Material Declaration Data Sheet

HMC0402 (Formerly HMC 1/16S)

High Value Thick Film Chip Resistor

Date: **January 9, 2013**
Component Weight (mg): **1.3701**

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	1.0141	740,217	96.00%	1.0564	77.11%
	silicon oxide	7631-86-9	0.0211	15,421	2.00%		
	magnesium oxide	1309-48-4	0.0106	7,711	1.00%		
	calcium oxide	1305-78-8	0.0106	7,711	1.00%		
Inner termination layer	silver	7440-22-4	0.0689	50,269	76.36%	0.0902	6.58%
	palladium	7440-05-3	0.0009	674	1.02%		
	lead borosilicate glass	undefined	0.0204	14,890	22.62%		
Resistive element	ruthenium oxide	12036-10-1	0.0073	5,351	27.18%	0.0270	1.97%
	silver	7440-22-4	0.0040	2,907	14.77%		
	palladium	7440-05-3	0.0012	843	4.28%		
	lead borosilicate glass	undefined	0.0145	10,583	53.76%		
Pre-coat	lead borosilicate glass	undefined	0.0421	30,729	94.43%	0.0446	3.25%
	copper oxide	1317-38-0	0.0011	801	2.46%		
	magnesium oxide	1309-48-4	0.0014	1,011	3.11%		
Over-coat	epoxy	67762-95-2	0.0438	31,969	100.00%	0.0438	3.20%
Middle termination layer	nickel	7440-02-0	0.0384	28,021	100.00%	0.0384	2.80%
Side termination	nickel	7440-02-0	0.00001	10	100.00%	0.0000	0.00%
	chromium	7440-47-3	0.00001	9	100.00%		
Outer termination layer	tin	7440-31-5	0.0697	50,874	100.00%	0.0697	5.09%
Total Weight			1.3701				

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

HMC0603 (Formerly HMC 1/16)

High Value Thick Film Chip Resistor

Date: **January 9, 2013**
Component Weight (mg): **2.3385**

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	751,238	96.00%	1.8300	78.25%
	silicon oxide	7631-86-9	0.0366	15,651	2.00%		
	magnesium oxide	1309-48-4	0.0183	7,825	1.00%		
	calcium oxide	1305-78-8	0.0183	7,825	1.00%		
Inner termination layer	silver	7440-22-4	0.1193	51,015	76.33%	0.1563	6.68%
	palladium	7440-05-3	0.0016	684	1.02%		
	lead borosilicate glass	undefined	0.0354	15,138	22.65%		
Resistive element	ruthenium oxide	12036-10-1	0.0127	5,431	27.19%	0.0467	2.00%
	silver	7440-22-4	0.0069	2,951	14.78%		
	palladium	7440-05-3	0.0020	855	4.28%		
	lead borosilicate glass	undefined	0.0251	10,733	53.75%		
Pre-coat	lead borosilicate glass	undefined	0.0377	16,121	89.76%	0.0420	1.80%
	copper oxide	1317-38-0	0.0019	812	4.52%		
	magnesium oxide	1309-48-4	0.0024	1,026	5.71%		
Over-coat	epoxy	67762-95-2	0.0760	32,499	100.00%	0.0760	3.25%
Middle termination layer	nickel	7440-02-0	0.0665	28,437	100.00%	0.0665	2.84%
Side termination	nickel	7440-02-0	0.00002	9	55.00%	0.00004	0.00%
	chromium	7440-47-3	0.00002	8	45.00%		
Outer termination layer	tin	7440-31-5	0.1210	51,742	100.00%	0.1210	5.17%
Total Weight			2.3385				

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

HMC0805 (Formerly HMC 1/10)

High Value Thick Film Chip Resistor

Date: **January 9, 2013**
Component Weight (mg): **5.0335**

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	734,280	96.00%	3.8500	76.49%
	silicon oxide	7631-86-9	0.0770	15,298	2.00%		
	magnesium oxide	1309-48-4	0.0385	7,649	1.00%		
	calcium oxide	1305-78-8	0.0385	7,649	1.00%		
Inner termination layer	silver	7440-22-4	0.2630	52,250	75.34%	0.3491	6.94%
	palladium	7440-05-3	0.0035	695	1.00%		
	lead borosilicate glass	undefined	0.0826	16,410	23.66%		
Resistive element	ruthenium oxide	12036-10-1	0.0221	4,391	25.49%	0.0867	1.72%
	silver	7440-22-4	0.0120	2,384	13.84%		
	palladium	7440-05-3	0.0030	596	3.46%		
	lead borosilicate glass	undefined	0.0496	9,854	57.21%		
Pre-coat	lead borosilicate glass	undefined	0.1067	21,198	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	31,588	100.00%	0.1590	3.16%
Middle termination layer	nickel	7440-02-0	0.1665	33,078	100.00%	0.1665	3.31%
Side termination	nickel	7440-02-0	0.00006	11	55.00%	0.0001	0.00%
	chromium	7440-47-3	0.00005	9	45.00%		
Outer termination layer	tin	7440-31-5	0.3030	60,197	100.00%	0.3030	6.02%
Total Weight			5.0335				

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

HMC1206 (Formerly HMC 1/8)

High Value Thick Film Chip Resistor

Date: **January 9, 2013**
Component Weight (mg): **10.2570**

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	779,643	96.00%	8.3300	81.21%
	silicon oxide	7631-86-9	0.1666	16,243	2.00%		
	magnesium oxide	1309-48-4	0.0833	8,121	1.00%		
	calcium oxide	1305-78-8	0.0833	8,121	1.00%		
Inner termination layer	silver	7440-22-4	0.5370	52,354	76.96%	0.6978	6.80%
	palladium	7440-05-3	0.0072	702	1.03%		
	lead borosilicate glass	undefined	0.1536	14,975	22.01%		
Resistive element	ruthenium oxide	12036-10-1	0.0463	4,514	25.85%	0.1791	1.75%
	silver	7440-22-4	0.0252	2,457	14.07%		
	palladium	7440-05-3	0.0073	712	4.08%		
	lead borosilicate glass	undefined	0.1003	9,779	56.00%		
Pre-coat	lead borosilicate glass	undefined	0.1604	15,638	89.66%	0.1789	1.74%
	copper oxide	1317-38-0	0.0082	799	4.58%		
	magnesium oxide	1309-48-4	0.0103	1,004	5.76%		
Over-coat	epoxy	67762-95-2	0.3070	29,931	100.00%	0.3070	2.99%
Middle termination layer	nickel	7440-02-0	0.2000	19,499	100.00%	0.2000	1.95%
Side termination	nickel	7440-02-0	0.00011	11	55.00%	0.0002	0.00%
	chromium	7440-47-3	0.00009	9	45.00%		
Outer termination layer	tin	7440-31-5	0.3640	35,488	100.00%	0.3640	3.55%
Total Weight			10.2570				

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

HMC1210 (Formerly HMC 1/4)

High Value Thick Film Chip Resistor

Date: **January 9, 2013**
Component Weight (mg): **16.6243**

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	12.7968	769,765	96.00%	13.3300	80.18%
	silicon oxide	7631-86-9	0.2666	16,037	2.00%		
	magnesium oxide	1309-48-4	0.1333	8,018	1.00%		
	calcium oxide	1305-78-8	0.1333	8,018	1.00%		
Inner termination layer	silver	7440-22-4	0.8379	50,402	76.95%	1.0889	6.55%
	palladium	7440-05-3	0.0112	674	1.03%		
	lead borosilicate glass	undefined	0.2398	14,425	22.02%		
Resistive element	ruthenium oxide	12036-10-1	0.1032	6,208	25.86%	0.3990	2.40%
	silver	7440-22-4	0.0560	3,369	14.04%		
	palladium	7440-05-3	0.0163	980	4.09%		
	lead borosilicate glass	undefined	0.2235	13,444	56.02%		
Pre-coat	lead borosilicate glass	undefined	0.3690	22,196	89.63%	0.4117	2.48%
	copper oxide	1317-38-0	0.0190	1,143	4.62%		
	magnesium oxide	1309-48-4	0.0237	1,426	5.76%		
Over-coat	epoxy	67762-95-2	0.6430	38,678	100.00%	0.6430	3.87%
Middle termination layer	nickel	7440-02-0	0.2665	16,031	100.00%	0.2665	1.60%
Side termination	nickel	7440-02-0	0.00011	7	55.00%	0.0002	0.00%
	chromium	7440-47-3	0.00009	5	45.00%		
Outer termination layer	tin	7440-31-5	0.4850	29,174	100.00%	0.4850	2.92%
Total Weight			16.6243				

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

HMC2010 (Formerly HMC 1/2)

High Value Thick Film Chip Resistor

Date: **January 9, 2013**
Component Weight (mg): **26.2066**

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	773,300	96.00%	21.1100	80.55%
	silicon oxide	7631-86-9	0.4222	16,110	2.00%		
	magnesium oxide	1309-48-4	0.2111	8,055	1.00%		
	calcium oxide	1305-78-8	0.2111	8,055	1.00%		
Inner termination layer	silver	7440-22-4	1.5135	57,753	78.95%	1.9171	7.32%
	palladium	7440-05-3	0.0202	771	1.05%		
	lead borosilicate glass	undefined	0.3834	14,630	20.00%		
Resistive element	ruthenium oxide	12036-10-1	0.2020	7,708	27.36%	0.7384	2.82%
	silver	7440-22-4	0.1097	4,186	14.86%		
	palladium	7440-05-3	0.0320	1,221	4.33%		
	lead borosilicate glass	undefined	0.3947	15,061	53.45%		
Pre-coat	lead borosilicate glass	undefined	0.6373	24,318	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	33,732	100.00%	0.8840	3.37%
Middle termination layer	nickel	7440-02-0	0.3000	11,447	100.00%	0.3000	1.14%
Side termination	nickel	7440-02-0	0.00013	5	55.00%	0.0002	0.00%
	chromium	7440-47-3	0.00010	4	45.00%		
Outer termination layer	tin	7440-31-5	0.5460	20,834	100.00%	0.5460	2.08%
Total Weight			26.2066				

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

HMC2512 (Formerly HMC 1)

High Value Thick Film Chip Resistor

Date: **January 9, 2013**
Component Weight (mg): **44.0065**

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	746,726	96.00%	34.2300	77.78%
	silicon oxide	7631-86-9	0.6846	15,557	2.00%		
	magnesium oxide	1309-48-4	0.3423	7,778	1.00%		
	calcium oxide	1305-78-8	0.3423	7,778	1.00%		
Inner termination layer	silver	7440-22-4	2.3783	54,044	79.54%	2.9900	6.79%
	palladium	7440-05-3	0.0317	720	1.06%		
	lead borosilicate glass	undefined	0.5800	13,180	19.40%		
Resistive element	ruthenium oxide	12036-10-1	0.3619	8,224	26.75%	1.3528	3.07%
	silver	7440-22-4	0.1965	4,465	14.53%		
	palladium	7440-05-3	0.0573	1,302	4.24%		
	lead borosilicate glass	undefined	0.7371	16,750	54.49%		
Pre-coat	lead borosilicate glass	undefined	2.1669	49,240	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	36,495	100.00%	1.6060	3.65%
Middle termination layer	nickel	7440-02-0	0.5000	11,362	100.00%	0.5000	1.14%
Side termination	nickel	7440-02-0	0.00017	4	55.00%	0.0003	0.00%
	chromium	7440-47-3	0.00014	3	45.00%		
Outer termination layer	tin	7440-31-5	0.9100	20,679	100.00%	0.9100	2.07%
Total Weight			44.0065				

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.