



# Material Declaration Data Sheet

## FCR0402 (Formerly FCR 1/16S)

Trimnable Thick Film Chip Resistor

Date: **April 8, 2015**  
 Component Weight (mg): **0.6200**

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	0.4994	805,440	96.00%	0.5202	83.90%
	silicon dioxide	14808-60-7	0.0156	25,170	3.00%		
	magnesium oxide	1309-48-4	0.0052	8,390	1.00%		
Inner termination - top side	silver	7440-22-4	0.0124	20,070	90.00%	0.0138	2.23%
	palladium	7440-05-3	0.0001	223	1.00%		
	terpineol	8000-41-7	0.0012	2,007	9.00%		
Inner termination - bottom side	silver	7440-22-4	0.0036	5,830	55.00%	0.0066	1.06%
	copper oxide	1317-38-0	0.0007	1,060	10.00%		
	butyl carbitol	112-34-5	0.0013	2,120	20.00%		
	terpineol	8000-41-7	0.0010	1,590	15.00%		
Resistive element	ruthenium oxide	12036-10-1	0.0019	3,075	25.00%	0.0076	1.23%
	terpineol	8000-41-7	0.0019	3,075	25.00%		
	lead borosilicate glass	undefined	0.00229	3,690	30.00%		
	silver	7440-22-4	0.00153	2,460	20.00%		
Over-coat	glass frits	65997-18-4	0.0026	4,270	70.00%	0.0038	0.61%
	butyl carbitol acetate	124-17-4	0.0009	1,525	25.00%		
	ethyl cellulose	9004-57-3	0.0002	244	4.00%		
	chromium oxide	1308-38-9	0.0000	61	1.00%		
Middle termination	nickel	7440-02-0	0.0339	54,600	100.00%	0.0339	5.46%
Side termination	nickel	7440-02-0	0.00017	275	55.00%	0.00031	0.05%
	chromium	7440-47-3	0.00014	225	45.00%		
Outer termination	tin	7440-31-5	0.0339	54,600	100.00%	0.0339	5.46%
Total Weight			0.6200				

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



# Material Declaration Data Sheet

FCR0603 (Formerly FCR 1/16)

Trimnable Thick Film Chip Resistor

Date: **April 8, 2015** Max Temp: **260°C** (Contact factory for detailed soldering recommendations.)  
 Component Weight (mg): **2.0420**

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	1.7647	864,192	96.00%	1.8382	90.02%
	silicon dioxide	14808-60-7	0.0551	27,006	3.00%		
	magnesium oxide	1309-48-4	0.0184	9,002	1.00%		
Inner termination - top side	silver	7440-22-4	0.0226	11,070	90.00%	0.0251	1.23%
	palladium	7440-05-3	0.0003	123	1.00%		
	terpineol	8000-41-7	0.0023	1,107	9.00%		
Inner termination - bottom side	silver	7440-22-4	0.0033	1,595	55.00%	0.0059	0.29%
	copper oxide	1317-38-0	0.0006	290	10.00%		
	butyl carbitol	112-34-5	0.0012	580	20.00%		
	terpineol	8000-41-7	0.0009	435	15.00%		
Resistive element	ruthenium oxide	12036-10-1	0.0035	1,700	25.00%	0.0139	0.68%
	terpineol	8000-41-7	0.0035	1,700	25.00%		
	lead borosilicate glass	undefined	0.00417	2,040	30.00%		
	silver	7440-22-4	0.00278	1,360	20.00%		
Over-coat	glass frits	65997-18-4	0.0053	2,590	70.00%	0.0076	0.37%
	butyl carbitol acetate	124-17-4	0.0019	925	25.00%		
	ethyl cellulose	9004-57-3	0.0003	148	4.00%		
	chromium oxide	1308-38-9	0.0001	37	1.00%		
Middle termination	nickel	7440-02-0	0.0753	36,900	100.00%	0.0753	3.69%
Side termination	nickel	7440-02-0	0.00034	165	55.00%	0.00061	0.03%
	chromium	7440-47-3	0.00028	135	45.00%		
Outer termination	tin	7440-31-5	0.0753	36,900	100.00%	0.0753	3.69%
Total Weight			2.0420				

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



# Material Declaration Data Sheet

FCR0805 (Formerly FCR 1/10)

Trimmable Thick Film Chip Resistor

Date: **April 8, 2015**  
 Component Weight (mg): **4.3680**

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	3.7731	863,808	96.00%	3.9303	89.98%
	silicon dioxide	14808-60-7	0.1179	26,994	3.00%		
	magnesium oxide	1309-48-4	0.0393	8,998	1.00%		
Inner termination - top side	silver	7440-22-4	0.0621	14,220	90.00%	0.0690	1.58%
	palladium	7440-05-3	0.0007	158	1.00%		
	terpineol	8000-41-7	0.0062	1,422	9.00%		
Inner termination - bottom side	silver	7440-22-4	0.0101	2,310	55.00%	0.0183	0.42%
	copper oxide	1317-38-0	0.0018	420	10.00%		
	butyl carbitol	112-34-5	0.0037	840	20.00%		
	terpineol	8000-41-7	0.0028	630	15.00%		
Resistive element	ruthenium oxide	12036-10-1	0.0073	1,675	25.00%	0.0293	0.67%
	terpineol	8000-41-7	0.0073	1,675	25.00%		
	lead borosilicate glass	undefined	0.00878	2,010	30.00%		
	silver	7440-22-4	0.00585	1,340	20.00%		
Over-coat	glass frits	65997-18-4	0.0089	2,030	70.00%	0.0127	0.29%
	butyl carbitol acetate	124-17-4	0.0032	725	25.00%		
	ethyl cellulose	9004-57-3	0.0005	116	4.00%		
	chromium oxide	1308-38-9	0.0001	29	1.00%		
Middle termination	nickel	7440-02-0	0.1538	35,200	100.00%	0.1538	3.52%
Side termination	nickel	7440-02-0	0.00048	110	55.00%	0.00087	0.02%
	chromium	7440-47-3	0.00039	90	45.00%		
Outer termination	tin	7440-31-5	0.1538	35,200	100.00%	0.1538	3.52%
Total Weight			4.3680				

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



# Material Declaration Data Sheet

## FCR1206 (Formerly FCR 1/8)

Trimnable Thick Film Chip Resistor

Date: **April 8, 2015**  
 Component Weight (mg): **8.9470**

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	7.9071	883,776	96.00%	8.2366	92.06%
	silicon dioxide	14808-60-7	0.2471	27,618	3.00%		
	magnesium oxide	1309-48-4	0.0824	9,206	1.00%		
Inner termination - top side	silver	7440-22-4	0.0733	8,190	90.00%	0.0814	0.91%
	palladium	7440-05-3	0.0008	91	1.00%		
	terpineol	8000-41-7	0.0073	819	9.00%		
Inner termination - bottom side	silver	7440-22-4	0.0202	2,255	55.00%	0.0367	0.41%
	copper oxide	1317-38-0	0.0037	410	10.00%		
	butyl carbitol	112-34-5	0.0073	820	20.00%		
	terpineol	8000-41-7	0.0055	615	15.00%		
Resistive element	ruthenium oxide	12036-10-1	0.0190	2,125	25.00%	0.0760	0.85%
	terpineol	8000-41-7	0.0190	2,125	25.00%		
	lead borosilicate glass	undefined	0.02281	2,550	30.00%		
	silver	7440-22-4	0.01521	1,700	20.00%		
Over-coat	glass frits	65997-18-4	0.0294	3,290	70.00%	0.0421	0.47%
	butyl carbitol acetate	124-17-4	0.0105	1,175	25.00%		
	ethyl cellulose	9004-57-3	0.0017	188	4.00%		
	chromium oxide	1308-38-9	0.0004	47	1.00%		
Middle termination	nickel	7440-02-0	0.2362	26,400	100.00%	0.2362	2.64%
Side termination	nickel	7440-02-0	0.00098	110	55.00%	0.00179	0.02%
	chromium	7440-47-3	0.00081	90	45.00%		
Outer termination	tin	7440-31-5	0.2362	26,400	100.00%	0.2362	2.64%
Total Weight			8.9470				

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



# Material Declaration Data Sheet

## FCR1210 (Formerly FCR 1/4)

Trimmable Thick Film Chip Resistor

Date: **April 8, 2015**  
 Component Weight (mg): **15.9590**

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	13.8330	866,784	96.00%	14.4094	90.29%
	silicon dioxide	14808-60-7	0.4323	27,087	3.00%		
	magnesium oxide	1309-48-4	0.1441	9,029	1.00%		
Inner termination - top side	silver	7440-22-4	0.2341	14,670	90.00%	0.2601	1.63%
	palladium	7440-05-3	0.0026	163	1.00%		
	terpineol	8000-41-7	0.0234	1,467	9.00%		
Inner termination - bottom side	silver	7440-22-4	0.0456	2,860	55.00%	0.0830	0.52%
	copper oxide	1317-38-0	0.0083	520	10.00%		
	butyl carbitol	112-34-5	0.0166	1,040	20.00%		
	terpineol	8000-41-7	0.0124	780	15.00%		
Resistive element	ruthenium oxide	12036-10-1	0.0415	2,600	25.00%	0.1660	1.04%
	terpineol	8000-41-7	0.0415	2,600	25.00%		
	lead borosilicate glass	undefined	0.04979	3,120	30.00%		
	silver	7440-22-4	0.03319	2,080	20.00%		
Over-coat	glass frits	65997-18-4	0.0614	3,850	70.00%	0.0878	0.55%
	butyl carbitol acetate	124-17-4	0.0219	1,375	25.00%		
	ethyl cellulose	9004-57-3	0.0035	220	4.00%		
	chromium oxide	1308-38-9	0.0009	55	1.00%		
Middle termination	nickel	7440-02-0	0.4756	29,800	100.00%	0.4756	2.98%
Side termination	nickel	7440-02-0	0.00088	55	55.00%	0.00160	0.01%
	chromium	7440-47-3	0.00072	45	45.00%		
Outer termination	tin	7440-31-5	0.4756	29,800	100.00%	0.4756	2.98%
Total Weight			15.9590				

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



# Material Declaration Data Sheet

FCR2010 (Formerly FCR 1/2)

Trimnable Thick Film Chip Resistor

Date: **April 8, 2015**  
 Component Weight (mg): **24.2410**

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	21.4748	885,888	96.00%	22.3696	92.28%
	silicon dioxide	14808-60-7	0.6711	27,684	3.00%		
	magnesium oxide	1309-48-4	0.2237	9,228	1.00%		
Inner termination - top side	silver	7440-22-4	0.2662	10,980	90.00%	0.2957	1.22%
	palladium	7440-05-3	0.0030	122	1.00%		
	terpineol	8000-41-7	0.0266	1,098	9.00%		
Inner termination - bottom side	silver	7440-22-4	0.0453	1,870	55.00%	0.0824	0.34%
	copper oxide	1317-38-0	0.0082	340	10.00%		
	butyl carbitol	112-34-5	0.0165	680	20.00%		
	terpineol	8000-41-7	0.0124	510	15.00%		
Resistive element	ruthenium oxide	12036-10-1	0.0776	3,200	25.00%	0.3103	1.28%
	terpineol	8000-41-7	0.0776	3,200	25.00%		
	lead borosilicate glass	undefined	0.09309	3,840	30.00%		
	silver	7440-22-4	0.06206	2,560	20.00%		
Over-coat	glass frits	65997-18-4	0.1476	6,090	70.00%	0.2109	0.87%
	butyl carbitol acetate	124-17-4	0.0527	2,175	25.00%		
	ethyl cellulose	9004-57-3	0.0084	348	4.00%		
	chromium oxide	1308-38-9	0.0021	87	1.00%		
Middle termination	nickel	7440-02-0	0.4848	20,000	100.00%	0.4848	2.00%
Side termination	nickel	7440-02-0	0.00133	55	55.00%	0.00242	0.01%
	chromium	7440-47-3	0.00109	45	45.00%		
Outer termination	tin	7440-31-5	0.4848	20,000	100.00%	0.4848	2.00%
Total Weight			24.2410				

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



# Material Declaration Data Sheet

## FCR2512 (Formerly FCR 1)

Trimnable Thick Film Chip Resistor

Date: **April 8, 2015**  
 Component Weight (mg): **39.4480**

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	35.1965	892,224	96.00%	36.6630	92.94%
	silicon dioxide	14808-60-7	1.0999	27,882	3.00%		
	magnesium oxide	1309-48-4	0.3666	9,294	1.00%		
Inner termination - top side	silver	7440-22-4	0.4189	10,620	90.00%	0.4655	1.18%
	palladium	7440-05-3	0.0047	118	1.00%		
	terpineol	8000-41-7	0.0419	1,062	9.00%		
Inner termination - bottom side	silver	7440-22-4	0.0586	1,485	55.00%	0.1065	0.27%
	copper oxide	1317-38-0	0.0107	270	10.00%		
	butyl carbitol	112-34-5	0.0213	540	20.00%		
	terpineol	8000-41-7	0.0160	405	15.00%		
Resistive element	ruthenium oxide	12036-10-1	0.1469	3,725	25.00%	0.5878	1.49%
	terpineol	8000-41-7	0.1469	3,725	25.00%		
	lead borosilicate glass	undefined	0.17633	4,470	30.00%		
	silver	7440-22-4	0.11756	2,980	20.00%		
Over-coat	glass frits	65997-18-4	0.2679	6,790	70.00%	0.3826	0.97%
	butyl carbitol acetate	124-17-4	0.0957	2,425	25.00%		
	ethyl cellulose	9004-57-3	0.0153	388	4.00%		
	chromium oxide	1308-38-9	0.0038	97	1.00%		
Middle termination	nickel	7440-02-0	0.6193	15,700	100.00%	0.6193	1.57%
Side termination	nickel	7440-02-0	0.00217	55	55.00%	0.00394	0.01%
	chromium	7440-47-3	0.00178	45	45.00%		
Outer termination	tin	7440-31-5	0.6193	15,700	100.00%	0.6193	1.57%
Total Weight			39.4480				

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