Extremely Thin Fine Pitch Wafer Level Chip Scale Package (CS)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Diameter	Y		0.30	
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8022-1A

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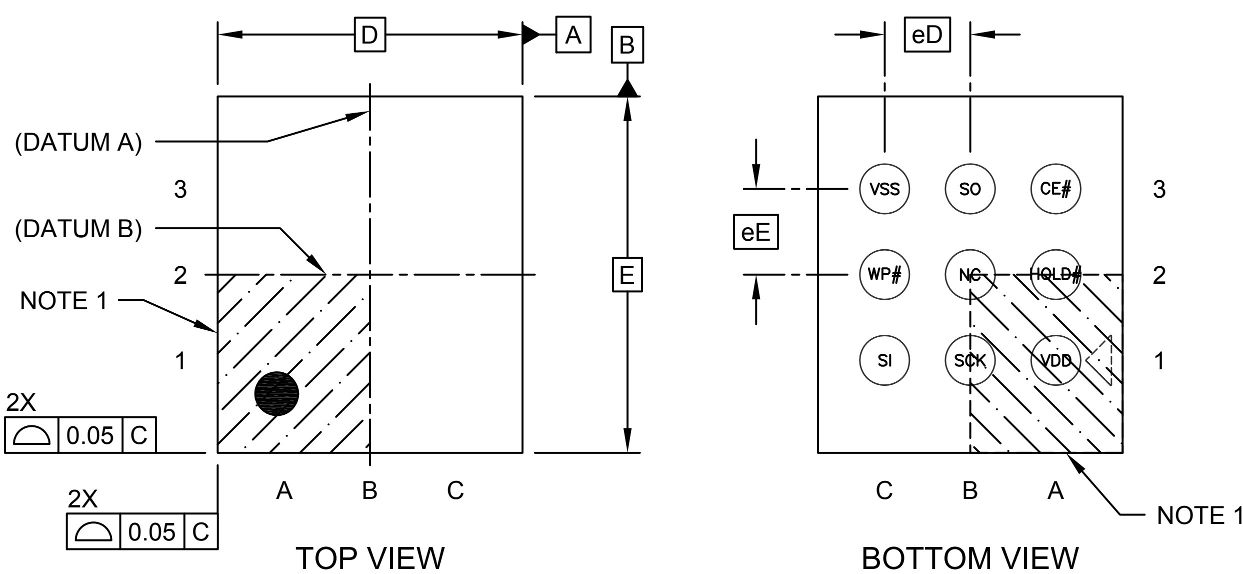
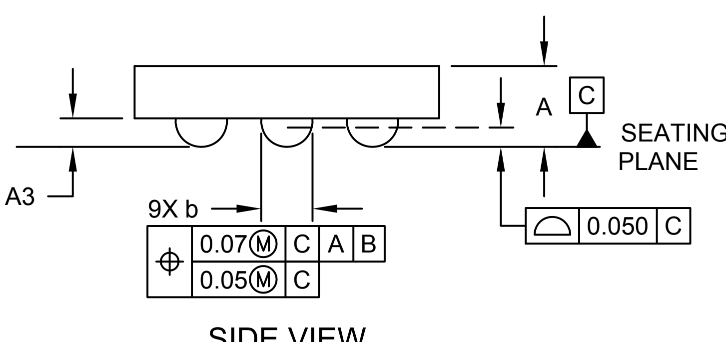
9-Bump Wafer Level Chip Scale Package (CS) - [WLCSP or CSP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

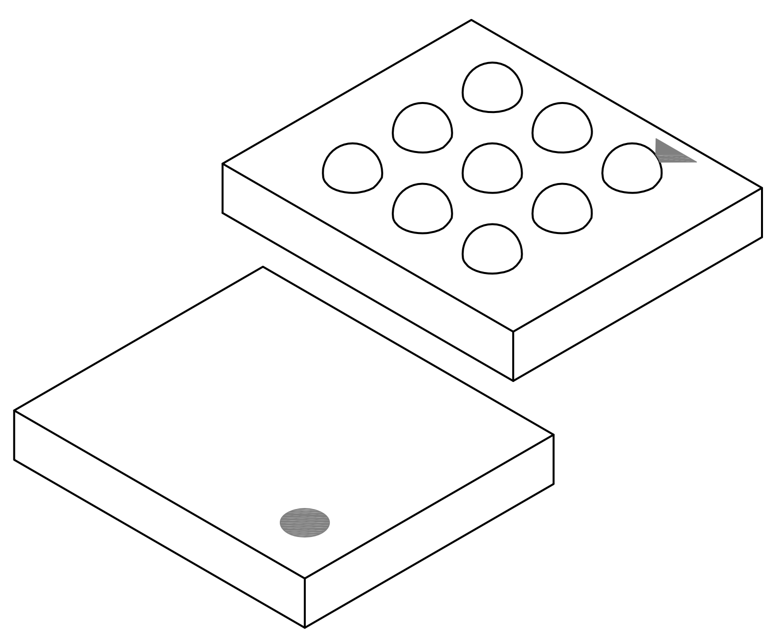




Microchip Technology Drawing C04-6035A Sheet 1 of 2

9-Bump Wafer Level Chip Scale Package (CS) - [WLCSP or CSP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Bump Pitch	eD	0.50 BSC		
Bump Pitch	eE	0.50 BSC		
Length	D	NOTE 5		
Width	E	NOTE 5		
Overall Height	A	0.432	0.472	0.512
Bump Height	A3	0.152	0.167	0.182
Bump Diameter	b	0.260	0.300	0.340

Notes:

1. Topside A1 indicator is an engraved figure.
2. Under-fill is recommended for best solder joint reliability.
3. Solder diameter at interface to package body is 300µm (nominal).
4. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Package size varies with specific devices. Please contact your local Microchip representative for specific details.

Microchip Technology Drawing C04-6035A Sheet 2 of 2

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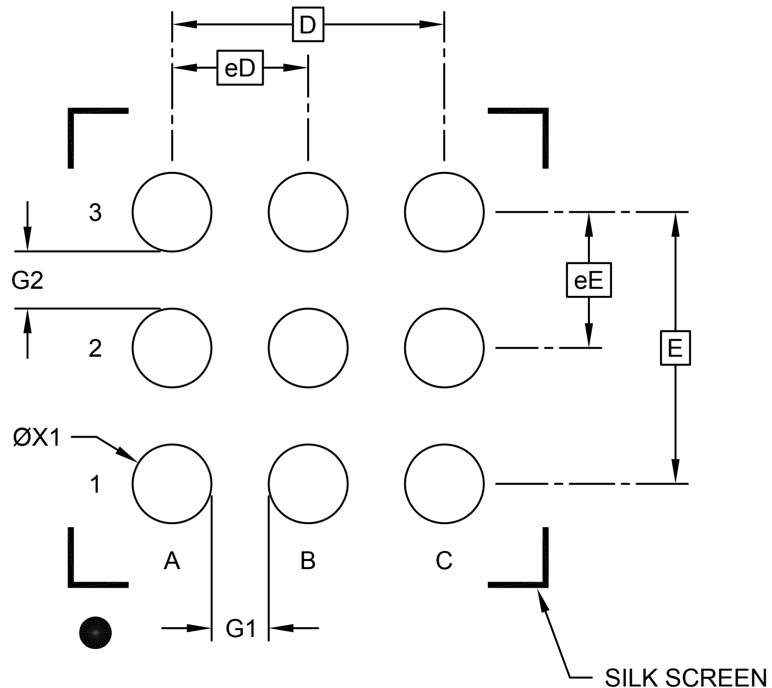
9-Bump Wafer Level Chip Scale Package (CS) - [WLCSP or CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	eD		0.50 BSC	
Contact Pitch	eE		0.50 BSC	
Overall Pitch	D		1.00 BSC	
Overall Pitch	E		1.00 BSC	
Space Between Contacts	G1		0.20	
Space Between Contacts	G2		0.20	
Contact Diameter	ØX1		0.30	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-8035A

14-Ball Wafer Level Chipscale Package (CS) - 1.57X2.36 Body [WLCSP] - PIC16LF822

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

NOTE 1

D A B E

1 2 3 4

A B C D E

2X 0.15 C

2X 0.15 C

TOP VIEW

C A A2

SEATING PLANE

A1

14X 0.08 C

SIDE VIEW

eD

eE

E D C B A

1 2 3 4

14X Øb

0.10Ⓜ C A B

0.07Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-6009A Sheet 1 of 2

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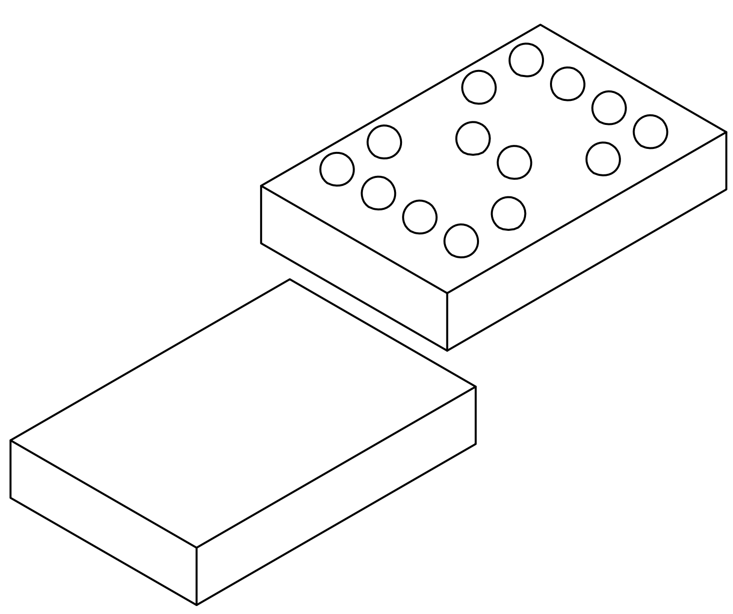
14-Ball Wafer Level Chipscale Package (CS) - 1.57X2.36 Body [WLCSP] - PIC16LF822

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		16	
Pitch	eD		0.35 BSC	
Pitch	eE		0.40 BSC	
Overall Height	A	0.55	0.59	0.62
Bump Height	A1	0.14	0.16	0.18
Die Height	A2	0.41	0.43	0.44
Overall Width	D		1.57 BSC	
Overall Length	E		2.36 BSC	
Terminal Width	b	0.24	0.25	0.26
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Terminal A1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

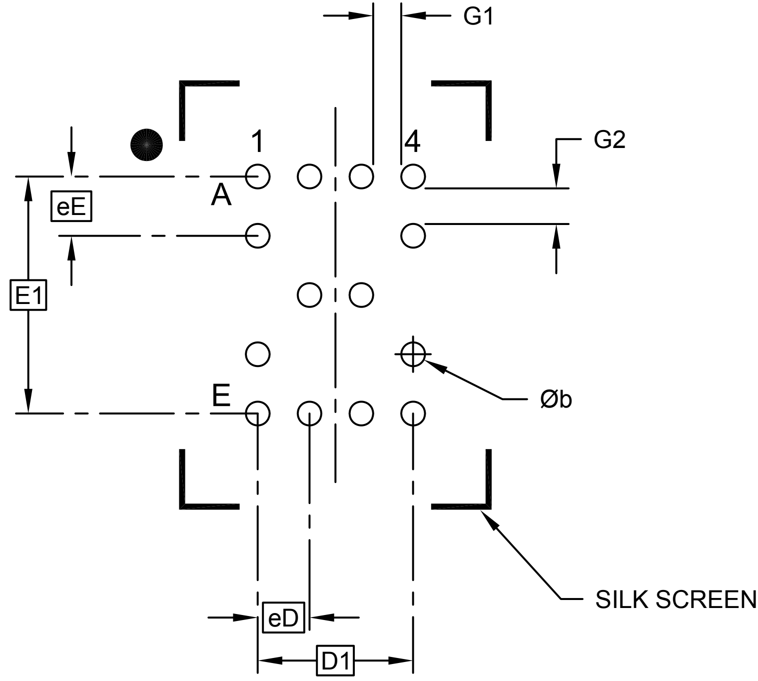
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-6009A Sheet 2 of 2

14-Ball Wafer Level Chipscale Package (CS) - 1.57X2.36 Body [WLCSP] - PIC16LF822

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	eD		0.35 BSC	
Contact Pitch	eE		0.40 BSC	
Overall Pitch	D1		1.05 BSC	
Overall Pitch	E1		1.60 BSC	
Contact Pad Diameter	b	0.15	0.16	0.17
Contact Pad Spacing	G1	0.23		
Contact Pad Spacing	G2	0.18		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-8009A

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CABGA

22-Ball Chip Array Ball Grid Array (JY) - 5x7 mm Body [CABGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

NOTE 1
D
A
B
1 2 3 4 5 6 7 8 9
A B C D E F G H J K L M N P
(DATUM B)
(DATUM A)
E
2X 0.10 C
2X 0.10 C
TOP VIEW

0.10 C
22X 0.08 C
A1
A2
A
C
SEATING PLANE
SIDE VIEW

eD
1 2 3 4 5 6 7 8 9
2X (0.25)
P N M L K J H G F E D C B A
eE
eE/2
e
2X (0.50)
22X Øb
0.15Ⓜ C A B
0.08Ⓜ C
e
BOTTOM VIEW

Microchip Technology Drawing C04-414A Sheet 1 of 2

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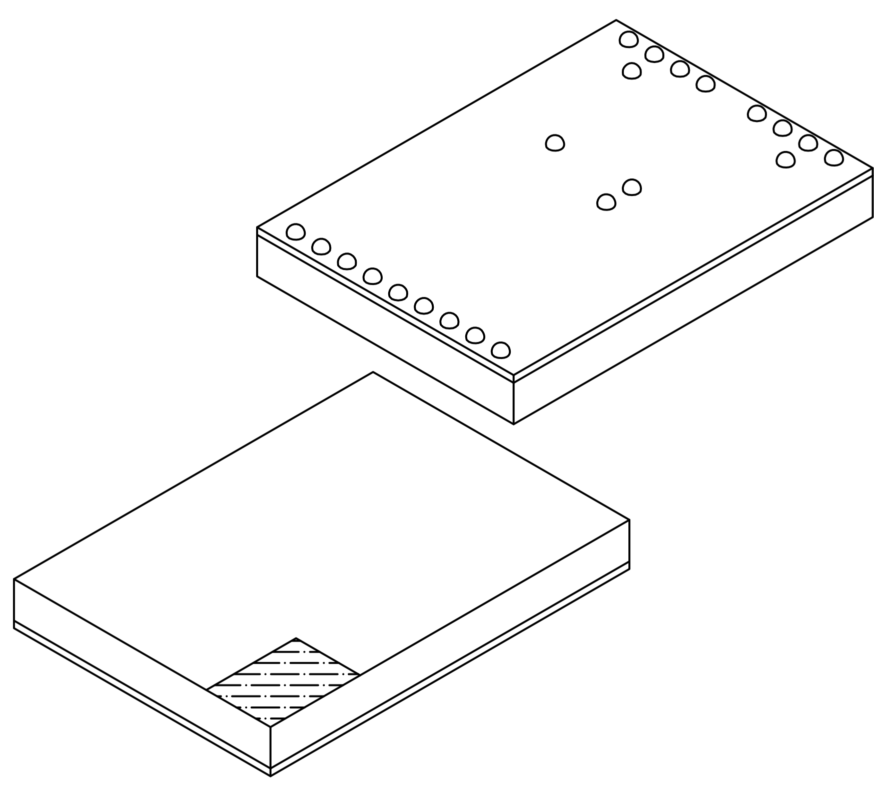
22-Ball Chip Array Ball Grid Array (JY) - 5x7 mm Body [CABGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	-		22	
Pitch	e		0.50 BSC	
Overall Height	A	0.91	0.98	1.05
Ball Height	A1	0.12	0.15	-
Package Thickness	A2	0.66	0.70	0.74
Overall Length	D		5.00 BSC	
Overall Terminal Pitch	eD		4.00 BSC	
Overall Width	E		7.00 BSC	
Overall Terminal Pitch	eE		6.50 BSC	
Ball Diameter	b	0.20	0.25	0.30

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

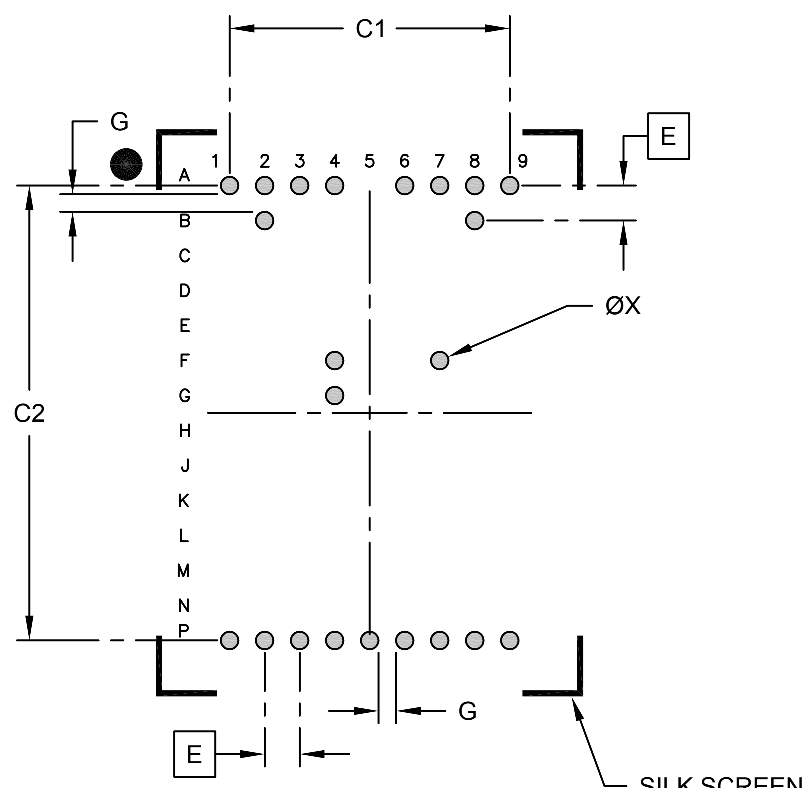
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-414A Sheet 2 of 2

22-Ball Chip Array Ball Grid Array (JY) - 5x7 mm Body [CABGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Contact Pad Spacing	C1		4.00	
Contact Pad Spacing	C2		6.50	
Contact Pad Diameter (X22)	X		0.25	
Contact Pad to Contact Pad	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2414A

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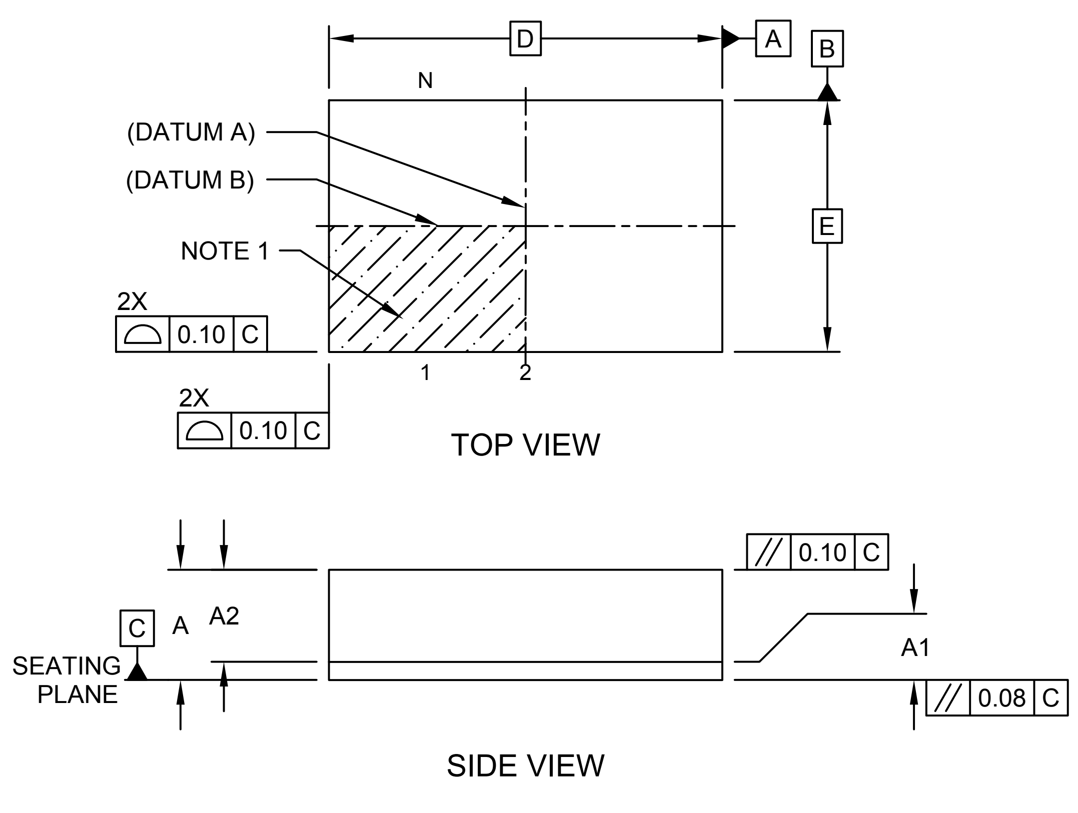
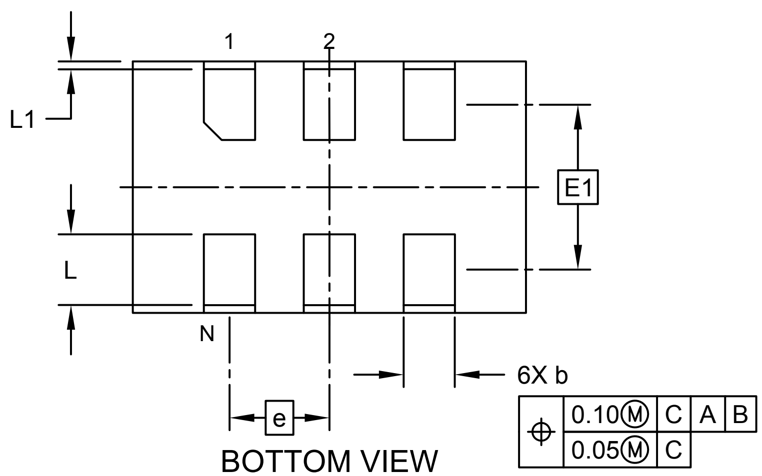
LLGA

6-Lead Low Profile Land Grid Array (ANA) - 5.0x3.2 mm Body [LLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Microchip Technology Drawing C04-1068A Sheet 1 of 2

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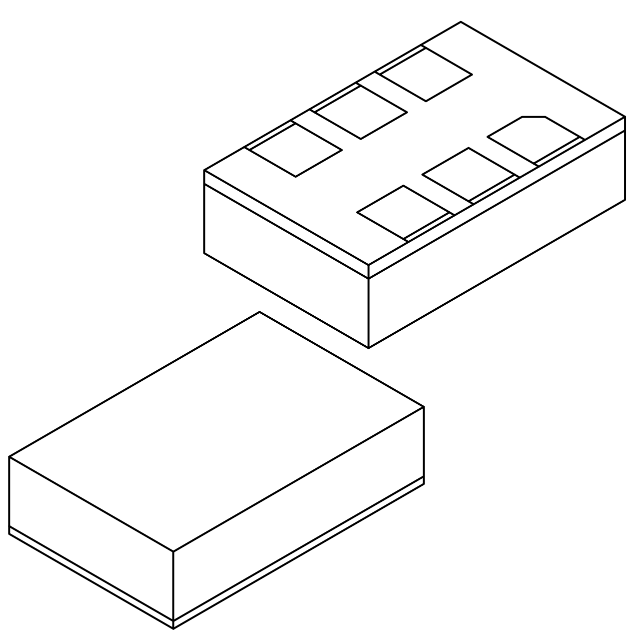
6-Lead Low Profile Land Grid Array (ANA) - 5.0x3.2 mm Body [LLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		6	
Pitch	e		1.27 BSC	
Overall Height	A	1.26	1.33	1.40
Substrate Thickness	A1	0.19	0.23	0.27
Mold Cap Height	A2	1.07	1.10	1.13
Overall Length	D		5.00 BSC	
Overall Width	E		3.20 BSC	
Terminal Pitch	E1		2.10 BSC	
Terminal Width	b	0.85	0.90	0.95
Terminal Length	L	0.85	0.90	0.95
Terminal Pullback	L1	0.05	0.10	0.15

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1068A Sheet 2 of 2

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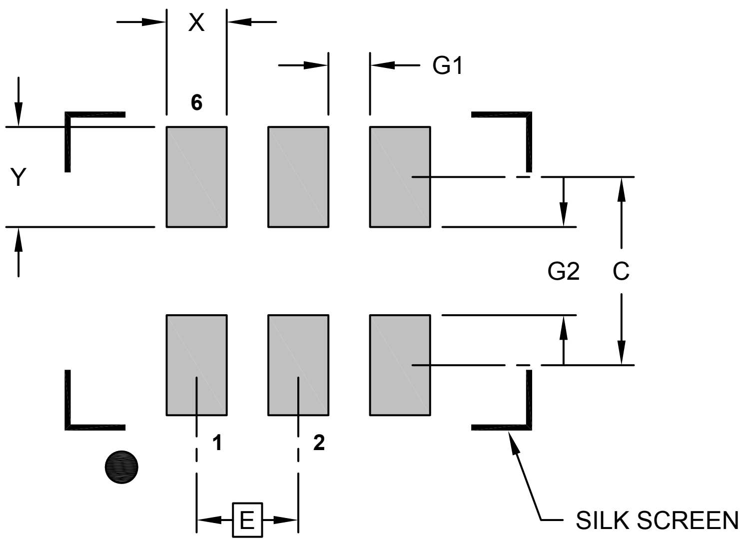
6-Lead Low Profile Land Grid Array (ANA) - 5.0x3.2 mm Body [LLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Spacing	C		2.35	
Contact Pad Width (X6)	X			0.75
Contact Pad Length (X6)	Y			1.25
Spacing Between Pads (X4)	G1	0.52		
Spacing Between Pads (X3)	G2	1.10		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3068A

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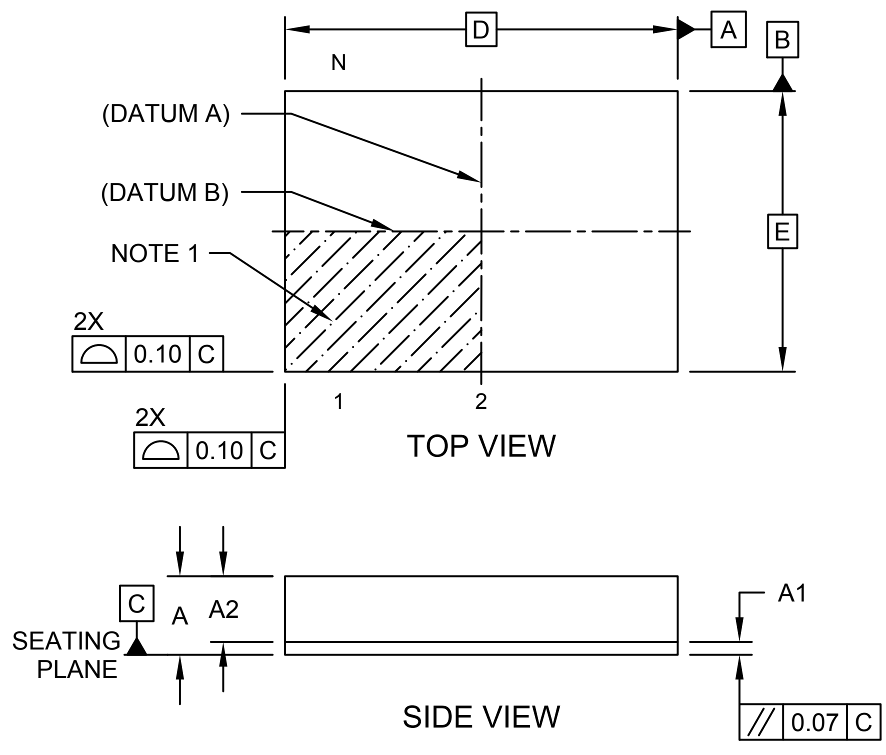
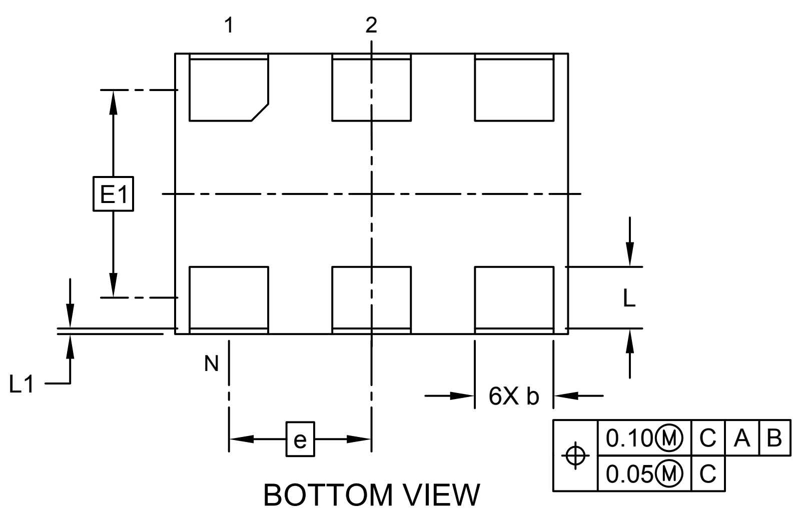
6-Lead Low Profile Land Grid Array [APA] - 7x5 mm Body (LLGA)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

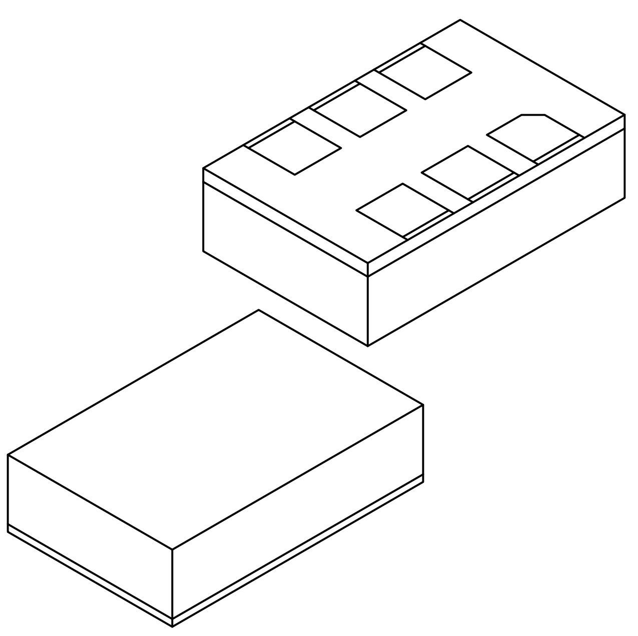




Microchip Technology Drawing C04-1071A Sheet 1 of 2

6-Lead Low Profile Land Grid Array (ANA) - 5.0x3.2 mm Body [LLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		6	
Pitch	e		1.27 BSC	
Overall Height	A	1.26	1.33	1.40
Substrate Thickness	A1	0.19	0.23	0.27
Mold Cap Height	A2	1.07	1.10	1.13
Overall Length	D		5.00 BSC	
Overall Width	E		3.20 BSC	
Terminal Pitch	E1		2.10 BSC	
Terminal Width	b	0.85	0.90	0.95
Terminal Length	L	0.85	0.90	0.95
Terminal Pullback	L1	0.05	0.10	0.15

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1068A Sheet 2 of 2

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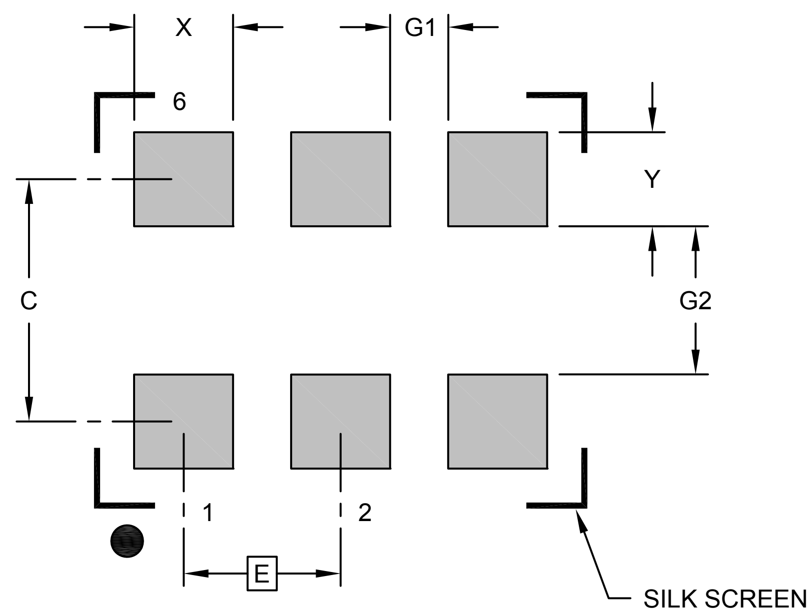
6-Lead Low Profile Land Grid Array [APA] - 7x5 mm Body (LLGA)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	2.54 BSC		
Contact Pad Spacing	C		3.93	
Contact Pad Width (X6)	X			1.60
Contact Pad Length (X6)	Y			1.53
Contact to Contact (X4)	G1	0.94		
Contact to Contact (X3)	G2	2.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3071A

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NOTES:

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LFBGA

169-Ball Low Profile Fine Pitch Ball Grid Array (HF) - 11x11x1.4 mm Body [LFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-365B Sheet 1 of 2

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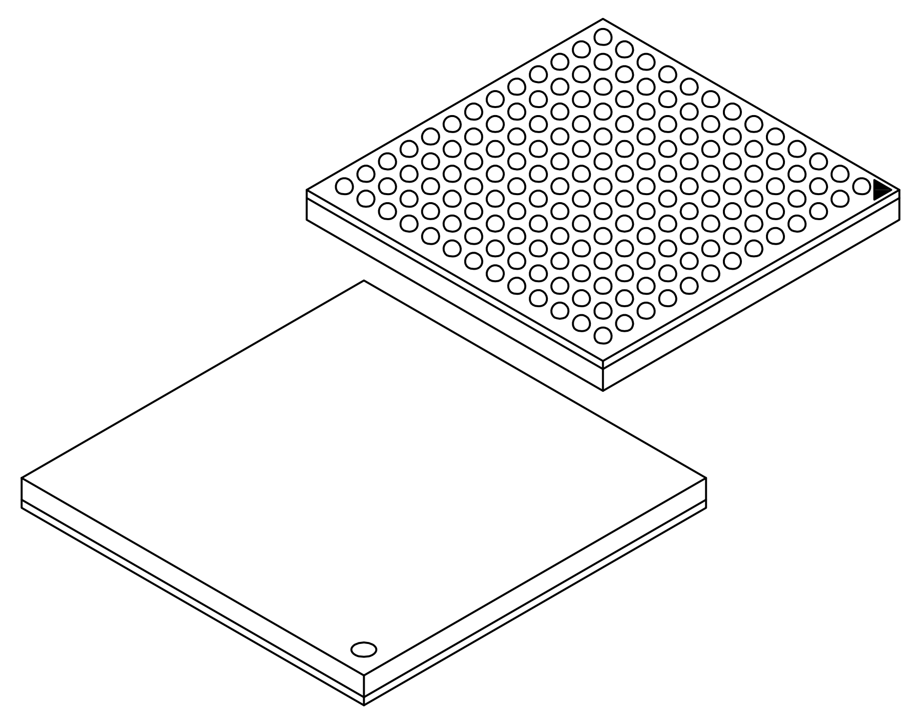
169-Ball Low Profile Fine Pitch Ball Grid Array (HF) - 11x11x1.4 mm Body [LFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals (Balls)	N		169	
Pitch	e		0.80 BSC	
Overall Height	A	1.17	1.285	1.40
Terminal (Ball) Height	A1	0.25	0.325	0.40
Mold Cap Thickness	(A2)		0.70 REF	
Substrate Thickness	(A3)		0.26 REF	
Overall Length	D		11.00 BSC	
Overall Width	E		11.00 BSC	
Overall Ball Pitch	D1		9.60	
Overall Ball Pitch	E1		9.60	
Ball Diameter	b	0.40	0.45	0.50

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-365B Sheet 2 of 2

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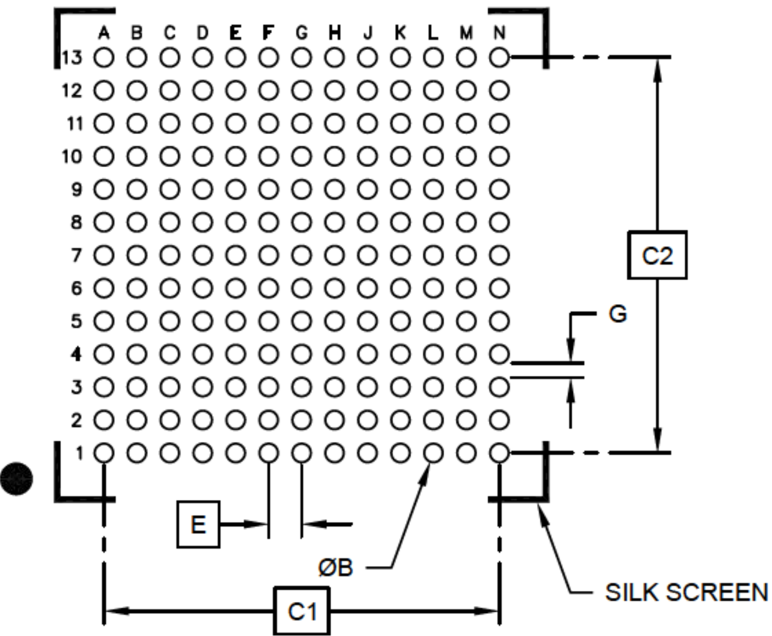
169 Ball Low Profile Fine Pitch Ball Grid Array (HF) - 11x11x1.4 mm Body [LFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Contact Pad Spacing	C1	9.60 BSC		
Contact Pad Spacing	C2	9.60 BSC		
Contact Pad Diameter (X169)	B	0.40	0.45	0.50
Pad-to-Pad Clearance	G	0.30		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2365B

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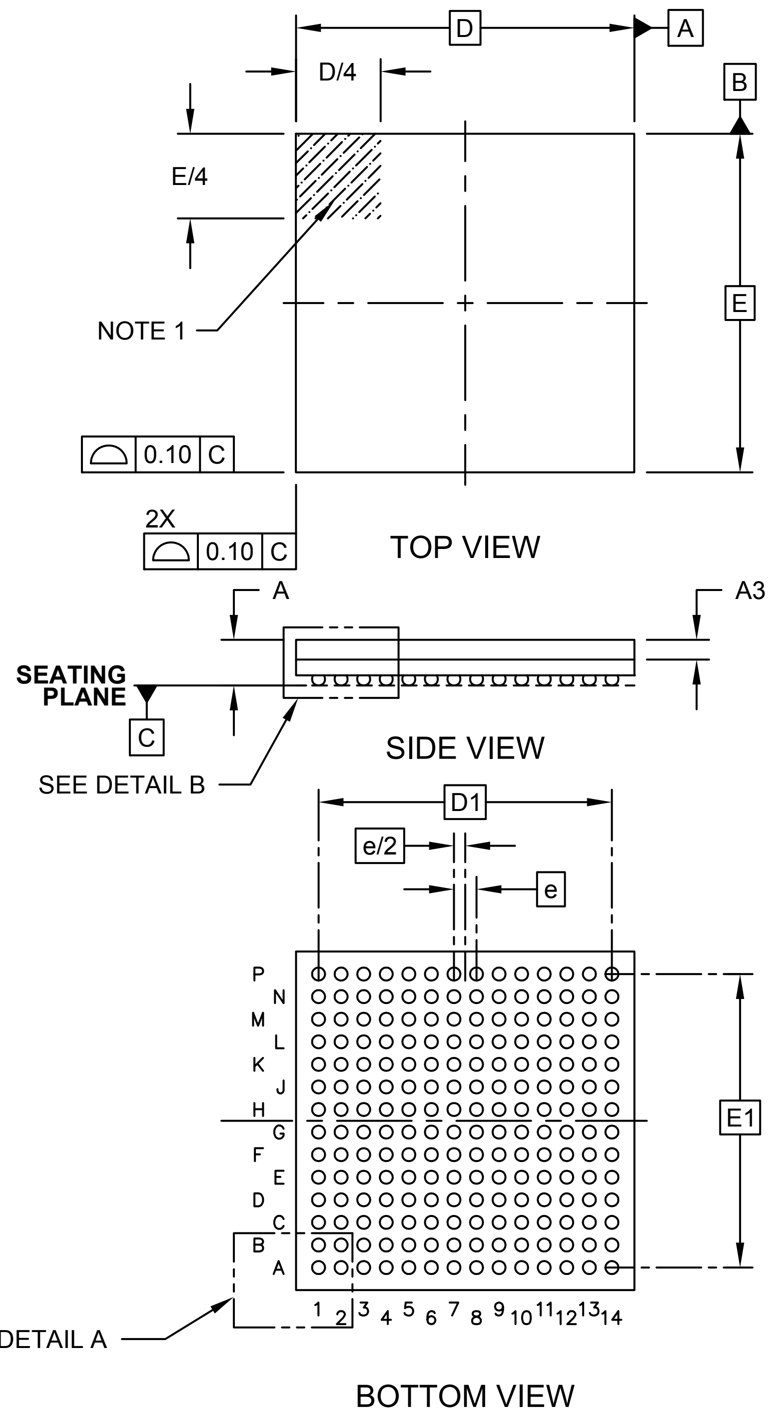
196-Ball Low Profile Fine Pitch Ball Grid Array (RG) - 12x12x1.4 mm Body [LFBGA]

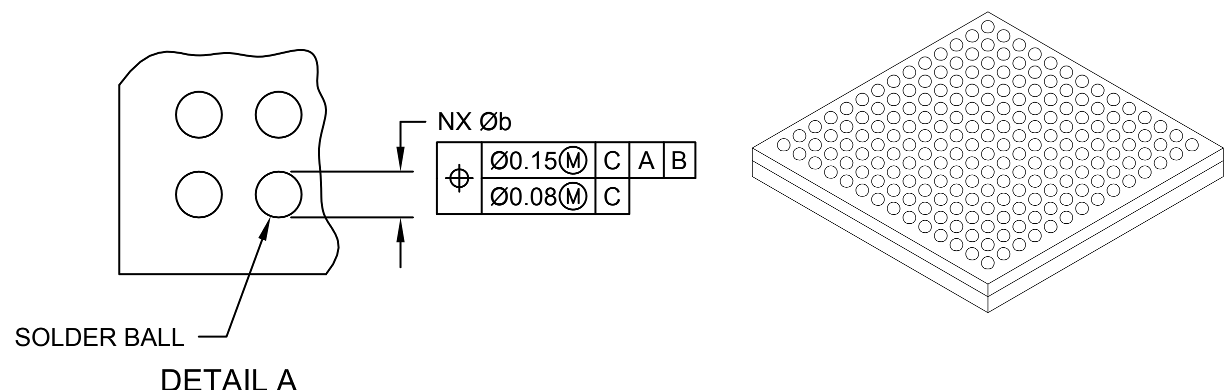
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

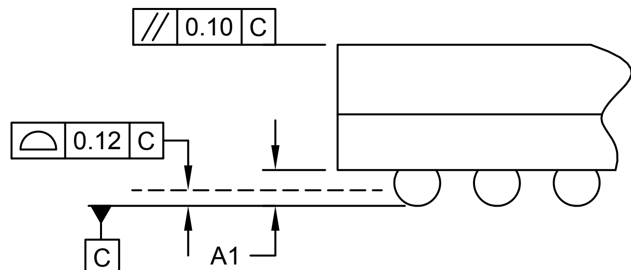


Microchip Technology Drawing C04-237A Sheet 1 of 2

196-Ball Low Profile Fine Pitch Ball Grid Array (RG) - 12x12x1.4 mm Body [LFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





DETAIL A

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		196	
Pitch	e		0.80 BSC	
Overall Height	A	1.52	1.62	1.70
Standoff	A1	0.31	0.36	0.41
Molded Cap Thickness	A3		0.70 REF	
Overall Width	E		12.00 BSC	
Overall Ball Pitch	E1		10.40 BSC	
Overall Length	D		12.00 BSC	
Overall Ball Pitch	D1		10.40 BSC	
Ball Diameter	Øb	0.41	0.46	0.51

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-237A Sheet 2 of 2

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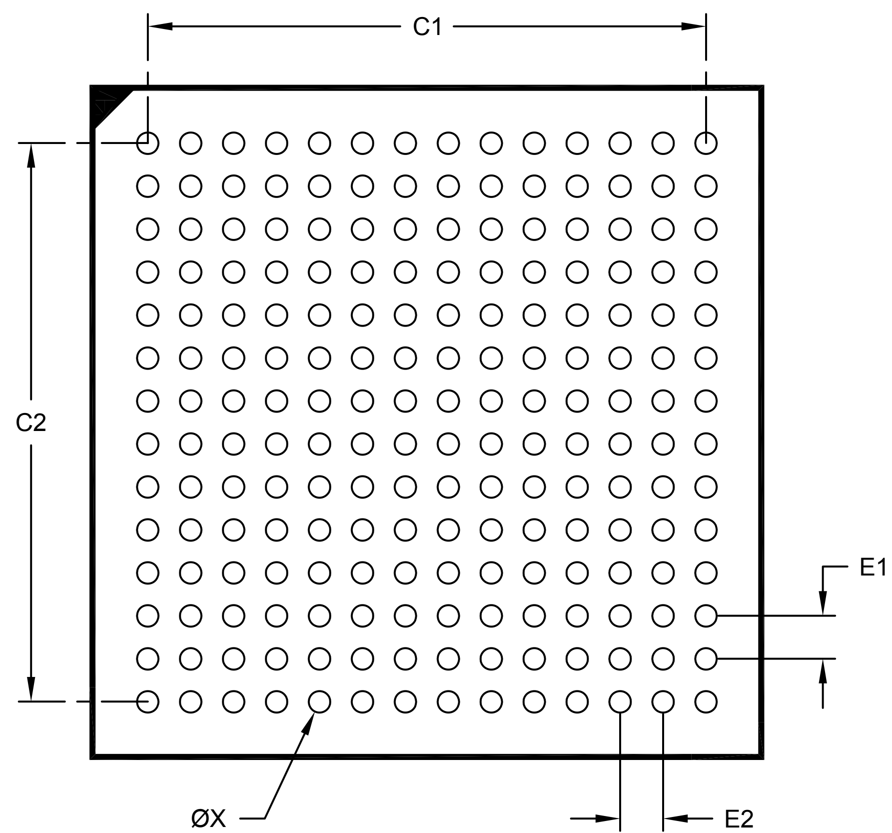
196-Ball Low Profile Fine Pitch Ball Grid Array (RG) - 12x12x1.4 mm Body [LFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E1		0.80 BSC	
Contact Pitch	E2		0.80 BSC	
Contact Pad Spacing	C1		10.40	
Contact Pad Spacing	C2		10.40	
Contact Pad Diameter (X196)	X			0.40

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2237A

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Package Outlines and Dimensions

288 Ball Low Profile Fine Pitch Ball Grid Array (4J) - 15x15x1.4 mm Body [LFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
A B C D E F G H J K L M N P R T U V
18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
E
2X
0.20 C
2X
0.20 C
NOTE 1
A1 CORNER
(DATUM B)
(DATUM A)

TOP VIEW

SEE DETAIL A
(A3)
(A2)
A
C
SEATING PLANE

SIDE VIEW

NOTE 1
D1
A B C D E F G H J K L M N P R T U V
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
e/2
E1
288X Øb
0.15Ⓜ C A B
0.08Ⓜ C
e

BOTTOM VIEW

0.20 C
A1
C
SEATING PLANE
288X
0.12 C

DETAIL A
(ROTATED 90° CW)

Microchip Technology Drawing C04-366C Sheet 1 of 2

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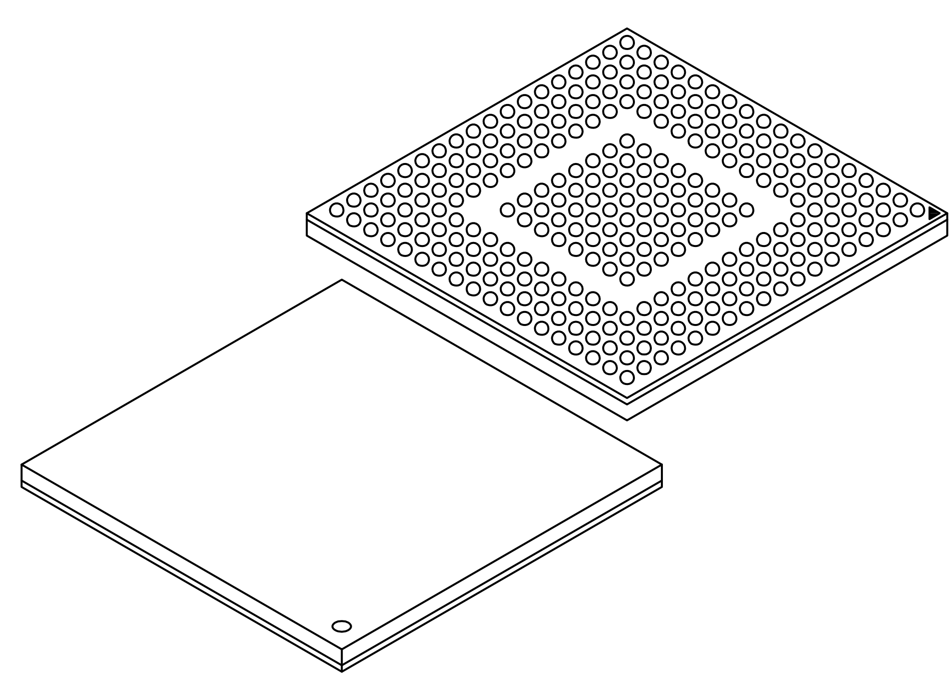
288 Ball Low Profile Fine Pitch Ball Grid Array (4J) - 15x15x1.4 mm Body [LFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals (Balls)	N		288	
Pitch	e		0.80 BSC	
Overall Height	A	-	-	1.40
Terminal (Ball) Height	A1	0.30	0.35	0.40
Mold Cap Height	(A2)		0.70 REF	
Substrate Thickness	(A3)		0.26 REF	
Overall Length	D		15.00 BSC	
Overall Ball Pitch	D1		13.60 BSC	
Overall Width	E		15.00 BSC	
Overall Ball Pitch	E1		13.60 BSC	
Ball Diameter	b	0.40	0.45	0.50

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

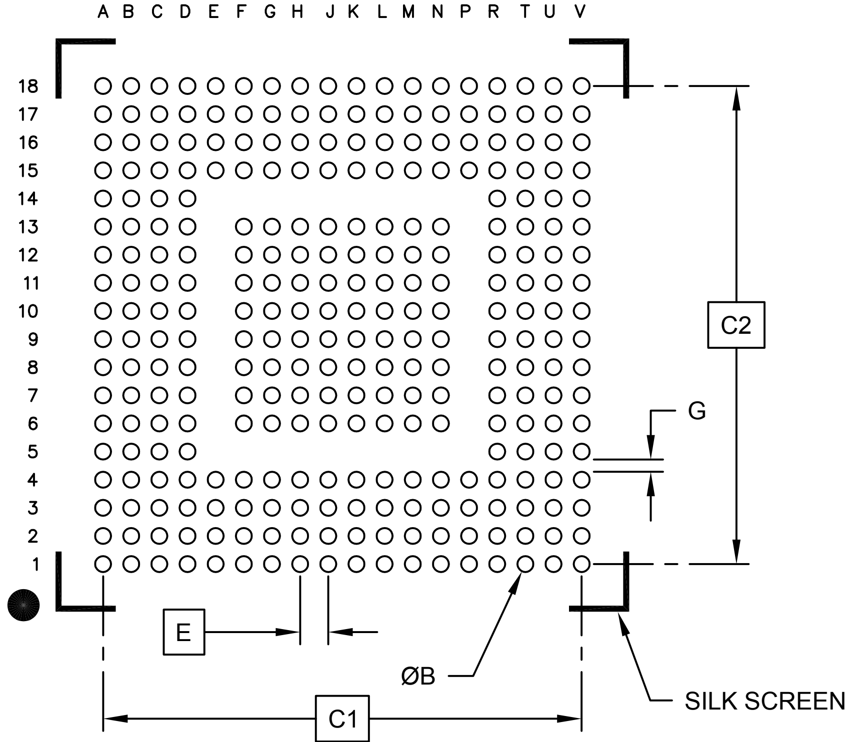
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-366C Sheet 2 of 2

288 Ball Low Profile Fine Pitch Ball Grid Array (4J) - 15x15x1.4 mm Body [LFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.80 BSC	
Contact Pad Spacing	C1		13.60 BSC	
Contact Pad Spacing	C2		13.60 BSC	
Contact Pad Diameter (X288)	B	0.40	0.45	0.50
Pad-to-Pad Clearance	G	0.30		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2366B

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TFBGA

24-Ball Thin Fine Pitch Ball Grid Array (TD) - 6x8 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

2X 0.15 C

D

A

B

(DATUM B)

E

E/4

2X 0.15 C

SEE NOTE 1

(DATUM A)

D/4

TOP VIEW

SEE DETAIL A

A2

A

SEATING PLANE

C

c

SIDE VIEW

D1

eD

eE

E1

eE/2

SEE DETAIL B

eD/2

BOTTOM VIEW

Microchip Technology Drawing C04-199A Sheet 1 of 2

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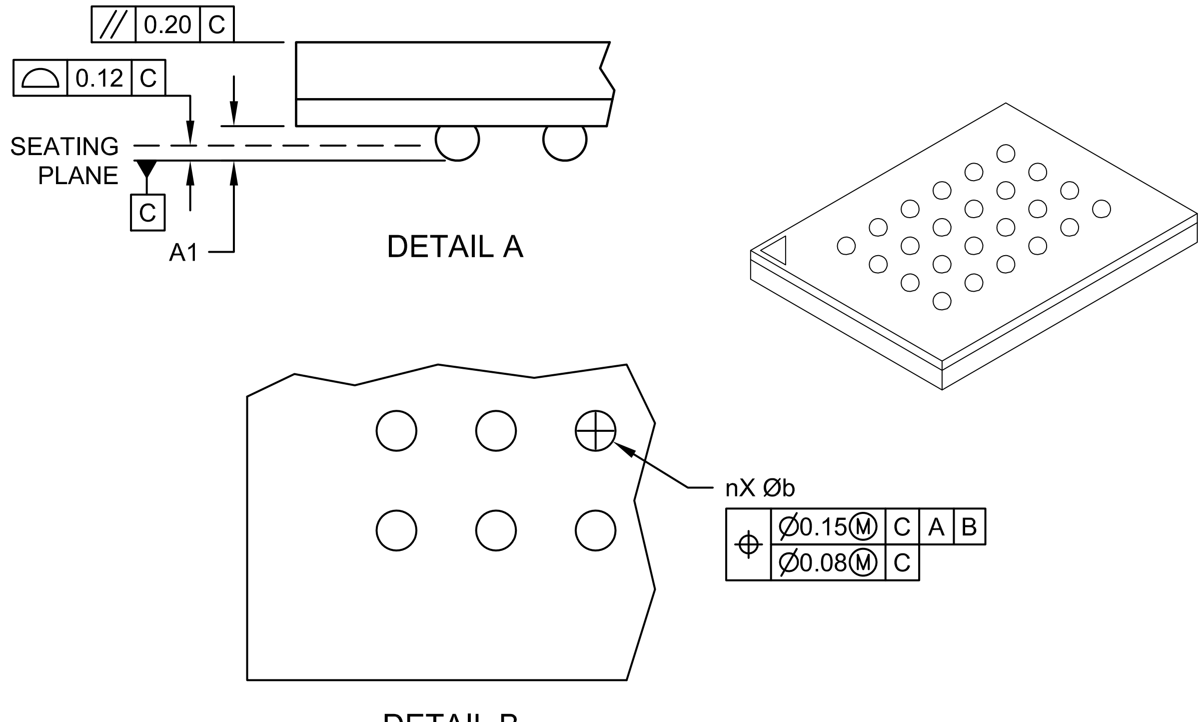
24-Ball Thin Fine Pitch Ball Grid Array (TD) - 6x8 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Solder Balls	n		24	
Solder Ball X-Pitch	eD		1.00 BSC	
Solder Ball Y-Pitch	eE		1.00 BSC	
Overall Height	A	1.00	1.10	1.20
Standoff	A1	0.25	—	0.35
Molded Package Thickness	A2	—	0.53	—
Overall Length	D		8.00 BSC	
Oveall Y-Pitch	D1		5.00 BSC	
Overall Width	E		6.00 BSC	
Overall Solder Ball Y-Pitch	E1		3.00 BSC	
Solder Ball Width	b	0.35	0.40	0.45
Substrate Thickness	c	-	0.21	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-199A Sheet 2 of 2

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48-Ball Thin Profile Fine Pitch Ball Grid Array (CD) - 6x8 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-168C Sheet 1 of 2

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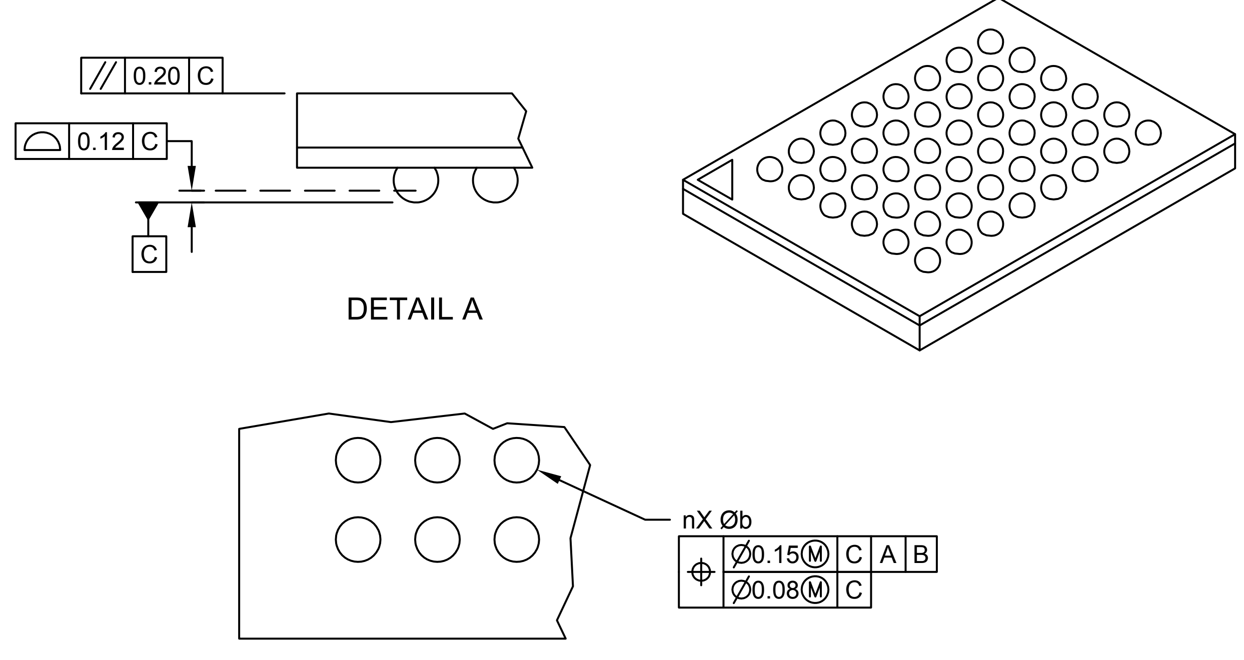
48-Ball Thin Profile Fine Pitch Ball Grid Array (CD) - 6x8 mm Body [TFBGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Solder Balls	n		48	
Solder Ball X-Pitch	eD		0.80 BSC	
Solder Ball Y-Pitch	eE		0.80 BSC	
Overall Height	A	1.00	1.10	1.20
Ball Height	A1	0.30	0.35	0.40
Overall Length	D		8.00 BSC	
Overall Solder Ball X-Pitch	D1		5.60 BSC	
Overall Width	E		6.00 BSC	
Overall Solder Ball Y-Pitch	E1		4.00 BSC	
Solder Ball Diameter	b	0.40	0.45	0.50

Notes:

1. Ball A1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
3. Ball interface to package body: 0.38mm nominal diameter.

Microchip Technology Drawing C04-168C Sheet 2 of 2

100-Ball Thin Fine Pitch Ball Grid Array (GJX) - 7x7 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
NOTE 1
1 2 3 4 5 6 7 8 9 10
A B C D E F G H J K
(DATUM B)
(DATUM A)
E
2X
0.15 C
2X
0.15 C
TOP VIEW

SEE
DETAIL A
A2
A
C
SEATING
PLANE
SIDE VIEW

D1
1 2 3 4 5 6 7 8 9 10
K J H G F E D C B A
E1
e/2
e
100X Øb
0.15Ⓜ C A B
0.08Ⓜ C
BOTTOM VIEW

0.20 C
A1
100X
0.10 C
C
SEATING
PLANE
DETAIL A
(ROTATED 90° CW)

Microchip Technology Drawing C04-328A Sheet 1 of 2

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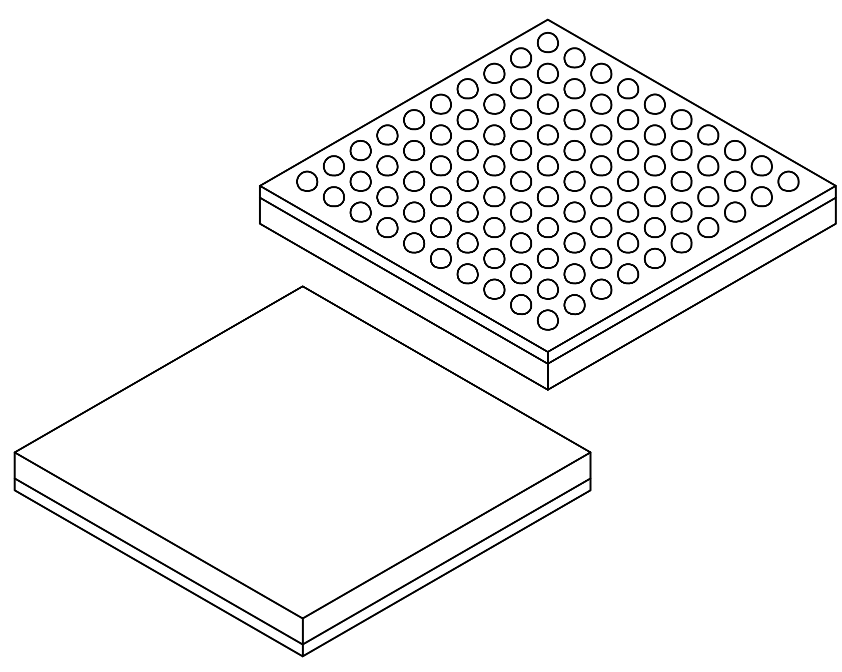
Package Outlines and Dimensions

100-Ball Thin Fine Pitch Ball Grid Array (GJX) - 7x7 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		100	
Pitch	e		0.65 BSC	
Overall Height	A	-	-	1.06
Ball Height	A1	0.18	0.26	-
Mold Cap Height	A2	0.45	0.50	0.55
Overall Length	D		7.00 BSC	
Overall Pitch	D1		5.85 BSC	
Overall Width	E		7.00 BSC	
Overall Pitch	E1		5.85 BSC	
Terminal Width	b	0.30	0.35	0.40

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

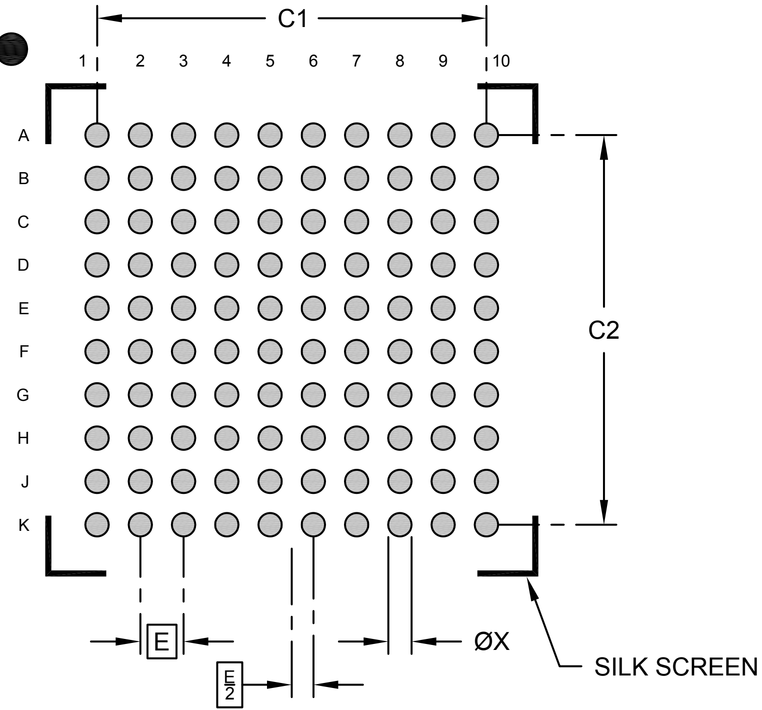
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-328A Sheet 2 of 2

100-Ball Thin Fine Pitch Ball Grid Array (GJX) - 7x7 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Contact Pad Diameter	X		0.35	
Contact Pad Spacing	C1		5.85	
Contact Pad Spacing	C2		5.85	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2328A

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121-Ball Thin Fine Pitch Ball Grid Array (3XX) - 8x8 mm Body [TFBGA] System In Package

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
NOTE 1
1 2 3 4 5 6 7 8 9 10 11
A B C D E F G H J K L
E
(DATUM B)
(DATUM A)
2X 0.15 C
2X 0.15 C

TOP VIEW

C
SEATING PLANE
A2
A1
A
0.10 C
0.10 C

SIDE VIEW

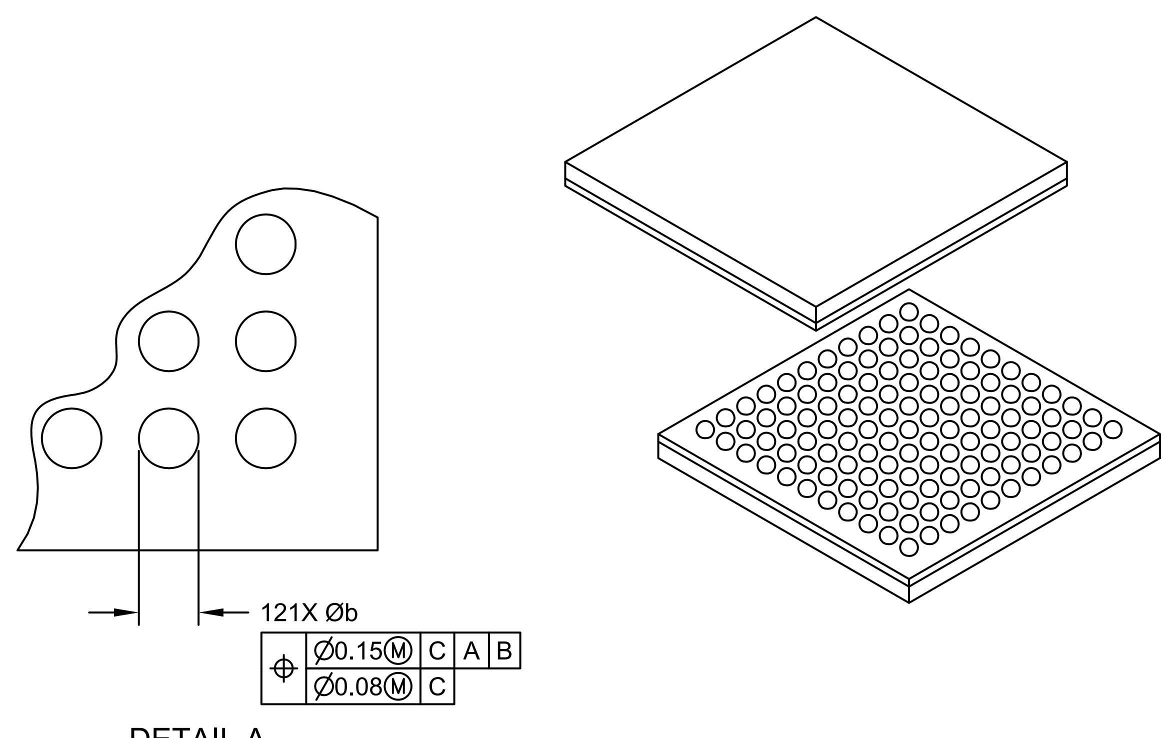
D1
eD
eE
E1
L K J H G F E D C B A
1 2 3 4 5 6 7 8 9 10 11
A1 BALL PAD CORNER
DETAIL A

BOTTOM VIEW

Microchip Technology Drawing C04-212A Sheet 1 of 2

121-Ball Thin Fine Pitch Ball Grid Array (3XX) - 8x8 mm Body [TFBGA] System In Package

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		121	
Pitch	eE		0.65 BSC	
Pitch	eD		0.65 BSC	
Overall Height	A	-	-	1.08
Standoff	A1	0.21	0.32	-
Cap Thickness	A2	0.40	0.45	0.50
Overall Width	E		8.00 BSC	
Overall Pitch	E1		6.50 BSC	
Overall Length	D		8.00 BSC	
Overall Pitch	D1		6.50 BSC	
Terminal Diameter	b	.035	0.40	0.45

Notes:

1. Terminal A1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-212A Sheet 2 of 2

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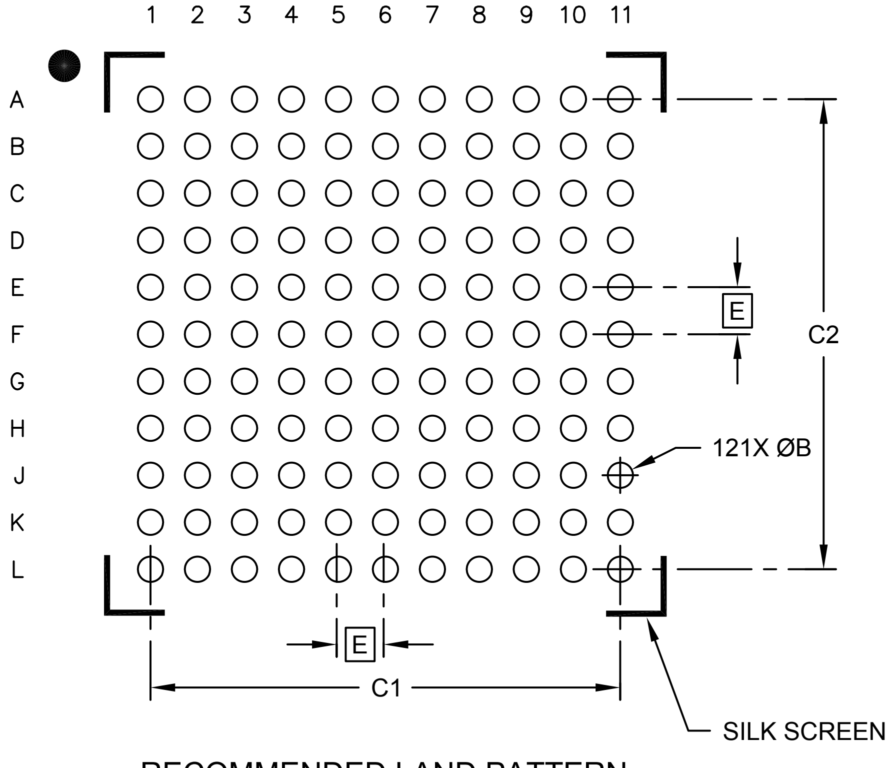
**121-Ball Thin Fine Pitch Ball Grid Array (3XX) - 8x8 mm Body [TFBGA]
System In Package**

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Contact Pad Spacing	C1		6.50	
Contact Pad Spacing	C2		6.50	
Contact Pad Diameter (X121)	B		0.35	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2212A

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121-Ball Thin Fine Pitch Ball Grid Array (TE) - 8x8 mm Body [TFBGA]
System In Package

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-212A Sheet 1 of 2

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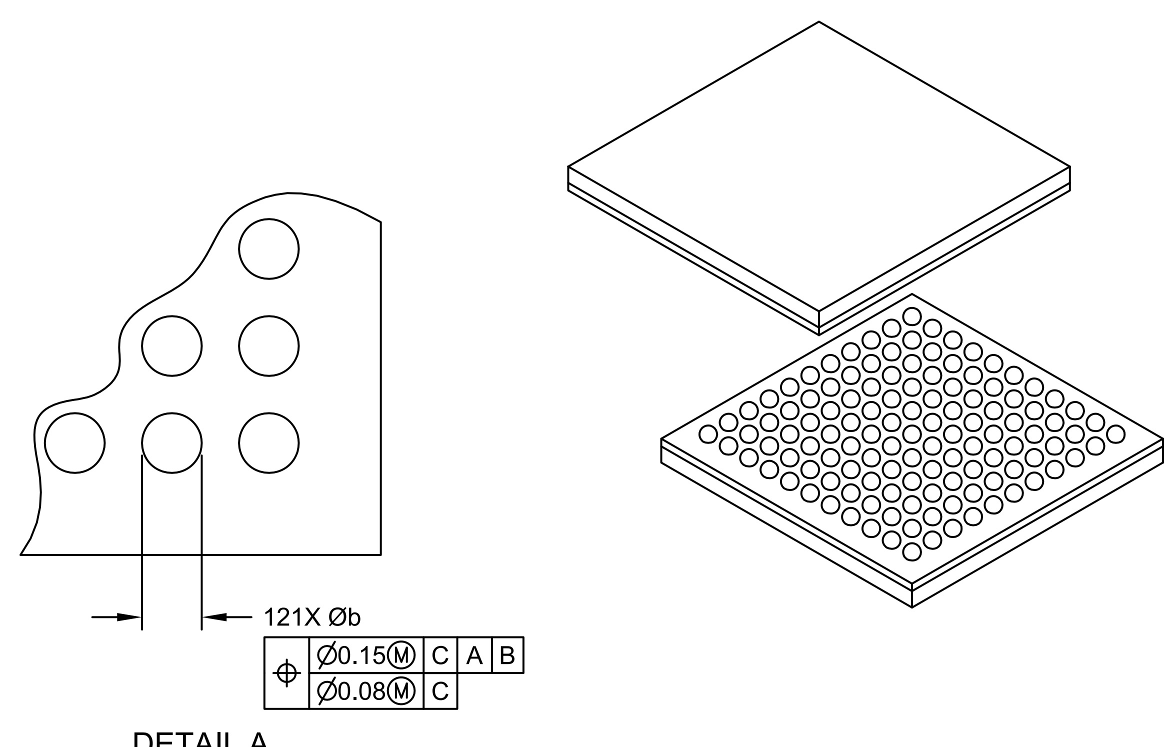
121-Ball Thin Fine Pitch Ball Grid Array (TE) - 8x8 mm Body [TFBGA] System In Package

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N	121		
Pitch	eE	0.65 BSC		
Pitch	eD	0.65 BSC		
Overall Height	A	-	-	1.08
Standoff	A1	0.21	0.32	-
Cap Thickness	A2	0.40	0.45	0.50
Overall Width	E	8.00 BSC		
Overall Pitch	E1	6.50 BSC		
Overall Length	D	8.00 BSC		
Overall Pitch	D1	6.50 BSC		
Terminal Diameter	b	.035	0.40	0.45

Notes:

1. Terminal A1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

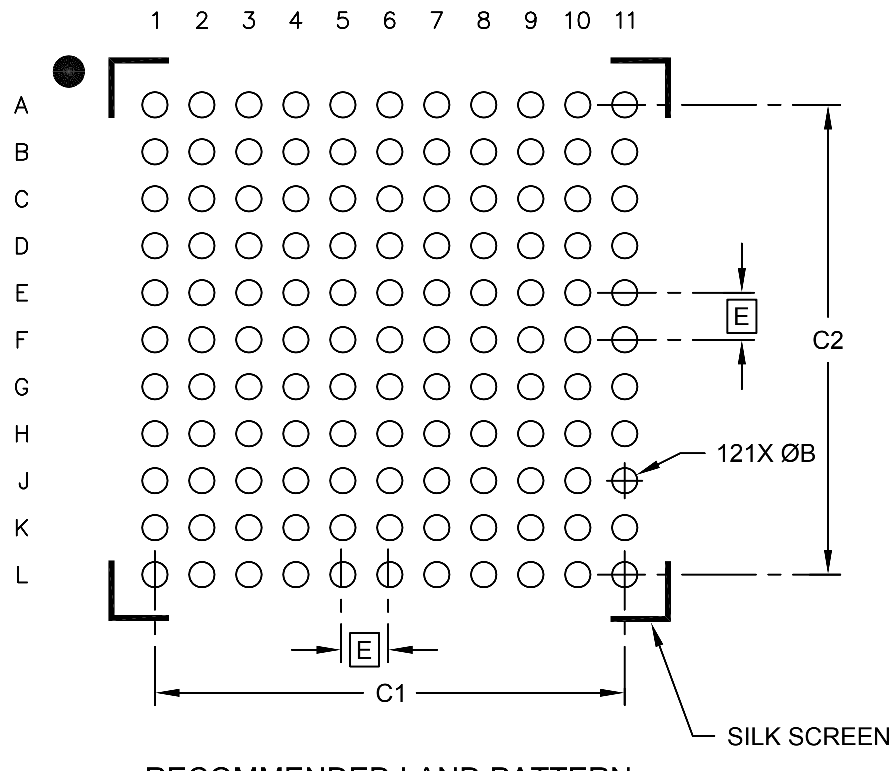
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-212A Sheet 2 of 2

121-Ball Thin Fine Pitch Ball Grid Array (TE) - 8x8 mm Body [TFBGA]
System In Package

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Contact Pad Spacing	C1		6.50	
Contact Pad Spacing	C2		6.50	
Contact Pad Diameter (X121)	B		0.35	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2212B-TE

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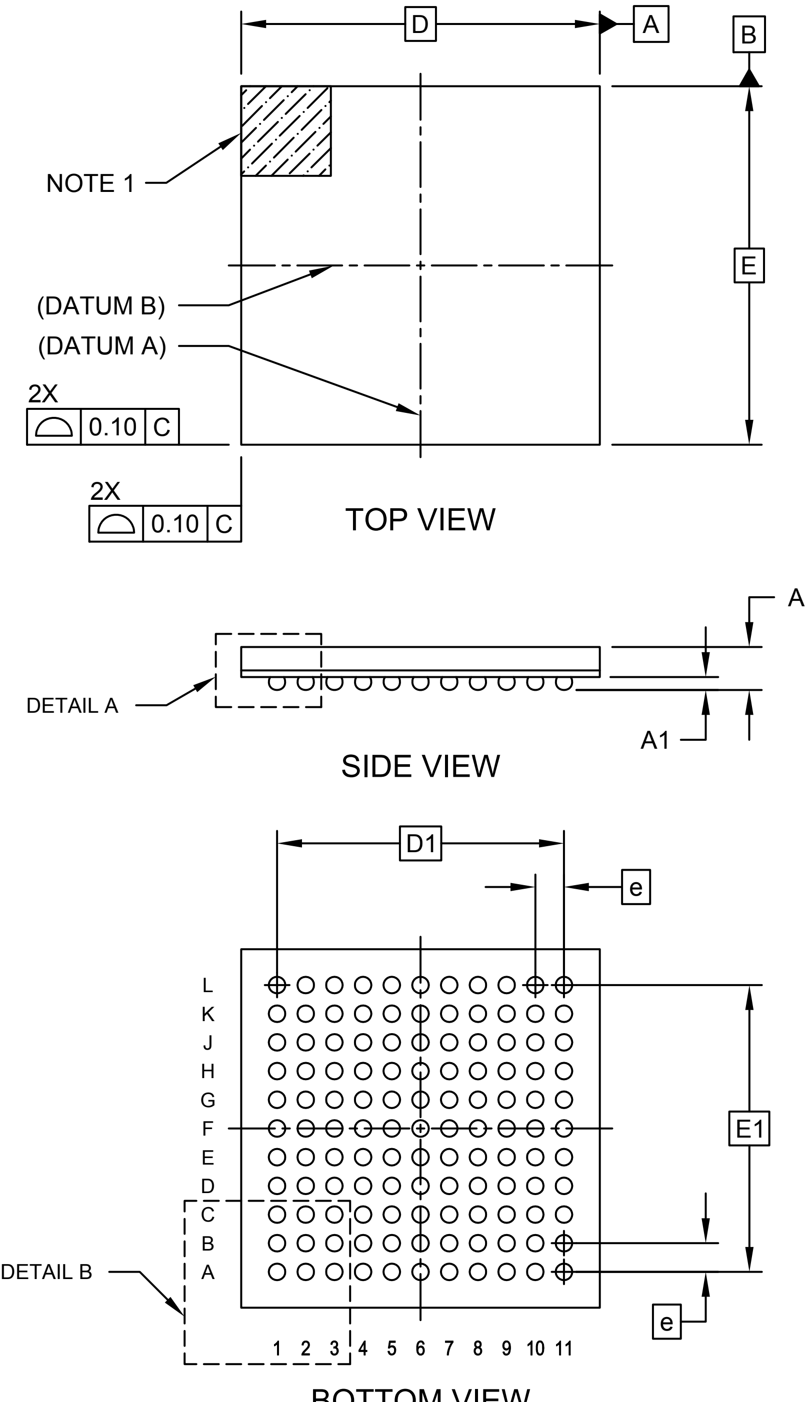
121-Ball Plastic Thin Profile Fine Pitch Ball Grid Array (BG) - 10x10x1.10 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-148 Rev F Sheet 1 of 2

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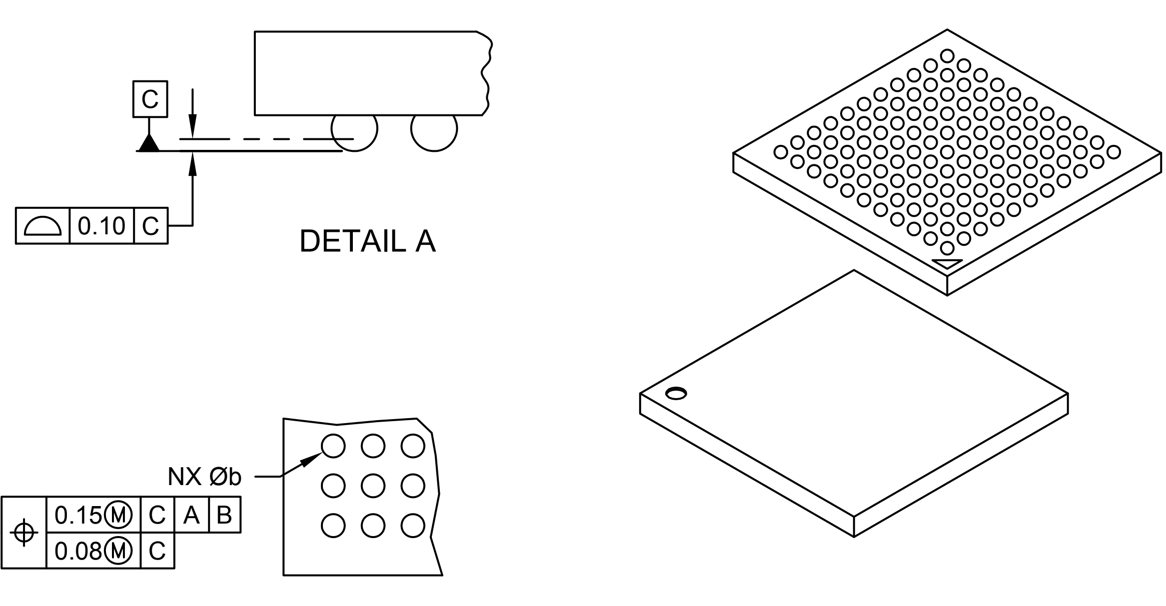
121-Ball Plastic Thin Profile Fine Pitch Ball Grid Array (BG) - 10x10x1.10 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Contacts	N		121	
Contact Pitch	e		0.80 BSC	
Overall Height	A	1.00	1.10	1.20
Ball Height	A1	0.25	0.30	0.35
Overall Width	E		10.00 BSC	
Array Width	E1		8.00 BSC	
Overall Length	D		10.00 BSC	
Array Length	D1		8.00 BSC	
Contact Diameter	b	0.35	0.40	0.45

Notes:

1. Ball A1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.
3. The outer rows and colums of balls are located with respect to datums A and B.
4. Ball interface to package body: 0.37mm nominal diameter.

Microchip Technology Drawing C04-148 Rev F Sheet 2 of 2

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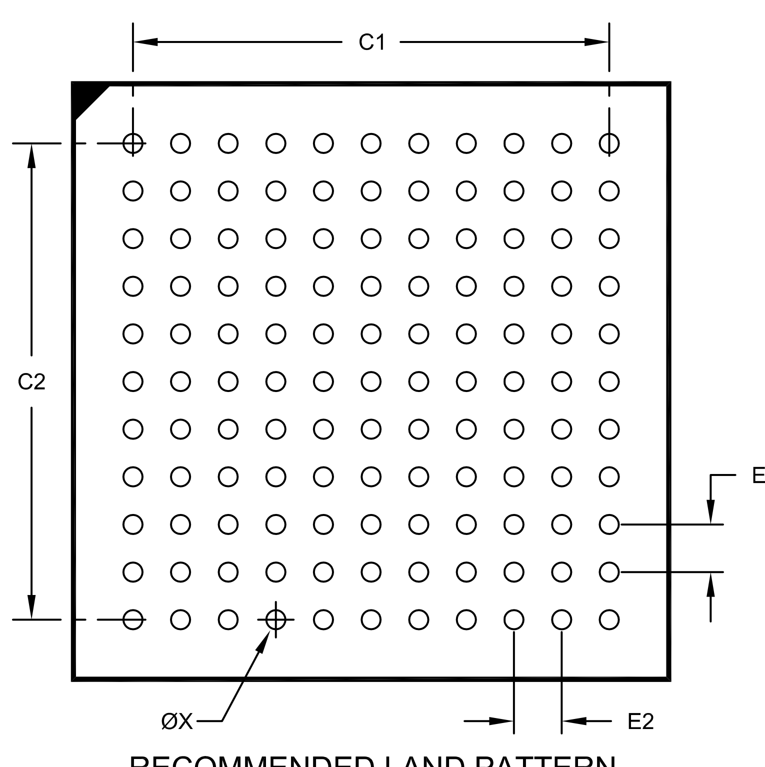
121-Lead Plastic Thin Profile Ball Grid Array (BG) - 10x10x1.10 mm Body [TFBGA--Formerly XBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E1	0.80 BSC		
Contact Pitch	E2	0.80 BSC		
Contact Pad Spacing	C1		8.00	
Contact Pad Spacing	C2		8.00	
Contact Pad Diameter (X121)	X			0.32

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2148 Rev D

132-Ball Thin Fine Pitch Ball Grid Array (AHA) - 12x12x1.2mm Body [TFBGA] Internal Flip Chip

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-1193A Sheet 1 of 2

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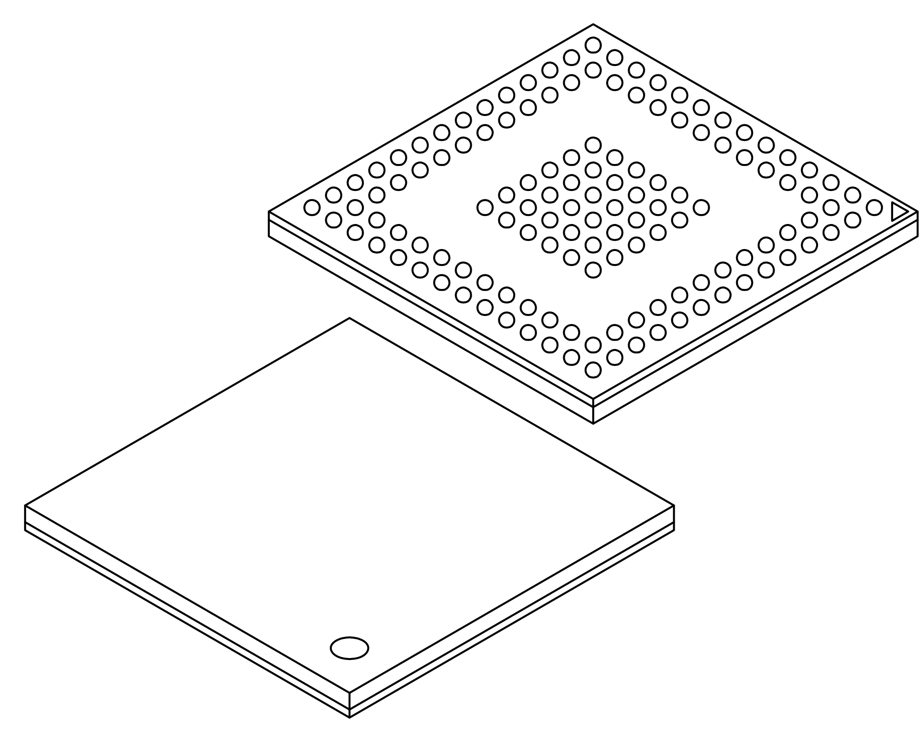
132-Ball Thin Fine Pitch Ball Grid Array (AHA) - 12x12x1.2mm Body [TFBGA] Internal Flip Chip

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		132	
Pitch	e		0.80 BSC	
Overall Height	A	-	-	1.20
Standoff	A1	0.27	0.32	0.37
Substrate Thickness	A2		0.26 REF	
Mold Cap Thickness	A4		0.53 REF	
Overall Length	D		12.00 BSC	
Overall Terminal Centers	D1		10.40 BSC	
Overall Width	E		12.00 BSC	
Overall Terminal Centers	E1		10.40 BSC	
Terminal Diameter	b	0.35	0.40	0.45

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

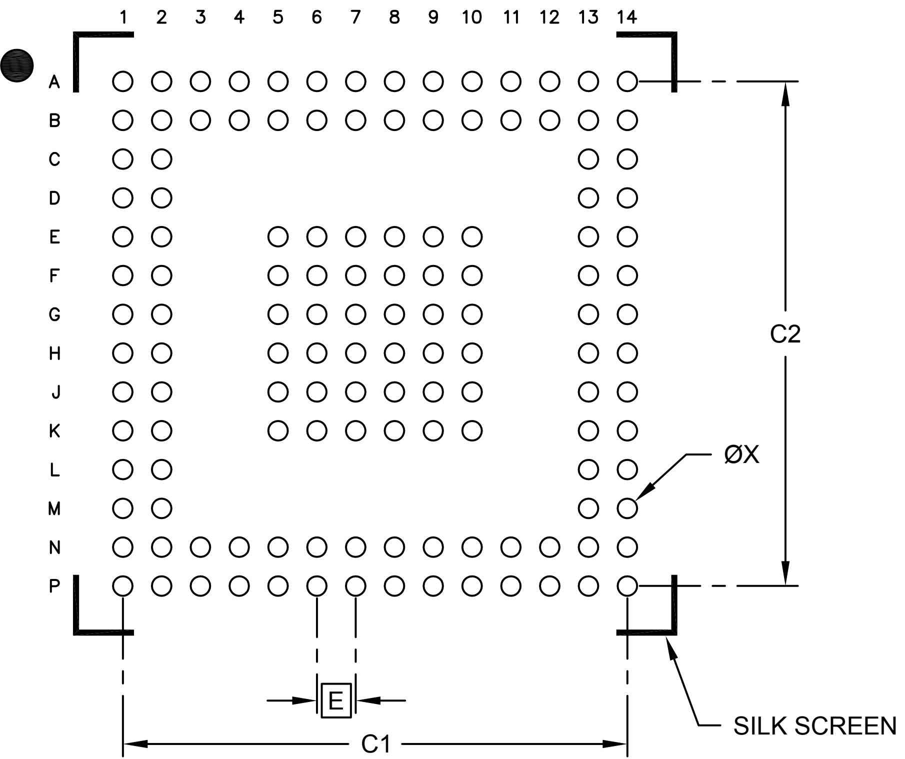
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1193A Sheet 2 of 2

132-Ball Thin Fine Pitch Ball Grid Array (AHA) - 12x12x1.2mm Body [TFBGA] Internal Flip Chip

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.80 BSC		
Contact Pad Diameter	ØX		0.40	
Contact Pad Spacing	C1		10.40	
Contact Pad Spacing	C2		10.40	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3193A

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144-Ball Thin Fine Pitch Ball Grid Array [JWX] - 7x7 mm Body (TFBGA)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

NOTE 1

D

A B

1 2 3 4 5 6 7 8 9 10 11 12 13

A B C D E F G H J K L M N

E

(DATUM B)
(DATUM A)

2X 0.15 C

2X 0.15 C

TOP VIEW

A2

C

A

0.10 C

A1

144X 0.08 C

D1

1 2 3 4 5 6 7 8 9 10 11 12 13

N M L K J H G F E D C B A

E1

NOTE 1

144X b

e

0.10Ⓜ C A B
0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-249A Sheet 1 of 2

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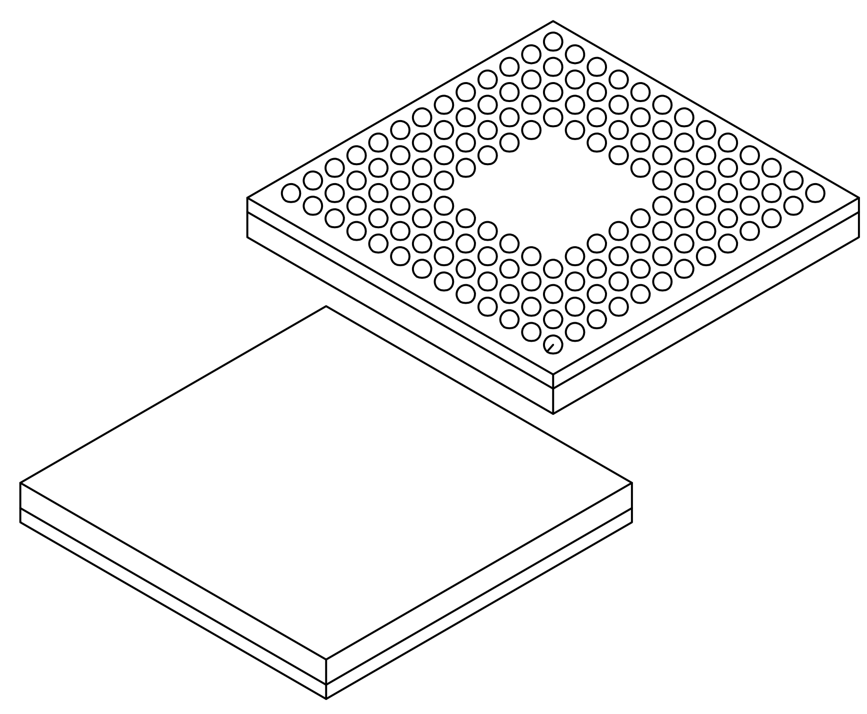
144-Ball Thin Fine Pitch Ball Grid Array [JWX] - 7x7 mm Body (TFBGA)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		144	
Pitch	e		0.50 BSC	
Overall Height	A	-	-	1.02
Standoff	A1	0.15	0.24	-
Molded Cap Height	A2	0.45	0.50	0.55
Overall Length	D		7.00 BSC	
Overall Pitch	D1		6.00 BSC	
Overall Width	E		7.00 BSC	
Overall Pitch	D1		6.00 BSC	
Ball Diameter	b	0.25	0.30	0.35

Notes:

1. Terminal A1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-249A Sheet 2 of 2

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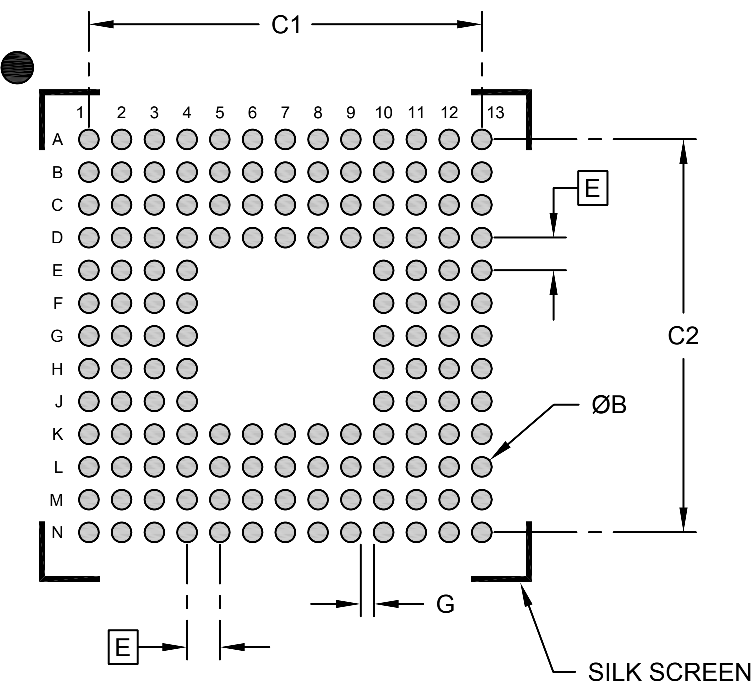
144-Ball Thin Fine Pitch Ball Grid Array [JWX] - 7x7 mm Body (TFBGA)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Overall Contact Pitch	C1		6.00	
Overall Contact Pitch	C2		6.00	
Contact Diameter (X 144)	X1			0.30
Spacing Between Contacts	G	0.30		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2429A

168-Ball Thin Fine-Pitch Ball Grid Array (AFA) - 13x13x1.2 mm Body [TFBGA] Internal Flip chip

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW

Microchip Technology Drawing C04-1191B Sheet 1 of 2

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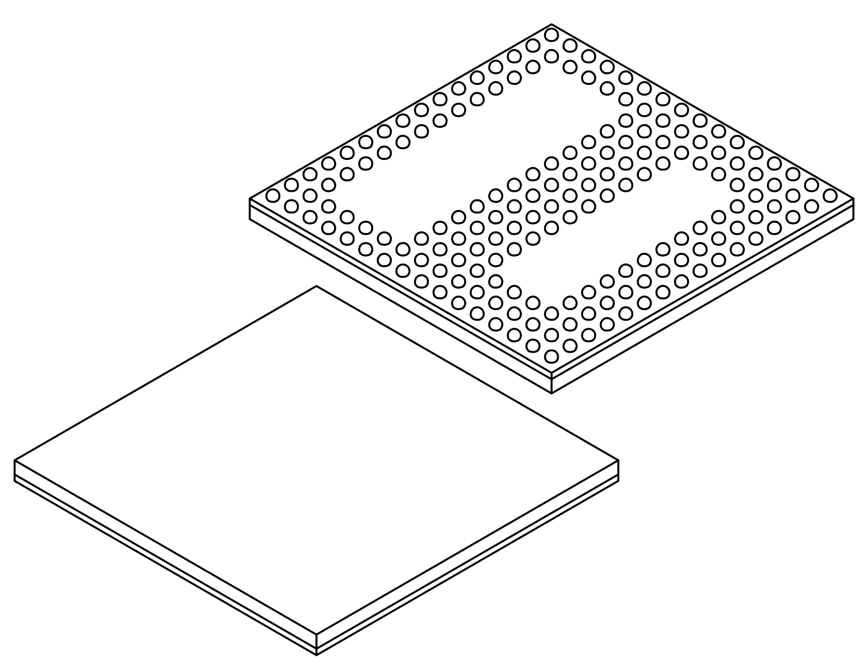
168-Ball Thin Fine-Pitch Ball Grid Array (AFA) - 13x13x1.2 mm Body [TFBGA] Internal Flip chip

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		168	
Pitch	e		0.80 BSC	
Overall Height	A	-	-	1.20
Standoff	A1	0.23	0.33	-
Mold Cap Height	A4		0.53 REF	
Overall Length	D		13.00 BSC	
Overall Width	E		13.00 BSC	
Ball Diameter	b	0.35	0.40	0.45

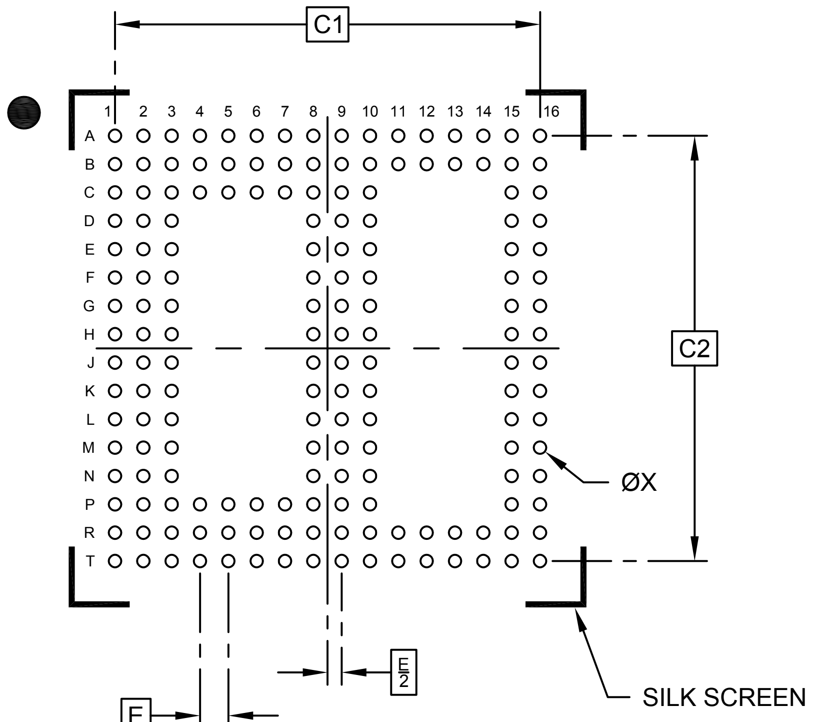
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1191B Sheet 1 of 2

168-Ball Thin Fine-Pitch Ball Grid Array (AFA) - 13x13x1.2 mm Body [TFBGA] Internal Flip chip

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.80 BSC	
Overall Contact Pad Spacing	C1		12.00 BSC	
Overall Contact Pad Spacing	C2		12.00 BSC	
Pad Diameter (X168)	ØX			0.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3191B

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169-Ball Thin Fine Pitch Ball Grid Array (7G) - 10x10x1.10 mm Body [TFBGA] (Complies with JEDEC Terminal Assignment recommendations)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

NOTE 1

D, D/4, A, B, E, E/4

1 2 3 4 5 6 7 8 9 10 11 12 13

A B C D E F G H J K L M N

(DATUM B)

(DATUM A)

2X 0.15 C

2X 0.15 C

TOP VIEW

C

SEATING PLANE

A A2 A1

0.20 C

169X 0.10 C

SIDE VIEW

1 2 3 4 5 6 7 8 9 10 11 12 13

N M L K J H G F E D C B A

e

169X Øb

0.15Ⓜ C A B

0.08Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-377-J Rev C Sheet 1 of 2

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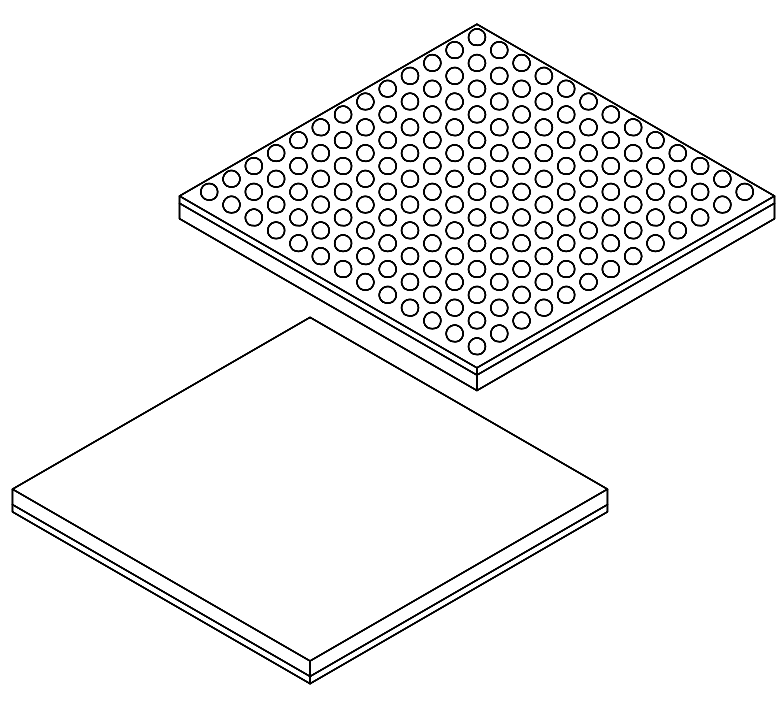
169-Ball Thin Fine Pitch Ball Grid Array (7G) - 10x10x1.10 mm Body [TFBGA] (Complies with JEDEC Terminal Assignment recommendations)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N	169		
Pitch	e	0.75 BSC		
Overall Height	A	-	-	1.10
Standoff	A1	0.21	0.32	-
Mold Cap Thickness	A2	0.50	0.45	0.50
Overall Length	D	10.00		
Overall Width	E	10.00		
Ball Diameter	b	0.35	0.40	0.45

Notes:

1. Terminal A1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-377-J Rev C Sheet 2 of 2

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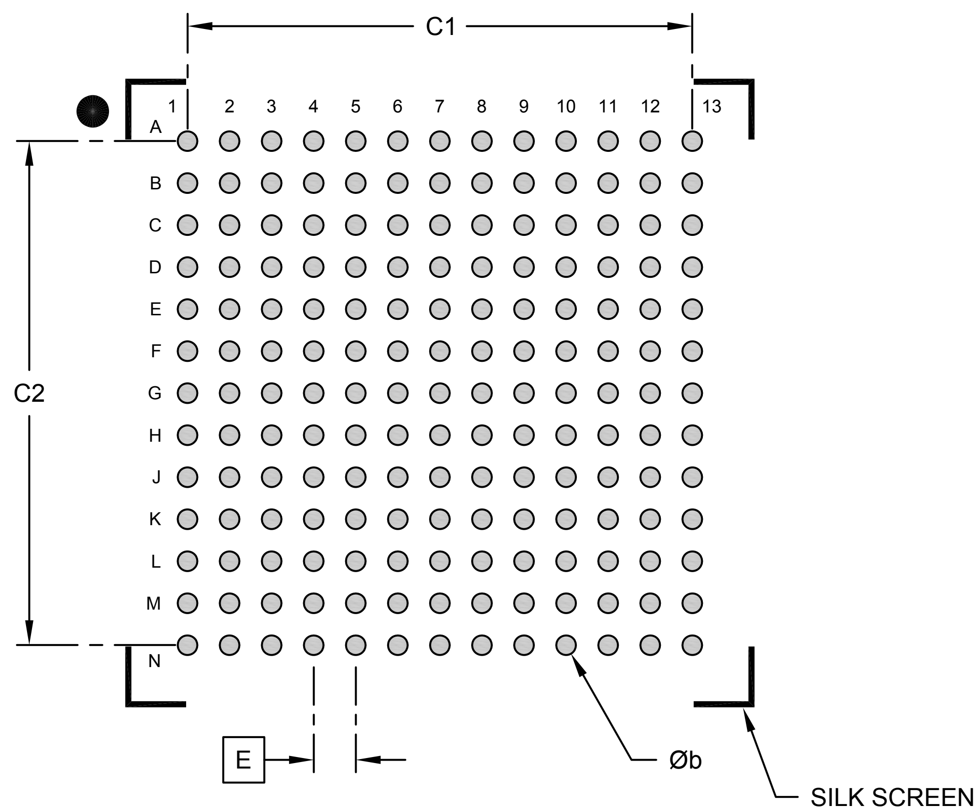
169-Ball Thin Fine Pitch Ball Grid Array (7G) - 10x10x1.10 mm Body [TFBGA] (Complies with JEDEC Terminal Assignment recommendations)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.75 BSC	
Contact Pad Spacing	C1		9.00	
Contact Pad Spacing	C2		9.00	
Contact Pad Diameter (X169)	b		0.35	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2377-J Rev C

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169-Ball Thin Fine Pitch Ball Grid Array (7G) - 10x10x1.10 mm Body [TFBGA] Alternate Terminal Assignments (does not comply with JEDEC recommendations)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-377-NJ- Rev c Sheet 1 of 2

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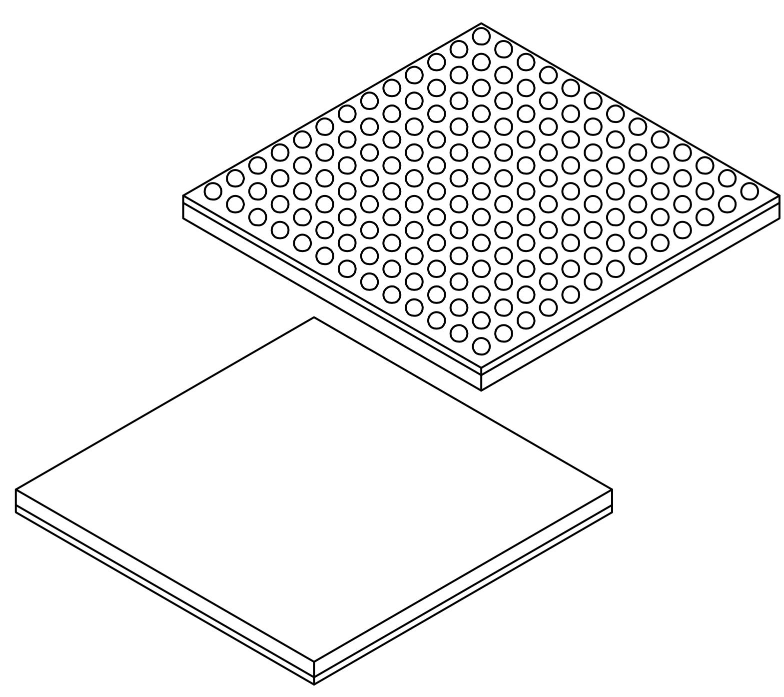
169-Ball Thin Fine Pitch Ball Grid Array (7G) - 10x10x1.10 mm Body [TFBGA] Alternate Terminal Assignments (does not comply with JEDEC recommendations)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		169	
Pitch	e		0.75 BSC	
Overall Height	A	-	-	1.10
Standoff	A1	0.21	0.32	-
Mold Cap Thickness	A2	0.50	0.45	0.50
Overall Length	D		10.00	
Overall Width	E		10.00	
Ball Diameter	b	0.35	0.40	0.45

Notes:

1. Terminal A1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-377-NJ Rev C Sheet 2 of 2

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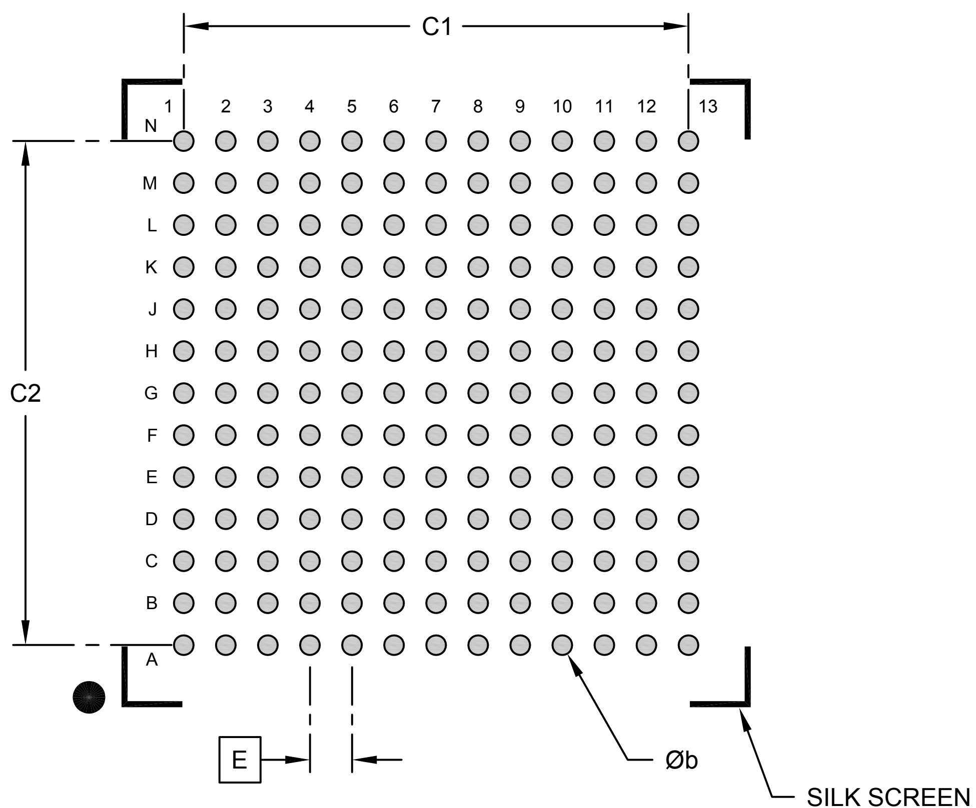
169-Ball Thin Fine Pitch Ball Grid Array (7G) - 10x10x1.10 mm Body [TFBGA] Alternate Terminal Assignments (does not comply with JEDEC recommendations)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.75 BSC	
Contact Pad Spacing	C1		9.00	
Contact Pad Spacing	C2		9.00	
Contact Pad Diameter (X169)	b		0.35	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2377-NJ Rev C

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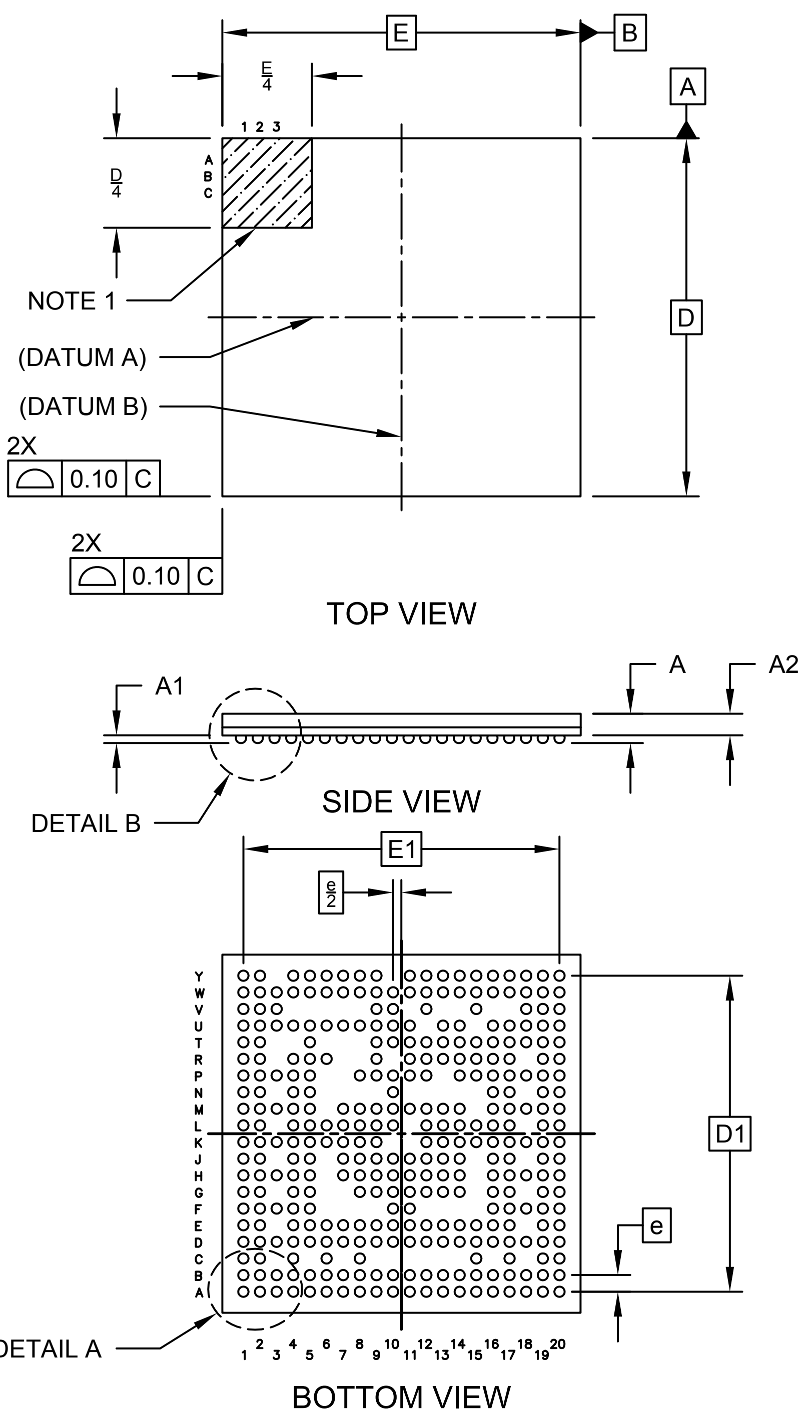
323-Ball Thin, Fine Pitch Ball Grid Array (HX) - 14x14x1.14 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-245A Sheet 1 of 2

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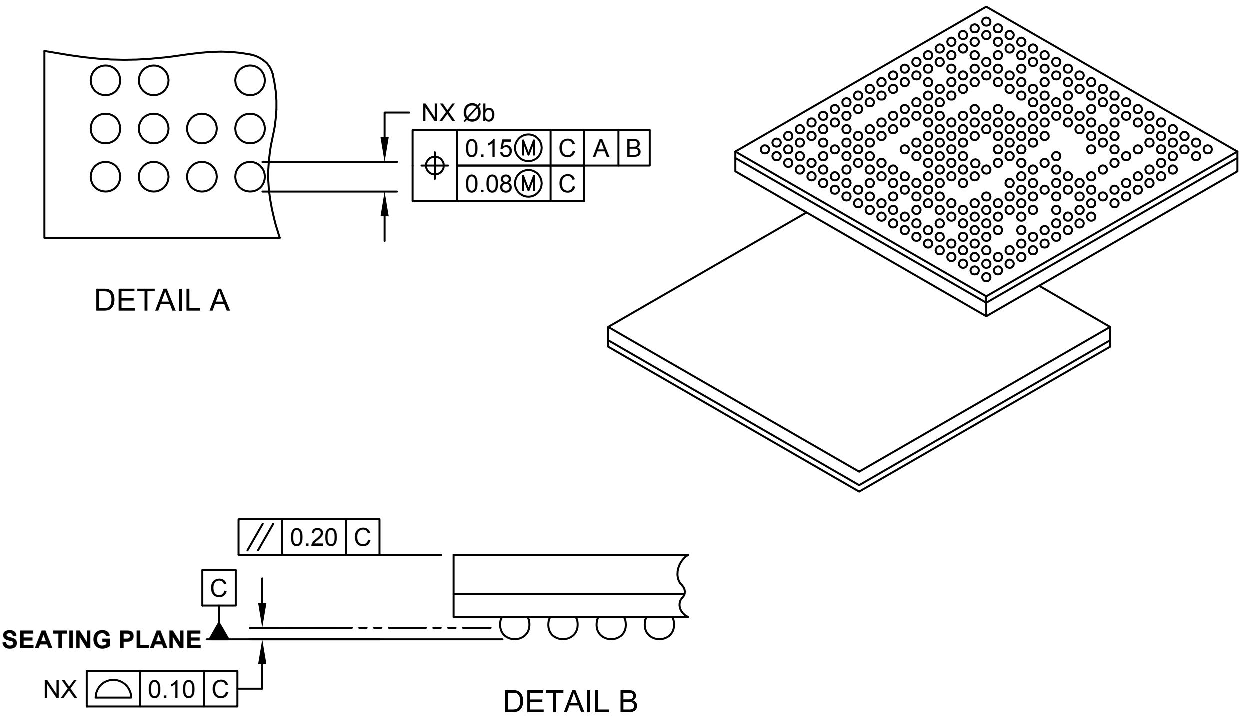
323-Ball Thin, Fine Pitch Ball Grid Array (HX) - 14x14x1.14 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Balls	N		323	
Pitch	e		0.65 BSC	
Overall Height	A	-	1.04	1.14
Standoff	A1	0.21	0.31	-
Package Thickness	A2	-	0.73	-
Overall Width	E		14.00 BSC	
Overall Ball Pitch	E1		12.35 BSC	
Overall Length	D		14.00 BSC	
Overall Ball Pitch	D1		12.35 BSC	
Ball Diameter	b	0.35	0.40	0.45

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-245A Sheet 2 of 2

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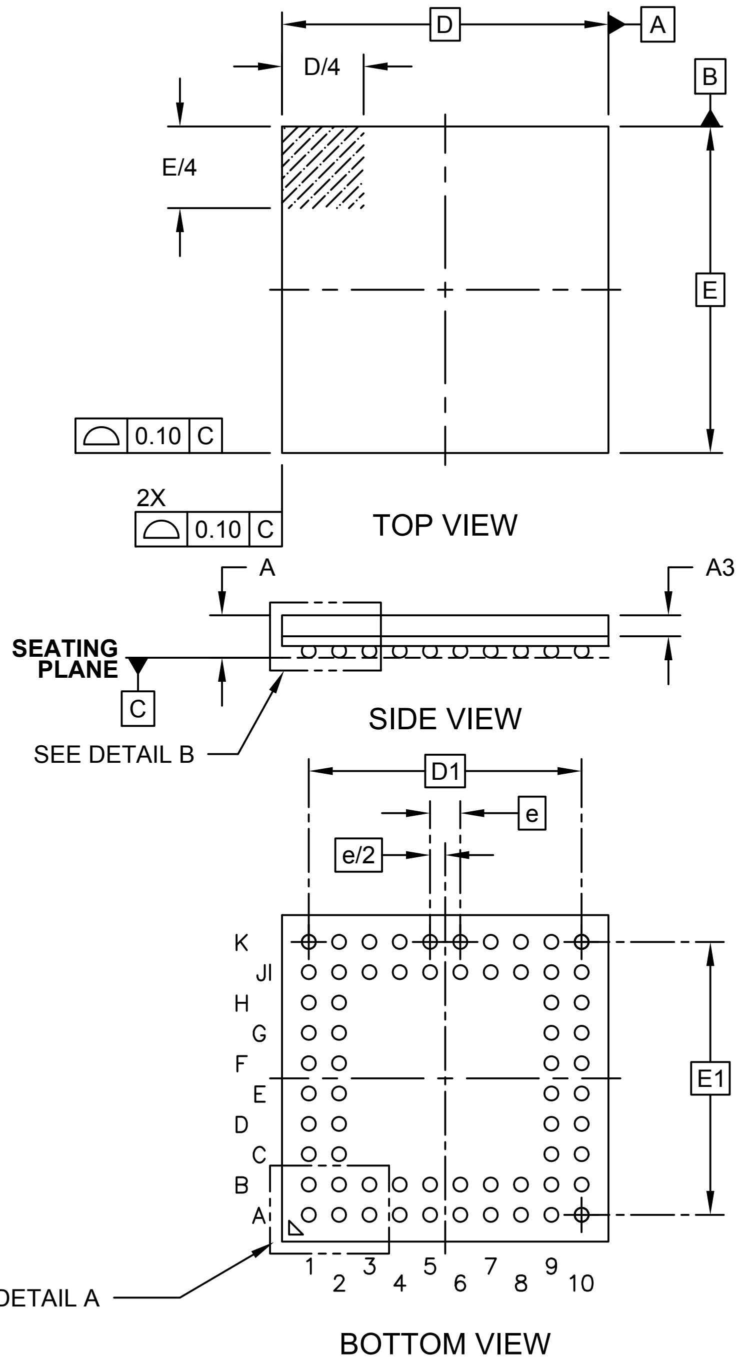
VFBGA

64-Ball Very Thin Fine Pitch Ball Grid Array (4G) - 7x7x1.0 mm Body [VFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-370A Sheet 1 of 2

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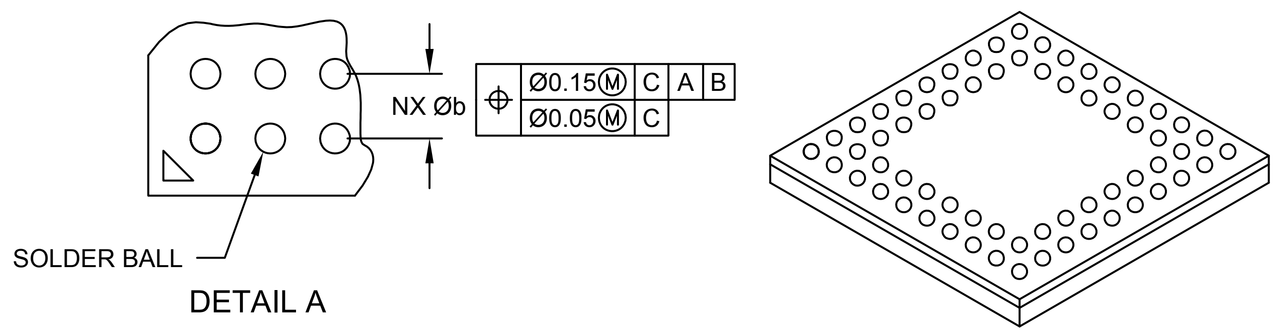
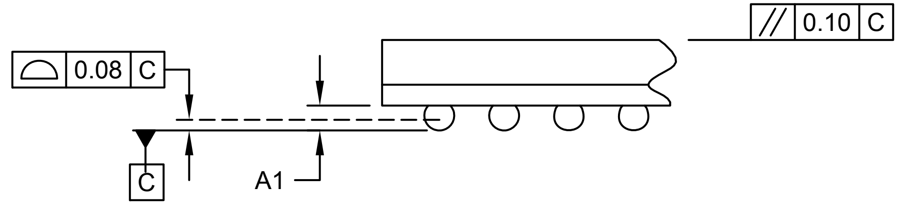
64-Ball Very Thin Fine Pitch Ball Grid Array (4G) - 7x7x1.0 mm Body [VFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		64	
Pitch	e		0.65 BSC	
Overall Height	A	-	-	1.00
Standoff	A1	0.16	-	0.25
Molded Cap Thickness	A3		0.45 REF	
Overall Width	E		7.00 BSC	
Overall Ball Pitch	E1		5.85 BSC	
Overall Length	D		7.00 BSC	
Overall Ball Pitch	D1		5.85 BSC	
Ball Diameter	Øb	0.25	0.30	0.35

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-370A Sheet 2 of 2

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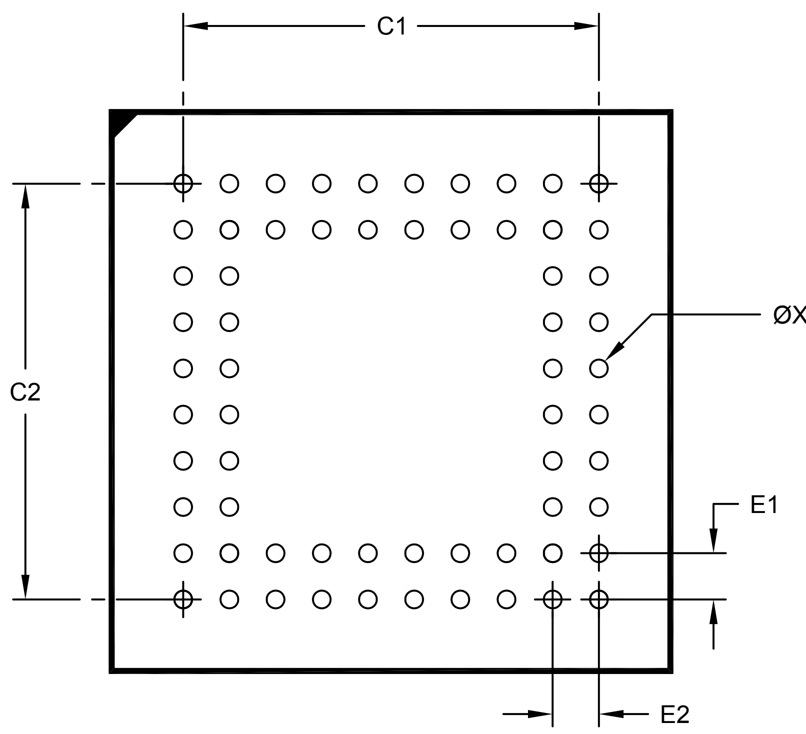
64-Ball Very Thin Fine Pitch Ball Grid Array (4G) - 7x7x1.0 mm Body [VFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E1	0.65 BSC		
Contact Pitch	E2	0.65 BSC		
Contact Pad Spacing	C1		5.85	
Contact Pad Spacing	C2		5.85	
Contact Pad Diameter (X64)	X		0.25	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2370A

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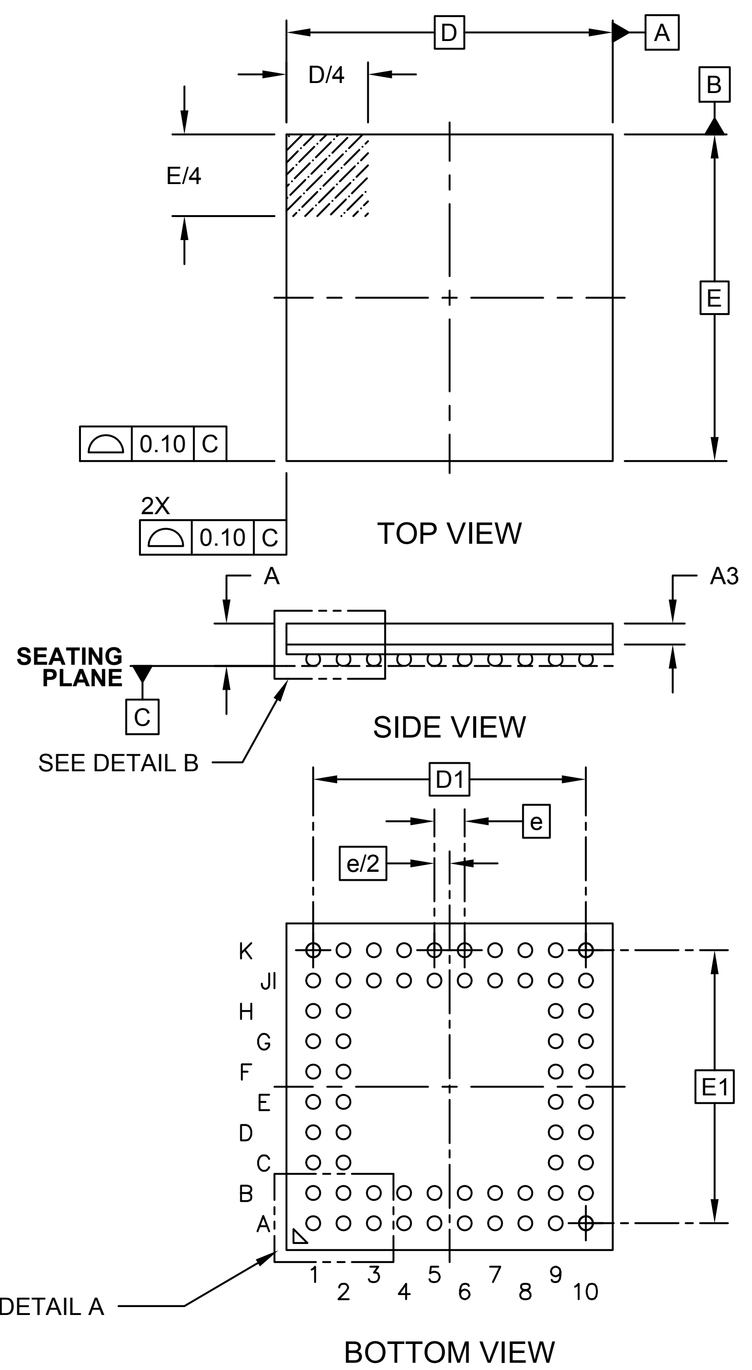
64-Ball Very Thin Fine Pitch Ball Grid Array (GA) - 7x7x1.0 mm Body [VFBGA] Supertex Legacy

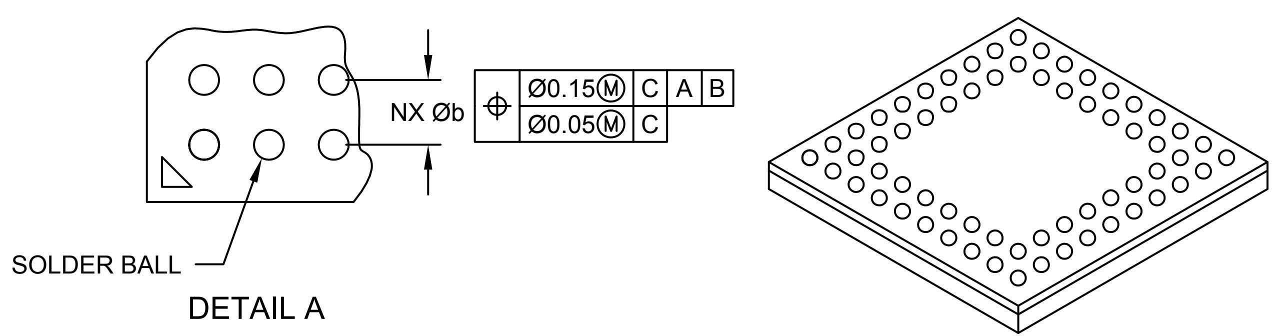
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

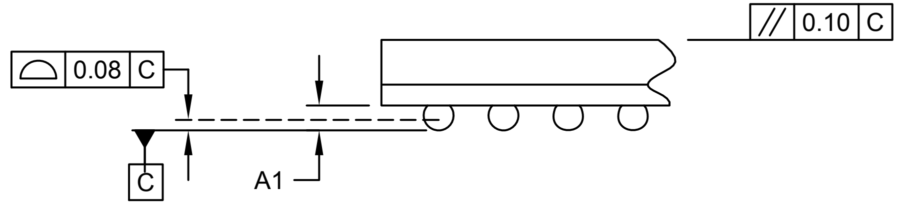


Microchip Technology Drawing C04-370-GA Rev A Sheet 1 of 2

64-Ball Very Thin Fine Pitch Ball Grid Array (GA) - 7x7x1.0 mm Body [VFBGA] Supertex Legacy

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





DETAIL A

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	64		
Pitch	e	0.65 BSC		
Overall Height	A	-	-	1.00
Standoff	A1	0.16	-	0.25
Molded Cap Thickness	A3	0.45 REF		
Overall Width	E	7.00 BSC		
Overall Ball Pitch	E1	5.85 BSC		
Overall Length	D	7.00 BSC		
Overall Ball Pitch	D1	5.85 BSC		
Ball Diameter	Øb	0.25	0.30	0.35

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-370-GA Rev A Sheet 2 of 2

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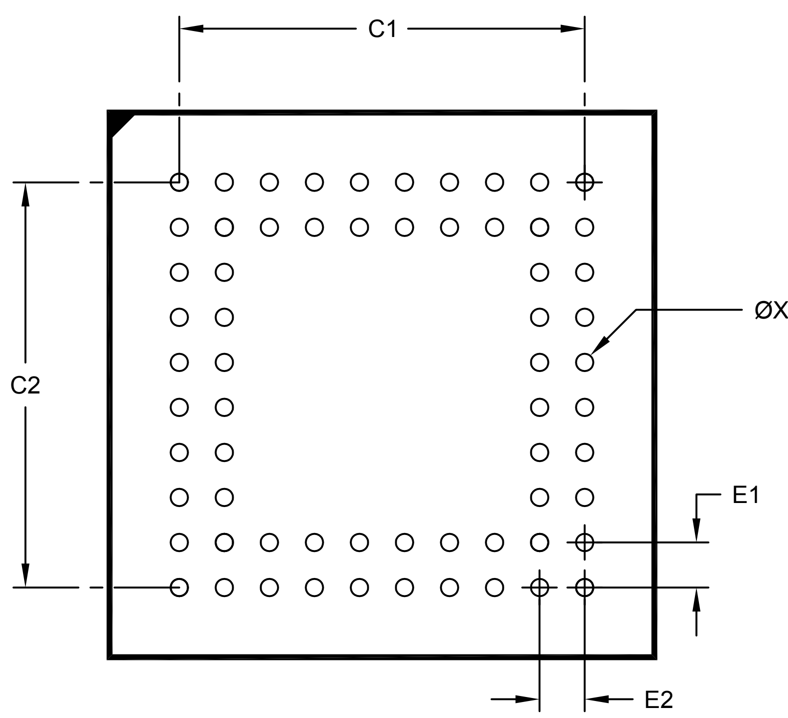
64-Ball Very Thin Fine Pitch Ball Grid Array (GA) - 7x7x1.0 mm Body [VFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E1		0.65 BSC	
Contact Pitch	E2		0.65 BSC	
Contact Pad Spacing	C1		5.85	
Contact Pad Spacing	C2		5.85	
Contact Pad Diameter (X64)	X		0.25	

Notes:

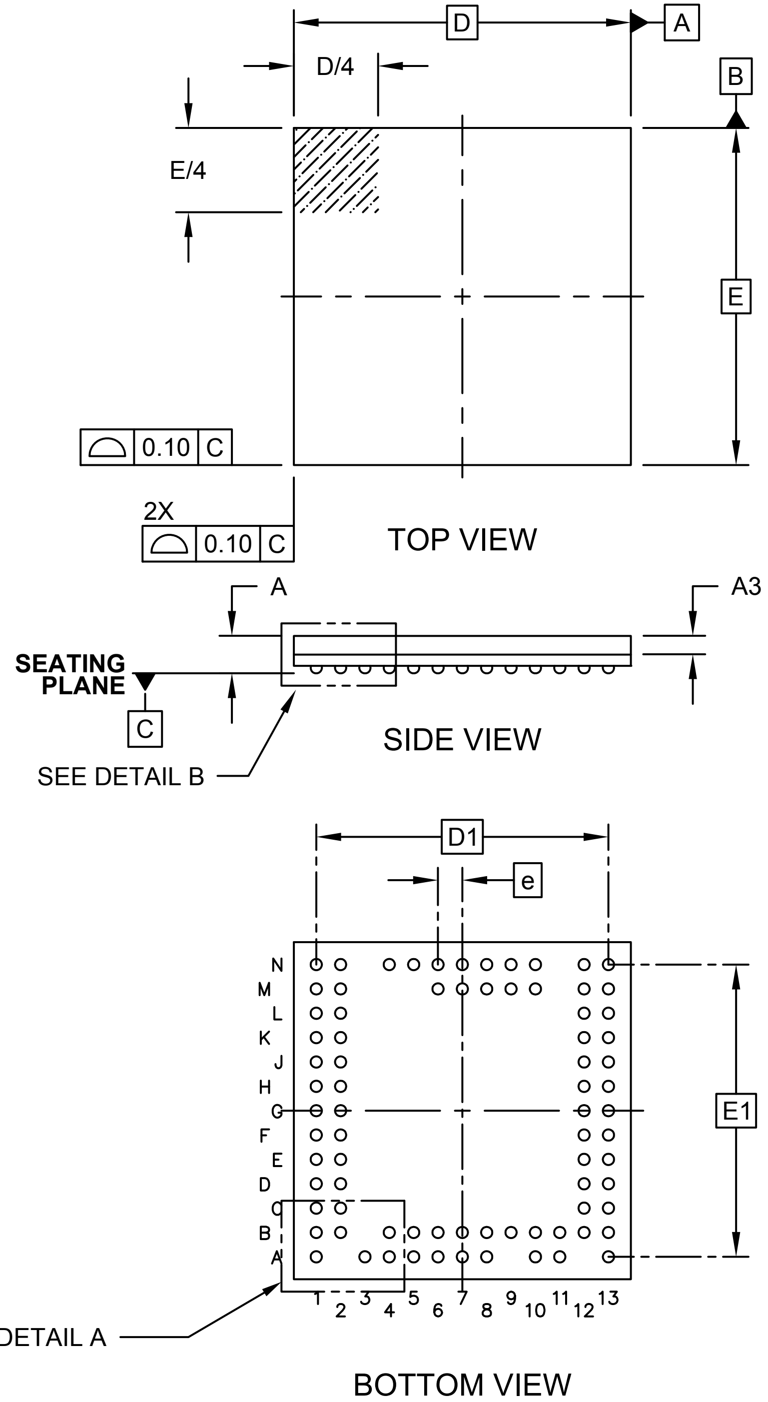
1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2370-GA Rev A

78-Ball Very Thin Fine Pitch Ball Grid Array (5G) - 9x9x1.0 mm Body [VFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-371-5G Rev B Sheet 1 of 2

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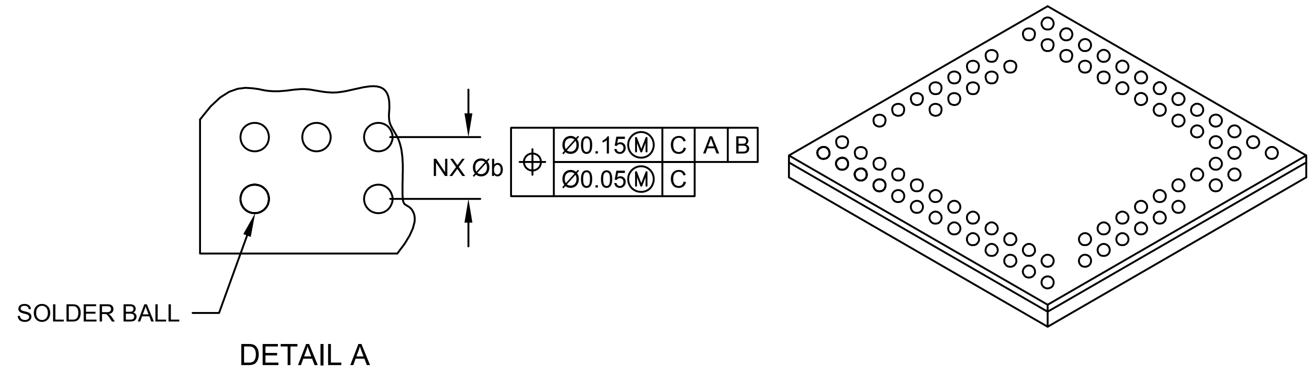
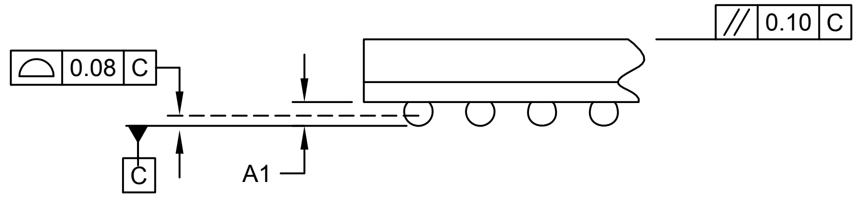
78-Ball Very Thin Fine Pitch Ball Grid Array (5G) - 9x9x1.0 mm Body [VFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		78	
Pitch	e		0.65 BSC	
Overall Height	A	-	-	1.00
Standoff	A1	0.15	0.20	0.25
Molded Cap Thickness	A3	0.45	0.50	0.55
Overall Width	E		9.00 BSC	
Overall Ball Pitch	E1		7.80 BSC	
Overall Length	D		9.00 BSC	
Overall Ball Pitch	D1		7.80 BSC	
Ball Diameter	Øb	0.25	0.30	0.35

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

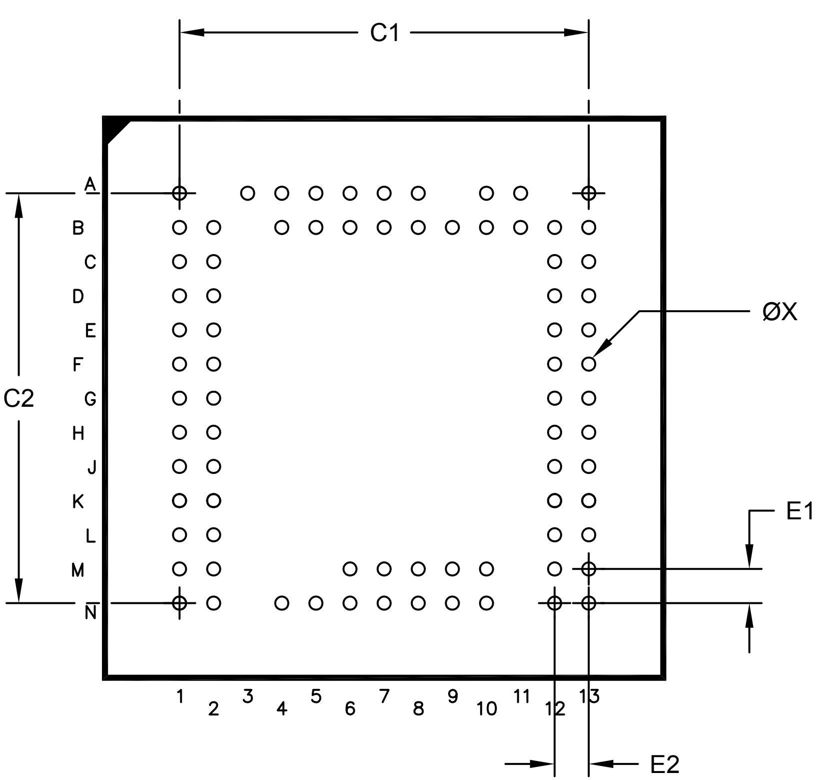
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-371-5G Rev B Sheet 2 of 2

78-Ball Very Thin Fine Pitch Ball Grid Array (5G) - 9x9x1.0 mm Body [VFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E1	0.65 BSC		
Contact Pitch	E2	0.65 BSC		
Contact Pad Spacing	C1		780	
Contact Pad Spacing	C2		7.80	
Contact Pad Diameter (X78)	X		0.25	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2371-5G Rev B

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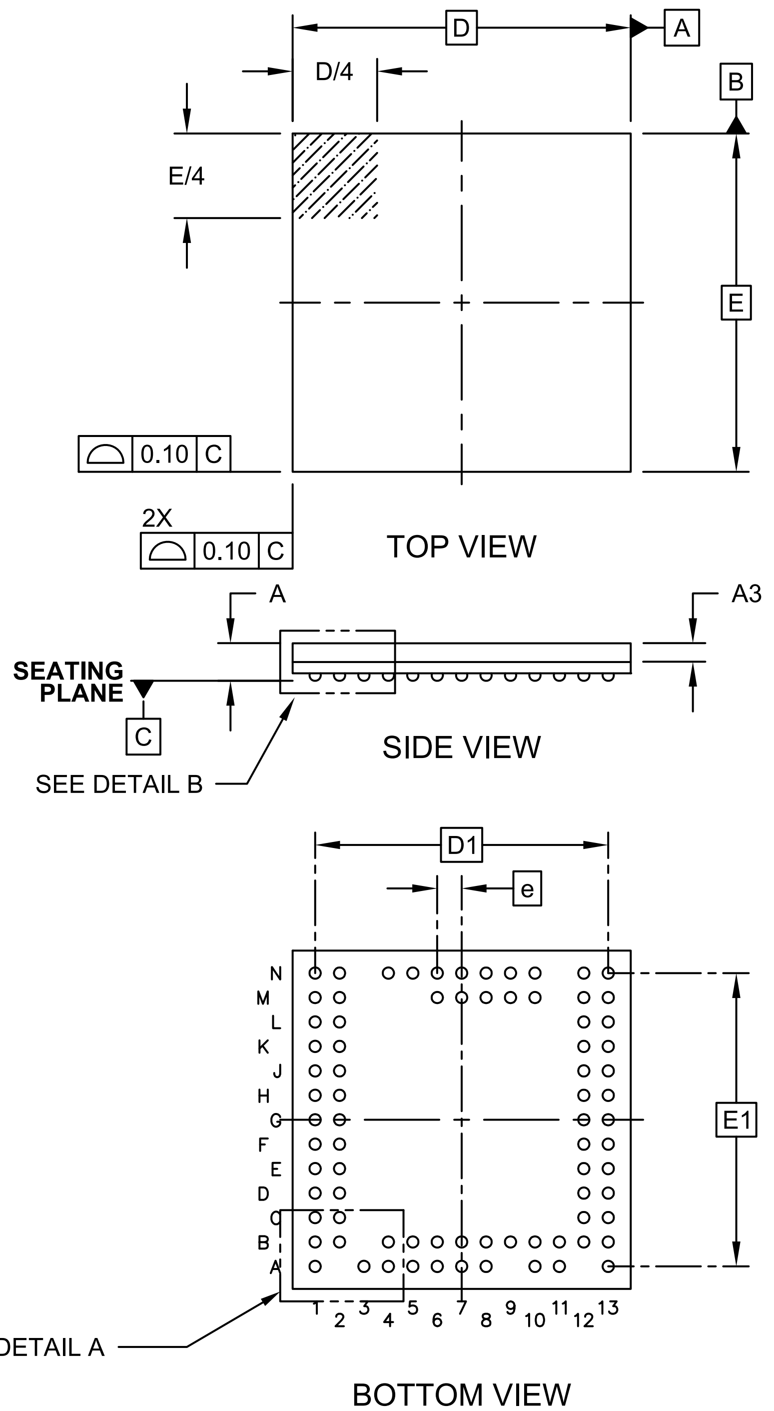
78-Ball Very Thin Fine Pitch Ball Grid Array (GA) - 9x9x1.0 mm Body [VFBGA] Supertex Legacy

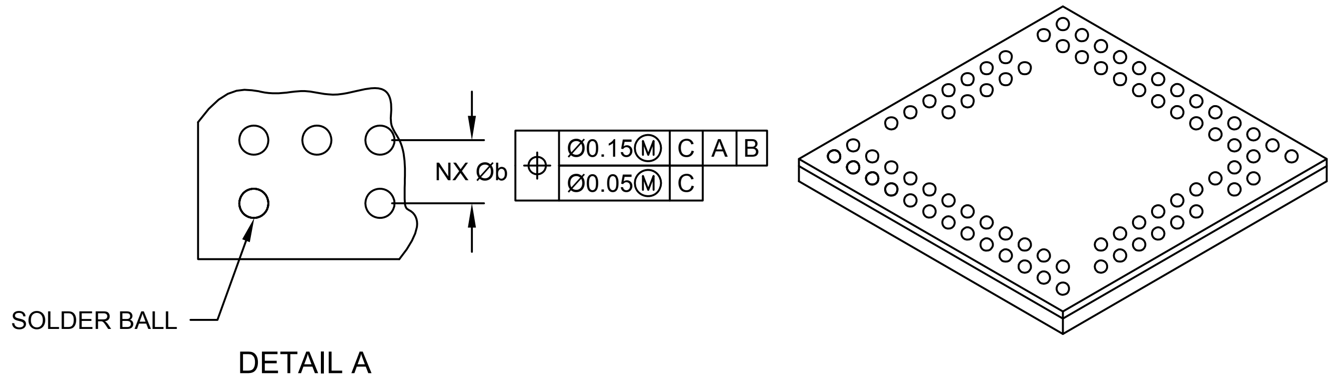
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

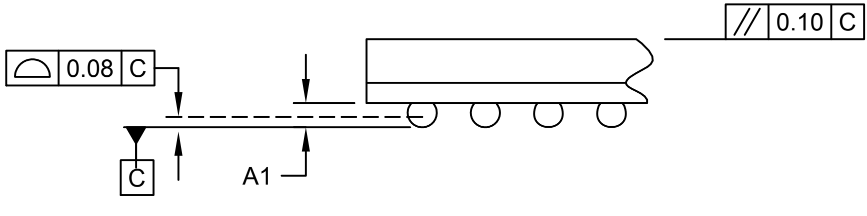


Microchip Technology Drawing C04-371-GA Rev B Sheet 1 of 2

78-Ball Very Thin Fine Pitch Ball Grid Array (GA) - 9x9x1.0 mm Body [VFBGA] Supertex Legacy

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		78	
Pitch	e		0.65 BSC	
Overall Height	A	-	-	1.00
Standoff	A1	0.15	0.20	0.25
Molded Cap Thickness	A3	0.45	0.50	0.55
Overall Width	E		9.00 BSC	
Overall Ball Pitch	E1		7.80 BSC	
Overall Length	D		9.00 BSC	
Overall Ball Pitch	D1		7.80 BSC	
Ball Diameter	Øb	0.25	0.30	0.35

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-371-GA Rev B Sheet 2 of 2

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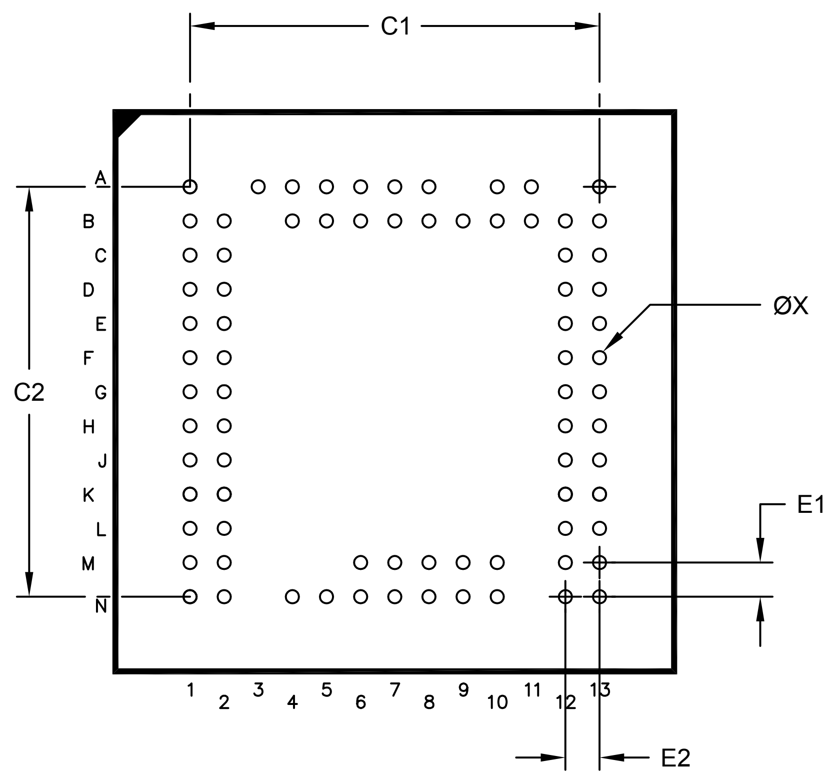
78-Ball Very Thin Fine Pitch Ball Grid Array (GA) - 9x9x1.0 mm Body [VFBGA] Supertex Legacy

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E1	0.65 BSC		
Contact Pitch	E2	0.65 BSC		
Contact Pad Spacing	C1		780	
Contact Pad Spacing	C2		7.80	
Contact Pad Diameter (X78)	X		0.25	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2371-GA Rev B

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NOTES:

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WFBGA

144-Ball Very, Very Thin Fine Pitch Ball Grid Array (SZ) -9x9x0.8 mm Body [WFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

NOTE 1

D

D/4

A

B

E/4

E

(DATUM B)

(DATUM A)

2X 0.15 C

2X 0.15 C

TOP VIEW

C

SEATING PLANE

A

A1

(A2)

SEE DETAIL "A"

SIDE VIEW

D1

e

e

E1

BALL A1

144X Øb

0.15Ⓜ C A B

0.08Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-380A Sheet 1 of 2

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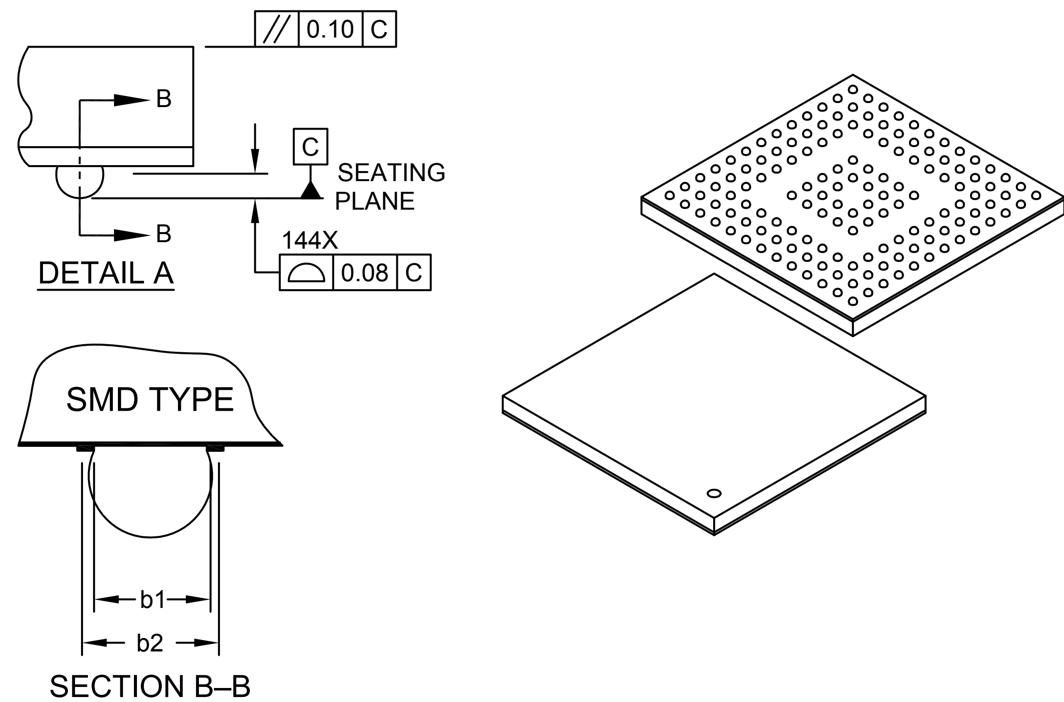
144-Ball Very, Very Thin Fine Pitch Ball Grid Array (SZ) -9x9x0.8 mm Body [WFBGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Ball Pitch	e		0.65 BSC	
Overall Height	A	-	0.70	0.80
Standoff	A1	0.12	0.17	0.22
Terminal Thickness	A2		0.53 REF	
Overall Length	D		9.00 BSC	
Overall Ball Pitch	D1		7.80 BSC	
Overall Width	E		9.00 BSC	
Overall Ball Pitch	E1		7.80 BSC	
Ball Diameter	b	0.20	0.25	0.30
Finished Solder Mask Opening	b1	0.22	0.25	0.28
Finished Bottom Ball Pad	b2	0.30	0.35	0.40

Notes:

1. Ball A1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Primary Datum "C" and Seating Plane are defined by the spherical crowns of the contact solder balls.
5. Dimension "A" does not include attached external featues, such as heat sink or chip capacitors.
6. The package ball solderable surface is solder-mask defined (SMD) type.

Microchip Technology Drawing C04-380A Sheet 2 of 2

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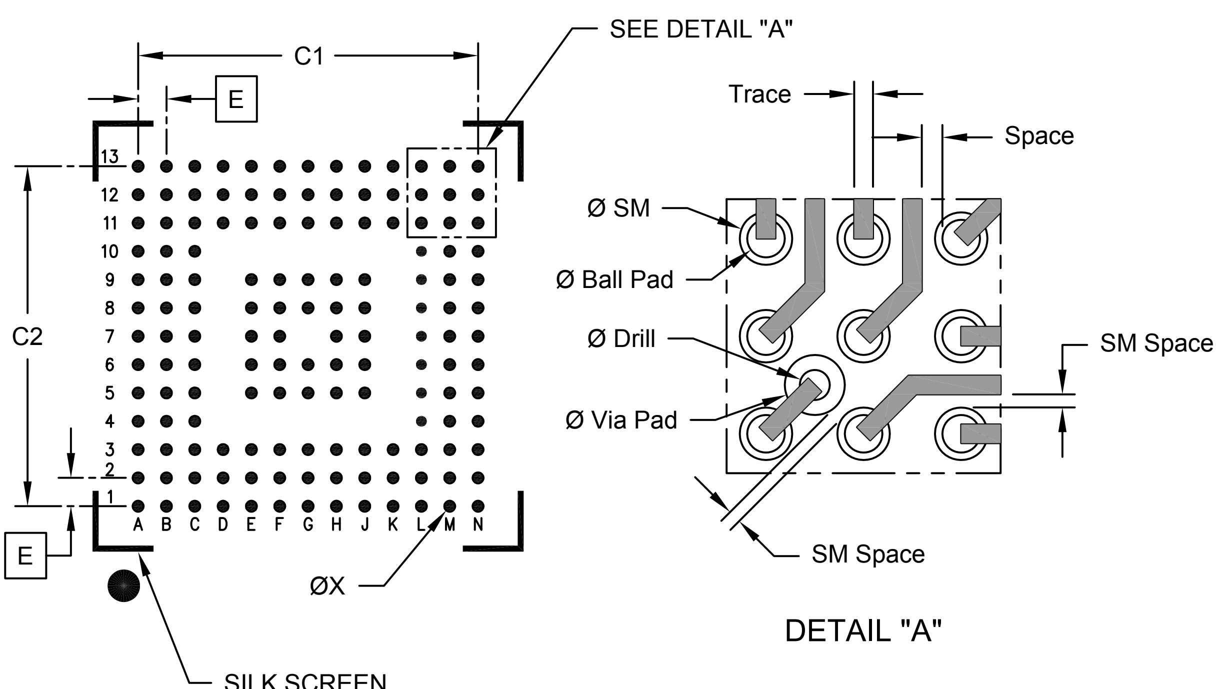
144-Ball Very, Very Thin Fine Pitch Ball Grid Array (SZ) -9x9x0.8 mm Body [WFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Overall Contact Pitch	C1		7.80	
Overall Contact Pitch	C2		7.80	
Contact Pad Diameter	X		0.25	

Routing Dimensions

Units	mm
Feature	
Ø PAD	0.250
Ø SM	0.350
Trace Width	0.125
Space (Min.)	0.135
SM Space (Min.)	0.085
Ø Via Pad	0.400
Ø Drill	0.200

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2380A

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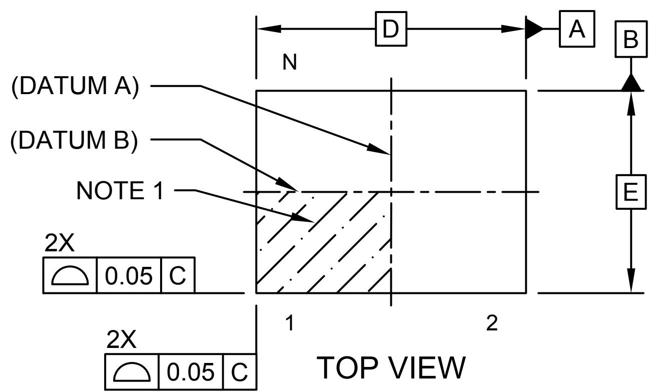
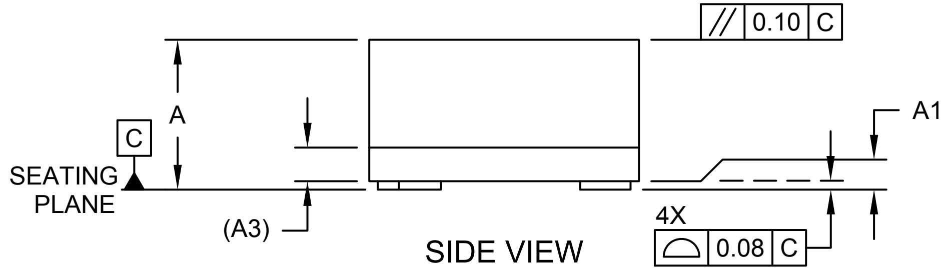
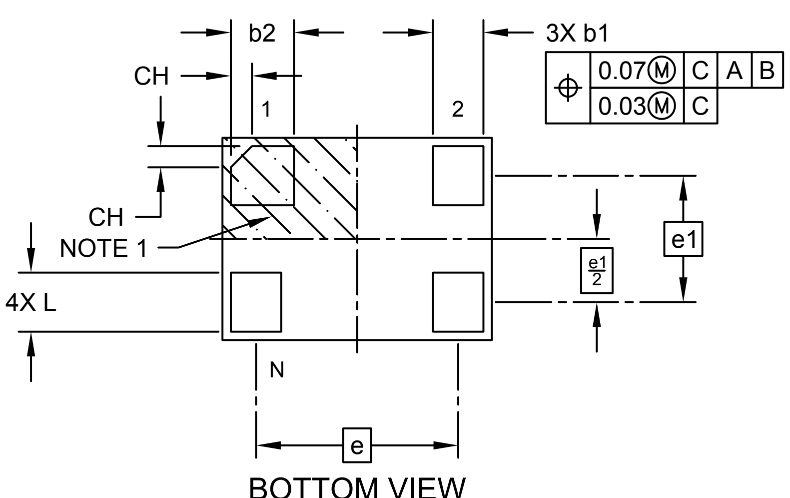
VFLGA

4-Lead Very Thin Fine Pitch Land Grid Array (ARA) - 1.6x1.2 mm Body [VFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-1199A Sheet 1 of 2

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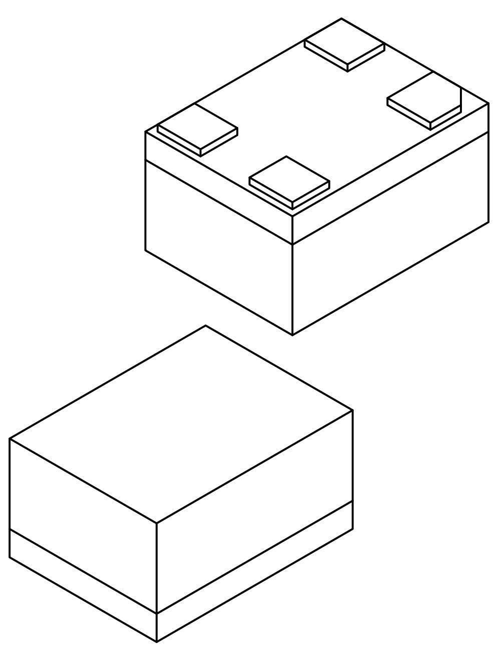
4-Lead Very Thin Fine Pitch Land Grid Array (ARA) - 1.6x1.2 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Terminals	N		4	
Terminal Pitch	e		1.20 BSC	
Terminal Pitch	e1		0.75 BSC	
Overall Height	A	0.79	0.84	0.89
Standoff	A1	0.00	0.02	0.05
Substrate Thickness (with Terminals)	A3		0.20 REF	
Overall Length	D		1.60 BSC	
Overall Width	E		1.20 BSC	
Terminal Width	b1	0.25	0.30	0.35
Terminal Width	b2	0.325	0.375	0.425
Terminal Length	L	0.30	0.35	0.40
Terminal 1 Index Chamfer	CH	-	0.125	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

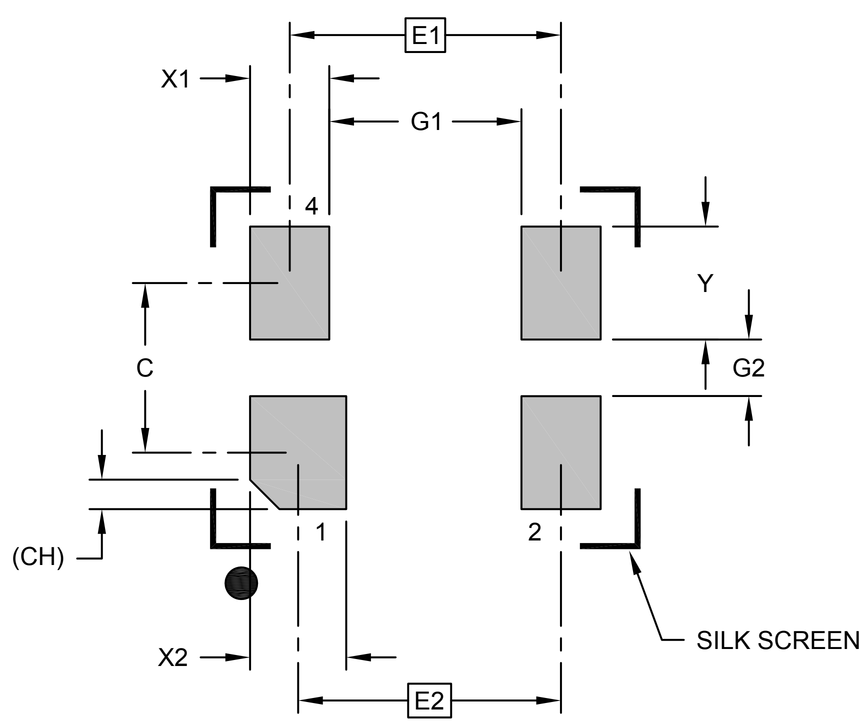
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1199A Sheet 2 of 2

4-Lead Very Thin Fine Pitch Land Grid Array (ARA) - 1.6x1.2 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E1		1.20 BSC	
Contact Pitch	E2		1.16 BSC	
Contact Spacing	C		0.75	
Contact Width (X3)	X1			0.35
Contact Width	X2			0.43
Contact Pad Length (X6)	Y			0.50
Space Between Contacts (X4)	G1	0.85		
Space Between Contacts (X3)	G2	0.25		
Contact 1 Index Chamfer	CH		0.13 X 45° REF	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3199A

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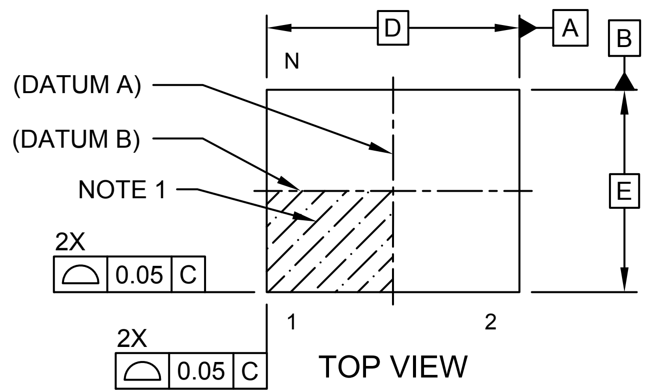
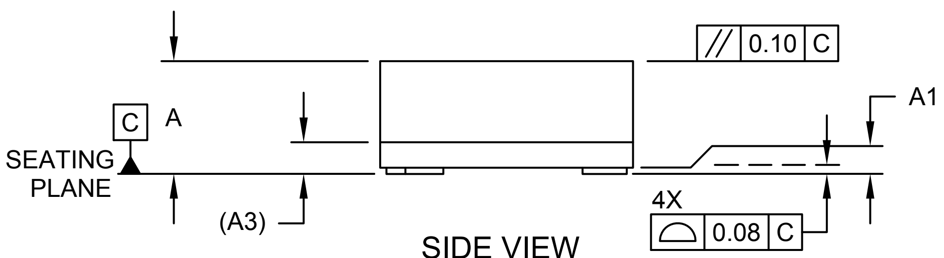
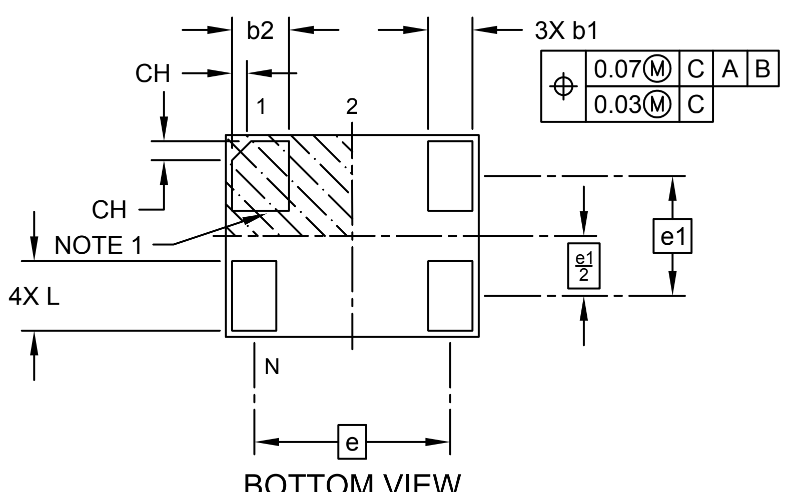
4-Lead Very Thin Fine Pitch Land Grid Array (ASA) - 2.0x1.6 mm Body [VFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-1200A Sheet 1 of 2

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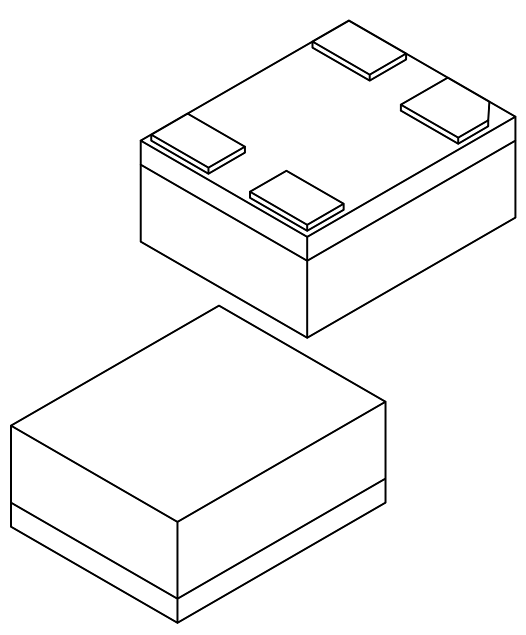
4-Lead Very Thin Fine Pitch Land Grid Array (ASA) - 2.0x1.6 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		6	
Terminal Pitch	e		1.55 BSC	
Terminal Pitch	e1		0.95 BSC	
Overall Height	A	0.79	0.84	0.89
Standoff	A1	0.00	0.02	0.05
Substrate Thickness (with Terminals)	A3		0.20 REF	
Overall Length	D		2.00 BSC	
Overall Width	E		1.60 BSC	
Terminal Width	b1	0.30	0.35	0.40
Terminal Width	b2	0.40	0.45	0.50
Terminal Length	L	0.50	0.55	0.60
Terminal 1 Index Chamfer	CH	-	0.15	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1200A Sheet 2 of 2

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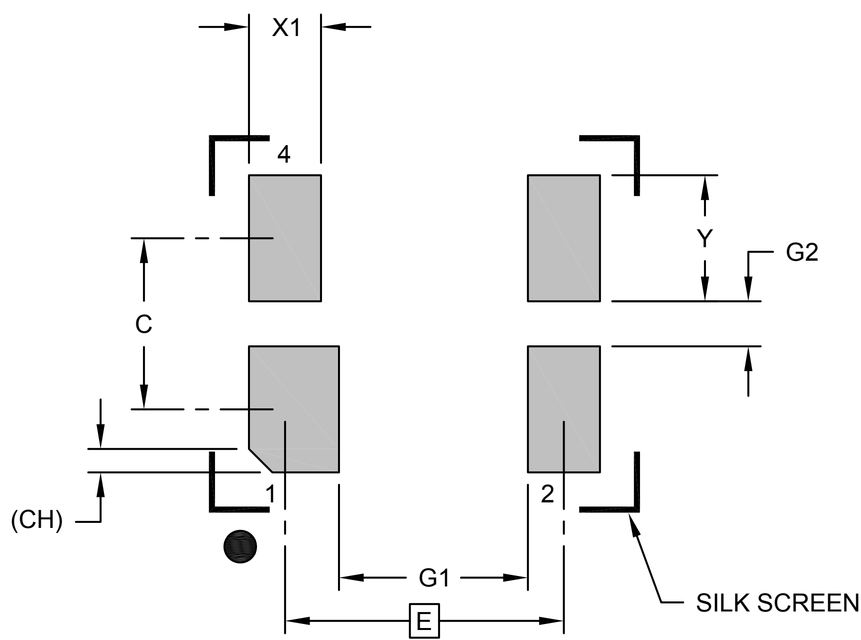
4-Lead Very Thin Fine Pitch Land Grid Array (ASA) - 2.0x1.6 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	1.55 BSC		
Contact Spacing	C		0.95	
Contact Width (X4)	X1			0.50
Contact Width (X2)	X2			0.40
Contact Pad Length (X6)	Y			0.70
Space Between Contacts (X4)	G1	1.05		
Space Between Contacts (X3)	G2	0.25		
Contact 1 Index Chamfer	CH	0.13 X 45° REF		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3200A

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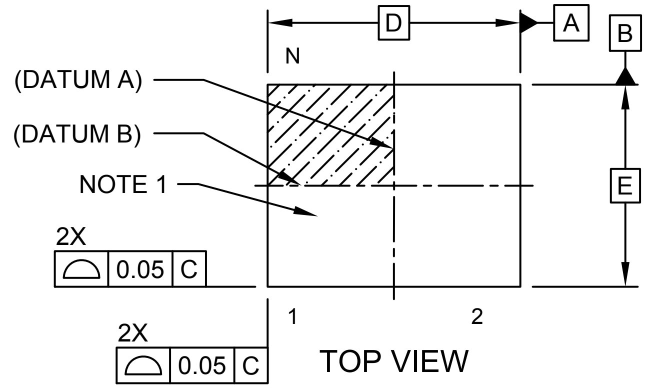
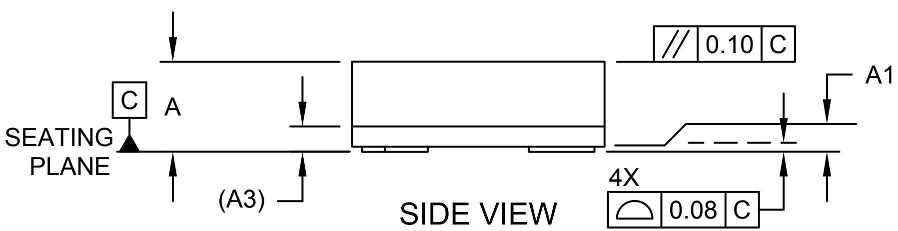
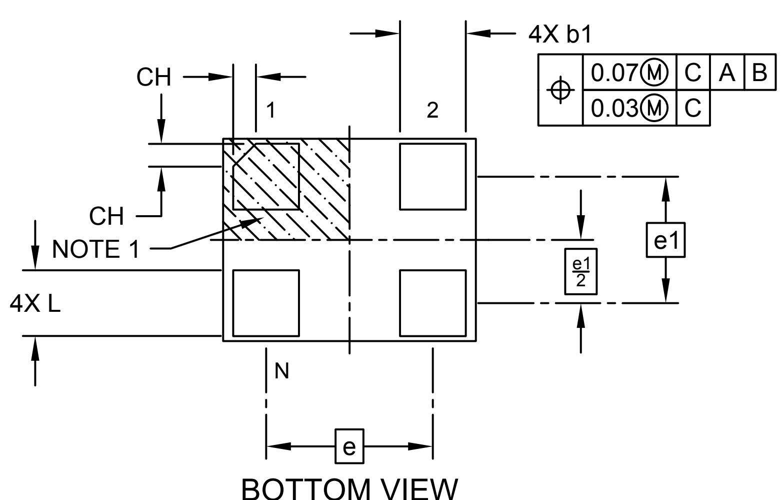
4-Lead Very Thin Land Grid Array (AUA) - 2.5x2.0 mm Body [VLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





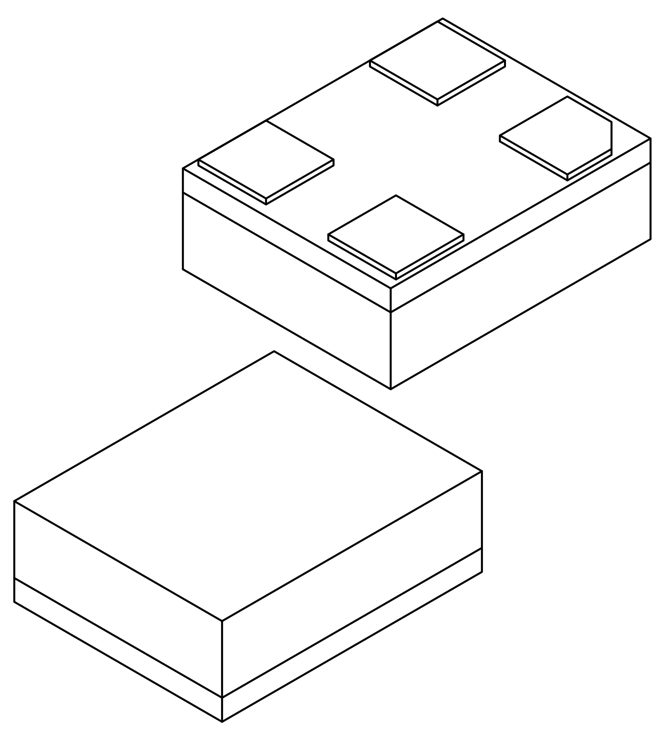


Microchip Technology Drawing C04-1202A Sheet 1 of 2

 © 2016 Microchip Technology Inc.

4-Lead Very Thin Land Grid Array (AUA) - 2.5x2.0 mm Body [VLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		4	
Terminal Pitch	e		1.65 BSC	
Terminal Pitch	e1		1.25 BSC	
Overall Height	A	0.79	0.84	0.89
Standoff	A1	0.00	0.02	0.05
Substrate Thickness (with Terminals)	A3		0.20 REF	
Overall Length	D		2.50 BSC	
Overall Width	E		2.00 BSC	
Terminal Width	b1	0.60	0.65	0.70
Terminal Length	L	0.60	0.65	0.70
Terminal 1 Index Chamfer	CH	-	0.225	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

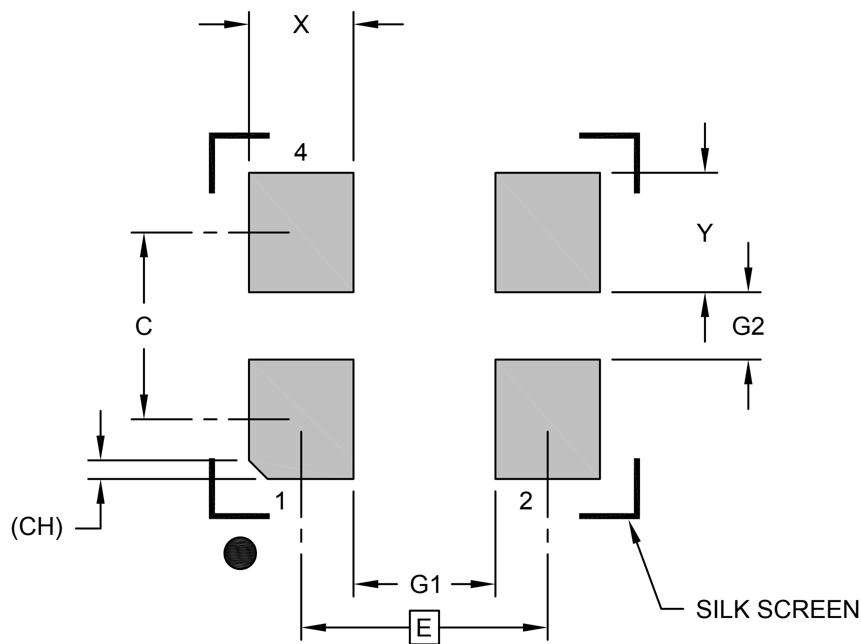
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1202A Sheet 2 of 2

4-Lead Very Thin Land Grid Array (AUA) - 2.5x2.0 mm Body [VLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.65 BSC	
Contact Spacing	C		1.25	
Contact Width (X4)	X			0.70
Contact Pad Length (X6)	Y			0.80
Space Between Contacts (X4)	G1	0.95		
Space Between Contacts (X3)	G2	0.45		
Contact 1 Index Chamfer	CH		0.13 X 45° REF	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3202A

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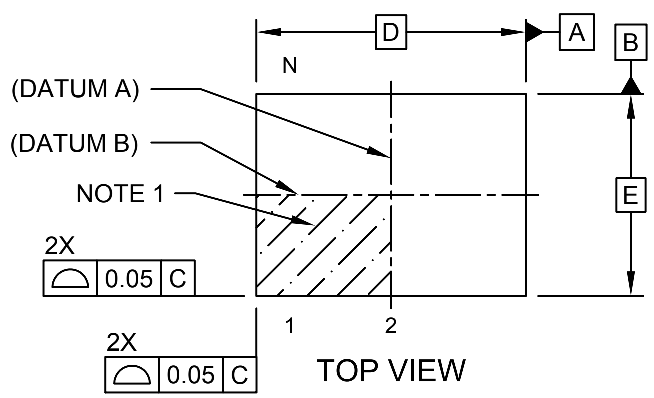
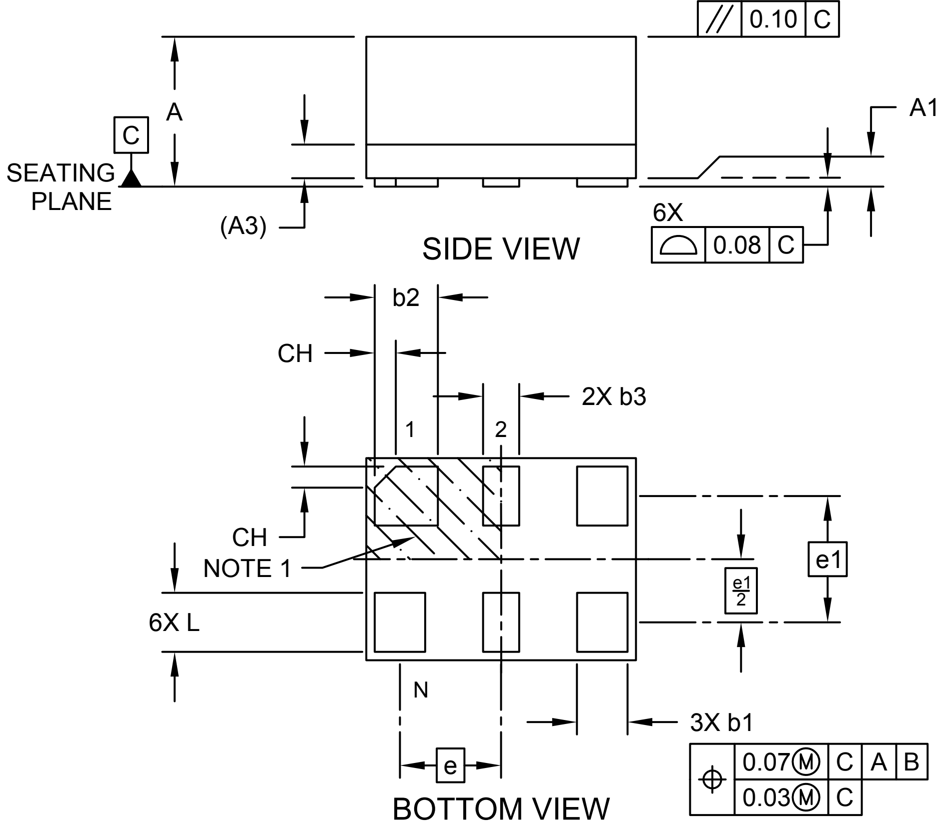
6-Lead Very Thin Fine Pitch Land Grid Array (AVA) - 1.6x1.2 mm Body [VFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

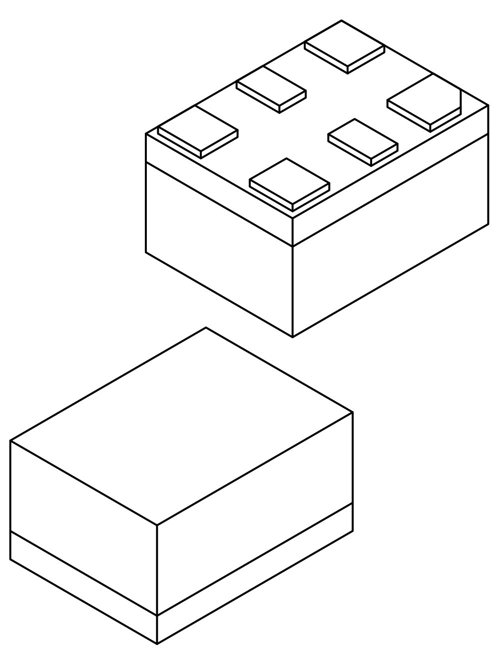




Microchip Technology Drawing C04-1203A Sheet 1 of 2

6-Lead Very Thin Fine Pitch Land Grid Array (AVA) - 1.6x1.2 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		6	
Terminal Pitch	e		0.60 BSC	
Terminal Pitch	e1		0.75 BSC	
Overall Height	A	0.79	0.84	0.89
Standoff	A1	0.00	0.02	0.05
Substrate Thickness (with Terminals)	A3		0.20 REF	
Overall Length	D		1.60 BSC	
Overall Width	E		1.20 BSC	
Terminal Width	b1	0.25	0.30	0.35
Terminal Width	b2	0.325	0.375	0.425
Terminal Width	b3	0.20	0.25	0.30
Terminal Length	L	0.30	0.35	0.40
Terminal 1 Index Chamfer	CH	-	0.125	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1203A Sheet 2 of 2

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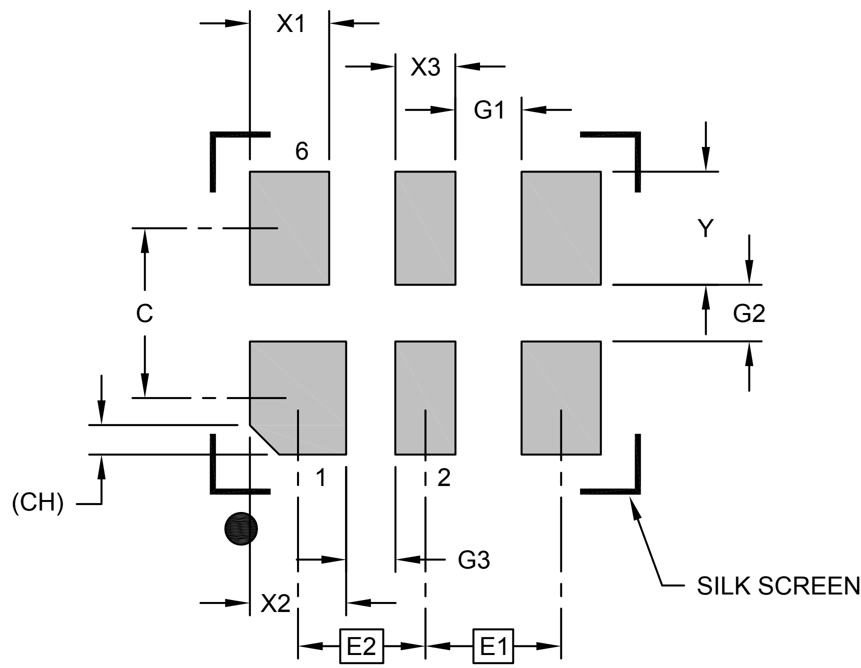
6-Lead Very Thin Fine Pitch Land Grid Array (AVA) - 1.6x1.2 mm Body [VFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch (X3)	E1	0.60 BSC		
Contact Pitch	E2		0.56 BSC	
Contact Spacing	C		0.75	
Contact Width (X3)	X1			0.35
Contact Width	X2			0.43
Contact Width (X2)	X3			0.27
Contact Pad Length (X6)	Y			0.50
Space Between Contacts (X4)	G1	0.29		
Space Between Contacts (X3)	G2	0.25		
Space Between Contacts	G3	0.22		
Contact 1 Index Chamfer	CH	0.13 X 45° REF		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3203A

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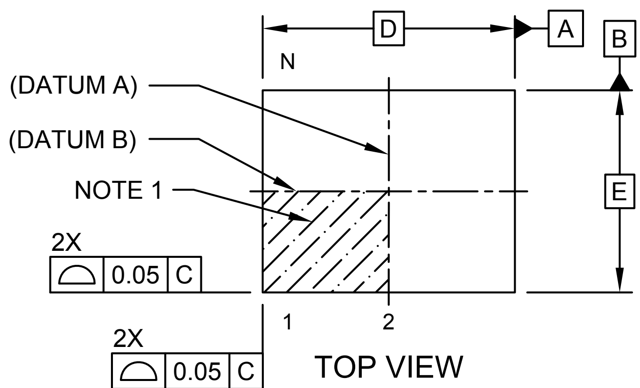
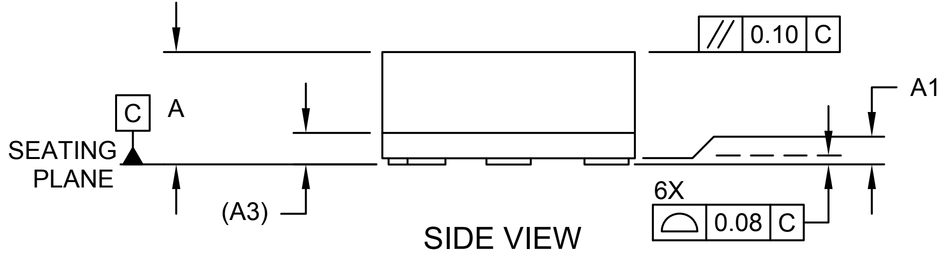
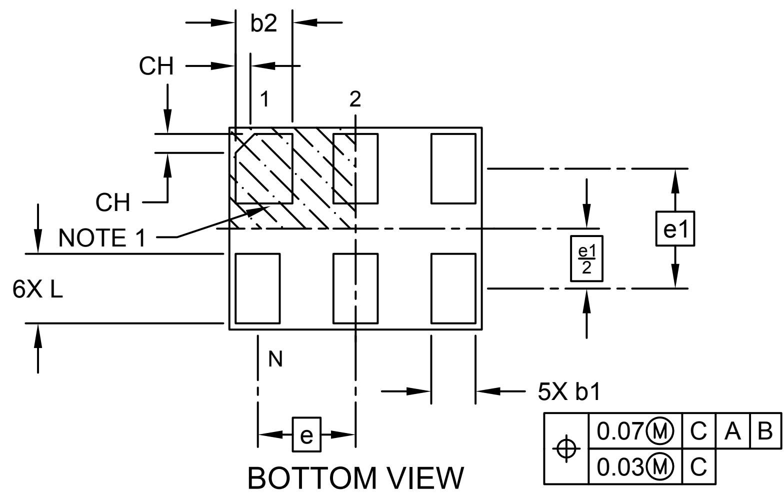
6-Lead Very Thin Fine Pitch Land Grid Array (ATA) - 2.0x1.6 mm Body [VFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-1201A Sheet 1 of 2

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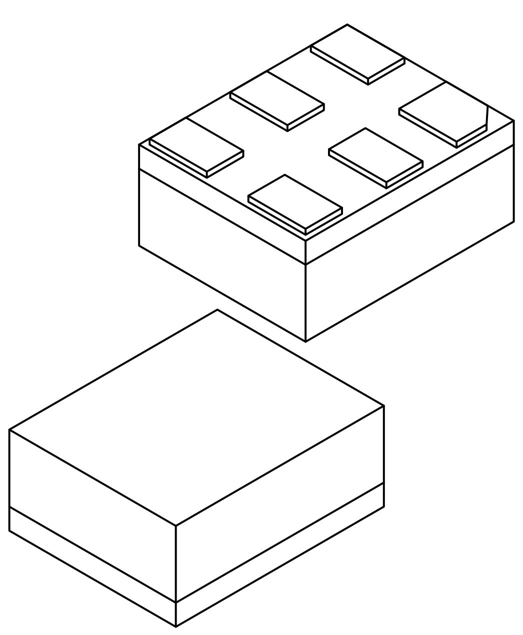
6-Lead Very Thin Fine Pitch Land Grid Array (ATA) - 2.0x1.6 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		6	
Terminal Pitch	e		0.775 BSC	
Terminal Pitch	e1		0.95 BSC	
Overall Height	A	0.79	0.84	0.89
Standoff	A1	0.00	0.02	0.05
Substrate Thickness (with Terminals)	A3		0.20 REF	
Overall Length	D		2.00 BSC	
Overall Width	E		1.60 BSC	
Terminal Width	b1	0.30	0.35	0.40
Terminal Width	b2	0.40	0.45	0.50
Terminal Length	L	0.50	0.55	0.60
Terminal 1 Index Chamfer	CH	-	0.15	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

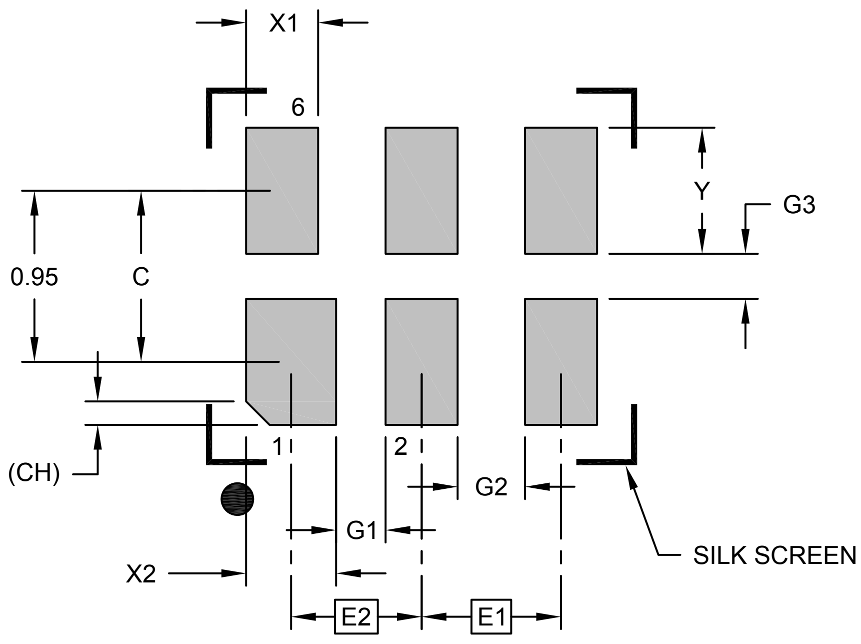
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1201A Sheet 2 of 2

6-Lead Very Thin Fine Pitch Land Grid Array (ATA) - 2.0x1.6 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E1	0.78 BSC		
Contact Pitch	E2	0.73 BSC		
Contact Spacing	C		0.95	
Contact Width (X4)	X1			0.40
Contact Width (X2)	X2			0.45
Contact Pad Length (X6)	Y			0.70
Space Between Contacts (X4)	G1	0.28		
Space Between Contacts (X3)	G2	0.38		
Space Between Contacts (X3)	G3	0.25		
Contact 1 Index Chamfer	CH	0.13 X 45° REF		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3201A

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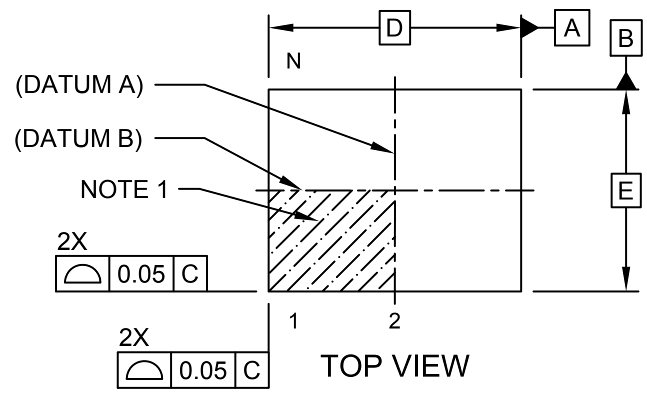
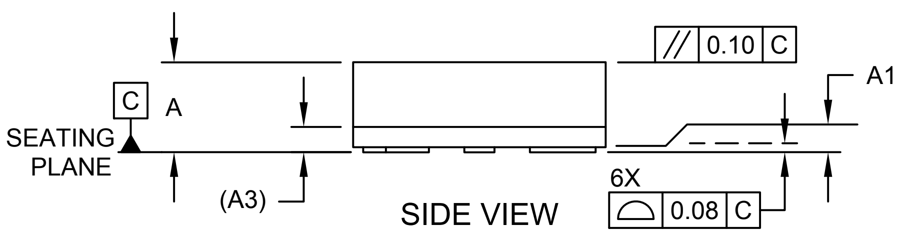
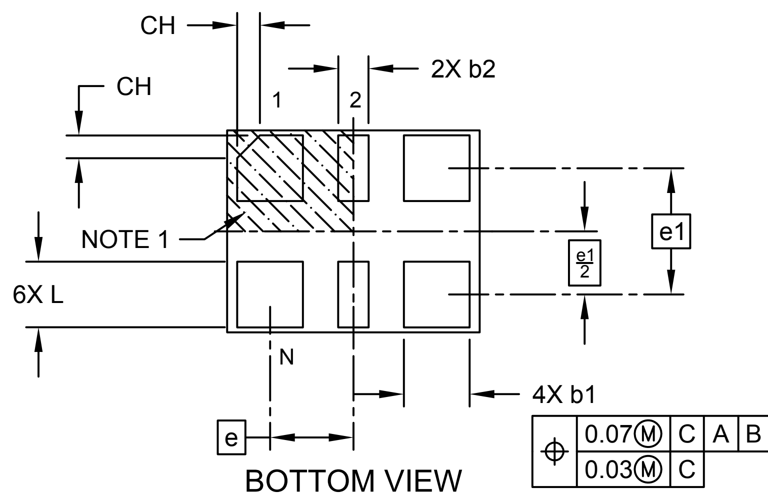
6-Lead Very Thin Fine Pitch Land Grid Array (AWA) - 2.5x2.0 mm Body [VFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







Microchip Technology Drawing C04-1204A Sheet 1 of 2

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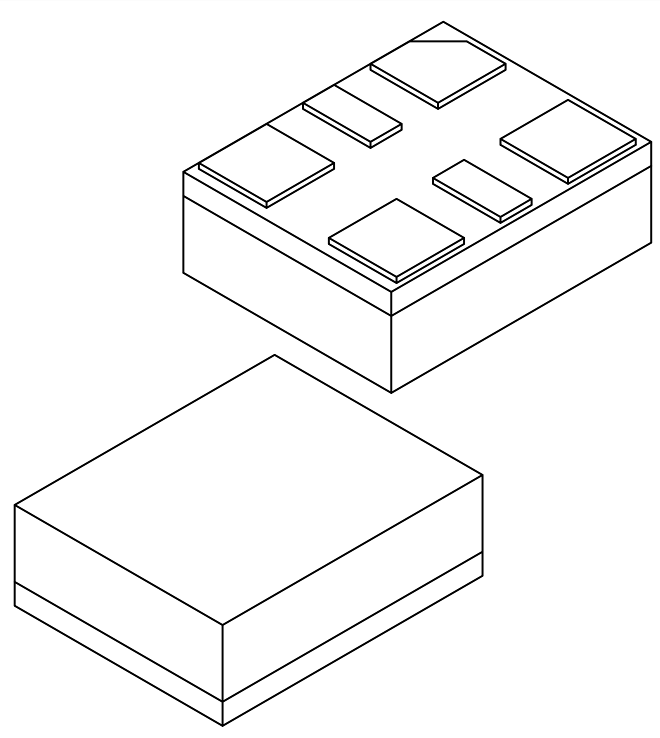
6-Lead Very Thin Fine Pitch Land Grid Array (AWA) - 2.5x2.0 mm Body [VFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		6	
Terminal Pitch	e		0.825 BSC	
Terminal Pitch	e1		1.25 BSC	
Overall Height	A	0.79	0.84	0.89
Standoff	A1	0.00	0.02	0.05
Substrate Thickness (with Terminals)	A3		0.20 REF	
Overall Length	D		2.50 BSC	
Overall Width	E		2.00 BSC	
Terminal Width	b1	0.60	0.65	0.70
Terminal Width	b2	0.25	0.30	0.35
Terminal Length	L	0.60	0.65	0.70
Terminal 1 Index Chamfer	CH	-	0.225	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1204A Sheet 2 of 2

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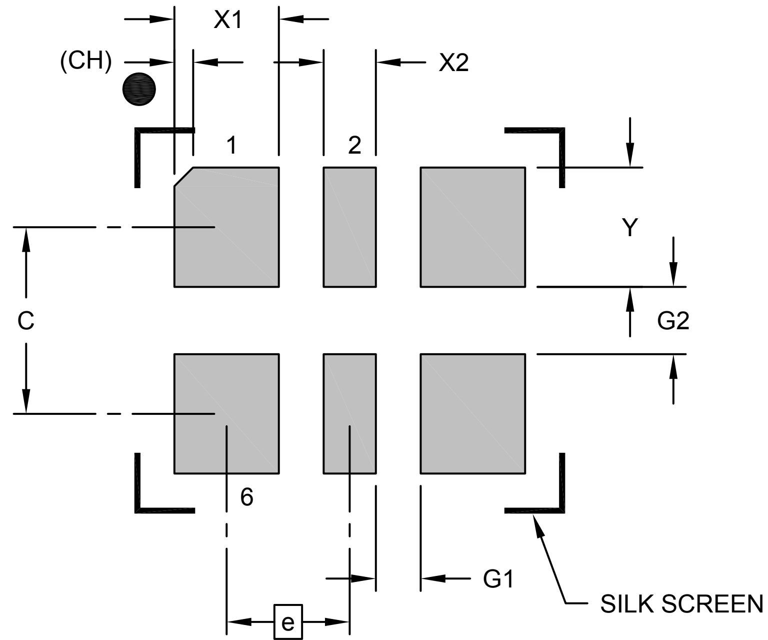
6-Lead Very Thin Fine Pitch Land Grid Array (AWA) - 2.5x2.0 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Contact Pitch	E	0.825 BSC		
Contact Spacing	C	1.25 BSC		
Contact Width (X4)	X1			0.70
Contact Width (X2)	X2			0.35
Contact Pad Length (X6)	Y			0.80
Space Between Contacts (X4)	G1	0.30		
Space Between Contacts (X3)	G2	0.45		
Contact 1 Index Chamfer	CH	0.13 X 45° REF		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3204A

56L Very Thin Fine Pitch Land Grid Array (4W) - 7x7x0.9 mm Body [VFLGA] With Exposed Pads

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Microchip Technology Drawing C04-384A Sheet 1 of 2

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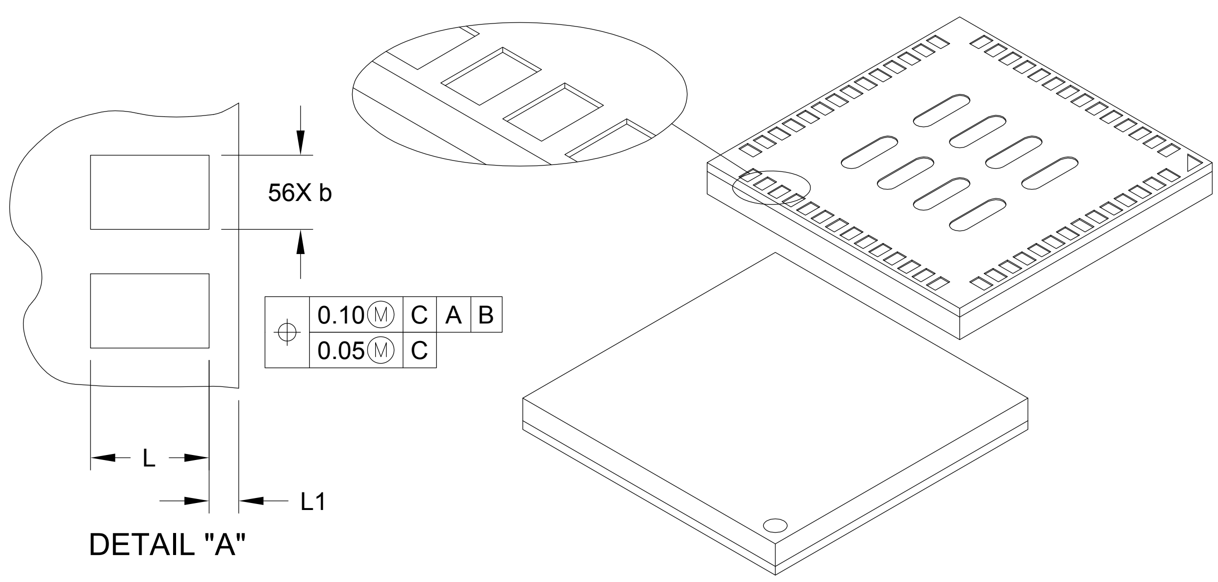
56L Very Thin Fine Pitch Land Grid Array (4W) - 7x7x0.9 mm Body [VFLGA] With Exposed Pads

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		56	
Pitch	e		0.40 BSC	
Exposed Pads Pitch	e2		1.00 BSC	
Exposed Pads Pitch	e3		2.00 BSC	
Overall Height	A	-	-	0.90
Substrate Thickness	A1		0.21 REF	
Mold Cap Height	A2		0.54 REF	
Overall Length	D		7.00 BSC	
Overall Terminal Pitch	D1		5.20 BSC	
Exposed Pads Overall Length	D3		3.40 REF	
Overall Width	E		7.00 BSC	
Overall Terminal Pitch	E1		5.20 BSC	
Overall Terminal Pitch	E1		3.40 REF	
Terminal Width	b	0.20	0.25	0.30
Exposed Pad Width	b3	0.35	0.40	0.45
Terminal Length	L	0.35	0.40	0.45
Terminal Pullback	L1	-	0.10	-
Exposed Pad Length	L3	1.35	1.40	1.45

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-384A Sheet 2 of 2

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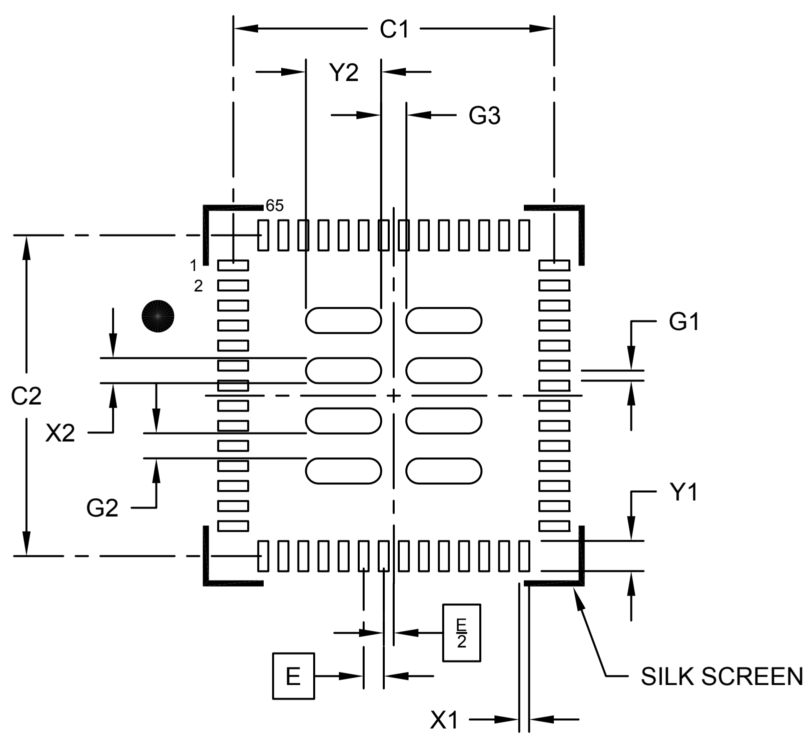
56L Very Thin Fine Pitch Land Grid Array (4W) - 7x7x0.9 mm Body [VFLGA] With Exposed Pads

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.40 BSC	
Center Pad Width (X8)	X2			0.50
Center Pad Length (X8)	Y2			1.50
Contact Pad Spacing	C1		6.40	
Contact Pad Spacing	C2		6.40	
Contact Pad Width (X56)	X1			0.20
Contact Pad Length (X56)	Y1			0.60
Contact Pad to Pad (X52)	G1	0.20		
Center Pads Clearance (X6)	G2		0.50	
Center Pads Clearance X4)	G3		0.50	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2384A

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Legacy SST Package Drawings & Specifications

NOTES:

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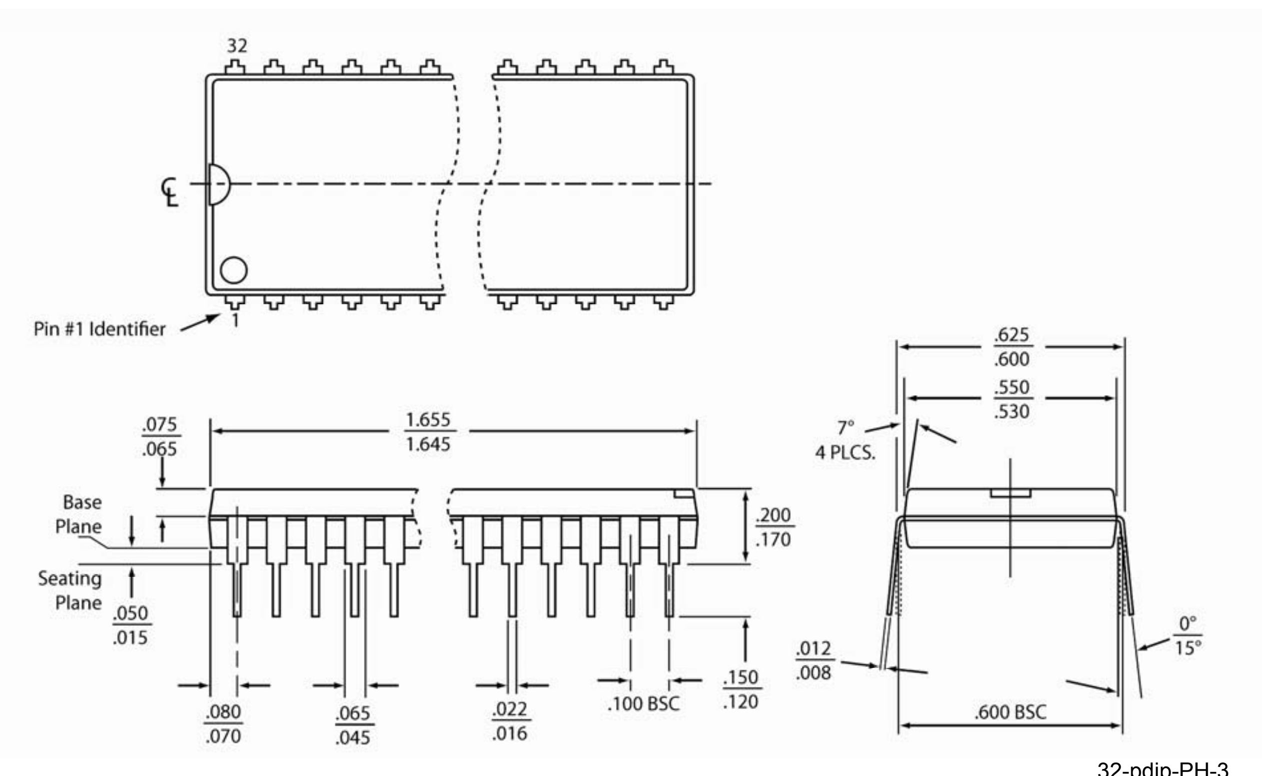
PDIP

SST Legacy

Package Outlines and Dimensions

32-Lead Plastic Dual Inline Package (PHE/F) - 15.2 mm Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



32-pdip-PH-3

Note:

1. Complies with JEDEC publication 95 MO-015 AP dimensions, although some dimensions may be more stringent.
2. All linear dimensions are in inches (max/min).
3. Dimensions do not include mold flash. Maximum allowable mold flash is .010 inches

Microchip Technology Drawing C04-14022A Sheet 1 of 1

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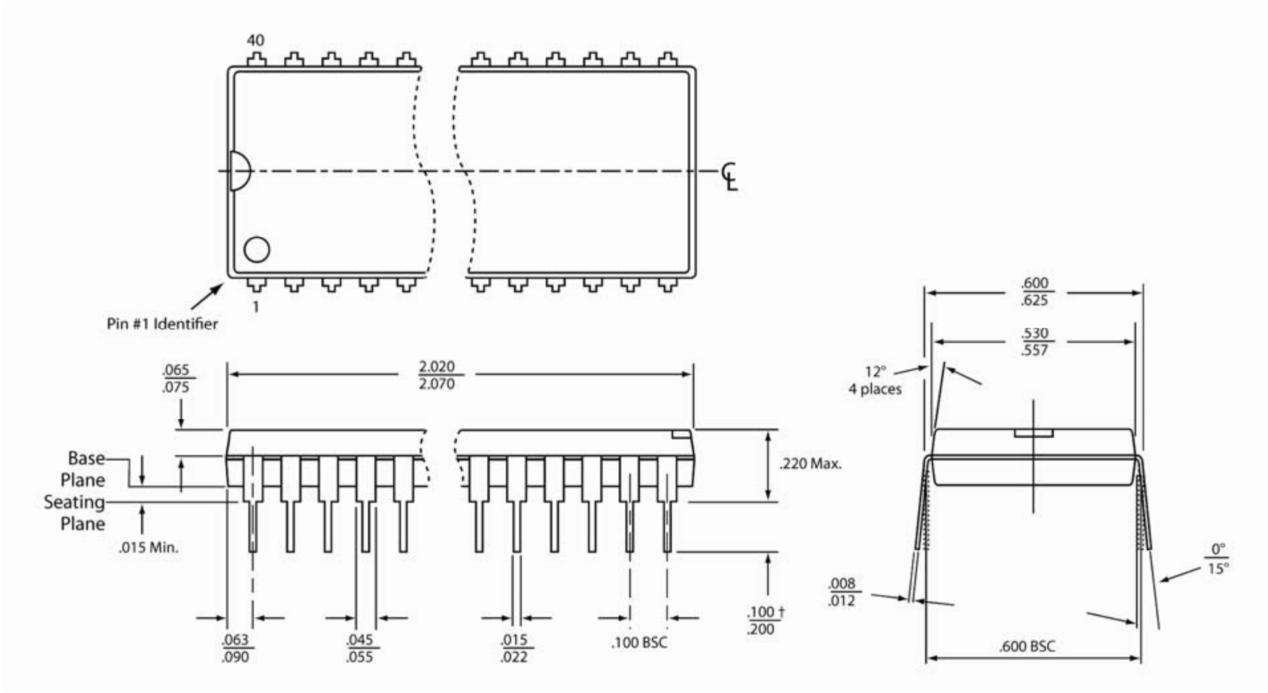
40-Lead Plastic Dual Inline Package (PIE/F) - .600 Inch Body [PDIP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



40-pdip-PI-7

Note:
1. Complies with JEDEC publication 95 MS-011 AC dimensions (except as noted), although some dimensions may be more stringent.
   † = JEDEC min is .115; SST min is less stringent
2. All linear dimensions are in inches (min/max).
3. Dimensions do not include mold flash. Maximum allowable mold flash is .010 inches.

Microchip Technology Drawing C04-14028A Sheet 1 of 1

NOTES:

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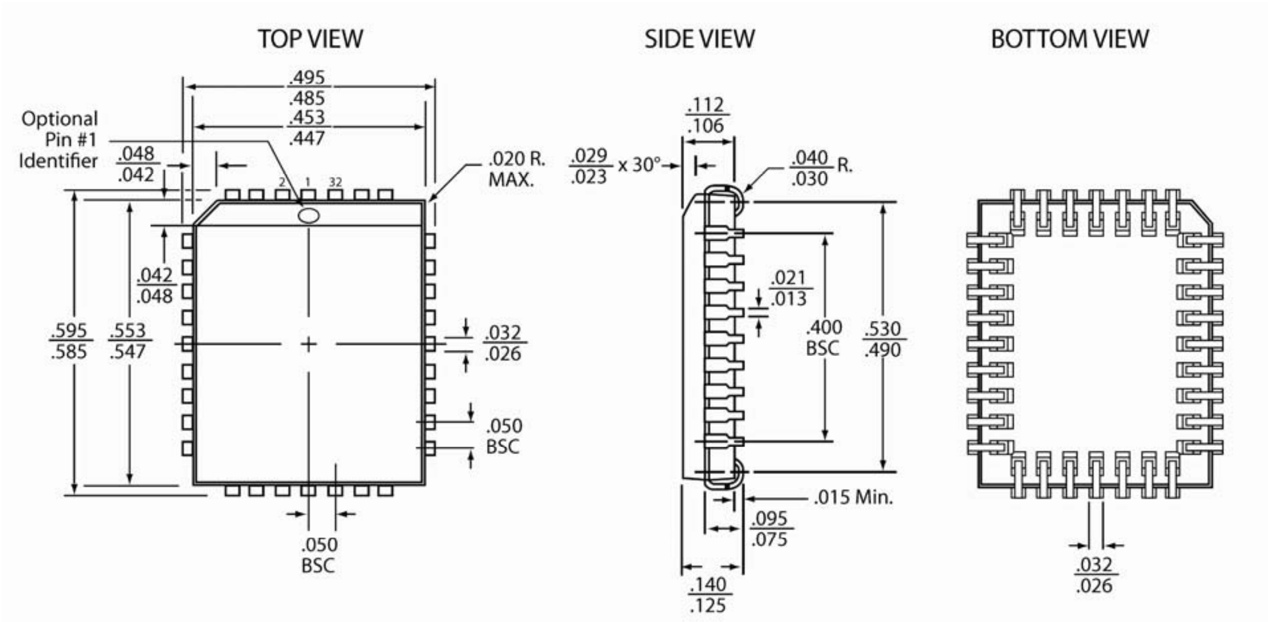
PLCC

SST Legacy

32-Lead Plastic Leadless Chip Carrier (NHE/F) - [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



32-plcc-NH-3

Note:

1. Complies with JEDEC publication 95 MS-016 AE dimensions, although some dimensions may be more stringent.
2. All linear dimensions are in inches (max/min).
3. Dimensions do not include mold flash. Maximum allowable mold flash is .008 inches.
4. Coplanarity: 4 mils.

Microchip Technology Drawing C04-14023A Sheet 1 of 1

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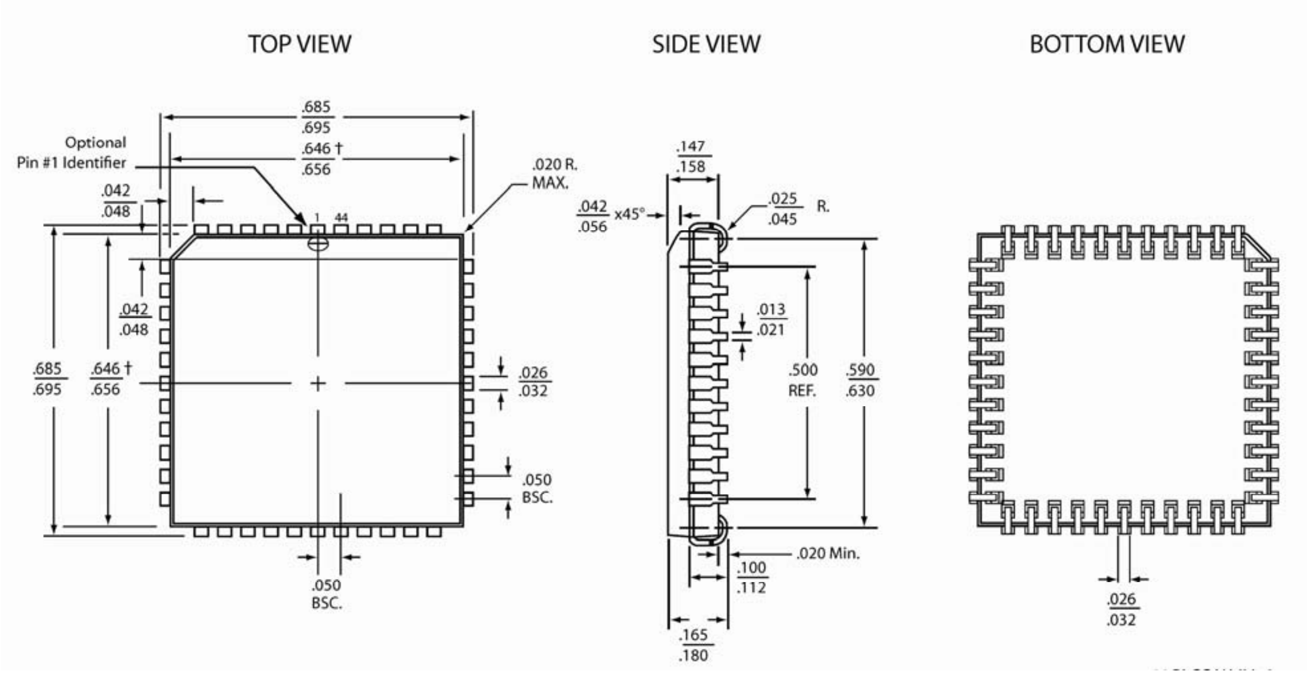
44-Lead Plastic Leadless Chip Carrier (NJE/F) - [PLCC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



44.PLCC.NJ-ILL.6

Note:

1. Complies with JEDEC publication 95 MS-018 AC dimensions (except as noted), although some dimensions may be more stringent.
   † = JEDEC min is .650; SST min is less stringent
2. All linear dimensions are in inches (min/max).
3. Dimensions do not include mold flash. Maximum allowable mold flash is .008 inches.
4. Coplanarity: ± 4 mils.

Microchip Technology Drawing C04-14033A Sheet 1 of 1

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NOTES:

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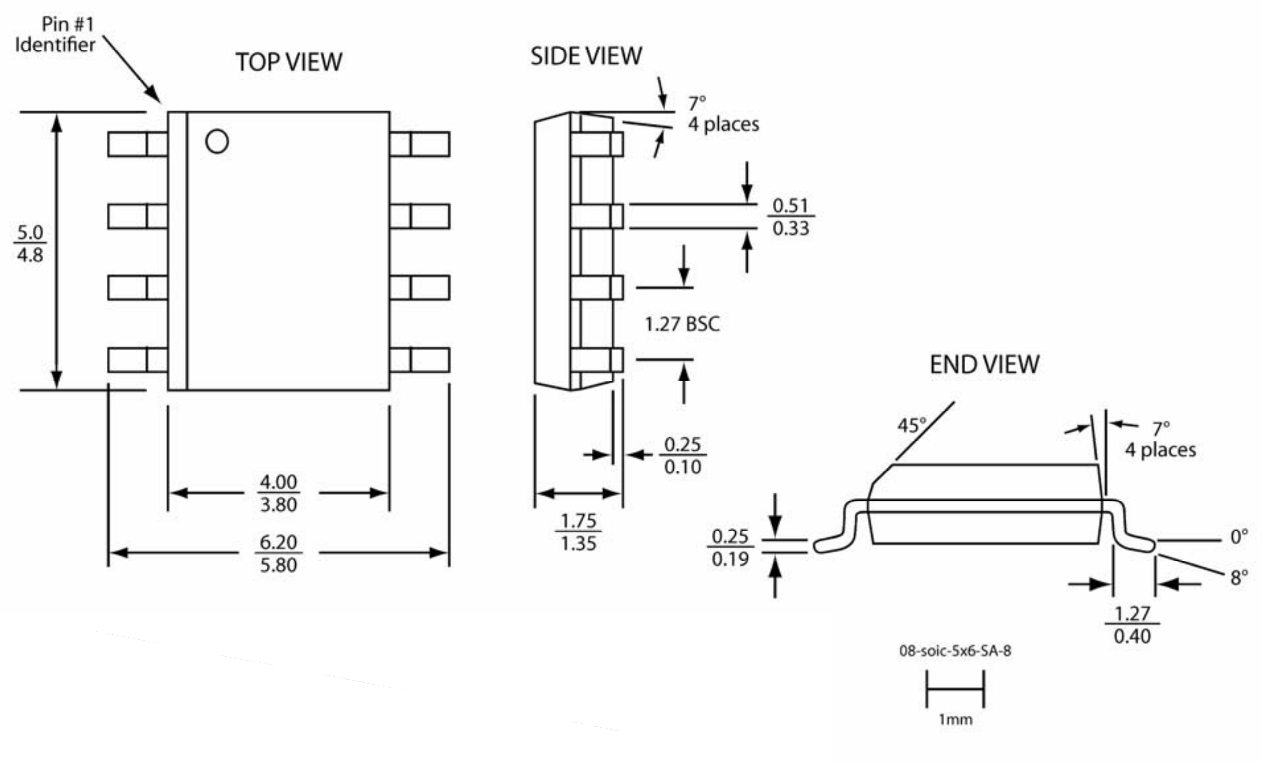
SOIC

SST Legacy

8-Lead Small Outline Integrated Circuit (SAE/F) - 5x6 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. Complies with JEDEC publication 95 MS-012 AA dimensions, although some dimensions may be more stringent.
2. All linear dimensions are in millimeters (max/min).
3. Coplanarity: 0.1 mm
4. Maximum allowable mold flash is 0.15 mm at the package ends and 0.25 mm between leads.

Microchip Technology Drawing C04-14003A Sheet 1 of 1

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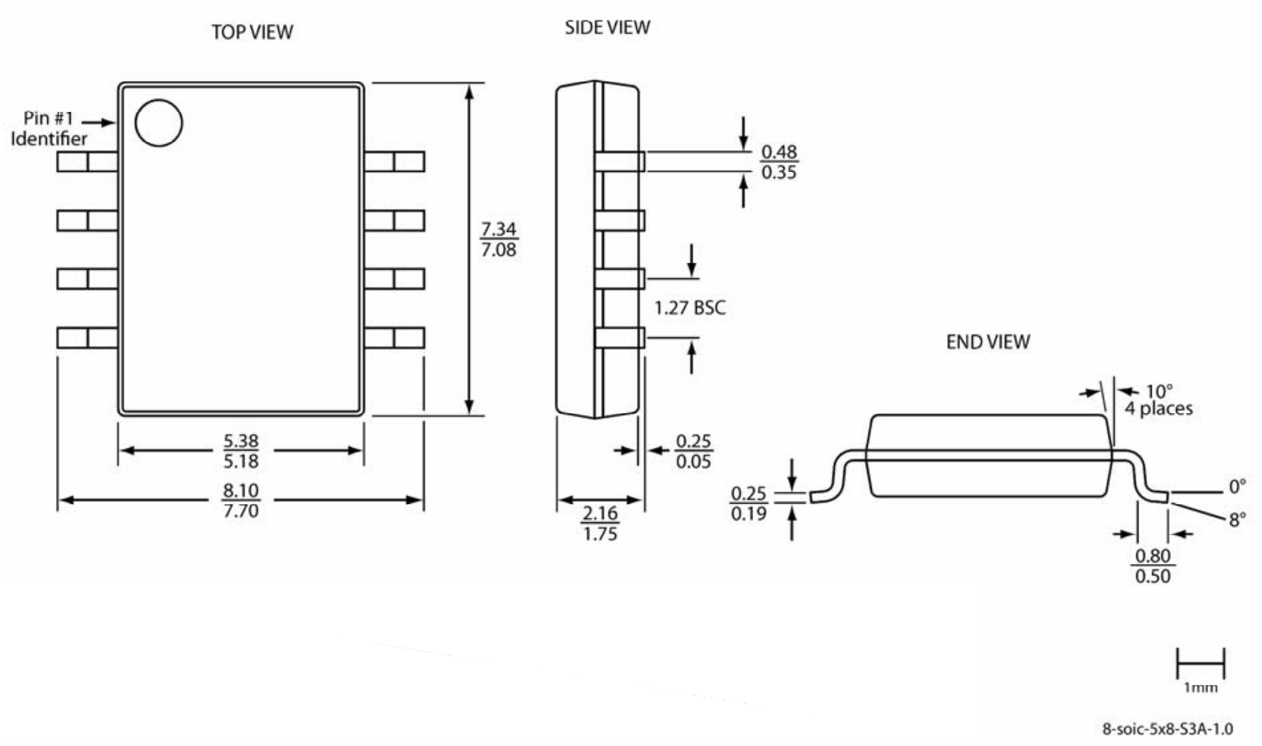
8-Lead Small Outline Integrated Circuit (S3AE/F) - 5x8 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. All linear dimensions are in millimeters (max/min).
2. Coplanarity: 0.1 mm
3. Maximum allowable mold flash is 0.15 mm at the package ends and 0.25 mm between leads.

Microchip Technology Drawing C04-14004A Sheet 1 of 1

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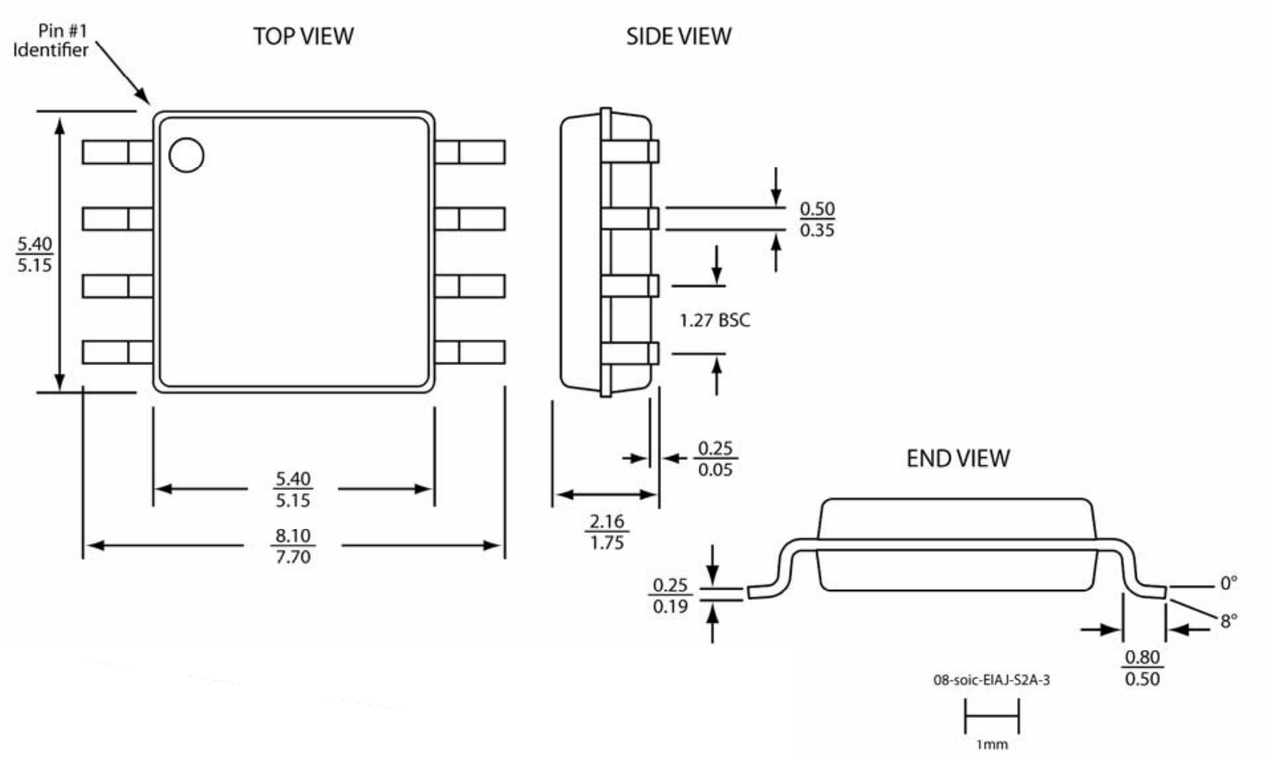
8-Lead Small Outline Integrated Circuit (S2AE/F) - .208 Inch Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. All linear dimensions are in millimeters (max/min).
2. Coplanarity: 0.1 mm
3. Maximum allowable mold flash is 0.15 mm at the package ends and 0.25 mm between leads.

Microchip Technology Drawing C04-14005A Sheet 1 of 1

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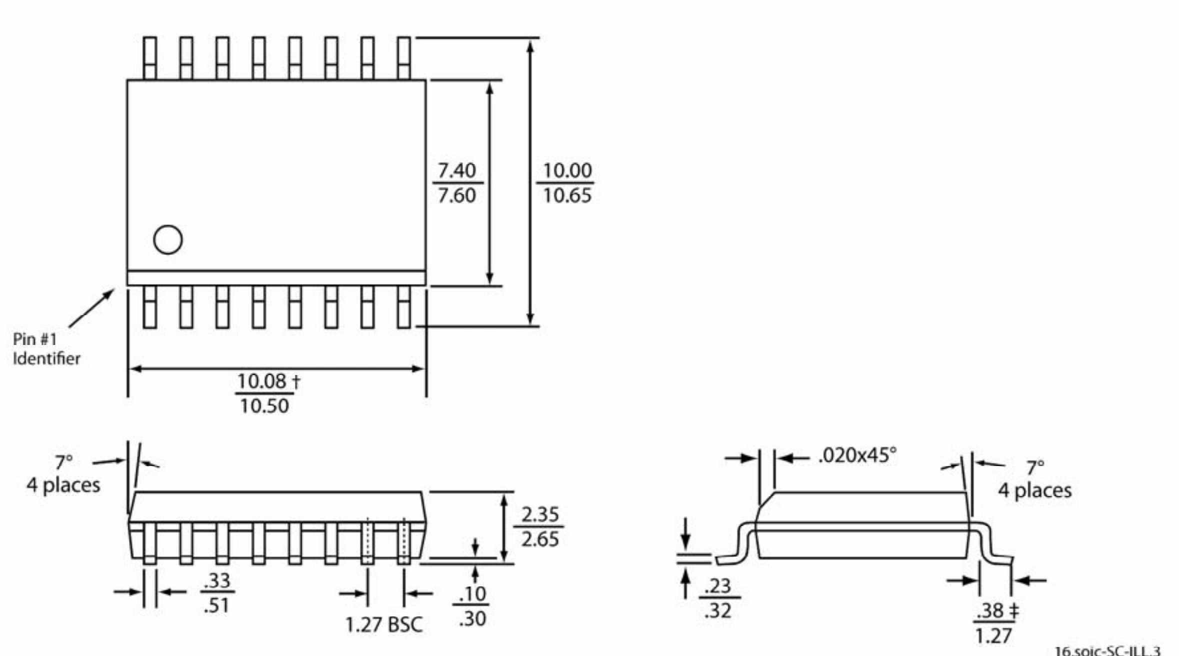
16-Lead Small Outline Integrated Circuit (SCE/F) - 7.5 mm Body [SOIC]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. Complies with JEDEC publication 95 MS-013 AA dimensions (except as noted), although some dimensions may be more stringent.
   † = JEDEC min is 10.10; SST min (10.08) is less stringent
   ‡ = JEDEC min is 0.40; SST min (0.38) is less stringent
2. All linear dimensions are in metric (min/max).
3. Coplanarity: 0.1 (±.05) mm.
4. Maximum allowable mold flash is 0.15mm at the package ends, and 0.25mm between leads.

Microchip Technology Drawing C04-14013A Sheet 1 of 1

NOTES:

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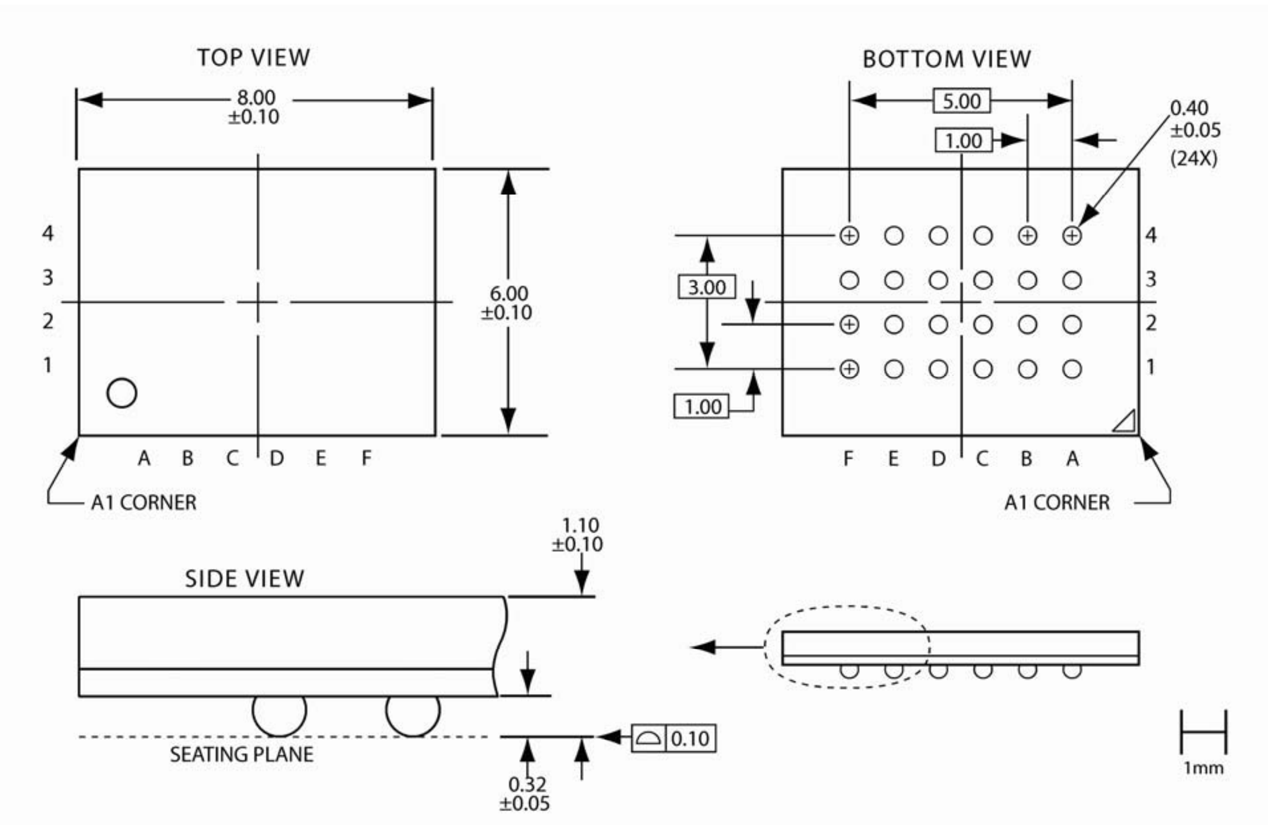
TBGA

SST Legacy

24-Lead Thin Ball Grid Array (T4DE/F) - 6x8 mm Body [TBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



24-tbga-T4D-6x8-1.0

Note:

1. Topside A1 indicator is laser engraved.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.10 mm
4. Ball opening size is 0.32mm (± 0.05 mm)

Microchip Technology Drawing C04-14020A Sheet 1 of 1

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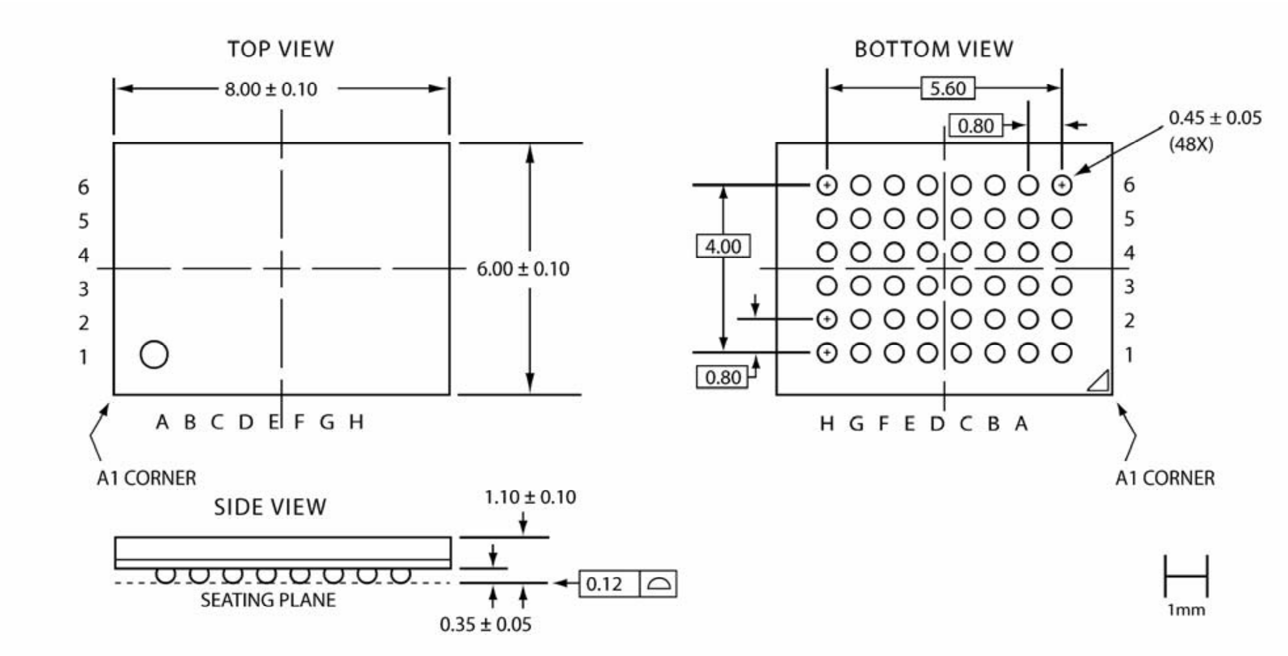
TFBGA

SST Legacy

48-Lead Thin Fine-Pitch Ball Grid Array (B3KE/F) - 6x8 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



48-tfbga-B3K-6x8-450mic-5

Note:

1. Complies with JEDEC Publication 95, MO-210, variant 'AB-1', although some dimensions may be more stringent.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.12 mm
4. Ball opening size is 0.38 mm (± 0.05 mm)

Microchip Technology Drawing C04-14035A Sheet 1 of 1

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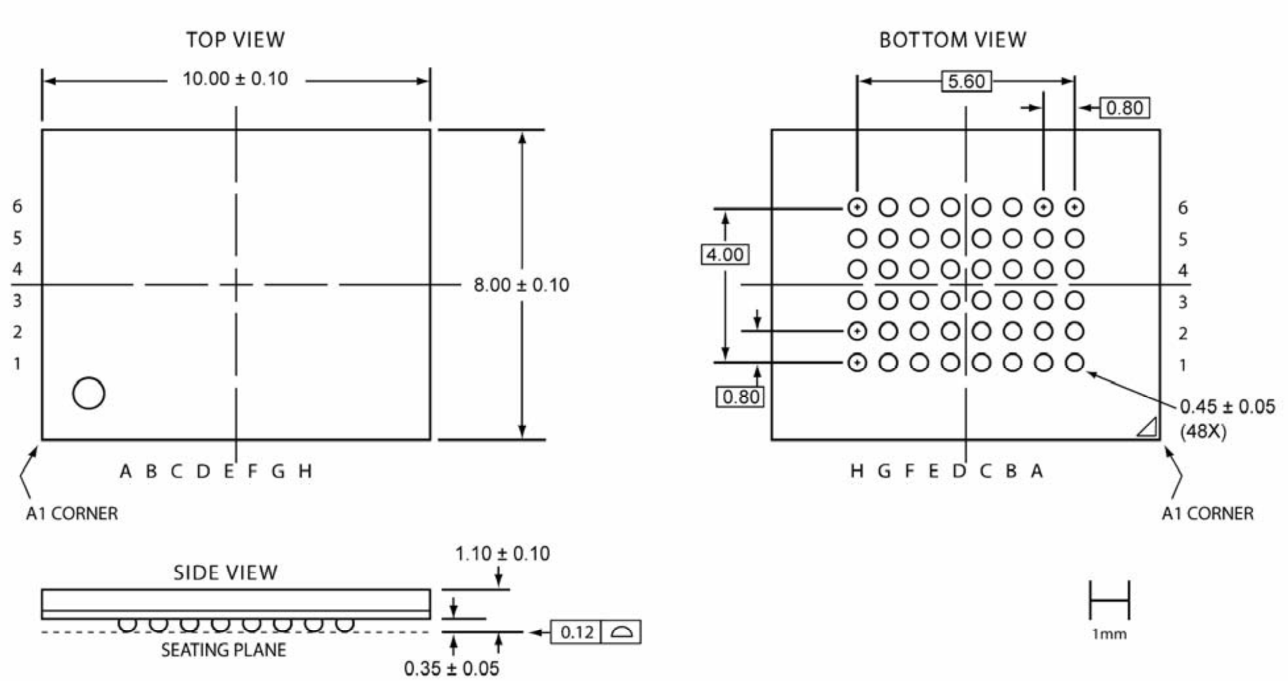
48-Lead Thin Fine-Pitch Ball Grid Array (B1KE/F) - 8x10 mm Body [TFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



48-tfbga-B1K-8x10-450mic-5

Note:
1. Although many dimensions are similar to those of JEDEC Publication 95, MO-210, this specific package is not registered.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.12 mm
4. Ball opening size is 0.38 mm (± 0.05 mm)

Microchip Technology Drawing C04-14034A Sheet 1 of 1

NOTES:

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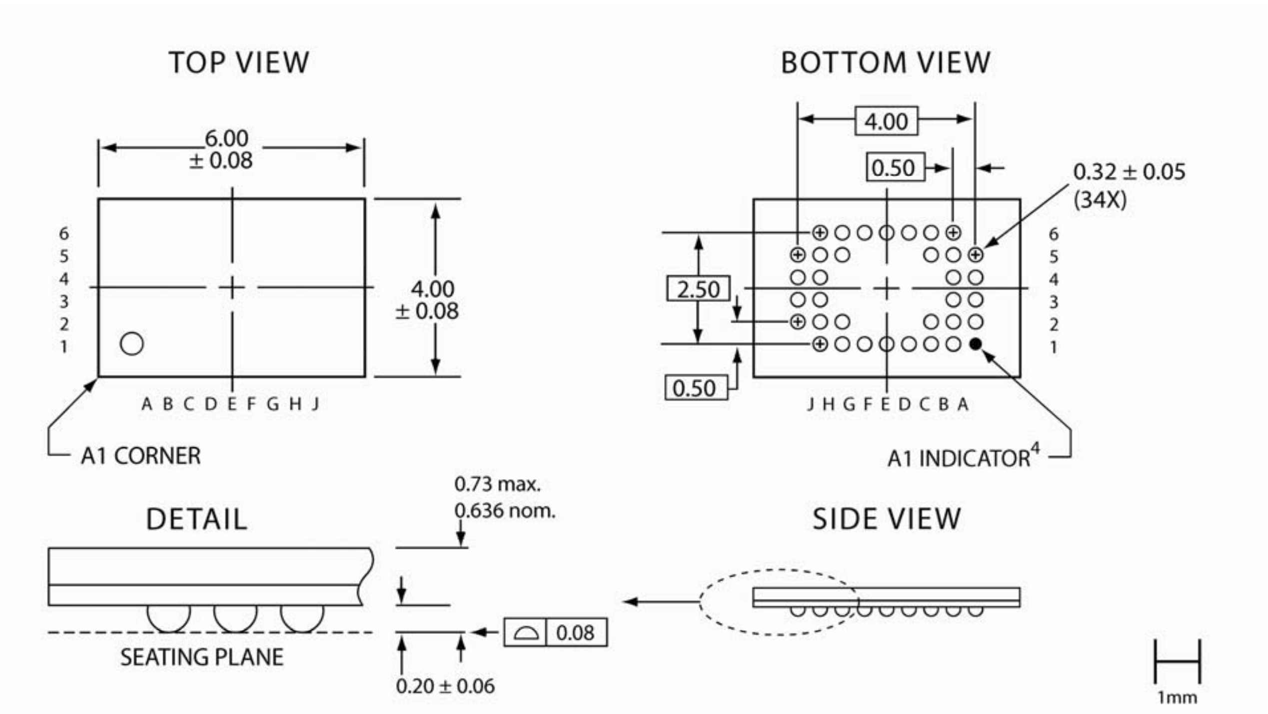
WFBGA

SST Legacy

34-Lead Very, Very Thin Find-Pitch Ball Grid Array (MME/F) - 4x6 mm Body [WFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



34-wfbga-MM-MAM-4x6-32mic-1.0

Note:

1. Complies with JEDEC Publication 95, MO-207, Variant CB-4 except nominal ball size is larger and there are fewer balls.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.08 mm.
4. No ball is present in position A1; a gold-colored indicator is present.
5. Ball opening size is 0.29 mm (± 0.05 mm).34-wfbga-MM-MAM-4x6-32mic-1.0

Microchip Technology Drawing C04-14026A Sheet 1 of 1

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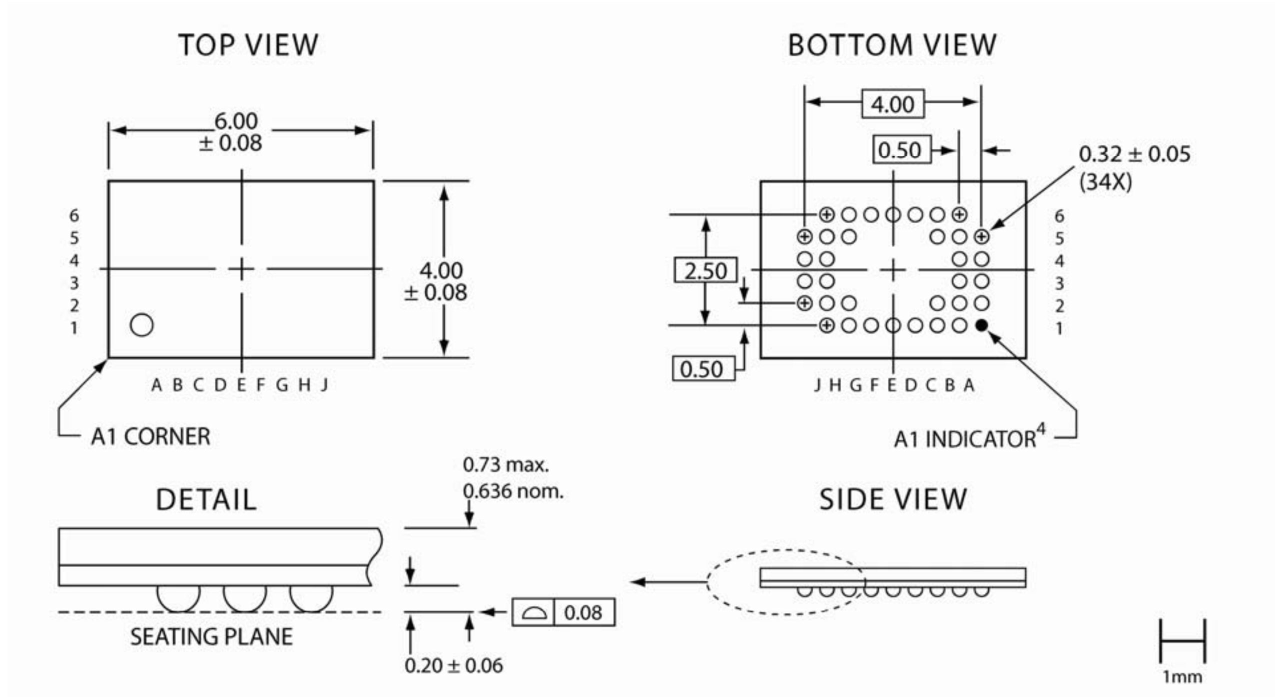
34-Lead Very, Very Thin Find-Pitch Ball Grid Array (MAME/F) - 4x6 mm Body [WFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



34-wfbga-MM-MAM-4x6-32mic-1.0

Note:

1. Complies with JEDEC Publication 95, MO-207, Variant CB-4 except nominal ball size is larger and there are fewer balls.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.08 mm.
4. No ball is present in position A1; a gold-colored indicator is present.
5. Ball opening size is 0.29 mm (± 0.05 mm).

Microchip Technology Drawing C04-14027A Sheet 1 of 1

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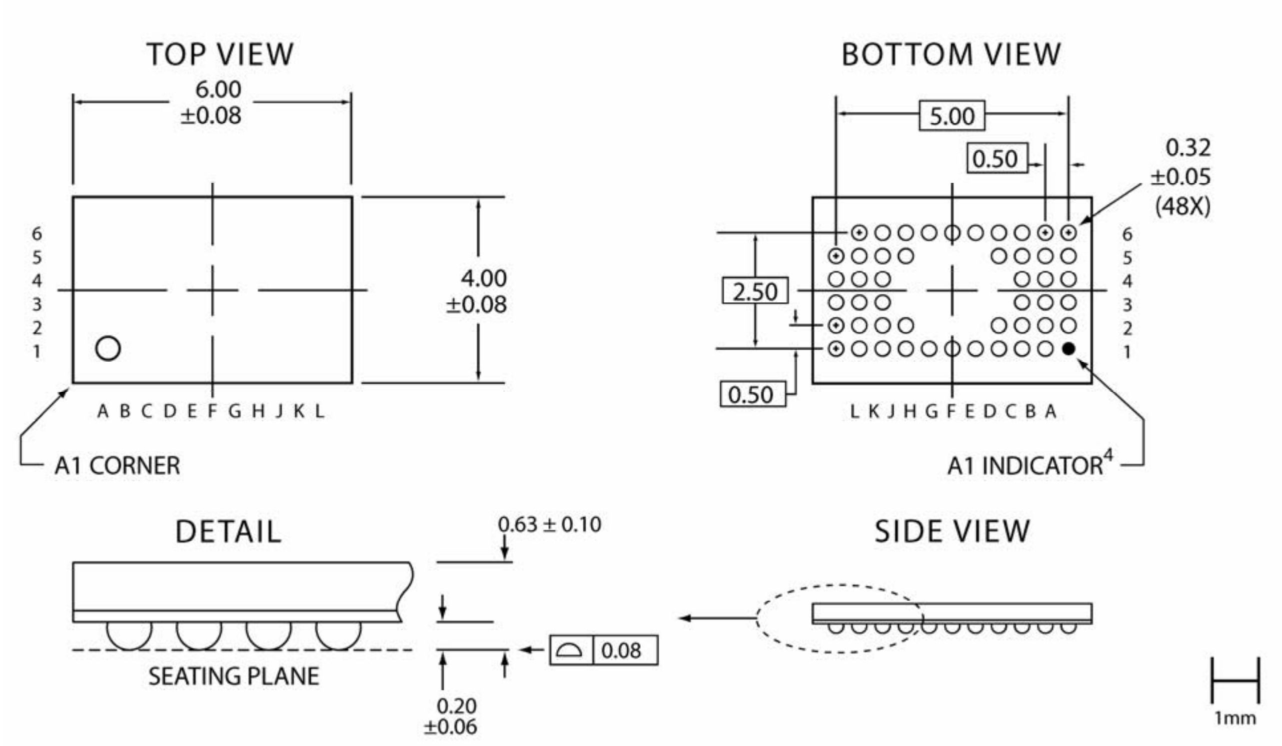
48-Lead Very, Very Thin Find-Pitch Ball Grid Array (M1QE/F) - 4x6 mm Body [WFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



48-wfbga-M1Q-4x6-32mic-6.0

Note:

1. Complies with JEDEC Publication 95, MO-207, Variant C2B-4, dimensions except nominal ball width is larger.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.08 mm.
4. No ball is present in position A1; a gold-colored indicator is present.
5. Ball opening size is 0.29 mm (± 0.05 mm).

Microchip Technology Drawing C04-14037A Sheet 1 of 1

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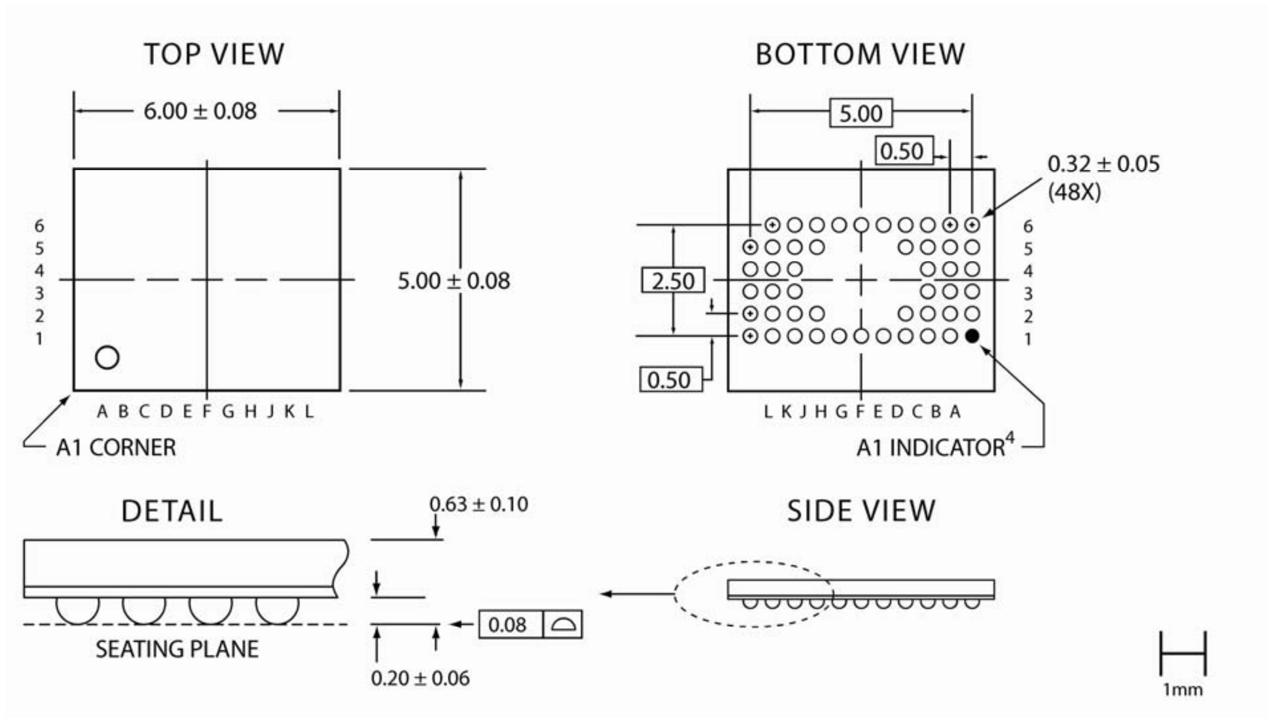
48-Lead Very, Very Thin Find-Pitch Ball Grid Array (M2QE/F) - 5x6 mm Body [WFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



48-wfbga-M2Q-5x6-32mic-0

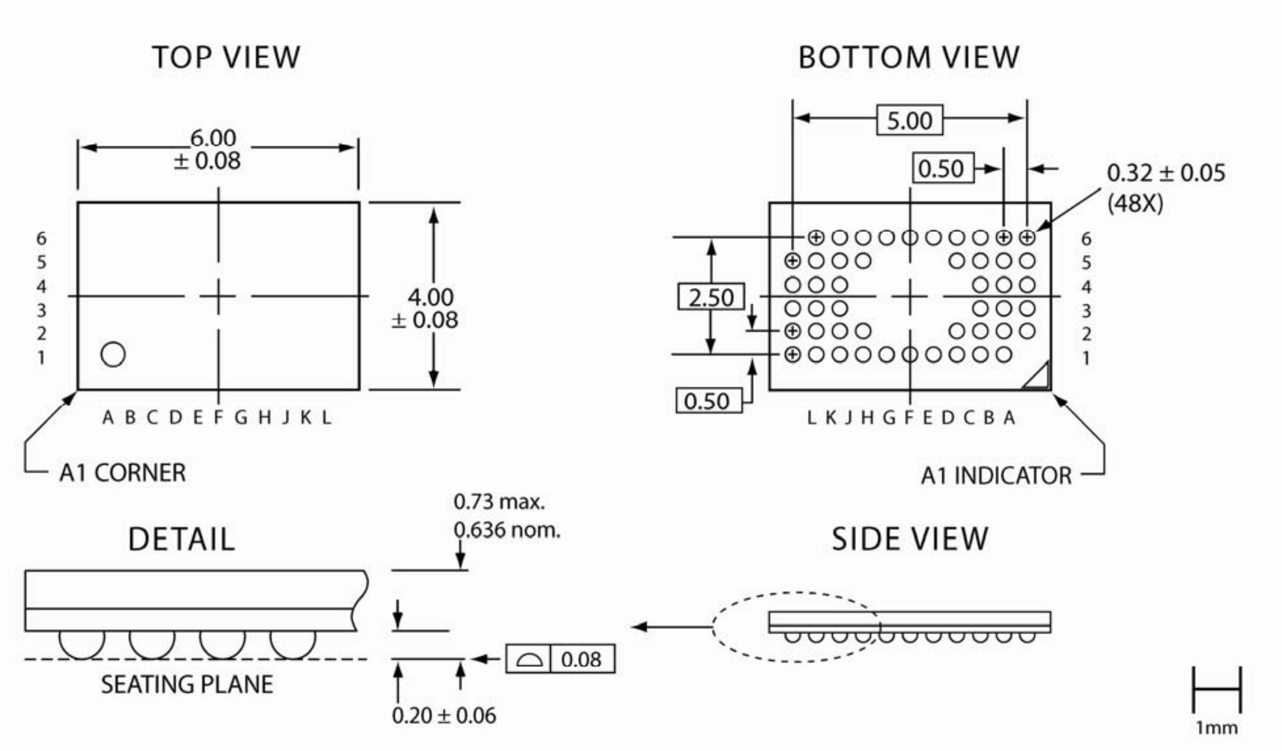
Note:

1. Although many dimensions are similar to those of JEDEC Publication 95, MO-225, this specific package is not registered.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.08 mm
4. No ball is present in position A1; a gold-colored indicator is present.
5. Ball opening size is 0.29 mm (± 0.05 mm)

Microchip Technology Drawing C04-14038A Sheet 1 of 1

48-Lead Very, Very Thin Find-Pitch Ball Grid Array (MAQE/F) - 4x6 mm Body [WFBGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



48-wfbga-MAQ-4x6-32mic-2.(

Note:

1. Complies with JEDEC Publication 95, MO-207, Variant CB-4 except nominal ball size is larger and bottom side A1 indicator is triangle at corner.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.08 mm
4. Ball opening size is 0.29 mm (± 0.05 mm)

Microchip Technology Drawing C04-14039A Sheet 1 of 1

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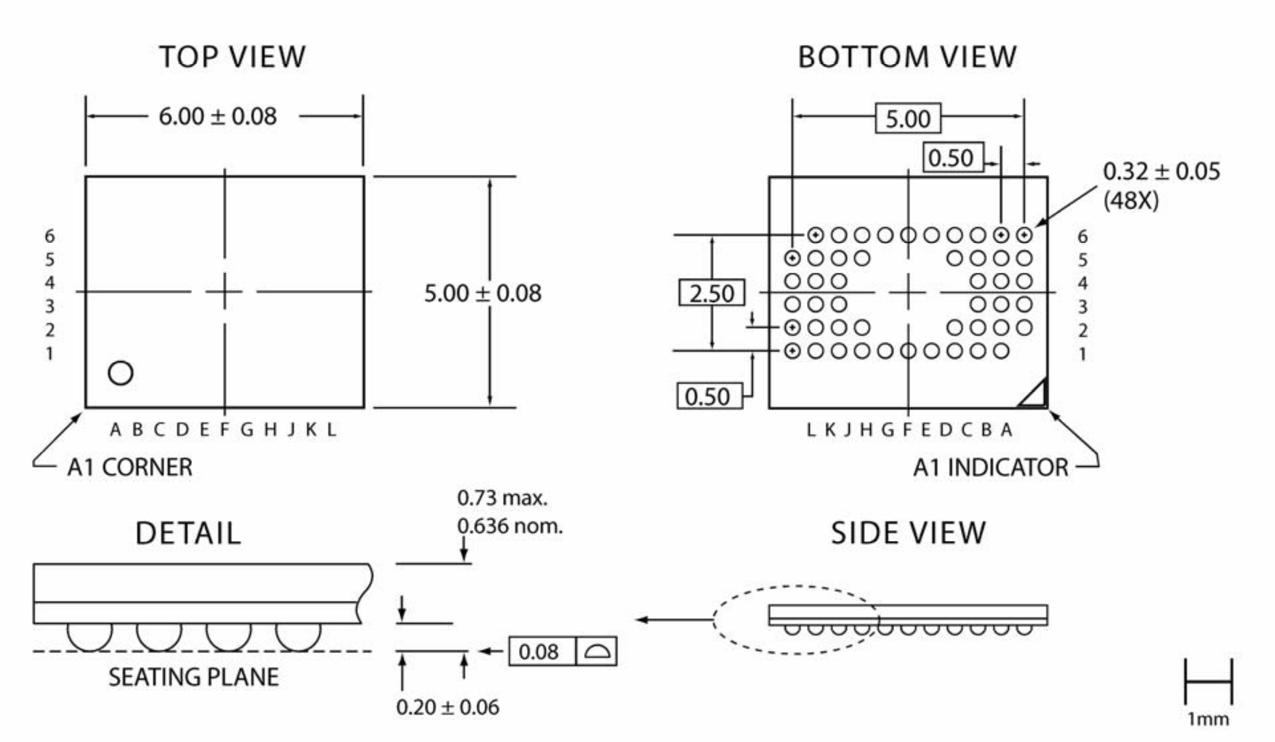
48-Lead Very, Very Thin Find-Pitch Ball Grid Array (MBQE/F) - 5x6 mm Body [WFBGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



48-wfbga-MBQ-5x6-32mic-0

Note:

1. Although many dimensions are similar to those of JEDEC Publication 95, MO-225, this specific package is not registered.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.08 mm
4. Ball opening size is 0.29 mm (± 0.05 mm)

Microchip Technology Drawing C04-14040A Sheet 1 of 1

NOTES:

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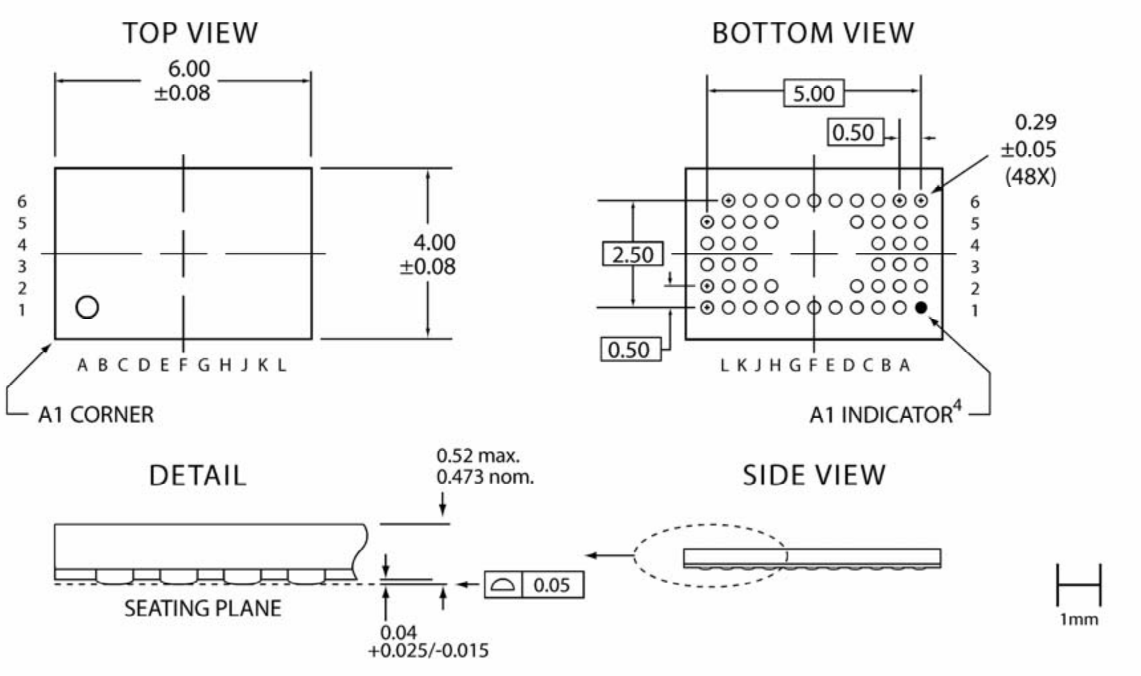
XFLGA

SST Legacy

48-Lead Extremely Thin Fine-Pitch Land Grid Array (C1QE/F) - 4x6 mm Body [XFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



48-xflga-C1Q-4x6-29mic-6.0

Note:

1. Complies with JEDEC Publication 95, MO-207, variant CZB-4, dimensions except bump height is much less.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.05 mm.
4. No ball is present at A1; a gold-colored indicator is present.
5. Bump opening size is 0.29 (±0.05 mm).

Microchip Technology Drawing C04-14041A Sheet 1 of 1

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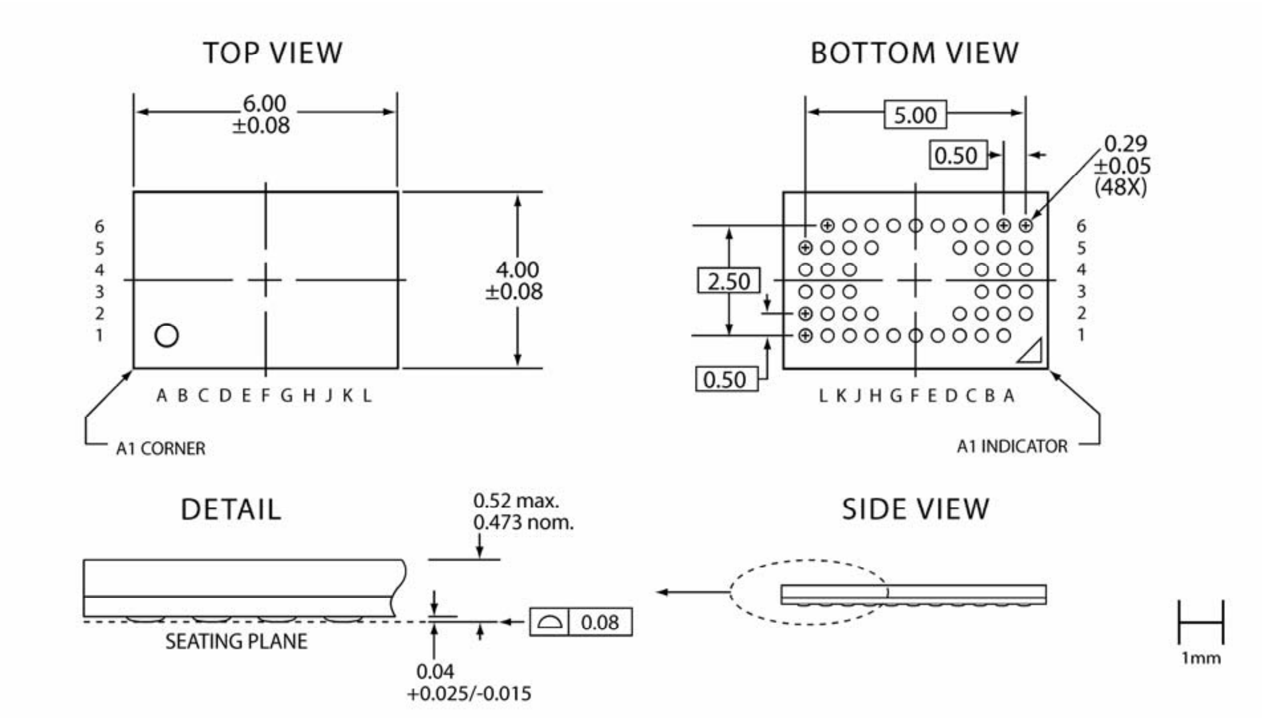
48-Lead Extremely Thin Fine-Pitch Land Grid Array (CAQE/F) - 4x6 mm Body [XFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



48-xflga-CAQ-4x6-29mic-6.0

Note:

1. Complies with JEDEC Publication 95, MO-207, variant CZB-4, dimensions except the bump height is much less, and the A1 indicator is different.
2. All linear dimensions are in millimeters.
3. Coplanarity: 0.08 mm.
4. For low-profile mounting on PCB, SST recommends underfill for best solder joint reliability.

Microchip Technology Drawing C04-14043A Sheet 1 of 1

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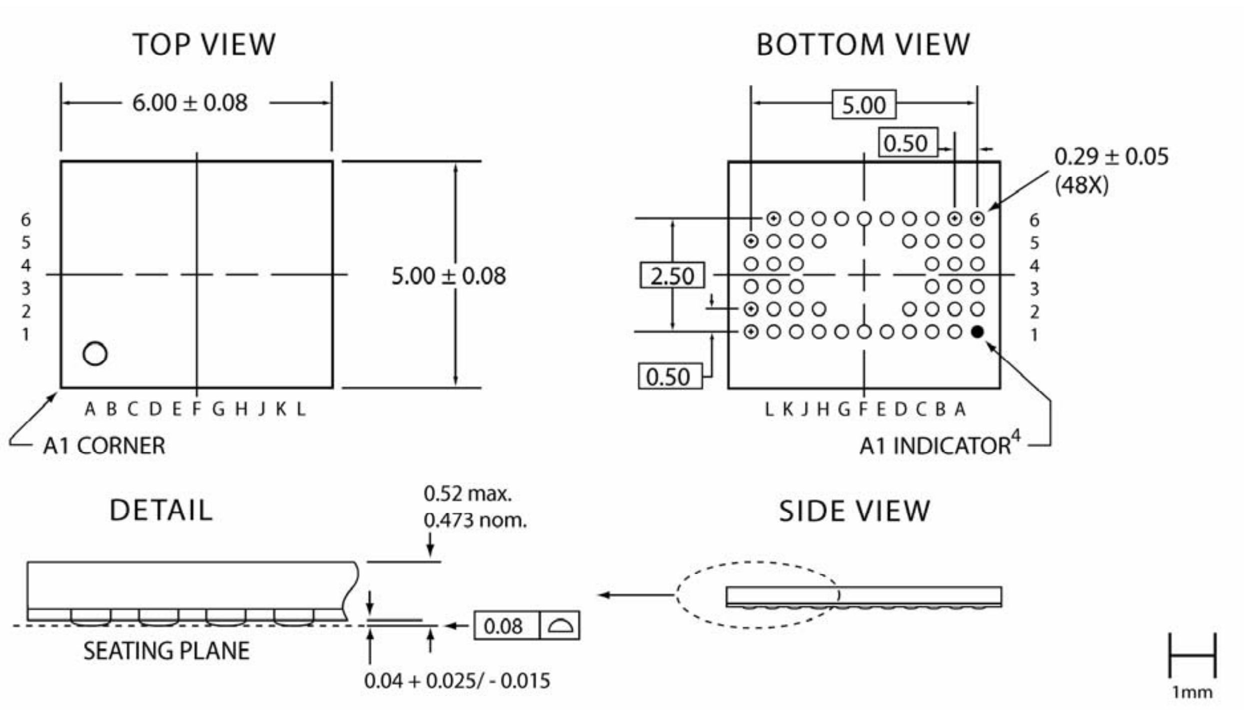
48-Lead Extremely Thin Fine-Pitch Land Grid Array (C2QE/F) - 5x6 mm Body [XFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



48-xflga-C2Q-5x6-29mic-NR

Note:

1. Although many dimensions are similar to those of JEDEC Publication 95, MO-222, this specific package is not registered.
2. All linear dimensions are in millimeters.
3. For low-profile mounting on PCB, SST recommends underfill for best solder joint reliability.
4. Coplanarity: 0.08 mm
5. No bump is present in position A1; a gold-colored indicator is present.

Microchip Technology Drawing C04-14042A Sheet 1 of 1

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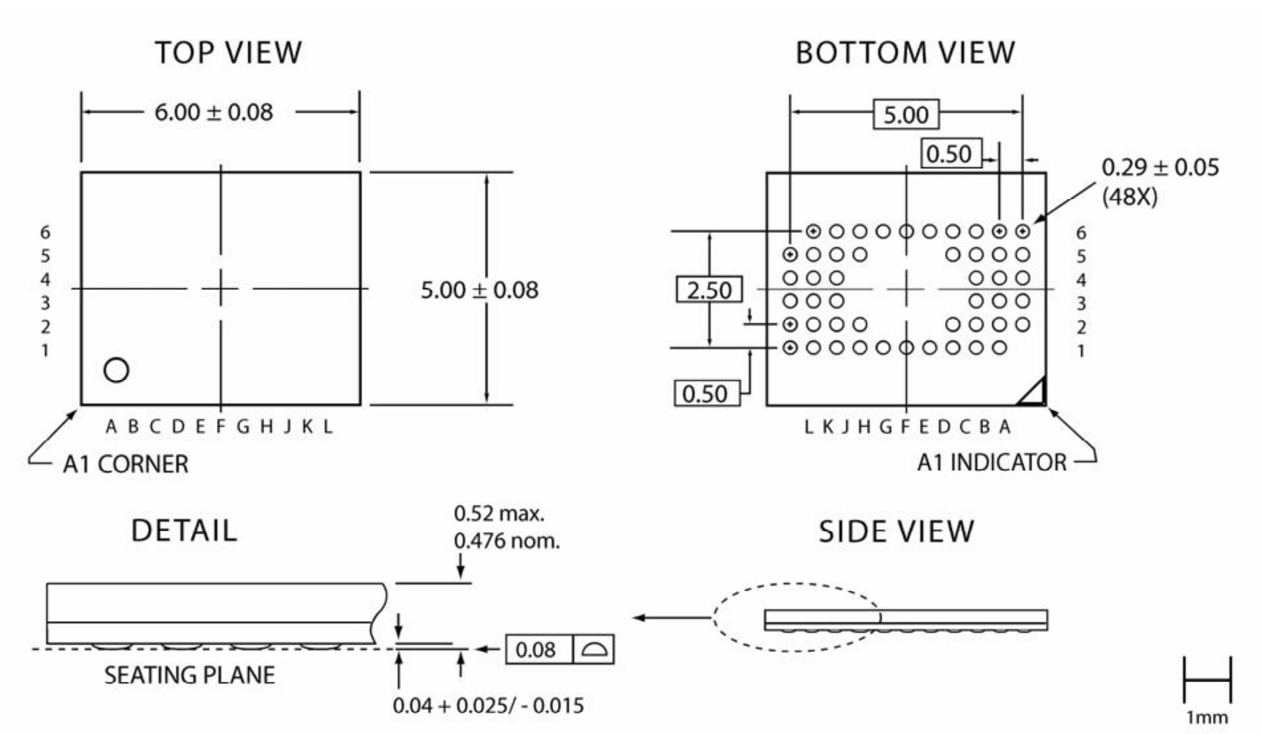
Package Outlines and Dimensions

48-Lead Extremely Thin Fine-Pitch Land Grid Array (CBQE/F) - 5x6 mm Body [XFLGA]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



48-xflga-CBQ-5x6-29mic-0

Note:

1. Although many dimensions are similar to those of JEDEC Publication 95, MO-222, this specific package is not registered.
2. All linear dimensions are in millimeters.
3. For low-profle mounting on PCB, SST recommends underfill for best solderjoint reliability.
4. Coplanarity: 0.08 mm

Microchip Technology Drawing C04-14044A Sheet 1 of 1

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NOTES:

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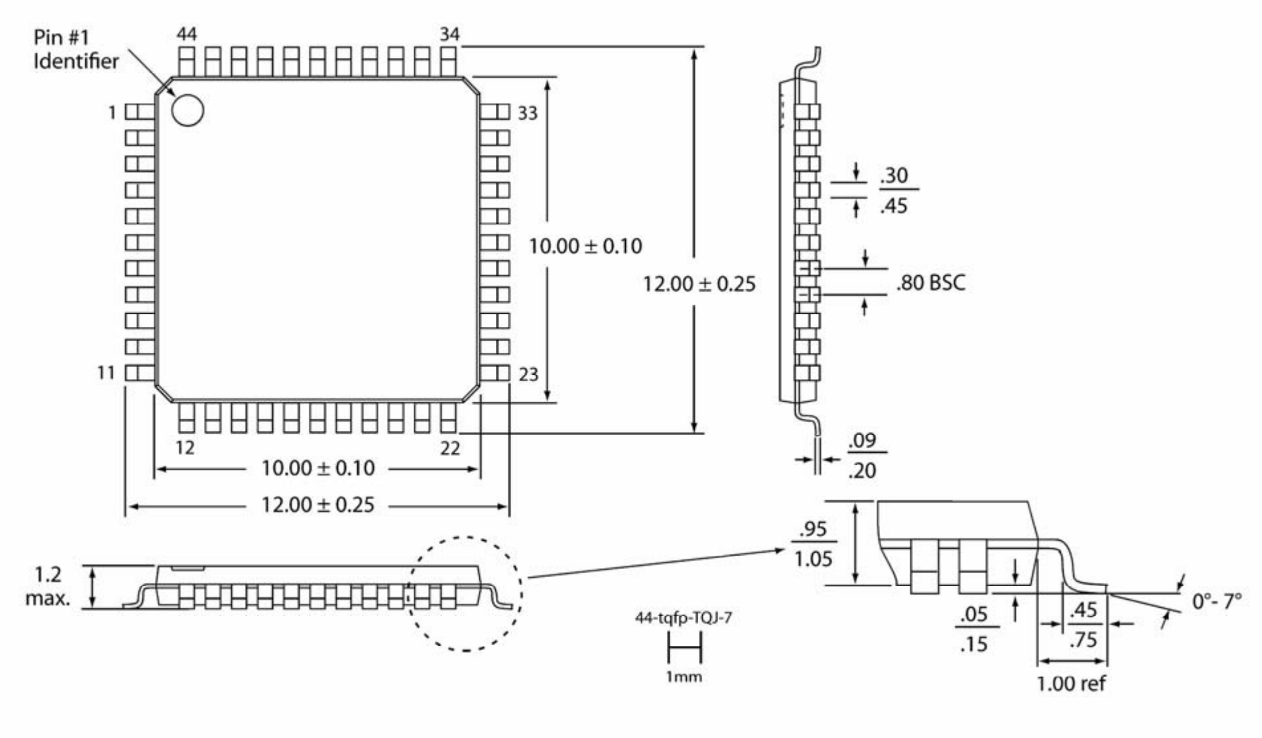
TQFP

SST Legacy

44-Lead Thin Quad Flat Pack (TQJE/F) - 10x10 mm Body [TQFP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



44-tqfp-TQJ-7

Note:

1. Complies with JEDEC publication 95 MS-026 ACB dimensions, although some dimensions may be more stringent.
2. All linear dimensions are in millimeters (min/max).
3. Coplanarity: 0.1 (±0.05) mm.
4. Package body dimensions do not include mold flash. Maximum allowable mold flash is .25mm.

Microchip Technology Drawing C04-14032A Sheet 1 of 1

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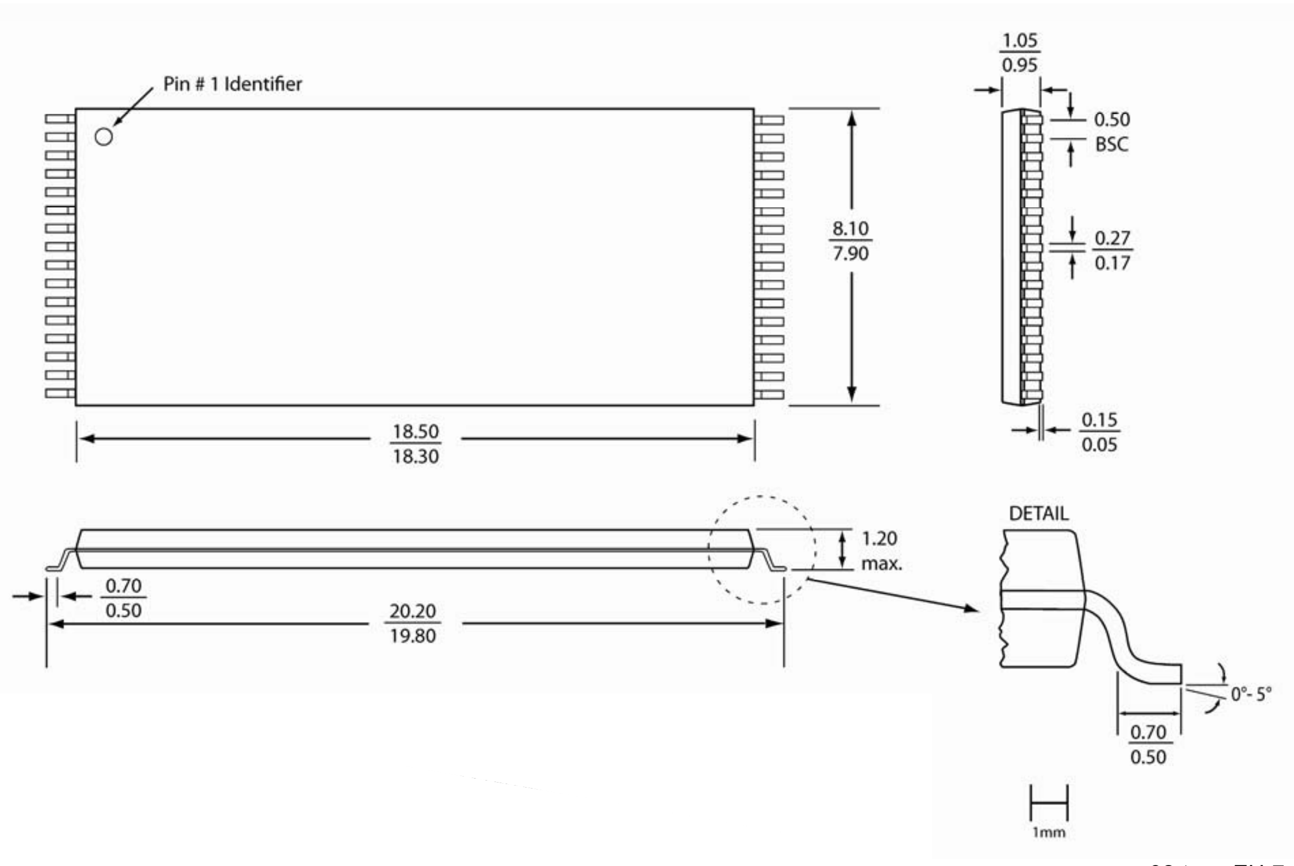
TSOP

SST Legacy

32-Lead Thin Small Outline Package (EHE/F) - [TSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



32-tsop-EH-7

Note:

1. Complies with JEDEC publication 95 MO-142 BD dimensions, although some dimensions may be more stringent.
2. All linear dimensions are in millimeters (max/min).
3. Coplanarity: 0.1 mm
4. Maximum allowable mold flash is 0.15 mm at the package ends, and 0.25mm between leads.

Microchip Technology Drawing C04-14024A Sheet 1 of 1

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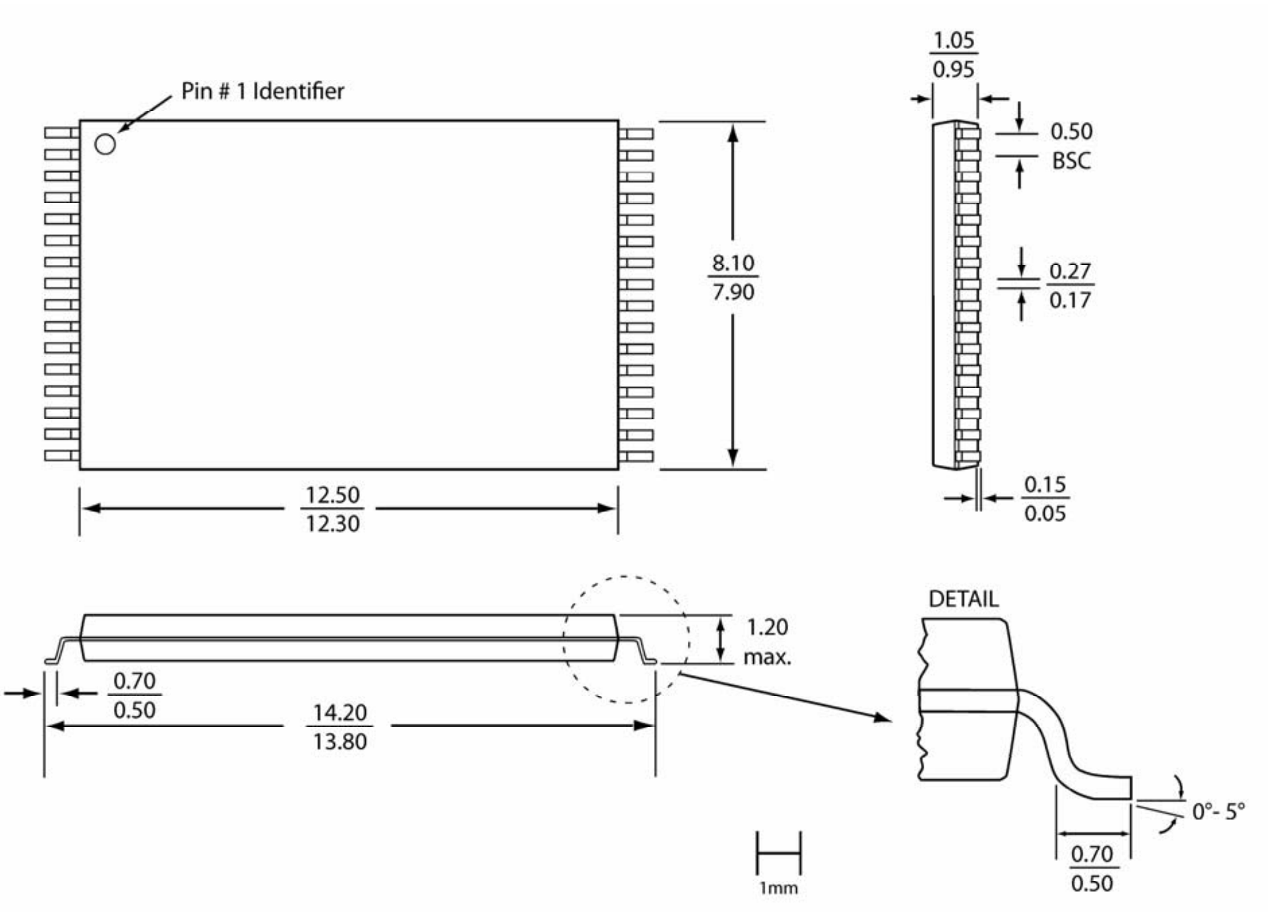
32-Lead Thin Small Outline Package (WHE/F) - [TSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



32-tsop-WH-7

Note:

1. Complies with JEDEC publication 95 MO-142 BA dimensions, although some dimensions may be more stringent.
2. All linear dimensions are in millimeters (max/min).
3. Coplanarity: 0.1 mm
4. Maximum allowable mold flash is 0.15 mm at the package ends, and 0.25 mm between leads.

Microchip Technology Drawing C04-14025A Sheet 1 of 1

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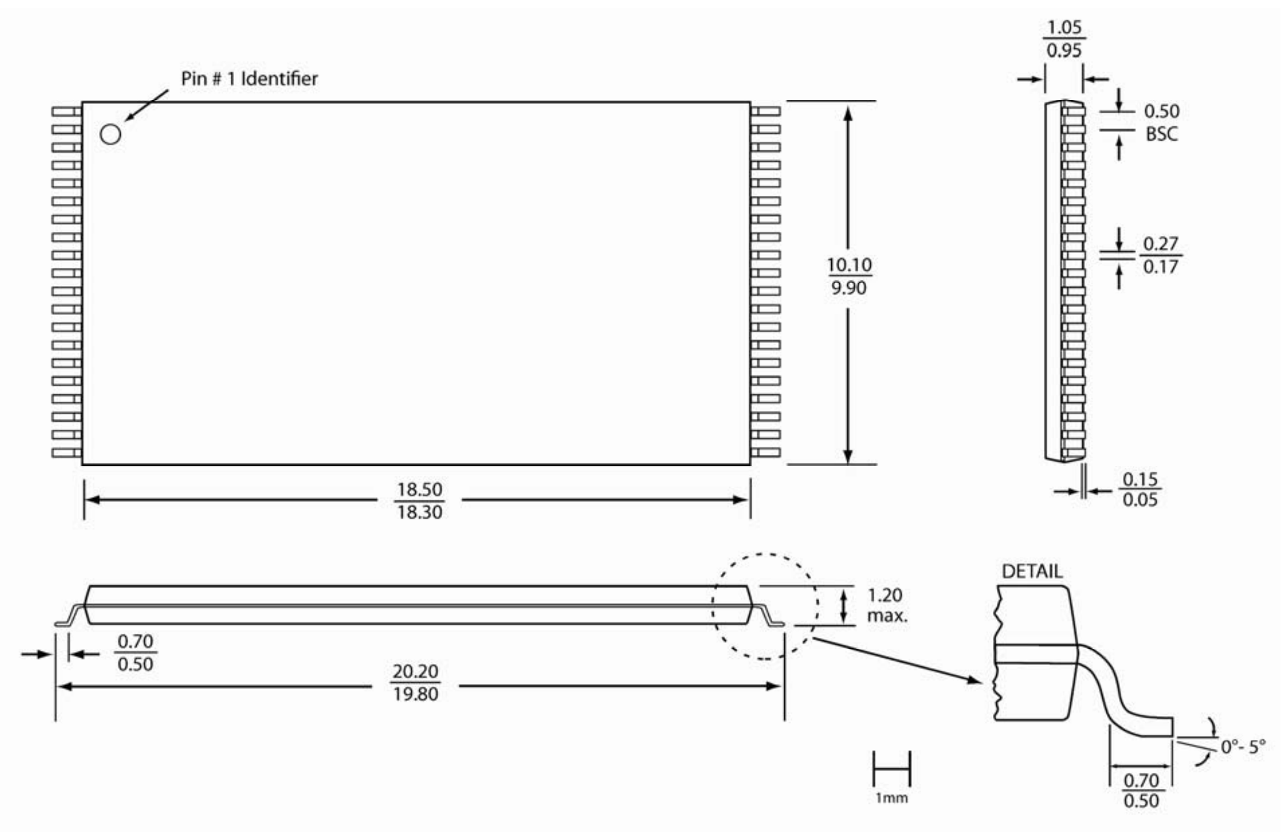
40-Lead Thin Small Outline Package (EIE/F) - [TSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



40-tsop-EI-7

Note:

1. Complies with JEDEC publication 95 MO-142 CD dimensions, although some dimensions may be more stringent.
2. All linear dimensions are in millimeters (max/min).
3. Coplanarity: 0.1 mm
4. Maximum allowable mold flash is 0.15 mm at the package ends, and 0.25 mm between leads.

Microchip Technology Drawing C04-14029A Sheet 1 of 1

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Package Outlines and Dimensions

40-Lead Thin Small Outline Package (WIE/F) - [TSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

40-tsop-WI-7

Note:

1. Complies with JEDEC publication 95 MO-142 CA dimensions, although some dimensions may be more stringent.
2. All linear dimensions are in millimeters (max/min).
3. Coplanarity: 0.1 mm
4. Maximum allowable mold flash is 0.15 mm at the package ends, and 0.25 mm between leads.

Microchip Technology Drawing C04-14030A Sheet 1 of 1

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48-Lead Thin Small Outline Package (EKE/F) - [TSOP]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

Pin # 1 Identifier
12.20 / 11.80
18.50 / 18.30
1.05 / 0.95
0.50 BSC
0.27 / 0.17
0.15 / 0.05
1.20 max.
0.70 / 0.50
20.20 / 19.80
DETAIL
0°- 5°
0.70 / 0.50
1mm

48-tsop-EK-8

Note:

1. Complies with JE
   DEC publication 95 MO-142 DD dimensions,
   although some dimensions may be more stringent.
2. All linear dimensions are in millimeters (max/min).
3. Coplanarity: 0.1 mm
4. Maximum allowable mold flash is 0.15 mm at the package ends, and 0.25 mm between leads.

Microchip Technology Drawing C04-14036A Sheet 1 of 1

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56-Lead Thin Small Outline Package (ENE/F) - [TSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

56-tsop-EN-2

Note:

1. Complies with JEDEC publication 95 MO-142 EC dimensions, although some dimensions may be more stringent.
2. All linear dimensions are in millimeters (max/min).
3. Coplanarity: 0.1 mm
4. Maximum allowable mold flash is 0.15 mm at the package ends, and 0.25 mm between leads.

Microchip Technology Drawing C04-14045A Sheet 1 of 1

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NOTES:

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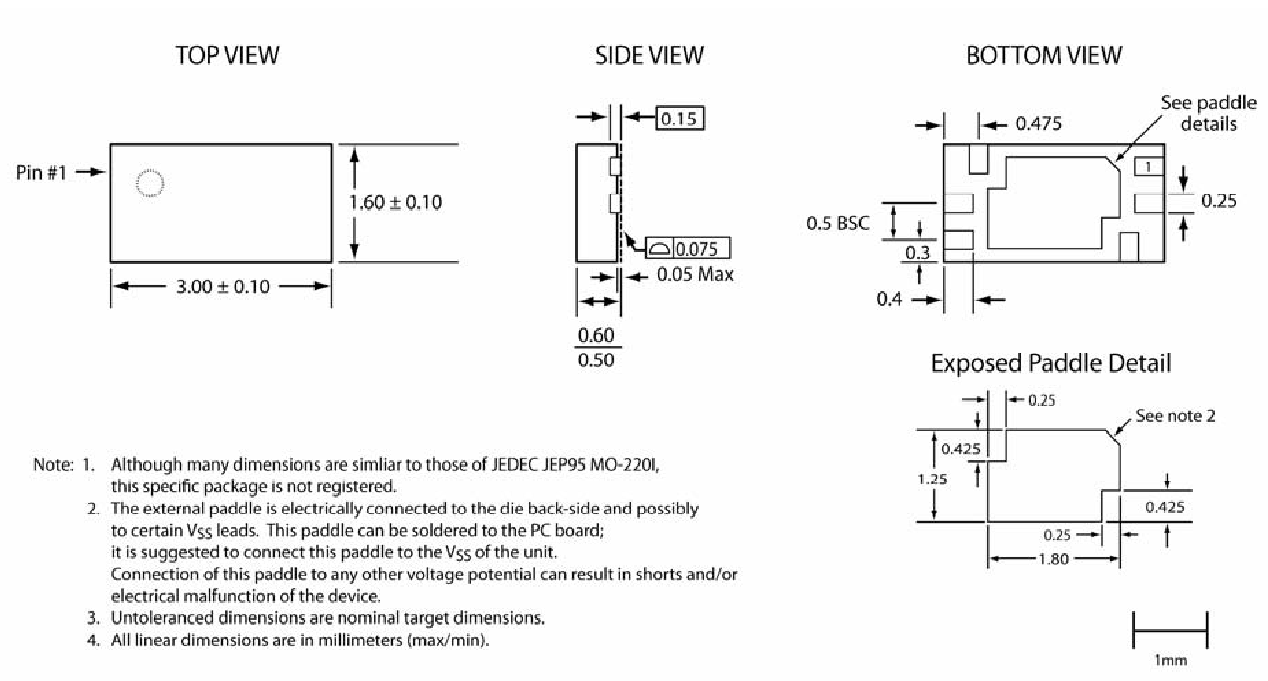
UQFN

SST Legacy

Package Outlines and Dimensions

6-Lead Ultra Thin Quad Flatpack No-Leads (QU6E/F) - 3x1.6 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-14001A Sheet 1 of 1

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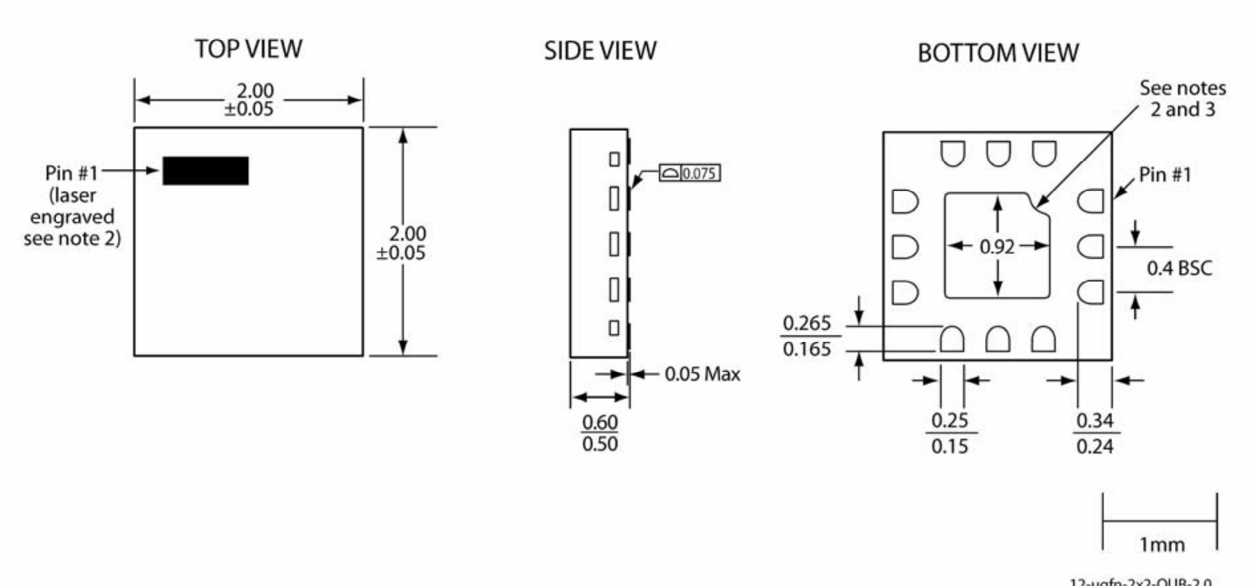
12-Lead Ultra Thin Quad Flatpack No-Leads (QUBE/F) - 2x2 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. Similar to JEDEC JEP95 UQFN/USON variants, though number of contacts and some dimensions are different.
2. The topside pin #1 indicator is laser engraved; its approximate shape and location is as shown.
3. From the bottom view, the pin #1 indicator may be either a curved indent or a 45-degree chamfer.
4. The external paddle is electrically connected to the die back-side and to VSS.
   This paddle must be soldered to the PC board; it is required to connect this paddle to the VSS of the unit. Connection of this paddle to any other voltage potential will result in shorts and electrical malfunction of the device.
5. Untoleranced dimensions are nominal target dimensions.
6. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14011A Sheet 1 of 1

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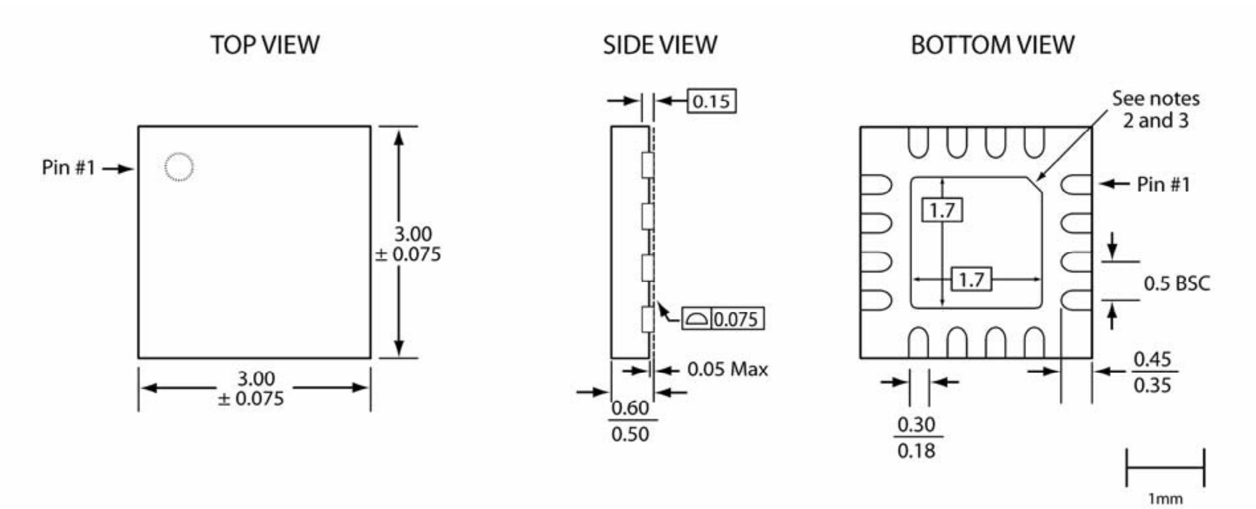
16-Lead Ultra Thin Quad Flatpack No-Leads (QUCE/F) - 3x3 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



16-uqfn-3x3-QUC-0.0

Note:

1. Complies with JEDEC JEP95 MO-248D, variant UEED-4 except external paddle nominal dimensions.
2. From the bottom view, the pin #1 indicator may be either a 45-degree chamfer or a half-circle notch.
3. The external paddle is electrically connected to the die back-side and possibly to certain VSS leads.
   This paddle can be soldered to the PC board; it is suggested to connect this paddle to the VSS of the unit.
   Connection of this paddle to any other voltage potential can result in shorts and/or electrical malfunction of the device
4. Untoleranced dimensions are nominal target dimensions.
5. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14014A Sheet 1 of 1

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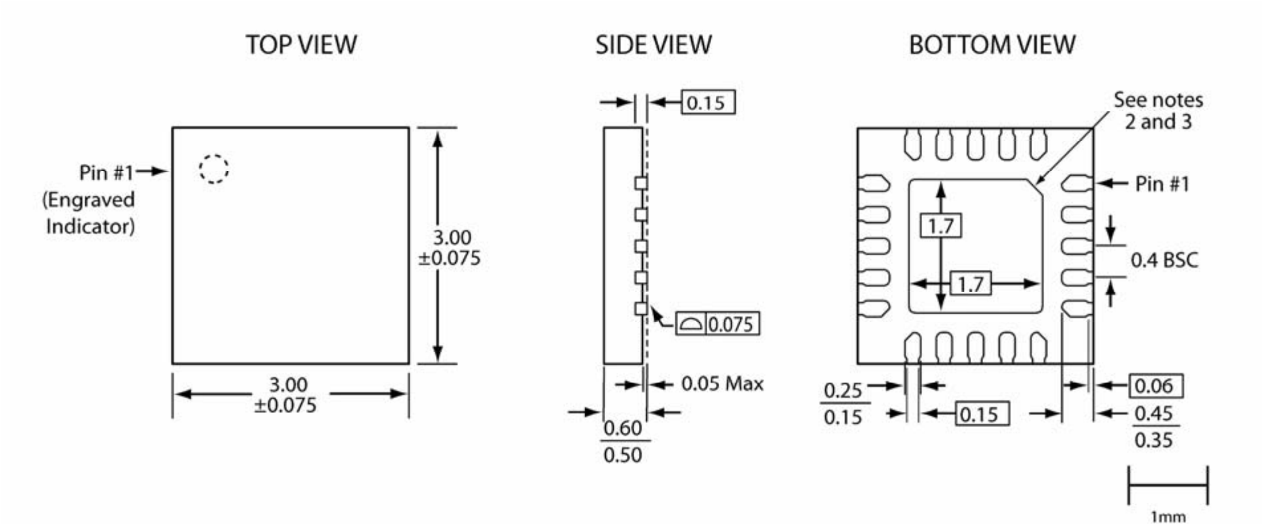
20-Lead Ultra Thin Quad Flatpack No-Leads (Q3DE/F) - 3x3 mm Body [UQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



20-uqfn-3x3-Q3D-1.0

Note:

1. Complies with JEDEC JEP95 MO-248E, variant UEEE except external paddle nominal dimensions, shape of terminals at the body edge and shape of inboard terminals near the corners.
2. From the bottom view, the pin #1 indicator may be either a 45-degree chamfer or a half-circle notch.
3. The external paddle is electrically connected to the die back-side and to VSS.
   This paddle must be soldered to the PC board; it is required to connect this paddle to the VSS of the unit.
   Connection of this paddle to any other voltage potential will result in shorts and electrical malfunction of the device.
4. Untoleranced dimensions are nominal target dimensions.
5. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14019A Sheet 1 of 1

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20-Lead Ultra Thin Quad Flat Pack, No Lead (GN) - 4x4x0.55 mm Body (UQFN)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D A B N NOTE 1 1 2 E (DATUM B) (DATUM A) 2X 0.20 C 2X 0.20 C

TOP VIEW

C SEATING PLANE A (A3) 0.10 C A1 0.08 C

SIDE VIEW

0.10Ⓜ C A B D2 0.10Ⓜ C A B K E2 2 1 L NOTE 1 N 20 X b e 0.07Ⓜ C A B 0.05Ⓜ C

BOTTOM VIEW

Microchip Technology Drawing C04-252A Sheet 1 of 2

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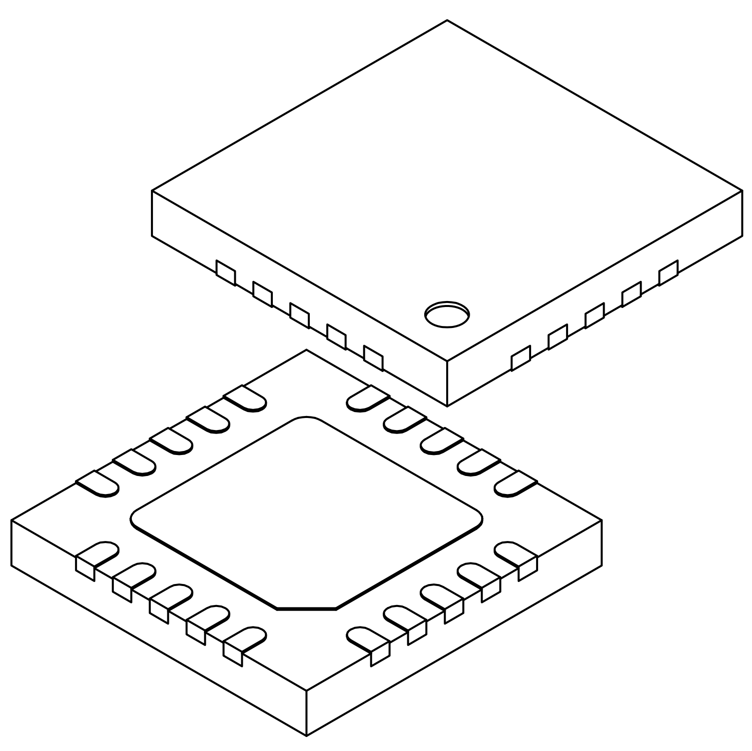
20-Lead Ultra Thin Quad Flat Pack, No Lead (GN) - 4x4x0.55 mm Body (UQFN)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		20	
Pitch	e		0.50 BSC	
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)		0.15 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.45	2.50	2.55
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.45	2.50	2.55
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.35	0.40	0.45
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-252A Sheet 2 of 2

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NOTES:

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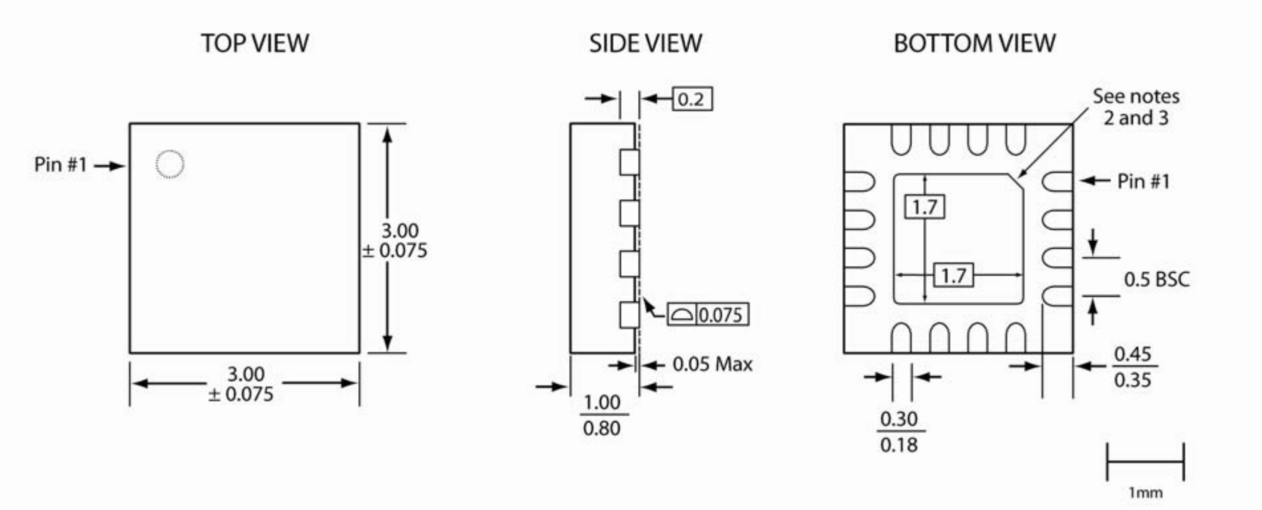
VQFN

SST Legacy

16-Lead Very Thin Quad Flatpack No-Leads (QVCE/F) - 3x3 mm Body [VQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



16-vqfn-3x3-QVC-2.0

Note:
1. Complies with JEDEC JEP95 MO-220J, variant VEED-4 except external paddle nominal dimensions.
2. From the bottom view, the pin #1 indicator may be either a 45-degree chamfer or a half-circle notch.
3. The external paddle is electrically connected to the die back-side and possibly to certain VSS leads. This paddle can be soldered to the PC board; it is suggested to connect this paddle to the VSS of the unit. Connection of this paddle to any other voltage potential can result in shorts and/or electrical malfunction of the device.
4. Untoleranced dimensions are nominal target dimensions.
5. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14015A Sheet 1 of 1

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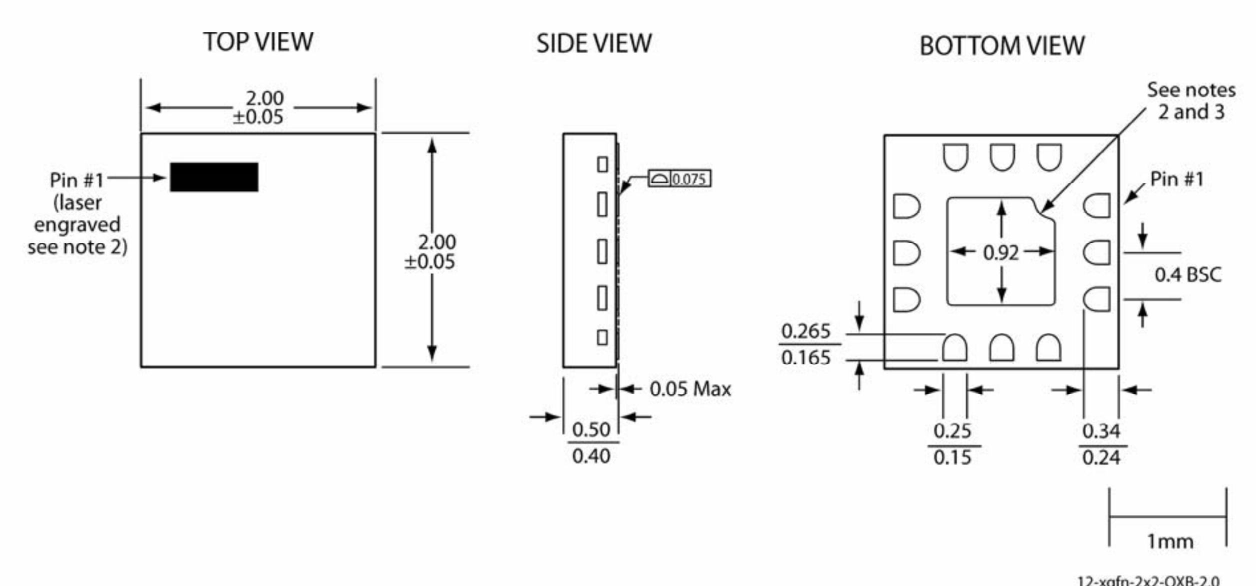
XQFN

SST Legacy

12-Lead Extremely Thin Quad Flatpack No-Leads (QXBE/F) - 2x2 mm Body [XQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. Complies with JEDEC JEP95 MO-220J, variant VEED-4 except external paddle nominal dimensions and pull-back of terminals from body edge.
2. The topside pin #1 indicator is laser engraved; its approximate shape and location is as shown.
3. From the bottom view, the pin #1 indicator may be either a curved indent or a 45-degree chamfer.
4. The external paddle is electrically connected to the die back-side and possibly to certain VSS leads. This paddle must be soldered to the PC board; it is required to connect this paddle to the VSS of the unit. Connection of this paddle to any other voltage potential will result in shorts and electrical malfunction of the device.
5. Untoleranced dimensions are nominal target dimensions.
6. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14012A Sheet 1 of 1

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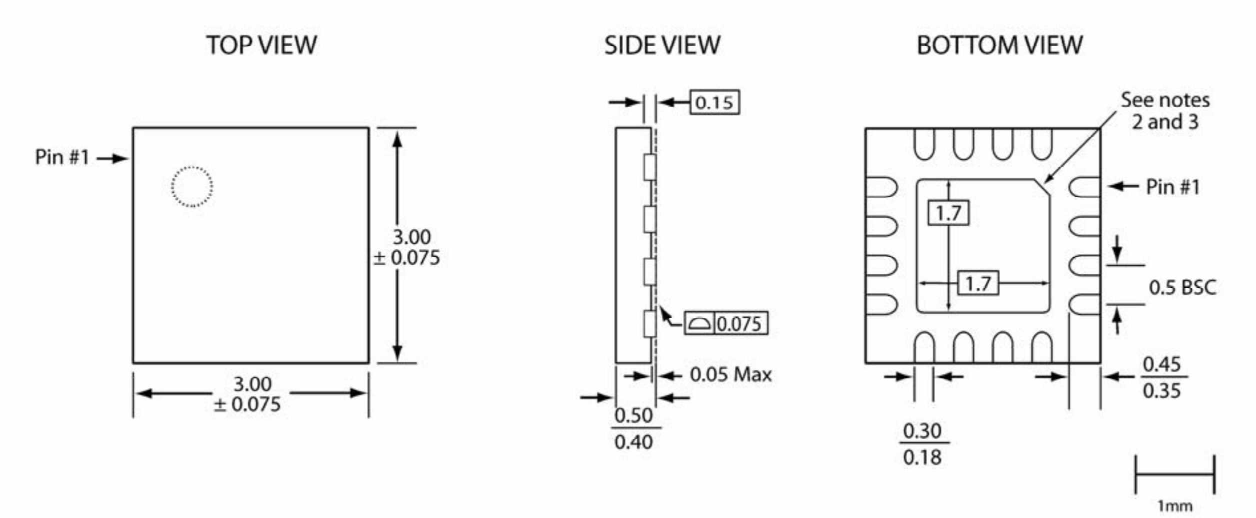
Package Outlines and Dimensions

16-Lead Extremely Thin Quad Flatpack No-Leads (QXCE/F) - 3x3 mm Body [XQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



16-xqfn-3x3-QXC-1.0

Note:

1. Complies with JEDEC JEP95 MO-248, variant XEED-4 except external paddle nominal dimensions.
2. From the bottom view, the pin #1 indicator may be either a 45-degree chamfer or a half-circle notch.
3. The external paddle is electrically connected to the die back-side and to VSS.
   This paddle must be soldered to the PC board; it is requiresd to connect this paddle to the VSS of the unit.
   Connection of this paddle to any other voltage potential will result in shorts and electrical malfunction of the device.
4. Untoleranced dimensions are nominal target dimensions.
5. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14018A Sheet 1 of 1

NOTES:

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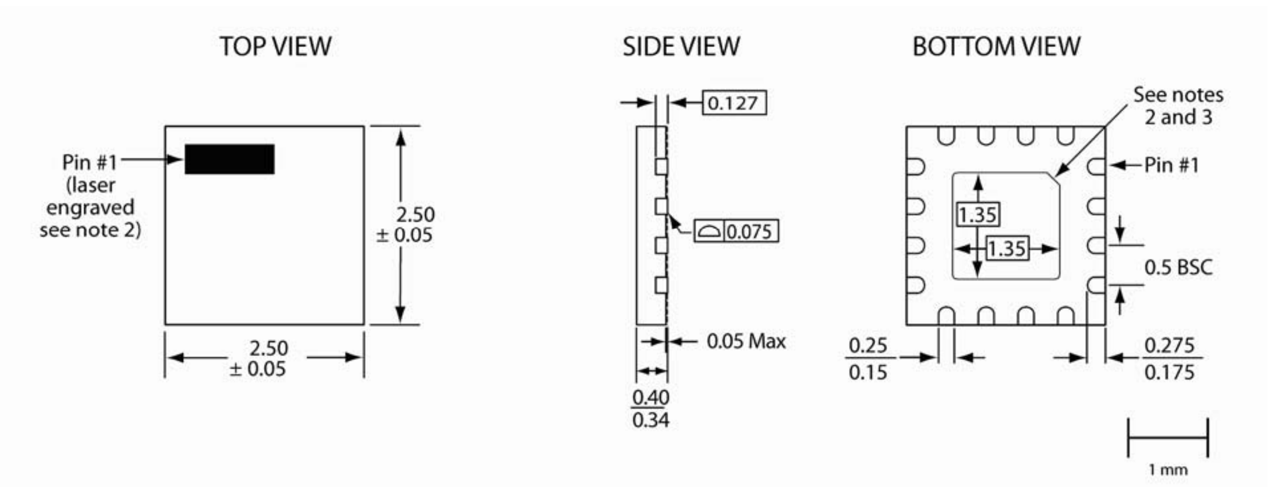
Package Outlines and Dimensions

X2QFN

SST Legacy

16-Lead Super-Thin Quad Flatpack No-Leads (Q3CE/F) - 2.5x2.5 mm Body [X2QFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



16-x2qfn-2.5x2.5-Q3C-2.0

Note:

1. From the bottom view, the pin #1 indicator may be either a 45-degree chamfer or a half-circle notch.
2. The topside pin #1 indicator is laser engraved; its approximate shape and location is as shown.
3. The external paddle is electrically connected to the die back-side and to VSS.
   This paddle must be soldered to the PC board; it is required to connect this paddle to the VSS of the unit.
   Connection of this paddle to any other voltage potential will result in shorts and electrical malfunction of the device.
4. Untoleranced dimensions are nominal target dimensions.
5. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14017A Sheet 1 of 1

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WQFN

SST Legacy

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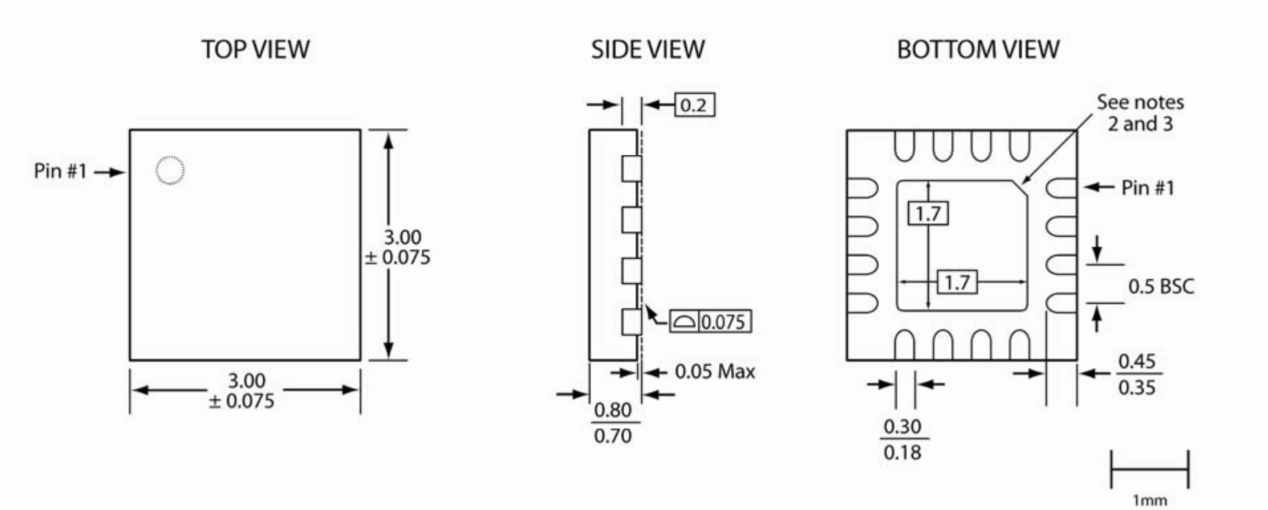
16-Lead Very, Very Thin Quad Flatpack No-Leads (QCE/F) - 3x3 mm Body [WQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



16-wqfn-3x3-QC-0.3

Note:

1. Complies with JEDEC JEP95 MO-220J, variant WEED-4 except external paddle nominal dimensions.
2. From the bottom view, the pin #1 indicator may be either a 45-degree chamfer or a half-circle notch.
3. The external paddle is electrically connected to the die back-side and possibly to certain VSS leads.
   This paddle can be soldered to the PC board; it is suggested to connect this paddle to the VSS of the unit.
   Connection of this paddle to any other voltage potential can result in shorts and/or electrical malfunction of the device.
4. Untoleranced dimensions are nominal target dimensions.
5. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14016A Sheet 1 of 1

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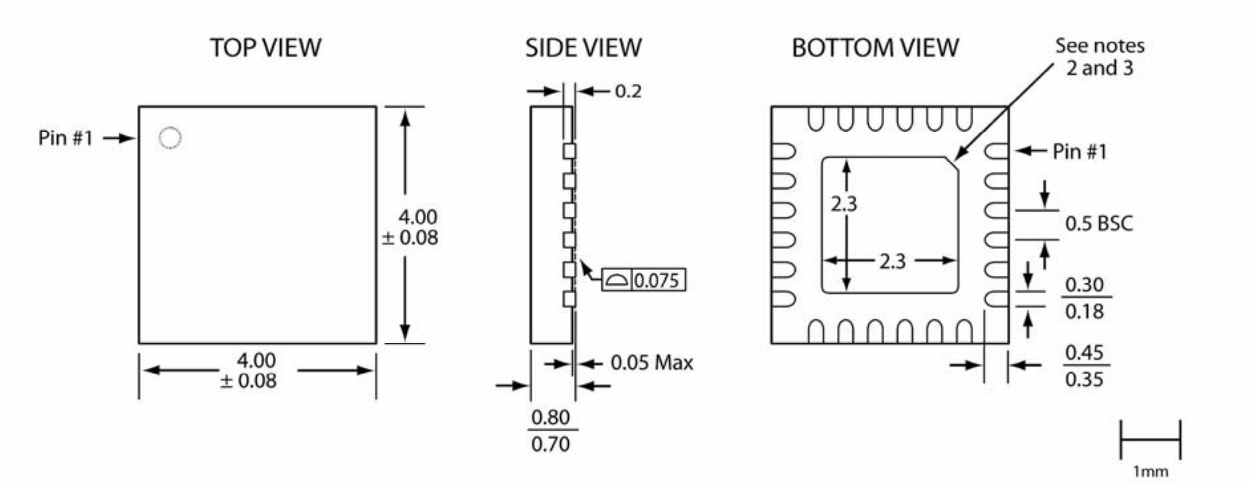
Package Outlines and Dimensions

24-Lead Very, Very Thin Quad Flatpack No-Leads (QDE/F) - 4x4 mm Body [WQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



24-wqfn-4x4-QD-2.0

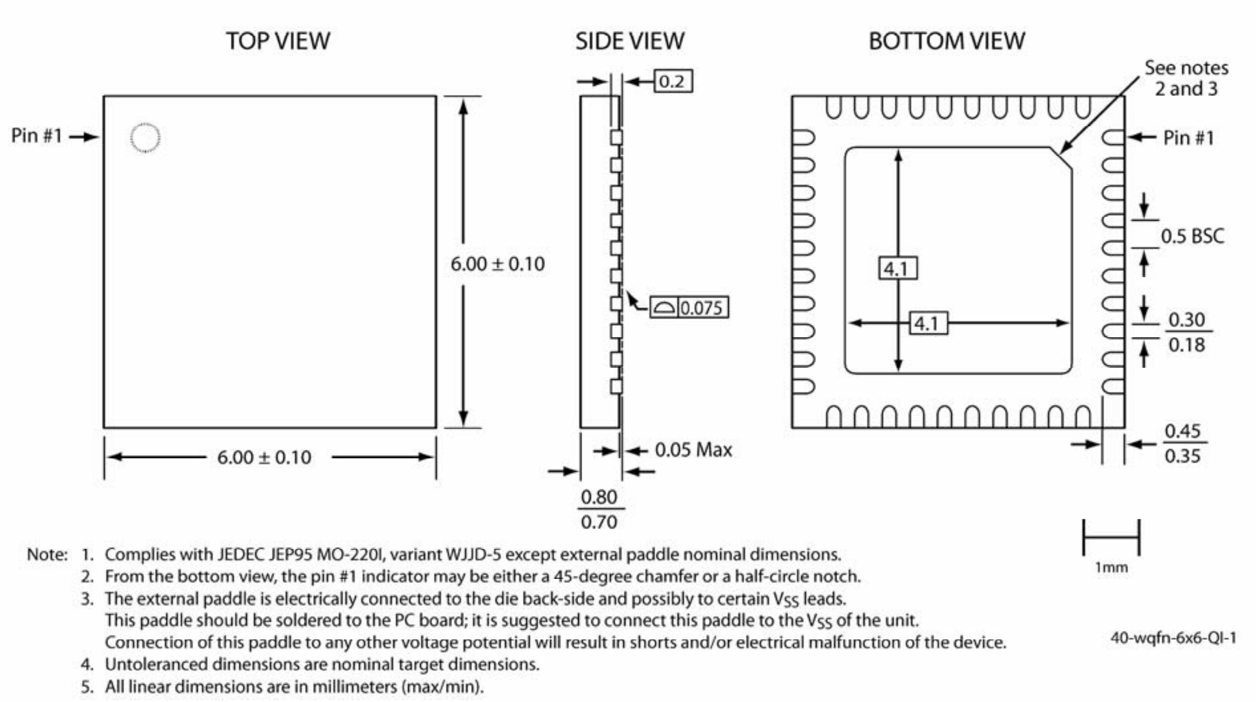
Note:

1. Complies with JEDEC JEP95 MO-220J, variant WGGD-4 except external paddle dimensions.
2. From the bottom view, the pin #1 indicator may be either a 45-degree chamfer or a half-circle notch.
3. The external paddle is electrically connected to the die back-side and possibly to certain VSS leads. This paddle can be soldered to the PC board; it is suggested to connect this paddle to the VSS of the unit. Connection of this paddle to any other voltage potential can result in shorts and/or electrical malfunction of the device.
4. Untoleranced dimensions are nominal target dimensions.
5. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14021A Sheet 1 of 1

40-Lead Very, Very Thin Quad Flatpack No-Leads (QIE/F) - 6x6 mm Body [WQFN]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-14031A Sheet 1 of 1

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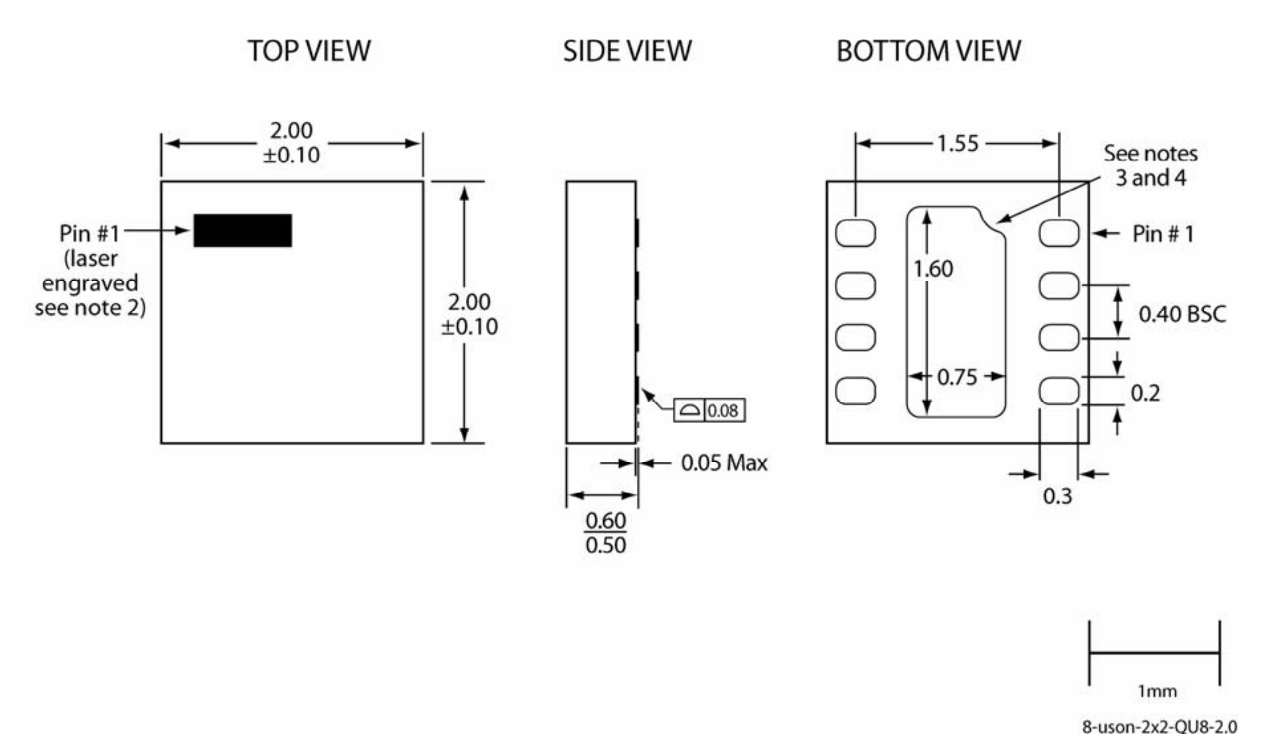
USON

SST Legacy

8-Lead Ultra Thin Small Outline No-Leads (QU8E/F) - 2x2 mm Body [USON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. Similar to JEDEC JEP95 XQFN/XSON variants, though number of contacts and some dimensions are different.
2. The topside pin #1 indicator is laser engraved; its approximate shape and location is as shown.
3. From the bottom view, the pin #1 indicator may be either a curved indent or a 45-degree chamfer.
4. The external paddle is electrically connected to the die back-side and to VSS.
   This paddle must be soldered to the PC board; it is required to connect this paddle to the VSS of the unit.
   Connection of this paddle to any other voltage potential will result in shorts and electrical malfunction of the device.
5. Untoleranced dimensions are nominal target dimensions.
6. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14006A Sheet 1 of 1

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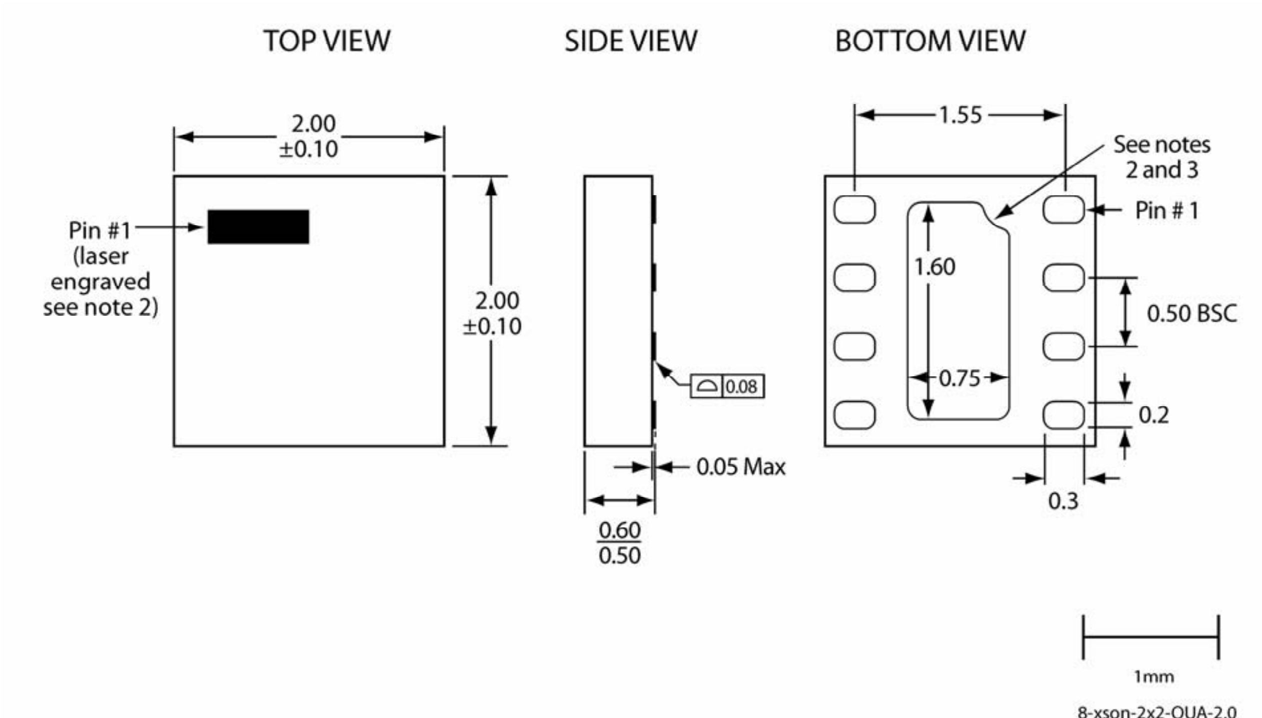
8-Lead Ultra Thin Small Outline No-Leads (QUAE/F) - 2x2 mm Body [USON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. Similar to JEDEC JEP95 UQFN/USON variants, though number of contacts and some dimensions are different.
2. The topside pin #1 indicator is laser engraved; its approximate shape and location is as shown.
3. The external paddle is electrically connected to the die back-side and to VSS.
   This paddle must be soldered to the PC board; it is required to connect this paddle to the VSS of the unit. Connection of this paddle to any other voltage potential will result in shorts and electrical malfunction of the device.
4. Untoleranced dimensions are nominal target dimensions.
5. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14007A Sheet 1 of 1

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NOTES:

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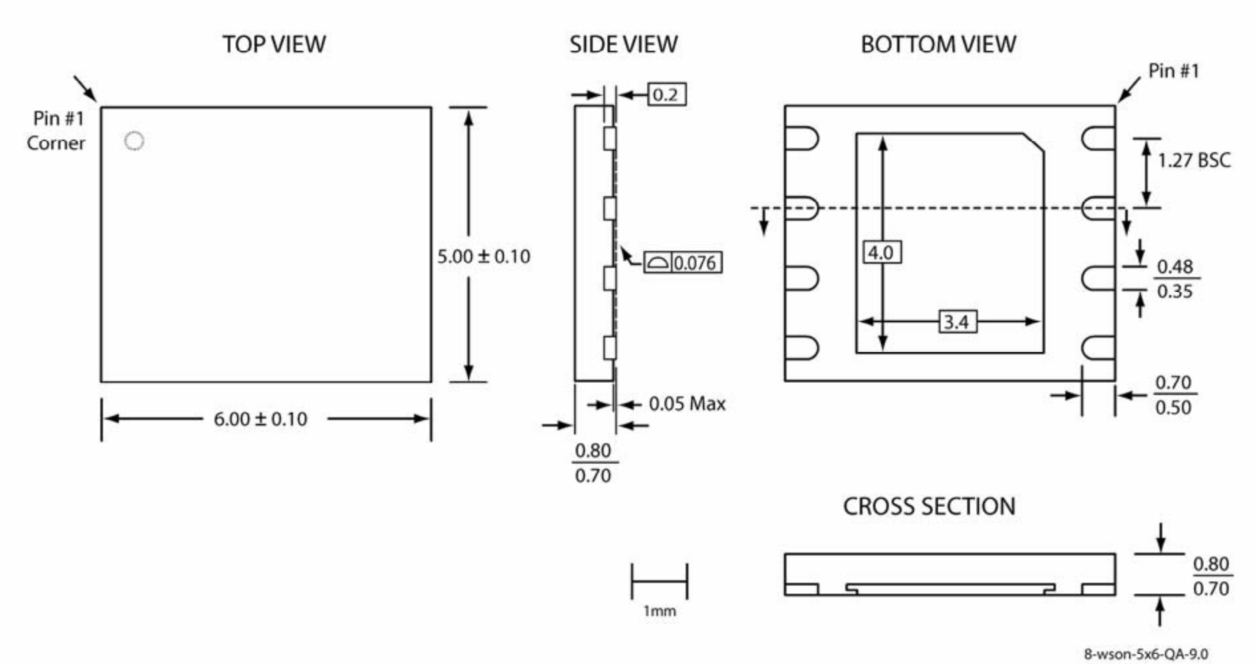
WSON

SST Legacy

8-Lead Very, Very Thin Small Outline No-Leads (QAE/F) - 5x6 mm Body [WSON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. All linear dimensions are in millimeters (max/min).
2. Untoleranced dimensions (shown with box surround) are nominal target dimensions.
3. The external paddle is electrically connected to the die back-side and possibly to certain VSS leads. This paddle can be soldered to the PC board; it is suggested to connect this paddle to the VSS of the unit. Connection of this paddle to any other voltage potential can result in shorts and/or electrical malfunction of the device.

Microchip Technology Drawing C04-14008A Sheet 1 of 1

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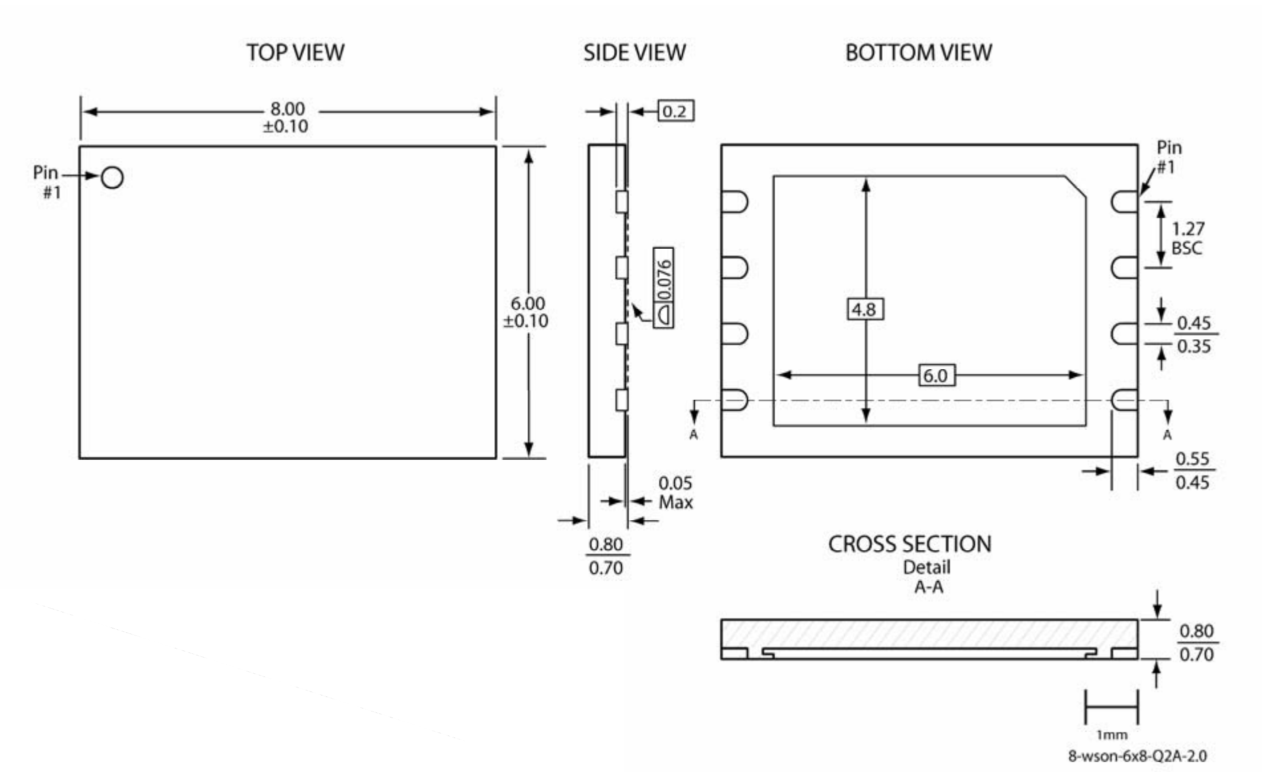
8-Lead Very, Very Thin Small Outline No-Leads (Q2AE/F) - 6x8 mm Body [WSON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. All linear dimensions are in millimeters (max/min).
2. Untoleranced dimensions are nominal target dimensions.
3. The external paddle is electrically connected to die back-side and VSS. This paddle can be soldered to the PC board; SST suggests connecting this paddle to VSS of the unit. Connection of this paddle to any other voltage potential will result in shorts and/or electrical malfunction of the device.

Microchip Technology Drawing C04-14009A Sheet 1 of 1

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NOTES:

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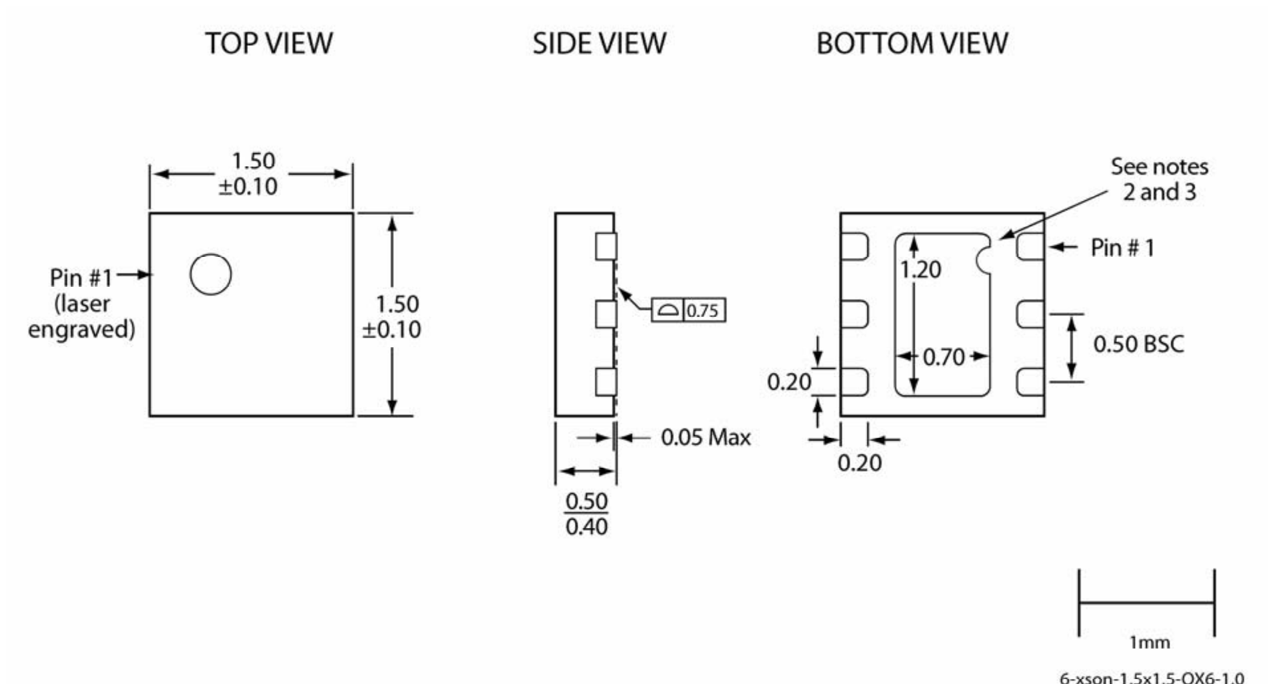
XSON

SST Legacy

6-Lead Extremely Thin Small Outline No-Leads (QX6E/F) - 1.5x1.5 mm Body [XSON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. Similar to JEDEC JEP95 XQFN/XSON variants, though number of contacts and some dimensions are different.
2. From the bottom view, the pin #1 indicator may be either a curved indent or a 45-degree chamfer.
3. The external paddle is electrically connected to the die back-side and to VSS.
   This paddle must be soldered to the PC board; it is required to connect this paddle to the VSS of the unit.
   Connection of this paddle to any other voltage potential will result in shorts and electrical malfunction of the device.
4. Untoleranced dimensions are nominal target dimensions.
5. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14002A Sheet 1 of 1

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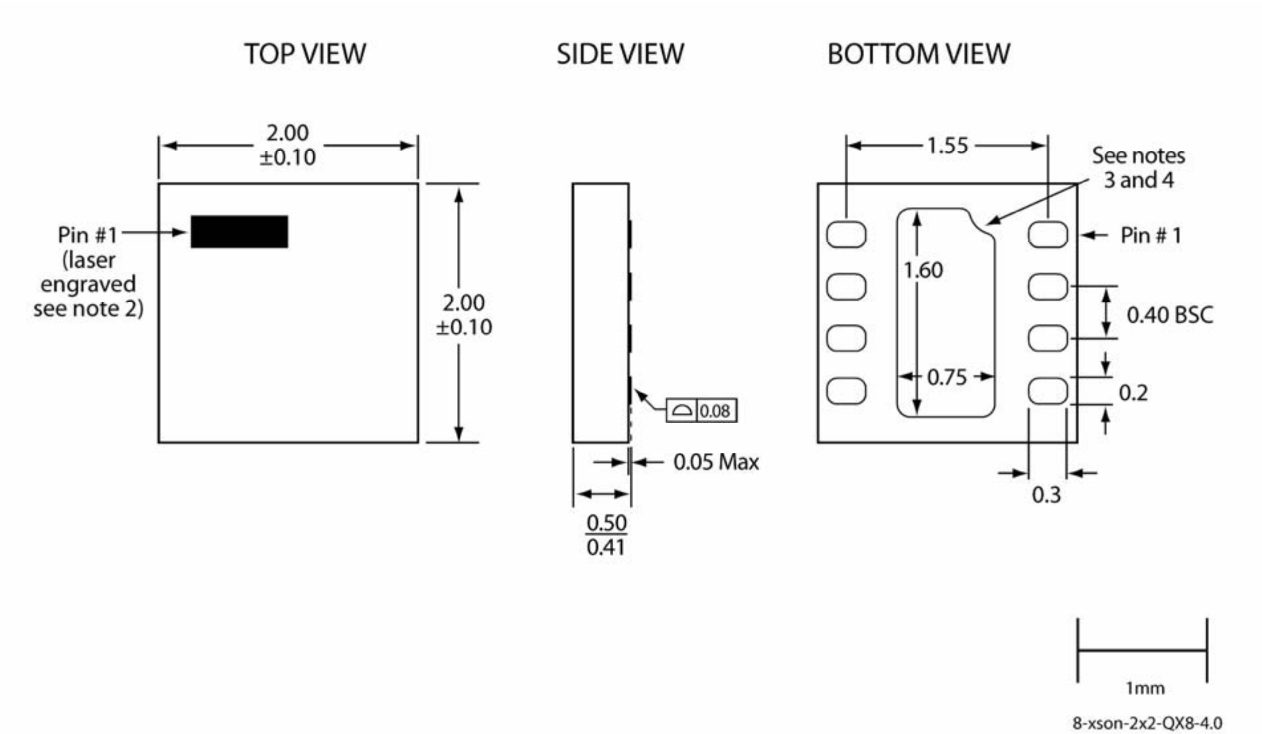
8-Lead Extremely Thin Small Outline No-Leads (QX8E/F) - 2x2 mm Body [XSON]

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Note:

1. Similar to JEDEC JEP95 XQFN/XSON variants, though number of contacts and some dimensions are different.
2. The topside pin #1 indicator is laser engraved; its approximate shape and location is as shown.
3. From the bottom view, the pin #1 indicator may be either a curved indent or a 45-degree chamfer.
4. The external paddle is electrically connected to the die back-side and to VSS.
   This paddle must be soldered to the PC board; it is required to connect this paddle to the VSS of the unit.
   Connection of this paddle to any other voltage potential will result in shorts and electrical malfunction of the device.
5. Untoleranced dimensions are nominal target dimensions.
6. All linear dimensions are in millimeters (max/min).

Microchip Technology Drawing C04-14010A Sheet 1 of 1

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NOTES:

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Legacy SMSC Package Drawings & Specifications

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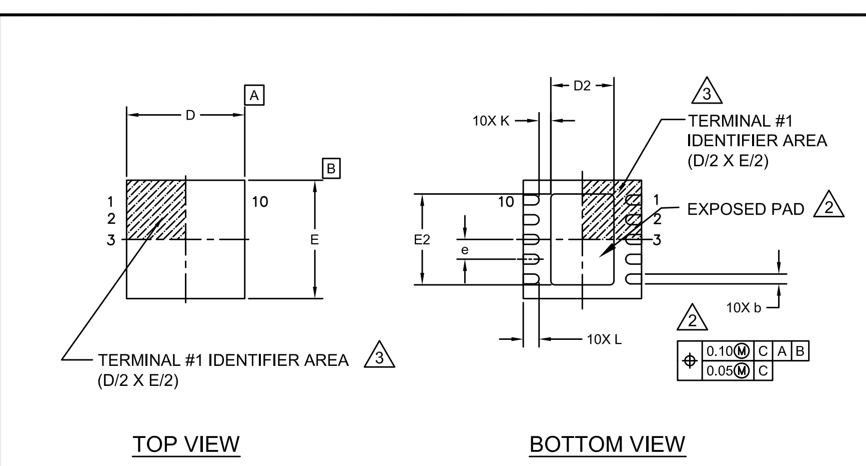
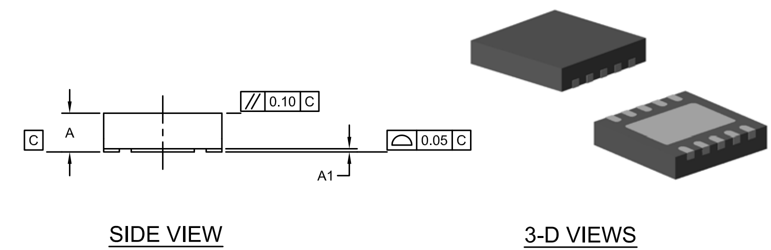
DFN

SMSC Legacy

Legacy SMSC Packaging Outlines and Dimensions





REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	2/28/08	S.K.ILIEV
B	ADDED PAGE 2of2. APPLICATION NOTES UPDATED	4/8/09	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
D/E	2.90	3.00	3.10	-	X/Y BODY SIZE
D2	1.50	1.60	1.70	2	X EXPOSED PAD SIZE
E2	2.20	2.30	2.40	2	Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.25	0.30	-	-	TERMINAL TO PAD DISTANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. UNILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED PAD, AS WELL AS THE TERMINALS. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025 — ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

		NAME	DATE
MATERIAL: -	DRAWN	-	2/28/08
FINISH: -	CHECKED	S.K.ILIEV	2/28/08
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.ILIEV	2/28/08

TITLE: PACKAGE DATA
10 PINS DFN-162304, 3x3mm BODY, 0.50mm PITCH
1.6x2.3mm ePAD, FULL LEAD DESIGN (SAWN)
Package Outline Drawing

DWG NUMBER	REV	SCALE	STD COMPLIANCE	SHEET
10DFN-162304-3x3B	B	1:1	MO-229	1 OF 2

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PCB LAND PATTERN

STENCIL

SEE DETAIL "A" FOR PERIMETER PAD AND SOLDER MASK

SEE DETAIL "A" FOR STENCIL RERIMETER PAD

SEE DETAIL "B" FOR CENTER PAD DESIGN (EXPOSED SOLDERABLE COPPER AREA)

SEE DETAIL "B" FOR CENTER PAD STENCIL OPENINGS

SOLDER MASK — CLEARANCE B/N PAD & SM 0.060 - 0.075

0.5; 0.075 (MIN); FULL RADIUS IS OPTIONAL; Xs; X; Ys; Y; 0.025 (MIN)

DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

OPTION 1 (NON-PLUGGED THERMAL VIAS): 1.1; 0.9; *Thermal Vias:* Ø0.30mm, 2x3 Matrix; *Stencil Openings:* Ø0.70-0.80mm

OPTION 2 (PLUGGED THERMAL VIAS): 0.1 (MIN); 0.2 (MIN); *Thermal Vias:* Ø0.30mm, 2x3 Matrix; *Stencil Openings:* 0.95x0.95mm (MAX)

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
B	ADDED PAGE 2of2. APPLICATION NOTES UPDATED	4/8/09	S.K.ILIEV

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD	2.10	-	2.20
GDs	2.20	-	-
D2'	-	1.60	1.60
E2'	-	2.30	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	4/8/09
FINISH: -		
CHECKED	S.K.ILIEV	4/8/09
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	4/9/09

TITLE: PACKAGE DATA
10 PINS DFN-162304, 3x3mm BODY, 0.50mm PITCH
1.6x2.3mm ePAD, FULL LEAD DESIGN (SAWN)
Application Notes

DWG NUMBER	REV
10DFN-162304-3x3B	B

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-229	2 OF 2

NOTES:

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DQFN Family

SMSC Legacy

Legacy SMSC Packaging Outlines and Dimensions

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	0.80	0.85	–	OVERALL PKG HEIGHT
A1	0	0.01	0.05	–	STANDOFF
A2	–	0.65	0.70	–	MOLD THICKNESS
D/E	9.90	10.00	10.10	–	"X"/"Y" BODY SIZE
D1/E1	9.65	9.75	9.85	–	"X"/"Y" MOLD SIZE
D2/E2	5.30	5.40	5.50	2	"X"/"Y" EXPOSED PAD SIZE
La	0.30	0.40	0.50	4	OUTER TERMINAL LENGTH
Lb	0.30	0.40	0.50	4	INNER TERMINAL LENGTH
b	0.18	–	0.22	2	TERMINAL WIDTH
e	0.50 BSC			–	TERMINAL PITCH
e1	0.65 BSC			–	OUTER–INNER ROW DISTANCE

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. POSITION TOLERANCE OF EACH TERMINAL AND EXPOSED PAD IS ± 0.05mm AT MAXIMUM MATERIAL CONDITION. DIMENSIONS "b" APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. ROUNDED INNER TIPS ON TERMINALS ARE OPTIONAL.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	12/10/07
CHECKED	S.K.ILIEV	12/10/07
APPROVED	S.K.ILIEV	12/12/07

MATERIAL: -
FINISH: -
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 124 DQFN, 10x10 MM BODY, 0.5 MM PITCH 5.4x5.4 MM ePAD (PUNCHED)
DWG NUMBER: AP-124-DQFN-10x10B-5.4x5.4ePAD REV: A
SCALE: 1:1 STD COMPLIANCE: - SHEET: 1 OF 1

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REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	4/5/05	S.K.ILIEV
B	REMOVE THE "PRELIMINARY" NOTE	7/2/05	S.K.ILIEV
C	REMOVED THE LOGO FROM THE TITLE BLOCK	9/26/07	S.K.ILIEV

TOP VIEW

TERMINAL #1 IDENTIFIER AREA (D1/2 X E1/2)

4X 45°X0.6 MAX (OPTIONAL)

BOTTOM VIEW

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)

EXPOSED PAD

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	0.80	0.85	–	OVERALL PKG HEIGHT
A1	0	0.01	0.05	–	STANDOFF
A2	–	0.65	0.70	–	MOLD THICKNESS
D/E	9.90	10.00	10.10	–	"X"/"Y" BODY SIZE
D1/E1	9.65	9.75	9.85	–	"X"/"Y" MOLD SIZE
D2/E2	6.75	6.90	7.05	2	"X"/"Y" EXPOSED PAD SIZE
La	0.30	0.40	0.50	4	OUTER TERMINAL LENGTH
Lb	0.30	0.40	0.50	4	INNER TERMINAL LENGTH
b	0.18	–	0.22	2	TERMINAL WIDTH
e	0.50 BSC			–	TERMINAL PITCH
e1	0.65 BSC			–	OUTER-INNER ROW DISTANCE

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. POSITION TOLERANCE OF EACH TERMINAL AND EXPOSED PAD IS ± 0.05mm AT MAXIMUM MATERIAL CONDITION. DIMENSIONS "b" APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. ROUNDED INNER TIPS ON TERMINALS ARE OPTIONAL.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

TITLE: PACKAGE OUTLINE 124 DQFN, 10x10 MM BODY, 0.5 MM PITCH (P)

	NAME	DATE
DRAWN	S.K.ILIEV	2/1/05
CHECKED	S.K.ILIEV	3/31/05
APPROVED	S.K.ILIEV	4/5/05

MATERIAL: -

FINISH: -

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

DWG NUMBER: AP-124-DQFN-10x10B — REV: C

SCALE: 1:1 — STD COMPLIANCE: - — SHEET: 1 OF 1

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/30/08	S.K.ILIEV
B	NEW LAYOUT OF PAGE 2of2 - TO UPDATE STENCIL	1/30/09	S.K.ILIEV

D
D1
E1 E
4X 45°X0.6 MAX (OPTIONAL)
TERMINAL #1 IDENTIFIER AREA (D1/2 X E1/2) 3

TOP VIEW

68X Lb 4
D2
e
0.10 M C A B
TERMINAL #1 IDENTIFIER AREA (D/2 X E/2) 3
EXPOSED PAD
E2
64X La 4
4X e1
e/2
132X b 2
0.10 M C A B
0.05 M C

BOTTOM VIEW

C
A
0.10 C
A1
A2

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.01	0.05	-	STANDOFF
A2	-	0.60	0.65	-	MOLD CAVITY HEIGHT
D/E	10.90	11.00	11.10	-	X/Y BODY SIZE
D1/E1	10.63	10.73	10.83	-	X/Y MOLD CAVITY SIZE
D2/E2	4.90	5.00	5.10	2	X/Y EXPOSED PAD SIZE
La/Lb	0.30	0.40	0.50	4	TERMINAL LENGTH
b	0.17	0.22	0.27	2	TERMINAL WIDTH
e	0.50 BSC			-	TERMINAL PITCH
e1	0.65 BSC			-	OUTER-INNER ROW PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. ROUNDED INNER ENDS OF THE TERMINALS ARE OPTIONAL.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025
ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994
MATERIAL -
FINISH -
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

	NAME	DATE
DRAWN	-	7/30/08
CHECKED	-	7/30/08
APPROVED	S.K.ILIEV	7/30/08

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

TITLE
PACKAGE DATA
132 PINS DQFN, 11x11mm BODY, 0.50/0.65mm LEAD PITCH (PUNCHED)

DWG NUMBER: 132-DQFN5004-11x11B-05P
REV: B
SCALE: 1:1
STD COMPLIANCE: MO-267
SHEET: 1 OF 2

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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
B	NEW LAYOUT OF PAGE 2of2 - TO UPDATE STENCIL	1/30/09	S.K.ILIEV

PCB LAND PATTERN

CENTER PAD DESIGN - SEE OPTIONS 1, 2 & 3
SOLDER MASK TO PAD CLEARANCE = 50um (MIN)

DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

SOLDER MASK
STENCIL OPENING (Outer Row) = 0.67x0.24mm
STENCIL OPENING (Inner Row) = 0.5x0.23mm

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD1/GE1	10.12	-	10.2
GD2/GE2	-	9.70	9.72
D2'/E2' (Copper center pad - NSMD)	-	5.00	5.00
DS2'/ES2' (Solder mask opening)	5.10	-	-
X	-	-	0.28
Y1	-	-	0.74
Y2	-	-	0.56
e		0.50	
NSMD = Non Solder Mask Defined			

REWORK STENCIL OPENING - PERIMETER LANDS
DIRECT SOLDER DEPOSIT ON PART

INNER ROW APERTURES ALIGNMENT (0.45 x 0.28 mm)
OUTER ROW APERTURES ALIGNMENT (0.45 x 0.30 mm)
CENTER PAD APERTURES TO BE THE SAME AS THE STENCIL APERTURES ON THE INITIAL PART PLACEMENT

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. NON SOLDER MASK DEFINED (NSMD) CENTER LAND PATTERN (CORRESPONDING TO THE PACKAGE EXPOSED PAD) IS RECOMMENDED.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1, 2 & 3)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.

NSMD SMD

6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCH = 0.5 mm.
7. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
8. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
9. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

OPTION 1 (UN-PLUGGED THERMAL VIAS) — *Thermal Vias:* Ø0.30mm, 5x5 Matrix @ 1.1mm Pitch; *Stencil Openings:* Ø0.90mm 4x4 Matrix @ 1.1mm Pitch

OPTION 2 — *Thermal Vias:* Ø0.40mm, 4x4 Matrix @ 1.0mm Pitch; *Stencil Openings:* Ø0.70mm 5x5 Matrix @ 1.0mm Pitch

OPTION 3 (PLUGGED THERMAL VIAS) — 0.1mm (MIN), 0.2mm (MIN); *Thermal Vias:* Ø0.30mm, 5x5 Matrix @ 1.1mm Pitch; *Stencil Openings:* 0.9x0.9mm 4x4 Matrix @ 1.2mm Pitch

THERMAL VIAS & STENCIL OPENING - CENTER PAD

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°. INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	7/30/08
FINISH: -	CHECKED: -	7/30/08
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	7/30/08

TITLE: APPLICATION NOTES 132 PINS DQFN, 11x11mm BODY, 0.50/0.65mm LEAD PITCH (PUNCHED)

DWG NUMBER: 132-DQFN5004-11x11B-05P — REV: B

SCALE: 1:1 — STD COMPLIANCE: - — SHEET: 2 OF 2

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	5/6/05	S.K.ILIEV
B	ePAD CHANGED FROM 8.9x8.9 TO 5.1x5.1 MM	5/24/05	S.K.ILIEV
C	3-D VIES ADDED	6/1/05	S.K.ILIEV
D	REMOVE THE LOGO FROM TITLE BLOCK	9/26/07	S.K.ILIEV
E	ADDED APPLICATION NOTE AS PAGE 2 of 2	5//6/08	S.K.ILIEV

D
D1
156
A1
A2
A3
3 TERMINAL #1 IDENTIFIER AREA (D1/2 X E1/2)
E1 E
4X 45°X0.6 MAX (OPTIONAL)

TOP VIEW

4 76X Lb
D2
e
N (A80)
B76
B1 B2 B3
A1 A2 A3
E2
3 TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)
EXPOSED PAD 2
4X e1
e/2
156X b 2
80X La 4

BOTTOM VIEW

A
A1
A2

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	0.80	0.85	–	OVERALL PKG HEIGHT
A1	0	0.01	0.05	–	STANDOFF
A2	–	0.65	0.70	–	MOLD THICKNESS
D/E	11.90	12.00	12.10	–	"X"/"Y" BODY SIZE
D1/E1	11.65	11.75	11.85	–	"X"/"Y" MOLD SIZE
D2/E2	4.95	5.10	5.25	2	"X"/"Y" EXPOSED PAD SIZE
La/Lb	0.30	0.40	0.50	4	OUTER/INNER TERMINAL LENGTH
b	0.18	–	0.22	2	TERMINAL WIDTH
e	0.50 BSC			–	TERMINAL PITCH
e1	0.65 BSC			–	OUTER–INNER ROW DISTANCE

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. POSITION TOLERANCE OF EACH TERMINAL AND EXPOSED PAD IS ± 0.05mm AT MAXIMUM MATERIAL CONDITION. DIMENSIONS "b" APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. ROUNDED INNER ENDS OF THE TERMINALS ARE OPTIONAL.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025
ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	S.K.ILIEV	2/1/05
FINISH: -		
CHECKED	S.K.ILIEV	2/1/05
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	5/6/05

TITLE: PACKAGE OUTLINE DATA
156 DQFN-51, 12x12 MM BODY, 0.5 MM PITCH

DWG NUMBER: 156DQFN-51-12x12B — REV: E

SCALE: 1:1 — STD COMPLIANCE: - — SHEET: 1 OF 1

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GD1
GD2
D2'
PIN 1
GE1
GE2
E2'
e
STENCIL OPENING = 0.5x0.24mm (Inner Row)
STENCIL OPENING = 0.67x0.25mm (Outer Row)
Y2
Y1
X
SOLDER MASK (50um MIN CLEARANCE)
CENTER PAD DESIGN - SEE OPTIONS 1, 2 & 3

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD1/GE1	11.12	-	11.2
GD2/GE2	-	10.70	10.72
D2'/E2' (SMD)	-	5.30	-
D2'/E2' (NSMD)	-	5.10	-
X (NSMD)	-	-	0.28
Y1 (NSMD)	-	-	0.74
Y2 (NSMD)	-	-	0.56
e	0.50		

RECOMMENDED PCB LAND PATTERN

OPTION 1 (UN-PLUGGED THERMAL VIAS)
Thermal Vias: Ø0.30mm, 6x6 Matrix @ 0.9mm Pitch
Stencil Openings: Ø0.60mm 5x5 Matrix @ 0.9mm Pitch

OPTION 2
Thermal Vias: Ø0.40mm, 5x5 Matrix @ 0.8mm Pitch
Stencil Openings: Ø0.50mm 6x6 Matrix @ 0.8mm Pitch

OPTION 3 (PLUGGED THERMAL VIAS)
0.1mm (MIN)
0.2mm (MIN)
Thermal Vias: Ø0.30mm, 6x6 Matrix @ 0.9mm Pitch
Stencil Openings: 0.9x0.9mm 4x4 Matrix @ 1.2mm Pitch

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK, SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE:
   NSMD: 5.1x5.1mm
   SMD: 5.3x5.3mm
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1, 2 & 3)
4. THE VIAS SHOULD BE AT 0.8 to 1.0MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025 ANGULAR ±1° INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
	NAME	DATE	TITLE: APPLICATION NOTES 156 DQFN-51, 12x12 MM BODY, 0.5 MM PITCH	
MATERIAL -	DRAWN S.K.ILIEV	2/1/05		
FINISH -	CHECKED S.K.ILIEV	2/1/05	DWG NUMBER 156DQFN-51-12x12B	REV E
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	5/6/05	SCALE 1:1 / STD COMPLIANCE -	SHEET 2 OF 2

NOTES:

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DS Family

SMSC Legacy

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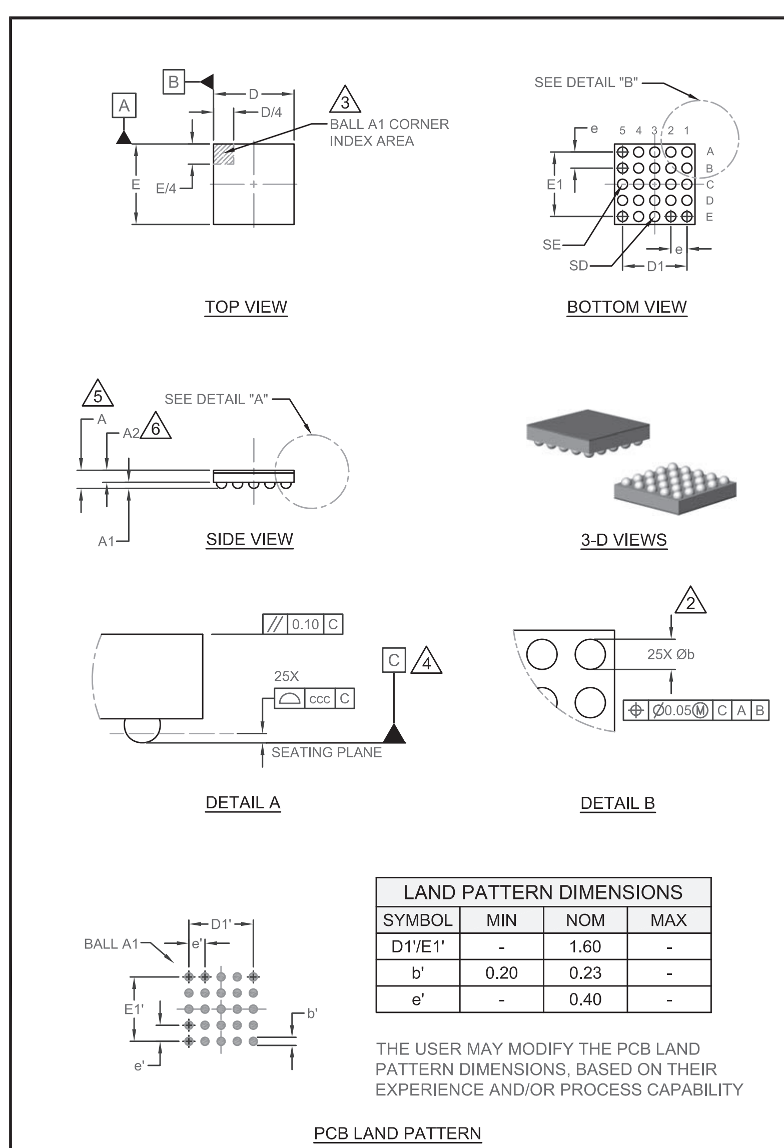

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	1.60	-
b'	0.20	0.23	-
e'	-	0.40	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	10/24/07	S.K.ILIEV
B	PCB LAND PATTERN UPDATED	4/20/09	S.K.ILIEV
C	D/E from 1.94 - 1.97 to 1.97±0.03mm	11/16/09	S.K.ILIEV
D	A from NOM & MAX to range MIN - MAX. ADDED SD and SE	MAR2010	S.K.ILIEV
E	UPDATED b' to be 0.20 MIN & 0.23 NOM	SEP 2010	SKI

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.52	0.56	0.62	5	OVERALL PACKAGE HEIGHT
A1	0.16	0.20	0.24	-	STANDOFF
A2	-	-	0.38	6	PACKAGE THICKNESS
D/E	1.94	1.97	2.00	-	X/Y DIE SIZE
D1/E1		1.60 BSC		-	X/Y END BALLS DISTANCE
b	0.20	0.25	0.30	2	BALL DIAMETER
e		0.40 BSC		-	BALL PITCH
SD/SE		0.00		-	CENTER BALL POSITION (OUTER ROW)
ccc	0	-	0.05	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
   DIMENSION "A(MAX)" IS GIVEN FOR THE EXTREMELY THIN VARIATION OF THE PACKAGE PROFILE HEIGHT.
6. DIMENSION "A2" INCLUDES A DIE COATING THICKNESS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

		NAME	DATE
MATERIAL	N/A		
	DRAWN	-	7/14/07
FINISH	N/A		
	CHECKED	S.K.ILIEV	10/23/07
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.ILIEV	10/24/07

TITLE: PACKAGE OUTLINE
25 Ball DSe1, 0.40mm Pitch, e1=SAC Ball Material
DSe1 = Die Size Package, or WLCSP

DWG NUMBER	REV
25DSe1-2x2B-0.4P	E

SCALE	STD COMPLIANCE	SHEET
1:1	MO-211	1 OF 1

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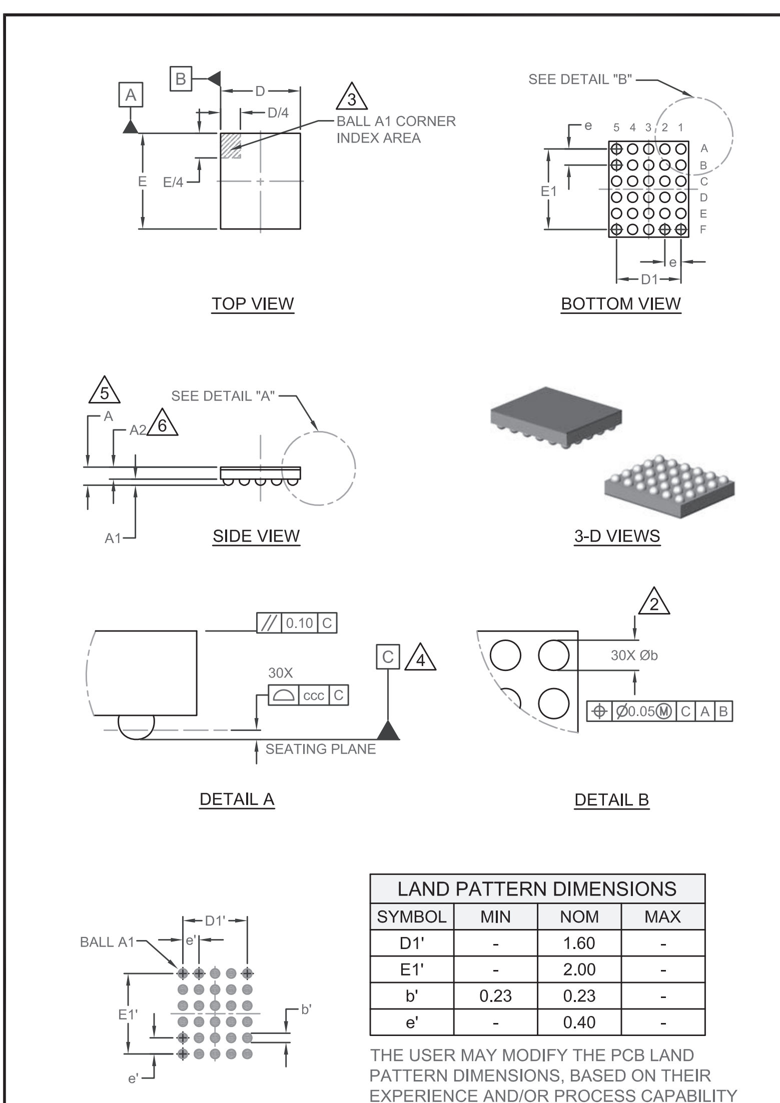

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'	-	1.60	-
E1'	-	2.00	-
b'	0.23	0.23	-
e'	-	0.40	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	8/26/09	S.K.ILIEV
A1	b' (min) and (nom) from 0.20 to 0.23	11/9/09	S.K.ILIEV
B	INITIAL RELEASE	1/22/10	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	0.53	0.62	5	OVERALL PACKAGE HEIGHT
A1	0.16	0.20	0.24	-	STANDOFF
A2	-	-	0.38	6	PACKAGE THICKNESS
D	1.94	1.97	2.00	-	X DIE SIZE
E	2.34	2.37	2.40	-	Y DIE SIZE
D1/E1	1.60 BSC			-	X END BALLS DISTANCE
E1	2.00 BSC			-	Y END BALLS DISTANCE
b	0.20	0.25	0.30	2	BALL DIAMETER
e	0.40 BSC			-	BALL PITCH
ccc	0	-	0.05	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
   DIMENSION "A(MAX)" IS GIVEN FOR THE EXTREMELY THIN VARIATION OF THE PACKAGE PROFILE HEIGHT.
6. DIMENSION "A2" INCLUDES A DIE COATING THICKNESS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: N/A	DRAWN: -	8/15/09
FINISH: N/A	CHECKED: S.K.ILIEV	8/26/09
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	8/26/09

TITLE: **PACKAGE OUTLINE**
30 BALL DS, 2x2.4mm BODY, 0.40mm PITCH
(DSe1 = Die Size Package, or WLCSP)

DWG NUMBER	REV
30DSe1-0.4P	B

SCALE	STD COMPLIANCE	SHEET
1:1	MO-211	1 OF 1

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NOTES:

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LBGA

SMSC Legacy

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	5/7/01	S.K.ILIEV
B	Par tol, 3-D & notes 4 & 5 added	3/21/05	S.K.ILIEV
C	REMOVED THE LOGO FROM THE TITLE BLOCK	9/26/07	S.K.ILIEV

ccc (MAX)	
PKG MOLDING	
SINGLE	MATRIX
0.15	0.12

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	1.10	–	1.50	–	OVERALL PACKAGE HEIGHT
A1	0.25	–	0.50	–	STANDOFF
A2	0.49	–	0.75	–	MOLD THICKNESS
D/E	16.80	17.00	17.20	–	"X" & "Y" SUBSTRATE LENGTH
D1/E1		15.00 BSC		–	"X" AND "Y" END BALL CENTERS
D2/E2	14.80	15.00	15.20	5	"X" AND "Y" LID LENGTH
b	0.40	0.50	0.70	2	BALL DIAMETER
e		1.00 BSC		–	BALL PITCH
ccc		SEE VARIATIONS		4	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAXIMUM RADIAL TRUE POSITION TOLERANCE OF EACH BALL IS ±0.125mm AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. DETAILS OF BALL "A1" IDENTIFIER MUST BE LOCATED WITHIN THE AREA INDICATED.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.
5. DASHED LINE INDICATES THE SINGLE (LID) MOLDED PACKAGE VERSION.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025 — ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	S.K.ILIEV	5/5/01
FINISH: -		
CHECKED	S.K.ILIEV	5/5/01
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	5/7/01

TITLE: PACKAGE OUTLINE 256 LBGA, 17x17 MM BODY, 1.00 MM PITCH

DWG NUMBER: AP-256-LBGA-17x17B-1.0P — REV: C

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-192 — SHEET: 1 OF 1

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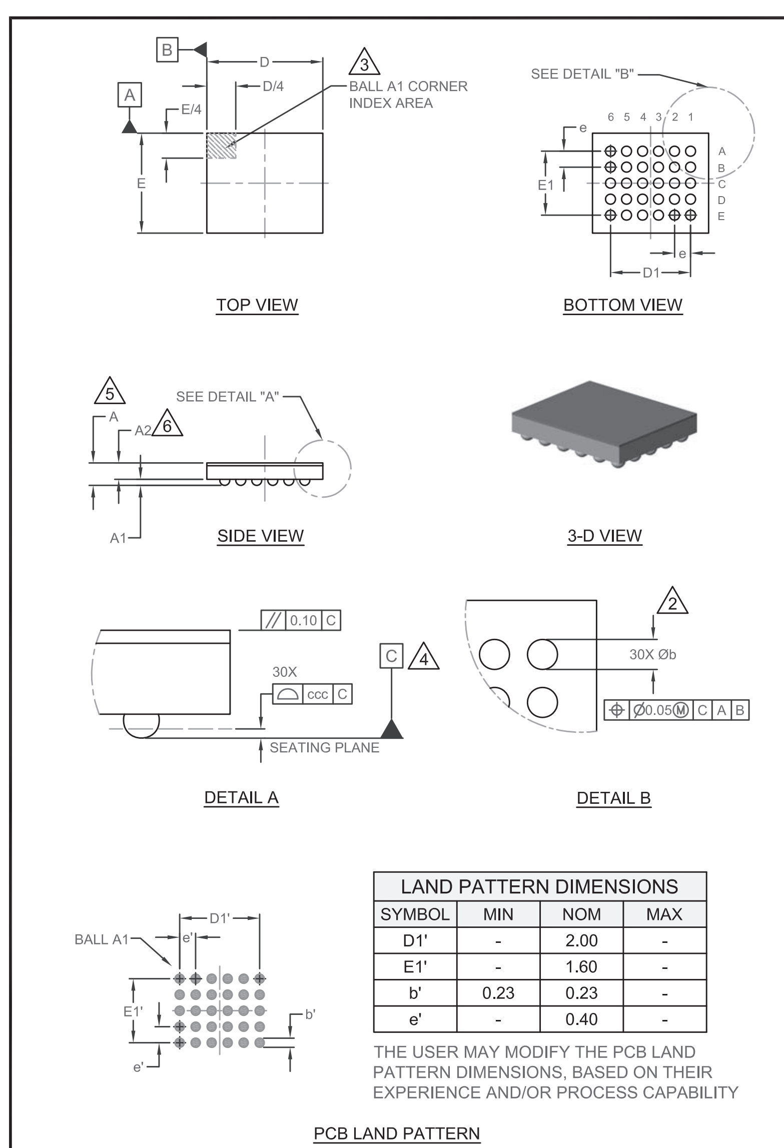
DSA

SMSC Legacy



REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	9/10/2012	S.K.ILIEV
A1	UPDATED A1 CORNER ON TOP VIEW TO MATCH THE ONE IN BOTTOM VIEW	3/19/2012	SKI
A2	ADDED 3-D VIEW	3/23/2012	SKI
A3	ROTATE PKG 90° CLOCKWISE	3/28/2012	SKI
B	INITIAL RELEASE	1/25/2013	SKI

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	0.56	0.62	5	OVERALL PACKAGE HEIGHT
A1	0.16	0.20	0.24	-	STANDOFF
A2	-	-	0.38	6	PACKAGE THICKNESS
D	2.87	2.90	2.93	-	X DIE SIZE
E	2.47	2.50	2.53	-	Y DIE SIZE
D1		2.00 BSC		-	X END BALLS DISTANCE
E1		1.60 BSC		-	Y END BALLS DISTANCE
b	0.20	0.25	0.30	2	BALL DIAMETER
e		0.40 BSC		-	BALL PITCH
ccc	0	-	0.05	4	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
   DIMENSION "A(MAX)" IS GIVEN FOR THE EXTREMELY THIN VARIATION OF THE PACKAGE PROFILE HEIGHT.
6. DIMENSION "A2" INCLUDES A DIE COATING THICKNESS.

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'	-	2.00	-
E1'	-	1.60	-
b'	0.23	0.23	-
e'	-	0.40	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994
THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	-	2/9/12
CHECKED	S.K.ILIEV	2/9/12
APPROVED	S.K.ILIEV	2/10/12

MATERIAL: N/A
FINISH: N/A
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: **PACKAGE OUTLINE**
30 BALL DSA, 2.5x2.9mm BODY, 0.40mm PITCH
(DSA = Die Size Package, or WLCSP)

DWG NUMBER: 30DSA-0.4P | REV: B
SCALE: 1:1 | STD COMPLIANCE: MO-211 | SHEET: 1 OF 1

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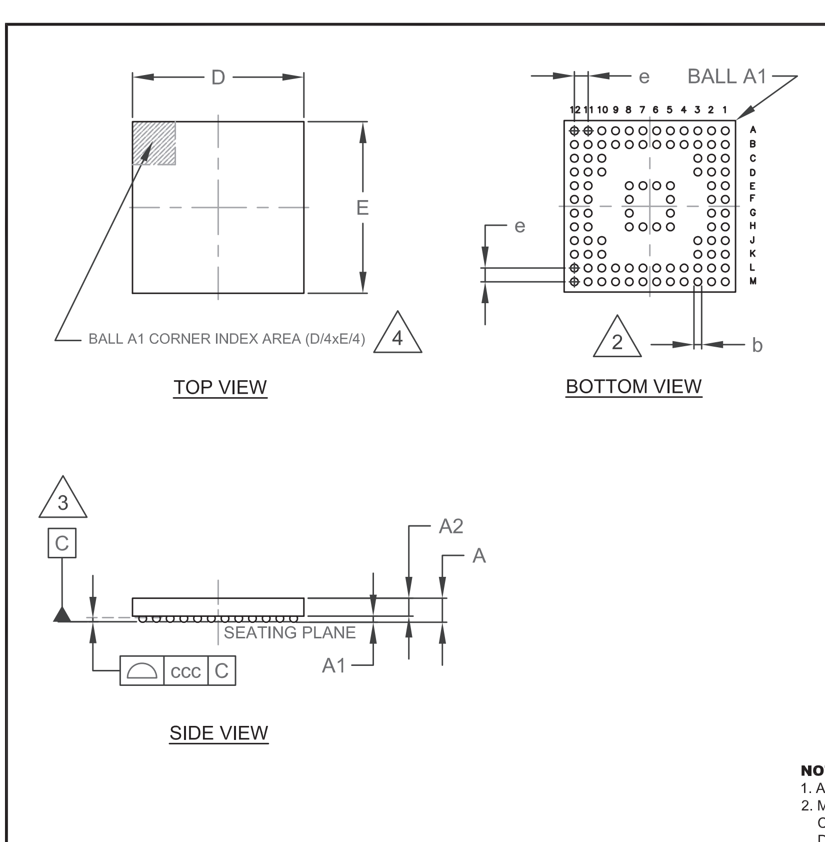
LFBGA

SMSC Legacy

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	8/22/07	S.K.ILIEV
B	INITIAL PRODUCTION RELEASE	3/20/08	S.K.ILIEV
C	ADDED PAGE 2of2. UPDATED APP NOTES.	2/7/09	S.K.ILIEV



3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.60	1.70	-	OVERALL PACKAGE HEIGHT
A1	0.25	0.34	-	-	STANDOFF
A2	1.16	1.26	1.36	-	PACKAGE BODY THICKNESS
D/E	9.90	10.00	10.10	-	OVERALL PACKAGE SIZE
b	0.40	0.45	0.50	2	BALL DIAMETER
e	0.80 BSC			-	BALL PITCH
ccc	-	-	0.20	3	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAXIMUM RADIAL TRUE POSITION TOLERANCE OF EACH BALL IS ±0.075mm AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, IDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE INIQUE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	8/20/07
FINISH: -		
CHECKED	-	8/20/07
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	8/21/07

TITLE: PACKAGE DATA
100 BALL LFBGA, 10x10mm BODY, 0.8mm PITCH
Package Outline Drawing (POD)

DWG NUMBER	REV
100LFBGA-10x10B-0.8P	C

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-275	1 OF 2

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REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	12/21/10	SKI
B	A1(max) from 0.35 to 0.40. Added DIM b1(max) & b2	3/2/11	SKI
C	PRODUCTION RELEASE. Vie pad from 0.46 to 0.45	4/15/11	SKI

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.30	1.40	5	OVERALL PACKAGE HEIGHT
A1	0.25	-	0.40	-	STANDOFF
A2	0.65	0.96	-	-	PACKAGE BODY THICKNESS
D/E	10.90	11.00	11.10	-	OVERALL PACKAGE SIZE
b	0.40	0.45	0.50	2	BALL DIAMETER
b1	0.35	0.40	0.45	6	FINISHED SOLDER MASK OPENING
b2	0.47	0.52	0.57	-	FINISHED BOTTOM BALL PAD
e	0.80 BSC			-	BALL PITCH
ccc	-	-	0.20	3	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, IDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE INIQUE.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

PCB LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
D1/E1	-	9.60	-
e'	0.80 BSC		

THE USER MAY MODIFY THE PCB LAND PATTERN & ROUTING DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN & ROUTING

ROUTING DIMENSIONS

SYMBOL	NOM
Ø PAD	0.40
Ø SM	0.50
L (Trace)	0.125
SPACE	0.135
SM-Space	0.09
Ø VIA PAD	0.45
Ø DRILL	0.25

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	12/17/10
FINISH: -		
CHECKED	S.K.ILIEV	12/20/10
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	12/21/10

TITLE: PACKAGE OUTLINE 156 BALL LFBGA, 11x11mm BODY, 0.8mm PITCH

DWG NUMBER	REV
156-LFBGA-11x11B-0.8P	C

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-275	1 OF 1

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REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	11/7/11	SKI
B	INITIAL RELEASE	2/15/12	SKI

BALL A1 CORNER INDEX AREA (D/4xE/4)

TOP VIEW

BALL A1

(DATUM A)

(DATUM B)

169X Øb

Ø0.15Ⓜ C A B

Ø0.08Ⓜ C

BOTTOM VIEW

169X

SEATING PLANE

DETAIL A

SMD

(TYPE)

SECTION B-B

SEE DETAIL "A"

SIDE VIEW

3D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.30	1.40	5	OVERALL PACKAGE HEIGHT
A1	0.25	-	0.40	-	STANDOFF
A2	0.65	0.96	-	-	PACKAGE BODY THICKNESS
D/E	10.90	11.00	11.10	-	OVERALL PACKAGE SIZE
b	0.40	0.45	0.50	2	BALL DIAMETER
b1	0.35	0.40	0.45	6	FINISHED SOLDER MASK OPENING
b2	0.47	0.52	0.57	-	FINISHED BOTTOM BALL PAD
e	0.80 BSC			-	BALL PITCH
ccc	-	-	0.20	3	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, IDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE INIQUE.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

BALL A1

SEE DETAIL "C"

PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1/E1	-	9.60	-
e'	0.80 BSC		

THE USER MAY MODIFY THE PCB LAND PATTERN & ROUTING DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN & ROUTING

Ø SM

Ø PAD

Ø VIA

Ø DRILL

SPACE

SM-Space

DETAIL C

ROUTING DIMENSIONS	
SYMBOL	NOM
Ø PAD	0.40
Ø SM	0.50
L (Trace)	0.125
SPACE (Min)	0.135
SM-Space (Min)	0.09
Ø VIA PAD	0.45
Ø DRILL	0.25

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:

DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	11/4/11
FINISH: -	CHECKED: S.K.ILIEV	11/4/11
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	11/7/11

TITLE: PACKAGE OUTLINE 169 BALL LFBGA, 11x11mm BODY, 0.8mm PITCH

DWG NUMBER	REV
169-LFBGA-11x11B-0.8P	B

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-275	1 OF 1

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REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	11/22/10	SKI
A1	ADDING DIM b1 & b2	3/3/11	SKI
B	PRODUCTION RELEASE. Added b1 (min, max) & b2 #s. Ø SM from 0.42 to 0.37. Ø DRILL from 0.25 to 0.20	4/15/11	SKI
C	ADDED b1 TOLERANCE, b2, and UBM INFORMATION	12/2/11	SKI
D	FIXED TYPO: b1 FROM 0.040 to 0.40	4/19/12	SKI

TOP VIEW

BOTTOM VIEW

DETAIL A

DETAIL B

SECTION B-B

SIDE VIEW

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.30	1.40	5	OVERALL PACKAGE HEIGHT
A1	0.25	-	0.37	-	STANDOFF
A2	0.65	0.96	-	-	PKG BODY THICKNESS
D/E	9.90	10.00	10.10	-	X/Y BODY SIZE
D1/E1	8.45 BSC			-	X/Y END BALLS DISTANCE
b	0.35	0.40	0.45	2	BALL DIAMETER
b1	0.30	0.35	0.40	6	FINISHED SOLDER MASK OPENING
b2	0.40	0.45	0.50	-	FINISHED BOTTOM BALL PAD
e	0.65 BSC			-	BALL PITCH
ccc	0	-	0.10	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE SPECIFIED.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

DETAIL C

PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	8.45	-
e'	0.65 BSC		

THE USER MAY MODIFY THE PCB LAND PATTERN AND ROUTING DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN AND ROUTING

ROUTING DIMENSIONS		
SYMBOL	NOM	
	STD Via	µ-via
Ø PAD	0.32	0.35
Ø SM (Solder Mask)	0.37	0.45
L (Trace)	0.10	0.10
SPACE (Min)	0.10	0.10
SM-Space (Min)	0.075	0.11
Ø VIA PAD	0.40	0.25
Ø DRILL	0.20	0.15

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°. INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

TITLE: PACKAGE OUTLINE 176 BALL LFBGA, 10x10mm BODY, 0.65mm PITCH

MATERIAL	N/A	DRAWN	-	10/12/10		
FINISH	N/A	CHECKED	S.K.ILIEV	10/25/10	DWG NUMBER 176LFBGA-10x10B-0.65P	REV D
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		APPROVED	S.K.ILIEV	11/22/10	SCALE 1:1; STD COMPLIANCE JEDEC: MO-275	SHEET 1 OF 1

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REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	11/02/11	H. CABALLERO
B	INITIAL RELEASE. b2 (NOM) from 0.40 to 0.365	2/23/12	SKI

BALL A1 CORNER INDEX AREA 3

TOP VIEW

BOTTOM VIEW

DETAIL A

DETAIL B

SECTION B-B

SMD (TYPE)

SIDE VIEW

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.30	1.40	5	OVERALL PACKAGE HEIGHT
A1	0.15	0.21	-	-	STANDOFF
A2	0.65	0.96	-	-	PKG BODY THICKNESS
D/E	9.90	10.00	10.10	-	X/Y BODY SIZE
D1/E1	8.45 BSC			-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
b1	0.237	0.275	0.312	6	FINISHED SOLDER MASK OPENING
b2	0.315	0.365	0.415	-	FINISHED BOTTOM BALL PAD
e	0.65 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

DETAIL C

PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	8.45	-
e'	0.65 BSC		

ROUTING DIMENSIONS		
SYMBOL	NOM	
	STD Via	µ-via
Ø PAD	0.275	0.300
Ø SM	0.375	0.400
L (Trace)	0.125	0.110
SPACE (Min)	0.122	0.110
SM-Space (Min)	0.072	0.070
Ø VIA PAD	0.400	0.250
Ø DRILL	0.200	0.150

THE USER MAY MODIFY THE PCB LAND PATTERN AND ROUTING DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN AND ROUTING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

TITLE: PACKAGE OUTLINE 196 BALL LFBGA, 10x10mm BODY, 0.65mm PITCH

	NAME	DATE
MATERIAL: N/A	DRAWN: H. CABALLERO	11/02/11
FINISH: N/A	CHECKED: H. CABALLERO	11/02/11
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	11/04/11

DWG NUMBER: 196LFBGA-10x10B-0.65P — REV: B

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-275 — SHEET: 1 OF 1

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REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/3/05	S.K.ILIEV

D/4

E/4

BALL A1 CORNER INDEX AREA 3

E

D

TOP VIEW

1.10 TYP

17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

A B C D E F G H J K L M N P R T U

E1

e

e

b 2

1.10 TYP

D1

BOTTOM VIEW

C

A2

A

SEATING PLANE

ccc C

A1

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	1.70	–	OVERALL PACKAGE HEIGHT
A1	0.25	–	–	–	STANDOFF
A2	0.65	–	–	–	PACKAGE BODY THICKNESS
D/E	14.90	15.00	15.10	–	"X" & "Y" PKG/SUBSTRATE LENGTH
D1/E1	12.80 BSC			–	"X" AND "Y" END BALL CENTERS
b	0.41	–	0.55	2	BALL DIAMETER
e	0.80 BSC			–	BALL PITCH
ccc	–	–	0.12	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. RADIAL TRUE POSITION TOLERANCE OF EACH BALL IS ±0.075mm AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE "A1" CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE, AND MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025
ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	2/2/05
CHECKED	S.K.ILIEV	2/3/05
APPROVED	S.K.ILIEV	2/3/05

MATERIAL -

FINISH -

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 208 LFBGA, 15x15 MM BODY, 0.80 MM PITCH

DWG NUMBER: MO-208-LFBGA-15x15B-0.8P REV: A

SCALE: 1:1 STD COMPLIANCE: JEDEC: MO-205 / F SHEET: 1 OF 1

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
B	INITIAL PRODUCTION RELEASE. ADDED DIM "b2" & PCB ROUTING	2/15/2011	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.30	1.40	5	OVERALL PACKAGE HEIGHT
A1	0.25	-	0.40	-	STANDOFF
A2	0.65	0.96	-	-	PACKAGE BODY THICKNESS
D/E	12.90	13.00	13.10	-	OVERALL PACKAGE SIZE
b	0.40	0.45	0.50	2	BALL DIAMETER
b1	0.35	0.40	0.45	6	FINISHED SOLDER MASK OPENING
b2	0.45	0.50	0.55	-	FINISHED BALL PAD DIAMETER
e	0.80 BSC			-	BALL PITCH
ccc	-	-	0.20	3	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. THE BALL "A1" CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, INDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE UNIQUE.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1/E1	-	11.20	-
e'	0.80 BSC		

THE USER MAY MODIFY THE PCB LAND PATTERN & ROUTING DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

ROUTING DIMENSIONS	
SYMBOL	NOM
Ø PAD	0.40
Ø SM	0.50
L (Trace)	0.125
SPACE (Min)	0.135
SM-Space (Min)	0.09
Ø VIA PAD	0.45
Ø DRILL	0.25

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°. INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	8/5/09
FINISH: -	CHECKED: -	8/5/09
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	8/6/09

TITLE: PACKAGE OUTLINE 225 BALL LFBGA, 13x13mm BODY, 0.8mm PITCH

DWG NUMBER: 225-LFBGA-13x13B-0.8P — REV: B

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-275 — SHEET: 1 OF 1

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REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	1/1/07	S.K.ILIEV

D

E

BALL A1 CORNER INDEX AREA (D/4xE/4) 4

TOP VIEW

e

BALL A1

20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

A B C D E F G H J K L M N P R T U V W Y

e

b 2

BOTTOM VIEW

3

C

A2

A

SEATING PLANE

ccc C

A1

SIDE VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.70	-	OVERALL PACKAGE HEIGHT
A1	0.25	-	-	-	STANDOFF
A2	0.65	-	-	-	PACKAGE BODY THICKNESS
D/E	16.85	17.00	17.15	-	OVERALL PACKAGE SIZE
b	0.41	-	0.55	2	BALL DIAMETER
e	0.80 BSC			-	BALL PITCH
ccc	-	-	0.20	3	COPLANARITY

D1

e'

E1

b'

e'

PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1/E1	-	15.20	-
b'	0.35	-	0.40
e'	0.80		

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAXIMUM RADIAL TRUE POSITION TOLERANCE OF EACH BALL IS ±0.075mm AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, IDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE INIQUE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025
ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	S.K.ILIEV	12/31/06
FINISH: -		
CHECKED	S.K.ILIEV	12/31/06
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	1/1/07

TITLE: PACKAGE OUTLINE
292 BALL LFBGA, 17x17mm BODY, 0.8mm PITCH

DWG NUMBER: MO-292LFBGA-17x17B-0.8P | REV: A

SCALE: 1:1 | STD COMPLIANCE: JEDEC: MO-205 | SHEET: 1 OF 1

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	1/26/07	S.K.ILIEV
B	REMOVE "PRELIMINARY", POSITION TOL FROM NOTES TO VIEW. JEDEC REF FROM 205 TO 275	10/17/07	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.56	1.70	-	OVERALL PACKAGE HEIGHT
A1	0.25	-	-	-	STANDOFF
A2	1.00	-	-	-	PACKAGE BODY THICKNESS
D/E	14.85	15.00	15.15	-	OVERALL PACKAGE SIZE
b	0.35	-	0.50	2	BALL DIAMETER
e	0.80 BSC			-	BALL PITCH
ccc	-	-	0.20	3	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, IDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE INIQUE.

PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1/E1	-	13.60	-
b'	0.30	-	0.35
e'	0.80		

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

RECOMMENDED PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025 ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: S.K.ILIEV	1/25/07
FINISH: -	CHECKED: S.K.ILIEV	1/25/07
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	1/26/07

TITLE: PACKAGE OUTLINE 324 BALL LFBGA, 15x15mm BODY, 0.8mm PITCH 4L DESIGN

DWG NUMBER: MO-324LFBGA-15x15B-0.8P-4L | REV: B

SCALE: 1:1 | STD COMPLIANCE: JEDEC: MO-275 | SHEET: 1 OF 1

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LGA

SMSC Legacy

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Legacy SMSC Packaging Outlines and Dimensions

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEW

DETAIL A

DETAIL B

SECTION B-B

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	AUG 2008	Kleer
B	D and E TOLERANCE FROM ±0.05 TO ±0.10	JUN 2010	S.K.ILIEV
C	"A" tolerance from ±0.05 to ±0.15. Added note for not present perimeter pads	FEB 2011	S.K.ILIEV
D	ADDED DIMs ON PAD 44 & 45 CORNER CUTS	MAR 2011	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	1.82	1.97	2.12	3	OVERALL PACKAGE HEIGHT
A2	-	0.32	-	-	SUBSTRATE THICKNESS
D	12.33	12.43	12.53	-	OVERALL PACKAGE SIZE, X
E	8.82	8.92	9.02	-	OVERALL PACKAGE SIZE, Y
b	0.31	0.36	0.41	4	PIN SOLDERABLE WIDTH
b1	-	0.46	-	-	PIN OVERALL WIDTH
L	0.46	0.51	0.56		PIN SOLDERABLE LENGTH
L1	-	0.56	-		PIN OVERALL LENGTH
e	0.62 BSC			-	PINS PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, INDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE UNIQUE.
3. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
4. THE PACKAGE PERIMETER PIN SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994
THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

TITLE: PACKAGE OUTLINE
45 LGA, 12x9 mm BODY, SiP MODULE
(KLR3012/A)

	NAME	DATE
MATERIAL: -		
DRAWN	-	5/12/10
FINISH: -		
CHECKED	-	5/17/10
APPROVED	S.K.ILIEV	5/20/10

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

DWG NUMBER: 45-LGA-12x9B-SiP-KLR3012/A — REV: D
SCALE: 1:1 — STD COMPLIANCE: N/A — SHEET: 1 OF 1

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TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEW

DETAIL A

DETAIL B

SECTION B-B

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	AUG 2008	Kleer
B	D and E TOLERANCE FROM ±0.05 TO ±0.10	JUN 2010	S.K.ILIEV
C	"A" tolerance from ±0.05 to ±0.15. Added note for not present perimeter pads	FEB 2011	S.K.ILIEV
D	ADDED DIMs ON PAD 44 & 45 CORNER CUTS	MAR 2011	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	1.82	1.97	2.12	3	OVERALL PACKAGE HEIGHT
A2	-	0.32	-	-	SUBSTRATE THICKNESS
D	12.33	12.43	12.53	-	OVERALL PACKAGE SIZE, X
E	8.82	8.92	9.02	-	OVERALL PACKAGE SIZE, Y
b	0.31	0.36	0.41	4	PIN SOLDERABLE WIDTH
b1	-	0.46	-	-	PIN OVERALL WIDTH
L	0.46	0.51	0.56		PIN SOLDERABLE LENGTH
L1	-	0.56	-		PIN OVERALL LENGTH
e	0.62 BSC			-	PINS PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, INDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE UNIQUE.
3. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
4. THE PACKAGE PERIMETER PIN SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	5/12/10
FINISH: -	CHECKED: -	5/17/10
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	5/20/10

TITLE: PACKAGE OUTLINE
45 LGA, 12x9 mm BODY, SiP MODULE
(KLR83012)

DWG NUMBER: 45-LGA-12x9B-SiP-KLR83012 — REV: D

SCALE: 1:1 — STD COMPLIANCE: N/A — SHEET: 1 OF 1

NOTES:

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LQFP

SMSC Legacy

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-

TOP VIEW

DETAIL "A"

SIDE VIEW

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	1.60	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.15	–	STANDOFF
A2	1.35	1.40	1.45	–	BODY THICKNESS
D/E	29.80	–	30.20	–	"X"/"Y" SPAN
D1/E1	27.90	28.00	28.10	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			–	LEAD LENGTH
b	0.17	0.22	0.27	2	LEAD WIDTH
c	0.09	–	0.23		LEAD FOOT THICKNESS
e	0.50 BSC			–	LEAD PITCH
R1	0.08	–	–		LEAD SHOULDER RADIUS
R2	0.08	–	0.20		LEAD FOOT RADIUS
ccc	–	–	0.08	–	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.XX ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	12/20/04
CHECKED	S.K.ILIEV	12/20/04
APPROVED	S.K.ILIEV	12/20/04

MATERIAL: -
FINISH: -
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 208 TQFP, 28x28x1.4 MM BODY, 0.50 MM PITCH
DWG NUMBER: MO-208-TQFP-28x28x1.4 REV: C
SCALE: 1:1 STD COMPLIANCE: JEDEC: MS-026 / D SHEET: 1 OF 1

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-

TOP VIEW

DETAIL "A"

SIDE VIEW

3-D VIEW

PCB LAND PATTERN AND APPLICATION NOTES

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	1.60	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.15	–	STANDOFF
A2	1.35	1.40	1.45	–	BODY THICKNESS
D/E	8.80	9.00	9.20	–	"X"/"Y" SPAN
D1/E1	6.80	7.00	7.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			–	LEAD LENGTH
b	0.13	0.18	0.23	2	LEAD WIDTH
c	0.09	–	0.20		LEAD FOOT THICKNESS
e	0.40 BSC			–	LEAD PITCH
ccc	–	–	0.08	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.035mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE. "D1" AND "E1" TO BE DETERMINED AT DATUM "H".
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°. INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	12/17/04
CHECKED	S.K.ILIEV	12/17/04
APPROVED	S.K.ILIEV	12/17/04

MATERIAL: -

FINISH: -

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 64 PIN STQFP-7x7x1.4mm BODY-0.4mm PITCH

DWG NUMBER: MO-64-STQFP-7x7x1.4 — REV: C

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MS-026 (D) — SHEET: 1 OF 1

NOTES:

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MQFP

SMSC Legacy

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REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-

TOP VIEW

SIDE VIEW

DETAIL "A" (SCALE: 3/1)

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	3.40	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.50	–	STANDOFF
A2	2.55	–	3.05	–	BODY THICKNESS
D	23.00	23.20	23.40	–	"X" SPAN
D1	19.90	20.00	20.10	3	"X" BODY SIZE
E	17.00	17.20	17.40	–	"Y" SPAN
E1	13.90	14.00	14.10	3	"Y" BODY SIZE
L	0.73	0.88	1.03	4	LEAD FOOT LENGTH
L1	1.60 REF			–	LEAD LENGTH
b	0.20	–	0.40	2	LEAD WIDTH
c	0.11	–	0.23	–	LEAD FOOT THICKNESS
e	0.65 BSC			–	LEAD PITCH
R1	0.10	–	0.25	–	LEAD SHOULDER RADIUS
R2	0.15	–	0.40	–	LEAD FOOT RADIUS
ccc	–	–	0.10	–	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TOLERANCE OF THE TRUE POSITION OF THE LEADS IS ± 0.065mm MAXIMUM.
3. PACKAGE BODY DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM MOLD PROTRUSION IS 0.25 mm.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025 — ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	11/30/04
CHECKED	S.K.ILIEV	11/30/04
APPROVED	S.K.ILIEV	11/30/04

MATERIAL: -
FINISH: -
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 100 QFP-14x20x2.7mm BODY-3.2mm FOOTPRINT
DWG NUMBER: MO-100 QFP-14x20-3.2FP — REV: C
SCALE: 1:1 — STD COMPLIANCE: JEDEC: MS-022 (B) — SHEET: -

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REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-

TOP VIEW

SIDE VIEW

SEE DETAIL "A"

SEATING PLANE

DETAIL "A" (SCALE: 3/1)

GAUGE PLANE

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	3.40	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.50	–	STANDOFF
A2	2.55	–	3.05	–	BODY THICKNESS
D	23.00	23.20	23.40	–	"X" SPAN
D1	19.90	20.00	20.10	3	"X" BODY SIZE
E	17.00	17.20	17.40	–	"Y" SPAN
E1	13.90	14.00	14.10	3	"Y" BODY SIZE
L	0.73	0.88	1.03	4	LEAD FOOT LENGTH
L1	1.60 REF			–	LEAD LENGTH
b	0.10	–	0.30	2	LEAD WIDTH
c	0.09	–	0.20	–	LEAD FOOT THICKNESS
e	0.50 BSC			–	LEAD PITCH
R1	0.08	–	–	–	LEAD SHOULDER RADIUS
R2	0.08	–	0.30	–	LEAD FOOT RADIUS
ccc	–	–	0.08	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TOLERANCE OF THE TRUE POSITION OF THE LEADS IS ± 0.04mm MAXIMUM.
3. PACKAGE BODY DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM MOLD PROTRUSION IS 0.25 mm.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

TITLE: PACKAGE OUTLINE 128 QFP-14x20x2.7mm BODY-3.2mm FOOTPRINT

	NAME	DATE
MATERIAL: -		
DRAWN	S.K.ILIEV	11/30/04
FINISH: -		
CHECKED	S.K.ILIEV	11/30/04
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	11/30/04

DWG NUMBER: MO-128 QFP-14x20-3.2FP — REV: E

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MS-022 (B) & MS-029 (A) — SHEET: -

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NOTES:

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PLCC

SMSC Legacy

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/26/01	S.K.ILIEV
B	NEW DWG LAYOUT. 3-D VIEW ADDED	3/09/05	S.K.ILIEV
C	REMOVED THE LOGO FROM THE TITLE BLOCK	9/25/07	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.165	–	0.180	–	OVERALL PKG HEIGHT
A1	0.090	–	0.120	–	LEAD HEIGHT
A2	0.020	–	–	–	STANDOFF
D/E	0.485	–	0.495	3	"X"/"Y" SPAN
D1/E1	0.450	0.453	0.456	3	"X"/"Y" BODY SIZE
D2/E2	0.390	–	0.430	–	LEAD CONTACT SPAN AT PLANE "C"
R	0.025	–	0.045	–	LEAD RADIUS AT PLANE "C"
e	0.050 BSC			–	LEAD PITCH
b	0.013	–	0.021	2	LEAD WIDTH AT PLANE "C"
b1	0.026	–	0.032	–	LEAD WIDTH AT PKG BODY/MOLD
c	0.010 TYP			–	LEAD THICKNESS
ccc	–	–	0.004	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.0035 inches AT MAXIMUM MATERIAL CONDITION.
3. DIMENSIONS "D1" & "E1" DO NOT INCLUDE MOLD PROTRUSION. MAXIMUM ALLOWABLE MOLD PROTRUSION IS 0.010 inches PER SIDE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	S.K.ILIEV	4/26/01
FINISH: -		
CHECKED	S.K.ILIEV	4/26/01
APPROVED	S.K.ILIEV	4/26/01

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 28 PIN PLCC, 0.050 inch PITCH

DWG NUMBER: AP-28-PLCC | REV: C

SCALE: 1:1 | STD COMPLIANCE: JEDEC: MO-047 | SHEET: 1 OF 1

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QFN

SMSC Legacy

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/6/06	S.K.ILIEV
B	ADDED PAGE 2of2, AND APP NOTES UPDATED. D/E TOLERANCE FROM ±0.15 TO ±0.10mm. ADDED DIM K. POSITION TOLERANCES SHOWN AT BOTTOM VIEW.	2/18/09	S.K.ILIEV
C	ADD K(NOM), AND RE-LAYOUT PAGE 2 of 2	6/10/09	S.K.ILIEV

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D1/E1	3.55	3.75	3.95	-	X/Y MOLD CAP SIZE
D2/E2	2.40	2.50	2.60	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.25	0.35	-	-	PIN TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

MATERIAL -	NAME	DATE
	DRAWN -	4/5/06
FINISH -	CHECKED S.K.ILIEV	4/5/06
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	4/6/06

TITLE: PACKAGE DATA
24 PINS QFN-2504, 4x4mm BODY, 0.5mm PITCH, 2.5x2.5mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER: 24QFN-2504-4x4B — REV: C
SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 2

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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
C	ADD K(NOM), AND RE-LAYOUT PAGE 2 of 2	6/10/09	S.K.ILIEV

PCB LAND PATTERN

GD, D2', Y, X, e, GE, E2', 0.2 (MIN), SEE NOTE 2

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	3.05	-	3.10
D2'/E2'	-	2.50	2.50
Pad: X	-	0.28	0.28
Pad: Y	-	0.69	-
e	0.50		

NOTES:
1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

STENCIL

SEE DETAIL "A" FOR STENCIL RERIMETER PAD, GDs, GEs, e, SEE DETAIL "B" FOR CENTER PAD STENCIL OPENINGS

STENCIL DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GDs/GEs	3.10	-	-
Xs	-	0.23	0.25
Ys	-	0.62	-
e	0.50		

DETAIL "A" - STENCIL OPENING for PERIMETER LANDS

FULL RADIUS IS OPTIONAL, SOLDER MASK, 0.075 (MIN), 0.025 (MIN)

DETAIL "B" - THERMAL VIAS and STENCIL OPENING for CENTER PAD

OPTION 1 (NON-PLUGGED THERMAL VIAS)

Thermal Vias: Ø0.30mm, 3x3 Matrix @ 1.00mm Pitch
Stencil Openings: Ø0.70-0.80mm 2x2 Matrix

OPTION 2 (PLUGGED THERMAL VIAS)

0.1mm (MIN), 0.2-0.3mm
Thermal Vias: Ø0.30mm, 3x3 Matrix @ 1.00mm Pitch
Stencil Openings: 0.62x0.62mm (MAX) 3x3 Matrix

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	2/18/09
FINISH: -		
CHECKED	S.K.ILIEV	2/18/09
APPROVED	S.K.ILIEV	2/18/09

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE DATA
24 PINS QFN-2504, 4x4mm BODY, 0.5mm PITCH, 2.5x2.5mm EXPOSED PAD, 0.4mm LEAD LENGTH
Application Notes

DWG NUMBER	REV
24QFN-2504-4x4B	C

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-220	2 OF 2

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	8/20/09	S.K.ILIEV

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

4X 45°X0.6MAX (OPTIONAL)

TERMINAL #1 IDENTIFIER AREA D1/2 X E1/2

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)

EXPOSED PAD (ePAD)

FULL RADIUS IS OPTIONAL

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	0.60	-	0.80	-	MOLD CAP THICKNESS
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D1/E1	4.55	4.75	4.95	-	X/Y MOLD CAP SIZE
D2/E2	3.00	3.10	3.20	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.45	0.55	-	-	TERMINAL TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	-	3.10	-
X	-	0.28	0.28
Y	-	0.69	-
e	0.50		

PCB LAND NOTES:

- THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
- EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
- MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	8/14/09
FINISH: -	CHECKED: S.K.ILIEV	8/17/09
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	8/20/09

TITLE: PACKAGE OUTLINE 28 PINS QFN-3104, 5x5mm BODY, 0.5mm PITCH 3.1x3.1mm ePAD, 0.4mm Lead Length

DWG NUMBER: 28QFN-3104-5x5 — REV: A

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 1

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REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	10/7/03	S.K.ILIEV
B	ADDING "PRELIMINARY" NOTE	12/1/03	S.K.ILIEV
C	REMOVE THE "PRELIMINARY" NOTE	12/14/04	S.K.ILIEV
D	NEW DRAWING FORMAT AND 3-D VIEW ADDED	12/20/04	S.K.ILIEV
E	D2/E2(MIN) FROM 1.25 TO 2.95 & (NOM) ADDED	6/21/05	S.K.ILIEV
F	RECOMMENDED PCB LAND PATTERN ADDED	4/20/06	S.K.ILIEV
G	ADDED PARALLELISM TOL, D2'/E2' MAX, Y(nom) and X(nom). POSITION TOL MOVED TO TOP VIEW. SIDE ANGLE (max) FROM 12 TO 14°. D/E and D2/E2 TOL FROM ±0.15 TO ±0.10. GD/ED FROM 3.53 TO 3.65. Y(max) NOT SPECIFIED NOW	4/12/2011	SKI

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	0.60	0.65	0.80	-	MOLD CAP THICKNESS
A3	0.20 (REF)			-	LEADFRAME THICKNESS
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D1/E1	4.55	4.75	4.95	-	X/Y MOLD CAP SIZE
D2/E2	3.00	3.10	3.20	2	X/Y EXPOSED PAD SIZE
L	0.50	0.60	0.75	4	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. ROUNDED INNER TIPS ON TERMINALS ARE OPTIONAL.

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	3.65	-	3.70
D2'/E2'	-	3.10	3.10
X	-	0.24	0.28
Y	-	0.89	-
e	0.50		

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	10/7/03
CHECKED	S.K.ILIEV	10/7/03
APPROVED	S.K.ILIEV	10/7/03

MATERIAL: -

FINISH: -

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: **PACKAGE DATA**
28 TERMINAL QFN, 5x5mm BODY, 0.5mm PITCH 3106 PCB FEATURES

DWG NUMBER: POD-28QFN-5x5B-05P-3106 — REV: G

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 1

Legacy SMSC Packaging Outlines and Dimensions

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/30/08	S.K.ILIEV
B	L(MAX) FROM 0.55 TO 0.50mm. ADDED D2/E2 TABLE	7/8/05	S.K.ILIEV
C	D2/E2 FROM 2.95 - 3.10 - 3.25 TO 3.15 - 3.30 - 3.45	10/19/05	S.K.ILIEV
D	ADDED PCB LAND PATTERN. ADDED DIM "K"	11/18/08	S.K.ILIEV
E	ADDED PAGE 2of2, AND APP NOTES UPDATED. D/E and D2/E2 TOLERANCES FROM ±0.15 TO ±0.10mm. MINIMUM "K" FROM 0.20 TO 0.35mm	2/17/09	S.K.ILIEV
F	FIXED 3-D VIEWS from 28 to 32 PINS. ADDED K(nom). RE-LAYOUT PAGE 2of2.	4/23/09	S.K.ILIEV
G	D2/E2 (MIN) from 3.10 to 3.20.	9/1/09	S.K.ILIEV
H	ADDED A2 (NOM). ADDED D2'/E2'(MIN). X from 0.28 to 0.24. Y from 0.69 to 0.75. Ys from 0.64 to 0.68.	10/7/10	S.K.ILIEV

REVISION HISTORY

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	0.65	0.90	-	MOLD CAP THICKNESS
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D1/E1	4.55	4.75	4.95	-	X/Y MOLD CAP SIZE
D2/E2	3.20	3.30	3.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.35	0.45	-	-	TERMINAL TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°. INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
	NAME	DATE	TITLE: PACKAGE DATA 32 PINS QFN-3304, 5x5mm BODY, 0.5mm PITCH 3.3x3.3mm ePAD, 0.4mm LEAD LENGTH **Package Outline Drawing (POD)**		
MATERIAL -	DRAWN -	2/19/04			
FINISH -	CHECKED S.K.ILIEV	2/19/04	DWG NUMBER 32QFN-3304-5x5B		REV H
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	7/12/04	SCALE 1:1	STD COMPLIANCE JEDEC: MO-220	SHEET 1 OF 2

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Legacy SMSC Packaging Outlines and Dimensions

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	3.10	-	3.30
X	-	0.24	0.28
Y	-	0.69	0.75
e	0.50		

NOTES:
1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

PCB LAND PATTERN

STENCIL DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GDs/GEs	4.05	-	-
Xs	-	0.23	0.25
Ys	-	0.62	0.68
e	0.50		

STENCIL

DETAIL "A" - STENCIL OPENING for PERIMETER LANDS

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

OPTION 1
(NON-PLUGGED THERMAL VIAS)

OPTION 2
(PLUGGED THERMAL VIAS)

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:

DECIMAL: X.X ±0.1; X.XX ±0.05; X.XXX ±0.025
ANGULAR: ±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	2/17/09
FINISH: -		
CHECKED	-	2/17/09
APPROVED	S.K.ILIEV	2/17/09

TITLE: PACKAGE DATA
32 PINS QFN-3304, 5x5mm BODY, 0.5mm PITCH, 3.3x3.3mm EXPOSED PAD, 0.4mm LEAD LENGTH
Application Notes

DWG NUMBER		REV
32QFN-3304-5x5B		H
SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-220	2 OF 2

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/24/07	S.K.ILIEV
B	"A" was 0.70-1.00, now 0.80-0.85-0.90. "A2" was - - 0.90, now - 0.65-0.75. D/E tolerance was ±0.15, now is ±0.10. ADDED PAGE 2of2. UPDATED APP NOTES	3/27/09	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	0.65	0.75	-	MOLD CAP THICKNESS
D/E	5.90	6.00	6.10	-	X/Y BODY SIZE
D1/E1	5.55	-	5.95	-	X/Y MOLD CAP SIZE
D2/E2	4.00	4.10	4.20	-	X/Y EXPOSED PAD SIZE
L	0.50	0.60	0.75	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.25	0.35	-	-	TERMINAL TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	7/20/07
FINISH: - / CHECKED	S.K.ILIEV	7/24/07
APPROVED	S.K.ILIEV	7/24/07

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE DATA
36 PINS QFN-4106, 6x6mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.6mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER: 36QFN-4106-6x6B — REV: B
SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 2

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PCB LAND PATTERN

STENCIL

SEE DETAIL "A" FOR PERIMETER PAD AND SOLDER MASK

SEE DETAIL "A" FOR STENCIL RERIMETER PAD

SEE DETAIL "B" FOR CENTER PAD DESIGN (EXPOSED SOLDERABLE COPPER AREA)

SEE DETAIL "B" FOR CENTER PAD STENCIL OPENINGS

DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

OPTION 1 (NON-PLUGGED THERMAL VIAS)

Thermal Vias: Ø0.30mm, 5x5 Matrix @ 0.90mm Pitch

Stencil Openings: Ø0.55-0.65mm 4x4 Matrix

OPTION 2 (PLUGGED THERMAL VIAS)

Thermal Vias: Ø0.30mm, 5x5 Matrix @ 0.90mm Pitch

Stencil Openings: 0.82x0.82mm (MAX) 4x4 Matrix

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
B	"A" was 0.70-1.00, now 0.80-0.85-0.90. "A2" was - - 0.90, now - 0.65-0.75. D/E tolerance was ±0.15, now is ±0.10. ADDED PAGE 2of2. UPDATED APP NOTES	3/27/09	S.K.ILIEV

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	4.70	-	4.75
GDs/GEs	4.80	-	-
D2'/E2'	-	4.10	4.10
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.90	0.90
Stencil: Ys	-	0.82	0.84
e		0.50	

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	3/25/09
FINISH: -		
CHECKED	S.K.ILIEV	3/27/09
APPROVED	S.K.ILIEV	3/27/09

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE DATA
36 PINS QFN-4106, 6x6mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.6mm LEAD LENGTH
Application Notes

DWG NUMBER	REV
36QFN-4106-6x6B	B

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-220	2 OF 2

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/30/08	S.K.ILIEV

D
D1
B
A
36
1
2
3
E1 E
4X 45°X0.6 MAX (OPTIONAL)
TERMINAL #1 IDENTIFIER AREA (D1/2 X E1/2) 3

TOP VIEW

D2
0.10 M C A B
e
3 TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)
36
1
2
3
E2
0.10 M C A B
4 EXPOSED PAD
36X L
36X k
36X b
2 0.10 M C A B
4 0.05 M C

BOTTOM VIEW

4 ccc C
A2
A
C
A1

SIDE VIEW

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	-	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	5.85	6.00	6.15	-	X/Y BODY SIZE
D1/E1	5.55	-	5.95	-	X/Y MOLD CAP SIZE
D2/E2	3.60	3.70	3.80	4	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.52	-	-	-	TERMINAL TO ePAD CLEARANCE
ccc	-	-	0.08	4	COPLANARITY
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. COPLANARITY ZONE APPLIES TO EXPOSED PAD AND TERMINALS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025
ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	10/28/08
CHECKED	S.K.ILIEV	10/29/08
APPROVED	S.K.ILIEV	10/30/08

MATERIAL -
FINISH -
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 36 PIN QFN, 6x6mm BODY, 0.5mm PITCH 3.7x3.7mm ePAD, 0.4mm LEAD

DWG NUMBER: MO-36QFN-3704-6x6B | REV: A

SCALE: 1:1 | STD COMPLIANCE: JEDEC: MO-220 | SHEET: 1 OF 1

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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/7/08	S.K.ILIEV

TOP VIEW

4X 45°X0.6 MAX (OPTIONAL)

TERMINAL #1 IDENTIFIER AREA (D1/2 X E1/2) 3

BOTTOM VIEW

3 TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)

4 EXPOSED PAD

36X L

36X k

36X b

SIDE VIEW

3-D VIEW

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	5.90	6.00	6.10	-	X/Y BODY SIZE
D1/E1	5.55	5.75	5.95	-	X/Y MOLD CAP SIZE
D2/E2	3.60	3.70	3.80	4	X/Y EXPOSED PAD SIZE
L	0.50	0.60	0.75	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.45	-	-	-	TERMINAL TO ePAD CLEARANCE
ccc	-	-	0.08	4	COPLANARITY
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. COPLANARITY ZONE APPLIES TO EXPOSED PAD AND TERMINALS.

FULL RADIUS IS OPTIONAL

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	4.60	-	4.70
D2'/E2'	-	3.70	-
X	-	0.28	0.28
Y	-	0.90	-
e	0.50		

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	10/3/08
CHECKED	S.K.ILIEV	10/6/08
APPROVED	S.K.ILIEV	10/7/08

MATERIAL: -

FINISH: -

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 36 PIN QFN, 6x6mm BODY, 0.5mm PITCH 3.7x3.7mm ePAD

DWG NUMBER: MO-36QFN-37-6x6B — REV: -

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 1

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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/7/04	S.K.ILIEV
B	ADDED PAGE 2of2. APP NOTES UPDATED	2/5/09	S.K.ILIEV

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PKG HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	5.90	6.00	6.10	-	X/Y OVERALL PKG BODY SIZE
D1/E1	5.55	5.75	5.95	-	X/Y MOLD CAP SIZE
D2/E2	4.00	4.10	4.20	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.45	-	-	-	ePAD TO PINS CLEARANCE
e	050 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:

DECIMAL: X.X ±0.1, X.XX ±0.05, X.XXX ±0.025 — ANGULAR ±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
FINISH: -		
DRAWN	-	2/06/04
CHECKED	-	2/07/04
APPROVED	S.K.ILIEV	2/07/04

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE DATA
40 PINS QFN-4104, 6x6mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER: 40QFN-4104-6x6B — REV: B

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 2

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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
B	ADDED PAGE 2of2. APP NOTES UPDATED	2/5/09	S.K.ILIEV

PCB LAND PATTERN

STENCIL

DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

OPTION 1 (NON-PLUGGED THERMAL VIAS)

OPTION 2 (PLUGGED THERMAL VIAS)

Thermal Vias: Ø0.30mm, 5x5 Matrix @ 0.90mm Pitch
Stencil Openings: Ø0.55-0.65mm 4x4 Matrix

Thermal Vias: Ø0.30mm, 5x5 Matrix @ 0.90mm Pitch
Stencil Openings: 0.82x0.82mm (MAX) 4x4 Matrix

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	5.00	-	5.10
GDs/GEs	5.05	-	-
D2'/E2'	-	4.10	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
FINISH: -		
DRAWN	-	2/06/04
CHECKED	-	2/07/04
APPROVED	S.K.ILIEV	2/07/04

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE DATA
40 PINS QFN-4104, 6x6mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.4mm LEAD LENGTH
Application Notes

DWG NUMBER	REV
40QFN-4104-6x6B	B

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-220	2 OF 2

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/29/04	S.K.ILIEV
B	ADDED USB3450 & PARA 1 TO 6 IN MO SPEC	7/13/05	S.K.ILIEV
C	D2/E2 FROM 3.95-4.10-4.25 TO 4.15-4.30-4.45. PCB	1/11/06	S.K.ILIEV
D	POSITION TOL. MOVED TO VIEWS. D2/E2 TOL=±0.1	3/30/08	S.K.ILIEV
E	ADDED PAGE 2of2. UPDATED APP NOTES	2/5/09	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PKG HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	5.90	6.00	6.10	-	X/Y OVERALL PKG BODY SIZE
D1/E1	5.55	5.75	5.95	-	X/Y MOLD CAP SIZE
D2/E2	4.20	4.30	4.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.35	-	-	-	ePAD TO PINS CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°. INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
	NAME	DATE	TITLE: PACKAGE DATA 40 PINS QFN-4304, 6x6mm BODY, 0.5mm PITCH, 4.3x4.3mm EXPOSED PAD, 0.4mm LEAD LENGTH **Package Outline Drawing (POD)**		
MATERIAL: -	DRAWN: -	10/29/04			
FINISH: -	CHECKED: -	10/29/04	DWG NUMBER: 40QFN-4304-6x6B		REV: E
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	10/29/04	SCALE: 1:1	STD COMPLIANCE: JEDEC: MO-220	SHEET: 1 OF 2

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GD
D2'
SEE DETAIL "A" FOR PERIMETER PAD AND SOLDER MASK
GE E2'
e
SEE DETAIL "B" FOR CENTER PAD DESIGN (EXPOSED SOLDERABLE COPPER AREA)

PCB LAND PATTERN

SEE DETAIL "A" FOR STENCIL RERIMETER PAD
GDs
GEs
e
SEE DETAIL "B" FOR CENTER PAD STENCIL OPENINGS

STENCIL

SOLDER MASK
CLEARANCE B/N PAD & SM 0.060 - 0.075
0.5
0.075 (MIN)
Xs X
FULL RADIUS IS OPTIONAL
Ys
Y
0.025 (MIN)

DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

OPTION 1
(NON-PLUGGED THERMAL VIAS)

Thermal Vias: Ø0.30mm, 5x5 Matrix @ 0.95mm Pitch
Stencil Openings: Ø0.60-0.70mm 4x4 Matrix

OPTION 3
(PLUGGED THERMAL VIAS)

0.1mm (MIN)
0.2-0.3mm
Thermal Vias: Ø0.30mm, 5x5 Matrix @ 0.95mm Pitch
Stencil Openings: 0.82x0.82mm (MAX) 4x4 Matrix

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
E	ADDED PAGE 2of2. UPDATED APP NOTES	2/5/09	S.K.ILIEV

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	5.00	-	5.10
GDs/GEs	5.05	-	-
D2'/E2'	-	4.30	4.30
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e		0.50	

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:

DECIMAL
X.X ±0.1
X.XX ±0.05
X.XXX ±0.025

ANGULAR
±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL -	DRAWN -	2/5/09
FINISH -	CHECKED -	2/5/09
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	2/5/09

TITLE
PACKAGE DATA
40 PINS QFN-4304, 6x6mm BODY, 0.5mm PITCH, 4.3x4.3mm EXPOSED PAD, 0.4mm LEAD LENGTH
Application Notes

DWG NUMBER		REV
40QFN-4304-6x6B		E
SCALE 1:1	STD COMPLIANCE JEDEC: MO-220	SHEET 2 OF 2

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/16/04	S.K.ILIEV
B	DELETE THE "PRELIMINARY" SIGN	11/30/04	S.K.ILIEV
C	3-D VIEW ADDED. D2/E2 WAS 1.25-5.80 NOW - SEE TABLE. L(MAX) WAS 0.75 NOW IS 0.50	7/14/05	S.K.ILIEV
D	PCB FOOTPRINT AND EMC4001 IN D2/E2 TABLE ADDED	2/23/06	S.K.ILIEV
E	NEW EXPOSED PAD ADDED FOR EMC4002 DEVICE	4/24/07	S.K.ILIEV
F	NEW EXPOSED PAD ADDED FOR OS81110 DEVICE	5/17/07	S.K.ILIEV
G	ADDED PAGE 2of2. UPDATED APP NOTES. D2/E2 TOLERANCE FROM ±0.15 TO ±0.10 mm	2/3/09	S.K.ILIEV

D, D1, B, A, 48, 1, 2, 3, E1, E, 4X 45°X0.6MAX (OPTIONAL), TERMINAL #1 IDENTIFIER AREA (D1/2 X E1/2) 3

TOP VIEW

0.10 M C A B, D2, 48X K, e, 3 TERMINAL #1 IDENTIFIER AREA (D/2 X E/2), 48, 1, 2, 3, E2, EXPOSED PAD, 48X L, 0.10 M C A B, 48X b 2, 0.10 M C A B, 0.05 M C

BOTTOM VIEW

C, A, 0.10 C, A2, A1

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	6.85	7.00	7.15	-	X/Y BODY SIZE
D1/E1	6.55	6.75	6.95	-	X/Y MOLD CAP SIZE
D2/E2	4.00	4.10	4.20	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.95		-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025 ANGULAR ±1° INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION NAME	DATE	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
MATERIAL -	DRAWN -	6/15/04	TITLE PACKAGE DATA 48 QFN-4104, 7x7mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.4mm LEAD LENGTH **Package Outline Drawing (POD)**		
FINISH -	CHECKED -	7/14/04	DWG NUMBER 48QFN-4104-7x7B		REV G
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	7/16/04	SCALE 1:1	STD COMPLIANCE JEDEC: MO-220	SHEET 1 OF 2

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REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
G	ADDED PAGE 2of2. UPDATED APP NOTES AND D2/E2 TOLERANCE FROM ±0.15 TO ±0.10 mm	2/3/09	S.K.ILIEV

PCB LAND PATTERN

STENCIL

STENCIL OPENING - PERIMETER LANDS

DETAIL "A"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

DETAIL "B"

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	6.00	-	6.10
GDs/GEs	6.05	-	-
D2'/E2'	-	4.10	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e		0.50	

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	2/3/09
FINISH: -	CHECKED: -	2/3/09
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	2/3/09

TITLE: PACKAGE DATA
48 QFN-4104, 7x7mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.4mm LEAD LENGTH
Application Notes

DWG #: 48QFN-4104-7x7B — REV: G
SCALE: 1:1 — STD COMPLIANCE: - — SHEET: 2 OF 2

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/26/07	S.K.ILIEV
B	ADDED PAGE 2of2. UPDATED APP NOTES	2/4/09	S.K.ILIEV

A B D D1 48 1 2 3 E1 E
3 TERMINAL #1 IDENTIFIER AREA
4X 45°X0.6MAX (OPTIONAL)

TOP VIEW

0.10 M C A B
D2 e 48X K 48 1 2 3
0.10 M C A B E2
48X L
EXPOSED PAD 48X b 2
0.10 M C A B
0.05 M C

BOTTOM VIEW

C A A2 // 0.10 C A1

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	6.85	7.00	7.15	-	X/Y BODY SIZE
D1/E1	6.55	6.75	6.95	-	X/Y MOLD CAP SIZE
D2/E2	5.20	5.30	5.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.35	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025
ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994
MATERIAL -
FINISH -
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

	NAME	DATE
DRAWN	-	7/25/07
CHECKED	-	7/25/07
APPROVED	S.K.ILIEV	7/26/07

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

TITLE
PACKAGE DATA
48 PINS QFN-5304, 7x7mm BODY, 0.5mm PITCH, 5.3x5.3mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER 48QFN-5304-7x7B REV B
SCALE 1:1 STD COMPLIANCE JEDEC: MO-220 SHEET 1 OF 2

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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
B	ADDED PAGE 2of2, UPDATED APP NOTES	2/4/09	S.K.ILIEV

PCB LAND PATTERN

STENCIL

DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

OPTION 1 (NON-PLUGGED THERMAL VIAS)

Thermal Vias: Ø0.30mm, 5x5 Matrix @ 0.90mm Pitch

Stencil Openings: Ø0.55-0.65mm 6x6 Matrix

OPTION 3 (PLUGGED THERMAL VIAS)

Thermal Vias: Ø0.30mm, 5x5 Matrix @ 0.90mm Pitch

Stencil Openings: 1.1x1.1mm (MAX) 4x4 Matrix

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	6.00	-	6.10
GDs/GEs	6.05	-	-
D2'/E2'	-	5.30	5.30
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e		0.50	

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	2/3/09
FINISH: -	CHECKED: -	2/3/09
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	2/4/09

TITLE: PACKAGE DATA
48 QFN-5304, 7x7mm BODY, 0.5mm PITCH, 5.3x5.3mm EXPOSED PAD, 0.4mm LEAD LENGTH
Application Notes

DWG #	REV
48QFN-5304-7x7B	B

SCALE	STD COMPLIANCE	SHEET
1:1	-	2 OF 2

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/7/04	S.K.ILIEV
B	REMOVE "PRELIMINARY" NOTE	10/7/04	S.K.ILIEV
C	L(MAX) FROM 0.55 TO 0.50. ADD D2/E2 VAR TABLE	7/2/05	S.K.ILIEV
D	DELETE EMC2700, ADD USB2504A, USB2524 AND EMC2700P IN THE D2/E2 VARIATIONS TABLE	4/13/06	S.K.ILIEV
E	4304 GEOMETRY SHOWN ONLY. ADDED PAGE 2of2	6/11/08	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	7.85	8.00	8.15	-	X/Y BODY SIZE
D1/E1	7.55	-	7.95	-	X/Y MOLD CAP SIZE
D2/E2	4.20	4.30	4.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	1.35	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

		NAME	DATE
MATERIAL: -	DRAWN	-	2/06/04
FINISH: -	CHECKED	-	2/07/04
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.ILIEV	2/07/04

TITLE: PACKAGE DATA
56 QFN-4304, 8x8mm BODY, 0.5mm PITCH, 4.3x4.3mm ePAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

DWG #	REV
56QFN-4304-8x8B	E

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-220	1 OF 2

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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
E	4304 GEOMETRY SHOWN ONLY. ADDED PAGE 2of2	6/11/08	S.K.ILIEV

PCB LAND PATTERN

STENCIL

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	6.93	-	7.05
GDs/GEs	7.00	-	-
D2'/E2'	-	4.30	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	6/11/08
FINISH: -	CHECKED: -	6/11/08
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	6/11/08

TITLE: PACKAGE DATA
56 QFN-4304, 8x8mm BODY, 0.5mm PITCH, 4.3x4.3mm ePAD, 0.4mm LEAD LENGTH
Application Notes

DWG #	REV
56QFN-4304-8x8B	E

SCALE	STD COMPLIANCE	SHEET
1:1	-	2 OF 2

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/7/04	S.K.ILIEV
B	REMOVE "PRELIMINARY" NOTE	10/7/04	S.K.ILIEV
C	L(MAX) FROM 0.55 TO 0.50. ADD D2/E2 VAR TABLE	7/2/05	S.K.ILIEV
D	DELETE EMC2700, ADD USB2504A, USB2524 AND EMC2700P IN THE D2/E2 VARIATIONS TABLE	4/13/06	S.K.ILIEV
E	POSITION TOLERANCE IN BOTTOM VIEW, 5904 GEOMETRY SHOWN, AND PAGE 2of2 ADDED	12/15/08	S.K.ILIEV
F	RE-LAYOUT PAGE 2of2 TO SEPARATE LAND PATTERN FROM STENCIL INFORMATION	4/23/09	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	7.85	8.00	8.15	-	X/Y BODY SIZE
D1/E1	7.55	7.75	7.95	-	X/Y MOLD CAP SIZE
D2/E2	5.80	5.90	6.00	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.55	0.65	-	-	CENTER PAD TO PIN CLEARANCE
e		0.50 BSC		-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	2/06/04
FINISH: -	CHECKED: -	2/07/04
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	2/07/04

TITLE: PACKAGE DATA
56 QFN-5904, 8x8mm BODY, 0.5mm PITCH, 5.9x5.9mm ePAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER: 56QFN-5904-8x8B — REV: F

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 2

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GD
D2'
Y
X
0.2 - 0.3
GE E2'
e
SEE NOTE 2

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	6.93	-	7.05
D2'/E2'	-	5.90	5.90
X	-	0.28	0.28
Y	-	0.69	0.69
e		0.50	

NOTES:
1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

PCB LAND PATTERN

SEE DETAIL "A" FOR STENCIL RERIMETER PAD
GDs
GEs
e
Xs
Ys
SEE DETAIL "B" FOR CENTER PAD STENCIL OPENINGS

STENCIL DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GDs/GEs	7.00	-	-
Xs	-	0.23	0.25
Ys	-	0.62	0.64
e		0.50	

STENCIL

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
F	RE-LAYOUT PAGE 2of2 TO SEPARATE LAND PATTERN FROM STENCIL INFORMATION	4/23/09	S.K.ILIEV

SOLDER MASK
FULL RADIUS IS OPTIONAL
0.075 (MIN)
0.025 (MIN)

DETAIL "A" - STENCIL OPENING FOR PERIMETER LANDS

OPTION 1 (NON-PLUGGED THERMAL VIAS)
Thermal Vias: Ø0.30mm, 6x6 Matrix @ 1.00mm Pitch
Stencil Openings: Ø0.65-0.75mm 5x5 Matrix

OPTION 2 (PLUGGED THERMAL VIAS)
0.1mm (MIN)
0.2-0.3mm
Thermal Vias: Ø0.30mm, 6x6 Matrix @ 1.00mm Pitch
Stencil Openings: 1.2x1.2mm 4x4 Matrix

OPTION 3 (PLUGGED THERMAL VIAS)
0.1mm (MIN)
Thermal Vias: Ø0.30mm, 9X 2x2 Matrix @ 1.00mm Pitch
Stencil Openings: 1.6x1.6mm 3x3 Matrix

DETAIL "B" - THERMAL VIAS and STENCIL OPENING FOR CENTER PAD

SMT APPLICATION RECOMMENDATIONS

1. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD) SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
2. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
3. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
4. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
5. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
6. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
7. IT IS RECOMMENDED TO USE "NO-CLEAN", "NO-VOIDS" TYPE 3 SOLDER PASTE.
8. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENT THERMAL MAS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025 — ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	12/11/08
FINISH: -	CHECKED: -	12/11/08
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	12/15/08

TITLE: PACKAGE DATA
56 QFN-5904, 8x8mm BODY, 0.5mm PITCH, 5.9x5.9mm ePAD, 0.4mm LEAD LENGTH
Application Notes

DWG #	REV
56QFN-5904-8x8B	F

SCALE	STD COMPLIANCE	SHEET
1:1	-	2 OF 2

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE (DWG is PRELIMINARY)	3/7/08	S.K.ILIEV
A1	D2/E2 FROM 4.90±0.10 TO 4.70±0.10 (DWG is PRELIMINARY)	3/31/08	S.K.ILIEV
B	INITIAL PRODUCTION RELEASE	11/5/08	S.K.ILIEV
C	ADDED PAGE 2of2. UPDATED APP NOTES.	2/3/09	S.K.ILIEV

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	0.65	0.80	-	MOLD CAP THICKNESS
D/E	8.90	9.00	9.10	-	X/Y BODY SIZE
D1/E1	8.65	8.75	8.85	-	X/Y MOLD CAP SIZE
D2/E2	4.60	4.70	4.80	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	1.55	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	3/7/08
FINISH: -		
CHECKED	-	3/7/08
APPROVED	S.K.ILIEV	3/7/08

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE DATA
64 PINS QFN-4704, 9x9mm BODY, 0.5mm PITCH, 4.7x4.7mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER	REV
64QFN-4704-9x9B	C

SCALE	STD COMPLIANCE	SHEET
1:1	MO-220	1 OF 2

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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
C	ADDED PAGE 2of2. UPDATED APP NOTES.	2/3/09	S.K.ILIEV

PCB LAND PATTERN

SEE DETAIL "A" FOR PERIMETER PAD AND SOLDER MASK

SEE DETAIL "B" FOR CENTER PAD DESIGN (EXPOSED SOLDERABLE COPPER AREA)

STENCIL

SEE DETAIL "A" FOR STENCIL RERIMETER PAD

SEE DETAIL "B" FOR CENTER PAD STENCIL OPENINGS

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	8.00	-	8.10
GDs/GEs	8.05	-	-
D2'/E2'	-	4.70	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

DETAIL "A"

SOLDER MASK (SM)
CLEARANCE B/N PAD & SM 0.060 - 0.075
0.5
0.075 (MIN)
FULL RADIUS IS OPTIONAL
0.025 (MIN)

STENCIL OPENING - PERIMETER LANDS

OPTION 1 (NON-PLUGGED THERMAL VIAS)

THERMAL VIAS: Ø0.30mm, 5x5 MATRIX @ 1.00mm PITCH
STENCIL OPENINGS: Ø0.7-0.8mm 4x4 MATRIX

OPTION 3 (PLUGGED THERMAL VIAS)

0.1mm (MIN)
0.2-0.3mm
THERMAL VIAS: Ø0.30mm, 5x5 MATRIX @ 1.00mm PITCH
STENCIL OPENINGS: 1.2x1.2mm 3x3 MATRIX

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

SMT APPLICATION NOTES (QFN)

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	2/1/09
FINISH: -		
CHECKED	-	2/1/09
APPROVED	S.K.ILIEV	2/3/09

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE DATA
64 PINS QFN-4704, 9x9mm BODY, 0.5mm PITCH, 4.7x4.7mm EXPOSED PAD, 0.4mm LEAD LENGTH
Application Notes

DWG NUMBER: 64QFN-4704-9x9B | REV: C
SCALE: 1:1 | STD COMPLIANCE: MO-220 | SHEET: 2 OF 2

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	1/21/09	S.K.ILIEV
B	ADDED PAGE 2-of-2. UPDATED APP NOTES.	2/3/09	S.K.ILIEV

TOP VIEW

4X 45°X0.6MAX (OPTIONAL)

TERMINAL #1 IDENTIFIER AREA 3

BOTTOM VIEW

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)

EXPOSED PAD

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	0.65	0.80	-	MOLD CAP THICKNESS
D/E	8.90	9.00	9.10	-	X/Y BODY SIZE
D1/E1	8.65	8.75	8.85	-	X/Y MOLD CAP SIZE
D2/E2	5.90	6.00	6.10	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.90	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	12/19/08
FINISH: -		
CHECKED	-	1/20/09
APPROVED	S.K.ILIEV	1/21/09

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE DATA
64 PINS QFN-6004, 9x9mm BODY, 0.5mm PITCH, 6.0x6.0mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER: 64QFN-6004-9x9B — REV: B
SCALE: 1:1 — STD COMPLIANCE: MO-220 — SHEET: 1 OF 2

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REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
B	ADDED PAGE 2-of-2. UPDATED APP NOTES.	2/3/09	S.K.ILIEV

PCB LAND PATTERN

SEE DETAIL "A" FOR PERIMETER PAD AND SOLDER MASK

SEE DETAIL "B" FOR CENTER PAD DESIGN (EXPOSED SOLDERABLE COPPER AREA)

STENCIL

SEE DETAIL "A" FOR STENCIL RERIMETER PAD

SEE DETAIL "B" FOR CENTER PAD STENCIL OPENINGS

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	8.00	-	8.10
GDs/GEs	8.05	-	-
D2'/E2'	-	6.00	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

SOLDER MASK (SM)
CLEARANCE B/N PAD & SM 0.060 - 0.075
0.5
0.075 (MIN)
FULL RADIUS IS OPTIONAL
Xs X
Ys
Y
0.025 (MIN)

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

OPTION 1 (NON-PLUGGED THERMAL VIAS)

THERMAL VIAS: Ø0.30mm, 6x6 MATRIX @ 1.00mm PITCH

STENCIL OPENINGS: Ø0.7-0.8mm 5x5 MATRIX

OPTION 3 (PLUGGED THERMAL VIAS)

0.1mm (MIN)
0.2-0.3mm

THERMAL VIAS: Ø0.30mm, 6x6 MATRIX @ 1.00mm PITCH

STENCIL OPENINGS: 1.2x1.2mm 4x4 MATRIX

SMT APPLICATION NOTES (QFN)

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	2/1/09
FINISH: -	CHECKED: -	2/1/09
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	2/3/09

TITLE: PACKAGE DATA
64 PINS QFN-6004, 9x9mm BODY, 0.5mm PITCH, 6.0x6.0mm EXPOSED PAD, 0.4mm LEAD LENGTH
Application Notes

DWG NUMBER: 64QFN-6004-9x9B — REV: B

SCALE: 1:1 — STD COMPLIANCE: MO-220 — SHEET: 2 OF 2

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REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	9/18/08	S.K.ILIEV
B	INITIAL PRODUCTION RELEASE	11/19/08	S.K.ILIEV
C	ADDED PAGE 2of2. UPDATED APP NOTES	2/3/09	S.K.ILIEV

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	0.65	0.80	-	MOLD CAP THICKNESS
D/E	8.90	9.00	9.10	-	X/Y BODY SIZE
D1/E1	8.65	8.75	8.85	-	X/Y MOLD CAP SIZE
D2/E2	7.20	7.30	7.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.35	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	9/18/08
FINISH: -	CHECKED: -	9/18/08
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	9/18/08

TITLE: PACKAGE DATA
64 PINS QFN-7304, 9x9mm BODY, 0.5mm PITCH, 7.3x7.3mm EXPOSED PAD, 0.40mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER		REV
64QFN-7304-9x9B		C
SCALE: 1:1	STD COMPLIANCE: MO-220	SHEET: 1 OF 2

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
C	ADDED PAGE 2of2. UPDATED APP NOTES	2/3/09	S.K.ILIEV

PCB LAND PATTERN

STENCIL

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	8.00	-	8.10
GDs/GEs	8.05	-	-
D2'/E2'	-	7.30	7.30
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e		0.50	

DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

SMT APPLICATION NOTES (QFN)

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025 ANGULAR ±1° INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging			
	NAME	DATE	TITLE: PACKAGE DATA 64 PINS QFN-7304, 9x9mm BODY, 0.5mm PITCH, 7.3x7.3mm EXPOSED PAD, 0.4mm LEAD LENGTH **Application Notes**			
MATERIAL -	DRAWN -	2/1/09				
FINISH -	CHECKED -	2/1/09	DWG NUMBER 64QFN-7304-9x9B			REV C
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	2/3/09	SCALE 1:1	STD COMPLIANCE MO-220		SHEET 2 OF 2

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE (DWG is PRELIMINARY)	4/14/08	S.K.ILIEV
B	INITIAL PRODUCTION RELEASE	2/2/09	S.K.ILIEV
C	RE-LAYOUT PAGE 2of2 TO SEPARATE LAND PATTERN FROM STENCIL INFORMATION	6/10/09	S.K.ILIEV

D, D1, E1, E, 72, 1, 2, 3, A, B

4X 45°X0.6MAX (OPTIONAL)

TERMINAL #1 IDENTIFIER AREA 3

TOP VIEW

D2, e, E2, 0.10 M C A B, 72X L, 72X b 2, 0.10 M C A B, 0.05 M C, 72X K

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2) 3

EXPOSED PAD

BOTTOM VIEW

C, A, A1, A2, // 0.10 C

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	0.65	0.80	-	MOLD CAP THICKNESS
D/E	9.90	10.00	10.10	-	X/Y BODY SIZE
D1/E1	9.65	9.75	9.85	-	X/Y MOLD CAP SIZE
D2/E2	5.90	6.00	6.10	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	1.50	1.60	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -	DRAWN: -	3/7/08
FINISH: -	CHECKED: -	3/7/08
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	4/14/08

TITLE: PACKAGE DATA
72 PINS QFN-6004, 10x10mm BODY, 0.5mm PITCH, 6.0x6.0mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER: AP-72QFN-6004-10x10B | REV: C

SCALE: 1:1 | STD COMPLIANCE: MO-220 | SHEET: 1 OF 2

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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
C	RE-LAYOUT PAGE 2of2 TO SEPARATE LAND PATTERN FROM STENCIL INFORMATION	6/10/09	S.K.ILIEV

SEE DETAIL "A" FOR STENCIL RERIMETER PAD

GD, D2', Y, X, e, GE, E2', 0.2 - 0.3, SEE NOTE 2

GDs, GEs, e, Xs, Ys

SEE DETAIL "B" FOR CENTER PAD STENCIL OPENINGS

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	9.00	-	9.10
D2'/E2'	-	6.00	-
X	-	0.28	0.28
Y	-	0.69	-
e		0.50	

NOTES:
1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

PCB LAND PATTERN

STENCIL DIMENSIONS

SYMBOL	MIN	NOM	MAX
GDs/GEs	9.05	-	-
Xs	-	0.23	0.25
Ys	-	0.62	0.64
e		0.50	

STENCIL

SOLDER MASK (SM)
FULL RADIUS IS OPTIONAL
0.075 (MIN)
0.025 (MIN)

DETAIL "A" - STENCIL OPENING for PERIMETER LANDS

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

OPTION 1 (NON-PLUGGED THERMAL VIAS)
THERMAL VIAS: Ø0.30mm, 6x6 MATRIX @ 1.00mm PITCH
STENCIL OPENINGS: Ø0.7-0.8mm 5x5 MATRIX

OPTION 2 (PLUGGED THERMAL VIAS)
0.1mm (MIN) 0.2-0.3mm
THERMAL VIAS: Ø0.30mm, 6x6 MATRIX @ 1.00mm PITCH
STENCIL OPENINGS: 1.2x1.2mm 4x4 MATRIX

OPTION 3 (PLUGGED THERMAL VIAS)
0.1mm (MIN)
Thermal Vias: Ø0.30mm, 9X 2x2 Matrix @ 1.00mm Pitch
Stencil Openings: 1.6x1.6mm 3x3 Matrix

DETAIL "B" - THERMAL VIAS and STENCIL OPENING for CENTER PAD

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

		NAME	DATE
MATERIAL	-	DRAWN -	3/7/08
FINISH	-	CHECKED -	3/7/08
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		APPROVED S.K.ILIEV	4/14/08

TITLE: PACKAGE DATA
72 PINS QFN-6004, 10x10mm BODY, 0.5mm PITCH, 6.0x6.0mm EXPOSED PAD, 0.4mm LEAD LENGTH
Application Notes

DWG NUMBER	REV
AP-72QFN-6004-10x10B	C

SCALE	STD COMPLIANCE	SHEET
1:1	MO-220	2 OF 2

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	5/29/12	SKI

TOP VIEW

4X 45°X0.6MAX (OPTIONAL)

TERMINAL #1 IDENTIFIER AREA 3

BOTTOM VIEW

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)

EXPOSED PAD

SIDE VIEW

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	0.65	0.80	-	MOLD CAP THICKNESS
D/E	9.90	10.00	10.10	-	X/Y BODY SIZE
D1/E1	9.65	9.75	9.85	-	X/Y MOLD CAP SIZE
D2/E2	7.80	7.90	8.00	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.55	0.65	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

MATERIAL	NAME	DATE
-	DRAWN: -	4/7/12
FINISH: -	CHECKED: -	5/7/12
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	5/29/12

TITLE: PACKAGE DATA
72 PINS QFN-7904, 10x10mm BODY, 0.5mm PITCH, 7.9x7.9mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER: AP-72QFN-7904-10x10B — REV: A
SCALE: 1:1 — STD COMPLIANCE: MO-220 — SHEET: 1 OF 1

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SQFN

SMSC Legacy

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	3/18/07	S.K.ILIEV
B	INITIAL RELEASE. L from 0.5±0.05 to 0.5±0.1mm. K(min) from 0.20 to 0.35mm. Y from 0.69 to 0.79mm.	1/9/09	S.K.ILIEV
C	Y from 0.79 (NOM) to 0.79mm (MIN). ADDED GD/GE (MAX)	1/8/10	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D2/E2	2.00	2.10	2.20	-	X/Y EXPOSED PAD SIZE
L	0.40	0.50	0.60	-	TERMINAL LENGTH
b	0.25	0.30	0.35	2	TERMINAL WIDTH
K	0.35	0.45	-	-	TERMINAL TO PAD DISTANCE
e	0.80 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	2.83	-	2.93
D2'/E2'	-	2.10	2.10
X	-	-	0.37
Y	0.79	-	-
e	0.80		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: - / DRAWN	-	3/14/07
FINISH: - / CHECKED	S.K.ILIEV	3/15/07
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING / APPROVED	S.K.ILIEV	3/18/07

TITLE: PACKAGE OUTLINE 12 PINS SQFNE3, 4x4mm BODY, 0.8mm PITCH (SAW SINGULATED, e3 PLATING)

DWG NUMBER: 12SQFNE3-4x4B-0.8P — REV: C

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 1

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	4/25/07	S.K.ILIEV
B	INITIAL RELEASE. L from 0.5±0.05 to 0.5±0.1mm. K(min) from 0.20 to 0.35mm. Y from 0.69 to 0.79mm.	3/26/08	S.K.ILIEV
C	A (nom) from 0.85 to 0.90; A (max) from 0.90 to 1.00; Y was 0.79 (min) now is 0.79 (nom); Added coplanarity limit.	7/2/12	SKI

D
E
16
1
2
3
4
TERMINAL #1 IDENTIFIER AREA (D/2 X E/2) 3

TOP VIEW

0.10 M C A B
D2
16X K
e
E2
16
1
2
3
TERMINAL #1 IDENTIFIER AREA (D/2 X E/2) 3
EXPOSED PAD (ePAD)
16X L
(DATUM B)
(DATUM A)
16X b 2
0.10 M C A B
0.05 M C

BOTTOM VIEW

0.10 C
A
C
A1
(A3)
0.08 C
16X + ePAD

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D2/E2	2.00	2.10	2.20	-	X/Y EXPOSED PAD SIZE
L	0.40	0.50	0.60	-	TERMINAL LENGTH
b	0.25	0.30	0.35	2	TERMINAL WIDTH
K	0.35	0.45	-	-	TERMINAL TO PAD DISTANCE
e	0.65 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

GD
D2'
GE
E2'
e
Y
X
FULL RADIUS IS OPTIONAL

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	2.83	-	2.93
D2'/E2'	-	2.10	2.10
X	-	-	0.37
Y	-	0.79	-
e	0.65		

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:

DECIMAL
X.X ±0.1
X.XX ±0.05
X.XXX ±0.025

ANGULAR
±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	-	4/23/07
CHECKED	S.K.ILIEV	4/23/07
APPROVED	S.K.ILIEV	4/25/07

MATERIAL: -

FINISH: -

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE
16 PINS SQFN, 4x4mm BODY, 0.65mm PITCH
(SAW SINGULATED DESIGN)

DWG NUMBER: 16SQFN-4x4B-0.65P

REV: C

SCALE: 1:1

STD COMPLIANCE: JEDEC: MO-220

SHEET: 1 OF 1

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REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	3/31/10	S.K.ILIEV
B	INITIAL RELEASE. ADDED THERMAL VIA IN PCB INFO	7/30/11	S.K.ILIEV

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	2.00	-	2.10
D2'/E2'	-	1.60	1.60
X	-	0.28	0.28
Y	0.69	-	-
e	0.50		

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	2.90	3.00	3.10	-	X/Y BODY SIZE
D2/E2	1.50	1.60	1.70	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.25	0.30	-	-	TERMINAL TO PAD DISTANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025 — ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	3/16/10
FINISH: -		
CHECKED	S.K.ILIEV	3/30/10
APPROVED	S.K.ILIEV	3/31/10

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE
16 PINS SQFN3, 3x3mm BODY, 0.5mm PITCH (SAWN QFN, FULL LEAD TERMINATION)

DWG NUMBER: 16-SQFN3-3x3B-0.5P — REV: B

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 1

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TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

PCB LAND PATTERN

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

FULL RADIUS IS OPTIONAL

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY DESIGN	3/25/10	S.K.ILIEV
A1	L tolerance from ±0.10 to ±0.05. 3D vies updated	6/3/10	S.K.ILIEV
A2	A from 0.85±0.05 to 0.90±0.10. Add profile tolerance at C	6/10/10	S.K.ILIEV
B	INITIAL RELEASE	11/12/10	SKI

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D2/E2	3.20	3.30	3.40	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.25	0.30	0.35	2	TERMINAL WIDTH
K	0.35	0.45	-	-	TERMINAL TO PAD DISTANCE
e	0.80 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	-	3.30	-
X	-	-	0.37
Y	0.69	-	-
e	0.80		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994
MATERIAL: -
FINISH: -
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING
THIRD ANGLE PROJECTION

	NAME	DATE
DRAWN	-	3/23/10
CHECKED	S.K.ILIEV	3/24/10
APPROVED	S.K.ILIEV	3/25/10

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

TITLE: PACKAGE OUTLINE
16 PINS S5QFN, 5x5mm BODY, 0.80mm PITCH (SAWN QFN, FULL LEAD TERMINATION DESIGN)

DWG NUMBER: 16-S5QFN-5x5B-0.80P — REV: B
SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 1

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	3/18/07	S.K.ILIEV
B	INITIAL PRODUCTION RELEASE	12/5/07	S.K.ILIEV
C	L from 0.4±0.05 to 0.4±0.1mm. Y from 0.65 to 0.69mm. GD/GE from 3.01 to 3.00. K(min) from 0.2 to 0.25	4/21/08	S.K.ILIEV
D	ADDED GD/GE MAX. Y=0.69 from NOM to MIN	3/8/10	S.K.ILIEV
E	ADDED Y (MAX) = 0.80	3/15/10	S.K.ILIEV
F	ADDED Y CENTER PCB PAD VIA INFORMATION	2/17/12	S.K.ILIEV

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D2/E2	2.50	2.60	2.70	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.25	0.30	-	-	TERMINAL TO PAD DISTANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	3.00	-	3.10
D2'/E2'	-	2.60	2.60
X	-	0.28	0.28
Y	0.69	-	0.80
e	0.50		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025 ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	3/14/07
FINISH: -		
CHECKED	S.K.ILIEV	3/15/07
APPROVED	S.K.ILIEV	3/18/07

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 20 PINS SQFN, 4x4mm BODY, 0.5mm PITCH (SAWN QFN, FULL LEAD TERMINATION)

DWG NUMBER: 20SQFN-4x4B-0.5P — REV: F

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 1

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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	2/16/12	S.K.ILIEV

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEW

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)

EXPOSED PAD (ePAD)

(DATUM B)

(DATUM A)

24X K

24X L

24X b

24X + ePAD

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D2/E2	2.40	2.50	2.60	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.25	0.35	-	-	PINL TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

SEE NOTE 2

0.2 (MIN)

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	3.05	-	3.10
D2'/E2'	-	2.50	2.50
Pad: X	-	0.28	0.28
Pad: Y	-	0.69	-
e	0.50		

NOTES:
1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

MATERIAL	-
FINISH	-

	NAME	DATE
DRAWN	-	2/9/12
CHECKED	S.K.ILIEV	2/15/12
APPROVED	S.K.ILIEV	2/16/12

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: **PACKAGE OUTLINE**
24 PINS S4QFN, 4x4mm BODY, 0.5mm PITCH
(S4QFN = 4x4mm BODY SAWN QFN, FULL LEAD TERMINATION)

DWG NUMBER: 24-S4QFN-4x4B-0.5P | REV: A
SCALE: 1:1 | STD COMPLIANCE: JEDEC: MO-220 | SHEET: 1 OF 1

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY DESIGN	3/25/10	S.K.ILIEV
A1	L tolerance from ±0.10 to ±0.05	6/3/10	S.K.ILIEV
A2	A from 0.85±0.05 to 0.90±0.10. Add profile tolerance at C	6/10/10	S.K.ILIEV
B	INITIAL RERLEASE	5/12/10	SKI

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D2/E2	3.20	3.30	3.40	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.25	0.30	0.35	2	TERMINAL WIDTH
K	0.35	0.45	-	-	TERMINAL TO PAD DISTANCE
e	0.65 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	-	3.30	-
X	-	-	0.37
Y	0.69	-	-
e	0.65		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994
THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: - / DRAWN	-	3/23/10
FINISH: - / CHECKED	S.K.ILIEV	3/24/10
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING / APPROVED	S.K.ILIEV	3/25/10

TITLE: PACKAGE OUTLINE
24 PINS SQFN, 5x5mm BODY, 0.65mm PITCH
(SAWN QFN, FULL LEAD TERMINATION DESIGN)

DWG NUMBER: 24-SQFN-5x5B-0.65P — REV: B
SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 1

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REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/6/12	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D2/E2	3.00	3.10	3.20	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.45	0.55	-	-	PIN TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	-	3.10	3.10
X	-	0.28	0.28
Y	-	0.69	-
e	0.50		

NOTES:
1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL: X.X ±0.1, X.XX ±0.05, X.XXX ±0.025
ANGULAR: ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	3/10/12
FINISH: -		
CHECKED	S.K.ILIEV	4/3/12
APPROVED	S.K.ILIEV	4/6/12

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE
PACKAGE OUTLINE
28 SQFN-3104, 5x5mm BODY, 0.5mm PITCH (SAWN QFN, 0.4 MM LEAD LENGTH)

DWG NUMBER	REV
28-SQFN-3104-5x5B-0.5P	A

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-220	1 OF 1

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/6/12	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D2/E2	3.00	3.10	3.20	-	X/Y EXPOSED PAD SIZE
L	0.50	0.60	0.75	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.25	0.35	-	-	PIN TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	3.65	-	3.70
D2'/E2'	-	3.10	3.10
X	-	0.28	0.28
Y	-	0.89	-
e	0.50		

NOTES:
1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	3/10/12
FINISH: -		
CHECKED	S.K.ILIEV	4/3/12
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	4/6/12

TITLE: **PACKAGE OUTLINE**
28 SQFN-3106, 5x5mm BODY, 0.5mm PITCH (SAWN QFN, 0.6 MM LEAD LENGTH)

DWG NUMBER	REV
28-SQFN-3106-5x5B-0.5P	A

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-220	1 OF 1

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REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	2/16/12	S.K.ILIEV
B	INITIAL RELEASE	5/20/12	SKI

TOP VIEW

BOTTOM VIEW

SIDE VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D2/E2	3.20	3.30	3.40	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.35	0.45	-	-	PIN TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	-	3.30	3.30
X	-	0.28	0.28
Y	-	0.69	-
e	0.50		

NOTES:

1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:

DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025 — ANGULAR ±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	2/10/12
FINISH: -		
CHECKED	S.K.ILIEV	2/16/12
APPROVED	S.K.ILIEV	2/16/12

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: **PACKAGE OUTLINE**
32 PINS SQFN, 5x5mm BODY, 0.5mm PITCH
(SAWN QFN, FULL LEAD TERMINATION)

DWG NUMBER	REV
32-SQFN-5x5B-0.5P	B

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-220	1 OF 1

TOP VIEW

BOTTOM VIEW

SIDE VIEW

PCB LAND PATTERN

TERMINAL #1 IDENTIFIER AREA (D1/2 X E1/2)

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)

EXPOSED PAD

FULL RADIUS IS OPTIONAL

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.60	-	4.70
D2'/E2'	-	3.70	-
X	-	0.28	0.28
Y	-	0.90	-
e	0.50		

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/5/2011	H. CABALLERO
B	A(min) from 0.70 to 0.80. A(nom) from 0.85 to 0.90. Added K(nom). PCB view updated.	6/18/2012	SKI

3-D VIEWs

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
D/E	5.90	6.00	6.10	-	X/Y BODY SIZE
D2/E2	3.60	3.70	3.80	4	X/Y EXPOSED PAD SIZE
L	0.50	0.60	0.75	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2, 4	TERMINAL WIDTH
k	0.45	0.55	-	-	TERMINAL TO ePAD CLEARANCE
ccc	-	-	0.08	4	COPLANARITY
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. COPLANARITY ZONE APPLIES TO EXPOSED PAD AND TERMINALS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	H. CABALLERO	10/25/11
FINISH: -		
CHECKED	H.CABALLERO	10/25/11
APPROVED	S.K.ILIEV	10/25/11

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 36 PIN SQFN, 6x6mm BODY, 0.5mm PITCH 3.7x3.7mm ePAD

DWG NUMBER: 36SQFN-3706-6x6B — REV: B

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-220 — SHEET: 1 OF 1

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	1/17/2012	HC
B	A(min) from 0.70 to 0.80. A(nom) from 0.85 to 0.90. Added K(nom)	6/18/2012	SKI

TOP VIEW

TERMINAL #1 IDENTIFIER AREA (D1/2 X E1/2) 3

BOTTOM VIEW

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)

EXPOSED PAD

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
D/E	6.90	7.00	7.10	-	X/Y BODY SIZE
D2/E2	4.00	4.10	4.20	4	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2, 4	TERMINAL WIDTH
K	0.95	1.05	-	-	CENTER PAD TO PIN CLEARANCE
ccc	-	-	0.08	4	COPLANARITY
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. COPLANARITY ZONE APPLIES TO EXPOSED PAD AND TERMINALS.

FULL RADIUS IS OPTIONAL

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	6.00		6.10
D2'/E2'		4.10	
X		0.28	0.28
Y		0.70	
e		0.50	

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°

INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

TITLE: PACKAGE OUTLINE 48 SQFN, 7x7mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.4mm LEAD LENGTH

	NAME	DATE
MATERIAL -	DRAWN -	1/17/12
FINISH -	CHECKED -	1/17/12
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED H. CABALLERO	1/17/12

DWG NUMBER: 48SQFN-4104-7x7B; REV: B; SCALE: 1:1; STD COMPLIANCE: JEDEC: MO-220; SHEET: 1 OF 1

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/17/2012	SKI

TOP VIEW

TERMINAL #1 IDENTIFIER AREA (D1/2 X E1/2) 3

BOTTOM VIEW

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2) 3

EXPOSED PAD 4

3-D VIEWS

SIDE VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
D/E	6.90	7.00	7.10	-	X/Y BODY SIZE
D2/E2	5.20	5.30	5.40	4	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2, 4	TERMINAL WIDTH
K	0.35	0.45	-	-	CENTER PAD TO PIN CLEARANCE
ccc	-	-	0.08	4	COPLANARITY
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. COPLANARITY ZONE APPLIES TO EXPOSED PAD AND TERMINALS.

FULL RADIUS IS OPTIONAL

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	6.00	-	6.10
D2'/E2'	-	4.10	-
X	-	0.28	0.28
Y	-	0.70	-
e	0.50		

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

TITLE: PACKAGE OUTLINE
48 SQFN, 7x7mm BODY, 0.5mm PITCH, 5.3x5.3mm EXPOSED PAD, 0.4mm LEAD LENGTH

	NAME	DATE
MATERIAL: -	DRAWN: -	1/17/12
FINISH: -	CHECKED: -	1/17/12
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: SKI	2/17/12

DWG NUMBER: 48SQFN-5304-7x7B; REV: A
SCALE: 1:1; STD COMPLIANCE: JEDEC: MO-220; SHEET: 1 OF 1

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QFP

SMSC Legacy

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-

D
D1 3
80 51
81 50
e
b 2
3 E1
E
D1/4 5
E1/4
100 31
1 30

TOP VIEW

R1
R2
0.25
0°-7°
GAUGE PLANE
L 4
L1

DETAIL "A" (SCALE: 3/1)

SEE DETAIL "A"
A2
C
A
SEATING PLANE
c
ccc C
A1

SIDE VIEW

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	3.40	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.50	–	STANDOFF
A2	2.55	–	3.05	–	BODY THICKNESS
D	23.65	–	24.15	–	"X" SPAN
D1	19.90	20.00	20.10	3	"X" BODY SIZE
E	17.65	–	18.15	–	"Y" SPAN
E1	13.90	14.00	14.10	3	"Y" BODY SIZE
L	0.73	0.88	1.03	4	LEAD FOOT LENGTH
L1	1.95 REF			–	LEAD LENGTH
b	0.20	–	0.40	2	LEAD WIDTH
c	0.11	–	0.23	–	LEAD FOOT THICKNESS
e	0.65 BSC			–	LEAD PITCH
R1	0.10	–	0.25	–	LEAD SHOULDER RADIUS
R2	0.15	–	0.40	–	LEAD FOOT RADIUS
ccc	–	–	0.10	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TOLERANCE OF THE TRUE POSITION OF THE LEADS IS ± 0.065mm MAXIMUM.
3. PACKAGE BODY DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM MOLD PROTRUSION IS 0.25 mm.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL: X.X ±0.1, X.XX ±0.05, X.XXX ±0.025
ANGULAR: ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	S.K.ILIEV	11/30/04
FINISH: -		
CHECKED	S.K.ILIEV	11/30/04
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	11/30/04

TITLE: PACKAGE OUTLINE 100 QFP-14x20x2.7mm BODY-3.9mm FOOTPRINT

DWG NUMBER: MO-100 QFP-14x20-3.9FP | REV: C

SCALE: 1:1 | STD COMPLIANCE: JEDEC: MO-112 (B) | SHEET: -

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Legacy SMSC Packaging Outlines and Dimensions

REV	DESCRIPTION	DATE	RELEASED BY
E	DESCRIPTION OF CHANGES - IN FRONT PAGE OF MO SPEC	12/13/04	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	3.40	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.50	–	STANDOFF
A2	2.55	–	3.05	–	BODY THICKNESS
D	23.70	23.90	24.10	–	"X" SPAN
D1	19.90	20.00	20.10	3	"X" BODY SIZE
E	17.70	17.90	18.10	–	"Y" SPAN
E1	13.90	14.00	14.10	3	"Y" BODY SIZE
L	0.73	0.88	1.03	4	LEAD FOOT LENGTH
L1	1.95 REF			–	LEAD LENGTH
b	0.10	–	0.30	2	LEAD WIDTH
c	0.09	–	0.20	–	LEAD FOOT THICKNESS
e	0.50 BSC			–	LEAD PITCH
R1	0.13	–	–	–	LEAD SHOULDER RADIUS
R2	0.13	–	0.30	–	LEAD FOOT RADIUS
ccc	–	–	0.08	–	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TOLERANCE OF THE TRUE POSITION OF THE LEADS IS ± 0.04mm MAXIMUM.
3. PACKAGE BODY DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM MOLD PROTRUSION IS 0.25 mm.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: N/A — DRAWN	S.K.ILIEV	11/30/04
FINISH: N/A — CHECKED	S.K.ILIEV	11/30/04
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING — APPROVED	S.K.ILIEV	11/30/04

TITLE: PACKAGE OUTLINE
128 QFP-14x20x2.7mm BODY, 3.9mm FOOTPRINT

DWG NUMBER: MO-128 QFP-14x20-3.9FP — REV: E

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-112 / MS-029 — SHEET: 1 OF 1

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REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/17/05	S.K.ILIEV

TOP VIEW

SIDE VIEW

DETAIL "A"

3-D VIEW

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	4.10	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.50	–	STANDOFF
A2	3.20	3.40	3.60	–	BODY THICKNESS
D/E	30.95	–	31.45	6	"X"/"Y" SPAN
D1/E1	27.80	28.00	28.20	3	"X"/"Y" BODY SIZE
L	0.73	0.88	1.03	–	LEAD FOOT LENGTH
L1	1.60 REF			–	LEAD LENGTH
b	0.22	–	0.40	2,4	LEAD WIDTH
c	0.11	–	0.23	4	LEAD FOOT THICKNESS
e	0.65 BSC			–	LEAD PITCH
ccc	–	–	0.10	–	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.065mm AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE. "D1" AND "E1" DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE "H".
4. DIMENSIONS "b" AND "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 mm AND 0.25 mm FROM THE LEAD TIP.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
6. DIMENSIONS "D" AND "E" TO BE DETERMINED AT SEATING PLANE "C".

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	S.K.ILIEV	2/17/05
FINISH: -		
CHECKED	S.K.ILIEV	2/17/05
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	2/17/05

TITLE: PACKAGE OUTLINE 160 QFP, 28x28x3.4 MM BODY, 0.65 MM PITCH

DWG NUMBER: MO-160-QFP-28x28B-0.65P | REV: A

SCALE: 1:1 | STD COMPLIANCE: JEDEC: MS-022 / B | SHEET: 1 OF 1

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-

TOP VIEW

DETAIL "A"

SIDE VIEW

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	4.07	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.50	–	STANDOFF
A2	3.17	–	3.67	–	BODY THICKNESS
D/E	30.35	–	30.85	–	"X"/"Y" SPAN
D1/E1	27.90	28.00	28.10	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.30 REF			–	LEAD LENGTH
b	0.10	–	0.30	2	LEAD WIDTH
c	0.09	–	0.20		LEAD FOOT THICKNESS
e	0.50 BSC			–	LEAD PITCH
R1	0.08	–	–		LEAD SHOULDER RADIUS
R2	0.08	–	0.25		LEAD FOOT RADIUS
ccc	–	–	0.08	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	12/20/04
CHECKED	S.K.ILIEV	12/20/04
APPROVED	S.K.ILIEV	12/20/04

MATERIAL: -
FINISH: -
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE
208 QFP, 28x28x3.4 MM BODY, 0.50 MM PITCH

DWG NUMBER: MO-208-QFP-28x28x3.4 — REV: C
SCALE: 1:1 — STD COMPLIANCE: JEDEC: MS-029 / A — SHEET: 1 OF 1

NOTES:

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SIP

SMSC Legacy

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
A	CONVERTING THE DRAWING TO DWG FORMAT	6/23/06	S.K.ILIEV
A	PCB LAND PATTERN IS ADDED	9/23/08	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	2.000	-	2.100	-	OVERALL PACKAGE LENGTH
B	0.625	0.650	0.675	-	PACKAGE WIDTH
H	-	-	0.400	-	PACKAGE HEIGHT
l	0.250	-	0.265	-	LEAD LENGTH (BENT to TIP)
b	0.018	-	0.022	2	LEAD WIDTH
c	0.008	0.010	0.012	-	LEAD THICKNESS
e	0.100 BSC			-	LEAD PITCH

NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ±0.02 INCHES AT MAXIMUM MATERIAL CONDITIONS. PINS MUST BE CUT STRAIGHT, AND THE CUTTING EDGE MUST BE PARALLEL TO THE PACKAGE BODY WITHIN 0.005 INCHES.

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

RECOMMENDED PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL: X.X ±0.1; X.XX ±0.05; X.XXX ±0.025
ANGULAR: ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

		NAME	DATE
MATERIAL	-	DRAWN: S.K.ILIEV	5/26/06
FINISH	-	CHECKED: S.K.ILIEV	6/23/06
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		APPROVED: S.K.ILIEV	6/23/06

TITLE: PACKAGE OUTLINE
20 LEADS SIP, 0.100 INCHES PITCH
(RIGHT ANGLE LEAD DESIGN)

DWG NUMBER: PS-HYC9088-20SIP-R — REV: B

SCALE: 1:1 — STD COMPLIANCE: N/A — SHEET: 1 OF 1

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QLeX

SMSC Legacy

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REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	12/17/10	SKI
B	PRODUCTION RELEASE	4/19/2011	SKI

D A B E
3 TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)
e 10 6X L 1 2 PIN #1 0.100X45° 4X L1

TOP VIEW

SIDE VIEW 1

BOTTOM VIEW

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.50	0.55	0.60	-	OVERALL PACKAGE HEIGHT
A1	0.00	0.02	0.05	-	STANDOFF
D	1.20	1.30	1.40	-	X BODY SIZE
E	1.70	1.80	1.90	-	Y BODY SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH (SHORT SIDE)
L1	0.45	0.50	0.55	-	TERMINAL LENGTH (LONG SIDE)
b	0.15	0.20	0.25	2	TERMINAL WIDTH
e	0.40 BSC			-	TERMINAL PITCH

SEE DETAIL A
A
// 0.10 C
A1
C
SEATING PLANE
2 10X b
0.08 C 4
0.07Ⓜ C A B
0.05Ⓜ C

SIDE VIEW 2

DETAIL A

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. IT CAN BE EITHER A MOLD OR MARKED FEATURE.
4. UNILATERAL COPLANARITY ZONE APPLIES TO ALL TERMINALS.

3-D VIEWS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025
ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	12/17/10
FINISH: -		
CHECKED	-	4/15/11
APPROVED	S.K.ILIEV	4/19/11

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE
PACKAGE OUTLINE
10 PINS S18QLeX, 1.8x1.3mm BODY, 0.40mm PITCH (CHIP-ON-LEAD, SAW QFN)

DWG NUMBER: 10-S18QLeX-1.8x1.3B-0.4P
REV: B
SCALE: 1:1
STD COMPLIANCE: MO-248
SHEET: 1 OF 1

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REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	12/17/10	SKI
B	PRODUCTION RELEASE	4/19/2011	SKI

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)

PIN #1 0.100X45°

TOP VIEW

SIDE VIEW 1

BOTTOM VIEW

SEE DETAIL A

SEATING PLANE

SIDE VIEW 2

DETAIL A

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.50	0.55	0.60	-	OVERALL PACKAGE HEIGHT
A1	0.00	0.02	0.05	-	STANDOFF
D	1.50	1.60	1.70	-	X BODY SIZE
E	2.00	2.10	2.20	-	Y BODY SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH (SHORT SIDE)
L1	0.60	0.65	0.70	-	TERMINAL LENGTH (LONG SIDE)
b	0.20	0.25	0.30	2	TERMINAL WIDTH
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. IT CAN BE EITHER A MOLD OR MARKED FEATURE.
4. UNILATERAL COPLANARITY ZONE APPLIES TO ALL TERMINALS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	-	12/17/10
FINISH: -		
CHECKED	-	4/15/11
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	4/19/11

TITLE: PACKAGE OUTLINE
10 PINS S21QLeX, 2.1x1.6mm BODY, 0.50mm PITCH (CHIP-ON-LEAD, SAW QFN)

DWG NUMBER: 10-S21QLeX-2.1x1.6B-0.5P — REV: B

SCALE: 1:1 — STD COMPLIANCE: MO-248 — SHEET: 1 OF 1

NOTES:

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SOT-23

SMSC Legacy

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REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/18/04	S.K.ILIEV
B	DIMENSION "E" FROM 2.80±0.20 TO 2.80±0.25 MM	6/12/06	S.K.ILIEV
C	REMOVE THE LOGO FROM THE TITLE BLOCK	9/25/07	S.K.ILIEV
D	ADDED PCB FOOTPRINT	3/17/08	S.K.ILIEV

D, E/2, E, E1, N, 4, 1, 2, 3, e, NX b, INDEX AREA (D/2 x E1/2), SEE DETAIL "A", c, H, GAUGE PLANE, 0.25, L, 0° - 8°, (0.60)

TOP VIEW **END VIEW** **DETAIL "A"**

C, A2, A, SEATING PLANE, A1, ccc C

N = 5 LEADS N = 6 LEADS

SIDE VIEW **3-D VIEWS**

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	-	0.10	-	STANDOFF
A2	0.70	0.90	1.00	-	BODY THICKNESS
D	2.75	2.90	3.05	3	X BODY SIZE
E	2.55	2.80	3.05	-	LEAD SPAN
E1	1.45	1.60	1.75	3	Y BODY SIZE
L	0.30	0.45	0.60	-	LEAD FOOT LENGTH
b	0.30	-	0.50	2,4	LEAD WIDTH
c	0.08	-	0.20	4	LEAD FOOT THICKNESS
e	0.95 BSC			-	LEAD PITCH
ccc	-	-	0.10	-	COPLANARITY
ddd	0	-	0.20	-	LEAD TRUE POSITION SPREAD

0.6, 0.95, 2.65, PIN 1, 0.95

N = 5 LEADS N = 6 LEADS

RECOMMENDED PCB LAND PATTERN

NOTES:
1. "N" IS THE TOTAL NUMBER OF LEADS.
2. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DANBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MAXIMUM MOLD FLASH, PROTRUSIONS OR GATE BURRS IS 0.15 mm PER END. DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. MAXIMUM INTERLEAD FLASH OR PROTRUSION IS 0.15 mm PER SIDE. "D1" & "E1" ARE DETERMINED AT DATUM PLANE "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. "b" & "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 TO 0.15 mm FROM THE LEAD TIP.
5. DETAILS OF PIN 1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
6. FIVE LEAD PACKAGE IS A VERSION OF 6 LEAD PACKAGE, WHERE LEAD #5 HAS BEEN REMOVED FROM 6 LEAD PACKAGE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

		NAME	DATE
MATERIAL: N/A	DRAWN	S.K.ILIEV	10/15/04
FINISH: N/A	CHECKED	S.K.ILIEV	10/18/04
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.ILIEV	10/18/04

TITLE: PACKAGE OUTLINE SOT FAMILY, 2.9 X 1.6 MM BODY, 0.95 MM PITCH

DWG NUMBER	REV
MO-SOT-2.9x1.6B	D

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-193	1 OF 1

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SOIC

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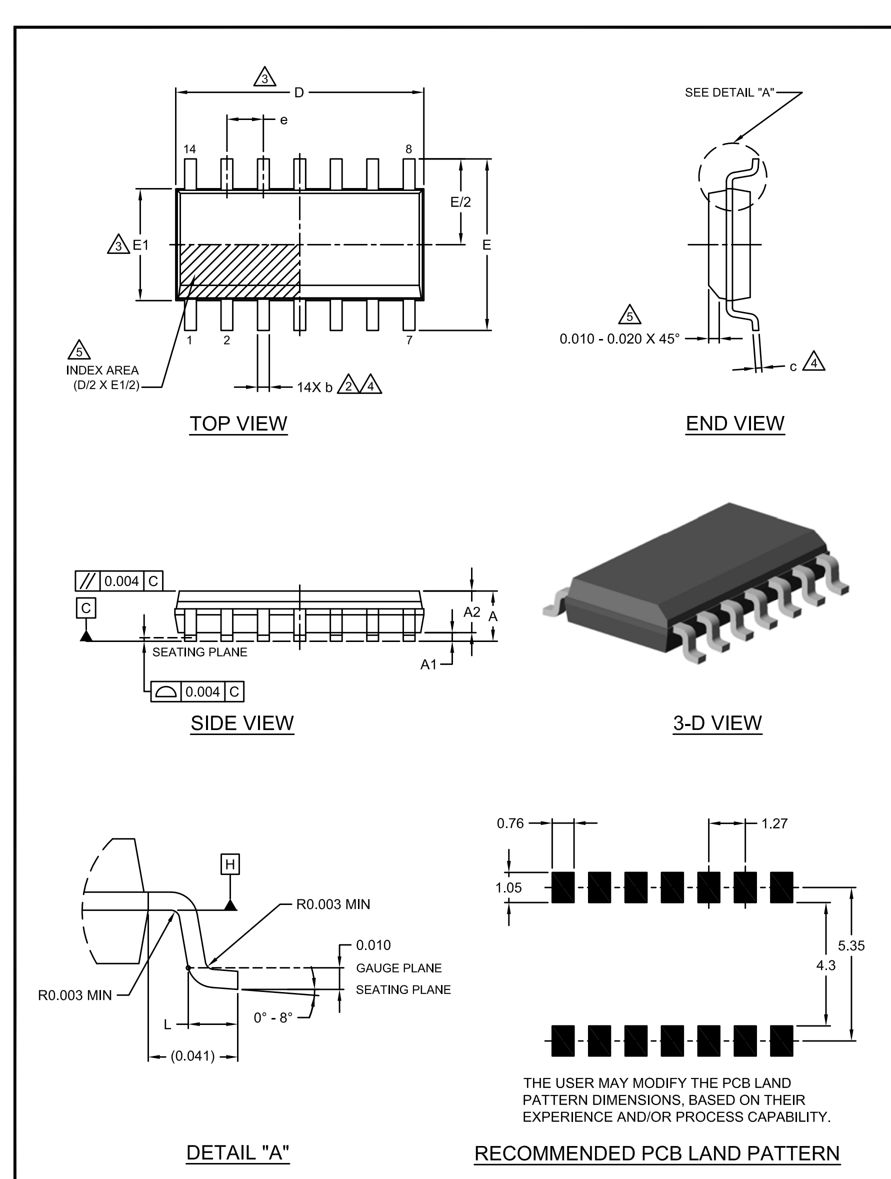
Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/29/08	S.K.ILIEV
B	3-D VIEW FROM 16 TO 14 LEADS	1/28/09	S.K.ILIEV



COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.053	–	0.069	–	OVERALL PKG HEIGHT
A1	0.004	–	0.010	–	STANDOFF
A2	0.049	–	0.065	–	BODY THICKNESS
D	0.336	0.340	0.344	3	"X" BODY SIZE
E	0.228	0.236	0.244	–	LEAD SPAN
E1	0.150	0.154	0.158	3	"Y" BODY SIZE
L	0.016	0.025	0.035	–	LEAD FOOT LENGTH
b	0.012	–	0.020	2,4	LEAD WIDTH
c	0.007	–	0.010	4	LEAD FOOT THICKNESS
e	0.050 BSC			–	LEAD PITCH

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.0049 inches AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MAXIMUM MOLD FLASH, PROTRUSIONS OR GATE BURRS IS 0.006" PER END. DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. MAXIMUM INTERLEAD FLASH OR PROTRUSION IS 0.010" PER SIDE. "D1" & "E1" DIMENSIONS ARE DETERMINED AT DATUM PLANE "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. "b" & "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.004 TO 0.010" FROM THE LEAD TIP.
5. THE CHAMFER FEATURE IS OPTIONAL. IF IT IS NOT PRESENT, THEN A PIN 1 IDENTIFIER MUST BE LOCATED WITHIN THE INDEX AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°. INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging
	NAME	DATE	TITLE: PACKAGE OUTLINE 14 SOIC, 0.150" WIDE BODY, 0.05" PITCH
MATERIAL: -	DRAWN: S.K.ILIEV	2/29/08	
FINISH: -	CHECKED: S.K.ILIEV	2/29/08	DWG NUMBER: AP-14SOIC-0.150"-WIDE; REV: B
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	2/29/08	SCALE: 1:1; STD COMPLIANCE: JEDEC: MS-012; SHEET: 1 OF 1

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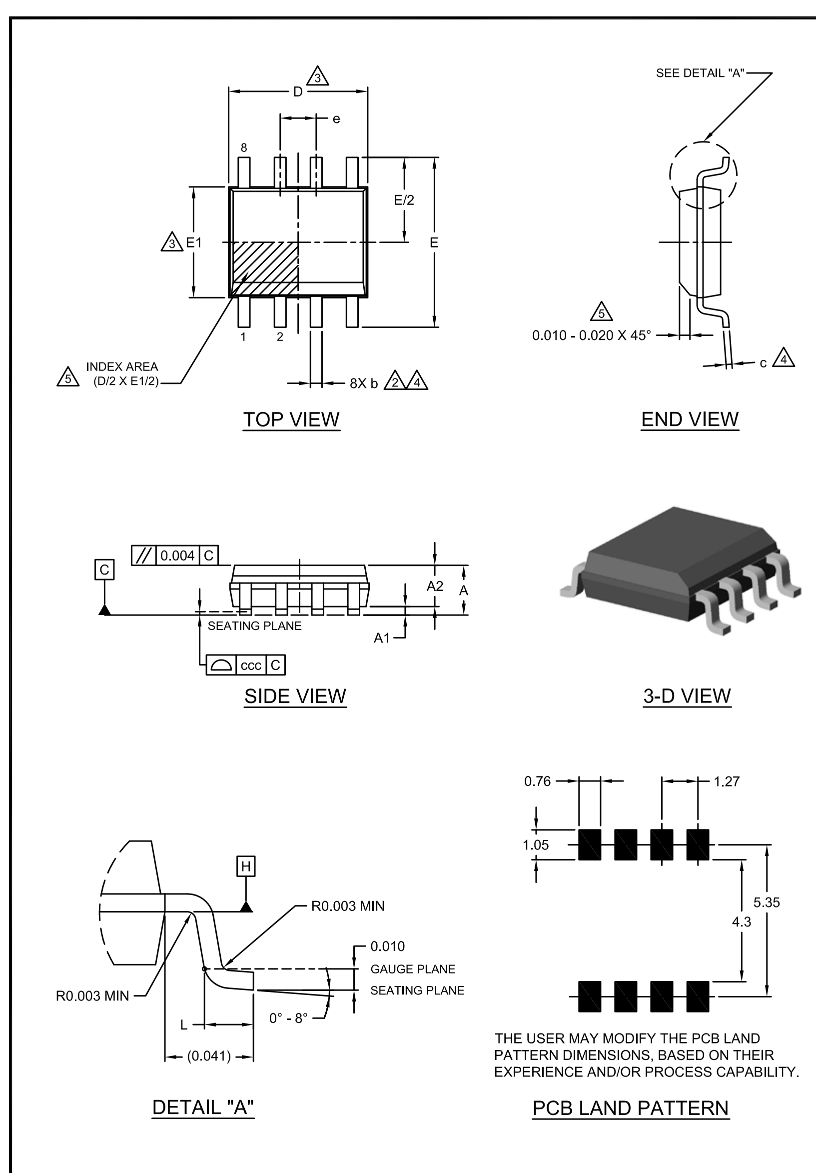
Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	5/20/04	S.K.ILIEV
B	ADDED PCB LAND PATTERN	7/9/12	SKI



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.053	–	0.069	–	OVERALL PKG HEIGHT
A1	0.004	–	0.010	–	STANDOFF
A2	0.049	–	0.065	–	BODY THICKNESS
D	0.189	0.193	0.197	3	"X" BODY SIZE
E	0.228	0.236	0.244	–	LEAD SPAN
E1	0.150	0.154	0.158	3	"Y" BODY SIZE
L	0.016	–	0.035	–	LEAD FOOT LENGTH
b	0.012	–	0.020	2,4	LEAD WIDTH
c	0.007	–	0.010	4	LEAD FOOT THICKNESS
e	0.050 BSC			–	LEAD PITCH
ccc	–	–	0.0035	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.0049 inches AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MAXIMUM MOLD FLASH, PROTRUSIONS OR GATE BURRS IS 0.006" PER END. DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. MAXIMUM INTERLEAD FLASH OR PROTRUSION IS 0.010" PER SIDE. "D1" & "E1" DIMENSIONS ARE DETERMINED AT DATUM PLANE "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. "b" & "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.004 TO 0.010" FROM THE LEAD TIP.
5. THE CHAMFER FEATURE IS OPTIONAL. IF IT IS NOT PRESENT, THEN A PIN 1 IDENTIFIER MUST BE LOCATED WITHIN THE INDEX AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025 ANGULAR ±1° INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging			
	NAME	DATE	TITLE PACKAGE OUTLINE 8 SOIC, 0.150" WIDE BODY, 0.05" PITCH			
MATERIAL -	DRAWN S.K.ILIEV	5/17/04				
FINISH -	CHECKED S.K.ILIEV	5/19/04	DWG NUMBER AP-8SOIC-0.150"-WIDE			REV B
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	5/20/04	SCALE 1:1	STD COMPLIANCE JEDEC: MS-012		SHEET 1 OF 1

NOTES:

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SSOP

SMSC Legacy

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/26/01	S.K.ILIEV
B	W&H to be b&c, par tol, 3-D & note 6 added, note 4 add	3/11/05	S.K.ILIEV
C	REMOVED THE LOGO FROM THE TITLE BLOCK	9/25/07	S.K.ILIEV

TOP VIEW

END VIEW

SIDE VIEW

3-D VIEW

DETAIL "A"

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.

PCB LAND PATTERN

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.053	–	0.069	–	OVERALL PKG HEIGHT
A1	0.004	–	0.010	–	STANDOFF
A2	0.049	–	0.065	–	BODY THICKNESS
D	SEE VARIATIONS			3	"X" BODY SIZE
E	0.228	–	0.244	–	LEAD SPAN
E1	0.150	0.154	0.158	3	"Y" BODY SIZE
L	0.016	–	0.035	–	LEAD FOOT LENGTH
b	0.008	0.010	0.012	2,6	LEAD WIDTH
c	0.006	–	0.010	6	LEAD FOOT THICKNESS
e	0.025 BSC			–	LEAD PITCH
ccc	SEE VARIATIONS			–	COPLANARITY

ccc (VARIATIONS)		
SITE	MODE	MAX
ASSEMBLY HOUSE	100% SCAN	0.0027
	QA	0.0030
TEST HOUSE	100% & QA	0.0035

D (VARIATIONS)			
N	MIN	NOM	MAX
16	0.189	0.193	0.197
24	0.337	0.341	0.345
28	0.386	0.390	0.394

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. TRUE POSITION TOLERANCE OF EACH LEAD IS ± 0.0035 INCHES AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. THEY SHALL NOT EXCEED 0.006 INCHES PER END. DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. THEY SHALL NOT EXCEED 0.006 INCHES PER SIDE. "D" AND "E1" ARE DETERMINED AT DATUM "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. THIS CHAMFER FEATURE IS OPTIONAL.
5. DETAILS OF PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
6. "b" AND "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.004 TO 0.010 INCHES FROM THE LEAD TIP.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

MATERIAL	-		NAME	DATE
		DRAWN	S.K.ILIEV	4/20/01
FINISH	-	CHECKED	S.K.ILIEV	4/21/01
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		APPROVED	S.K.ILIEV	4/26/01

TITLE: PACKAGE OUTLINE SSOP FAMILY, 0.150" WIDE BODY, 0.025" PITCH

DWG NUMBER	REV	SCALE	STD COMPLIANCE	SHEET
AP-SSOP-0.150"-WIDE	C	1:1	JEDEC: MO-137	1 OF 1

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TDFN

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	8/6/09	S.K.ILIEV

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2) (3)

D, E, A, B, 3 2 1, 8

D2, E2, 8X L, 8X K, e, 8X b (2), EXPOSED PAD (2)

⌖ 0.10Ⓜ C A B / 0.05Ⓜ C

TOP VIEW

BOTTOM VIEW

C, A, A1, // 0.10 C, ⌓ 0.05 C

SIDE VIEW

3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.75	0.80	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
D	1.90	2.00	2.10	-	X BODY SIZE
E	2.90	3.00	3.10	-	Y BODY SIZE
D2	1.40	1.50	1.60	2	X EXPOSED PAD SIZE
E2	1.60	1.70	1.80	2	Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.20	0.25	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. UNILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED PAD, AS WELL AS THE TERMINALS. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

e, GE, E2', D2', X, Y, FULL RADIUS IS OPTIONAL

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GE	2.10	-	2.20
D2'	-	1.50	1.50
E2'	-	1.70	1.70
X	-	-	0.28
Y	-	-	0.69
e	0.50		

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

RECOMMENDED PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

		NAME	DATE
MATERIAL	-	DRAWN -	8/6/09
FINISH	-	CHECKED -	8/6/09
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		APPROVED S.K.ILIEV	8/6/09

TITLE: PACKAGE OUTLINE
8 TERMINAL TDFN, 2x3mm BODY, 0.50mm PITCH
(TYPE-1, DUAL-IN-LINE & SAW SINGULATE DESIGN)

DWG NUMBER: 8TDFN-2x3B-TYPE1 | REV: A

SCALE: 1:1 | STD COMPLIANCE: MO-229 | SHEET: 1 OF 1

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TFBGA

SMSC Legacy

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	7/28/10	S.K.ILIEV
B	INITIAL RELEASE	11/4/10	S.K.ILIEV
C	ADDED b1 AND b2 DIMENSIONS	11/15/11	SKI

TOP VIEW

BOTTOM VIEW

SIDE VIEW

DETAIL A

DETAIL B

SECTION B-B

PCB LAND PATTERN

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.99	1.10	1.20	5	OVERALL PACKAGE HEIGHT
A1	0.20	0.24	0.28	-	STANDOFF
A2	0.80	0.86	0.92	-	PKG BODY THICKNESS
D/E	6.90	7.00	7.10	-	X/Y BODY SIZE
D1/E1		6.00 BSC		-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
b1	0.23	0.27	0.31	6	FINISHED SOLDER MASK OPENING
b2	0.30	0.35	0.40	-	FINISHED BOTTOM BALL PAD
e		0.50 BSC		-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PKG BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD).

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	6.00	-
b'	-	0.27	-
e'	-	0.50	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°. INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: N/A / DRAWN	-	7/27/10
FINISH: N/A / CHECKED	S.K.ILIEV	7/28/10
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING / APPROVED	S.K.ILIEV	7/28/10

TITLE: PACKAGE OUTLINE 129 BALL TFBGA, 7x7mm BODY, 0.50mm PITCH

DWG NUMBER: 129TFBGA-7x7B-0.5P — REV: C

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-195 — SHEET: 1 OF 1

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	10/21/07	S.K.ILIEV
B	INITIAL PRODUCTION RELEASE. ADDED A2 (min)	2/20/09	S.K.ILIEV

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEW

DETAIL A

DETAIL B

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.02	1.20	5	OVERALL PACKAGE HEIGHT
A1	0.15	0.21	-	-	STANDOFF
A2	0.71	0.81	1.00	-	PKG BODY THICKNESS
D/E	6.90	7.00	7.10	-	X/Y BODY SIZE
D1/E1	6.00 BSC			-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
e	0.50 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

		NAME	DATE
MATERIAL	N/A	DRAWN: -	10/18/07
FINISH	N/A	CHECKED: S.K.ILIEV	10/21/07
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		APPROVED: S.K.ILIEV	10/21/07

TITLE: PACKAGE OUTLINE 134 BALL TFBGA, 7x7mm BODY, 0.50mm PITCH

DWG NUMBER: MO-134TFBGA-7x7B-0.5P — REV: B

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-195 — SHEET: 1 OF 1

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	10/21/07	S.K.ILIEV
B	INITIAL RELEASE	11/10/08	S.K.ILIEV
C	b' FROM 0.20-0.25 TO 0.27 (min) and 0.27 (max)	8/10/10	S.K.ILIEV
D	ADDED ROUTING AND SECTION C-C (b1 DIM)	12/11/2010	S.K.ILIEV

TOP VIEW — BALL A1 CORNER INDEX AREA

BOTTOM VIEW — SEE DETAIL "B"

DETAIL A — SEATING PLANE

DETAIL B — 144X Øb

SECTION C-C — SMD (TYPE)

SIDE VIEW — SEE DETAIL "A"

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.02	1.20	5	OVERALL PACKAGE HEIGHT
A1	0.15	0.21	-	-	STANDOFF
A2	-	0.81	1.00	-	PKG BODY THICKNESS
D/E	6.90	7.00	7.10	-	X/Y BODY SIZE
D1/E1		6.00 BSC		-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
b1	0.24	0.27	0.30	6	BALL SOLDERABLE PAD DIAMETER
e		0.50 BSC		-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM C.
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PKG BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

DETAIL D

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	6.00	-
e'	-	0.50	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN & ROUTING

ROUTING DIMENSIONS				
Symbol	Recommended		Acceptable	
Ø PAD	0.27		0.25	0.30
Ø SM	0.325	0.346	0.325	0.375
Ø VIA-CP	0.28		0.28	N/A
Ø VIA-DRILL	0.13		0.13	Via-In-Pad
Lo	0.10		0.10	0.10
Li	0.075		0.075	N/A
SPACE (Metal-to-Metal)	0.078		0.088	0.20
SM-R	0.05	0.04	0.05	-

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°. INTERPRET DIM AND TOL PER ASME Y14.5M - 1994. THIRD ANGLE PROJECTION.

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	10/18/07
CHECKED	S.K.ILIEV	10/21/07
APPROVED	S.K.ILIEV	10/21/07

MATERIAL: N/A — FINISH: N/A — PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 144 BALL TFBGA, 7x7mm BODY, 0.50mm PITCH

DWG NUMBER: MO-144TFBGA-7x7B-0.5P — REV: D

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-195 — SHEET: 1 OF 1

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TSSOP

SMSC Legacy

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/07/04	S.K.ILIEV
B	REMOVED THE LOGO FROM THE TITLE BLOCK	9/25/07	S.K.ILIEV

TOP VIEW

END VIEW

3-D VIEW

SIDE VIEW

DETAIL "A"

RECOMMENDED PCB LAND PATTERN

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	–	1.10	–	OVERALL PKG HEIGHT
A1	0.05	–	0.15	–	STANDOFF
A2	0.75	0.85	0.95	–	BODY THICKNESS
D	SEE VARIATIONS			3	"X" BODY SIZE
E	4.65	4.90	5.15	–	LEAD SPAN
E1	2.80	3.00	3.20	3	"Y" BODY SIZE
L	0.40	0.60	0.80	–	LEAD FOOT LENGTH
b	SEE VARIATIONS			2,4	LEAD WIDTH
c	0.08	–	0.23	4	LEAD FOOT THICKNESS
e	SEE VARIATIONS			–	LEAD PITCH
0		–	0.10	–	COPLANARITY
ddd	SEE VARIATIONS			–	LEAD TRUE POSITION SPREAD

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSIONS "D" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS, FLASH OR INTERLEAD FLASH. MAXIMUM MOLD PROTRUSIONS, FLASH OR INTERLEAD FLASH IS 0.15 mm PER END OR SIDE. "D" AND "E1" ARE DETERMINED AT DATUM PLANE "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. DIMENSIONS "b" AND "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 mm FROM THE LEAD TIP.
5. DETAILS OF PIN 1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

VAR	D		e	ddd	b	
N	MIN	MAX	BSC	MAX	MIN	MAX
8	2.80	3.20	0.65	0.13	0.22	0.38
10	2.80	3.20	0.50	0.08	0.17	0.27

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
FINISH: -		
DRAWN	S.K.ILIEV	7/05/04
CHECKED	S.K.ILIEV	7/05/04
APPROVED	S.K.ILIEV	7/07/04

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE TSSOP FAMILY, 3.0 MM WIDE BODY

DWG NUMBER: MO-TSSOP-3.0mm-WIDE — REV: B

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-187 — SHEET: 1 OF 1

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TQFP

SMSC Legacy

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	1.60	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.15	–	STANDOFF
A2	1.35	1.40	1.45	–	BODY THICKNESS
D/E	15.80	–	16.20	–	"X"/"Y" SPAN
D1/E1	13.90	14.00	14.10	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			–	LEAD LENGTH
b	0.17	0.22	0.27	2	LEAD WIDTH
c	0.09	–	0.20		LEAD FOOT THICKNESS
e	0.50 BSC			–	LEAD PITCH
R1	0.08	–	–		LEAD SHOULDER RADIUS
R2	0.08	–	0.20		LEAD FOOT RADIUS
ccc	–	–	0.08	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	S.K.ILIEV	12/17/04
FINISH: -		
CHECKED	S.K.ILIEV	12/17/04
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	12/17/04

TITLE: PACKAGE OUTLINE
100 PIN TQFP-14x14x1.4mm BODY-0.5mm PITCH

DWG NUMBER: MO-100-TQFP-14x14x1.4 — REV: C

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MS-026 (D) — SHEET: 1 OF 1

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Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/20/04	S.K.ILIEV

TOP VIEW

DETAIL "A" (SCALE: 2/1)

SIDE VIEW

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	1.60	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.15	–	STANDOFF
A2	1.35	1.40	1.45	–	BODY THICKNESS
D/E	21.80	–	22.20	–	"X"/"Y" SPAN
D1/E1	19.80	20.00	20.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			–	LEAD LENGTH
b	0.13	0.18	0.23	2,6	LEAD WIDTH
c	0.09	–	0.20	6	LEAD FOOT THICKNESS
e	0.40 BSC			–	LEAD PITCH
ccc	–	–	0.08	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.035mm AT MAXIMUM MATERIAL CONDITION.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE. "D1" AND "E1" ARE MAXIMUM PLASTIC BODY SIZE DIMENSIONS INCLUDING MOLD MISMATCH.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
6. DIMENSIONS "b" & "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10mm AND 0.25 mm FROM THE LEAD TIP.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	5/4/04
CHECKED	S.K.ILIEV	7/20/04
APPROVED	S.K.ILIEV	7/19/04

MATERIAL: -
FINISH: -
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 176 PIN TQFP-20x20x1.4mm BODY-0.4mm PITCH
DWG NUMBER: MO-176-TQFP-20x20x1.4 — REV: A
SCALE: 1:1 — STD COMPLIANCE: JEDEC: MS-026 (D) — SHEET: 1 OF 1

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/26/01	S.K.ILIEV
B	Par tol, 3-D & note 6 added, note 4 changed	3/18/05	S.K.ILIEV
C	Removed logo in title block, added XTQFP package	9/25/07	S.K.ILIEV

TOP VIEW

BOTTOM VIEW
(XTQFP only)

SIDE VIEW

3-D VIEWS

DETAIL "A"

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.60	-	OVERALL PKG HEIGHT
A1	0.05	-	0.15	-	STANDOFF
A2	1.35	1.40	1.45	-	BODY THICKNESS
L	0.45	0.60	0.75	-	LEAD FOOT LENGTH
c	0.09	-	0.20	4	LEAD FOOT THICKNESS
ccc	SEE TABLE			-	COPLANARITY

VARIATIONS							
N	48-TQFP		208-TQFP		256-XTQFP		NOTE
SYM	MIN	MAX	MIN	MAX	MIN	MAX	
D/E	8.80	9.20	29.80	30.20	29.80	30.20	6
D1/E1	6.80	7.20	27.80	28.20	27.80	28.20	3
D2/E2	N/A		N/A		5.85	6.15	7
e	0.50 BSC		0.50 BSC		0.40 BSC		
b	0.17	0.27	0.17	0.27	0.13	0.23	2, 4

ccc (VARIATION)		
SITE	MODE	MAX
ASSEMBLY HOUSE	100% SCAN	0.07
	QA gate	0.0762
TEST HOUSE	100% & QA	0.08

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04mm AT MAXIMUM MATERIAL CONDITIONS. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED MOLD PROTRUSION IS 0.25 mm PER SIDE. "D1" AND "E1" ARE MAXIMUM PLASTIC BODY SIZE DIMENSIONS INCLUDING MOLD MISMATCH, AND ARE DETERMINED AT PLANE "H".
4. DIMENSIONS "b" AND "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 mm AND 0.25 mm FROM THE LEAD TIP.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
6. DIMENSIONS "D" AND "E" TO BE DETERMINED AT SEATING PLANE "C".
7. EXPOSED PAD SHALL BE COPLANAR WITH BOTTOM OF PACKAGE WITHIN 0.05 MM.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	S.K.ILIEV	4/20/01
FINISH: -		
CHECKED	S.K.ILIEV	4/23/01
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	4/26/01

TITLE: PACKAGE OUTLINE
TQFP, 1.4mm THICK, SQUARE FAMILY

DWG NUMBER	REV
AP-TQFP-1.4T-SQ	C

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MS-026	1 OF 1

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UFBGA

SMSC Legacy

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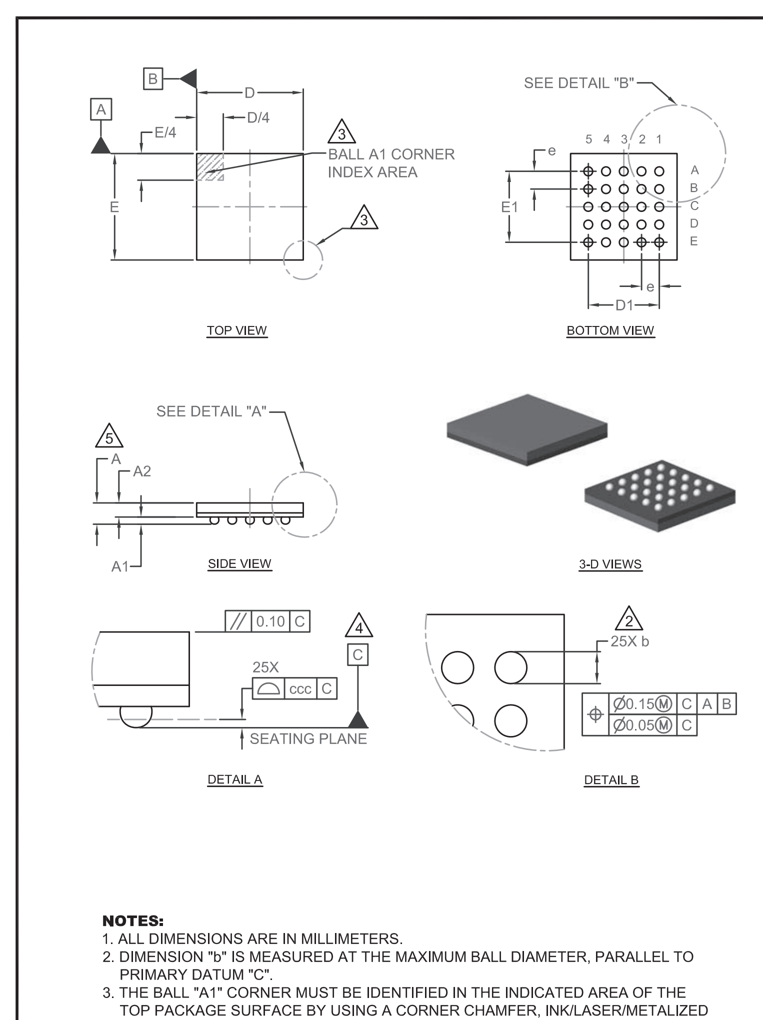
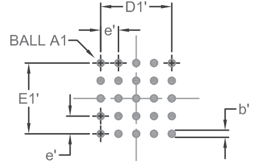
Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	11/7/07	S.K.ILIEV
B	INITIAL RELEASE	3/2/2008	SKI





PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	2.00	-
b'	0.20	-	0.25
e'	-	0.50	-

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	0.61	0.62	5	OVERALL PACKAGE HEIGHT
A1	0.18	0.23	-	-	STANDOFF
A2	0.40 REF			-	PKG BODY THICKNESS
D/E	2.90	3.00	3.10	-	X/Y BODY SIZE
D1/E1	2.00 BSC			-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
e	0.50 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL: X.X ±0.1, X.XX ±0.05, X.XXX ±0.025
ANGULAR: ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

		NAME	DATE
MATERIAL: N/A	DRAWN	S.K.ILIEV	11/7/07
FINISH: N/A	CHECKED	S.K.ILIEV	11/7/07
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.ILIEV	11/7/07

TITLE: PACKAGE OUTLINE
25 BALL UFBGA, 3x3mm BODY, 0.50mm PITCH

DWG NUMBER	REV
AP-25UFBGA-3x3B-0.5P	B

SCALE	STD COMPLIANCE	SHEET
1:1	MO-280	1 OF 1

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VFBGA

SMSC Legacy

REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	6/8/06	S.K.ILIEV
B	ADDED b1, Amin, Amax and A2max. Updated PCB dimensions accordingly.	April-2010	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.77	-	1.00	5	OVERALL PACKAGE HEIGHT
A1	0.15	-	0.29	-	STANDOFF
A2	0.65	-	0.71	-	PKG BODY THICKNESS
D/E	2.90	3.00	3.10	-	X/Y BODY SIZE
D1/E1	2.00 BSC			-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
b1	0.22	0.25	0.28	7	SOLDERABLE SURFACE
e	0.50 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

SECTION B-B

DETAIL A

DETAIL B

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. PARALLELISM ON THE TOP SURFACE APPLIES ONLY TO THE MINIMUM FLAT AREA SHOWN ON THE TOP VIEW.
7. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD).

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
D1'/E1'	2.00 BSC		
b'	0.25	0.25	0.28
e'	0.50 BSC		

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	-	6/8/06
CHECKED	S.K.ILIEV	6/8/06
APPROVED	S.K.ILIEV	6/8/06

MATERIAL: N/A

FINISH: N/A

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 25 BALL VFBGA, 3x3mm BODY, 0.50mm PITCH

DWG NUMBER: 25VFBGA-3x3B-0.5P | REV: B

SCALE: 1:1 | STD COMPLIANCE: - | SHEET: 1 OF 1

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REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	5/25/06	S.K.ILIEV

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

DETAIL A

DETAIL B

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.00	5	OVERALL PACKAGE HEIGHT
A1	0.15	-	-	-	STANDOFF
A2	0.65	-	-	-	PKG BODY THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D1/E1	3.00 BSC			-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
e	0.50 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAXIMUM RADIAL TRUE POSITION TOLERANCE OF EACH BALL IS ± 0.075mm AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	3.00	-
b'	0.20	-	0.25
e'	-	0.50	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

RECOMMENDED PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025 — ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: N/A — DRAWN	S.K.ILIEV	5/25/06
FINISH: N/A — CHECKED	S.K.ILIEV	5/25/06
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING — APPROVED	S.K.ILIEV	5/25/06

TITLE: PACKAGE OUTLINE 40 BALL VFBGA, 4x4mm BODY, 0.50mm PITCH

DWG NUMBER: MO-40VFBGA-4x4B-0.5P — REV: A

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MO-225 — SHEET: 1 OF 1

NOTES:

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WFBGA

SMSC Legacy

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	11/30/2010	S.K.ILIEV

TOP VIEW

BOTTOM VIEW

SIDE VIEW

3-D VIEWS

SECTION C-C

DETAIL A

DETAIL B

PRELIMINARY

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.60	0.70	0.80	5	OVERALL PACKAGE HEIGHT
A1	0.12	0.20	0.24	-	STANDOFF
A2	0.53 REF			-	PKG BODY THICKNESS
D/E	3.40	3.50	3.60	-	X/Y BODY SIZE
D1/E1	2.40 BSC			-	X/Y END BALLS DISTANCE
b	0.20	0.25	0.30	2	BALL DIAMETER
b1	0.19	0.22	0.25	6	SOLDERABLE SURFACE
e	0.40 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD).

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	2.40 BSC		
b'	0.22	0.22	0.25
e'	0.40 BSC		

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: N/A	DRAWN: -	11/9/10
FINISH: N/A	CHECKED: S.K.ILIEV	11/22/10
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	11/30/10

TITLE: PACKAGE OUTLINE
49 BALL WFBGA, 3.5x3.5mm BODY
0.40mm PITCH

DWG NUMBER: 49WFBGA-3.5x3.5B-0.4P; REV: A
SCALE: 1:1; STD COMPLIANCE: MO-298; SHEET: 1 OF 1

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VTQFP

SMSC Legacy

Legacy SMSC Packaging Outlines and Dimensions

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	1.20	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.15	–	STANDOFF
A2	0.95	–	1.05	–	BODY THICKNESS
D/E	15.80	–	16.20	–	"X"/"Y" SPAN
D1/E1	13.90	14.00	14.10	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			–	LEAD LENGTH
b	0.17	0.22	0.27	2	LEAD WIDTH
c	0.09	–	0.20		LEAD FOOT THICKNESS
e	0.50 BSC			–	LEAD PITCH
R1	0.08	–	–		LEAD SHOULDER RADIUS
R2	0.08	–	0.20		LEAD FOOT RADIUS
ccc	–	–	0.08	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: -		
DRAWN	S.K.ILIEV	12/17/04
FINISH: -		
CHECKED	S.K.ILIEV	12/17/04
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	12/17/04

TITLE: PACKAGE OUTLINE 100 VTQFP-14x14x1.0mm BODY-0.5mm PITCH

DWG NUMBER: MO-100-VTQFP-14x14x1.0 — REV: C

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MS-026 (D) — SHEET: 1 OF 1

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REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
C	DESCRIPTION OF CHANGES - IN FRONT PAGE OF MO SPEC	12/28/04	S.K.ILIEV

TOP VIEW

DETAIL "A"

SIDE VIEW

3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	1.20	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.15	–	STANDOFF
A2	0.95	–	1.05	–	BODY THICKNESS
D/E	15.80	–	16.20	–	"X"/"Y" SPAN
D1/E1	13.80	14.00	14.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1		1.00 REF		–	LEAD LENGTH
b	0.13	0.18	0.23	2	LEAD WIDTH
c	0.09	–	0.20		LEAD FOOT THICKNESS
e		0.40 BSC		–	LEAD PITCH
R1	0.08	–	–		LEAD SHOULDER RADIUS
R2	0.08	–	0.20		LEAD FOOT RADIUS
ccc	–	–	0.08	–	COPLANARITY

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.035mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: N/A		
DRAWN	S.K.ILIEV	12/17/04
FINISH: N/A		
CHECKED	S.K.ILIEV	12/17/04
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		
APPROVED	S.K.ILIEV	12/17/04

TITLE: PACKAGE OUTLINE 128 VTQFP-14x14x1.0mm BODY, 0.4mm PITCH

DWG NUMBER: MO-128-VTQFP-14x14x1.0 — REV: C

SCALE: 1:1 — STD COMPLIANCE: JEDEC: MS-026 — SHEET: 1 OF 1

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-

TOP VIEW

SIDE VIEW

3-D VIEW

DETAIL "A"

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	–	–	1.20	–	OVERALL PACKAGE HEIGHT
A1	0.05	–	0.15	–	STANDOFF
A2	0.95	–	1.05	–	BODY THICKNESS
D/E	21.80	–	22.20	–	"X"/"Y" SPAN
D1/E1	19.80	20.00	20.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			–	LEAD LENGTH
b	0.17	0.22	0.27	2	LEAD WIDTH
c	0.09	–	0.20		LEAD FOOT THICKNESS
e	0.50 BSC			–	LEAD PITCH
R1	0.08	–	–		LEAD SHOULDER RADIUS
R2	0.08	–	0.20		LEAD FOOT RADIUS
ccc	–	–	0.08	–	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1, X.XX ±0.05, X.XXX ±0.025; ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
DRAWN	S.K.ILIEV	2/16/05
CHECKED	S.K.ILIEV	2/16/05
APPROVED	S.K.ILIEV	2/16/05

MATERIAL: -
FINISH: -
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING

TITLE: PACKAGE OUTLINE 144 VTQFP-20x20x1.0mm BODY-0.5mm PITCH
DWG NUMBER: MO-144-VTQFP-20x20x1.0 REV: A
SCALE: 1:1 STD COMPLIANCE: JEDEC: MS-026 (D) SHEET: 1 OF 1

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XVTQFP

SMSC Legacy

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/14/07	S.K.ILIEV

D
D1
128
1
E1/4
D1/4
E1
E
e
128X b ⌖ ddd Ⓜ C 2

TOP VIEW

D2
E2
128
1
EXPOSED PAD

BOTTOM VIEW

3-D VIEWS

SEE DETAIL "A"
A2
A
C
SEATING PLANE
c
A1
ccc C

SIDE VIEW

0.25
0°-7°
GAUGE PLANE
L
(1.00)

DETAIL "A"

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.20	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.15	-	STANDOFF
A2	0.95	1.00	1.05	-	PLASTIC BODY THICKNESS
D/E	15.80	16.00	16.20	-	X/Y SPAN
D1/E1	13.80	14.00	14.20	3	X/Y PLASTIC BODY SIZE
D2/E2	4.85	5.00	5.15	4	X/Y EXPOSED PAD SIZE
L	0.45	0.60	0.75	-	LEAD FOOT LENGTH
b	0.13	0.18	0.23	2	LEAD WIDTH
c	0.09	-	0.20	2	LEAD FOOT THICKNESS
e	0.40 BSC			-	LEAD PITCH
ddd	0	-	0.07	-	TRUE POSITION SPREAD
ccc	-	-	0.08	-	COPLANARITY

15.2
0.4
1.6
0.25
FULL RADIUS OPTIONAL
5
13.6
16.8
12.4
5

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK, SHOULD BE AS SHOWN (5.0X5.0MM) FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. A CLEARANCE OF AT LEAST 0.25MM SHOULD BE DESIGNED BETWEEN THE CENTER PAD AND THE INNER EDGES OF THE LEAD PATTERNS.
4. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF VIAS IS INCORPORATED IN THE CENTER LAND PATTERN.
5. THE VIAS SHOULD BE AT 1.2MM GRID WITH 0.30 TO 0.33MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
6. STENCIL THICKNESS SHOULD BE CONSIDERED BASED ON PACKAGE PITCH, COPLANARITY LIMIT AND STAND-OFF. IT IS RECOMMENDED TO USE 0.127 TO 0.2MM THICK STENCIL.
7. THE APERTURE OPENING OF THE CENTER LAND PATTERN SHOULD BE SUBDIVIDED INTO AN ARRAY OF SMALLER OPENINGS, AND PLACED BETWEEN THE VIAS.

PCB LAND PATTERN AND APPLICATION NOTES

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS b & c APPLIES TO THE FLAT SECTION OF THE LEAD FOOT BETWEEN 0.10 AND 0.25 mm FROM THE LEAD TIP. THE BASE METAL IS EXPOSED AT THE LEAD TIP.
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE. D1 AND E1 ARE MAXIMUM PLASTIC BODY SIZE DIMENSIONS INCLUDING MOLD MISMATCH.
4. DIMENSIONS D2 AND E2 REPRESENT THE SIZE OF THE EXPOSED PAD, AND IT SHALL BE COPLANAR WITH BOTTOM OF PACKAGE WITHIN 0.05 mm.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE:
DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025
ANGULAR ±1°
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging

	NAME	DATE
MATERIAL: N/A	DRAWN: S.K.ILIEV	4/12/07
FINISH: N/A	CHECKED: S.K.ILIEV	4/12/07
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED: S.K.ILIEV	4/14/07

TITLE: PACKAGE OUTLINE
128 XVTQFP-14x14x1.0mm BODY, EXPOSED PAD

DWG NUMBER: 128-XVTQFP-14x14x1.0-ePAD | REV: A
SCALE: 1:1 | STD COMPLIANCE: JEDEC: MS-026 | SHEET: 1 OF 1

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Legacy Supertex Package Drawings & Specifications

NOTES:

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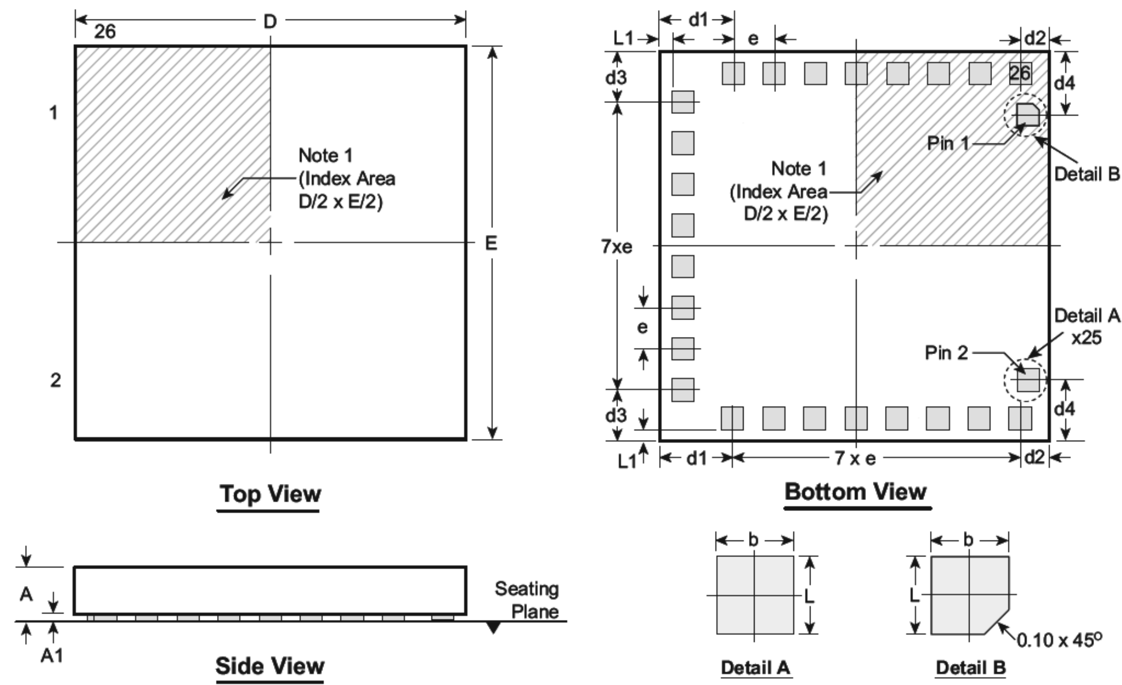
BCC

Supertex Legacy

26-Lead BCC Package Outline (B1)

6.00x6.00mm body, 0.80mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	b	D	d1	d2	d3	d4	E	e	L	L1
Dimension (mm)	MIN	0.65	0.050	0.25	5.85	1.050 REF	0.400 REF	0.725 REF	0.925 REF	5.85	0.65 BSC	0.25	0.10 REF
	NOM	-	0.075	0.35	6.00					6.00		0.35	
	MAX	0.80	0.100	0.45	6.15					6.15		0.45	

Drawings not to scale.

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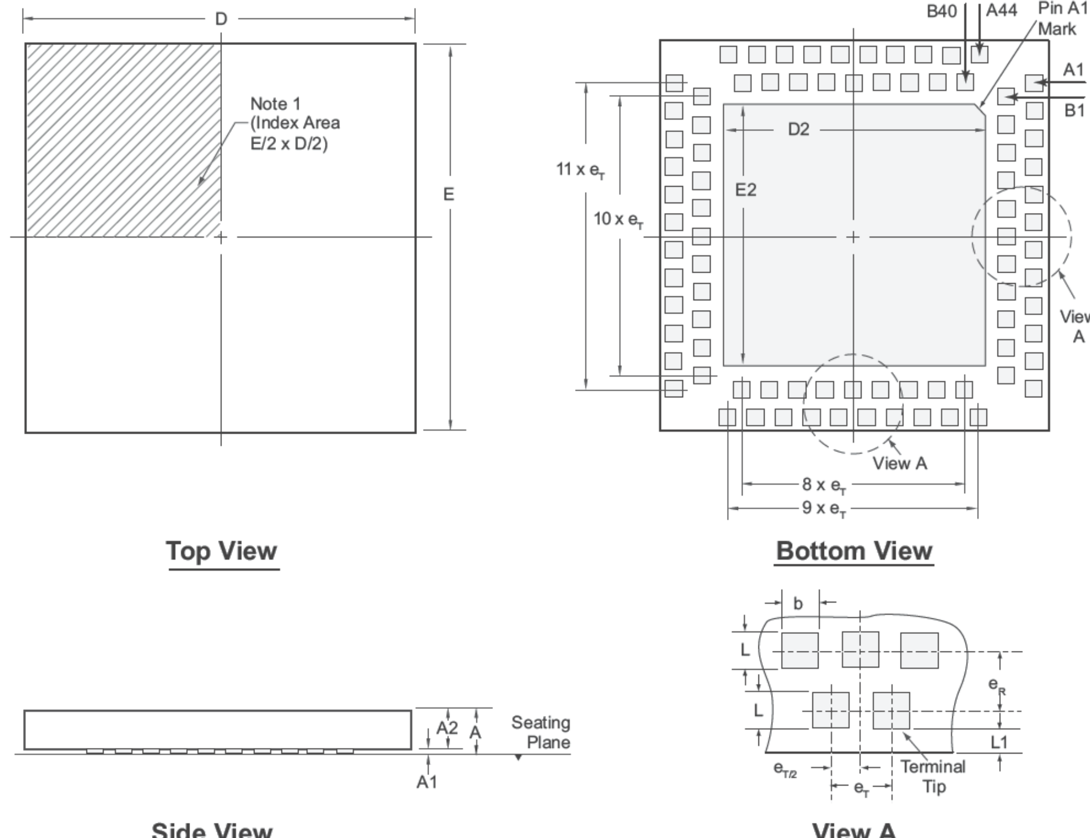
84-Lead BCC+ Package Outline (B2)

7.00x7.00mm body, 0.80mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	D2	E	E2	e_R	e_T	L	L1
Dimension (mm)	MIN	0.65	0.05	0.60	0.20	6.85	4.55	6.85	4.55	0.50 BSC	0.50 BSC	0.20	0.10 REF
	NOM	-	-	0.65	0.30	7.00	4.70	7.00	4.70			0.30	
	MAX	0.80	0.10	0.70	0.40	7.15	4.85	7.15	4.85			0.40	

Drawings not to scale.

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NOTES:

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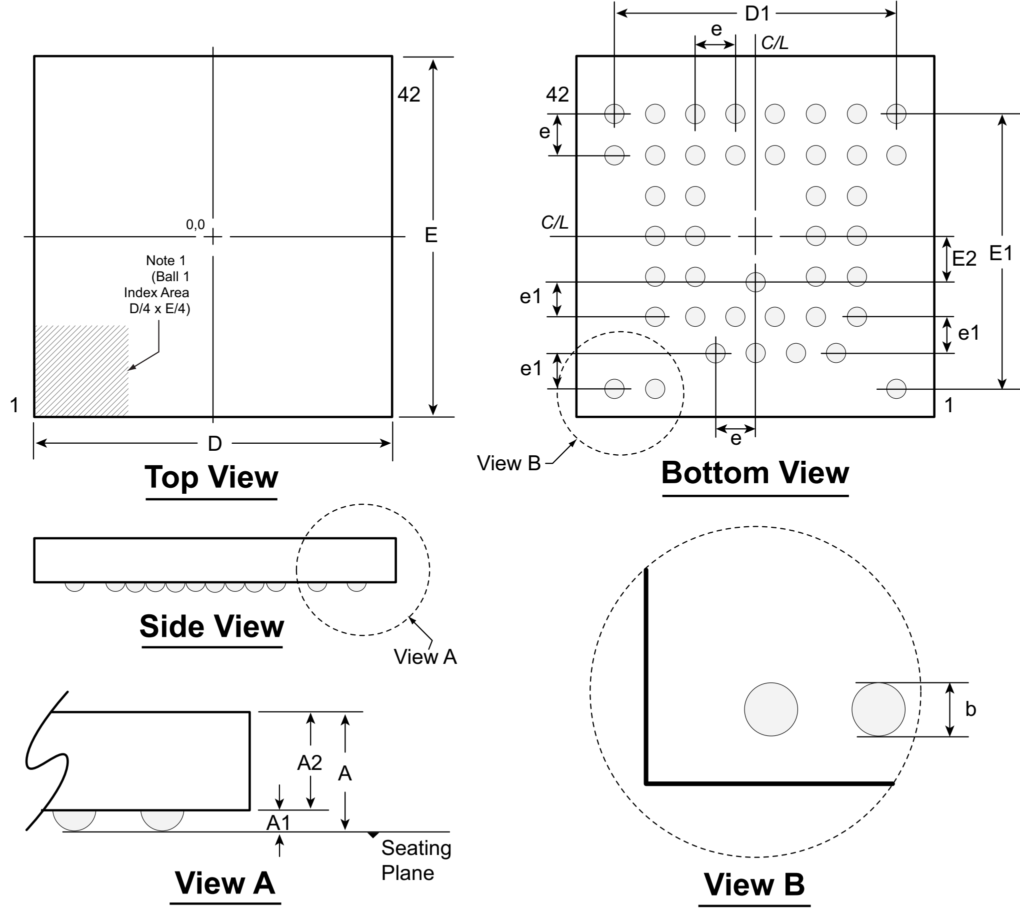
BD

Supertex Legacy

42-Ball Bumped Die Package Outline (BD)

5.29x5.30mm body, 1.02mm height (max), 0.52 / 0.60mm pitch



Notes: For the most current package drawings, See the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *Ball 1 identifier must be located in the index area indicated. Ball 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	D1	E	E1	E2	e	e1
Dimension (mm)	MIN	0.91	0.21	0.70	0.29	5.19	4.20 BSC	5.20	4.04 BSC	0.68 BSC	0.60 BSC	0.52 BSC
	NOM	0.965	0.24	0.725	0.32	5.29		5.30				
	MAX	1.02	0.27	0.75	0.35	5.39		5.40				

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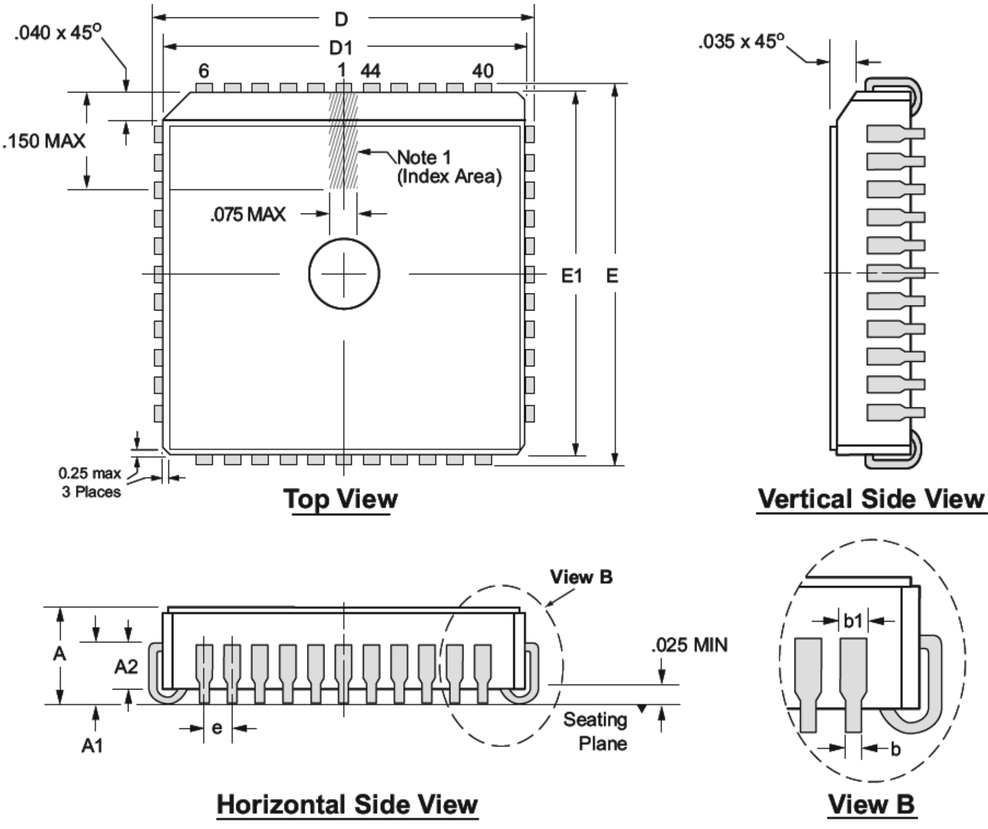
Cerpac

Supertex Legacy

44-Lead Quad Cerpac Package Outline (DJ)

.650x.650in body, .190in height (max), .050in pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	b1	D	D1	E	E1	e
Dimension (inches)	MIN	.155	.090	.060 REF	.017	.026	.685	.630	.685	.630	.050 BSC
	NOM	.172	.100		.019	.029	.690	.650	.690	.650	
	MAX	.190	.120		.021	.032	.695	.665	.695	.665	

JEDEC Registration MO-087, Variation AB, Issue B, August, 1991.

Drawings not to scale.

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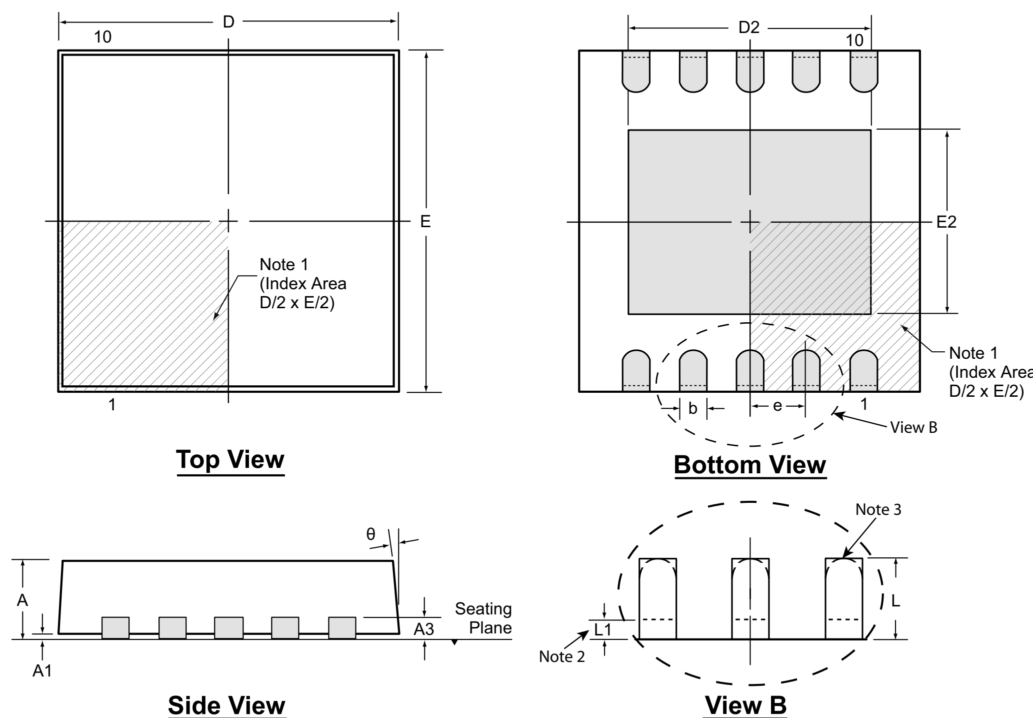
DFN

Supertex Legacy

10-Lead DFN Package Outline (K7)

3.00x3.00mm body, 0.80mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.70	0.00	0.20 REF	0.18	2.85*	2.20	2.85*	1.40	0.50 BSC	0.30	0.00*	0°
	NOM	0.75	0.02		0.25	3.00	-	3.00	-		0.40	-	-
	MAX	0.80	0.05		0.30	3.15*	2.70	3.15*	1.75		0.50	0.15	14°

JEDEC Registration MO-229, Variation WEED-5, Issue C, Aug. 2003.
** This dimension is not specified in the JEDEC drawing.*
Drawings not to scale.

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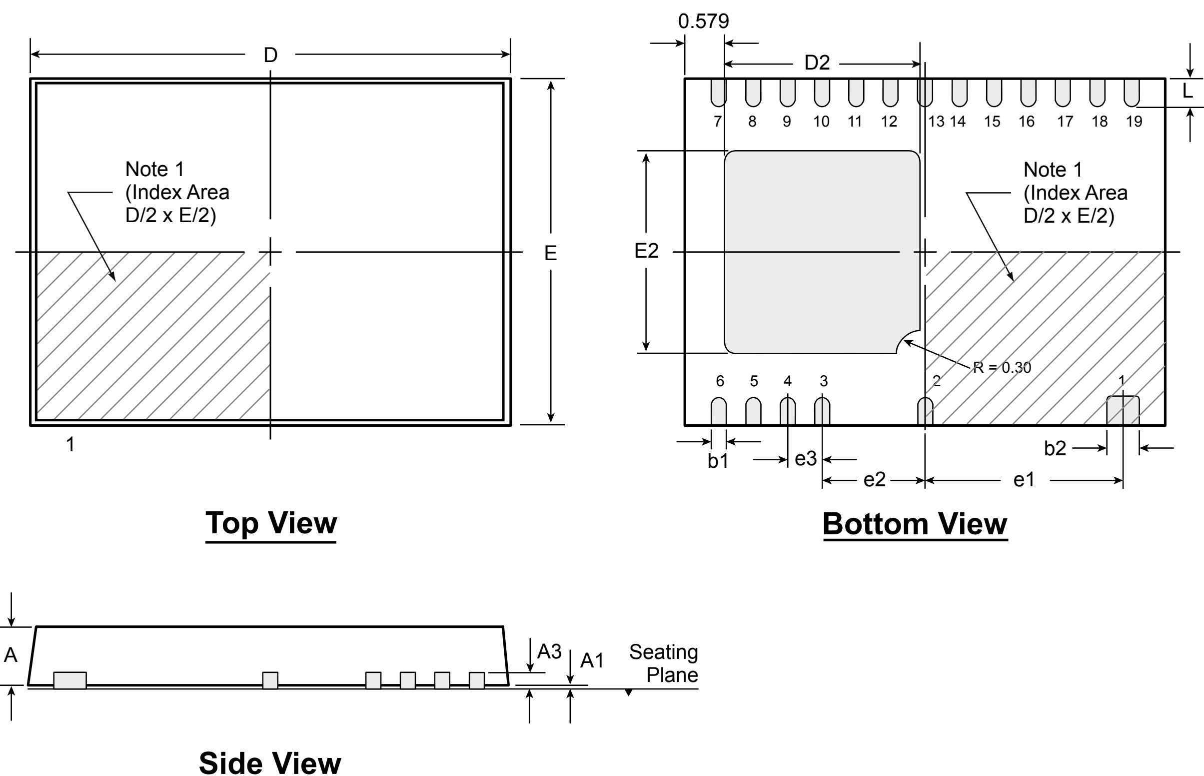
19-Lead DFN Package Outline (K7)

7.00x5.00mm body, 0.80mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b1	b2	D	D2	E	E2	e1	e2	e3	L
Dimension (mm)	MIN	0.70	0.00	0.20 REF	0.20	0.42	7.00 BSC	2.692	5.00 BSC	2.802	2.875 BSC	1.50 BSC	0.50 BSC	0.30
	NOM	0.75	0.02		0.25	0.47		2.842		2.952				0.40
	MAX	0.80	0.05		0.30	0.52		2.942		3.052				0.50

Drawings not to scale.

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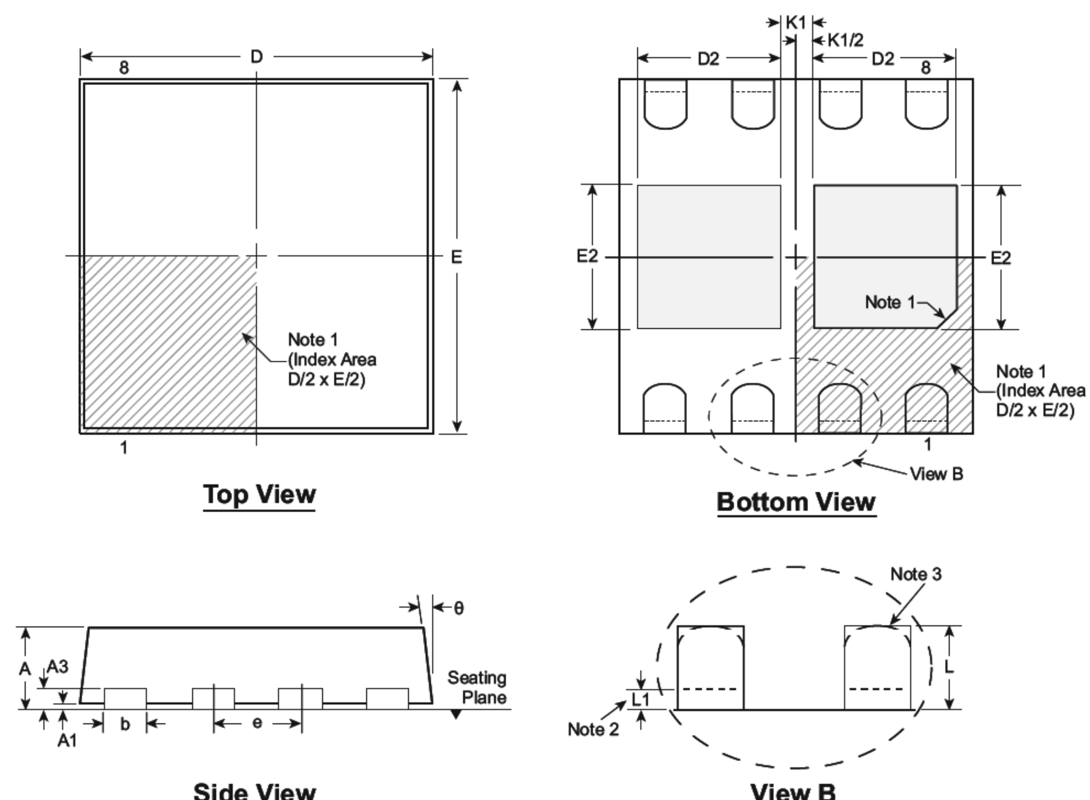
8-Lead DFN Package Outline (K6)

4.00x4.00mm body, 1.00mm height (max), 1.00mm pitch (dual pad)



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	K1	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.25	3.90	1.35	3.90	1.35	1.00 BSC	0.50 REF	0.40	0.00	0°
	NOM	0.90	-		0.30	4.00	1.45	4.00	1.45			0.50	-	-
	MAX	1.00	0.05		0.35	4.10	1.55	4.10	1.55			0.60	0.15	14°

Drawings not to scale

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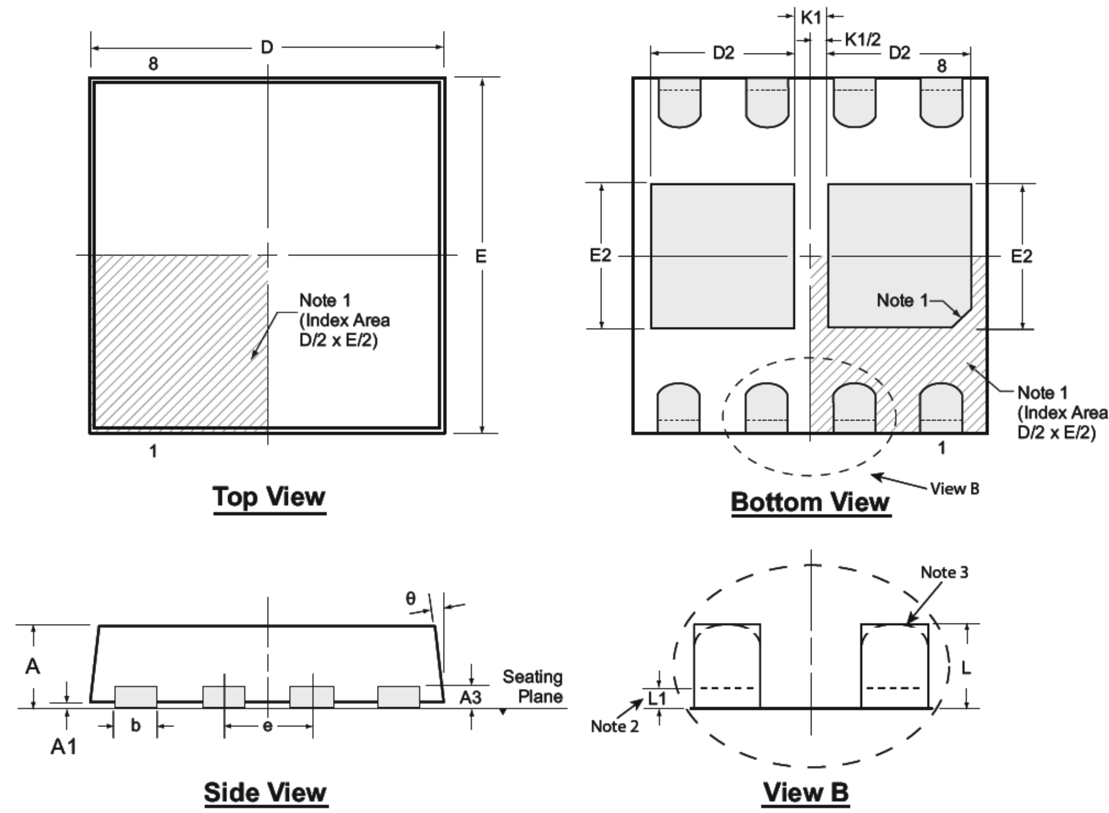
8-Lead DFN Package Outline (K6)

5.00x5.00mm body, 0.90mm height (max), 1.27mm pitch (dual pad)



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

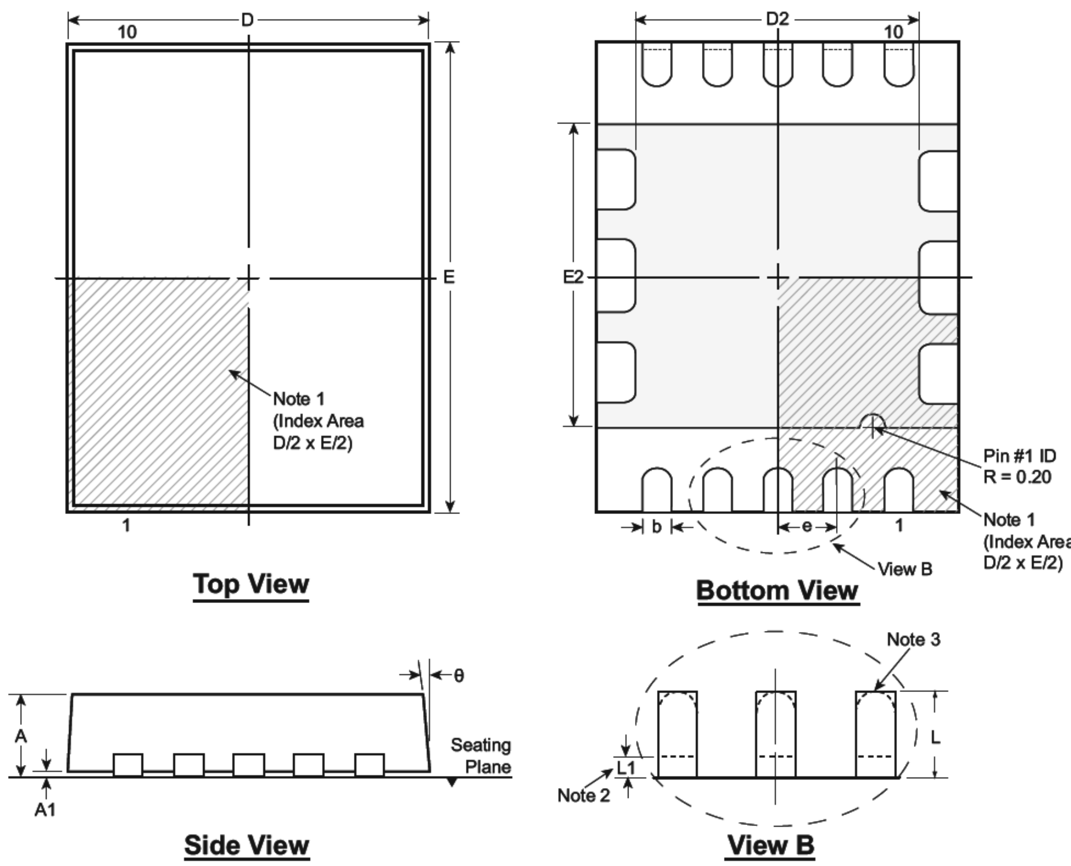
1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	K1	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.35	4.90	1.93	4.90	1.90	1.27 BSC	0.40 REF	0.40	0.00	0°
	NOM	0.85	-		0.40	5.00	2.03	5.00	2.00			0.50	-	-
	MAX	0.90	0.05		0.45	5.10	2.13	5.10	2.10			0.60	0.15	14°

Drawings not to scale

10-Lead DFN Package Outline (K6)

3.00x4.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.18	2.95	2.20	3.95	2.50	0.50 BSC	0.30	0.00	0°
	NOM	0.90	0.02	0.25	3.00	2.35	4.00	2.65		0.40	-	-
	MAX	1.00	0.05	0.30	3.05	2.45	4.05	2.75		0.50	0.15	14°

Drawings not to scale.

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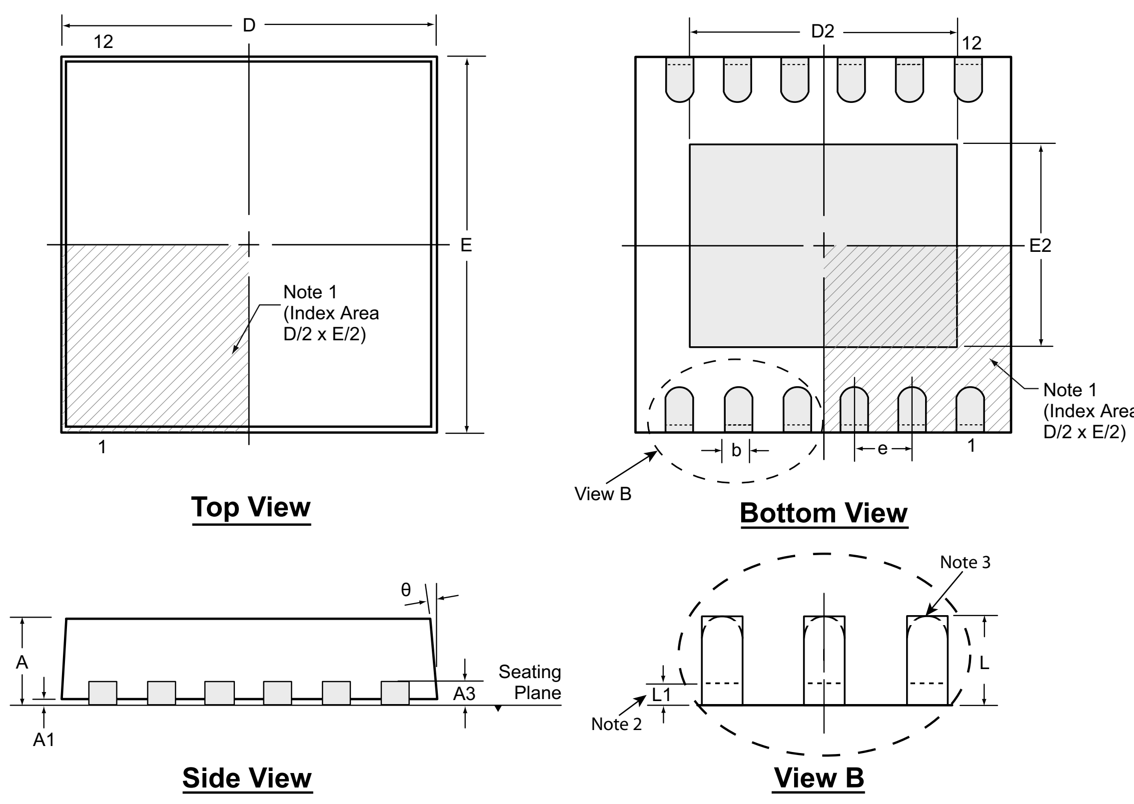
12-Lead DFN Package Outline (K6)

4.00x4.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.18	3.85	3.19	3.85	2.29	0.50 BSC	0.30	0.00	0°
	NOM	0.90	0.02		0.25	4.00	3.34	4.00	2.44		0.40	-	-
	MAX	1.00	0.05		0.30	4.15	3.44	4.15	2.54		0.50	0.15	14°

Drawings not to scale.

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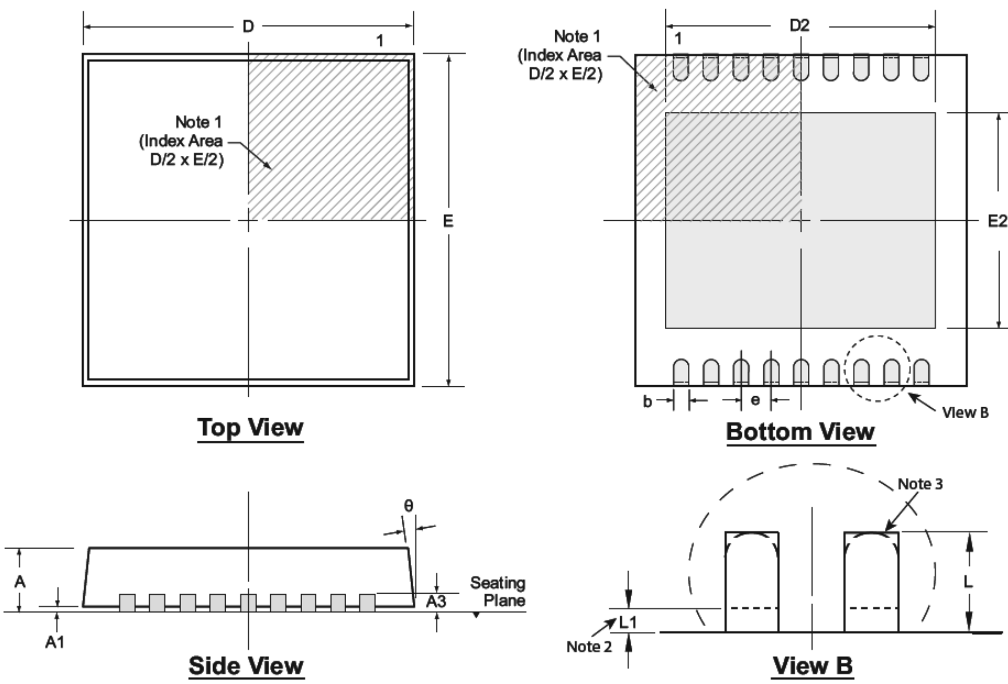
18-Lead DFN Package Outline (K6)

5.00x5.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.18	4.85*	4.20†	4.85*	3.50†	0.50 BSC	0.30†	0.00*	0°
	NOM	0.90	0.02		0.25	5.00	4.35†	5.00	3.65†		0.40†	-	-
	MAX	1.00	0.05		0.30	5.15*	4.45†	5.15*	3.75†		0.50†	0.15	14°

JEDEC Registration MO-229, Variation VJJD-2, Issue C, Aug 2003.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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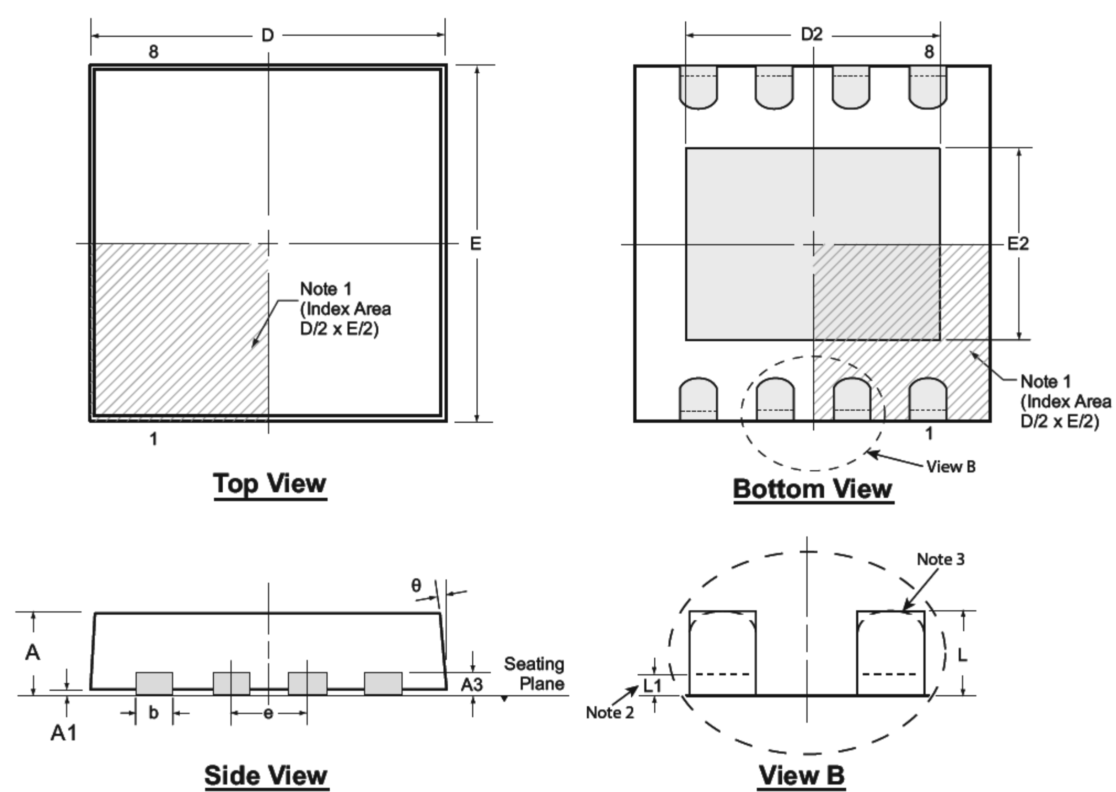
8-Lead DFN Package Outline (K7)

3.00x3.00mm body, 0.80mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.70	0.00	0.20 REF	0.25	2.85*	1.60	2.85*	1.35	0.65 BSC	0.30	0.00*	0°
	NOM	0.75	0.02		0.30	3.00	-	3.00	-		0.40	-	-
	MAX	0.80	0.05		0.35	3.15*	2.50	3.15*	1.75		0.50	0.15	14°

JEDEC Registration MO-229, Variation WEEC-2, Issue C, Aug. 2003.
** This dimension is not specified in the JEDEC drawing.*
Drawings not to scale.

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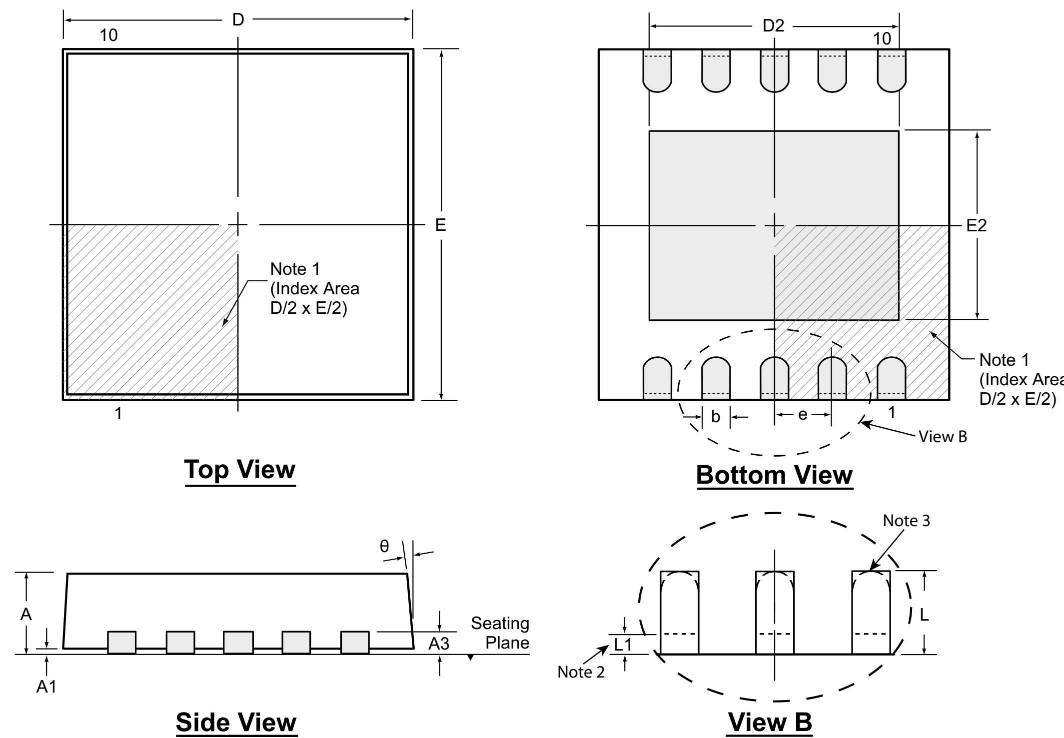
10-Lead DFN Package Outline (K7)

3.00x3.00mm body, 0.80mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.70	0.00	0.20 REF	0.18	2.85*	2.20	2.85*	1.40	0.50 BSC	0.30	0.00*	0°
	NOM	0.75	0.02		0.25	3.00	-	3.00	-		0.40	-	-
	MAX	0.80	0.05		0.30	3.15*	2.70	3.15*	1.75		0.50	0.15	14°

JEDEC Registration MO-229, Variation WEED-5, Issue C, Aug. 2003.
** This dimension is not specified in the JEDEC drawing.*

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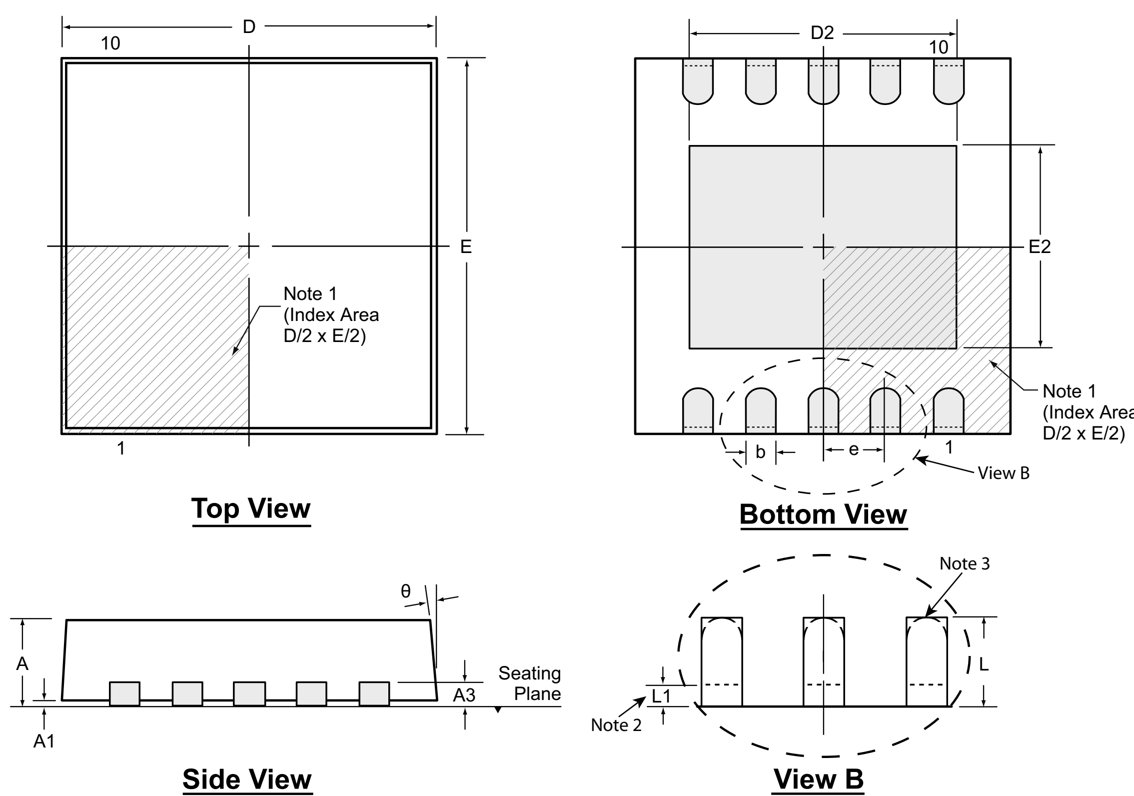
10-Lead DFN Package Outline (K7)

4.00x4.00mm body, 0.80mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.70	0.00	0.20 REF	0.25	3.85*	2.80	3.85*	2.30	0.65 BSC	0.30	0.00*	0°
	NOM	0.75	0.02		0.30	4.00	-	4.00	-		0.40	-	-
	MAX	0.80	0.05		0.35	4.15*	3.50	4.15*	2.80		0.50	0.15	14°

JEDEC Registration MO-229, Variation WGGC, Issue C, Aug. 2003.
** This dimension is not specified in the JEDEC drawing.*
Drawings not to scale.

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NOTES:

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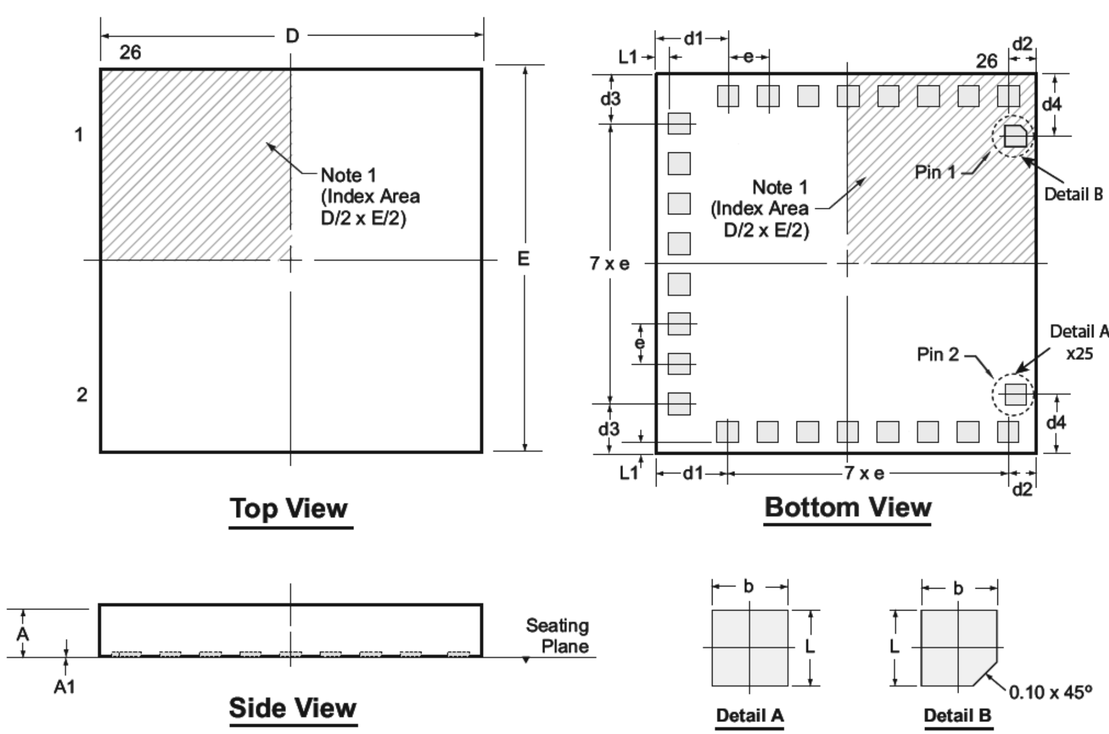
LLGA

Supertex Legacy

26-Lead LLGA Package Outline (G1)

6.00x6.00mm body, 0.60mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	b	D	d1	d2	d3	d4	E	e	L	L1
Dimension (mm)	MIN	0.50	0.00	0.25	5.90	1.050 REF	0.400 REF	0.725 REF	0.925 REF	5.90	0.65 BSC	0.25	0.10 REF
	NOM	0.55	-	0.35	6.00					6.00		0.35	
	MAX	0.60	0.05	0.45	6.10					6.10		0.45	

Drawings not to scale.

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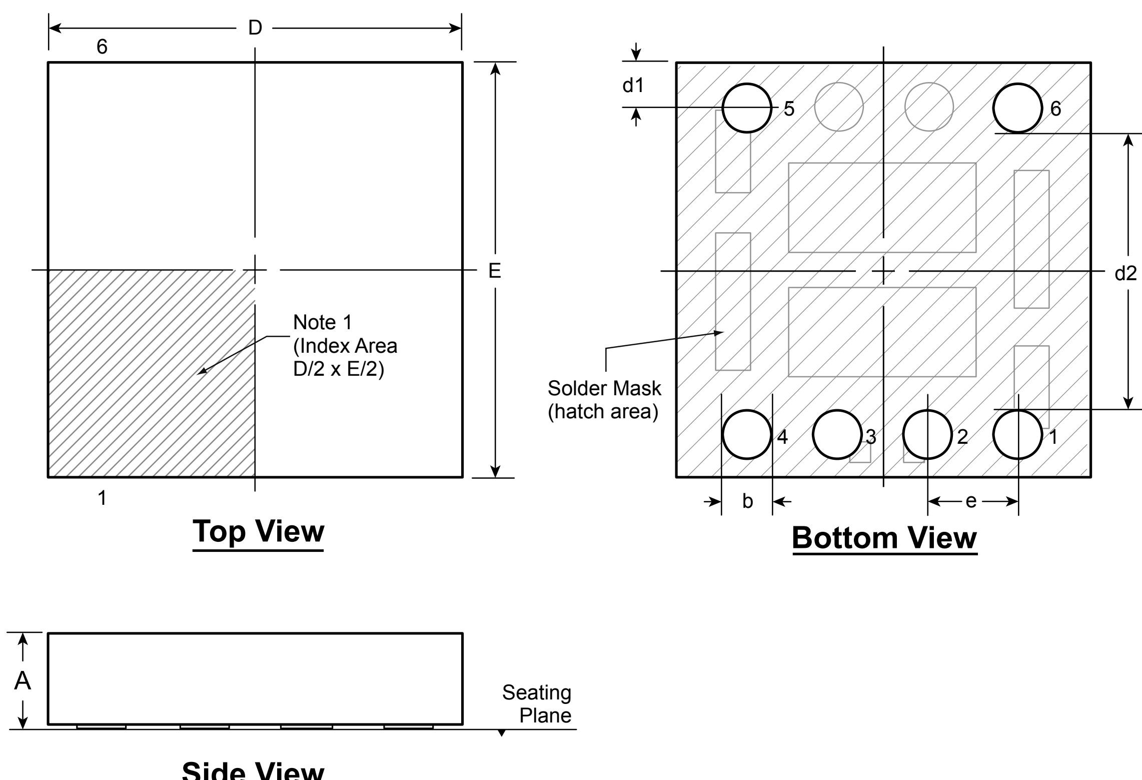
LFGA

Supertex Legacy

6-Lead LFGA Package Outline (LA)

3.00x3.00mm body, 0.85mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	b	D	E	d1	d2	e
Dimension (mm)	MIN	0.75	0.30	2.925	2.925	0.225	2.00 BSC	0.65 BSC
	NOM	0.80	0.35	3.000	3.000	0.325		
	MAX	0.85	0.40	3.075	3.075	0.425		

Drawings not to scale

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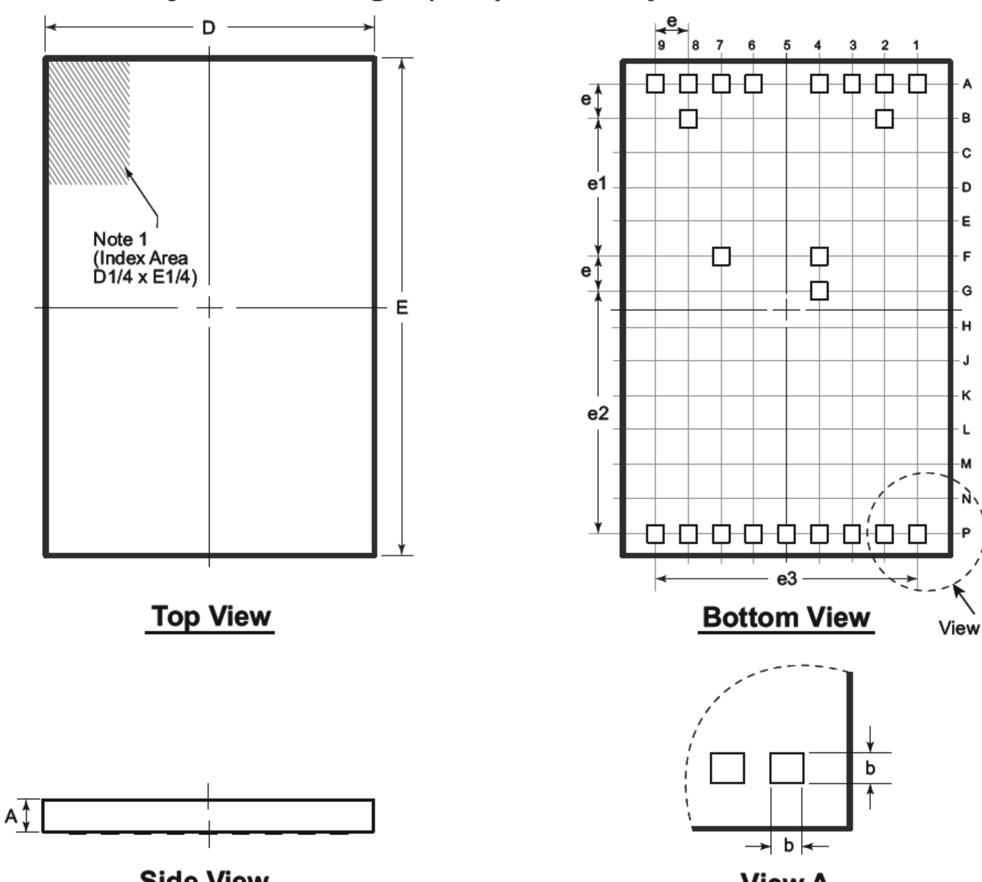
22-Lead LFGA Package Outline (LA)

5.00x7.00mm body, 0.85mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	b	D	E	e	e1	e2	e3
Dimension (mm)	MIN	0.75	0.20	4.925	6.925	0.50 BSC	2.00 BSC	3.50 BSC	4.00 BSC
	NOM	0.80	0.25	5.000	7.000				
	MAX	0.85	0.30	5.075	7.075				

Drawings not to scale.

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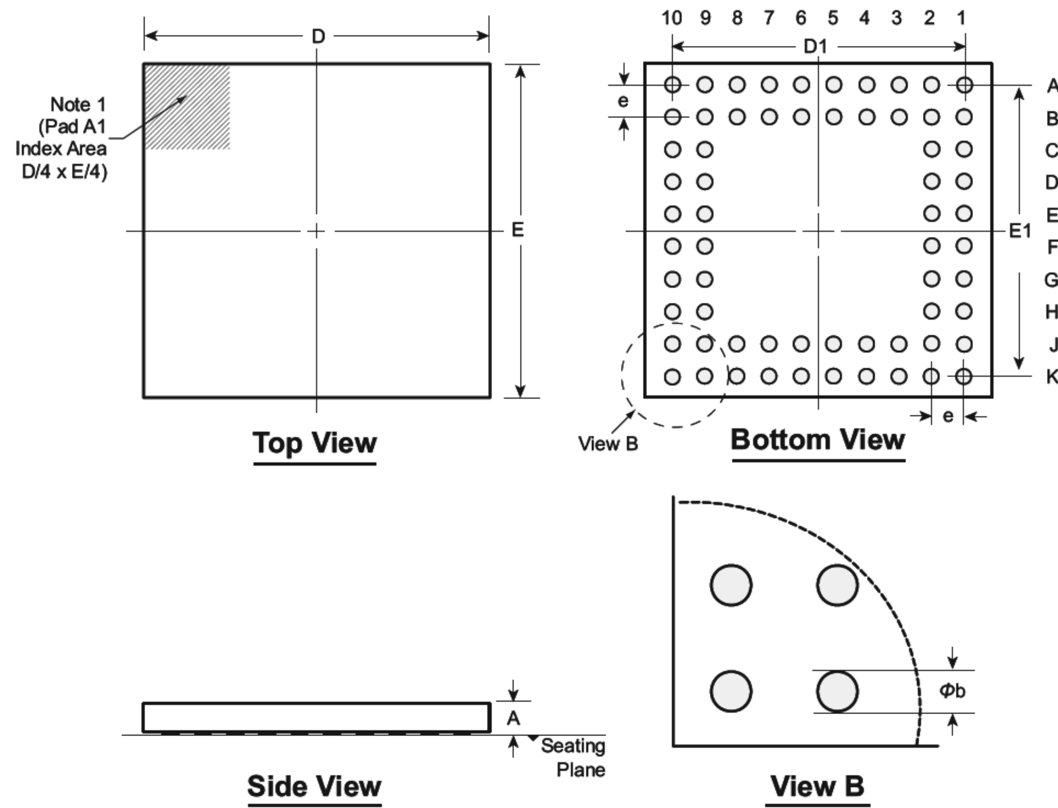
64-Pad LFGA Package Outline (LA)

7.00x7.00mm body, 0.85mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *Pad A1 identifier must be located in the index area indicated. Pad A1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	b	D	D1	E	E1	e
Dimension (mm)	MIN	0.75	0.25	6.925	5.85 BSC	6.925	5.85 BSC	0.65 BSC
	NOM	0.80	0.30	7.000		7.000		
	MAX	0.85	0.35	7.075		7.075		

Drawings not to scale.

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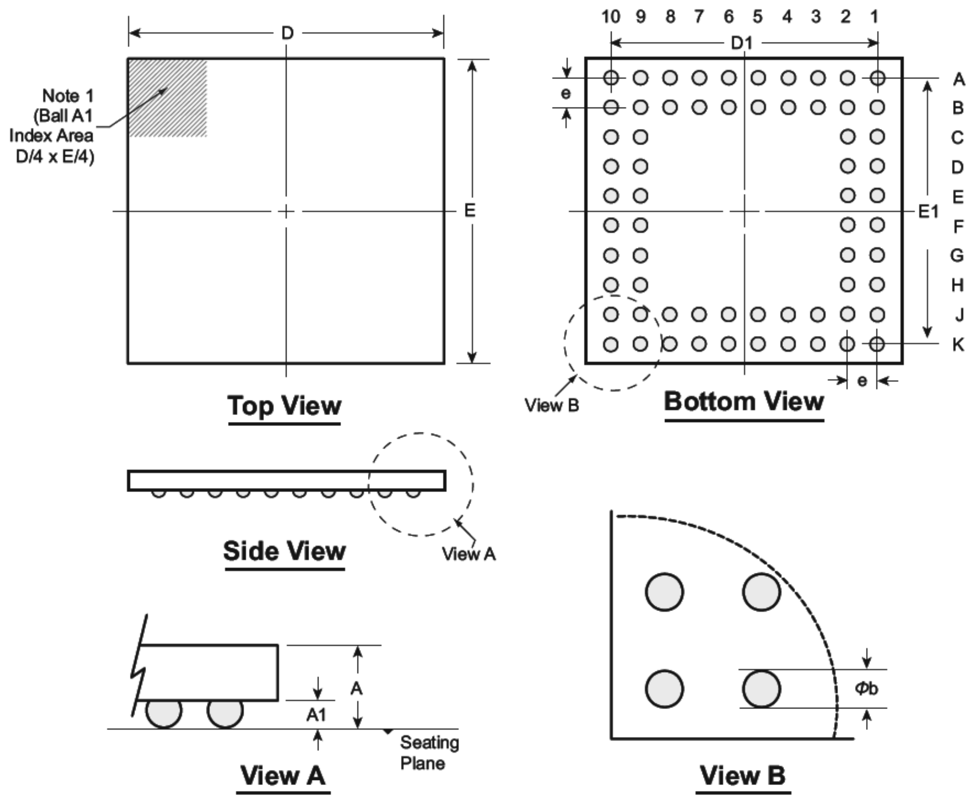
64-Ball LFGA Package Outline (LB)

7.00x7.00mm body, 1.00mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *Ball A1 identifier must be located in the index area indicated. Ball A1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	b	D	D1	E	E1	e
Dimension (mm)	MIN	0.90	0.10	0.25	6.925	5.85 BSC	6.925	5.85 BSC	0.65 BSC
	NOM	0.95	0.15	0.30	7.000		7.000		
	MAX	1.00	0.20	0.35	7.075		7.075		

Drawings not to scale.

NOTES:

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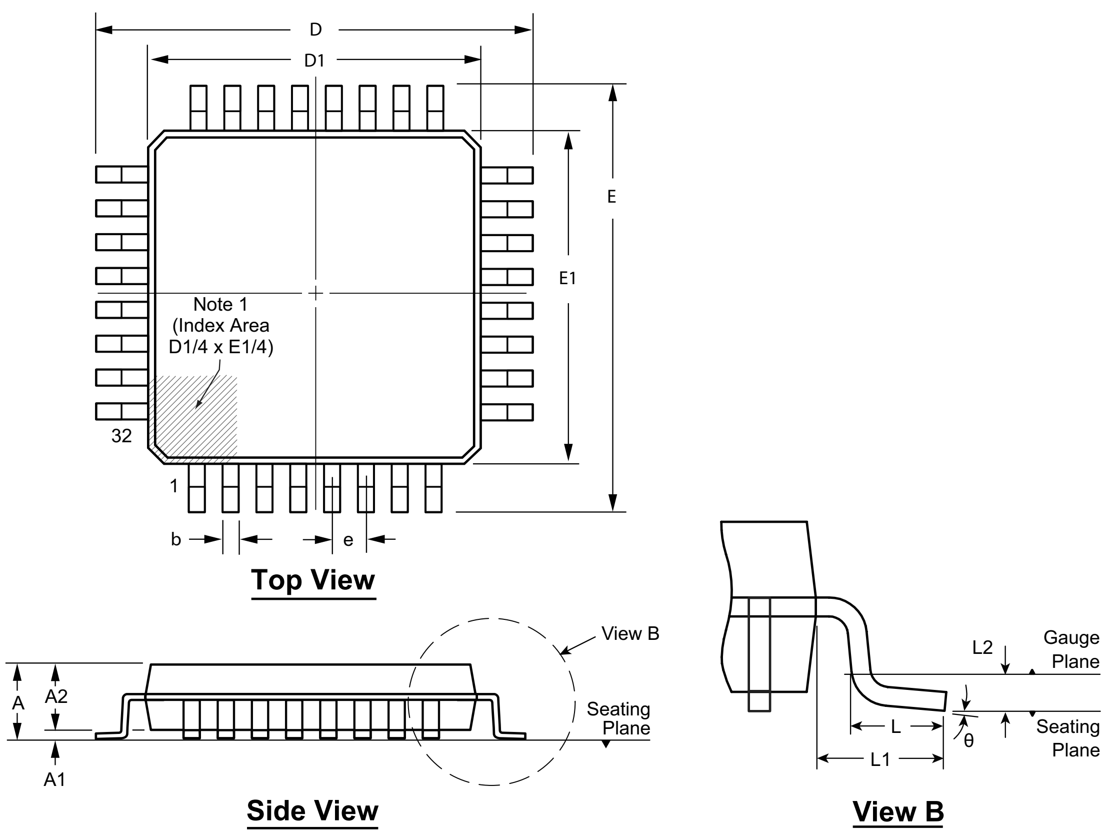
LQFP

Supertex Legacy

32-Lead LQFP Package Outline (FG)

7.00x7.00mm body, 1.60mm height (max), 0.80mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	D1	E	E1	e	L	L1	L2	θ
Dimension (mm)	MIN	1.40*	0.05	1.35	0.30	8.80*	6.80*	8.80*	6.80*	0.80 BSC	0.45	1.00 REF	0.25 BSC	0°
	NOM	-	-	1.40	0.37	9.00	7.00	9.00	7.00		0.60			3.5°
	MAX	1.60	0.15	1.45	0.45	9.20*	7.20*	9.20*	7.20*		0.75			7°

JEDEC Registration MS-026, Variation BBA, Issue D, Jan. 2001.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

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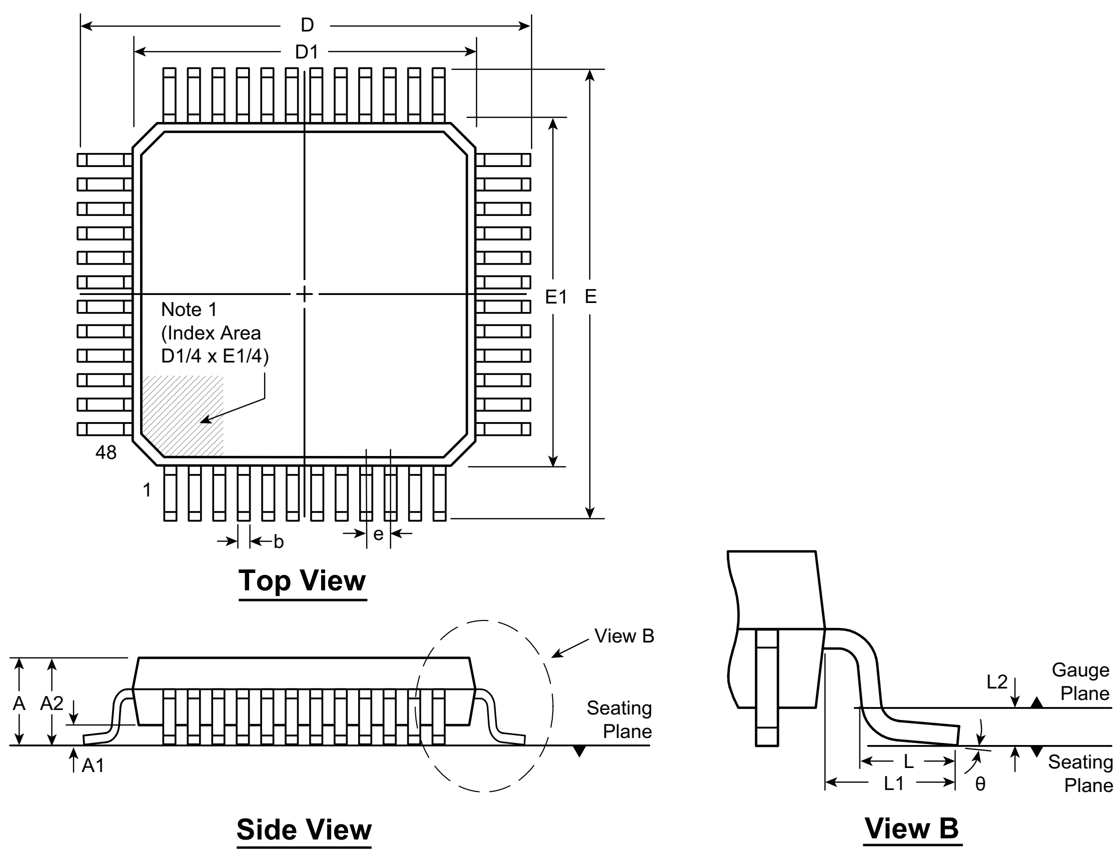
48-Lead LQFP Package Outline (FG)

7.00x7.00mm body, 1.60mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.

Symbol		A	A1	A2	b	D	D1	E	E1	e	L	L1	L2	θ
Dimension (mm)	MIN	1.40*	0.05	1.35	0.17	8.80*	6.80*	8.80*	6.80*	0.50 BSC	0.45	1.00 REF	0.25 BSC	0°
	NOM	-	-	1.40	0.22	9.00	7.00	9.00	7.00		0.60			3.5°
	MAX	1.60	0.15	1.45	0.27	9.20*	7.20*	9.20*	7.20*		0.75			7°

JEDEC Registration MS-026, Variation BBC, Issue D, Jan. 2001.
** This dimension is not specified in the JEDEC drawing.*

Drawings are not to scale.

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NOTES:

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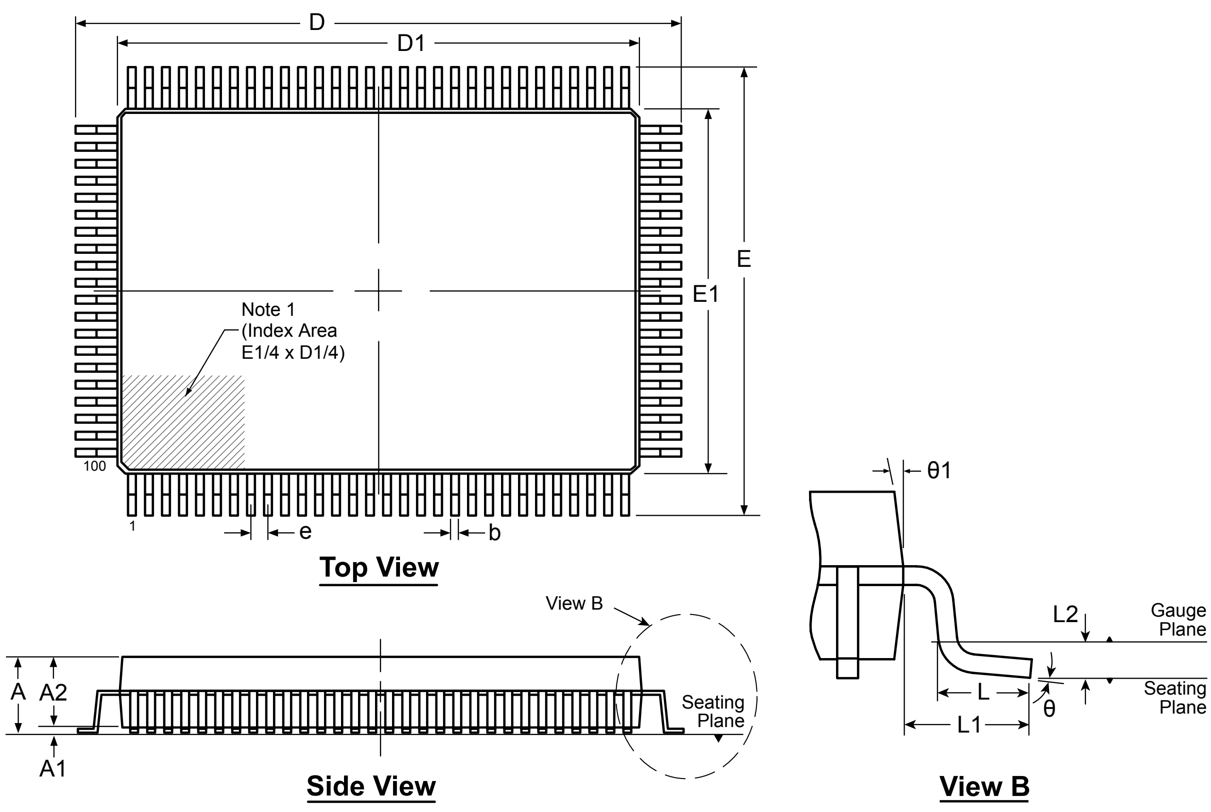
MQFP

Supertex Legacy

100-Lead MQFP Package Outline (FG)

20.00x14.00mm body, 3.15mm height (max), 0.65mm pitch, 3.20mm footprint



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	D1	E	E1	e	L	L1	L2	θ	θ1
Dimension (mm)	MIN	2.50*	0.00	2.50	0.22	22.95*	19.80*	16.95*	13.80*	0.65 BSC	0.73	1.60 REF	0.25 BSC	0°	5°
	NOM	-	-	2.70	-	23.20	20.00	17.20	14.00		0.88			-	-
	MAX	3.15	0.25	2.90	0.40	23.45*	20.20*	17.45*	14.20*		1.03			7°	16°

JEDEC Registration MS-022, Variation GC-2, Issue B, Dec. 1996.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

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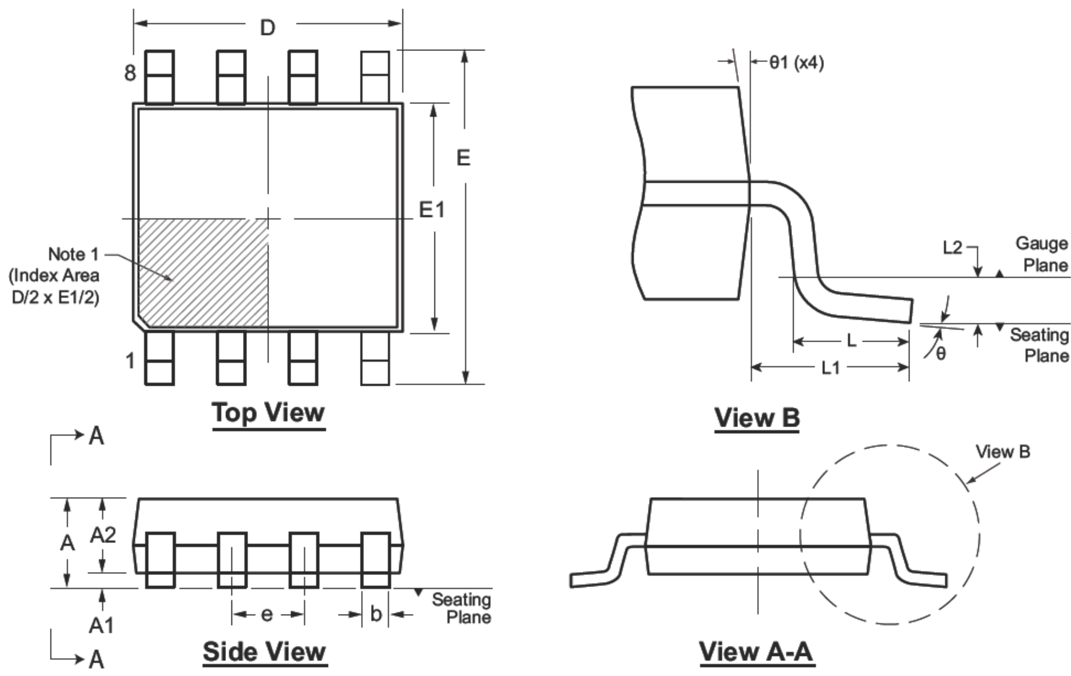
MSOP

Supertex Legacy

8-Lead MSOP Package Outline (MG)

3.00x3.00mm body, 1.10mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	L	L1	L2	θ	θ1
Dimension (mm)	MIN	0.75*	0.00	0.75	0.22	2.80*	4.65*	2.80*	0.65 BSC	0.40	0.95 REF	0.25 BSC	0°	5°
	NOM	-	-	0.85	-	3.00	4.90	3.00		0.60			-	-
	MAX	1.10	0.15	0.95	0.38	3.20*	5.15*	3.20*		0.80			8°	15°

JEDEC Registration MO-187, Variation AA, Issue E, Dec. 2004.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

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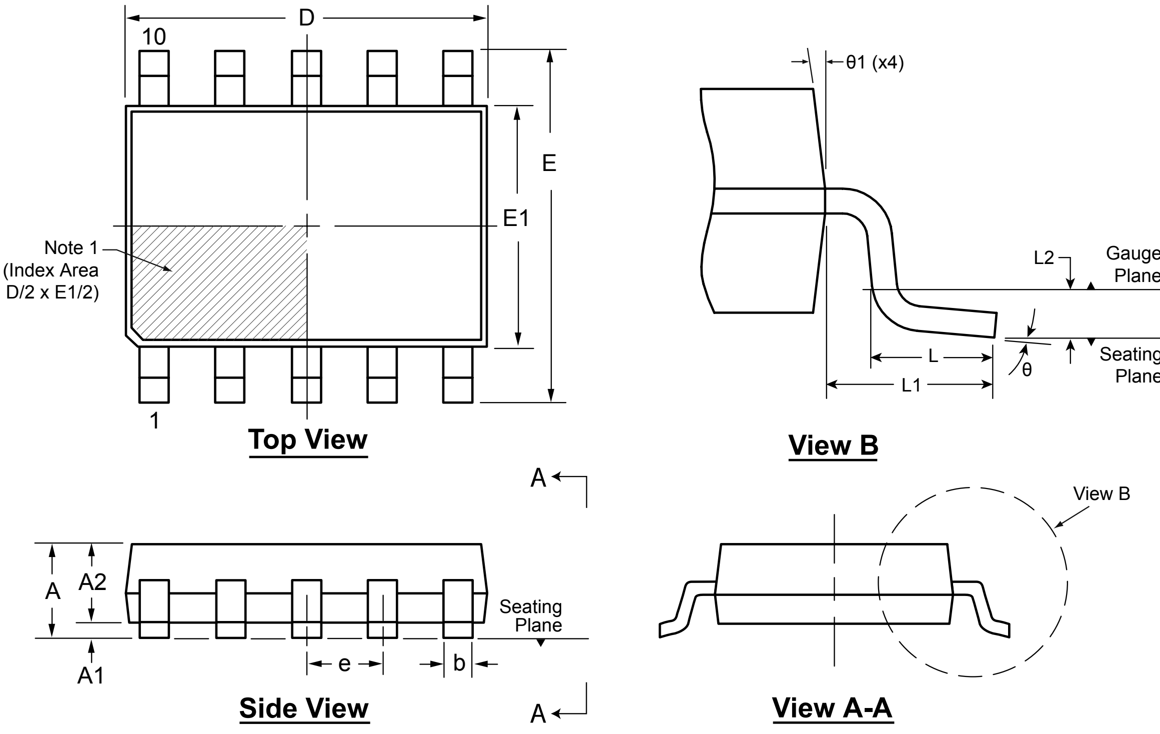
10-Lead MSOP Package Outline (MG)

3.00x3.00mm body, 1.10mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	L	L1	L2	θ	θ1
Dimen-sion (mm)	MIN	0.75*	0.00	0.75	0.17	2.80*	4.65*	2.80*	0.50 BSC	0.40	0.95 REF	0.25 BSC	0°	5°
	NOM	-	-	0.85	-	3.00	4.90	3.00		0.60			-	-
	MAX	1.10	0.15	0.95	0.33	3.20*	5.15*	3.20*		0.80			8°	15°

JEDEC Registration MO-187, Variation BA, Issue E, Dec. 2004.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

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NOTES:

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PDIP

Supertex Legacy

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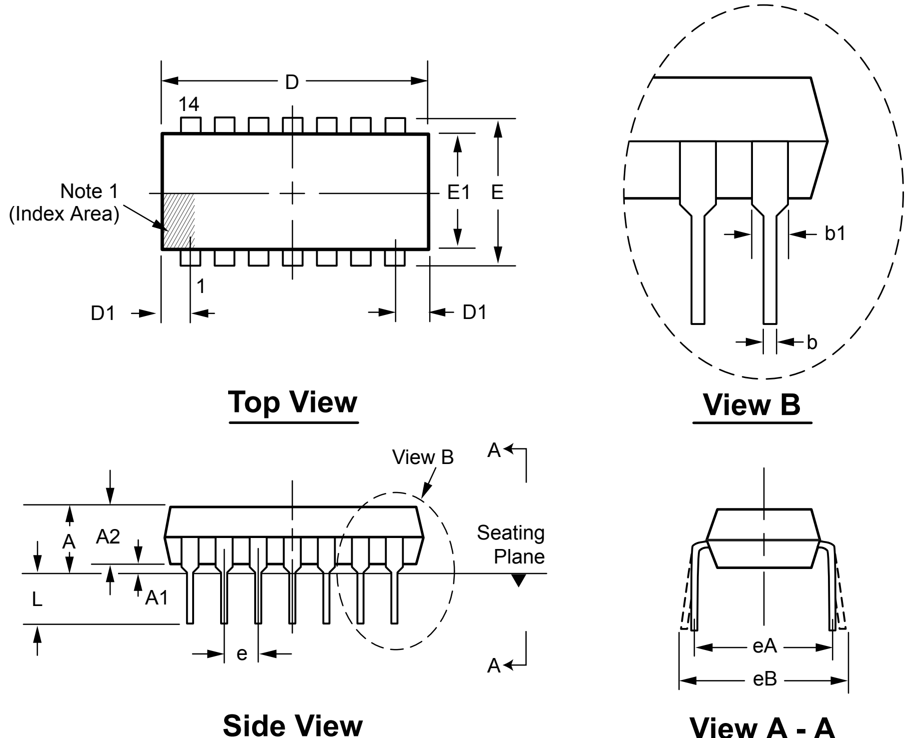
14-Lead PDIP (.300in Row Spacing) Package Outline (P)

.750x.250in body, .210in height (max), .100in pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	b1	D	D1	E	E1	e	eA	eB	L
Dimension (inches)	MIN	.130*	.015	.115	.014	.045	.735	.065†	.290†	.240	.100 BSC	.300 BSC	.300*	.115
	NOM	-	-	.130	.018	.060	.750	-	.310	.250			-	.130
	MAX	.210	.035*	.195	.023†	.070	.810†	.085*	.325	.280			.430	.150

JEDEC Registration MS-001, Variation AA, Issue D, June, 1993.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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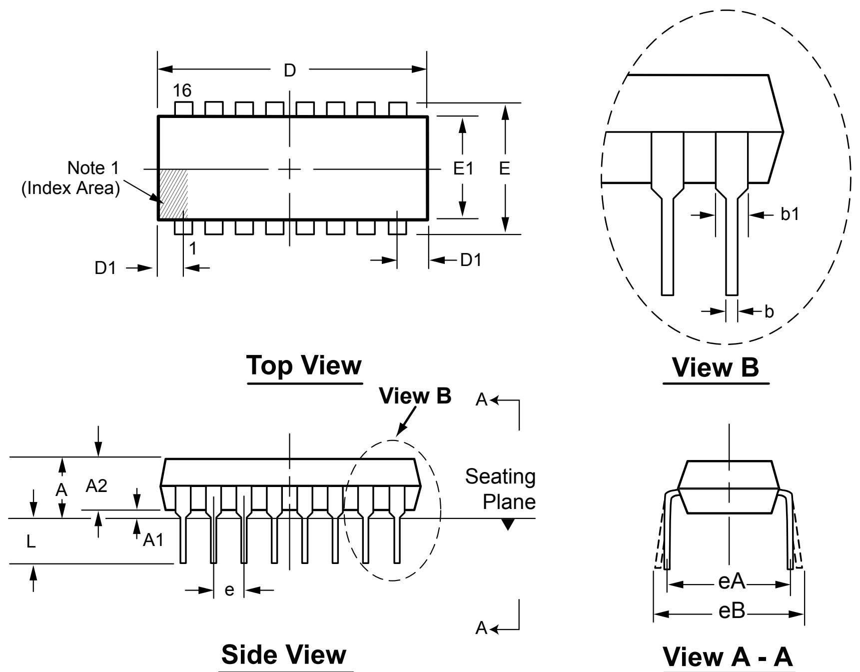
16-Lead PDIP (.300in Row Spacing) Package Outline (P)

.790x.250in body, .210in height (max), .100in pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

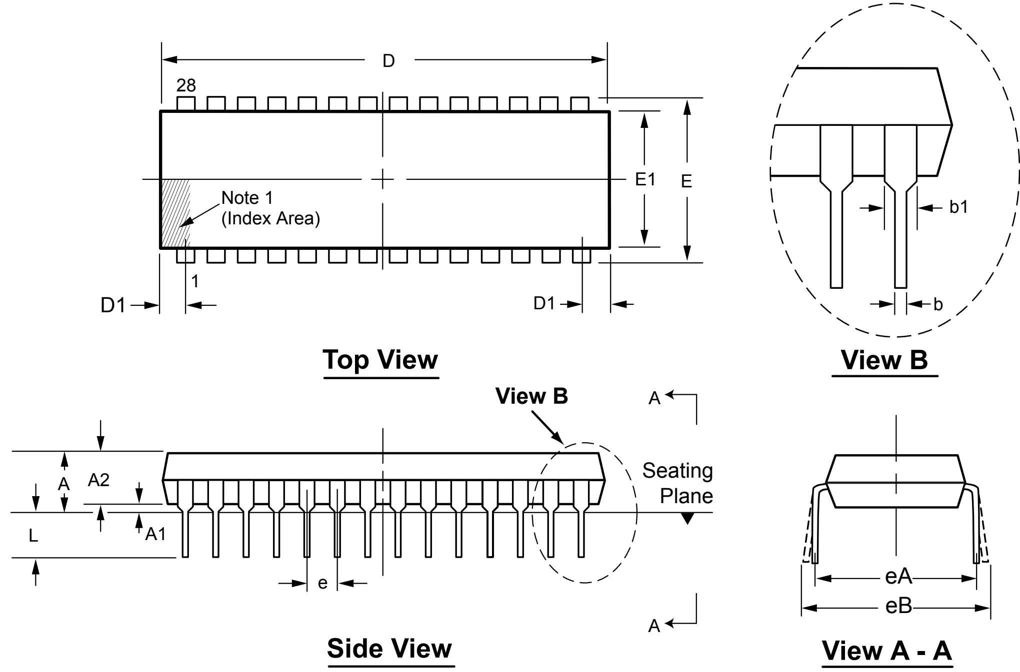
1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	b1	D	D1	E	E1	e	eA	eB	L
Dimension (inches)	MIN	.130*	.015	.115	.014	.045	.745†	.005	.290†	.240			.300*	.115
	NOM	-	-	.130	.018	.060	.790	-	.310	.250	.100 BSC	.300 BSC	-	.130
	MAX	.210	.035*	.195	.023†	.070	.810†	.050*	.325	.280			.430	.150

JEDEC Registration MS-001, Variation AB, Issue D, June, 1993.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

28-Lead PDIP (.600in Row Spacing) Package Outline (P)

1.565x.580in body, .250in height (max), .100in pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	b1	D	D1	E	E1	e	eA	eB	L
Dimension (inches)	MIN	.140*	.015	.125	.014	.030	1.380	.065†	.590†	.485			.600*	.115
	NOM	-	-	-	-	-	-	-	-	-	.100 BSC	.600 BSC	-	-
	MAX	.250	.055*	.195	.023†	.070	1.565	.085*	.625	.580			.700	.200

JEDEC Registration MS-011, Variation AB, Issue B, June, 1988.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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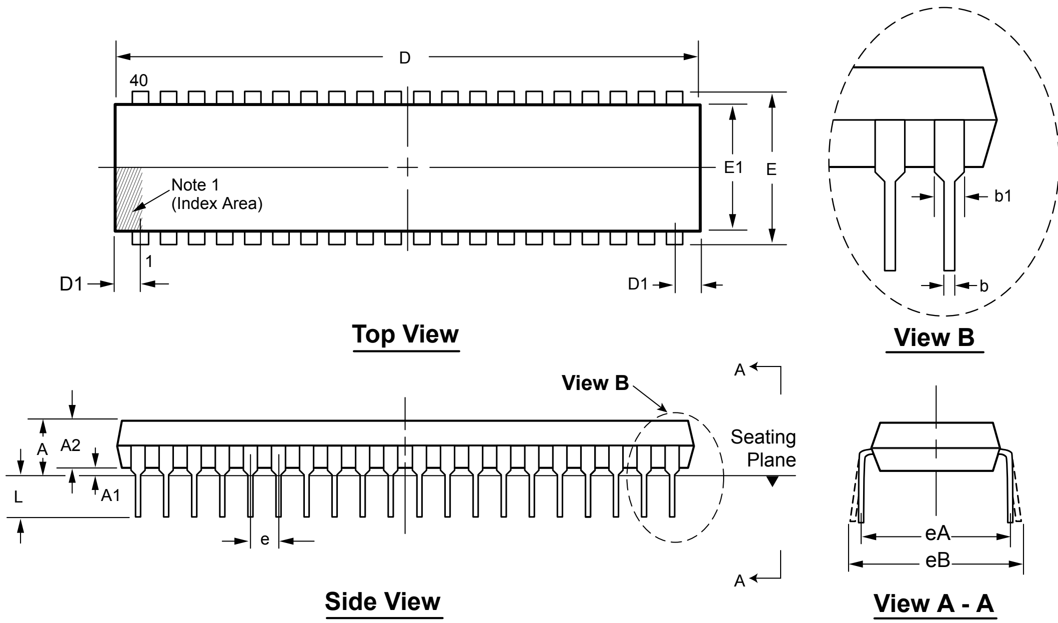
40-Lead PDIP (.600in Row Spacing) Package Outline (P)

2.095x.580in body (max), .250in height (max), .100in pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	b1	D	D1	E	E1	e	eA	eB	L
Dimension (inches)	MIN	.140*	.015	.125	.014	.030	1.980	.065†	.590†	.485			.600*	.115
	NOM	-	-	-	-	-	-	-	-	-	.100 BSC	.600 BSC	-	-
	MAX	.250	.055*	.195	.023†	.070	2.095	.085*	.625	.580			.700	.200

JEDEC Registration MS-011, Variation AC, Issue B, June, 1988.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

NOTES:

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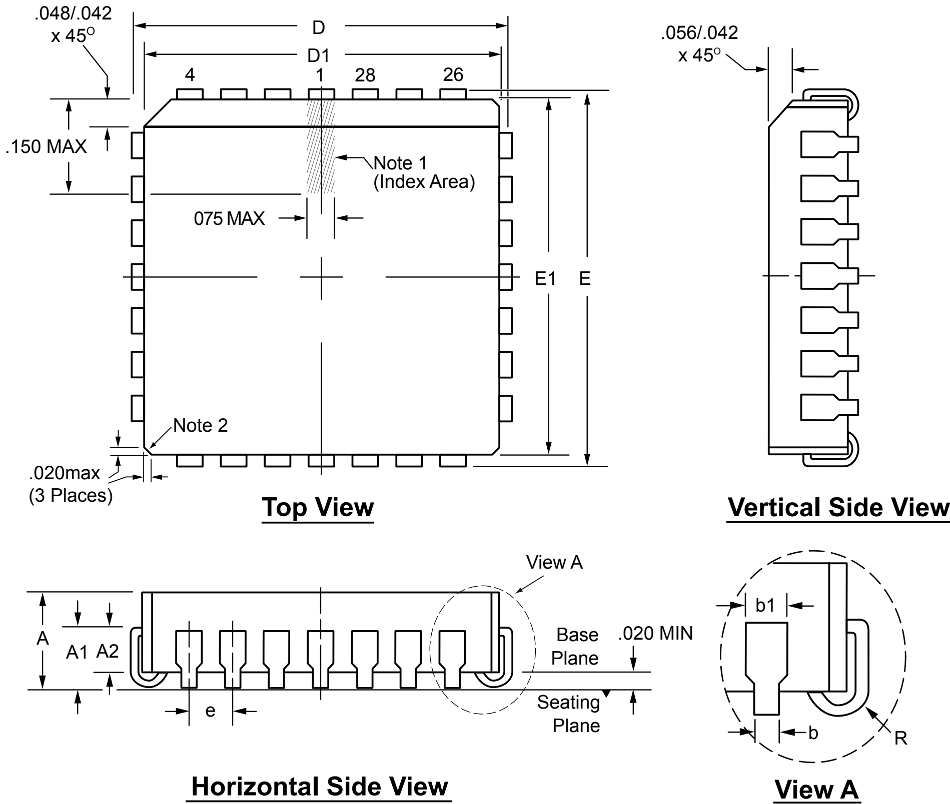
PLCC

Supertex Legacy

28-Lead PLCC Package Outline (PJ)

.453x.453in. body, .180in. height (max), .050in. pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Actual shape of this feature may vary.*

Symbol		A	A1	A2	b	b1	D	D1	E	E1	e	R
Dimension (inches)	MIN	.165	.090	.062	.013	.026	.485	.450	.485	.450	.050 BSC	.025
	NOM	.172	.105	-	-	-	.490	.453	.490	.453		.035
	MAX	.180	.120	.083	.021	.032	.495	.456	.495	.456		.045

JEDEC Registration MS-018, Variation AB, Issue A, June, 1993.
***Drawings not to scale**.*

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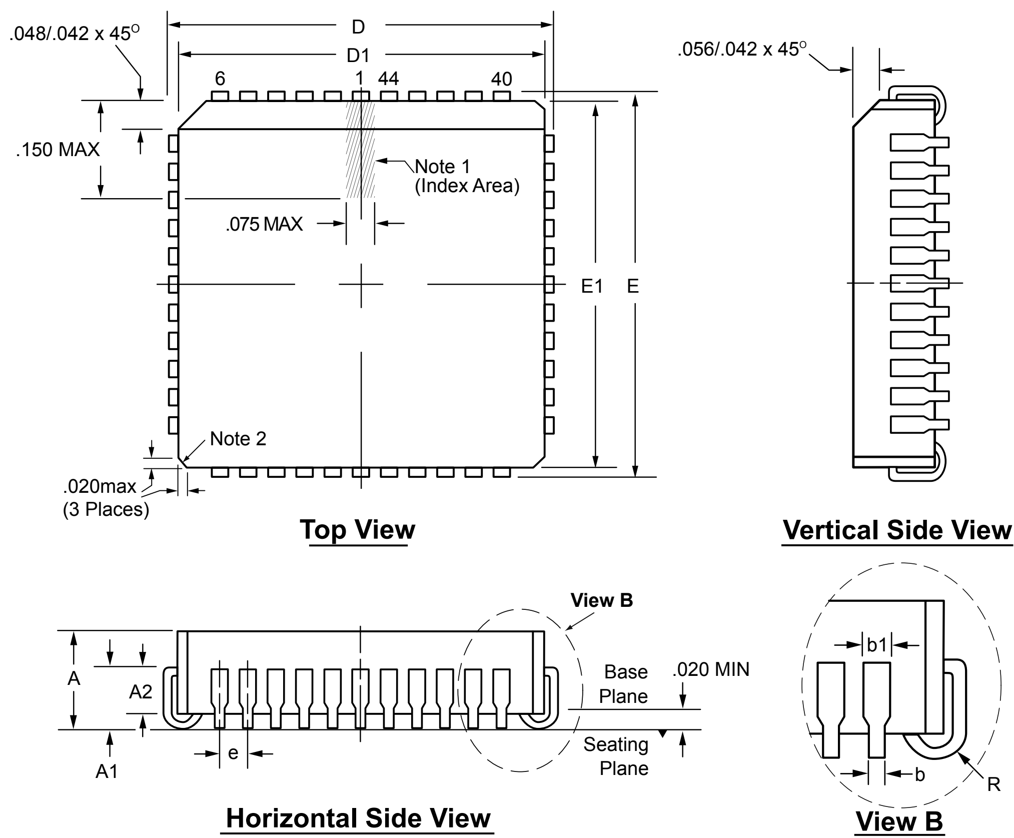
44-Lead PLCC Package Outline (PJ)

.653x.653in body, .180in height (max), .050in pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Actual shape of this feature may vary.*

Symbol		A	A1	A2	b	b1	D	D1	E	E1	e	R
Dimension (inches)	MIN	.165	.090	.062	.013	.026	.685	.650	.685	.650	.050 BSC	.025
	NOM	.172	.105	-	-	-	.690	.653	.690	.653		.035
	MAX	.180	.120	.083	.021	.036†	.695	.656	.695	.656		.045

JEDEC Registration MS-018, Variation AC, Issue A, June, 1993.
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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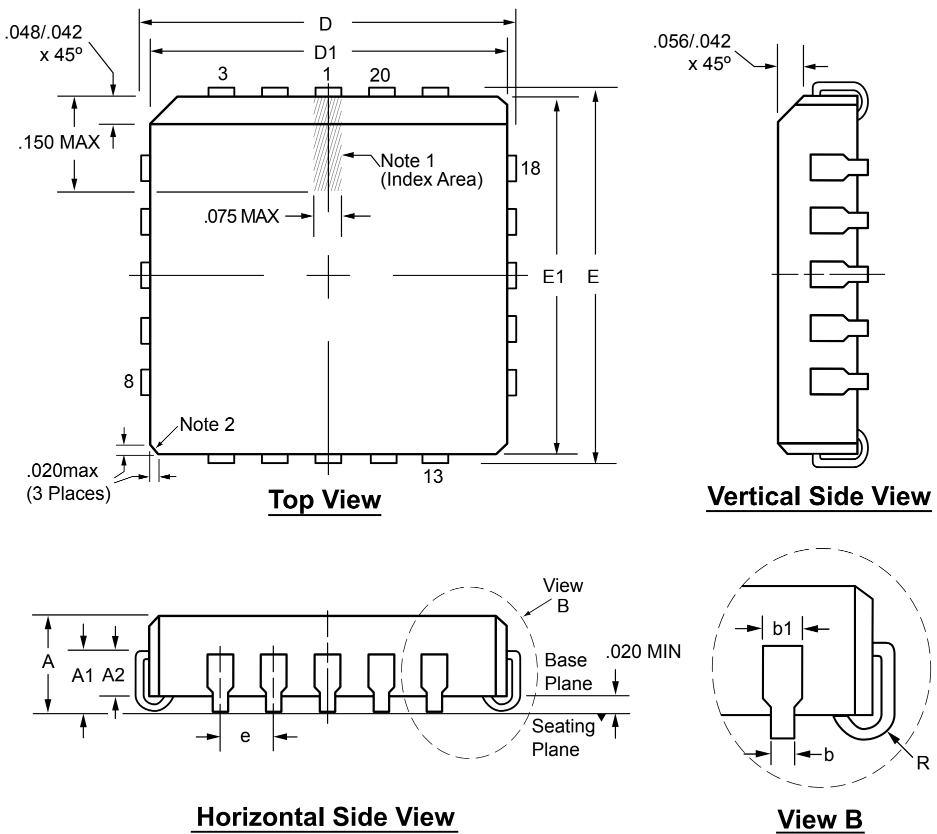
20-Lead PLCC Package Outline (PJ)

.353x.353in body, .180in height (max), .050in pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Actual shape of this feature may vary.*

Symbol		A	A1	A2	b	b1	D	D1	E	E1	e	R
Dimension (inches)	MIN	.165	.090	.062	.013	.026	.385	.350	.385	.350	.050 BSC	.025
	NOM	.172	.105	-	-	-	.390	.353	.390	.353		.035
	MAX	.180	.120	.083	.021	.032	.395	.356	.395	.356		.045

JEDEC Registration MS-018, Variation AA, Issue A, June, 1993.
Drawings not to scale.

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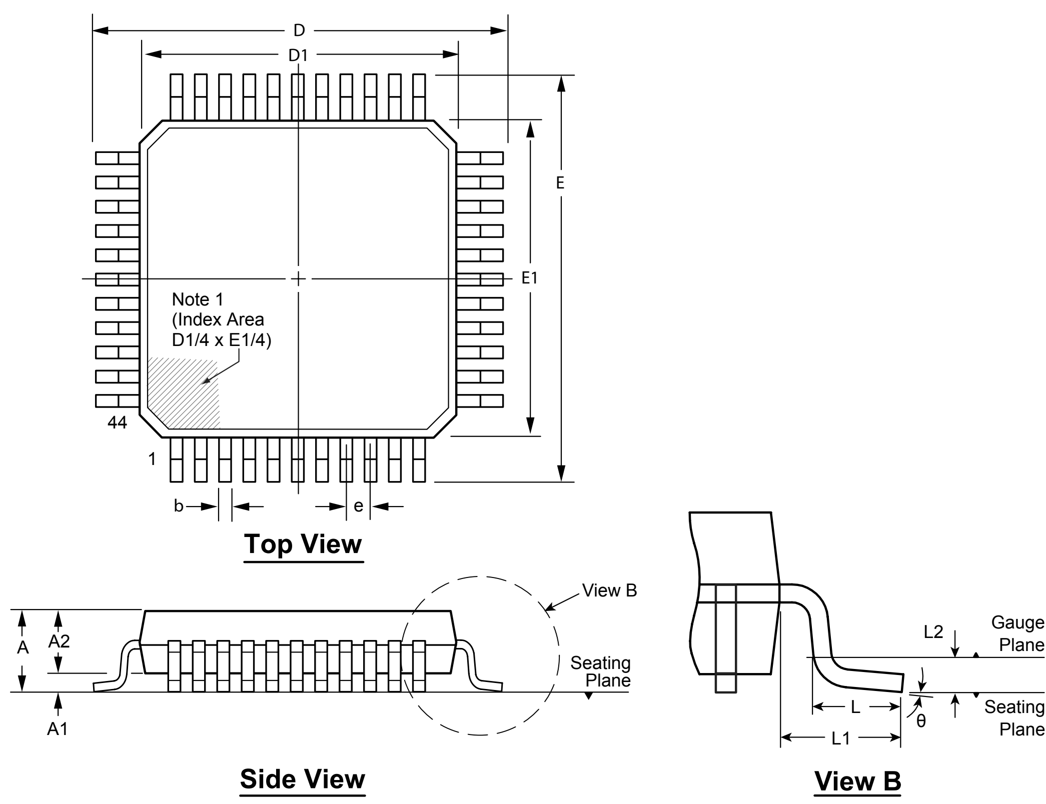
PQFP

Supertex Legacy

44-Lead PQFP Package Outline (PG)

10.00x10.00mm body, 2.35mm height (max), 0.80mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	D1	E	E1	e	L	L1	L2	θ
Dimension (mm)	MIN	1.95*	0.00	1.95	0.30	13.65*	9.80*	13.65*	9.80*	0.80 BSC	0.73	1.95 REF	0.25 BSC	0°
	NOM	-	-	2.00	-	13.90	10.00	13.90	10.00		0.88			3.5^{O}
	MAX	2.35	0.25	2.10	0.45	14.15*	10.20*	14.15*	10.20*		1.03			7°

JEDEC Registration MO-112, Variation AA-2, Issue B, Sep.1995.
** This dimension is not specified in the JEDEC drawing.*
Drawings not to scale.

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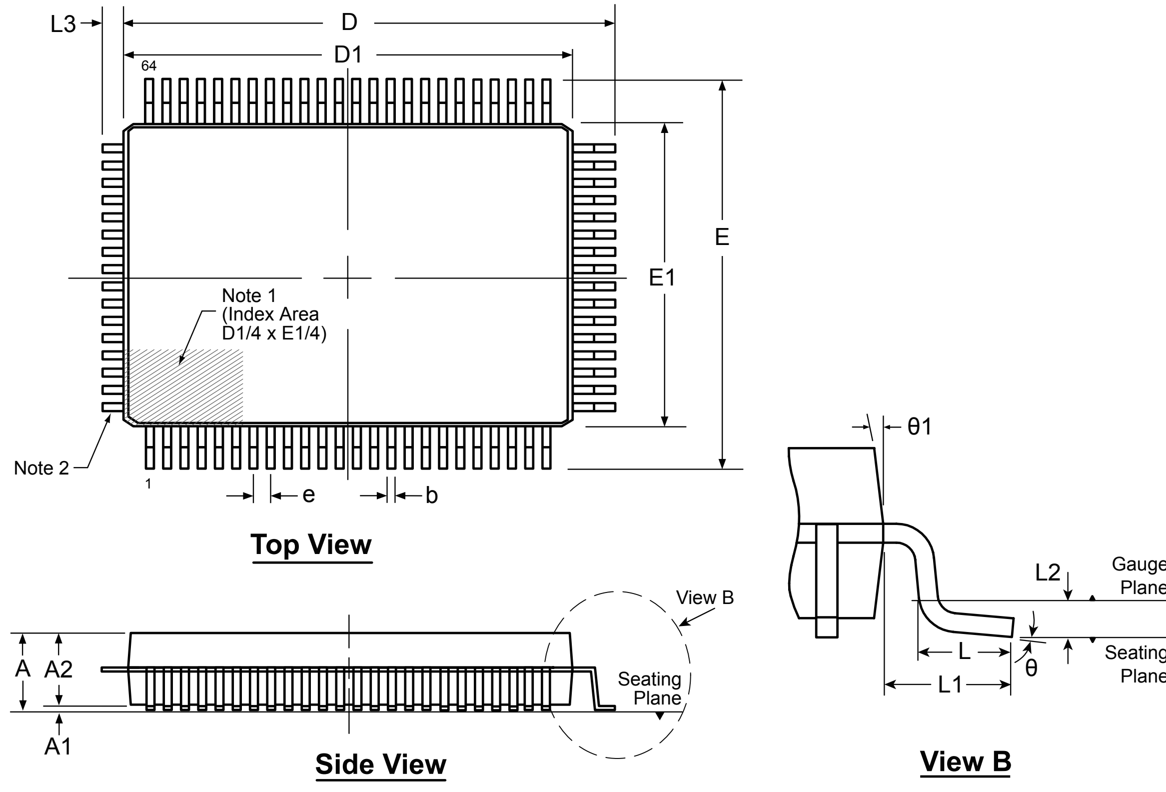
64-Lead PQFP (3-Sided) Package Outline (PG)

20.00x14.00mm body, 3.40mm height (max), 0.80mm pitch, 3.90mm footprint



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *The leads on this side are trimmed.*

Symbol		A	A1	A2	b	D	D1	E	E1	e	L	L1	L2	L3	θ	θ1
Dimension (mm)	MIN	2.80	0.25	2.55	0.30	22.25	19.80	17.65	13.80	0.80 BSC	0.73	1.95 REF	0.25 BSC	0.55 REF	0°	5°
	NOM	-	-	2.80	-	22.50	20.00	17.90	14.00		0.88				3.5°	-
	MAX	3.40	0.50	3.05	0.45	22.75	20.20	18.15	14.20		1.03				7°	16°

Drawings not to scale.
Supertex Doc. #: *DSPD-64PQFPPG, Version NR090608.*

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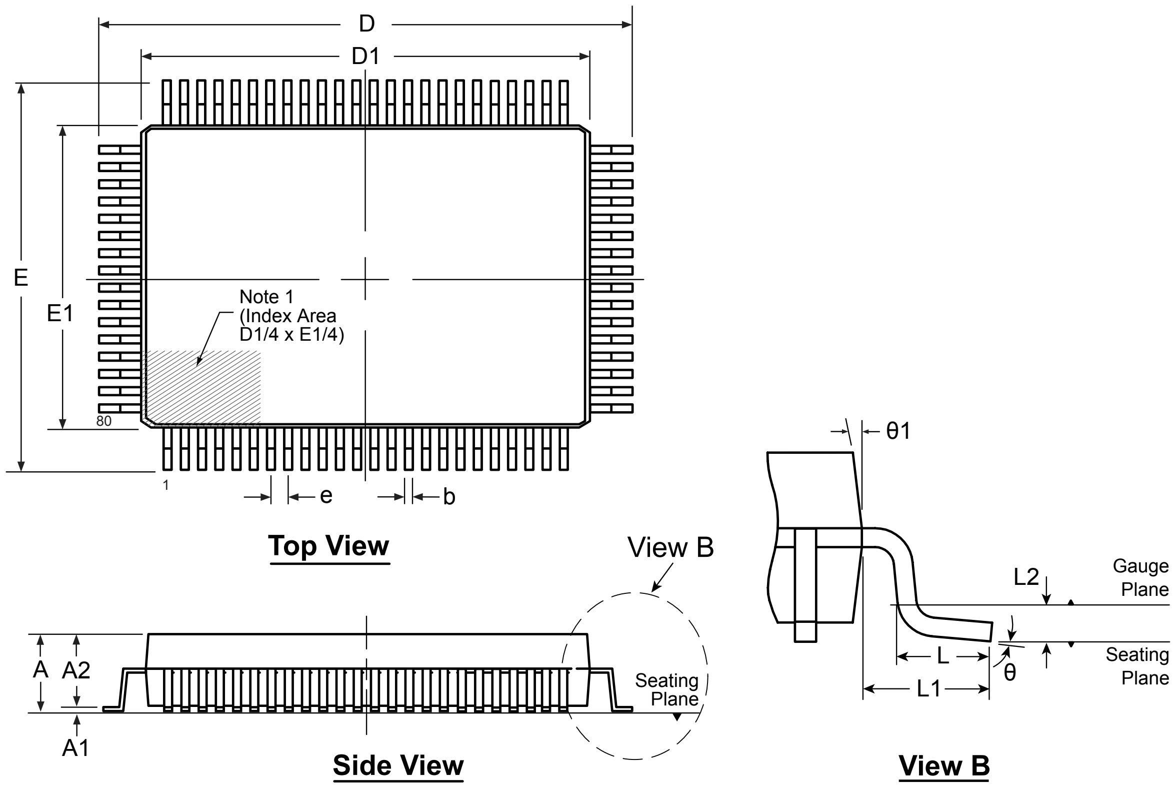
80-Lead PQFP Package Outline (PG)

20.00x14.00mm body, 3.40mm height (max), 0.80mm pitch, 3.90mm footprint



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	D1	E	E1	e	L	L1	L2	θ	θ1
Dimen-sion (mm)	MIN	2.80*	0.25	2.55	0.30	23.65*	19.80*	17.65*	13.80*	0.80 BSC	0.73	1.95 REF	0.25 BSC	0°	5°
	NOM	-	-	2.80	-	23.90	20.00	17.90	14.00		0.88			3.5°	-
	MAX	3.40	0.50*	3.05	0.45	24.15*	20.20*	18.15*	14.20*		1.03			7°	16°

JEDEC Registration MO-112, Variation CB-1, Issue B, Sept.1995.
** This dimension is not specified in the JEDEC drawing.*
Drawings not to scale.
S D # *DSPD 80PQFPPG V i C041309*

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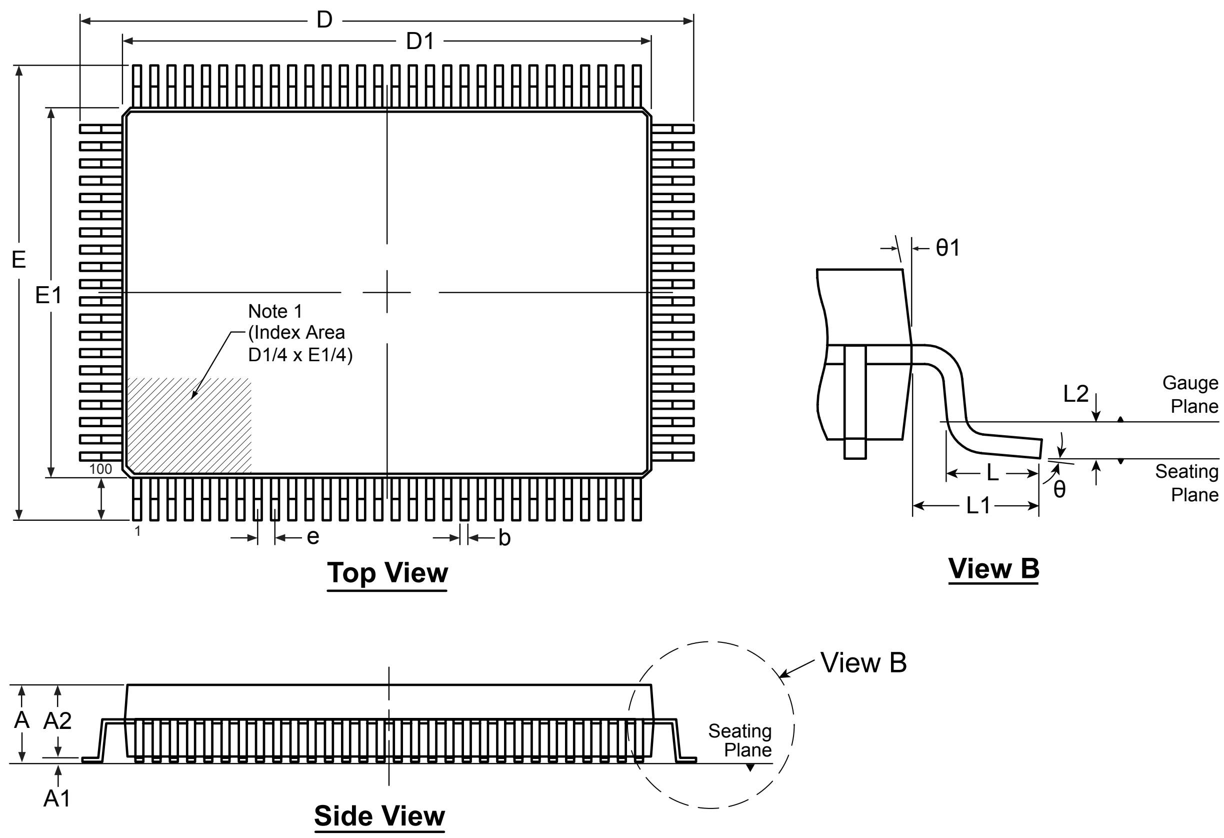
100-Lead PQFP Package Outline (PG)

20.00x14.00mm body, 3.40mm height (max), 0.65mm pitch, 3.90mm footprint



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	D1	E	E1	e	L	L1	L2	θ	θ1
Dimension (mm)	MIN	2.80*	0.25	2.55	0.22	23.65*	19.80*	17.65*	13.80*	0.65 BSC	0.73	1.95 REF	0.25 BSC	0	5°
	NOM	-	-	2.80	-	23.90	20.00	17.90	14.00		0.88			3.5°	-
	MAX	3.40	0.50*	3.05	0.38	24.15*	20.20*	18.15*	14.20*		1.03			7°	16°

JEDEC Registration MO-112, Variation CC-1, Issue B, Sept.1995.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.
***S D #** DSPD 100PQFPPG V i C111109*

NOTES:

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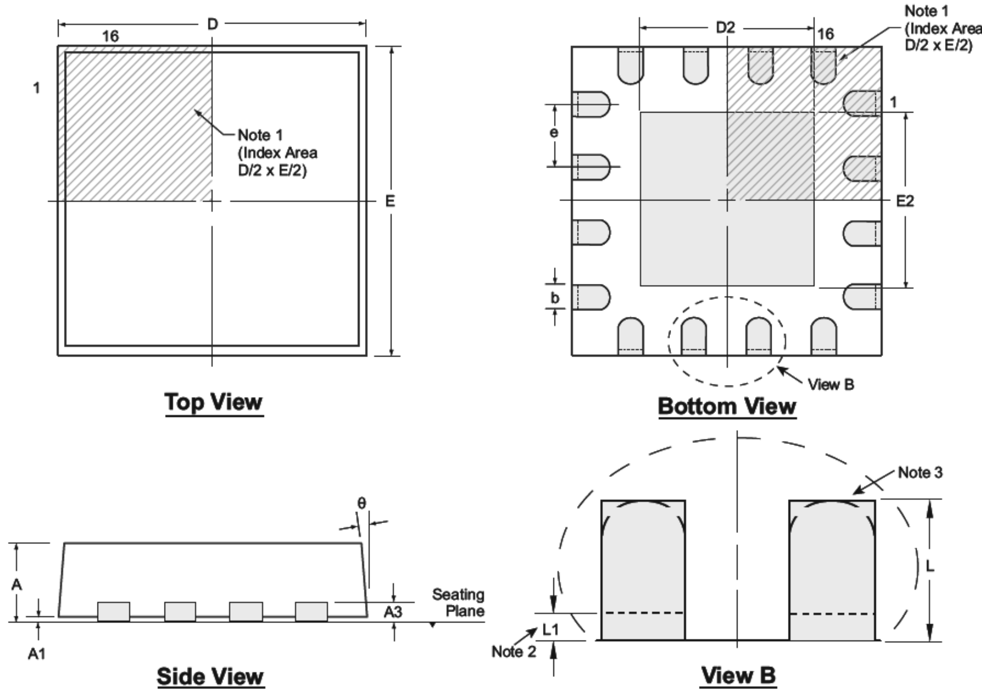
QFN

Supertex Legacy

16-Lead QFN Package Outline (K6)

4.00x4.00mm body, 1.00mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.25	3.85*	2.50	3.85*	2.50	0.65 BSC	0.30†	0.00	0°
	NOM	0.90	0.02		0.30	4.00	2.65	4.00	2.65		0.40†	-	-
	MAX	1.00	0.05		0.35	4.15*	2.80	4.15*	2.80		0.50†	0.15	14°

JEDEC Registration MO-220, Variation VGGC-2, Issue K, June 2006.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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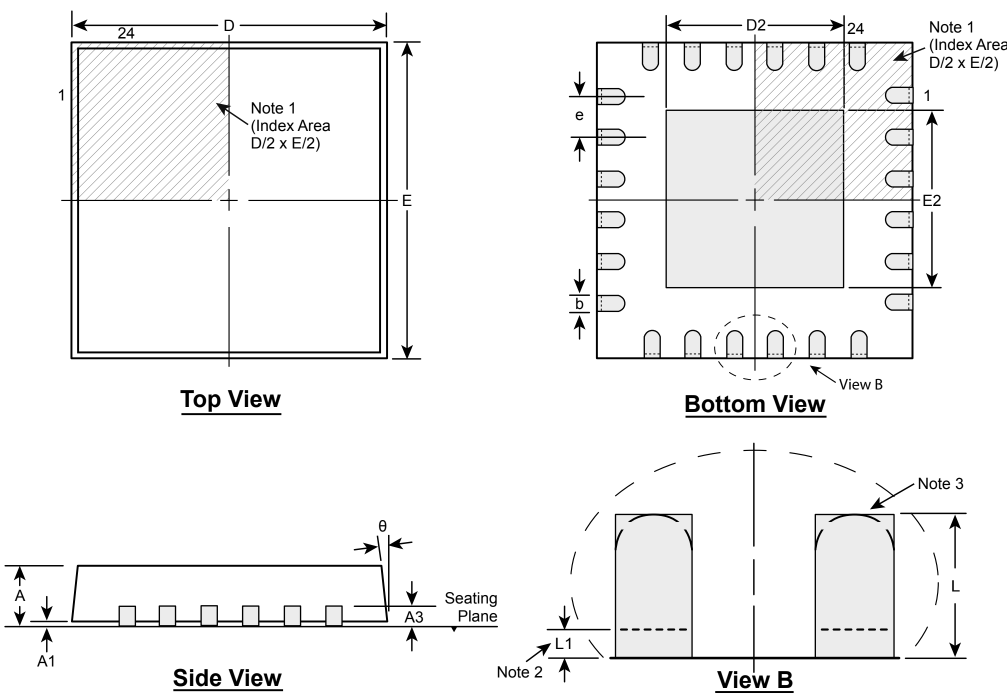
24-Lead QFN Package Outline (K6)

4.00x4.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

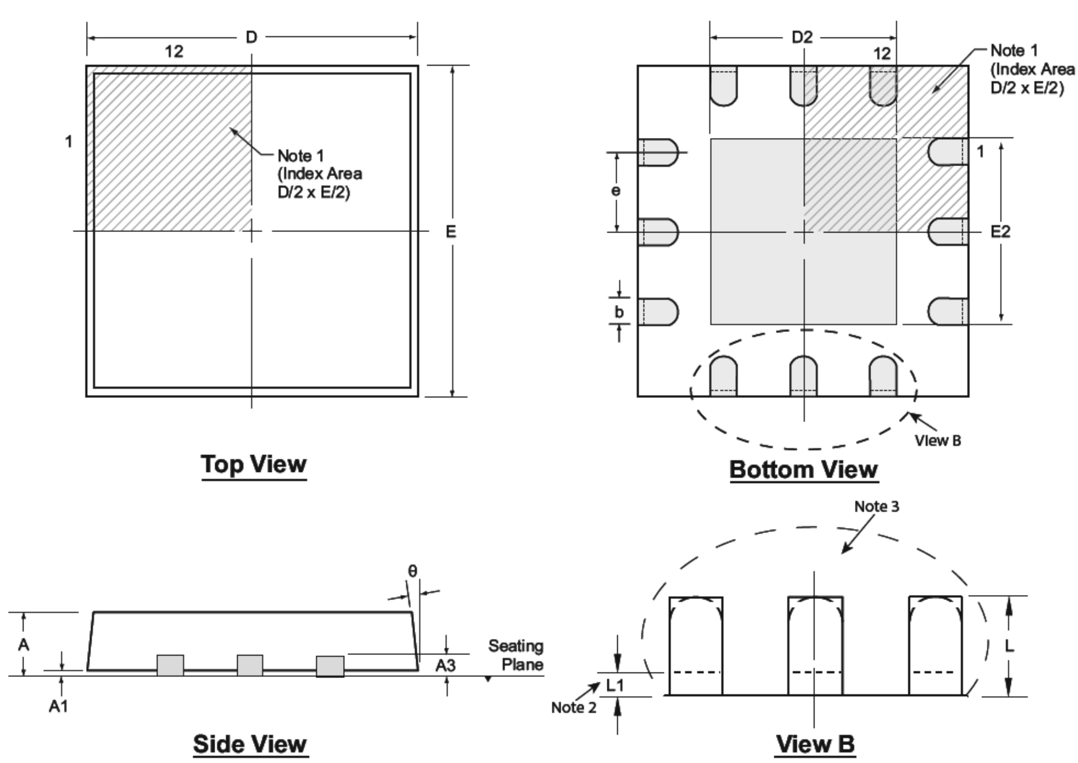
1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.18	3.85	2.55	3.85	2.55	0.50 BSC	0.25	0.03	0°
	NOM	0.90	0.02		0.25	4.00	2.70	4.00	2.70		0.35	-	-
	MAX	1.00	0.05		0.30	4.15	2.80	4.15	2.80		0.45	0.15	14°

Drawings not to scale.

12-Lead QFN Package Outline (K6)

4.00x4.00mm body, 1.00mm height (max), 0.80mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.25	3.85*	0.75	3.85*	0.75	0.80 BSC	0.35	0.00	0°
	NOM	0.90	0.02		0.30	4.00	1.70	4.00	1.70		0.55	-	-
	MAX	1.00	0.05		0.35	4.15*	2.25	4.15*	2.25		0.75	0.15	14°

JEDEC Registration MO-220, Variation VGGB, Issue K, June 2006.
** This dimension is not specified in the JEDEC drawing.*
Drawings not to scale.

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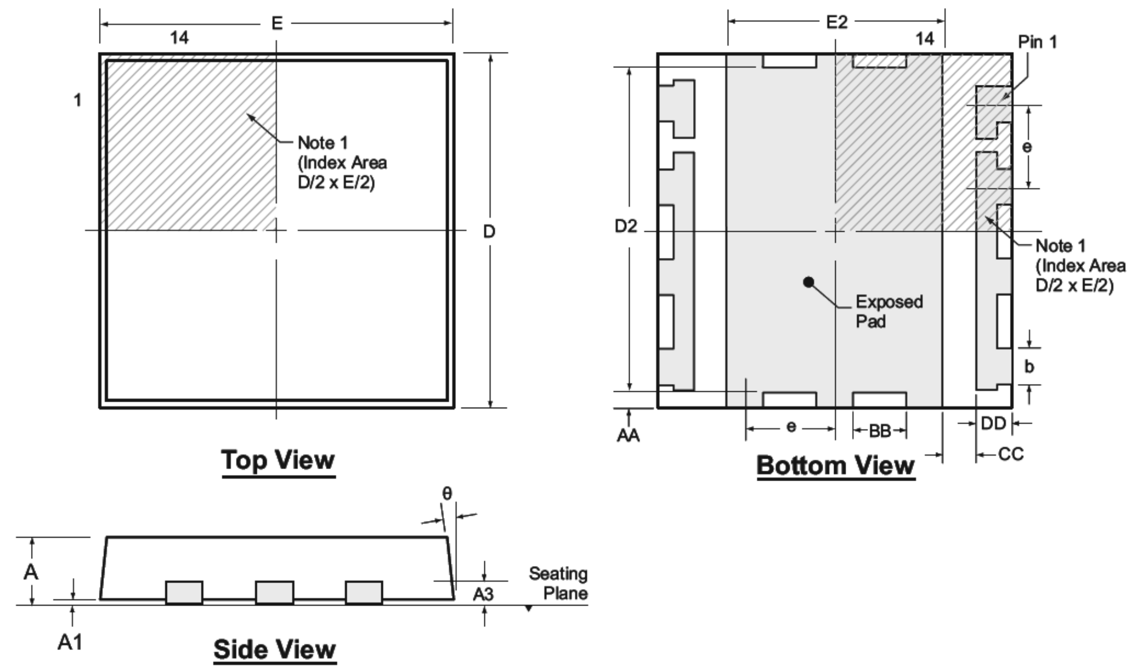
14-Lead QFN Package Outline (K6)

5.00x5.00mm body, 1.00mm height (max), 1.27mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	AA	BB	CC	DD	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.46	4.85	4.45	4.85	2.52	1.27 BSC	0.152	0.473	0.66	0.456	0°
	NOM	0.90	0.02		0.51	5.00	4.50	5.00	2.57		0.252	0.523	0.71	0.506	-
	MAX	1.00	0.05		0.58	5.15	4.55	5.15	2.62		0.352	0.583	0.77	0.566	14°

Drawings not to scale.

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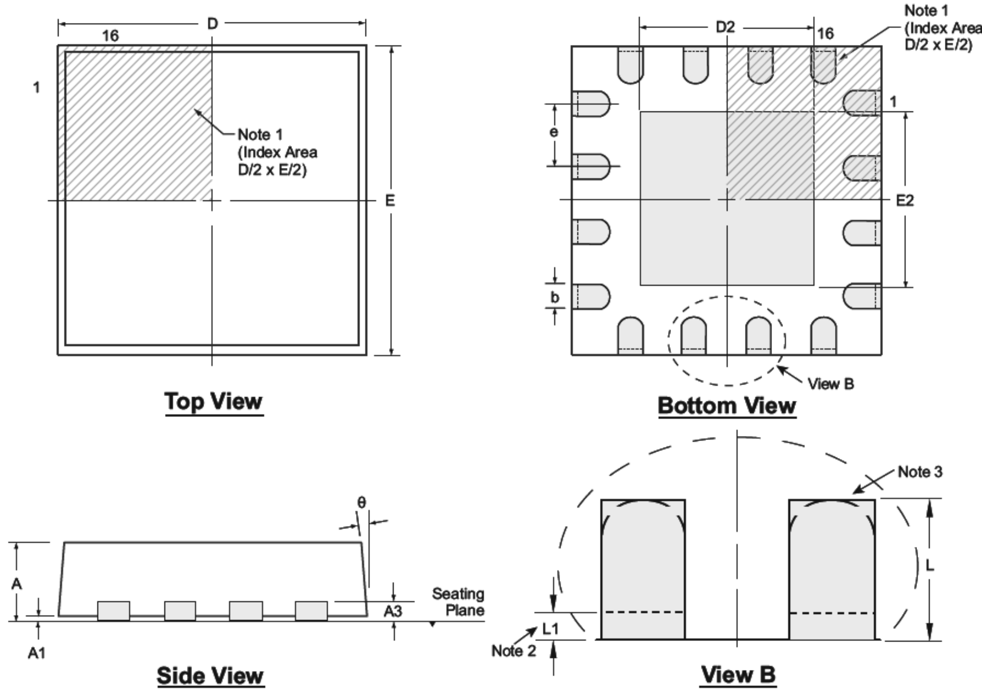
16-Lead QFN Package Outline (K6)

3.00x3.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00		0.18	2.85*	1.50	2.85*	1.50		0.20†	0.00	0°
	NOM	0.90	0.02	0.20 REF	0.25	3.00	1.65	3.00	1.65	0.50 BSC	0.30†	-	-
	MAX	1.00	0.05		0.30	3.15*	1.80	3.15*	1.80		0.45	0.15	14°

JEDEC Registration MO-220, Variation VEED-4, Issue K, June 2006.
***** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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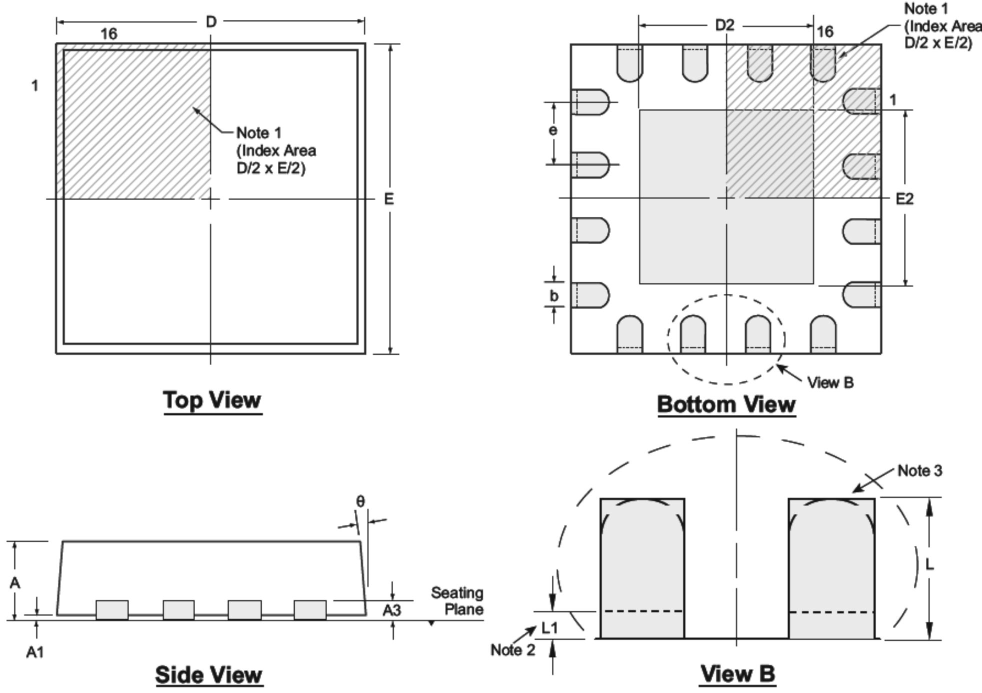
Package Outlines and Dimensions

16-Lead QFN Package Outline (K6)

4.00x4.00mm body, 1.00mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

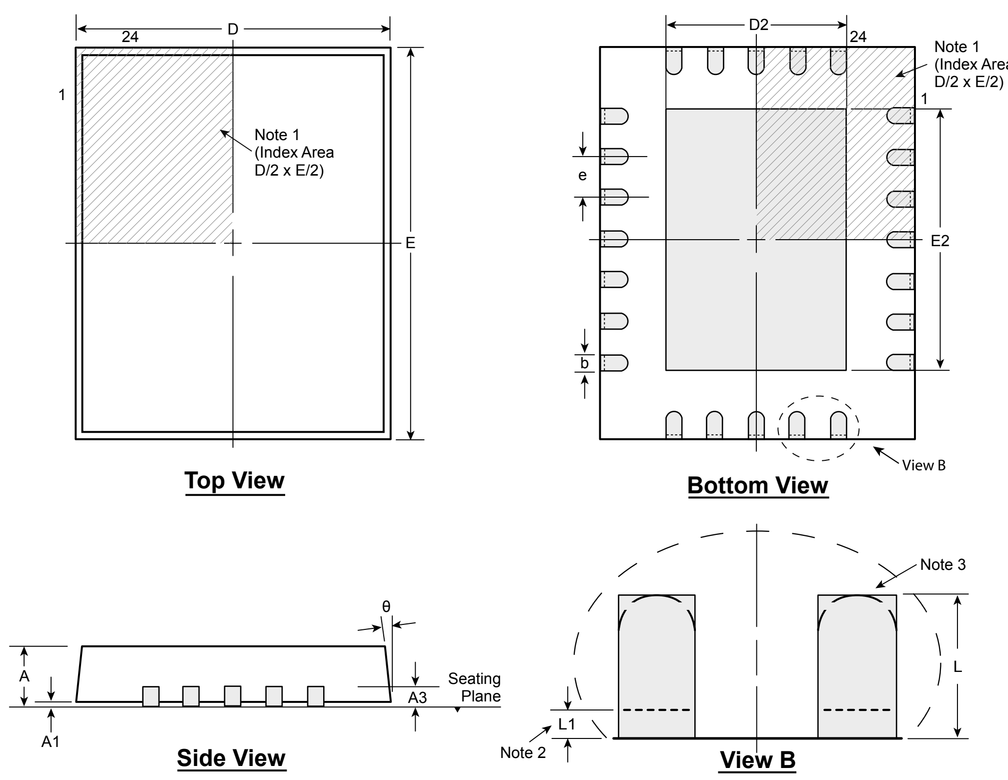
1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.25	3.85*	2.50	3.85*	2.50	0.65 BSC	0.30†	0.00	0°
	NOM	0.90	0.02		0.30	4.00	2.65	4.00	2.65		0.40†	-	-
	MAX	1.00	0.05		0.35	4.15*	2.80	4.15*	2.80		0.50†	0.15	14°

JEDEC Registration MO-220, Variation VGGC-2, Issue K, June 2006.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

24-Lead QFN Package Outline (K6)

4.00x5.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.18	3.85*	2.50	4.85*	3.50	0.50 BSC	†0.30	0.00	0°
	NOM	0.90	0.02		0.25	4.00	2.65	5.00	3.65		0.40	-	-
	MAX	1.00	0.05		0.30	4.15*	2.80	5.15*	3.80		†0.50	0.15	14°

JEDEC Registration MO-220, Variation VGHD-1, Issue K, June 2006
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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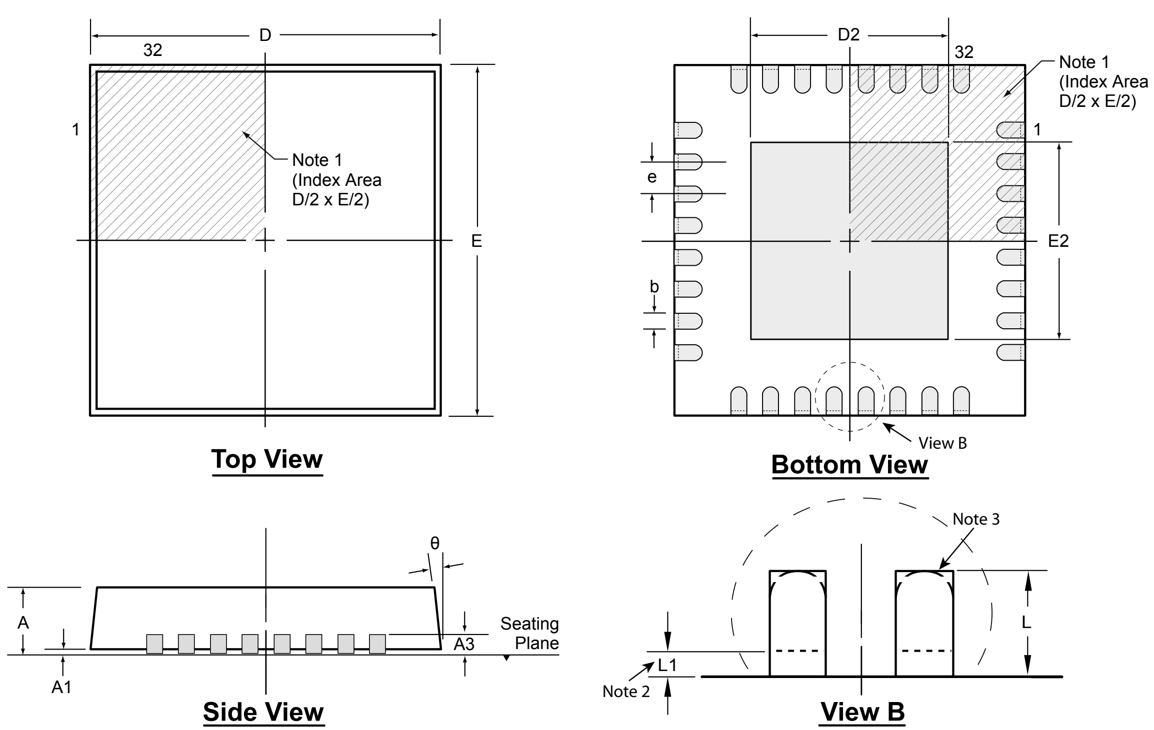
32-Lead QFN Package Outline (K6)

5.00x5.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.18	4.85*	1.05	4.85*	1.05	0.50 BSC	0.30†	0.00	0°
	NOM	0.90	0.02		0.25	5.00	-	5.00	-		0.40†	-	-
	MAX	1.00	0.05		0.30	5.15*	3.55†	5.15*	3.55†		0.50†	0.15	14°

JEDEC Registration MO-220, Variation VHHD-6, Issue K, June 2006.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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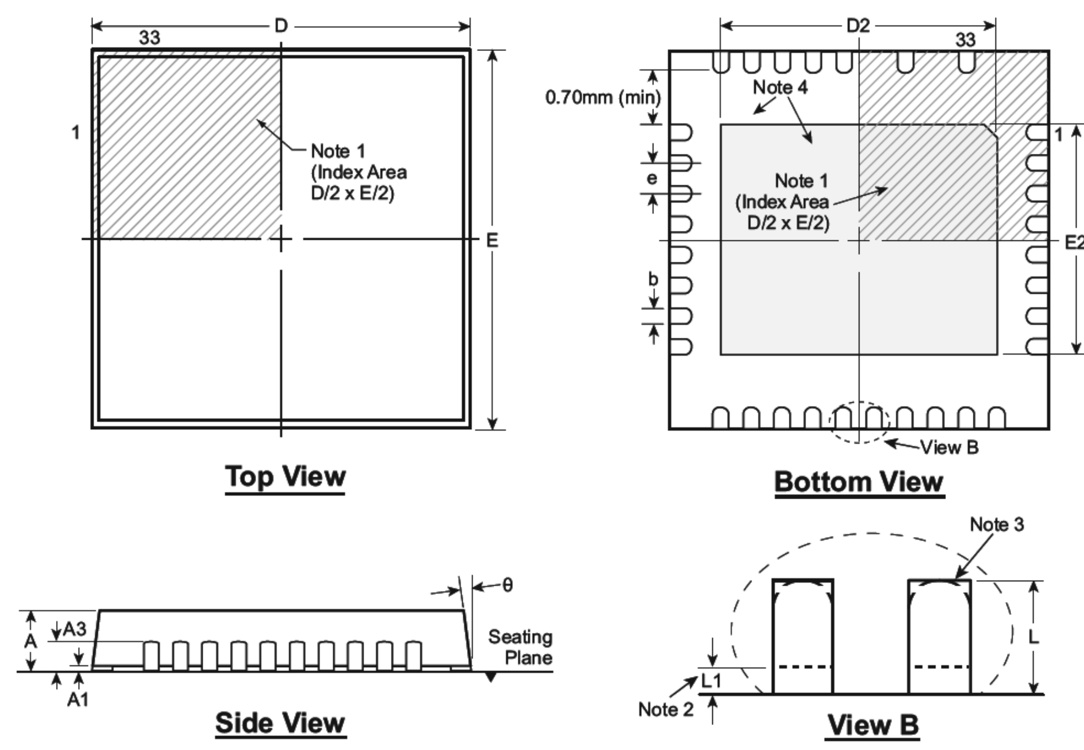
33-Lead QFN Package Outline (K6)

6.00x6.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*
4. *There will be an exposed DAP. A minimum of 0.7mm spacing will be maintained between the leads and the DAP.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ°
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.18	5.85	4.00	5.85	3.60	0.50 BSC	0.30	0.00	0
	NOM	0.90	0.02		0.25	6.00	4.15	6.00	3.75		0.40	-	-
	MAX	1.00	0.05		0.30	6.15	4.25	6.15	3.85		0.50	0.15	14

Drawings not to scale.

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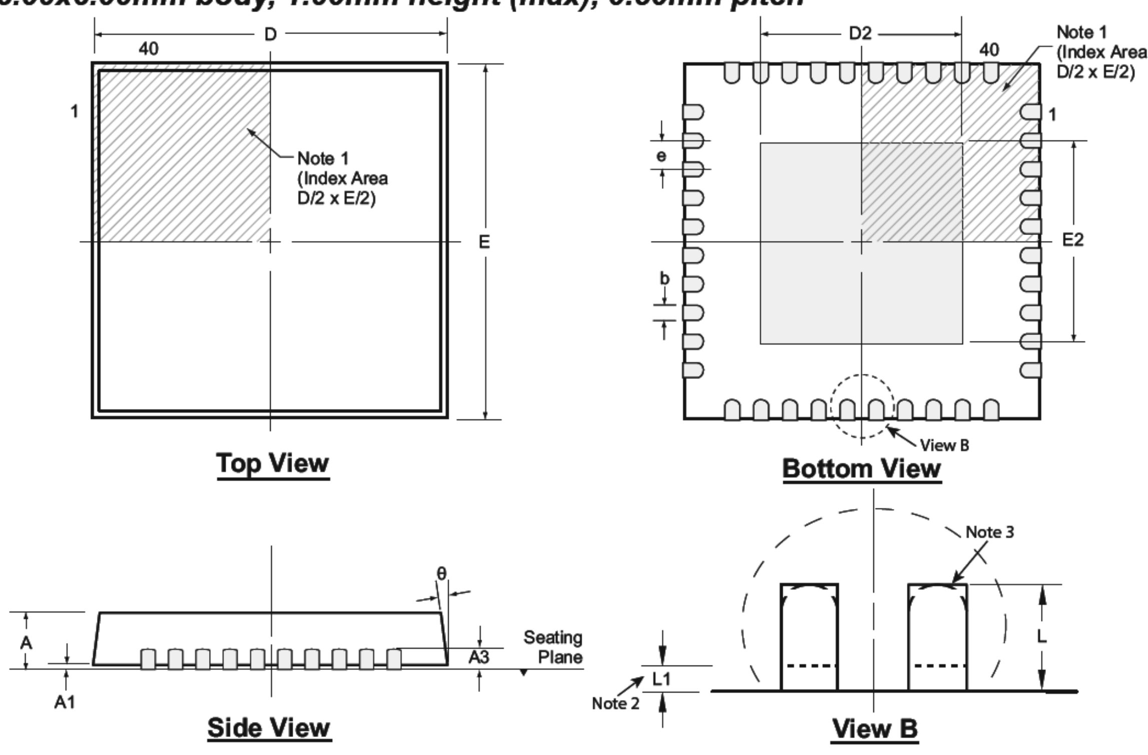
Package Outlines and Dimensions

40-Lead QFN Package Outline (K6)

6.00x6.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ°
	MIN	0.80	0.00		0.18	5.85*	1.05	5.85*	1.05		0.30†	0.00	0
Dimension (mm)	NOM	0.90	0.02	0.20 REF	0.25	6.00	-	6.00	-	0.50 BSC	0.40†	-	-
	MAX	1.00	0.05		0.30	6.15*	4.45	6.15*	4.45		0.50†	0.15	14

JEDEC Registration MO-220, Variation VJJD-6, Issue K, June 2006.
***** *This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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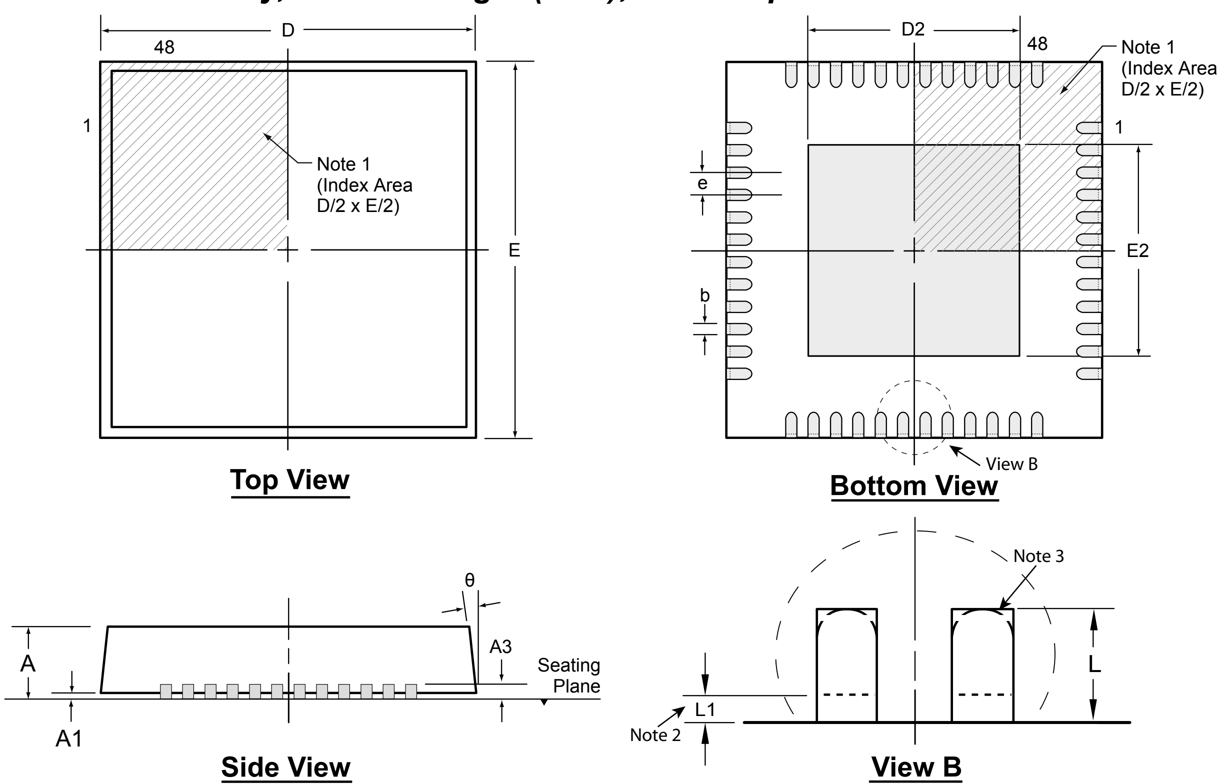
Package Outlines and Dimensions

48-Lead QFN Package Outline (K6)

7.00x7.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.18	6.85*	1.25	6.85*	1.25	0.50 BSC	0.30†	0.00	0°
	NOM	0.90	0.02		0.25	7.00	-	7.00	-		0.40†	-	-
	MAX	1.00	0.05		0.30	7.15*	5.45	7.15*	5.45		0.50†	0.15	14°

JEDEC Registration MO-220, Variation VKKD-6, Issue K, June 2006.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings are not to scale.

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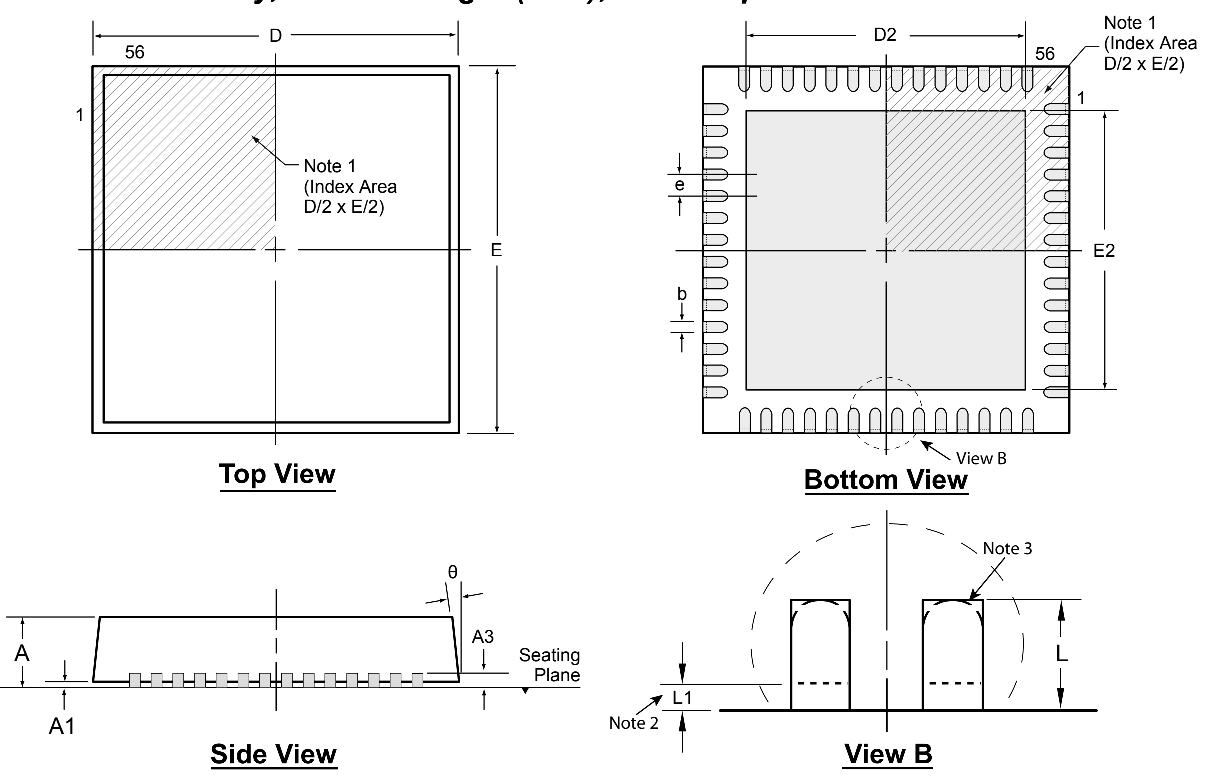
56-Lead QFN Package Outline (K6)

8.00x8.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

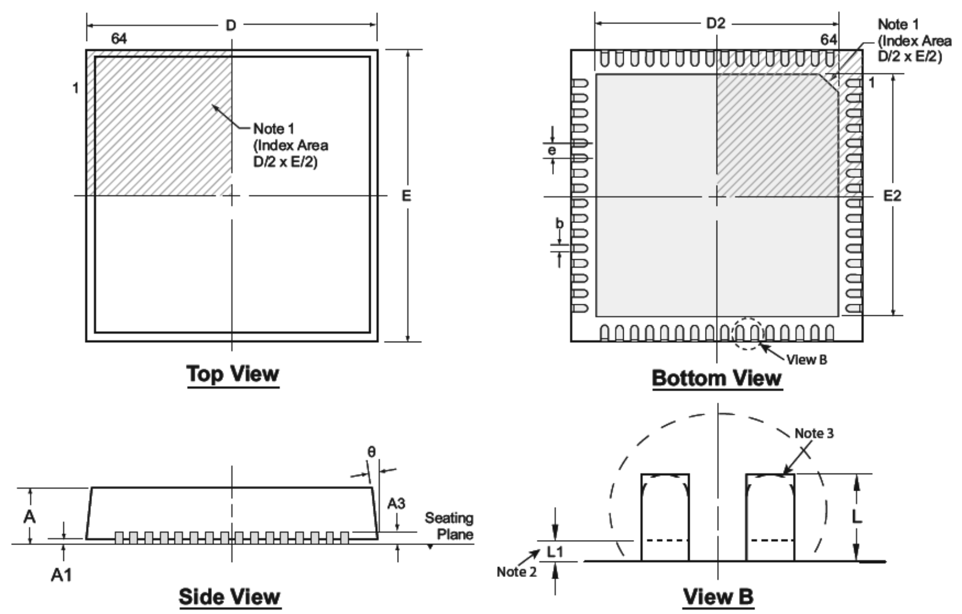
1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.18	7.85*	2.75	7.85*	2.75	0.50 BSC	0.30	0.00	0°
	NOM	0.90	0.02		0.25	8.00	5.70	8.00	5.70		0.40	-	-
	MAX	1.00	0.05		0.30	8.15*	6.70†	8.15*	6.70†		0.50	0.15	14°

JEDEC Registration MO-220, Variation VLLD-2, Issue K, June 2006.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings are not to scale.

64-Lead QFN Package Outline (K6)

9.00x9.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.18	8.85*	6.00	8.85*	6.00	0.50 BSC	0.30	0.00	0°
	NOM	0.90	0.02		0.25	9.00	7.70*	9.00	7.70*		0.40	-	-
	MAX	1.00	0.05		0.30	9.15*	7.80†	9.15*	7.80†		0.50	0.15	14°

JEDEC Registration MO-220, Variation VMMD-4, Issue K, June 2006.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings are not to scale.

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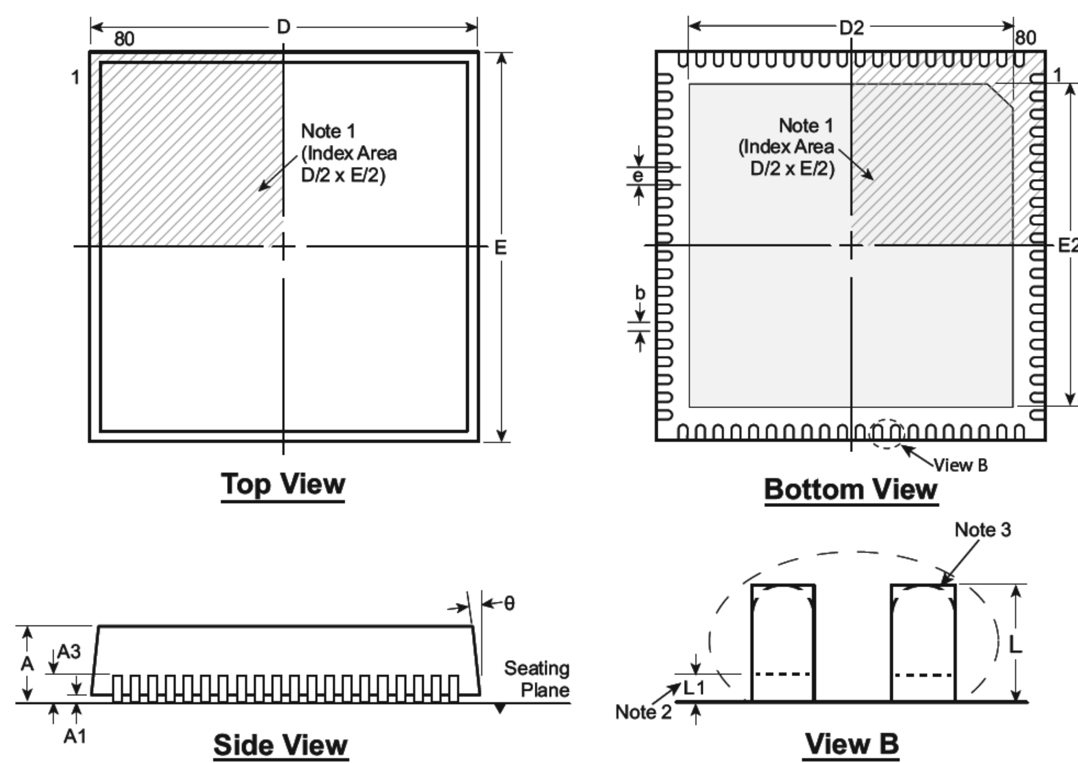
80-Lead QFN Package Outline (K6)

11.00x11.00mm body, 1.00mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.80	0.00	0.20 REF	0.18	10.90	9.50	10.90	9.50	0.50 BSC	0.30	0.00	0°
	NOM	0.90	0.02		0.25	11.00	9.65	11.00	9.65		0.40	-	-
	MAX	1.00	0.05		0.30	11.10	9.75	11.10	9.75		0.50	0.15	14°

Drawings are not to scale.

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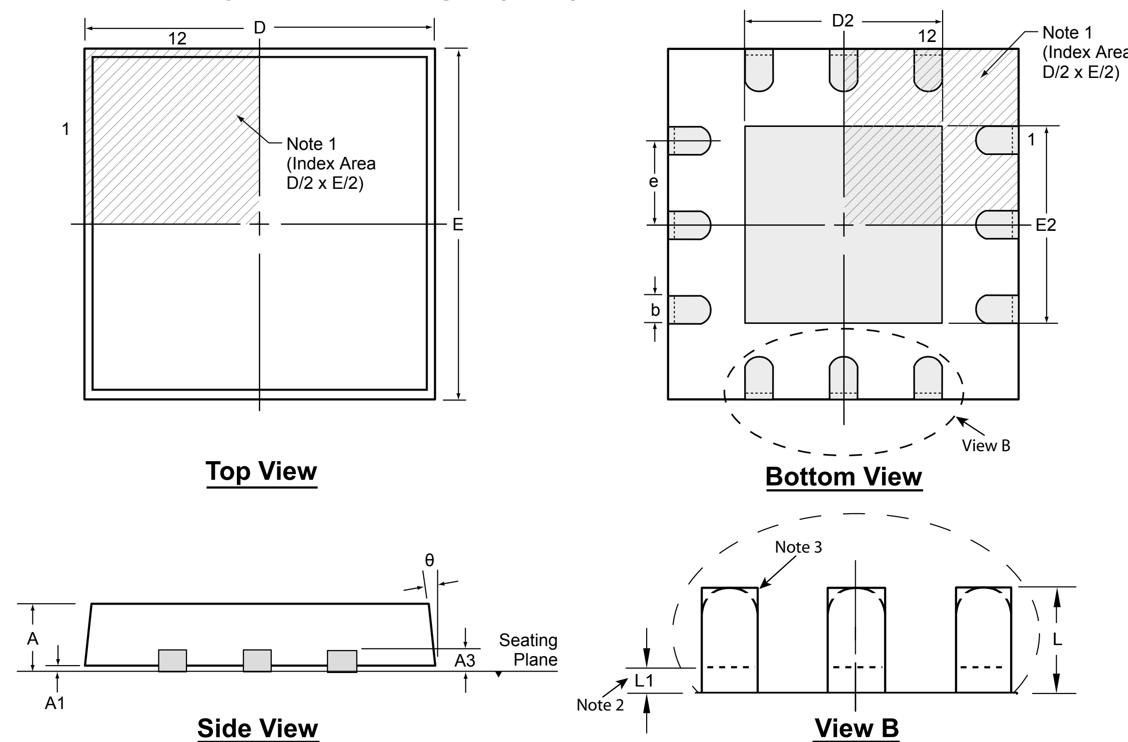
12-Lead QFN Package Outline (K7)

3.00x3.00mm body, 0.80mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.70	0.00	0.20 REF	0.18	2.85*	1.25	2.85*	1.25	0.50 BSC	0.30	0.00	0°
	NOM	0.75	0.02		0.25	3.00	-	3.00	-		0.40	-	-
	MAX	0.80	0.05		0.30	3.15*	1.65	3.15*	1.65		0.50	0.15	14°

JEDEC Registration MO-220, Variation WEED-5, Issue K, June 2006.
** This dimension is not specified in the JEDEC drawing.*
Drawings not to scale.

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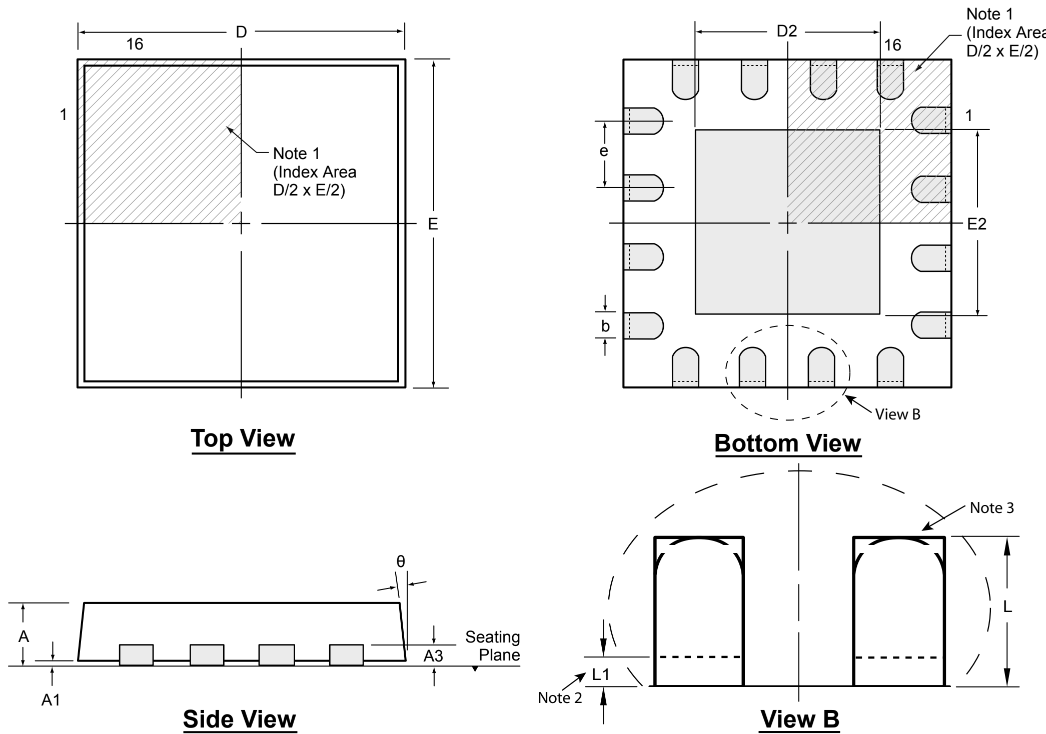
16-Lead QFN Package Outline (K7)

3.00x3.00mm body, 0.80mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.70	0.00	0.20 REF	0.18	2.85*	1.50	2.85*	1.50	0.50 BSC	0.20†	0.00	0°
	NOM	0.75	0.02		0.25	3.00	1.65	3.00	1.65		0.30†	-	-
	MAX	0.80	0.05		0.30	3.15*	1.80	3.15*	1.80		0.45	0.15	14°

JEDEC Registration MO-220, Variation WEED-4, Issue K, June 2006.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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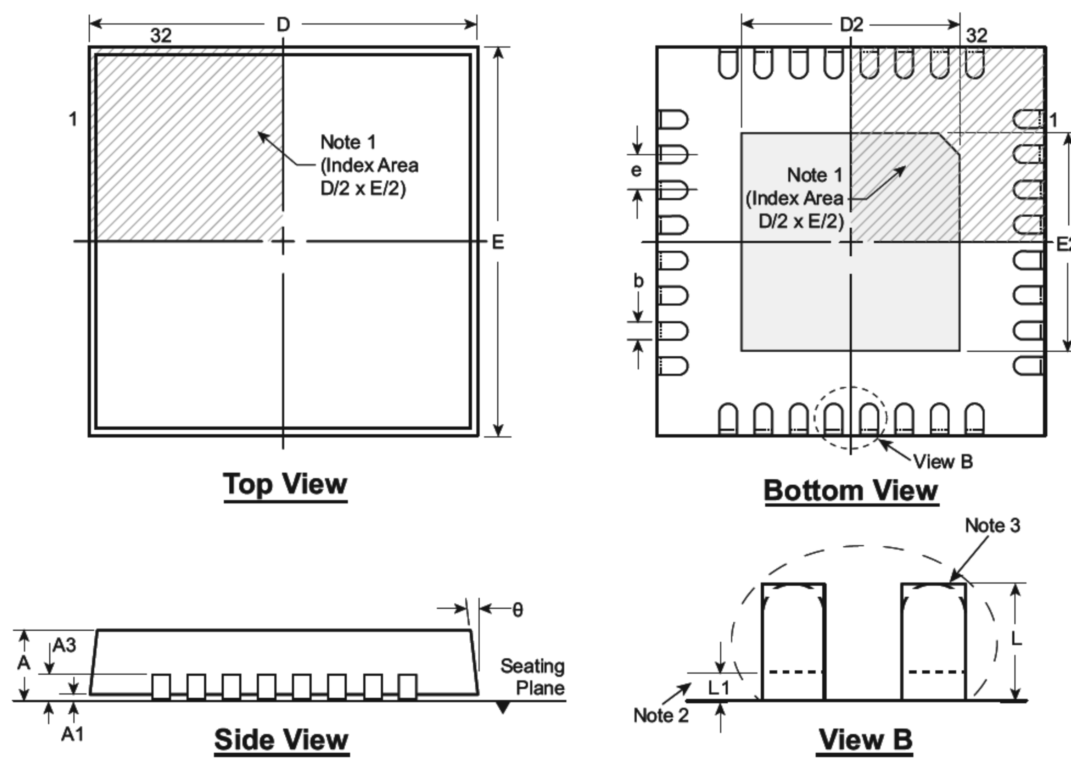
32-Lead QFN Package Outline (K7)

5.00x5.00mm body, 0.80mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.70	0.00	0.20 REF	0.18	4.85*	1.05	4.85*	1.05	0.50 BSC	0.30†	0.00	0°
	NOM	0.75	0.02		0.25	5.00	-	5.00	-		0.40†	-	-
	MAX	0.80	0.05		0.30	5.15*	3.55†	5.15*	3.55†		0.50†	0.15	14°

JEDEC Registration MO-220, Variation WHHD-6, Issue K, June 2006.

** This dimension is not specified in the JEDEC drawing.*

† This dimension differs from the JEDEC drawing.

Drawings not to scale.

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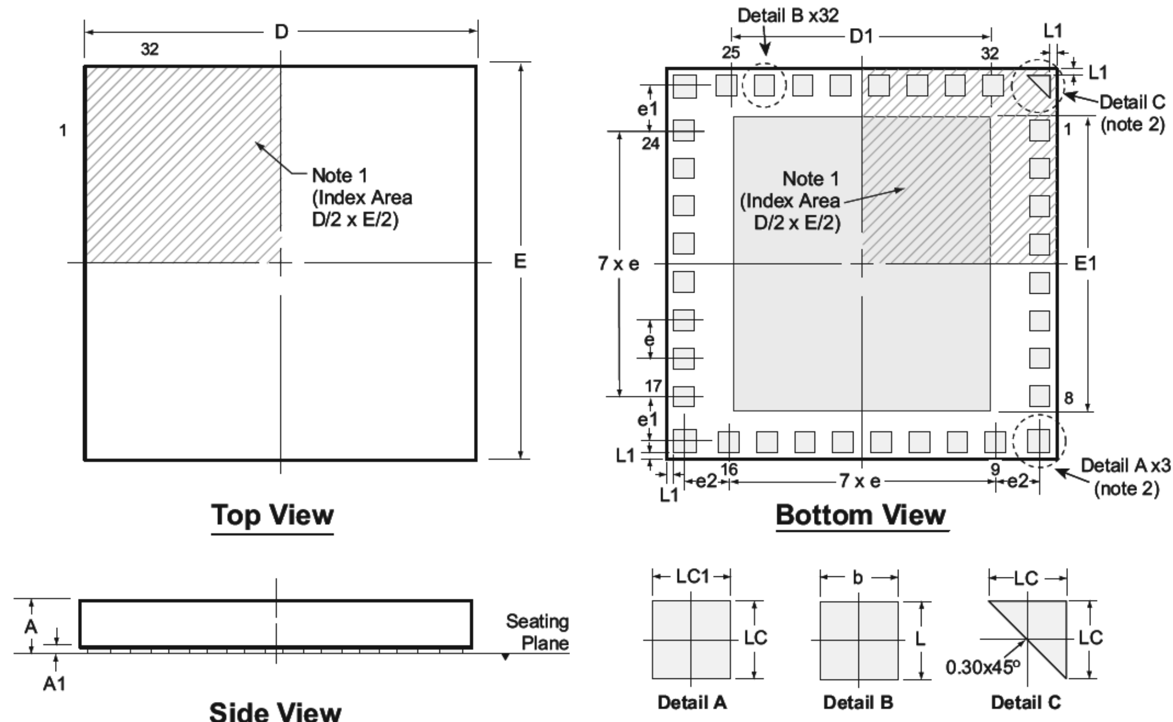
32-Lead QFN Package Outline (K7)

6.00x6.00mm body, 0.80mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

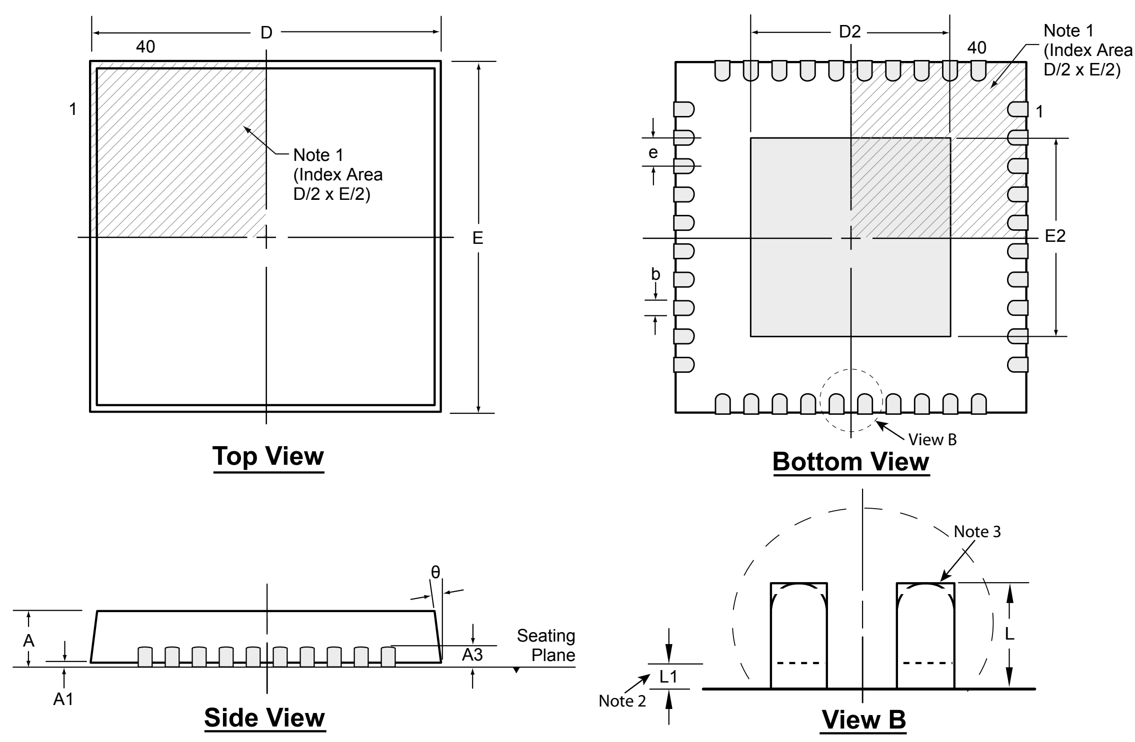
1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *The 4 corner pads are for mechanical placement only, they are not internally connected.*

Symbol		A	A1	b	D	D1	E	E1	e	e1	e2	L	L1	LC	LC1
Dimension (mm)	MIN	0.70	0.00	0.20	5.90	3.20	5.90	4.30	0.50 BSC	1.00 REF	0.975 REF	0.20	0.10 REF	0.20	0.25
	NOM	0.75	-	0.30	6.00	3.30	6.00	4.40				0.30		0.30	0.35
	MAX	0.80	0.05	0.40	6.10	3.40	6.10	4.50				0.40		0.40	0.45

Drawings not to scale.

40-Lead QFN Package Outline (K7)

5.00x5.00mm body, 0.80mm height (max), 0.40mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.70	0.00	0.20 REF	0.15	4.85*	3.45	4.85*	3.45	0.40 BSC	0.25†	0.00	0°
	NOM	0.75	0.02		0.20	5.00	3.60	5.00	3.60		0.35†	-	-
	MAX	0.80	0.05		0.25	5.15*	3.70†	5.15*	3.70†		0.45†	0.15	14°

JEDEC Registration MO-220, Variation WHHE-1, Issue K, June 2006
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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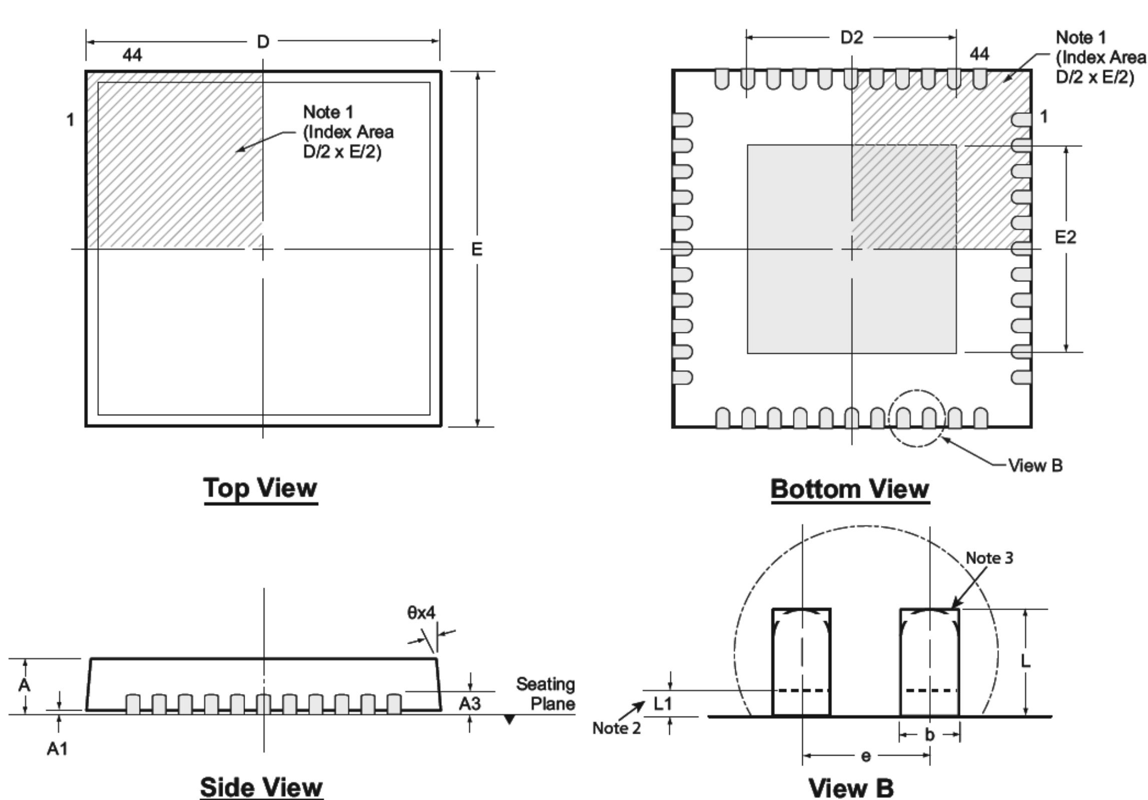
44-Lead QFN Package Outline (K7)

7.00x7.00mm body, 0.80mm height (max), 0.50mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*
2. *Depending on the method of manufacturing, a maximum of 0.15mm pullback (L1) may be present.*
3. *The inner tip of the lead may be either rounded or square.*

Symbol		A	A1	A3	b	D	D2	E	E2	e	L	L1	θ
Dimension (mm)	MIN	0.70	0.00	0.20 REF	0.18	6.85*	5.00†	6.85*	5.00†	0.50 BSC	0.45†	0.00	0°
	NOM	0.75	0.02		0.25	7.00	5.15†	7.00	5.15†		0.55†	-	-
	MAX	0.80	0.05		0.30	7.15*	5.25†	7.15*	5.25†		0.65†	0.15	14°

JEDEC Registration MO-220, Variation WKKD-3, Issue K, June 2006
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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NOTES:

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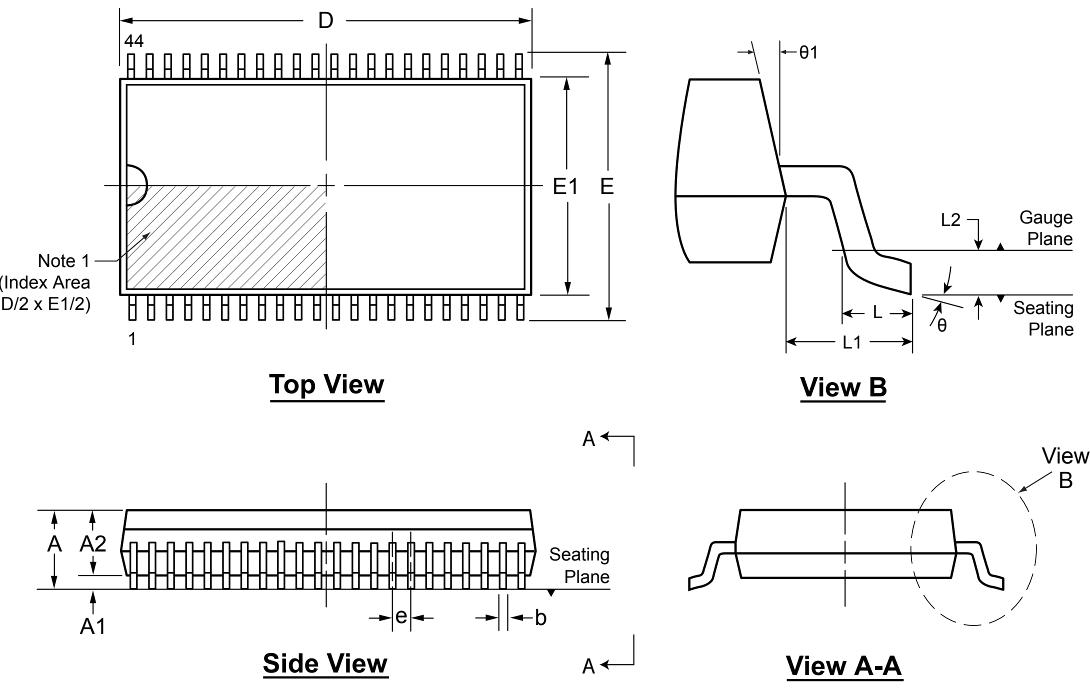
QSOP

Supertex Legacy

44-Lead QSOP Package Outline (QP)

17.83x7.50mm body, 2.64mm height (max), 0.80mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	L	L1	L2	θ	θ1
Dimensions (mm)	MIN	2.44	0.10	2.34	0.28	17.73	10.11	7.40	0.80 REF	0.40	1.405 REF	0.355 BSC	0°	7° TYP
	NOM	-	-	-	-	-	-	-		-			-	
	MAX	2.64	0.30	2.54	0.51	17.93	10.51	7.60		1.27			8°	

Drawings are not to scale.

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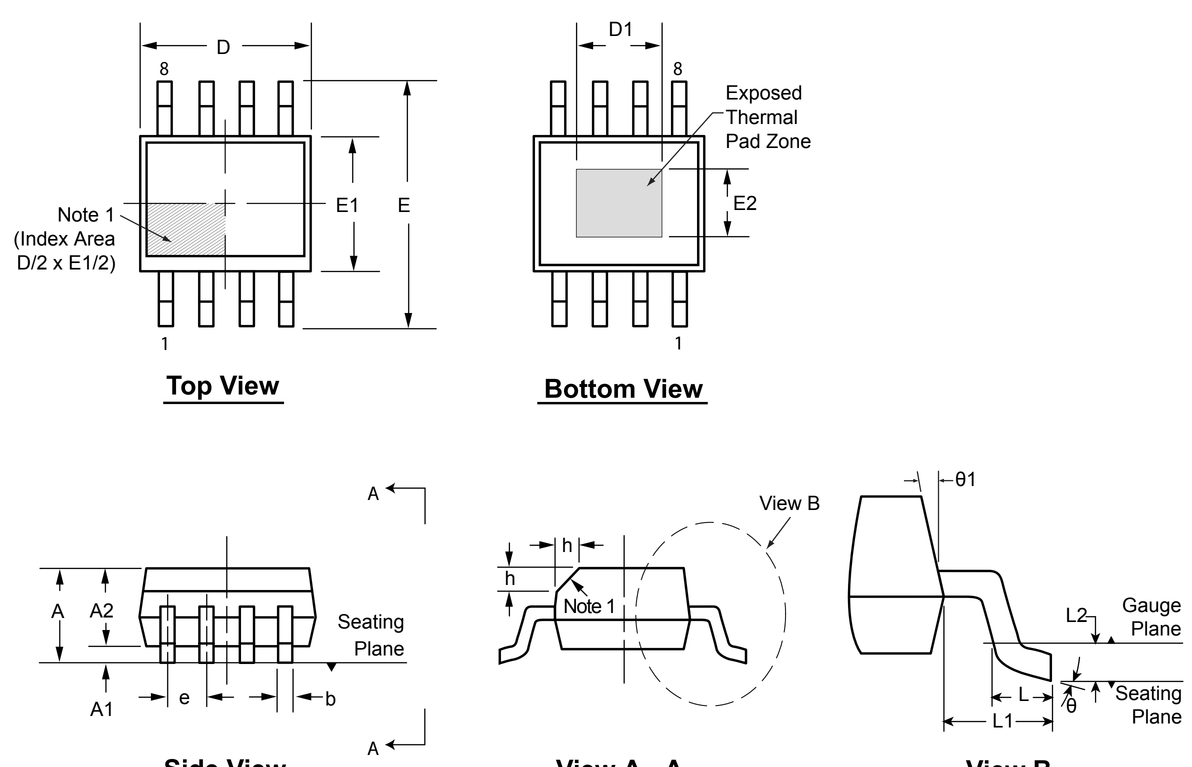
Package Outlines and Dimensions

SOIC

Supertex Legacy

8-Lead SOIC (Narrow Body w/Heat Slug) Package Outline (SG)

4.90x3.90mm body, 1.70mm height (max), 1.27mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *If optional chamfer feature is not present, a Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	D1	E	E1	E2	e	h	L	L1	L2	θ	θ1
Dimension (mm)	MIN	1.25*	0.00	1.25	0.31	4.80*	3.30†	5.80*	3.80*	2.29†	1.27 BSC	0.25	0.40	1.04 REF	0.25 BSC	0°	5°
	NOM	-	-	-	-	4.90	-	6.00	3.90	-		-	-			-	-
	MAX	1.70	0.15	1.55*	0.51	5.00*	3.81†	6.20*	4.00*	2.79†		0.50	1.27			8°	15°

JEDEC Registration MS-012, Variation BA, Issue E, Sept. 2005.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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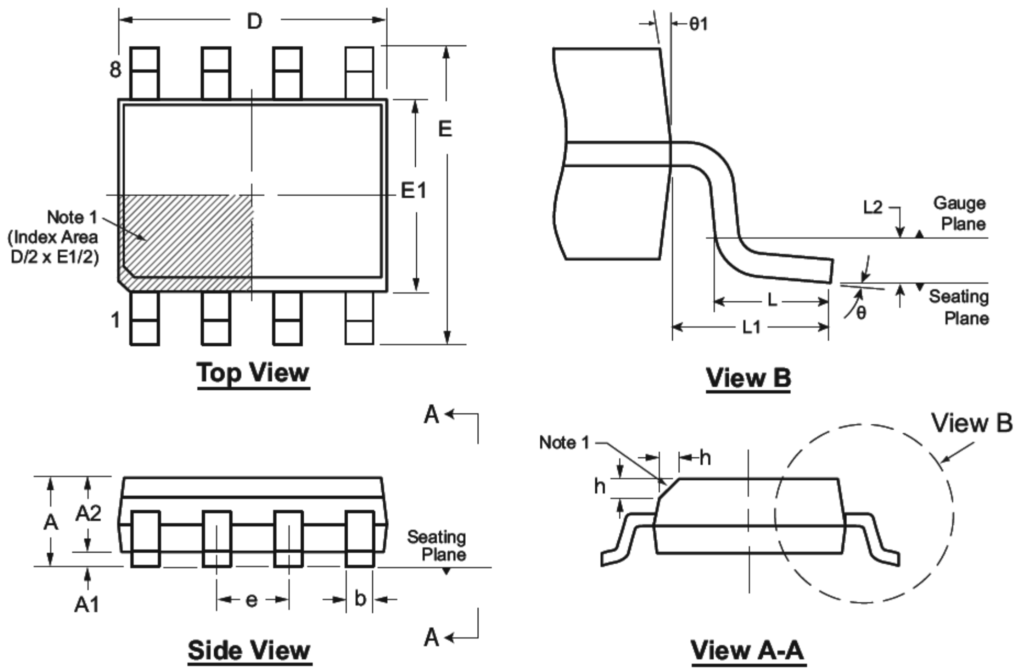
8-Lead SOIC (Narrow Body) Package Outline (LG/TG)

4.90x3.90mm body, 1.75mm height (max), 1.27mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

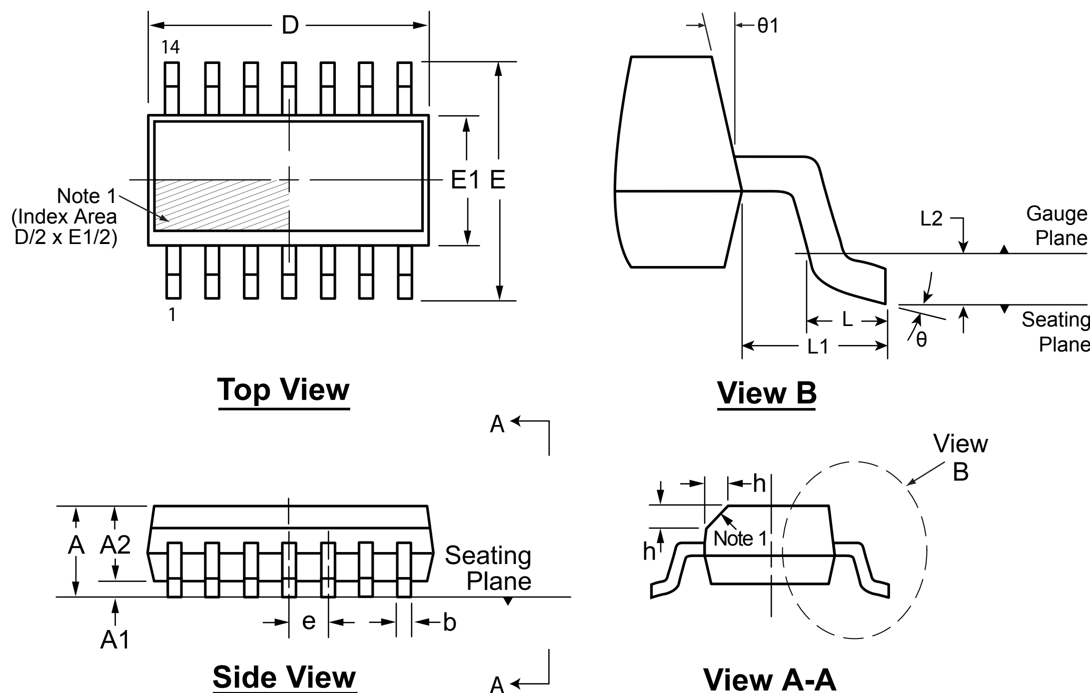
Note:
1. *This chamfer feature is optional. A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	h	L	L1	L2	θ	θ1
Dimension (mm)	MIN	1.35*	0.10	1.25	0.31	4.80*	5.80*	3.80*	1.27 BSC	0.25	0.40	1.04 REF	0.25 BSC	0°	5°
	NOM	-	-	-	-	4.90	6.00	3.90		-	-			-	-
	MAX	1.75	0.25	1.65*	0.51	5.00*	6.20*	4.00*		0.50	1.27			8°	15°

JEDEC Registration MS-012, Variation AA, Issue E, Sept. 2005.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

14-Lead SOIC (Narrow Body) Package Outline (NG)

8.65x3.90mm body, 1.75mm height (max), 1.27mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *This chamfer feature is optional. If it is not present, then a Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	h	L	L1	L2	θ	θ1
Dimension (mm)	MIN	1.35*	0.10	1.25	0.31	8.55*	5.80*	3.80*	1.27 BSC	0.25	0.40	1.04 REF	0.25 BSC	0°	5°
	NOM	-	-	-	-	8.65	6.00	3.90		-	-			-	-
	MAX	1.75	0.25	1.65*	0.51	8.75*	6.20*	4.00*		0.50	1.27			8°	15°

JEDEC Registration MS-012, Variation AB, Issue E, Sept. 2005.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

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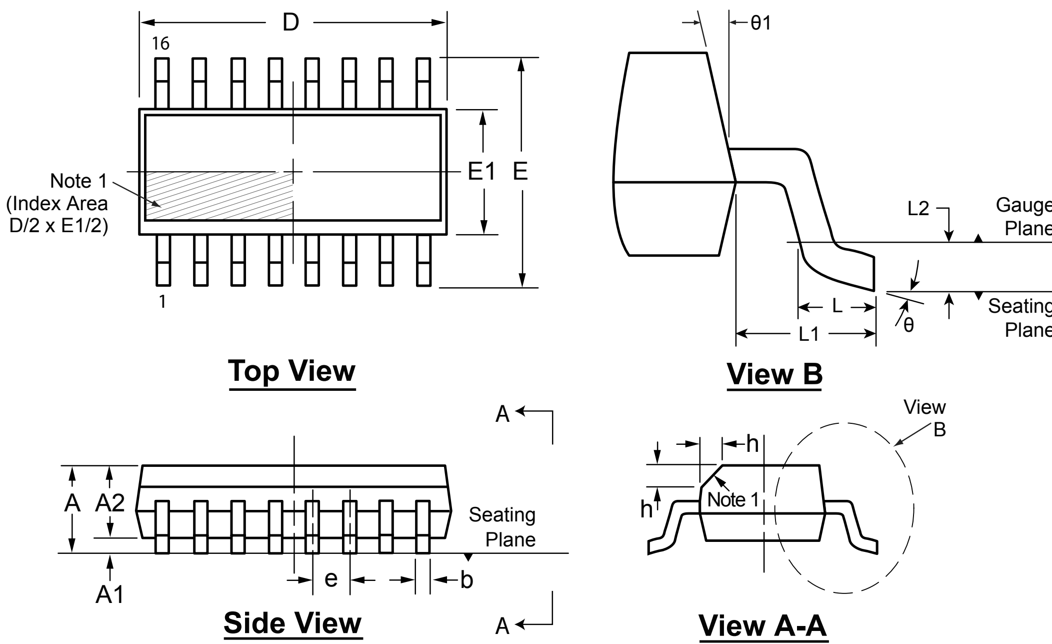
16-Lead SOIC (Narrow Body) Package Outline (NG)

9.90x3.90mm body, 1.75mm height (max), 1.27mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. This chamfer feature is optional. If it is not present, then a Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.

Symbol		A	A1	A2	b	D	E	E1	e	h	L	L1	L2	θ	θ1
Dimension (mm)	MIN	1.35*	0.10	1.25	0.31	9.80*	5.80*	3.80*	1.27 BSC	0.25	0.40	1.04 REF	0.25 BSC	0°	5°
	NOM	-	-	-	-	9.90	6.00	3.90		-	-			-	-
	MAX	1.75	0.25	1.65*	0.51	10.00*	6.20*	4.00*		0.50	1.27			8°	15°

JEDEC Registration MS-012, Variation AC, Issue E, Sept. 2005.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

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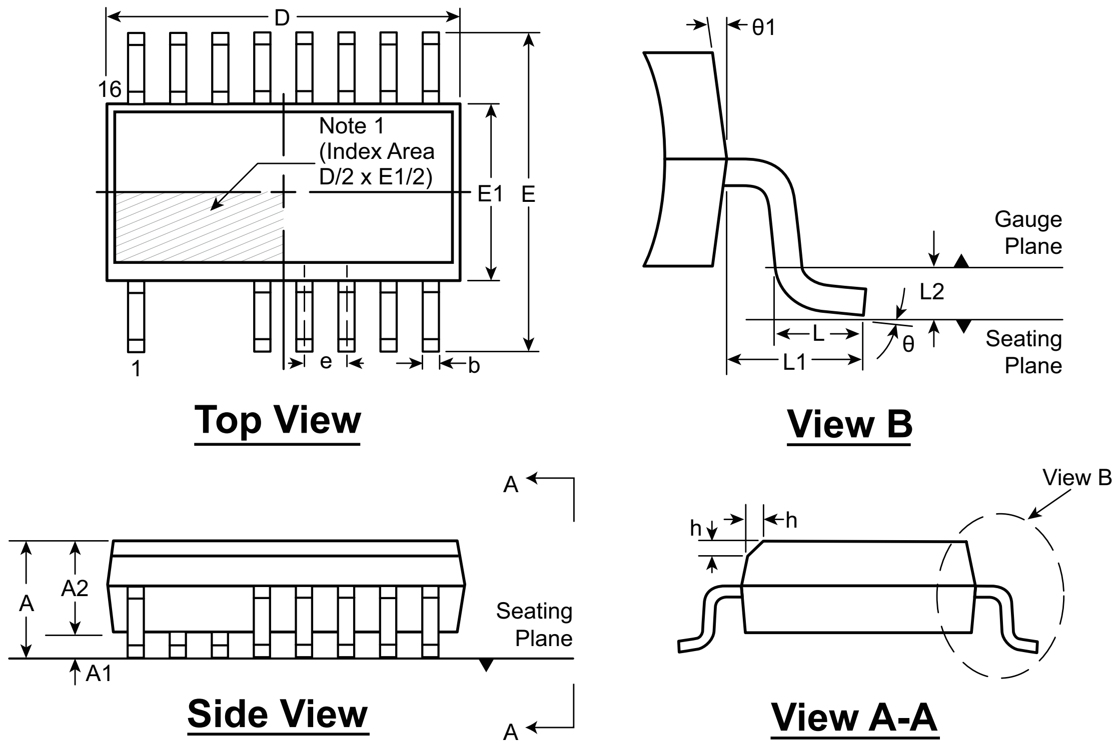
16-Lead SOIC (Narrow Body) Package Outline (NG) Pins #2 and #3 Trimmed

9.90x3.90mm body, 1.75mm height (max), 1.27mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *This chamfer feature is optional. If it is not present, then a Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	h	L	L1	L2	θ	θ1
Dimension (mm)	MIN	1.35*	0.10	1.25	0.31	9.80*	5.80*	3.80*	1.27 BSC	0.25	0.40	1.04 REF	0.25 BSC	0°	5°
	NOM	-	-	-	-	9.90	6.00	3.90		-	-			-	-
	MAX	1.75	0.25	1.65*	0.51	10.00*	6.20*	4.00*		0.50	1.27			8°	15°

JEDEC Registration MS-012, Variation AC, Issue E, Sept. 2005.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

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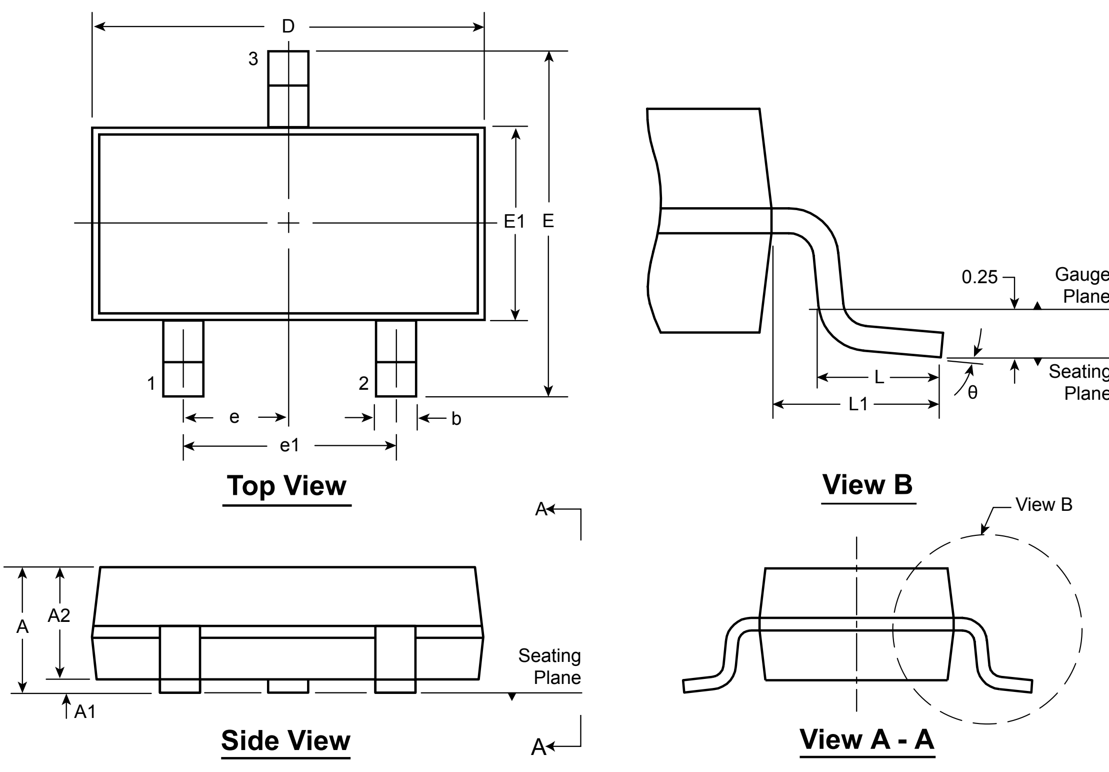
SOT-23

Supertex Legacy

3-Lead TO-236AB (SOT-23) Package Outline (K1/T)

2.90x1.30mm body, 1.12mm height (max), 1.90mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Symbol		A	A1	A2	b	D	E	E1	e	e1	L	L1	θ
Dimension (mm)	MIN	0.89	0.01	0.88	0.30	2.80	2.10	1.20	0.95 BSC	1.90 BSC	0.20†	0.54 REF	0°
	NOM	-	-	0.95	-	2.90	-	1.30			0.50		-
	MAX	1.12	0.10	1.02	0.50	3.04	2.64	1.40			0.60		8°

JEDEC Registration TO-236, Variation AB, Issue H, Jan. 1999.
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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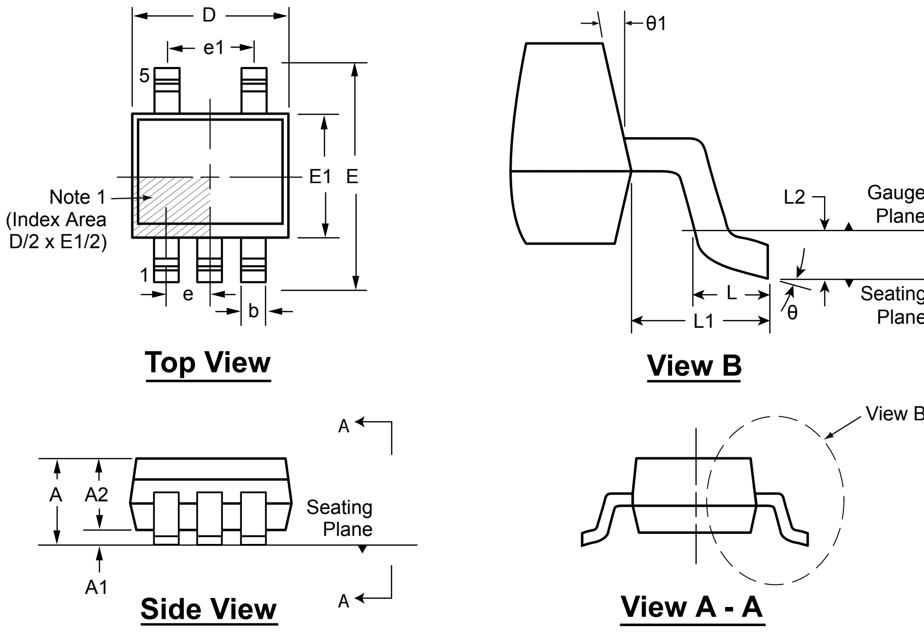
5-Lead SOT-23 Package Outline (K1)

2.90x1.60mm body, 1.45mm height (max), 0.95mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	e1	L	L1	L2	θ	θ1
Dimension (mm)	MIN	0.90*	0.00	0.90	0.30	2.75*	2.60*	1.45*	0.95 BSC	1.90 BSC	0.30	0.60 REF	0.25 BSC	0°	5°
	NOM	-	-	1.15	-	2.90	2.80	1.60			0.45			4°	10°
	MAX	1.45	0.15	1.30	0.50	3.05*	3.00*	1.75*			0.60			8°	15°

JEDEC Registration MO-178, Variation AA, Issue C, Feb. 2000.
** This dimension is not specified in the JEDEC drawing.*
Drawings not to scale.

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NOTES:

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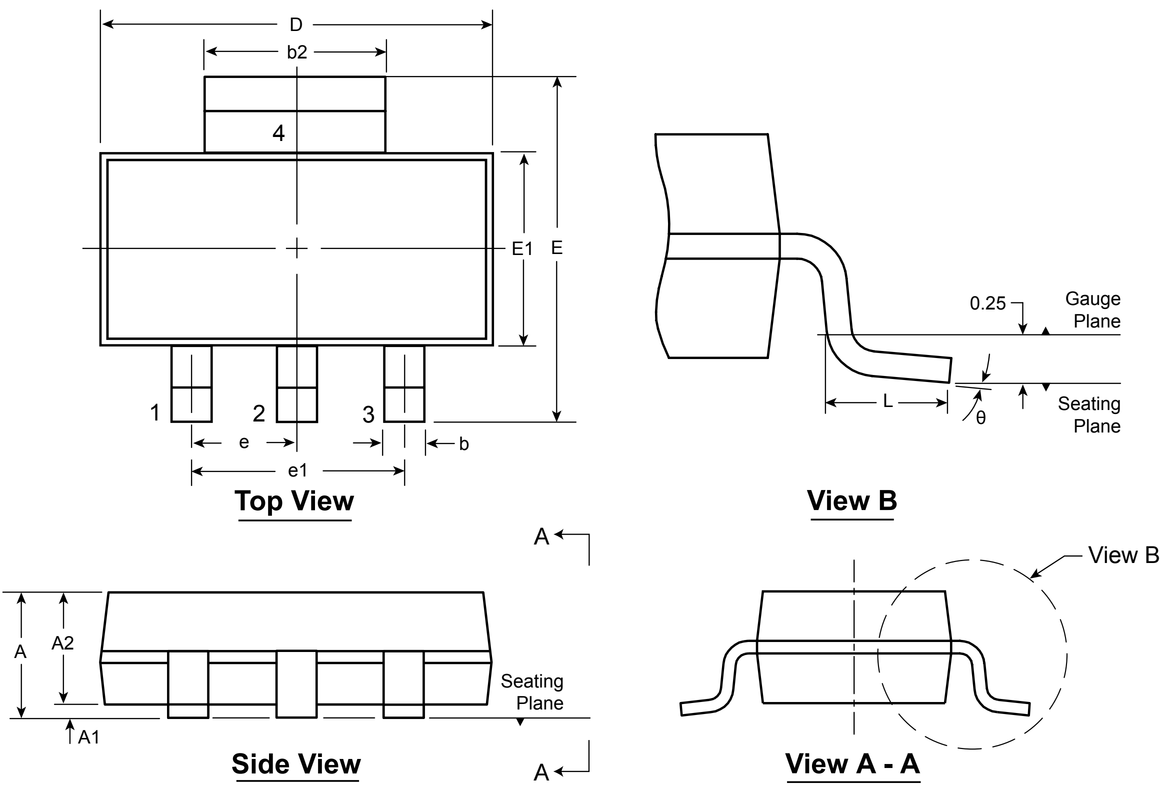
SOT-223

Supertex Legacy

3-Lead SOT-223 Package Outline (K5)

6.50x3.50mm body, 1.80mm height (max), 2.30mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Symbol		A	A1	A2	b	b2	D	E	E1	e	e1	L	θ
Dimension (mm)	MIN	1.48*	0.02	1.50	0.65†	2.90	6.30	6.70	3.30	2.30 BSC	4.60 BSC	0.75	0°
	NOM	-	-	1.60	0.76	3.00	6.50	7.00	3.50			-	-
	MAX	1.80	0.10	1.70	0.85†	3.15†	6.70	7.30	3.70			-	10°

JEDEC Registration TO-261, Variation AA, Issue C, May 2002.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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SOW

Supertex Legacy

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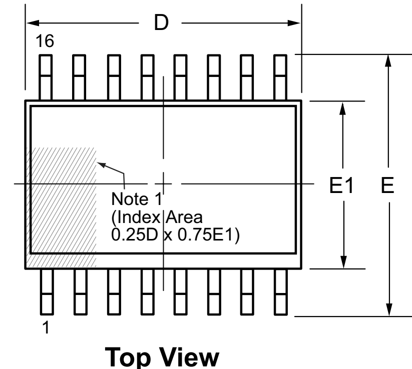
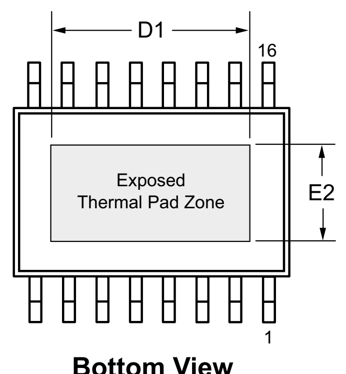
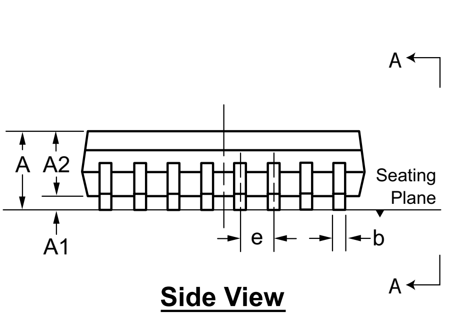
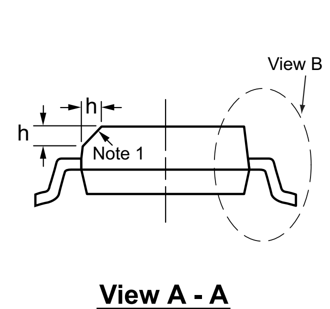
16-Lead SOW (Wide Body w/Heat Slug) Package Outline (SG)

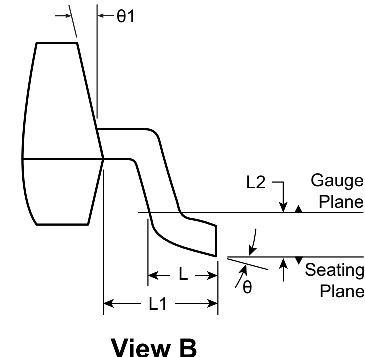
10.30x7.50mm body, 2.64mm height (max), 1.27mm pitch











Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:

1. *If optional chamfer feature is not present, a Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	D1	E	E1	E2	e	h	L	L1	L2	θ	θ1
Dimension (mm)	MIN	2.06*	0.00	2.03†	0.31	10.10*	5.84†	9.97*	7.40*	4.57†	1.27 BSC	0.25	0.40	1.40 REF	0.25 BSC	0°	5°
	NOM	-	-	-	-	10.30	-	10.30	7.50	-		-	-			-	-
	MAX	2.64†	0.15	2.54*	0.51	10.50*	6.35†	10.63*	7.60*	5.08†		0.75	1.27			8°	15°

JEDEC Registration MS-013, Variation BA, Issue E, 2005.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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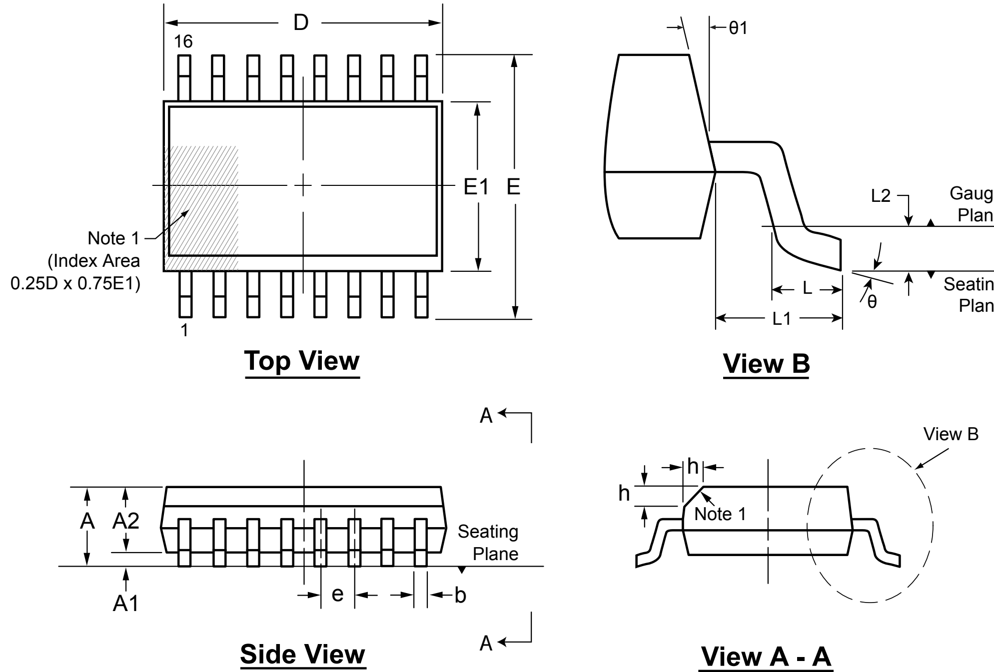
16-Lead SOW (Wide Body) Package Outline (WG)

10.30x7.50mm body, 2.65mm height (max), 1.27mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	h	L	L1	L2	θ	θ1
Dimension (mm)	MIN	2.15*	0.10	2.05	0.31	10.10*	9.97*	7.40*		0.25	0.40			0°	5°
	NOM	-	-	-	-	10.30	10.30	7.50	1.27 BSC	-	-	1.40 REF	0.25 BSC	-	-
	MAX	2.65	0.30	2.55*	0.51	10.50*	10.63*	7.60*		0.75	1.27			8°	15°

JEDEC Registration MS-013, Variation AA, Issue E, Sep. 2005.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

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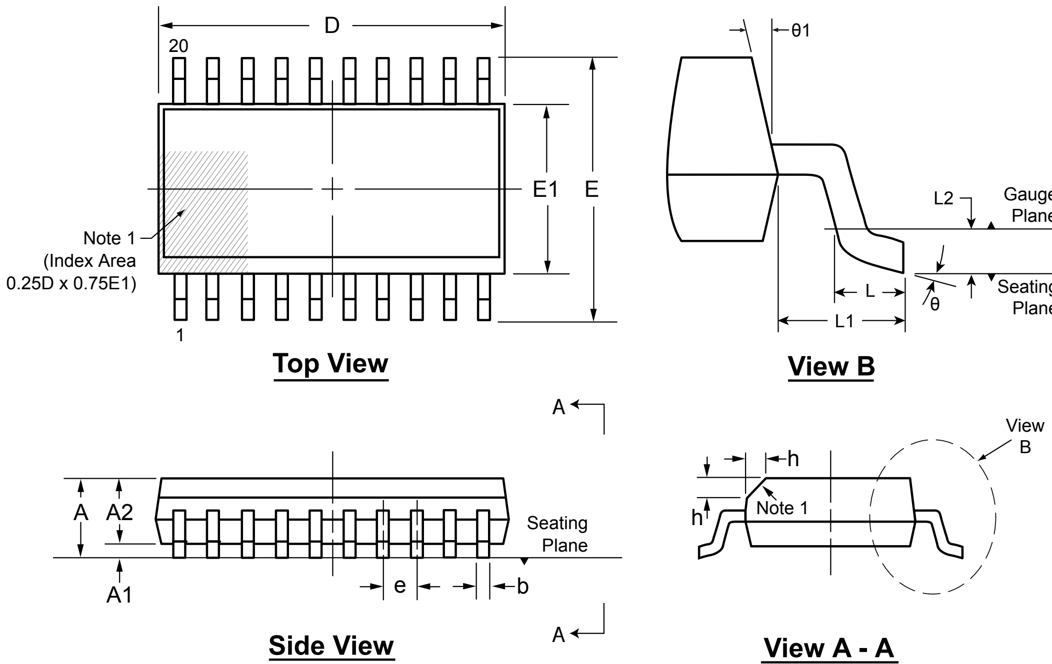
20-Lead SOW (Wide Body) Package Outline (WG)

12.80x7.50mm body, 2.65mm height (max), 1.27mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	h	L	L1	L2	θ	θ1
Dimension (mm)	MIN	2.15*	0.10	2.05	0.31	12.60*	9.97*	7.40*	1.27 BSC	0.25	0.40	1.40 REF	0.25 BSC	0°	5°
	NOM	-	-	-	-	12.80	10.30	7.50		-	-			-	-
	MAX	2.65	0.30	2.55*	0.51	13.00*	10.63*	7.60*		0.75	1.27			8°	15°

JEDEC Registration MS-013, Variation AC, Issue E, Sep. 2005.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

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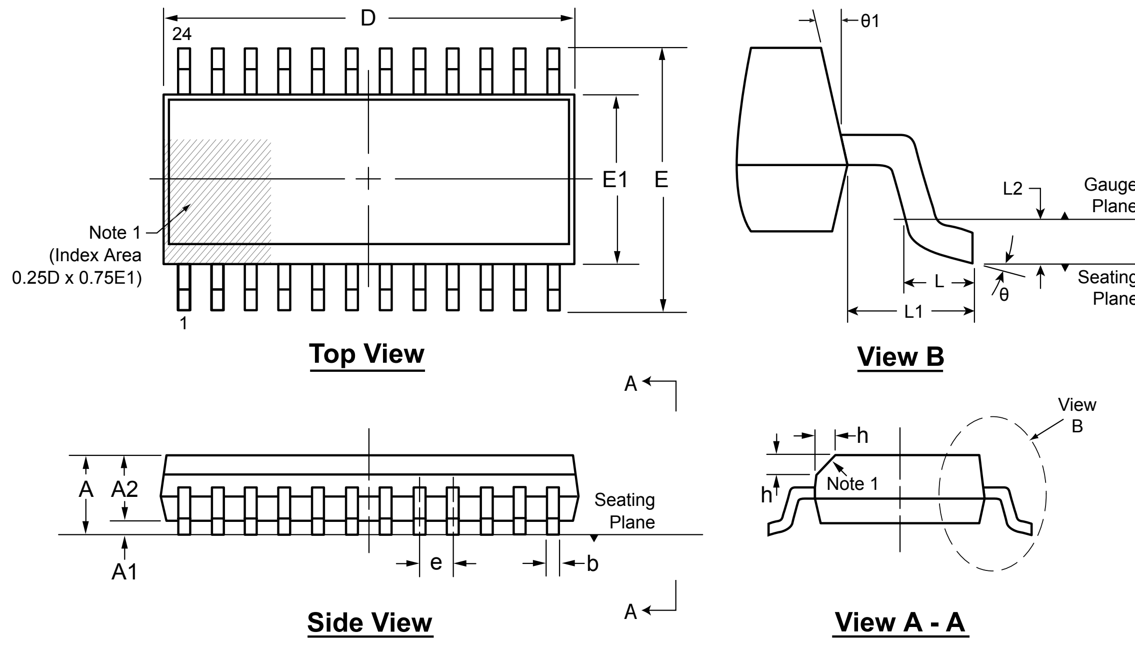
24-Lead SOW (Wide Body) Package Outline (WG)

15.40x7.50 body, 2.65mm height (max), 1.27mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.

Symbol		A	A1	A2	b	D	E	E1	e	h	L	L1	L2	θ	θ1
Dimension (mm)	MIN	2.15*	0.10	2.05	0.31	15.20*	9.97*	7.40*	1.27 BSC	0.25	0.40	1.40 REF	0.25 BSC	0°	5°
	NOM	-	-	-	-	15.40	10.30	7.50		-	-			-	-
	MAX	2.65	0.30	2.55*	0.51	15.60*	10.63*	7.60*		0.75	1.27			8°	15°

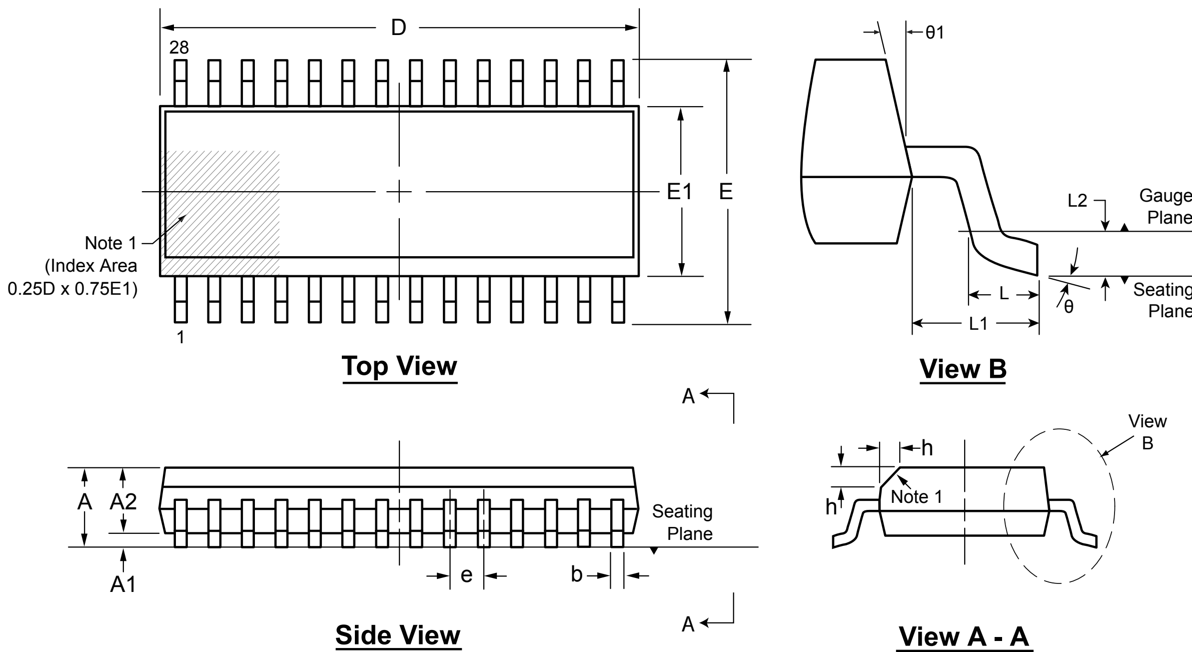
JEDEC Registration MS-013, Variation AD, Issue E, Sep. 2005.

** This dimension is not specified in the JEDEC drawing.*

Drawings are not to scale.

28-Lead SOW (Wide Body) Package Outline (WG)

17.90x7.50mm body, 2.65mm height (max), 1.27mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	h	L	L1	L2	θ	θ1
Dimension (mm)	MIN	2.15*	0.10	2.05	0.31	17.70*	9.97*	7.40*	1.27 BSC	0.25	0.40	1.40 REF	0.25 BSC	0°	5°
	NOM	-	-	-	-	17.90	10.30	7.50		-	-			-	-
	MAX	2.65	0.30	2.55*	0.51	18.10*	10.63*	7.60*		0.75	1.27			8°	15°

JEDEC Registration MS-013, Variation AE, Issue E, Sep. 2005.
** This dimension is not specified in the JEDEC drawing.*
Drawings are not to scale.

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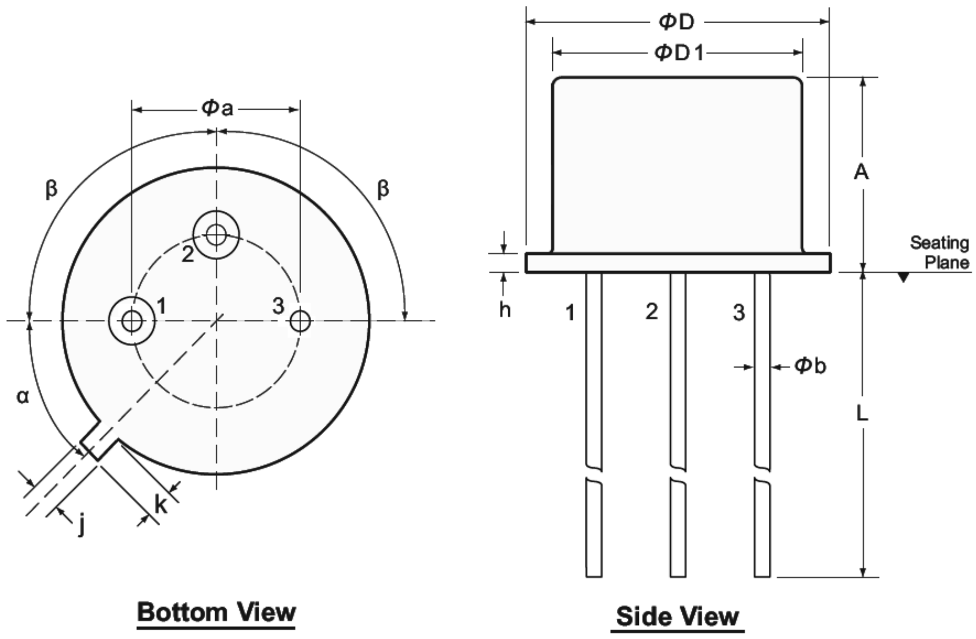
TO-39

Supertex Legacy

3-Lead TO-39 Package Outline (N2)



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Symbol		α	β	A	Φa	Φb	ΦD	ΦD1	h	j	k	L
Dimension (inches)	MIN	45° NOM	90° NOM	.240	.190	.016	.350	.315	.009	.028	.029	.500
	NOM			-	-	-	-	-	-	-	-	-
	MAX			.260	.210	.021	.370	.335	.125	.034	.040	.560*

JEDEC Registration TO-39.
** This dimension is not specified in the JEDEC drawing.*
Drawings not to scale.

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TO-92

Supertex Legacy

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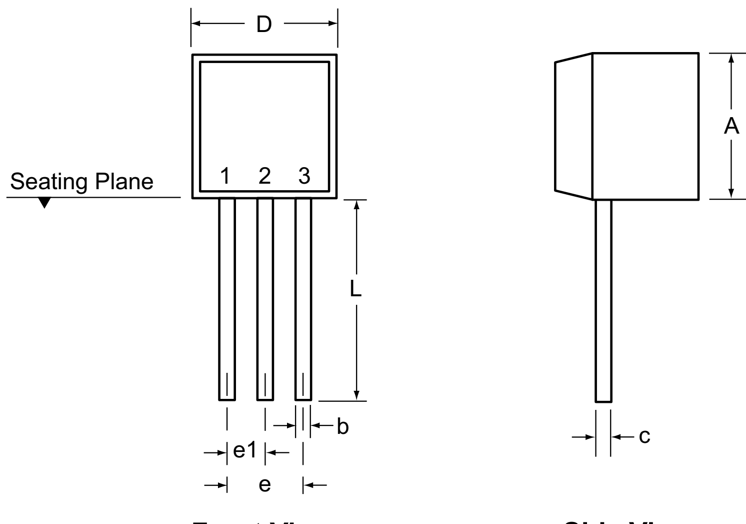
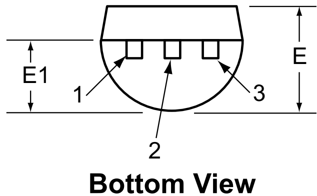
3-Lead TO-92 Package Outline (L/LL/N3)





Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Symbol		A	b	c	D	E	E1	e	e1	L
Dimensions (inches)	MIN	.170	.014†	.014†	.175	.125	.080	.095	.045	.500
	NOM	-	-	-	-	-	-	-	-	-
	MAX	.210	.022†	.022†	.205	.165	.105	.105	.055	.610*

JEDEC Registration TO-92.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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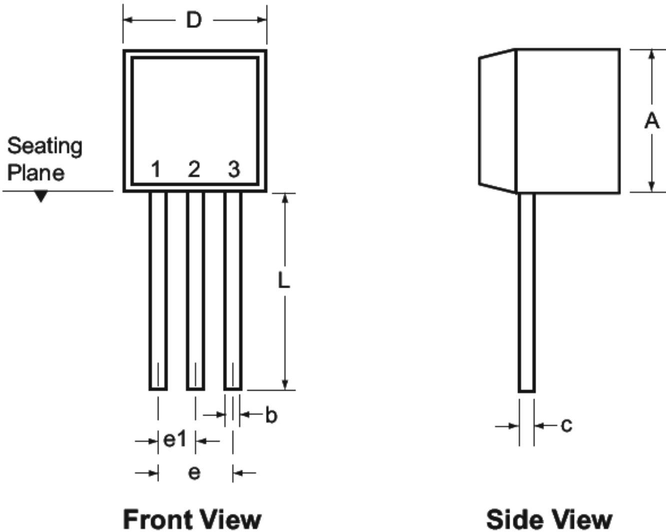
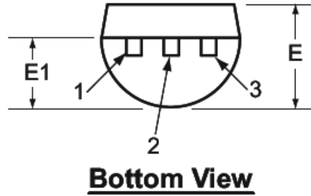
3-Lead TO-92 Package Outline (L/LL/N3)





Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Symbol		A	b	c	D	E	E1	e	e1	L
Dimensions (inches)	MIN	.170	.014†	.014†	.175	.125	.080	.095	.045	.500
	NOM	-	-	-	-	-	-	-	-	-
	MAX	.210	.022†	.022†	.205	.165	.105	.105	.055	.610*

JEDEC Registration TO-92.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

NOTES:

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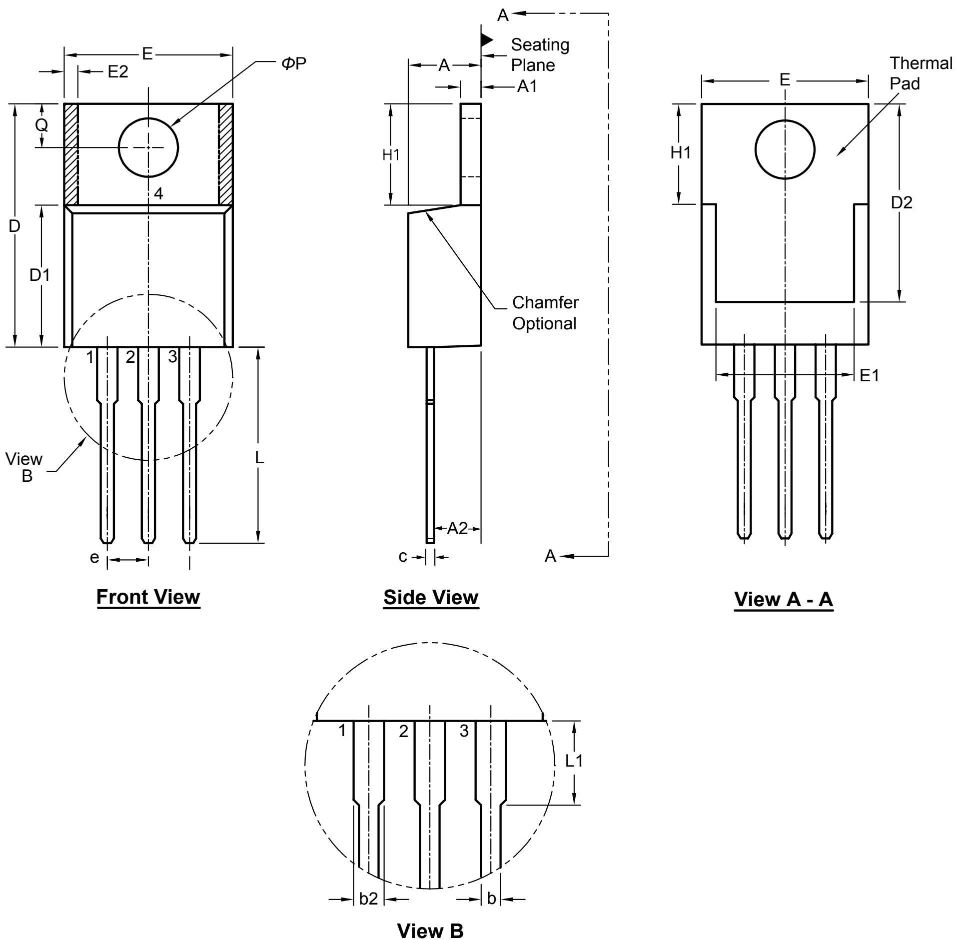
TO-220

Supertex Legacy

3-Lead TO-220 Package Outline (N5)



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Symbol		A	A1	A2	b	b2	c	D	D1	D2	E	E1	E2	e	H1	L	L1	Q	ΦP
Dimen-sion (inches)	MIN	.140	.020	.080	.015	.045	.012†	.560	.326†	.474†	.380	.270	0.20*		.230	.500	.200*	.100	.139
	NOM	-	-	-	.027	.057	-	-	-	-	-	-	-	.100 BSC	-	-	-	-	-
	MAX	.190	.055	.120†	.040	.070	.024	.650	.361†	.507	.420	.350	.030		.270	.580	.250	.135	.161

JEDEC Registration TO-220, Variation AB, Issue K, April 2002.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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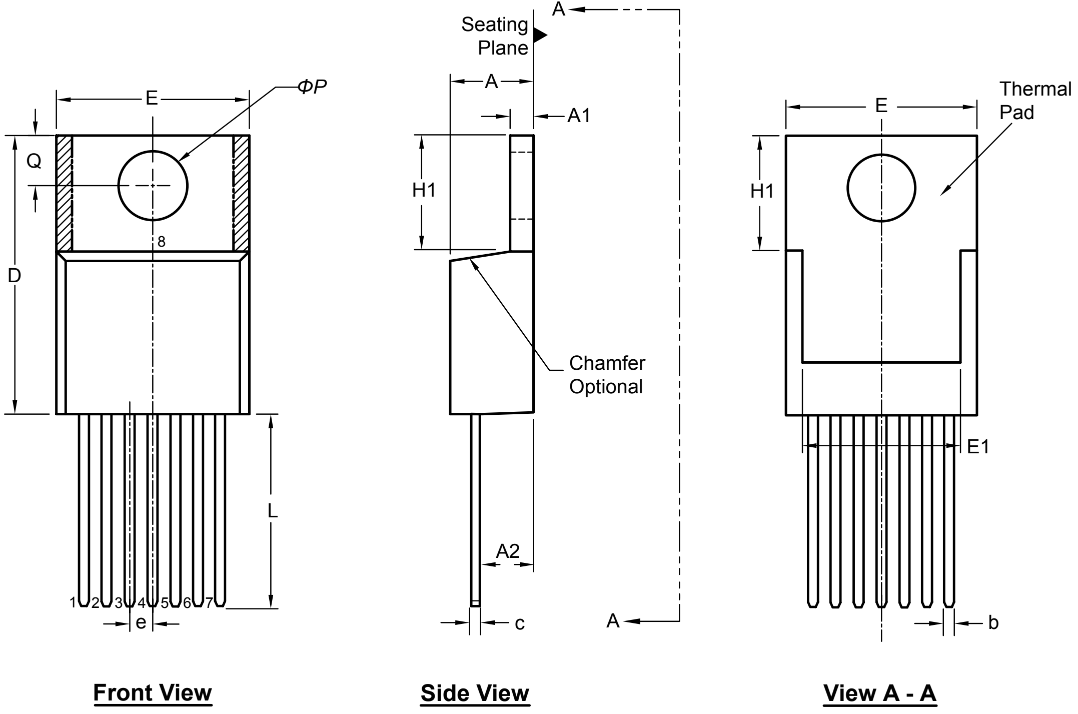
7-Lead TO-220 Package Outline (K2)



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Symbol		A	A1	A2	b	c	D	E	E1	e	H1	L	Q	ΦP
Dimension (inches)	MIN	.160	.045	.090	.023	.015	.560	.385	.300 REF	.045	.234	.540	.103	.146
	NOM	-	-	-	-	-	-	-		-	-	-	-	-
	MAX	.190	.055	.115	.037	.022	.590	.415		.055	.258	.560	.113	.156

Drawings not to scale.

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NOTES:

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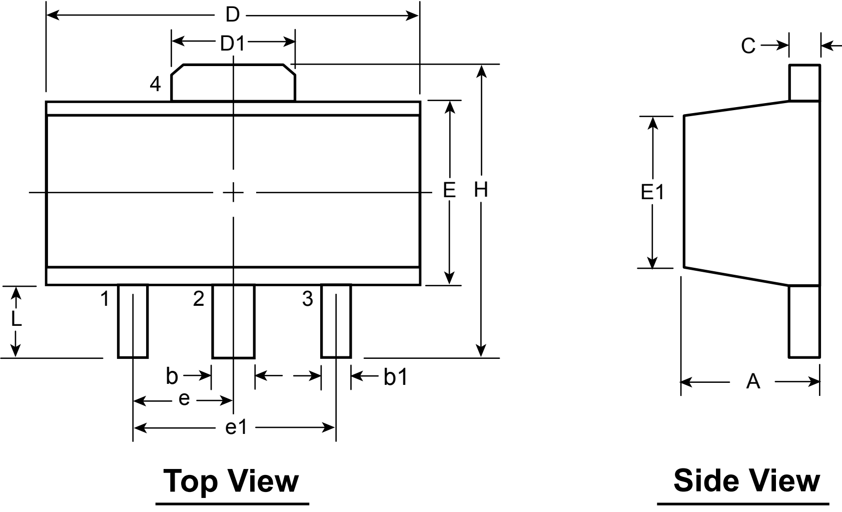
TO-243

Supertex Legacy

3-Lead TO-243AA (SOT-89) Package Outline (N8)



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Symbol		A	b	b1	C	D	D1	E	E1	e	e1	H	L
Dimensions (mm)	MIN	1.40	0.44	0.36	0.35	4.40	1.62	2.29	2.00†	1.50 BSC	3.00 BSC	3.94	0.73†
	NOM	-	-	-	-	-	-	-	-			-	-
	MAX	1.60	0.56	0.48	0.44	4.60	1.83	2.60	2.29			4.25	1.20

JEDEC Registration TO-243, Variation AA, Issue C, July 1986.
† This dimension differs from the JEDEC drawing
***Drawings not to scale**.*

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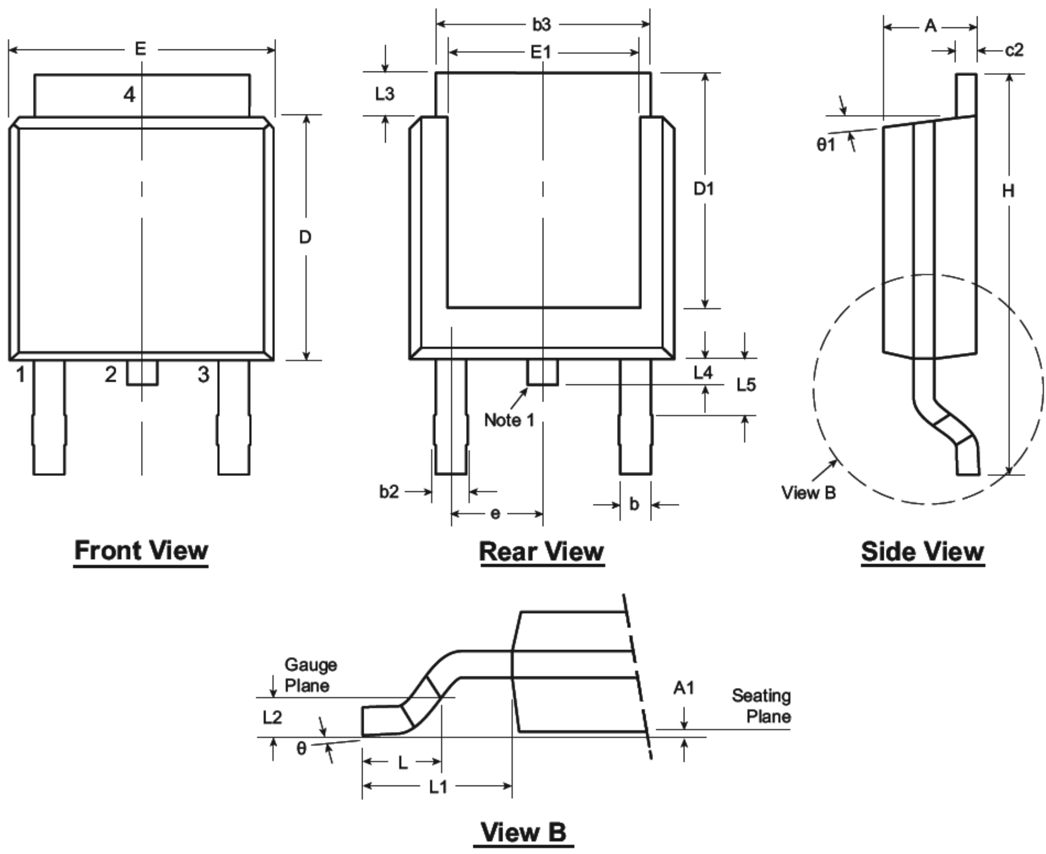
TO-252

Supertex Legacy

3-Lead TO-252 (D-PAK) Package Outline (K4)



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *Although 4 terminal locations are shown, only 3 are functional. Lead number 2 was removed.*

Symbol		A	A1	b	b2	b3	c2	D	D1	E	E1	e	H	L	L1	L2	L3	L4	L5	θ	θ1
Dimen-sion (inches)	MIN	.086	.000*	.025	.030	.195	.018	.235	.205	.250	.170	.090 BSC	.370	.055	.108 REF	.020 BSC	.035	.025*	.035†	0°	0°
	NOM	-	-	-	-	-	-	.240	-	-	-		-	.060			-	-	-	-	-
	MAX	.094	.005	.035	.045	.215	.035	.245	.217*	.265	.200*		.410	.070			.050	.040	.060	10°	15°

JEDEC Registration TO-252, Variation AA, Issue E, June 2004.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings not to scale.

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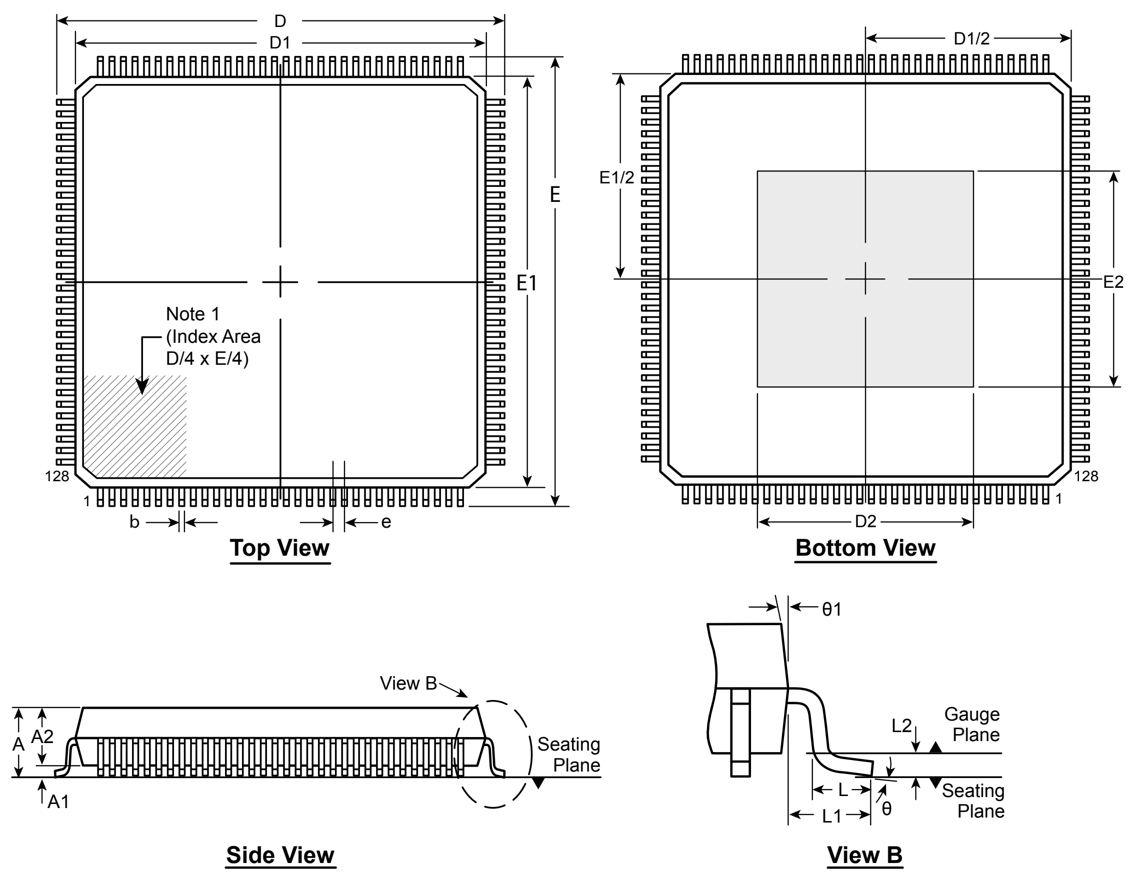
TQFP

Supertex Legacy

128-Lead TQFP (w/Heat Slug) Package Outline (HF)

14.00x14.00mm body, 1.20mm height (max), 0.40mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	D1	D2	E	E1	E2	e	L	L1	L2	θ	θ1
Dimension (mm)	MIN	-	0.05	0.95	0.13	16.00 BSC	14.00 BSC	9.50 BSC	16.00 BSC	14.00 BSC	9.50 BSC	0.40 BSC	0.45	1.00 REF	0.25 BSC	0°	11°
	NOM	-	-	1.00	0.18								0.60			3.5°	12°
	MAX	1.20	0.15	1.05	0.23								0.75			7°	13°

Drawings not to scale.

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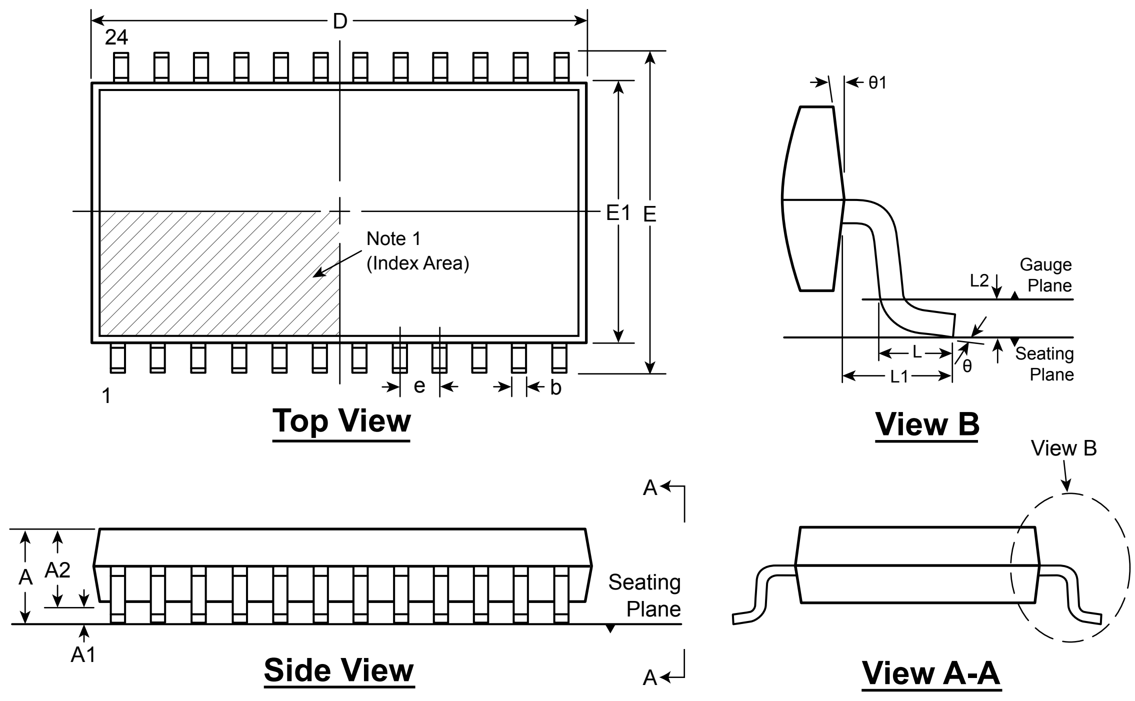
TSSOP

Supertex Legacy

24-Lead TSSOP Package Outline (TS)

7.80x4.40mm body, 1.20mm height (max), 0.65mm pitch



Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:

1. *A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.*

Symbol		A	A1	A2	b	D	E	E1	e	L	L1	L2	θ	θ1
Dimension (mm)	MIN	0.85*	0.05	0.80	0.19	7.70	6.20*	4.30	0.65 BSC	0.45	1.00 REF	0.25 BSC	0°	12° REF
	NOM	-	-	1.00	-	7.80	6.40	4.40		0.60			-	
	MAX	1.20	0.15	1.15†	0.30	7.90	6.60*	4.50		0.75			8°	

JEDEC Registration MS-153, Variation AD, Issue F, May 2001.
** This dimension is not specified in the JEDEC drawing.*
† This dimension differs from the JEDEC drawing.
Drawings are not to scale.

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Legacy Micrel Package Drawings & Specifications

NOTES:

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CDFN

Micrel Legacy

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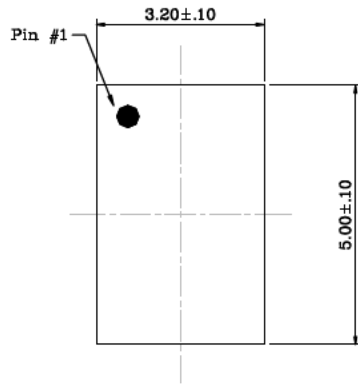
Package Outlines and Dimensions

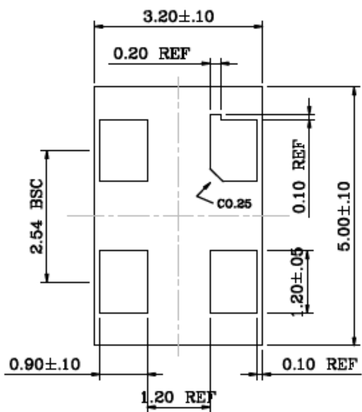
TITLE

4 LEAD CDFN 5.0x3.2mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

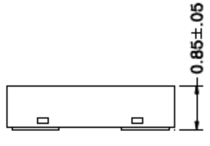
DRAWING #	CDFN5032-4LD-PL-1	UNIT	MM



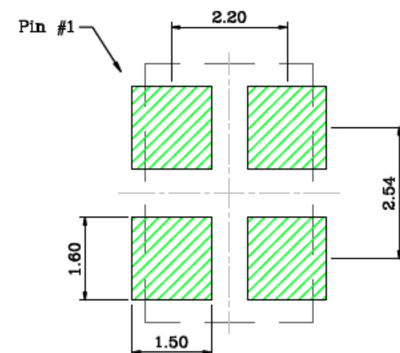
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:

1. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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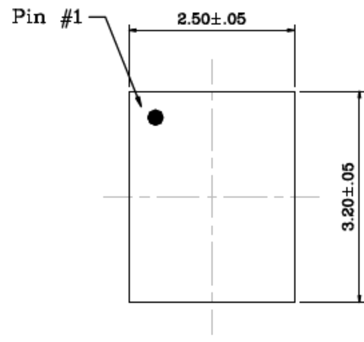
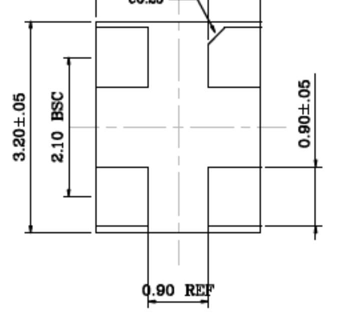
TITLE
4 LEAD CDFN 3.2x2.5mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

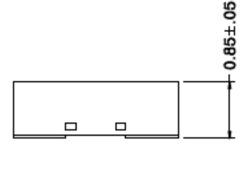
DRAWING #	CDFN3225-4LD-PL-1	UNIT	MM



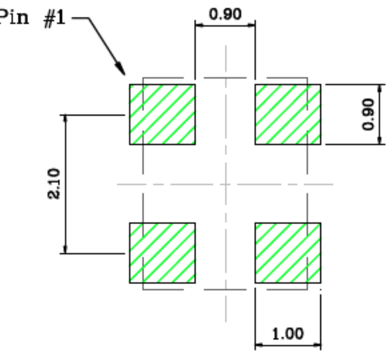
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:
1. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.

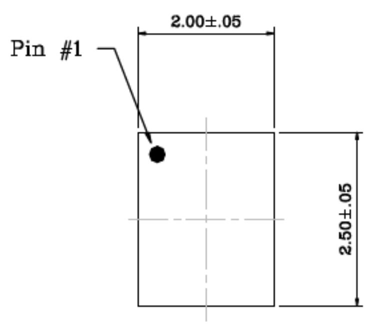
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

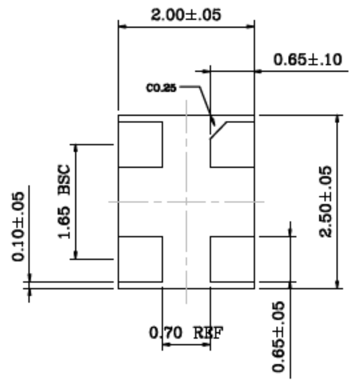
Package Outlines and Dimensions

TITLE

4 LEAD CDFN 2.5x2.0mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

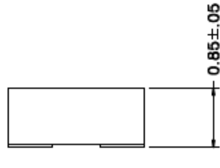
DRAWING #	CDFN2520-4LD-PL-1	UNIT	MM



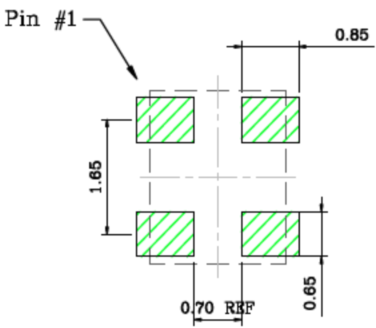


Top View

Bottom View



Side View



Recommended Land Pattern

NOTE:

1. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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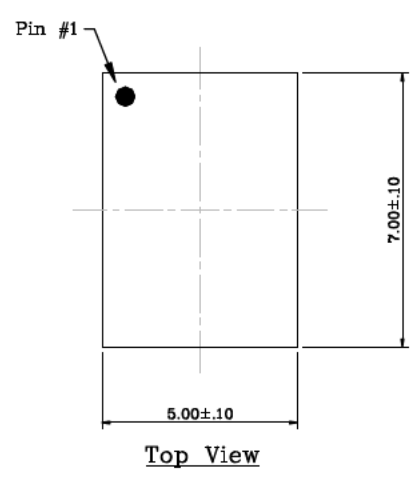
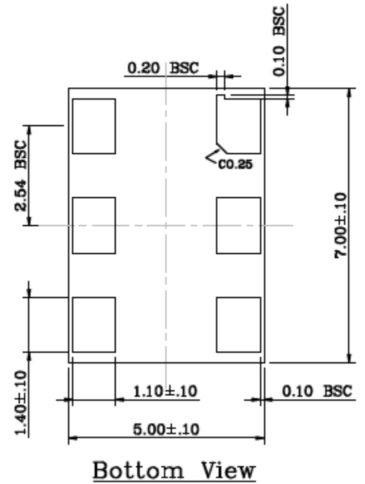
TITLE

6 LEAD CDFN 7.0x5.0mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

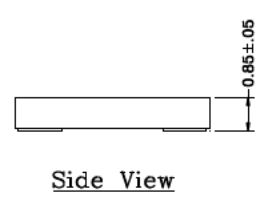
DRAWING #	CDFN75-6LD-PL-1	UNIT	MM



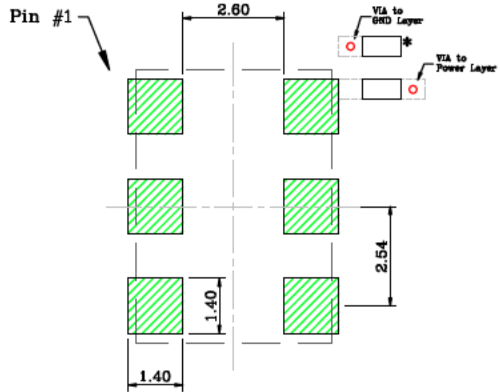
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:

1. * Power Supply Decoupling Capacitor is required in Recommended Land Pattern.
2. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.
3. Red circles in Recommended Land Pattern are thermal VIA.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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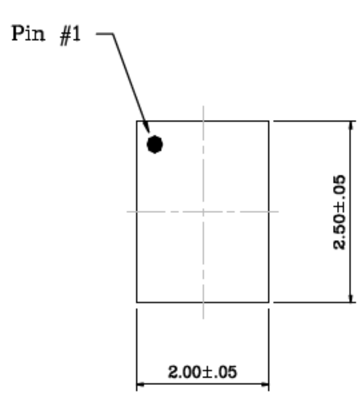
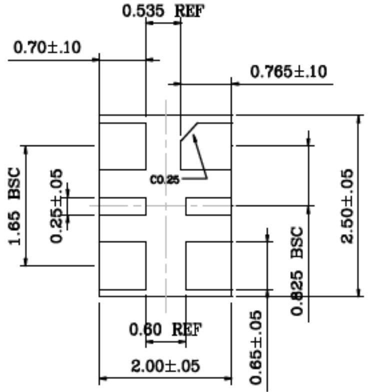
Package Outlines and Dimensions

TITLE
6 LEAD CDFN 2.5x2.0mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

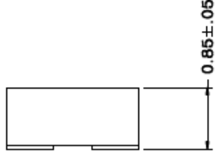
DRAWING #	CDFN2520-6LD-PL-1	UNIT	MM



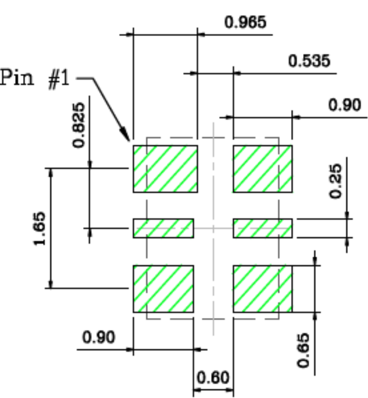
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:
1. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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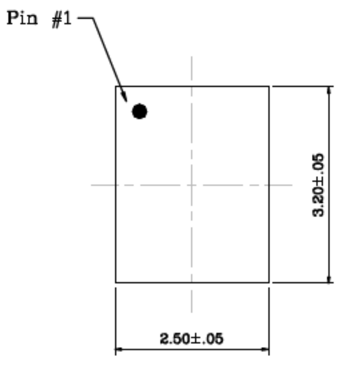
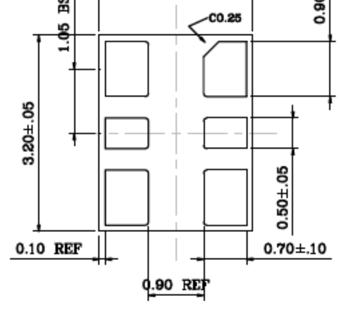
Package Outlines and Dimensions

TITLE
6 LEAD CDFN 3.2x2.5mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

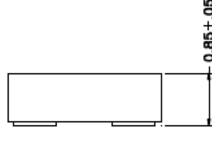
DRAWING #	CDFN3225-6LD-PL-1	UNIT	MM



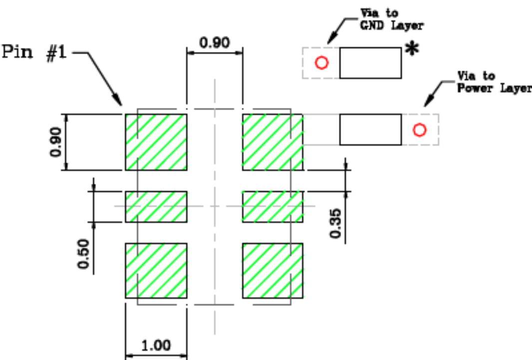
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:

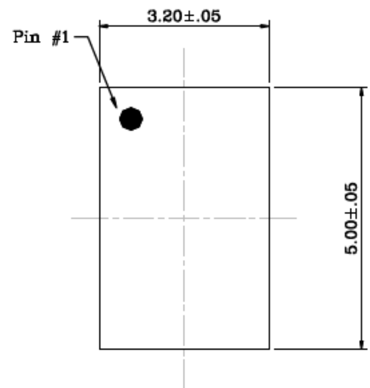
1. * Power Supply Decoupling Capacitor is required in Recommended Land Pattern.
2. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.
3. Red circles in Recommended Land Pattern are thermal VIA.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

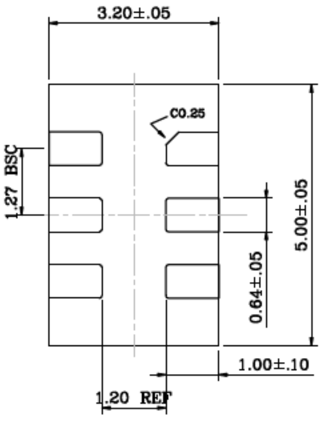
TITLE

6 LEAD CDFN 5.0x3.2mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

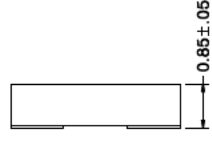
DRAWING #	CDFN5032-6LD-PL-1	UNIT	MM



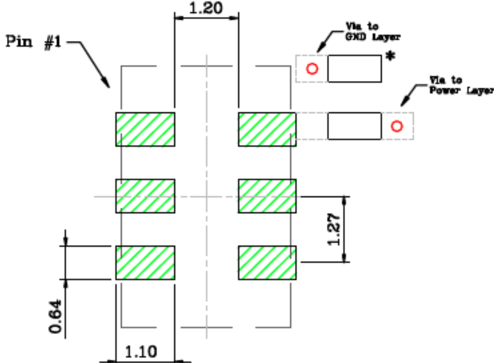
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:

1. * Power Supply Decoupling Capacitor is required in Recommended Land Pattern.
2. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.
3. Red circles in Recommended Land Pattern are thermal VIA.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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CERQUAD

Micrel Legacy

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TITLE

32 LEAD CERAMIC QUAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	CERQUAD-32LD-PL-1	UNIT	INCH (MM)
MATERIAL TYPE	Ceramic A1203	Lead Finish	Solder plated

0.588±0.010 (14.94±0.254)
0.400 BSC (10.16)
0.488±0.010 (12.40±0.254)
0.300 BSC (10.16)
C 0.040 (1.02)
0.050 BSC (1.27)
1

TOP VIEW

0.550±0.010 (13.97±0.254)
0.450±0.010 (11.43±0.254)

BOTTOM VIEW

0.111±0.010 (2.82±0.254)
45° x 0.012 (0.30)
0.142±0.010 (3.61±0.254)
0.040±0.010 (1.02±0.254)
0.083±0.010 (2.11±0.254)
0.019 BSC (0.48)

SIDE VIEW

Note:
1. Reference to MIL-STD-1835
2. Drawing not to scale
3. Dimensions on drawing are reference only.
4. Chip or crack on package body is not allowed.
5. Base material supplier is KYOCERA, Japan.
6. Package lead coplanarity is +/- 0.004 mils (0.100 mm).

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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CERSiP

Micrel Legacy

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6-Lead Ceramic System In Package (AC) - 5x7x1.62mm Body [CERSiP]
Micrel Legacy "Module"

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

D
A
B
N
(DATUM A)
(DATUM B)
E
E1
NOTE 1
2X
0.14 C
1
2
2X
0.14 C
D1
TOP VIEW
END VIEW

0.10 C
C
A
A2
SEATING PLANE
(A3)
6X
0.08 C
SIDE VIEW

2e
e
1
2
NOTE 1
L
N
6X b
0.08Ⓜ C A B
0.05Ⓜ C
BOTTOM VIEW

Microchip Technology Drawing C04-1189A Sheet 1 of 2

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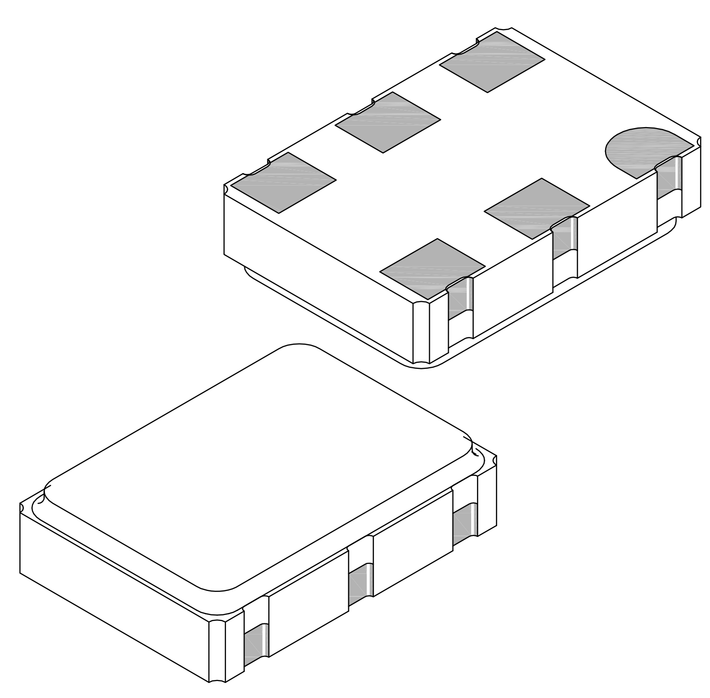
6-Lead Ceramic System In Package (AC) - 5x7x1.62mm Body [CERSiP] Micrel Legacy "Module"

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		6	
Pitch	e		2.54 BSC	
Overall Height	A	1.47	1.62	1.77
Ceramic Base Height	A2	1.17	1.27	1.37
Terminal Thickness	A3		0.69 REF	
Overall Length	D		7.00 BSC	
Lid Length	D1	6.70	6.80	6.90
Overall Width	E		5.00 BSC	
Lid Width	E1	4.70	4.80	4.90
Terminal Width	b	1.30	1.40	1.50
Terminal Length	L	1.17	1.27	1.37

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1189A Sheet 2 of 2

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NOTES:

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CLLCC

Micrel Legacy

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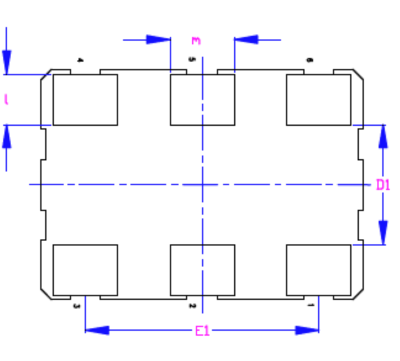
TITLE

6 LEAD CLLCC 7x5 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

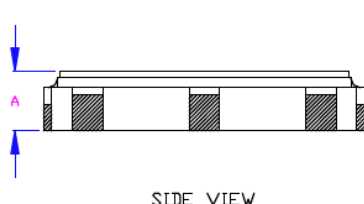
DRAWING #	CLLCC75-6LD-PL-1	UNIT	MM

PIN# 1 DOT BY MARKING

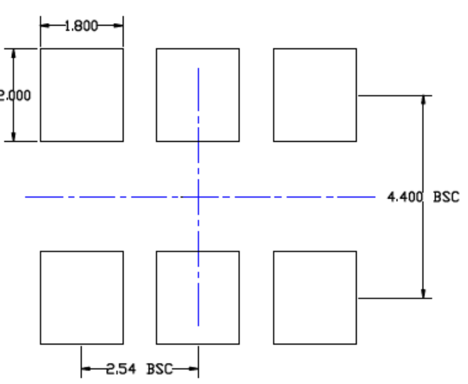
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN

Dimensional Ref.			
REF.	Min.	Nom	Max.
A	1.100	1.300	1.500
D	4.800	5.000	5.200
D1	2.600 BSC		
E	6.800	7.000	7.200
E1	5.080 BSC		
l	0.900	1.100	1.300
m	1.200	1.400	1.600
n	6		

Notes

1. Dimensioning and Tolerancing per ASME Y14.5M-1994.
2. Dimensions are in millimeters.
3. 'n' is the maximum no. of Land for a specified Package.
4. Package warp shall be 0.050 max.
5. Substrate base is Ceramic.
6. The Pin#1 corner must be identified on top side only.
7. Pad dimension tolerance is +/- 0.02mm unless otherwise specified

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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CQFN

Micrel Legacy

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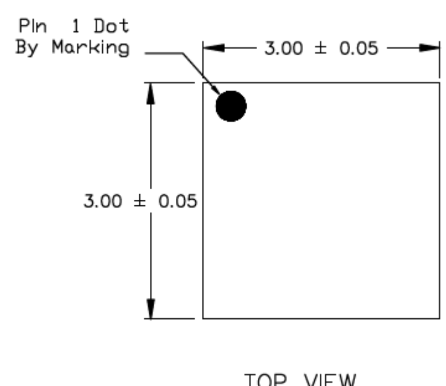
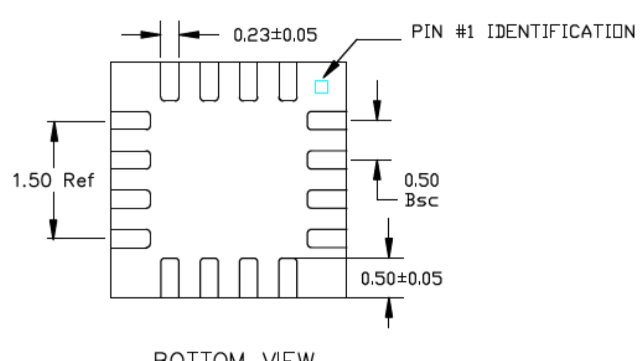
TITLE
16 LEAD QFN 3.0x3.0mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

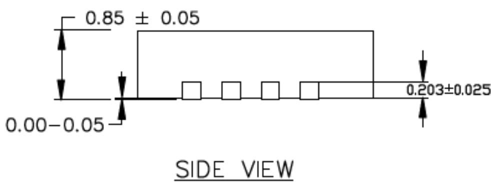
DRAWING #	CQFN33-16LD-PL-1	**UNIT**	MM
Lead Frame	NiPdAu	**Lead Finish**	NiPdAu



TOP VIEW



BOTTOM VIEW



SIDE VIEW

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS, ANGLES ARE IN DEGREES.
   N IS THE TOTAL NUMBER OF TERMINALS.
2. MAX PACKAGE WARPAGE IS 0.05mm, MAX ALLOWABLE BURRS IS 0.076 mm
   IN ALL DIRECTIONS.
3. PIN #1 ID ON TOP WILL BE LASER/INK MARKED.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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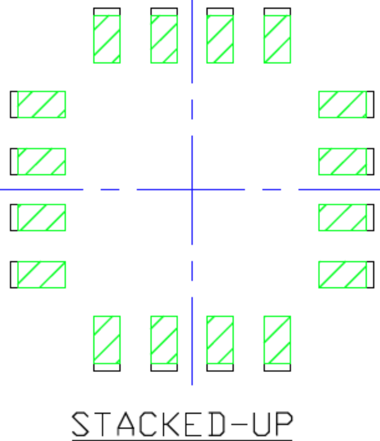
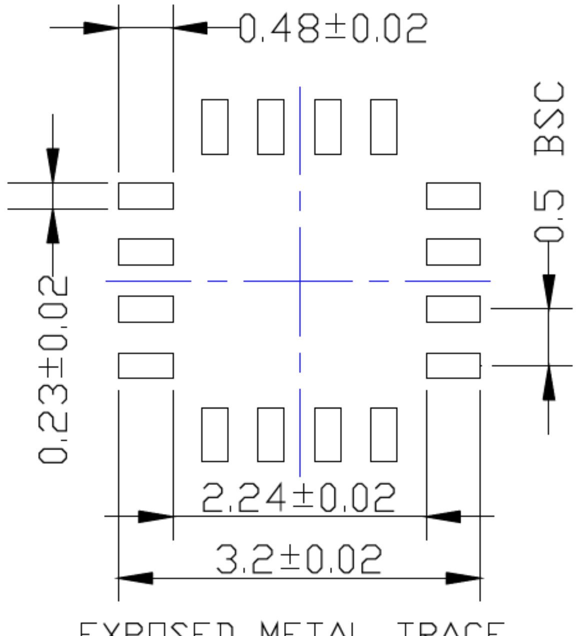
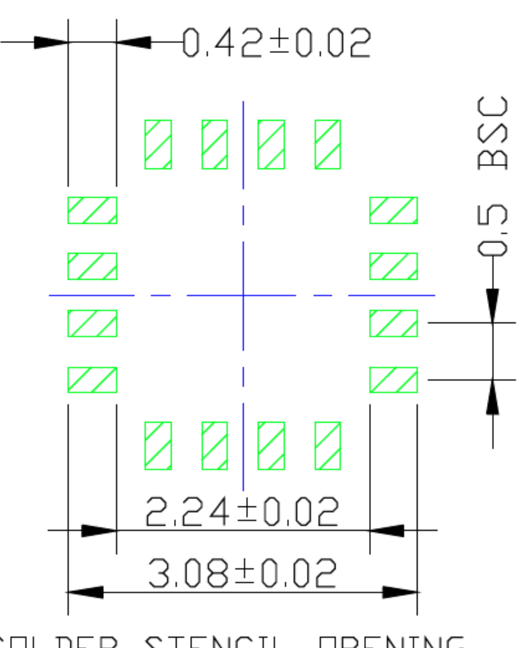
POD-Land Pattern drawing #CQFN33-16LD-PL-1

RECOMMENDED LAND PATTERN





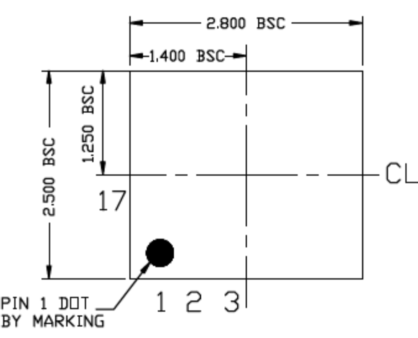


Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

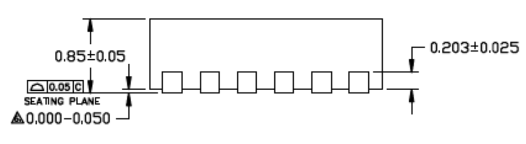
TITLE
17 LEAD COL QFN 2.5x2.8mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	CQFN2528-17LD-PL-1	UNIT	MM

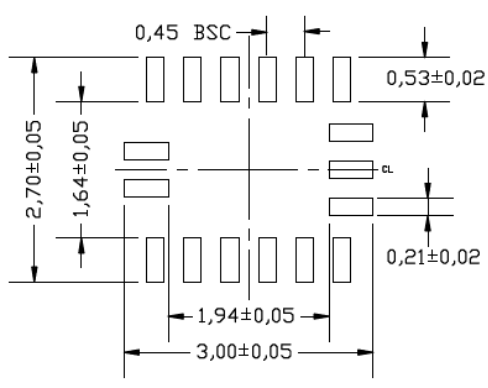


TOP VIEW

0.450±0.050
0.450 BSC
CL
17
0.230±0.050
0.910±0.050
1
0.685±0.050
2.250 Ref.



SIDE VIEW



RECOMMENDED LAND PATTERN

NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAX. PACKAGE WARPAGE IS 0.05 mm.
3. MAXIMUM ALLOWABE BURRS IS 0.076 mm IN ALL DIRECTIONS.
4. PIN #1 ID ON TOP WILL BE LASER/INK MARKED.
5. DIMENSION APPLIES TO METALIZED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25 mm FROM TERMINAL TIP.
6. APPLIED ONLY FOR TERMINALS.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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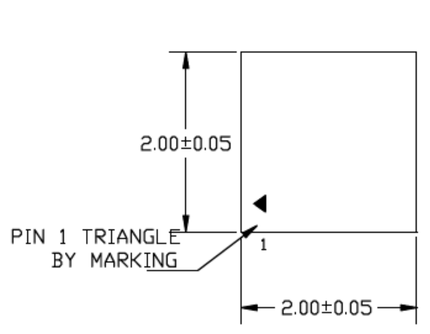
CTDFN

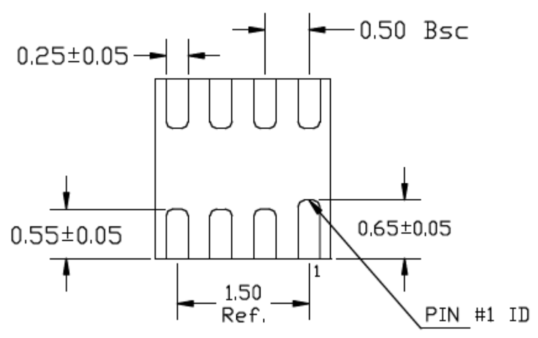
Micrel Legacy

Package Outlines and Dimensions

TITLE
8 LEAD TDFN 2.0x2.0mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

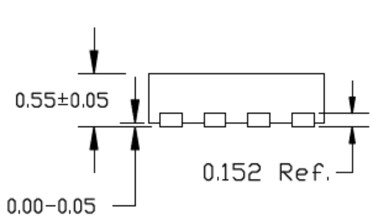
DRAWING #	CTDFN22-8LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu

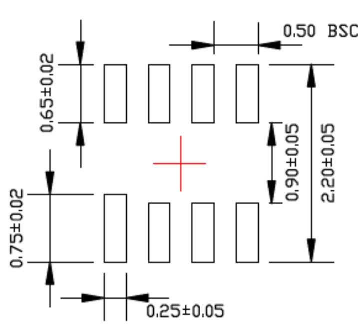




TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2, 3





SIDE VIEW
NOTE: 1, 2, 3

RECOMMENDED LAND PATTERN

NOTE:
1. MAX PACKAGE WARPAGE IS 0.08 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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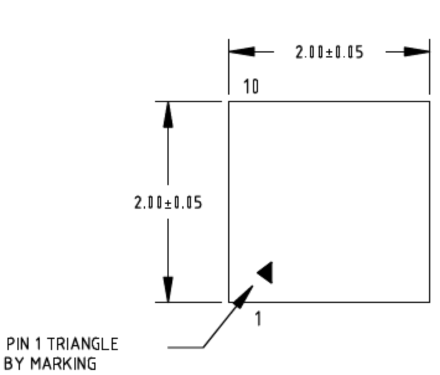
Package Outlines and Dimensions

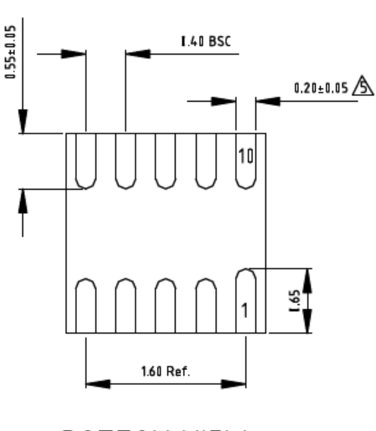
TITLE

10 LEAD TDFN 2.0x2.0mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

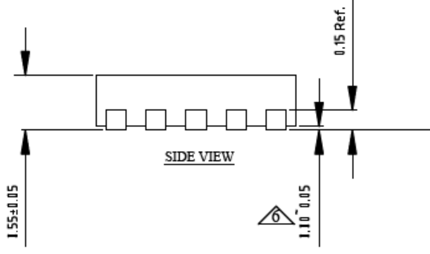
DRAWING #	CTDFN22-10LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu



TOP VIEW

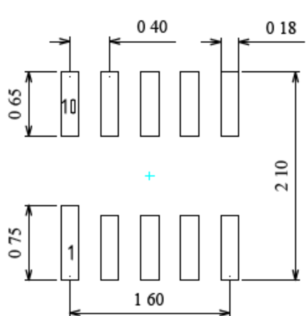


BOTTOM VIEW



BOTTOM VIEW

NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAX. PACKAGE WARPAGE IS 1.05 mm.
3. MAXIMUM ALLOWABE BURRS IS 1.076 mm IN ALL DIRECTIONS.
4. PIN #1 ID ON TOP WILL BE LASER/INK MARKED.
5. DIMENSION APPLIES TO METALIZED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25 mm FROM TERMINAL TIP.
6. APPLIED ONLY FOR TERMINALS.
7. APPLIED FOR EXPOSED PAD AND TERMINALS.



RECOMMENDED LAND PATTERN

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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NOTES:

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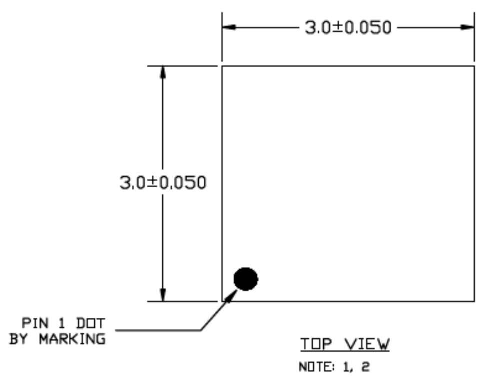
CTQFN

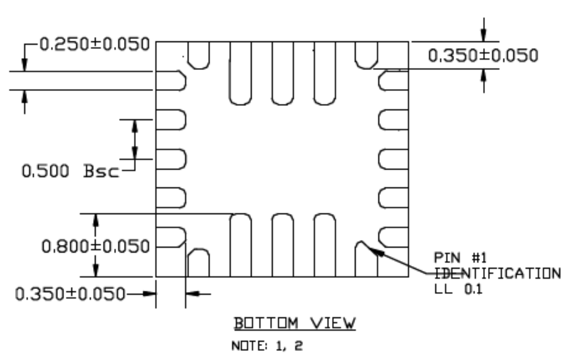
Micrel Legacy

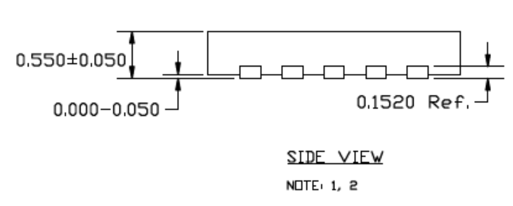
Package Outlines and Dimensions

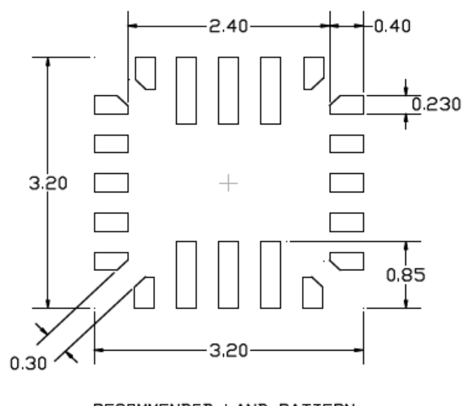
TITLE
20LD COL TQFN 3.0x3.0mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	CTQFN33-20LD-PL-1	UNIT	mm
Lead Frame	Copper	Lead Finish	Matte Tin









NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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DFN

Micrel Legacy

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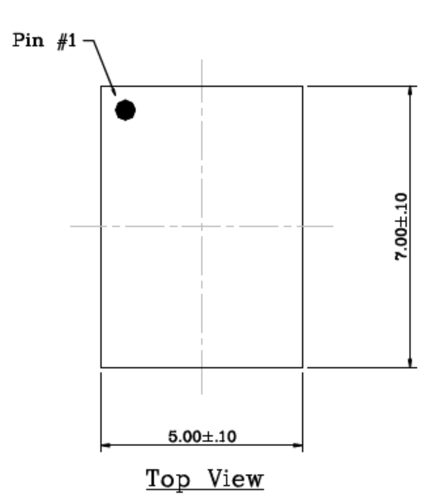
Package Outlines and Dimensions

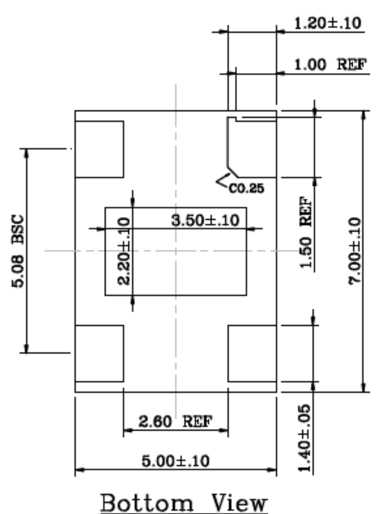
TITLE

4 LEAD DFN 7.0x5.0mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

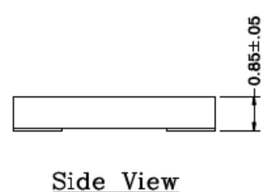
DRAWING #	DFN75-4LD-PL-1	UNIT	MM



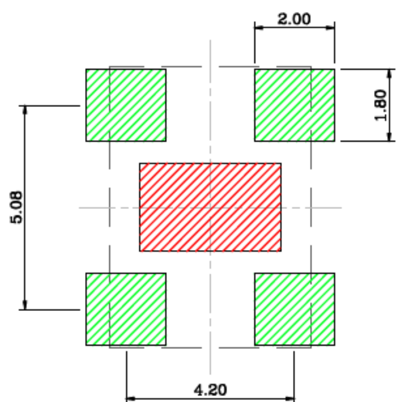
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:

1. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.
2. Red shaded rectangle in Recommended Land Pattern is keep out area.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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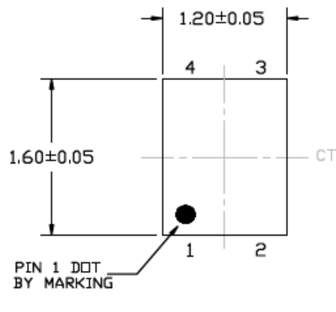
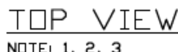
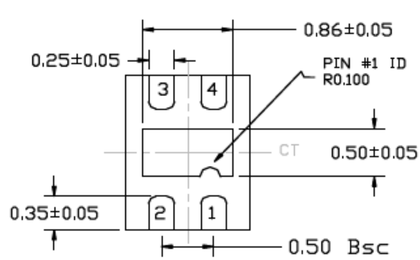
TITLE

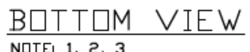
4 LEAD DFN 1.2 x 1.6 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

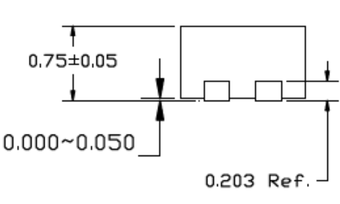
DRAWING #	DFN1216-4LD-PL-1	**UNIT**	MM

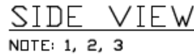


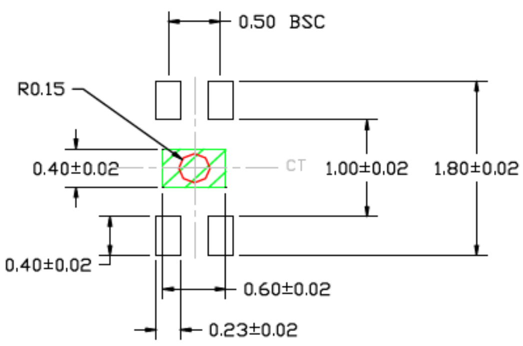












RECOMMENDED LAND PATTERN

NOTE: 4, 5

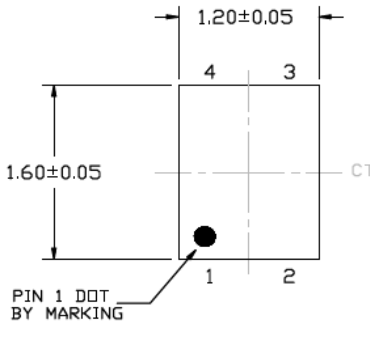
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN REPRESENTS THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLE (SHADED AREA) REPRESENTS SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 0.60mmx0.40mm.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

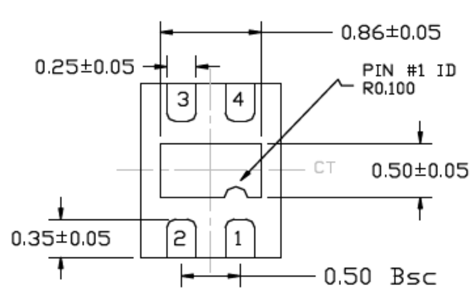
TITLE

4 LEAD DFN 1.2 x 1.6 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

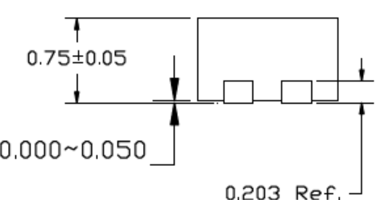
DRAWING #	DFN1216-4LD-PL-1	UNIT	MM



TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



SIDE VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN REPRESENTS THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLE (SHADED AREA) REPRESENTS SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 0.60mmx0.40mm.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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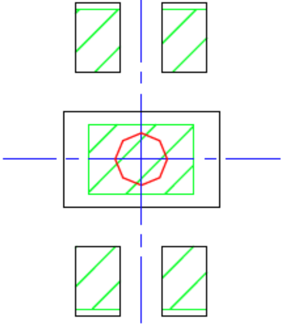
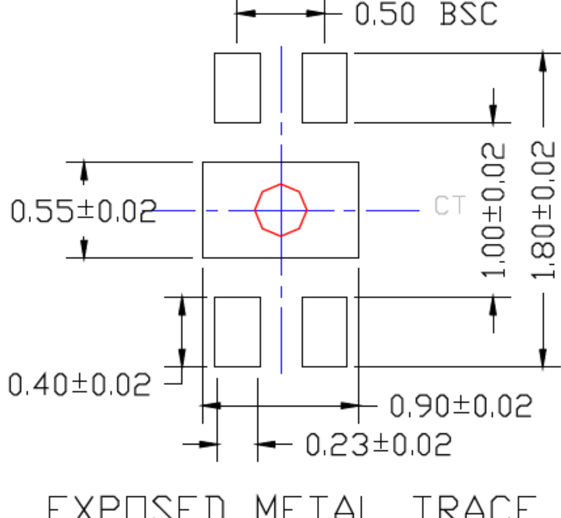
POD-Land Pattern drawing #DFN1216-4LD-PL-1

RECOMMENDED LAND PATTERN

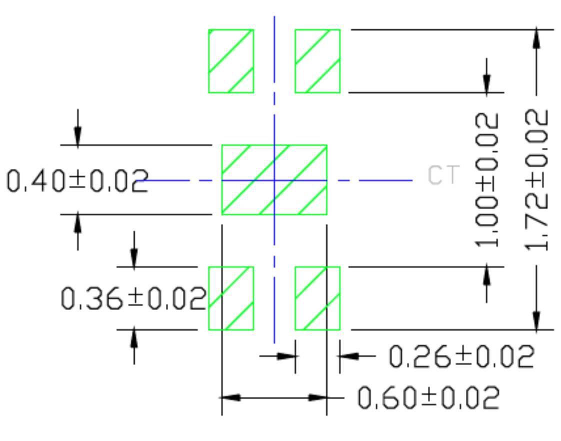
NOTE: 4, 5



STACKED-UP



EXPOSED METAL TRACE

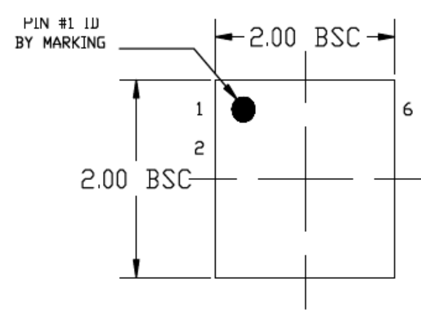


SOLDER STENCIL OPENING

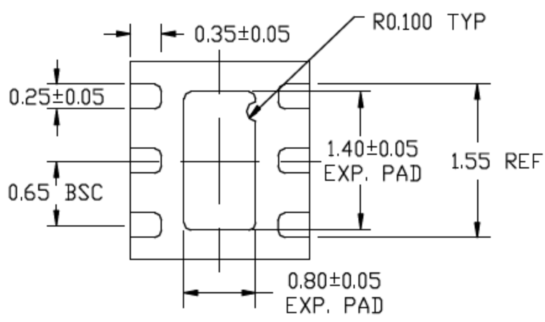
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
6 LEAD DFN 2x2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

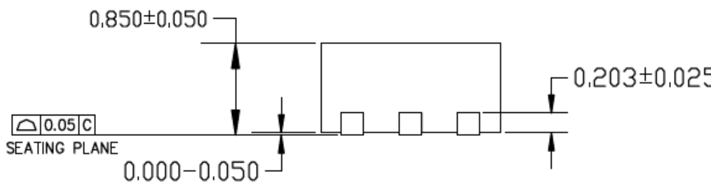
DRAWING #	DFN22-6LD-PL-1	UNIT	MM



TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



END VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.60x0.40 MM IN SIZE, 0.20 MM SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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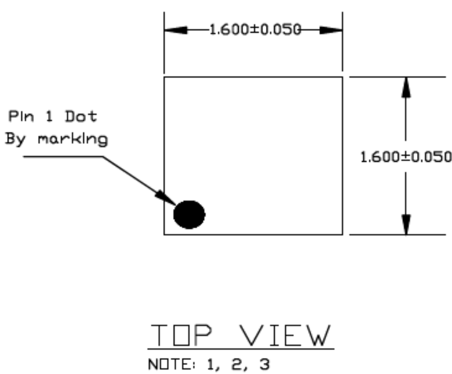
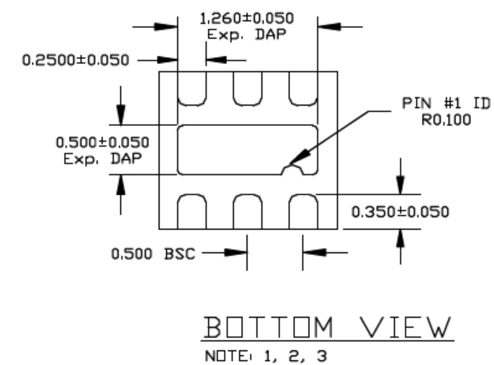
TITLE
6 LEAD DFN 1.6x1.6mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

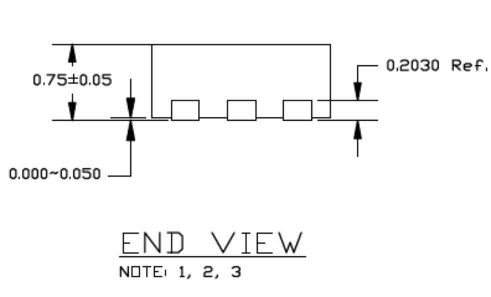
DRAWING #	DFN1616-6LD-PL-1	UNIT	MM



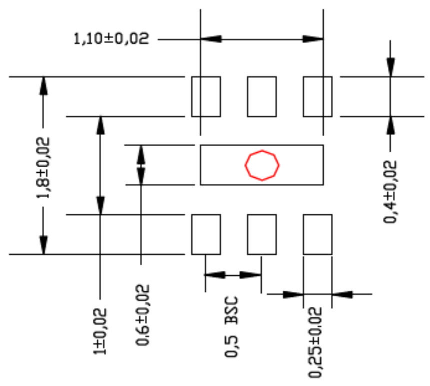
TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



END VIEW
NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN
NOTE: 4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE
6 LEAD DFN 1.6x1.6mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN1616-6LD-PL-1	**UNIT**	MM

1.600±0.050

Pin 1 Dot
By marking

1.600±0.050

1.260±0.050
Exp. DAP

0.2500±0.050

PIN #1 ID
R0.100

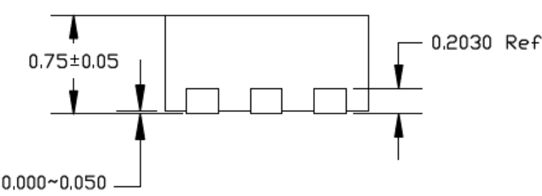
0.500±0.050
Exp. DAP

0.350±0.050

0.500 BSC

TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2, 3



END VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076 MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35 MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE

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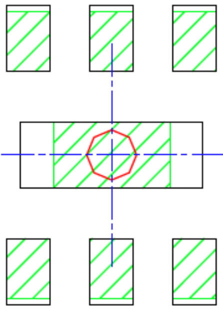
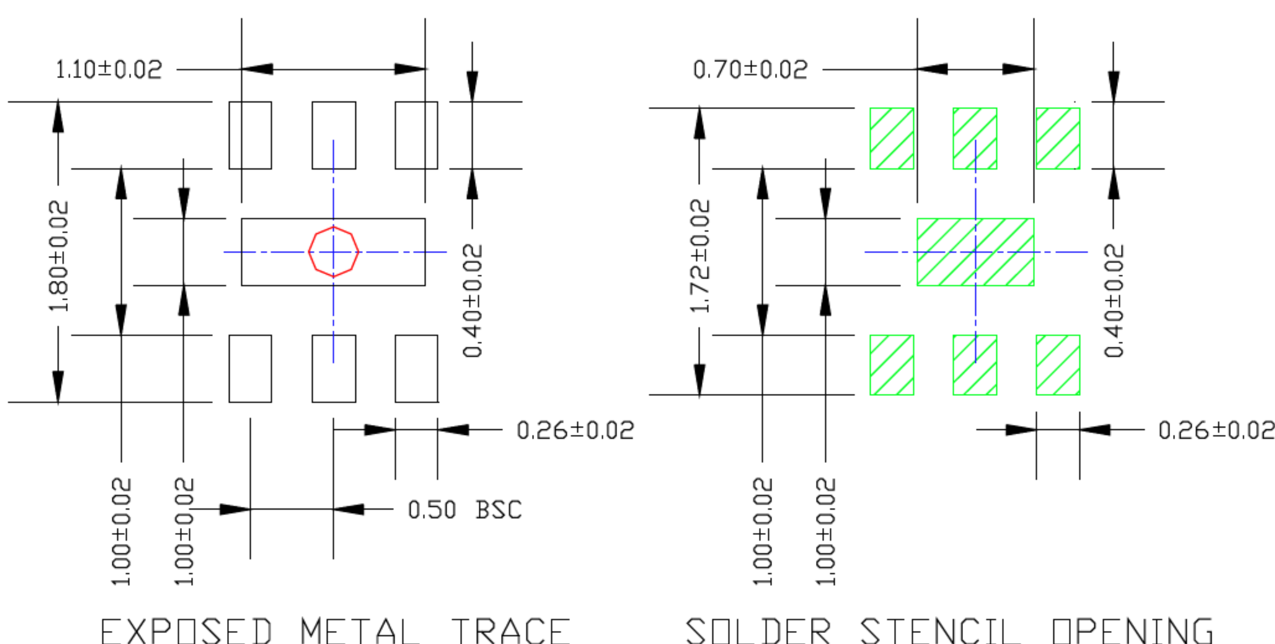
POD-Land Pattern drawing #DFN1616-6LD-PL-1

RECOMMENDED LAND PATTERN

NOTE: 4



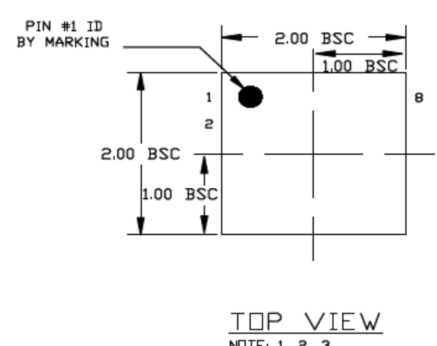
STACKED-UP



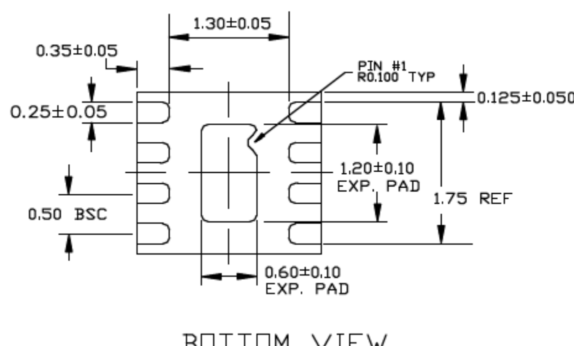
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
8 LEAD DFN 2x2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

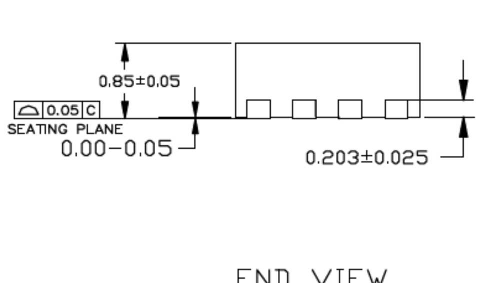
DRAWING #	DFN22-8LD-PL-1	UNIT	MM



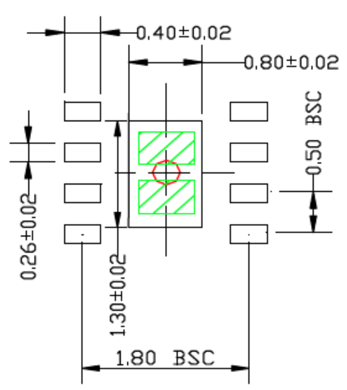
TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



END VIEW
NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) INDICATE SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.60x0.40 MM IN SIZE, 0.20 MM SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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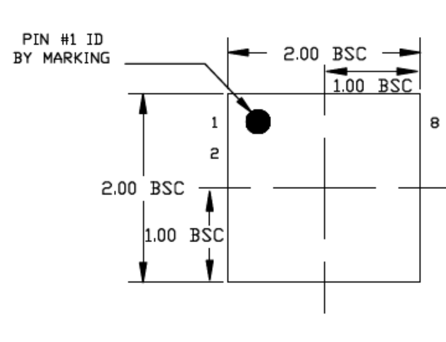
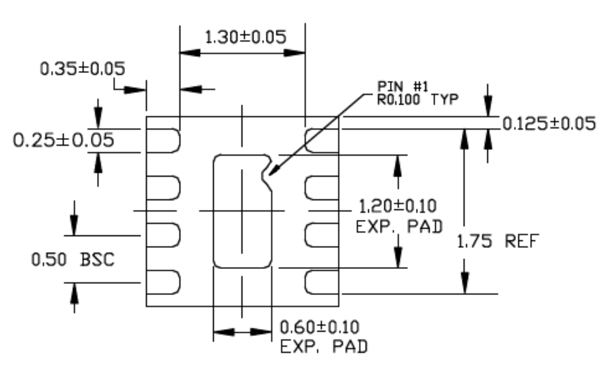
TITLE
8 LEAD DFN 2x2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

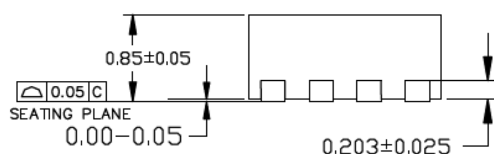
DRAWING #	DFN22-8LD-PL-1	UNIT	MM



TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



END VIEW
NOTE: 1, 2, 3

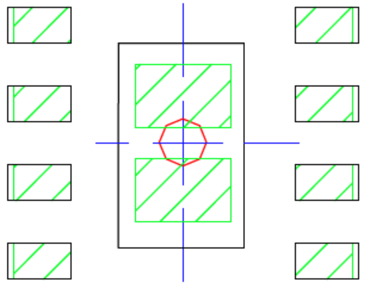
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) INDICATE SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.60x0.40 MM IN SIZE, 0.20 MM SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

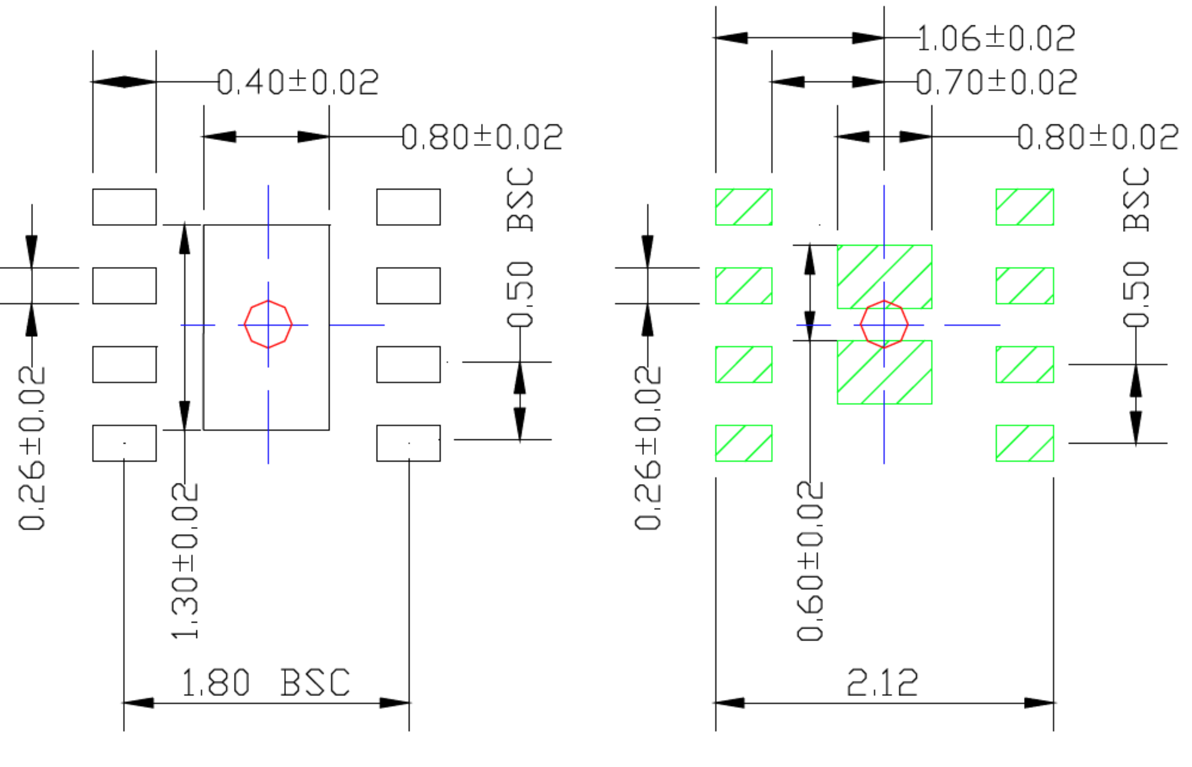
POD-Land Pattern Drawing # DFN22-8LD-PL-1

RECOMMENDED LAND PATTERN

NOTE: 4, 5



STACKED-UP



EXPOSED METAL TRACE

SOLDER STENCIL OPENING

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
8 LEAD DFN 2x2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN22-8LD-PL-8	**UNIT**	MM

PIN #1 ID BY MARKING
2.00 BSC
2.00 BSC
1 2 8

TOP VIEW
NOTE: 1, 2, 3

0.30±0.10
PIN #1
0.25± 0.05 / 0.07
1.70±0.10
0.5 BSC
0.90±0.10

BOTTOM VIEW
NOTE: 1, 2, 3

0.90±0.10
0.08 C
SEATING PLANE
0.00-0.05
0.20 REF

END VIEW
NOTE: 1, 2, 3

0.30±0.12
1.10±0.02
0.26±0.02
0.5 BSC
1.74 BSC

RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLE IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) INDICATE SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.60x0.60mm IN SIZE, 0.20mm SPACING.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

8 LEAD DFN 2x2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN22-8LD-PL-8	**UNIT**	MM

PIN #1 ID BY MARKING

2.00 BSC

2.00 BSC

TOP VIEW

NOTE: 1, 2, 3

0.30±0.10

PIN #1

0.25± 0.05 0.07

1.70±0.10

0.5 BSC

0.90±0.10

BOTTOM VIEW

NOTE: 1, 2, 3

0.90±0.10

0.08 C

SEATING PLANE

0.00-0.05

0.20 REF

NOTE:

1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLE IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) INDICATE SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.60x0.60mm IN SIZE, 0.20mm SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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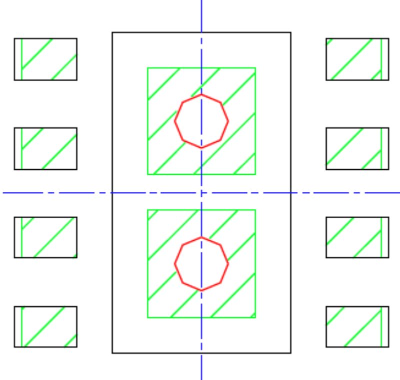
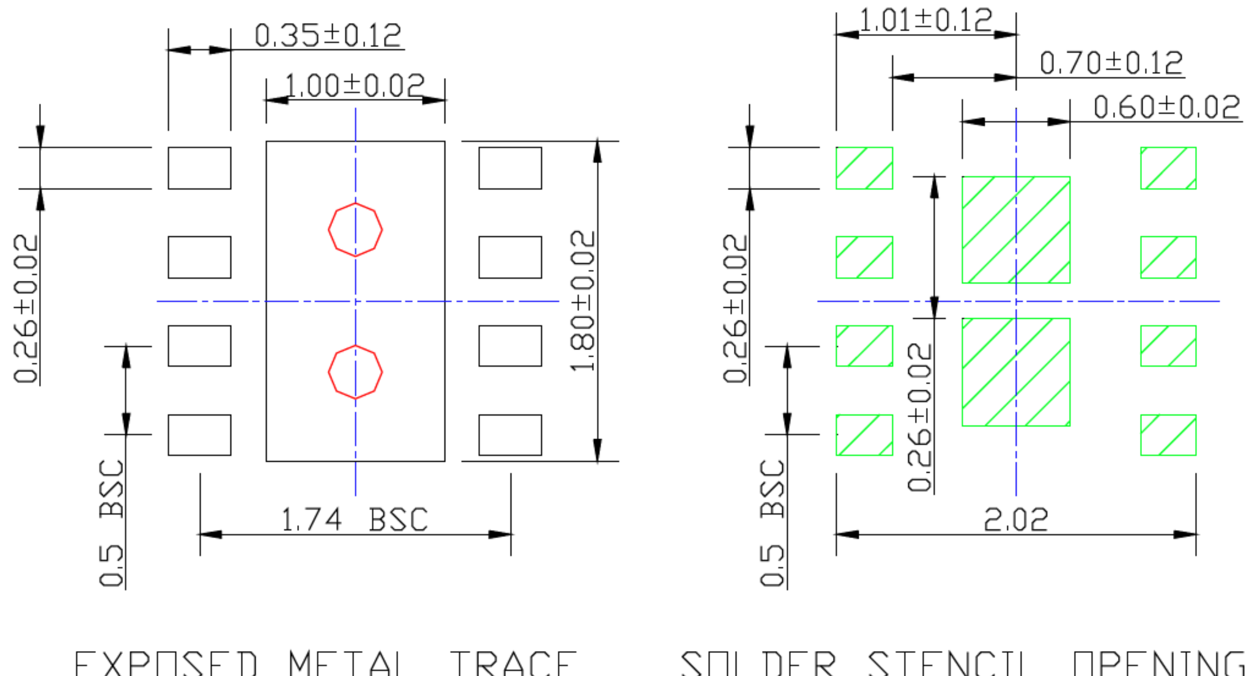
POD-Land Pattern drawing # DFN22-8LD-PL-8

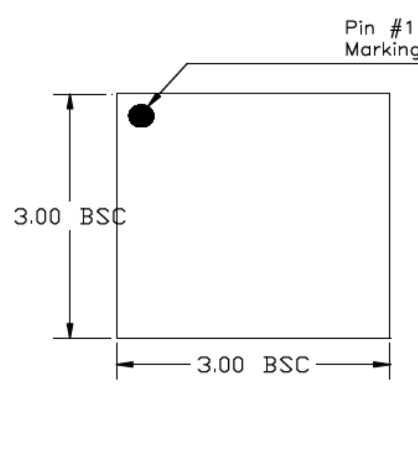




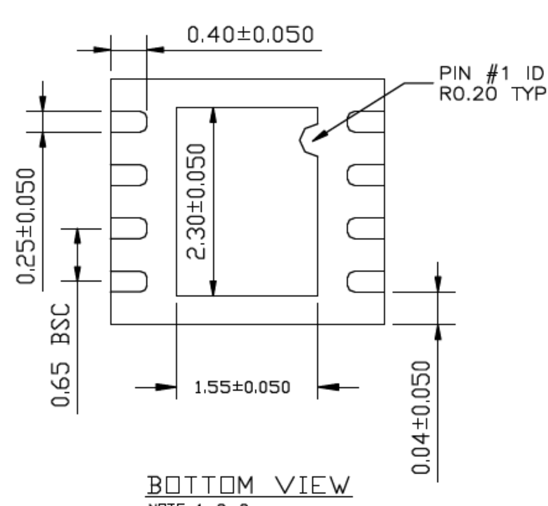
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
8 LEAD DFN 3x3mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

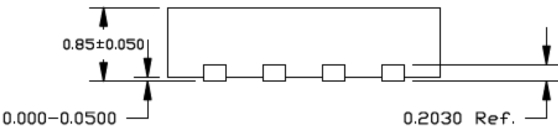
DRAWING #	DFN33-8LD-PL-1	**UNIT**	MM



TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



SIDE VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30–0.35 MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) INDICATE SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.50x0.90 MM IN SIZE, 0.20 MM SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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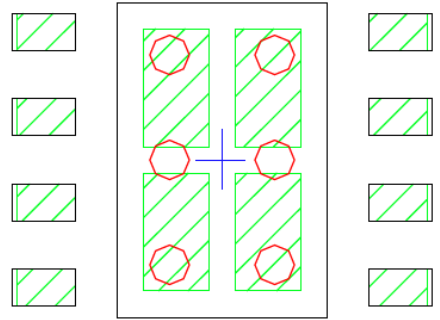
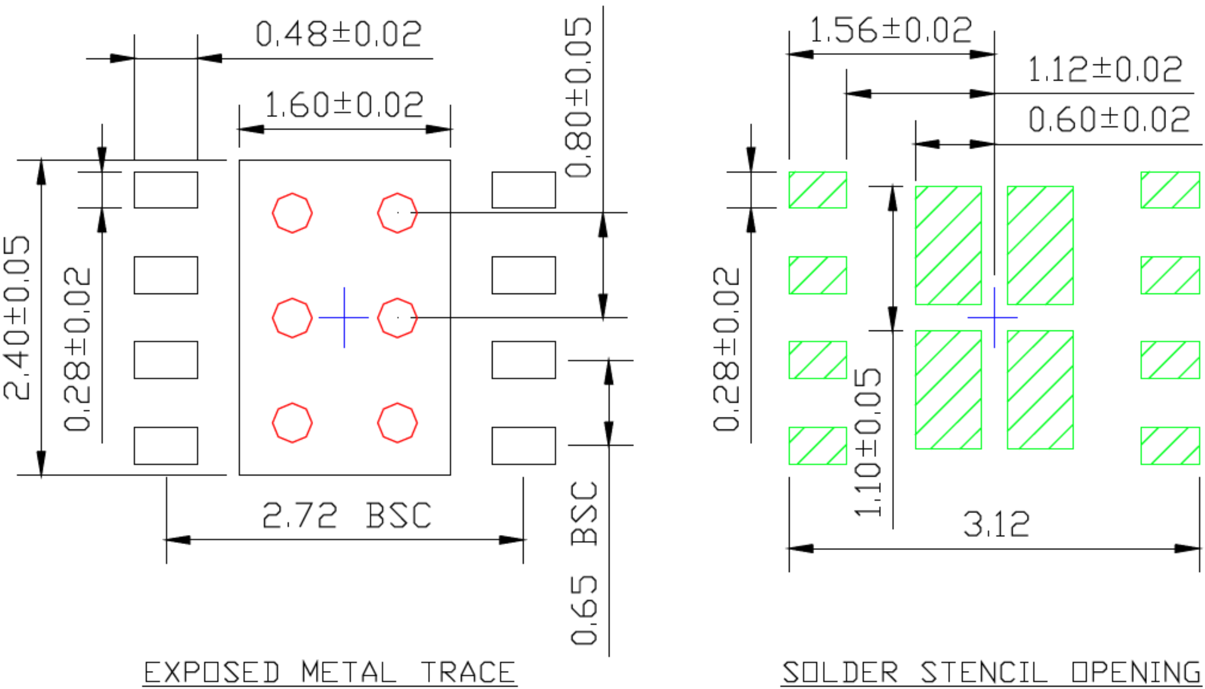
POD-Land Pattern drawing #DFN33-8LD-PL-1





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

8 LEAD DFN 4.0 x 4.0 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN44-8LD-PL-1	**UNIT**	MM

4.0000±0.050

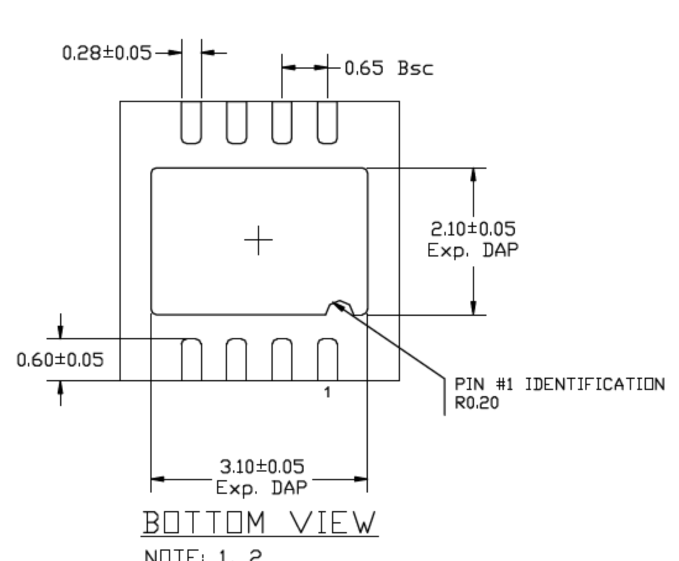
4.0000±0.050

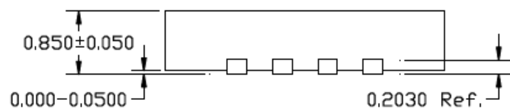
PIN 1 DOT
BY MARKING

1

TOP VIEW

NOTE: 1, 2, 3





SIDE VIEW

NOTE: 1, 2

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) REPRESENT STENCIL OPENING ON EXPOSED AREA. SIZE IS 1.30X0.70 MM, 0.20 MM SPACING
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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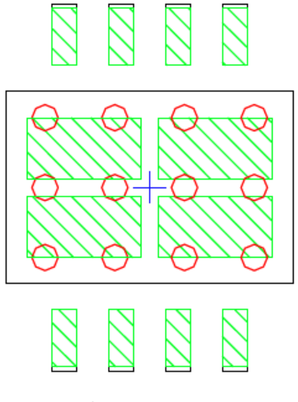
POD-Land Pattern drawing # DFN44-8LD-PL-1

RECOMMENDED LAND PATTERN
NOTE: 4, 5



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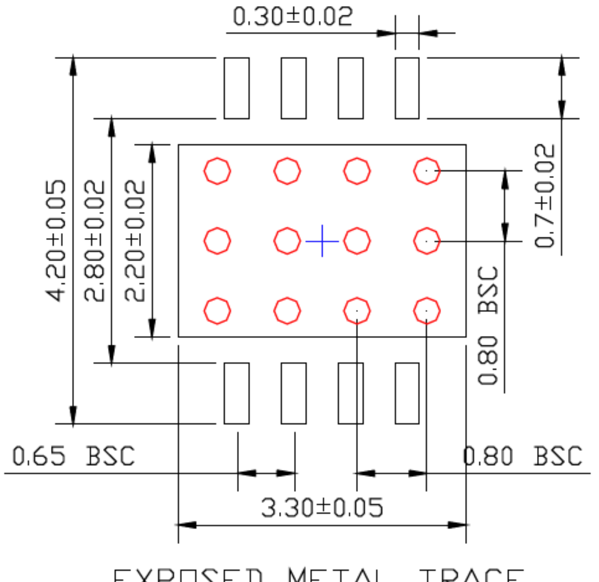
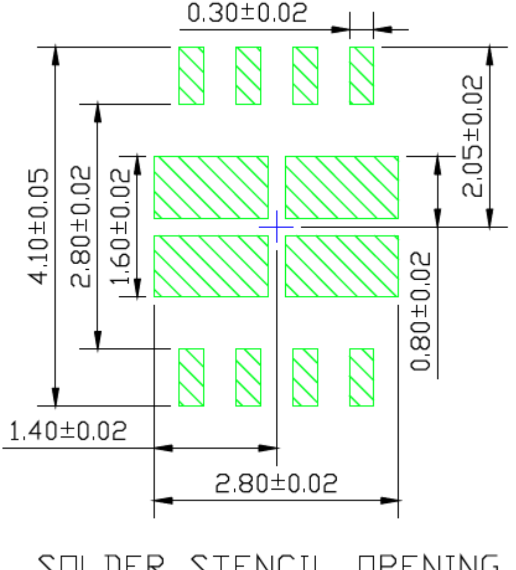


EXPOSED METAL TRACE



SOLDER STENCIL OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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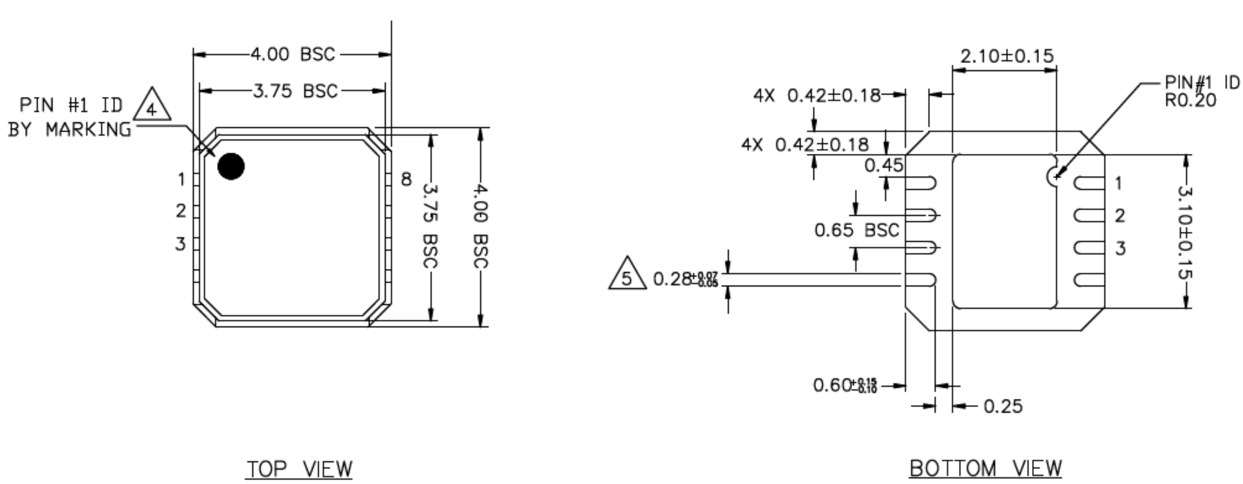
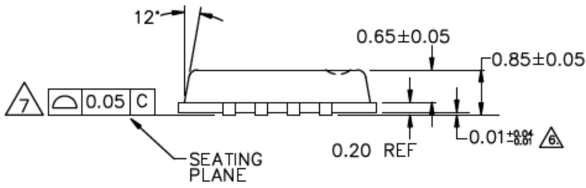
Package Outlines and Dimensions

TITLE

8 LEAD DFN 4.0 x 4.0 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN44-8LD-PL-2	UNIT	MM





SIDE VIEW

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAX. PACKAGE WARPAGE IS 0.05 mm.
3. MAXIMUM ALLOWABE BURRS IS 0.076 mm IN ALL DIRECTIONS.
4. PIN #1 ID ON TOP WILL BE LASER/INK MARKED.
5. DIMENSION APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25mm FROM TERMINAL TIP.
6. APPLIED ONLY FOR TERMINALS.
7. APPLIED FOR EXPOSED PAD AND TERMINALS.
8. GREEN RECTANGLES (SHADED AREA) REPRESENT STENCIL OPENING ON EXPOSED AREA. SIZE IS 1.30X0.70 MM, 0.20 MM SPACING
9. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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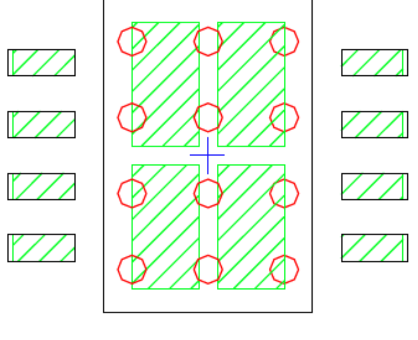
POD-Land Pattern drawing # DFN44-8LD-PL-2

RECOMMENDED LAND PATTERN

NOTE: 8, 9



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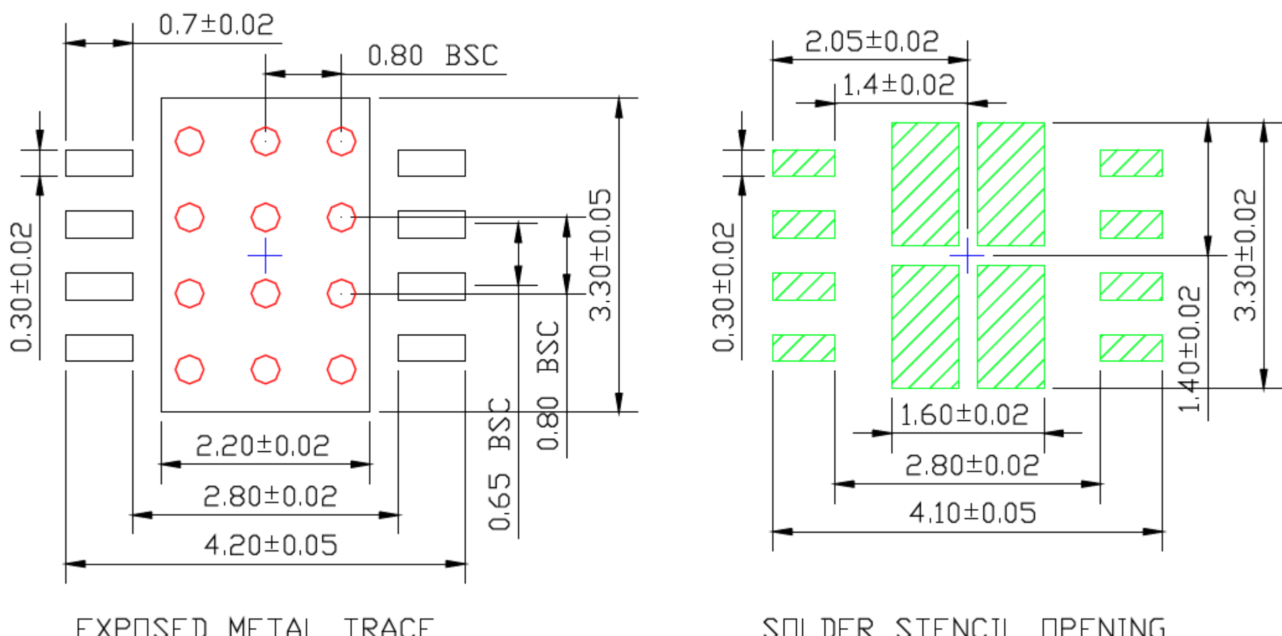


EXPOSED METAL TRACE

SOLDER STENCIL OPENING

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE

10 LEAD DFN 3x3mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN33-10LD-PL-1	**UNIT**	MM

Pin #1 Marking

3.00 BSC

3.00 BSC

TOP VIEW

NOTE: 1, 2, 3

0.40±0.050

PIN #1 ID R0.20 TYP

0.25±0.050

2.40±0.050

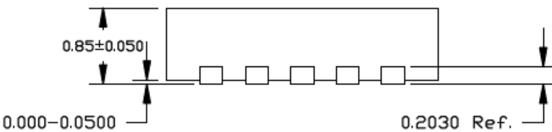
0.50 BSC

1.70±0.050

0.04±0.050

BOTTOM VIEW

NOTE: 1, 2, 3



SIDE VIEW

NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35 MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.50x0.95 MM IN SIZE, 0.20 MM SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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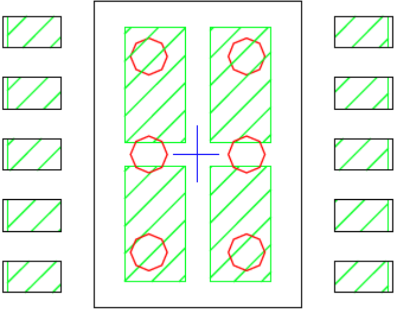
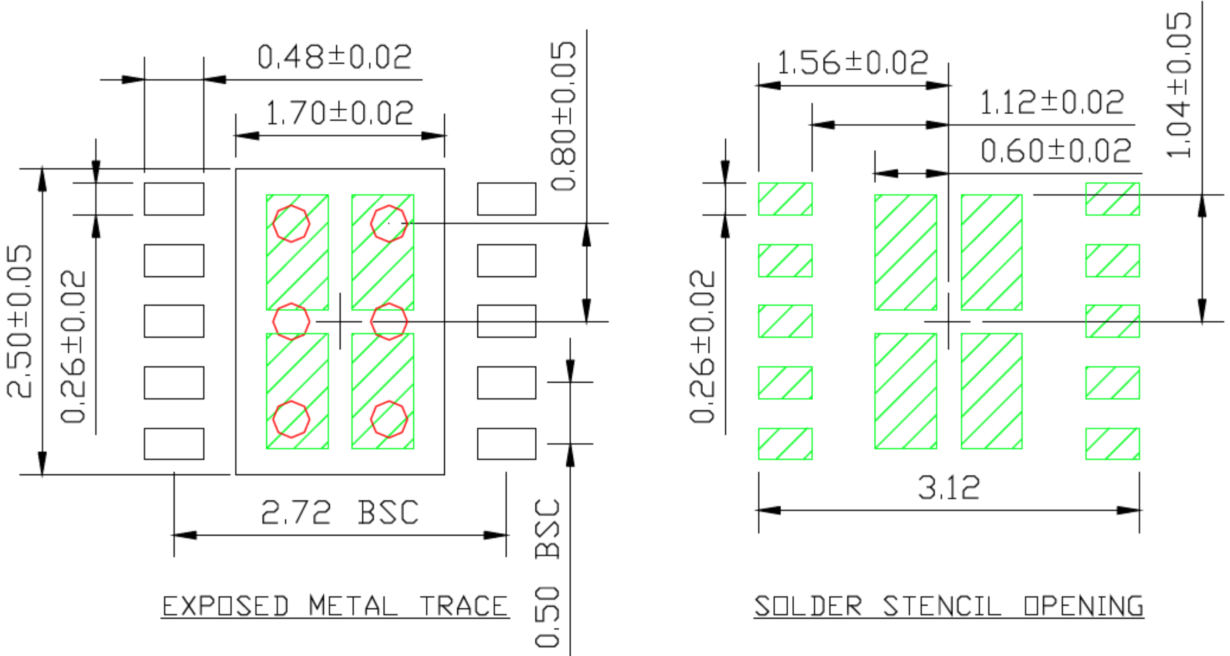
POD-Land Pattern drawing #DFN33-10LD-PL-1





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Package Outlines and Dimensions

TITLE

10 LEAD DFN 2.5 x 2.5 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN2525-10LD-PL-1	UNIT	MM

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA. SIZE SHOULD BE 0.30-0.3M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 1.00x0.70 MM, 0.20 MM SPACING.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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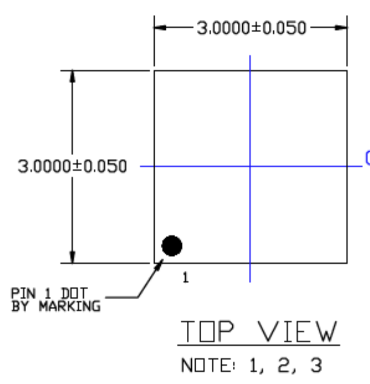
TITLE

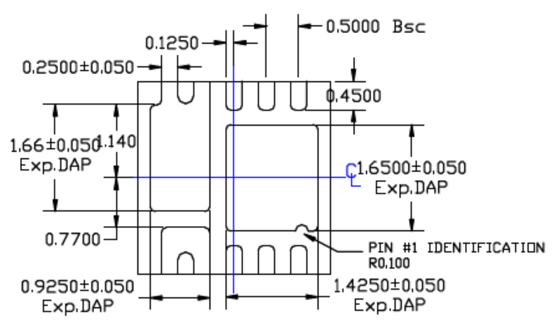
10 LEAD DFN 3x3 mm PACKAGE (Co-Package) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN33-10LD-PL-2	**UNIT**	MM
Lead Frame	NiPdAu	**Lead Finish**	NiPdAu



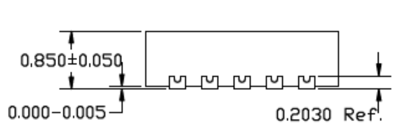
TOP VIEW

NOTE: 1, 2, 3



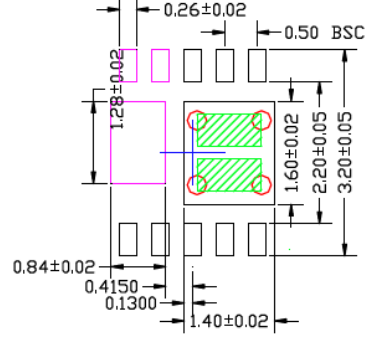
BOTTOM VIEW

NOTE: 1, 2



SIDE VIEW

NOTE: 1, 2



RECOMMENDED LAND PATTERN

NOTE: 4, 5, 6

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) REPRESENT STENCIL OPENING ON EXPOSED AREA. SIZE IS 1.00X0.50 MM, 0.20 MM SPACING
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER, 1.0 MM PITCH
6. PURPLE PADS ARE OF DIFFERENT POTENTIAL. DO NOT CONNECT TO GND.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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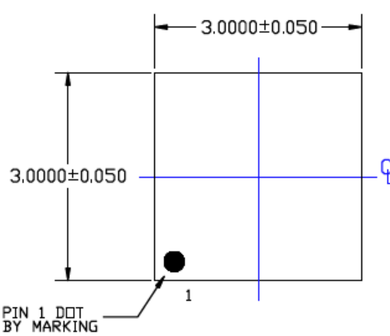
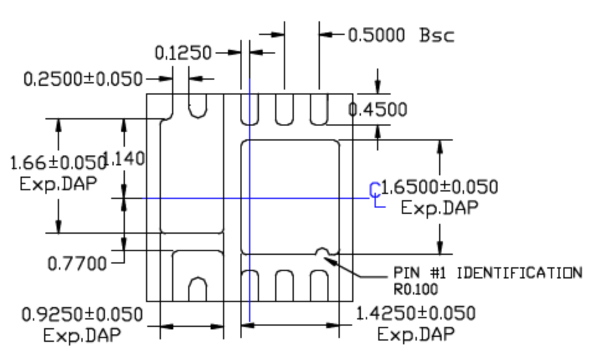
TITLE

10 LEAD DFN 3x3 mm PACKAGE (Co-Package) OUTLINE & RECOMMENDED LAND PATTERN

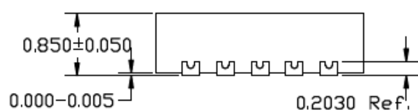
DRAWING #	DFN33-10LD-PL-2	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu





TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2



SIDE VIEW
NOTE: 1, 2

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) REPRESENT STENCIL OPENING ON EXPOSED AREA. SIZE IS 1.00X0.50 MM, 0.20 MM SPACING
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER, 1.0 MM PITCH
6. PURPLE PADS ARE OF DIFFERENT POTENTIAL. DO NOT CONNECT TO GND.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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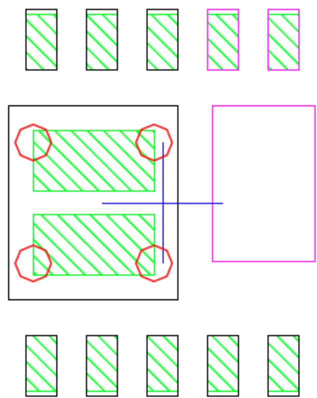
POD-Land Pattern drawing #DFN33-10LD-PL-2

RECOMMENDED LAND PATTERN

NOTE: 4, 5, 6



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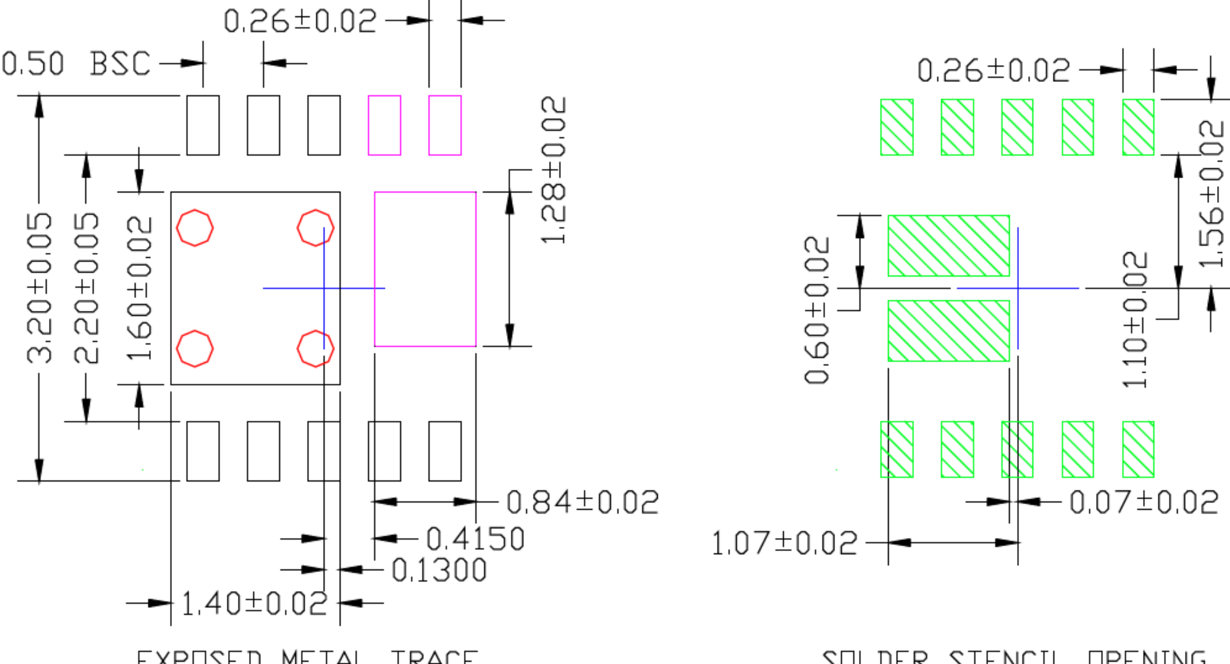


EXPOSED METAL TRACE

SOLDER STENCIL OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE

12 LEAD DFN 3x3mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN33-12LD-PL-1	**UNIT**	MM

Pin #1 Marking

3.00 BSC

3.00 BSC

TOP VIEW

NOTE: 1, 2, 3

0.40±0.050

PIN #1 ID R0.15 TYP

12

1

2

0.23±0.050

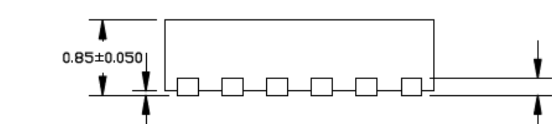
2.40±0.050

0.50 BSC

1.70±0.050

BOTTOM VIEW

NOTE: 1, 2, 3



SIDE VIEW

NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076 MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35 MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.50x0.95 MM IN SIZE, 0.20 MM SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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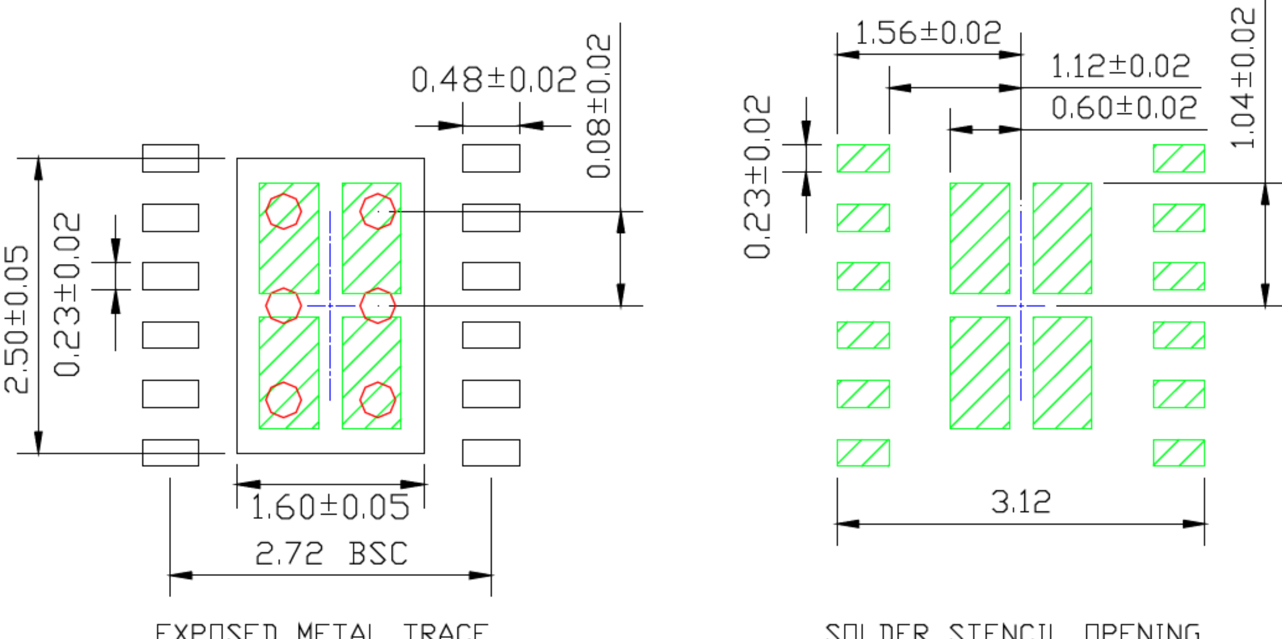
POD-Land Pattern drawing # DFN33-12LD-PL-1



Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE
20 LEAD DFN 3mmx5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN35-20LD-PL-1	UNIT	MM

NOTES:

1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Red color circles are thermal via. 0.30-0.35mm in diameter and 0.80mm pitch. Should be connected to GND for maximum performance.
5. Black color pads represent different IOs. Do not connect together.
6. Shaded rectangles (area) represents solder stencil opening on exposed metal trace.
7. Recommended Land Pattern Tolerance is ±0.020mm unless specified.
8. See recommended Land Pattern on page2.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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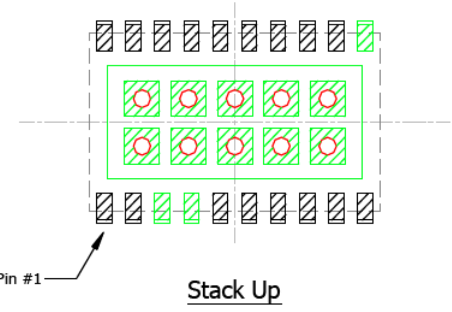
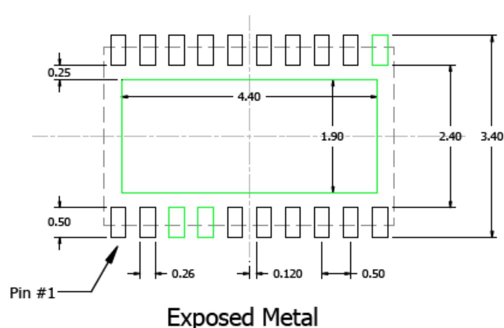
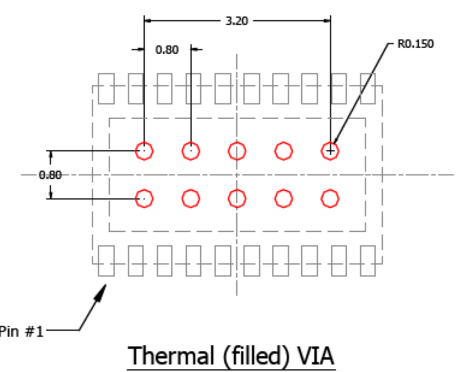
POD-Land Pattern Doc #: DFN35-20LD-PL-1-A

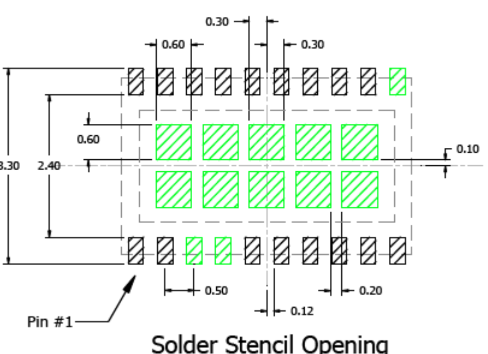
Recommended Land Pattern

Note: 4,5,6,7





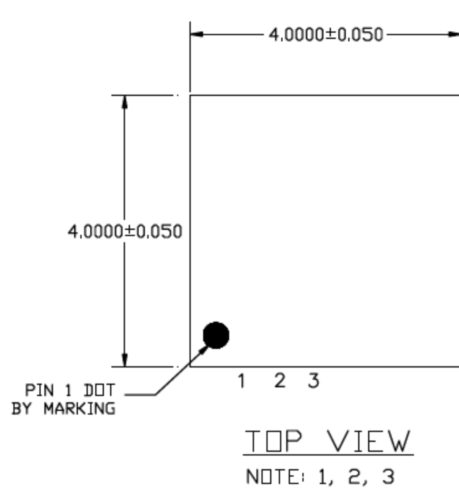


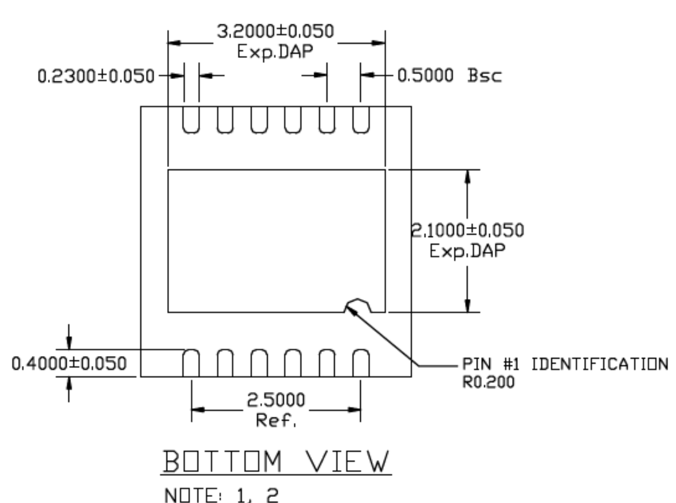


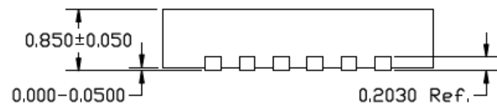
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
12 LEAD DFN 4.0 x 4.0 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN44-12LD-PL-1	UNIT	MM







SIDE VIEW
NOTE: 1, 2

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) REPRESENT STENCIL OPENING ON EXPOSED AREA. SIZE IS 0.85X0.87 MM, 1.07 MM PITCH SPACING
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER, 1.0MM PITCH SPACING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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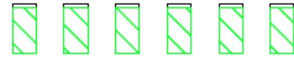
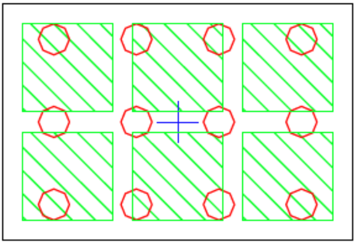
POD-Land Pattern drawing # DFN44-12LD-PL-1

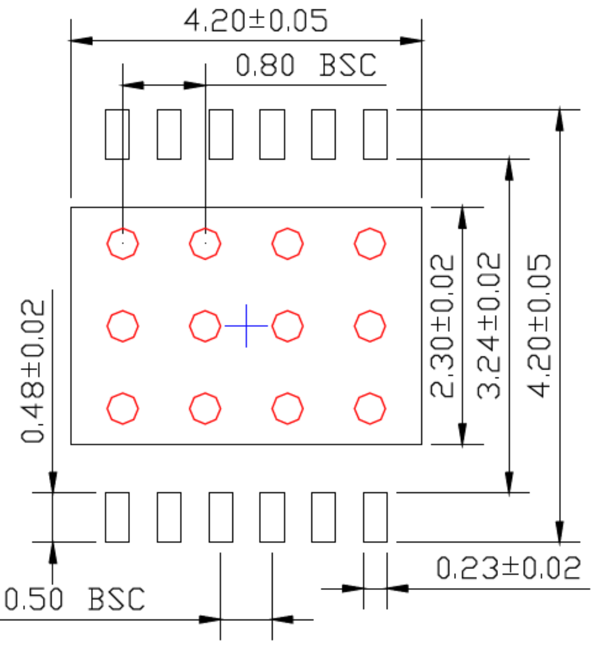
RECOMMENDED LAND PATTERN

NOTE: 4, 5

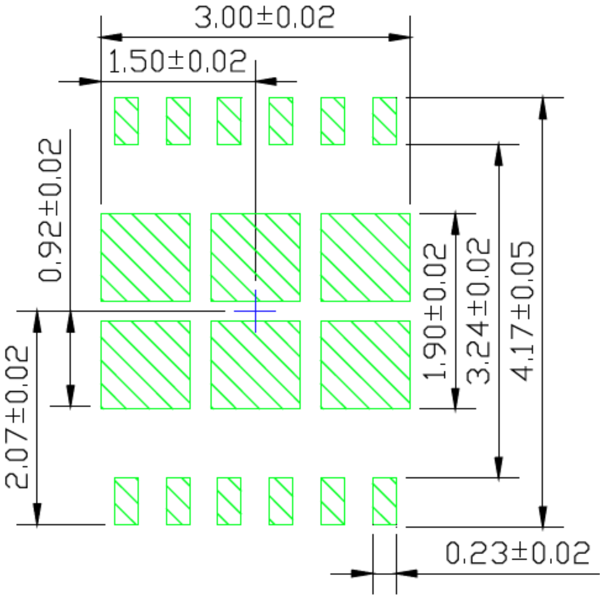




STACKED-UP



EXPOSED METAL TRACE



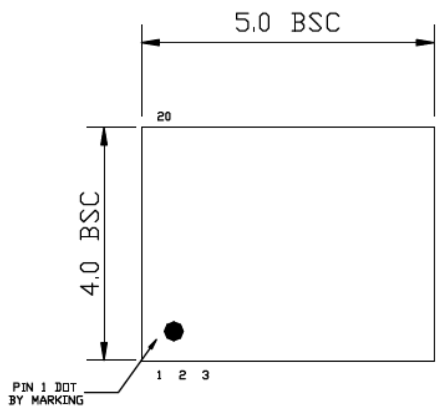
SOLDER STENCIL OPENING

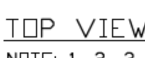
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

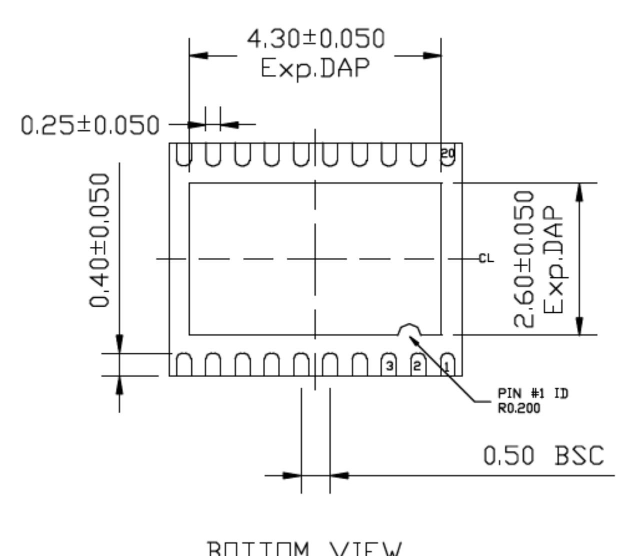
Package Outlines and Dimensions

TITLE
20 LEAD DFN 4.0 x 5.0 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	DFN45-20LD-PL-1	**UNIT**	MM

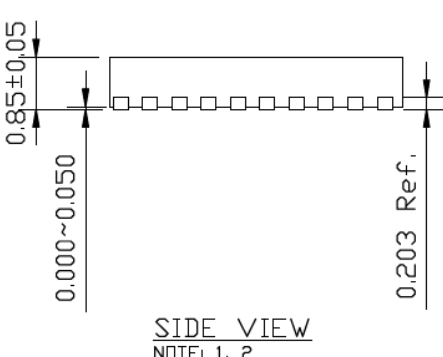






TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2



SIDE VIEW
NOTE: 1, 2

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) REPRESENT STENCIL OPENING ON EXPOSED AREA. SIZE IS 1.17X0.60 MM, 0.80 MM SPACING
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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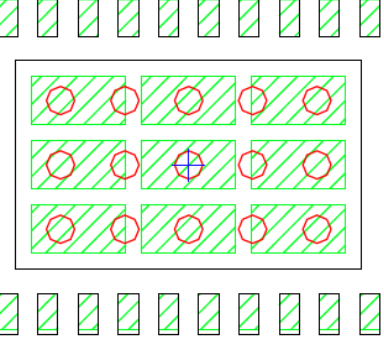
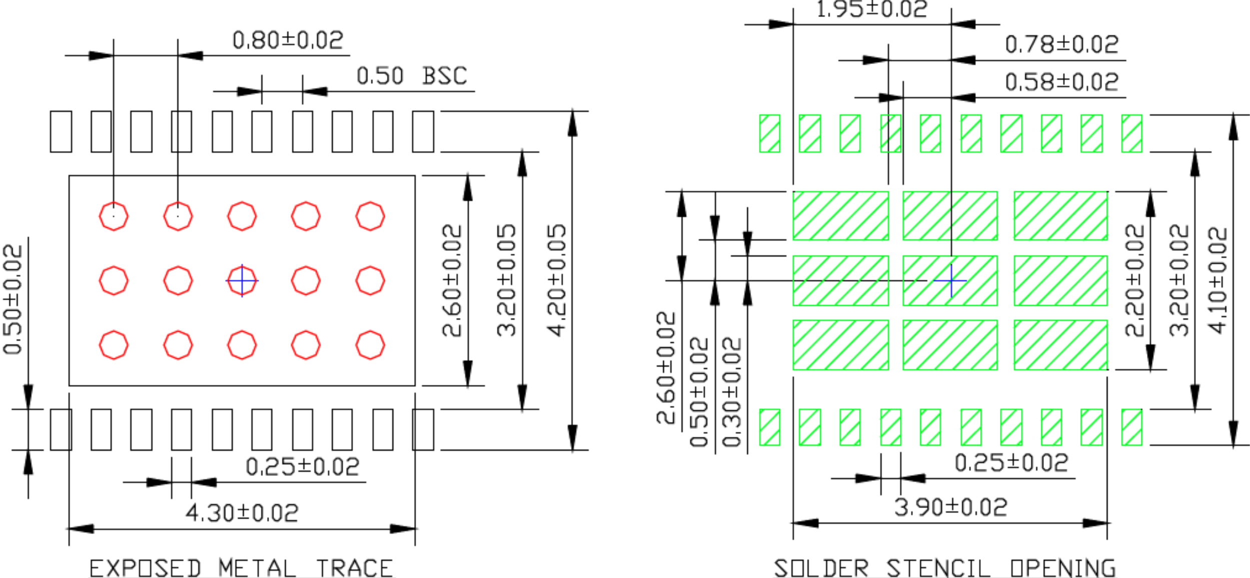
POD-Land Pattern drawing #DFN45-20LD-PL-1





Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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FBGA

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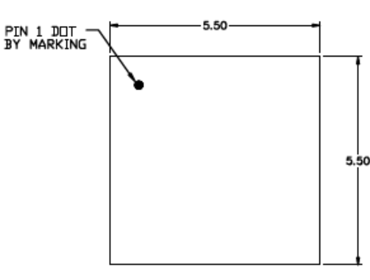
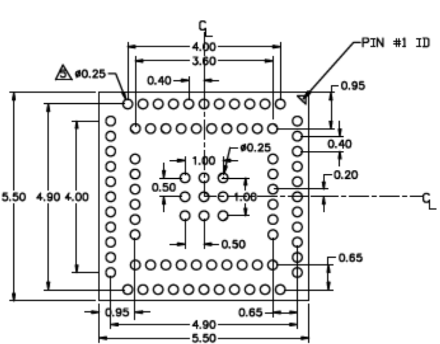
Package Outlines and Dimensions

TITLE
85 LEAD FBGA 5.5x5.5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

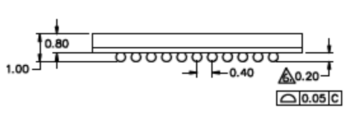
DRAWING #	FBGA5555-85LD-PL-1	UNIT	INCH



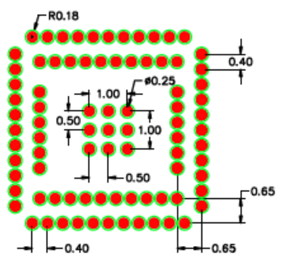
TOP VIEW



BOTTOM VIEW



SIDE VIEW
NOTE: 1,2,3,4,5,6



RECOMMENDED LAND PATTERN
NOTE: 7

NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAX. PACKAGE WARPAGE IS 0.05 mm.
3. MAXIMUM ALLOWABE BURRS IS 0.076 mm IN ALL DIRECTIONS.
4. PIN #1 ID ON TOP WILL BE LASER/INK MARKED.
5. DIMENSION APPLIES TO SOLDER BUMPS AND IS MEASURED BETWEEN 0.10 AND 0.15 mm FROM TIP.
6. APPLIED ONLY FOR TERMINALS.
7. SHADED RED CIRCLES REPRESENTS CONTACT PAD AREA. GREEN CIRCLES REPRESENTS SOLDER MASK OPENNING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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FDFN

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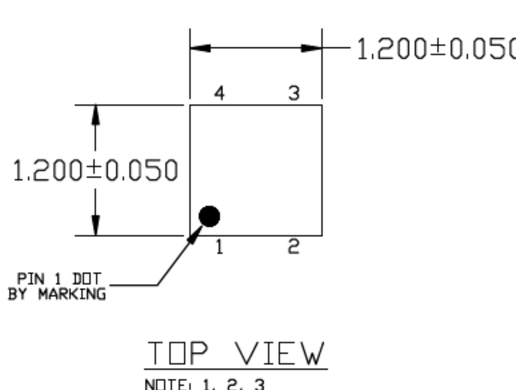
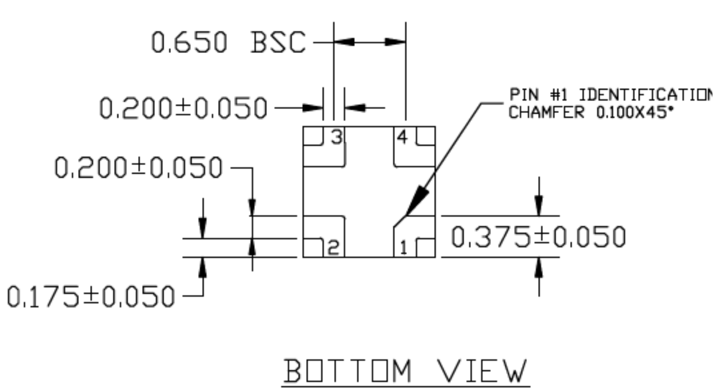
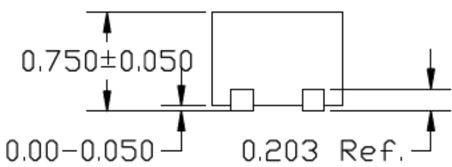
Package Outlines and Dimensions

TITLE
4 LEAD FDFN 1.2x1.2 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTER

DRAWING #	FDFN1212-4LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu







END VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. CYAN SHADED AREAS INDICATE OPTIONAL SOLDER STENCIL OPENING FOR IMPROVED THERMAL PERFORMANCE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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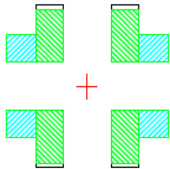
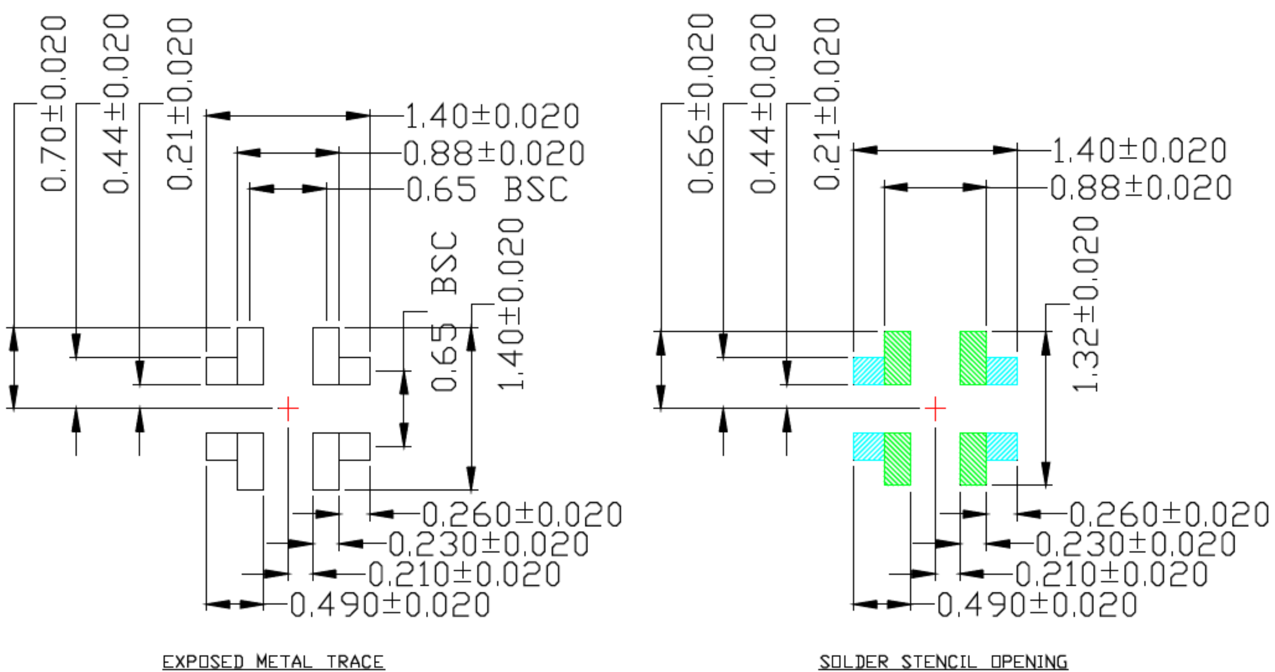
POD-Land Pattern drawing #FDFN1212-4LD-PL-1

RECOMMENDED LAND PATTERN

NOTE: 4



STACKED-UP



Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
10 LEAD FDFN 3x4mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FDFN34-10LD-PL-9	UNIT	MM

TOP VIEW: 4.000±0.050; 3.000±0.050; #1; PIN #1 DOT BY MARKING

BOTTOM VIEW: 0.650 Bsc.; 0.600±0.050; 1.290±0.050; 0.280±0.050; 1.248±0.050; PIN #1 IDENTIFICATION R0.10

SIDE VIEW: 0.850±0.050; 0.000–0.050

RECOMMENDED LAND PATTERN: 4.000; 0.650; 0.600; 0.040; 2.000; 1.600; 3.200; 0.840; 0.505; 1.245

NOTE :
1. Max package warpage is 0.05mm
2. Max allowable burr is 0.076mm in all directions
3. Pin #1 will be laser marked
4. Red circle in land pattern indicate thermal via.
   Size should be 0.20mm in diameter, 0.40mm pitch
   & connected to GND for max thermal performance.
5. Purple hidden lines are recommended metal trace/
   GND planes for improved thermal performance.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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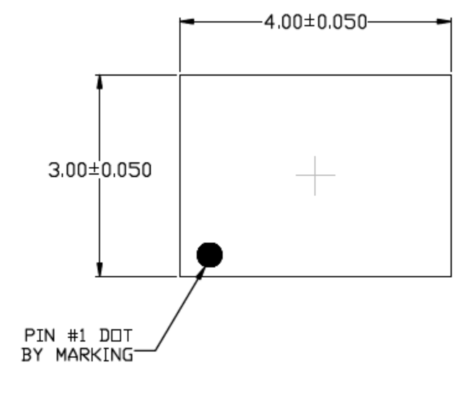
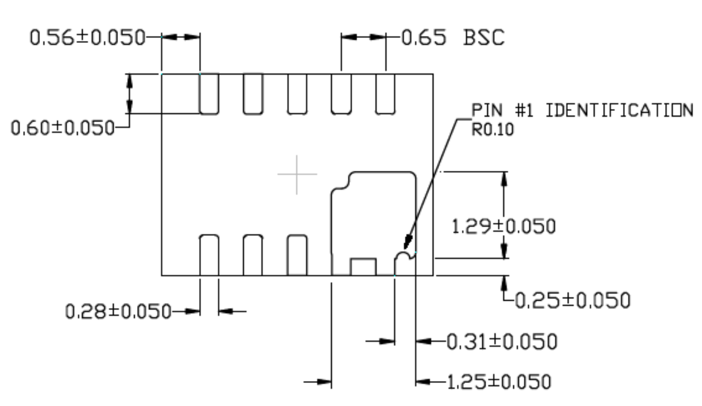
TITLE
10 LEAD DFN 4x3mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FDFN43-10LD-PL-1	**UNIT**	MM
Lead Frame	Copper	**Lead Finish**	Matte Tin





TOP VIEW
NOTE: 1, 2, 3

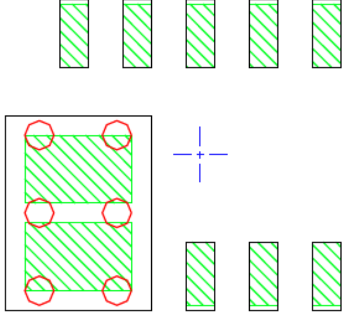
BOTTOM VIEW
NOTE: 1, 2

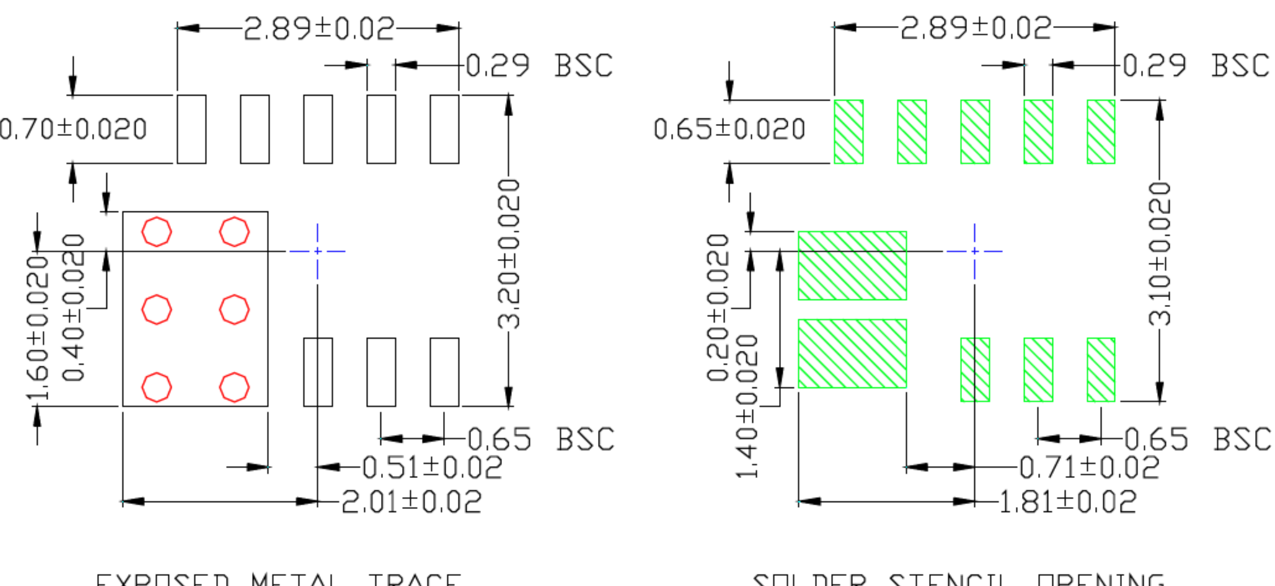
SIDE VIEW
NOTE: 1, 2

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) REPRESENT STENCIL OPENING ON EXPOSED AREA. SIZE IS 0.85X0.87 MM, 1.07 MM PITCH SPACING
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER, 0.80MM PITCH SPACING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

POD-Land Pattern drawing #FDFN43-10LD-PL-1





Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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FQFN

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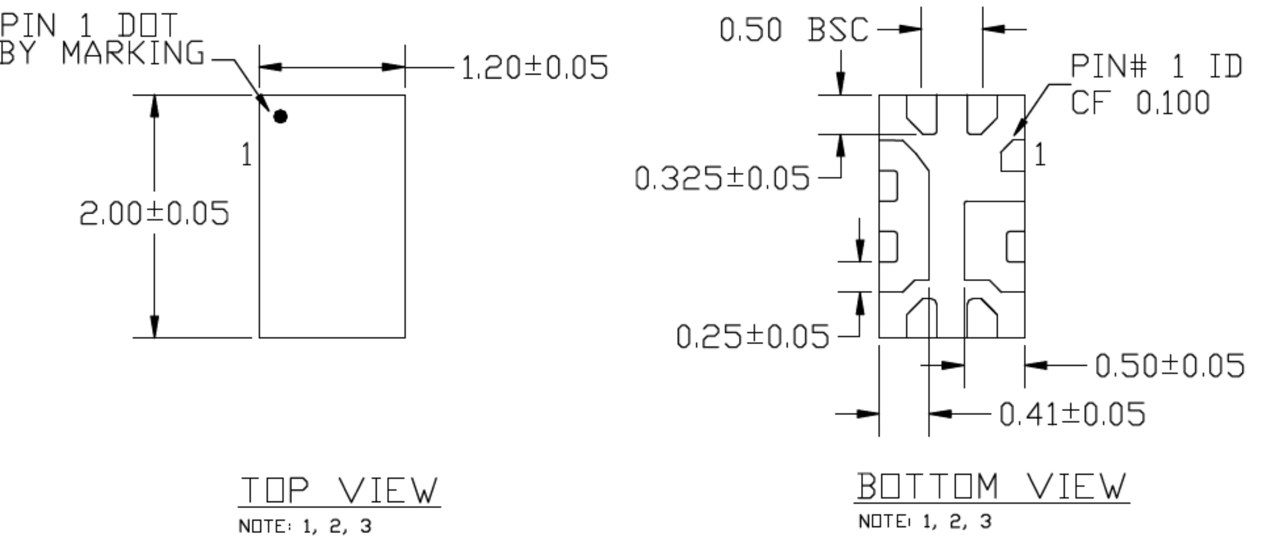
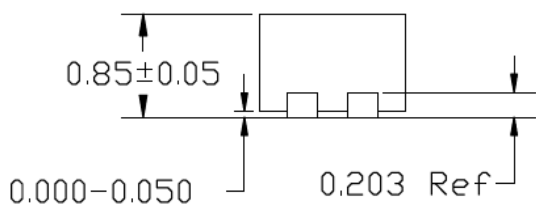
Package Outlines and Dimensions

TITLE
10 LEAD FQFN 1.2x2.0 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN1220-10LD-PL-1	**UNIT**	MM
Lead Frame	Copper	**Lead Finish**	Matte Tin





END VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. GREEN SHADED RECTANGLES (AREA) REPRESENTS SOLDER STENCIL OPENING ON EXPOSED METAL TRACE.
5. CYAN SHADED AREAS INDICATE OPTIONAL SOLDER STENCIL OPENING FOR IMPROVED THERMAL PERFORMANCE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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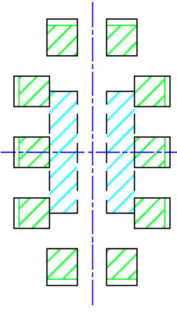
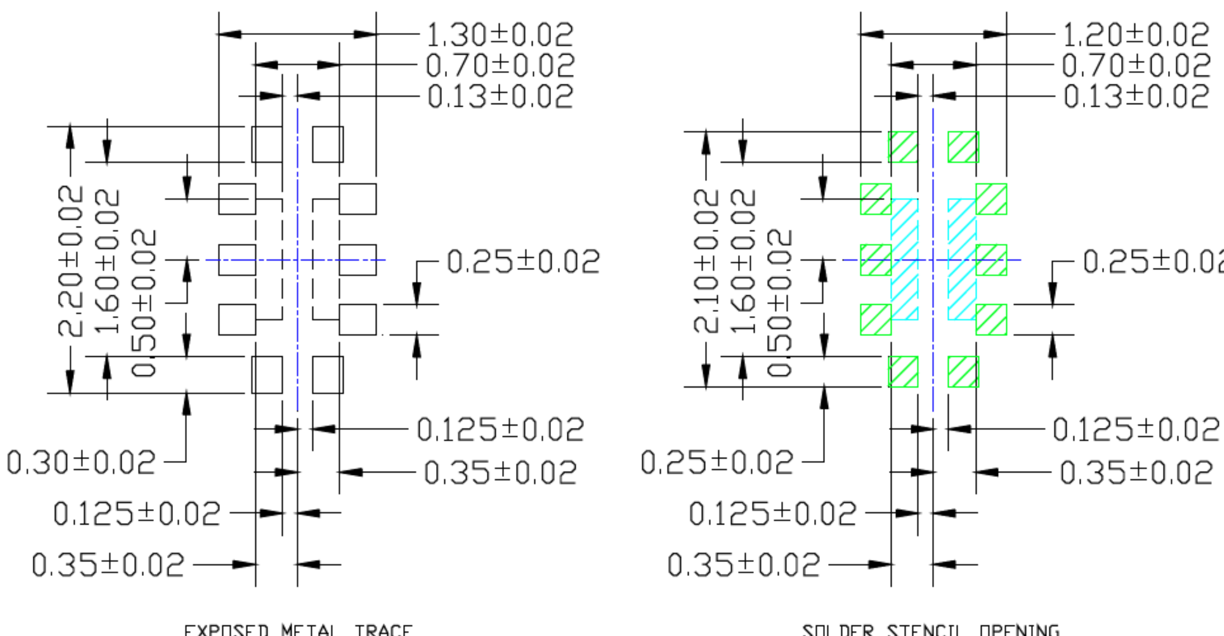
POD-Land Pattern drawing #FQFN1220-10LD-PL-1

RECOMMENDED LAND PATTERN

NOTE: 4, 5



STACKED-UP



EXPOSED METAL TRACE

SOLDER STENCIL OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE

16 LEAD FQFN 3X3 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN33-16LD-PL-1	**UNIT**	MM

PIN 1 DOT
BY MARKING
3.00±0.05
3.00±0.05

TOP VIEW
NOTE: 1, 2, 3

0.92±0.05
1.15±0.05
PIN# 1 ID
RD 0.100
0.50 BSC
0.80±0.05
0.25±0.05
0.45
1.2±0.05

BOTTOM VIEW
NOTE: 1, 2, 3

0.000~0.050
0.85±0.05
0.203 Ref

SIDE VIEW
NOTE: 1, 2, 3

3.20±0.05
2.20±0.05
0.25
0.26
3.20±0.05
2.20±0.05
0.50
0.54
0.6±0.02
0.6±0.02
1.2±0.02

RECOMMENDED LAND PATTERN
NOTE: 4, 5, 6

NOTE :

1. Max package warpage is 0.05mm
2. Max allowable burr is 0.076mm in all directions
3. Pin #1 will be laser marked
4. Red circle in land pattern indicate thermal via. Size should be 0.30~0.35mm in diameter and should be connected to GND for max thermal performance.
5. Green rectangle (shaded area) in GND black colored pad represent stencil opening on exposed area. Size is 0.80x0.40mm.
6. Red & Magenta colored pads represent different potentials, do not connect to GND.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

20 LEAD FQFN 3x3mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN33-20LD-PL-1	UNIT	MM
Lead Frame	Cu	Lead Finish	Matte Tin

PIN 1 DOT BY MARKING
3.00±0.05
3.00±0.05
1

TOP VIEW
NOTE: 1, 2, 3

PIN# 1 IDENFICATION CHAMFER 0.100X45°
0.22±0.05
0.25±0.05
1.35±0.05
0.50 BSC
0.52
0.33±0.05
0.77±0.05
0.64±0.05
0.24±0.05
0.46±0.05
0.33
0.3±0.05
0.61
0.79
0.09±0.02
0.16±0.05

BOTTOM VIEW
NOTE: 1, 2, 3

0.85±0.05
SEATING PLANE
0.00–0.05
0.203 Ref.

SIDE VIEW
NOTE: 1, 2, 3

0.33±0.02
0.45±0.02
1.17±0.02
0.30±0.05
0.20±0.05
0.47±0.02
0.31±0.02
0.45±0.02
1.75±0.02
2.20±0.05
2.60±0.05
3.20±0.05
0.79±0.02
0.86±0.02
0.3±0.02

RECOMMENDED LAND PATTERN
NOTE: 4, 5, 6, 7

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 (TOP) IS LASER MARKED.
4. RED CIRCLES IN LAND PATTERN REPRESENTS THERMAL VIA AND SHOULD BE CONNECTED TO GROUND FOR MAXIMUM PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) ARE RECOMMENDED SOLDER STENCIL OPENNING ON EXPOSED PAD AREA.
6. BLUE COLOR AND PURPLE COLOR PADS REPRESENT DIFFERENT POTENTIALS. DO NOT CONNECT TO GROUND.
7. VIA SIZE is 0.30mm DIAMETER and 0.70mm PITCH.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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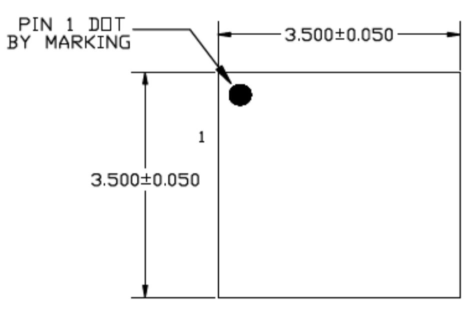
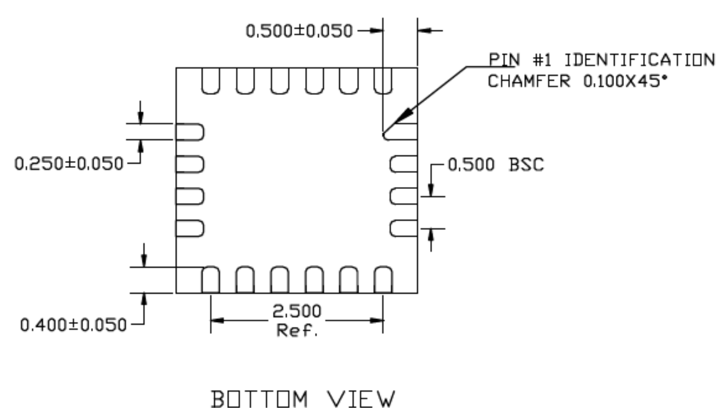
Package Outlines and Dimensions

TITLE
20 LEAD FQFN 3.5x3.5mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

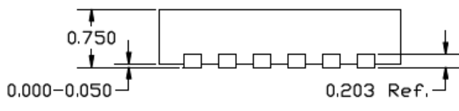
DRAWING #	FQFN3535-20LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu



TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



SIDE VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN SHADED RECTANGLES (AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED METAL TRACE

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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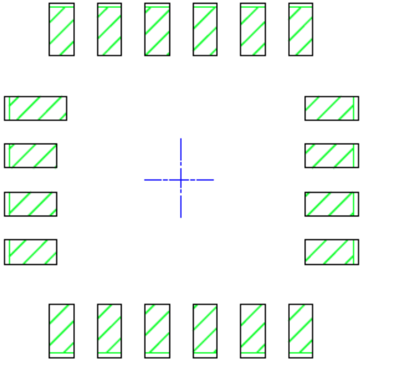
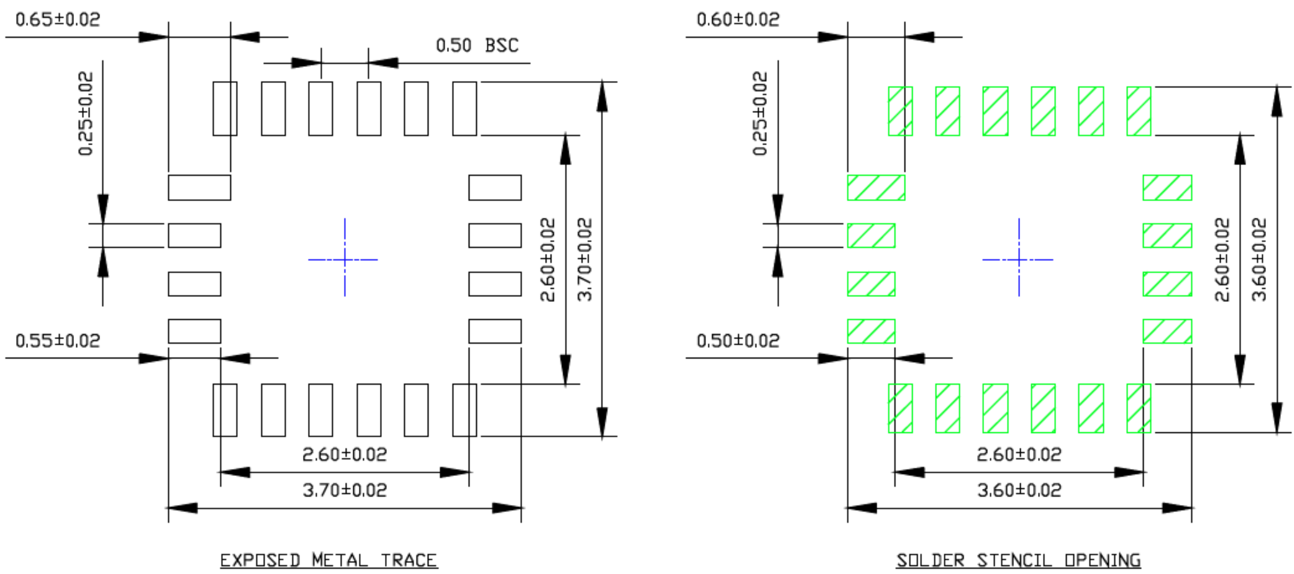
POD-Land Pattern drawing #FQFN3535-20LD-PL-1





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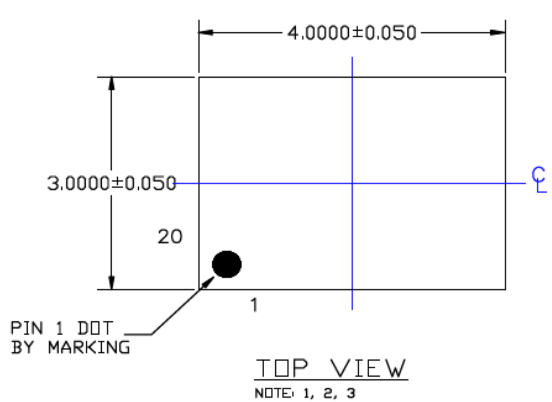
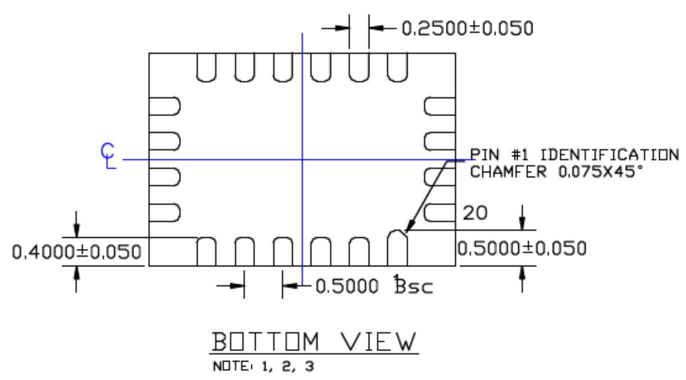
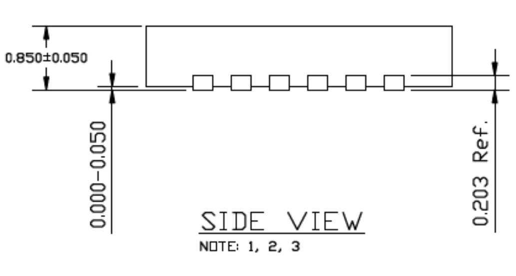
TITLE

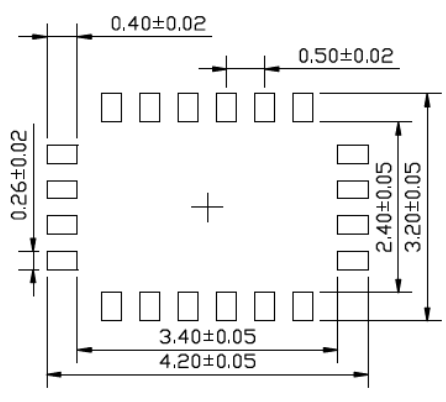
20 LEAD QFN 3x4mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN34-20LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu









RECOMMENDED LAND PATTERN

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

24 LEAD QFN 3x3mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN33-24LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu

PIN 1 DOT
BY MARKING
3.00±0.05
1
3.00±0.05

TOP VIEW
NOTE: 1, 2, 3

PIN #1 IDENTIFICAT
CHAMFER 0.075X45°
0.40 Bsc
0.30±0.05
0.18±0.05

BOTTOM VIEW
NOTE: 1, 2, 3

0.85±0.05
0.2030 Ref.
0.000-0.005

SIDE VIEW
NOTE: 1, 2, 3

0.30±0.02
0.20±0.02
0.40 BSC
2.60±0.05
3.20±0.05

RECOMMENDED LAND PATTERN

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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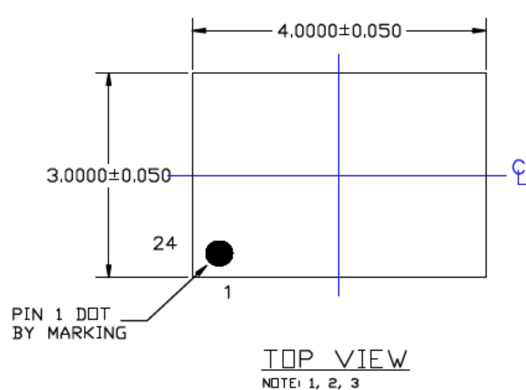
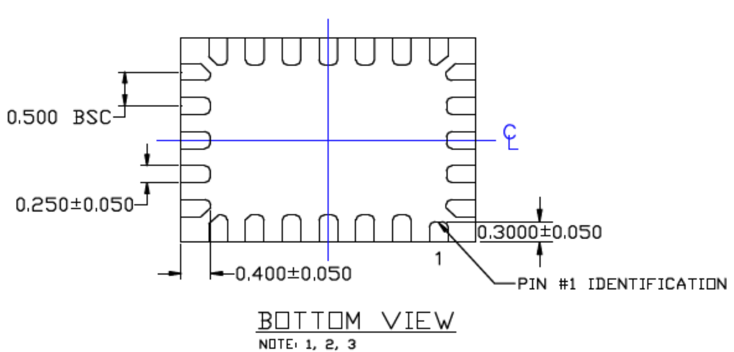
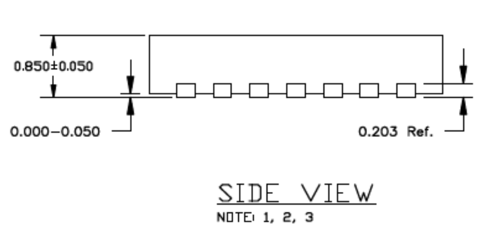
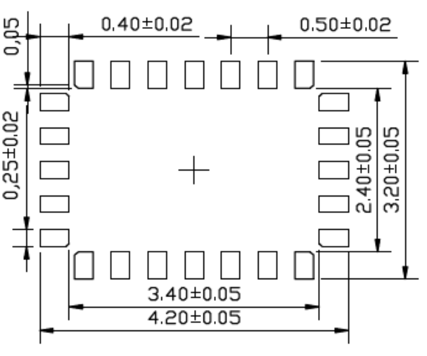
TITLE
24 LEAD QFN 3x4mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN34-24LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu









RECOMMENDED LAND PATTERN

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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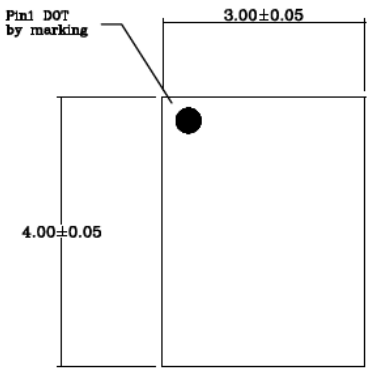
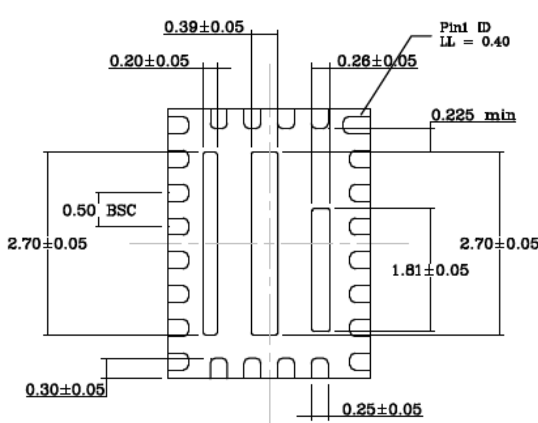
TITLE

24 LEAD FQFN 3x4mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

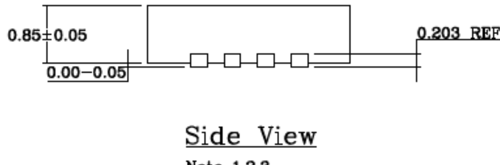
DRAWING #	FQFN34-24LD-PL-2	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin





Top View
Note 1,2,3

Bottom View
Note 1,2,3



Side View
Note 1,2,3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAs & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE. SIZE IS 0.30~0.35mm WITH 0.80mm PITCH.
5. SHADED AREA RECTANGLES REPRESENT SOLDER STENCIL OPENING ON EXPOSED METAL TRACE.
6. MAGENTA & BLUE COLORED RECTANGLES REPRESENT DIFFERENT POTENTIAL, DO NOT CONNECT TO GND.
7. BLACK COLORED RECTANGLES REPRESENT DIFFERENT IOs. DO NOT CONNECT TOGETHER.
8. RECOMMENDED LAND PATTERN TOLERANCE IS 0.02mm UNLESS SPECIFIED.
9. SEE RECOMMENDED LAND PATTERN ON PAGE 2.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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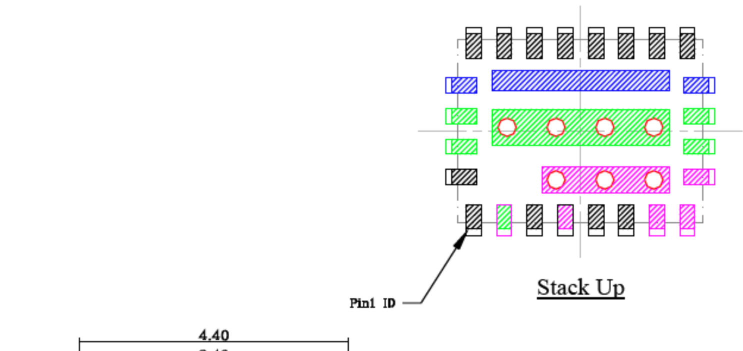
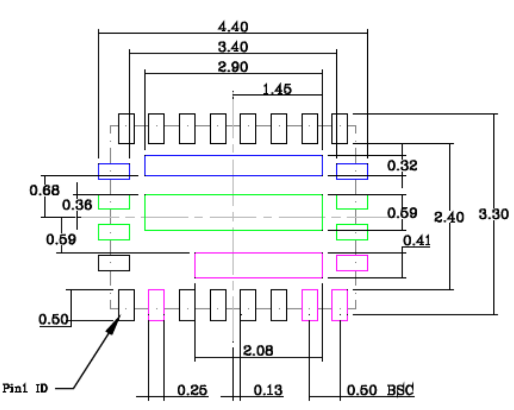
POD-Land Pattern Doc #: FQFN34-24LD-PL-2-E

Recommended Land Pattern

Note: 4,5,6,7



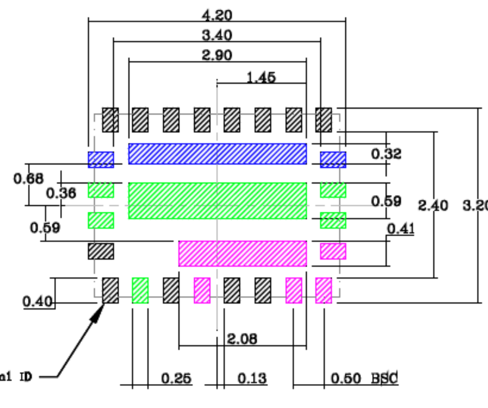
Stack Up



Exposed Metal

0.40 0.40 R0.15 0.07 0.79 0.80

Thermal (filled) VIA



Solder Stencil Opening

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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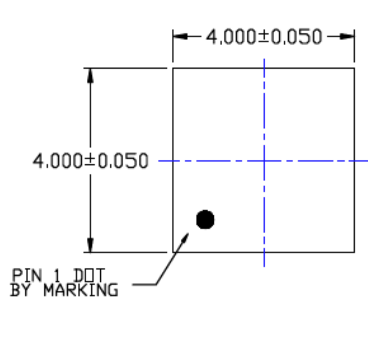
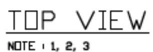
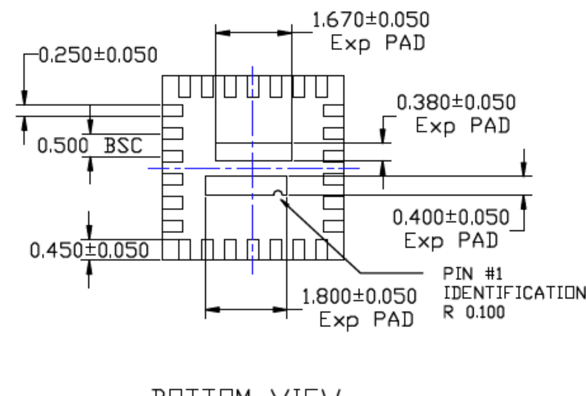
TITLE
26 LEAD FQFN 4x4mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

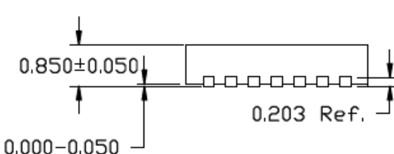
DRAWING #	FQFN44-26LD-PL-1	UNIT	MM







BOTTOM VIEW
NOTE : 1, 2

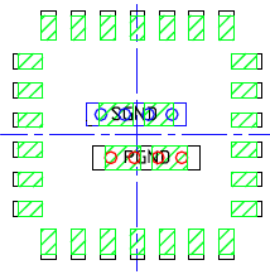


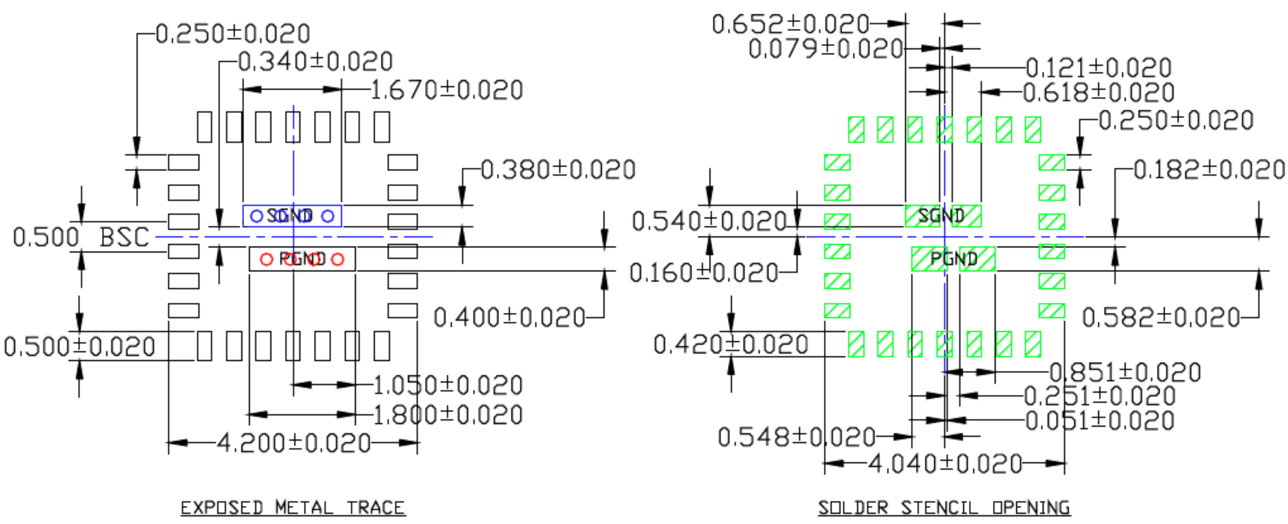
SIDE VIEW
NOTE : 1, 2

NOTE:
1. Max package warpage is 0.05mm.
2. Max allowable burr is 0.076mm in all directions.
3. Pin #1 will be laser marked.
4. Red circle in PGND indicate thermal via. Size should be 0.20mm in diameter, 0.40mm pitch and should be connected to GND for max thermal performance.
5. Blue colored pad & circle indicate SGND, do not connect to GND.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

POD-Land Pattern drawing #FQFN44-26LD-PL-1





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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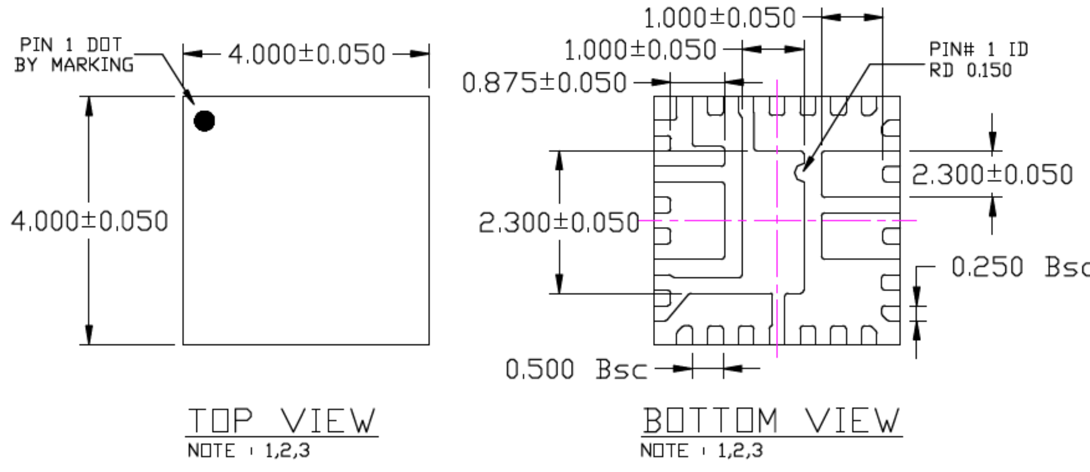
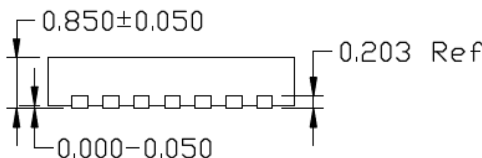
TITLE

28 LEAD FQFN 4x4mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN44-28LD-PL-1	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin





SIDE VIEW
NOTE : 1,2,3

NOTE :

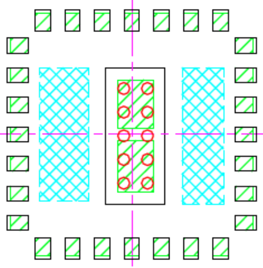
1. Max package warpage is 0.05mm.
2. Max allowable burr is 0.076mm in all directions.
3. Pin #1 will be laser marked.
4. Red circle in land pattern indicate thermal via. Size should be 0.20mm in diameter, 0.400mm pitch and should be connected to GND for max thermal performance.
5. Green rectangles (shaded area) in GND pad represent stencil opening on exposed area. Size is 0.600x0.825mm, pitch is 1.025mm.
6. Cyan colored hidden lines should be covered with solder mask.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

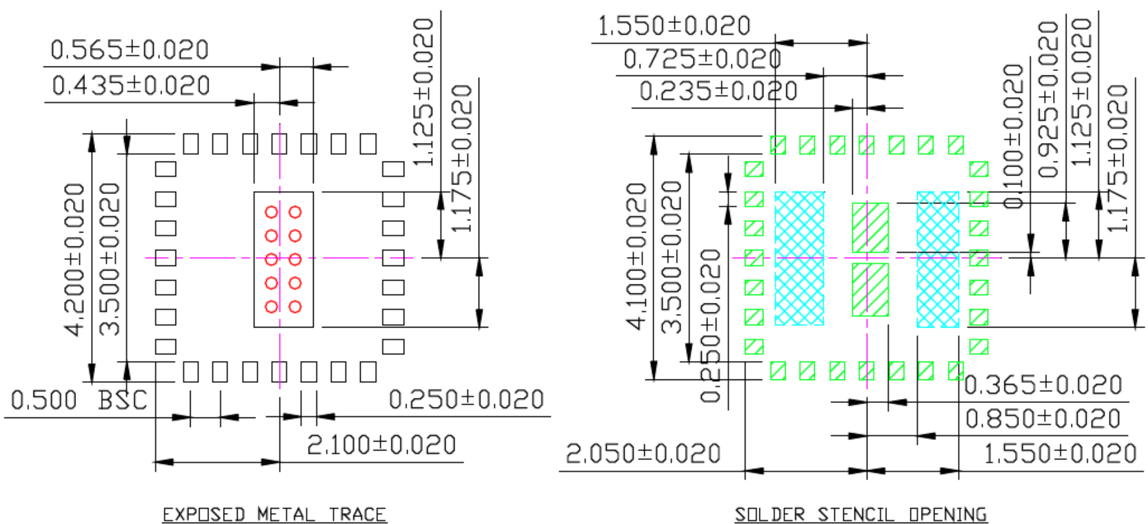
POD-Land Pattern drawing #FQFN44-28LD-PL-1

RECOMMENDED LAND PATTERN

NOTE : 4,5,6



STACKED-UP



Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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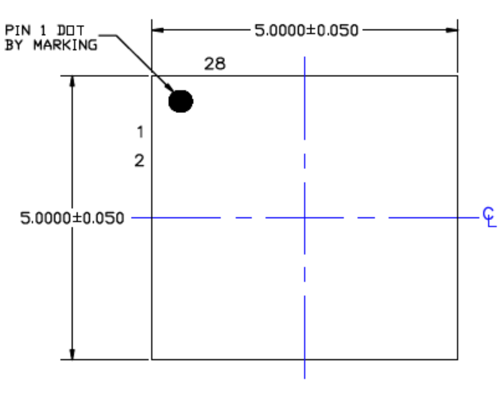
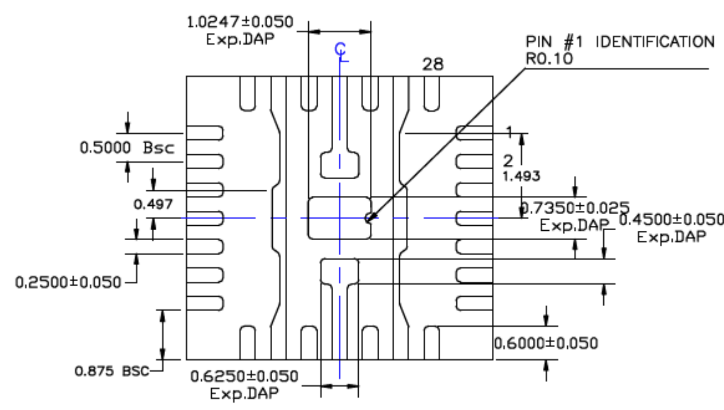
TITLE

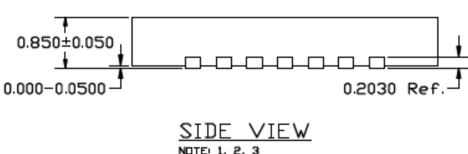
28 LEAD QFN 5x5mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN55-28LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu





BOTTOM VIEW
NOTE: 1, 2, 3

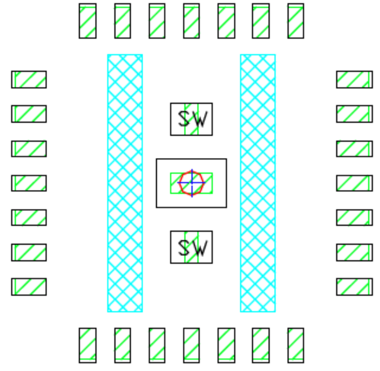


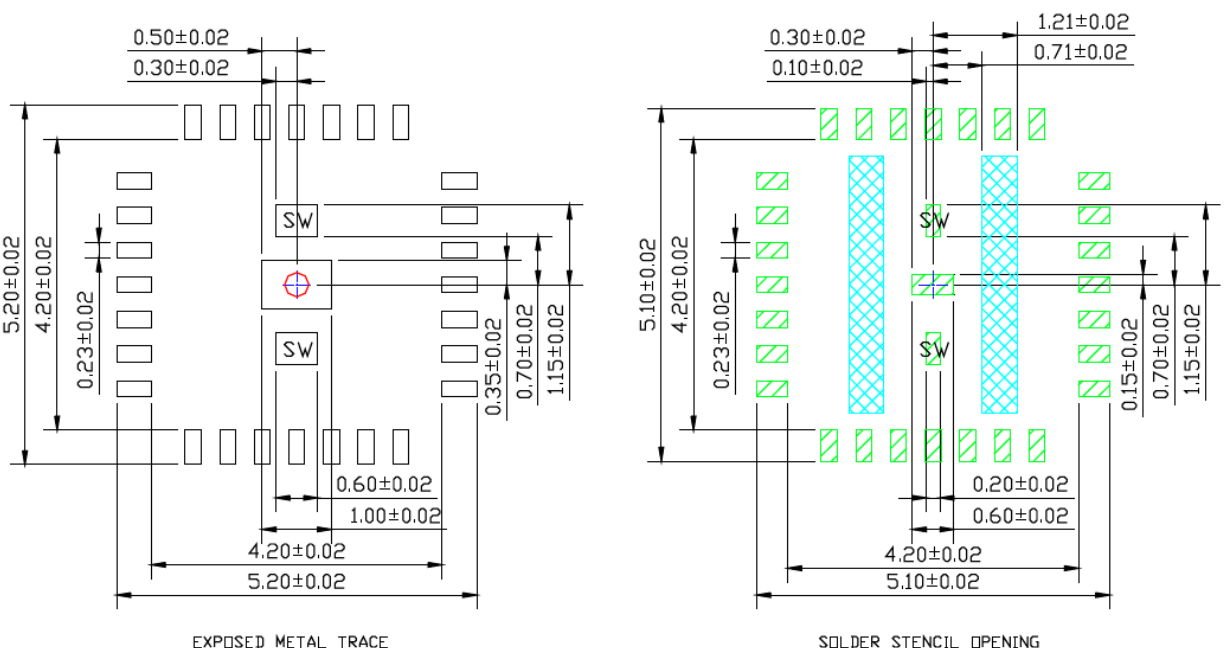
SIDE VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076 MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35 MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. NO EXPOSED TRACES ALLOWED WITHIN THE CYAN COLORED SHADED AREA.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

POD-Land Pattern drawing #FQFN55-28LD-PL-1





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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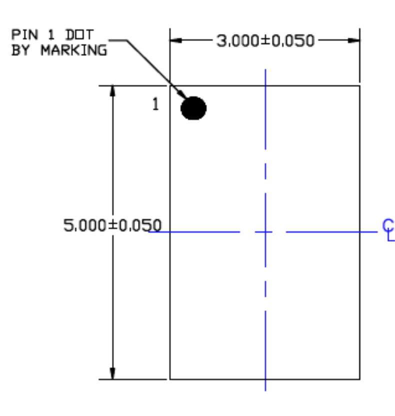
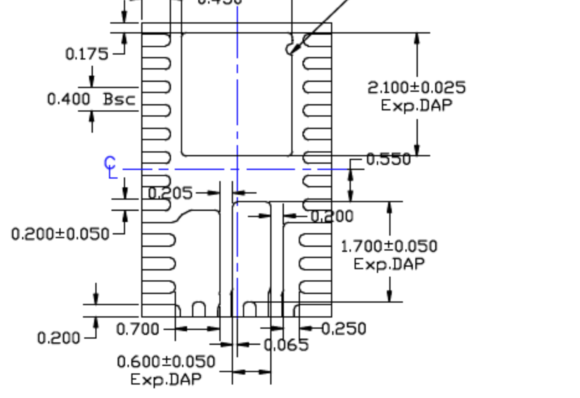
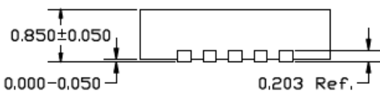
TITLE
29 LEAD FQFN 3x5mm (TRI-SIDE) PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN35-29LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu



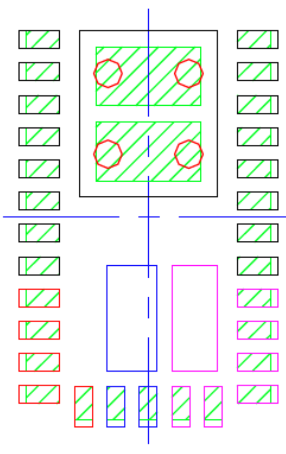


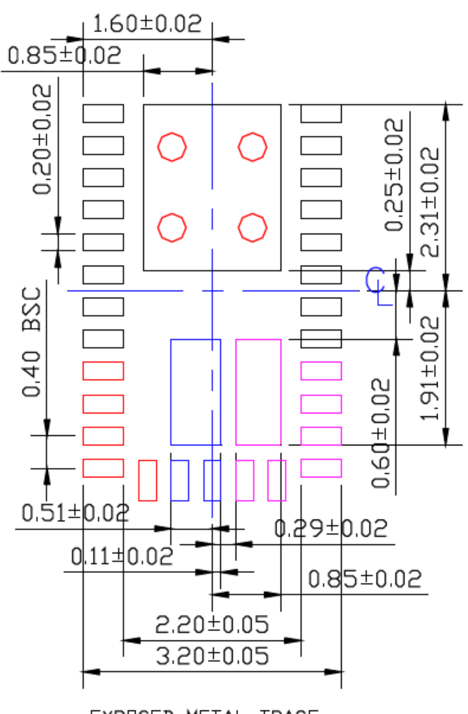


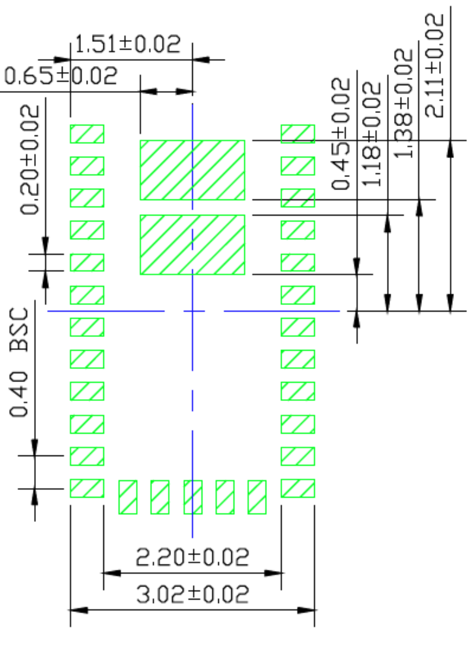
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076 MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA. SIZE SHOULD BE 0.30-0.35 MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE. 1.0MM PITCH
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 0.73x1.30 MM, SPACING IS 0.2MM

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

POD-Land Pattern drawing # FQFN35-29LD-PL-1







Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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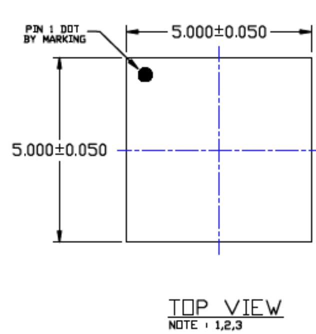
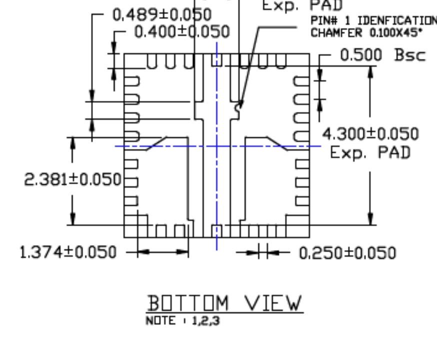
TITLE

32 LEAD QFN 5x5mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

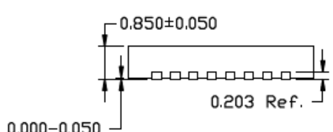
DRAWING #	FQFN55-32LD-PL-1	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin



TOP VIEW
NOTE : 1,2,3



BOTTOM VIEW
NOTE : 1,2,3



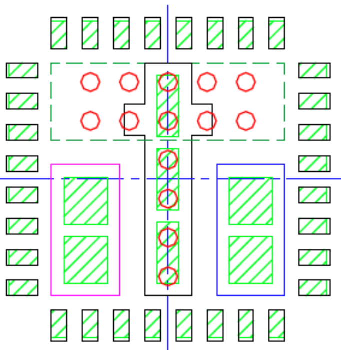
SIDE VIEW
NOTE : 1,2,3

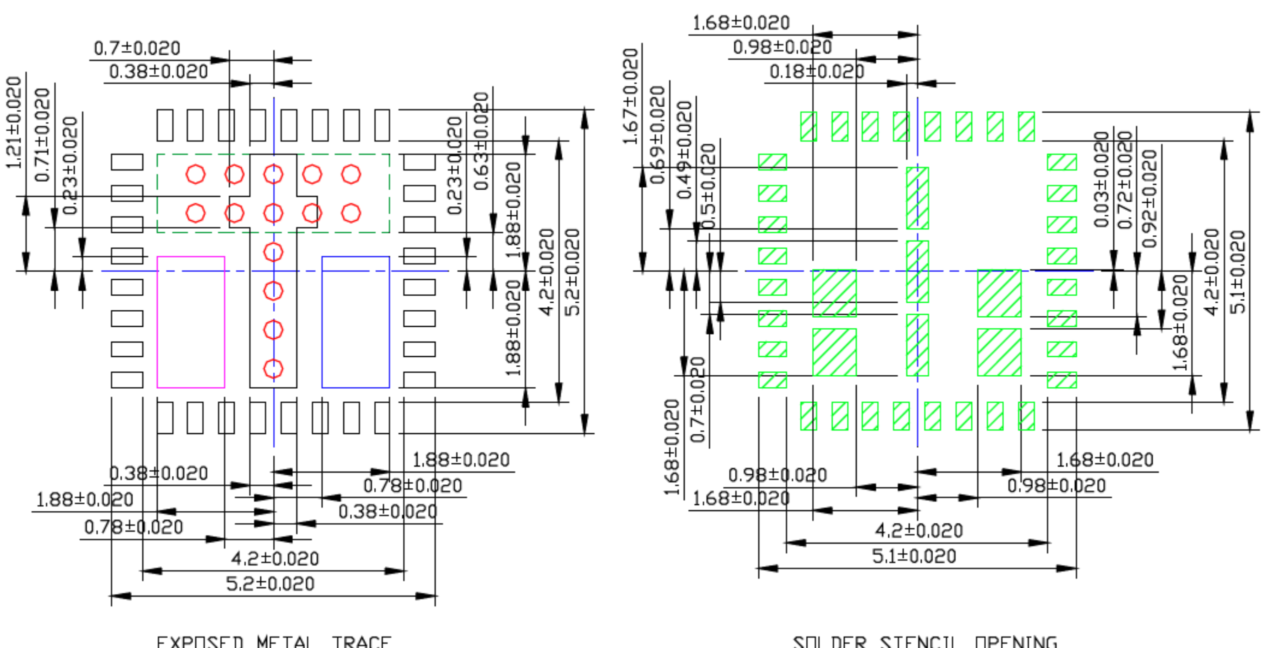
NOTE :

1. Max package warpage is 0.05mm.
2. Max allowable burr is 0.076mm in all directions.
3. Pin #1 will be laser marked.
4. Red circle in land pattern indicate thermal via. Size should be 0.30mm in diameter, 0.625mm pitch and should be connected to GND for max thermal performance.
5. Green rectangles (shaded area) in GND black colored pad represent stencil opening on exposed area. Size is 0.35x0.98mm, pitch is 1.18mm.
6. Dark Green shown in hidden lines (Optional) for improved thermal performance.
7. Blue & Magenta colored pads represent different potentials, do not connect to GND.
8. Green rectangles (shaded area) in blue & magenta colored pad represent stencil opening on exposed area. Size is 0.70x0.75mm, pitch is 0.95mm.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

POD-Land Pattern drawing #FQFN55-32LD-PL-1





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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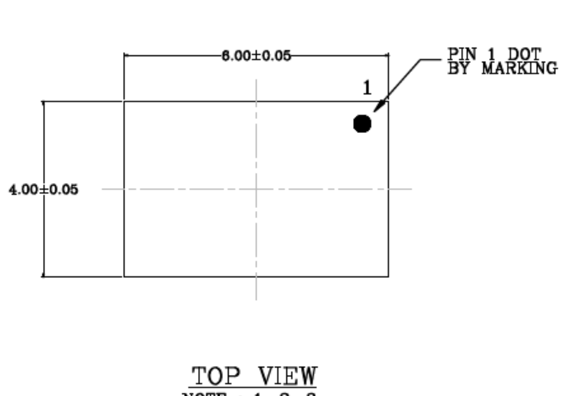
Package Outlines and Dimensions

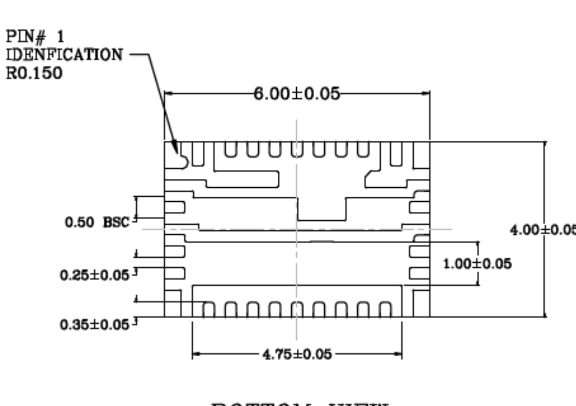
TITLE

34 LEAD FQFN 4x6mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN46-34LD-PL-1	**UNIT**	MM



TOP VIEW
NOTE : 1, 2, 3



BOTTOM VIEW
NOTE : 2, 3

0.85±0.05
0.00–0.05
0.203 REF
SEATING PLANE

SIDE VIEW
NOTE : 2, 3

NOTES:

1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Red color circles are thermal via. 0.30-0.35mm in diameter and 0.80mm pitch and should be connected to GND for maximum performance.
5. Blue and Purple color pads represent different potential. Do not connect to GND.
6. Green rectangles (shaded area) represents solder stencil opening on exposed metal trace.
7. Recommended Land Pattern Tolerance is ±0.020mm unless specified.
8. See recommended land pattern on page2.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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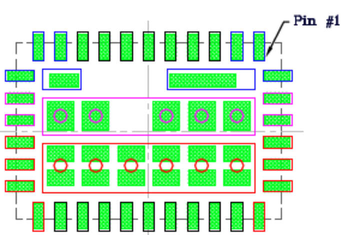
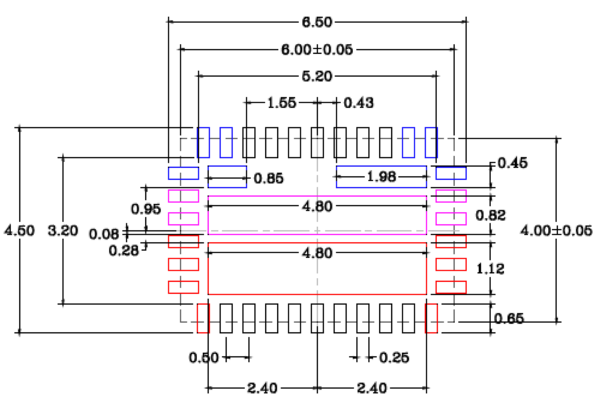
POD-Land Pattern Doc #: FQFN46-34LD-PL-1-A

Recommended Land Pattern

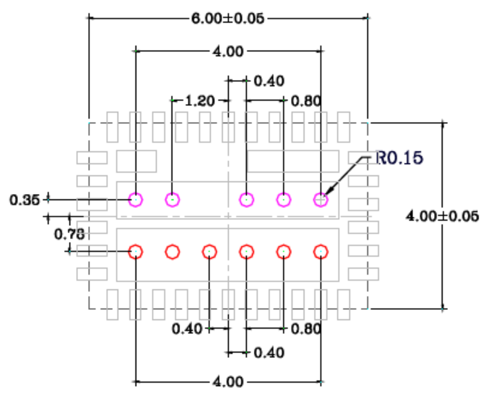
Note: 4,5,6,7



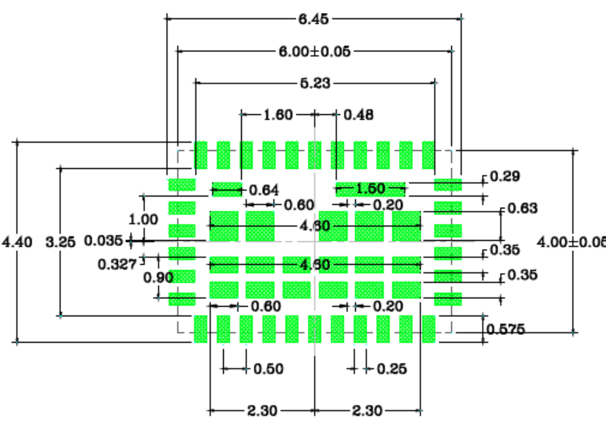
Stack Up



Exposed Metal Trace



Thermal (filled) Via



Solder Stencil Opening

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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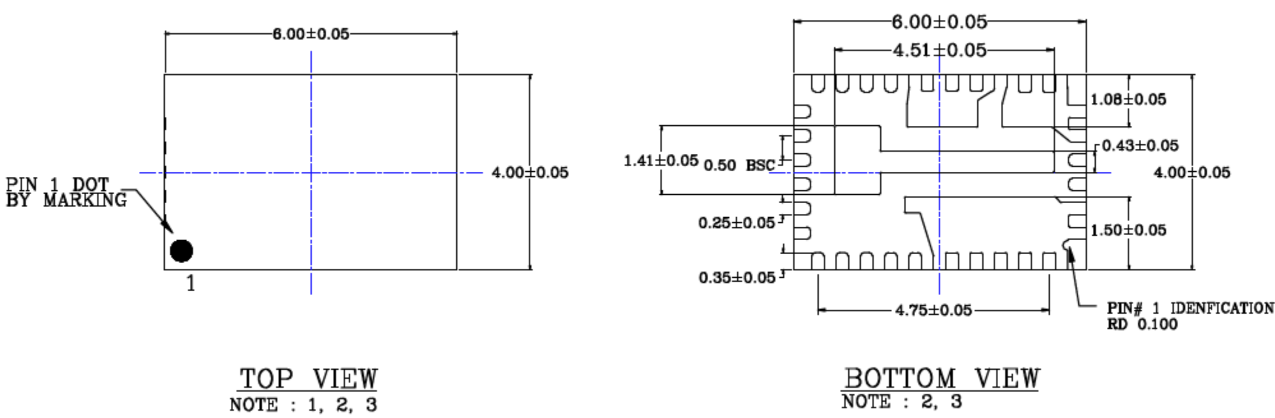
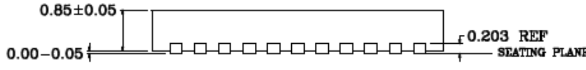
TITLE
34 LEAD FQFN 4x6mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN46-34LD-PL-2	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin





SIDE VIEW
NOTE : 2, 3

NOTES:
1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Black colored circles are thermal via. 0.30-0.35mm in diameter and 0.62mm pitch and should be connected to GND for maximum performance.
5. Green rectangles (shaded area) in GND Black colored pad represent stencil opening on exposed area. Size is 0.74x0.27mm, 0.94mm pitch.
6. Black colored hidden lines (optional) for improved thermal performance.
7. Blue and Red color pads represent different potential. Do not connect to GND.
8. Green rectangles (shaded area) in Red colored pad represents solder stencil opening on exposed area. Size is 0.57x0.35mm, 0.77mm pitch.
9. Recommended Land Pattern Tolerance is ±0.020mm unless specified.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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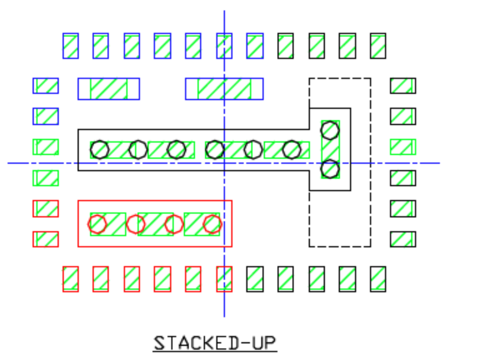
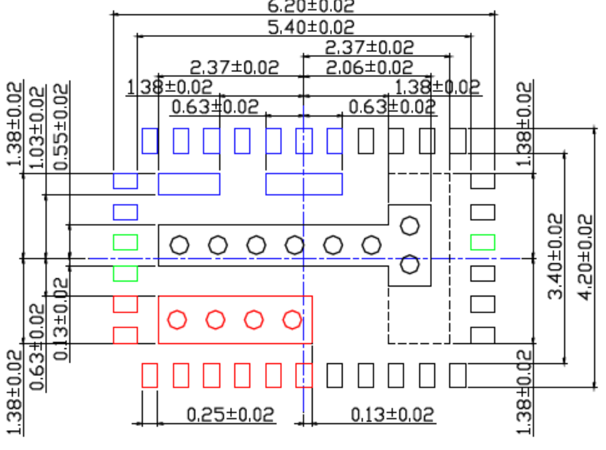
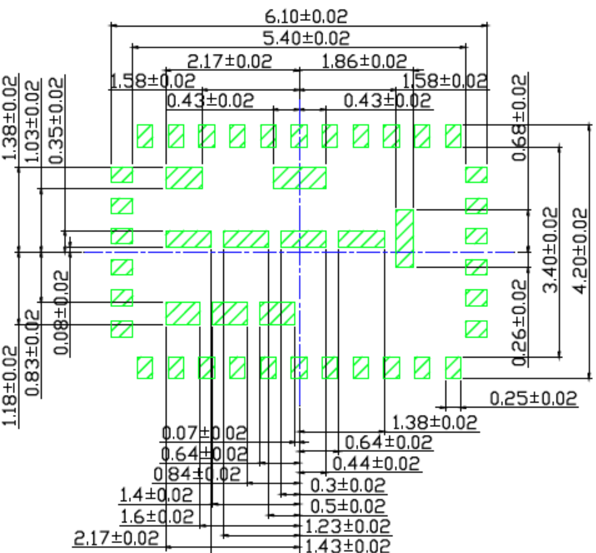
POD-Land Pattern drawing #FQFN46-34LD-PL-2







Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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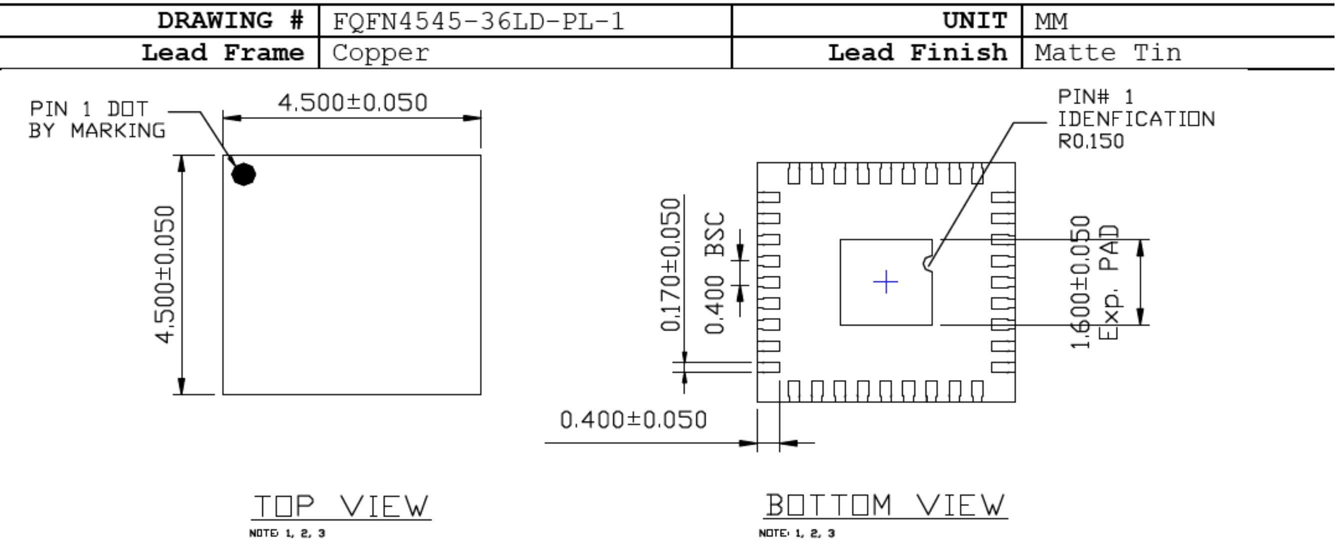
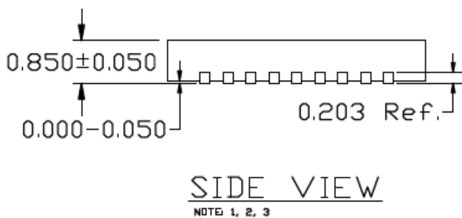
TITLE

36 LEAD QFN 4.5x4.5mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN4545-36LD-PL-1	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin

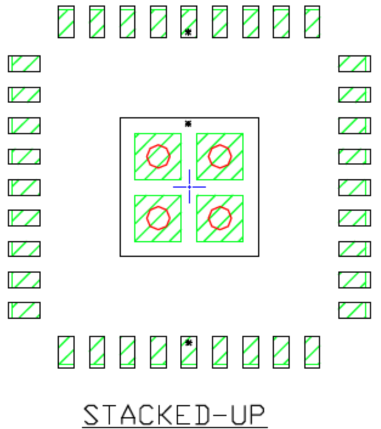


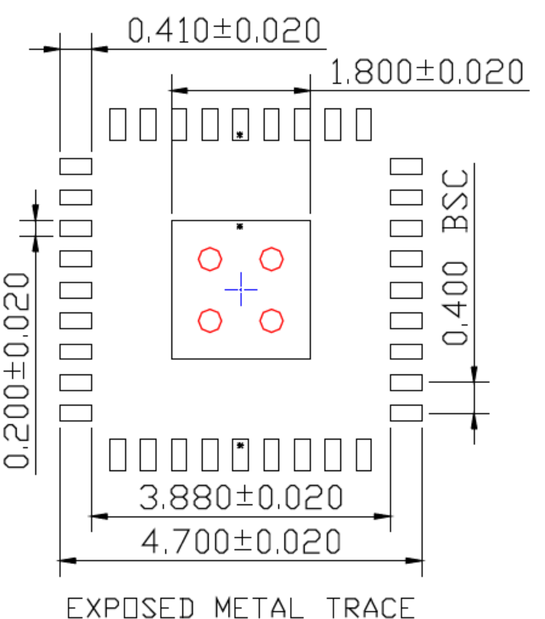


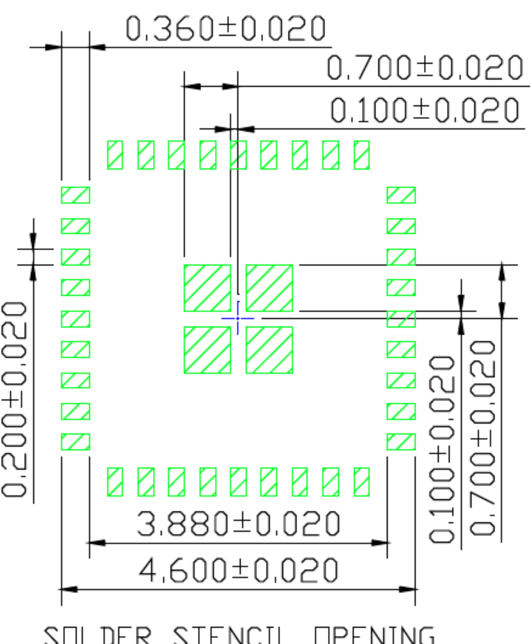
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN REPRESENT THERMAL VIA. SIZE SHOULD BE 0.30-0.35MM IN DIAMETER, 0.8MM PITCH & MUST BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA, OPTIONAL) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.60X0.60 MM IN SIZE, 0.20MM SPACING.
6. LAND PATTERN OPENINGS MARKED BY "*" (PINS#14, 32 & EPAD) ARE OF SAME GND AND SHOULD BE CONNECTED ON BOARD LEVEL FOR MAXIMUM THERMAL PERFORMANCE

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

POD-Land Pattern drawing #FQFN4545-36LD-PL-1







Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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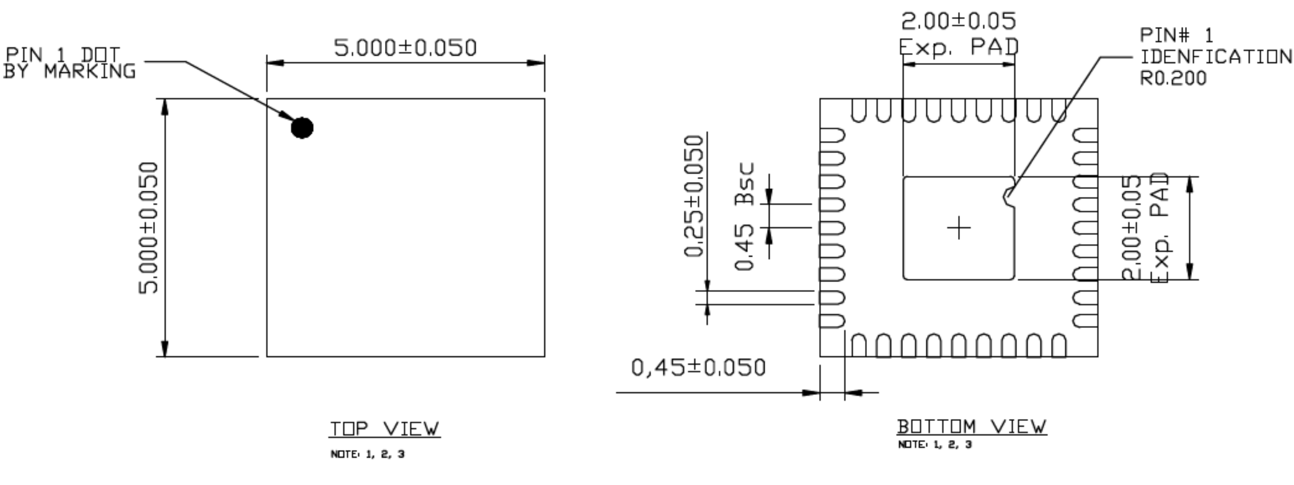
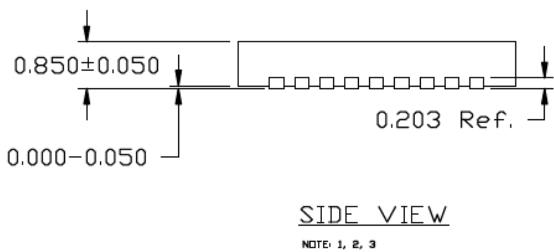
Package Outlines and Dimensions

TITLE
36 LEAD QFN 5x5mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN55-36LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu





NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076 MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN REPRESENT THERMAL VIA. SIZE SHOULD BE 0.30-0.35MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA, OPTIONAL) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.80X0.80 MM IN SIZE, 0.20 MM SPACING.
6. LAND PATTERN OPENINGS MARKED BY "*" (PINS#14, 32 & EPAD) ARE OF SAME GND AND SHOULD BE CONNECTED ON BOARD LEVEL FOR MAXIMUM THERMAL PERFORMANCE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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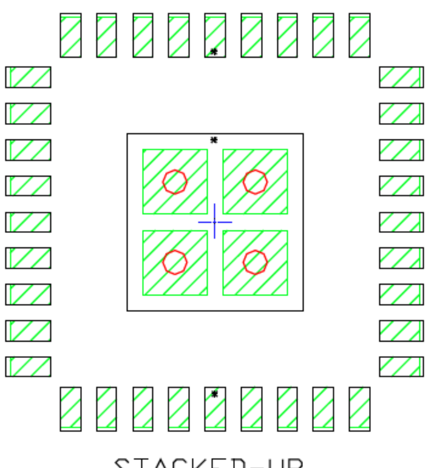
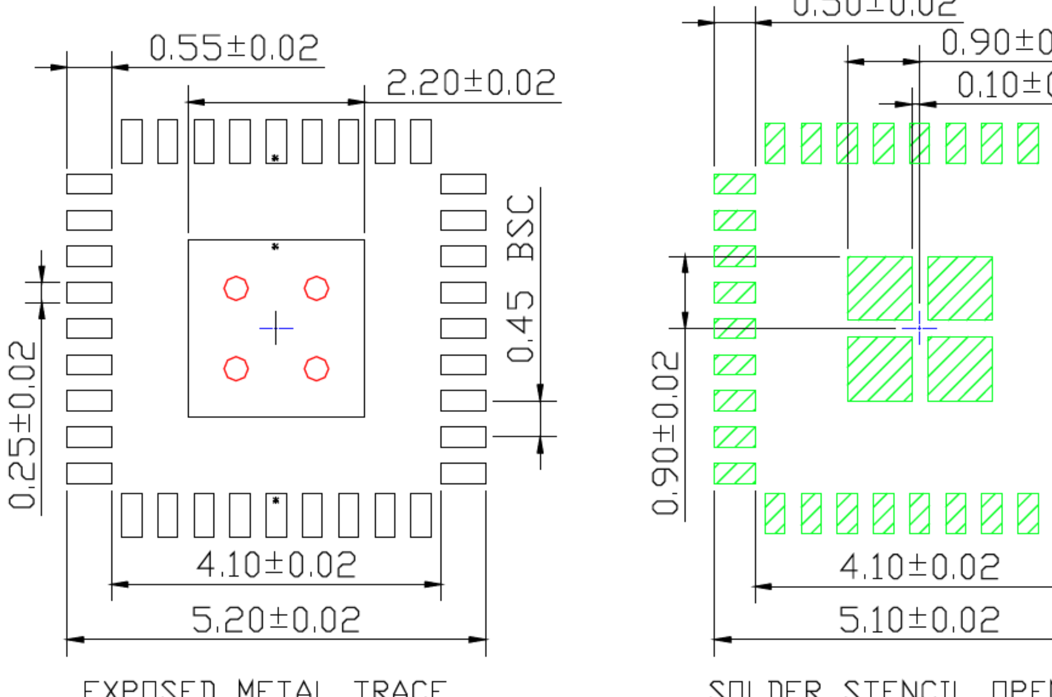
POD-Land Pattern drawing #FQFN55-36LD-PL-1





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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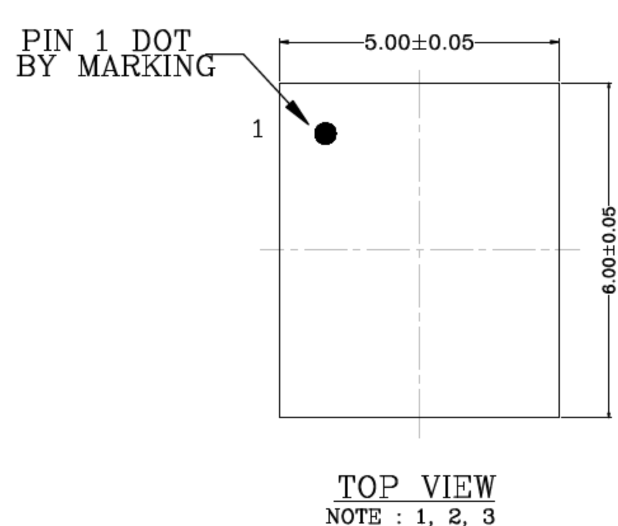
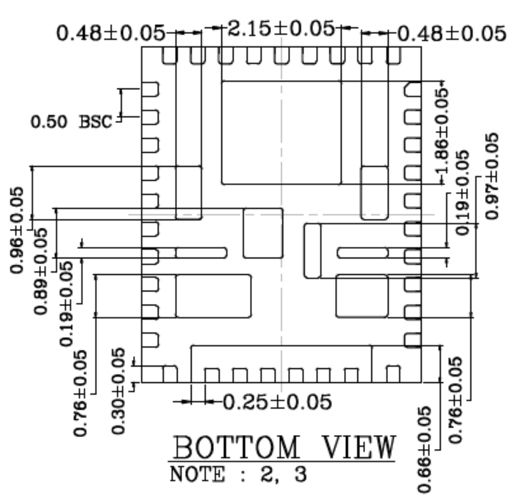
Package Outlines and Dimensions

TITLE

38 LEAD FQFN 5x6mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FQFN56-38LD-PL-1	UNIT	MM
Leadframe	Copper	Lead finish	Matte Tin





SIDE VIEW

NOTE : 2, 3

NOTES:

1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Black color circles are thermal via. 0.30-0.35mm in diameter and 0.60mm pitch and should be connected to GND for maximum performance.
5. Blue and Red color pads & via holes represent different potential. Do not connect to GND.
6. Green rectangles (shaded area) represents solder stencil opening on exposed metal trace.
7. Recommended Land Pattern Tolerance is ±0.020mm unless specified.
8. See recommended land pattern on page 2 & 3.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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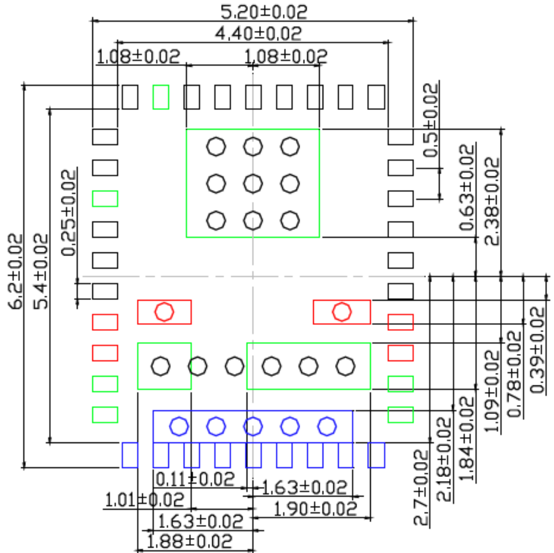
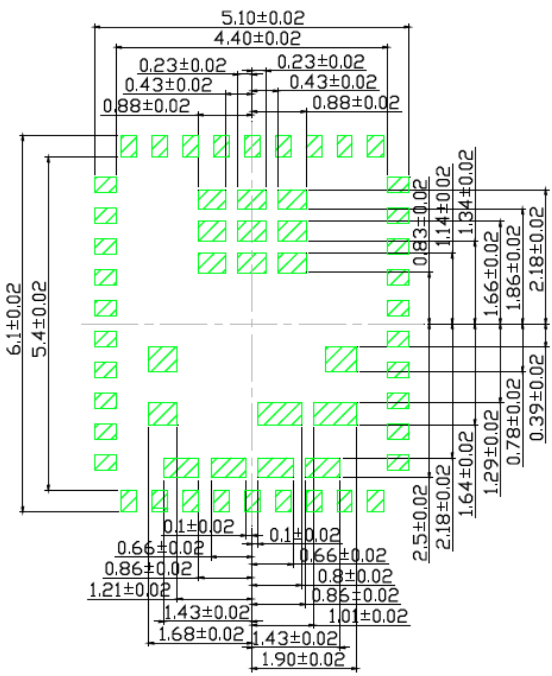
POD-Land Pattern Doc #: FQFN56-38LD-PL-1

RECOMMENDED LAND PATTERN

NOTE : 4, 5, 6, 7, 8



EXPOSED METAL TRACE



SOLDER STENCIL OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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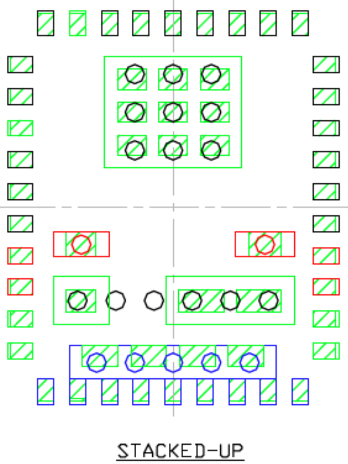
POD-Land Pattern Doc #: FQFN56-38LD-PL-1



Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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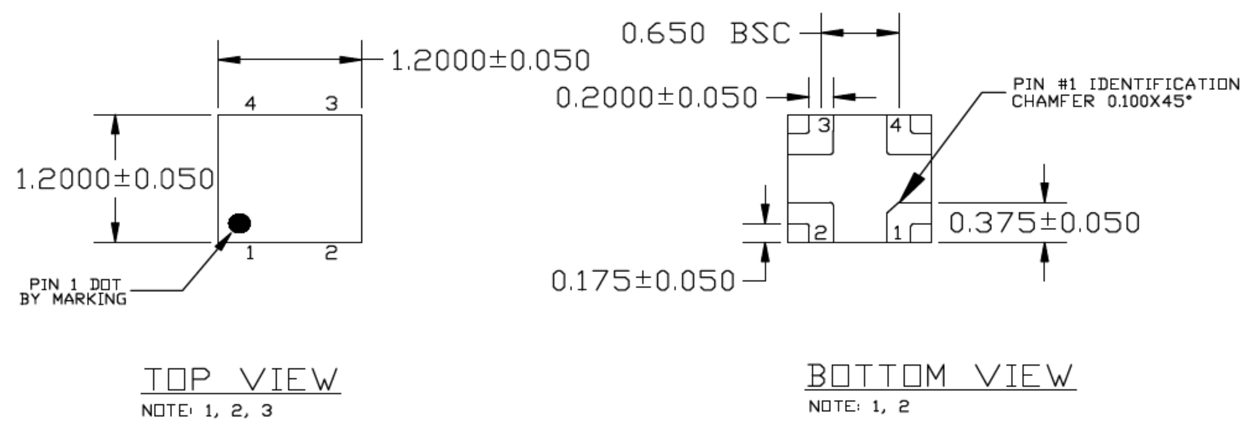
FTDFN

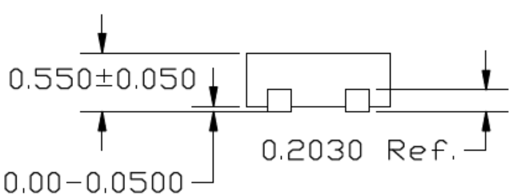
Micrel Legacy

Package Outlines and Dimensions

TITLE
4 LEAD FTDFN 1.2x1.2 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FTDFN1212-4LD-PL-1	UNIT	MM
LEAD FRAME	NiPdAu	LEAD FINISH	NiPdAu





END VIEW
NOTE: 1, 2

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN COLORED SHADED RECTANGLES (AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED METAL TRACE
5. CYAN COLORED SHADED AREAS REPRESENT OPTIONAL SOLDER STENCIL OPENING FOR IMPROVED THERMAL PERFORMANCE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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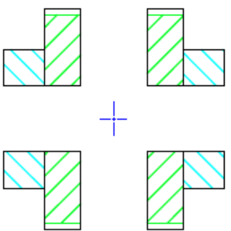
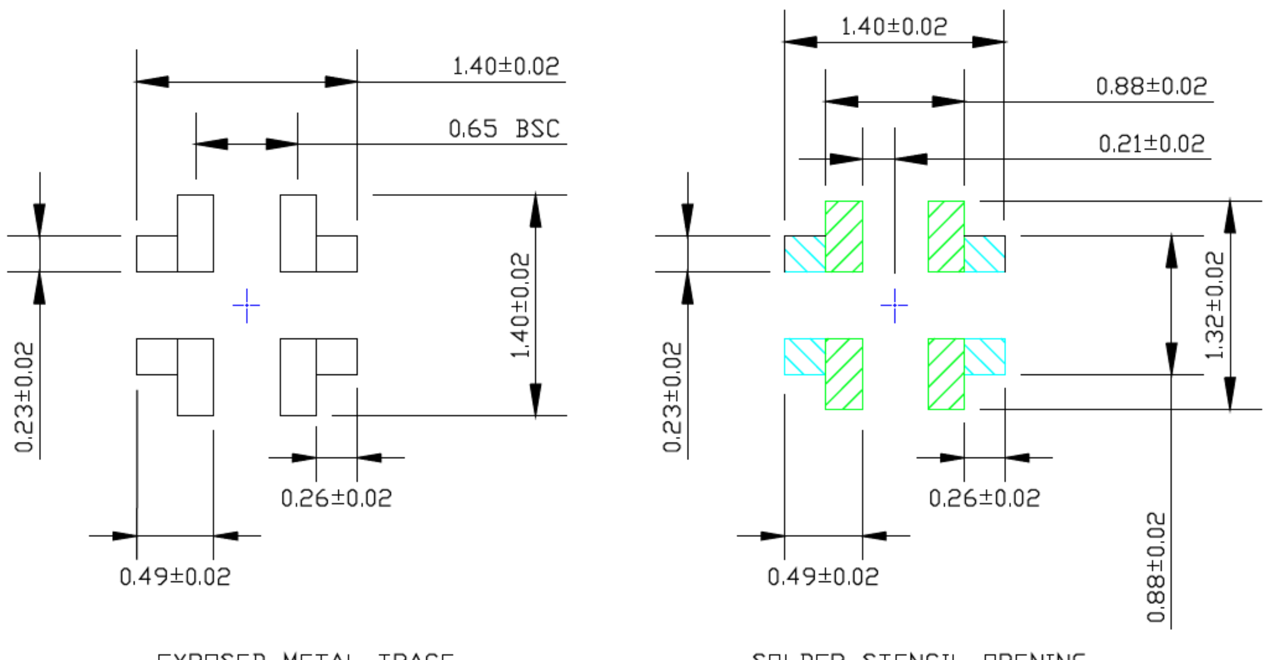
POD-Land Pattern drawing #FTDFN1212-4LD-PL-1

RECOMMENDED LAND PATTERN

NOTE: 4, 5



STACKED-UP



EXPOSED METAL TRACE

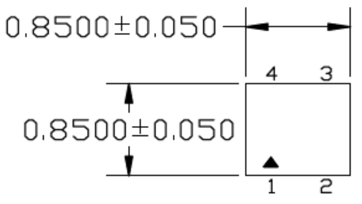
SOLDER STENCIL OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

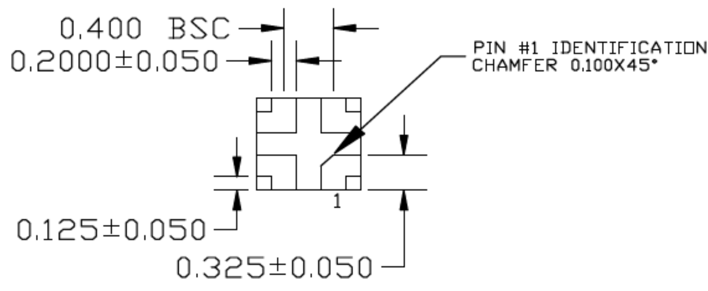
Package Outlines and Dimensions

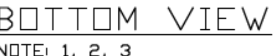
TITLE
4 LEAD FTDFN 0.85x0.85 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

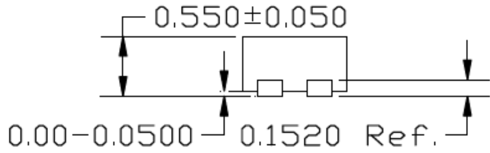
DRAWING #	FTDFN085085-4LD-PL-1	UNIT	MM
LEAD FRAME	Copper Alloy	LEAD FINISH	NiPdAu



TOP VIEW
NOTE: 1, 2, 3







END VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076 MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN COLORED RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED METAL TRACE.
5. CYAN COLORED RECTANGLES (SHADED AREA) REPRESENT OPTIONAL SOLDER STENCIL OPENING.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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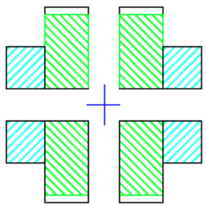
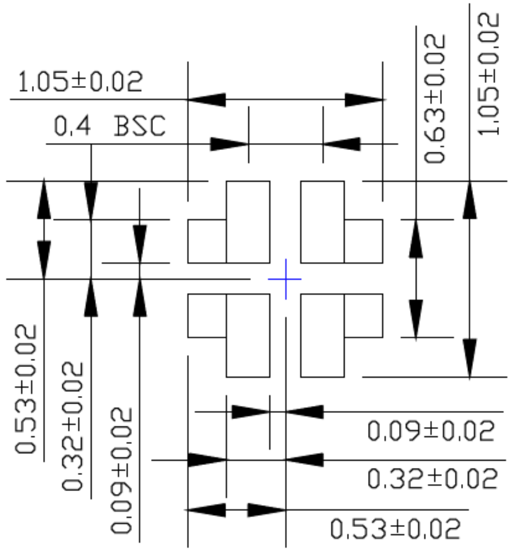
POD-Land Pattern drawing #FTDFN085085-4LD-PL-1

RECOMMENDED LAND PATTERN

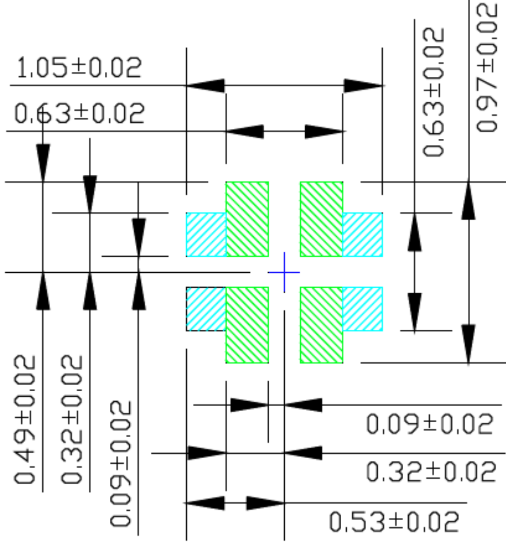
NOTE: 4, 5



STACKED-UP



EXPOSED METAL TRACE



SOLDER STENCIL OPENING

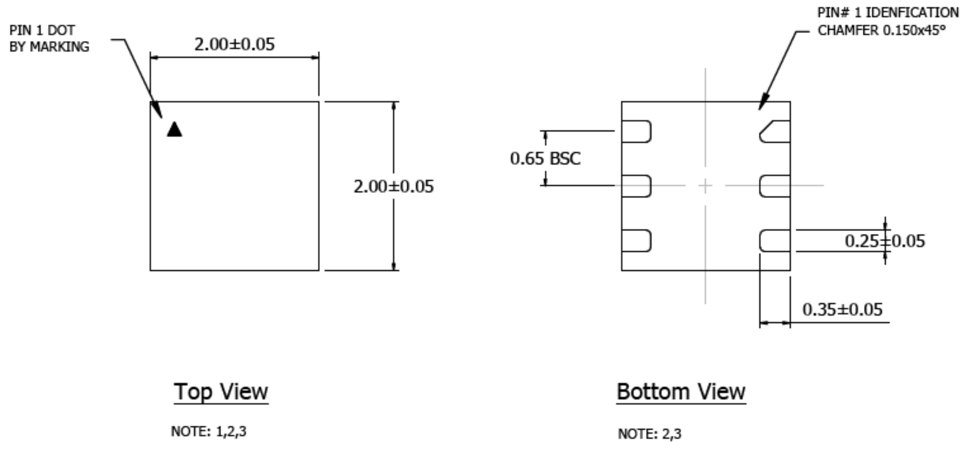
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

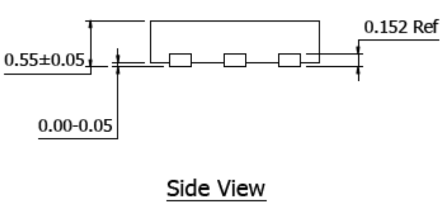
Package Outlines and Dimensions

TITLE

6 LEAD FTDFN 2.0x2.0 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FTDFN22-6LD-PL-1	**UNIT**	MM





Side View

NOTE: 2,3

NOTES:

1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Green, Blue and Red Color pads represent different potential. Do not connect to GND.
5. Black Color pads represent different IOs. Do not connect together.
6. Red Color circles are VIAs. 0.30-0.35mm in diameter and 0.80mm pitch. Should be connected to ground for maximum thermal performance.
7. Green Color shaded rectangles (area) represents solder stencil opening on exposed metal trace.
8. Recommended Land Pattern Tolerance is ±0.020mm unless specified.
9. See recommended Land Pattern on page2.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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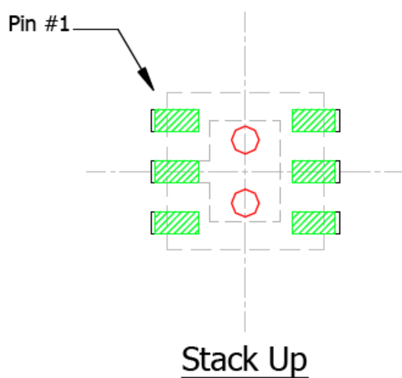
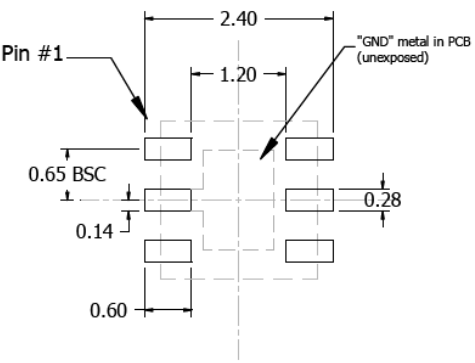
POD-Land Pattern Doc #: FTDFN22-6LD-PL-1-Prem0

Recommended Land Pattern

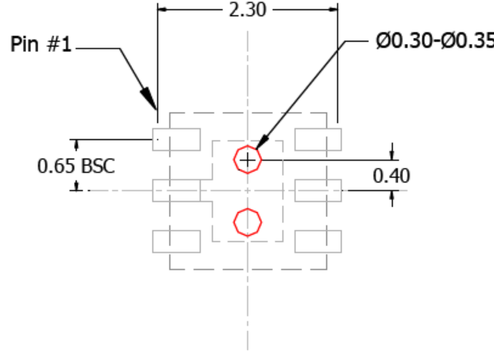
Note: 4,5,6,7



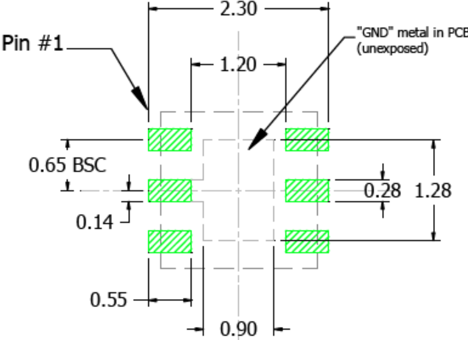
Stack Up



Exposed Metal



Thermal Filled VIA



Solder Stencil Opening

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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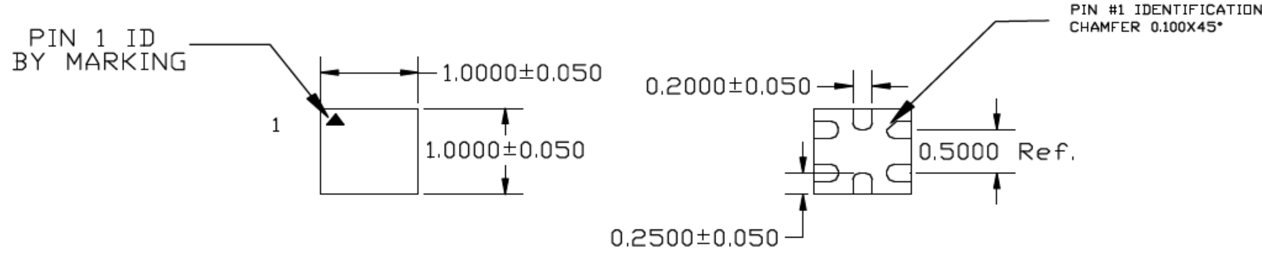
FTQFN

Micrel Legacy

Package Outlines and Dimensions

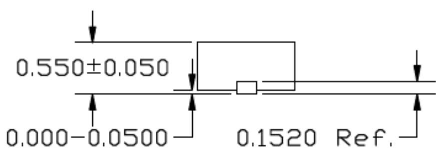
TITLE
6 LEAD FTQFN 1.0 x1.0 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FTQFN1010-6LD-PL-1	**UNIT**	MM
LEAD FRAME	NiPdAu	**LEAD FINISH**	NiPdAu



TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2, 3



END VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED METAL TRACE

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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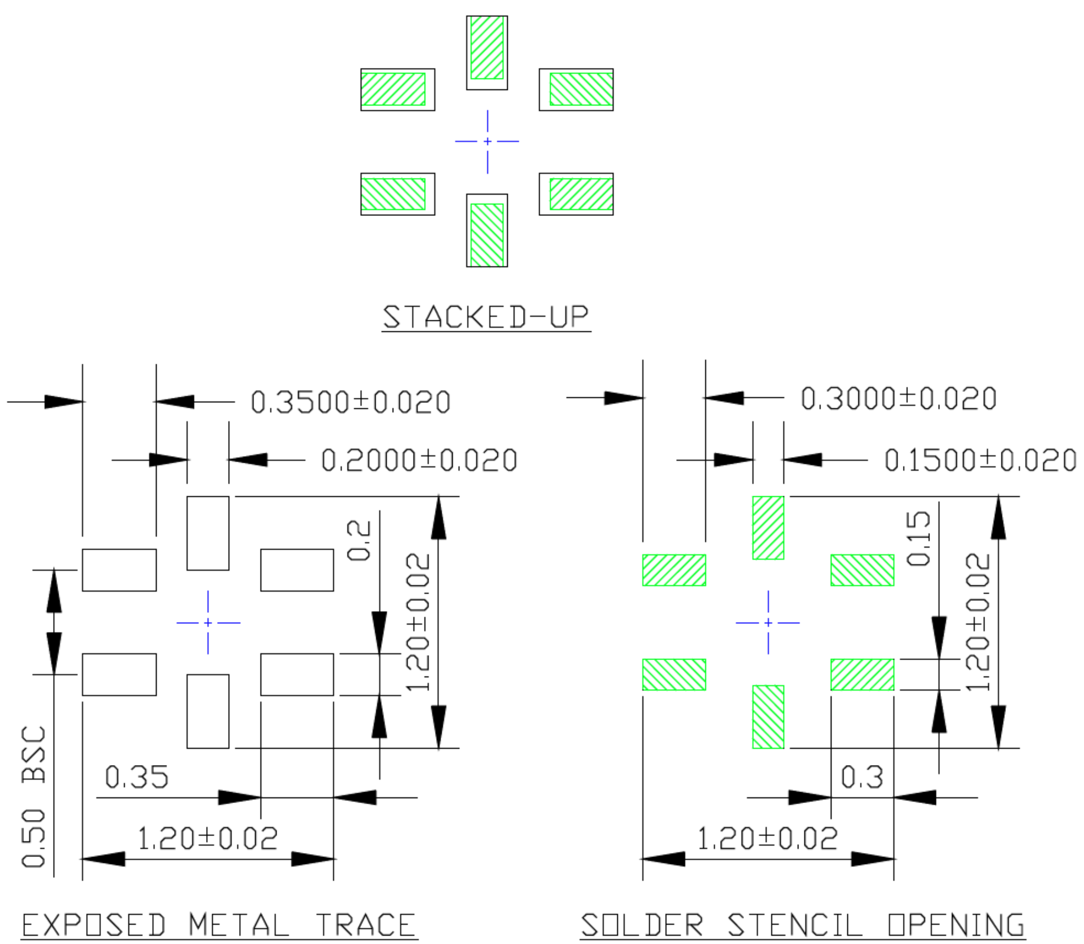
POD-Land Pattern drawing #FTQFN1010-6LD-PL-1

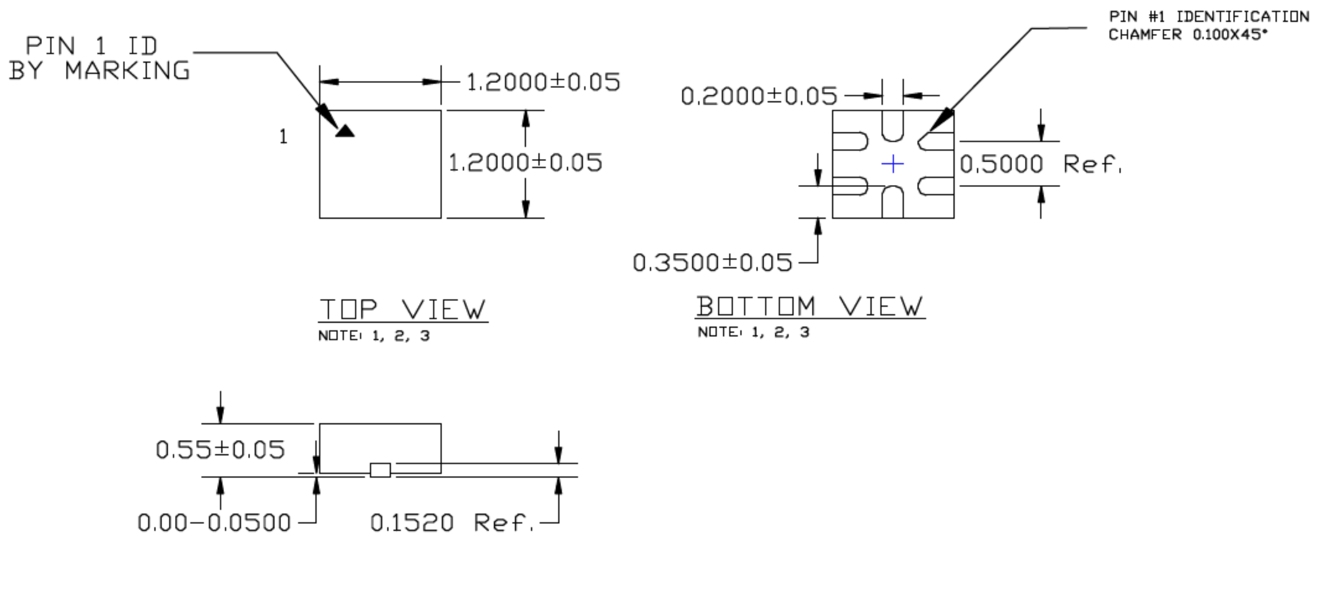


Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE
6 LEAD FTQFN 1.2x1.2 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FTQFN1212-6LD-PL-1	UNIT	MM
LEAD FRAME	NiPdAu	LEAD FINISH	NiPdAu



NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN COLORED RECTANGLES (SHADED AREAS) INDICATE SOLDER STENCIL OPENING ON EXPOSED METAL TRACE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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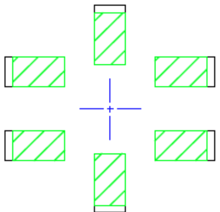
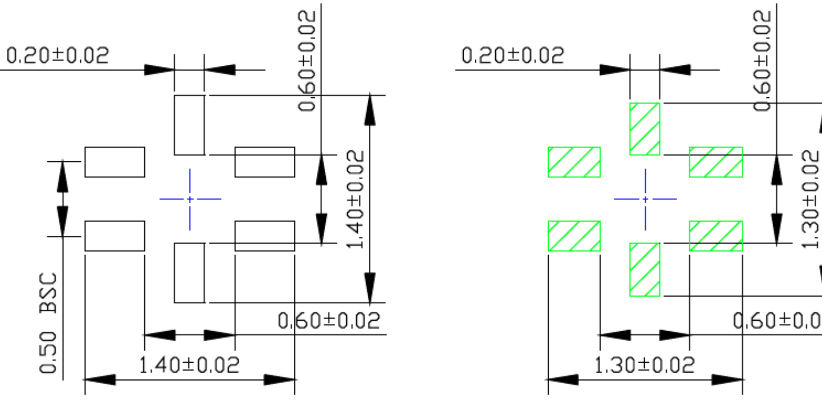
POD-Land Pattern drawing #FTQFN1212-6LD-PL-1

RECOMMENDED LAND PATTERN

NOTE : 4



STACKED-UP



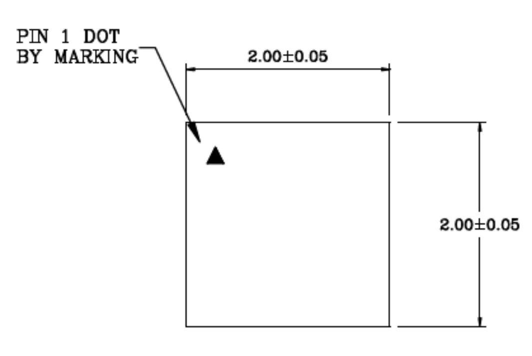
EXPOSED METAL TRACE

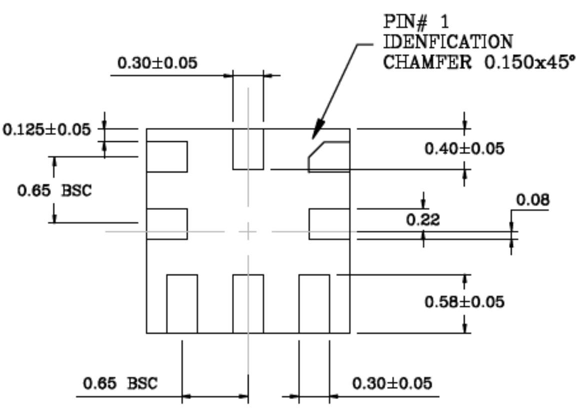
SOLDER STENCIL OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
8 LEAD FTQFN 2.0x2.0 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FTQFN22-8LD-PL-1	UNIT	MM



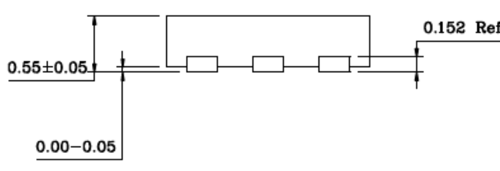


Top View

NOTE: 1,2,3

Bottom View

NOTE: 2,3



Side View

NOTE: 2,3

NOTES:
1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Green, Blue and Red color pads represent different potential. Do not connect to GND.
5. Black color pads represent different IOs. Do not connect together.
6. Shaded rectangles (area) represents solder stencil opening on exposed metal trace.
7. Recommended Land Pattern Tolerance is ±0.020mm unless specified.
8. See recommended Land Pattern on page2.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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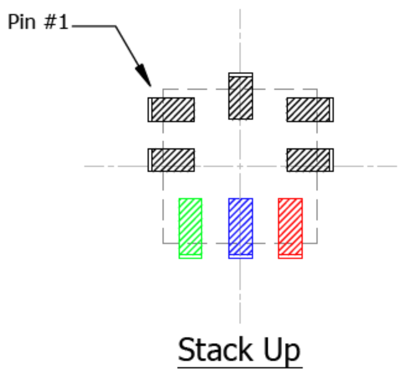
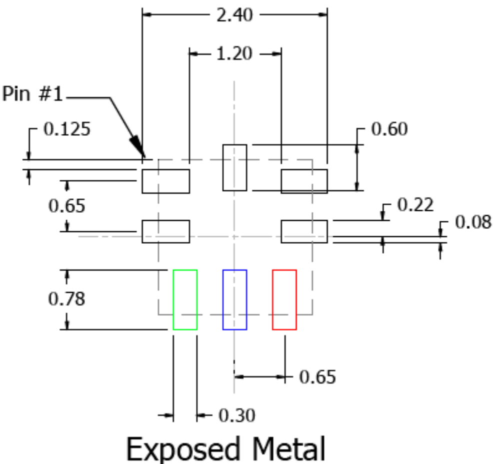
POD-Land Pattern Doc #: FTQFN22-8LD-PL-1-A

Recommended Land Pattern

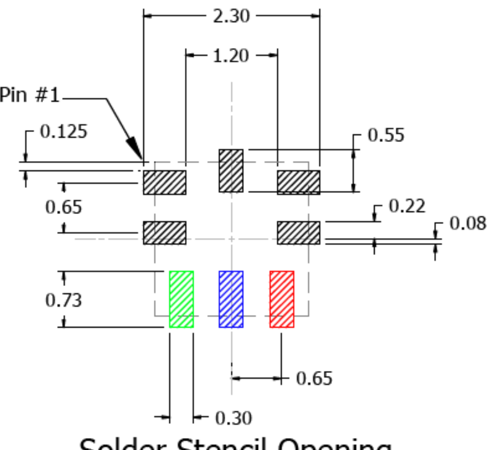
Note: 4,5,6,7



Stack Up



Exposed Metal

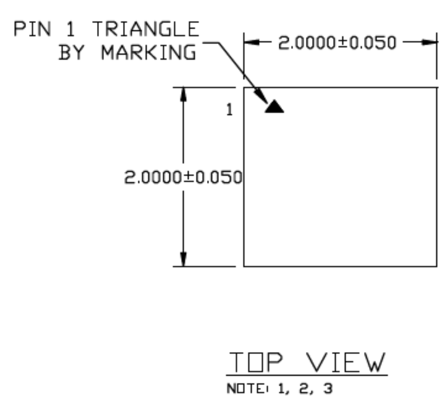


Solder Stencil Opening

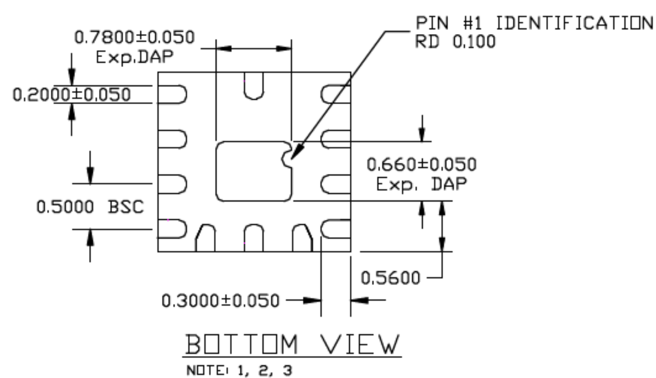
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
12 LEAD FTQFN 2.0x2.0 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

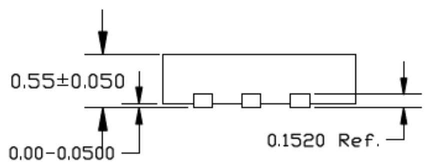
DRAWING #	FTQFN22-12LD-PL-1	UNIT	MM
LEAD FRAME	Copper Alloy	LEAD FINISH	NiPdAu



TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



SIDE VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076 MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN COLORED RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED METAL TRACE.
5. RED CIRCLE IN LAND PATTERN REPRESENT THERMAL VIA. RECOMMENDED SIZE IS 0.20 MM DIAMETER, 0.40 MM PITCH AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
6. PURPLE HIDDEN LINES ARE RECOMMENDED METAL TRACE/GND PLANES FOR IMPROVED THERMAL PERFORMANCE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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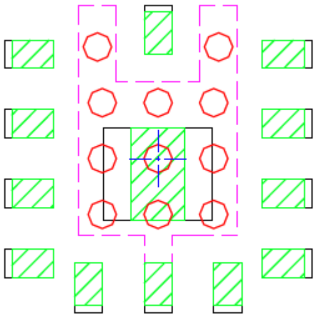
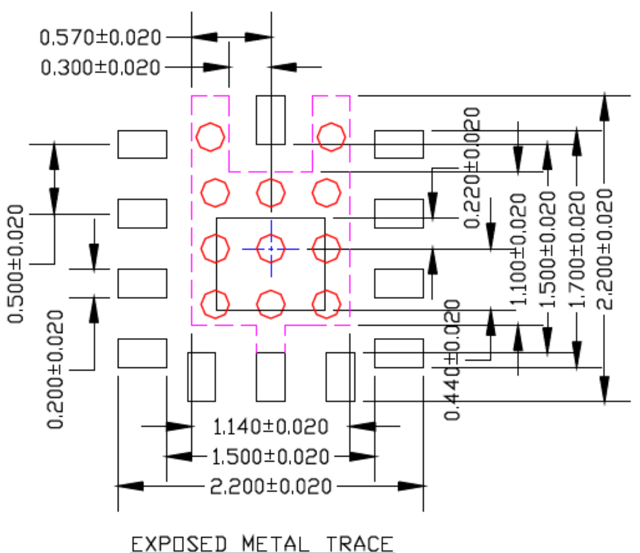
PO-Land Pattern drawing #FTQFN22-12LD-PL-1

RECOMMENDED LAND PATTERN

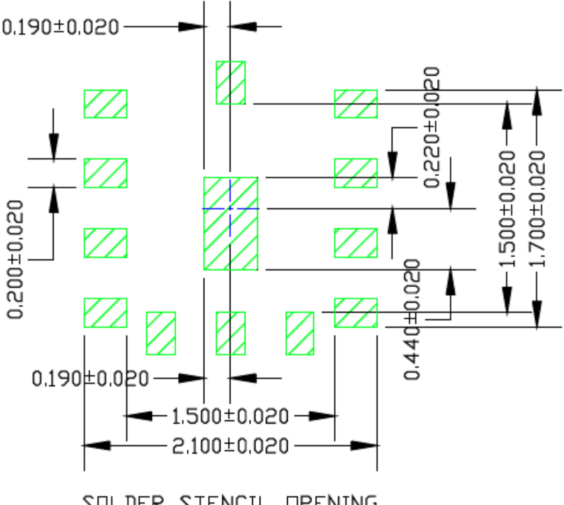
NOTE: 4, 5, 6



STACKED-UP



EXPOSED METAL TRACE



SOLDER STENCIL OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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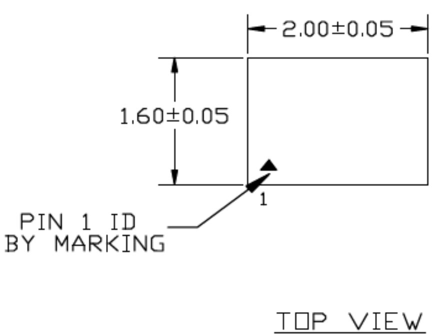
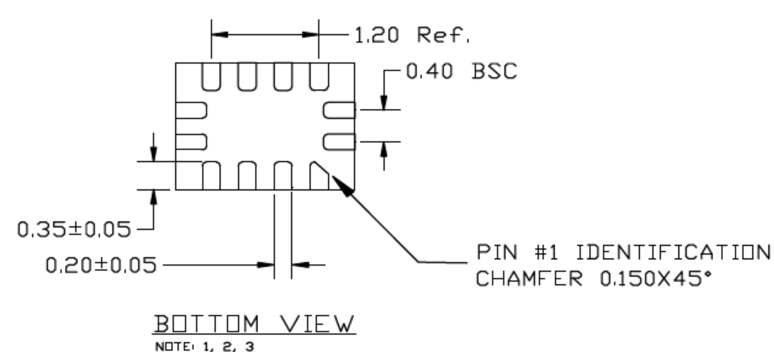
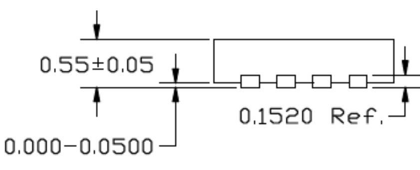
TITLE
12 LEAD FTQFN 1.6x2.0 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FTQFN1620-12LD-PL-1	**UNIT**	MM
LEAD FRAME	NiPdAu	**LEAD FINISH**	NiPdAu







END VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN COLORED RECTANGLES (SHADED AREA) INDICATE SOLDER STENCIL OPENING ON EXPOSED METAL TRACE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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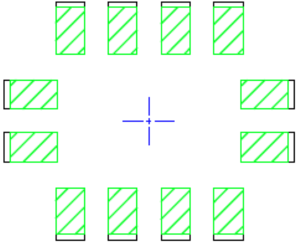
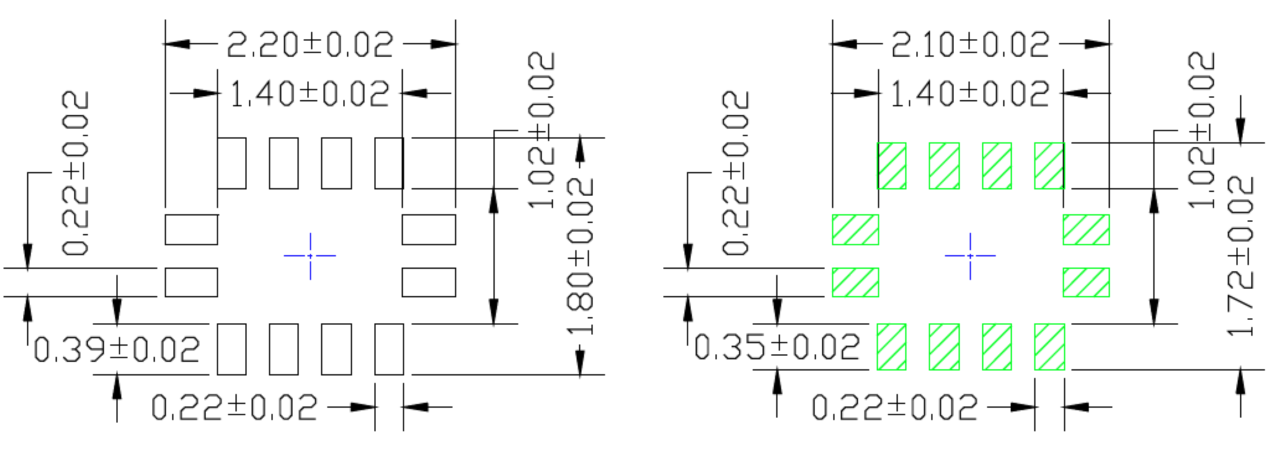
POD-Land Pattern drawing #FTQFN1620-12LD-PL-1





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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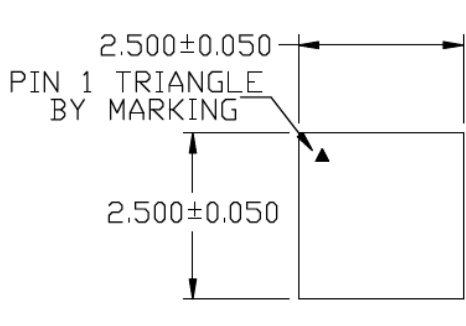
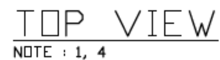
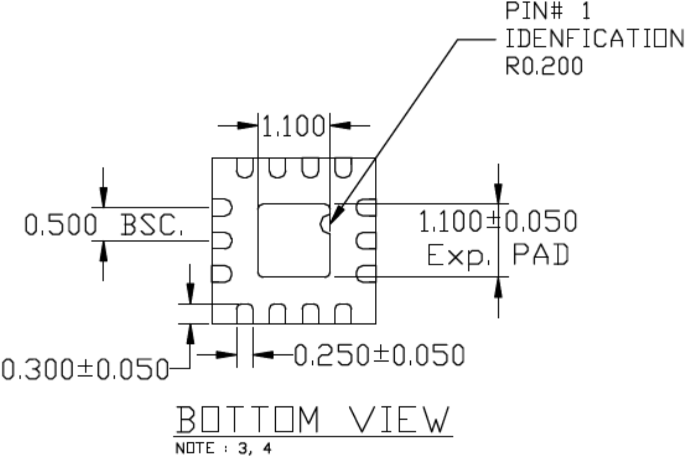
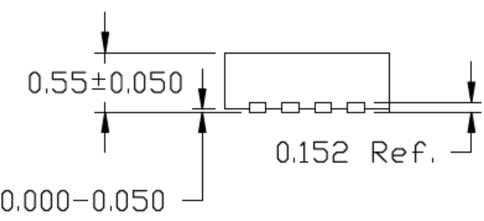
TITLE
14 LEAD FTQFN 2.5x2.5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FTQFN2525-14LD-PL-1	UNIT	MM









SIDE VIEW
NOTE : 1, 2, 3

NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAX. PACKAGE WARPAGE IS 0.08 mm.
3. MAXIMUM ALLOWABE BURRS IS 0.076 mm IN ALL DIRECTIONS.
4. PIN #1 ID WILL BE LASER MARKED.
5. RED CIRCLE INDICATE THERMAL VIA. SIZE IS 0.300-0.350 mm IN DIAMETER AND SHOULD BE CONNECTED TO GND PLANE FOR MAXIMUM THERMAL PERFORMANCE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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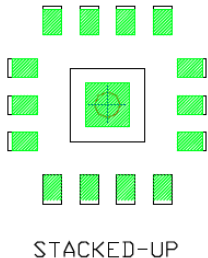
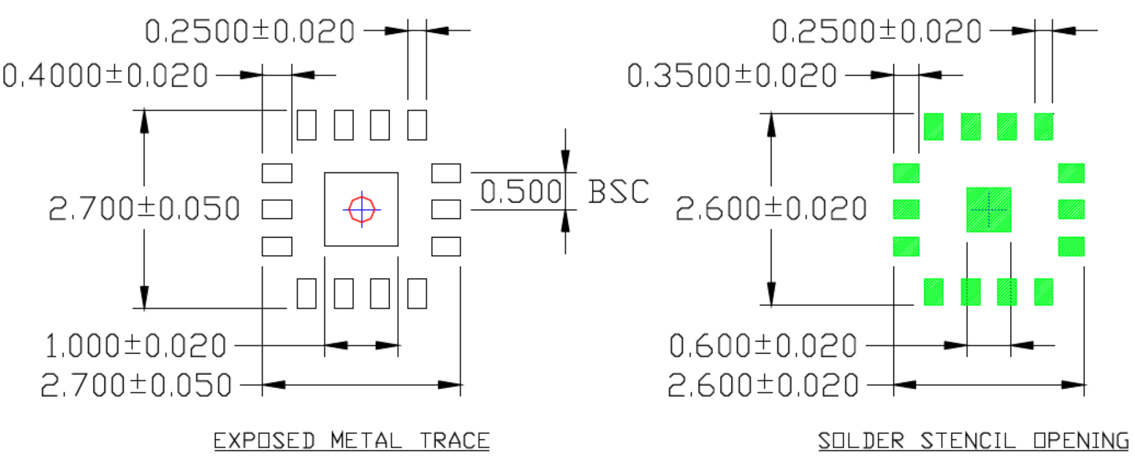
RECOMMENDED LAND PATTERN

NOTE : 5

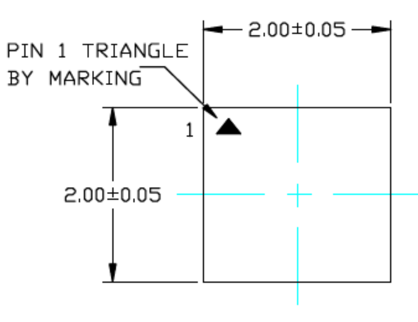




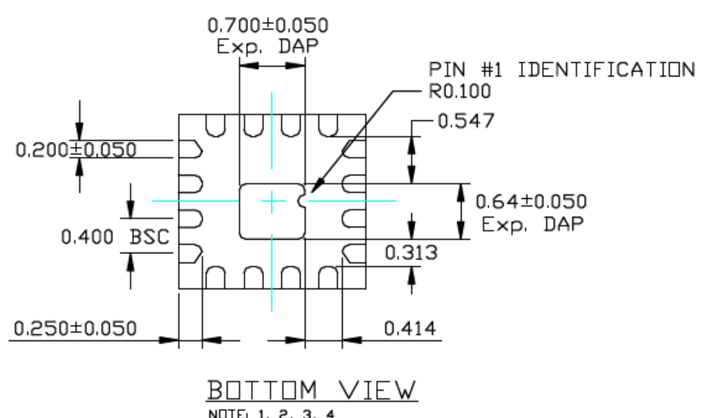
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
16 LEAD FTQFN 2X2mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

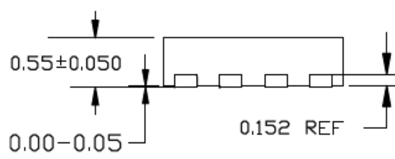
DRAWING #	FTQFN22-16LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu



TOP VIEW
NOTE: 1, 2, 3, 4



BOTTOM VIEW
NOTE: 1, 2, 3, 4



SIDE VIEW
NOTE: 1, 2, 3, 4

NOTE:
1. ALL DIMENSION ARE IN MILLIMETERS
2. MAX PACKAGE WARPAGE IS 0.08 MM
3. MAX ALLOWABLE BURR IS 0.076 MM IN ALL DIRECTIONS
4. PIN #1 ID WILL BE LASER MARKED
5. RED CIRCLE INDICATES THERMAL VIA. SIZE SHOULD BE 0.300 MM IN DIAMETER AND SHOULD BE CONNECTED TO GROUND PLANE FOR MAXIMUM THERMAL PERFORMANCE.
6. GREEN COLORED RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED METAL TRACE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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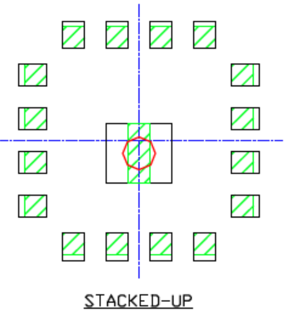
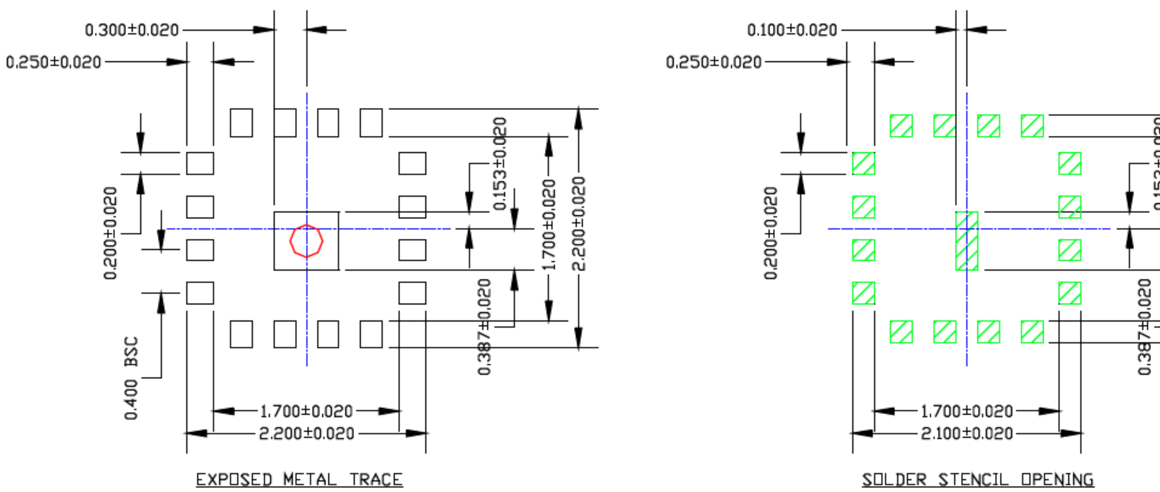
POD-Land Pattern drawing # FTQFN22-16LD-PL-1





Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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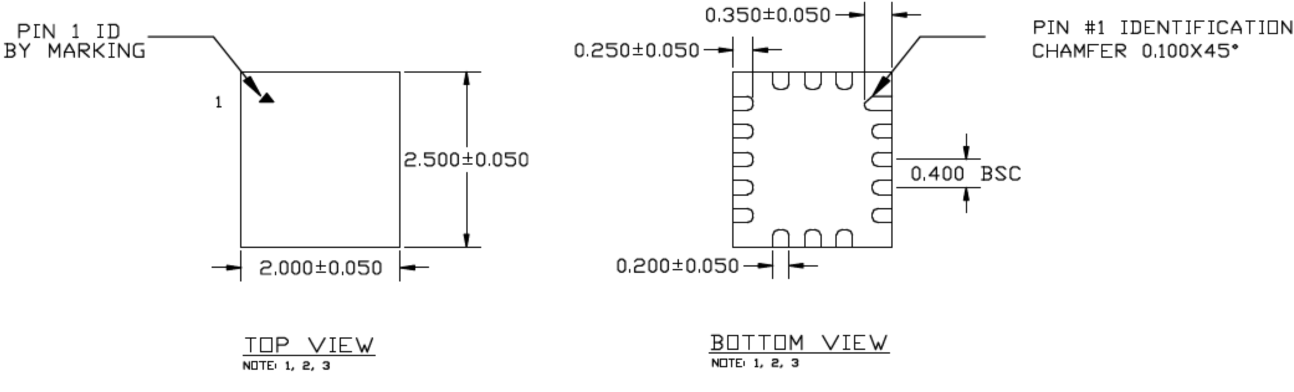
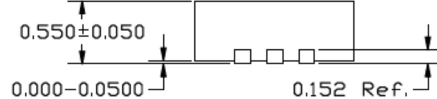
Package Outlines and Dimensions

TITLE
16 LEAD FTQFN 2.0 x 2.5 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FTQFN2025-16LD-PL-1	UNIT	MM
LEAD FRAME	NiPdAu	LEAD FINISH	NiPdAu





END VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN COLORED RECTANGLES (SHADED AREAS) INDICATE SOLDER STENCIL OPENING ON EXPOSED METAL TRACE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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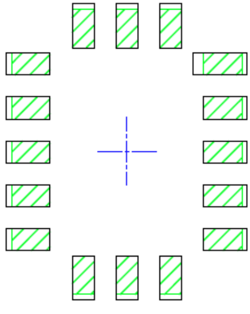
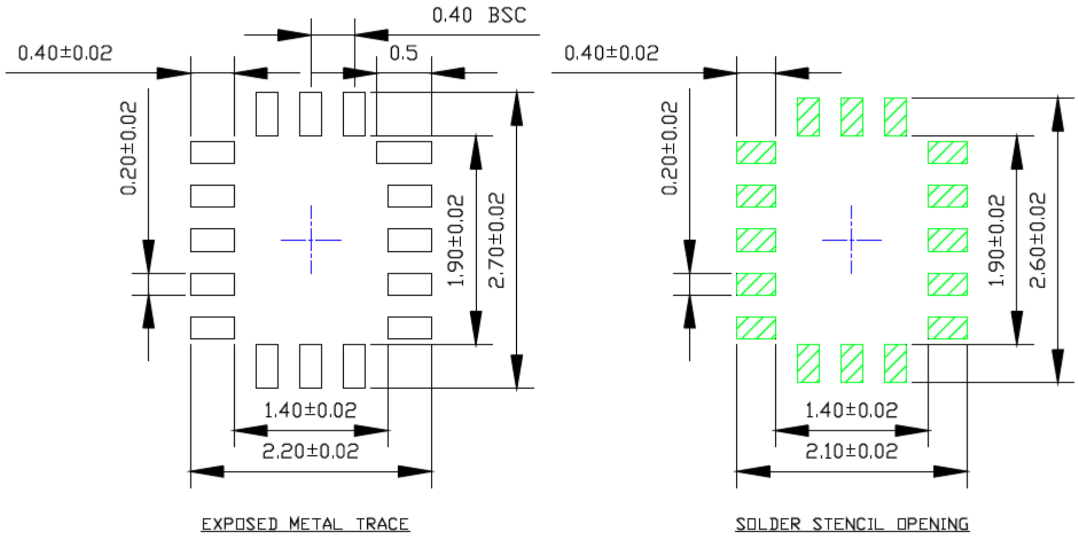
POD-Land Pattern drawing #FTQFN2025-16LD-PL-1

RECOMMENDED LAND PATTERN

NOTE: 4



STACKED-UP

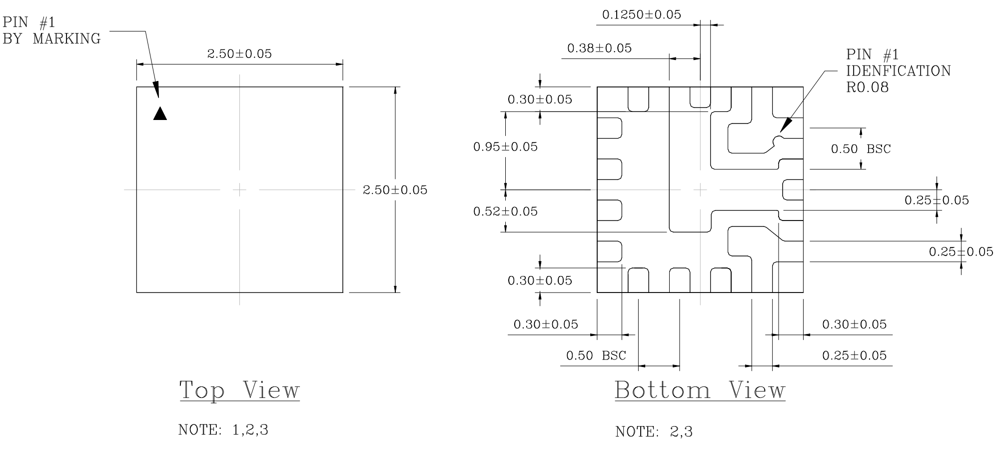


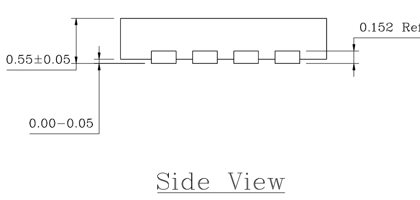
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE
16 LEAD FTQFN 2.5x2.5 mm PACKAGE (Flip Chip) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FTQFN2525-16LD-PL-1	UNIT	MM





Side View

NOTE: 2,3

NOTES:
1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Black, Blue and Red color pads represent different potential. Do not connect to GND.
5. Black color pads represent different IOs. Do not connect together.
6. Shaded rectangles (area) represents solder stencil opening on exposed metal trace.
7. Red Color circles are VIAs. 0.30mm diameter. Should be connected to ground for maximum thermal performance.
8. Thermal VIAs are optional.
9. Recommended Land Pattern Tolerance is ±0.020mm unless specified.
10. See recommended Land Pattern on page2.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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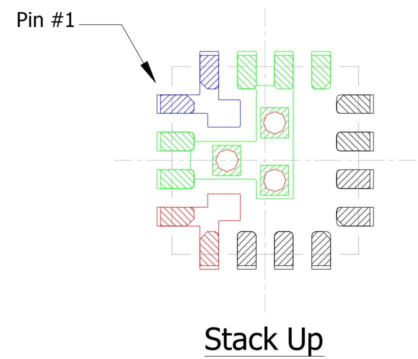
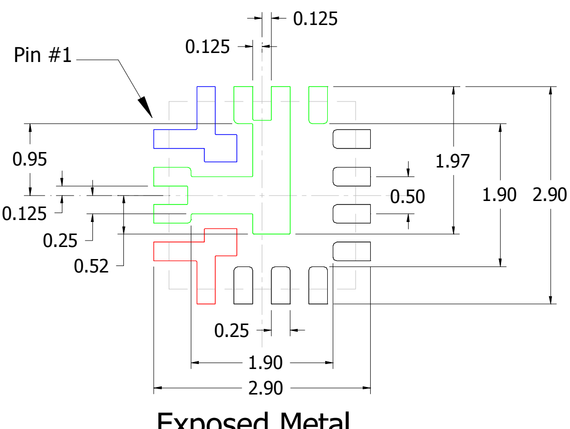
POD-Land Pattern Doc #: FTQFN2525-16LD-PL-1-A

Recommended Land Pattern

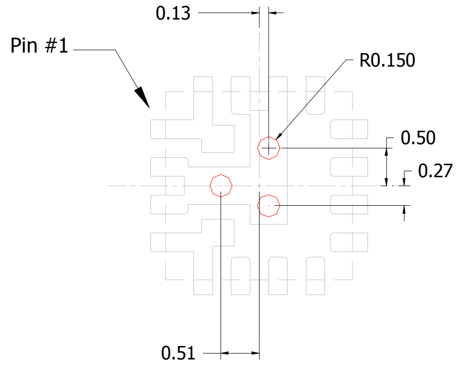
Note: 4,5,6,7,8, 9



Stack Up

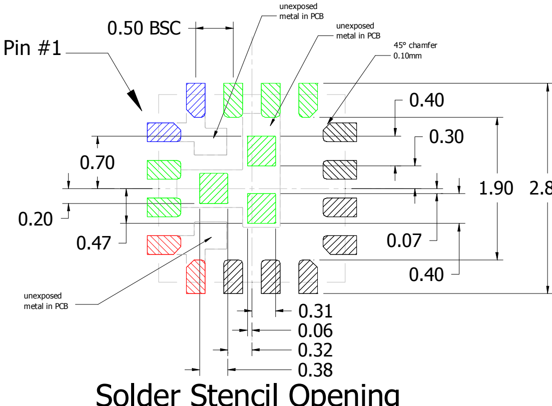


Exposed Metal



Thermal (Filled) VIA

optional



Solder Stencil Opening

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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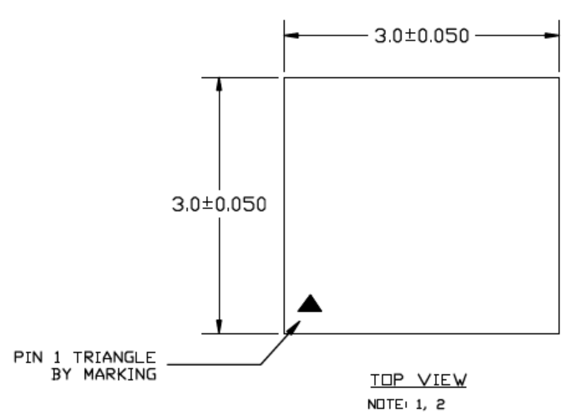
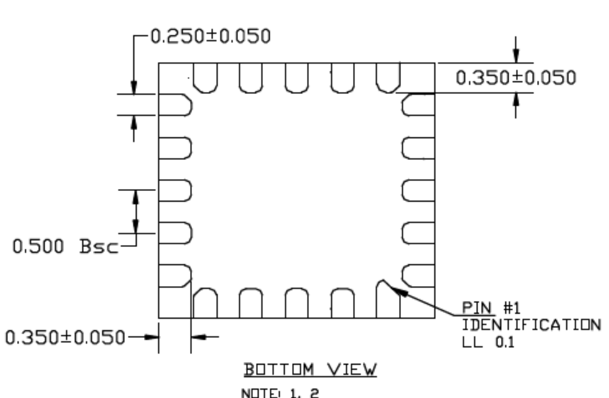
Package Outlines and Dimensions

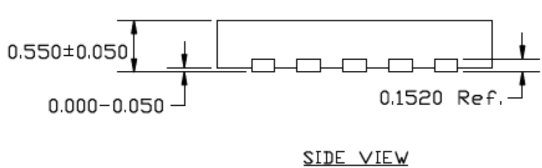
TITLE

20 LEAD FTQFN 3x3mm (Flip Chip) PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	FTQFN33-20LD-PL-1	UNIT	mm
Lead Frame	Copper	Lead Finish	Matte Tin







SIDE VIEW

NOTE: 1, 2

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076 MM IN ALL DIRECTIONS
3. GREEN RECTANGLES (SHADED AREA) REPRESENT STENCIL OPENING ON EXPOSED METAL TRACE.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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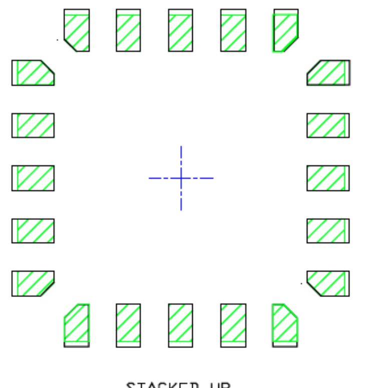
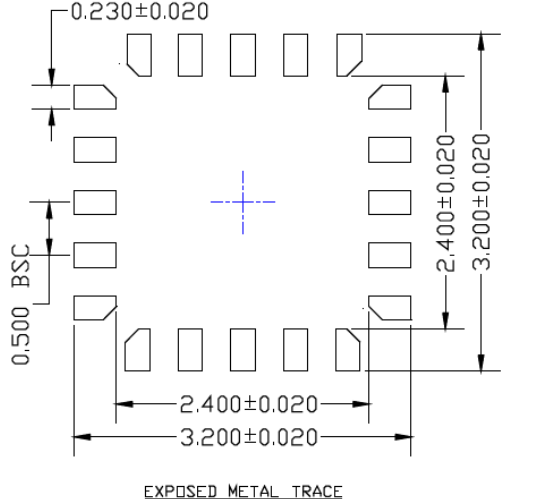
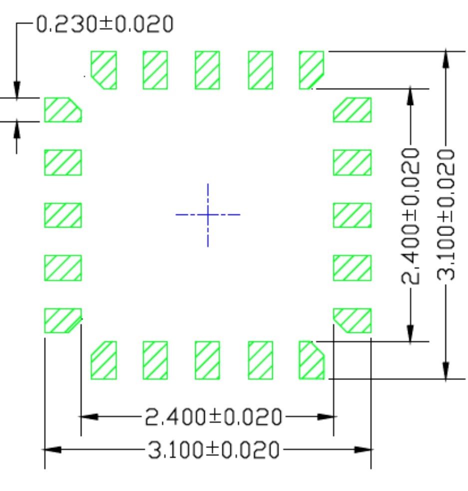
POD-Land Pattern drawing #FTQFN33-20LD-PL-1







Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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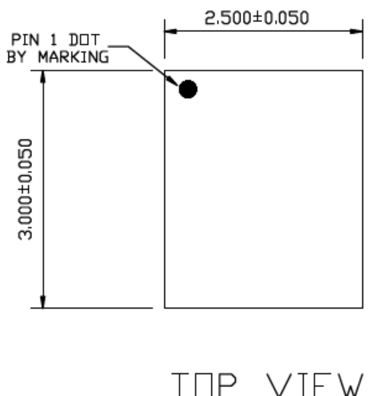
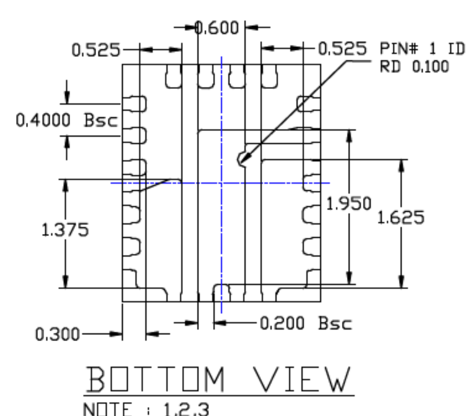
GJQFN

Micrel Legacy

TITLE
20 LEAD GJQFN 2.5x3mm PKG (Flip Chip & Hybrid) OUTLINE & RECOMMENDED LAND PATTERN

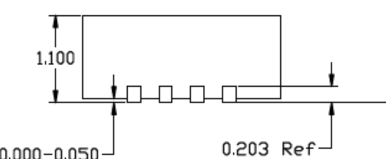
DRAWING #	GJQFN2530-20LD-PL-1	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin





TOP VIEW
NOTE : 1,2,3

BOTTOM VIEW
NOTE : 1,2,3



SIDE VIEW
NOTE : 1,2,3

NOTE :
1. Max package warpage is 0.05mm.
2. Max allowable burr is 0.076mm in all directions.
3. Pin #1 will be laser marked.
4. Red circle in land pattern indicate thermal via. Size should be 0.20mm in diameter, 0.400mm pitch and should be connected to GND for max thermal performance.
5. Green rectangles (shaded area) in GND black colored pad represent stencil opening on exposed area. Size is 0.200x1.475mm.
6. Hidden lines (Optional) for improved thermal performance.
7. Blue & Magenta colored pads represent different potentials, do not connect to GND.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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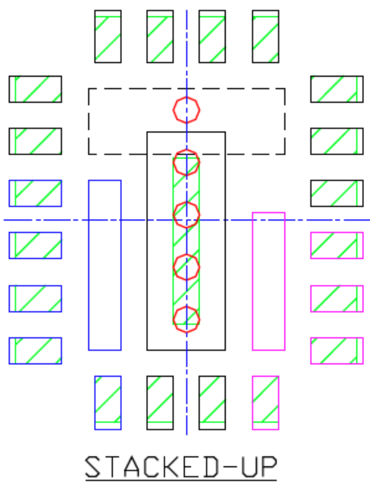
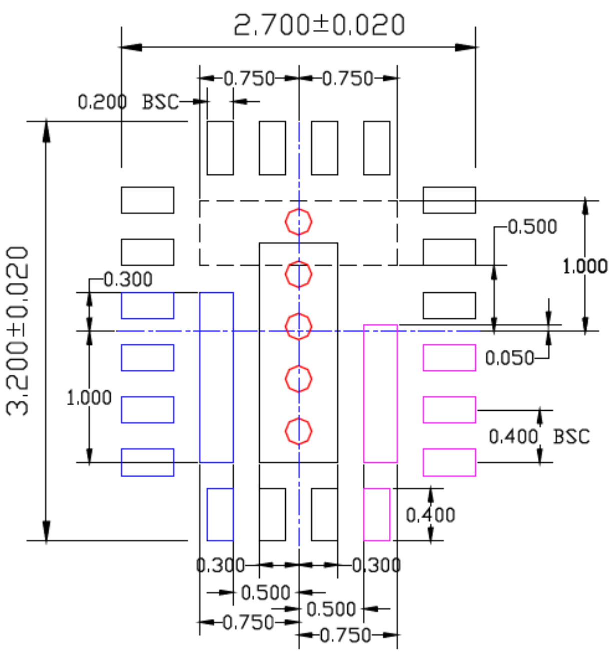
POD-Land Pattern drawing #GJQFN2530-20LD-PL-1

RECOMMENDED LAND PATTERN

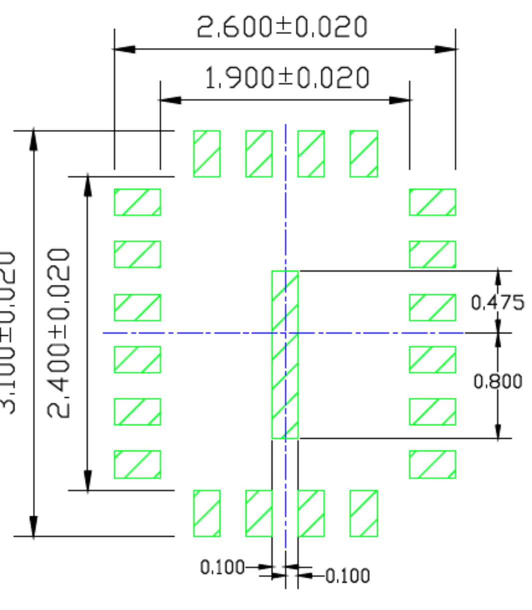
NOTE : 4,5,6,7



STACKED-UP



EXPOSED METAL TRACE



SOLDER STENCIL OPENING

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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NOTES:

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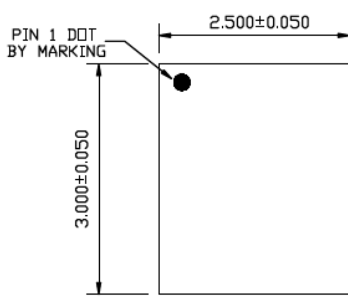
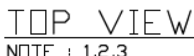
GKQFN

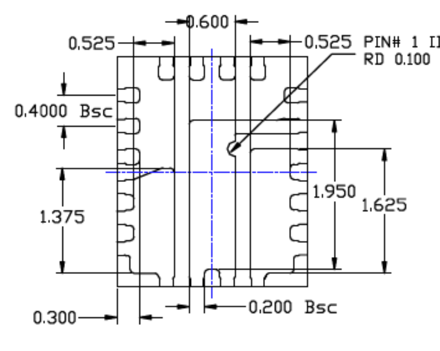
Micrel Legacy

TITLE
20 LEAD GKQFN 2.5x3mm PKG (Flip Chip & Hybrid) OUTLINE & RECOMMENDED LAND PATTERN

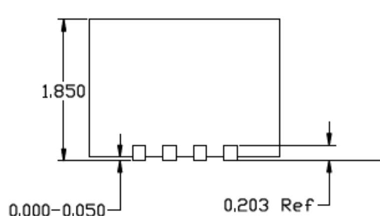
DRAWING #	GKQFN2530-20LD-PL-1	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin







BOTTOM VIEW
NOTE : 1,2,3



SIDE VIEW
NOTE : 1,2,3

NOTE :
1. Max package warpage is 0.05mm.
2. Max allowable burr is 0.076mm in all directions.
3. Pin #1 will be laser marked.
4. Red circle in land pattern indicate thermal via. Size should be 0.20mm in diameter, 0.400mm pitch and should be connected to GND for max thermal performance.
5. Green rectangles (shaded area) in GND black colored pad represent stencil opening on exposed area. Size is 0.200x1.475mm.
6. Hidden lines (Optional) for improved thermal performance.
7. Blue & Magenta colored pads represent different potentials, do not connect to GND.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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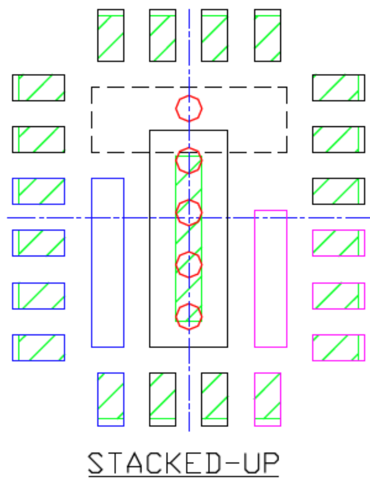
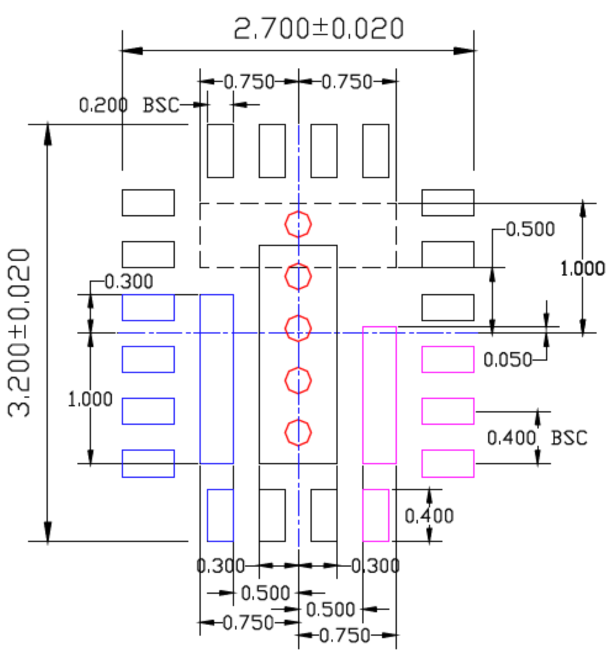
POD-Land Pattern drawing #GKQFN2530-20LD-PL-1

RECOMMENDED LAND PATTERN

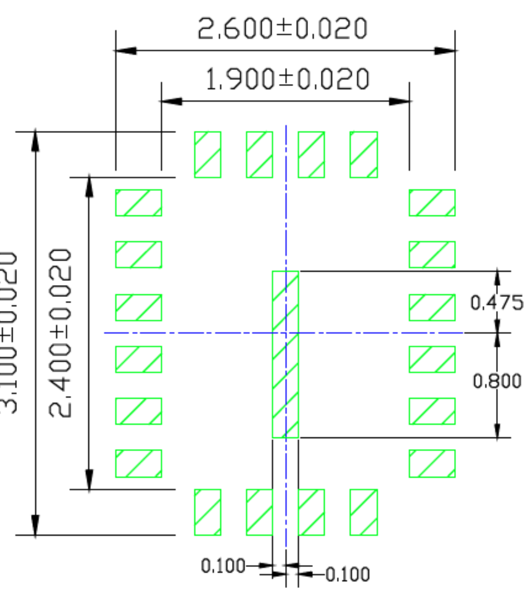
NOTE : 4,5,6,7



STACKED-UP



EXPOSED METAL TRACE



SOLDER STENCIL OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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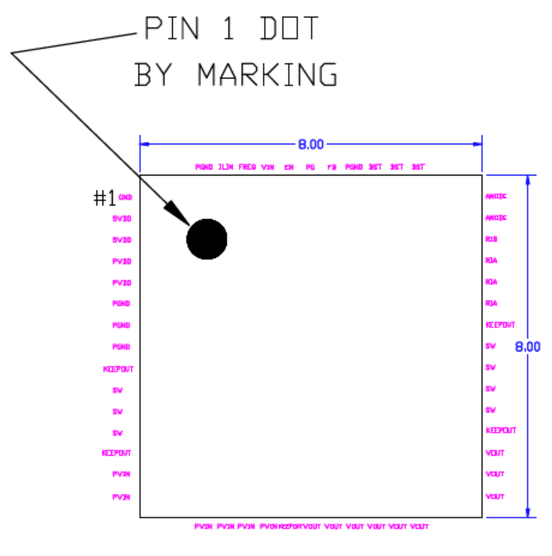
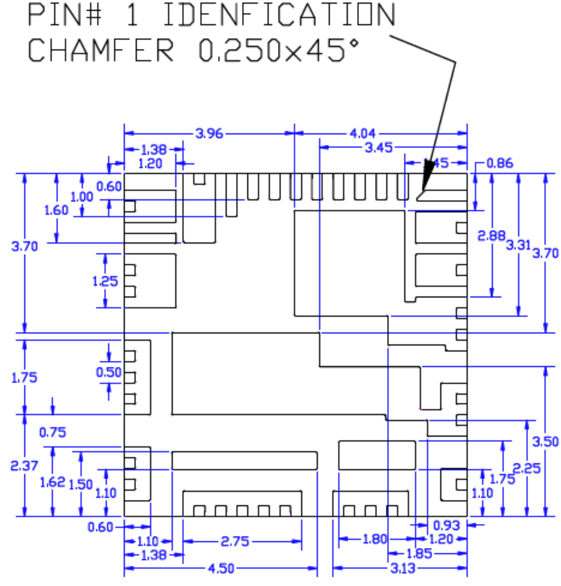
H3QFN

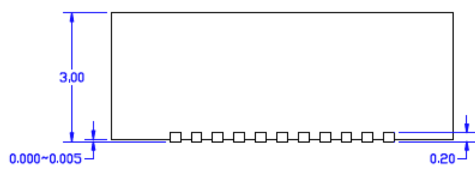
Micrel Legacy

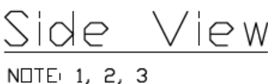
TITLE
52 LEAD H3QFN 8x8mm PACKAGE (Module) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	H3QFN88-52LD-PL-1	**UNIT**	MM
Lead Frame	Copper	**Lead Finish**	Matte Tin









Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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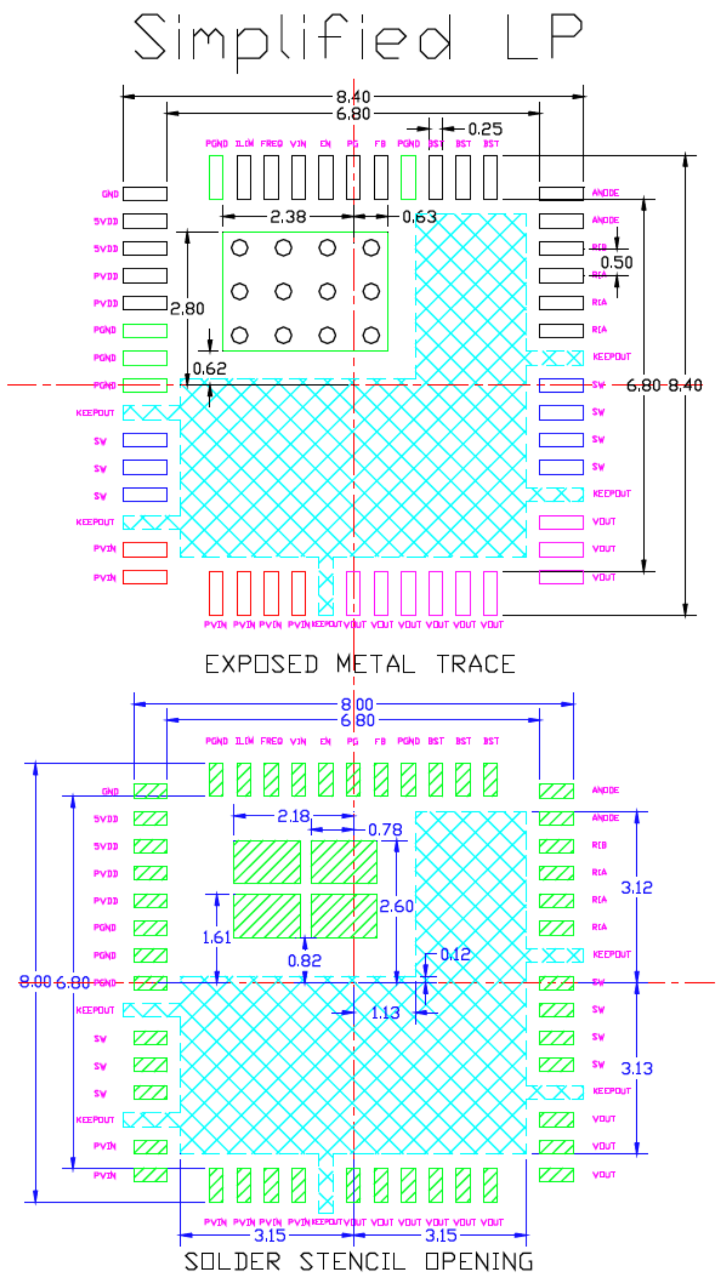
Recommended Land Pattern

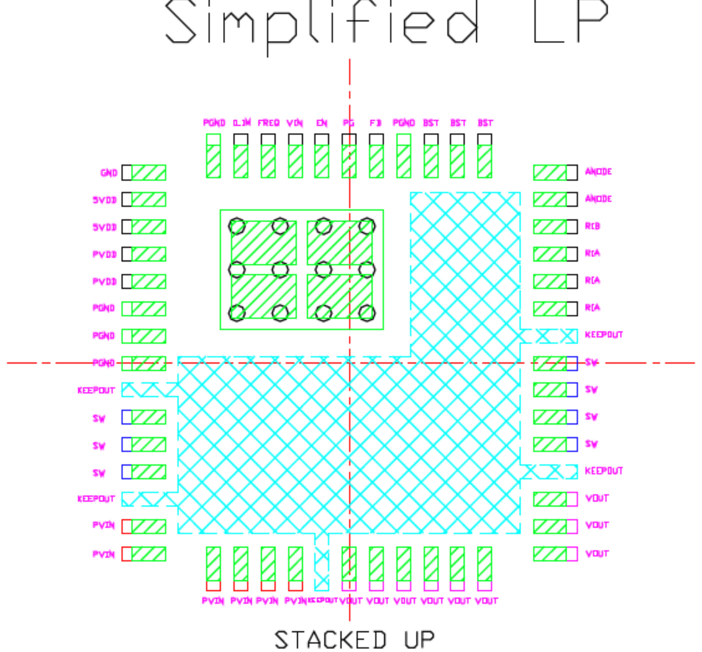
NOTE: 4, 5, 6



Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Recommended Land Pattern

NOTE: 4, 5, 6



NOTE:

1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. BLACK CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA, RECOMMENDED SIZE IS 0.30-0.35mm, AT 0.80mm PITCH & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA.
6. CYAN COLORED SHADED PAD REPRESENT EXPOSED TRACE KEEP OUT AREA.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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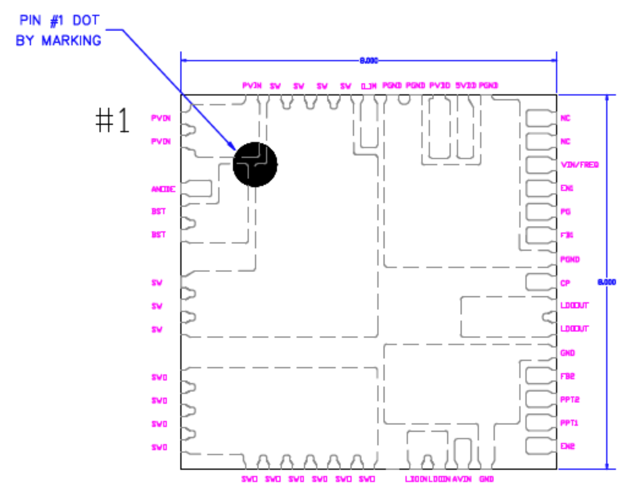
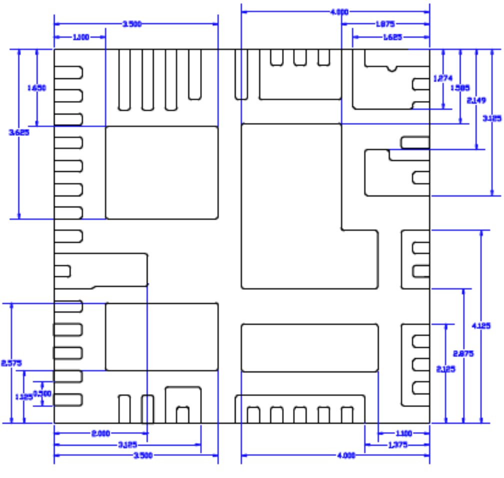
Package Outlines and Dimensions

TITLE
52 LEAD H3QFN 8x8mm PACKAGE (Module) OUTLINE & RECOMMENDED LAND PATTERN

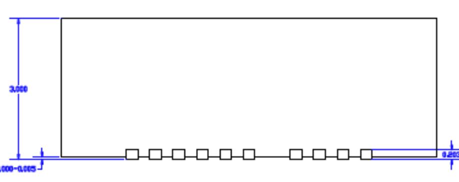
DRAWING #	H3QFN88-52LD-PL-2	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin



Top View
NOTE: 1, 2, 3



Bottom View
NOTE: 1, 2, 3

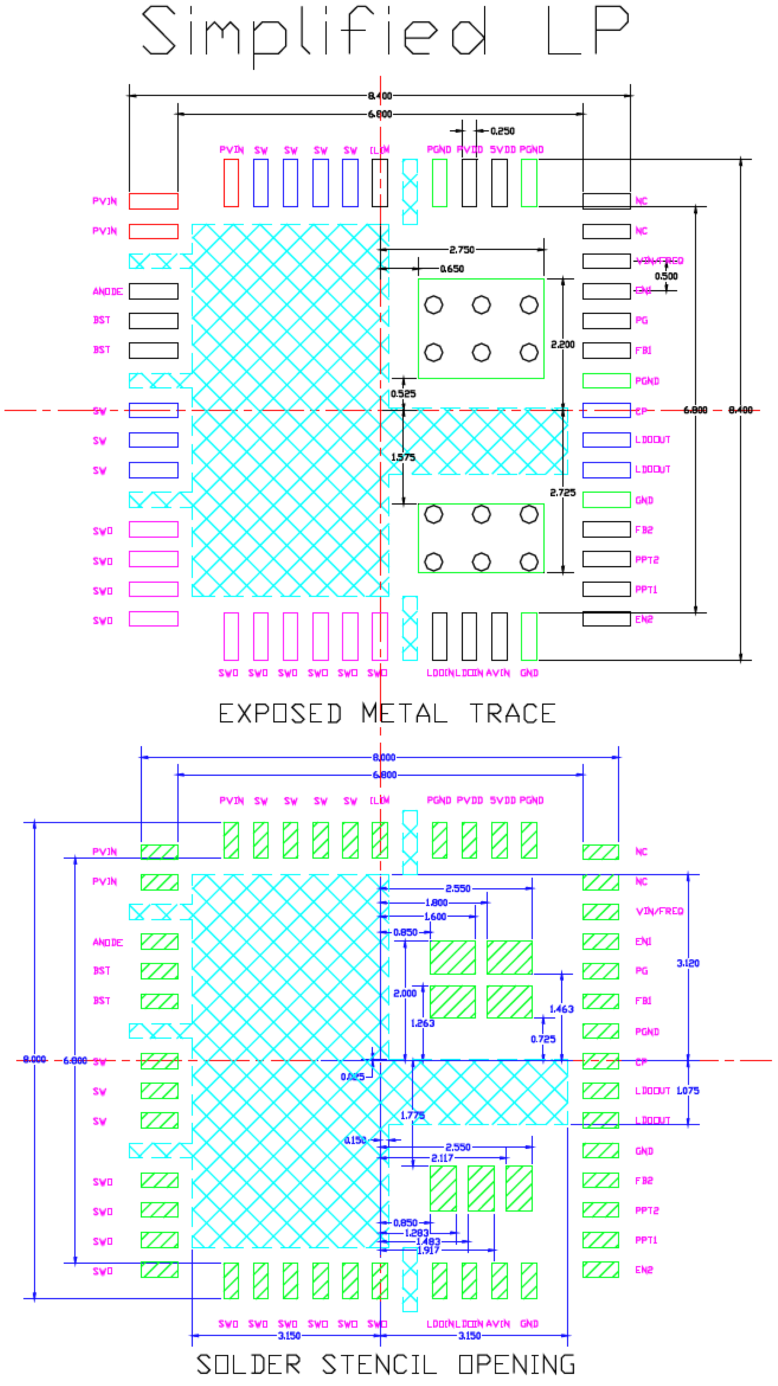


Side View
NOTE: 1, 2, 3

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Recommended Land Pattern

NOTE: 4, 5, 6



Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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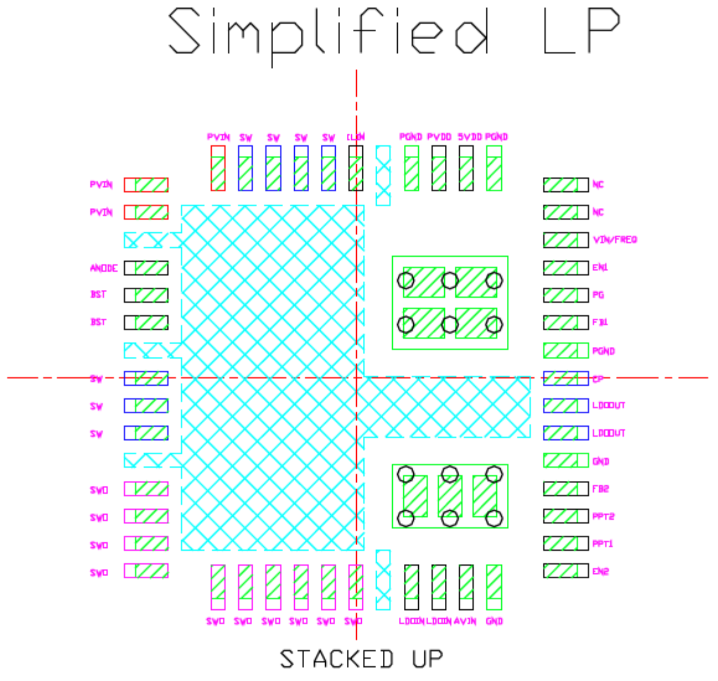
Recommended Land Pattern

NOTE: 4, 5, 6



NOTE:

1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. BLACK CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA, RECOMMENDED SIZE IS 0.30-0.35mm, AT 0.80mm PITCH & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA.
6. CYAN COLORED SHADED PAD REPRESENT EXPOSED TRACE KEEP OUT AREA.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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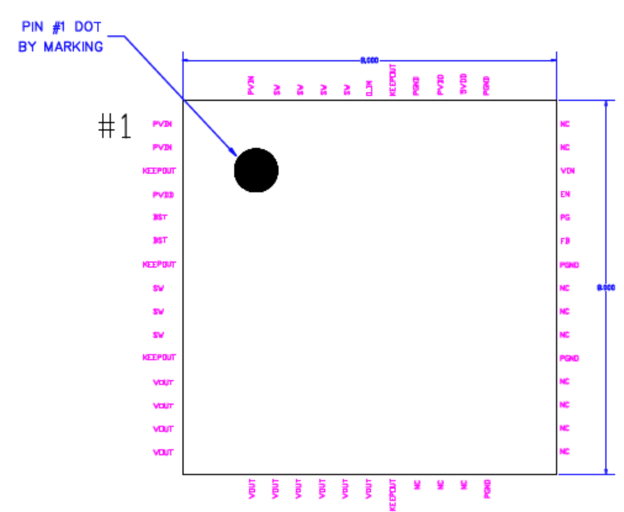
TITLE

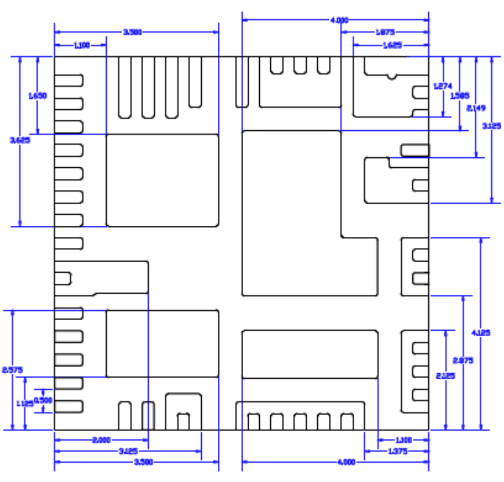
52 LEAD H3QFN 8x8mm PACKAGE (Module) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	H3QFN88-52LD-PL-3	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin



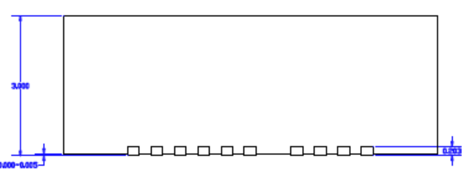
Top View

NOTE: 1, 2, 3



Bottom View

NOTE: 1, 2, 3



Side View

NOTE: 1, 2, 3

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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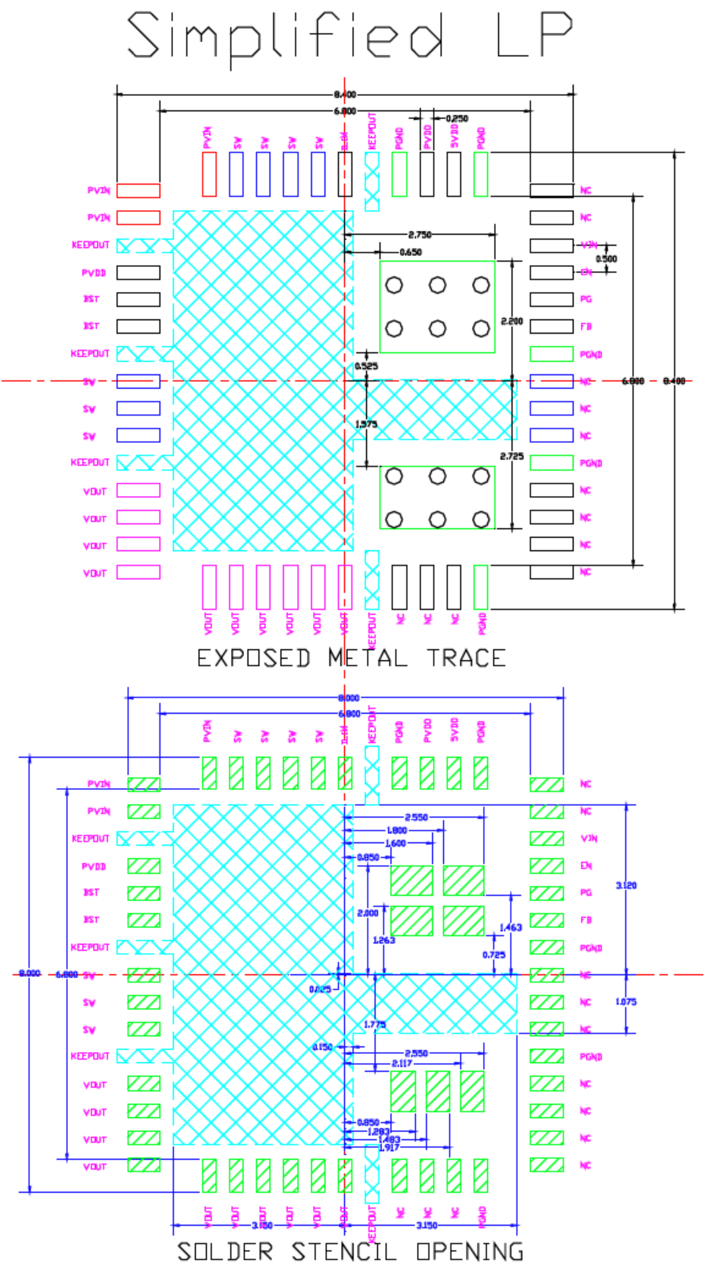
Recommended Land Pattern

NOTE: 4, 5, 6

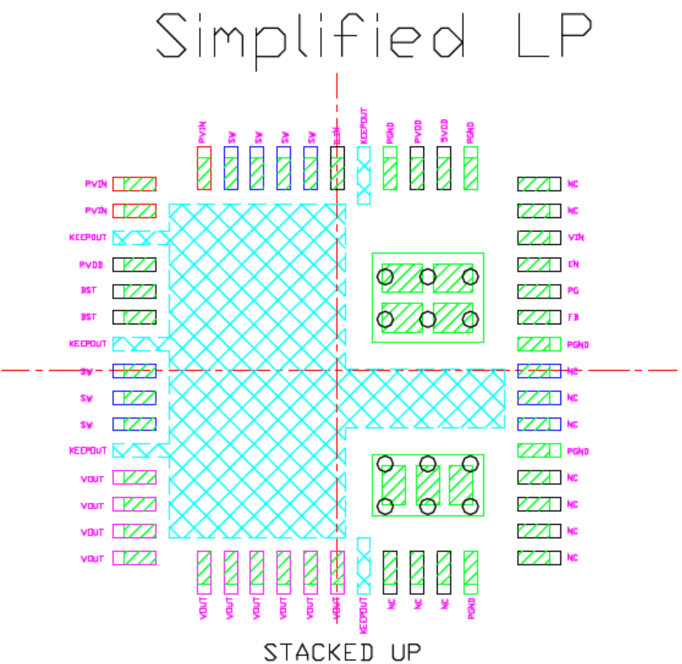


Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

Recommended Land Pattern

NOTE: 4, 5, 6



NOTE:

1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. BLACK CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA, RECOMMENDED SIZE IS 0.30-0.35mm, AT 0.80mm PITCH & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA.
6. CYAN COLORED SHADED PAD REPRESENT EXPOSED TRACE KEEP OUT AREA.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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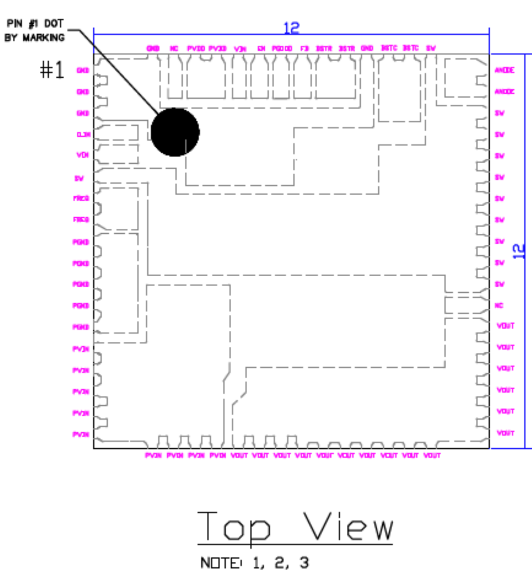
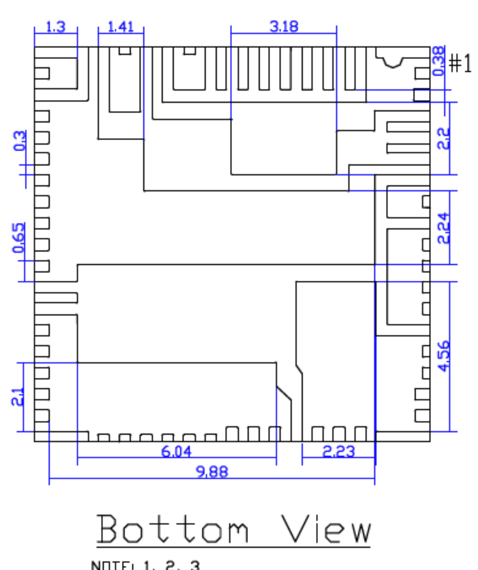
TITLE
64 LEAD H3QFN 12x12mm PACKAGE (Module) OUTLINE & RECOMMENDED LAND PATTERN

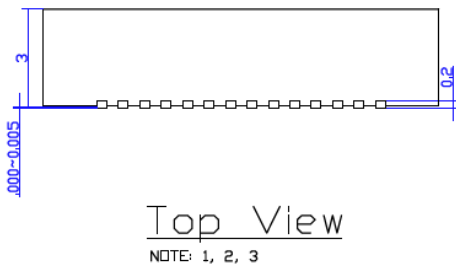
DRAWING #	H3QFN1212-64LD-PL-1	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin



Top View
NOTE: 1, 2, 3

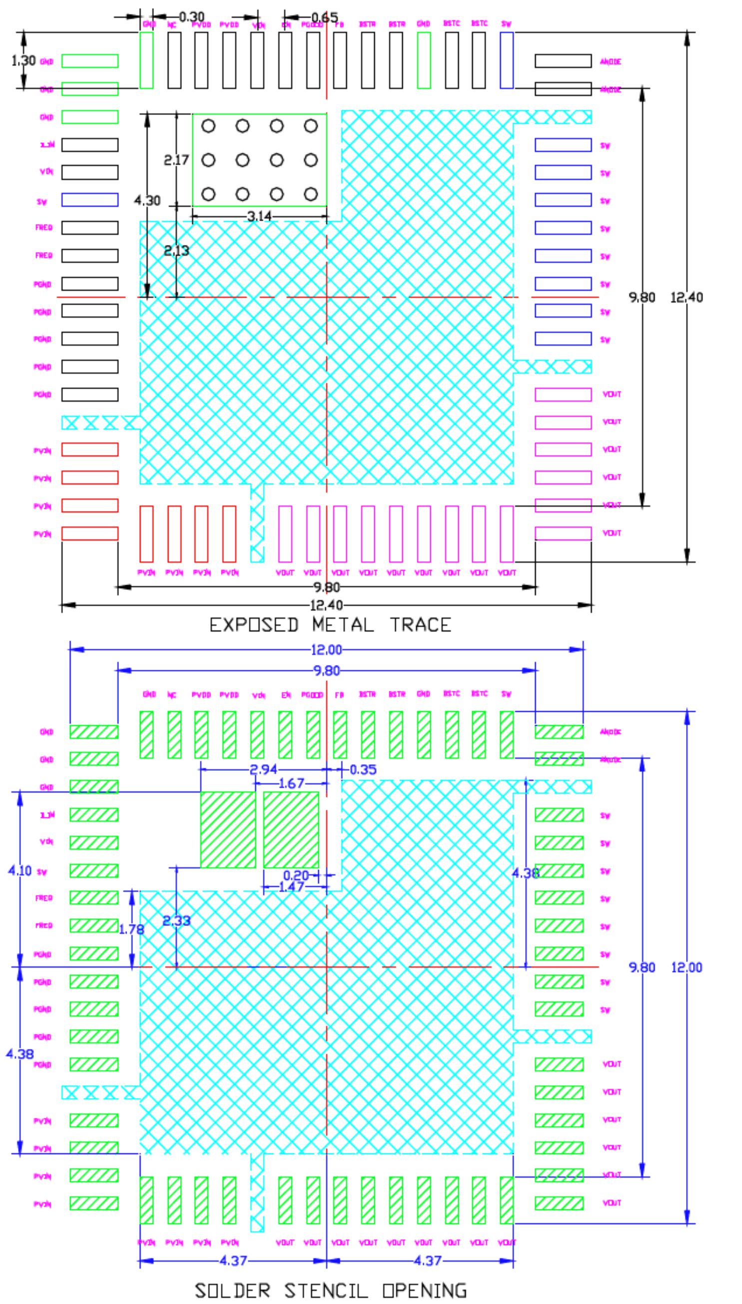


Bottom View
NOTE: 1, 2, 3



Top View
NOTE: 1, 2, 3

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.



Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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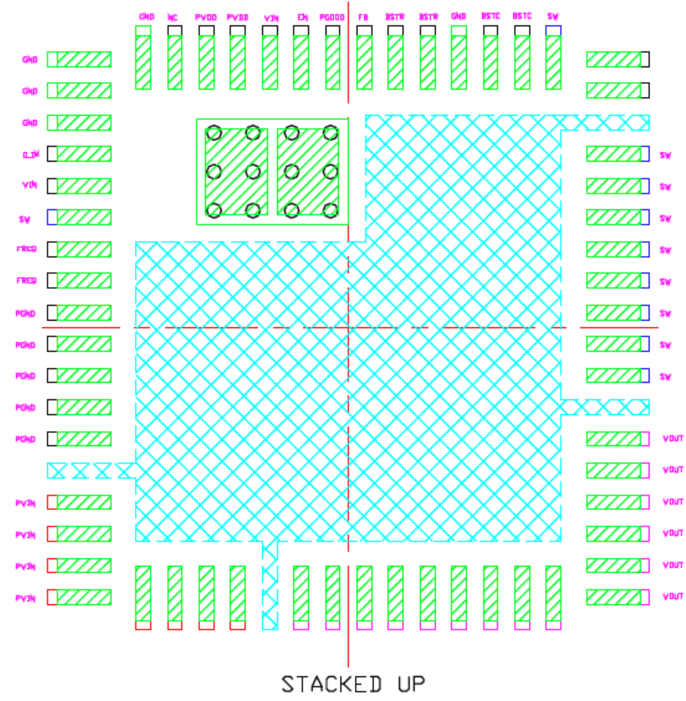
Recommended Land Pattern

NOTE: 4, 5, 6

Simplified LP



NOTE:

1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. BLACK CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA, RECOMMENDED SIZE IS 0.30-0.35mm, AT 0.80mm PITCH & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA.
6. CYAN COLORED SHADED PAD REPRESENT EXPOSED TRACE KEEP OUT AREA.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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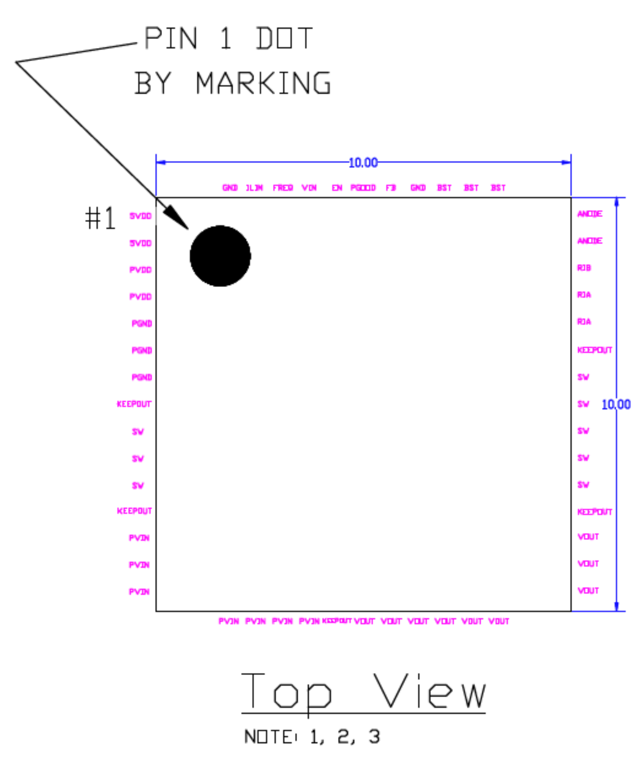
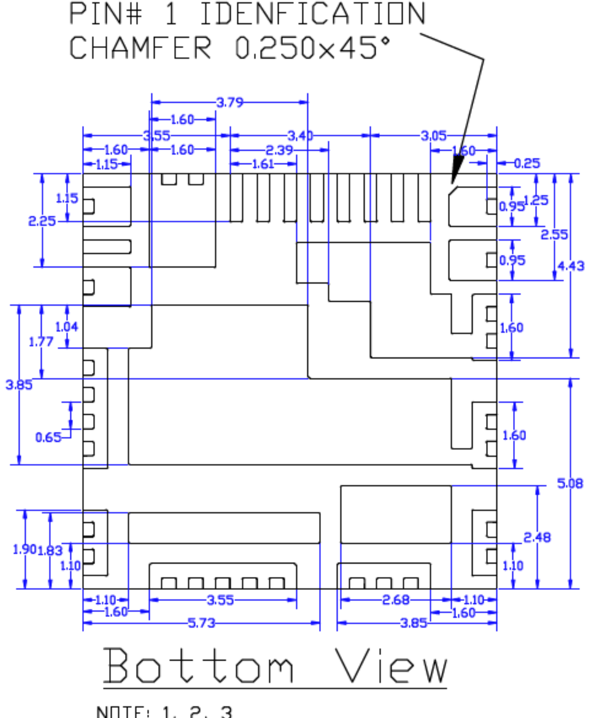
H4QFN

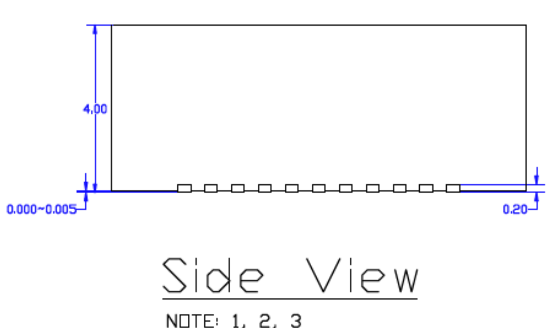
Micrel Legacy

TITLE
52 LEAD H4QFN 10x10mm PACKAGE (Module) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	H4QFN1010-52LD-PL-1	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin







Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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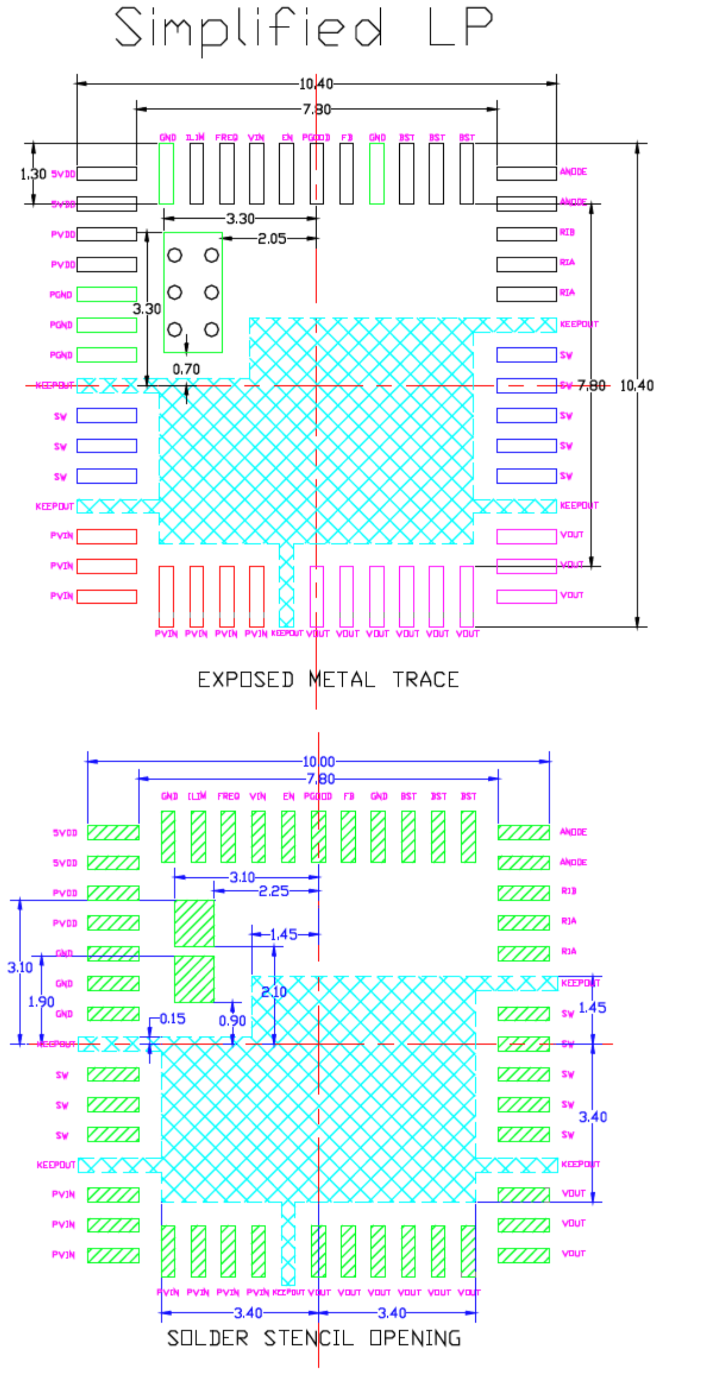
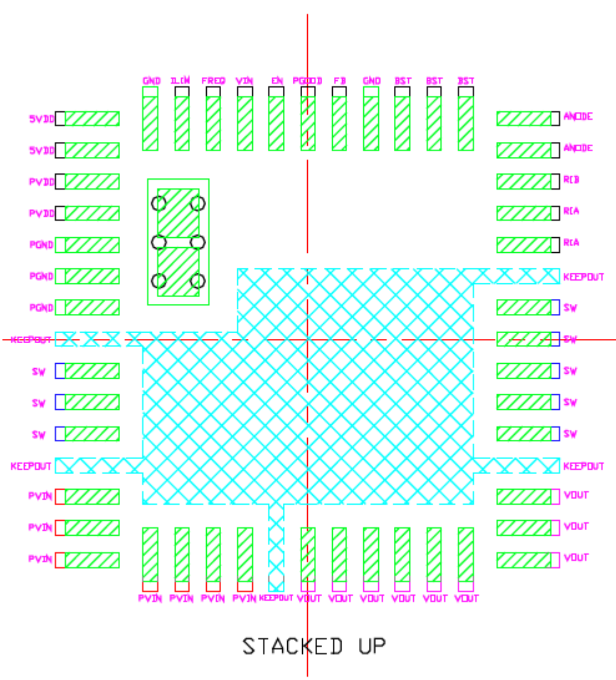


Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Recommended Land Pattern

NOTE: 4, 5, 6

Simplified LP



NOTE:

1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. BLACK CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA, RECOMMENDED SIZE IS 0.30-0.35mm, AT 0.80mm PITCH & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA.
6. CYAN COLORED SHADED PAD REPRESENT EXPOSED TRACE KEEP OUT AREA.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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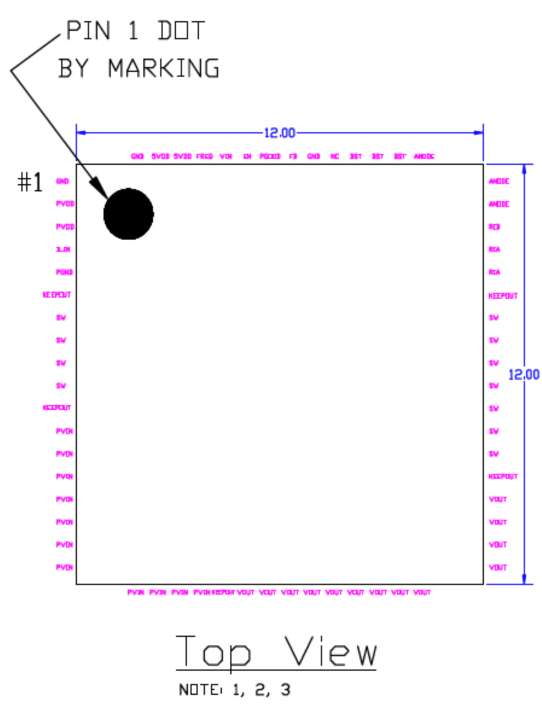
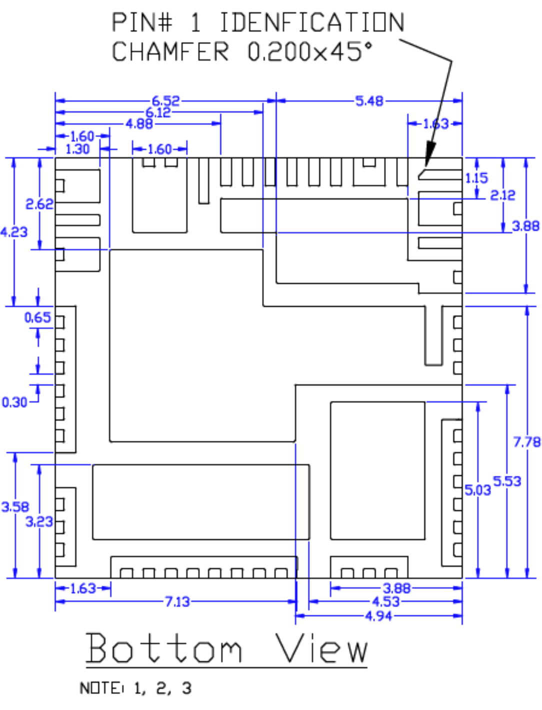
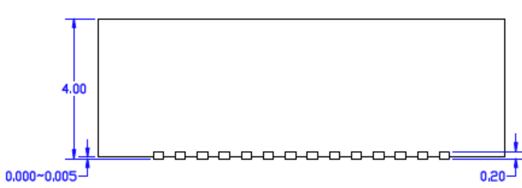
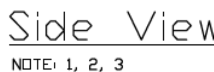
TITLE
64 LEAD H4QFN 12x12mm PACKAGE (Module) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	H4QFN1212-64LD-PL-1	**UNIT**	MM
Lead Frame	Copper	**Lead Finish**	Matte Tin

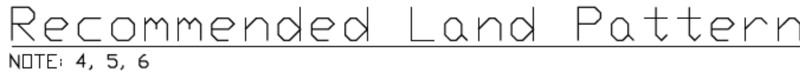


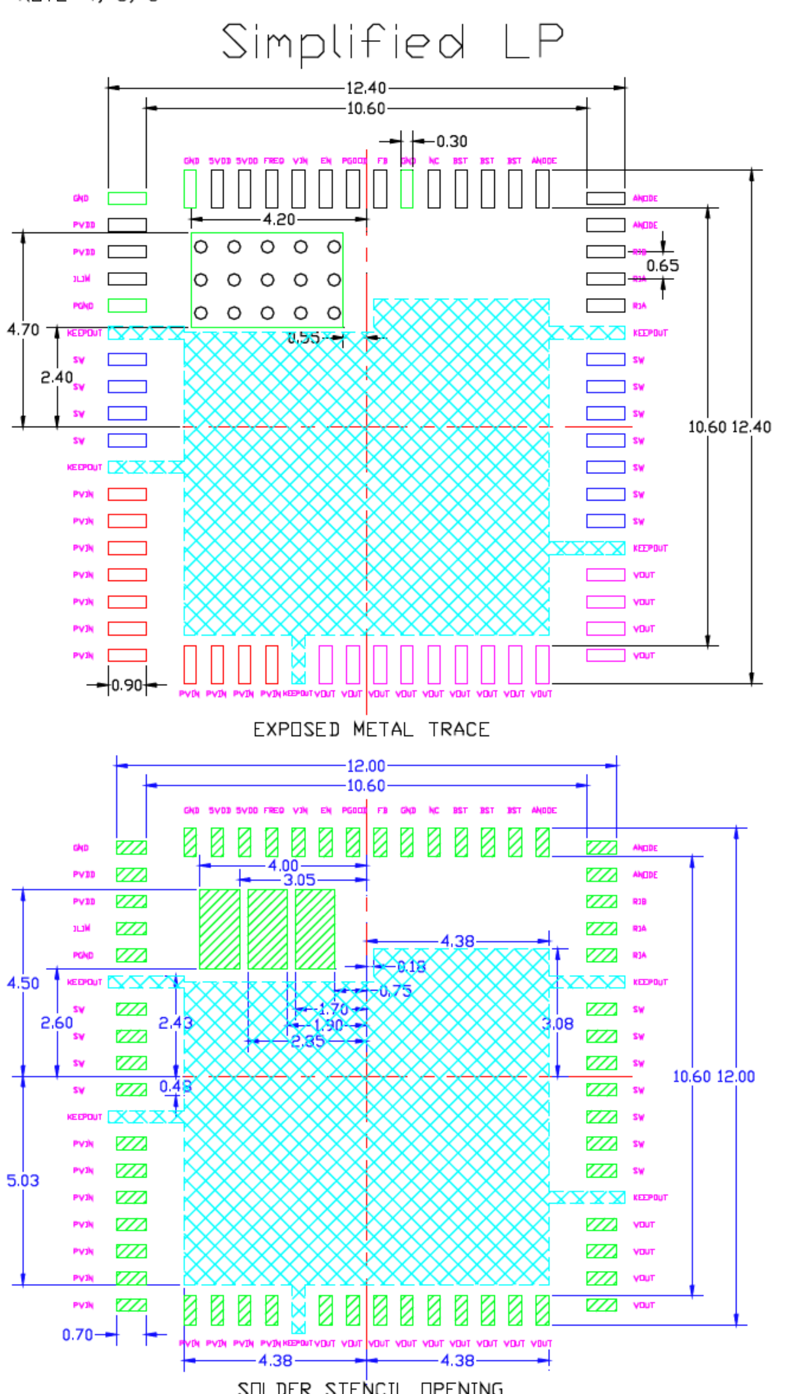






Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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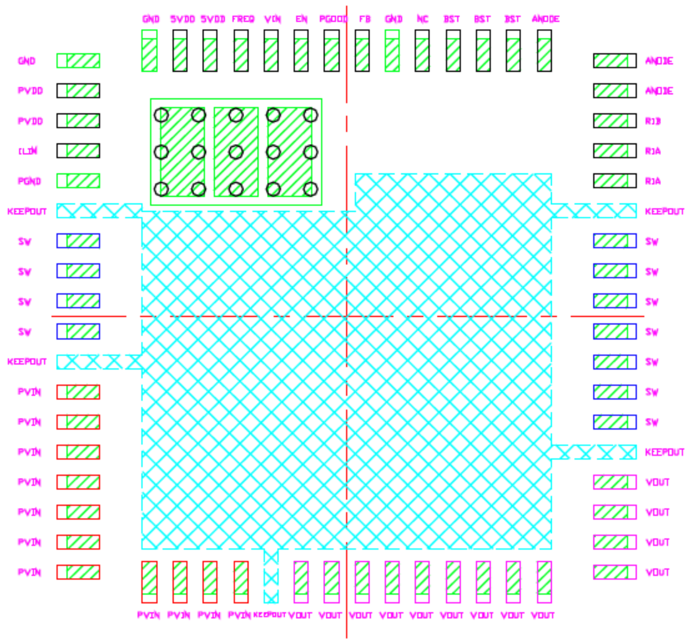
Recommended Land Pattern

NOTE: 4, 5, 6

Simplified LP



STACKED UP

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. BLACK CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA, RECOMMENDED SIZE IS 0.30-0.35mm, AT 0.80mm PITCH & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA.
6. CYAN COLORED SHADED PAD REPRESENT EXPOSED TRACE KEEP OUT AREA.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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HDFN

Micrel Legacy

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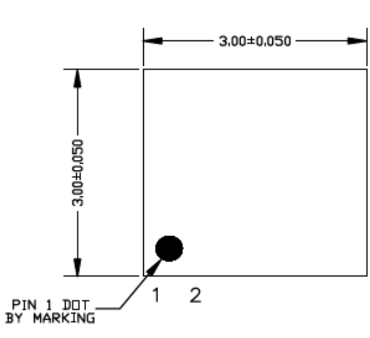
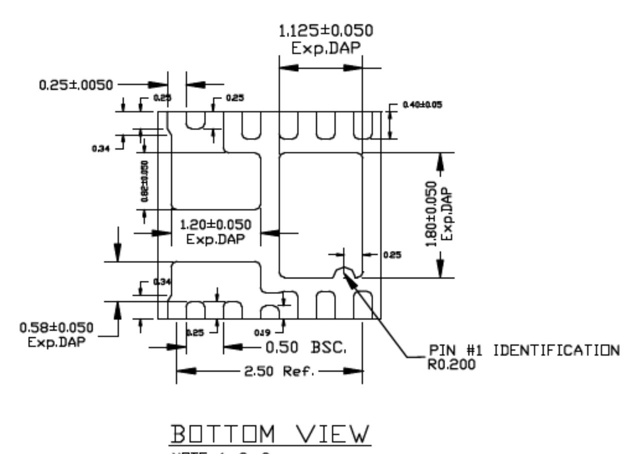
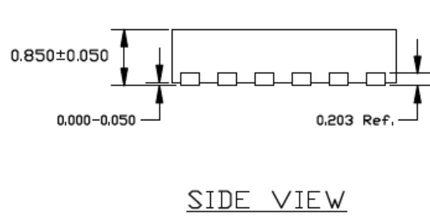
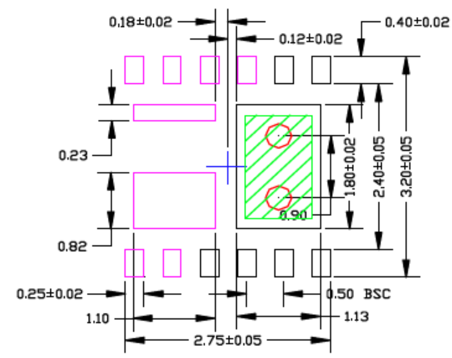
TITLE
12 LEAD HDFN 3x3 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	HDFN33-12LD-PL-1	**UNIT**	MM









NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
5. GREEN RECTANGLE REPRESENTS (OPTIONAL) SOLDER STENCIL OPENING. RECOMMENDED SIZE IS 0.90X1.50 MM.
6. PURPLE PADS REPRESENT DIFFERENT POTENTIAL. DO NOT CONNECT TO GND.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
14 LEAD HDFN 3.0 x 3.5 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	HDFN3035-14LD-PL-1	UNIT	MM

TOP VIEW
NOTE: 1,2,3

BOTTOM VIEW
NOTE: 1,2,3

SIDE VIEW
NOTE: 1,2

RECOMMENDED LAND PATTERN
NOTE: 4,5,6,7

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLES IN RECOMMENDED LAND PATTERN ARE THERMAL VIAS. SIZE IS 0.30-0.35mm AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
5. GREEN RECTANGLE REPRESENTS (OPTIONAL) SOLDER STENCIL OPENING. RECOMMENDED SIZE IS 1.0X1.5MM.
6. PURPLE PADS REPRESENT DIFFERENT POTENTIAL. DO NOT CONNECT TO GND.
7. RECOMMENDED LAND PATTERN TOLERANCE IS ±0.02 UNLESS SPECIFIED.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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NOTES:

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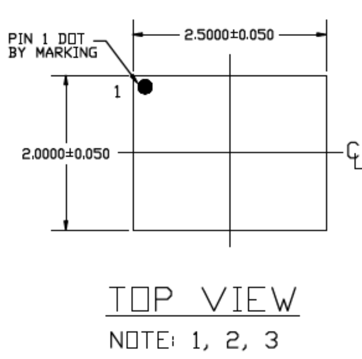
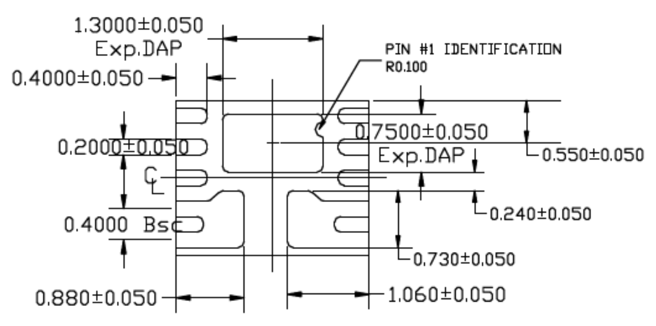
HJDFN

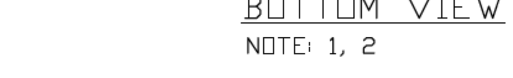
Micrel Legacy

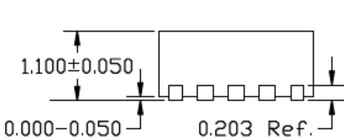
TITLE
10 LEAD HJDFN 2.5 x 2.0 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	HJDFN2520-10LD-PL-1	UNIT	MM

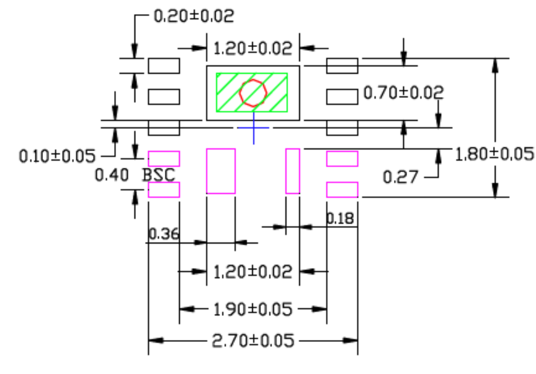








SIDE VIEW
NOTE: 1, 2



RECOMMENDED LAND PATTERN
NOTE: 4, 5, 6

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLE (SHADED AREA) REPRESENTS STENCIL OPENING ON EXPOSED AREA. SIZE IS 0.90X0.50 MM
5. RED CIRCLE REPRESENTS THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER
6. PURPLE PADS ARE OF A DIFFERENT POTENTIAL, DO NOT CONNECT TO GND

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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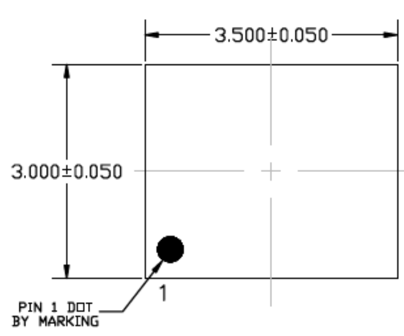
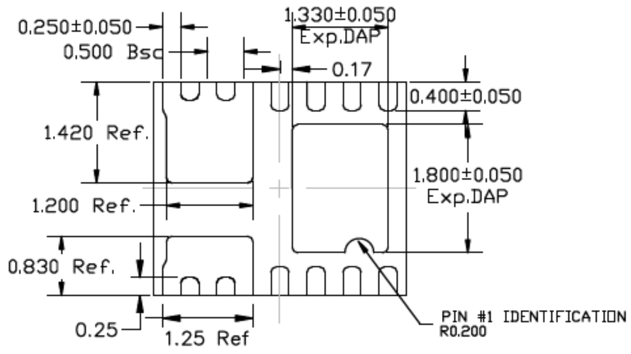
TITLE
14 LEAD HJDFN 3.0 x 3.5 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

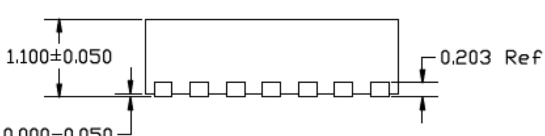
DRAWING #	HJDFN3035-14LD-PL-1	UNIT	MM





TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2, 3



SIDE VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLES IN RECOMMENDED LAND PATTERN ARE THERMAL VIAS. SIZE IS 0.30-0.35mm AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
5. GREEN RECTANGLE REPRESENTS (OPTIONAL) SOLDER STENCIL OPENING.
6. PURPLE PADS REPRESENT DIFFERENT POTENTIAL. DO NOT CONNECT TO GND.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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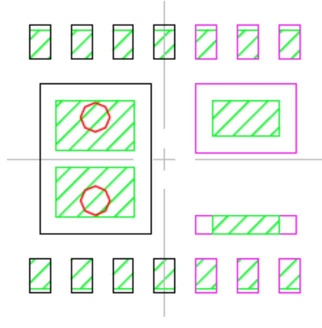
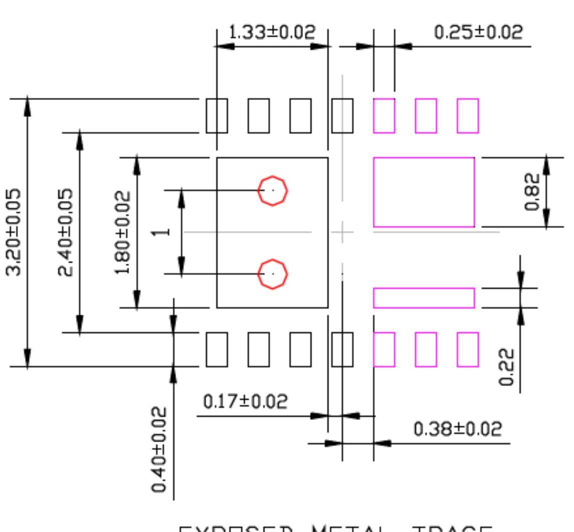
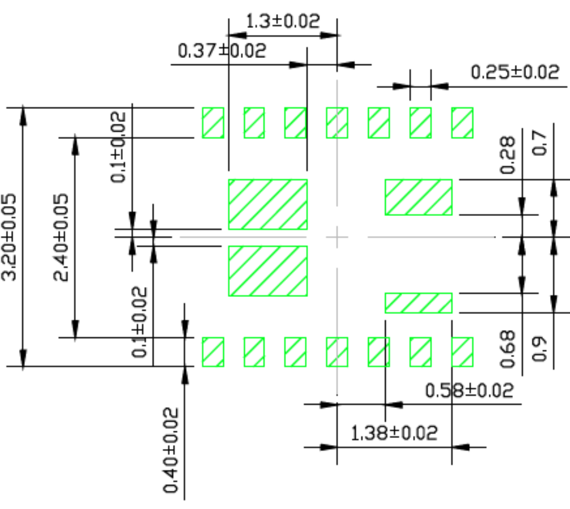
POD-Land Pattern drawing # HJDFN3035-14LD-PL-1







Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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HKQFN

Micrel Legacy

Package Outlines and Dimensions

TITLE

34 LEAD HQFN 4 x 6 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	HKQFN46-34LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu

TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2, 3

SIDE VIEW
NOTE: 1, 2, 3

RECOMMENDED LAND PATTERN
NOTE 4, 5, 6

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM, AT 0.60-1.00MM PITCH AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
5. GREEN RECTANGLE REPRESENTS (OPTIONAL) SOLDER STENCIL OPENING. RECOMMENDED SIZE IS 1.0X0.6MM, 0.2MM SPACING
6. PURPLE PAD REPRESENTS EXPOSED TRACE KEEP OUT AREA

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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HQFN

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TITLE

28 LEAD HQFN 4 x 6 mm (TRI-SIDE) PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	HQFN46-28LD-PL-1	**UNIT**	MM

TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2, 3

SIDE VIEW
NOTE: 1, 2, 3

RECOMMENDED LAND PATTERN
NOTE: 4, 5, 6

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
5. GREEN RECTANGLES REPRESENT (OPTIONAL) SOLDER STENCIL OPENING. RECOMMENDED SIZE IS 0.8x0.8MM, 0.2MM SPACING.
6. PURPLE PADS REPRESENT DIFFERENT POTENTIAL. DO NOT CONNECT TO GND.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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LDFN

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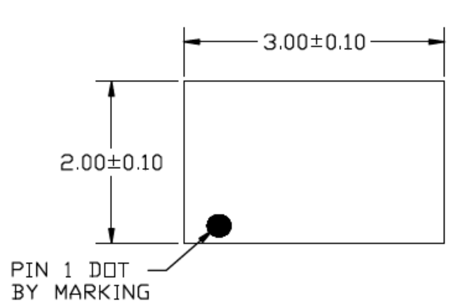
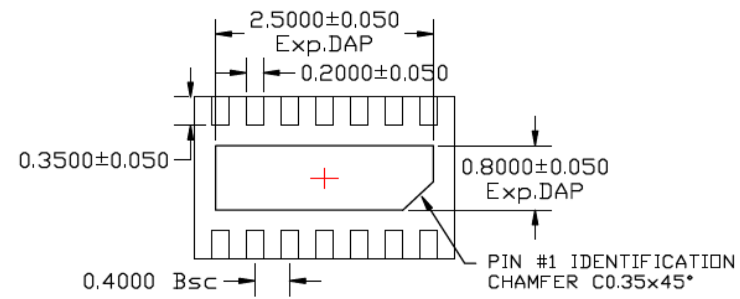
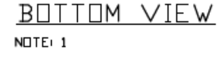
TITLE
14 LEAD LDFN 3x2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

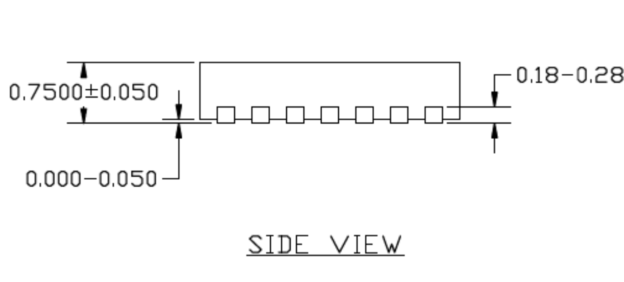
DRAWING #	LDFN32-14LD-PL-1	UNIT	MM



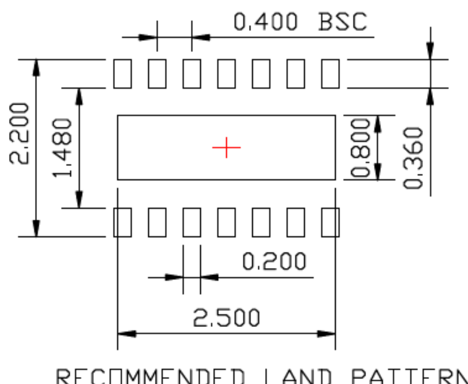


TOP VIEW





SIDE VIEW



RECOMMENDED LAND PATTERN

NOTE:
1. LEADS AND EPAD CORNER MAXIMUM RADIUS 0.075MM

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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LFBGA

Micrel Legacy

TITLE

100 LEAD LFBGA 9x9mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

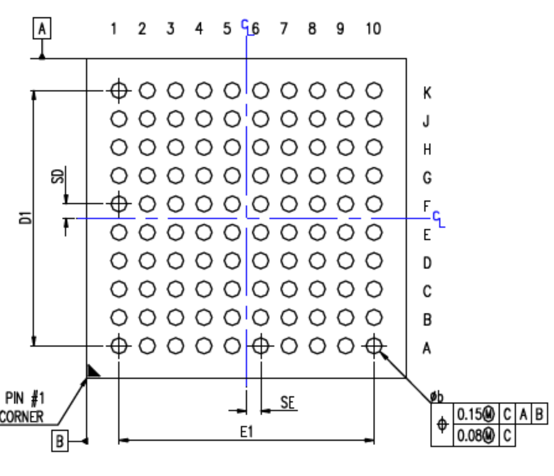
DRAWING #	LFBGA9x9-100LD-PL-1	UNIT	MM

PIN #1 CORNER

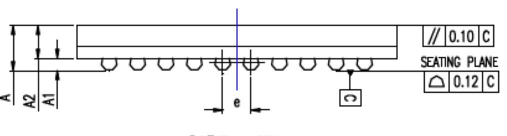
E

D

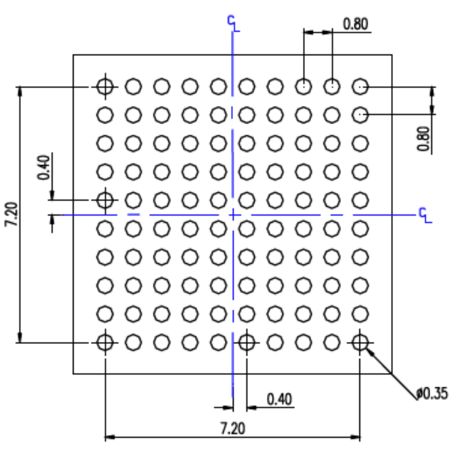
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN

NOTE 1

SYMBOL	DIMENSION IN MM		
	MIN.	NOM	MAX.
A	1.16	1.27	1.38
A1	0.30	0.35	0.40
A2	0.86	0.92	0.98
b	0.40	0.45	0.50
D	8.90	9.00	9.10
D1	7.20 BSC.		
E	8.90	9.00	9.10
E1	7.20 BSC.		
SD	0.40 BSC.		
SE	0.40 BSC.		
N	100		
e	0.8 BSC.		
JEDEC	MO-219 (REF.)		

NOTE :

1. ALL UNITS IN mm. TOLERANCE +/- 0.05 IF NOT NOTED.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
100 LEAD LFBGA 10x10mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LFBGA10x10-100LD-PL-1	UNIT	MM

TOP VIEW

BOTTOM VIEW

SIDE VIEW

SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.20	1.31	1.42	0.047	0.052	0.056
A1	0.34	0.39	0.44	0.013	0.015	0.017
A2	0.86	0.92	0.98	0.034	0.036	0.039
b	0.45	0.50	0.55	0.018	0.020	0.022
D	9.90	10.00	10.10	0.390	0.394	0.398
E	9.90	10.00	10.10	0.390	0.394	0.398
e	1.00 BSC.			0.039 BSC.		
JEDEC	MO-192(REF.)					
SE	0.50 BSC.			0.020 BSC.		
SD	0.50 BSC.			0.020 BSC.		
E1	9.00 BSC.			0.351 BSC.		
D1	9.00 BSC.			0.351 BSC.		

RECOMMENDED LAND PATTERN
NOTE 1

NOTE :
1. TOLERANCE +/- 0.05 IF NOT NOTED

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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LGA

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TITLE

6 LEAD LGA 5.0x3.2 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LGA5032-6LD-PL-1	UNIT	MM

TOP VIEW

BOTTOM VIEW

SIDE VIEW

RECOMMENDED LAND PATTERN

0.900

1.600

2.600 BSC

1.270 BSC

Dimensional Tol.	
aaa	0.100
bbb	0.070

Dimensional Ref.			
REF.	Min.	Nom	Max.
A	1.260	1.330	1.401
A1	0.190	0.230	0.271
A2	1.070	1.101	1.130
D	3.100	3.200	3.300
D1	2.100 BSC		
E	4.900	5.000	5.100
E1	2.540 BSC		
b	0.850	1.900	0.951
c	0.850	0.901	0.951
e	1.270 BSC		
f	0.051	0.100	0.150
k	0.860	0.910	0.960
m	0.580	0.630	0.680
n		6	

DETAIL A
SCALE 5:1

Notes

1. Dimensioning and Tolerancing per ASME Y14.5M-1994.
2. Dimensions are in millimeters.
3. 'e' represents the basic LGA pitch
4. 'n' is the maximum no. of Land for a specified Package.
5. Package warp shall be 0.050 max.
6. Substrate base is BT Resin
7. The Pin#1 corner must be identified on top side only.
8. Reference Jedec Spec M0-220

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

6 LEAD LGA 7x5 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LGA75-6LD-PL-1	**UNIT**	MM

PIN# 1 DOT BY MARKING

TOP VIEW

DETAIL A

BOTTOM VIEW

Seating Plane

SIDE VIEW

1.900

1.750

3.70 BSC

2.54 BSC

RECOMMENDED LAND PATTERN

DETAIL A
SCALE 5:1

Dimensional Tol.	
aaa	0.101
bbb	0.171

Dimensional Ref.			
REF.	Min.	Nom	Max.
A	1.260	1.331	1.400
A1	0.190	0.230	0.270
A2	1.070	1.100	1.130
D	4.900	5.000	5.100
D1	3.700 BSC		
E	6.900	7.000	7.100
E1	5.080 BSC		
b	1.051	1.110	1.150
c	1.351	1.400	1.450
e	2.540 BSC		
f	1.050	0.100	0.151
k	1.210	0.260	0.311
m	1.090	1.140	1.191
n		36	

Notes

1. Dimensioning and Tolerancing per ASME Y14.5M-1994.
2. Dimensions are in millimeters.
3. 'e' represents the basic LGA pitch
4. 'n' is the maximum no. of Land for a specified Package.
5. Package warp shall be 0.050 max.
6. Substrate base is BT Resin
7. The Pin#1 corner must be identified on top side only.
8. Reference Jedec Spec MI-221
9. Land pattern tolerance is 1.15mm unless otherwise specified

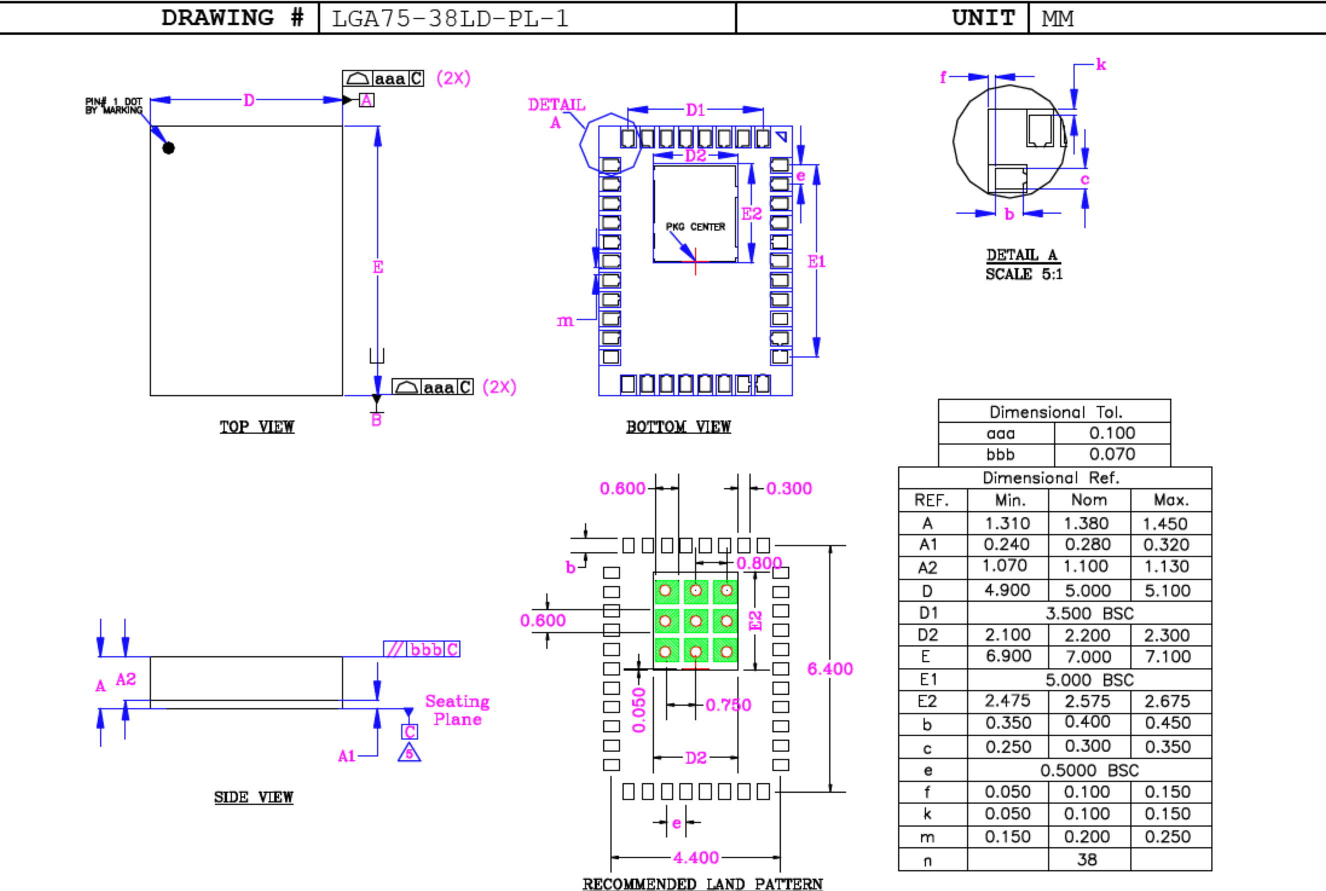
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE

38 LEAD LGA 7x5 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LGA75-38LD-PL-1	**UNIT**	MM



Dimensional Tol.	
aaa	0.100
bbb	0.070

Dimensional Ref.			
REF.	Min.	Nom	Max.
A	1.310	1.380	1.450
A1	0.240	0.280	0.320
A2	1.070	1.100	1.130
D	4.900	5.000	5.100
D1		3.500 BSC	
D2	2.100	2.200	2.300
E	6.900	7.000	7.100
E1		5.000 BSC	
E2	2.475	2.575	2.675
b	0.350	0.400	0.450
c	0.250	0.300	0.350
e		0.5000 BSC	
f	0.050	0.100	0.150
k	0.050	0.100	0.150
m	0.150	0.200	0.250
n		38	

Notes:
1. Dimensioning and Tolerancing per ASME Y14.5M-1994.
2. Dimensions are in millimeters.
3. 'e' represents the basic LGA pitch
4. 'n' is the maximum no. of Land for a specified Package.
5. Package warp shall be 0.050 max.
6. Substrate base is BT Resin
7. The Pin#1 corner must be identified on top side only.
8. Reference JEDEC Spec M0-220.
9. Red circles in land pattern indicate thermal via. Size should be 0.30mm in diameter. Pitch is 0.80mm and connected to GND for maximum thermal performance.
10. Green rectangles (SHADED AREA) indicate solder stencil opening on exposed pad area. Size is 0.60x0.60mm. Pitch is 0.75mm
11. Land Pattern Tolerance is ±0.02mm.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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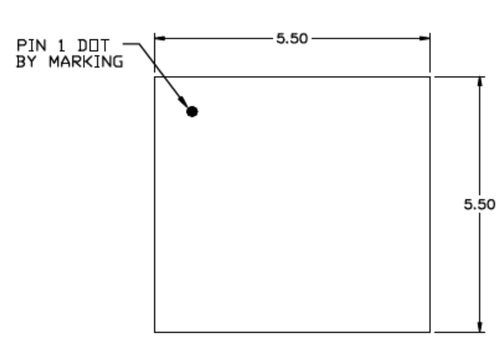
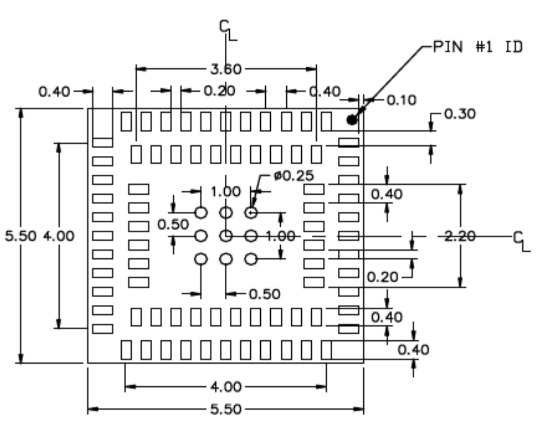
TITLE

76 LEAD LGA 5.5 x 5.5 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

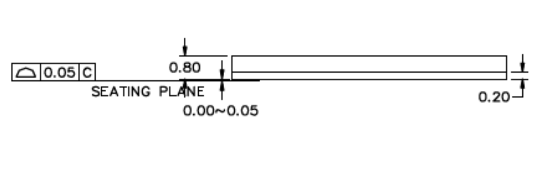
DRAWING #	LGA5555-76LD-PL-1	UNIT	MM



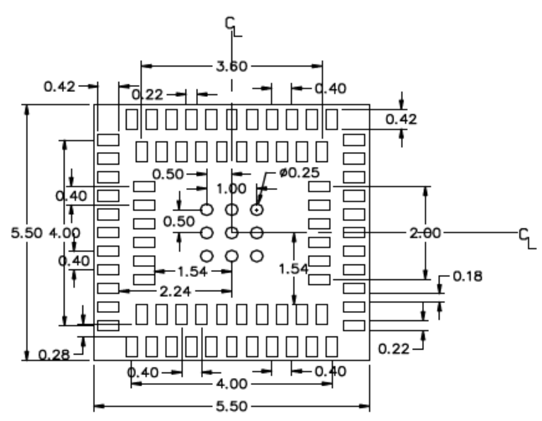
TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



SIDE VIEW
NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN
NOTE: 4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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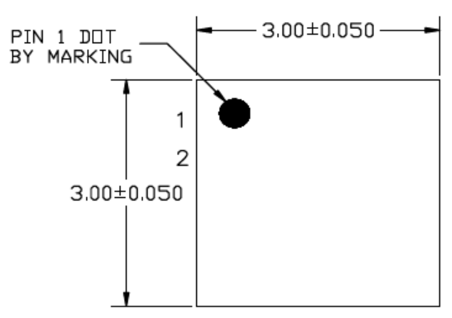
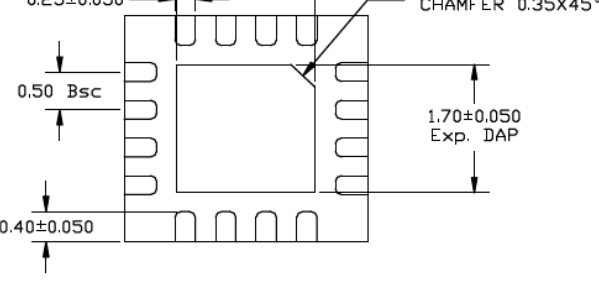
LQFN

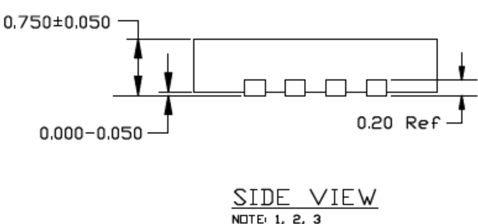
Micrel Legacy

TITLE
16 LEAD LQFN 3x3mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LQFN33-16LD-PL-1	**UNIT**	MM
Lead Frame	Copper Alloy		







NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLE IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.60x0.60mm IN SIZE, 0.20mm SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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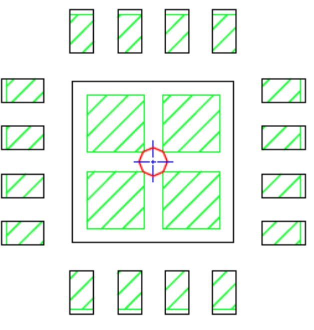
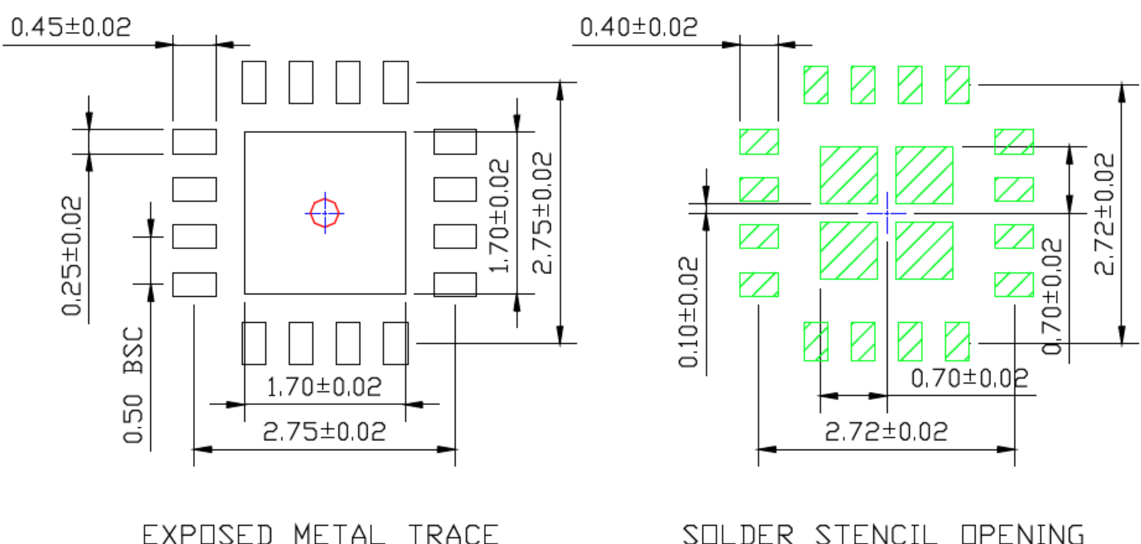
POD-Land Pattern Drawing #LQFN33-16LD-PL-1





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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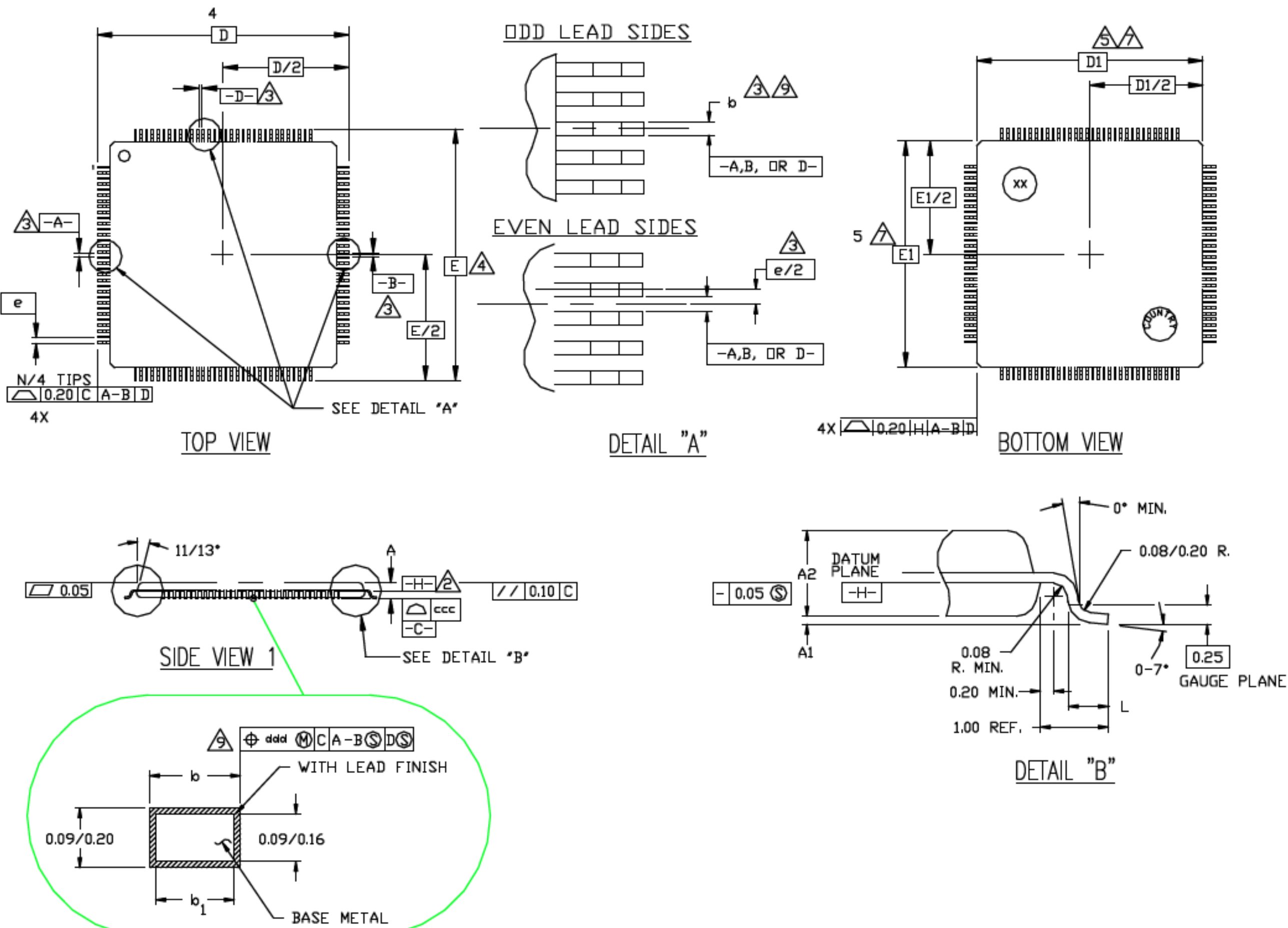
LQFP

Micrel Legacy

TITLE
144/52/64 LEAD LQFP 10x10 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LQFP10x10-445264LD-PL-1	UNIT	MM



Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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NOTES:

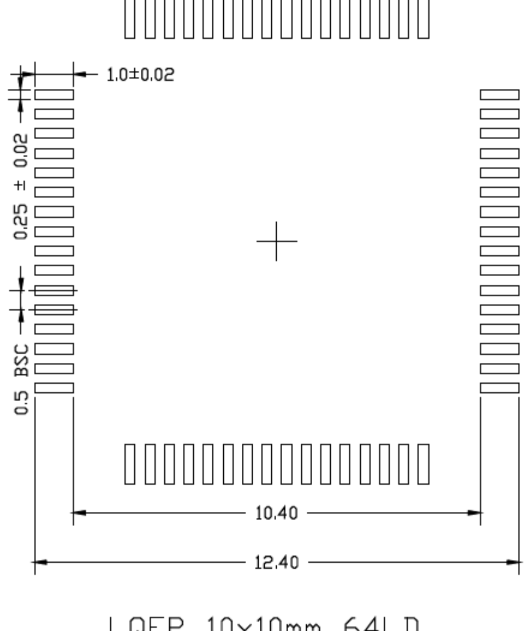
1. ALL DIMENSIONING AND TOLERANCING CONFORM TO ANSI Y14.5-1982.
2. DATUM PLANE [-H-] LOCATED AT MOLD PARTING LINE AND COINCIDENT WITH LEAD, WHERE LEAD EXITS PLASTIC BODY AT BOTTOM OF PARTING LINE.
3. DATUMS [A-B] AND [-D-] TO BE DETERMINED AT CENTERLINE BETWEEN LEADS WHERE LEADS EXIT PLASTIC BODY AT DATUM PLANE [-H-] .
4. TO BE DETERMINED AT SEATING PLANE [-C-] .
5. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE MOLD PROTRUSION IS 0.254 MM ON D1 AND E1 DIMENSIONS.
6. "N" IS THE TOTAL NUMBER OF TERMINALS.
7. THESE DIMENSIONS TO BE DETERMINED AT DATUM PLANE [-H-] .
8. THE TOP OF PACKAGE IS SMALLER THAN THE BOTTOM OF PACKAGE BY 0.15 MILLIMETERS.
9. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08mm TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT.
10. CONTROLLING DIMENSION: MILLIMETER.
11. MAXIMUM ALLOWABLE DIE THICKNESS TO BE ASSEMBLED IN THIS PACKAGE FAMILY IS 0.38 MILLIMETERS.
12. THIS OUTLINE CONFORMS TO JEDEC PUBLICATION 95 REGISTRATION MS-026, VARIATIONS BCB, BCC, BCD & BCE.
13. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.

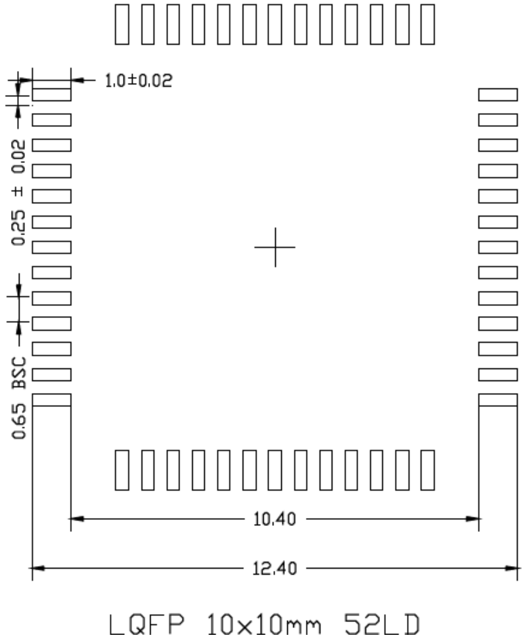
N	JEDEC VARIATION ALL DIMENSIONS IN MILLIMETERS			
	44			NOTE
	MIN.	NOM.	MAX.	
A	-	-	1.60	
A1	0.05	-	0.15	13
A2	1.35	1.40	1.45	
D	12.00 BSC.			4
D1	10.00 BSC.			7,8
E	12.00 BSC.			4
E1	10.00 BSC.			7,8
L	0.45	0.60	0.75	
e	0.80 BSC.			
b	0.30	0.37	0.45	9
b1	0.30	0.35	0.40	
ccc	-	-	0.10	
ddd	-	-	0.20	

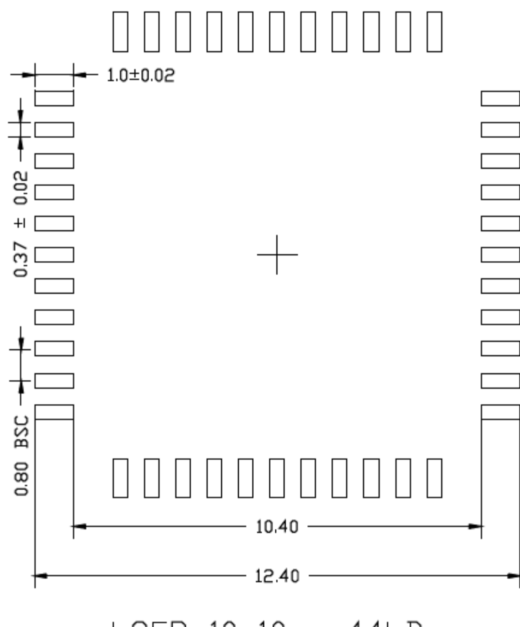
N	JEDEC VARIATION ALL DIMENSIONS IN MILLIMETERS			
	52			NOTE
	MIN.	NOM.	MAX.	
A	-	-	1.60	
A1	0.05	-	0.15	13
A2	1.35	1.40	1.45	
D	12.00 BSC.			4
D1	10.00 BSC.			7,8
E	12.00 BSC.			4
E1	10.00 BSC.			7,8
L	0.45	0.60	0.75	
e	0.65 BSC.			
b	0.22	0.32	0.38	9
b1	0.22	0.30	0.33	
ccc	-	-	0.10	
ddd	-	-	0.13	

N	JEDEC VARIATION ALL DIMENSIONS IN MILLIMETERS			
	64			NOTE
	MIN.	NOM.	MAX.	
A	-	-	1.60	
A1	0.05	-	0.15	13
A2	1.35	1.40	1.45	
D	12.00 BSC.			4
D1	10.00 BSC.			7,8
E	12.00 BSC.			4
E1	10.00 BSC.			7,8
L	0.45	0.60	0.75	
e	0.50 BSC.			
b	0.17	0.22	0.27	9
b1	0.17	0.20	0.23	
ccc	-	-	0.08	
ddd	-	-	0.08	

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.







RECOMMENDED LAND PATTERN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE
48 LEAD LQFP 7x7mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LQFP7x7-48LD-PL-1	**UNIT**	MM [INCHES]

SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM	MAX.	MIN.	NOM	MAX.
A			1.60			0.063
A1	0.05		0.15	0.002		0.006
A2	1.35	1.40	1.45	0.053	0.055	0.057
D	8.90	9.00	9.10	0.350	0.354	0.358
D1	6.90	7.00	7.10	0.272	0.276	0.280
E	8.90	9.00	9.10	0.350	0.354	0.358
E1	6.90	7.00	7.10	0.272	0.276	0.280
c	0.178 TYP.			0.007 TYP.		
c1	0.127 TYP.			0.005 TYP.		
L	0.50	0.60	0.70	0.020	0.024	0.028
L1	1.00 REF.			0.039 REF.		
θ	0	3.5	7	0	3.5	7
JEDEC						

N	b (MM)			b1 (MM)			e (MM)			JEDEC
	MIN.	NOM	MAX.	MIN.	NOM	MAX.	MIN.	NOM	MAX.	
48L	0.19	0.22	0.25	0.17	0.20	0.23	0.50 BSC.			

TOP VIEW

SIDE VIEW 1

DETAIL "A"

DETAIL "B"

RECOMMENDED LAND PATTERN

NOTES:
1. ALL DIMENSIONS ARE IN MM [INCHES].
2. CONTROLLING DIMENSION : MM.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE
48 LEAD LQFP 7x7mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LQFP7x7-48LD-PL-5	UNIT	MM [INCHES]
Lead Frame	Copper Alloy	Lead Finish	Matte Tin

TOP VIEW

SIDE VIEW 1

SIDE VIEW 2

DETAIL "A"

DETAIL "B"

RECOMMENDED LAND PATTERN

SYMBOL	DIMENSION IN MM		
	MIN.	NOM	MAX.
A	–	–	1.60
A1	0.05	–	0.15
A2	1.35	1.40	1.45
D	9.00 BSC		
D1	7.00 BSC		
E	9.00 BSC		
E1	7.00 BSC		
c	0.09	–	0.20
c1	0.09	–	0.16
L	0.45	0.60	0.75
L1	1.00 REF.		
θ	0	3.5	7

N	b (MM)			b1 (MM)			e (MM)		
	MIN.	NOM	MAX.	MIN.	NOM	MAX.	MIN.	NOM	MAX.
48L	0.17	0.22	0.27	0.17	0.20	0.23	0.50 BSC.		

TOLERANCE OF FORM AND POSITION	
aaa	0.20
bbb	0.20
ccc	0.08
ddd	0.08

NOTES:
1. ALL DIMENSIONS ARE IN MM.
2. REFER TO JEDEC STANDARD MS-026 BBC.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. ALLOWABLE PROTRUSION IS 0.25mm PER SIDE. "D1" AND "E1' ARE MAXIMUM PLASTIC BODY SIZE DIMENSIONS INCLUDING MOLD MISMATCH.
4. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.
5. TO BE DETERMINED AT SEATING DATUM PLANE C.
6. "aaa" IS THE BILATERAL PROFILE TOLERANCE THAT CONTROLS THE POSITION OF THE PLASTIC BODY SIDES. THE CENTER OF THE PROFILE ZONES ARE DEFINED BY THE BASIC DIMENSIONS "D" AND "E".
7. "bbb" THE TOLERANCE THAT CONTROLS THE POSITION OF THE ENTIRE TERMINAL PATTERN WITH RESPECT TO DATUM'S A AND B. THE CENTER OF THE TOELRANCE ZONE FOR EACH TERMINAL IS DEFINED BY THE BASIC DIMENSION "e" RELATED TO DATUM A AND B.
8. "ccc" THE TOLERANCE RELATED TO THE SEATING PLANE IN WHICH THE TOP SURFACE OF THE PACKAGE MUST BE LOCATED.
9. "ddd" THE TOLERANCE THAT CONTROLS THE POSITION OF THE TERMINALS TO EACH OTHER. THE CENTER OF THE PROFILE ZONES ARE DETERMINED BY THE BASIC DIMENSION "e".
10. THIS DOCUMENT IS FOR AUTOMOTIVE PRODUCT USE ONLY.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

64 LEAD LQFP 7x7mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LQFP7x7-64LD-PL-817	**UNIT**	MM [INCHES]

TOP VIEW

Symbol	Dimension in mm			Dimension in inch		
	Min	Nom	Max	Min	Nom	Max
A	—	—	1.60	—	—	0.063
A_1	0.05	—	0.15	0.002	—	0.006
A_2	1.35	1.40	1.45	0.053	0.055	0.057
b	0.13	0.18	0.23	0.005	0.007	0.009
b_1	0.13	0.16	0.19	0.005	0.006	0.007
c	0.09	—	0.20	0.004	—	0.008
c_1	0.09	—	0.16	0.004	—	0.006
D	9.00 BSC			0.354 BSC		
D_1	7.00 BSC			0.276 BSC		
E	9.00 BSC			0.354 BSC		
E_1	7.00 BSC			0.276 BSC		
e	0.40 BSC			0.016 BSC		
L	0.45	0.60	0.75	0.018	0.024	0.030
L_1	1.00 REF			0.039 REF		
R_1	0.08	—	—	0.003	—	—
R_2	0.08	—	0.20	0.003	—	0.008
θ	0°	3.5°	7°	0°	3.5°	7°
θ_1	0°	—	—	0°	—	—
θ_2	11°	12°	13°	11°	12°	13°
θ_3	11°	12°	13°	11°	12°	13°
ccc	0.08			0.003		

SECTION A-A

SIDE VIEW

RECOMMENDED LAND PATTERN

NOTE:

1. DIMENSIONS ARE IN MM [INCHES].
2. CONTROLLING DIMENSION: MM.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OF 0.254[0.010] MAX.
4. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX
5. THIS DIMENSION INCLUDES LEAD FINISH.
6. RECOMMENDED LAND PATETRN TOLERANCE IS ±0.02mm UNLESS SPECIFIED.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE

64 LEAD LQFP 10x10mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LQFP10x10-64LD-PL-1	UNIT	MM

TOP VIEW

DETAIL "A"

ODD LEAD SIDES

EVEN LEAD SIDES

BOTTOM VIEW

SIDE VIEW 1

DETAIL "B"

N	JEDEC VARIATION ALL DIMENSIONS IN MILLIMETERS			NOTE
	64			
	MIN.	NOM.	MAX.	
A	—	—	1.60	
A1	0.05	—	0.15	13
A2	1.35	1.40	1.45	
D	12.00 BSC.			4
D1	10.00 BSC.			7,8
E	12.00 BSC.			4
E1	10.00 BSC.			7,8
L	0.45	0.60	0.75	
e	0.50 BSC.			
b	0.17	0.22	0.27	9
b1	0.17	0.20	0.23	
ccc	—	—	0.08	
ddd	—	—	0.08	

NOTES:

1. ALL DIMENSIONING AND TOLERANCING CONFORM TO ANSI Y14.5-1982.
2. DATUM PLANE [-H-] LOCATED AT MOLD PARTING LINE AND COINCIDENT WITH LEAD, WHERE LEAD EXITS PLASTIC BODY AT BOTTOM OF PARTING LINE.
3. DATUMS [A-B] AND [-D-] TO BE DETERMINED AT CENTERLINE BETWEEN LEADS WHERE LEADS EXIT PLASTIC BODY AT DATUM PLANE [-H-] .
4. TO BE DETERMINED AT SEATING PLANE [-C-] .
5. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE MOLD PROTRUSION IS 0.254 MM ON D1 AND E1 DIMENSIONS.
6. "N" IS THE TOTAL NUMBER OF TERMINALS.
7. THESE DIMENSIONS TO BE DETERMINED AT DATUM PLANE [-H-] .
8. THE TOP OF PACKAGE IS SMALLER THAN THE BOTTOM OF PACKAGE BY 0.15 MILLIMETERS.
9. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08mm TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT.
10. CONTROLLING DIMENSION: MILLIMETER.
11. MAXIMUM ALLOWABLE DIE THICKNESS TO BE ASSEMBLED IN THIS PACKAGE FAMILY IS 0.38 MILLIMETERS.
12. THIS OUTLINE CONFORMS TO JEDEC PUBLICATION 95 REGISTRATION MS-026, VARIATIONS BCB, BCC, BCD & BCE.
13. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.

RECOMMENDED LAND PATTERN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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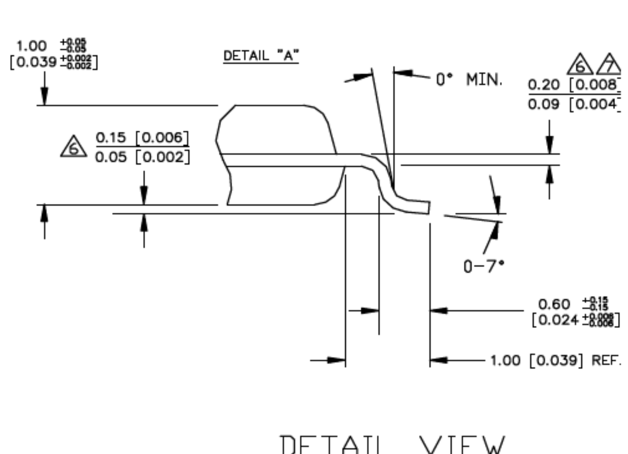
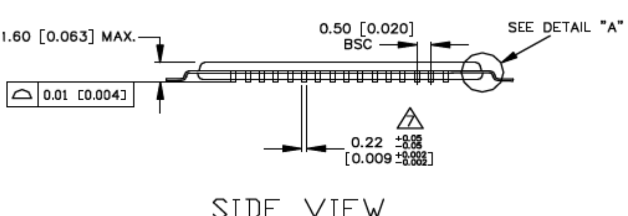
TITLE
64 LEAD LQFP 10X10 mm EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LQFPEP10X10-64LD-PL-1	UNIT	MM [INCH]

TOP/BOTTOM VIEW





RECOMMENDED LAND PATTERN

NOTES:

1. DIMENSIONS ARE IN MM[INCHES].
2. CONTROLLING DIMENSION: MM.
3. EXPOSED PAD: Cu WITH Sn PLATING.
4. DIMENSION DOES NOT INCLUDE MOLD FLASH OF 0.25[0.010] MAX.
5. DIE UP ORIENTATION SHOWN. EXPOSED PAD IS VISIBLE FROM BOTTOM OF PACKAGE.
6. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX / MIN
7. THIS DIMENSION INCLUDES LEAD FINISH.
8. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. SIZE IS 0.30MM AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE

> Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE

80 LEAD LQFP 10x10mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LQFP10x10-80LD-PL-1	**UNIT**	MM

TOP VIEW

Detail "X"

SECTION A-A

BOTTOM VIEW

SIDE VIEW 1

SIDE VIEW 2

RECOMMENDED LAND PATTERN

	SYMBOL	DIMENSION (MM)			DIMENSION (MIL)		
		MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
	A			1.60			63
	A1	0.05		0.15	2		6
	A2	1.35	1.40	1.45	53	55	57
	b	0.13	0.18	0.23	5	7	9
	b1	0.13	0.16	0.19	5	6	7
	c	0.09		0.20	4		8
	c1	0.09		0.16	4		6
2	D	11.90	12.00	12.10	368	472	476
2	D1	9.90	10.00	10.10	390	394	398
2	E	11.90	12.00	12.10	368	472	476
2	E1	9.90	10.00	10.10	390	394	398
	e	0.40 BSC			16 BSC		
	L	0.45	0.60	0.75	18	24	30
	L1	1.00 REF			39 REF		
	R1	0.08			3		
	R2	0.08		0„20	3		8
2	Y			0.08			3
	θ	0°	3.5°	7°	0°	3.5°	7°
	θ1	0°			0°		
	θ2	11°	12°	13°	11°	12°	13°
	θ3	11°	12°	13°	11°	12°	13°

NOTES:

1. REFER TO JEDEC MS-026 (ISSUE D) / BCE
2. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.25mm PER SIDE D1 AND E1 ARE MAXIMUM PLASTIC BODY SIZE DIMENSION INCLUDING MOLD MISMATCH.
3. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED THE MAXIMUM b DIMENSION BY MORE THAN 0.08mm.
4. ALL DIMENSIONS IN MILLIMETERS.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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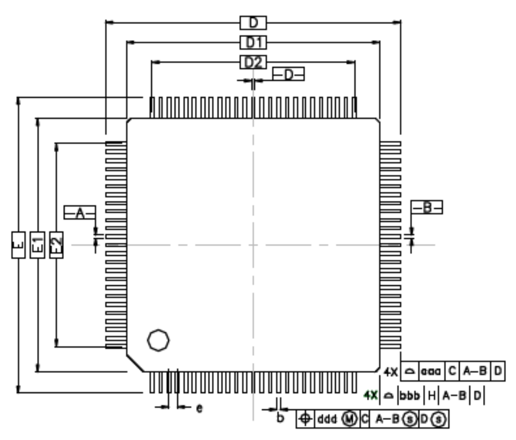
Package Outlines and Dimensions

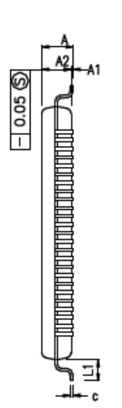
TITLE

100 LEAD LQFP 12x12mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

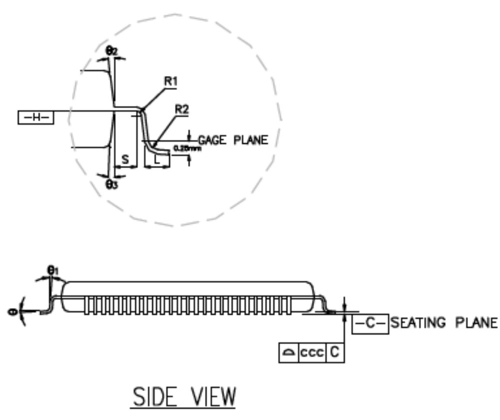
DRAWING #	LQFP12x12-100LD-PL-86	UNIT	MM [INCHES]



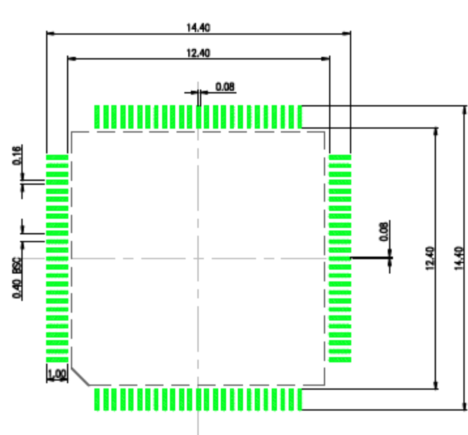
TOP VIEW



SYMBOL	MILLIMETER			INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	—	—	1.60	—	—	0.063
A_1	0.05	—	0.15	0.002	—	0.006
A_2	1.35	1.40	1.45	0.053	0.055	0.057
D	14.00 BSC.			0.551 BSC.		
D_1	12.00 BSC.			0.472 BSC.		
E	14.00 BSC.			0.551 BSC.		
E_1	12.00 BSC.			0.472 BSC.		
R_2	0.08	—	0.20	0.003	—	0.008
R_1	0.08	—	—	0.003	—	—
θ	0°	3.5°	7°	0°	3.5°	7°
θ_1	0°	—	—	0°	—	—
θ_2	11°	12°	13°	11°	12°	13°
θ_3	11°	12°	13°	11°	12°	13°
c	0.09	—	0.20	0.004	—	0.008
L	0.45	0.60	0.75	0.018	0.024	0.030
L_1	1.00 REF			0.039 REF		
S	0.20	—	—	0.008	—	—
b	0.13	0.16	0.23	0.005	0.006	0.009
e	0.40 BSC			0.016 BSC		
TOLERANCES OF FORM AND POSITION						
aaa	0.20			0.008		
bbb	0.20			0.008		
ccc	0.08			0.003		
ddd	0.08			0.003		



SIDE VIEW



RECOMMENDED LAND PATTERN

NOTE:

1. DIMENSIONS ARE IN MM [INCHES].
2. CONTROLLING DIMENSION: MM.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OF 0.254[0.010] MAX.
4. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX
5. THIS DIMENSION INCLUDES LEAD FINISH.
6. RECOMMENDED LAND PATETRN TOLERANCE IS ±0.02mm UNLESS SPECIFIED.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE

128 LEAD LQFP 14x14mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LQFP14x14-128LD-PL-1	**UNIT**	MM [INCHES]

SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM	MAX.	MIN.	NOM	MAX.
A			1.60			0.063
A1	0.05		0.15	0.002		0.006
A2	1.35	1.40	1.45	0.053	0.055	0.057
D	15.90	16.00	16.10	0.626	0.630	0.634
D1	13.90	14.00	14.10	0.547	0.551	0.555
E	15.90	16.00	16.10	0.626	0.630	0.634
E1	13.90	14.00	14.10	0.547	0.551	0.555
⚠ c	0.178			0.007		
c1	0.127 BSC.			0.005 BSC.		
L	0.45	0.60	0.75	0.018	0.024	0.030
L1	1.00 REF.			0.039 REF.		
θ	0	3.5	7	0	3.5	7
⚠ b	0.15	0.18	0.21	0.006	0.007	0.008
⚠ b1	0.13	0.16	0.19	0.005	0.006	0.007
e	0.40 BSC.			0.016 BSC.		

TOP VIEW

DETAIL "A" DETAIL "B"

DETAIL VIEW

SIDE VIEW

RECOMMENDED LAND PATTERN

NOTES:

1. DIMENSIONS ARE IN MM [INCHES].
2. CONTROLLING DIMENSION: MM.
3. ⚠ DIMENSION DOES NOT INCLUDE MOLD FLASH OF 0.254[0.010] MAX.
4. ⚠ MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX
5. ⚠ THIS DIMENSION INCLUDES LEAD FINISH.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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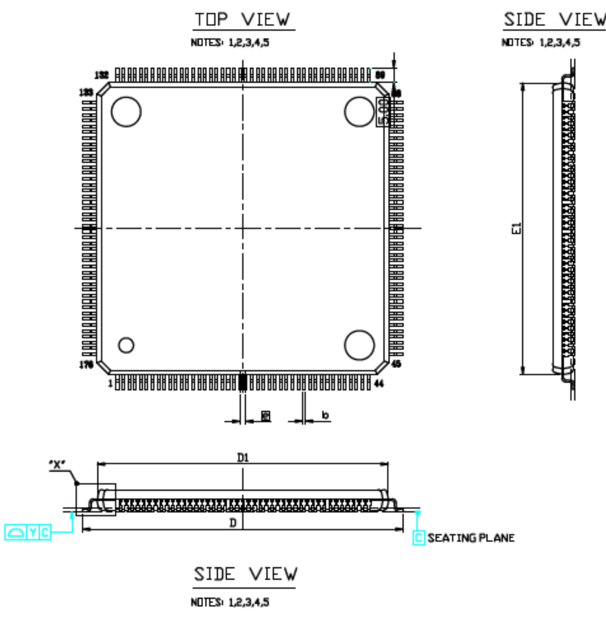
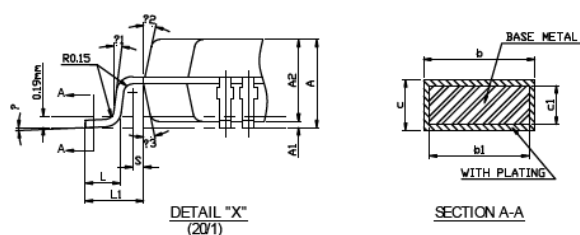
Package Outlines and Dimensions

TITLE
176 LEAD LQFP 20x20mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	LQFP20x20-176LD-PL-1	**UNIT**	MM/ INCH

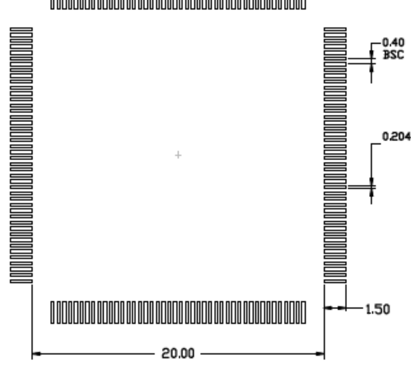


SYMBOL	DIMENSION (MM)			DIMENSION (MIL)		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	——	——	1.60	——	——	62.99
A1	0.05	——	0.15	1.97	——	5.91
A2	1.35	1.40	1.45	53.15	55.12	57.09
b	0.13	0.18	0.23	5.12	7.09	9.06
b1	0.13	0.16	0.19	5.12	6.30	7.48
c	0.09	——	0.20	3.54	——	7.87
c1	0.09	——	0.16	3.54	——	6.30
D	21.90	22.00	22.10	862.20	866.14	870.08
D1	19.90	20.00	20.10	783.46	787.40	791.34
E	21.90	22.00	22.10	862.20	866.14	870.08
E1	19.90	20.00	20.10	783.46	787.40	791.34
e	0.40 BSC			15.75 BSC		
L	0.45	0.60	0.75	17.72	23.62	29.53
L1	1.00 REF			39.37 REF		
R1	0.08	——	——	3.15	——	——
R2	0.08	——	0.20	3.15	——	7.87
Y	——	——	0.075	——	——	2.95
θ	0°	3.5°	7°	0°	3.5°	7°
θ1	0°	——	——	0°	——	——
θ2	11°	12°	13°	11°	12°	13°
θ3	11°	12°	13°	11°	12°	13°
S	0.20	——	——	7.87	——	——



DETAIL "X"
(20/1)

SECTION A-A



RECOMMENDED LAND PATTERN

NOTES:
1. REFER TO JEDEC MS-026/BFC REV. D
2. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.25mm PER SIDE. D1 AND E1 ARE MAXIMUM PLASTIC BODY SIZE DIMENSION INCLUDING MOLD MISMATCH.
3. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED THE MAXIMUM b DIMENSION BY MORE THAN 0.08mm.
4. ALL DIMENSIONS IN MILLIMETERS.
5. MODIFYIED MIL DIMENSION ,ADD TWO DECIMALS FOR CUSTOMER MANUFACTURE USE
6. LAND PATTERN UNIT OF MEASUREMENT IN MM.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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NOTES:

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MSOP

Micrel Legacy

TITLE
8 LEAD MSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	MSOP-8LD-PL-1	**UNIT**	INCH [MM]

TOP VIEW

BOTTOM VIEW

DETAIL A

SIDE VIEW

RECOMMENDED LAND PATTERN

NOTES:
1. DIMENSIONS ARE IN INCHES [MM].
2. CONTROLLING DIMENSION: MM
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.008 [0.20] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

8 LEAD MSOP EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	MSOPEP-8LD-PL-1	**UNIT**	MM [INCH]

TOP VIEW

END VIEW

BOTTOM VIEW

Exposed Paddle

DETAIL A

RECOMMENDED LAND PATTERN

NOTE:
1. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.20 [0.008] PER SIDE
2. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM IN DIAMETER, 1.00 PITCH AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

10 LEAD MSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	MSOP-10LD-PL-1	UNIT	INCH [MM]

TOP VIEW

BOTTOM VIEW

DETAIL A

SIDE VIEW

RECOMMENDED LAND PATTERN

NOTES:

1. DIMENSIONS ARE INCHES [MM].
2. CONTROLLING DIMENSION: MM
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.008 [0.20] PER SIDE.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
10 LEAD MSOP EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	MSOPEP-10LD-PL-1	UNIT	MM [INCH]

TOP VIEW

END VIEW

BOTTOM VIEW

DETAIL A

RECOMMENDED LAND PATTERN

NOTE:
1. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.20 [0.008] PER SIDE
2. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM IN DIAMETER, 1.00 PITCH AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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P2QFN

Micrel Legacy

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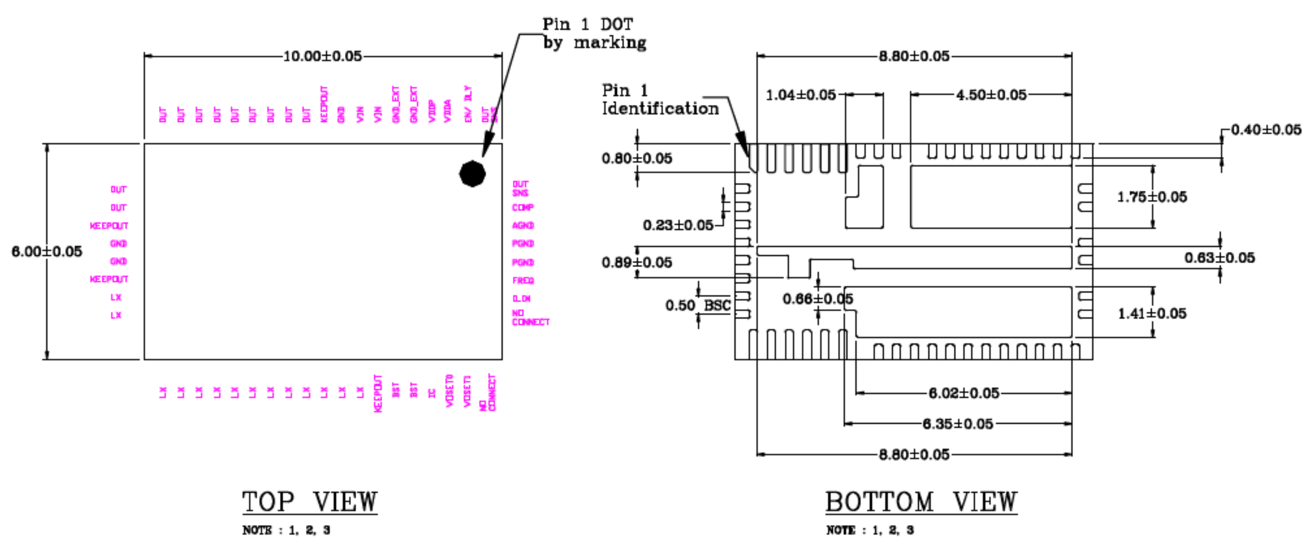
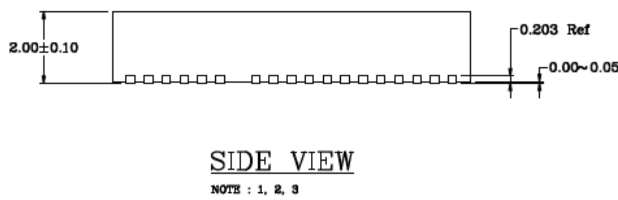
TITLE

54 LEAD P2QFN 10x6mm PACKAGE (PIP Module) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	P2QFN106-54LD-PL-1	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin





SIDE VIEW

NOTE : 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLES IN LAND PATTERN REPRESENTS THERMAL VIA. RECOMMENDED SIZE IS 0.30-0.35mm, AT 0.80mm PITCH & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA.
6. CYAN COLORED (SHADED) PAD REPRESENT EXPOSED TRACE KEEP OUT AREA.
7. RECOMMENDED LAND PATTERN TOLERANCE IS 0.020mm UNLESS SPECIFIED.
8. SEE RECOMMENDED LAND PATTERN ON PAGE 2.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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PBGA

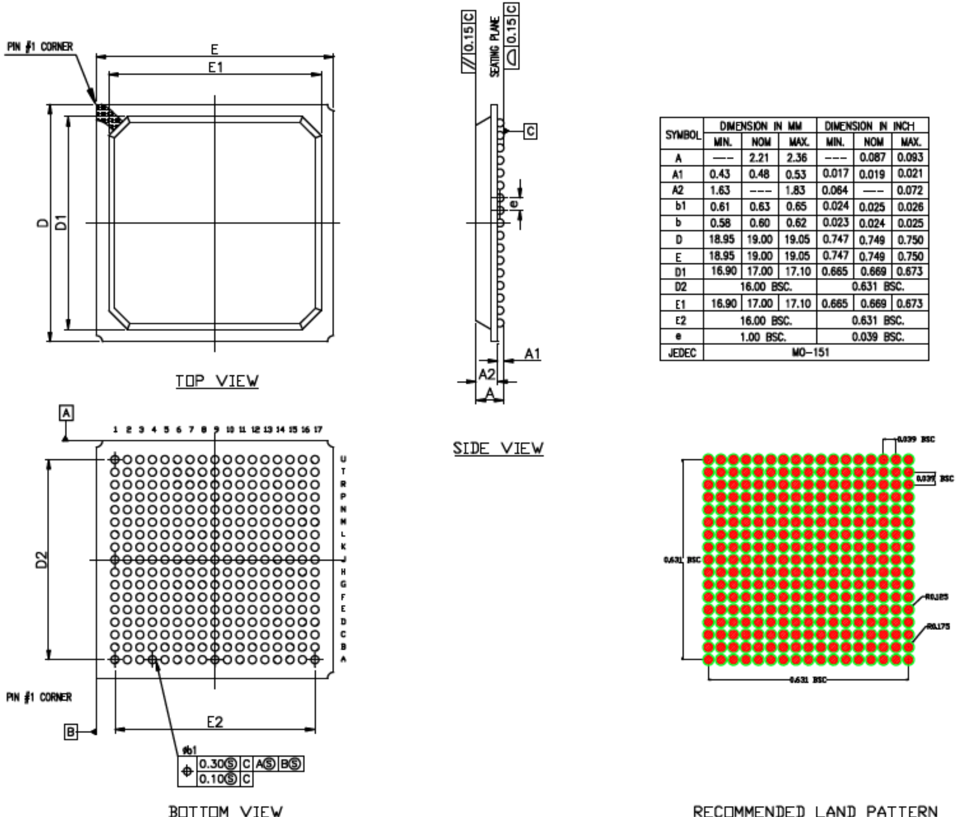
Micrel Legacy

Package Outlines and Dimensions

TITLE

289 LEAD PBGA 19x19mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PBGA19x19-289LD-PL-1	**UNIT**	INCH/ MM



SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM	MAX.	MIN.	NOM	MAX.
A	---	2.21	2.36	---	0.087	0.093
A1	0.43	0.48	0.53	0.017	0.019	0.021
A2	1.63	---	1.83	0.064	---	0.072
b1	0.61	0.63	0.65	0.024	0.025	0.026
b	0.58	0.60	0.62	0.023	0.024	0.025
D	18.95	19.00	19.05	0.747	0.749	0.750
E	18.95	19.00	19.05	0.747	0.749	0.750
D1	16.90	17.00	17.10	0.665	0.669	0.673
D2	16.00 BSC.			0.631 BSC.		
E1	16.90	17.00	17.10	0.665	0.669	0.673
E2	16.00 BSC.			0.631 BSC.		
e	1.00 BSC.			0.039 BSC.		
JEDEC	MO-151					

NOTES: UNLESS OTHERWISE SPECIFIED

1. SPEC "B" IS SOLDER BALL DIAMETER BEFORE REFLOW. B1 IS SOLDER BALL DIAMETER AFTER REFLOW.
2. LAND PATTERN UNIT IN INCH. TOLERANCE +/- 0.002
3. SHADED RED CIRCLE REPRESENTS CONTACT PAD AREA. GREEN CIRCLES REPRESENTS SOLDER MASK OPENNING.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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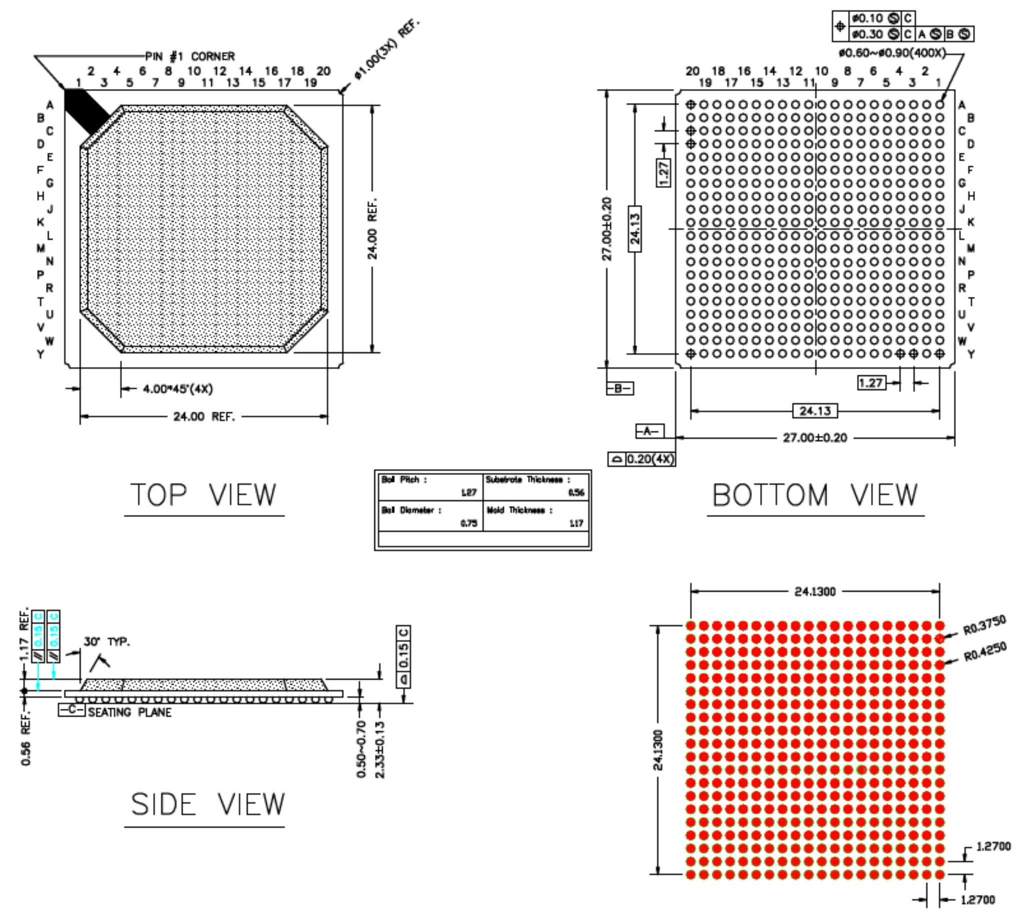
Package Outlines and Dimensions

TITLE
400 LEAD PBGA 27x27mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PBGA27x27-400LD-PL-1	**UNIT**	MM



RECOMMENDED LAND PATTERN

NOTE:
1. LAND PATTERN UNIT IN MM. TOLERANCE +/− 0.05.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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PDIP

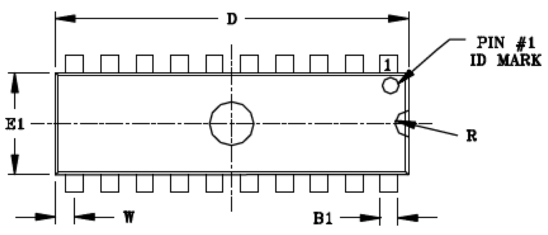
Micrel Legacy

Package Outlines and Dimensions

TITLE

8, 14, 16, 18, 20LD LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

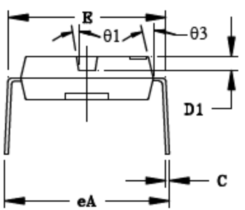
DRAWING #	PDIP-300mil-PL-1	UNIT	INCH
Lead Frame	Copper	Lead Finish	Matte Tin



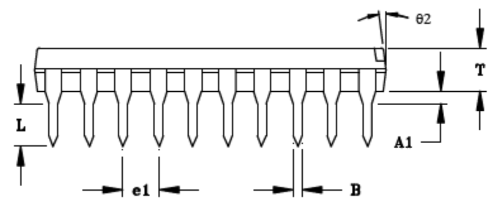
TOP VIEW

REMARKS:
FOR 8L/16L(S)
ALL END LEADS (4X)
ARE HALF LEAD TYPES

V1=0.039 (4X)



END VIEW



SIDE VIEW

LEAD TYPE		8LD	14/16LD	18LD	20LD
STAND-OFF	A1	0.015 MIN	0.015 MIN	0.015 MIN	0.015 MIN
LEAD WIDTH *	B	0.018	0.018	0.018	0.018
SPADE WIDTH *	B1	0.060	0.060	0.060	0.060
LEAD THICKNESS *	C	0.010	0.010	0.010	0.010
LENGTH TOL ±0.004	D	0.375	0.750	0.890	1.020
IDENT DEPTH	D1	0.030 ~ 0.060	0.030 ~ 0.060	0.030 ~ 0.060	0.030 ~ 0.060
SHOULDER WIDTH OUTER TO OUTER	E	0.300 ~ 0.325	0.300 ~ 0.325	0.300 ~ 0.325	0.300 ~ 0.325
WIDTH TOL ±0.004	E1	0.250	0.250	0.250	0.250
LEAD SPREAD OUTER TO OUTER	eA	0.320 ~ 0.370	0.320 ~ 0.370	0.320 ~ 0.370	0.320 ~ 0.370
LEAD PITCH *	e1	0.100	0.100	0.100	0.100
LEAD LENGTH TOL ±0.004	L	0.125	0.125	0.125	0.125
IDENT RADIUS	R	0.030	0.030	0.030	0.030
TOTAL THICKNESS TOL ±0.004	T	0.130	0.130	0.130	0.130
LEAD TO END PACKAGE	W	0.025 REF	0.075REF14LD 0.025REF16LD	0.045REF	0.060REF
IDENT DRAFT TOL ±3°	θ1	7°	7°	7°	7°
END ANGLE (4x) TOL ±3°	θ2	7°	7°	7°	7°
SIDE ANGLE (4x) TOL ±3°	θ3	7°	7°	7°	7°

NOTE:

1. SPADE WIDTH, LEAD WIDTH AND LEAD THICKNESS EXCLUSIVE OF TIN PLATING OR SOLDER PLATING/ DIPPING THICKNESS.
2. PACKAGE OUTLINE EXCLUSIVE OF ANY MOLD FLASHES.
3. PACKAGE OUTLINE EXCLUSIVE OF BURR DIMENSION.
4. * - REFERENCE DIMENSION.
5. PACKAGE AND FINISHING : TOP, BOTTOM & ALL SIDE: MATTE VDI #24~27.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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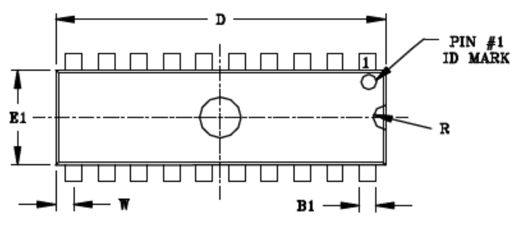
Package Outlines and Dimensions

TITLE
8, 14, 16, 18, 20, 24LD LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PDIP-300mil-PL-1	**UNIT**	INCH
Lead Frame	Copper	**Lead Finish**	Matte Tin



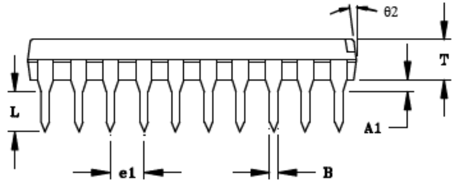
TOP VIEW

REMARKS:
FOR 8L/16L(S)
ALL END LEADS (4X)
ARE HALF LEAD TYPES

V1=0.039 (4X)

E
θ1
θ3
D1
C
eA

END VIEW



SIDE VIEW

LEAD TYPE		8LD	14/16LD	18LD	20LD	24LD
STAND-OFF	A1	0.015 MIN	0.015 MIN	0.015 MIN	0.015 MIN	0.015 MIN
LEAD WIDTH *	B	0.018	0.018	0.018	0.018	0.018
SPADE WIDTH *	B1	0.060	0.060	0.060	0.060	0.060
LEAD THICKNESS *	C	0.010	0.010	0.010	0.010	0.012
LENGTH TOL ±0.004	D	0.375	0.750	0.890	1.020	1.250
IDENT DEPTH	D1	0.030 ~ 0.060	0.030 ~ 0.060	0.030 ~ 0.060	0.030 ~ 0.060	0.030 ~ 0.060
SHOULDER WIDTH OUTER TO OUTER	E	0.300 ~ 0.325	0.300 ~ 0.325	0.300 ~ 0.325	0.300 ~ 0.325	0.300 ~ 0.325
WIDTH TOL ±0.004	E1	0.250	0.250	0.250	0.250	0.250
LEAD SPREAD OUTER TO OUTER	eA	0.320 ~ 0.370	0.320 ~ 0.370	0.320 ~ 0.370	0.320 ~ 0.370	0.320 ~ 0.370
LEAD PITCH *	e1	0.100	0.100	0.100	0.100	0.100
LEAD LENGTH TOL ±0.004	L	0.125	0.125	0.125	0.125	0.125
IDENT RADIUS	R	0.030	0.030	0.030	0.030	0.030
TOTAL THICKNESS TOL ±0.004	T	0.130	0.130	0.130	0.130	0.130
LEAD TO END PACKAGE	W	0.025 REF	0.075REF14LD 0.025REF16LD	0.045REF	0.060REF	0.075REF
IDENT DRAFT TOL ±3°	θ1	7°	7°	7°	7°	7°
END ANGLE (4x) TOL ±3°	θ2	7°	7°	7°	7°	7°
SIDE ANGLE (4x) TOL ±3°	θ3	7°	7°	7°	7°	7°

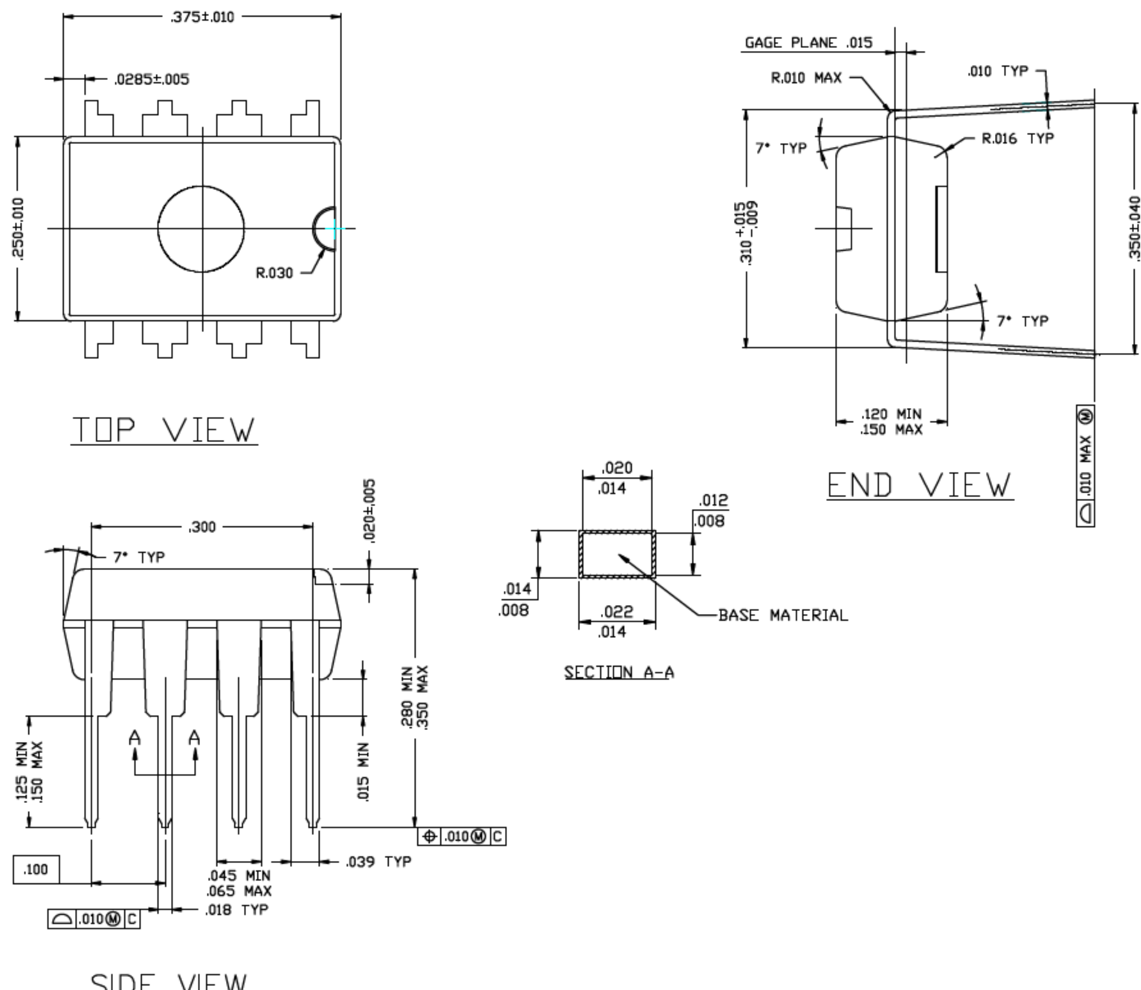
NOTE:
1. SPADE WIDTH, LEAD WIDTH AND LEAD THICKNESS EXCLUSIVE OF TIN PLATING OR SOLDER PLATING/ DIPPING THICKNESS.
2. PACKAGE OUTLINE EXCLUSIVE OF ANY MOLD FLASHES.
3. PACKAGE OUTLINE EXCLUSIVE OF BURR DIMENSION.
4. * – REFERENCE DIMENSION.
5. PACKAGE AND FINISHING : TOP, BOTTOM & ALL SIDE: MATTE VDI #24~27.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE
8 LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PDIP-8LD-PL-1	**UNIT**	INCH
Lead Frame	Copper	**Lead Finish**	Matte Tin



Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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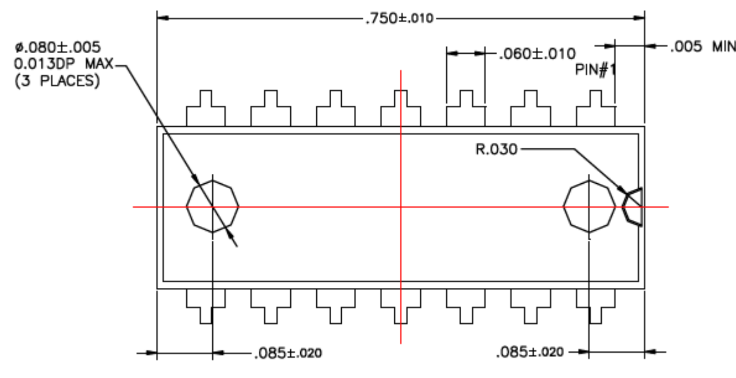
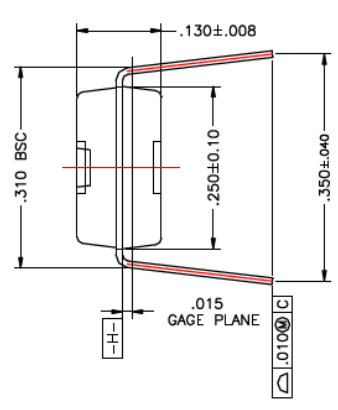
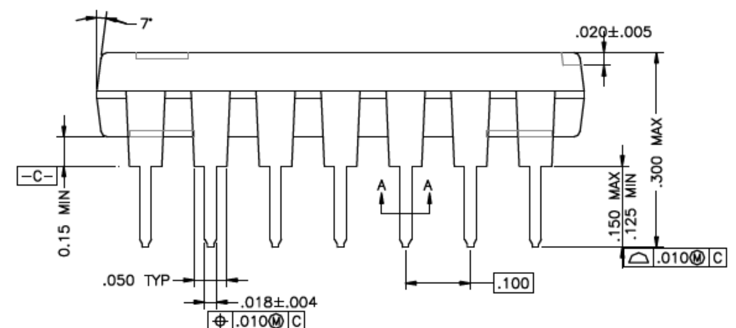
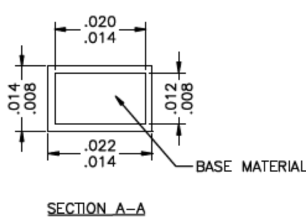
TITLE
14 LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PDIP-14LD-PL-1	UNIT	INCH
LEAD FRAME	Copper	LEAD FINISH	Matte Tin









Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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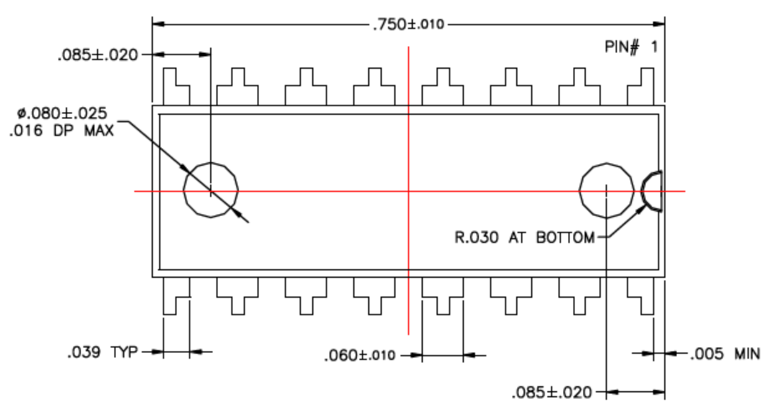
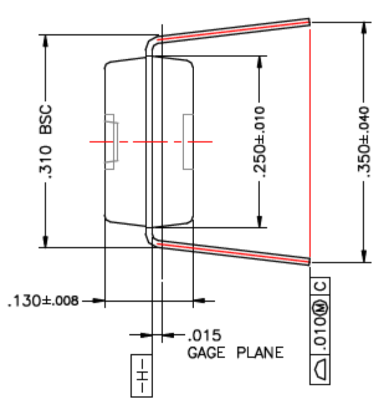
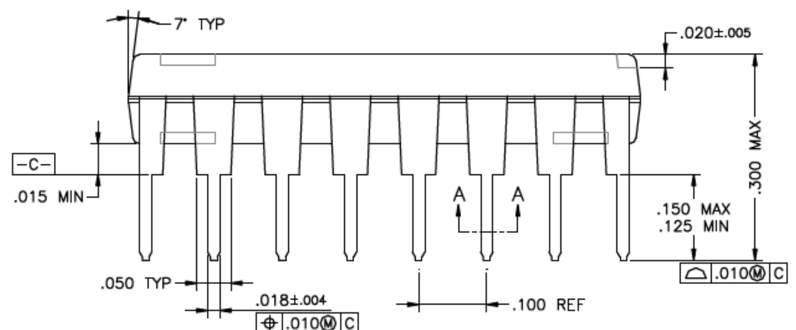
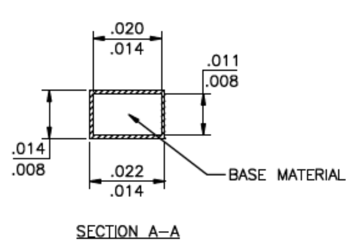
TITLE
16 LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PDIP-16LD-PL-1	**UNIT**	INCH
LEAD FRAME	Copper	**LEAD FINISH**	Matte Tin









Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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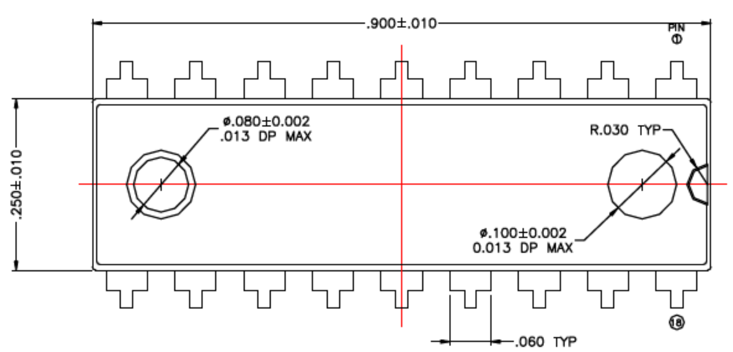
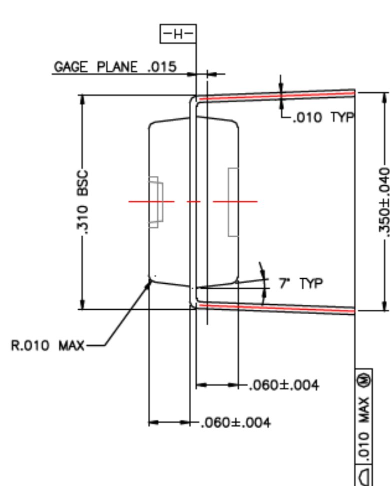
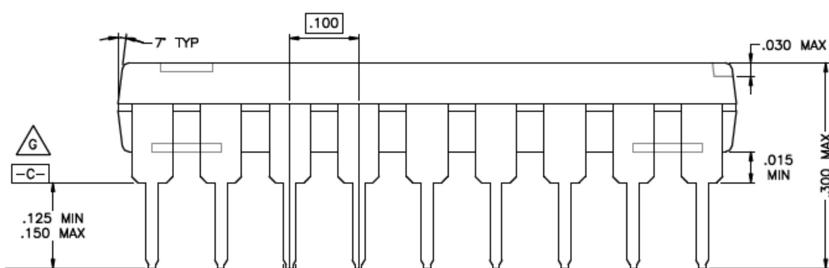
TITLE
18 LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PDIP-18LD-PL-1	**UNIT**	INCH
LEAD FRAME	Copper	**LEAD FINISH**	Matte Tin





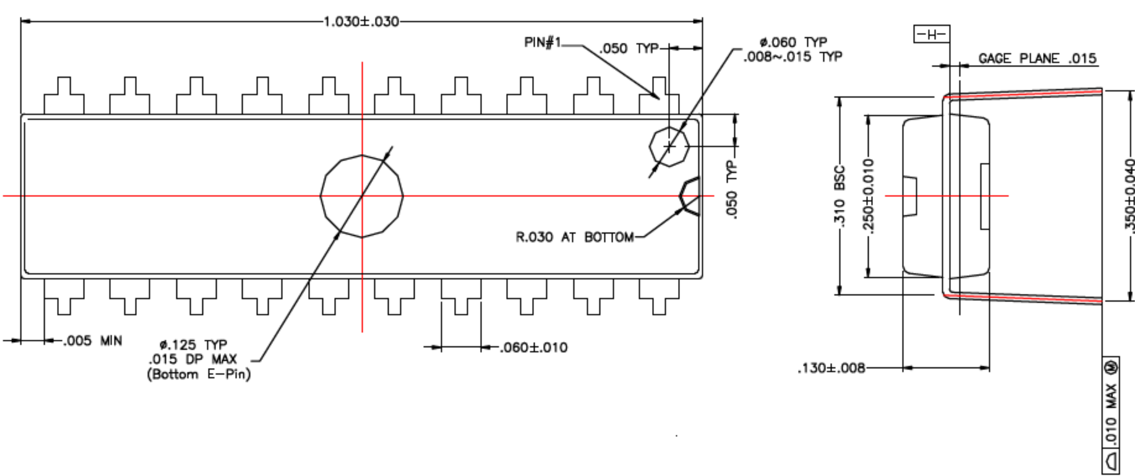


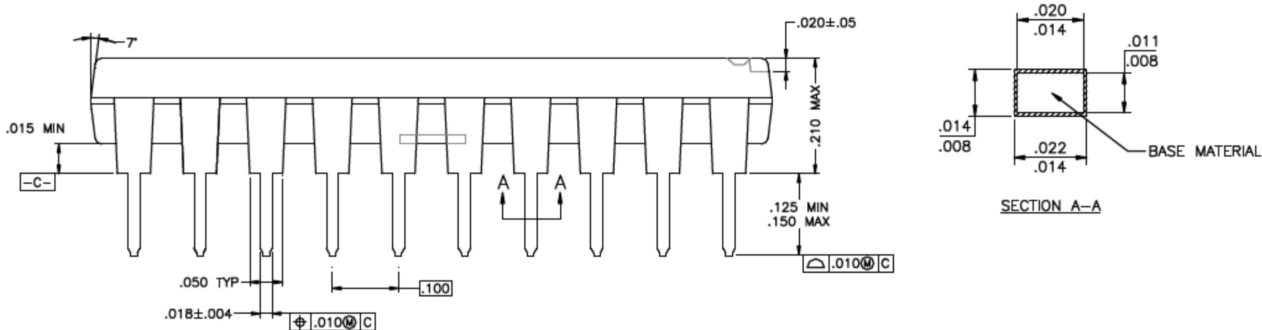
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE
20 LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PDIP-20LD-PL-1	UNIT	INCH
LEAD FRAME	Copper	LEAD FINISH	Matte Tin





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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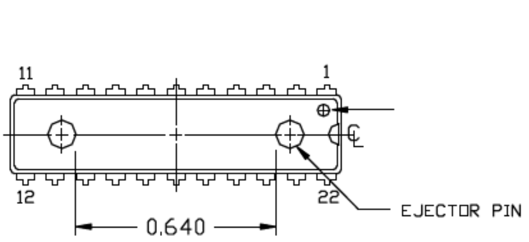
Package Outlines and Dimensions

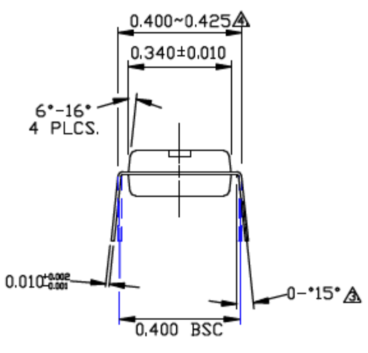
TITLE

22 LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

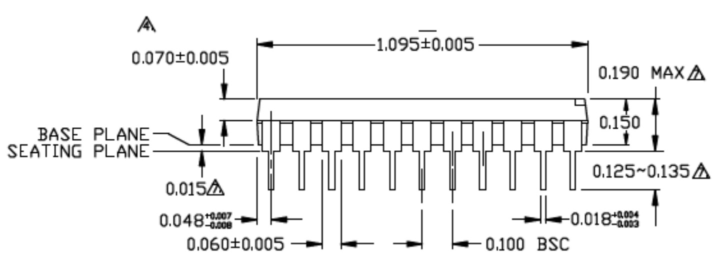
DRAWING #	PDIP-22LD-PL-1	UNIT	INCH
Lead Frame	Copper	Lead Finish	Matte Tin



TOP VIEW



END VIEW



SIDE VIEW

NOTES:

- REFER TO APPLICABLE SYMBOL LIST.
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5-1982.
- APPLIES TO SPREAD LEADS PRIOR TO INSTALLATION.
- DIMENSIONS ARE TO BE MEASURED AT MAXIMUM MATERIAL CONDITION BUT DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS .010 INCH/0.254 MM.
- CONTROLLING DIMENSION: INCH.
- DIMENSIONS A, A1 & L ARE MEASURED WITH THE PACKAGE SEATED IN JEDEC SEATING PLANE GAUGE GS-3.
- THIS PACKAGE CONFORMS TO JEDEC REFERENCE MS-010, VARIATION AA.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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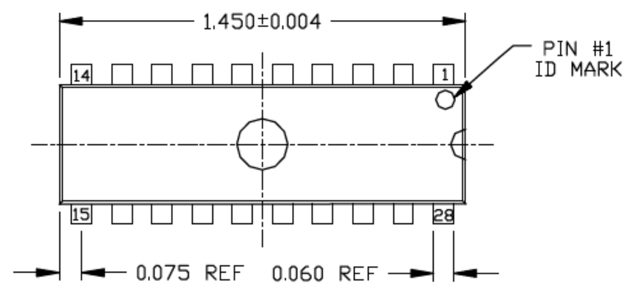
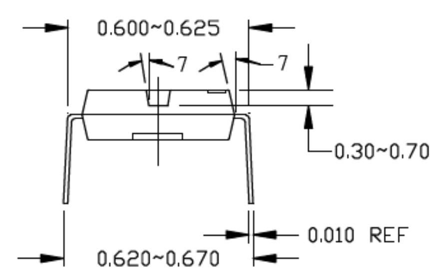
TITLE
28 LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

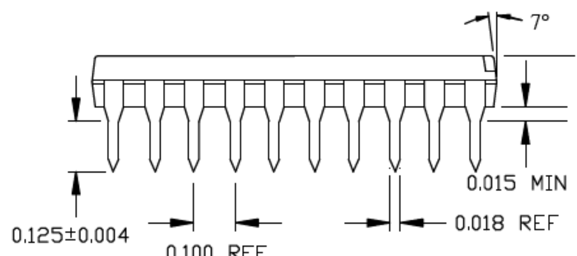
DRAWING #	PDIP-28LD-PL-1	UNIT	INCH
Lead Frame	Copper	Lead Finish	Matte Tin



TOP VIEW



END VIEW



SIDE VIEW

1. SPADE WIDTH, LEAD WIDTH AND LEAD THICKNESS EXCLUSIVE OF TIN PLATING OR SOLDER PLATING/ DIPPING THICKNESS.
2. PACKAGE OUTLINE EXCLUSIVE OF ANY MOLD FLASHES.
3. PACKAGE OUTLINE EXCLUSIVE OF BURR DIMENSION.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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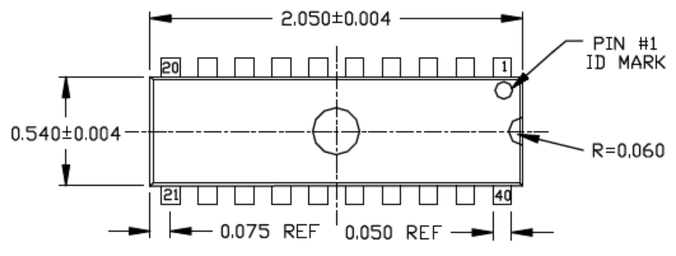
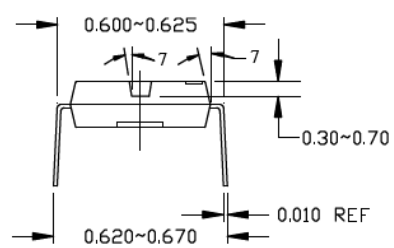
TITLE
40 LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

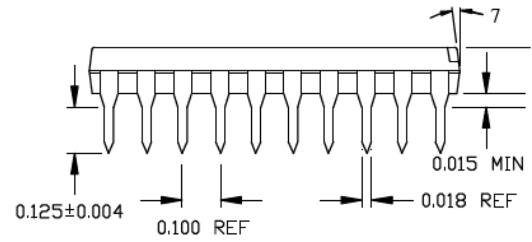
DRAWING #	PDIP-40LD-PL-1	**UNIT**	INCH
Lead Frame	Copper	**Lead Finish**	Matte Tin



TOP VIEW



END VIEW



SIDE VIEW

1. SPADE WIDTH, LEAD WIDTH AND LEAD THICKNESS EXCLUSIVE OF TIN PLATING OR SOLDER PLATING/ DIPPING THICKNESS.
2. PACKAGE OUTLINE EXCLUSIVE OF ANY MOLD FLASHES.
3. PACKAGE OUTLINE EXCLUSIVE OF BURR DIMENSION.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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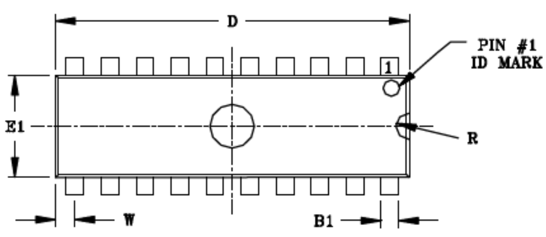
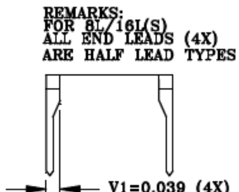
Package Outlines and Dimensions

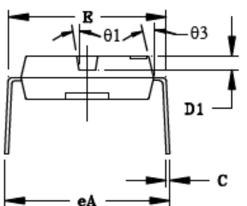
TITLE
8, 14, 16, 18, 20LD LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PDIP-300mil-PL-1	UNIT	INCH
Lead Frame	Copper	Lead Finish	Matte Tin

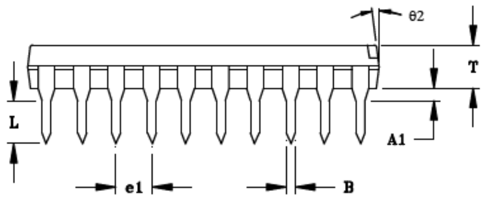


TOP VIEW





END VIEW



SIDE VIEW

NOTE:
1. SPADE WIDTH, LEAD WIDTH AND LEAD THICKNESS EXCLUSIVE OF TIN PLATING OR SOLDER PLATING/ DIPPING THICKNESS.
2. PACKAGE OUTLINE EXCLUSIVE OF ANY MOLD FLASHES.
3. PACKAGE OUTLINE EXCLUSIVE OF BURR DIMENSION.
4. * - REFERENCE DIMENSION.
5. PACKAGE AND FINISHING : TOP, BOTTOM & ALL SIDE: MATTE VDI #24~27.

LEAD TYPE		8LD	14/16LD	18LD	20LD
STAND-OFF	A1	0.015 MIN	0.015 MIN	0.015 MIN	0.015 MIN
LEAD WIDTH *	B	0.018	0.018	0.018	0.018
SPADE WIDTH *	B1	0.060	0.060	0.060	0.060
LEAD THICKNESS *	C	0.010	0.010	0.010	0.010
LENGTH TOL ±0.004	D	0.375	0.750	0.890	1.020
IDENT DEPTH	D1	0.030 ~ 0.060	0.030 ~ 0.060	0.030 ~ 0.060	0.030 ~ 0.060
SHOULDER WIDTH OUTER TO OUTER	E	0.300 ~ 0.325	0.300 ~ 0.325	0.300 ~ 0.325	0.300 ~ 0.325
WIDTH TOL ±0.004	E1	0.250	0.250	0.250	0.250
LEAD SPREAD OUTER TO OUTER	eA	0.320 ~ 0.370	0.320 ~ 0.370	0.320 ~ 0.370	0.320 ~ 0.370
LEAD PITCH *	e1	0.100	0.100	0.100	0.100
LEAD LENGTH TOL ±0.004	L	0.125	0.125	0.125	0.125
IDENT RADIUS	R	0.030	0.030	0.030	0.030
TOTAL THICKNESS TOL ±0.004	T	0.130	0.130	0.130	0.130
LEAD TO END PACKAGE	W	0.025 REF	0.075REF14LD 0.025REF16LD	0.045REF	0.060REF
IDENT DRAFT TOL ±3°	θ1	7°	7°	7°	7°
END ANGLE (4x) TOL ±3°	θ2	7°	7°	7°	7°
SIDE ANGLE (4x) TOL ±3°	θ3	7°	7°	7°	7°

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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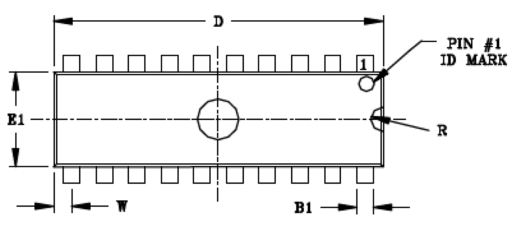
Package Outlines and Dimensions

TITLE

8, 14, 16, 18, 20, 24LD LEAD PDIP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

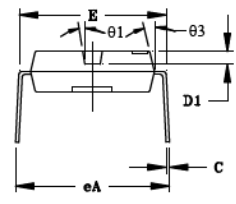
DRAWING #	PDIP-300mil-PL-1	**UNIT**	INCH
Lead Frame	Copper	**Lead Finish**	Matte Tin



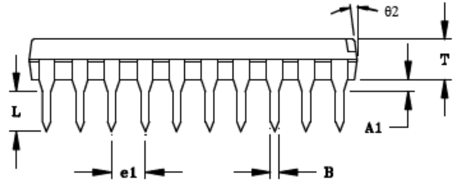
TOP VIEW

REMARKS:
FOR 8L/16L(S)
ALL END LEADS (4X)
ARE HALF LEAD TYPES

V1=0.039 (4X)



END VIEW



SIDE VIEW

NOTE:

1. SPADE WIDTH, LEAD WIDTH AND LEAD THICKNESS EXCLUSIVE OF TIN PLATING OR SOLDER PLATING/ DIPPING THICKNESS.
2. PACKAGE OUTLINE EXCLUSIVE OF ANY MOLD FLASHES.
3. PACKAGE OUTLINE EXCLUSIVE OF BURR DIMENSION.
4. * – REFERENCE DIMENSION.
5. PACKAGE AND FINISHING : TOP, BOTTOM & ALL SIDE: MATTE VDI #24~27.

LEAD TYPE		8LD	14/16LD	18LD	20LD	24LD
STAND-OFF	A1	0.015 MIN	0.015 MIN	0.015 MIN	0.015 MIN	0.015 MIN
LEAD WIDTH *	B	0.018	0.018	0.018	0.018	0.018
SPADE WIDTH *	B1	0.060	0.060	0.060	0.060	0.060
LEAD THICKNESS *	C	0.010	0.010	0.010	0.010	0.012
LENGTH TOL ±0.004	D	0.375	0.750	0.890	1.020	1.250
IDENT DEPTH	D1	0.030 ~ 0.060	0.030 ~ 0.060	0.030 ~ 0.060	0.030 ~ 0.060	0.030 ~ 0.060
SHOULDER WIDTH OUTER TO OUTER	E	0.300 ~ 0.325	0.300 ~ 0.325	0.300 ~ 0.325	0.300 ~ 0.325	0.300 ~ 0.325
WIDTH TOL ±0.004	E1	0.250	0.250	0.250	0.250	0.250
LEAD SPREAD OUTER TO OUTER	eA	0.320 ~ 0.370	0.320 ~ 0.370	0.320 ~ 0.370	0.320 ~ 0.370	0.320 ~ 0.370
LEAD PITCH *	e1	0.100	0.100	0.100	0.100	0.100
LEAD LENGTH TOL ±0.004	L	0.125	0.125	0.125	0.125	0.125
IDENT RADIUS	R	0.030	0.030	0.030	0.030	0.030
TOTAL THICKNESS TOL ±0.004	T	0.130	0.130	0.130	0.130	0.130
LEAD TO END PACKAGE	W	0.025 REF	0.075REF14LD 0.025REF16LD	0.045REF	0.060REF	0.075REF
IDENT DRAFT TOL ±3°	θ1	7°	7°	7°	7°	7°
END ANGLE (4x) TOL ±3°	θ2	7°	7°	7°	7°	7°
SIDE ANGLE (4x) TOL ±3°	θ3	7°	7°	7°	7°	7°

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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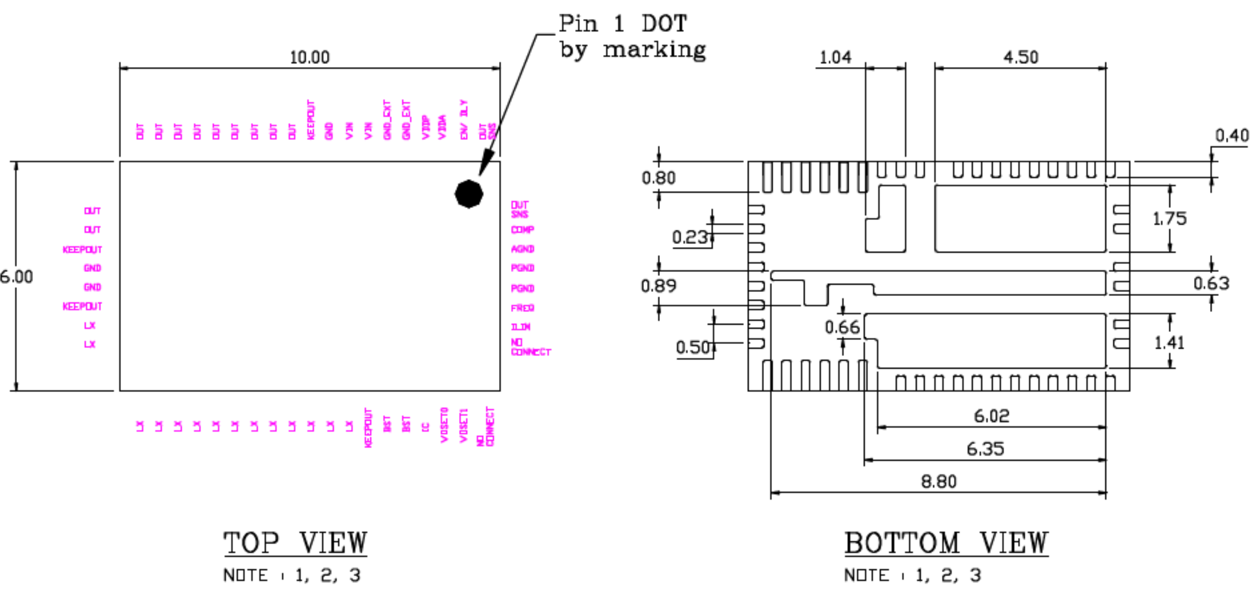
PKQFN

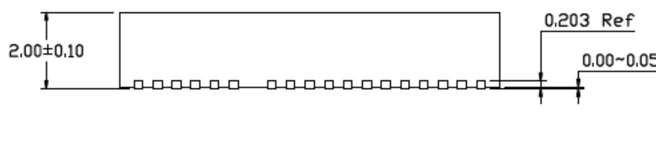
Micrel Legacy

Package Outlines and Dimensions

TITLE
54 LEAD PKQFN 10x6mm PACKAGE (Module) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PKQFN106-54LD-PL-1	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin





SIDE VIEW
NOTE : 1, 2, 3

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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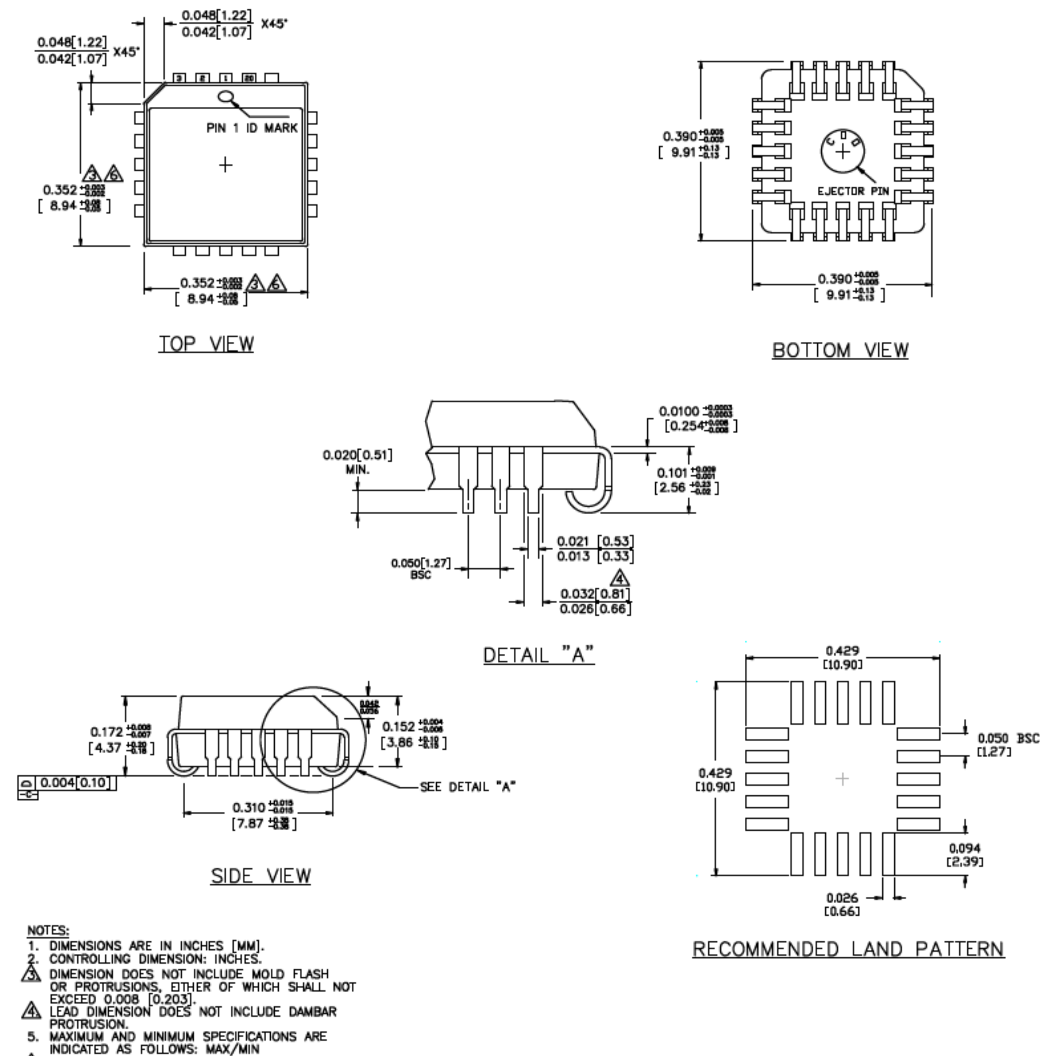
PLCC

Micrel Legacy

TITLE

20 LEAD PLCC PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PLCC-20LD-PL-1	**UNIT**	INCH
Lead Frame	Copper	**Lead Finish**	Matte Tin



Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
28 LEAD PLCC PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PLCC-28LD-PL-1	UNIT	INCH [MM]

0.048[1.22] / 0.042[1.07] X45°

0.048[1.22] / 0.042[1.07] X45°

3 2 1 28

PIN 1 ID MARK

0.452 +0.004/−0.002 [11.48 +0.10/−0.05] (notes 3, 6)

0.452 +0.004/−0.002 [11.48 +0.10/−0.05] (notes 3, 6)

TOP VIEW

DETAIL "A"

0.490 +0.005/−0.005 [12.45 +0.13/−0.13]

EJECTOR PIN

0.490 +0.005/−0.005 [12.45 +0.13/−0.13]

BOTTOM VIEW

0.0100 +0.0003/−0.0003 [0.254 +0.008/−0.008]

0.020[0.51] MIN.

0.101 +0.019/−0.011 [2.56 +0.48/−0.27]

0.021 [0.53] / 0.013 [0.33]

0.050[1.27] BSC

0.032[0.81] / 0.026[0.66] (note 4)

0.049±0.007

0.172 +0.008/−0.007 [4.37 +0.20/−0.18]

0.004 [0.10] −C−

SEE DETAIL 'A'

SIDE VIEW

0.354 +0.005/−0.005 [9.00 +0.13/−0.13]

0.020 +0.005/−0.005 [0.50 +0.13/−0.13]

0.527 +0.005/−0.005 [13.40 +0.13/−0.13]

0.087 +0.005/−0.005 [2.20 +0.13/−0.13]

0.527 +0.005/−0.005 [13.40 +0.13/−0.13]

RECOMMENDED LAND PATTERN

NOTES:
1. DIMENSIONS ARE IN INCHES [MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.008 [0.203].
4. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
5. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS : MAX/MIN
6. PACKAGE TOP DIMENSION MAY BE SLIGHTLY SMALLER THAN BOTTOM DIMENSION.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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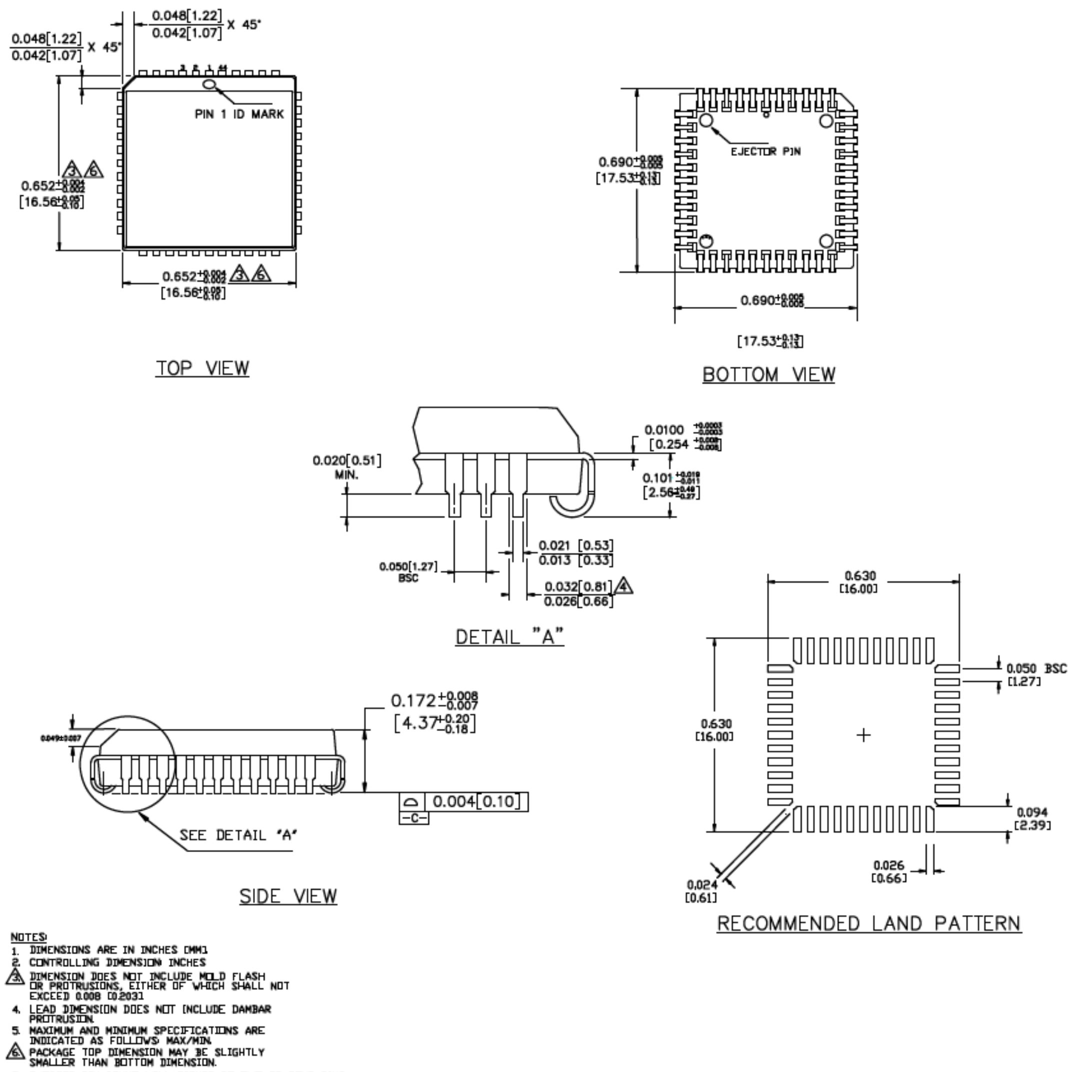
Package Outlines and Dimensions

TITLE
44 LEAD PLCC PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PLCC-44LD-PL-1	UNIT	INCH
Lead Frame	Copper	Lead Finish	Matte Tin



Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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PQFP

Micrel Legacy

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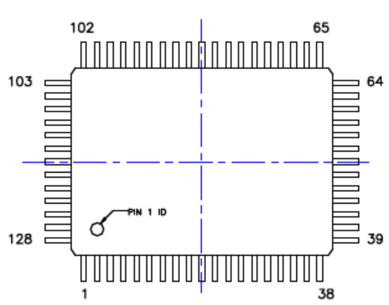
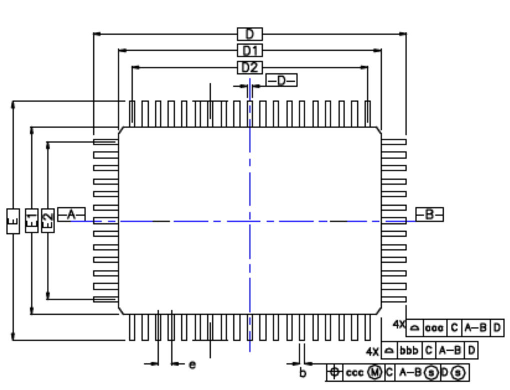
TITLE

128 LEAD PQFP 14x20mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

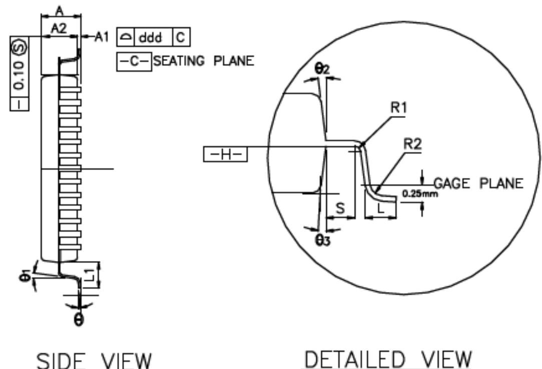
DRAWING #	PQFP14x20-128LD-PL-1	**UNIT**	MM [INCHES]



TOP VIEW
Note 1,2,3



BOTTOM VIEW
Note 1,2,3



SIDE VIEW
Note 1,2,3

DETAILED VIEW

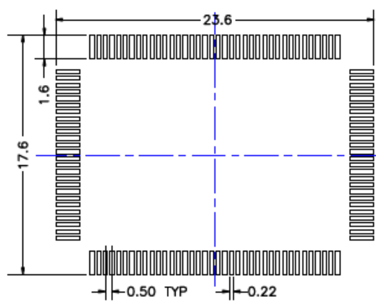
SYMBOL	MILLIMETER			INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	—	—	3.40	—	—	0.134
A_1	0.25	—	—	0.010	—	—
A_2	2.50	2.72	2.90	0.098	0.107	0.114
D	23.20 BASIC			0.913 BASIC		
D_1	20.00 BASIC			0.787 BASIC		
E	17.20 BASIC			0.677 BASIC		
E_1	14.00 BASIC			0.551 BASIC		
R_2	0.13	—	0.30	0.005	—	0.012
R_1	0.13	—	—	0.005	—	—
θ	0°	—	7°	0°	—	7°
θ_1	0°	—	—	0°	—	—
θ_2, θ_3	15° REF			15° REF		

SYMBOL	MILLIMETER			INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
c	0.11	0.15	0.23	0.004	0.006	0.009
L	0.73	0.88	1.03	0.029	0.035	0.041
L_1	1.60 REF			0.063 REF		
S	0.20	—	—	0.008	—	—
b	0.170	0.200	0.270	0.007	0.008	0.011
e	0.50 BSC.			0.020 BSC		
D2	18.50			0.728		
E2	12.50			0.492		
TOLERANCES OF FORM AND POSITION						
aaa	0.20			0.008		
bbb	0.20			0.008		
ccc	0.08			0.003		
ddd	0.08			0.003		

COTROL DIMENSIONS ARE IN MILLIMETERS.

NOTES :

1. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.25mm PER SIDE. DIMENSIONS D1 AND E1 DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE -H-
2. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08mm TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE LEAD FOOT.
3. THE DIAGRAMS DO NOT REPRESNET THE ACTUAL PIN COUNT.
4. ALL UNITS IN mm. TOLERANCE +/− 0.05 IF NOT NOTED.



RECOMMENDED LAND PATTERN
Note 4

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

208 LEAD PQFP 28x28mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	PQFP28x28-208LD-PL-1	**UNIT**	INCH

TOP VIEW
NOTES : 1,2,3

BOTTOM VIEW
NOTES : 1,2,3

DETAILED VIEW

SYMBOL	MILLIMETER			INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	—	—	4.10	—	—	0.161
A_1	0.25	—	—	0.010	—	—
A_2	3.20	3.32	3.60	0.126	0.131	0.142
D	31.20 BASIC			1.228 BASIC		
D_1	28.00 BASIC			1.102 BASIC		
E	31.20 BASIC			1.228 BASIC		
E_1	28.00 BASIC			1.102 BASIC		
R_2	0.13	—	0.30	0.005	—	0.012
R_1	0.13	—	—	0.005	—	—
θ	0°	—	7°	0°	—	7°
θ_1	0°	—	—	0°	—	—
θ_2	8° REF			8° REF		
θ_3	8° REF			8° REF		
c	0.11	0.15	0.23	0.004	0.006	0.009
L	0.73	0.88	1.03	0.029	0.035	0.041
L_1	1.60 REF			0.063 REF		
S	0.20	—	—	0.008	—	—
b	0.17	0.20	0.27	0.007	0.008	0.011
e	0.50 BSC.			0.020 BSC.		
D2	25.50			1.004		
E2	25.50			1.004		
TOLERANCES OF FORM AND POSITION						
aaa	0.25			0.010		
bbb	0.20			0.008		
ccc	0.08			0.003		

COTROL DIMENSIONS ARE IN MILLIMETERS.

SIDE VIEW
NOTES : 1,2,3

RECOMMENDED LAND PATTERN
NOTES : 4

NOTES :

1. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.25mm PER SIDE. DIMENSIONS D1 AND E1 DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE −H− .
2. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 mm TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE LEAD FOOT.
3. THE DIAGRAMS DO NOT REPRESNET THE ACTUAL PIN COUNT.
4. LAND PATTERN UNIT IN MM. TOLERANCE +/− 0.05.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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QFN

Micrel Legacy

Package Outlines and Dimensions

TITLE

10 LEAD QFN 2X2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN22-10LD-PL-1	UNIT	MM

TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2, 3

SIDE VIEW
NOTE: 1, 2, 3

RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLE (SHADED AREA) REPRESENTS OPTIONAL SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 0.60x0.60 MM.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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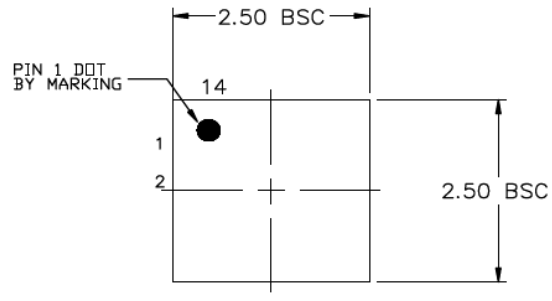
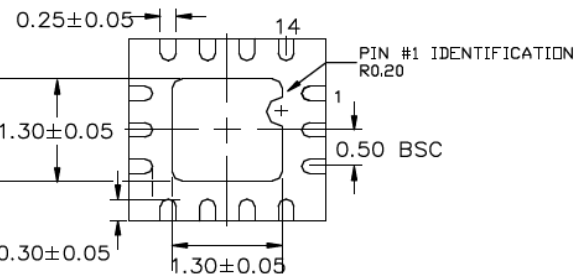
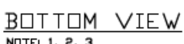
TITLE
14 LEAD QFN 2.5x2.5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

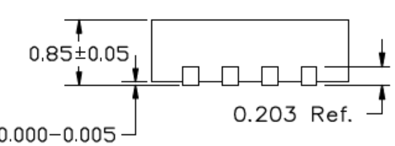
DRAWING #	QFN2525-14LD-PL-1	UNIT	MM



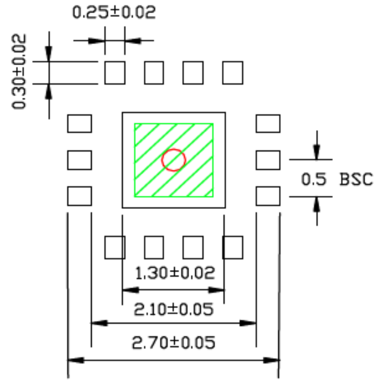


TOP VIEW
NOTE: 1, 2, 3





SIDE VIEW
NOTE: 1, 2, 3



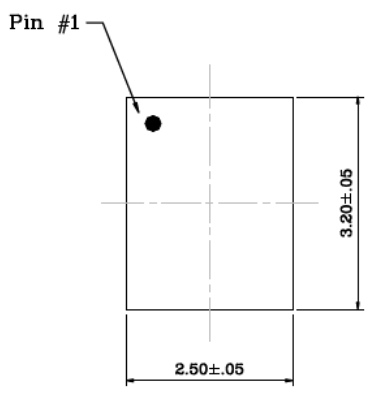
RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLE (SHADED AREA) REPRESENTs SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 1.00x1.00 MM

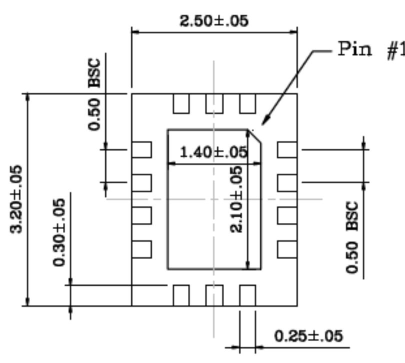
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
14 LEAD QFN 2.5x3.2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

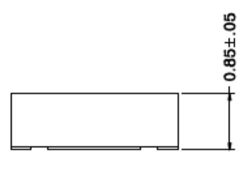
DRAWING #	QFN2532-14LD-PL-1	UNIT	MM



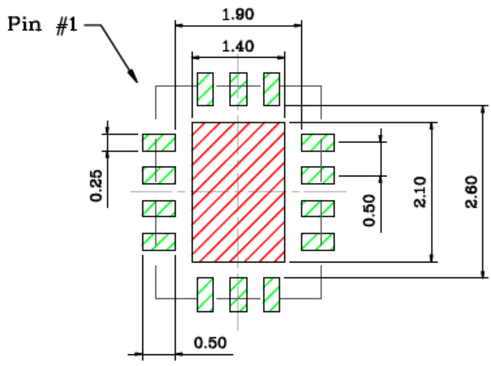
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:
1. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.
2. Red shaded rectangle in Recommended Land Pattern is keep out area.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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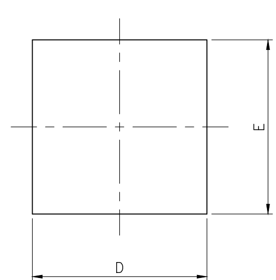
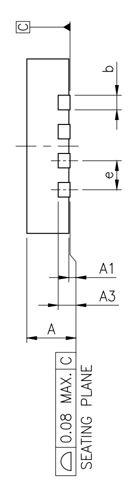
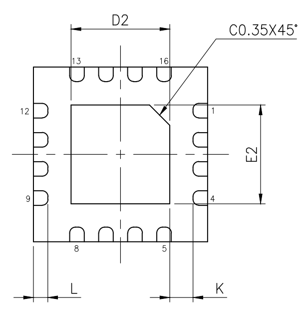
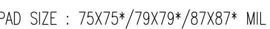
Package Outlines and Dimensions

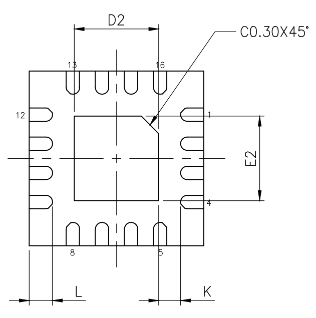
THERMALLY ENHANCED PLASTIC VERY THIN AND VERY VERY THIN FINE PITCH QUAD FLAT NO LEAD PACKAGE
QFN 16 TERMINALS (3.0X3.0mm) X316/Y316











⚠5 PAD SIZE : 67X67* MIL

	PACKAGE TYPE					
JEDEC OUTLINE	MO-220			MO-220		
PKG CODE	WQFN(X316)			VQFN(Y316)		
SYMBOLS	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.80	0.85	0.90
A1	0.00	0.02	0.05	0.00	0.02	0.05
A3	0.203 REF.			0.203 REF.		
b	0.18	0.25	0.30	0.18	0.25	0.30
D	3.00 BSC			3.00 BSC		
E	3.00 BSC			3.00 BSC		
e	0.50 BSC			0.50 BSC		
K	0.20	—	—	0.20	—	—

PAD SIZE	D2			E2			L			LEAD FINISH		JEDEC CODE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	Pure Tin	PPF	
⚠5 67X67* MIL	1.40	1.45	1.50	1.40	1.45	1.50	0.35	0.40	0.45	V	X	W(V)EED-6
75X75* MIL	1.65	1.70	1.75	1.65	1.70	1.75	0.35	0.40	0.45	V	X	W(V)EED-4
79X79* MIL	1.65	1.70	1.75	1.65	1.70	1.75	0.30	0.35	0.40	V	V	W(V)EED-4
87X87* MIL	1.65	1.70	1.75	1.65	1.70	1.75	0.20	0.25	0.30	V	X	N/A

"*"表示汎用字元,此汎用字元可能被其它不同字元所取代,實際的字元請參照bonding diagram所示.
"*" is an universal character, which means maybe replaced by specific character, the actual character please refers to the bonding diagram.

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15mm AND 0.30mm FROM THE TERMINAL TIP. IF THE TERMINAL HAS THE OPTIONAL RADIUS ON THE OTHER END OF THE TERMINAL, THE DIMENSION b SHOULD NOT BE MEASURED IN THAT RADIUS AREA.
3. BILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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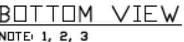
TITLE
16 LEAD QFN 3x3mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

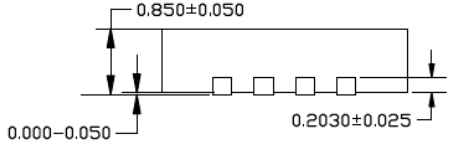
DRAWING #	QFN33-16LD-PL-1	UNIT	MM

PIN 1 DOT BY MARKING
3.0000±0.050
1
2
3.0000±0.050

TOP VIEW
NOTE: 1, 2, 3

PIN #1 IDENTIFICATION CHAMFER 0.300 X 45°
1.5500±0.050 Exp.DAP
0.4000±0.050
0.5000 BSC
1
2
1.5500±0.050 Exp.DAP
0.2300±0.050
1.5000 Ref.





SIDE VIEW
NOTE: 1, 2, 3

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076 MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35 MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.60x0.60 MM IN SIZE, 0.20 MM SPACING.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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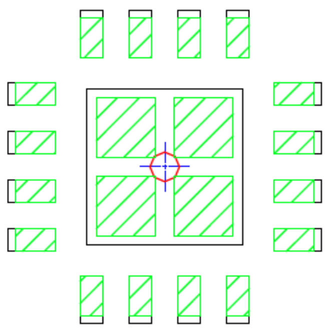
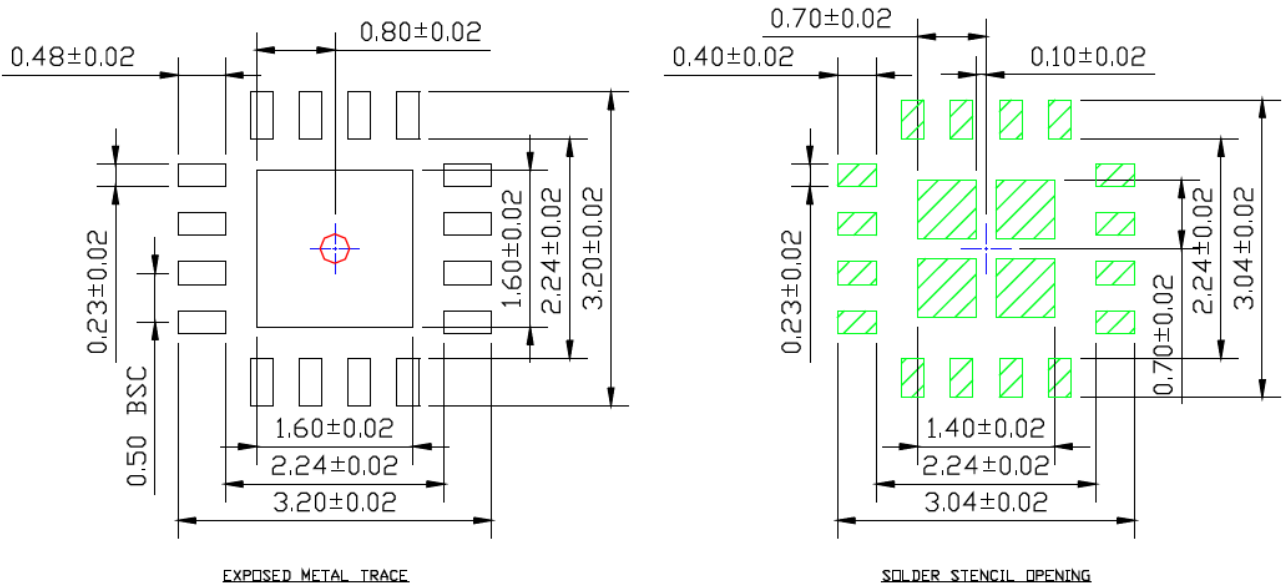
POD-Land Pattern drawing # QFN33-16LD-PL-1

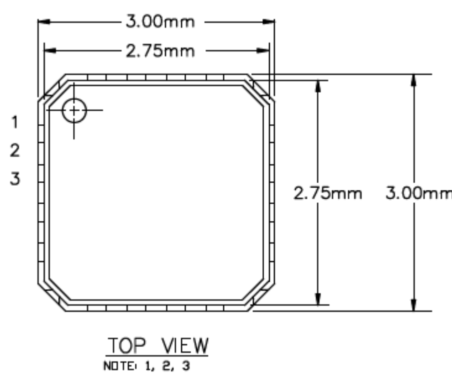


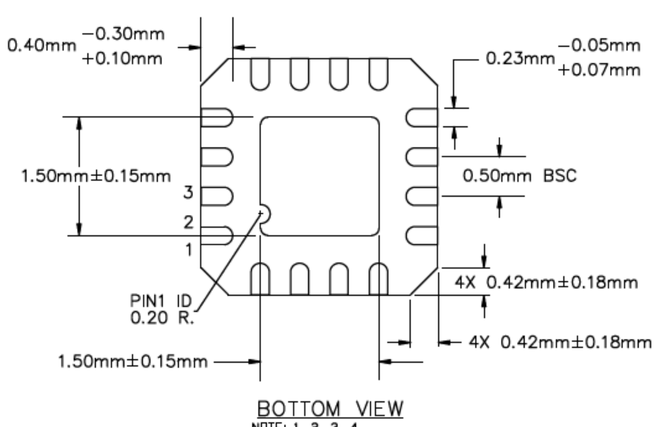


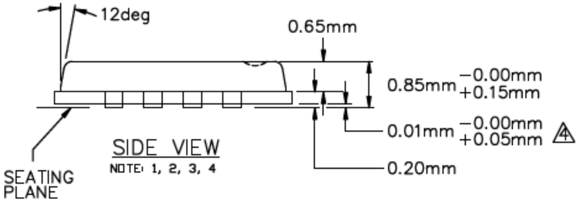
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

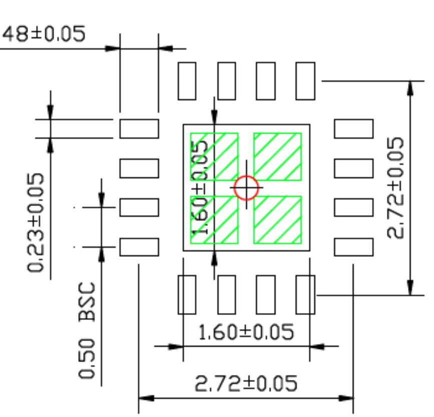
TITLE
16 LEAD QFN 3x3mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN33-16LD-PL-2	UNIT	MM









RECOMMENDED LAND PATTERN
NOTE: 5, 6

NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. THE PIN#1 IDENTIFIRE MUST EXIST ON THE TOP SURFACE OF PACKAGE USING IDENTIFICATION MARK OR OTHER FEATURE OF PACKAGE BODY.
3. PACKAGE WARPAGE MAX 0.05mm.
4. APPLIED FOR EXPOSED PAD AND TERMINALS.
5. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
6. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.60x0.60 MM IN SIZE, 0.20 MM SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE
16 LEAD QFN 3x3mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN33-16LD-PL-3	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLE IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.60x0.60mm IN SIZE, 0.20mm SPACING.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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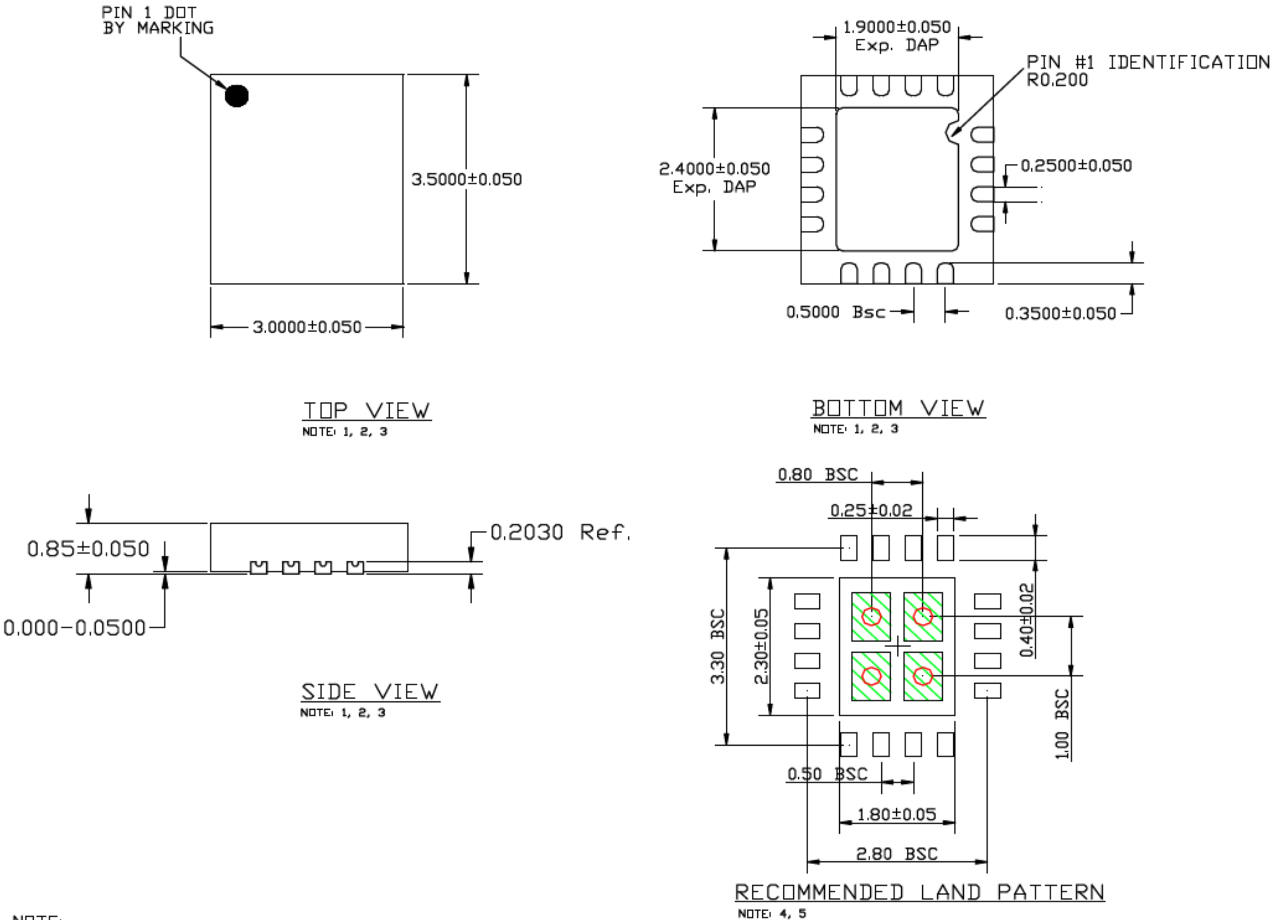
Package Outlines and Dimensions

TITLE
16 LEAD QFN 3.0x3.5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN3035-16LD-PL-1	UNIT	MM



NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN REPRESENT THERMAL VIA. RECOMMENDED DIAMETER IS 0.30 - 0.35 MM AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.80x0.60 MM, 0.20 MM SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE

16 LEAD QFN 4.0 x 4.0 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN44-16LD-PL-1	**UNIT**	MM

Pin 1 Dot
By marking
4.00 BSC
4.00 BSC
1
2
3

TOP VIEW
NOTE: 1, 2, 3

2.350±0.050
Exp.DAP
PIN #1 IDENTIFICATION
R0.200
0.550±0.050
0.650 Bsc
2.350±0.050
Exp.DAP
0.300±0.050
1.950
Ref.

BOTTOM VIEW
NOTE: 1, 2

0.850±0.050
0.2030 Ref.
0.000-0.0500

SIDE VIEW
NOTE: 1, 2

0.53±0.02
0.65 BSC
0.30±0.02
2.50±0.02
3.14±0.02
4.20±0.05

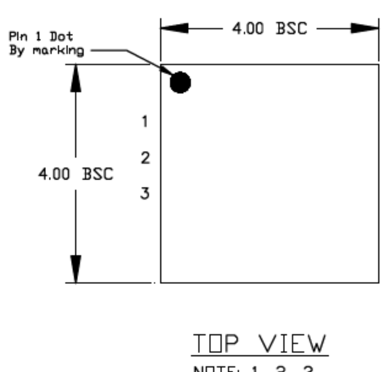
RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) REPRESENT STENCIL OPENING ON EXPOSED AREA. SIZE IS 0.95X0.95MM, 1.15MM PITCH SPACING
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER, 1.0MM PITCH SPACING

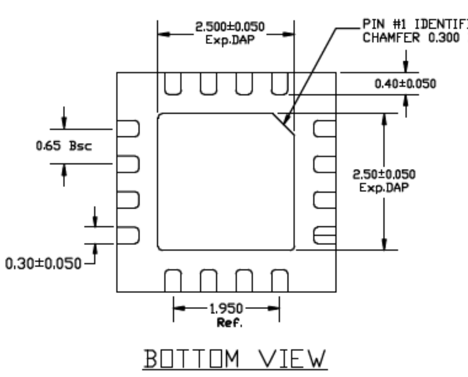
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
16 LEAD QFN 4.0 x 4.0 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

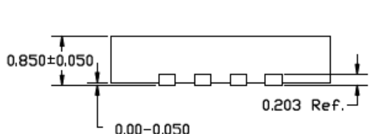
DRAWING #	QFN44-16LD-PL-2	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu



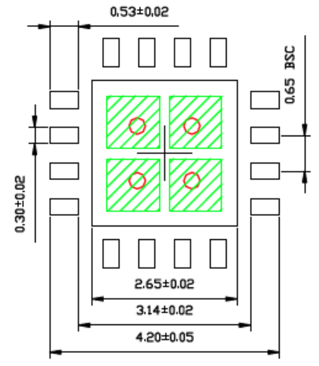
TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2



SIDE VIEW
NOTE: 1, 2



RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. GREEN RECTANGLES (SHADED AREA) REPRESENT STENCIL OPENING ON EXPOSED AREA. SIZE IS 0.95X0.95mm, 1.15MM PITCH SPACING.
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30-0.35mm. RECOMMENDED DIAMETER, 1.0mm PITCH SPACING.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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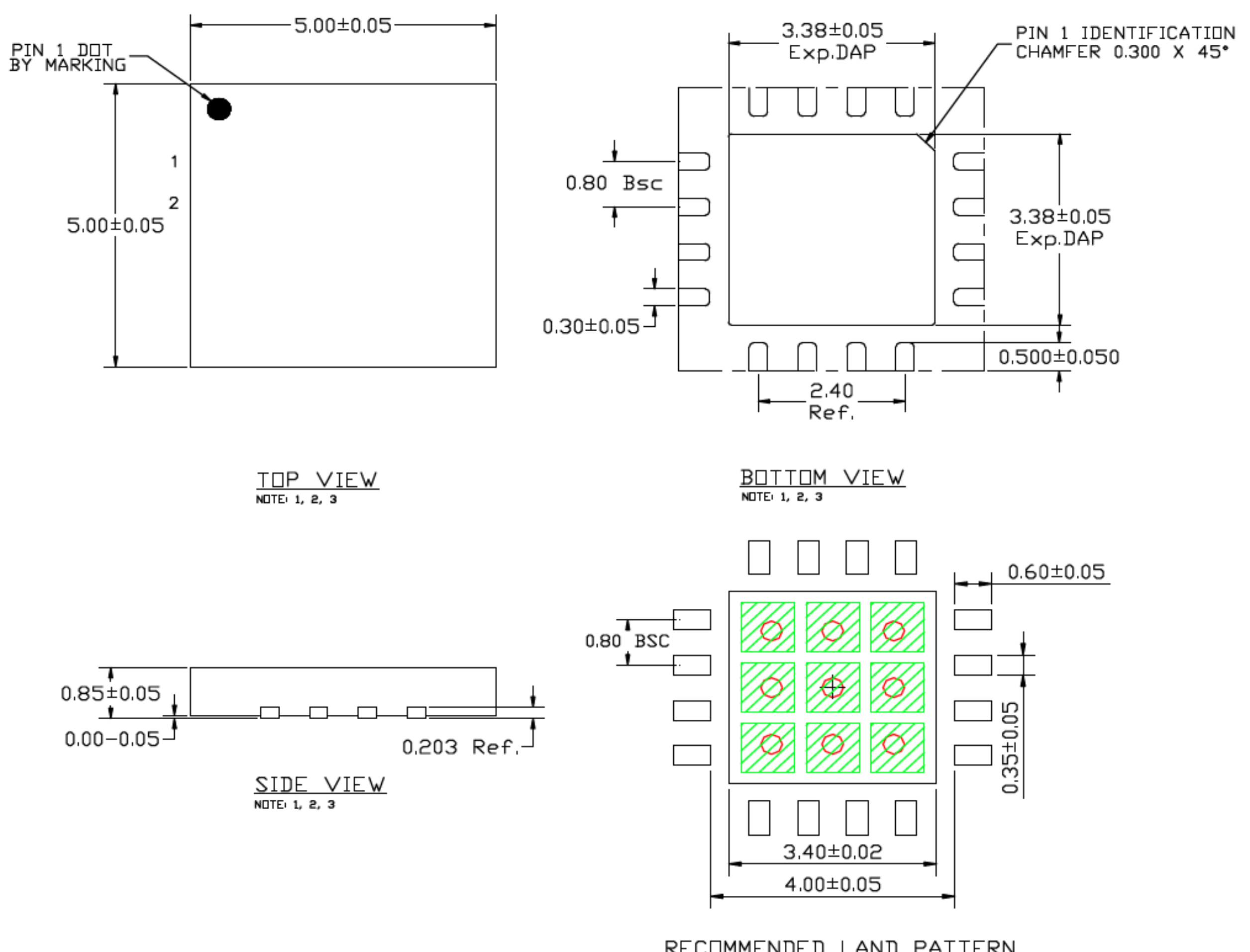
Package Outlines and Dimensions

TITLE
16 LEAD QFN 5x5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN55-16LD-PL-1	**UNIT**	MM



NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) Indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.87x0.87 MM IN SIZE, 1.07 MM PITCH.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE

20 LEAD QFN 3x4mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN34-20LD-PL-1	UNIT	MM

4.000 BSC

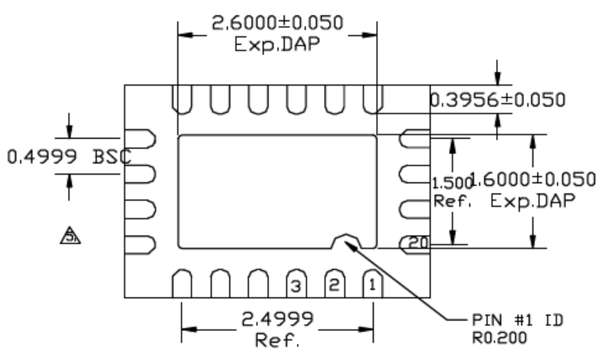
3.000 BSC

20

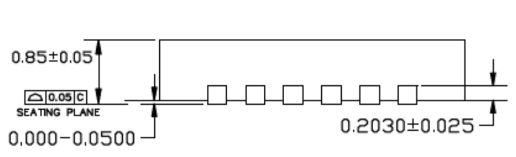
Pin 1 Dot
By marking

1 2 3

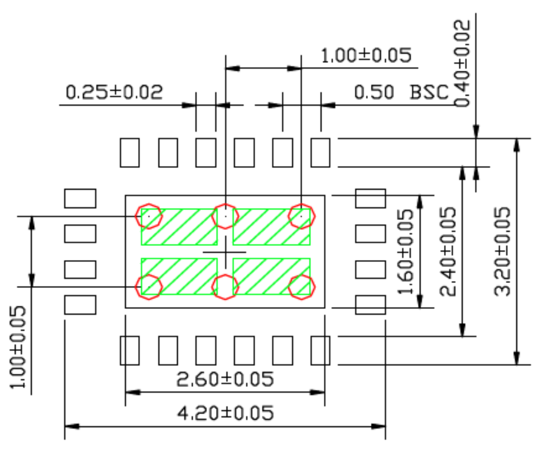
TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



SIDE VIEW
NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 1.00x0.50 MM IN SIZE, 0.70 MM PITCH.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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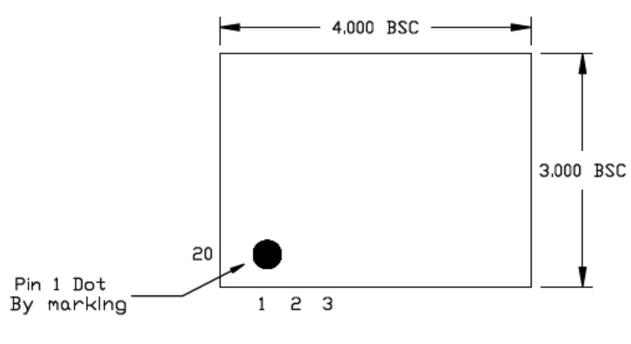
TITLE

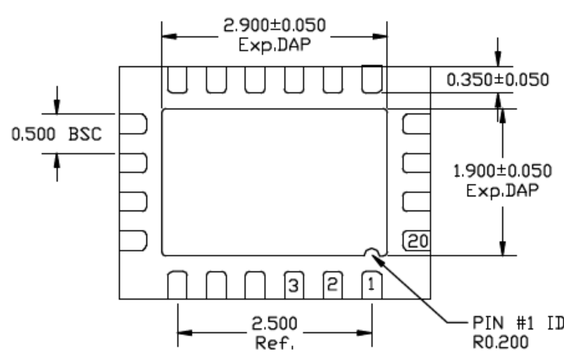
20 LEAD QFN 3x4mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN34-20LD-PL-2	UNIT	MM
Leadframe	Copper	Lead Finish	Matte Tin



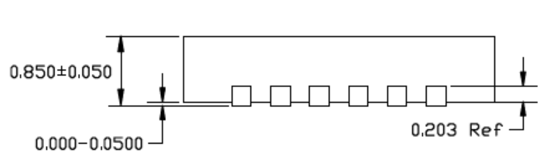
TOP VIEW

NOTE: 1, 2, 3



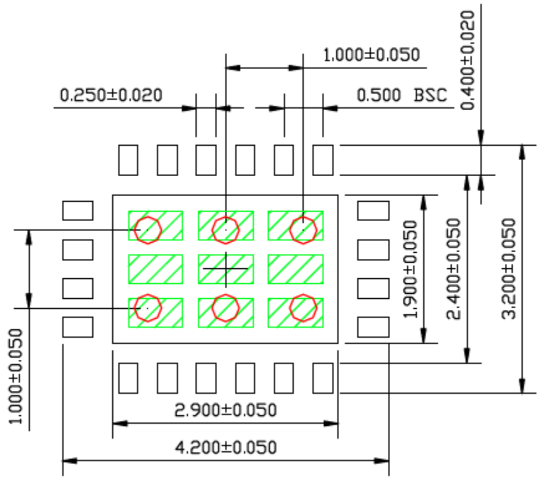
BOTTOM VIEW

NOTE: 1, 2, 3



SIDE VIEW

NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN

NOTE: 4, 5

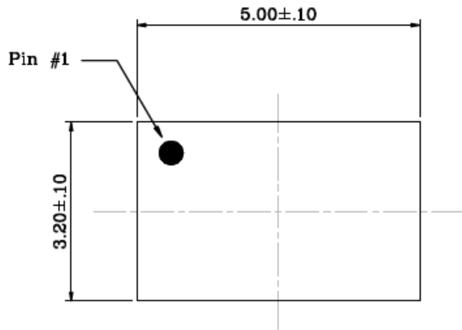
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.700x0.370 MM IN SIZE, 0.90 MM PITCH.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

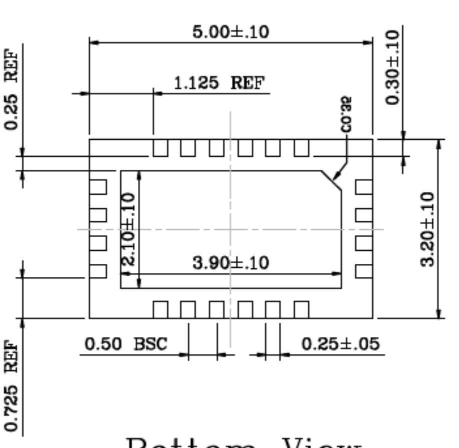
TITLE

20 LEAD QFN 5.0x3.2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

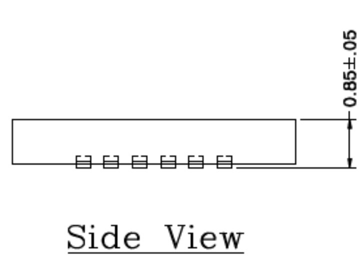
DRAWING #	QFN5032-20LD-PL-1	UNIT	MM



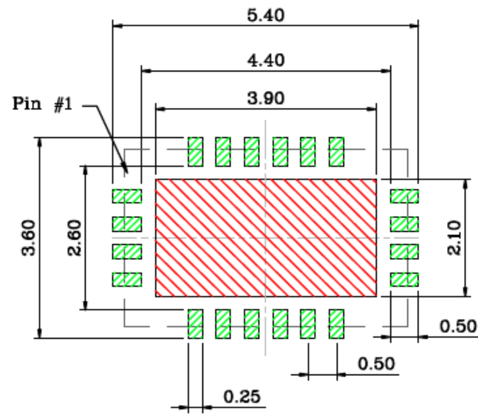
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:

1. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.
2. Red shaded rectangle in Recommended Land Pattern is keep-out area.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
24 LEAD QFN 4x4mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN44-24LD-PL-1	UNIT	MM

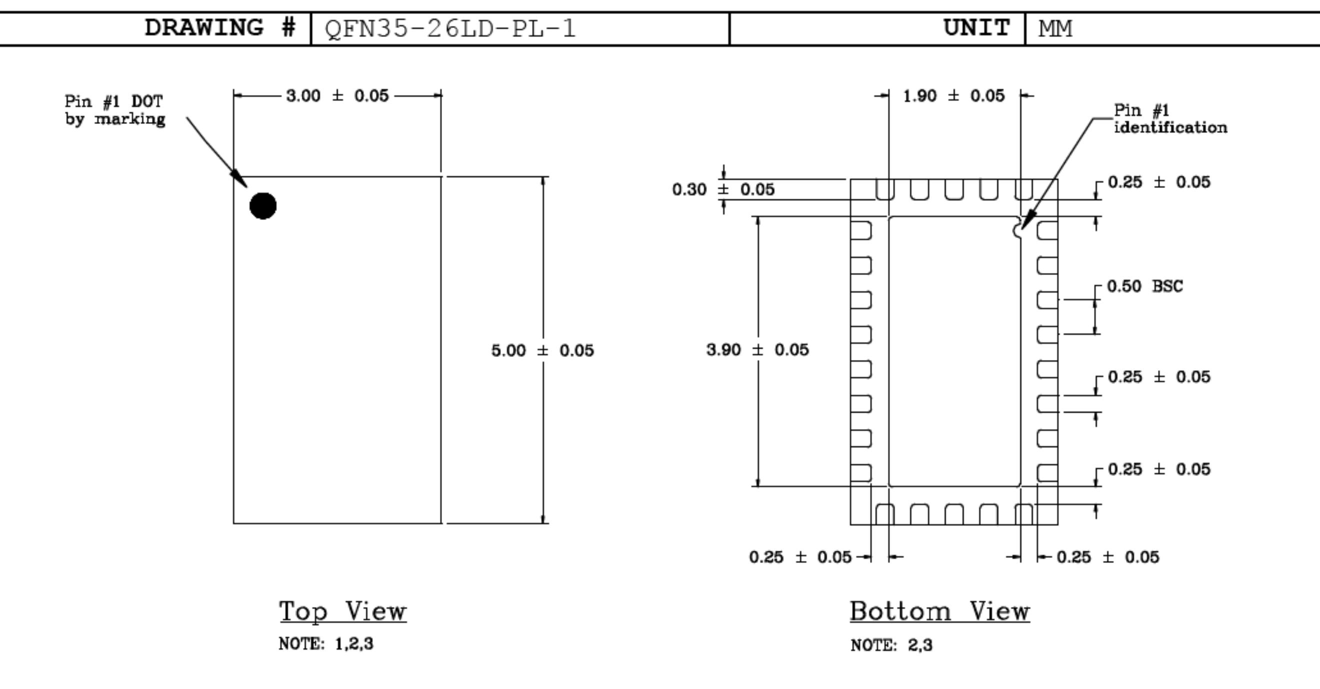
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) Indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 1.00x1.00 MM IN SIZE, 1.20 MM PITCH.

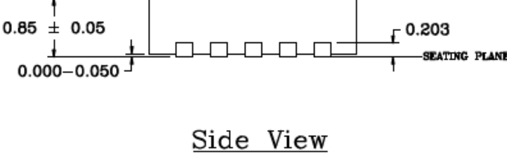
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE
26 LEAD QFN 3mmx5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN35-26LD-PL-1	UNIT	MM





Side View
NOTE: 2,3

NOTES:
1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Red color circles are thermal via. 0.30-0.35mm in diameter and 0.80mm pitch. Should be connected to GND for maximum performance.
5. Blue and Purple color pads represent different potential. Do not connect to GND.
6. Black color pads represent different IOs. Do not connect together.
7. Shaded rectangles (area) represents solder stencil opening on exposed metal trace.
8. Recommended Land Pattern Tolerance is ±0.020mm unless specified.
9. See recommended Land Pattern on page2.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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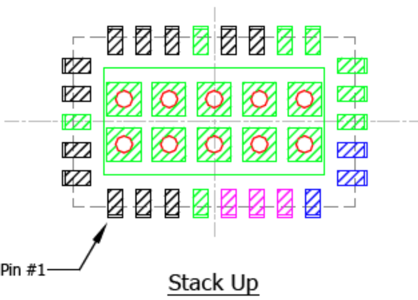
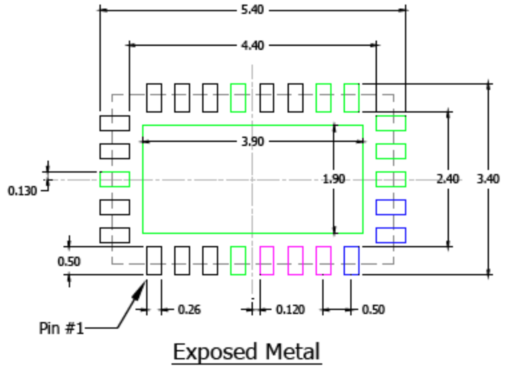
POD-Land Pattern Doc #: QFN35-26LD-PL-1-B

Recommended Land Pattern

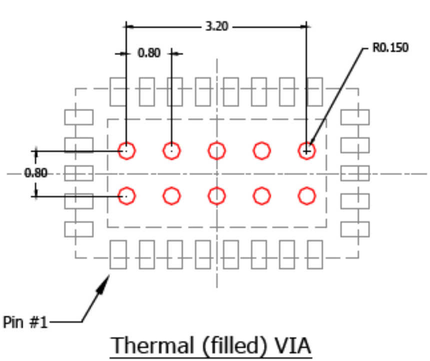
Note: 4,5,6,7



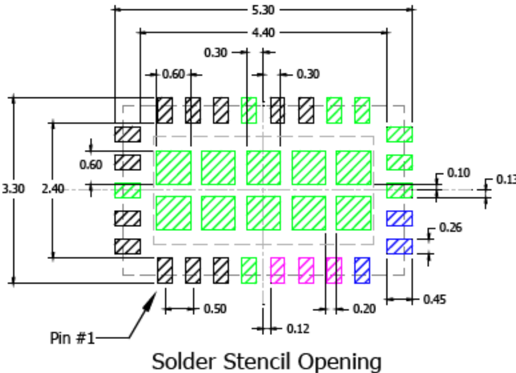
Stack Up



Exposed Metal



Thermal (filled) VIA



Solder Stencil Opening

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE
28 LEAD QFN 4x4mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN44-28LD-PL-1	UNIT	MM

TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2, 3

SIDE VIEW
NOTE: 1, 2, 3

RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) Indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 1.00x1.00 MM IN SIZE, 1.20 MM PITCH.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

28 LEAD QFN 4x5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN45-28LD-PL-1	**UNIT**	MM
Lead Frame	Copper Alloy	**Lead Finish**	Matte Tin

5.00 BSC
4.00 BSC
PIN 1 DOT BY MARKING

TOP VIEW
NOTE: 1, 2, 3

3.65±0.050 Exp.DAP
0.40±0.050
0.50 Bsc
2.50 Ref.
2.65±0.050 Exp.DAP
0.25±0.050
3.50 Ref.
PIN #1 IDENTIFICATION CHAMFER 0.400 X 45°

BOTTOM VIEW
NOTE: 1, 2, 3

0.85±0.05
SEATING PLANE
0.000-0.05
0.203 Ref.

SIDE VIEW
NOTE: 1, 2, 3

0.5mm±0.02
0.50mm BSC
2.85mm±0.05
3.2mm±0.05
4.2mm±0.05
0.25mm±0.05
3.85mm±0.05
4.2mm±0.05
5.2mm±0.05

RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLE IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE. 0.91mm Pitch.
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.71mmx0.71mm IN SIZE. 0.20mm Gap.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
28 LEAD QFN 5X6mm PACKAGE OUTLINE (Co-Package) & RECOMMENDED LAND PATTERN

DRAWING #	QFN56-28LD-PL-1	UNIT	MM

TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2, 3

SIDE VIEW
NOTE: 1, 2, 3

RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA.
6. BLUE COLORED PADS & PURPLE COLORED PADS REPRESENT DIFFERENTPOTENTIALS. DO NOT CONNECT TO GND.
7. RECOMMENDED SOLDER STENCIL OPENING AND VIA SIZES:

		Via size/Pitch	Solder stencil opening/Pitch	Comments
Red circle, black pad	Thermal Via	0 300-0 350mm/0 80mm	1 55x1 20mm/1 75mm	Must be connected to GND plane
Blue circle & pad		0 300-0 350mm/0 80mm	0 80x1 11mm/1 31mm	DO NOT connect to GND plane
Magenta circle & pad		0 300-0 350mm/0 80mm	0 50x1 11mm/1 31mm	DO NOT connect to GND plane

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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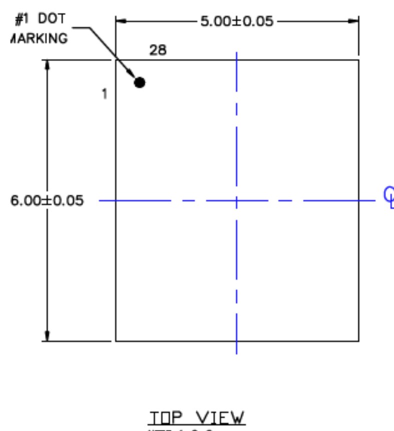
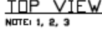
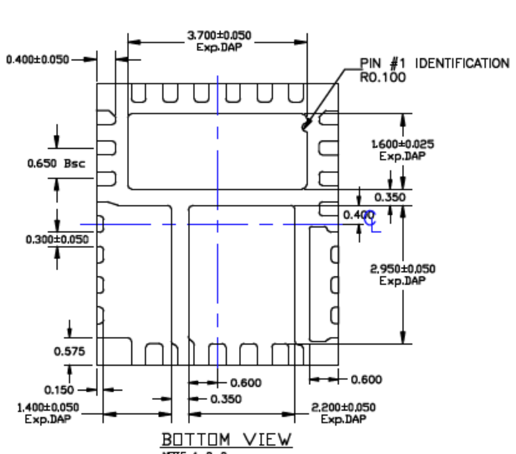
TITLE

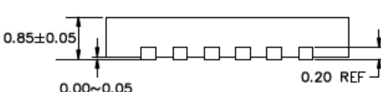
28 LEAD QFN 5X6mm PACKAGE (Co-Package) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN56-28LD-PL-2	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu

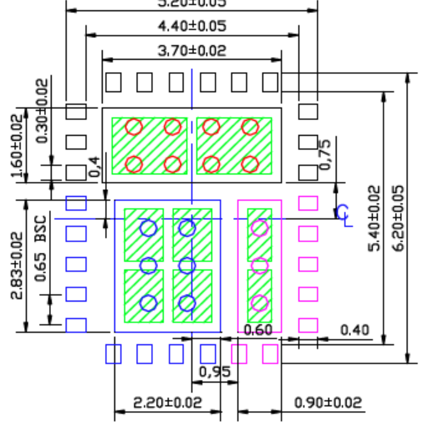








SIDE VIEW
NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA.
6. BLUE COLORED PADS & PURPLE COLORED PADS REPRESENT DIFFERENTPOTENTIALS. DO NOT CONNECT TO GND.
7. RECOMMENDED SOLDER STENCIL OPENING AND VIA SIZES:

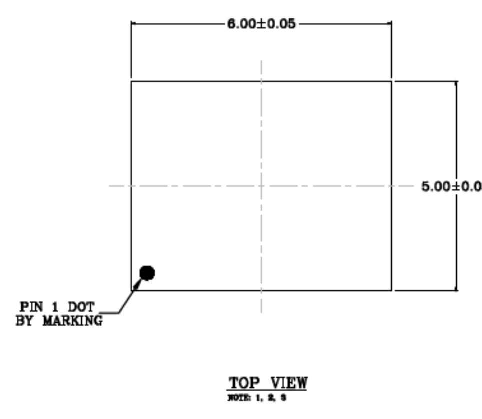
		Via size/Pitch	Solder stencil opening/Pitch	Comments
Red circle, black pad	Thermal Via	0 300-0 350mm/0 80mm	1 55x1 20mm/1 75mm	Must be connected to GND plane
Blue circle & pad		0 300-0 350mm/0 80mm	0 80x1 11mm/1 31mm	DO NOT connect to GND plane
Magenta circle & pad		0 300-0 350mm/0 80mm	0 50x1 11mm/1 31mm	DO NOT connect to GND plane

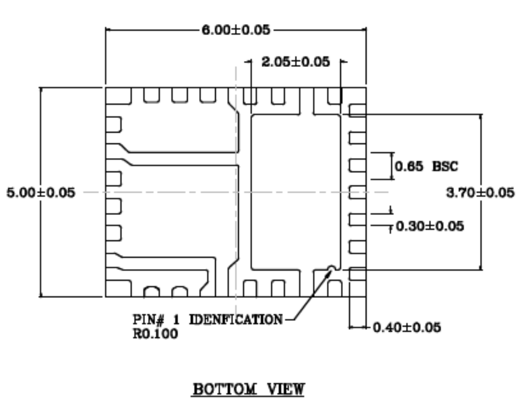
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

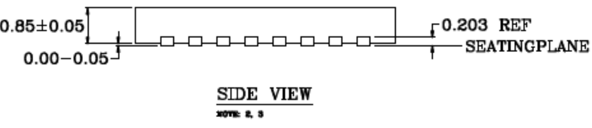
TITLE

30 LEAD QFN 5X6mm PACKAGE (Co-Package) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN56-30LD-PL-1	**UNIT**	MM







NOTE:

1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Red, Purple, and Blue color circles are thermal via. 0.30-0.35mm in diameter and 0.80mm pitch. Red circles should be connected to GND for maximum performance.
5. Blue & Magenta color pads represent different potential. Do not connect to GND.
6. Green rectangles (shaded area) represents solder stencil opening on exposed metal trace.
7. Recommended Land Pattern Tolerance is ±0.020mm unless specified.
8. See recommended land pattern on page2.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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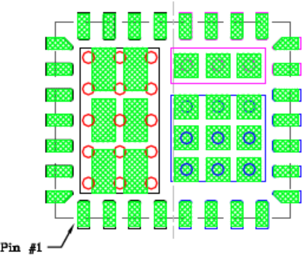
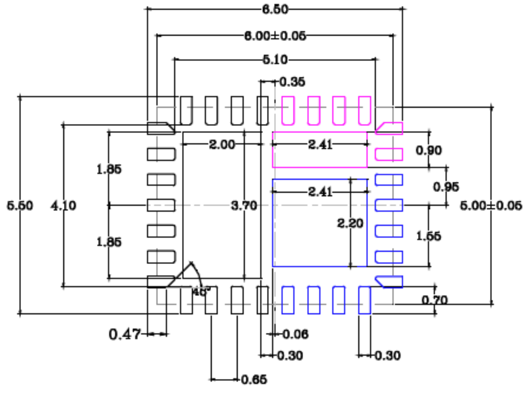
POD-Land Pattern Doc #: QFN56-30LD-PL-1-A

Recommended Land Pattern

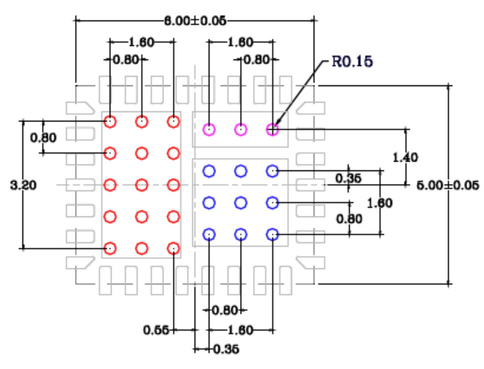
Note: 4,5,6,7



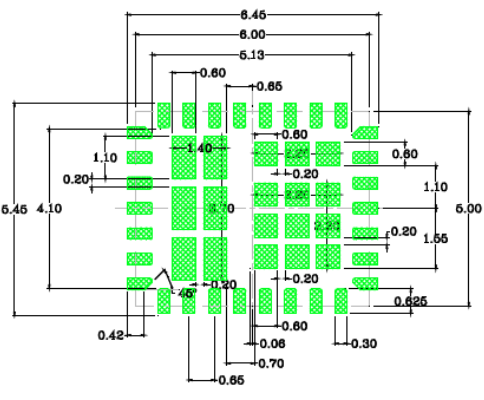
Stacked Up



Exposed Metal Trace



Thermal (filled) Via



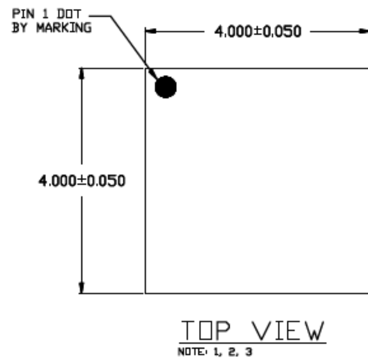
Solder Stencil Opening

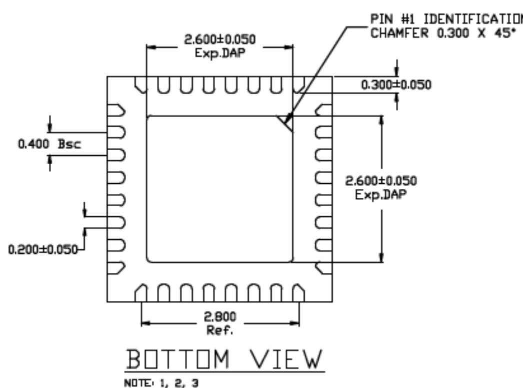
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

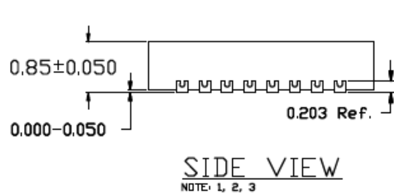
Package Outlines and Dimensions

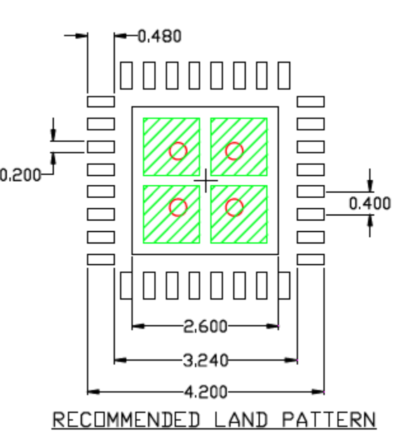
TITLE
32 LEAD QFN PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN44-32LD-PL-1	**UNIT**	MM
Lead Frame	NiPdAu	**Lead Finish**	NiPdAu









NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 1.00x1.00 MM IN SIZE, 1.20 MM PITCH.
6. TOLERANCE ±0.02 MM.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE
32 LEAD QFN 5x5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN55-32LD-PL-1	UNIT	MM

PIN 1 DOT BY MARKING
32
1
2
5.00±0.05
5.00±0.05

TOP VIEW
NOTE: 1, 2, 3

0.25±0.05
0.50 BSC
32
PIN #1 ID R0.20
1
2
3.10±0.05
0.40±0.05
3.10±0.05

BOTTOM VIEW
NOTE: 1, 2, 3

0.05 C
0.85±0.05
SEATING PLANE
0.00~0.05
0.203 REF

SIDE VIEW
NOTE: 1, 2, 3

0.50±0.02
0.23±0.02
0.50 BSC
3.40±0.02
4.20±0.05

RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) INDICATE SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.87x0.87 MM IN SIZE, 1.07 MM PITCH.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE

32 LEAD QFN 5x5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN55-32LD-PL-2	**UNIT**	MM

TOP VIEW

BOTTOM VIEW

SIDE VIEW

RECOMMENDED LAND PATTERN

NOTE: 4, 5

NOTES:
1. THE PIN#1 IDENTIFIER MUST EXIST ON THE TOP SURFACE OF PACKAGE USING IDENTIFICATION MARK OR OTHER FEATURE OF PACKAGE BODY.
2. PACKAGE WRAPAGE MAX 0.05MM.
3. APPLIES TO EXPOSED PAD AND TERMINALS.
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.87x0.87 MM IN SIZE, 1.07 MM PITCH.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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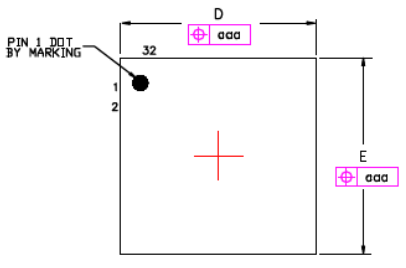
Package Outlines and Dimensions

TITLE

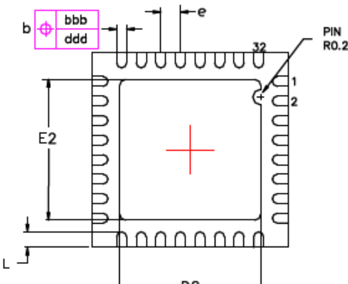
32 LEAD QFN 5x5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN55-32LD-PL-5	**UNIT**	MM
LEAD FRAME	NiPdAu	**LEAD FINISH**	NiPdAu



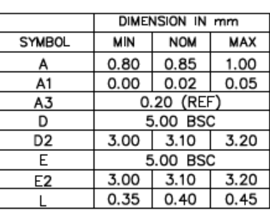
TOP VIEW

NOTE: 9, 10



BOTTOM VIEW

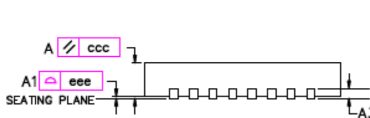
NOTE: 9, 10



SYMBOL	DIMENSION IN mm MIN	NOM	MAX
A	0.80	0.85	1.00
A1	0.00	0.02	0.05
A3	0.20 (REF)		
D	5.00 BSC		
D2	3.00	3.10	3.20
E	5.00 BSC		
E2	3.00	3.10	3.20
L	0.35	0.40	0.45

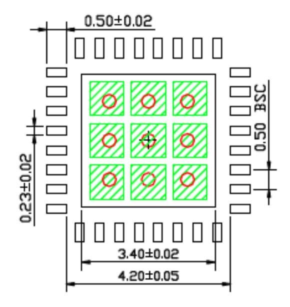
N	b (mm) MIN	NOM	MAX	e (mm) MIN	NOM	MAX
32	0.18	0.25	0.30	0.50 BSC		

TOLERANCE OF FORM AND POSITION	
aaa	0.15
bbb	0.10
ccc	0.10
ddd	0.05
eee	0.08



SIDE VIEW

NOTE: 9, 10



RECOMMENDED LAND PATTERN

NOTE: 11, 12

NOTE:

1. REFER TO JEDEC STANDARD MO-220 VHHD-2.
2. DIMENSION 'b' APPLIES TO METALIZED TERMINAL AND IS MEASURED BETWEEN 0.15mm TO 0.30mm FROM THE TERMINAL TIP.
3. 'aaa' THE BILATERAL PROFILE TOLERANCE THAT CONTROLS THE POSITION OF THE PLASTIC BODY SIDES. THE CENTERS OF THE PROFILE ZONES ARE DEFINED BY THE BASIC DIMENSIONS 'D' AND 'E'.
4. 'bbb' THE TOLERANCE THAT CONTROLS THE POSITION OF THE ENTIRE TERMINAL PATTERN WITH RESPECT TO DATUM'S A AND B. THE CENTER OF THE TOLERANCE ZONE OF EACH TERMINAL IS DEFINED BY THE BASIC DIMENSION 'e' AS RELATED TO DATUM A AND B.
5. 'ccc' THE TOLERANCE LOCATED PARALLEL TO THE SEATING PLANE IN WHICH THE TOP SURFACE OF THE PACKAGE MUST BE LOCATED.
6. 'ddd' THE TOLERANCE THAT CONTROLS THE POSITION OF THE TERMINALS TO EACH OTHER. THE CENTERS OF THE PROFILE ZONES ARE DEFINED BY BASIC DIMENSION 'e'.
7. 'eee' THE UNILATERAL TOLERANCE LOCATED ABOVE THE SEATING PLANE WHEREIN THE BOTTOM SURFACE OF THE TERMINALS MUST BE LOCATED.
8. THE TOLERANCE THAT CONTROLS THE POSITION OF THE EXPOSED METAL HEAT FEATURE. THE CENTER OF THE TOLERANCE ZONE WILL BE THE DATUM'S DEFINED BY THE CENTERLINES OF THE PACKAGE BODY.
9. MAX PACKAGE WARPAGE IS 0.05 MM.
10. PIN #1 IS ON TOP WILL BE LASER MARKED.
11. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35M IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE.
12. GREEN RECTANGLES (SHADED AREA) indicate SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.87x0.87 MM IN SIZE, 1.07 MM PITCH.
13. THIS DOCUMENT IS FOR AUTOMOTIVE PRODUCT USE ONLY.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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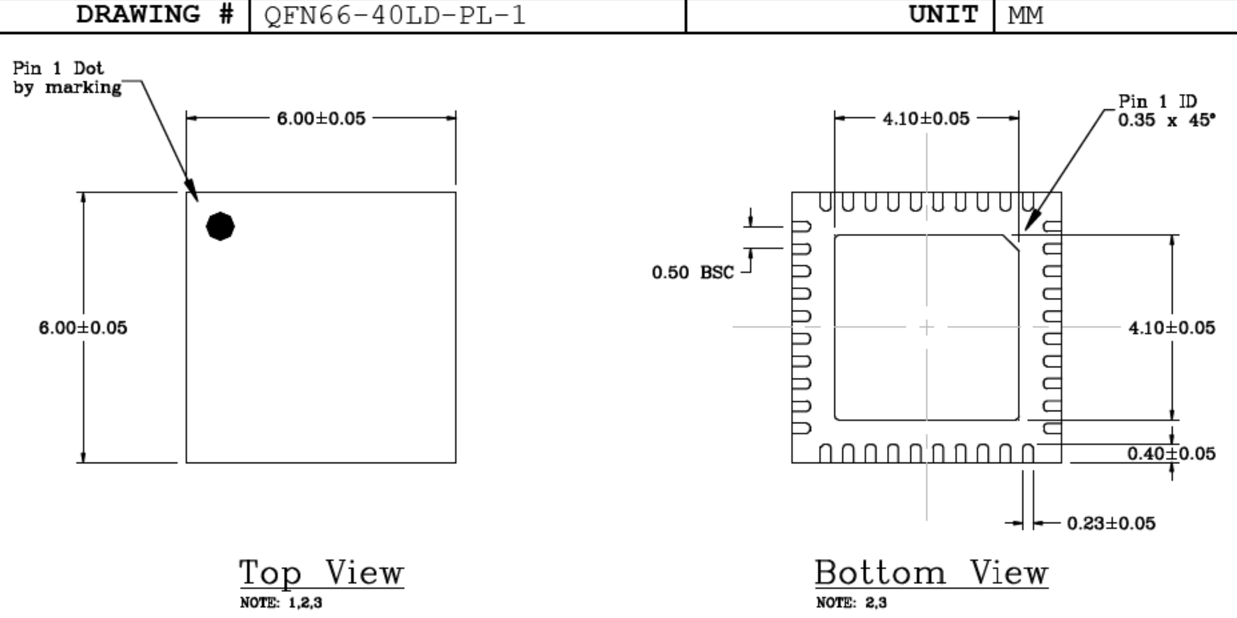
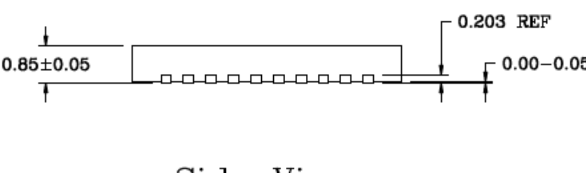
Package Outlines and Dimensions

TITLE
40 LEAD QFN 6x6mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN66-40LD-PL-1	UNIT	MM





Side View
NOTE: 2,3

NOTES:
1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Red color circles are thermal via. 0.30-0.35mm in diameter and 1.20mm pitch. Should be connected to GND for maximum performance.
5. Black color pads represent different IOs. Do not connect together.
6. Green shaded rectangles (area) represents solder stencil opening on exposed metal trace.
7. Recommended Land Pattern Tolerance is ±0.020mm unless specified.
8. See recommended Land Pattern on page2.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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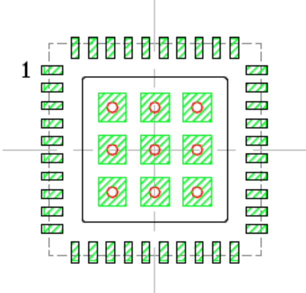
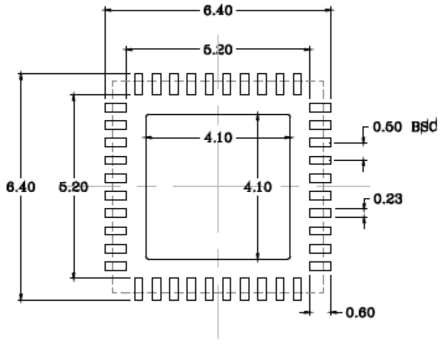
POD-Land Pattern Doc #: QFN66-40LD-PL-1

Recommended Land Pattern

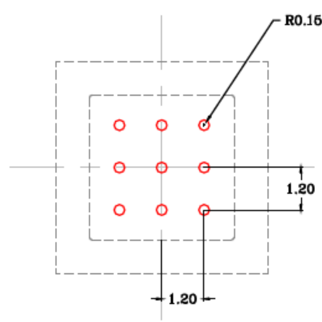
Note: 4,5,6,7



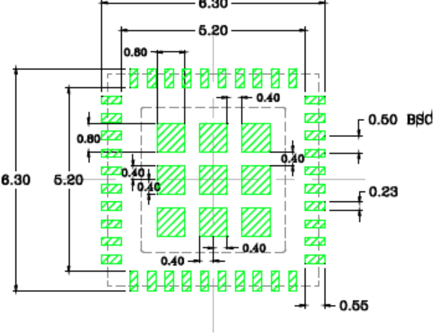
Stack Up



Exposed Metal



Thermal (filled) VIA



Solder Stencil Opening

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE

44 LEAD QFN 7x7mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN77-44LD-PL-1	UNIT	MM

PIN 1 ID

7.00±0.05

44

1

2

7.00±0.05

TOP VIEW

NOTE: 1, 2, 3

3.30±0.10

PIN #1 ID

R0.20

44

0.60±0.05

1

2

3.30±0.10

0.20 MIN.

0.50 BSC

0.25±0.05

BOTTOM VIEW

NOTE: 1, 2, 3

0.85±0.05

0.00–0.05

0.20 REF.

SIDE VIEW

NOTE: 1, 2, 3

0.8±0.02

0.25±0.02

3.6±0.02

3.6±0.02

0.5 BSC

5.6±0.05

7.2±0.05

RECOMMENDED LAND PATTERN

NOTE: 4, 5

NOTE:

1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.35MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE. 1.0MM PITCH
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 0.93x0.93MM, SPACING IS 0.2MM

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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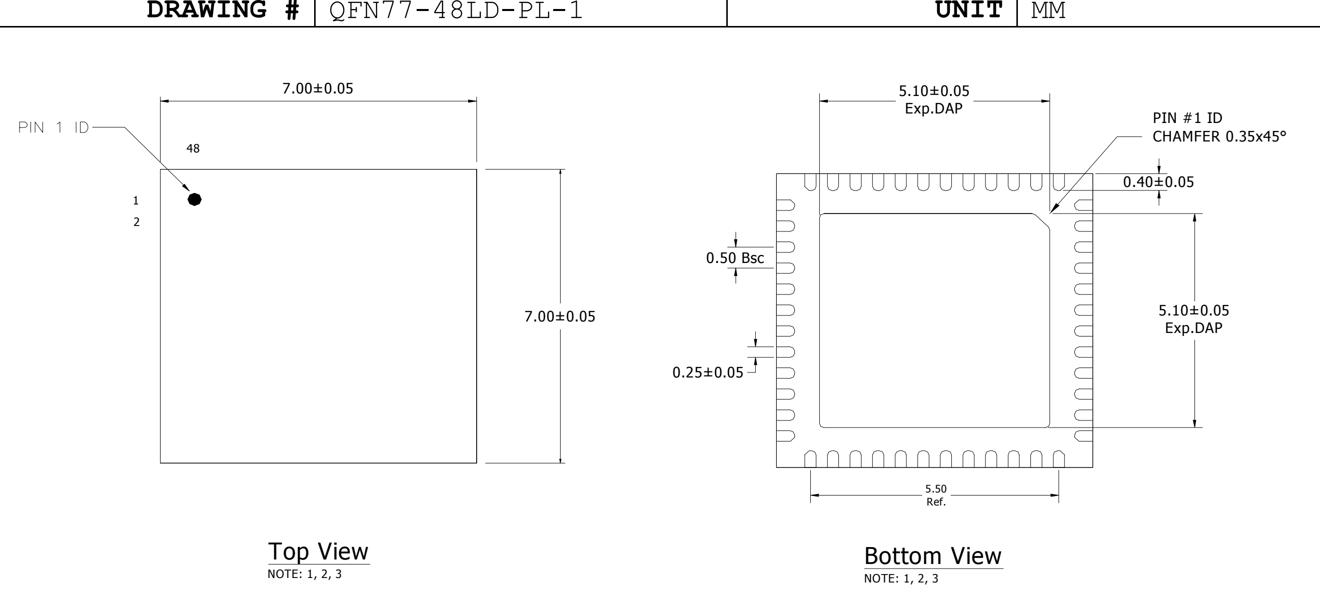
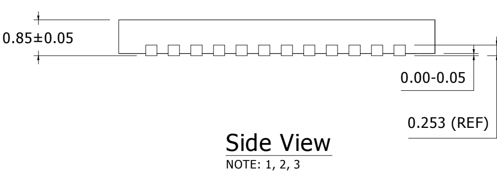
Package Outlines and Dimensions

TITLE
48 LEAD QFN 7x7mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN77-48LD-PL-1	UNIT	MM





NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLE IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE. PITCH is 1.00mm.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 1.00x1.00mm, SPACING IS 0.25mm.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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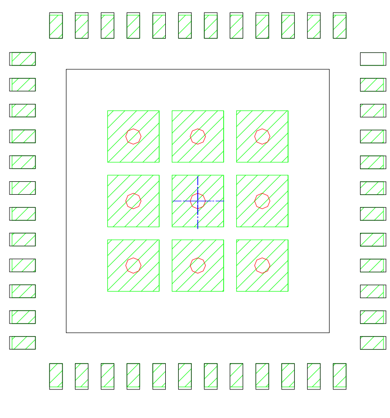
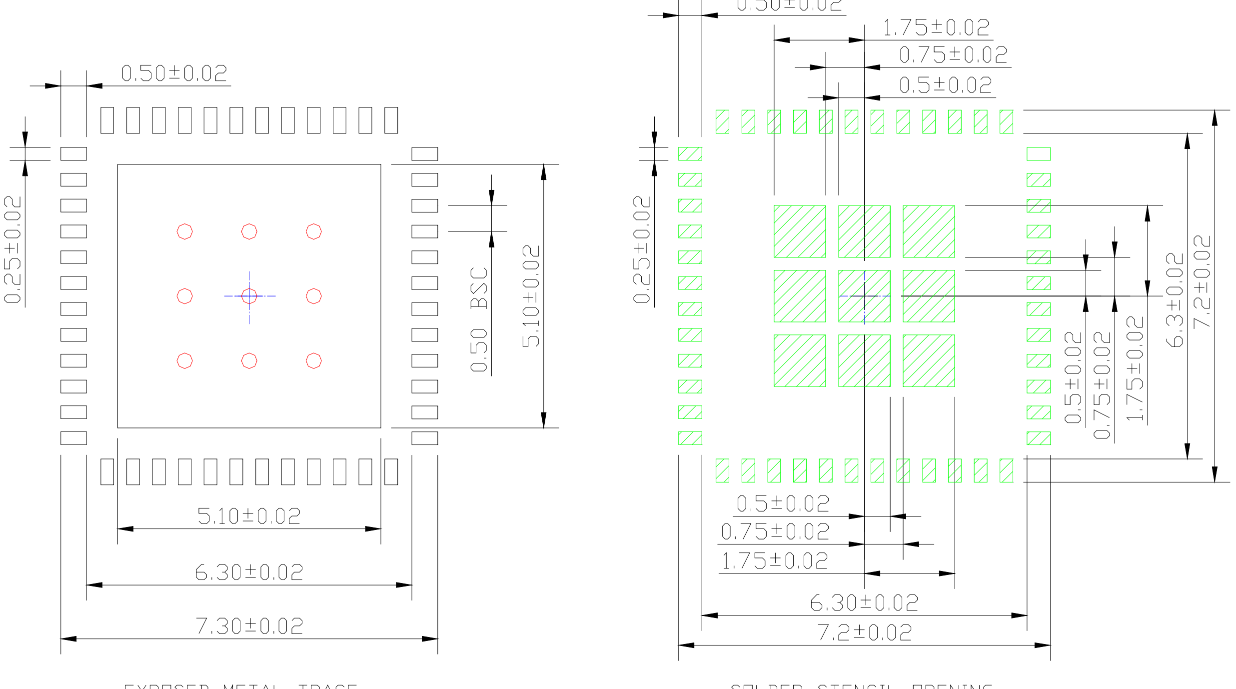
POD-Land Pattern drawing #: QFN77-48LD-PL-1-C

RECOMMENDED LAND PATTERN

NOTE: 4, 5





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
48 LEAD QFN 7x7mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN77-48LD-PL-2	UNIT	MM

TOP VIEW
NOTE 1, 2, 3

BOTTOM VIEW
NOTE 1, 2, 3

SIDE VIEW
NOTE 1, 2, 3

RECOMMENDED LAND PATTERN
NOTE 4, 5

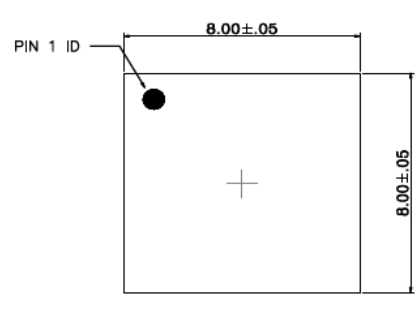
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE. PITCH is 1.25mm.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 1.00mm x 1.00mm, SPACING IS 0.25mm, PITCH is 1.25mm.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

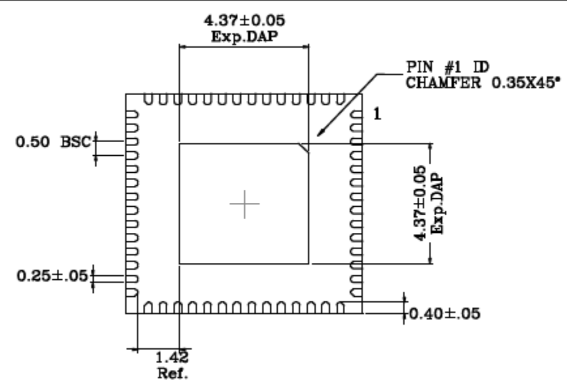
TITLE

56 LEAD QFN 8.0x8.0mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

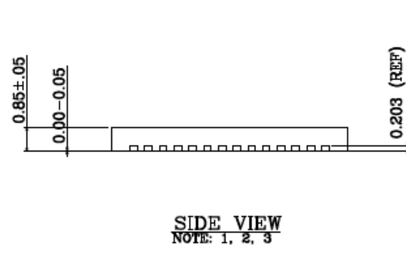
DRAWING #	QFN88-56LD-PL-1	UNIT	MM
Lead Frame Type	AgCu	Lead Finish	Matte Tin



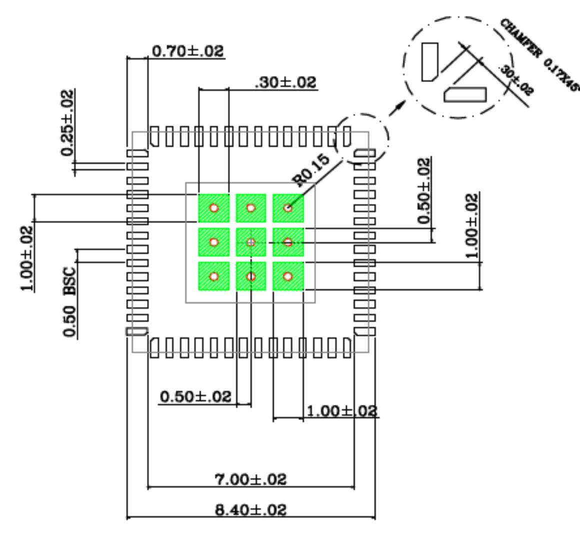
TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



SIDE VIEW
NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARK.
4. RED CIRCLES IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE. PITCH IS 1.25mm.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 1.0x1.0mm, SPACING IS 0.25mm.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

64 LEAD QFN 8x8mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN88-64LD-PL-1	UNIT	MM

PIN 1 DOT BY MARKING

8.00±0.05

8.00±0.05

TOP VIEW

NOTE : 1,2,3,4

6.50±0.05 Exp.DAP

PIN #1 ID CHAMFER 0.50x45°

0.40±0.05

0.40 Bsc

6.50±0.05 Exp.DAP

0.20±0.050

6.00 Ref.

BOTTOM VIEW

NOTE : 1,2,3,4,5

0.85±0.05

0.05 C SEATING PLANE

0.000-0.05 6

0.20 Ref

SIDE VIEW

NOTE : 1,2,3,4,5,6,7

0.6±0.02

1.00±0.05

0.4 BSC.

0.25±0.02

6.0±0.05

7.0±0.05

8.2±0.05

RECOMMENDED LAND PATTERN

NOTE : 8,9

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAX. PACKAGE WARPAGE IS 0.05 mm.
3. MAXIMUM ALLOWABE BURRS IS 0.076 mm IN ALL DIRECTIONS.
4. PIN #1 ID ON TOP WILL BE LASER/INK MARKED.
5. DIMENSION APPLIES TO METALIZED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25 mm FROM TERMINAL TIP.
6. APPLIED ONLY FOR TERMINALS.
7. APPLIED FOR EXPOSED PAD AND TERMINALS.
8. RED CIRCLE INDICATES THERMAL VIA. SIZE SHOULD BE 0.300-0.350mm IN DIAMETER AND IT SHOULD BE CONNECTED TO GND PLANE FOR MAXIMUM THERMAL PERFORMANCE.
9. GREEN RECTANGLE (WITH SHADED AREA) INDICATES SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.93x0.93mm, 1.13mm PITCH.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

64 LEAD QFN 8x8mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN88-64LD-PL-2	UNIT	MM

PIN 1 DOT BY MARKING
8.00±0.05
8.00±0.05

TOP VIEW
NOTE : 1,2,3,4

4.20±0.05 Exp.DAP
PIN #1 ID CHAMFER 0.50x45°
0.40±0.05
0.40 Bsc
4.20±0.05 Exp.DAP
0.20±0.050

BOTTOM VIEW
NOTE : 1,2,3,4,5

0.85±0.05
0.05 C
SEATING PLANE
0.000–0.05
0.20 Ref

SIDE VIEW
NOTE : 1,2,3,4,5,6,7

0.6±0.02
2.27±0.05
1.13±0.05
3.7±0.05
0.4 BSC.
3.7±0.05
0.25±0.02
7.0±0.05
8.2±0.05

RECOMMENDED LAND PATTERN
NOTE : 8,9

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAX. PACKAGE WARPAGE IS 0.05 mm.
3. MAXIMUM ALLOWABE BURRS IS 0.076 mm IN ALL DIRECTIONS.
4. PIN #1 ID ON TOP (PACKAGE) WILL BE LASER MARKED.
5. DIMENSION APPLIES TO METALIZED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25 mm FROM TERMINAL TIP.
6. APPLIED ONLY FOR TERMINALS.
7. APPLIED FOR EXPOSED PAD AND TERMINALS.
8. RED CIRCLE INDICATES THERMAL VIA. SIZE SHOULD BE 0.300-0.350mm IN DIAMETER AND IT SHOULD BE CONNECTED TO GND PLANE FOR MAXIMUM THERMAL PERFORMANCE.
9. GREEN RECTANGLE (WITH SHADED AREA) INDICATES SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.93x0.93mm.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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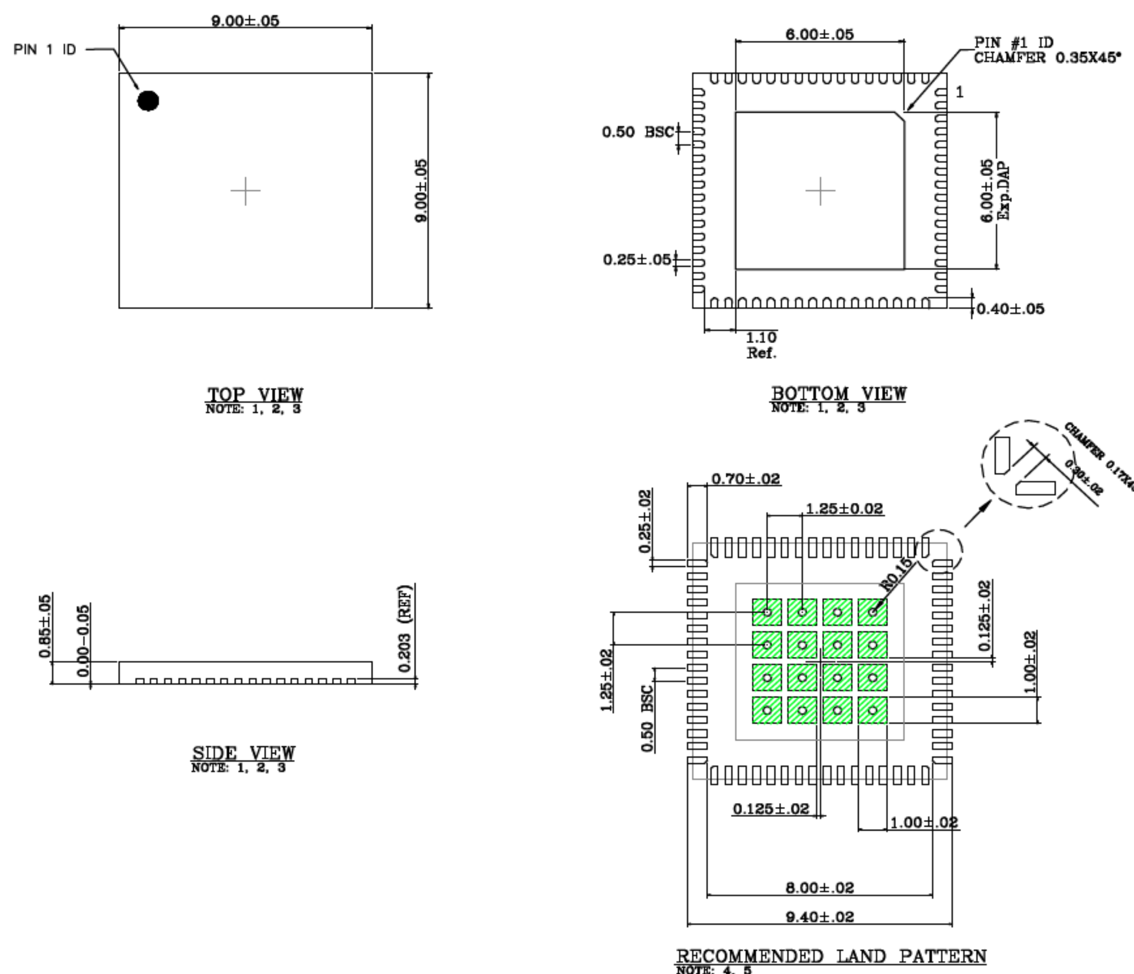
Package Outlines and Dimensions

TITLE

64 LEAD QFN 9.0x9.0mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN99-64LD-PL-1	UNIT	MM
Lead Frame Type	AgCu	Lead Finish	Matte Tin



NOTE:

1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARK.
4. RED CIRCLES IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE. PITCH IS 1.25mm.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 1.0x1.0mm, SPACING IS 0.25mm.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE

68 LEAD QFN 8x8mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN88-68LD-PL-86	UNIT	MM

TOP VIEW
NOTE : 1,2,3,4

BOTTOM VIEW
NOTE : 1,2,3

SIDE VIEW
NOTE : 1,2,3

RECOMMENDED LAND PATTERN
NOTE : 5,6,7

NOTE:

1. All dimension in mm.
2. Maximum package warpage is 0.05mm.
3. Maximum allowable burr is 0.076mm in all direction.
4. Top pin #1 ID is laser marked.
5. Red circles indicates thermal via. Size should be 0.30-0.35mm in diameter and should be connected to GND plane for maximum thermal performance.
6. Green rectangles (shaded area) indicates solder stencil opening. Exposed pad solder stencil opening is 0.93mm x 0.93mm.
7. Recommended Land Pattern is ±0.02 unless specified.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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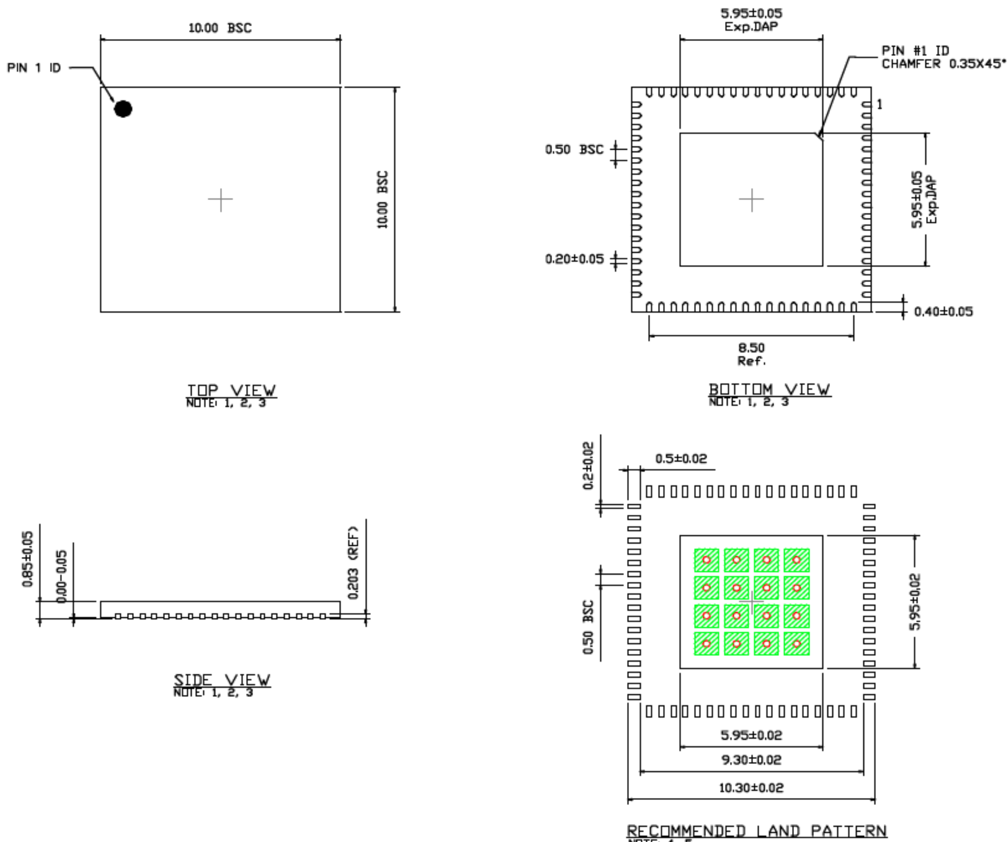
Package Outlines and Dimensions

TITLE

72 LEAD QFN 10x10mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN1010-72LD-PL-1	**UNIT**	MM
Lead Frame Type	AgCu	**Lead Finish**	Matte Tin



NOTE:

1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARK.
4. RED CIRCLES IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.3mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE. 1.0MM PITCH
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 1.0x1.0mm, SPACING IS 0.25mm.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
84 LEAD QFN 7x7mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QFN77-84LD-PL-1	UNIT	MM
Lead Frame	Substrate	Lead Finish	Matte Tin

TOP VIEW

DETAIL A

BOTTOM VIEW

SIDE VIEW

RECOMMENDED LAND PATTERN

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLE IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAXIMUM THERMAL PERFORMANCE. PITCH IS 0.90mm.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 0.70x0.70 mm, PITCH IS 0.90 mm.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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QSOP

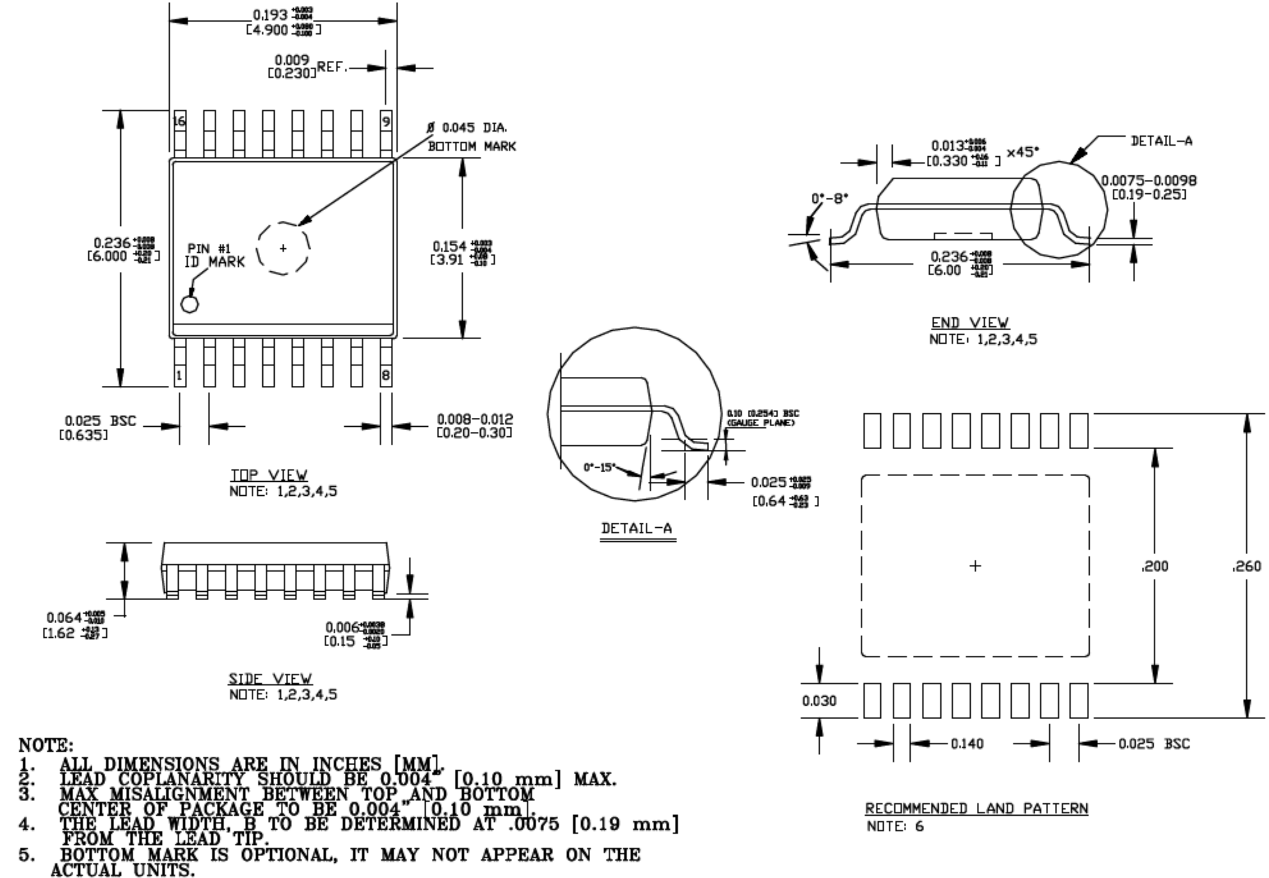
Micrel Legacy

Package Outlines and Dimensions

TITLE

16 LEAD QSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QSOP-16LD-PL-1	UNIT	INCH
Lead Frame	Copper	Lead Finish	Matte Tin



Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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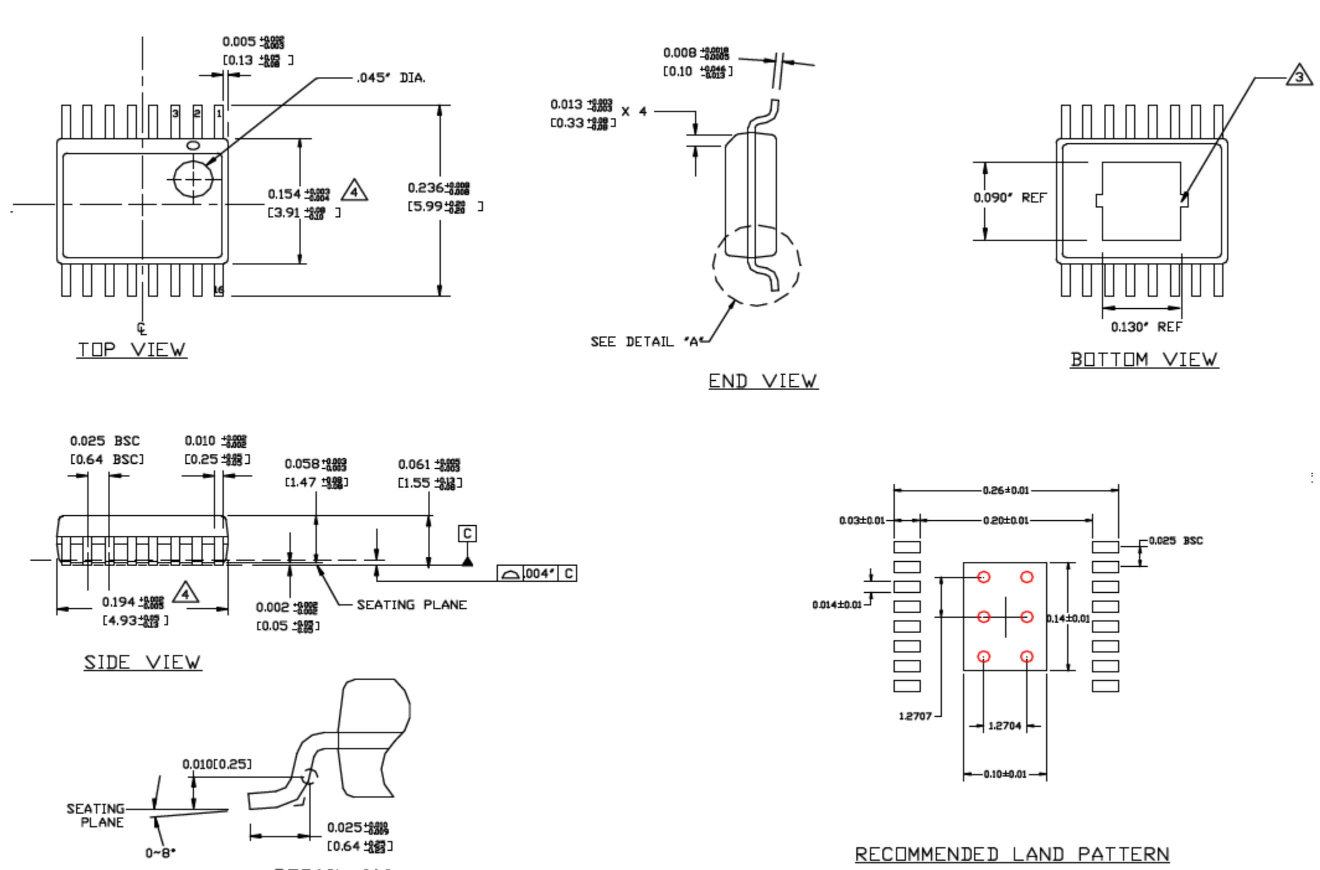
Package Outlines and Dimensions

TITLE

16 LEAD QSOP EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QSOPEP-16LD-PL-1	**UNIT**	INCH [MM]

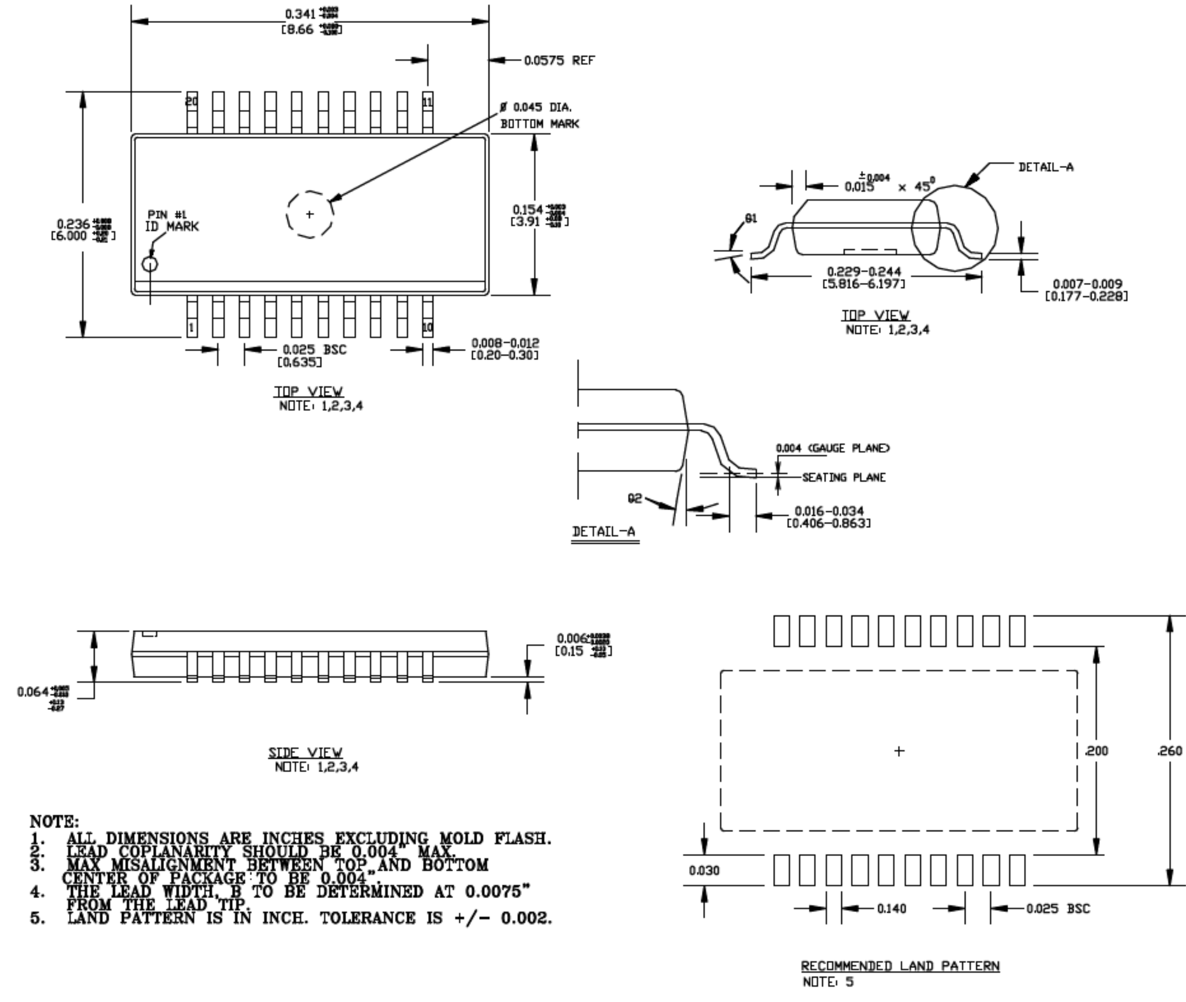


NOTE:
1. EXPOSED PAD ON BOTTOM SIDE IS TEH SAME AS LEAD FRAME PADDLE SIZE
2. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM IN DIAMETER, 1.00 PITCH AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
3. EXTRUSION OF EXPOSED PAD ON BOTTOM SIDE IS 0.20MM TYP.
4. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL EXCEED 0.006 INCHES FOR ENDS AND 0.008 INCHES FOR SIDES

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
20 LEAD QSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	QSOP-20LD-PL-1	UNIT	INCH
Lead Frame	Copper	Lead Finish	Matte Tin



NOTE:
1. ALL DIMENSIONS ARE INCHES EXCLUDING MOLD FLASH.
2. LEAD COPLANARITY SHOULD BE 0.004" MAX.
3. MAX MISALIGNMENT BETWEEN TOP AND BOTTOM CENTER OF PACKAGE TO BE 0.004".
4. THE LEAD WIDTH, B TO BE DETERMINED AT 0.0075" FROM THE LEAD TIP.
5. LAND PATTERN IS IN INCH. TOLERANCE IS +/- 0.002.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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SC70

Micrel Legacy

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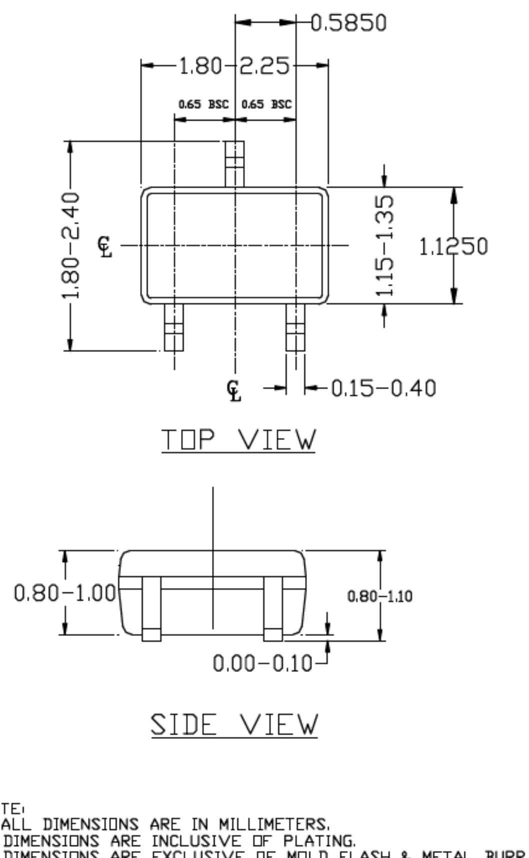
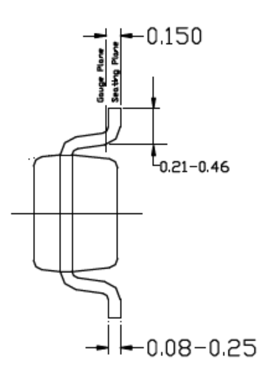
Package Outlines and Dimensions

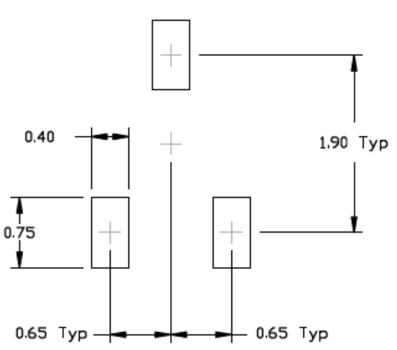
TITLE
3 LEAD SC70 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SC70-3LD-PL-1	**UNIT**	MM
Lead Frame	Copper	**Lead Finish**	Matte Tin





END VIEW



RECOMMENDED LAND PATTERN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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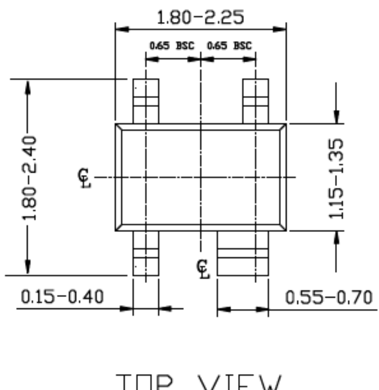
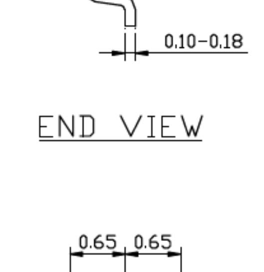
Package Outlines and Dimensions

TITLE

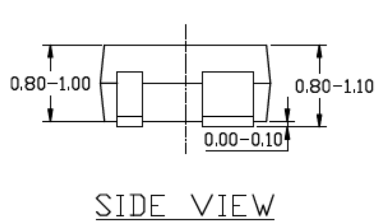
4 LEAD SC70 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SC70-4LD-PL-1	UNIT	MM





END VIEW



SIDE VIEW

0.65 0.65
0.55
1.90
1.00
0.75
1.08

RECOMMENDED LAND PATTERN

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH & METAL BURR.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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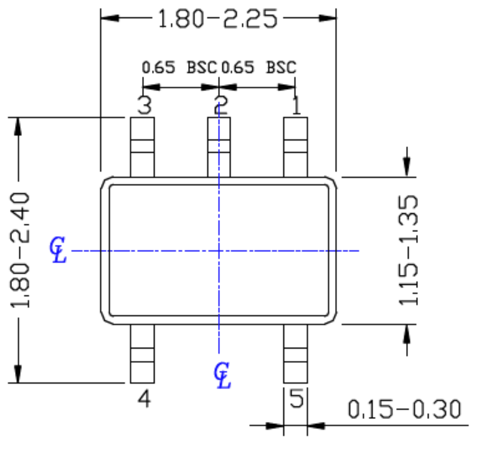
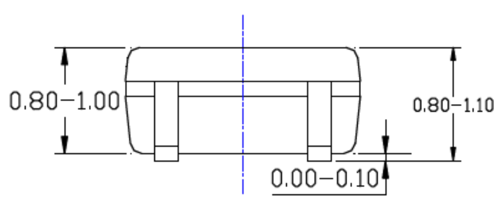
Package Outlines and Dimensions

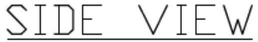
TITLE
5 LEAD SC70 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SC70-5LD-PL-1	UNIT	MM

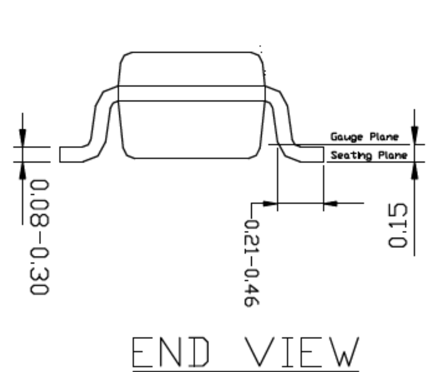


TOP VIEW

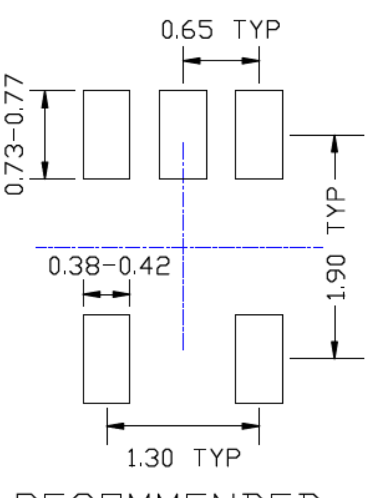




SIDE VIEW



END VIEW



RECOMMENDED LAND PATTERN

NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH & METAL BURR.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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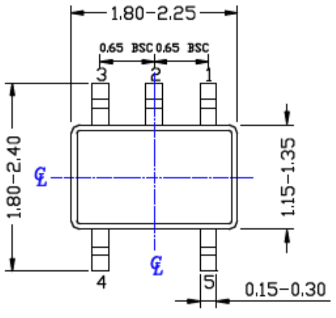
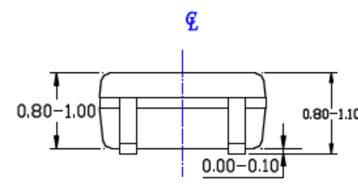
TITLE
5 LEAD SC70 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

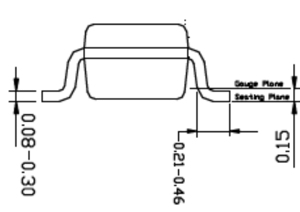
DRAWING #	SC70-5LD-PL-2	UNIT	MM



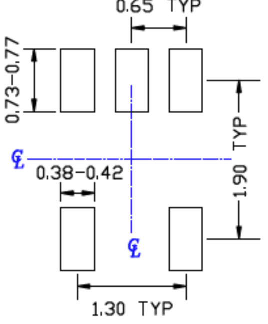
TOP VIEW



SIDE VIEW



END VIEW



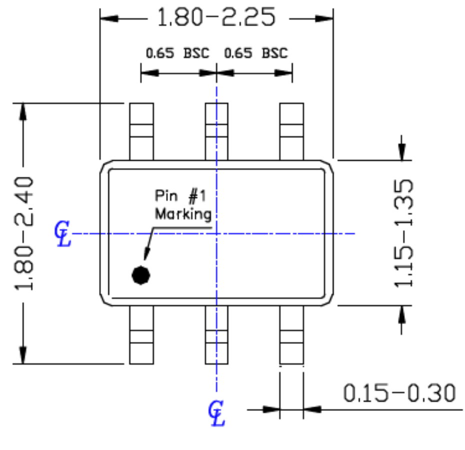
RECOMMENDED LAND PATTERN

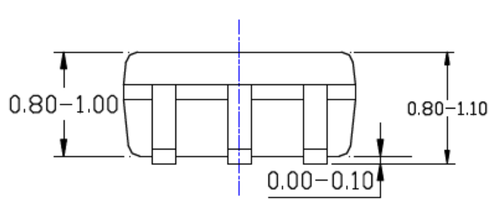
NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH & METAL BURR.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
6 LEAD SC70 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

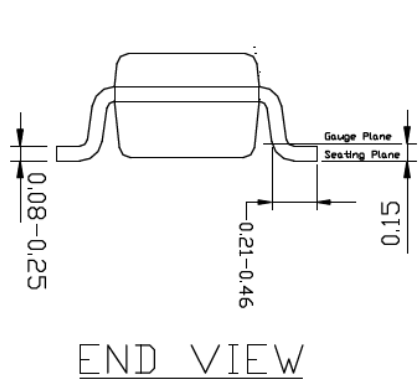
DRAWING #	SC70-6LD-PL-1	UNIT	MM



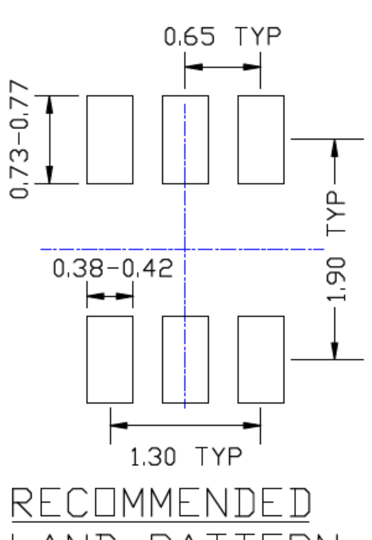


TOP VIEW

SIDE VIEW



END VIEW



RECOMMENDED LAND PATTERN

NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH & METAL BURR.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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SOIC

Micrel Legacy

TITLE

8 LEAD SOICN PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICN-8LD-PL-1	UNIT	INCH [MM]

TOP VIEW

PIN #1 ID MARK

0.236±0.008 [5.99±0.21]

0.194 $^{+0.002}_{-0.005}$ [4.93 $^{+0.05}_{-0.13}$] (3)

BOTTOM VIEW

BOTTOM MARK 0.085-0.100 DIA.

0.016 $^{+0.0032}_{-0.0022}$ [0.41 $^{+0.08}_{-0.06}$]

0.050[1.27] BSC

DETAIL "A"

-C- 0.004[0.10]

5° $^{+3°}_{-5°}$

0.025 $^{+0.025}_{-0.009}$ [0.64 $^{+0.63}_{-0.23}$]

END VIEW

SEE DETAIL "A"

0.064 $^{+0.004}_{-0.010}$ [1.63 $^{+0.10}_{-0.254}$] (A)

0.013 $^{+0.007}_{-0.003}$ ×45° [0.33 $^{+0.17}_{-0.08}$]

0.008 $^{+0.0018}_{-0.0005}$ [0.20 $^{+0.05}_{-0.01}$]

0.006 $^{+0.004}_{-0.002}$ [0.15 $^{+0.10}_{-0.05}$]

0.155 $^{+0.002}_{-0.005}$ [3.94 $^{+0.05}_{-0.13}$] (3)

RECOMMENDED LAND PATTERN

[5.50 $^{+0.05}_{-0.05}$]

[2.20 $^{+0.05}_{-0.05}$]

[0.70 $^{+0.05}_{-0.05}$]

[1.27 BSC]

NOTES:

1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.010[0.25] PER SIDE.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

8 LEAD SOICN EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICNEP-8LD-PL-1	UNIT	INCH [MM]

TOP VIEW

END VIEW

BOTTOM VIEW

DETAIL "A"

RECOMMENDED LAND PATTERN

NOTE:

1. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL EXCEED 0.006 INCHES PER SIDE
2. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.30MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAXIMUM THERMAL PERFORMANCE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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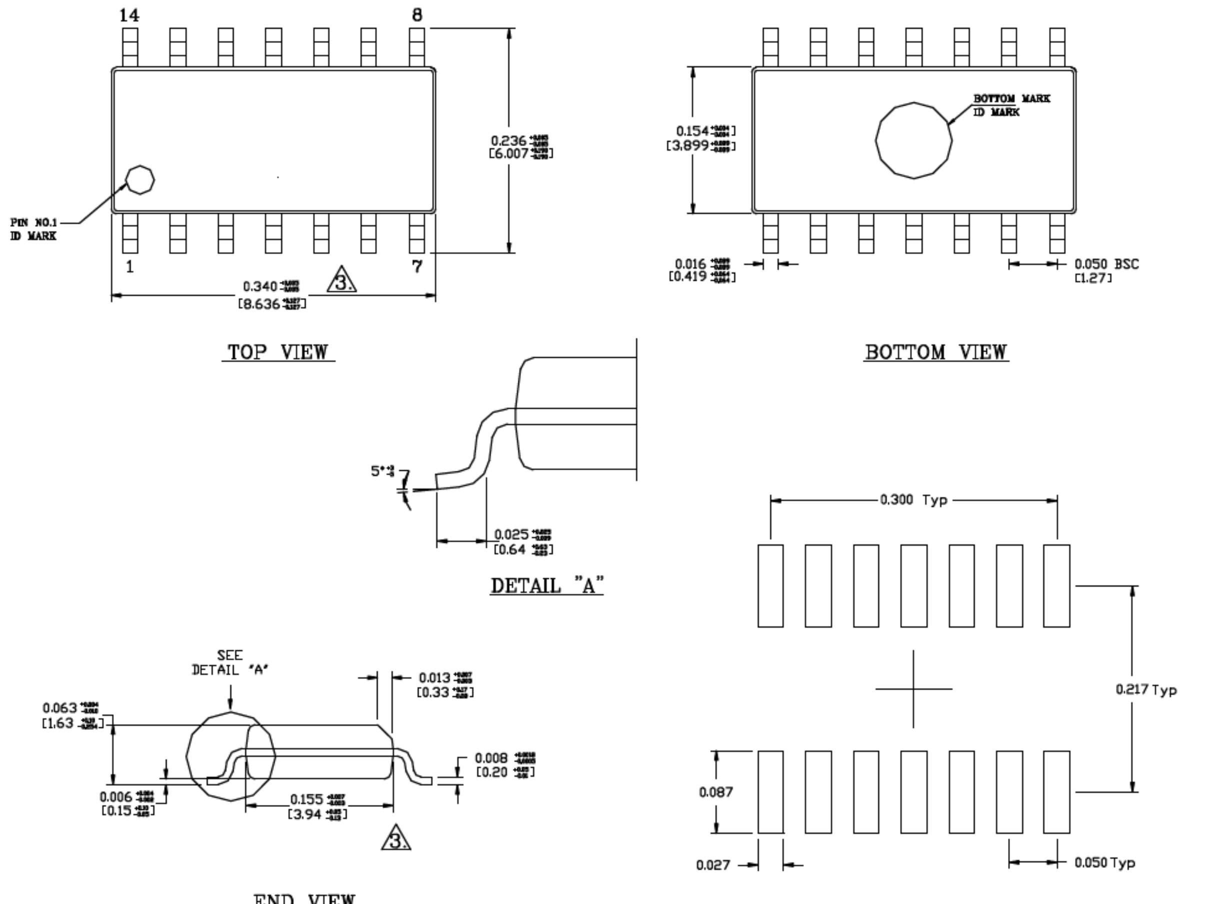
Package Outlines and Dimensions

TITLE
14 LEAD SOICN PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICN-14LD-PL-1	**UNIT**	INCH [MM]
Lead Frame	Copper	**Lead Finish**	Matte Tin



NOTES:
1. DIMENSIONS ARE IN INCHES [MILLIMETER].
2. CONTTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.010 [0.25] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

16 LEAD SOICN PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICN-16LD-PL-1	**UNIT**	INCH [MM]
Lead Frame	Copper	**Lead Finish**	Matte Tin

NOTES:
1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.010[0.25] PER SIDE.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

16 LEAD SOICW PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICW-16LD-PL-1	UNIT	INCH [MM]

16 9

PIN ID MARK [0.63-0.89 mm]

PIN #1 ID MARK

0.406 +0.008 −0.008 [10.31 +0.20 −0.20]

1 8

0.407 +0.005 −0.009 [10.34 +0.12 −0.23]

TOP VIEW

NOTE : 1, 2

9 16

0.296 +0.003 −0.004 [7.52 +0.07 −0.10]

1

0.016 +0.003 −0.002 [0.41 +0.07 −0.06]

0.050 [1.27] BSC

BOTTOM VIEW

NOTE : 1, 2

0°-8°

0.032 +0.008 −0.012 [0.81 +0.21 −0.30] 3

DETAIL "A"

0.092 +0.012 −0.002 [2.34 +0.30 −0.05]

0.013 +0.007 −0.003 [0.33 +0.38 −0.08] ×45°

SEE DETAIL "A"

0.010 +0.0025 −0.0009 [0.25 +0.07 −0.02]

0.003 +0.101 −0.002 [0.08 +0.22 −0.05]

0.296 +0.003 −0.004 [7.52 +0.07 −0.10]

END VIEW

NOTE : 1, 2, 3

[8.89 TYP]

[9.32 TYP]

[2.2]

[0.7]

[1.27 TYP]

RECOMMENDED LAND PATTERN

NOTES:

1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.006[0.15] PER SIDE.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

18 LEAD SOICW PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICW-18LD-PL-1	UNIT	INCH [MM]

18 10

0.406 +0.008 −0.008
[10.31 +0.20 −0.20]

PIN #1
ID MARK

1 9

0.455 +0.007 −0.009
[11.55 +0.18 −0.23]

TOP VIEW
NOTE : 1, 2

10 18

0.296 +0.003 −0.004
[7.52 +0.07 −0.10]

1

0.016 +0.003 −0.002
[0.41 +0.07 −0.06]

0.050 [1.27]
BSC

BOTTOM VIEW
NOTE : 1, 2

0°−8°

0.028 +0.008 −0.012 (3)
[0.72 +0.21 −0.30]

DETAIL "A"

0.092 +0.012 −0.002
[2.34 +0.30 −0.05]

0.013 +0.007 −0.003 ×45°
[0.33 +0.38 −0.08]

SEE
DETAIL "A"

0.010 +0.0025 −0.0009
[0.25 +0.07 −0.02]

0.003 +0.101 −0.002
[0.08 +0.22 −0.05]

0.296 +0.003 −0.004
[7.52 +0.07 −0.10]

END VIEW
NOTE : 1, 2, 3

[10.86 TYP]

[11.52 TYP]

[2.2]

[0.7]

[1.27 TYP]

RECOMMENDED LAND PATTERN

NOTES:
1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.006[0.15] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
20 LEAD SOICW PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICW-20LD-PL-1	UNIT	INCH [MM]

NOTES:
1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.006[0.15] PER SIDE.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE
24 LEAD SOICW PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICW-24LD-PL-1	UNIT	INCH [MM]

NOTES:
1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.006[0.15] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

28 LEAD SOICW PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICW-28LD-PL-1	UNIT	INCH [MM]

TOP VIEW

NOTE : 1, 2

BOTTOM VIEW

NOTE : 1, 2

DETAIL "A"

END VIEW

NOTE : 1, 2, 3

RECOMMENDED LAND PATTERN

NOTES:

1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. (Δ) DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.006[0.15] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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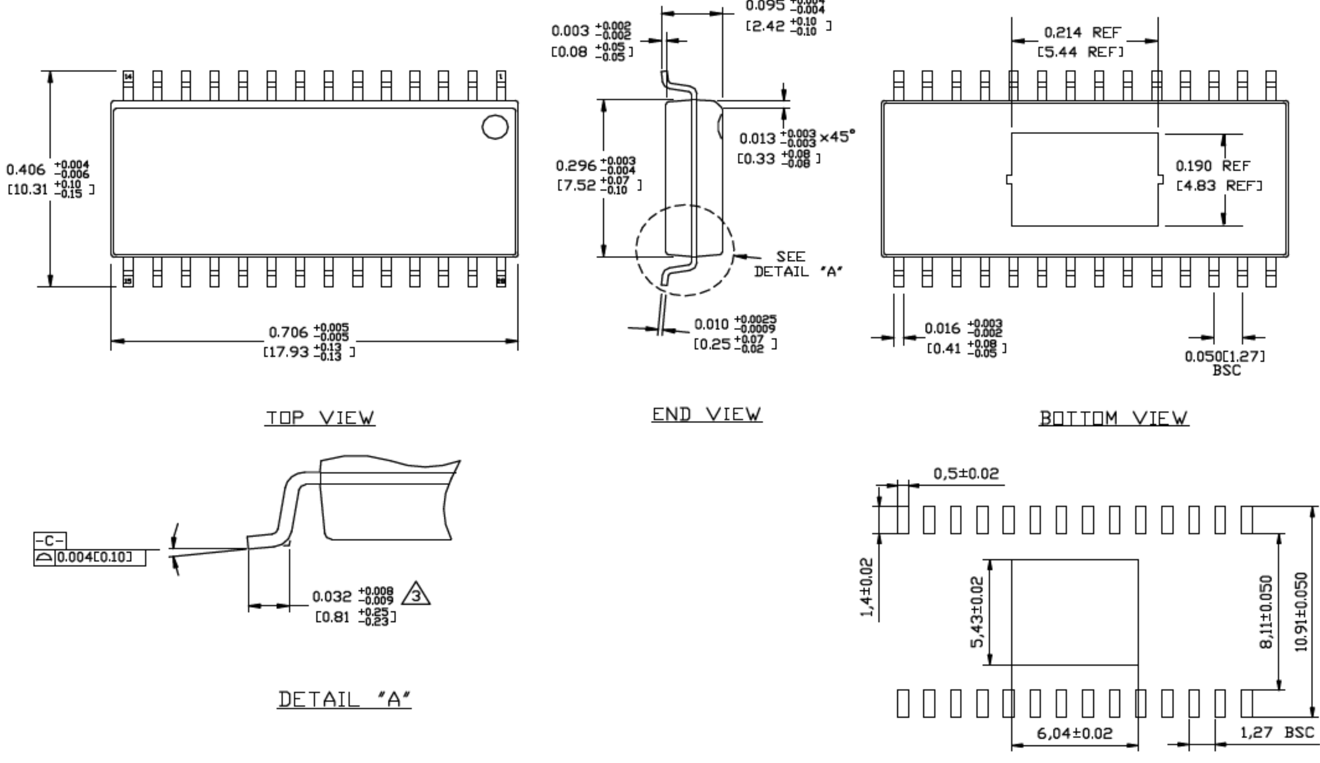
Package Outlines and Dimensions

TITLE

28 LEAD SOICW EPAD (0.300" BODY)PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICWEP-28LD-PL-1	UNIT	INCH [MM]



NOTES:

1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.006[0.15] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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NOTES:

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SOT

Micrel Legacy

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TITLE
3 LEAD SOT23 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOT23-3LD-PL-1	UNIT	MM

NOTE:

1. All dimensions are in millimeters.
2. Package surface to be matte finish VDI 11~13. Y14.5M, 1982.
3. Die is facing up for mold & trim/form.
4. (4) Dimension are exclusive mold flash and gate burr.
5. (5) Dimension are exclusive solder plating.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

5 LEAD SOT23 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOT23-5LD-PL-1	UNIT	MM

2.90±0.10
0.95 TYP
3 2 1
4 5
1.60±0.10
2.80±0.20
0.250 (MIN)
0.500 (MAX)

TOP VIEW

10° TYP (2 PLCS)
1.10±0.20
0.90 (MIN)
1.45 (MAX)
SEATING PLANE
0.00 (MIN)
0.15 (MAX)

SIDE VIEW

10° TYP (2 PLCS)
0°~ 3°
0.45±0.1
0.20 bsc Gauge Plane

DETAIL

0.09 (MIN)
0.20 (MAX)

END VIEW

1.90 BSC
0.95 BSC
3.63±0.05
2.60±0.05
1.00±0.02
0.66±0.02

RECOMMENDED LAND PATTERN

NOTE:

1. PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH & BURR.
2. PACKAGE OUTLINE INCLUSIVE OF SOLER PLATING.
3. DIMENSION AND TOLERANCE PER ANSI Y14.5M, 1982.
4. FOOT LENGTH MEASUREMENT BASED ON GAUGE PLANE METHOD.
5. DIE FACES UP FOR MOLD, AND FACES DOWN FOR TRIM/FORM.
6. ALL DIMENSIONS ARE IN MILLIMETERS.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
6 LEAD SOT23 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOT23-6LD-PL-1	UNIT	MM

2.90±0.10 ⚠5
0.950 TYP.
0.950 TYP.
Pin #1 Marking
1.50–1.75 (1.60 NOM) ⚠5
2.80±0.20
0.350(MIN)
0.500(MAX)
(6 PLCS)
TOP VIEW

10° TYP (2 plcs)
0.90 ~1.30
(0.90~1.45)
SEATING PLANE
10° TYP (2 plcs)
0.15 (MAX)
SIDE VIEW

10° TYP (2 plcs)
0.20 BSC Gauge Plane
0°~8°
0.30~0.55
DETAILED VIEW

0.09~0.20
10° TYP (2 plcs)
END VIEW

1.90 TYP
2.59 TYP
0.99±0.02
0.69±0.02
RECOMMENDED LAND PATTERN

NOTE:
1. Dimensions and tolerances are as per ANSI Y14.5M, 1982.
2. Package surface to be mirror finish.
3. Die is facing up for mold. Die is facing down for trim/form, ie. reverse trim/form.
4. The footlength measuring is based on the gauge plane method.
⚠5 Dimension are exclusive of mold flash & gate burr.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
8 LEAD SOT23 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOT23-8LD-PL-1	**UNIT**	MM
Lead Frame	Copper Alloy	**Lead Finish**	Matte Tin

TOP VIEW

SIDE VIEW

VARIATION(ALL DIMENSIONS SHOWN IN MM)

SYMBOL	MIN.	NOM.	MAX.
A	–	–	1.45
A1	0.00	–	0.15
A2	0.90	1.15	1.30
b	0.22	–	0.38
c	0.08	–	0.22
D		2.90 BSC.	
E		2.80 BSC.	
E1		1.60 BSC.	
e		0.65 BSC.	
e1		1.95 BSC.	
L	0.30	0.45	0.60
L1		0.60 REF.	
L2		0.25 BSC.	
R	0.10	–	–
R1	0.10	–	0.25
θ	0°	4°	8°
θ1	5°	10°	15°

NOTE :
1. JEDEC OUTLINE : MO-178 BA.

END VIEW

DETAIL A

RECOMMENDED LAND PATTERN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

4 LEAD SOT143 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOT143-4LD-PL-1	UNIT	MM

2.92±0.12 (4)
0.950 TYP.
0.950 TYP.
1.30±0.10 (4)
2.37±0.27
0.760(MIN)
0.940(MAX)
0.360(MIN)
0.520(MAX)
(3 PLCS)

TOP VIEW

10° TYP (2 plcs)
1.00 +0.15 -0.11
SEATING PLANE
10° TYP (2 plcs)
0.013(MIN)
0.100(MAX)

SIDE VIEW

10° TYP (2 plcs)
0°~3°
0.31 ± 0.1

DETAILED

10° TYP (2 plcs)
0.100 (5)

END VIEW

1.90 TYP
1.44±0.02
1.20±0.02
1.00±0.02
2.20 TYP
1.44±0.02
1.70 TYP

RECOMMENDED LAND PATTERN

NOTE:

1. Dimensions and tolerances are as per ANSI Y14.5M, 1982.
2. Package surface to be mirror finish.
3. Die is facing up for mold & trim/form.
4. Dimension are exclusive of mold flash and gate burr.
5. Dimension are exclusive of solder plating.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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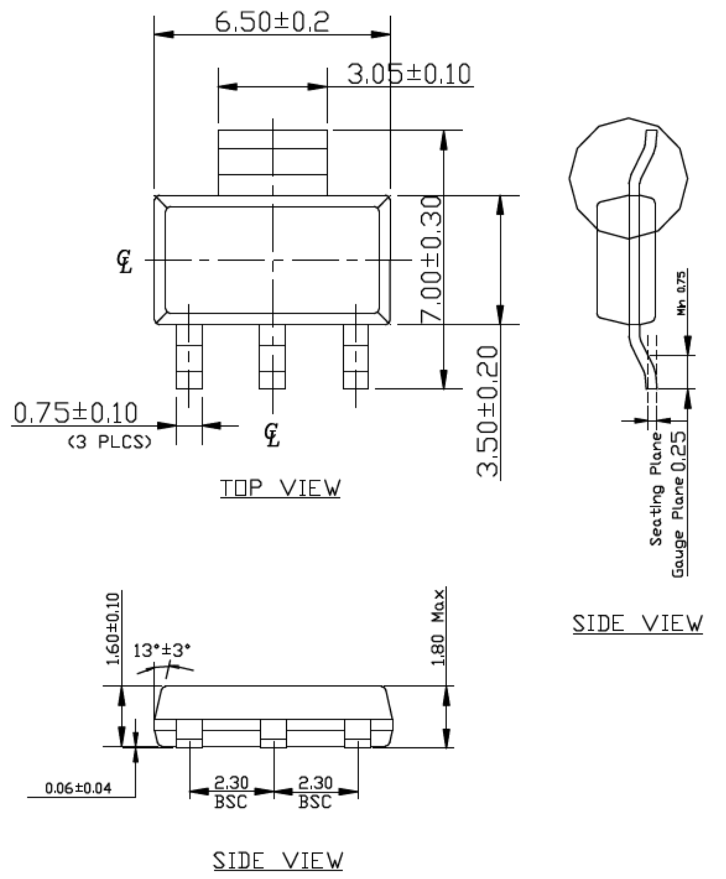
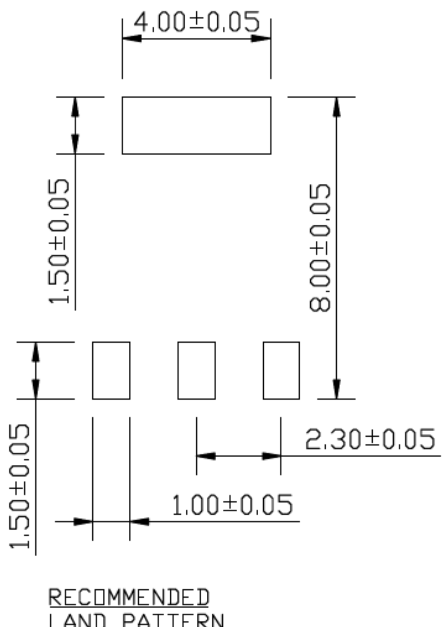
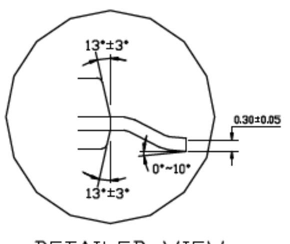
TITLE

3 LEAD SOT223 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOT223-3LD-PL-1	UNIT	MM







NOTE:

1. Dimensions and tolerances are as per ANSI Y14.5M, 1982.
2. Controlling dimension: Millimeters.
3. Dimensions are exclusive of mold flash and gate burr.
4. All specification comply to Jedec spec TO261 Issue C.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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SPAK

Micrel Legacy

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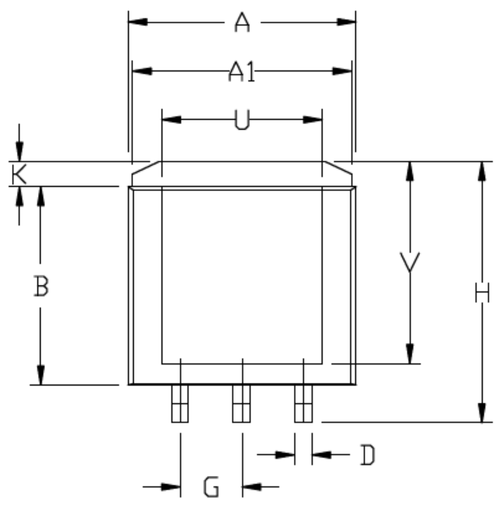
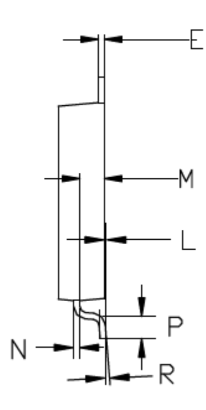
Package Outlines and Dimensions

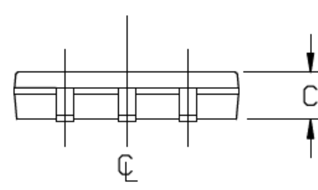
TITLE
3 LEAD SPAK PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

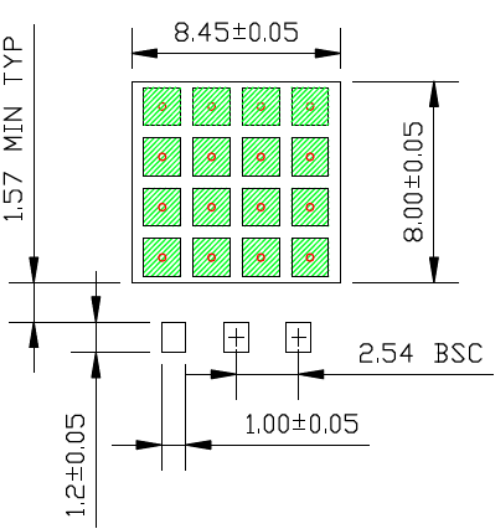
DRAWING #	SPAK-3LD-PL-1	UNIT	INCH/MM





	INCHES		MILLIMETERS	
A	0.365	0.375	9.27	9.52
A1	0.350	0.360	8.89	9.14
B	0.310	0.320	7.87	8.13
C	0.070	0.080	1.78	2.03
D	0.025	0.031	0.63	0.79
E	0.010	BSC	0.25	BSC
G	0.100	BSC	2.54	BSC
H	0.410	0.420	10.41	10.67
K	0.030	0.050	0.76	1.27
L	0.001	0.005	0.03	0.13
M	0.035	0.045	0.89	1.14
N	0.010	BSC	0.25	BSC
P	0.031	0.041	0.79	1.04
R	0°	6°	0°	6°
U	0.256	BSC	6.50	BSC
V	0.316	BSC	8.03	BSC





RECOMMENDED LAND PATTERN (UNIT: MM)

NOTE:
1. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
2. DIMENSION INCLUDES PLATING THICKNESS. SOLDER MASK OPENING
3. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA, 0.30MM IN DIAMETER & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
4. GREEN RECTANGLES IN LAND PATTERN REPRESENT SOLDER STENCIL OPENING (OPTIONAL), 1.50X1.50MM.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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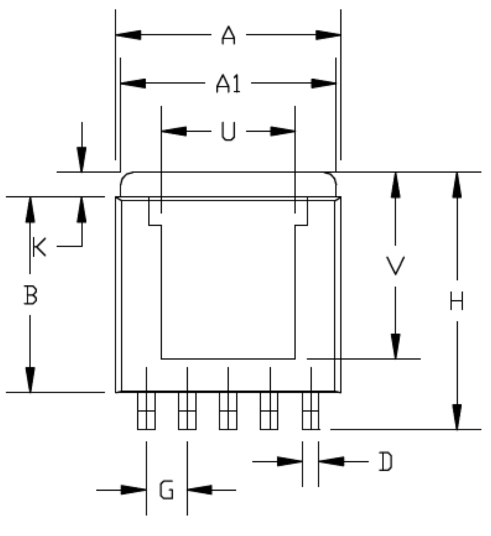
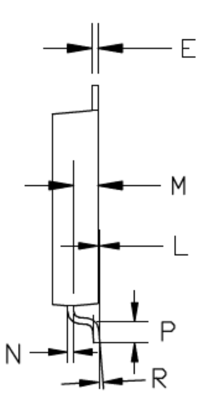
Package Outlines and Dimensions

TITLE

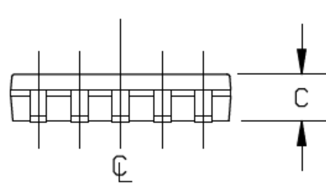
5 LEAD SPAK PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

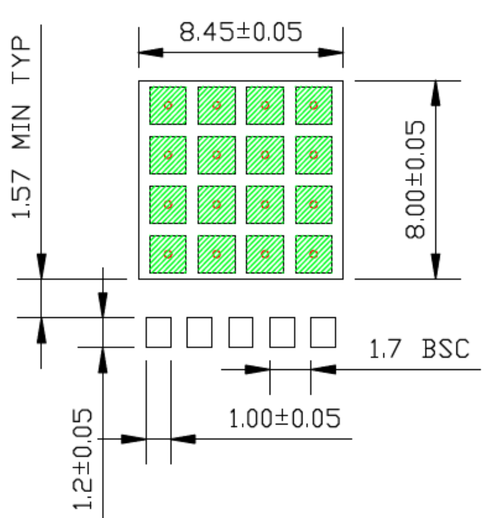
DRAWING #	SPAK-5LD-PL-1	**UNIT**	MM





	INCHES		MILLIMETERS	
A	0.365	0.375	9.27	9.52
A1	0.350	0.360	8.89	9.14
B	0.310	0.320	7.87	8.13
C	0.070	0.080	1.78	2.03
D	0.025	0.031	0.63	0.79
E	0.010	BSC	0.25	BSC
G	0.067	BSC	1.70	BSC
H	0.410	0.420	10.41	10.67
K	0.030	0.050	0.76	1.27
L	0.001	0.005	0.03	0.13
M	0.035	0.045	0.89	1.14
N	0.010	BSC	0.25	BSC
P	0.031	0.041	0.79	1.04
R	0°	6°	0°	6°
U	0.220	BSC	5.58	BSC
V	0.296	BSC	7.52	BSC





NOTE:

1. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
2. DIMENSION INCLUDES PLATING THICKNESS. SOLDER MASK OPENING
3. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA, 0.30MM IN DIAMETER & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
4. GREEN RECTANGLES IN LAND PATTERN REPRESENT SOLDER STENCIL OPENING (OPTIONAL), 1.50X1.50MM.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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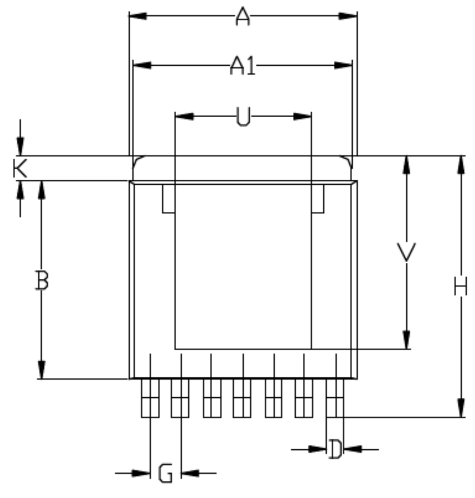
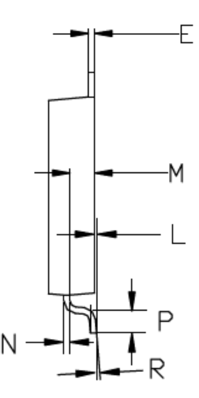
Package Outlines and Dimensions

TITLE

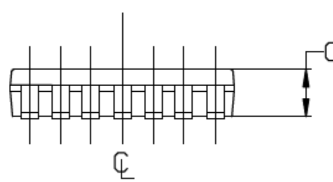
7 LEAD SPAK PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

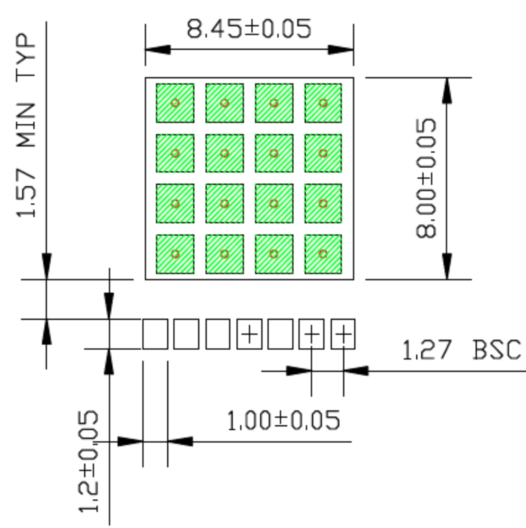
DRAWING #	SPAK-7LD-PL-1	**UNIT**	INCH/MM





	INCHES		MILLIMETERS	
A	0.365	0.375	9.27	9.52
A1	0.350	0.360	8.89	9.14
B	0.310	0.320	7.87	8.13
C	0.070	0.080	1.78	2.03
D	0.025	0.031	0.63	0.79
E	0.010	BSC	0.25	BSC
G	0.050	BSC	1.27	BSC
H	0.410	0.420	10.41	10.67
K	0.030	0.050	0.76	1.27
L	0.001	0.005	0.03	0.13
M	0.035	0.045	0.89	1.14
N	0.010	BSC	0.25	BSC
P	0.031	0.041	0.79	1.04
R	0°	6°	0°	6°
U	0.220	BSC	5.58	BSC
V	0.296	BSC	7.52	BSC





NOTE:
1. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
2. DIMENSION INCLUDES PLATING THICKNESS. SOLDER MASK OPENING
3. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIA, 0.30MM IN DIAMETER & SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
4. GREEN RECTANGLES IN LAND PATTERN REPRESENT SOLDER STENCIL OPENING (OPTIONAL), 1.50X1.50MM.

RECOMMENDED LAND PATTERN (UNIT: MM)

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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SSOP

Micrel Legacy

TITLE
16 LEAD SSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SSOP-16LD-PL-1	**UNIT**	INCH [MM]

3 2 1
16
0.307 ±0.004/0.006
[7.80 ±0.10/0.15]

TOP VIEW
NOTE : 1, 2

BOTTOM VIEW
NOTE : 1, 2

0.0256 BSC
[0.65]
0.125 ±0.025
[0.32 ±0.06/0.07]
0.073 ±0.005
[1.86 ±0.13]
0.244 ±0.005
[6.20 ±0.13]
0.005 ±0.003
[0.13 ±0.08]
SEATING PLANE

SIDE VIEW
NOTE : 1, 2

GAUGE PLANE
0.10[0.25] BSC
0.030 ±0.007/0.005
[0.75 ±0.20/0.12]
SEATING PLANE
0~8°
0.049 REF.
[1.25]

DETAIL 'A'

12-16°
0.068 ±0.002
[1.73 ±0.05]
0.209 ±0.003/0.004
[7.80 ±0.08/0.10]
SEE DETAIL 'A'
0.006 ±0.002
[0.15 ±0.07/0.06]

END VIEW
NOTE : 1, 2, 3

[0.65 TYP]
[6.55 TYP]
[2.25]
[0.43]
[4.55 TYP]

RECOMMENDED LAND PATTERN

NOTES:
1. DIMENSIONS ARE INCHES [MM].
2. CONTROL DIMENSION: MILLIMETERS.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OR WHICH SHALL NOT EXCEED 0.006[0.15] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
20 LEAD SSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SSOP-20LD-PL-1	UNIT	MM

TOP VIEW
NOTE : 1, 2, 6

BOTTOM VIEW

END VIEW
NOTE : 1, 2, 4

SECTION G-G (10)
NOTE : 8, 10

SIDE VIEW
NOTE : 3, 4, 7, 8

DETAIL 'A'
NOTE : 5

RECOMMENDED LAND PATTERN

NOTES:
1. MAXIMUM DIE THICKNESS ALLOWABLE IS 0.43mm (.017 INCHES).
2. DIMENSIONING & TOLERANCES PER ANSI.Y14.5M-1982.
3. (triangle) "T" IS A REFERENCE DATUM.
4. (triangle) "D" & "E" ARE REFERENCE DATUMS AND DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS, BUT DO INCLUDE MOLD MISMATCH AND ARE MEASURED AT THE PARTING LINE, MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15mm PER SIDE.
5. (triangle) DIMENSION IS THE LENGTH OF TERMINAL FOR SOLDERING TO A SUBSTRATE.
6. (triangle) TERMINAL POSITIONS ARE SHOWN FOR REFERENCE ONLY.
7. (triangle) FORMED LEADS SHALL BE PLANAR WITH RESPECT TO ONE ANOTHER WITHIN 0.08mm AT SEATING PLANE.
8. (triangle) DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION/INTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13mm TOTAL IN EXCESS OF DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR INTRUSION SHALL NOT REDUCE DIMENSION BY MORE THAN 0.07mm AT LEAST MATERIAL CONDITION.
9. CONTROLLING DIMENSION: MILLIMETERS.
10. (triangle) THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25mm FROM LEAD TIPS.
11. THIS PACKAGE OUTLINE DRAWING COMPLIES WITH JEDEC SPECIFICATION NO. MO-150 FOR THE LEAD COUNTS SHOWN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE
24 LEAD SSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SSOP-24LD-PL-1	UNIT	MM

TOP VIEW
NOTE : 1, 2, 6

BOTTOM VIEW

END VIEW
NOTE : 1, 2, 4

SECTION G-G 10
NOTE : 8, 10

SIDE VIEW
NOTE : 3, 4, 7, 8

DETAIL 'A'
NOTE : 5

NOTES:

1. MAXIMUM DIE THICKNESS ALLOWABLE IS 0.43mm (.017 INCHES).
2. DIMENSIONING & TOLERANCES PER ANSI.Y14.5M-1982.
3. "T" IS A REFERENCE DATUM.
4. "D" & "E" ARE REFERENCE DATUMS AND DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS, BUT DO INCLUDE MOLD MISMATCH AND ARE MEASURED AT THE PARTING LINE, MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15mm PER SIDE.
5. DIMENSION IS THE LENGTH OF TERMINAL FOR SOLDERING TO A SUBSTRATE.
6. TERMINAL POSITIONS ARE SHOWN FOR REFERENCE ONLY.
7. FORMED LEADS SHALL BE PLANAR WITH RESPECT TO ONE ANOTHER WITHIN 0.08mm AT SEATING PLANE.
8. DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION/INTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13mm TOTAL IN EXCESS OF DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR INTRUSION SHALL NOT REDUCE DIMENSION BY MORE THAN 0.07mm AT LEAST MATERIAL CONDITION.
9. CONTROLLING DIMENSION: MILLIMETERS.
10. THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25mm FROM LEAD TIPS.
11. THIS PACKAGE OUTLINE DRAWING COMPLIES WITH JEDEC SPECIFICATION NO. MO-150 FOR THE LEAD COUNTS SHOWN

RECOMMENDED LAND PATTERN

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE

28 LEAD SSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SSOP-28LD-PL-1	**UNIT**	MM

TOP VIEW
NOTE : 1, 2, 6

BOTTOM VIEW

END VIEW
NOTE : 1, 2, 4

SECTION G-G
NOTE : 8, 10

SIDE VIEW
NOTE : 3, 4, 7, 8

DETAIL 'A'
NOTE : 5

RECOMMENDED LAND PATTERN

NOTES:

1. MAXIMUM DIE THICKNESS ALLOWABLE IS 0.43mm (.017 INCHES).
2. DIMENSIONING & TOLERANCES PER ANSI.Y14.5M-1982.
3. "T" IS A REFERENCE DATUM.
4. "D" & "E" ARE REFERENCE DATUMS AND DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS, BUT DO INCLUDE MOLD MISMATCH AND ARE MEASURED AT THE PARTING LINE, MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15mm PER SIDE.
5. DIMENSION IS THE LENGTH OF TERMINAL FOR SOLDERING TO A SUBSTRATE.
6. TERMINAL POSITIONS ARE SHOWN FOR REFERENCE ONLY.
7. FORMED LEADS SHALL BE PLANAR WITH RESPECT TO ONE ANOTHER WITHIN 0.08mm AT SEATING PLANE.
8. DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION/INTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13mm TOTAL IN EXCESS OF DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR INTRUSION SHALL NOT REDUCE DIMENSION BY MORE THAN 0.07mm AT LEAST MATERIAL CONDITION.
9. CONTROLLING DIMENSION: MILLIMETERS.
10. THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25mm FROM LEAD TIPS.
11. THIS PACKAGE OUTLINE DRAWING COMPLIES WITH JEDEC SPECIFICATION NO. MO-150 FOR THE LEAD COUNTS SHOWN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE

48 LEAD SSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SSOP-48LD-PL-1	UNIT	MM

SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM	MAX.	MIN.	NOM	MAX.
A	2.413	2.591	2.794	0.095	0.102	0.110
A1	0.203	0.305	0.406	0.008	0.012	0.016
b	0.203		0.343	0.008		0.014
b1	0.203	0.254	0.305	0.008	0.010	0.012
c	0.127		0.254	0.005		0.010
c1	0.127		0.216	0.005		0.009
E	10.058	10.312	10.566	0.396	0.406	0.416
E1	7.391	7.493	7.595	0.291	0.295	0.299
e	0.635 BASIC			0.025 BASIC		
h	0.381		0.635	0.015		0.025
L	0.508		1.016	0.020		0.040
L1	0.254 BASIC			0.010 BASIC		
R1						
θ	0		5	0		5
D	15.748	15.875	16.002			

NOTES :

1. THE DIAGRAMS DO NOT REPRESNET THE ACTUAL PIN COUNT.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TDFN

Micrel Legacy

TITLE

6 LEAD TDFN 2x2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN (0.65mm lead pitch)

DRAWING #	TDFN22-6LD-PL-1	UNIT	MM

NOTE:
1. MAX PACKAGE WARPAGE IS 0.08 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN REPRESENTS THERMAL VIA. SIZE SHOULD BE 0.30-0.3 MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) REPRESENTS SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 1.10x0.60 MM.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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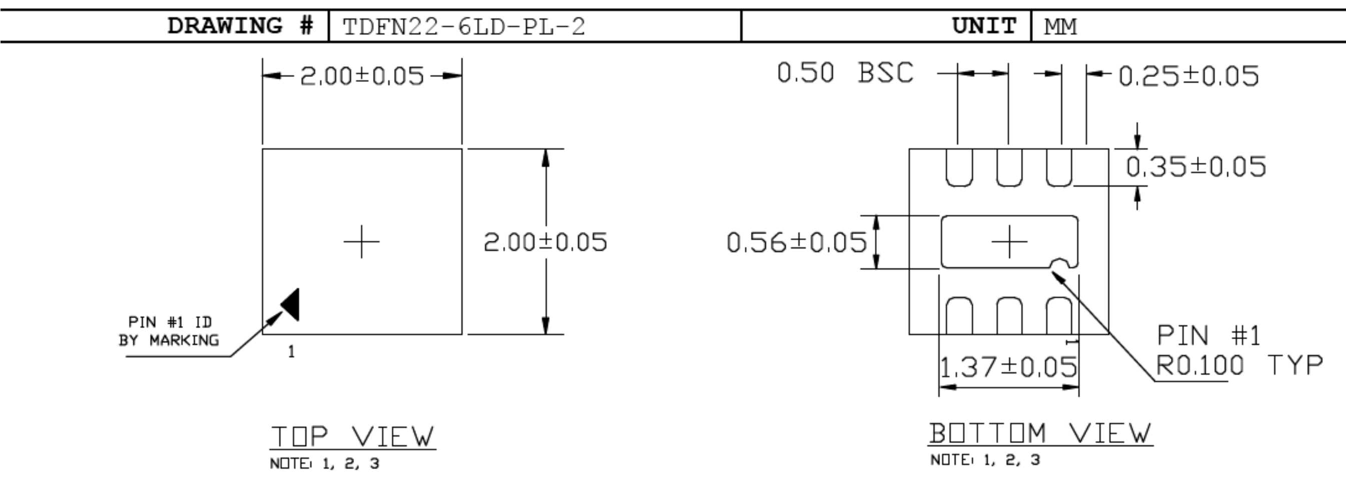
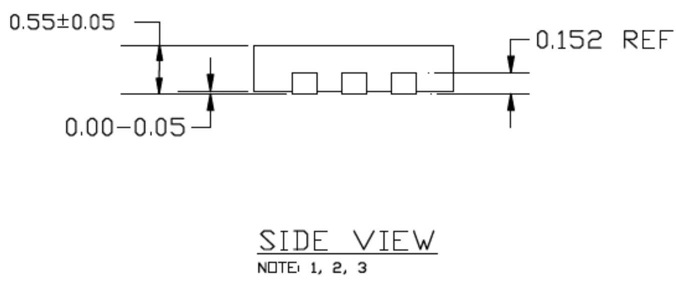
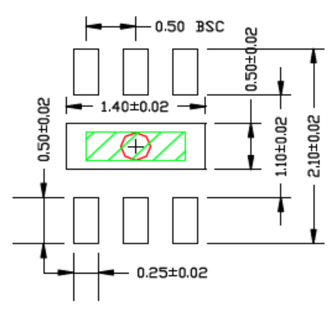
TITLE

6 LEAD TDFN 2X2mm (0.50mm LEAD PITCH) PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TDFN22-6LD-PL-2	UNIT	MM







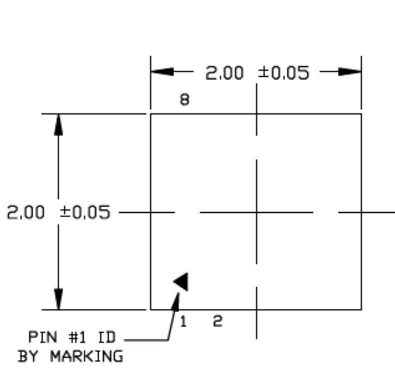
RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLE (SHADED AREA) REPRESENTS OPTIONAL SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 1.00x0.30 MM.

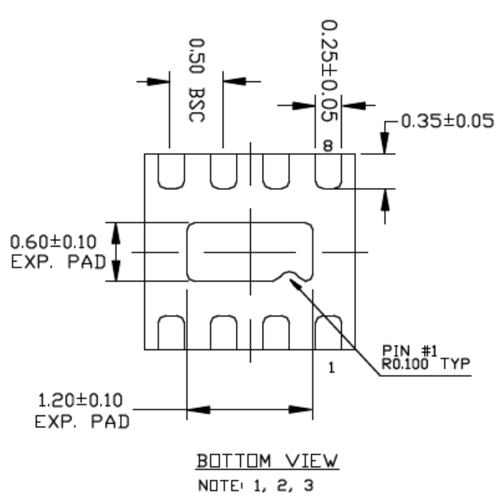
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
8 LEAD TDFN 2x2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

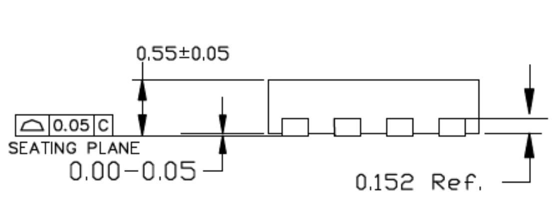
DRAWING #	TDFN22-8LD-PL-1	UNIT	MM



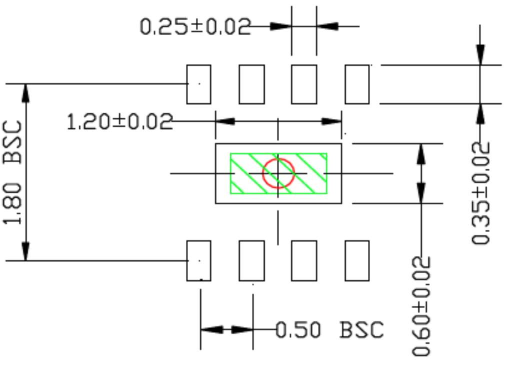
TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



END VIEW
NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN REPRESENTS THERMAL VIA. SIZE SHOULD BE 0.30-0.3 MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) REPRESENTS SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE SHOULD BE 0.40x0.90 MM.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

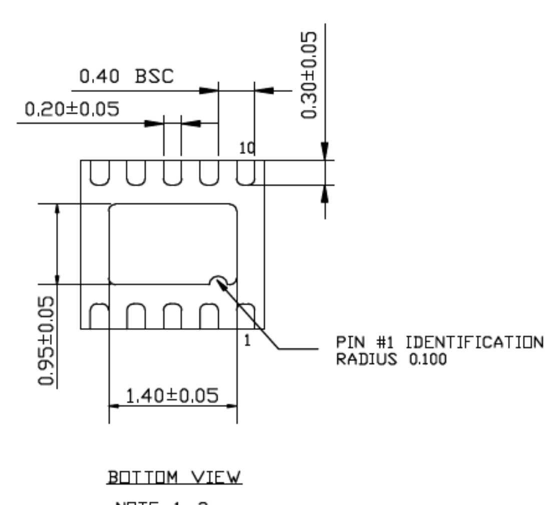
10 LEAD TDFN 2.0x2.0mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TDFN22-10LD-PL-1	UNIT	MM

2.00±0.05
10
2.00±0.05
1
PIN 1 TRIANGLE BY MARKING

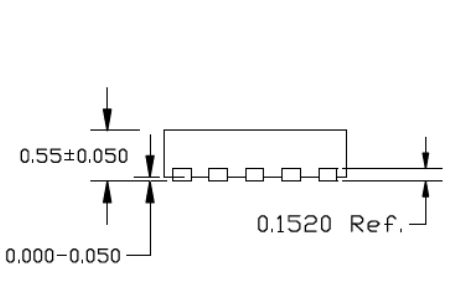
TOP VIEW

NOTE: 1, 2, 3



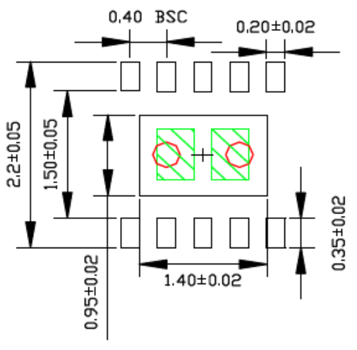
BOTTOM VIEW

NOTE: 1, 2



SIDE VIEW

NOTE: 1, 2



RECOMMENDED LAND PATTERN

NOTE: 4

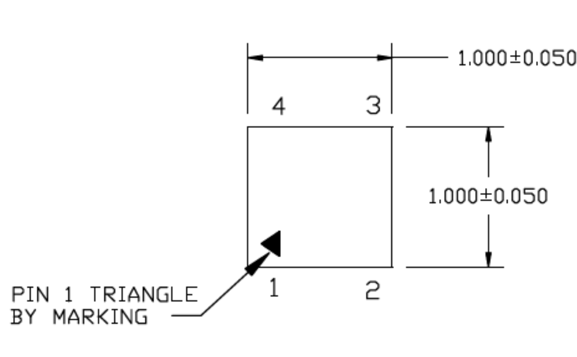
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) INDICATE STENCIL OPENING ON EXPOSED AREA. SIZE IS 0.6X0.4MM, SPACING IS 0.2MM.
5. RED CIRCLES REPRESENT THERMAL VIAS AND SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 – 0.35 MM RECOMMENDED DIAMETER, 0.80 MM PITCH.

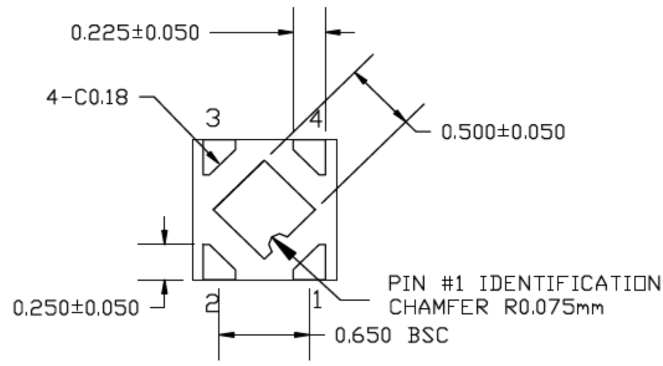
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

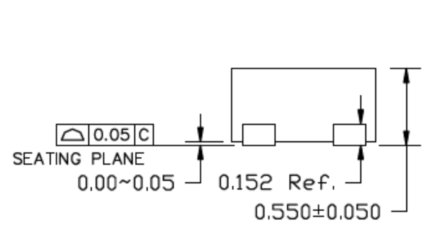
Package Outlines and Dimensions

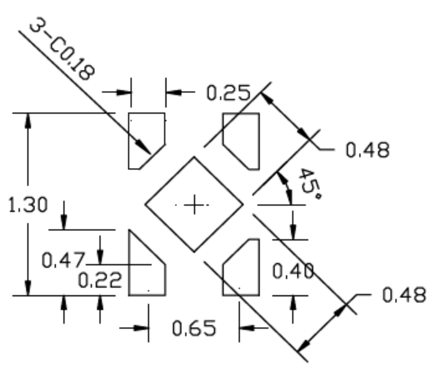
TITLE
4 LEAD TDFN 1.0x1.0mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TDFN1010-4LD-PL-2	UNIT	MM









NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. UNSPECIFIED TOLERANCE IS +/- 0.05 MM

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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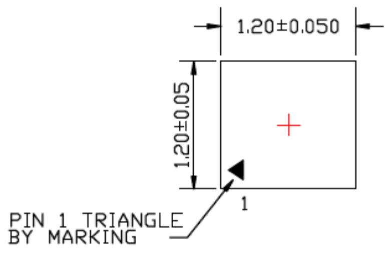
TITLE

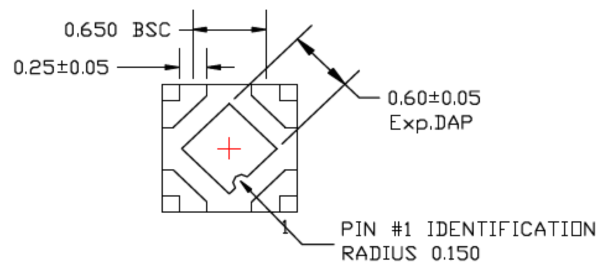
4 LEAD TDFN 1.2x1.2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TDFN1212-4LD-PL-1	UNIT	MM



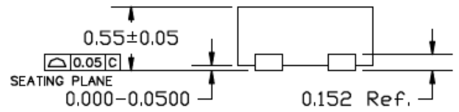
TOP VIEW

NOTE: 1, 2, 3



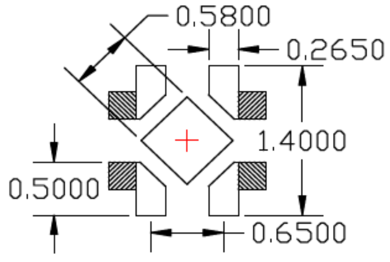
BOTTOM VIEW

NOTE: 1, 2, 3



SIDE VIEW

NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN

NOTE: 4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. SHADED AREA INDICATE SOLDER STENCIL OPENING (OPTIONAL) FOR IMPROVED THERMAL PERFORMANCE

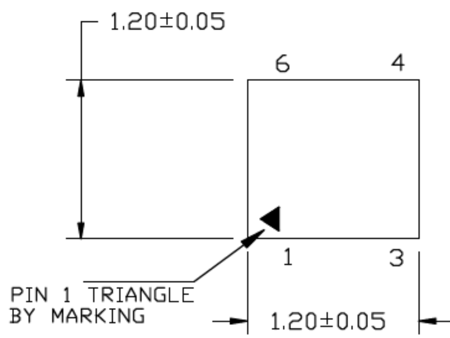
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE

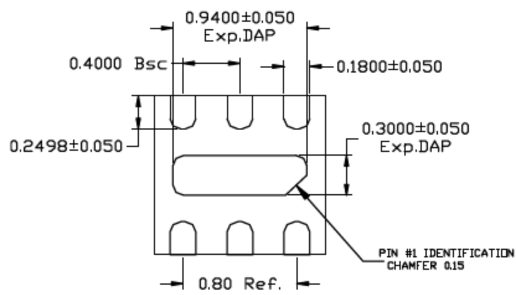
6 LEAD TDFN 1.2x1.2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TDFN1212-6LD-PL-1	UNIT	MM



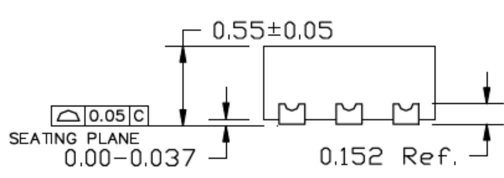
TOP VIEW

NOTE: 1, 2, 3



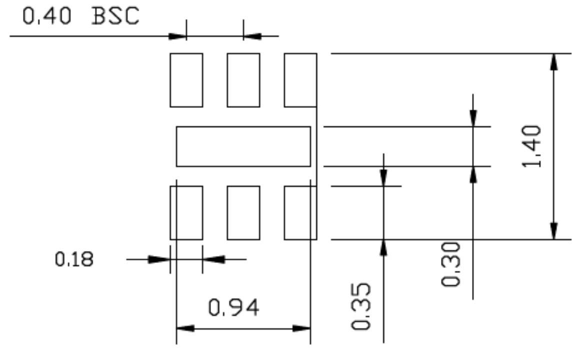
BOTTOM VIEW

NOTE: 1, 2, 3



SIDE VIEW

NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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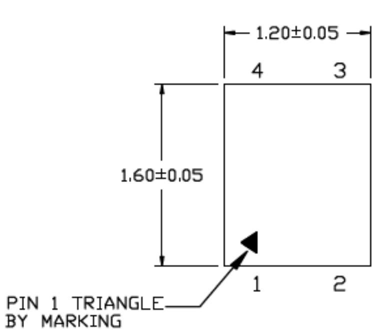
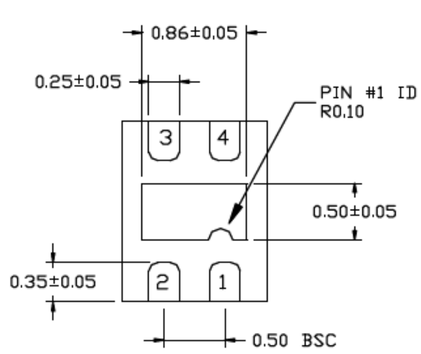
TITLE
4 LEAD TDFN 1.2x1.6mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

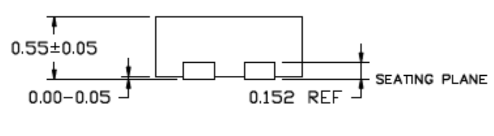
DRAWING #	TDFN1216-4LD-PL-1	UNIT	MM



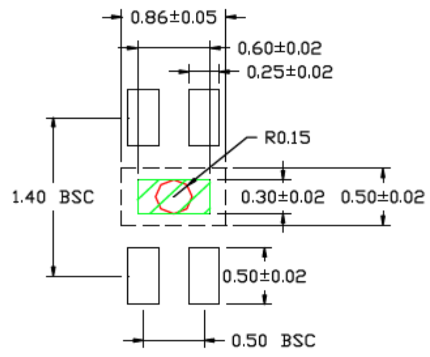
TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



SIDE VIEW
NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN
NOTE: 4, 5

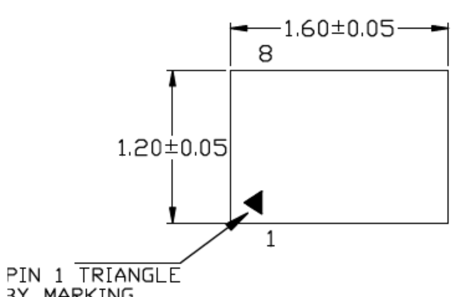
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. GREEN SHADED AREA INDICATES SOLDER STENCIL OPENING (OPTIONAL) FOR IMPROVED THERMAL PERFORMANCE. RECOMMENDED SIZE is 0.60mm x 0.30mm.
5. RED CIRCLE REPRESENTS THERMAL VIA & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. RECOMMENDED DIAMETER is 0.30mm - 0.35mm.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE

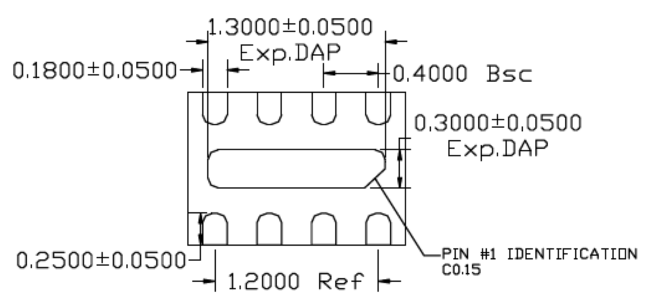
8 LEAD TDFN 1.6x1.2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TDFN1612-8LD-PL-1	UNIT	MM



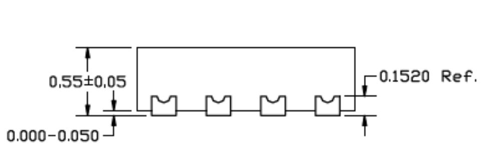
TOP VIEW

NOTE: 1, 2, 3



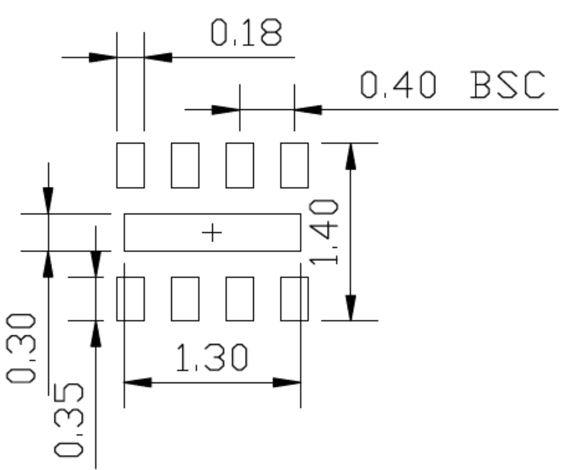
BOTTOM VIEW

NOTE: 1, 2, 3



SIDE VIEW

NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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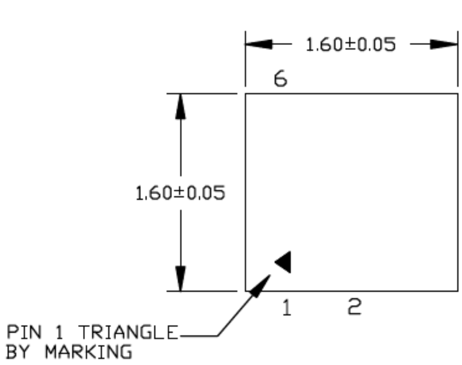
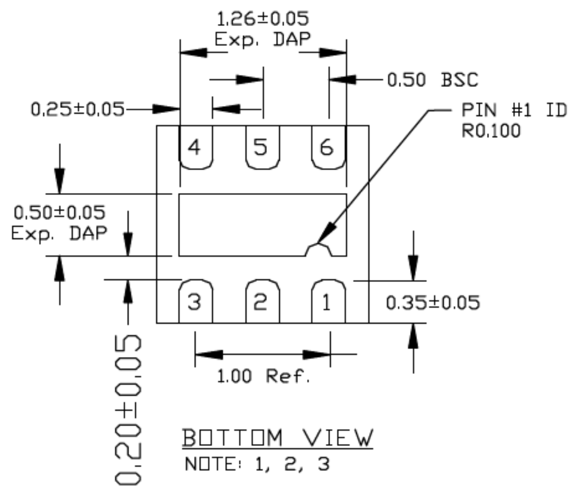
TITLE
6 LEAD TDFN 1.6x1.6mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

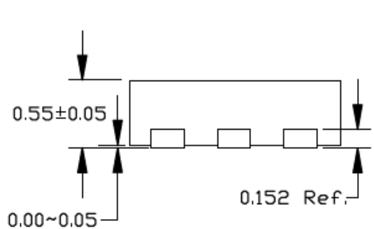
DRAWING #	TDFN1616-6LD-PL-1	UNIT	MM



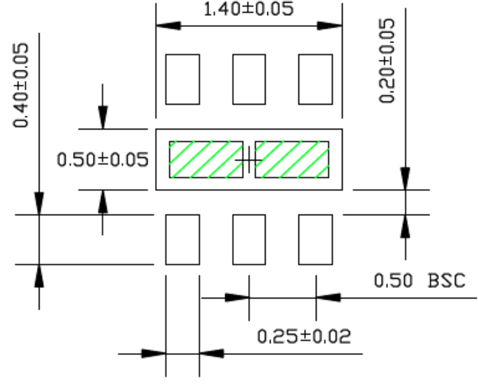
TOP VIEW
NOTE: 1, 2, 3



BOTTOM VIEW
NOTE: 1, 2, 3



SIDE VIEW
NOTE: 1, 2, 3



RECOMMENDED LAND PATTERN
NOTE: 4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN SHADED AREA REPRESENT SOLDER STENCIL OPENING (OPTIONAL) FOR IMPROVED THERMAL PERFORMANCE. SIZE: 0.55x0.30MM

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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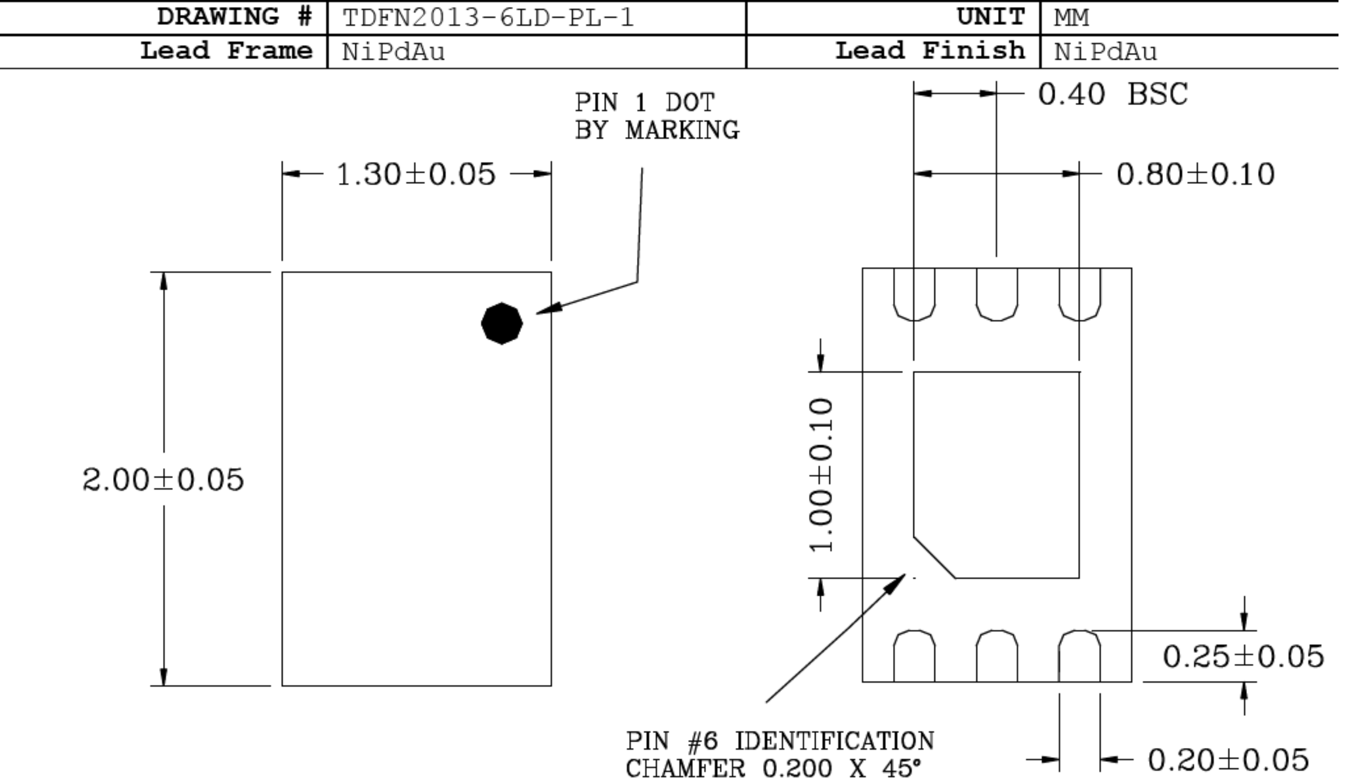
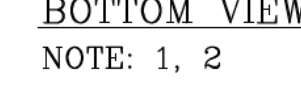
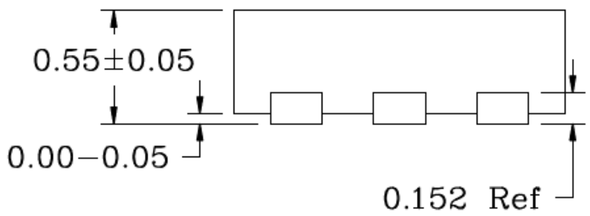
TITLE
6 LEAD TDFN 2.0x1.3 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TDFN2013-6LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu



TOP VIEW
NOTE: 1, 2





SIDE VIEW
NOTE: 1, 2

NOTES
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mmm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. UNIT IN mm.
5. SHADED AREA IS SOLDER STENCIL OPENING.
6. RECOMMENDED VIA SIZE IS 0.30-0.35mm.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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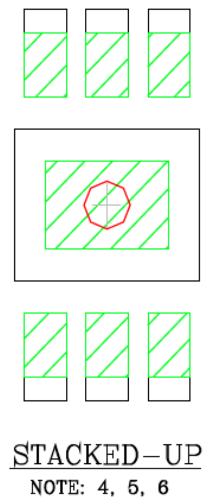
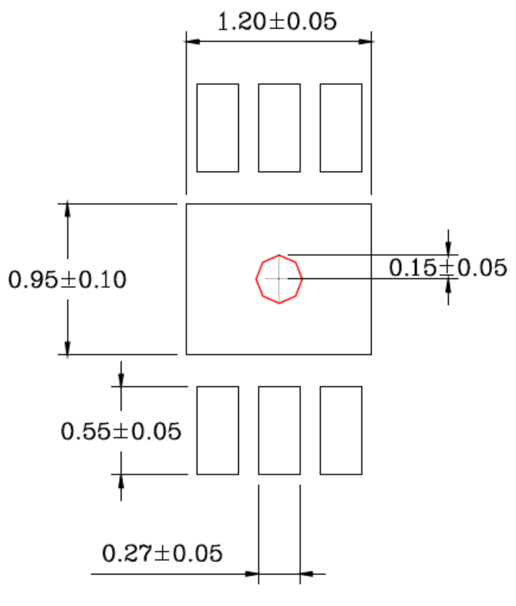
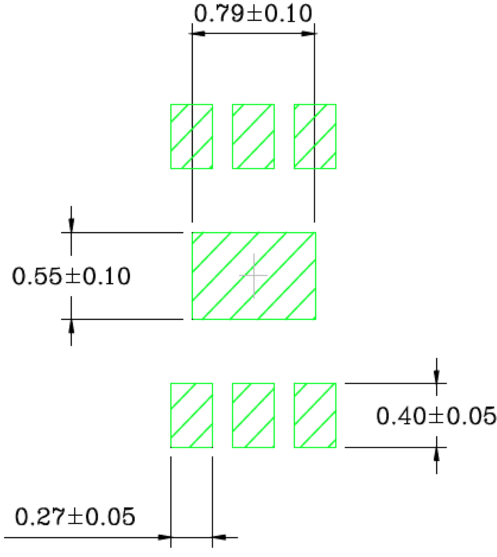
POD-Land Pattern TDFN2013-6LD-PL-1

RECOMMENDED LAND PATTERN



STACKED-UP
NOTE: 4, 5, 6





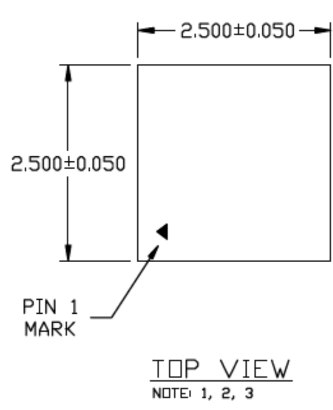
NOTE: 4, 6

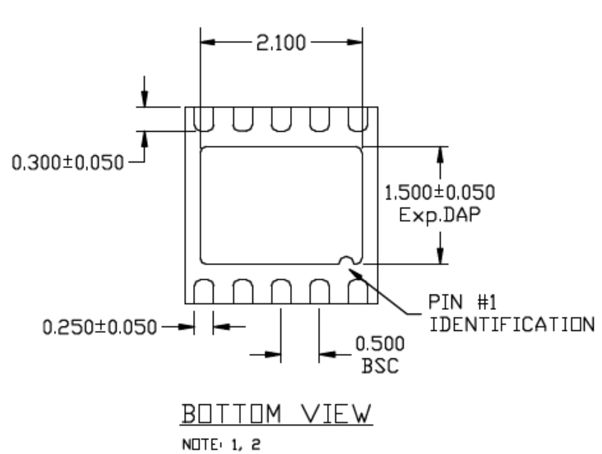
SOLDER STENCIL OPENING
NOTE: 4, 5

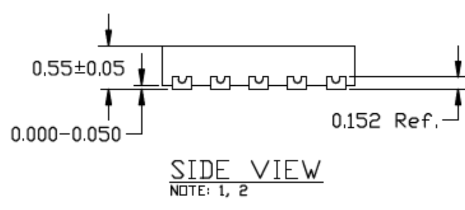
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

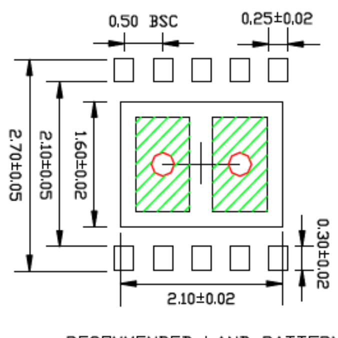
TITLE
10 LEAD TDFN 2.5x2.5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TDFN2525-10LD-PL-1	UNIT	MM
Lead Frame	Copper	Lead Finish	Matte Tin









RECOMMENDED LAND PATTERN
NOTE: 4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) INDICATE STENCIL OPENING ON EXPOSED AREA. SIZE IS 0.6X0.9MM, SPACING IS 0.3MM.
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER, 1.00 MM PITCH

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
12 LEAD TDFN 2.5x2.5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TDFN2525-12LD-PL-1	UNIT	MM

TOP VIEW: 2.5000 TYP; 2.5000 TYP; 12; 1; Pin 1 Triangle By marking

TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW: 1.9000±0.050 Exp.DAP; 0.400 Bsc; 0.3500±0.050; 1.200±0.050 Exp.DAP; 0.2000±0.050; 2.0000 Ref.; PIN #1 IDENTIFICATION R0.250

BOTTOM VIEW
NOTE: 1, 2

SIDE VIEW: 0.55±0.05; 0.000-0.050; 0.152 Ref.

SIDE VIEW
NOTE: 1, 2

RECOMMENDED LAND PATTERN: 0.40 BSC; 0.20±0.02; 2.70±0.05; 1.90±0.05; 1.20±0.02; 0.35±0.02; 1.90±0.02

RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) INDICATE STENCIL OPENING ON EXPOSED AREA. SIZE IS 0.6X0.9MM, SPACING IS 0.3MM.
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER, 1.00 MM PITCH

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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NOTES:

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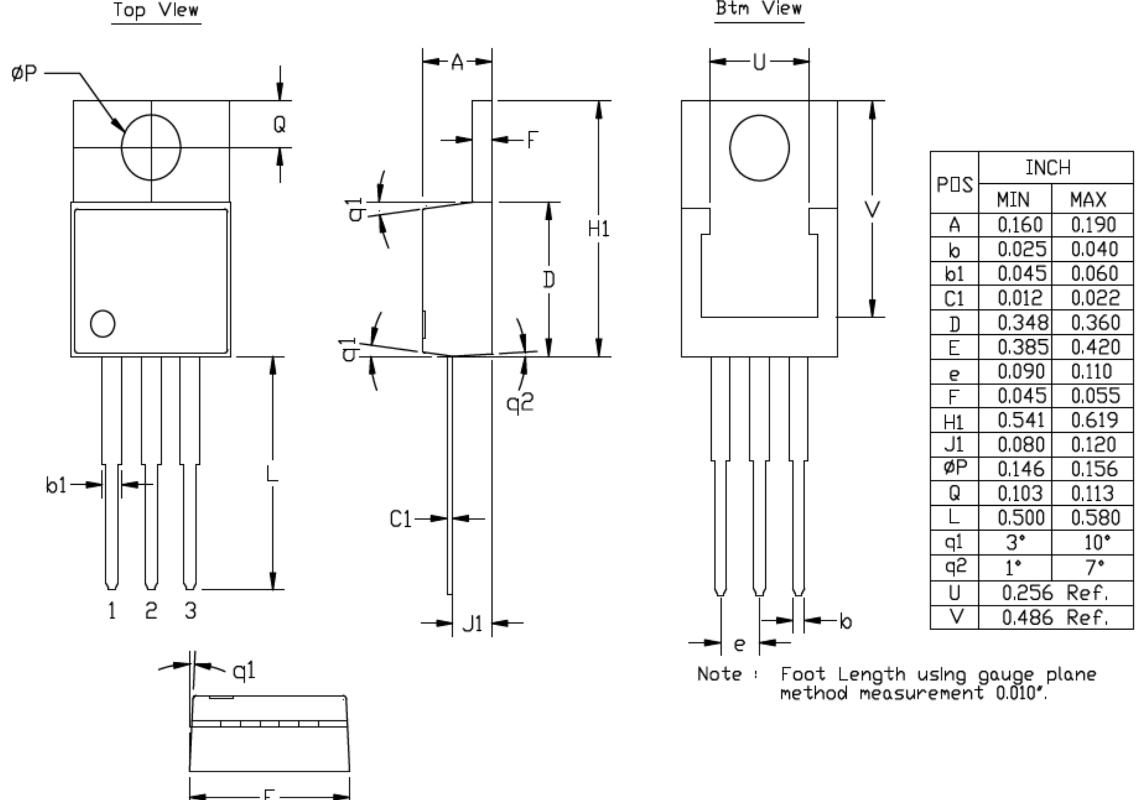
TO220-TO263

Micrel Legacy

Package Outlines and Dimensions

TITLE
3 LEAD TO220 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TO220-3LD-PL-1	**UNIT**	INCH
Lead Frame	Copper Alloy	**Lead Finish**	Matte Tin



POS	INCH	
	MIN	MAX
A	0.160	0.190
b	0.025	0.040
b1	0.045	0.060
C1	0.012	0.022
D	0.348	0.360
E	0.385	0.420
e	0.090	0.110
F	0.045	0.055
H1	0.541	0.619
J1	0.080	0.120
ØP	0.146	0.156
Q	0.103	0.113
L	0.500	0.580
q1	3°	10°
q2	1°	7°
U	0.256 Ref.	
V	0.486 Ref.	

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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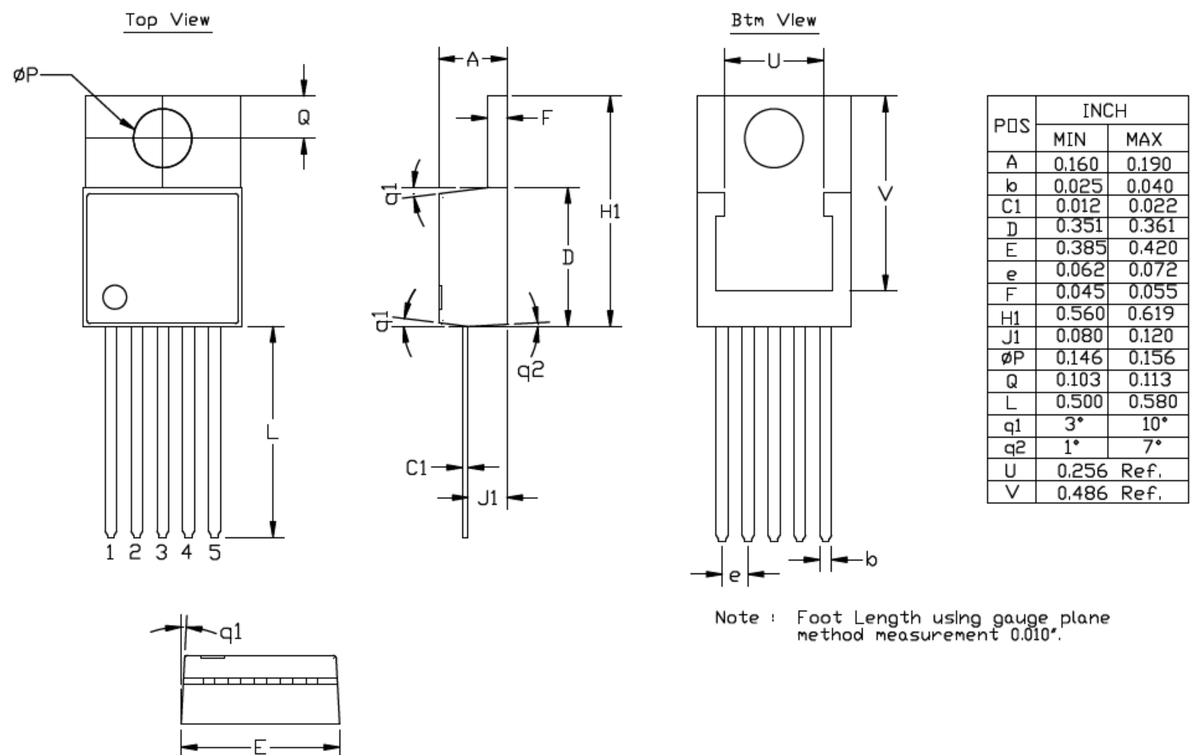
Package Outlines and Dimensions

TITLE

5 LEAD TO220 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TO220-5LD-PL-1	**UNIT**	INCH
Lead Frame	Copper Alloy	**Lead Finish**	Matte Tin



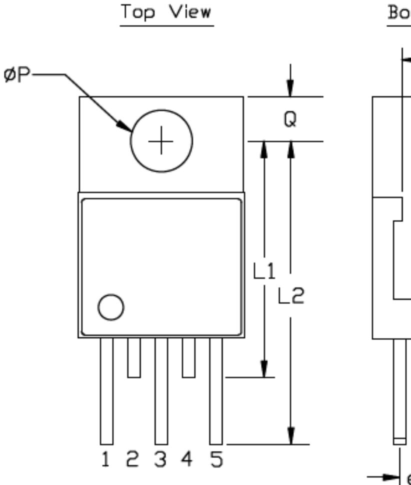
POS	INCH	
	MIN	MAX
A	0.160	0.190
b	0.025	0.040
C1	0.012	0.022
D	0.351	0.361
E	0.385	0.420
e	0.062	0.072
F	0.045	0.055
H1	0.560	0.619
J1	0.080	0.120
øP	0.146	0.156
Q	0.103	0.113
L	0.500	0.580
q1	3°	10°
q2	1°	7°
U	0.256 Ref.	
V	0.486 Ref.	

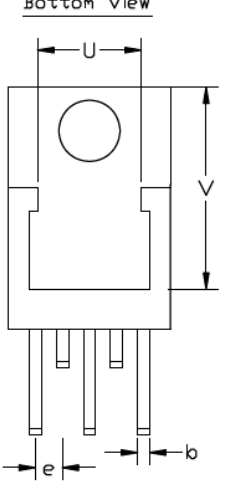
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

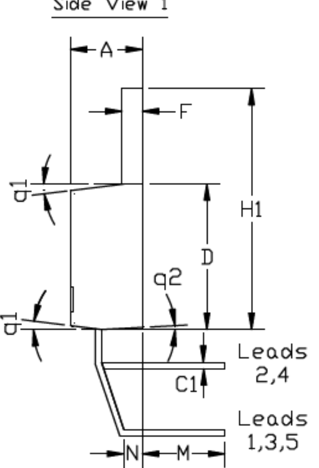
Package Outlines and Dimensions

TITLE
2 and 5 LEAD TO220 (LB) PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

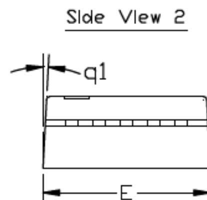
DRAWING #	TO220-LB02-5LD-PL-1	**UNIT**	INCH
Lead Frame	Copper Alloy	**Lead Finish**	Matte Tin







POS	INCH	
	MIN	MAX
A	0.160	0.190
b	0.025	0.040
C1	0.012	0.022
D	0.351	0.361
E	0.385	0.420
e	0.062	0.072
F	0.045	0.055
H1	0.560	0.595
L1	0.563	0.583
L2	0.725	0.745
M	0.185	0.215
N	0.010	0.080
øP	0.146	0.156
Q	0.103	0.113
q1	3°	10°
q2	1°	7°
U	0.256 Ref.	
V	0.486 Ref.	



Note : Foot Length using gauge plane method measurement 0.010".

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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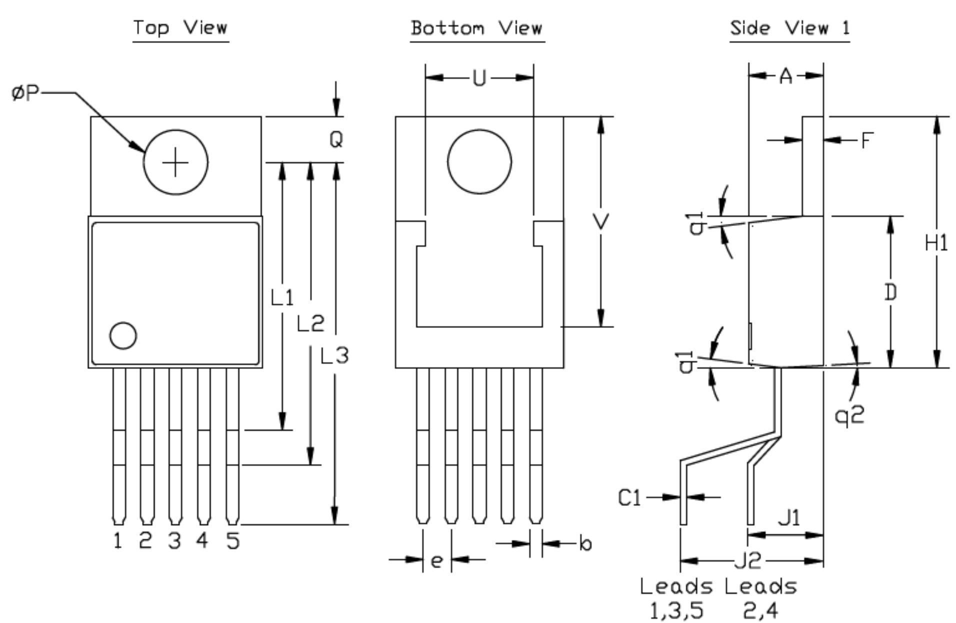
Package Outlines and Dimensions

TITLE
3 and 5 LEAD TO220 (LB) PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TO220-LB03-5LD-PL-1	**UNIT**	INCH
Lead Frame	Copper Alloy	**Lead Finish**	Matte Tin



POS	INCH MIN	INCH MAX
A	0.160	0.190
b	0.025	0.040
C1	0.012	0.022
D	0.351	0.361
E	0.385	0.420
e	0.062	0.072
F	0.045	0.055
H1	0.560	0.595
J1	0.167	0.185
J2	0.324	0.344
øP	0.146	0.156
Q	0.103	0.113
L1	0.612	0.632
L2	0.689	0.719
L3	0.823	0.853
q1	3°	10°
q2	1°	7°
U	0.256 Ref.	
V	0.486 Ref.	

Note : Foot Length using gauge plane method measurement 0.010".

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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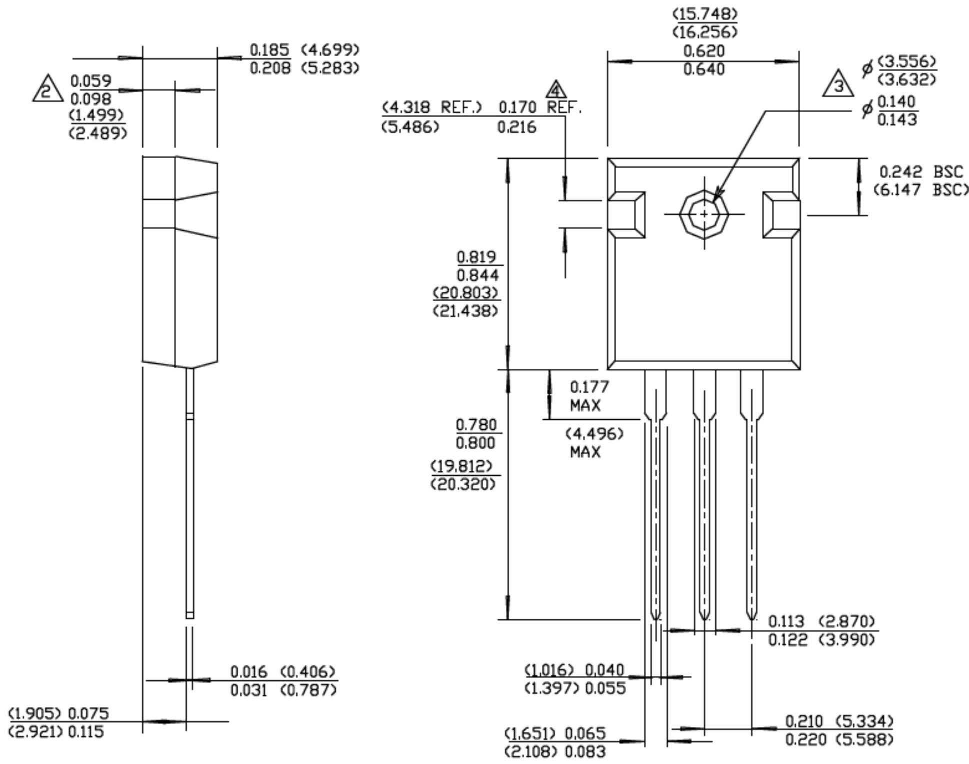
Package Outlines and Dimensions

TITLE

3 LEAD TO247 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TO247-3LD-PL-1	UNIT	INCH/ MM
Lead Frame	Copper Alloy	Lead Finish	Matte Tin



NOTE

1. CONTROLLED DIMENSION IS INCH. DIMENSION IN BLANKET IS MILLIMETER.
2. DIMENSIONS DO NOT INCLUDE END FLASH, MOLD FLASH, MATERIAL PROTRUSIONS.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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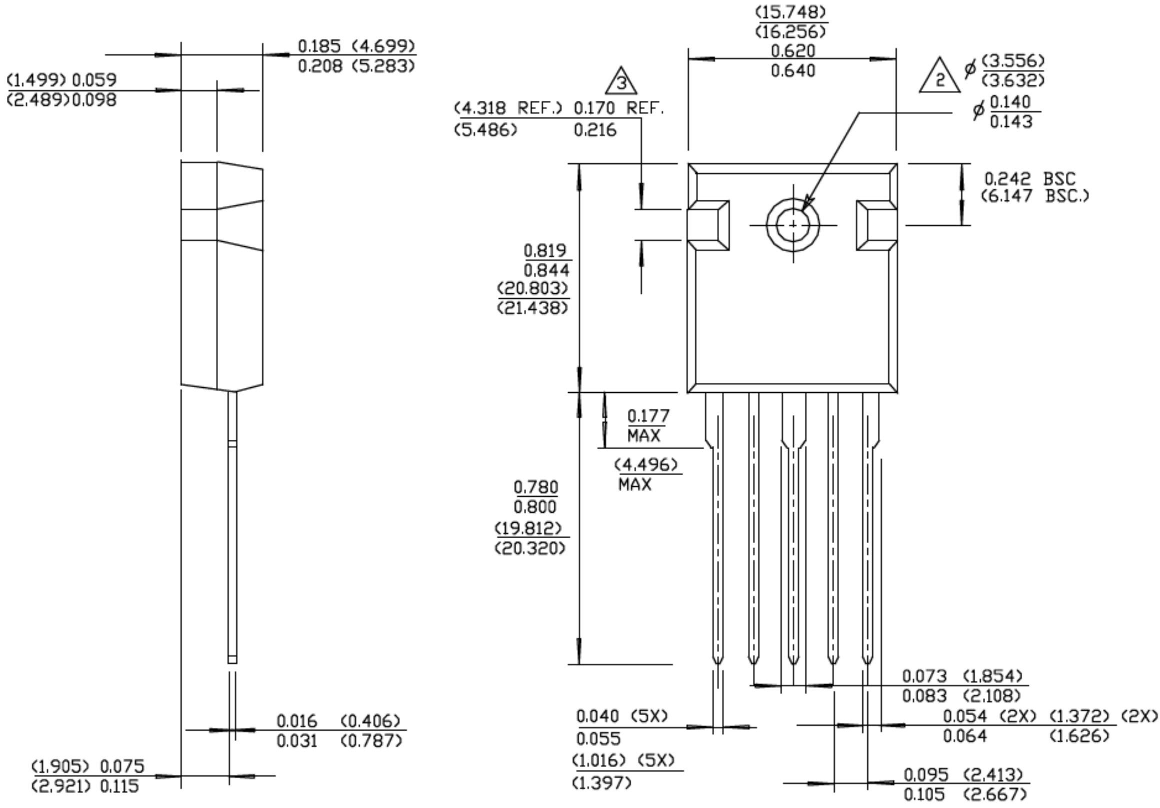
Package Outlines and Dimensions

TITLE

5 LEAD TO247 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TO247-5LD-PL-1	**UNIT**	INCH/ MM
Lead Frame	Copper Alloy	**Lead Finish**	Matte Tin



NOTE

1. CONTROLLED DIMENSION IS INCH. DIMENSION IN BLANKET IS MILLIMETER.
2. DIMENSIONS DO NOT INCLUDE END FLASH, MOLD FLASH, MATERIAL PROTRUSIONS.

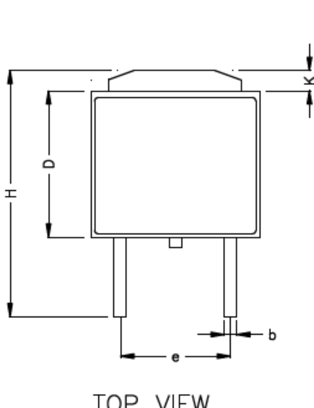
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

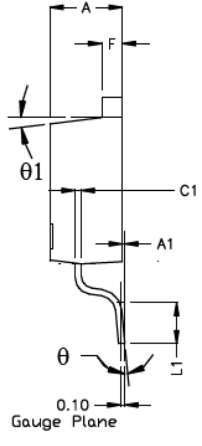
TITLE

2 LEAD TO252 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

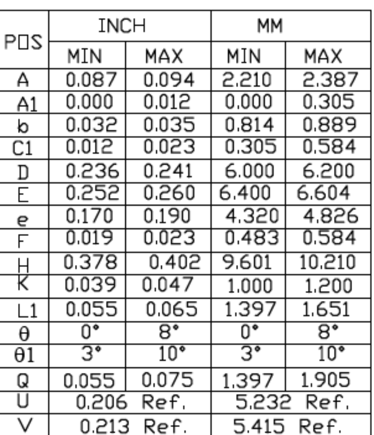
DRAWING #	TO252-2LD-PL-1	UNIT	INCH/ MM
Lead Frame	Copper Alloy	Lead Finish	Matte Tin



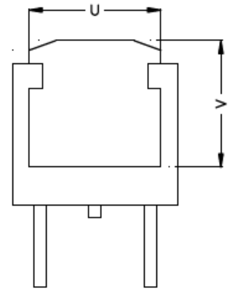
TOP VIEW



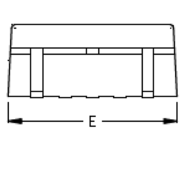
SIDE VIEW 1



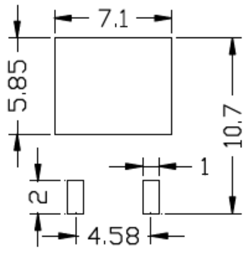
POS	INCH		MM	
	MIN	MAX	MIN	MAX
A	0.087	0.094	2.210	2.387
A1	0.000	0.012	0.000	0.305
b	0.032	0.035	0.814	0.889
C1	0.012	0.023	0.305	0.584
D	0.236	0.241	6.000	6.200
E	0.252	0.260	6.400	6.604
e	0.170	0.190	4.320	4.826
F	0.019	0.023	0.483	0.584
H	0.378	0.402	9.601	10.210
K	0.039	0.047	1.000	1.200
L1	0.055	0.065	1.397	1.651
θ	0°	8°	0°	8°
θ1	3°	10°	3°	10°
Q	0.055	0.075	1.397	1.905
U	0.206 Ref.		5.232 Ref.	
V	0.213 Ref.		5.415 Ref.	



BOTTOM VIEW



SIDE VIEW 2



RECOMMENDED LAND PATTERN

NOTE: unit in mm

NOTE:
1. PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH & METAL BURR.
2. PACKAGE OUTLINE INCLUSIVE OF PLATING THICKNESS.
3. FOOT LENGTH USING GAUGE PLANE METHOD MEASUREMENT 0.010"
4. ALL DIMENSIONS ARE IN INCHES/MILLIMETERS.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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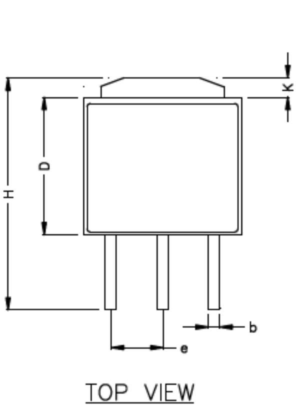
Package Outlines and Dimensions

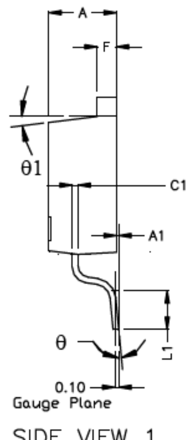
TITLE

3 LEAD TO252 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

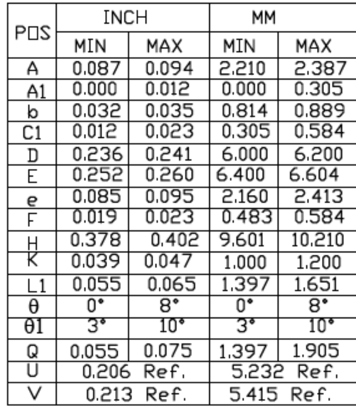
DRAWING #	TO252-3LD-PL-1	**UNIT**	INCH/ MM
Lead Frame	Copper Alloy	**Lead Finish**	Matte Tin



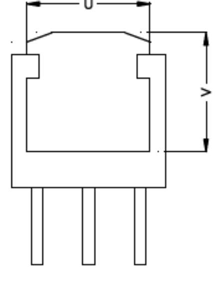
TOP VIEW



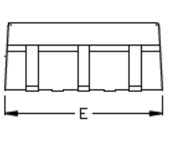
SIDE VIEW 1



POS	INCH		MM	
	MIN	MAX	MIN	MAX
A	0.087	0.094	2.210	2.387
A1	0.000	0.012	0.000	0.305
b	0.032	0.035	0.814	0.889
C1	0.012	0.023	0.305	0.584
D	0.236	0.241	6.000	6.200
E	0.252	0.260	6.400	6.604
e	0.085	0.095	2.160	2.413
F	0.019	0.023	0.483	0.584
H	0.378	0.402	9.601	10.210
K	0.039	0.047	1.000	1.200
L1	0.055	0.065	1.397	1.651
θ	0°	8°	0°	8°
θ1	3°	10°	3°	10°
Q	0.055	0.075	1.397	1.905
U	0.206 Ref.		5.232 Ref.	
V	0.213 Ref.		5.415 Ref.	



BOTTOM VIEW



SIDE VIEW 2

7.1
5.85
10.7
2
2.29
1

RECOMMENDED LAND PATTERN

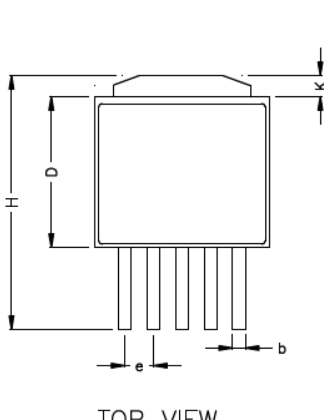
NOTE: unit in mm

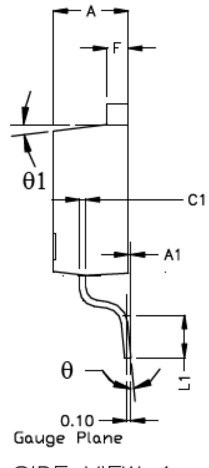
NOTE:
1. PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH & METAL BURR.
2. PACKAGE OUTLINE INCLUSIVE OF PLATING THICKNESS.
3. FOOT LENGTH USING GAUGE PLANE METHOD MEASUREMENT 0.010"
4. ALL DIMENSIONS ARE IN INCHES/MILLIMETERS.

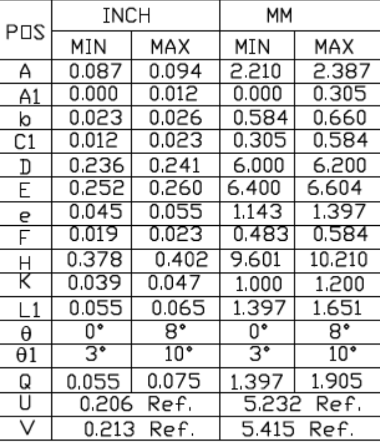
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
5 LEAD TO252 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

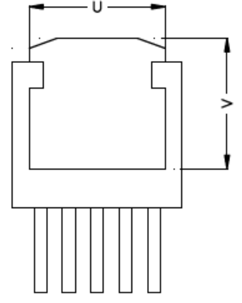
DRAWING #	TO252-5LD-PL-1	**UNIT**	INCH/ MM
Lead Frame	Copper Alloy	**Lead Finish**	Matte Tin



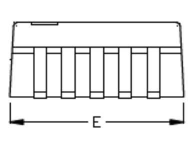




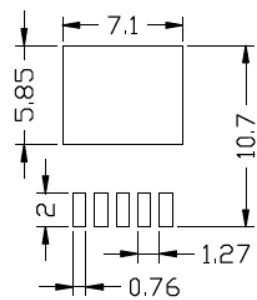
POS	INCH		MM	
	MIN	MAX	MIN	MAX
A	0.087	0.094	2.210	2.387
A1	0.000	0.012	0.000	0.305
b	0.023	0.026	0.584	0.660
C1	0.012	0.023	0.305	0.584
D	0.236	0.241	6.000	6.200
E	0.252	0.260	6.400	6.604
e	0.045	0.055	1.143	1.397
F	0.019	0.023	0.483	0.584
H	0.378	0.402	9.601	10.210
K	0.039	0.047	1.000	1.200
L1	0.055	0.065	1.397	1.651
θ	0°	8°	0°	8°
θ1	3°	10°	3°	10°
Q	0.055	0.075	1.397	1.905
U	0.206 Ref.		5.232 Ref.	
V	0.213 Ref.		5.415 Ref.	



BOTTOM VIEW



SIDE VIEW 2



REOMMENDED LAND PATTERN
NOTE: unit in mm

NOTE:
1. PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH & METAL BURR.
2. PACKAGE OUTLINE INCLUSIVE OF PLATING THICKNESS.
3. FOOT LENGTH USING GAUGE PLANE METHOD MEASUREMENT 0.010"
4. ALL DIMENSIONS ARE IN INCHES/MILLIMETERS.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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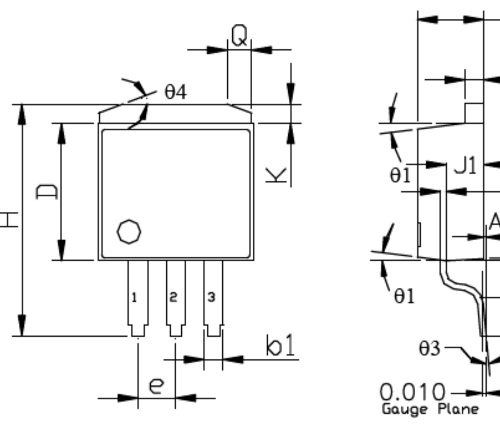
Package Outlines and Dimensions

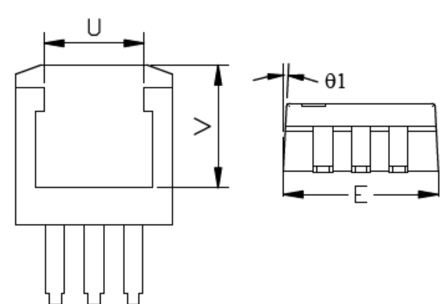
TITLE
3 LEAD TO263 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TO263-3LD-PL-1	UNIT	INCH/MM

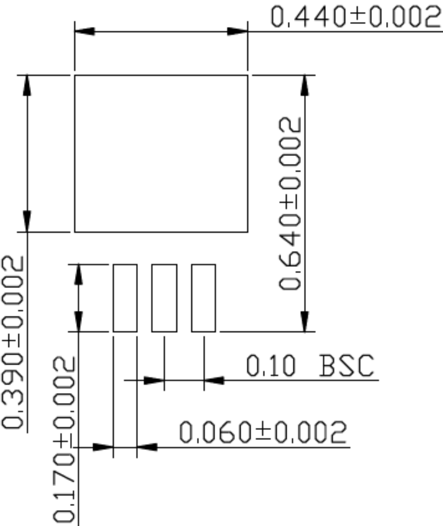


TOP VIEW SIDE VIEW 1

POS	INCH MIN	INCH MAX	MM MIN	MM MAX
A	0.170	0.181	4.318	4.597
A1	0.000	0.012	0.000	0.305
b1	0.047	0.053	1.194	1.346
C1	0.012	0.023	0.305	0.584
D	0.330	0.361	8.382	9.169
E	0.396	0.420	10.058	10.668
e	0.095	0.105	2.413	2.667
F	0.045	0.055	1.143	1.397
H	0.575	0.625	14.605	15.875
J1	0.080	0.120	2.032	3.048
L1	0.090	0.110	2.286	2.794
K	0.045	0.066	1.143	1.676
θ1	3°	10°	3°	10°
θ2	1°	7°	1°	7°
θ3	0°	8°	0°	8°
θ4	18°	22°	18°	22°
Q	0.055	0.075	1.397	1.905
U	0.256 Ref.		6.502 Ref.	
V	0.303 Ref.		7.696 Ref.	



BOTTOM VIEW SIDE VIEW 2



RECOMMENDED LAND PATTERN (UNIT: INCH)

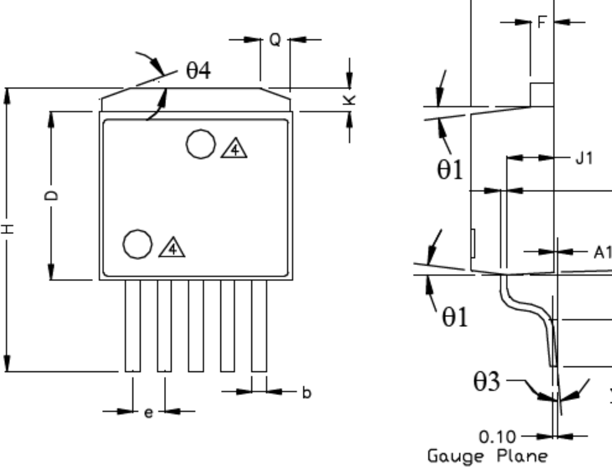
NOTES:
FOOT LENGTH USE GUAGE PLANE METHOD MEASUREMENT 0.010"

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE

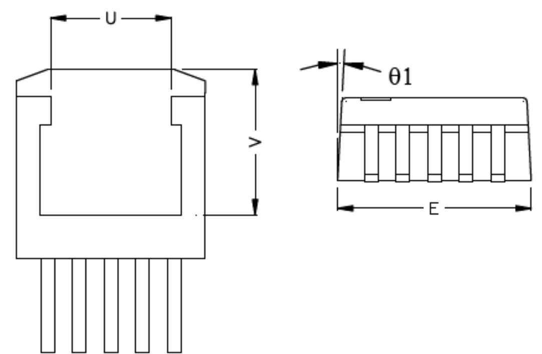
5 LEAD T0263 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

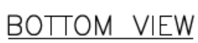
DRAWING #	T0263-5LD-PL-1	**UNIT**	INCH/MM



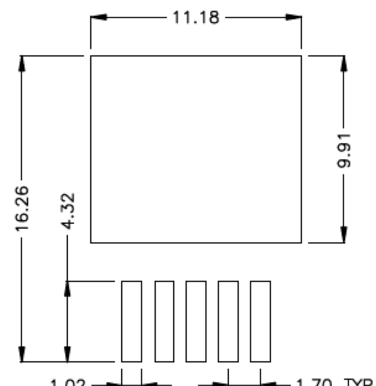
TOP VIEW SIDE VIEW 1

POS	INCH		MM	
	MIN	MAX	MIN	MAX
A	0.170	0.181	4.318	4.597
A1	0.000	0.012	0.000	0.305
b	0.026	0.036	0.660	0.914
C1	0.012	0.023	0.305	0.584
D	0.330	0.361	8.392	9.169
E	0.396	0.420	10.058	10.668
e	0.062	0.072	1.575	1.829
F	0.045	0.055	1.143	1.397
H	0.575	0.625	14.605	15.875
J1	0.080	0.120	2.032	3.048
K	0.045	0.066	1.143	1.676
L1	0.090	0.110	2.286	2.794
θ1	3°	10°	3°	10°
θ2	1°	7°	1°	7°
θ3	0°	8°	0°	8°
θ4	18°	22°	18°	22°
Q	0.055	0.075	1.397	1.905
U	0.256 Ref.		6.502 Ref.	
V	0.305 Ref.		7.747 Ref.	





BOTTOM VIEW SIDE VIEW 2



RECOMMENDED LAND PATTERN
(UNIT : mm)

NOTE:
1. PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH & METAL BURR.
2. PACKAGE OUTLINE INCLUSIVE OF PLATING THICKNESS.
3. FOOT LENGTH USING GAUGE PLANE METHOD MEASUREMENT 0.010"
4. PACKAGE TOP MARK MAY BE IN TOP CENTER OR LOWER LEFT CORNER
5. ALL DIMENSIONS ARE IN INCHES/MILLIMETERS.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE
7 LEAD T0263 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	T0263-7LD-PL-1	**UNIT**	INCH/MM

	INCHES		MILIMETERS	
POS	MIN	MAX	MIN	MAX
A	.396	.406	10.05	10.31
B	.330	.340	8.38	8.64
C	.170	.180	4.31	4.57
D	.026	.036	0.66	0.91
E	.045	.055	1.14	1.40
G	.050 ref		1.27 ref	
H	.580	.620	14.73	15.75
K	.055	.066	1.40	1.68
L	.000	.010	0.00	0.25
M	.098	.108	2.49	2.74
N	.017	.023	0.43	0.58
P	.090	.110	2.29	2.79
R	0°	8°	0°	8°
S	.095	.105	2.41	2.67
U	.30 ref		7.62 ref	
V	.305 ref		7.75 ref	
W	.010		0.25	

TOP VIEW

SIDE VIEW 1

TERMINAL 8

BOTTOM VIEW

SIDE VIEW 2

11.18, 9.91, 16.26, 4.32, 1.02, 1.27 TYP

RECOMMENDED LAND PATTERN
(UNIT : mm)

NOTE:
1. PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH & METAL BURR.
2. PACKAGE OUTLINE INCLUSIVE OF PLATING THICKNESS.
3. FOOT LENGTH USING GAUGE PLANE METHOD MEASUREMENT 0.010"
4. ALL DIMENSIONS ARE IN INCHES/MILLIMETERS.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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NOTES:

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TQFN

Micrel Legacy

TITLE

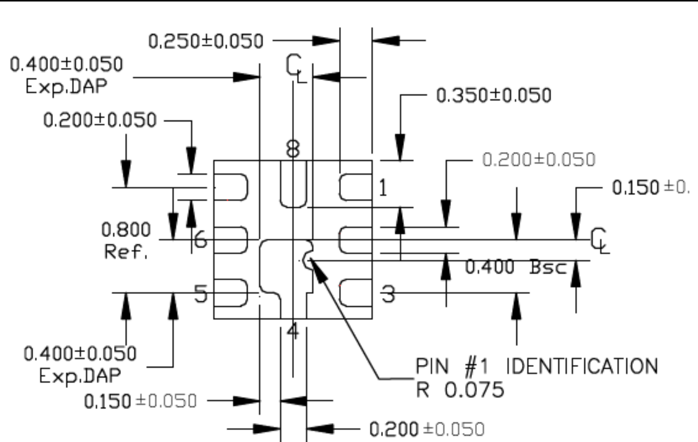
8 LEAD TQFN 1.2x1.2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TQFN1212-8LD-PL-1	UNIT	MM

1 TRIANGLE
IARKING
1.200±0.050
8
1
7
1.200±0.050
3
5
4

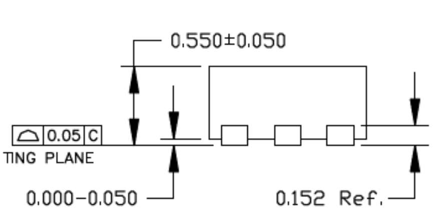
TOP VIEW

NOTE: 1, 2, 3



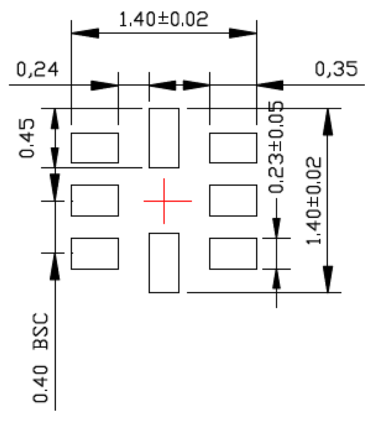
BOTTOM VIEW

NOTE: 1, 2



SIDE VIEW

NOTE: 1, 2



RECOMMENDED LAND PATTERN

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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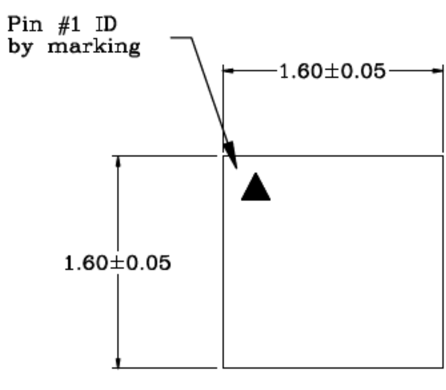
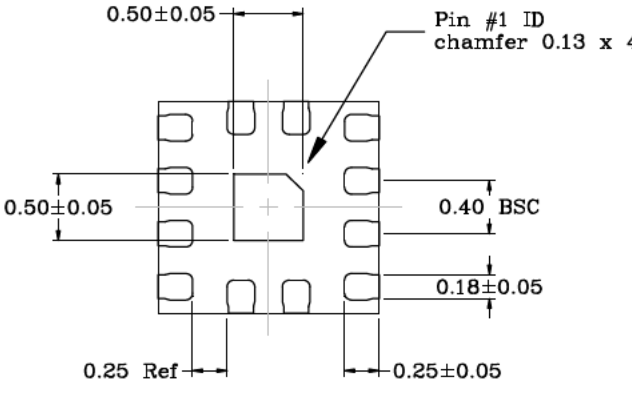
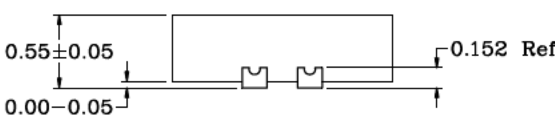
TITLE			
12 LEAD TQFN 1.60x1.60mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN			
DRAWING #	TQFN1616-12LD-PL-1	UNIT	MM



TOP VIEW
NOTE: 1,2,3



BOTTOM VIEW
NOTE: 2,3



SIDE VIEW
NOTE: 2,3

NOTES:

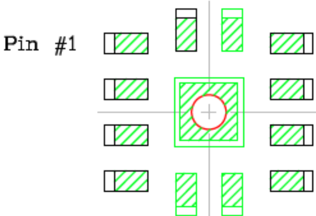
1. Top mark Pin #1 will be laser mark.
2. 0.05mm max package warpage.
3. Max allowable burr is 0.076mm in all directions.
4. Red color circle is thermal via. 0.30-0.35mm in diameter. Should be connected to GND for maximum performance.
5. Shaded rectangles (area) represents solder stencil opening on exposed metal trace.
6. Green color pads represent same IO and are connected together.
7. Black color pads represent different IOs. Do not connect together.
8. Recommended Land Pattern Tolerance is ±0.020mm unless specified.
9. See recommended Land Pattern on page2.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

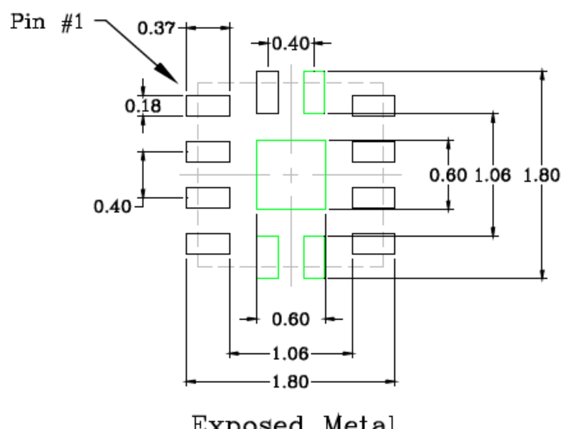
POD-Land Pattern Doc #: TQFN1616-12LD-PL-1-A

Recommended Land Pattern

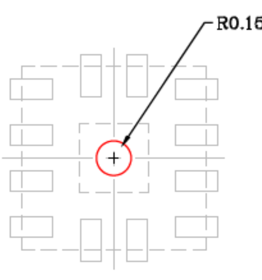
Note: 4,5,6,7,8



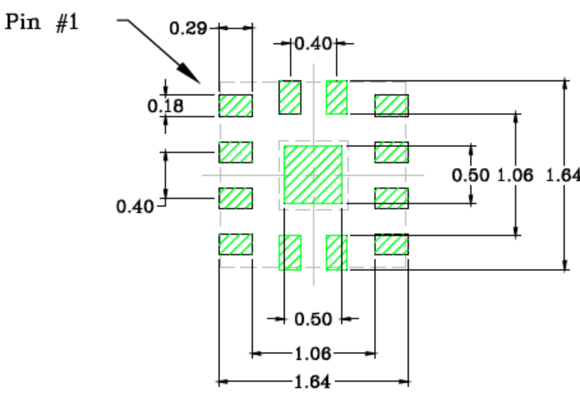
STACK UP



Exposed Metal



THERMAL (FILLED) VIA



SOLDER STENCIL OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
14 LEAD TQFN 2.5x2.5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TQFN2525-14LD-PL-1	UNIT	MM

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. RED CIRCLE IN LAND PATTERN INDICATE THERMAL VIA. SIZE SHOULD BE 0.30-0.3MM IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE
5. GREEN RECTANGLES (SHADED AREA) REPRESENT OPTIONAL SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 0.50x0.50 MM, 0.10 MM SPACING.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
16 LEAD TQFN 2.5x2.5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TQFN2525-16LD-PL-1	UNIT	MM

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN RECTANGLES (SHADED AREA) INDICATE STENCIL OPENING ON EXPOSED AREA. SIZE IS 0.4X0.4MM, SPACING IS 0.2MM.
5. RED CIRCLES REPRESENT THERMAL VIAS & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. 0.30 - 0.35 MM RECOMMENDED DIAMETER

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TQFP

Micrel Legacy

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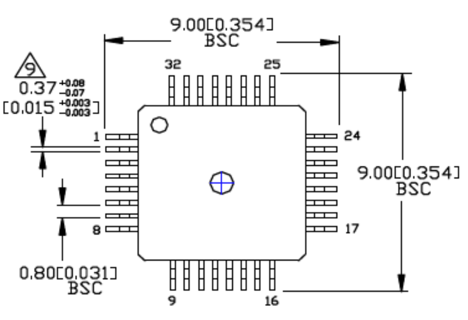
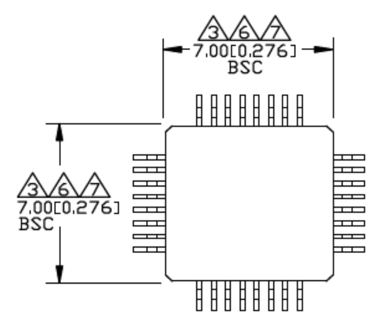
Package Outlines and Dimensions

TITLE
32 LEAD TQFP 7X7 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

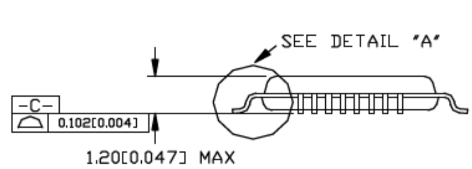
DRAWING #	TQFP7X7-32LD-PL-1	UNIT	MM [INCH]



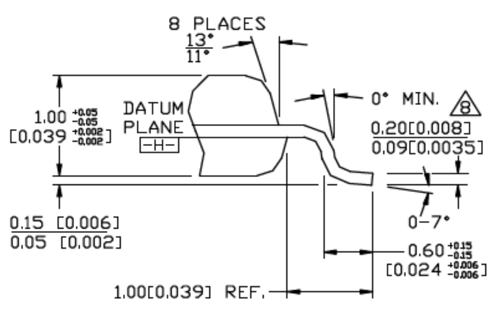
TOP VIEW



BOTTOM VIEW

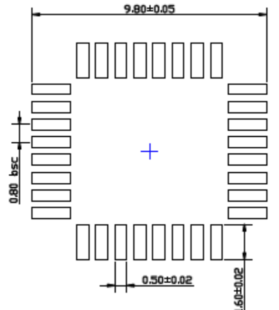


SIDE VIEW



DETAIL "A"

NOTES:
1. DIMENSIONS ARE IN MM[INCHES].
2. CONTROLLING DIMENSION: MM.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.254 [0.010].
4. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
5. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX/MIN.
6. THESE DIMENSIONS TO BE DETERMINED AT DATUM PLANE -H-
7. PACKAGE TOP DIMENSIONS ARE SMALLER THAN BOTTOM DIMENSIONS AND TOP OF PACKAGE WILL NOT OVERHANG BOTTOM OF PACKAGE.
8. DIMENSION INCLUDES LEAD FINISH.



RECOMMENDED LAND PATTERN

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

32 LEAD TQFP 7X7 mm EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TQFPEP7X7-32LD-PL-1	UNIT	MM [INCH]

TOP VIEW

BOTTOM VIEW

SIDE VIEW

DETAIL "A"

NOTES:

1. DIMENSIONS ARE IN MM[INCHES].
2. CONTROLLING DIMENSION: MM.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.254 [0.010].
4. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
5. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX/MIN.
6. THESE DIMENSIONS TO BE DETERMINED AT DATUM PLANE -H-
7. PACKAGE TOP DIMENSIONS ARE SMALLER THAN BOTTOM DIMENSIONS AND TOP OF PACKAGE WILL NOT OVERHANG BOTTOM OF PACKAGE.
8. EXPOSED PAD SHALL BE COPLANAR WITH PACKAGE BOTTOM WITHIN 0.05mm EXPOSED PAD: Cu WITH Sn/Pb PLATING
9. DIMENSION INCLUDES LEAD FINISH.
10. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30MM DIAMETER, CONNECT TO GND

RECOMMENDED LAND PATTERN

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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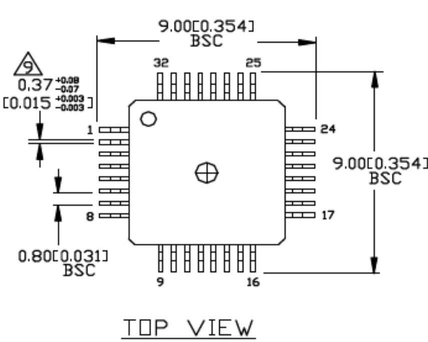
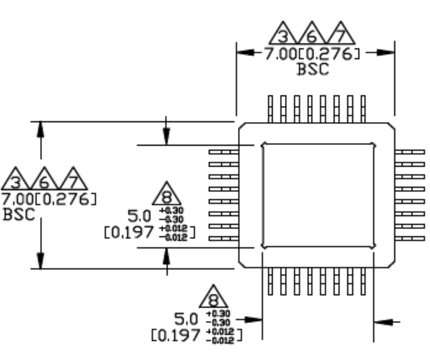
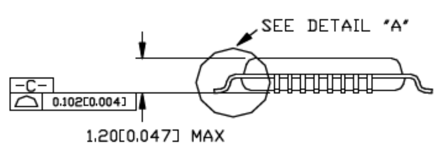
Package Outlines and Dimensions

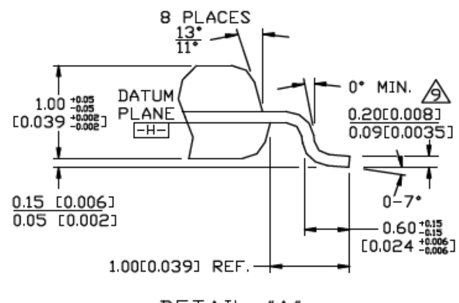
TITLE
32 LEAD TQFP 7X7 mm EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TQFPEP7X7-32LD-PL-2	**UNIT**	MM [INCH]
Lead Frame	Copper	**Lead Finish**	Matte Tin

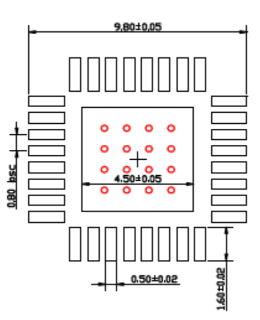








NOTES:
1. DIMENSIONS ARE IN MM[INCHES].
2. CONTROLLING DIMENSION: MM.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.254 [0.010].
4. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
5. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX/MIN.
6. THESE DIMENSIONS TO BE DETERMINED AT DATUM PLANE -H-
7. PACKAGE TOP DIMENSIONS ARE SMALLER THAN BOTTOM DIMENSIONS AND TOP OF PACKAGE WILL NOT OVERHANG BOTTOM OF PACKAGE.
8. EXPOSED PAD SHALL BE COPLANAR WITH PACKAGE BOTTOM WITHIN 0.05mm EXPOSED PAD: Cu WITH Sn/Pb PLATING
9. DIMENSION INCLUDES LEAD FINISH.
10. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30MM DIAMETER, CONNECT TO GND



Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

48 LEAD TQFP 7x7mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TQFP7x7-48LD-PL-1	UNIT	MM

TOP VIEW

BOTTOM VIEW

SIDE VIEW

DETAIL "A"

RECOMMENDED LAND PATTERN

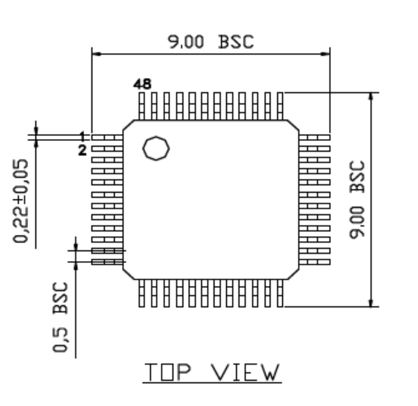
NOTES :

1. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.254MM.
2. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
3. PACKAGE TOP MOLD DIMENSIONS ARE SMALLER THAN BOTTOM
4. (△) MOLD DIMENSIONS AND TOP OF PACKAGE WILL NOT OVERHANG BOTTOM OF PACKAGE.

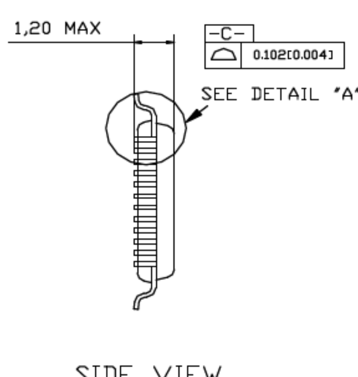
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
48 LEAD TQFP 7X7 mm EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

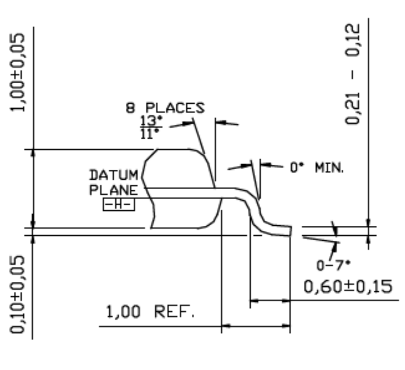
DRAWING #	TQFPEP7X7-48LD-PL-1	UNIT	MM



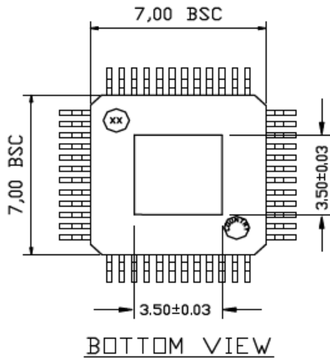
TOP VIEW



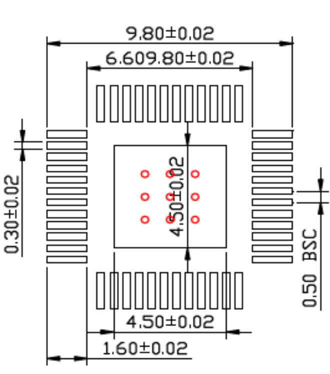
SIDE VIEW



DETAIL "A"



BOTTOM VIEW



RECOMMENDED LAND PETTERN

NOTES
1. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.254MM.
2. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
3. PACKAGE TOP MOLD DIMENSIONS ARE SMALLER THAN BOTTOM
4. MOLD DIMENSIONS AND TOP OF PACKAGE WILL NOT OVERHANG BOTTOM OF PACKAGE.
5. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30MM AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
64 LEAD TQFP 10x10mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TQFP10x10-64LD-PL-1	UNIT	MM [INCH]

12.00 [0.472] BSC SQ.
10.00 [0.394] BSC SQ. (3)
64 49 1 48 16 33 17 32

TOP/BOTTOM VIEW
NOTES : 1, 2, 3

DETAIL "A"
1.00 +0.05/−0.05 [0.039 +0.002/−0.002]
0.15 [0.006] / 0.05 [0.002] (4)
0° MIN.
0.20 [0.008] / 0.09 [0.004]
0–7°
0.60 +0.15/−0.15 [0.024 +0.006/−0.006]
1.00 [0.039] REF.

DETAIL VIEW
NOTES : 1, 2, 4

1.20 [0.047] MAX.
0.50 [0.020] BSC
SEE DETAIL "A"
0.01 [0.004]
0.22 +0.05/−0.05 [0.009 +0.002/−0.002] (5)

SIDE VIEW
NOTES : 5

1.00 [0.04]
0.25 [0.01]
0.50 [0.02] BSC
10.40 [0.409] TYP
12.40 [0.488] TYP

RECOMMENDED LAND PATTERN

NOTES:
1. DIMENSIONS ARE IN MM [INCHES].
2. CONTROLLING DIMENSION: MM.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OF 0.254[0.010] MAX.
4. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX/MIN
5. THIS DIMENSION INCLUDES LEAD FINISH.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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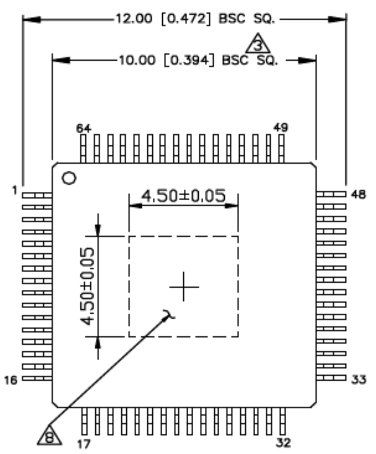
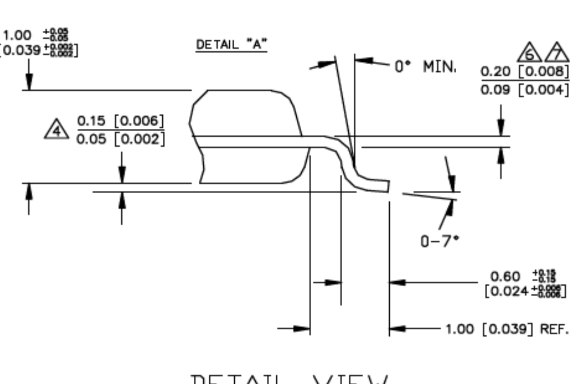
TITLE

64 LEAD TQFP 10X10 mm EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

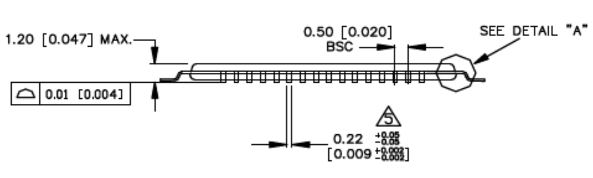
DRAWING #	TQFPEP10X10-64LD-PL-1	UNIT	MM [INCH]

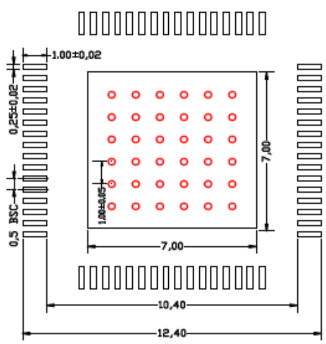




DETAIL VIEW

TOP/BOTTOM VIEW





SIDE VIEW

RECOMMENDED LAND PATTERN

NOTES:
1. DIMENSIONS ARE IN MM [INCHES].
2. CONTROLLING DIMENSION: MM.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OF 0.254[0.010] MAX.
4. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX / MIN
5. THIS DIMENSION INCLUDES LEAD FINISH.
6. LAND PATTERN TOLERANCE IS ±0,05 UNLESS OTHERWISE SPECIFIED
7. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. SIZE IS 0.30MM AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
8. DIE UP ORIENTATION SHOW. EPAD IS VISIBLE FROM BOTTOM OF PACKAGE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE

80 LEAD TQFP 14x14mm EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TQFPEP14x14-80LD-PL-1	UNIT	MM

TOP VIEW

NOTE: BACKSIDE EJECTOR PIN MARKS ARE OPTIONAL FOR EPAD.

NOTE: EXPOSED PAD OPTION.

NOTE: COUNTRY OF ORIGIN (OPTIONAL) XX: CAVITY NUMBER

BOTTOM VIEW

SIDE VIEW

DETAIL "C" (EXPOSED PAD CORNER DETAIL)

DETAIL "B"

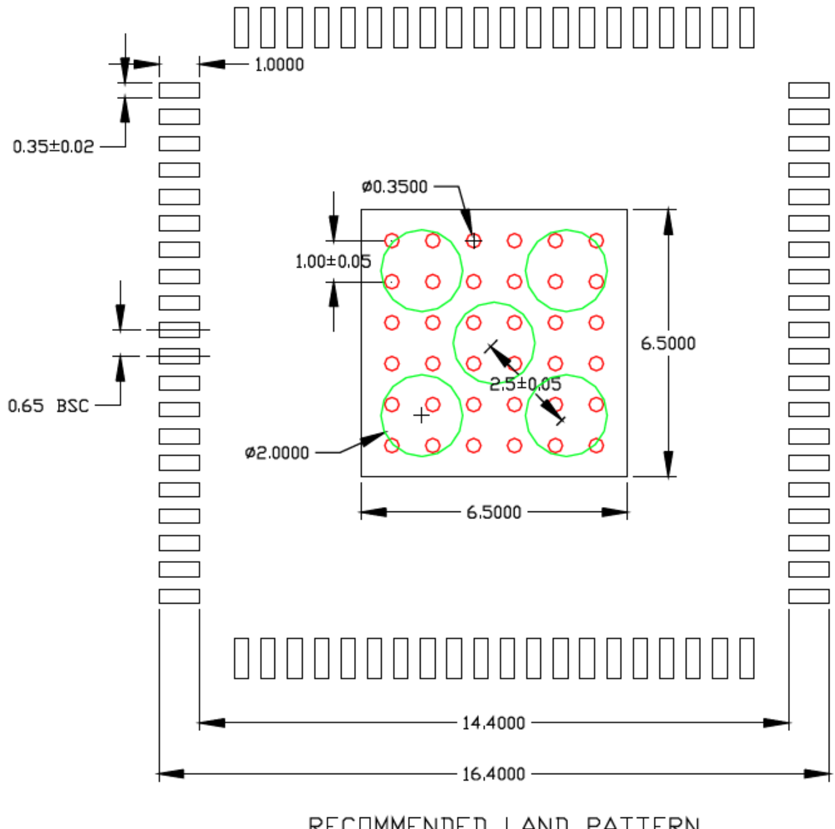
DETAILED VIEW

NOTES:

1. ALL DIMENSIONING AND TOLERANCING CONFORM TO ANSI Y14.5-1982.
2. DATUM PLANE -H- LOCATED AT MOLD PARTING LINE AND COINCIDENT WITH LEAD, WHERE LEAD EXITS PLASTIC BODY AT BOTTOM OF PARTING LINE.
3. DATUMS A-B AND -D- TO BE DETERMINED AT CENTERLINE BETWEEN LEADS WHERE LEADS EXIT PLASTIC BODY AT DATUM PLANE -H- .
4. TO BE DETERMINED AT SEATING PLANE -C- .
5. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE MOLD PROTRUSION IS 0.254 MM ON D1 AND E1 DIMENSIONS.
6. "N" IS THE TOTAL NUMBER OF TERMINALS.
7. THESE DIMENSIONS TO BE DETERMINED AT DATUM PLANE -H- .
8. THE TOP OF PACKAGE IS SMALLER THAN THE BOTTOM OF PACKAGE BY 0.15 MILLIMETERS.
9. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08mm TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT.
10. CONTROLLING DIMENSION: MILLIMETER.
11. MAXIMUM ALLOWABLE DIE THICKNESS TO BE ASSEMBLED IN THIS PACKAGE FAMILY IS 0.30 MILLIMETERS.
12. THIS OUTLINE CONFORMS TO JEDEC PUBLICATION 95 REGISTRATION MS-026, VARIATION ACB, AEC, AED, & AEE (EXCEPT FOR 44 & 128 LEAD).
13. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.
14. DIMENSION D2 AND E2 REPRESENT THE SIZE OF THE EXPOSED PAD. THE ACTUAL DIMENSIONS ARE SPECIFIED ON THE BONDING DIAGRAM, AND IS DEPENDENT ON THE DIE SIZE.
15. EXPOSED PAD SHALL BE COPLANAR WITH BOTTOM OF PACKAGE WITHIN 0.05.
16. CORNER CHAMFER OF EXPOSED DIE PAD SHALL BE WITHIN 0.30 MM.

SYMBOL	JEDEC VARIATION — ALL DIMENSIONS IN MILLIMETERS			NOTE
	AEC			
	MIN.	NOM.	MAX.	
A	—	—	1.20	
A_1	0.05	—	0.15	13
A_2	0.95	1.00	1.05	
D	16.00 BSC.			4
D_1	14.00 BSC.			7,8
E	16.00 BSC.			4
E_1	14.00 BSC.			7,8
L	0.45	0.60	0.75	
N	80			
e	0.65 BSC.			
b	0.22	0.32	0.38	9
b1	0.22	0.30	0.33	
ccc	—	—	0.10	
ddd	—	—	0.13	

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.



RECOMMENDED LAND PATTERN

1. RED CIRCLES REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
2. GREEN CIRCLES REPRESENT COLDER STENCIL OPENING ON EXPOSED PAD AREA

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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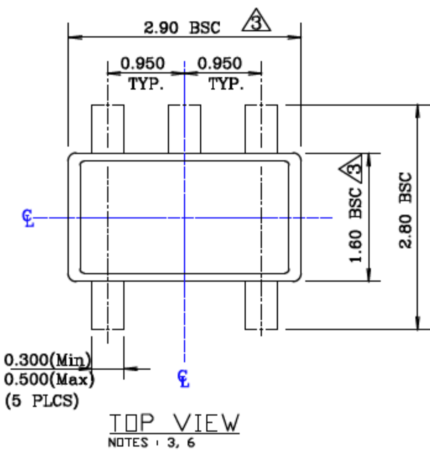
TSOT

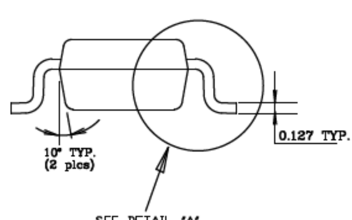
Micrel Legacy

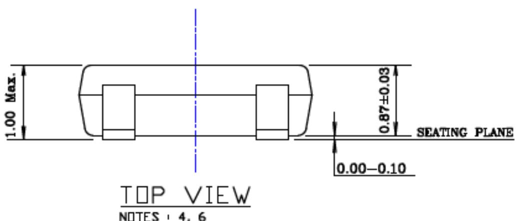
TITLE

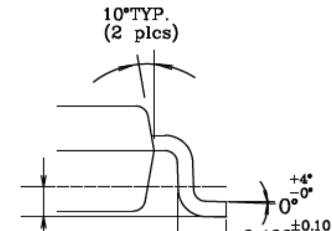
5 LEAD TSOT PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

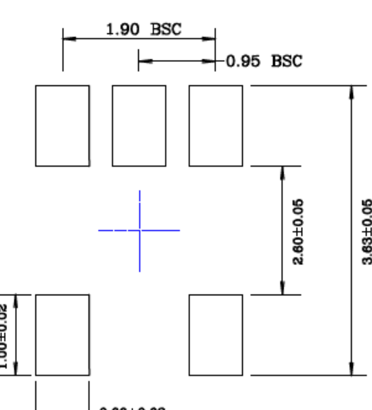
DRAWING #	TSOT-5LD-PL-1	UNIT	MM











NOTE:

1. Dimensions and tolerances are as per ANSI Y14.5M, 1994.
2. Die is facing up for mold. Die is facing down for trim/form, ie. reverse trim/form.
3. Dimensions are exclusive of mold flash and gate burr.
4. The footlength measuring is based on the gauge plane method.
5. All specification comply to Jedec Spec MO193 Issue C.
6. All dimensions are in millimeters.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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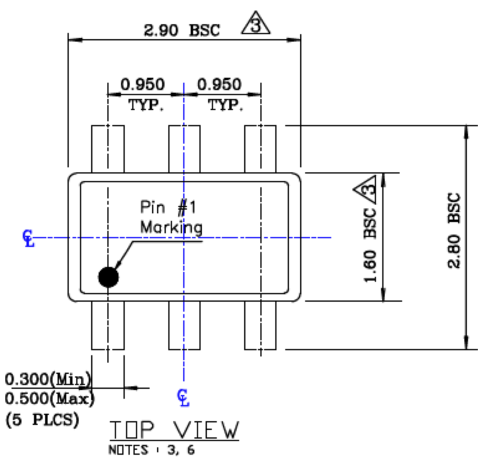
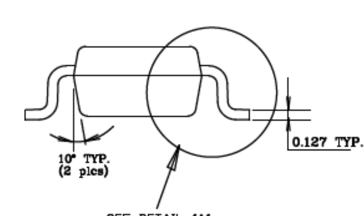
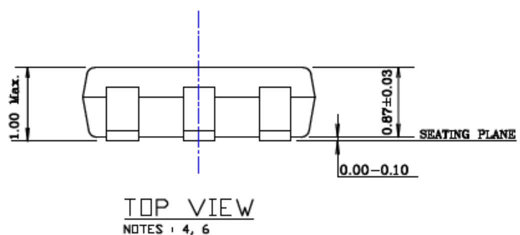
TITLE

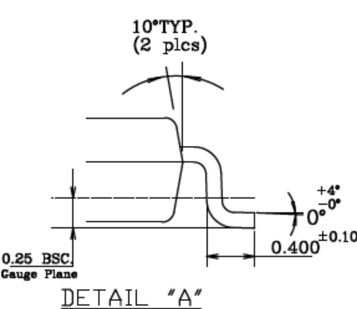
6 LEAD TSOT PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

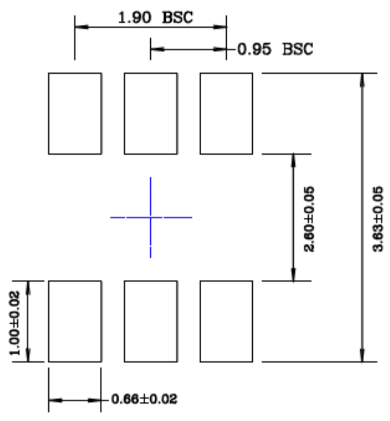
DRAWING #	TSOT-6LD-PL-1	UNIT	MM











NOTE:

1. Dimensions and tolerances are as per ANSI Y14.5M, 1994.
2. Die is facing up for mold. Die is facing down for trim/form, ie. reverse trim/form.
3. Dimensions are exclusive of mold flash and gate burr.
4. The footlength measuring is based on the gauge plane method.
5. All specification comply to Jedec Spec MO193 Issue C.
6. All dimensions are in millimeters.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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NOTES:

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Package Outlines and Dimensions

TSSOP

Micrel Legacy

TITLE
8 LEAD TSSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TSSOP-8LD-PL-1	UNIT	MM

0.65±0.13
0.25±0.03
INDEX MARK
6.40±0.13
4.40±0.07
0.25±0.03
1.95REF
TOP VIEW
NOTE 2 4

0.15±0.03
A
B
B
END VIEW
NOTE 5

BOTTOM VIEW

0.20MIN
POLISH FINISH
0.10±0.03X45°±5°
H
R0.09MIN
R0.09MIN
12.00°REF
0.60±0.10
4°±3°
1.00REF
DETAIL A
NOTE 6

0.25±0.03
0.15±0.03
0.13±0.03
0.22±0.03
SECTION B-B
NOTE 3

1.20 MAX
0.90+0.10−0.07
3.00±0.07
0.10±0.03
SEATING PLANE
SIDE VIEW
NOTE 1 4

1.95 TYP
1.78
5.95 TYP
0.42
0.65 TYP
RECOMMENDED LAND PATTERN

NOTE :

1. DIMENSION (3.00±0.07) DOES NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE.
2. DIMENSION (4.40±0.07) DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED O.25 PER SIDE.
3. DIMENSION (0.25±0.03) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 mm TOTAL IN EXCESS OF THE (0.25±0.03) DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT. MINIMUM SPACE BETWEEN PROTRUSION AND ADJACENT LEAD IS 0.07 mm.
4. DIMENSIONS (3.00±0.07) AND (4.40±0.07) TO BE DETERMINED AT DATUM PLANE H.
5. CROSS SECTION B-B TO BE DETERMINED AT 0.10 TO 0.25 MM FROM THE LEAD TIP.
6. PACKAGE EDGE ANGLES (8 X FOR 4 SIDES EACH FOR TOP & BOTTOM).

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
14 LEAD TSSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TSSOP-14LD-PL-1	UNIT	MM [INCH]

NOTES:
1. DIMENSIONS ARE IN MM [INCHES].
2. CONTROLLING DIMENSION: MM.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OF 0.254[0.010] MAX.
4. THIS DIMENSION INCLUDES LEAD FINISH.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
16 LEAD TSSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TSSOP-16LD-PL-1	UNIT	MM

5.00±0.10
16
PIN 1 ID MARK
1.00 DIA.
1 2 3
4.40±0.10
6.40 BSC

TOP VIEW

0.19-0.30
0.09-0.16
0.09-0.20
0.22±0.03

LEAD TIP DETAIL

DETAIL 'A'
0.09-0.20

END VIEW

0.90
1.20 MAX
SEATING PLANE
0.19-0.30
0.65 BSC
0.05-0.15

SIDE VIEW

0.09
0.25
GAUGE PLANE
0.09
0°-8°
SEATING PLANE
0.60±0.15
1.00 REF

DETAIL 'A'

4.55 TYP
0.65 TYP
5.94 TYP
0.42
1.78

RECOMMENDED LAND PATTERN

Notes :

1. All DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH ,PROTRUSIONS OR GATE BURRS.
4. DIMENSION DOES NOT INCLUDE INTERNAL FLASH OR PROTRUSION.
5. DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
7. CROSS SECTION TO BE DETERMINED AT 0.10 TO 0.25MM FROM THE LEAD TIP.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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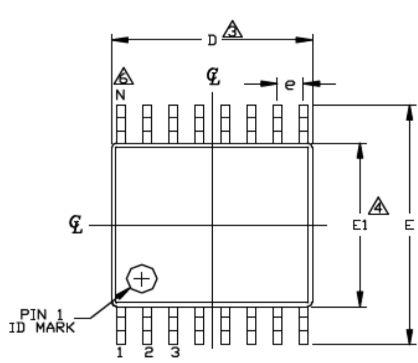
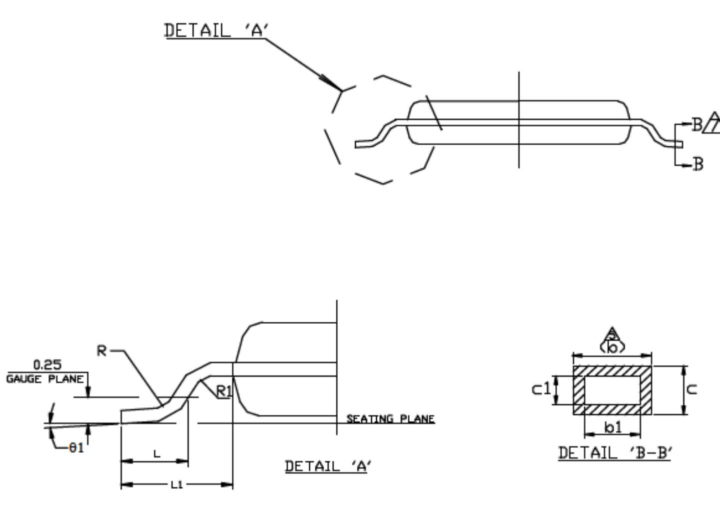
Package Outlines and Dimensions

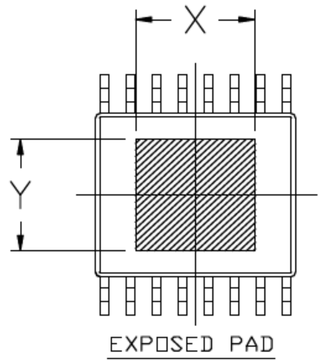
TITLE
14/16 LEAD TSSOP EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TSSOPEP-1416LD-PL-1	UNIT	INCH

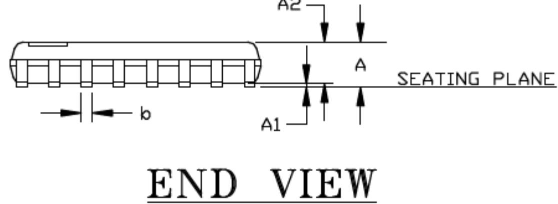


TOP VIEW





BOTTOM VIEW



END VIEW

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

SYMBOL	14L TSSOP Thermally Enhanced			16L TSSOP Thermally Enhanced		
	MIN	NOM.	MAX	MIN	NOM.	MAX
A	—	—	1.20	—	—	1.20
A1	0.025	—	0.100	0.025	—	0.100
A2	0.80	0.90	1.05	0.80	0.90	1.05
D	4.9	5.0	5.1	4.9	5.0	5.1
E1	4.3	4.4	4.5	4.3	4.4	4.5
E	6.2	6.4	6.6	6.2	6.4	6.6
L	0.45	0.60	0.75	0.45	0.60	0.75
R	0.09	—	—	0.09	—	—
R1	0.09	—	—	0.09	—	—
b	0.19	—	0.30	0.19	—	0.30
b1	0.19	0.22	0.25	0.19	0.22	0.25
c	0.09	—	0.20	0.09	—	0.20
c1	0.09	—	0.16	0.09	—	0.16
θ1	0°	—	8°	0°	—	8°
L1	1.0 REF			1.0 REF		
e	0.65 BSC			0.65 BSC		
N	14			16		
Ref.	Jedec MO-153 Issue C Variation ABT-1			Jedec MO-153 Issue C Variation ABT		
EP Area	Pad Size	X	Y	Pad Size	X	Y
	Op 1	2.997	3.200	Op 1	2.997	2.997

Notes

1. All DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
3. DIMENSION 'D' DOES NOT INCLUDE MOLD FLASH ,PROTRUSIONS OR GATE BURRS.
4. DIMENSION 'E1' DOES NOT INCLUDE INTERNAL FLASH OR PROTRUSION.
5. DIMENSION 'b' DOES NOT INCLUDE DAMBAR PROTRUSION.
6. "N" IS THE MAXIMUM NUMBER OF LEAD TERMINAL POSITIONS FOR THE SPECIFIED PACKAGE LENGTH.
7. CROSS SECTION B-B TO BE DETERMINED AT 0.10 TO 0.25MM FROM THE LEAD TIP.
8. EXPOSED PAD WILL BE DEPEND ON THE PAD SIZE OF THE L/F.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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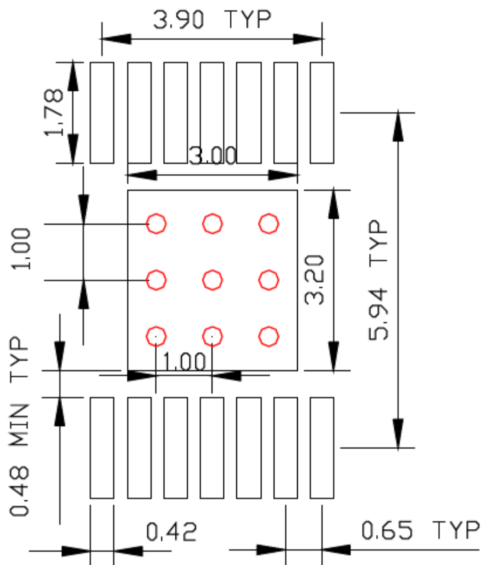
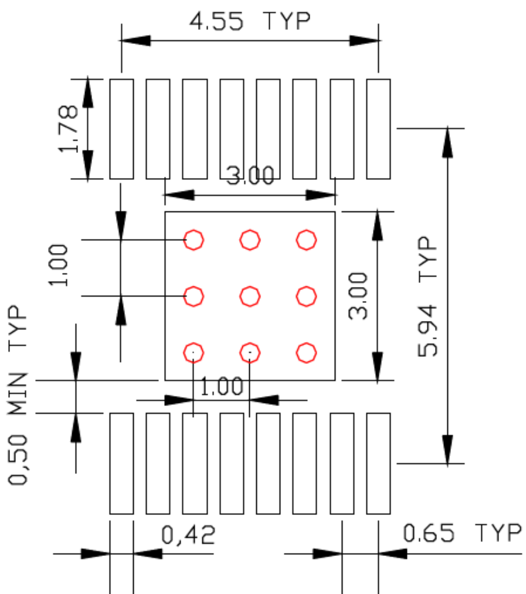
Package Outlines and Dimensions





Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

Package Outlines and Dimensions

TITLE
20 LEAD TSSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TSSOP-20LD-PL-1	UNIT	MM [INCH]

10 1
4.40±0.10 (0.173±0.004)
6.40±0.20 (0.252±0.008)
11 20
6.50±0.10 (0.256±0.004)
TOP VIEW
NOTES : 1, 2, 3

0.15 +0.05 −0.06 (0.006±0.002)
0.10±0.05 (0.004±0.002)
0−8°
0.60±0.15 (0.024±0.006)
DETAIL 'A'
(VIEW ROTATED 90° C.W.)

SEE DETAIL 'A'
END VIEW

0.24 +0.06 −0.05 (0.009 +0.002 −0.002)
.65 BCS (.026 BCS)
1.20 MAX. (0.047 MAX.)
SIDE VIEW
NOTES : 1, 2, 4

5.85 TYP
0.65 TYP
5.94 TYP
1.78
0.42
RECOMMENDED LAND PATTERN

NOTES:
1. DIMENSIONS ARE IN MM [INCHES].
2. CONTROLLING DIMENSION: MM.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OF 0.254[0.010] MAX.
4. THIS DIMENSION INCLUDES LEAD FINISH.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
20 LEAD TSSOP EPAD PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TSSOPEP-20LD-PL-1	UNIT	MM (INCH)

TOP VIEW

BOTTOM VIEW

SIDE VIEW

DETAIL 'A'

RECOMMENDED LAND PATTERN

NOTE:
1. DIMENSION DOES NOT INCLUDE MOLD FLASH OF 0.254 (0.010) MAX.
2. DIMENSION INCLUDES LEAD FINISH WHERE APPLICABLE
3. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM IN DIAMETER, 1.00 PITCH AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
24 LEAD TSSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TSSOP-24LD-PL-1	UNIT	MM [INCH]

7.80±0.10 ⚠3

24

PIN 1 ID MARK
1.00 DIA.

1 2 3

4.40±0.10 ⚠4

6.40 BSC

TOP VIEW
NOTES : 1, 2, 3, 4

DETAIL 'A'

0.09-0.20

END VIEW

0.09

0.25
GAUGE PLANE

0°-8°

0.09

SEATING PLANE

0.60±0.15

1.00 REF

DETAIL 'A'

0.19-0.30 ⚠5

0.09-0.16

0.09-0.20

0.22±0.03

⚠6

LEAD TIP DETAIL
NOTES : 6

0.90

1.20 MAX

SEATING PLANE

0.19-0.30

0.65 BSC

0.05-0.15

SIDE VIEW
NOTES : 1, 2

7.15 TYP

0.65 TYP

5.94 TYP

1.78

0.42

RECOMMENDED LAND PATTERN

Notes

1. All DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
3. ⚠ DIMENSION DOES NOT INCLUDE MOLD FLASH ,PROTRUSIONS OR GATE BURRS.
4. ⚠ DIMENSION DOES NOT INCLUDE INTERNAL FLASH OR PROTRUSION.
5. ⚠ DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
6. ⚠ CROSS SECTION TO BE DETERMINED AT 0.10 TO 0.25MM FROM THE LEAD TIP.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
24 LEAD TSSOP EPAD (4.3x3.0 EPAD) PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TSSOPEP-24LD-PL-1	UNIT	MM (INCH)

TOP VIEW

BOTTOM VIEW

SIDE VIEW

DETAIL 'A'

DETAIL 'B-B'

END VIEW

RECOMMENDED LAND PATTERN

NOTE:
1. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM IN DIAMETER, 1.00 PITCH AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
2. DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS & BURR

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
24 LEAD TSSOP EPAD (5.5x3.0MM EPAD) PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TSSOPEP-24LD-PL-2	UNIT	MM (INCH)

TOP VIEW

BOTTOM VIEW

SIDE VIEW

DETAIL 'A'

DETAIL 'B-B'

END VIEW

RECOMMENDED LAND PATTERN

NOTE:
1. RED CIRCLES IN LAND PATTERN REPRESENT THERMAL VIAS. RECOMMENDED SIZE IS 0.30-0.35MM IN DIAMETER, 1.00 PITCH AND SHOULD BE CONNECTED TO GND FOR MAXIMUM PERFORMANCE
2. DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS & BURR

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE

28 LEAD TSSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	TSSOP-28LD-PL-1	**UNIT**	MM [INCH]

9.70±0.10
28
PIN 1 ID MARK
1.00 DIA.
1 2 3
4.40±0.10
6.40 BSC

TOP VIEW
NOTES : 1, 2, 3, 4

DETAIL 'A'
0.09–0.20

END VIEW

0.09
0.25
GAUGE PLANE
0°–8°
0.09
SEATING PLANE
0.60±0.15
1.00 REF

DETAIL 'A'

0.19–0.30
0.09–0.16
0.09–0.20
0.22±0.03

LEAD TIP DETAIL
NOTES : 6

0.90
1.20 MAX
SEATING PLANE
0.19–0.30
0.65 BSC
0.05–0.15

SIDE VIEW
NOTES : 1, 2

8.45 TYP
0.65 TYP
5.94 TYP
1.78
0.42

RECOMMENDED LAND PATTERN

Notes

1. All DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH ,PROTRUSIONS OR GATE BURRS.
4. DIMENSION DOES NOT INCLUDE INTERNAL FLASH OR PROTRUSION.
5. DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
6. CROSS SECTION TO BE DETERMINED AT 0.10 TO 0.25MM FROM THE LEAD TIP.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTES:

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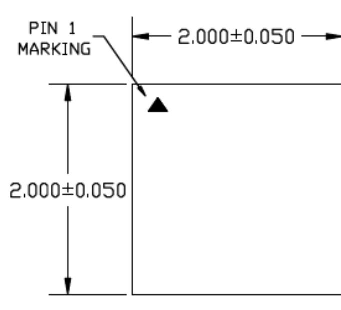
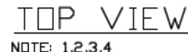
UTDFN

Micrel Legacy

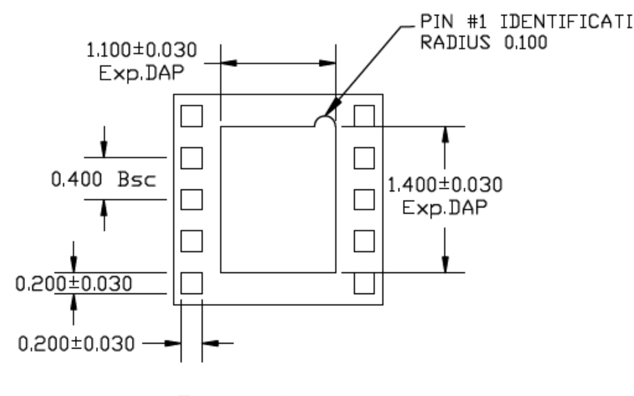
TITLE
10 LEAD UTDFN 2.0x2.0 mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	UTDFN22-10LD-PL-1	**UNIT**	MM
Lead Frame	Copper	**Lead Finish**	Au-Ni-Au

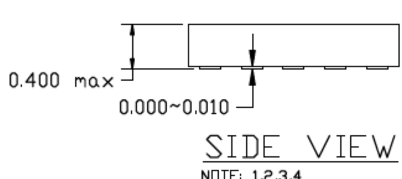




NOTE: 1,2,3,4

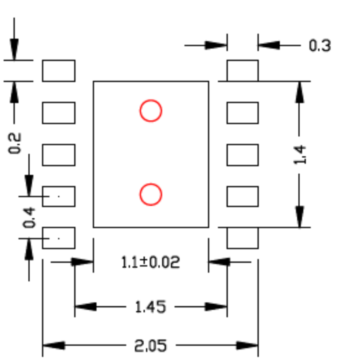


NOTE: 1,2,3,4



NOTE: 1,2,3,4

NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAX. PACKAGE WARPAGE IS 0.08 mm.
3. MAXIMUM ALLOWABE BURRS IS 0.076 mm IN ALL DIRECTIONS.
4. PIN #1 ID ON TOP WILL BE LASER MARKED.
5. Red Circle Indicates Thermal Via. Size should be 0.200mm to 0.0350mm in diameter, 0.80mm pitch, and should be connected to ground plane for maximum thermal performance.



RECOMMENDED LAND PATTERN
NOTE: 5

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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WLCSP

Micrel Legacy

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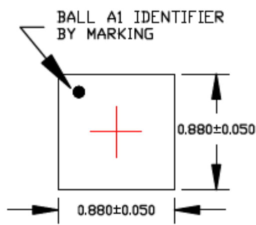
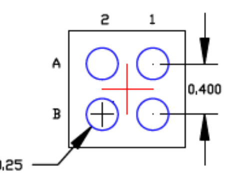
Package Outlines and Dimensions

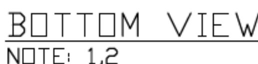
TITLE
4 BALL WLCSP 0.88x0.88mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

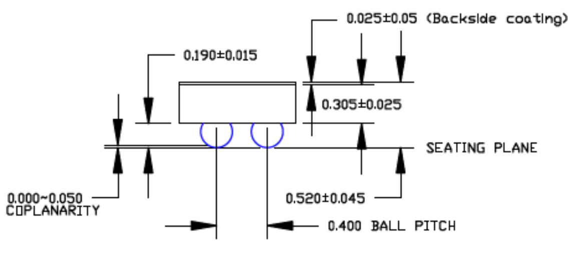
DRAWING #	WLCSP088088D-4BL-PL-9	**UNIT**	MM

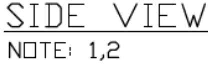


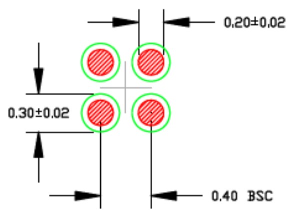
TOP VIEW
NOTE: 1,2




BOTTOM VIEW
NOTE: 1,2




SIDE VIEW
NOTE: 1,2



RECOMMENDED LAND PATTERN
NOTE: 3,4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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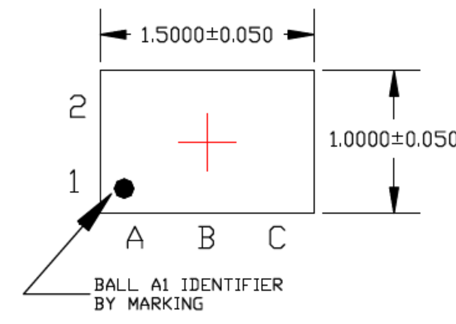
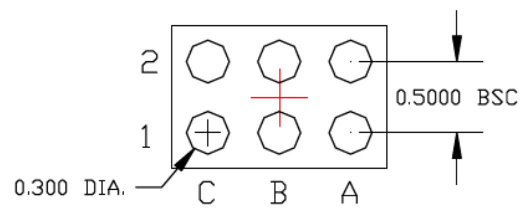
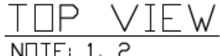
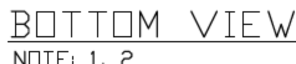
TITLE
6 BALL WLCSP 1.5x1.0mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

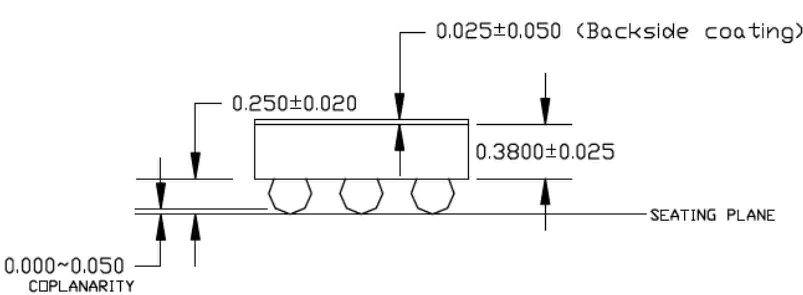
DRAWING #	WLCSP1510D-6BL-PL-9	UNIT	MM

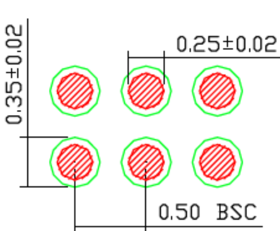












SIDE VIEW
NOTE: 1, 2

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

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TITLE
6 BALL WLCSP 0.80x1.20mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	WLCSP080120D-6BL-PL-9	UNIT	MM

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

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Package Outlines and Dimensions

TITLE
6 BALL WLCSP 0.84x1.32mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	WLCSP084132D-6BL-PL-9	UNIT	MM

1.3200±0.050
0.840±0.050
2
1
A B C
BALL A1 IDENTIFIER
BY MARKING

TOP VIEW
NOTE: 1, 2

2
1
C B A
0.4000 BSC
0.250 DIA.

BOTTOM VIEW
NOTE: 1, 2

0.025±0.050 (Backside coating)
0.1900±0.050
0.305±0.025
SEATING PLANE
0.000~0.050
COPLANARITY
0.520±0.050

SIDE VIEW
NOTE: 1, 2

0.30±0.02
0.20±0.02
0.40 BSC

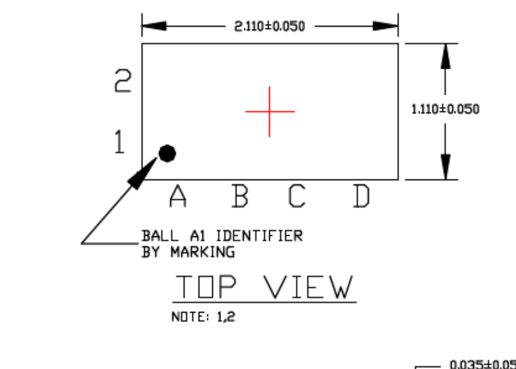
RECOMMENDED
LAND PATTERN
NOTE: 3, 4

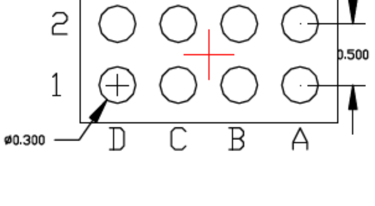
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

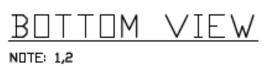
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

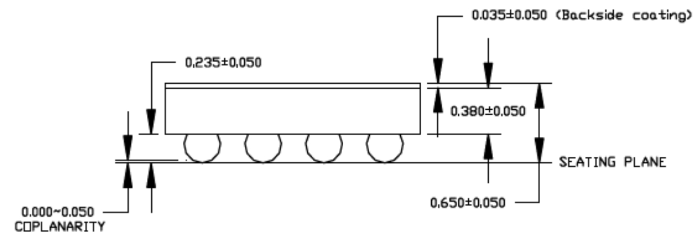
TITLE
8 BALL WLCSP 2.11x1.11mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

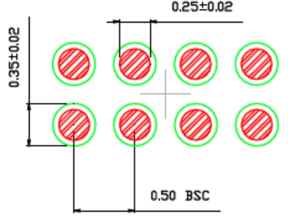
DRAWING #	WLCSP211111D-8BL-PL-9	UNIT	MM











SIDE VIEW
NOTE: 1,2

RECOMMENDED LAND PATTERN
NOTE: 3,4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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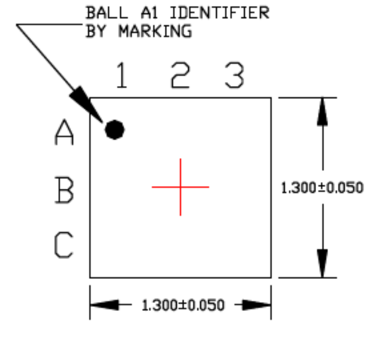
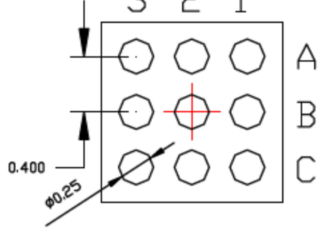
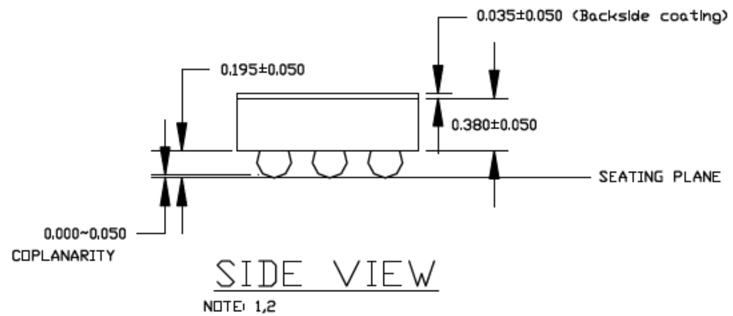
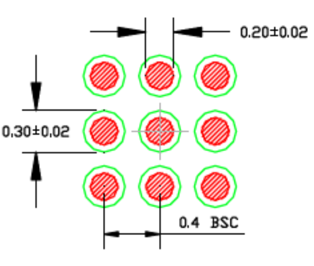
TITLE
9 BALL WLCSP 1.3x1.3mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	WLCSP1313Q-9BL-PL-9	UNIT	MM









RECOMMENDED LAND PATT
NOTE: 3,4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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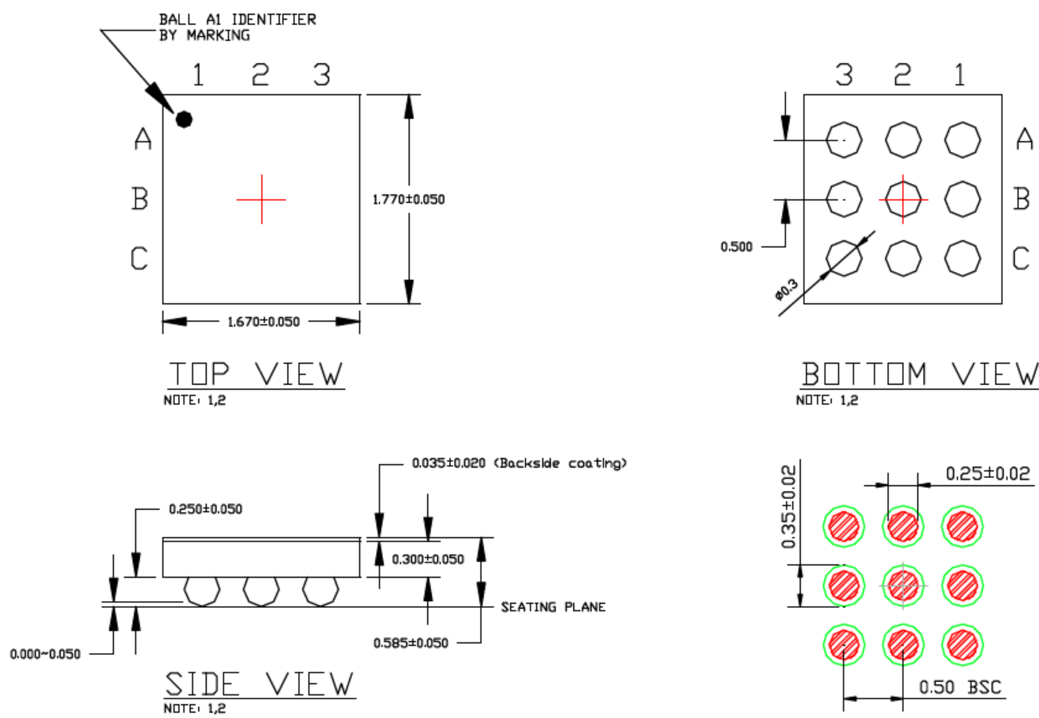
Package Outlines and Dimensions

TITLE
9 BALL WLCSP 1.67x1.77mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	WLCSP167177Q-9BL-PL-9	UNIT	MM



RECOMMENDED LAND PATTERN
NOTE: 3,4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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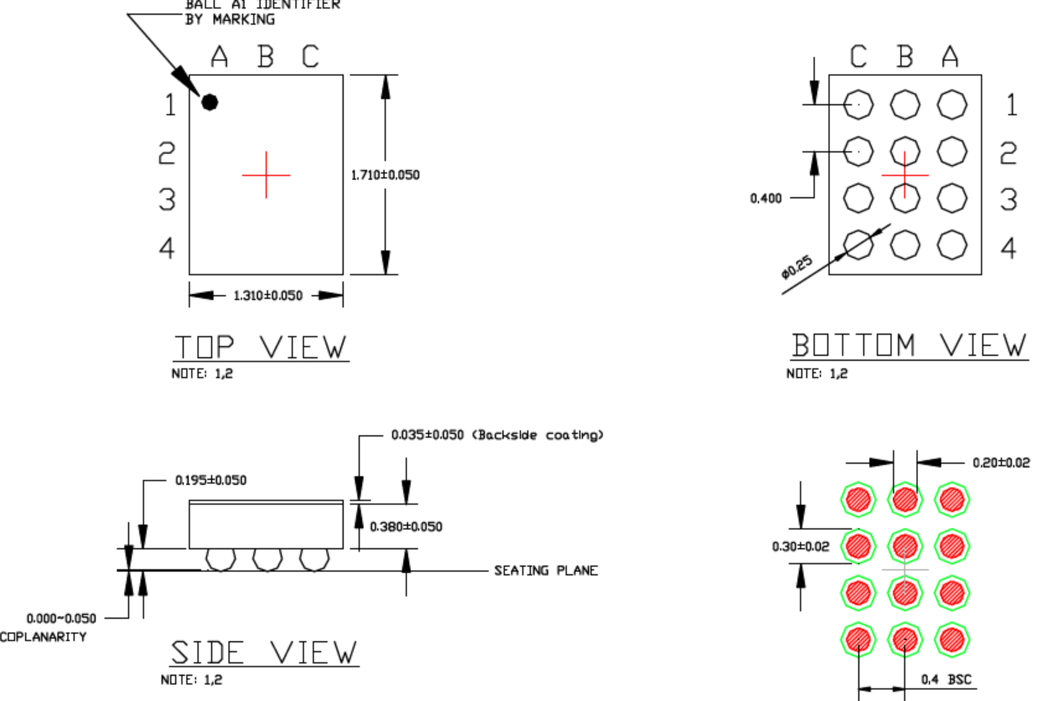
Package Outlines and Dimensions

TITLE
12 BALL WLCSP 1.31x1.71mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	WLCSP131171Q-12BL-PL-9	UNIT	MM



NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
16 BALL WLCSP 1.81x1.71mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	WLCSP181171Q-16BL-PL-9	UNIT	MM

1.8100±0.050
1.7100±0.050
4
3
2
1
A B C D
BALL A1 IDENTIFIER
BY MARKING

TOP VIEW
NOTE: 1, 2

4
3
2
1
D C B A
0.4000 BSC
0.250 DIA.

BOTTOM VIEW
NOTE: 1, 2

0.025±0.050 (Backside coating)
0.200±0.020
0.3800±0.025
SEATING PLANE
0.000~0.050
COPLANARITY

SIDE VIEW
NOTE: 1, 2

0.30±0.02
0.20±0.02
0.40 BSC

RECOMMENDED
LAND PATTERN
NOTE: 3, 4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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TITLE
16 BALL WLCSP 1.88x1.88mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	WLCSP188188Q-16BL-PL-9	UNIT	MM

BALL A1 IDENTIFIER BY MARKING

1.8800±0.050

1.8800±0.050

A B C D

1 2 3 4

TOP VIEW
NOTE: 1, 2

A B C D

4 3 2 1

0.4000 BSC

0.250 DIA.

BOTTOM VIEW
NOTE: 1, 2

0.025±0.050 (Backside coating)

0.200±0.020

0.3800±0.025

SEATING PLANE

0.000~0.050
COPLANARITY

SIDE VIEW
NOTE: 1, 2

0.30±0.02

0.20±0.02

0.40 BSC

RECOMMENDED LAND PATTERN
NOTE: 3, 4

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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Package Outlines and Dimensions

TITLE

25 BALL WLCSP 2.07x2.26mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	WLCSP207226Q-16BL-PL-9	UNIT	MM

BALL A1 IDENTIFIER BY MARKING

2.0700±0.050

2.2600±0.050

A B C D E

1 2 3 4 5

TOP VIEW

NOTE: 1, 2

A B C D E

0.4000 BSC

0.250 DIA.

5 4 3 2 1

BOTTOM VIEW

NOTE: 1, 2

0.025±0.050 (Backside coating)

0.200±0.020

0.3800±0.025

SEATING PLANE

0.000~0.050

COPLANARITY

SIDE VIEW

NOTE: 1, 2

0.20±0.02

0.30±0.02

0.40 BSC

RECOMMENDED LAND PATTERN

NOTE: 3, 4

NOTE:

1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. NON-SOLDERMASK DEFINED PADS ARE RECOMMENDED FOR BOARD LAYOUT
4. SHADED RED CIRCLES REPRESENT CONTACT PAD AREA. GREEN CIRCLES REPRESENT SOLDER MASK OPENING

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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WQFN

Micrel Legacy

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TITLE

32 LEAD WQFN 5x5mm PACKAGE (Wettable Flank) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	WQFN55-32LD-PL-1	**UNIT**	MM

TOP VIEW
NOTE: 1, 2, 3

BOTTOM VIEW
NOTE: 1, 2, 3

SIDE VIEW
NOTE: 1, 2, 3, 6

CROSS SECTION
NOTE: Not drawn to scale. For reference only.

RECOMMENDED LAND PATTERN
NOTE: 4, 5

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLES IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER, 1.00mm PITCH & SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE.
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 0.87x0.87mm, 1.07mm PITCH.
6. "W" IN WQFN IS WETTABLE FLANK PACKAGE.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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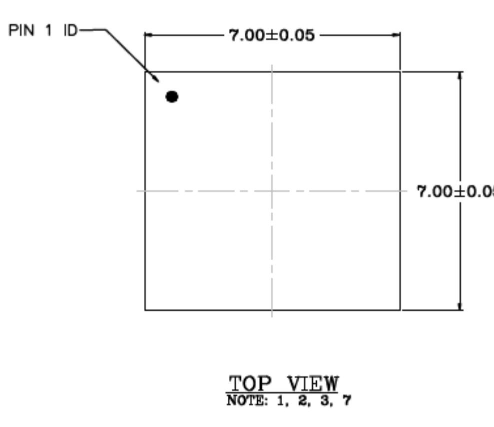
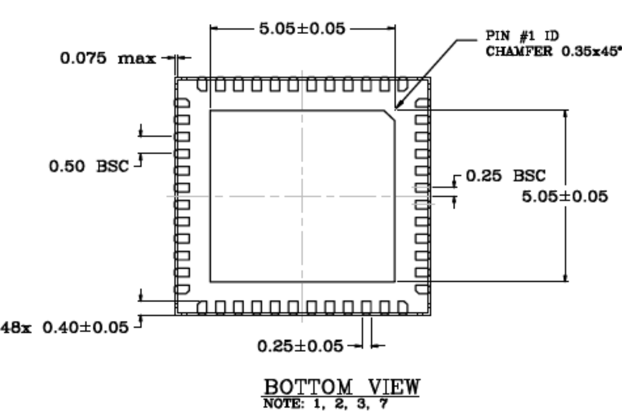
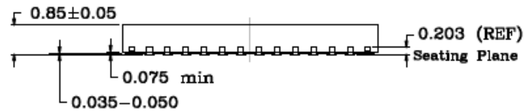
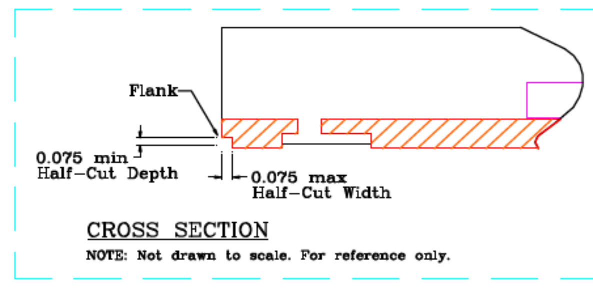
TITLE
48 LEAD WQFN 7x7mm PACKAGE (Wettable Flank) OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	WQFN77-48LD-PL-1	UNIT	MM





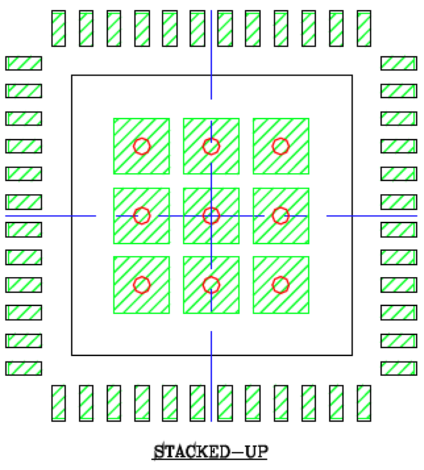


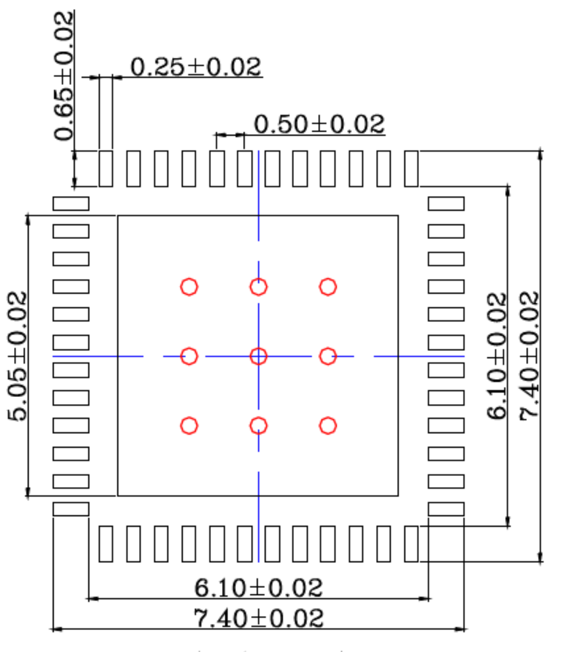


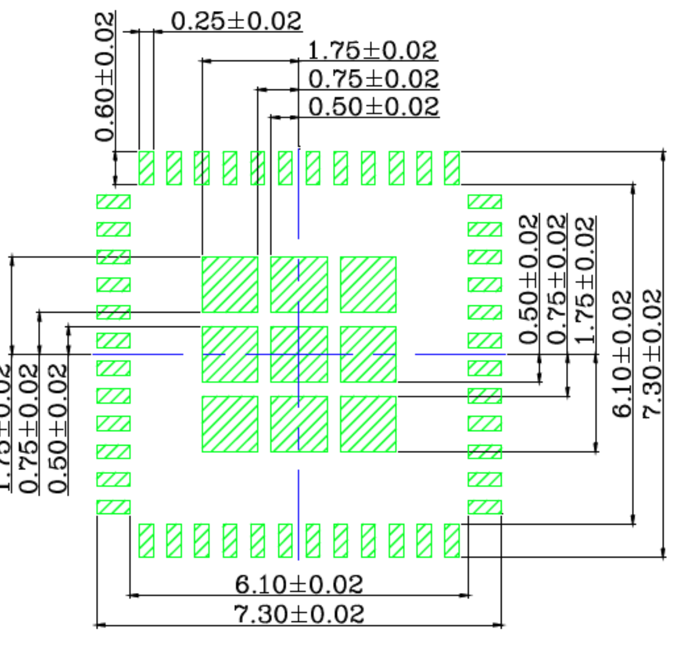
NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. RED CIRCLES IN LAND PATTERN INDICATES THERMAL VIA. SIZE SHOULD BE 0.30-0.35mm IN DIAMETER AND SHOULD BE CONNECTED TO GND FOR MAX THERMAL PERFORMANCE. PITCH = 1.00mm
5. GREEN RECTANGLES (SHADED AREA) REPRESENT SOLDER STENCIL OPENING ON EXPOSED PAD AREA. RECOMMENDED SIZE IS 1.0x1.0mm, SPACING = 0.25mm.
6. “W” IN WQFN IS WETTABLE FLANK PACKAGE.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

POD-Land Pattern drawing #WQFN77-48LD-PL-1







Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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XTDFN

Micrel Legacy

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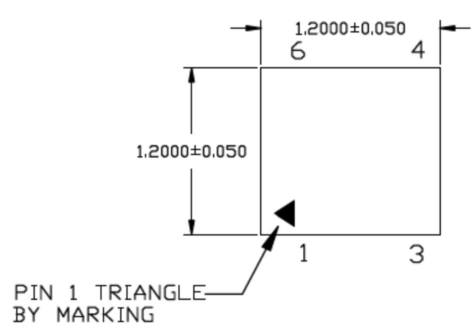
Package Outlines and Dimensions

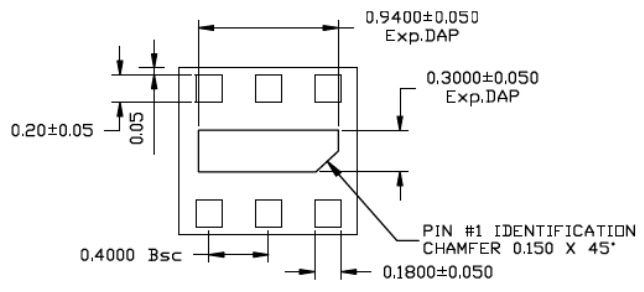
TITLE
6 LEAD XTDFN 1.2x1.2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	XTDFN1212-6LD-PL-1	UNIT	MM
Lead Frame	NiPdAu	Lead Finish	NiPdAu



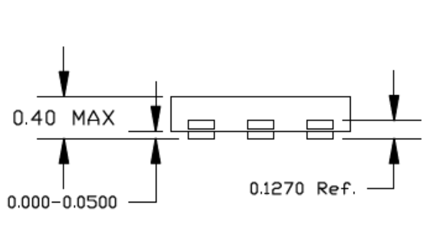
TOP VIEW

NOTE: 1, 2



BOTTOM VIEW

NOTE: 1, 2, 3



SIDE VIEW

NOTE: 1, 2

0.40 BSC

1.40

0.18

0.94

0.35

0.30

RECOMMENDED LAND PATTERN

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. LEAD AND EPAD CORNER MAXIMUM RADIUS 0.075MM

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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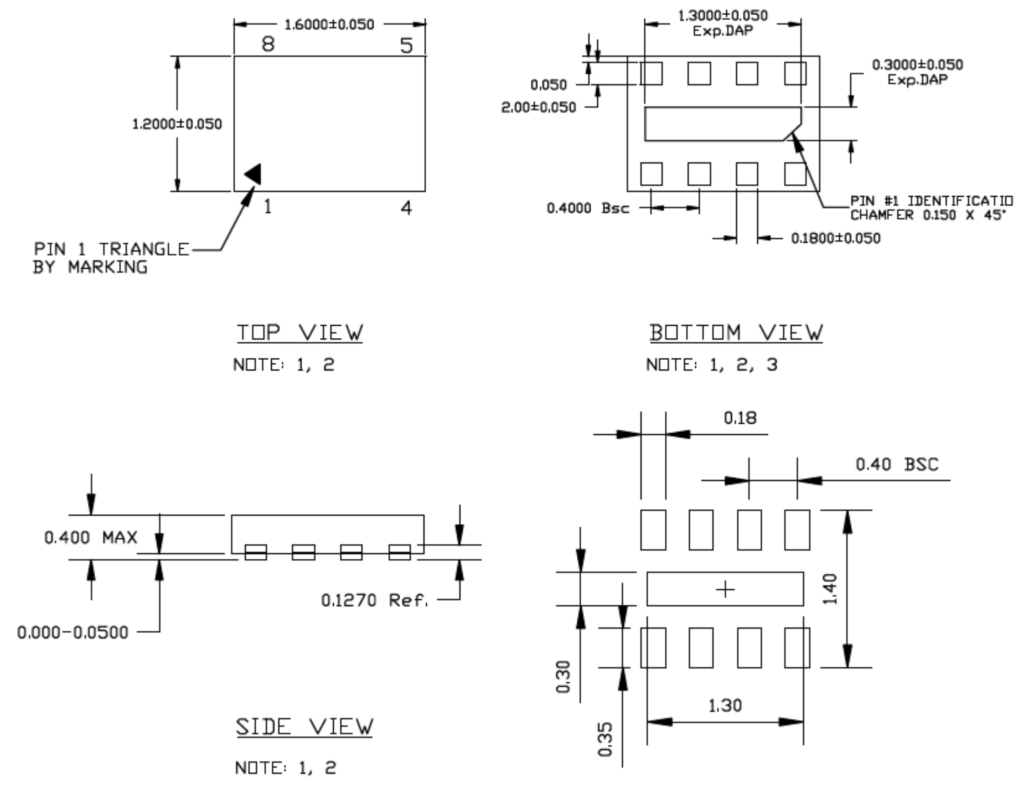
Package Outlines and Dimensions

TITLE

8 LEAD XTDFN 1.6x1.2mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	XTDFN1612-8LD-PL-1	**UNIT**	MM
Lead Frame	NiPdAu	**Lead Finish**	NiPdAu



RECOMMENDED LAND PATTERN

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. LEAD AND EPAD CORNER MAXIMUM RADIUS 0.075MM

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

TITLE
10 LEAD XTDFN 2.5x2.5mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	XTDFN2525-10LD-PL-1	UNIT	MM

2.50±.05
2.50±.05
Pin #1 Triangle Shape by marking

TOP VIEW
NOTE: 1, 2

2.10±.05
0.30±.05
1.50±.05
0.25±.05
0.50 BSC

BOTTOM VIEW
NOTE: 1, 2, 3

0.400 MAX
SEATING PLANE
0.000–0.05

SIDE VIEW
NOTE: 1, 2

0.50 BSC
0.25
2.70 2.10 1.60
0.30
0.15
2.10

RECOMMENDED LAND PATTERN
NOTE: 4, 5, 6

NOTE:
1. MAX PACKAGE WARPAGE IS 0.05mm
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. LEAD AND EPAD CORNER MAXIMUM RADIUS 0.075mm.
4. GREEN RECTANGLES IN RECOMMENDED LAND PATERN IS SOLDER STENCIL OPENING ON EXPOSED PAD AREA. SIZE IS 0.60mm X 0.90mm. SPACING is 0.30mm.
5. RED CIRCLES IN LAND PATTERN ARE VIAS AND SHOULD BE CONNECTED TO GROUND FOR MAXIMUM PERFORMANCE. DIAMETER IS 0.30-0.35mm, PITCH IS 1.0mm.
6. RECOMMENDED LAND PATTERN TOLERANCE IS ±0.020mm UNLESS SPECIFIED.

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

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APPENDIX A: REVISION HISTORY

Revision AL (February 2007)

Packages were revised. Telcom package designators were added where the designators vary from Microchip designators.

Revised 3-Lead Plastic Transistor Outline (TO or ZB) [TO-92].

Revised 3-Lead Plastic Small Outline Transistor (TT or NB) [SOT-23].

Revised 3-Lead Plastic Small Outline Transistor (CB or NB) [SOT-23A].

Revised 3-Lead Plastic Small Outline Transistor (DB) [SOT-223].

Revised 5-Lead Plastic Small Outline Transistor (DB) [SOT-223].

Revised 4-Lead Plastic Small Outline Transistor (RC) [SOT-143].

Revised 5-Lead Plastic Small Outline Transistor (OT or CT) [SOT-23].

Revised 6-Lead Plastic Small Outline Transistor (CH) [SOT-23].

Revised 8-Lead Plastic Dual In-Line (P or PA) 300 mil Body [PDIP].

Revised 14-Lead Plastic Dual In-Line (P or PD) 300 mil Body [PDIP].

Revised 16-Lead Plastic Dual In-Line (P or PE) 300 mil Body [PDIP].

Revised 24-Lead Plastic Dual In-Line (P or PG) 600 mil Body [PDIP].

Revised 24-Lead Skinny Plastic Dual In-Line (SP or PF) 300 mil Body [SPDIP].

Revised 28-Lead Skinny Plastic Dual In-Line (SP or PJ) 300 mil Body [SPDIP].

Revised 28-Lead Plastic Dual In-Line (P or PI) 600 mil Body [PDIP].

Revised 40-Lead Plastic Dual In-Line (P or PL) 600 mil Body [PDIP].

Revised 20-Lead Plastic Leaded Chip Carrier (L) Square [PLCC].

Revised 28-Lead Plastic Leaded Chip Carrier (L or LI) Square [PLCC].

Revised 32-Lead Plastic Leaded Chip Carrier (L) Rectangle [PLCC].

Revised 44-Lead Plastic Leaded Chip Carrier (L or LW) Square [PLCC].

Revised 68-Lead Plastic Leaded Chip Carrier (L or LS) Square [PLCC].

Revised 84-Lead Plastic Leaded Chip Carrier (L) Square [PLCC].

Revised 8-Lead Plastic Small Outline (SN or OA) Narrow, 3.90 mm Body [SOIC].

Revised 14-Lead Plastic Small Outline (SL or OD) Narrow, 3.90 mm Body [SOIC].

Revised 16-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC].

Revised 8-Lead Plastic Small Outline (SM) Medium, 5.28 mm Body [SOIJ].

Revised 16-Lead Plastic Small Outline (SO or OE) Wide, 7.50 mm Body [SOIC].

Revised 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC].

Revised 20-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC].

Revised 24-Lead Plastic Small Outline (SO or PF) Wide, 7.50 mm Body [SOIC].

Revised 28-Lead Plastic Small Outline (SO or OI) Wide, 7.50 mm Body [SOIC].

Revised 8-Lead Plastic Micro Small Outline Package (MS or UA) [MSOP].

Revised 10-Lead Plastic Micro Small Outline Package (MS or UN) [MSOP].

Revised 16-Lead Plastic Shrink Small Outline Narrow Body (QR).150” Body [QSOP].

Revised 64-Lead Plastic Metric Quad Flatpack (KU) 14x14x2.7 mm Body, 3.20 mm Footprint [MQFP].

Revised 44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2.0 mm Body, 3.9 mm Footprint [PQFP].

Revision AM (March 2007)

Four Microchip and Telcom package designators were corrected and one package was removed.

Revised 6-Lead Plastic Small Outline Transistor (CH) [SOT-23] to (CH or OT).

Revised 3-Lead Plastic Small Outline Transistor (CB or NB) [SOT-23A] to (CB) .

Revised 44-Lead Plastic Metric Quad Flatpack (PQ) [MQFP] to (PQ or KW).

Revised 64-Lead Plastic Metric Quad Flatpack (KU) [MQFP] to (BU).

Deleted 44-Lead Plastic Metric Quad Flatpack (KW) – 10x10x2.0 mm Body, 3.9 mm Footprint [PQFP].

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Revision AN (March 2007)

16-Lead Plastic Shrink Small Outline Narrow Body (QR) .150” Body [QSOP]: the nominal pitch value for the package is corrected to “.025.” This correction revises MCHP Drawing C04-024B to C04-024C.

Packages with a Microchip and a Telcom designator are represented on separate pages, rather than having both designators on a single page.

Revision AP (April 2007)

Revised 40-Lead Ceramic Dual In-Line with Window (JW) .600” Body [CERDIP]. The E-1 MAX dimension has changed from “.540” to “.583”. This correction revises MCHP Drawing C04-014B to C04-014C.

Revision AQ (July 2007)

Revised 5-Lead Plastic Small Outline Transistor [SOT-223] package designator from (DB) to (DC). This correction revises MCHP Drawing C04-137A to C04-137B.

Revision AR (September 2007)

Land patterns have been added for the following 13 packages:

8-Lead Plastic Small Outline (SN) – Narrow, 3.90 mm Body [SOIC].

28-Lead Plastic Quad Flat, No Lead Package (ML) – 6x6 mm Body [QFN] with 0.55 mm Contact Length.

28-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN-S] with 0.40 mm Contact Length.

44-Lead Plastic Quad Flat, No Lead Package (ML) – 8x8 mm Body [QFN].

44-Lead Plastic Metric Quad Flatpack (PQ) – 10x10x2 mm Body, 3.20 mm [MQFP].

64-Lead Plastic Metric Quad Flatpack (BU) – 14x14x2.7 mm Body, 3.20 mm [MQFP].

44-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP].

64-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP].

64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP].

80-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP].

80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP].

100-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP].

100-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP].

Revision AS (January 2008)

The following packages are new:

Drawing 0129B, 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body [TDFN] on page 156.

Drawing 136B, 8-Lead Plastic Dual Flat, No Lead Package (MU) - 2x3x0.5 mm Body [UDFN] on page 158.

Land patterns have been added for the following packages:

Drawing 2032A, 3-Lead Plastic Small Outline Transistor (DB) Footprint [SOT-223] on page 33.

Drawing 2137A, 5-Lead Plastic Small Outline Transistor (DC) Footprint [SOT-223] on page 35.

Drawing 2031A, 4-Lead Plastic Small Outline Transistor (RC) Footprint [SOT-143] on page 37.

Drawing 2057A, 8-Lead Plastic Small Outline (SN) Narrow, 3.90 mm Body Footprint [SOIC] on page 79.

Drawing 2057A, 8-Lead Plastic Small Outline (OA) Narrow, 3.90 mm Body Footprint [SOIC] on page 81.

Drawing 2056A, 8-Lead Plastic Small Outline (SM) Medium, 5.28 mm Body Footprint [SOIJ] on page 86.

Drawing 2123A, 8-Lead Plastic Dual Flat, No Lead Package (MC) 2x3x0.9 mm Body Footprint [DFN] on page 99.

Drawing 2062A, 8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9 mm Body Footprint [DFN] on page 103.

Drawing 2131A, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body Footprint [DFN] on page 105.

Drawing 2063A, 10-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body Footprint [DFN] on page 109.

Drawing 2129A, 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body Footprint [TDFN] on page 157.

Drawing 2136A, 8-Lead Plastic Dual Flat, No Lead Package (MU) - 2x3x0.5 mm Body Footprint [UDFN] on page 159.

Corrections have been made to the following packages:

Drawing 123C, 8-Lead Plastic Dual Flat, No Lead Package (MC) 2x3x0.9 mm Body [DFN] on page 98.

Drawing 131D, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body [DFN] on page 104.

Drawing 2116A, 80-Lead Plastic Thin Quad Flatpack (PF) 14x14x1 mm Body, 2.00 mm Footprint [TQFP] on page 151.

Revision AT (June 2008)

Revised 24-Lead Plastic Small Outline [SOIC], Wide, 7.50 mm Body package designator from (PF) to (OG) on page 104.

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The following packages are new:

Drawing 0143A, 24-Lead Plastic Quad Flat, No Lead Package (MJ) 4x4 mm Body [QFN] on page 130.

Drawing 0144A, 28-Lead Plastic Quad Flat, No Lead Package (MK) 4x4 mm Body [QFN] on page 132.

Drawing 0140A, 28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5 mm Body [QFN] on page 134.

Drawing 0145A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on page 182.

Land patterns have been added for the following packages:

Drawing 2060A, 3-Lead Plastic Small Outline Transistor (LB) Footprint [SC70] on page 43.

Drawing 2061A, 5-Lead Plastic Small Outline Transistor (LT) Footprint [SC70] on page 45.

Drawing 2015A, 7-Lead Plastic (EK) Footprint [DDPAK] on page 51.

Drawing 2065A, 14-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body Footprint [SOIC] on page 89.

Drawing 2065A, 14-Lead Plastic Small Outline (OD) Narrow, 3.90 mm Body Footprint [SOIC] on page 91.

Drawing 2108A, 16-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body Footprint [SOIC] on page 93.

Drawing 2102A, 16-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 97.

Drawing 2102A, 16-Lead Plastic Small Outline (OE) Wide, 7.50 mm Body Footprint [SOIC] on page 99.

Drawing 2051A, 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 101.

Drawing 2122A, 8-Lead Plastic Dual Flat, No Lead Package (MF) 6x5 mm Body Footprint [DFN-S] on page 119.

Drawing 2127A, 16-Lead Plastic Quad Flat, No Lead Package (ML) 4x4x0.9 mm Body Footprint [QFN] on page 127.

Drawing 2126A, 20-Lead Plastic Quad Flat, No Lead Package (ML) 4x4x0.9 mm Body Footprint [QFN] on page 129.

Drawing 2143A, 24-Lead Plastic Quad Flat, No Lead Package (MJ) 4x4 mm Body Footprint [QFN] on page 131.

Drawing 2144A, 28-Lead Plastic Quad Flat, No Lead Package (MK) 4x4 mm Body Footprint [QFN] on page 133.

Drawing 2140A, 28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5 mm Body Footprint [QFN] on page 135.

Revision AU (June 2008)

Updated 8-Lead Plastic Small Outline (SM) Medium 5.28 mm Body Footprint [SOIJ] on page 95.

Revision AV (September 2008)

Added Drawing 0139A, 20-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Body [QFN] on page 124.

Revision AW (October 2008)

Revised 40-Lead Plastic Quad Flat, No Lead Package (MM) 6x6x0.9 mm Body [QFN] on page 136, correcting the package designator from (MM) to (ML).

Revision AX (January 2009)

Added Drawing 149A, 64-Lead Plastic Quad Flat, No Lead Package (ML) 6x6x0.9 mm Body [QFN] on page 140. This package is presented on 2 pages to facilitate a more explicit specification through the addition of geometric dimensioning and tolerancing (GD&T) information. GD&T symbols and rules are described and defined in the ASME Y14.5M-1994 standard (www.asme.org).

Revision AY (March 2009)

Revised Drawing 0131E, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body [DFN] to the new two-page format. It is shown on pages 115-116.

Also revised Drawing 149B, 64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Body [QFN] on pages 147-148. A corresponding land pattern (2149A), in the list below, was added.

The following packages are new:

Drawing 151A, 6-Lead Plastic Small Outline Transistor (LT) [SC70] on pages 45-46.

Drawing 2151A, 6-Lead Plastic Small Outline Transistor (LT) Footprint [SC70] on page 47.

Drawing 2149A, 64-Lead Plastic Quad Flat, No Lead Package (MR) 9x9x0.9 mm Body Footprint [QFN] on page 149.

Drawing 068A,16-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body [TSSOP] on page 161-162.

Drawing 2068A, 16-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 163.

Drawing 6005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern [CSP] on pages 191-192.

Drawing 8005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern Footprint [CSP] on page 193.

Drawing 6004A, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern [CSP] on pages 195-196.

Drawing 8004A, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern Footprint [CSP] on page 197.

Drawing 6001A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on pages 199-200. This package was designated Drawing 145A in the last version of the packaging specification (00049AX).

Drawing 8001A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern Footprint [CSP] on page 201.

Drawing 6003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern [CSP] on pages 203-204.

Drawing 8003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern Footprint [CSP] on page 205.

Drawing 6002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 [CSP] on pages 207-208.

Drawing 8002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 Footprint [CSP] on page 209.

Appendix B: Control Dimensions (inspection information) on page 217.

Revision AZ (April 2009)

The following drawings were removed:

Drawing 6003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern [CSP] on pages 203-204.

Drawing 8003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern Footprint [CSP] on page 205.

Drawing 6002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 [CSP] on pages 207-208.

Drawing 8002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 Footprint [CSP] on page 209.

Appendix B: “Control Dimensions” was modified to include the item “Foot Angle” under B.1 “On Surface Mount Devices (SMD)” on page 549.

Revision BA (April 2009)

The following drawing is new:

Drawing 142A, 16-Lead Plastic Quad Flat, No Lead Package (MG) 3x3x0.9 mm Body [QFN] on pages 126-127.

The following drawing was corrected:

Drawing 2051A, 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 99. The second page of this drawing was incorrectly labeled as Drawing 2015A.

Note 4 on the following drawings has been modified to refer interested parties to a Microchip representative, instead of a data Sheet, for details about the package:

Drawing 6005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern [CSP] on page 194.

Drawing 6004A, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern [CSP] on page 198.

Drawing 6001A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on page 202.

Revision BB (August 2009)

The following drawings are new:

Drawing 0154A, 64-Lead Plastic Quad Flat, No Lead Package (MR) 9x9x0.9 mm Body with 5.40x5.40 Exp. Pad [QFN] on pages 152-153.

Drawing 0152A, 28-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) 4x4x0.5 mm Body [UQFN] on pages 154-155.

Drawing 2111A, 8-Lead Plastic Micro Small Outline Package (MS) Footprint [MSOP] on page 157.

Drawing 2021A, 10-Lead Plastic Micro Small Outline Package (MS) Footprint [MSOP] on page 161.

Drawing 2086A, 8-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 169.

Drawing 2087A, 14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 171.

Drawing 2088A, 20-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 177.

Drawing 148A, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [XBGA] on pages 216-217.

Revision BC (January 2010)

The following drawings are new or corrected:

Drawing 2097A, 68-Lead Ceramic Leaded (CL) Chip Carrier w/Window Square Footprint [CERQUAD] on page 31.

Drawing 2112A, 84-Lead Ceramic Leaded (CL) Chip Carrier w/Window Square Footprint [CERQUAD] on page 33.

Drawing 2104A, 3-Lead Plastic Small Outline Transistor (NB) Footprint [SOT-23] on page 44.

Drawing 2104A, 3-Lead Plastic Small Outline Transistor (TT) Footprint [SOT-23] on page 46.

Drawing 2091A, 5-Lead Plastic Small Outline Transistor (CT) Footprint [SOT-23] on page 48.

Drawing 2091A, 5-Lead Plastic Small Outline Transistor (OT) Footprint [SOT-23] on page 50.

Drawing 2028A, 6-Lead Plastic Small Outline Transistor (CH) Footprint [SOT-23] on page 52.

Drawing 2028A, 6-Lead Plastic Small Outline Transistor (OT) Footprint [SOT-23] on page 54.

Drawing 2130A, 3-Lead Plastic Small Outline Transistor (CB) Footprint [SOT-23A] on page 56.

Drawing 2029A, 3-Lead Plastic Small Outline Transistor Header (MB) Footprint [SOT-89] on page 58.

Drawing 2030A, 5-Lead Plastic Small Outline Transistor Header (MT) Footprint [SOT-89] on page 60.

Drawing 2128A, 5-Lead Plastic Thin Small Outline Transistor (OS) Footprint [TSOT] on page 73.

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Drawing 2011A, 3-Lead Plastic (EB) Footprint [DDPAK] on page 77.

Drawing 2012A, 5-Lead Plastic (ET) Footprint [DDPAK] on page 79.

Drawing 2064A, 20-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 105.

Drawing 2026A, 28-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 107.

Drawing 2026A, 28-Lead Plastic Leaded Chip Carrier (LI) Square Footprint [PLCC] on page 109.

Drawing 2023A, 32-Lead Plastic Leaded Chip Carrier (L) Rectangle Footprint [PLCC] on page 111.

Drawing 2048A, 44-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 113.

Drawing 2048A, 44-Lead Plastic Leaded Chip Carrier (LW) Square Footprint [PLCC] on page 115.

Drawing 2049A, 68-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 117.

Drawing 2049A, 68-Lead Plastic Leaded Chip Carrier (LS) Square Footprint [PLCC] on page 119.

Drawing 2093A, 84-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 121.

Drawing 056C, 8-Lead Plastic Small Outline (SM) Medium, 5.28 mm Body [SOIJ] on pages 134-135.

Drawing 2094A, 20-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 144.

Drawing 2025A, 24-Lead Plastic Small Outline (OG) Wide, 7.50 mm Body Footprint [SOIC] on page 146.

Drawing 2025A, 24-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 148.

Drawing 2052A, 28-Lead Plastic Small Outline (OI) Wide, 7.50 mm Body Footprint [SOIC] on page 150.

Drawing 2052A, 28-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 152.

Drawing 062C, 8-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body [DFN] on pages 159-160.

Drawing 2131C, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body Footprint [DFN] on page 164.

Drawing 0129C, 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body [TDFN] on pages 168-169.

Drawing 2142A, 16-Lead Plastic Quad Flat, No Lead Package (MG) 3x3x0.9 mm Body Footprint [QFN] on page 177.

Drawing 2139A, 20-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Body Footprint [QFN] on page 183.

Drawing 118D, 40-Lead Plastic Quad Flat, No Lead Package (ML) 6x6x0.9 mm Body [QFN] on pages 194-195.

Drawing 2118A, 40-Lead Plastic Quad Flat, No Lead Package (ML) 6x6x0.9 mm Body Footprint [QFN] on page 196.

Drawing 2111A, 8-Lead Plastic Micro Small Outline Package (UA) Footprint [MSOP] on page 211.

Drawing 2021A, 10-Lead Plastic Micro Small Outline Package (UN) Footprint [MSOP] on page 215.

Drawing 2024A, 16-Lead Plastic Shrink Small Outline Narrow Body (QR) .150" Body Footprint [QSOP] on page 217.

Drawing 2072A, 20-Lead Plastic Shrink Small Outline (SS) 5.30 mm Body Footprint [SSOP] on page 221.

Drawing 2132A, 24-Lead Plastic Shrink Small Outline (SS) 5.30 mm Body Footprint [SSOP] on page 223.

Drawing 2073A, 28-Lead Plastic Shrink Small Outline (SS) 5.30 mm Body Footprint [SSOP] on page 225.

Drawing 2086A, 8-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 229.

Drawing 044A, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm [LQFP] on pages 243-244.

Drawing 2044A, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm Footprint [LQFP] on page 245.

Drawing 2071A, 44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2 mm Body, 3.20 mm Footprint [MQFP] on page 249.

Drawing 2074A, 32-Lead Plastic Thin Quad Flatpack (PT) 7x7x1.0 mm Body, 2.00 mm Footprint [TQFP] on page 257.

Drawing 155A, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm [TQFP] on pages 272-273.

Drawing 2155A, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm Footprint [TQFP] on page 274.

Drawing 6005D, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern [CSP] on pages 276-277.

Drawing 8005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern Footprint [CSP] on page 276.

Drawing 6004D, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern [CSP] on pages 279-280.

Drawing 6001C, 8-Lead Chip Scale Package (CS)3x2x3 Ball Pattern [CSP] on pages 282-283.

Drawing 148A, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [XBGA] on pages 286-287.

Drawing 2148A, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [XBGA] on page 288.

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PACKAGING SPECIFICATION

Revision BD (February 2010)

The following drawings are new:

Drawings 6008A (2) and 8008A, 4-Lead Chip Scale Package (CS) Package Code AL [CSP] on pages 279-282.

Revision BE (June 2010)

The following drawings are new:

Drawing 162A, 8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow, 3.90 mm Body w/Exp. heat slug [SOIC] on pages 130-131.

Drawing 2162A, 8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow, 3.90 mm Body Footprint [SOIC] on page 132.

Drawing 120B (Sheet 2), 6-Lead Plastic Dual Flat, No Lead Package (MA) 2x2x0.9 mm Body [DFN] on page 161.

Drawing 2120A, 6-Lead Plastic Dual Flat, No Lead Package (MA) 2x2x0.9 mm Body Footprint [DFN] on page 162.

Drawing 2143B, 24-Lead Plastic Quad Flat, No Lead Package (MJ) 4x4 mm Body Footprint [QFN] on page 193.

Drawing 156A, 40-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 5x5 mm Body [UQFN] on pages 214-215.

Drawing 2156A, 40-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 5x5 mm Body Footprint [UQFN] on page 216.

Drawing 087C (Sheet 2), 14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body [TSSOP] on page 241.

Drawing 2044A, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm Footprint [LQFP] on page 257.

The following drawings have been revised:

Drawing 2030C 5-Lead Plastic Small Outline Transistor Header (MT) Footprint [SOT-89] on page 60.

Drawing 057C 8-Lead Plastic Small Outline (SN) Narrow, 3.90 mm Body [SOIC] on pages 124-125.

Drawing 057C 8-Lead Plastic Small Outline (OA) Narrow, 3.90 mm Body [SOIC] on pages 124-125.

Drawing 120B 6-Lead Plastic Dual Flat, No Lead Package (MA) 2x2x0.9 mm Body [DFN] on page 160.

Drawing 0129C 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body [TDFN] on page 176-177.

Drawing 087C 14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body [TSSOP] on page 240.

Drawing 044B 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm [LQFP] on page 255-256.

Drawing 008A 4-Lead Chip Scale (CS) [CSP] on page 291.

Drawing 6008A 4-Lead Chip Scale Package PkgCode.AL (continued) (CS) 2x2 Ball Pattern [CSP] on page 292.

Drawing 148B 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [XBGA] on pages 302-303.

Drawing 2148B 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [XBGA] on page 304.

Revision BF (July 2010)

Drawings C04-028A and C04-2028A with CHY package designators have been added for the 6-Lead Plastic Small Outline Transistor (CHY) [SOT-23] package and associated land pattern. The drawings appear on pages 53 and 54.

Revision BG (March 2011)

The following drawings are new:

Drawing 065C, 14-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC] on page 136.

Drawing 065C, 14-Lead Plastic Small Outline (Sheet 2) (OD) Narrow, 3.90 mm Body [SOIC] on page 139.

Drawing 108C, 16-Lead Plastic Small Outline (Sheet 2) (SL) Narrow, 3.90 mm Body [SOIC] on page 142.

Drawing 102C, 16-Lead Plastic Small Outline (Sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 148.

Drawing 102C, 16-Lead Plastic Small Outline (Sheet 2) (OE) Wide, 7.50 mm Body [SOIC] on page 151.

Drawing 051C, 18-Lead Plastic Small Outline (Sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 154.

Drawing 094C, 20-Lead Plastic Small Outline (Sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 157.

Drawing 025C, 24-Lead Plastic Small Outline (Sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 160.

Drawing 025C, 24-Lead Plastic Small Outline (Sheet 2) (OG) Wide, 7.50 mm Body [SOIC] on page 163.

Drawing 052C, 28-Lead Plastic Small Outline (Sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 166.

Drawing 052C, 28-Lead Plastic Small Outline (Sheet 2) (OI) Wide, 7.50 mm Body [SOIC] on page 169.

Drawing 078A, 6-Lead Plastic Dual Flat, No Lead Package (MY) 2x2x0.8 mm Body [TDFN] on pages 188-189.

Drawing 185A, 10-Lead Plastic Dual Flat, No Lead Package (MN) 3x3x0.8 mm Body [TDFN] on pages 193-194.

Drawing 063C, 10-Lead Plastic Dual Flat, No Lead Package (Sheet 2) (MF) 3x3x0.9 mm Body [DFN] on page 198.

Drawing 2063B, 10-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body Footprint [DFN] on page 199.

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Drawing 140B, 28-Lead Plastic Quad Flat, No Lead Package (Sheet 2) (MQ) 5x5x0.9 mm Body [QFN] on page 214.

Drawing 153A, 48-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 6x6x0.5 mm Body [UQFN] on pages 235-236.

Drawing 184A, 20-Lead Thermal Leadless Array Package (TL) 3x3x0.7 Exp. Pad [UQFN] on pages 326-237.

Drawing 187B, 36-Lead Thermal Leadless Array Package (TL) 5x5x0.9 Exp. Pad [TLA] on pages 328-329.

Drawing 157B, 44-Lead Thermal Leadless Array Package (TL) 6x6x0.9 Exp. Pad [TLA] on pages 330-331.

The following drawings have been revised:

Drawing 001C, 8-Lead Ceramic Dual In-Line w/Window (JA) .300" Body [CERDIP] on page 16.

Drawing 027C, 8-Lead Ceramic Dual In-Line (JW) .300" Body [CERDIP] on page 17.

Drawing 002C, 14-Lead Ceramic Dual In-Line (JD) .300" Body [CERDIP] on page 18.

Drawing 099C, 14-Lead Ceramic Dual In-Line w/Window (JW) .300" Body [CERDIP] on page 19.

Drawing 003C, 16-Lead Ceramic Dual In-Line w/Window (JE) .300" Body [CERDIP] on page 20.

Drawing 010C, 18-Lead Ceramic Dual In-Line (JW) .300" Body [CERDIP] on page 21.

Drawing 115C, 20-Lead Ceramic Dual In-Line w/Window (JW) .300" Body [CERDIP] on page 22.

Drawing 004C, 24-Lead Ceramic Dual In-Line (JG) .600" Body [CERDIP] on page 23.

Drawing 006C, 28-Lead Ceramic Dual In-Line (JN) .600" Body [CERDIP] on page 24.

Drawing 080C, 28-Lead Ceramic Dual In-Line w/Window (JW) .300" Body [CERDIP] on page 25.

Drawing 013C, 28-Lead Ceramic Dual In-Line w/Window (JW) .600" Body [CERDIP] on page 26.

Drawing 008C, 40-Lead Ceramic Dual In-Line (JK) .600" Body [CERDIP] on page 27.

Drawing 014C, 40-Lead Ceramic Dual In-Line w/Window (JW) .600" Body [CERDIP] on page 28.

Drawing 162B, 8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow, 3.90 mm Body [SOIC] on page 132.

Drawing 162B, 8-Lead Thermally Enhanced Plastic Small Outline w/Exp. heat slug (Sheet 2) (SE) Narrow, 3.90 mm Body [SOIC] on page 133.

Drawing 065C, 14-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC] on page 135.

Drawing 065C, 14-Lead Plastic Small Outline (OD) Narrow, 3.90 mm Body [SOIC] on page 138.

Drawing 108C, 16-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC] on page 141.

Drawing 102C, 16-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 147.

Drawing 102C, 16-Lead Plastic Small Outline (OE) Wide, 7.50 mm Body [SOIC] on page 150.

Drawing 051C, 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 153.

Drawing 094C, 20-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 156.

Drawing 025C, 24-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 159.

Drawing 025C, 24-Lead Plastic Small Outline (OG) Wide, 7.50 mm Body [SOIC] on page 162.

Drawing 052C, 28-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 165.

Drawing 052C, 28-Lead Plastic Small Outline (OI) Wide, 7.50 mm Body [SOIC] on page 168.

Drawing 2123B, 8-Lead Plastic Dual Flat, No Lead Package (MC) 2x3x0.9 mm Body Footprint [DFN] on page 178.

Drawing 2062B, 8-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body Footprint [DFN] on page 181.

Drawing 063C, 10-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body [DFN] on page 197.

Drawing 140B, 28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Body [QFN] on page 213.

Drawing 149C, 64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Body w/7.15x7.15 Exp. pad [QFN] on page 225-226.

Drawing 2156B, 40-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 5x5 mm Body Footprint [UQFN] on page 234.

Drawing 2044B, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm Footprint [LQFP] on page 277.

Drawing 2071B, 44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2 mm Body, 3.20 mm Footprint [MQFP] on page 281.

Drawing 2071B, 44-Lead Plastic Metric Quad Flatpack (PQ) 10x10x2 mm Body, 3.20 mm Footprint [MQFP] on page 283.

Drawing 2022B, 64-Lead Plastic Metric Quad Flatpack (BU) 14x14x2.7 mm Body, 3.20 mm Footprint [MQFP] on page 285.

Drawing 2074B, 32-Lead Plastic Thin Quad Flatpack (PT) 7x7x1.0 mm Body, 2.00 mm Footprint [TQFP] on page 289.

Drawing 2076B, 44-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body, 2.00 mm Footprint [TQFP] on page 291.

Drawing 2085B, 64-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body, 2.00 mm Footprint [TQFP] on page 293.

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Drawing 2116C, 80-Lead Plastic Thin Quad Flatpack (PF) 14x14x1 mm Body, 2.00 mm Footprint [TQFP] on page 297.

Drawing 2092B, 80-Lead Plastic Thin Quad Flatpack (PT) 12x12x1 mm Body, 2.00 mm Footprint [TQFP] on page 299.

Drawing 2110B, 100-Lead Plastic Thin Quad Flatpack (PF) 14x14x1 mm Body, 2.00 mm Footprint [TQFP] on page 301.

Drawing 2100B, 100-Lead Plastic Thin Quad Flatpack (PT) 12x12x1 mm Body, 2.00 mm Footprint [TQFP] on page 303.

Drawing 155B, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm [TQFP] on page 304.

Drawing 155B, 144-Lead Plastic Thin Quad Flatpack (Sheet 2) (PH) 16x16x1 mm Body, 2.00 mm [TQFP] on page 305.

Drawing 2155B, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm Footprint [TQFP] on page 306.

Revision BH (November 2011)

The following drawings are new:

Drawing 121A, 8-Lead Thermally Enhanced Plastic Outline Body (SE) Narrow 3.90 Body on pages 130-131.

Drawing 2121A, 8-Lead Thermally Enhanced Plastic Outline Body (SE) Narrow 3.90 Body Footprint on page 132.

Drawing 194A, 10-Lead Plastic Ultra Thin Dual Flat No Lead (NA[Y]) 3x3x05 mm Body [UDFN] on pages 342-343.

Drawing 2148D, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [TFBGA] on page 344.

The following drawings have been revised:

Drawing 111C, 8-Lead Plastic Micro Small Outline Package (MS) [MSOP] on pages 254-255.

Drawing 111C, 8-Lead Plastic Micro Small Outline Package (UA) [MSOP] on pages 257-258.

Drawing 021C, 10-Lead Plastic Micro Small Outline Package (MS) [MSOP] on pages 260-261.

Drawing 021C, 10-Lead Plastic Micro Small Outline Package (UN) [MSOP] on pages 263-264.

Drawing 148D,121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [TFBGA] on pages 342-343.

Drawing 2148D, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [TFBGA] on page 344.

Revision BJ (December 2011)

The following drawings are new:

Drawing 188A, 8-Lead High Power Dual Flat, No Lead Package (MF) 5x6x1.0 mm Body [PDFN] on pages 200-201.

Drawing 197A, 16-Lead Plastic Quad Flat, No Lead Package (NG) 3x3x0.9 mm Body [QFN] on pages 216-217.

Drawing 2197A, 16-Lead Plastic Quad Flat, No Lead Package (NG) 3x3x0.9 mm Body Footprint [QFN] on page 220.

The following drawing has been revised:

Drawing 120C, 6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) 2x2x0.9 mm Body [DFN] on pages 180-181.

Revision BK (June 2012)

The following drawings are new:

Drawing 141A, 6-Lead Plastic Thin Small Outline Transistor (OS) [TSOT] on pages 78-79.

Drawing 2188B, 8-Lead Plastic Dual Flat No Lead Package (MF) 5x6x1.0 mm Body Footprint [PDFN] on page 204

Drawing 195A, 8-Lead Plastic Dual Flat No Lead Package (LC) 3.3x3.3x1.0 mm Body [PDFN] on pages 205-206.

Drawing 2195A, 8-Lead Plastic Dual Flat No Lead Package (LC) 3.3x3.3x1.0 mm Body Footprint [PDFN] on page 207.

Drawing 078A, 6-Lead Plastic Dual Flat, No Lead Package (MYY) 2x2x0.8 mm Body [TDFN] on pages 212-213.

Drawing 198A, 8-Lead Plastic Dual Flat No Lead Package (LZ) 2x2x0.9 mm Body [VDFN] on pages 226-227.

Drawing 2198A, 8-Lead Plastic Dual Flat No Lead Package (LZ) 2x2x0.9 mm Body Footprint [VDFN] on page 228.

Drawing 2153A, 48-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 6x6x0.5 mm Body Footprint [UQFN] on page 273.

Drawing 058A, 128-Lead Plastic Low Profile Quad Flatpack (PT) 14x14x1.4 mm Body [LQFP] on pages 317-318.

Drawing 133A, 256-Lead Plastic Metric Quad Flatpack (PQ) 28x28x3.40 mm Body [MQFP] on pages 330-331.

Drawing 193A, 124-Terminal Very Thin Leadless Array (TL) 9x9x0.9 mm Body [VTLA] on pages 378-379.

The following drawings have been revised:

Drawing 188B, 8-Lead Plastic Dual Flat No Lead Package (MF) 5x6x1.0 mm Body [PDFN] on pages 202-203.

Drawing 105C, 28-Lead Plastic Quad Flat, No Lead Package (ML) 6x6 mm Body [QFN] on pages 249-250.

Drawing 124C, 28-Lead Plastic Quad Flat, No Lead Package (MM) 6x6x0.9 mm Body [QFN-S] on pages 252-253.

Drawing 184B, 20-Terminal Very, Very Thin Thermal Leadless Array (TL) 3x3x0.7 mm Body [WTLA] on pages 372-373.

Drawing 187C, 36-Terminal Very Thin Thermal Leadless Array (TL) 5x5x0.9 mm Body [VTLA] on pages 374-375.

Drawing 157C, 44-Terminal Very Thin Thermal Leadless Array (TL) 6x6x0.9 mm Body [VTLA] on pages 376-377.

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Revision BL (September 2012)

The following drawings are new:

Drawing 061B, 5-Lead Plastic Small Outline Transistor (LTY) [SC70] on page 46.

Drawing 2061B, 5-Lead Plastic Small Outline Transistor (LTY) Footprint [SC70] on page 47.

Drawing 103C, 44-Lead Plastic Quad Flat, No Lead Package (ML) 8x8 mm Body [QFN], Sheet 2 was added on page 265.

Drawing 2152A, 28-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 4x4x0.5 mm Body Footprint [UQFN] on page 276.

Drawing 209A, 28-Lead Plastic Quad Flat No Lead Package (MV) 6x6x05 Ultra-Thin [UQFN] on pages 277 and 278.

Drawing 2209A, 28-Lead Plastic Quad Flat No Lead Package (MV) 6x6x05 Ultra-Thin Footprint [UQFN] on pages 279.

Drawing 6014B, 32-Lead Chip Scale Package (CS) [CSP] on pages 378 and 379.

The following drawings have been revised:

Drawing 103C, 44-Lead Plastic Quad Flat, No Lead Package (ML) 8x8 mm Body [QFN], Sheet 1 on page 264.

Drawing 2103C, 44-Lead Plastic Quad Flat, No Lead Package (ML) 8x8 mm Body Footprint [QFN] on page 266.

Revision BM (December 2012)

The following drawings are new:

Drawing 203A, 8-Lead Plastic Ultra Thin Small Outline No Lead (NP) 2x3 mm Body [USON] on pages 288-289.

Drawing 210A, 8-Lead Plastic Very, Very Thin Small Outline No Lead (MF) 5x6 mm Body [WSON] on pages 292-293.

Drawing 177A, 48-Lead Thin Small Outline Package (TV) 12x20 mm Body [TSOP] on pages 333-334.

Drawing 199A, 24-Lead Thin Fine Pitch Ball Grid Array (TD) 6x8 mm [TFBGA] on pages 392-393.

Drawing 168B, 48-Lead Thin Fine Pitch Ball Grid Array (CD) 6x8 mm [TFBGA] on pages 394-395.

Revision BN (April 2013)

The following drawings are new:

Drawing 2194A, 10-Lead Plastic Ultra Thin Dual Flat No Lead Package (NA[Y]) 3x3x0.5 mm Body Footprint [UDFN] on page 230.

Drawing 213A, 64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Body w/7.7x7.7 exposed pad [QFN] on pages 272-273.

Drawing 216A, 16-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 2.5x2.5x0.6 mm Body [UQFN] on pages 276-277.

Drawing 217A, 16-Lead Extremely Thin Quad Flat No Lead Package (NL) 3x3x0.5 mm Body [XQFN] on pages 290-290.

Drawing 210A, 6-Lead Plastic Super Thin Small Outline No Lead Package (NR) 1.5x1.5x0.4 mm Body [X2SON] on pages 302-303.

The following drawings have been revised:

Drawing 148E, 121-Lead Plastic Thin Profile Ball Grid Array Package (BG) 10x10x1.10 mm Body [TFBGA], on pages 406-407.

Drawing 187C, 36-Terminal Very Thin Leadless Array Package (TL) 5x5x0.9 Body Footprint [WTLA] on page 414.

Revision BP (September 2013)

The following drawings are new:

Drawing 047-001A, 40-Lead Plastic Quad Flat (MP) 5x5 mm Body with 3.5 exp pad [QFN] on pages 272-274.

Drawing 047-002A, 40-Lead Plastic Quad Flat (MP) 5x5 mm Body with 3.7 exp pad [QFN] on pages 275-277.

Drawing 211A, 16-Lead Ultra Thin Quad Flat Pack (MV) 3x3x0.50 mm Body [UQFN] on pages 292-294.

Drawing 183A, 48-Lead Thin Quad Flatpack (PT) 7x7x1 mm Body [TQFP] on pages 382-384.

The following drawings have been revised:

Drawing 029C, 3-Lead Plastic Small Outline Transistor (MB) [SOT-89], on pages 71-73.

Drawing 157D, 8-Lead Plastic Very Very Thin Small Outline (MF) 5x6 mm [WDFN], replacing the drawing of the same name [WSON}, on pages 240-242.

Drawing 209B, 28-Lead Ultra Thin Quad Flat No Lead (MX) 6x6x0_5 mm Body and Corner Anchors [UQFN] on pages 295-297.

Drawing 085C, 64-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body [TQFP], on pages 387-389.

Drawing 157D, 44-Terminal Very Thin Leadless Array (TL) 6x6x0-9 mm [VTLA], on pages 431-433.

Revision BQ (March 2014)

The following drawings are new:

[PDIP] Drawing C04-018D 8-Lead Plastic Dual In-Line (P) 300 mil Body on pages 108-109.

[PDIP] Drawing C04-018D 8-Lead Plastic Dual In-Line (PA) 300 mil Body on pages 110-111.

[UDFN] Drawing C04-203A 8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) 2x3 mm Body on pages 242-243.

[UDFN] Drawing C04-2203A 8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) 2x3 mm Body Land Pattern on page 244.

[UDFN] Drawing C04-254A 8-Lead Ultra Thin Plastic Dual Flat No Lead Package (RF) 3x3x0.50 mm Body on pages 245-246.

[UDFN] Drawing C04-2254A 8-Lead Ultra Thin Plastic Dual Flat No Lead Package (RF) 3x3x0.50 mm Body Land Pattern on page 247.

[QFN] Drawing C04-259A 16-Lead Plastic Quad Flat No Lead Package (8E) 4x4x0.9 mm Body on pages 268-269.

[QFN] Drawing C04-2259A 16-Lead Plastic Quad Flat No Lead Package (8E) 4x4x0.9 mm Body Land Pattern on page 270.

[QFN] Drawing C04-262A 16-Lead Plastic Quad Flat No Lead Package (FX) 4x4x0.9 mm Body on pages 271-272

[QFN] Drawing C04-2262A 16-Lead Plastic Quad Flat No Lead Package (FX) 4x4x0.9 mm Body Land Pattern on page 273.

[QFN] Drawing C04-260A 64-Terminal Plastic Quad Flat Pack No Lead (RG) 9x9x0.9 mm Body Saw Singulated on pages 313-314.

[QFN] Drawing C04-2260A 64-Lead Very Thin Plastic Quad Flat No Lead (RG) 9x9x1.0 mm Body 4.7 Exp Pad Land Pattern on page 315

[UQFN] Drawing C04-253A 16-Lead Ultra Thin Quad Flat No Lead Package (UC) 3x3x0.5 mm Body on pages 323-324.

[UQFN] Drawing C04-2253A 16-Lead Ultra Thin Quad Flat No Lead Package (UC) 3x3x0.55 mm Body Land Pattern on page 325.

[UQFN] Drawing C04-217A 16-Lead Ultra Thin Quad Flat No Lead Package (UD) 3x3x0.55 mm Body on pages 326-327.

[UQFN] Drawing C04-2217A 16-Lead Ultra Thin Quad Flat No Lead Package (UD) 3x3x0.55 mm Body Land Pattern on page 328.

[UQFN] Drawing C04-257A 16-Lead Ultra Thin Plastic Quad Flat No Lead Package (JQ) 4x4x0.5 mm Body on pages 329-330.

[UQFN] Drawing C04-2257A 16-Lead Ultra Thin Plastic Quad Flat No Lead Package (JQ) 4x4x0.5 mm Body Land Pattern on page 331.

[UQFN] Drawing C04-256A 20-Lead Ultra Thin Plastic Quad Flat No Lead Package (JP) 3x3x0.5 mm Body on pages 332-333.

[UQFN] Drawing C04-2256A 20-Lead Ultra Thin Plastic Quad Flat No Lead Package (JP) 3x3x0.5 mm Body Land Pattern on page 334.

[UQFN] Drawing C04-255A 20-Lead Ultra Thin Plastic Quad Flat No Lead Package (GZ) 4x4x0.5 mm Body on pages 335-336.

[UQFN] Drawing C04-2255A 20-Lead Ultra Thin Plastic Quad Flat No Lead Package (GZ) 4x4x0.5 mm Body Land Pattern on page 337.

[USON] Drawing C04-271A 8-Terminal Plastic Ultra Thin Dual Flat No Lead Package (UB) 4x3x0.55 mm Body Body on pages 356-357.

[USON] Drawing C04-2271A 8-Terminal Plastic Ultra Thin Dual Flat No Lead Package (UB) 4x3x0.55 mm Body Land Pattern on page 358.

[VQFN] Drawing C04-2160A 32-Lead Ultra Thin Plastic Quad Flat No Lead Package (MQ) 5x5x0.9 mm Body Land Pattern on page 366.

[X2SON] Drawing C04-201A 8-Terminal Super Thin Plastic Small Outline No Lead Package (NR) 2x2x0.4 mm (Max) Body on pages 370-371.

[X2SON] Drawing C04-201A 8-Terminal Super Thin Plastic Small Outline No Lead Package (NR) 2x2x0.4 mm (Max) Body Land Pattern on page 372.

[XSON] Drawing C04-205A 8-Lead Extremely Thin Small Outline No-Leads (NF) 2x2x0.45 mm Body on pages 373-374.

[XSON] Drawing C04-205A 8-Lead Extremely Thin Small Outline No-Leads (QX8E) 2x2x0.45 mm Body on pages 375-376.

[TQFP] Drawing C04-220A 44-Lead Plastic Quad Flatpack (MW) 10x10x1.0 mm Body 4.5x4.5 mm Exp Pad Body on pages 444-445.

[CSP] Drawing C04-8014A 32-Ball Wafer Level Chip Scale Package (CS) Land Pattern on page 483.

[TFBGA] Drawing C04-245A 323-Ball Thin Fine Pitch Ball Grid Array (HX) 14x14x1.14 mm Body on pages 497-498.

[VTLA] Drawing C04-2193A 124-Very Thin Leadless Array Package (TL) 9x9x0.9 mm Body Land Pattern on page 510.

The following drawings have been revised:

[QFN] Drawing C04-140C 28-Lead Plastic Quad Flat No Lead Package (MQ) 5x5x0.9 mm Body on pages 282-283.

[QFN] Drawing C04-2140C 28-Lead Plastic Quad Flat No Lead Package (MQ) 5x5x0.9 mm Body Land Pattern on page 284.

[QFN] Drawing C04-140C 28-Lead Plastic Quad Flat No Lead Package (MQY) 5x5x0.9 mm Body on pages 285-286.

[QFN] Drawing C04-2140C 28-Lead Plastic Quad Flat No Lead Package (MQY) 5x5x0.9 mm Body Land Pattern on page 287.

[USON] Drawing C04-203B 8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) 2x3 mm Body on pages 354-355.

[VQFN] Drawing C04-140C 28-Lead Plastic Quad Flat No Lead Package (MQ) 5x5x0.9 mm Body on pages 354-355.

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Revision BR (March 2014)

The following drawings have been revised:

[VDFN] Drawing C04-198B, 8-Lead Very Thin Dual Flatpack No-Lead (LZ) – 2x2x0.9 mm Body on pages 252-253.

[TQFP] Drawing C04-220B, 44-Lead Plastic Quad Flatpack (MW) 10x10x1.0 mm Body 4.5x4.5 mm Exposed Pad on pages 444-445.

Revision BS (September 2014)

The following drawings are new:

[QFN] Drawing C04-223A, 48-Lead Plastic Quad Flat, No Lead Package (AIS Package HZH) - 7x7 mm Body on pages 322-323.

[QFN] Drawing 2154A, 64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body With 0.40 mm Contact Length and 5.40x5.40 mm Exposed Pad (Footprint) on page 327.

[VDFN] Drawing C04-2198A, 8-Lead Plastic Very Thin Flat, No Lead Package (LZ) - 2x2 mm Body With 0.55mm Contact Length (Footprint) on page 268.

[VQFN] Drawing C04-334A, 28-Lead Very Thin Plastic Quad Flat Pack, No Lead Package (PV) 5x5 mm Body With Rectangular Exposed Pad (with Footprint) on pages 378-379.

[VQFN] Drawing C04-160A, 32-Lead Very Thin Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Body on pages 381-383.

[X2SON] Drawing C04-201-NR-A, 8-Terminal Super-Thin Plastic Small Outline, No Lead Package (NR) - 2x2x0.4 mm (Max) Body on pages 400-402.

[X2SON] Drawing C04-201-XX8E-A, 8-Terminal Super-Thin Plastic Small Outline, No Lead Package (NR) - 2x2x0.4 mm (Max) Body on pages 403-405.

[WLCSP] Drawing C04-6009A, 14-Ball Wafer Level Chipscale Package (CS) - 1.57X2.36 Body - PIC16LF822 (with Footprint) on pages 518-520.

[LGA] SMSC Legacy Drawing for 12x9 mm Body, SIP Module KLR83012 on page 647.

Supertex Legacy – 76 drawings from Supertex were added.

The following drawings have been revised:

[TDFN-S] Drawing C04-210B, 8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body (with Footprint) on pages 251-252.

[QFN] Drawing C04-259B, 16-Lead Plastic Quad Flat, No Lead Package (8E) - 4x4x0.9 mm Body on pages 284-285.

[TQFP] Drawing C04-076C, 44-Lead Plastic Thin Quad Flatpack (PT) - 10x10x1.0 mm Body on pages 472-473.

Revision BT (December 2014)

The following drawings are new:

[QFN] Drawing C04-0225A, 24-Lead Plastic Quad Flat, No Lead Package (RU) - 4x4 mm Body, with 2.5x2.5 mm Exposed Pad, Punch Singulated on pages 310-312.

[QFN] Drawing C04-0364A, 24-Lead Plastic Quad Flat, No Lead Package (LY) - 5x5x1.0 mm Body on pages 313-315.

[QFN] Drawing C04-0229A, 40-Lead Plastic Flat, No Lead Package (RR) - 6x6 mm Body, with 4.1x4.1 mm Exposed Pad, Punch Singulated on pages 330-332.

[QFN] Drawing C04-0243A, 72-Lead Plastic Quad Flat, No Lead Package (5E), with 10x10 mm Body, with 6.0x6.0 Exposed Pad, Punch Singulated, Dimpled Terminals on pages 359-361.

[MQFP] Drawing C04-0221A, 100-Lead Plastic Metric Quad Flatpack (PQ) - 14x20 mm, with 3.90 mm Footprint on pages 500-501.

[TQFP] Drawing C04-0220A, 44-Lead Plastic Quad Flat, No Lead Package (PT) - 10x10x1.0 mm Body, with 4.5x4.5 mm Exposed Pad on pages 511-512.

[TQFP] Drawing C04-0222A, 64-Lead Plastic Quad Flat, No Lead Package (PT) - 10x10x1.0 mm Body, with 6.0x6.0 mm Exposed Pad on pages 521-522.

[TQFP] Drawing C04-0226A, 128-Lead Plastic Quad Flat, No Lead Package (Z7) - 14x14x1.0 mm, with 5.0x5.0 mm Exposed Pad on pages 531-532.

[WDFN] Drawing C04-0172, 8-Lead Very, Very Thin Small Outline No Lead (MN) - 6x8 mm Body on pages 277-279.

[WSON] Drawing C04-0172, 8-Lead Very, Very Thin Small Outline No Lead (MN) - 6x8 mm Body on pages 282-284.

[VQFN] Drawing C04-0364A, 24-Lead Plastic Quad Flat, No Lead Package (LY) 5x5x1.0 mm Body on pages 400-402.

[LFBGA] Drawing C04-0237A, 196-Ball Low Profile Fine Pitch Ball Grid Array (RG) - 12x12x1.4 mm Body on pages 562-564.

The following drawings have been revised:

[QFN] Drawing C04-2213B, 64-Lead Plastic Quad Flat, No Lead Package (MR) - 9x9x0.9 mm Body with 0.40 mm Contact Length and 7.70x7.70 mm Exposed Pad Land Pattern on page 355.

[VQFN] Drawing C04-0223B, 48-Lead Plastic Quad Flat, No Lead Package (RS) - 7x7 mm Body, with 5.5x5.5 mm Exposed Pad, Punch Singulated on pages 415-417.

PACKAGING SPECIFICATION

Revision BU (February 2015)

The following drawings are new:

[VDFN] Drawing C04-0382A, 8-Lead Very Thin Plastic Dual Flat No Lead Package (8Q) 2x3 Body on pages 301-303.

[VDFN] Drawing C04-0206A, 10-Lead Very Thin Plastic Dual Flat No Lead Package (9Q) 3x3 Body on pages 304-306.

[WDFN] Drawing C04-0261A, 8-Lead Very Very Thin Plastic Dual Flat No Lead (RW) 2x2 mm Body on pages 308-310.

[X2SON] Drawing C04-0338A, 8-Lead Plastic Super-Thin Dual Small Outline No-Lead (8X) 1.5x1.5 mm Body on pages 334-336.

[UQFN] Drawing C04-0386A, 10-Lead Ultra Thin Plastic Quad Flat Package (2V) 1.3x1.8x0.6 mm Body on pages 420-422.

[UQFN] Drawing C04-0379A, 10-Lead Ultra Thin Plastic Quad Flat Package (3V) 1.6x2.1 Body on pages 423-425.

[UQFN] Drawing C04-0385A, 28-Lead Ultra Thin Plastic Quad Flat Package (2N) 6x6x0.55 Body on pages 449-451.

[VQFN] Drawing C04-0272A, 36-Terminal Very Thin Plastic Quad Flatpack (AEN) 6x6x0.9 mm Body on pages 486-488.

[X2QFN] Drawing C04-0376A, 10-Lead Super-Thin Plastic Quad Flat No Lead Package (9X) 1.5x1.5 mm Body on pages 498-500.

[QSOP] Drawing C04-0385A, 24-Lead Plastic Shrink Small Outline Narrow Body (QR) .150 Body on pages 533-535.

[CSP] Drawing C04-6035A, 6035A9-Bump Wafer Level Chip Scale Package (CS) on pages 631-633.

[WLCSP] Drawing C04-6035A, 9-Bump Wafer Level Chip Scale Package (CS) on pages 641-643.

[VFBGA] Drawing C04-0370A, 64-Ball Very Thin Fine Pitch Ball Grid Array (4G) 7x7x1.0 Body on pages 658-660.

[WFBGA] Drawing C04-0380A, 144-Ball Very Very Thin Fine Pitch Ball Grid Array (SZ) 9x9x0.8 Body on pages 662-664.

[VFLGA] Drawing C04-0384A, 56L Very Thin Fine Pitch Land Grid Array (4W) 7x7x0.9 mm Body with Exposed Pad on pages 666-668.

The following drawings have been revised:

[VQFN] Drawing C04-039C, 20-Lead Plastic Quad Flat No Lead (MQ) 5x5x1.0 mm Body with 0.40 mm Contact Length on pages 467-469.

[VQFN] Drawing C04-0223C, 48-Lead Plastic Quad Flat No Lead (RS) 7x7 mm Body with 5.5x5.5 Exposed Pad, Punch Singulated on pages 489-491.

[QSOP] Drawing C04-0024D, 16-Lead Plastic Shrink Small Outline Narrow Body (QR) .150 Body on pages 530-532.

[WLCSP] Drawing C04-6022D , 8-Bump Extremely Thin Fine Pitch Wafer Level (CS) on pages 638-640.

Revision BV (March 2015)

The following drawings are new:

[QFN] Drawing C04-0241A, 36-Lead Plastic Quad Flat (4E) 6x6 mm Body with 3.7x3.7 mm Exposed Pad, Punch Singulated, 0.40 mm Dimpled Terminals on pages 353-355.

[QFN] Drawing C04-0363A, 48-Lead Plastic Quad Flat (5E) 6x6 mm Body with 5.1x5.1 mm Exposed Pad, Punch Singulated, 0.40 mm Dimpled Terminals on pages 371-373.

[VQFN] Drawing C04-0232A, 32-Lead Very Thin Plastic Quad Flat (RN) 5x5 mm Body with 3.3x3.3 mm Exposed Pad, Punch Singulated on pages 462-464.

[VQFN] Drawing C04-0347A, 48-Lead Very Thin Plastic Quad Flat (VQ) 7x7 mm Body with 5.3 Exposed Pad, Punch Singulated on pages 474-476.

[VQFN] Drawing C04-0374A, 56-Lead Very Thin Quad Flat (P6) 8x8 mm with 5.2x5.2 mm Exposed Pad, Punch Singulated on pages 477-479.

[VQFN] Drawing C04-0375A, 56-Lead Very Thin Quad Flat (RT) 8x8 mm with 5.9x5.9 mm Exposed Pad, Punch Singulated on pages 480-482.

[QSOP] Drawing C04-0383A, 24-Lead Plastic Shrink Small Outline Narrow Body (QR) .150” Body on pages 523-525.

[LQFP] Drawing C04-0233A, 100-Lead Low Profile Quad Flatpack (PL) 14x14x1 mm Body on pages 555-557.

Revision BW (April 2015)

The following drawings are new:

[SOT-25] Drawings C04-0389A and C04-2389A for the 5-Lead Plastic Small Outline Transistor Package (5A).

[USPQ-4B04] Drawings C04-0383A and C04-2383A for the 4-Lead Plastic Ultra Small Square Package (5X) 1x1x0.6 mm.

[LFBGA] Drawings C04-365A and C04-2365A for the 169-Ball Low Profile Fine Pitch Ball Grid Array (HF) 11x11x1.4 mm Body.

[LFBGA] Drawings C04-366A and C04-2366A for the 288-Ball Low Profile Fine Pitch Ball Grid Array (4J) 15x15x1.4 mm Body.

[LQFP] Drawings C04-367A and C04-2367A for the 176-Lead Low Profile Quad Flat Pack (2J) 20x20x1.4 mm Body with 7x7 mm Exposed Pad.

Revision BX (May 2015)

The following drawings are new:

[UQFN] Drawings C04-393B and C04-2393B for the 4-Lead Plastic Ultra Thin Quad Flatpack, No Leads (5X) - 1x1x0.6 mm Body (Formerly USPQ-4B04) on pages 416-418.

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[UQFN] Drawings C04-333A and C04-2333A for the 28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (M6) - 4x4x0.6 mm Body on pages 450-452.

[VQFN] Drawings C04-360A and C04-2360A for the 132-Lead Very Thin Plastic Quad Flat, No Lead (NX) - 10x10x0.9 mm Body Dual Row Terminals, Punch Singulated on pages 514-516.

[MQFN] Drawings C04-186A and C04-286B for the 20-Lead More Thin Plastic Quad Flat, No Lead Package (NU) - 5x5x1.0 mm Body (Also called VQFN) on pages 412-414.

[VFBGA] Drawings C04-371A and C04-2371A for the 78-Ball Very Thin Fine Pitch Ball Grid Array (5G) - 9X9X1.0 mm Body on pages 705-707.

Revision BY (June 2015)

The following drawings are new:

[SOT-25] Drawings C04-0389A and C04-2389A for the 5L Plastic Small Outline Transistor Package (5A) on pages 96-98.

[VQFN] Drawings C04-0403B and C04-2403A for the 16-Lead Quad Flat No Lead (7N) 4x4x1.0, Stepped, with 0.40 Terminal Length on pages 476-478.

[VQFN] Drawings C04-0404B and C04-2404A for the 16-Lead Quad Flat No Lead (8N) 3x3x1.0, Stepped, with 0.35 Terminal Length on pages 473-475.

[VQFN] Drawings C04-0402B and C04-2402A for the 20-Lead Quad Flat No Lead (6N) 4x4x1.0, Stepped, with 0.40 Terminal Length on pages 480-482.

[VQFN] Drawings C04-0143B MJ and C04-2143A MJ for the 24-Lead Very Thin Quad Flat (MJ) 4x4x0.9 on pages 488-490.

[VQFN] Drawings C04-0143B S4QFN and C04-2143A S4QFN for the 24-Lead Very Thin Quad Flat (MJ) 4x4x0.9 SMSC Legacy S4QFN on pages 491-493.

[VQFN] Drawings C04-0401B and C04-2401A for the 28-Lead Quad Flat No Lead (5N) 6x6, Stepped, with 0.55 Terminal Length on pages 506-508.

[VQFN] Drawings C04-0400B and C04-2400A for the 28-Lead Quad Flat No Lead (4N) 6x6x1.0, Stepped, with 6.45x6.45 Exposed Pad on pages 509-511.

[VQFN] Drawings C04-0160B MQ and C04-2160C MQ for the 32-Lead Very Thin Quad Flat (MQ) 5x5x0.9 on pages 515-517.

[VQFN] Drawings C04-0160B SQFN and C04-2160C SQFN for the 32-Lead Very Thin Quad Flat (MQ) 5x5x0.9 SMSC Legacy SQFN on pages 518-520.

[VQFN] Drawings C04-0399B and C04-2399A for the 44-Lead Very Thin Quad Flat No Lead (3N) 8x8x1.0, Stepped, on pages 524-526.

[LQFP] Drawings C04-0367A and C04-2367A for the 176-Lead Low Profile Quad Flat Pack (2J) 20x20x1.4 mm Body w-7x7 mm Exposed Pad on pages 623-625.

Supertex [BD] BD_42_BumpDiex on page 962.

Supertex [LQFP] FG_048_LQFPx on page 987.

Supertex [SOIC] NG_16_SOICV1x on page 1040.

The following drawings are revised:

[QFN] Drawing C04-2229B for the 40-Lead Plastic Quad Flat, No Lead Package (RR) 6x6 mm with 4.1x4.1 mm Exposed Pad Punch Singulated Land Pattern on page 374.

[UQFN] Drawings C04-393C and C04-2393C for the 4-Lead Plastic Ultra Thin Quad Flatpack, No Leads (5X) - 1x1x0.6 mm Body (Formerly USPQ-4B04) on pages 414-416.

[VQFN] Drawings C04-0223C and C04-2223B were renamed to 48-Lead Plastic Quad Flat No Lead Package (RS) 7x7 mm Body with Exposed Pad Punch Singulated (AIS HZH) on pages 527-529.

Revision BZ (September 2015)

The following drawings are new:

[VDFN] Drawings C04-0413A and C04-2413A for the 8-Lead Very Thin Plastic Dual Flat (9U) 6x5 with Dual Exposed Pads on pages 288-290.

[VQFN] Drawings C04-0182A and C04-2182A for the 48-Lead Very Thin Quad Flat (ML) 7x7x1.0 mm Body with 5.3x5.3 mm Exposed Pad on pages 537-539.

[VQFN] Drawings C04-0202A and C04-2202A for the 72-Lead Plastic Quad Flat (NQ) 10x10x1.0 mm Body on pages 553-554.

[TQFP] Drawings C04-0300A and C04-2300A for the 48-Lead Thin Quad Flatpack (PT) 7x7x1.0 mm Body on pages 666-668.

[TQFP] Drawings C04-0300A and C04-2300A for the 48-Lead Thin Quad Flatpack (Y8) 7x7x1.0 mm Body on pages 669-671.

The following drawings are revised:

[QFN] Drawings C04-0127D and C04-2127A for the 16-Lead Plastic Quad Flat (ML) 4x4x0.9 mm Body on pages 344-346.

[UQFN] Drawings C04-0333-M6 B and C04-2333-M6 B for the 28-Lead Ultra Thin Plastic Quad Flat (M6) 4x4x0.6 mm Body with Corner Anchors on pages 454-456.

[UQFN] Drawings C04-0209C and C04-2209B for the 28-Lead Plastic Quad Flat No Lead (MX) 6x6x0.5 Body Ultra-Thin with 0.4x0.6 mm Terminal Width/Length and Corner Anchors on pages 460-462.

[UQFN] Drawings C04-0333-PW B and C04-2333-PW B for the 28-Lead Ultra Thin Plastic Quad Flat (PW) 4x4x0.6 mm Body with Corner Anchors on pages 463-465.

[MSOP] Drawings C04-0021D and C04-2021B for the 10-Lead Plastic Micro Small Outline Package (MS) on pages 588-590.

Revision CA (November 2015)

The following drawings are new:

[VDFN] Drawing C04-0413A and C04-2413A for the 8-Lead Very Thin Plastic Dual Flat (9U) 6x5 with Dual Exposed Pads on pages 298-300.

[QFN] Drawings C04-0240A and C04-2240A for the 32-L Plastic Quad Flat (3E) 5x5 mm Body 0.40 mm Terminals with 3.3x3.3 Exposed Pad - Punch Singulated, Dimpled on pages 384-386.

[VQFN] Drawings C04-0182A and C04-2182A for the 48-L Very Thin Quad Flat (ML) 7x7x1 mm with 5.3x5.3 Exposed Pad on pages 549-5551.

[LQFP] Drawings C04-0367A and C04-2367A for the 176-Lead Low Profile Quad Flat Pack (2J) 20x20x1.4 mm Body with 7x7 mm Exposed Pad on pages 651-653.

The following drawings are revised:

[SOT-89] Drawing C04-0127D for the 3-Lead Plastic Small Outline Transistor (MB) Land Pattern on page 112.

[LFBGA] Drawings C04-0365B and C04-2365B for the 169-Ball Low Profile Fine Pitch Ball Grid Array (HF) 11x11x1.4 mm Body on pages 738-740.

[LFBGA] Drawings C04-0366B and C04-2366B for the 288-Ball Low Profile Fine Pitch Ball Grid Array (4J) 15x15x1.4 mm Body on pages 744-746.

[TFBGA] Drawings C04-0377B and C04-2377B for the 169-Ball Thin Fine Pitch Ball Grid Array (7G) 10x10x1.1 mm Body on pages 755-757.

Revision CB (December 2015)

The following drawings are revised:

[TFBGA] Drawings C04-0377C and C04-2377C for the 169-Ball Thin Fine Pitch Ball Grid Array (7G) 10x10x1.1 mm Body on pages 755-757.

Revision CC (February 2016)

The following drawings are new:

[SOIC] Drawings C04-0419A and C04-2419A for the 8-Lead Small Outline Integrated Circuit (5DX) .150 In. Body with 3.30x2.41 Exposed Pad on pages 188-190.

[TDFN] Drawings C04-0129A and C04-2129A for the 8-Lead Plastic Dual Flat No Lead Package (MN) 2x3x0.75 mm Body on pages 272-274.

[TDFN] Drawings C04-0129A and C04-2129A for the 8-Lead Plastic Dual Flat No Lead Package (MNY) 2x3x0.75 mm Body on pages 275-277.

[VQFN] Drawings C04-0388A and C04-2388A for the 88-Lead Very Thin Plastic Quad Flat, No Lead Package (KB) 12x12x0.9 mm Punch Singulated Wettable Flanks with 6x6 Exposed Pad on pages 587-589.

[TQFP] Drawing C04-2222A for the 64-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body with 6x6 Exposed Pad Land Pattern on page 713.

[TQFP] Drawings C04-0418A and C04-2418A for the 128-Lead Thin Quad Flatpack (6XX) 10x10x1.0 mm Body with 10x10 mm Exposed Pad on pages 724-726.

[VFBGA] Drawings C04-0370A and C04-2370A for the 64-Ball Very Thin Fine Pitch (GA) 7x7x1.0 mm Body on pages 791-793.

Micrel Legacy [CERSiP] Drawings for the 6-Lead Ceramic System In Package (AC) 5x7x1.62 mm Body on pages 1154-1155.

Micrel Legacy [FTQFN] Drawings for the 16-Lead FTQFN 2.5x2.5 mm Package (Flip Chip) on pages 1270-1271.

The following drawings are revised:

[UDFN] Drawings C04-0203C and C04-2203C for the 8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) 2x3 mm Body on pages 288-290.

[UDFN] Drawings C04-0203C and C04-2203C for the 8-Lead Plastic Ultra Thin Small Outline No Lead Package (PRX) 2x3 mm Body on pages 291-293.

[VDFN] Drawings C04-0206B and C04-2206B for the 10-Lead Very Thin Plastic Dual Flat No Lead Package (9Q) 3x3 mm Body on pages 311-313.

[USON] Drawings C04-0203C and C04-2203C for the 8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) 2x3 mm Body on pages 326-328.

[USON] Drawings C04-0203C and C04-2203C for the 8-Lead Plastic Ultra Thin Small Outline No Lead Package (PRX) 2x3 mm Body on pages 329-331.

[QFN] Drawings C04-0103D and C04-2103C for the 44-Lead Plastic Quad Flat No Lead Package (ML) 8x8 mm Body on pages 416-418.

[QFN] Drawings C04-0243B and C04-2243B for the 72-Lead Plastic Quad Flat No Lead (6E) 10x10 mm with Exposed Pad Punch Singulated Dimpled on pages 434-436.

[VQFN] Drawings C04-0103D and C04-2103C for the 44-Lead Plastic Quad Flat No Lead Package (ML) 8x8 mm Body on pages 563-565.

[VQFN] Drawings C04-0243B and C04-2243B for the 72-Lead Plastic Quad Flat No Lead (6E) 10x10 mm with Exposed Pad Punch Singulated Dimpled on pages 584-586.

[SSOP] Drawing C04-2072B for the 20-Lead Plastic Shrink Small Outline (SS) 5.30 Land Pattern on page 639.

[TQFP] Drawing C04-0222B for the 64-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body with 6x6 Exposed Pad on pages 711-712.

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[LFBGA] Drawings C04-0366C and C04-2366B for the 288-Ball Low Profile Fine Pitch Ball Grid Array (4J) 15x15x1.4 mm Body on pages 768-770.

[TFBGA] Drawings C04-0377-J Rev. C and C04-2377-J Rev. C for the 169-Ball Thin Fine Pitch Ball Grid Array (7G) 10x10x1.1 mm Body on pages 779-781 (complies with JEDEC terminal assignment recommendations).

[TFBGA] Drawings C04-0377-NJ Rev. C and C04-2377-NJ Rev. C for the 169-Ball Thin Fine Pitch Ball Grid Array (7G) 10x10x1.1 mm Body on pages 782-784 (does not comply with JEDEC terminal assignment recommendations).

[VFBGA] Drawings C04-0371B and C04-2371B for the 78-Ball Very Thin Fine Pitch Ball Grid Array (5G) 9x9x1.0 Body on pages 794-796.

[VFBGA] Drawings C04-0371B and C04-2371B for the 78-Ball Very Thin Fine Pitch Ball Grid Array (GA) 9x9x1.0 Body on pages 797-799.

Supertex Legacy [BD] Drawing for the 42-Ball Bumped Package Outline (BD) 5.29x5.30 mm Body on page 1032.

Micrel Legacy [QFN] Drawings for the QFN77-48LD-PL-1 C 1 and 2 on pages 1417-1418.

Revision CD (April 2016)

The following drawings are new:

[VDFN] Drawings C04-0332A and C04-2332A for the 10-Lead Very Thin Plastic Dual Flat (9R) 2.5x2.0 mm Body on pages 289-291.

[TFBGA] Drawings C04-0212A and C04-2212A for the 121-Ball Thin Fine Pitch Ball Grid Array (3XX) SiP 8x8 mm Body on pages 756-758.

[TFBGA] Drawings C04-0212A and C04-2212A for the 121-Ball Thin Fine Pitch Ball Grid Array (TE) SiP 8x8 mm Body on pages 759-761.

The following drawings are revised:

[UQFN] Drawings C04-0385B and C04-2385B for the 28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (2N) 6x6x0.55 mm Body with 4.65x4.65 mm Exposed Pad and Corner Anchors on pages 469-471.

Revision CE (May 2016)

The following drawings are new:

[CABGA] Drawings C0-0414A and C0-2414A for the 22-Ball Chip Array Ball Grid Array (JY) 5x7 mm Body on pages 832-834.

[LLGA] Drawings C0-1068A and C0-3068A for the 6-Lead Low Profile Land Grid Array (APA) 7x5 mm Body on pages 839-841.

[LLGA] Drawings C0-1071A and C0-3071A for the 6-Lead Low Profile Land Grid Array (ANA) 5.0x3.2 mm Body on pages 836-838.

[SOIC] Drawings C0-0423A and C0-2423A for the 8-Lead Small Outline Integrated Circuit (7HX) .150 in. with 1.65x1.65 Exposed Pad on pages 192-194.

[TFBGA] Drawings C0-0328A and C0-2328A for the 100-Ball Thin Fine Pitch Ball Grid Array (GJX) 7x7 mm Body on pages 858-860.

[TFBGA] Drawings C0-1193A and C0-3193A for the 132-Ball Thin Fine Pitch Ball Grid Array (AHA) 12x12x1.2 mm Internal Flip Chip on pages 870-872.

[TFBGA] Drawings C0-0429A and C0-2429A for the 144-Ball Thin Fine Pitch Ball Grid Array (JWX) 7x7 mm Body on pages 873-875.

[TSSOP] Drawings C0-0424A and C0-2424A for the 38-Lead Thin Shrink Small Outline Package (SBX) 4.4 mm Body with 4.6x3.2 Exposed Pad on pages 723-725.

[VDFN] Drawings C0-1006A and C0-3006A for the 4-Lead Very Thin Plastic Dual Flatpack (H4A) 3.2x2.5 mm Body on pages 310-312.

[VDFN] Drawings C0-1005A and C0-3005A for the 6-Lead Very Thin Dual Flatpack (J7A) 2.5x2 mm Body on pages 313-315.

[VDFN] Drawings C0-1007A and C0-3007A for the 6-Lead Very Thin Plastic Dual Flatpack (H5A) 3.2x2.5 mm Body on pages 316-318.

[VDFN] Drawings C0-1197A and C0-3197A for the 11-Lead Very Thin Plastic Dual Flat Package (K4A) 6x5 mm Body with Dual Fused Exposed Pads on pages 334-336.

[VDFN] Drawings C0-1198A and C0-3198A for the 14-Lead Very Thin Plastic Quad Flat (JHA) 4.5x3 mm Body with Dimpled Wettable Flanks on pages 337-339.

[VFLGA] Drawings C0-1199A and C0-3199A for the 4-Lead Very Thin Fine Pitch Land Grid Array (ARA) 1.6x1.2 mm Body on pages 906-908.

[VFLGA] Drawings C0-1200A and C0-3200A for the 4-Lead Very Thin Fine Pitch Land Grid Array (ASA) 2x1.6 mm Body on pages 909-911.

[VFLGA] Drawings C0-1202A and C0-3202A for the 4-Lead Very Thin Land Grid Array (AUA) 2.5x2 mm Body on pages 912-914.

[VFLGA] Drawings C0-1203A and C0-3203A for the 6-Lead Very Thin Fine Pitch Land Grid Array (AVA) 1.6x1.2 mm Body on pages 915-917.

[VFLGA] Drawings C0-1201A and C0-3201A for the 6-Lead Very Thin Fine Pitch Land Grid Array (ATA) 2x1.6 mm Body on pages 918-920.

[VFLGA] Drawings C0-1204A and C0-3204A for the 6-Lead Very Thin Fine Pitch Land Grid Array (AWA) 2.5x2 mm Body on pages 921-923.

[VQFN] Drawings C0-0421A and C0-2421A for the 20-Lead Very Thin Plastic Quad Flat (LXX) 3x3x0.9 mm Body Internal Flip Chip on pages 545-547.

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[VQFN] Drawings C0-1205A and C0-3205A for the 32-Lead Very Thin Plastic Quad Flat (P5A) 5x5x0.9 mm Body with 3.5x3.5 Exposed Pad on pages 590-592.

[VQFN] Drawings C0-1196A and C0-3196A for the 32-Lead Very Thin Plastic Quad Flat (PHA) 6x6 mm Body Wettable Flanks Multiple Exposed Pads on pages 593-595.

[VQFN] Drawings C0-1109A and C0-3109A for the 40-Lead Very Thin Plastic Quad Flat (PQA) 6x6 mm Body with 4.1x4.1 Exposed Pad on pages 605-607.

[VQFN] Drawings C0-1206A and C0-3206A for the 40-Lead Very Thin Quad Flat (NPA) 5x6.5 mm Body with Dimpled Wettable Flanks on pages 602-604.

[VQFN] Drawings C0-0430A and C0-2430A for the 52-Lead Very Thin Plastic Quad Flat (8HX) 8x8 mm Body with 6.6x6.6 Exposed Pad on pages 632-634.

The following drawings are revised:

[QFN] Drawings C0-00149D and C0-2149C for the 64-Lead Very Thin Plastic Quad Flat (R4X) 9x9x0.9 mm Body with 7.15x7.15 Exposed Pad on pages 451-453.

[QFN] Drawings C0-00149D and C0-2149C for the 64-Lead Very Thin Plastic Quad Flat (MR) 9x9x0.9 mm Body with 7.15x7.15 Exposed Pad on pages 448-450.

[SC70] Drawings C0-00060C and C0-2060B for the 3-Lead Plastic Small Outline Transistor (LB) on pages 78-80.

[SC70] Drawings C0-00061D and C0-2061B for the 5-Lead Plastic Small Outline Transistor (LT) on pages 81-83.

[SC70] Drawings C0-0151B and C0-2151B for the 6-Lead Plastic Small Outline Transistor (LT) on pages 86-88.

[TDFN] Drawings C0-0129E and C0-2129B for the 8-Lead Plastic Dual Flat (MN) 2x3x0.8 mm Body with 1.4x1.3 Exposed Pad on pages 280-282.

[TDFN] Drawings C0-0129E and C0-2129B for the 8-Lead Plastic Dual Flat (MNY) 2x3x0.8 mm Body with 1.4x1.3 Exposed Pad on pages 283-285.

[TFBGA] Drawings C0-0212B and C0-2212B for the 121-Ball Thin Fine Pitch Ball Grid Array (TE) 8x8 mm SiP on pages 864-866.

[TFBGA] Drawings C0-1191B and C0-3191B for the 168-Ball Fine Pitch Ball Grid Array (AFA) 13x13x1.2 mm Internal Flip Chip on pages 876-878.

[VDFN] Drawings C0-0198C and C0-2198C for the 8-Lead Very Thin Flat Dual Package (LZ) 2x2 mm Body with 0.55 Contact Length on pages 319-321.

[VDFN] Drawings C0-0332B and C0-2332A for the 10-Lead Very Thin Plastic Dual Flat (9R) 2.5x2.0 mm Body on pages 328-330.

[VQFN] Drawings C0-0272B and C0-2272B for the 36-Terminal Very Thin Plastic Quad Flatpack (AEN) 6x6x0.9 mm Body on pages 599-601.

[VQFN] Drawings C0-0272B and C0-2272B for the 36-Terminal Very Thin Plastic Quad Flatpack (M2) 6x6x0.9 mm Body on pages 596-598.

[VQFN] Drawings C0-0182B and C0-2182C for the 48-Lead Very Thin Quad Flat (ML) 7x7x1 mm Body with 4.1x4.1 Exposed Pad on pages 614-616.

[VQFN] Drawings C0-0182B and C0-2182C for the 48-Lead Very Thin Quad Flat (Y3X) 7x7x1 mm Body with 4.1x4.1 Exposed Pad on pages 617-619.

[VQFN] Drawings C0-0431B and C0-2431A for the 48-Lead Very Thin Quad Flat (ML) 7x7x1 mm Body with 5.3x5.3 Exposed Pad on pages 620-622.

[VQFN] Drawings C0-0431B and C0-2431A for the 48-Lead Very Thin Quad Flat (Y9X) 7x7x1 mm Body with 5.3x5.3 Exposed Pad on pages 623-625.

[VQFN] Drawings C0-0149D and C0-2149C for the 64-Lead Very Thin Plastic Quad Flat (MR) 9x9x0.9 mm Body with 7.15x7.15 Exposed Pad on pages 641-643.

[VQFN] Drawings C0-0149D and C0-2149C for the 64-Lead Very Thin Plastic Quad Flat (R4X) 9x9x0.9 mm Body with 7.15x7.15 Exposed Pad on pages 644-646.

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APPENDIX B: CONTROL DIMENSIONS

Microchip inspects the first lot of every new package. Thereafter, one lot of each package, from each assembly site, shall be inspected yearly.

The following dimensions shall be inspected on all types of packages:

- Package Length
- Package Width
- Package Height
- Lead or Contact Width
- Lead or Contact Pitch

The following packages contain dimensions that shall be added to the inspection described above.

B.1 On Surface Mount Devices (SMD)

- § Lead Coplanarity[1]
- § Standoff*
- Molded Package Length (if different from overall package length)
- Side Flash
- Foot Angle

B.2 Through-Hole

- § Lead Span*

B.3 Surface Mount Devices And Through-Hole

- Molded Package Width
- Molded Package Thickness

B.4 DFN and QFN Only

- Contact Length
- Contact to Exp. Pad
- Exp. Pad Length
- Exp. Pad Width

1 The § symbol denotes a significant characteristic specified in the control plan.

NOTES:

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Overview of Microchip Die/Wafer Support

INTRODUCTION

In addition to packaged devices, Microchip Technology Inc. devices are available in wafer and die form. All products sold in die or wafers have been characterized and qualified according to the requirements of Microchip Technology Inc. Specifications SPI-41014, “Characterization and Qualification of Integrated Circuits” and QCI-39000, “Worldwide Quality Conformance Requirements”.

PRODUCT INTEGRITY

Product supplied in die or wafer form is fully tested and characterized. Die and wafers are inspected to Microchip Technology Inc. Specification, QCI-30014.

> **CAUTION**
>
> Some EEPROM devices use EPROM cells for device configuration. Exposure to ultraviolet light must be avoided. Exposure to ultraviolet light may cause the device to operate improperly.
>
> Extreme care is urged in the handling and assembly of these products since they are susceptible to damage from electro-static discharge.

PACKAGING OPTIONS

Die/wafer products are available as individual Die in Waffle Pack, Whole Wafers or as Sawn Wafer on Frame. As a standard, all die on a wafer are tested and Ink Dots are used to indicate the bad die on a wafer. Inkless wafers with electronic wafer maps are also available upon request. To acquire individual electronic wafer maps, customers can request a password-protected account on a Microchip FTP site where their wafer maps are stored and easily downloaded.

Various wafer thicknesses are available, which include 8, 11, 15 and 29 mils for unground wafers. Standard wafer thickness varies from product to product, so contact your Microchip Sales Office for details.

ORDERING INFORMATION

Die sales must be initiated by contacting your Microchip Sales Office. To order or to obtain information (on pricing or delivery) for a specific device, use one of the following part numbers.

Standard Thickness Die/Wafer		**EEPROM Examples**
DEVICE.NUMBER/S	Die in Waffle Pack	24LC01B-I/S
DEVICE.NUMBER/W	Whole Wafers	24LC01B-I/W
DEVICE.NUMBER/WF	Sawn Wafer on Frame	24LC01B-I/WF
No Backgrind Wafers		
DEVICE.NUMBER/WNBG	Whole Wafers with Ink	24LC01B-I/WNBG
DEVICE.NUMBER/WNBI	Whole Wafers without Ink	24LC01B-I/WNBI
Standard Die/Wafers with Manufacturing Process Included in Part Number		
DEVICE.NUMBER/SXXX	Die in Waffle Pack	24LC01B-I/S15K
DEVICE.NUMBER/WXXX	Whole Wafers	24LC01B-I/W15K
DEVICE.NUMBER/WFXXX	Sawn Wafer on Frame	24LC01B-I/WF15K

DEVICE.NUMBER is the base part number of the device that you require, the S specifies Die in Waffle Pack, a W specifies a Whole Wafer and WF specifies Sawn Wafer on Frame. Whole wafers specified as NBG are shipped as inked wafers with no backgrind (29 mils) and those specified as NBI are shipped with no backgrind and without Ink.

As further clarification, the manufacturing process is sometimes indicated with a three digit suffix added at the end of the part number. For example, a wafer from the 160K process will use the suffix 16K, one from the 150K process will use 15K and one from the 121K process will use 12K.

Overview of Microchip Die/Wafer Support

ELECTRICAL SPECIFICATIONS

The functional and electrical specifications of Microchip devices in die form are identical to those of a packaged version. Please refer to individual data sheets for complete details.

DIE MECHANICAL SPECIFICATIONS

Refer to the individual data Sheet for these specifications.

BOND PAD COORDINATES

The die figures have associated bond pad coordinates. These coordinates assist in the attaching of the bond wire to the die. All the dimensions of these coordinates are in micrometers (mm) unless otherwise specified. The origin for the coordinates is the center of the die, as shown in Figure 1. Refer to the specific die data Sheet for each device for openings and pitch.

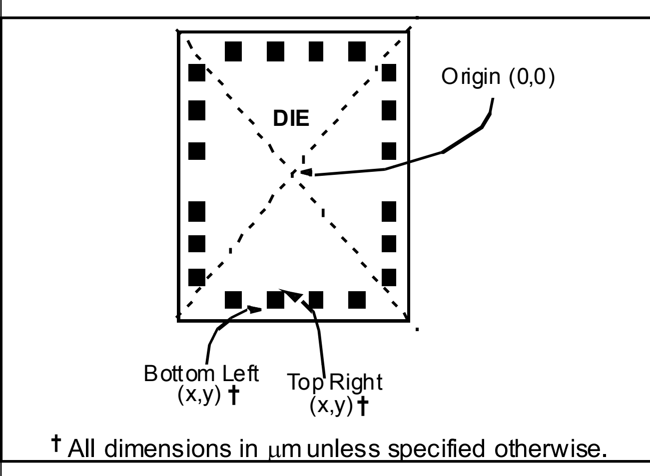

FIGURE 1: Die Coordinate Origin

The die is capable of thermosonic gold or ultrasonic wire bonding. Die meet the minimum conditions of MIL-STD 883, Method 2011 on "Bond Strength (Destructive Bond Pull Test)". The Bond Pad metallization is silicon doped aluminum.

SUBSTRATE BONDING

Substrate bonding may be required on certain product families. For more information, refer to the specific die data Sheet for that product.

SHIPPING OPTIONS

Die Form (/S)

Microchip product in die form can be shipped in waffle pack. The waffle pack has sufficient cavity area to restrain the die, while maintaining their orientation. Lint free paper inserts are placed over the waffle packs, and each pack is secured with a plastic locking clip. Groups of waffle packs are assembled into sets for shipment. A label with lot number, quantity and part number is attached.

These waffle packs are hermetically sealed in bags.

Wafer Form (/W)

Products may also be shipped in wafer form (see ordering information). Wafers are uncut and shipped in a wafer tub. The tub is padded with non-conductive foam. Lint free paper inserts are placed around each wafer. A label with lot number, quantity and part number is attached.

Sawn Wafer on Frames (/WF)

Products may also be shipped on wafer frames. Wafers are mounted on plastic frames and 100% sawn through. Sawn wafer on frames may be shipped in bulk (25 wafers per carrier) or as a single wafer in a carrier. A label with lot number, quantity and part number is attached with each shipment.

Storage Procedures

Temperature and humidity greatly affect the storage life of die. It is recommended that the die be used as soon as possible after receipt.

Upon receipt, the sealed bags should be stored in a cool and dry environment (25°C and 25% relative humidity). In these conditions, sealed bags have a shelf life of 12 months. Temperatures or humidities greater than these will reduce the storage life.

Once a bag containing waffle packs has been opened, the devices should be assembled and encapsulated within 48 hours (assuming 25°C and 25% humidity).

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NOTES:

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