



			Termination Base Alloy: Copper Alloy (Cu)			Package Homogeneous Materials: 8.1 Electronics (e.g. pc boards, displays)			J-STD-609A Product Marking and/or Pkg. Labeling e3																																																																																			
Semiconductor Device Type: 48 TQFP 7x7x1.0mm Matte Tin (CQA)																																																																																												
Basic Substance		CAS Number	"Contained In" Sub-Component	% Total Weight	mg/part	ppm	84.75	(mg) Total	Mold Compound	% of Total Weight	67.69																																																																																	
Fused Silica		60676-86-0	Mold Compound	57.266	71.697	572.657	<table><tr><td>Fused Silica</td><td>60676-86-0</td><td>84.60</td></tr><tr><td>Epoxy Resin</td><td>Trade Secret</td><td>5.90</td></tr><tr><td>Metal Hydroxide</td><td>Trade Secret</td><td>5.70</td></tr><tr><td>Phenol Resin</td><td>Trade Secret</td><td>3.60</td></tr><tr><td>Carbon Black</td><td>1333-86-4</td><td>0.20</td></tr><tr><td colspan="2">Total</td><td>100.00</td></tr></table>	Fused Silica	60676-86-0	84.60	Epoxy Resin	Trade Secret	5.90	Metal Hydroxide	Trade Secret	5.70	Phenol Resin	Trade Secret	3.60	Carbon Black	1333-86-4	0.20	Total		100.00	<table><tr><td>Fused Silica</td><td>60676-86-0</td><td>84.60</td></tr><tr><td>Epoxy Resin</td><td>Trade Secret</td><td>5.90</td></tr><tr><td>Metal Hydroxide</td><td>Trade Secret</td><td>5.70</td></tr><tr><td>Phenol Resin</td><td>Trade Secret</td><td>3.60</td></tr><tr><td>Carbon Black</td><td>1333-86-4</td><td>0.20</td></tr><tr><td colspan="2">Total</td><td>100.00</td></tr></table>	Fused Silica	60676-86-0	84.60	Epoxy Resin	Trade Secret	5.90	Metal Hydroxide	Trade Secret	5.70	Phenol Resin	Trade Secret	3.60	Carbon Black	1333-86-4	0.20	Total		100.00	<table><tr><td>Copper</td><td>7440-50-8</td><td>95.24</td></tr><tr><td>Nickel</td><td>7440-02-0</td><td>2.54</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>1.67</td></tr><tr><td>Silicon</td><td>7440-21-3</td><td>0.45</td></tr><tr><td>Magnesium</td><td>7439-95-4</td><td>0.10</td></tr><tr><td colspan="2">Total</td><td>100.00</td></tr></table>	Copper	7440-50-8	95.24	Nickel	7440-02-0	2.54	Silver	7440-22-4	1.67	Silicon	7440-21-3	0.45	Magnesium	7439-95-4	0.10	Total		100.00	<table><tr><td>(mg) Total</td><td>Lead Frame</td><td>% of Total Weight</td><td>26.96</td></tr><tr><td>Copper</td><td>7440-50-8</td><td></td><td></td></tr><tr><td>Nickel</td><td>7440-02-0</td><td></td><td></td></tr><tr><td>Silver</td><td>7440-22-4</td><td></td><td></td></tr><tr><td>Silicon</td><td>7440-21-3</td><td></td><td></td></tr><tr><td>Magnesium</td><td>7439-95-4</td><td></td><td></td></tr><tr><td colspan="2">Total</td><td></td><td></td></tr></table>	(mg) Total	Lead Frame	% of Total Weight	26.96	Copper	7440-50-8			Nickel	7440-02-0			Silver	7440-22-4			Silicon	7440-21-3			Magnesium	7439-95-4			Total			
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Epoxy Resin		Trade Secret	Mold Compound	3.994	5.000	39.937	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Phenol Resin		Trade Secret	Mold Compound	2.437	3.051	24.368	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Carbon Black		1333-86-4	Mold Compound	0.135	0.169	1.354	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Copper		7440-50-8	Lead Frame	25.677	32.148	256.770	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Nickel		7440-02-0	Lead Frame	0.685	0.857	6.848	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Silver		7440-22-4	Lead Frame	0.450	0.563	4.500	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Magnesium		7439-95-4	Lead Frame	0.027	0.034	270	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Silver		7440-22-4	Die Attach	0.061	0.076	608	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Epoxy resin		Trade Secret	Die Attach	0.016	0.020	160	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Copper		7440-50-8	Die Attach	0.003	0.004	32	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Silicon		7440-21-3	Chip (Die)	0.940	1.177	9,400	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Gold		7440-57-5	Wire Bond	0.790	0.989	7,900	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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Tin		7440-31-5	Plating on external leads (pins) - Matte Tin / annealed at 150°C for 1 hour	3.540	4.432	35,400	<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00		<table><tr><td>(mg) Total</td><td>Die Attach</td><td>% of Total Weight</td><td>0.08</td></tr><tr><td>Silver</td><td>7440-22-4</td><td>76.00</td><td></td></tr><tr><td>Epoxy resin</td><td>Trade Secret</td><td>20.00</td><td></td></tr><tr><td>Copper</td><td>7440-50-8</td><td>4.00</td><td></td></tr><tr><td colspan="2">Total</td><td>100.00</td><td></td></tr></table>	(mg) Total	Die Attach	% of Total Weight	0.08	Silver	7440-22-4	76.00		Epoxy resin	Trade Secret	20.00		Copper	7440-50-8	4.00		Total		100.00																																													
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This semiconductor device and its homogenous materials comply with EU Directives: 2002/95/EC (27 January 2003) & Directive 2011/65/EU (08 June 2011) and 2015/863/EU (31 March 2015) and 2002/53/EC (End-of-Life Vehicles (ELV) without exemption (zero)

Compliance with the above EU Directives has been verified via internal design controls, supplier declarations, and /or analytical test data.

If a chemical substance is absent from the list above, the chemical substance is NOT an intentional ingredient in the semiconductor device and, to the best of Microchip Technology Incorporated's knowledge and belief as of the date of this document, there is no credible reason to believe that the unavoidable impurity concentration of the chemical substance, if any, is not below the threshold of regulatory concern for any regulatory scheme world-wide.

Molding compounds used by Microchip meet the UL94 V0 flammability standard for plastics. You can access the UL IQTM family of databases to obtain a test report at <http://ul.com/global/eng/pages/offering/industries/chemicals/plastics/>

The protective "tubes" in which the specific product is shipped are made from polyvinyl chloride (PVC) plastic. "Window envelopes" used to hold the packing slip on the outer box and certain "reels" may be made from PVC plastic.

Microchip Technology Incorporated believes the information in this form concerning substances restricted by RoHS in Microchip Technology Incorporated's semiconductor devices in their original packing materials is true and correct to the best of its knowledge and belief, as of the date listed in this form. Microchip Technology Incorporated cannot guarantee the completeness and accuracy of data in this form because it has been compiled based on the ranges provided in Material Safety Data Sheets provided by raw material suppliers. Supplier information is often protected from disclosure as trade secrets and some information may not have been provided by subcontract assemblers and raw material suppliers. Information is provided only as estimates of the average weight of these parts and the average weight of anticipated significant toxic metals components. These estimates do not include trace levels of dopants, metals, and non-metal materials contained within silicon devices (silicon IC) in the finished parts.

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Assembled package referenced above is EU REACH compliant based on the latest SVHC candidate list of ECHA which can be found at <http://echa.europa.eu/web/guest/candidate-list-table>

125.20

100.00