



Material Declaration Data Sheet

HVCB0603

High Voltage Thick Film Chip Resistor - Solderable Wraparound

Date: **January 7, 2013**
 Component Weight (mg): **2.3368**

Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)

BOM Item	Material	CAS Number	Material Weight (mg)	Material PPM of Component	Material % of BOM Item	BOM Item Weight (mg)	BOM Item % of Component
Ceramic substrate	aluminum oxide	1344-28-1	1.7568	751,807	96.00%	1.8300	78.31%
	silicon oxide	7631-86-9	0.0366	15,663	2.00%		
	magnesium oxide	1309-48-4	0.0183	7,831	1.00%		
	calcium oxide	1305-78-8	0.0183	7,831	1.00%		
Inner termination layer	silver	7440-22-4	0.1176	50,326	76.08%	0.1546	6.61%
	palladium	7440-05-3	0.0016	672	1.02%		
	lead borosilicate glass	undefined	0.0354	15,149	22.90%		
Resistive element	ruthenium oxide	12036-10-1	0.0127	5,435	27.19%	0.0467	2.00%
	silver	7440-22-4	0.0069	2,953	14.78%		
	palladium	7440-05-3	0.0020	856	4.28%		
	lead borosilicate glass	undefined	0.0251	10,741	53.75%		
Pre-coat	lead borosilicate glass	undefined	0.0377	16,133	89.76%	0.0420	1.80%
	copper oxide	1317-38-0	0.0019	813	4.52%		
	magnesium oxide	1309-48-4	0.0024	1,027	5.71%		
Over-coat	epoxy	67762-95-2	0.0760	32,524	100.00%	0.0760	3.25%
Middle termination layer	nickel	7440-02-0	0.0665	28,458	100.00%	0.0665	2.85%
Outer termination layer	tin	7440-31-5	0.1210	51,781	100.00%	0.1210	5.18%
Total Weight			2.3368				

Note: Lead oxide contained in glass frit is part of the thick film formulations. This lead content is covered by exemption 7c-I of the Directive Annex ("... electronic components containing lead in a glass..."). Weights are approximate.



Material Declaration Data Sheet

HVCB0805

High Voltage Thick Film Chip Resistor - Solderable Wraparound

Date: **January 7, 2013**
 Component Weight (mg): **5.0317**

Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)

BOM Item	Material	CAS Number	Material Weight (mg)	Material PPM of Component	Material % of BOM Item	BOM Item Weight (mg)	BOM Item % of Component
Ceramic substrate	aluminum oxide	1344-28-1	3.6960	734,543	96.00%	3.8500	76.51%
	silicon oxide	7631-86-9	0.0770	15,303	2.00%		
	magnesium oxide	1309-48-4	0.0385	7,651	1.00%		
	calcium oxide	1305-78-8	0.0385	7,651	1.00%		
Inner termination layer	silver	7440-22-4	0.2618	52,030	75.36%	0.3474	6.90%
	palladium	7440-05-3	0.0030	596	0.86%		
	lead borosilicate glass	undefined	0.0826	16,416	23.78%		
Resistive element	ruthenium oxide	12036-10-1	0.0221	4,392	25.49%	0.0867	1.72%
	silver	7440-22-4	0.0120	2,385	13.84%		
	palladium	7440-05-3	0.0030	596	3.46%		
	lead borosilicate glass	undefined	0.0496	9,858	57.21%		
Pre-coat	lead borosilicate glass	undefined	0.1067	21,206	89.59%	0.1191	2.37%
	copper oxide	1317-38-0	0.0055	1,093	4.62%		
	magnesium oxide	1309-48-4	0.0069	1,371	5.79%		
Over-coat	epoxy	67762-95-2	0.1590	31,600	100.00%	0.1590	3.16%
Middle termination layer	nickel	7440-02-0	0.1665	33,090	100.00%	0.1665	3.31%
Outer termination layer	tin	7440-31-5	0.3030	60,218	100.00%	0.3030	6.02%
Total Weight			5.0317				

Note: Lead oxide contained in glass frit is part of the thick film formulations. This lead content is covered by exemption 7c-I of the Directive Annex ("... electronic components containing lead in a glass..."). Weights are approximate.



Material Declaration Data Sheet

HVCB1206

High Voltage Thick Film Chip Resistor - Solderable Wraparound

Date: **January 7, 2013**
 Component Weight (mg): **10.2545**

Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)

BOM Item	Material	CAS Number	Material Weight (mg)	Material PPM of Component	Material % of BOM Item	BOM Item Weight (mg)	BOM Item % of Component
Ceramic substrate	aluminum oxide	1344-28-1	7.9968	779,833	96.00%	8.3300	81.23%
	silicon oxide	7631-86-9	0.1666	16,247	2.00%		
	magnesium oxide	1309-48-4	0.0833	8,123	1.00%		
	calcium oxide	1305-78-8	0.0833	8,123	1.00%		
Inner termination layer	silver	7440-22-4	0.5370	52,367	76.96%	0.6978	6.80%
	palladium	7440-05-3	0.0072	702	1.03%		
	lead borosilicate glass	undefined	0.1536	14,979	22.01%		
Resistive element	ruthenium oxide	12036-10-1	0.0451	4,398	25.51%	0.1768	1.72%
	silver	7440-22-4	0.0241	2,350	13.63%		
	palladium	7440-05-3	0.0073	712	4.13%		
	lead borosilicate glass	undefined	0.1003	9,781	56.73%		
Pre-coat	lead borosilicate glass	undefined	0.1604	15,642	89.66%	0.1789	1.74%
	copper oxide	1317-38-0	0.0082	800	4.58%		
	magnesium oxide	1309-48-4	0.0103	1,004	5.76%		
Over-coat	epoxy	67762-95-2	0.3070	29,938	100.00%	0.3070	2.99%
Middle termination layer	nickel	7440-02-0	0.2000	19,504	100.00%	0.2000	1.95%
Outer termination layer	tin	7440-31-5	0.3640	35,497	100.00%	0.3640	3.55%
Total Weight			10.2545				

Note: Lead oxide contained in glass frit is part of the thick film formulations. This lead content is covered by exemption 7c-I of the Directive Annex ("... electronic components containing lead in a glass..."). Weights are approximate.



Material Declaration Data Sheet

HVCB2010

High Voltage Thick Film Chip Resistor - Solderable Wraparound

Date: **January 7, 2013**
 Component Weight (mg): **26.2022**

Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)

BOM Item	Material	CAS Number	Material Weight (mg)	Material PPM of Component	Material % of BOM Item	BOM Item Weight (mg)	BOM Item % of Component
Ceramic substrate	aluminum oxide	1344-28-1	20.2656	773,431	96.00%	21.1100	80.57%
	silicon oxide	7631-86-9	0.4222	16,113	2.00%		
	magnesium oxide	1309-48-4	0.2111	8,057	1.00%		
	calcium oxide	1305-78-8	0.2111	8,057	1.00%		
Inner termination layer	silver	7440-22-4	1.5135	57,762	78.95%	1.9171	7.32%
	palladium	7440-05-3	0.0202	771	1.05%		
	lead borosilicate glass	undefined	0.3834	14,632	20.00%		
Resistive element	ruthenium oxide	12036-10-1	0.1997	7,621	27.20%	0.7342	2.80%
	silver	7440-22-4	0.1078	4,114	14.68%		
	palladium	7440-05-3	0.0320	1,221	4.36%		
	lead borosilicate glass	undefined	0.3947	15,064	53.76%		
Pre-coat	lead borosilicate glass	undefined	0.6373	24,322	89.65%	0.7109	2.71%
	copper oxide	1317-38-0	0.0327	1,248	4.60%		
	magnesium oxide	1309-48-4	0.0409	1,561	5.75%		
Over-coat	epoxy	67762-95-2	0.8840	33,738	100.00%	0.8840	3.37%
Middle termination layer	nickel	7440-02-0	0.3000	11,449	100.00%	0.3000	1.14%
Outer termination layer	tin	7440-31-5	0.5460	20,838	100.00%	0.5460	2.08%
Total Weight			26.2022				

Note: Lead oxide contained in glass frit is part of the thick film formulations. This lead content is covered by exemption 7c-I of the Directive Annex ("... electronic components containing lead in a glass..."). Weights are approximate.



Material Declaration Data Sheet

HVCB2512

High Voltage Thick Film Chip Resistor - Solderable Wraparound

Date: **January 7, 2013**
 Component Weight (mg): **44.0042**

Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)

BOM Item	Material	CAS Number	Material Weight (mg)	Material PPM of Component	Material % of BOM Item	BOM Item Weight (mg)	BOM Item % of Component
Ceramic substrate	aluminum oxide	1344-28-1	32.8608	746,765	96.00%	34.2300	77.79%
	silicon oxide	7631-86-9	0.6846	15,558	2.00%		
	magnesium oxide	1309-48-4	0.3423	7,779	1.00%		
	calcium oxide	1305-78-8	0.3423	7,779	1.00%		
Inner termination layer	silver	7440-22-4	2.3783	54,047	79.54%	2.9900	6.79%
	palladium	7440-05-3	0.0317	720	1.06%		
	lead borosilicate glass	undefined	0.5800	13,181	19.40%		
Resistive element	ruthenium oxide	12036-10-1	0.3608	8,199	26.71%	1.3508	3.07%
	silver	7440-22-4	0.1956	4,445	14.48%		
	palladium	7440-05-3	0.0573	1,302	4.24%		
	lead borosilicate glass	undefined	0.7371	16,751	54.57%		
Pre-coat	lead borosilicate glass	undefined	2.1669	49,243	89.64%	2.4174	5.49%
	copper oxide	1317-38-0	0.1113	2,529	4.60%		
	magnesium oxide	1309-48-4	0.1392	3,163	5.76%		
Over-coat	epoxy	67762-95-2	1.6060	36,497	100.00%	1.6060	3.65%
Middle termination layer	nickel	7440-02-0	0.5000	11,363	100.00%	0.5000	1.14%
Outer termination layer	tin	7440-31-5	0.9100	20,680	100.00%	0.9100	2.07%
Total Weight			44.0042				

Note: Lead oxide contained in glass frit is part of the thick film formulations. This lead content is covered by exemption 7c-I of the Directive Annex ("... electronic components containing lead in a glass..."). Weights are approximate.



Material Declaration Data Sheet

HVCS0603

High Voltage Thick Film Chip Resistor - Solderable Single Surface (Sn/Pb)

Date: **January 7, 2013**
 Component Weight (mg): **2.3368**

Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)

BOM Item	Material	CAS Number	Material Weight (mg)	Material PPM of Component	Material % of BOM Item	BOM Item Weight (mg)	BOM Item % of Component
Ceramic substrate	aluminum oxide	1344-28-1	1.7568	751,807	96.00%	1.8300	78.31%
	silicon oxide	7631-86-9	0.0366	15,663	2.00%		
	magnesium oxide	1309-48-4	0.0183	7,831	1.00%		
	calcium oxide	1305-78-8	0.0183	7,831	1.00%		
Inner termination layer	silver	7440-22-4	0.1176	50,326	76.08%	0.1546	6.61%
	palladium	7440-05-3	0.0016	672	1.02%		
	lead borosilicate glass	undefined	0.0354	15,149	22.90%		
Resistive element	ruthenium oxide	12036-10-1	0.0127	5,435	27.19%	0.0467	2.00%
	silver	7440-22-4	0.0069	2,953	14.78%		
	palladium	7440-05-3	0.0020	856	4.28%		
	lead borosilicate glass	undefined	0.0251	10,741	53.75%		
Pre-coat	lead borosilicate glass	undefined	0.0377	16,133	89.76%	0.0420	1.80%
	copper oxide	1317-38-0	0.0019	813	4.52%		
	magnesium oxide	1309-48-4	0.0024	1,027	5.71%		
Over-coat	epoxy	67762-95-2	0.0760	32,524	100.00%	0.0760	3.25%
Middle termination layer	nickel	7440-02-0	0.0665	28,458	100.00%	0.0665	2.85%
Outer termination layer	tin	7440-31-5	0.0762	32,622	63.00%	0.1210	5.18%
	lead	7439-92-1	0.0448	19,159	37.00%		
Total Weight			2.3368				

Note: Lead oxide contained in glass frit is part of the thick film formulations. This lead content is covered by exemption 7c-1 of the Directive Annex ("... electronic components containing lead in a glass..."). Weights are approximate.



Material Declaration Data Sheet

HVCS0805

High Voltage Thick Film Chip Resistor - Solderable Single Surface (Sn/Pb)

Date: **January 7, 2013**
 Component Weight (mg): **5.0317**

Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)

BOM Item	Material	CAS Number	Material Weight (mg)	Material PPM of Component	Material % of BOM Item	BOM Item Weight (mg)	BOM Item % of Component
Ceramic substrate	aluminum oxide	1344-28-1	3.6960	734,543	96.00%	3.8500	76.51%
	silicon oxide	7631-86-9	0.0770	15,303	2.00%		
	magnesium oxide	1309-48-4	0.0385	7,651	1.00%		
	calcium oxide	1305-78-8	0.0385	7,651	1.00%		
Inner termination layer	silver	7440-22-4	0.2618	52,030	75.36%	0.3474	6.90%
	palladium	7440-05-3	0.0030	596	0.86%		
	lead borosilicate glass	undefined	0.0826	16,416	23.78%		
Resistive element	ruthenium oxide	12036-10-1	0.0221	4,392	25.49%	0.0867	1.72%
	silver	7440-22-4	0.0120	2,385	13.84%		
	palladium	7440-05-3	0.0030	596	3.46%		
	lead borosilicate glass	undefined	0.0496	9,858	57.21%		
Pre-coat	lead borosilicate glass	undefined	0.1067	21,206	89.59%	0.1191	2.37%
	copper oxide	1317-38-0	0.0055	1,093	4.62%		
	magnesium oxide	1309-48-4	0.0069	1,371	5.79%		
Over-coat	epoxy	67762-95-2	0.1590	31,600	100.00%	0.1590	3.16%
Middle termination layer	nickel	7440-02-0	0.1665	33,090	100.00%	0.1665	3.31%
Outer termination layer	tin	7440-31-5	0.1909	37,937	63.00%	0.3030	6.02%
	lead	7439-92-1	0.1121	22,281	37.00%		
Total Weight			5.0317				

Note: Lead oxide contained in glass frit is part of the thick film formulations. This lead content is covered by exemption 7c-1 of the Directive Annex ("... electronic components containing lead in a glass..."). Weights are approximate.



Material Declaration Data Sheet

HVCS1206

High Voltage Thick Film Chip Resistor - Solderable Single Surface (Sn/Pb)

Date: **January 7, 2013**
 Component Weight (mg): **10.2545**

Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)

BOM Item	Material	CAS Number	Material Weight (mg)	Material PPM of Component	Material % of BOM Item	BOM Item Weight (mg)	BOM Item % of Component
Ceramic substrate	aluminum oxide	1344-28-1	7.9968	779,833	96.00%	8.3300	81.23%
	silicon oxide	7631-86-9	0.1666	16,247	2.00%		
	magnesium oxide	1309-48-4	0.0833	8,123	1.00%		
	calcium oxide	1305-78-8	0.0833	8,123	1.00%		
Inner termination layer	silver	7440-22-4	0.5370	52,367	76.96%	0.6978	6.80%
	palladium	7440-05-3	0.0072	702	1.03%		
	lead borosilicate glass	undefined	0.1536	14,979	22.01%		
Resistive element	ruthenium oxide	12036-10-1	0.0451	4,398	25.51%	0.1768	1.72%
	silver	7440-22-4	0.0241	2,350	13.63%		
	palladium	7440-05-3	0.0073	712	4.13%		
	lead borosilicate glass	undefined	0.1003	9,781	56.73%		
Pre-coat	lead borosilicate glass	undefined	0.1604	15,642	89.66%	0.1789	1.74%
	copper oxide	1317-38-0	0.0082	800	4.58%		
	magnesium oxide	1309-48-4	0.0103	1,004	5.76%		
Over-coat	epoxy	67762-95-2	0.3070	29,938	100.00%	0.3070	2.99%
Middle termination layer	nickel	7440-02-0	0.2000	19,504	100.00%	0.2000	1.95%
Outer termination layer	tin	7440-31-5	0.2293	22,363	63.00%	0.3640	3.55%
	lead	7439-92-1	0.1347	13,134	37.00%		
Total Weight			10.2545				

Note: Lead oxide contained in glass frit is part of the thick film formulations. This lead content is covered by exemption 7c-1 of the Directive Annex ("... electronic components containing lead in a glass..."). Weights are approximate.



Material Declaration Data Sheet

HVCS2010

High Voltage Thick Film Chip Resistor - Solderable Single Surface (Sn/Pb)

Date: **January 7, 2013**
 Component Weight (mg): **26.2022**

Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)

BOM Item	Material	CAS Number	Material Weight (mg)	Material PPM of Component	Material % of BOM Item	BOM Item Weight (mg)	BOM Item % of Component
Ceramic substrate	aluminum oxide	1344-28-1	20.2656	773,431	96.00%	21.1100	80.57%
	silicon oxide	7631-86-9	0.4222	16,113	2.00%		
	magnesium oxide	1309-48-4	0.2111	8,057	1.00%		
	calcium oxide	1305-78-8	0.2111	8,057	1.00%		
Inner termination layer	silver	7440-22-4	1.5135	57,762	78.95%	1.9171	7.32%
	palladium	7440-05-3	0.0202	771	1.05%		
	lead borosilicate glass	undefined	0.3834	14,632	20.00%		
Resistive element	ruthenium oxide	12036-10-1	0.1997	7,621	27.20%	0.7342	2.80%
	silver	7440-22-4	0.1078	4,114	14.68%		
	palladium	7440-05-3	0.0320	1,221	4.36%		
	lead borosilicate glass	undefined	0.3947	15,064	53.76%		
Pre-coat	lead borosilicate glass	undefined	0.6373	24,322	89.65%	0.7109	2.71%
	copper oxide	1317-38-0	0.0327	1,248	4.60%		
	magnesium oxide	1309-48-4	0.0409	1,561	5.75%		
Over-coat	epoxy	67762-95-2	0.8840	33,738	100.00%	0.8840	3.37%
Middle termination layer	nickel	7440-02-0	0.3000	11,449	100.00%	0.3000	1.14%
Outer termination layer	tin	7440-31-5	0.3440	13,128	63.00%	0.5460	2.08%
	lead	7439-92-1	0.2020	7,710	37.00%		
Total Weight			26.2022				

Note: Lead oxide contained in glass frit is part of the thick film formulations. This lead content is covered by exemption 7c-1 of the Directive Annex ("... electronic components containing lead in a glass..."). Weights are approximate.



Material Declaration Data Sheet

HVCS2512

High Voltage Thick Film Chip Resistor - Solderable Single Surface (Sn/Pb)

Date: **January 7, 2013**
 Component Weight (mg): **44.0042**

Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)

BOM Item	Material	CAS Number	Material Weight (mg)	Material PPM of Component	Material % of BOM Item	BOM Item Weight (mg)	BOM Item % of Component
Ceramic substrate	aluminum oxide	1344-28-1	32.8608	746,765	96.00%	34.2300	77.79%
	silicon oxide	7631-86-9	0.6846	15,558	2.00%		
	magnesium oxide	1309-48-4	0.3423	7,779	1.00%		
	calcium oxide	1305-78-8	0.3423	7,779	1.00%		
Inner termination layer	silver	7440-22-4	2.3783	54,047	79.54%	2.9900	6.79%
	palladium	7440-05-3	0.0317	720	1.06%		
	lead borosilicate glass	undefined	0.5800	13,181	19.40%		
Resistive element	ruthenium oxide	12036-10-1	0.3608	8,199	26.71%	1.3508	3.07%
	silver	7440-22-4	0.1956	4,445	14.48%		
	palladium	7440-05-3	0.0573	1,302	4.24%		
	lead borosilicate glass	undefined	0.7371	16,751	54.57%		
Pre-coat	lead borosilicate glass	undefined	2.1669	49,243	89.64%	2.4174	5.49%
	copper oxide	1317-38-0	0.1113	2,529	4.60%		
	magnesium oxide	1309-48-4	0.1392	3,163	5.76%		
Over-coat	epoxy	67762-95-2	1.6060	36,497	100.00%	1.6060	3.65%
Middle termination layer	nickel	7440-02-0	0.5000	11,363	100.00%	0.5000	1.14%
Outer termination layer	tin	7440-31-5	0.5733	13,028	63.00%	0.9100	2.07%
	lead	7439-92-1	0.3367	7,652	37.00%		
Total Weight			44.0042				

Note: Lead oxide contained in glass frit is part of the thick film formulations. This lead content is covered by exemption 7c-1 of the Directive Annex ("... electronic components containing lead in a glass..."). Weights are approximate.