

## PRODUCTION IDENTIFICATION

- **PRODUCT NAME:** RL02 - Complete PbO-Free Thick Film Chip Resistor  
 - **MANUFACTURE NAME:** Cal-Chip Electronics, Inc  
 - **ADDRESS:** 59 Steamwhistle Drive Ivyland, PA 18974  
 - **RESPONSIBLE PERSON NAME:** Michael Doak  
 - **TELEPHONE:** 215.942.8900

TYPE	SUBSTANCE	SUBSTANCE PERCENT (%)	CASE NO.
		RL02 / 0.18393 mg	
Alumina Substrate	Ai2O3	72.8734	1344-28-1
	SiO2	1.3494	14808-60-7
	MgO	0.5997	1309-48-4
	CaO	0.1501	1305-78-8
Protective Coating (G1)	Bi2O3	0.6165	1304-76-3
	SiO2	0.3083	14808-60-7
	Cr2O3	0.0462	1308-38-9
Protective Coating (G2)	Epoxy Resin	0.4670	25068-38-6
	Silica	0.5600	60676-86-0
	Talcum	0.1865	14807-96-6
Resistive Element	Ruthenium (IV) Oxide	0.2428	12036-10-1
	Terpineol	0.3642	8000-41-7
	Bisphenol A-epichlorohydrin Resin	0.1214	25068-38-6
	Glass or Ceramic Ingredients	0.4856	/
Termination C1	Ag	1.3146	7440-22-4
	Pd	0.0201	7440-05-03
	Glass	0.1011	65997-17-3
Termination C2	Ag	0.8449	7440-22-4
	Glass	0.1261	65997-17-3
Termination C3	Ni	0.0152	7440-02-0
	Cr	0.0038	7440-47-3
Termination (between) Ni Plating	Ni	9.6776	7440-02-0
Termination (outer) Sn Plating	Sn	9.5254	7440-31-5
TOTAL		100	

# MATERIAL DECLARATION

RL SERIES

## PRODUCTION IDENTIFICATION

- **PRODUCT NAME:** RL04 - Complete Pb-Free Thick Film Chip Resistor
- **MANUFACTURE NAME:** Cal-Chip Electronics, Inc
- **ADDRESS:** 59 Steamwhistle Drive Ivyland, PA 18974
- **RESPONSIBLE PERSON NAME:** Michael Doak
- **TELEPHONE:** 215.942.8900

TYPE	SUBSTANCE	SUBSTANCE PERCENT (%)	CASE NO.
		RL04 / 0.60485 mg	
Alumina Substrate	Ai2O3	80.8580	1344-28-1
	SiO2	1.4974	14808-60-7
	MgO	0.6655	1309-48-4
	CaO	0.1663	1305-78-8
Protective Coating (G1)	Bi2O3	0.6104	1304-76-3
	SiO2	0.3052	14808-60-7
	Cr2O3	0.0458	1308-38-9
Protective Coating (G2)	Epoxy Resin	0.5628	25068-38-6
	Silica	0.6752	60676-86-0
	Talcum	0.2250	14807-96-6
Resistive Element	Ruthenium (IV) Oxide	0.1087	12036-10-1
	Terpineol	0.1630	8000-41-7
	Bisphenol A-epichlorohydrin Resin	0.0543	25068-38-6
	Glass or Ceramic Ingredients	0.2173	/
Termination C1	Ag	1.1998	7440-22-4
	Pd	0.0086	7440-05-03
	Glass	0.0686	65997-17-3
Termination C2	Ag	0.7637	7440-22-4
	Glass	0.1141	65997-17-3
Termination C3	Ni	0.0093	7440-02-0
	Cr	0.0023	7440-47-3
Termination (between) Ni Plating	Ni	5.8857	7440-02-0
Termination (outer) Sn Plating	Sn	5.7931	7440-31-5
TOTAL		100	



## PRODUCTION IDENTIFICATION

- **PRODUCT NAME:** RL06 - Complete Pb-Free Thick Film Chip Resistor
- **MANUFACTURE NAME:** Cal-Chip Electronics, Inc
- **ADDRESS:** 59 Steamwhistle Drive Ivyland, PA 18974
- **RESPONSIBLE PERSON NAME:** Michael Doak
- **TELEPHONE:** 215.942.8900

TYPE	SUBSTANCE	SUBSTANCE PERCENT (%)	CASE NO.
		RL06 / 0.16034 mg	
Alumina Substrate	Ai2O3	82.6815	1344-28-1
	SiO2	1.5311	14808-60-7
	MgO	0.6805	1309-48-4
	CaO	0.1701	1305-78-8
Protective Coating (G1)	Bi2O3	0.3340	1304-76-3
	SiO2	0.1670	14808-60-7
	Cr2O3	0.0250	1308-38-9
Protective Coating (G2)	Epoxy Resin	0.5493	25068-38-6
	Silica	0.6589	60676-86-0
	Talcum	0.2196	14807-96-6
Resistive Element	Ruthenium (IV) Oxide	0.1202	12036-10-1
	Terpineol	0.1803	8000-41-7
	Bisphenol A-epichlorohydrin Resin	0.0601	25068-38-6
	Glass or Ceramic Ingredients	0.2404	/
Termination C1	Ag	1.1098	7440-22-4
	Pd	0.0079	7440-05-03
	Glass	0.0396	65997-17-3
Termination C2	Ag	0.3007	7440-22-4
	Glass	0.0449	65997-17-3
Termination C3	Ni	1.0617	7440-02-0
	Cr	0.1960	7440-47-3
Termination (between) Ni Plating	Ni	4.7678	7440-02-0
Termination (outer) Sn Plating	Sn	4.5529	7440-31-5
Marking	Epoxy Resin	0.1503	25068-38-6
	TiO2	0.0902	13463-67-7
	BaSO4	0.0601	7727-43-7
TOTAL		100	

# MATERIAL DECLARATION

RL SERIES

## PRODUCTION IDENTIFICATION

- **PRODUCT NAME:** RL10 - Complete Pb-Free Thick Film Chip Resistor
- **MANUFACTURE NAME:** Cal-Chip Electronics, Inc
- **ADDRESS:** 59 Steamwhistle Drive Ivyland, PA 18974
- **RESPONSIBLE PERSON NAME:** Michael Doak
- **TELEPHONE:** 215.942.8900

TYPE	SUBSTANCE	SUBSTANCE PERCENT (%)	CASE NO.
		RL10 / 4.6985 mg	
Alumina Substrate	Ai2O3	85.3065	1344-28-1
	SiO2	1.5966	14808-60-7
	MgO	0.7096	1309-48-4
	CaO	0.1774	1305-78-8
Protective Coating (G1)	Bi2O3	0.3383	1304-76-3
	SiO2	0.1691	14808-60-7
	Cr2O3	0.0254	1308-38-9
Protective Coating (G2)	Epoxy Resin	0.5021	25068-38-6
	Silica	0.6024	60676-86-0
	Talcum	0.2007	14807-96-6
Resistive Element	Ruthenium (IV) Oxide	0.5021	12036-10-1
	Terpineol	0.6024	8000-41-7
	Bisphenol A-epichlorohydrin Resin	0.2007	25068-38-6
	Glass or Ceramic Ingredients	0.2611	/
Termination C1	Ag	0.9707	7440-22-4
	Pd	0.0069	7440-05-03
	Glass	0.0346	65997-17-3
Termination C2	Ag	0.2433	7440-22-4
	Glass	0.0364	65997-17-3
Termination C3	Ni	0.4393	7440-02-0
	Cr	0.1098	7440-47-3
Termination (between) Ni Plating	Ni	3.2989	7440-02-0
Termination (outer) Sn Plating	Sn	3.4011	7440-31-5
M/K	Epoxy Resin	0.1332	25068-38-6
	TiO2	0.0799	13463-67-7
	BaSO4	0.0533	7727-43-7
TOTAL		100	



## PRODUCTION IDENTIFICATION

- **PRODUCT NAME:** RL12 - Complete Pb-Free Thick Film Chip Resistor
- **MANUFACTURE NAME:** Cal-Chip Electronics, Inc
- **ADDRESS:** 59 Steamwhistle Drive Ivyland, PA 18974
- **RESPONSIBLE PERSON NAME:** Michael Doak
- **TELEPHONE:** 215.942.8900

TYPE	SUBSTANCE	SUBSTANCE PERCENT (%)	CASE NO.
		RL12 / 8.5848 mg	
Alumina Substrate	Ai2O3	88.0101	1344-28-1
	SiO2	1.6264	14808-60-7
	MgO	0.7228	1309-48-4
	CaO	0.1807	1305-78-8
Protective Coating (G1)	Bi2O3	0.4449	1304-76-3
	SiO2	0.2224	14808-60-7
	Cr2O3	0.0334	1308-38-9
Protective Coating (G2)	Epoxy Resin	0.7019	25068-38-6
	Silica	0.8421	60676-86-0
	Talcum	0.2806	14807-96-6
Resistive Element	Ruthenium (IV) Oxide	0.0328	12036-10-1
	Terpineol	0.1839	8000-41-7
	Bisphenol A-epichlorohydrin Resin	0.0328	25068-38-6
	Glass or Ceramic Ingredients	0.2233	/
Termination C1	Ag	0.9379	7440-22-4
	Pd	0.0067	7440-05-03
	Glass	0.0334	65997-17-3
Termination C2	Ag	0.2667	7440-22-4
	Glass	0.0398	65997-17-3
Termination C3	Ni	0.2097	7440-02-0
	Cr	0.0524	7440-47-3
Termination (between) Ni Plating	Ni	2.3300	7440-02-0
Termination (outer) Sn Plating	Sn	2.2933	7440-31-5
M/K	Epoxy Resin	0.1460	25068-38-6
	TiO2	0.0876	13463-67-7
	BaSO4	0.0584	7727-43-7
TOTAL		100	

# MATERIAL DECLARATION

RL SERIES

## PRODUCTION IDENTIFICATION

- **PRODUCT NAME:** RL14 - Complete Pb-Free Thick Film Chip Resistor
- **MANUFACTURE NAME:** Cal-Chip Electronics, Inc
- **ADDRESS:** 59 Steamwhistle Drive Ivyland, PA 18974
- **RESPONSIBLE PERSON NAME:** Michael Doak
- **TELEPHONE:** 215.942.8900

TYPE	SUBSTANCE	SUBSTANCE PERCENT (%)	CASE NO.
		RL14 / 14.8187 mg	
Alumina Substrate	Ai2O3	86.8520	1344-28-1
	SiO2	1.6084	14808-60-7
	MgO	0.7148	1309-48-4
	CaO	0.1787	1305-78-8
Protective Coating (G1)	Bi2O3	0.6774	1304-76-3
	SiO2	0.3387	14808-60-7
	Cr2O3	0.0508	1308-38-9
Protective Coating (G2)	Epoxy Resin	0.7439	25068-38-6
	Silica	0.8924	60676-86-0
	Talcum	0.2974	14807-96-6
Resistive Element	Ruthenium (IV) Oxide	0.1280	12036-10-1
	Terpineol	0.1920	8000-41-7
	Bisphenol A-epichlorohydrin Resin	0.0640	25068-38-6
	Glass or Ceramic Ingredients	0.2561	/
Termination C1	Ag	0.8697	7440-22-4
	Pd	0.0062	7440-05-03
	Glass	0.0310	65997-17-3
Termination C2	Ag	0.2437	7440-22-4
	Glass	0.0364	65997-17-3
Termination C3	Ni	0.5992	7440-02-0
	Cr	0.1498	7440-47-3
Termination (between) Ni Plating	Ni	2.4204	7440-02-0
Termination (outer) Sn Plating	Sn	2.3823	7440-31-5
M/K	Epoxy Resin	0.1334	25068-38-6
	TiO2	0.0800	13463-67-7
	BaSO4	0.0533	7727-43-7
TOTAL		100	



## PRODUCTION IDENTIFICATION

- **PRODUCT NAME:** RL20 - Complete Pb-Free Thick Film Chip Resistor
- **MANUFACTURE NAME:** Cal-Chip Electronics, Inc
- **ADDRESS:** 59 Steamwhistle Drive Ivyland, PA 18974
- **RESPONSIBLE PERSON NAME:** Michael Doak
- **TELEPHONE:** 215.942.8900

TYPE	SUBSTANCE	SUBSTANCE PERCENT (%)	CASE NO.
		RL20 / 23.9577 mg	
Alumina Substrate	Ai2O3	88.2299	1344-28-1
	SiO2	1.6339	14808-60-7
	MgO	0.7262	1309-48-4
	CaO	0.1815	1305-78-8
Protective Coating (G1)	Bi2O3	0.8239	1304-76-3
	SiO2	0.4120	14808-60-7
	Cr2O3	0.0618	1308-38-9
Protective Coating (G2)	Epoxy Resin	0.8492	25068-38-6
	Silica	1.0187	60676-86-0
	Talcum	0.3395	14807-96-6
Resistive Element	Phosphate Ester	0.1659	12036-10-1
	Terpineol	0.2488	8000-41-7
	Bisphenol A-epichlorohydrin Resin	0.0829	25068-38-6
	Glass or Ceramic Ingredients	0.3318	/
Termination C1	Ag	0.8981	7440-22-4
	Pd	0.0064	7440-05-03
	Glass	0.0320	65997-17-3
Termination C2	Ag	0.2561	7440-22-4
	Glass	0.0383	65997-17-3
Termination C3	Ni	0.3399	7440-02-0
	Cr	0.0850	7440-47-3
Termination (between) Ni Plating	Ni	1.4971	7440-02-0
Termination (outer) Sn Plating	Sn	1.4735	7440-31-5
M/K	Epoxy Resin	0.1338	25068-38-6
	TiO2	0.0803	13463-67-7
	BaSO4	0.0535	7727-43-7
TOTAL		100	

# MATERIAL DECLARATION

RL SERIES

## PRODUCTION IDENTIFICATION

- **PRODUCT NAME:** RL25 - Complete Pb-Free Thick Film Chip Resistor
- **MANUFACTURE NAME:** Cal-Chip Electronics, Inc
- **ADDRESS:** 59 Steamwhistle Drive Ivyland, PA 18974
- **RESPONSIBLE PERSON NAME:** Michael Doak
- **TELEPHONE:** 215.942.8900

TYPE	SUBSTANCE	SUBSTANCE PERCENT (%)	CASE NO.
		RL25 / 39.1719 mg	
Alumina Substrate	Ai2O3	89.0536	1344-28-1
	SiO2	1.6491	14808-60-7
	MgO	0.7330	1309-48-4
	CaO	0.1832	1305-78-8
Protective Coating (G1)	Bi2O3	0.7474	1304-76-3
	SiO2	0.3737	14808-60-7
	Cr2O3	0.0561	1308-38-9
Protective Coating (G2)	Epoxy Resin	0.8457	25068-38-6
	Silica	1.0145	60676-86-0
	Talcum	0.3381	14807-96-6
Resistive Element	Ruthenium (IV) Oxide	0.1418	12036-10-1
	Terpineol	0.2127	8000-41-7
	Bisphenol A-epichlorohydrin Resin	0.0709	25068-38-6
	Glass or Ceramic Ingredients	0.2837	/
Termination C1	Ag	1.0201	7440-22-4
	Pd	0.0072	7440-05-03
	Glass	0.0364	65997-17-3
Termination C2	Ag	0.1974	7440-22-4
	Glass	0.0295	65997-17-3
Termination C3	Ni	0.2735	7440-02-0
	Cr	0.0684	7440-47-3
Termination (between) Ni Plating	Ni	1.1996	7440-02-0
Termination (outer) Sn Plating	Sn	1.1808	7440-31-5
M/K	Epoxy Resin	0.1418	25068-38-6
	TiO2	0.0851	13463-67-7
	BaSO4	0.0567	7727-43-7
TOTAL		100	

