Contents 2012

RoHS Compliant

CERAMIC METALIZED SUBSTRATE

Recognized Standard UL94 file No.E350290

CIRCUIT PROTECTION PRODUCTS

Over-Current Protection

Over-Voltage (ESD) Protection

Temperature sensor

RESISTORS PRODUCTS

SMD Resistors

Chip Resistors Series

Current Sensing Resistors Series

Contents 2012

RoHS Compliant

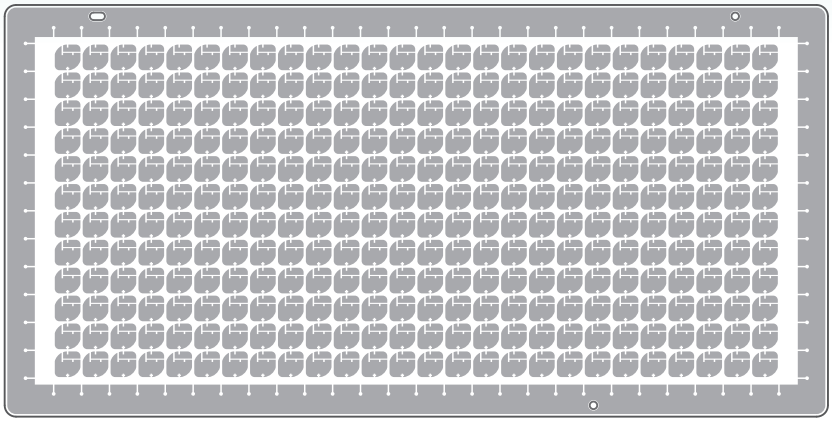
RESISTORS PRODUCTS

LH Thermal Dissipation Substrate

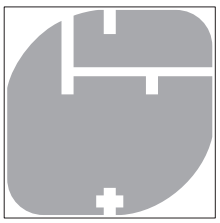
RoHS Compliant

3535 / LHA01APTAI004B

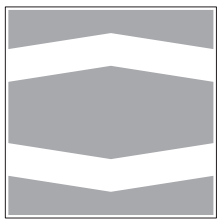
Panel



Single Unit



Front



Back

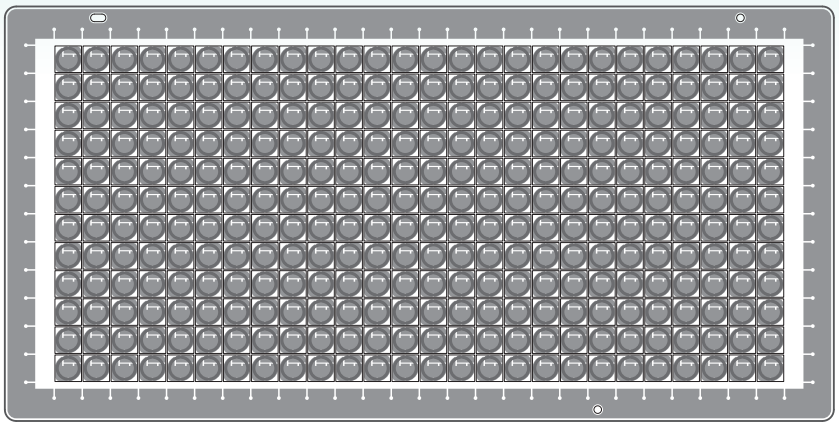
Item		Specification
Panel (mm)	Length	109.2±0.1
	Width	54.6±0.1
	Thickness	0.38±0.038
Single Substrate (mm)	Length	3.5±0.03
	Width	3.5±0.03
Circuit (um)	Thickness	65±10
Final Finish (um)	Thickness	Ag: 0.5(0.4~1.2)um Ni Au: 5(2~8) um / 0.3(0.2~0.8) um Ni Au: 5(2~8) um / 0.5(0.35~0.9) um Ni Au: 5(2~8) um / 0.075(0.05~0.15) um Ni Pd Au: 5(2~8) um / 0.1(0.05~0.25) / 0.1(0.05~0.25) um Ni Au: 5(2~8) um / 0.3(0.2~0.8)um Ni Ag: 5(2~10) um / 3(1.5~7) um

LH Thermal Dissipation Substrate

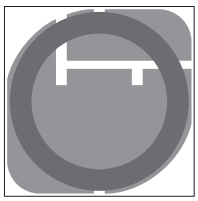
RoHS Compliant

Cavity 3535 / LHA01APTAI004G

Panel



Single Unit



Front

Back

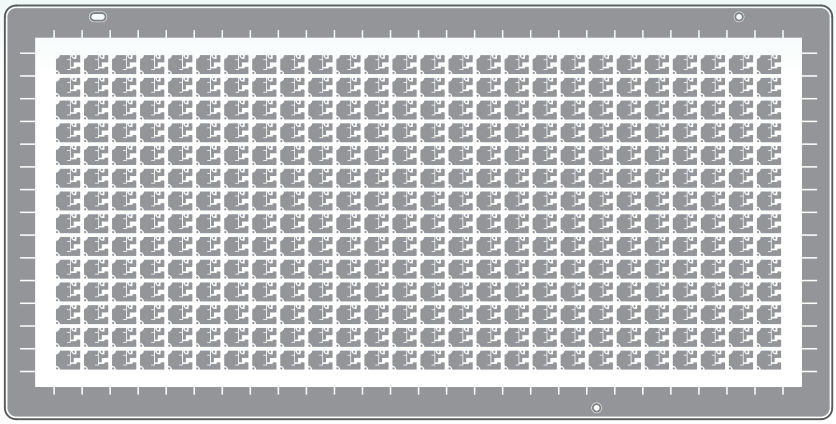
Item		Specification
Panel (mm)	Length	109.2±0.1
	Width	54.6±0.1
	Thickness	0.38±0.038
Single Substrate (mm)	Length	3.5±0.03
	Width	3.5±0.03
Circuit (um)	Thickness	65±10
Final Finish (um)	Thickness	Ni Pd Au: 5(2~8) um / 0.1(0.05~0.25) / 0.1(0.05~0.25) um
Cavity thickness(Dry-film) (mm)	Thickness	0.1±0.02

LH Thermal Dissipation Substrate

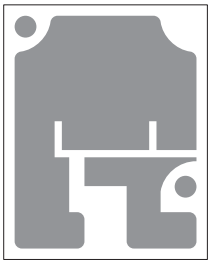
RoHS Compliant

3528 / LHA01APTAI001

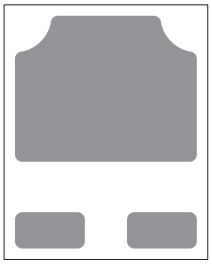
Panel



Single Unit



Front



Back

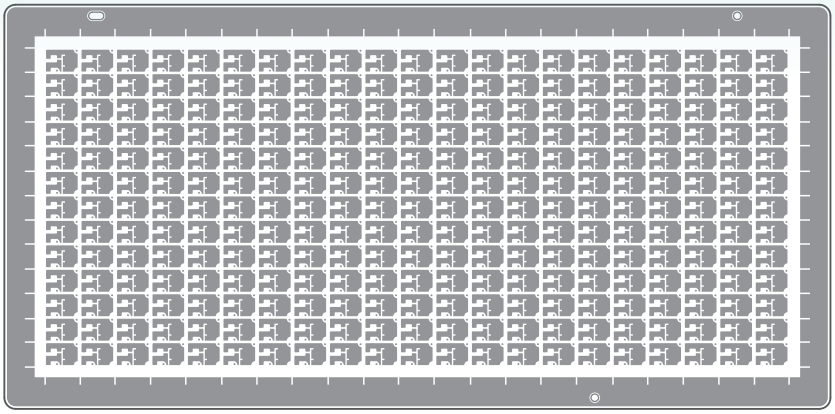
Item		Specification
Panel (mm)	Length	109.2±0.1
	Width	54.6±0.1
	Thickness	0.38±0.038
Single Substrate (mm)	Length	3.5±0.05
	Width	2.8±0.05
Circuit (um)	Thickness	65±10
Final Finish (um)	Thickness	Ag: 0.5(0.4~1.2)um Ni Au: 5(2~8) um / 0.3(0.2~0.8) um Ni Au: 5(2~8) um / 0.5(0.35~0.9) um Ni Au: 5(2~8) um / 0.075(0.05~0.15) um Ni Pd Au: 5(2~8) um / 0.1(0.05~0.25) / 0.1(0.05~0.25) um Ni Au: 5(2~8) um / 0.3(0.2~0.8)um Ni Ag: 5(2~10) um / 3(1.5~7) um

LH Thermal Dissipation Substrate

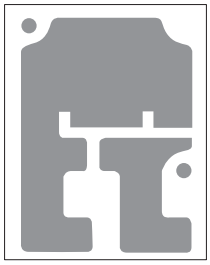
RoHS Compliant

4530 / LHA01APTAI003

Panel



Single Unit



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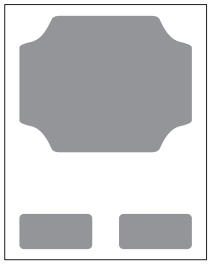


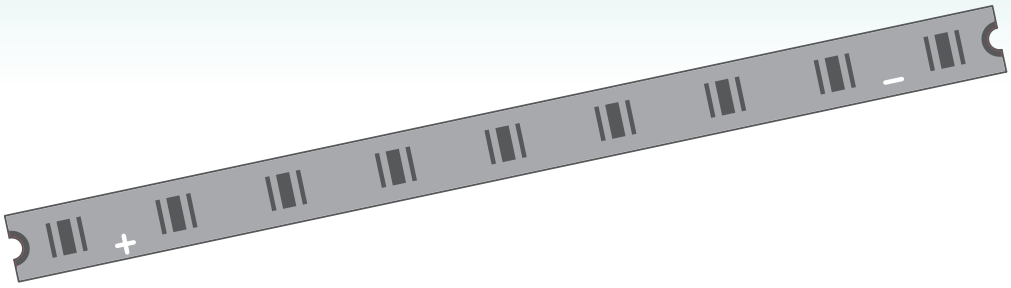
Back

Item		Specification
Panel (mm)	Length	109.2±0.1
	Width	54.6±0.1
	Thickness	0.38±0.038
Single Substrate (mm)	Length	4.5±0.05
	Width	3.0±0.05
Circuit (um)	Thickness	65±10
Final Finish (um)	Thickness	Ag: 0.5(0.4~1.2)um Ni Au: 5(2~8) um / 0.3(0.2~0.8) um Ni Au: 5(2~8) um / 0.5(0.35~0.9) um Ni Au: 5(2~8) um / 0.075(0.05~0.15) um Ni Pd Au: 5(2~8) um / 0.1(0.05~0.25) / 0.1(0.05~0.25) um Ni Au: 5(2~8) um / 0.3(0.2~0.8)um Ni Ag: 5(2~10) um / 3(1.5~7) um

LC LED Ceramic Board

RoHS Compliant

LCB08APTAI012A



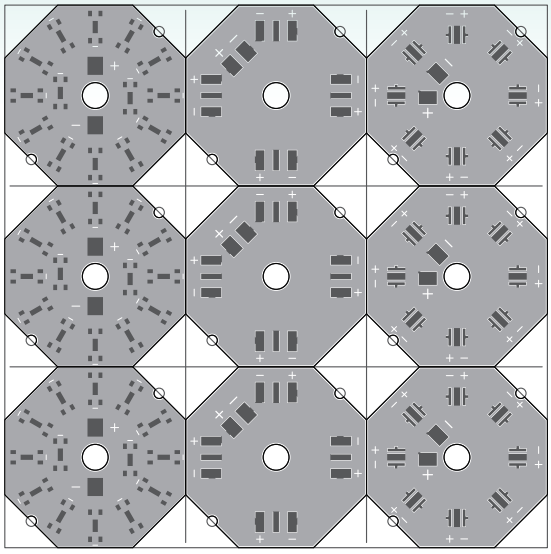
Item		Specification
Single Substrate (mm)	Length	90±0.1
	Width	6±0.05
	Thickness	1±0.1
Ag Paste (um)	Thickness	>10
Solder Mask (um)	Thickness	20±10

LC LED Ceramic Board

RoHS Compliant

LCB05APTAI026A (5630/5050/3535)

Panel



Single Unit

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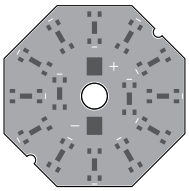

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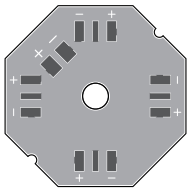

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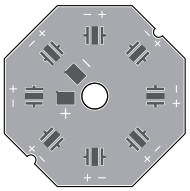


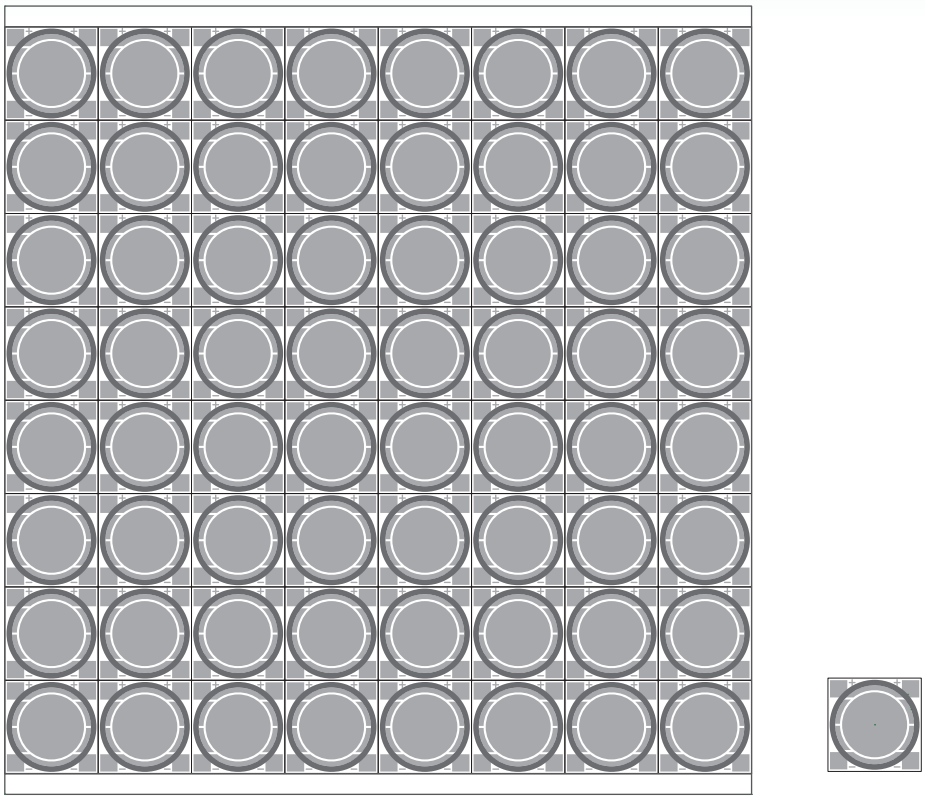
Item		Specification
Panel (mm)	Length	105±0.1
	Width	105±0.1
	Thickness	0.635±0.06
Single Substrate (mm)	Length	35±0.1
	Width	35±0.1
Ag Paste (um)	Thickness	>10
Solder Mask (um)	Thickness	20±10

CB LED Chip on Board

RoHS Compliant

CBB05APTAI021A (Watt ≤3W)

Panel



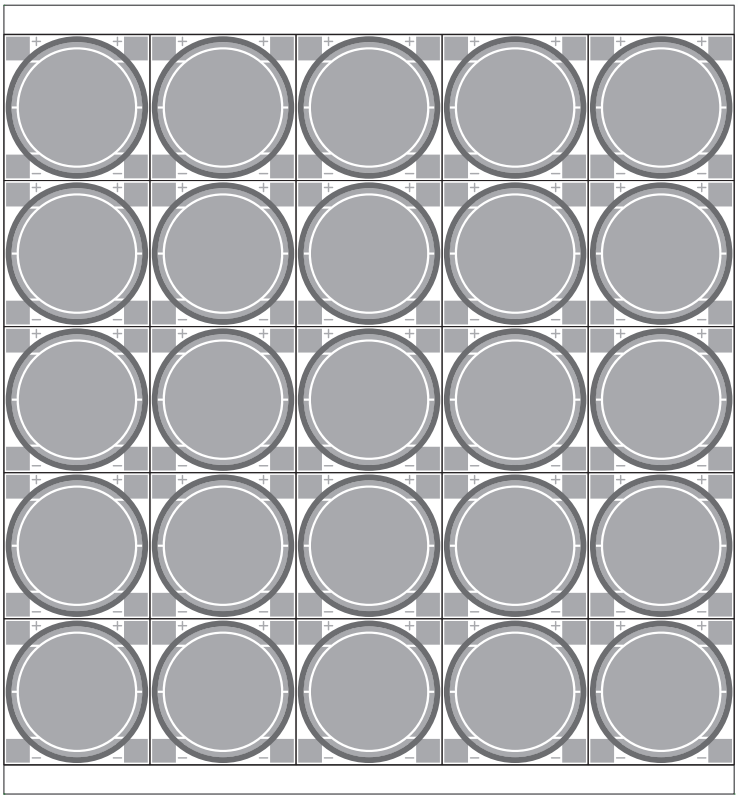
Item		Specification
Panel (mm)	Length	108±0.1
	Width	114±0.1
	Thickness	0.635±0.06
Single Substrate (mm)	Length	13.5±0.1
	Width	13.5±0.1
Ag Paste (mm)	Thickness	>10
Cavity (mm)	Thickness	0.6±0.15

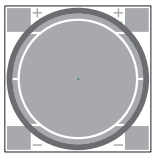
CB LED Chip on Board

RoHS Compliant

CBB06APTAI022A (3W <Watt ≤5W)

Panel





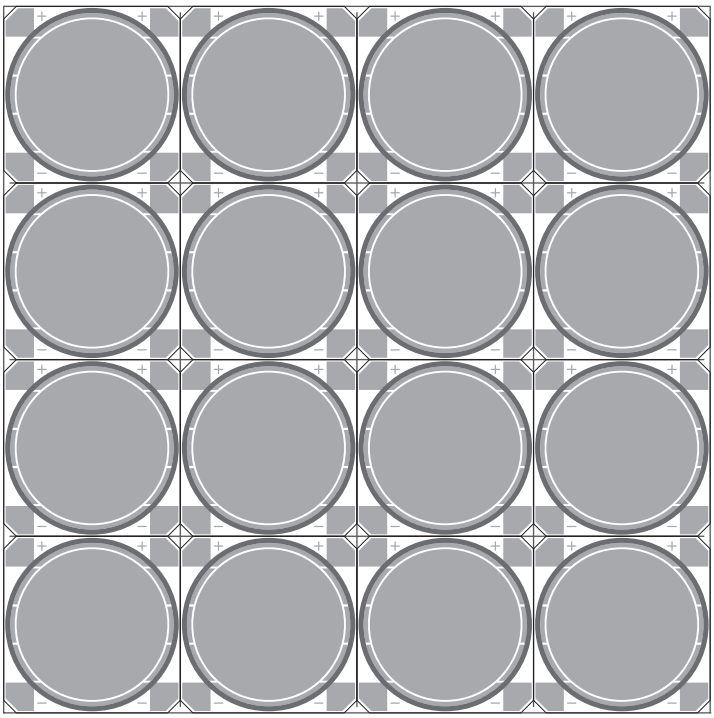
Item		Specification
Panel (mm)	Length	100±0.1
	Width	108±0.1
	Thickness	0.635±0.06
Single Substrate (mm)	Length	20±0.1
	Width	20±0.1
Ag Paste (um)	Thickness	>10
Cavity (mm)	Thickness	0.6±0.15

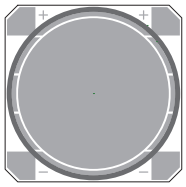
CB LED Chip on Board

RoHS Compliant

CBB05APTAI023A (5W <Watt ≤10W)

Panel





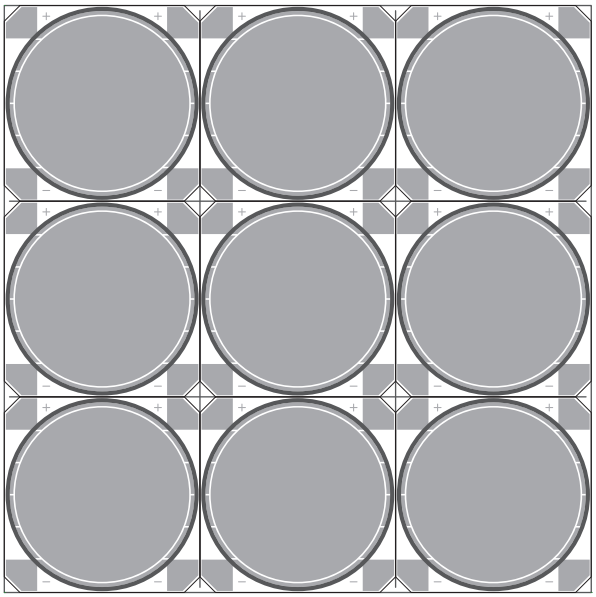
Item		Specification
Panel (mm)	Length	112±0.1
	Width	112±0.1
	Thickness	0.635±0.06
Single Substrate (mm)	Length	28±0.1
	Width	28±0.1
Ag Paste (mm)	Thickness	>10
Cavity (mm)	Thickness	0.6±0.15

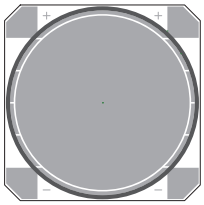
CB LED Chip on Board

RoHS Compliant

CBB05APTAI024A (10W <Watt ≤50W)

Panel





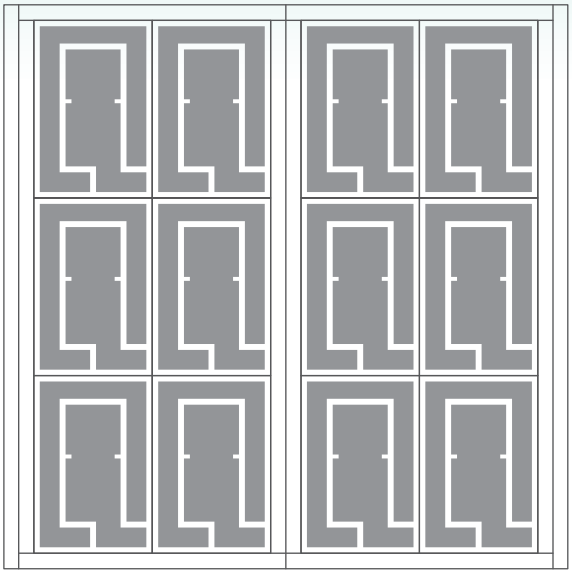
Item		Specification
Panel (mm)	Length	112.5±0.1
	Width	112.5±0.1
	Thickness	0.635±0.06
Single Substrate (mm)	Length	37.5±0.1
	Width	37.5±0.1
Ag Paste (um)	Thickness	>10
Cavity (mm)	Thickness	0.6±0.15

PV HCPV Package Substrate

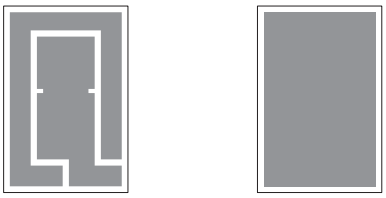
RoHS Compliant

PVA01APSSS001C

Panel



Single Unit



Front Back

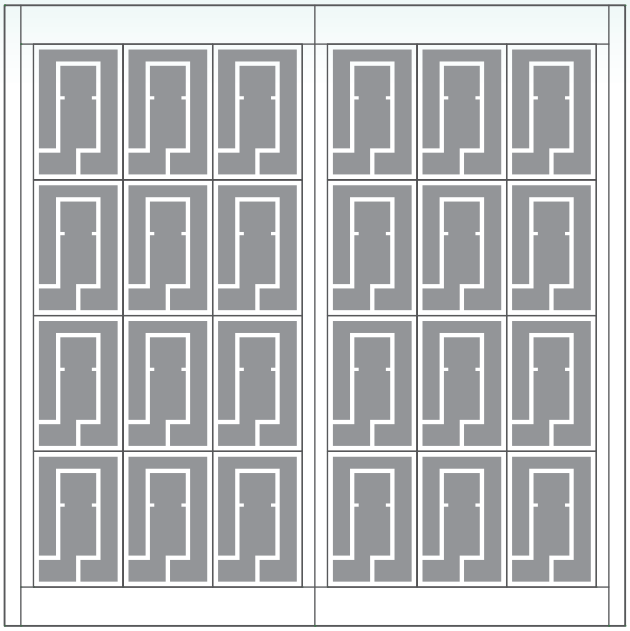
Item		Specification
Panel (mm)	Length	114.3±0.1
	Width	114.3±0.1
	Thickness	0.38±0.038
Single Substrate (mm)	Length	36±0.05
	Width	24±0.05
Circuit (um)	Thickness	75±15
Final Finish (um)	Thickness	Ni Au: 5(2~8) um / 0.075(0.05~0.15) um

PV PhotoVoltaic Substrate

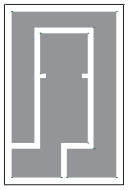
RoHS Compliant

PVA01APSSS002C

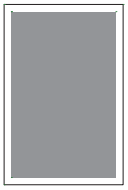
Panel



Single Unit



Front



Back

Item		Specification
Panel (mm)	Length	114.3±0.1
	Width	114.3±0.1
	Thickness	0.38±0.038
Single Substrate (mm)	Length	25±0.05
	Width	16.5±0.05
Circuit (um)	Thickness	75±15
Final Finish (um)	Thickness	NiAu: 5(2~8) um / 0.075(0.05~0.15) um

Reliability Test

RoHS Compliant

No.	Item	Parameter	Specification
1	Solderability	1. Temp: 235±5°C 2. Time: 5±1sec 3. solder bath composition: (Ag/Sn/Cu=3/96.5/0.5%)	• Coverage >90%
2	Adhesion test	1. Temp: RT 2. Tool: 3M-610 3. Time: adhesive 30 seconds 4. Angle: 180°	• The exterior must be no separate.
3	Thermal test	1. Temp.: 300°C 2. Times: 1min	• No yellowing.

Notices

When inspection, packaging and handling:

- Must wear gloves and masks when inspect products.
- Must wear latex gloves before unpacking products
- Must avoid vibration, shock and stress etc. when carry products.

Storage conditions:

- Store under 25°C±5°C 50%±10RH when sealed.
- The expiration date is less than 3 months when sealed.
- Store under 25°C±5°C 50%±10RH when unsealed.
- Please store unsealed package in airtight containers and used up within 3 days.

Before wire bonding:

- Please clean and preheat before wire bonding.

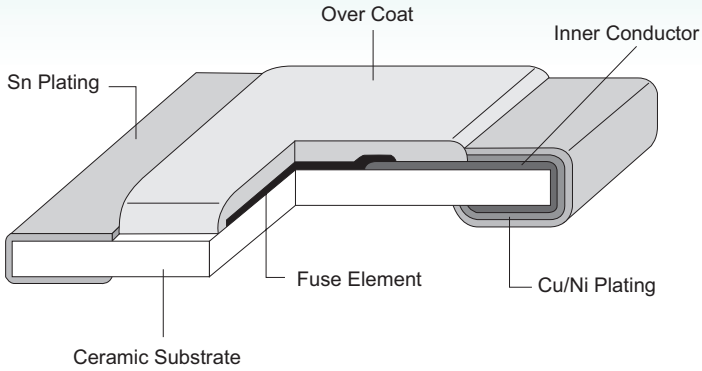
CF/CFS Thin Film Chip Fuse

RoHS Compliant

Features

- Small and light weight design
- Thin film manufacturing method stabilizing fusing characteristics
- Low internal resistance
- Suitable for over current protection
- Recognized standard: UL248-14 file No. E241710

Construction



Application

- PC related equipment and peripherals (PC, Hard Drive, ODD, Printer etc.)
- Small portable devices, mobile phone, PDA, battery charger etc.
- Digital camera
- Game equipment
- LCD monitors, LCD modules (Backlight inverter)
- Battery package

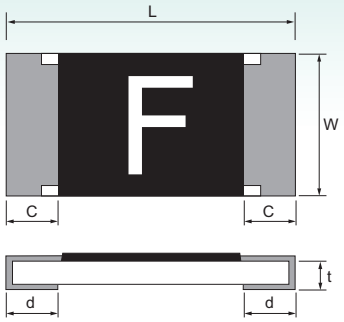
Type Designation

CF/CFS	06	V5	T	R50
Product Code	**Size**	**Rated Voltage**	**Packaging**	**Rated Current**
CF: Open within 1min. at 200% rated current CFS: Open within 5 sec. at 250% rated current	04: 1.0x0.52mm 06: 1.6x0.80mm 12: 3.1x1.55mm	V6: 63V V5: 50V V3: 32V	T: Paper Tape (5K/10K)	R50: 0.5A 1R0: 1A

CF/CFS Thin Film Chip Fuse

RoHS Compliant

Dimensions



Unit: mm

Type (inch)	L	W	C	d	t
CF/CFS 04 (0402)	1.0±0.1	0.52±0.05	0.2±0.1	0.25±0.10	0.35±0.05
CF/CFS 06 (0603)	1.6±0.1	0.80±0.10	0.3±0.2	0.35±0.20	0.45±0.10
CF/CFS 12 (1206)	3.1±0.1	1.55±0.10	0.5±0.3	0.5±0.20	0.60±0.10

Reliability Tests

Parameter	Requirement	Test Method
Carrying capacity	No fusing	Rated current, 4hrs
Interrupting Ability	No mechanical damages	After the fuse is interrupted, rated voltage applied for 30secs. again
Bending Test	No mechanical damages	Distance between holding points: 90mm, Bending: 3mm, 30 Seconds, 1time
Resistance to Solder Heat	±20%	260°C±5°C, 10±1sec.
Solderability	95% coverage minimum	245°C±5°C, 2±0.5secs. (Lead Free) 235°C±5°C, 10±1sec.
Temperature Rise	<75°C	100% of its rated current, measure of surface temperature
Resistance to Dry Heat	±20%	105°C±5°C, 1000hrs
Resistance to Solvent	No evident damages on protective coating and marking	23°C±5°C of Isopropyl alcohol 90secs.
Insulation Resistance	10kΩ and more	Measure DC resistance after fusing
Thermal Shock	ΔR<10%	-20°C/+25°C/+125°C/+25°C, 10 cycles

CF/CFS Thin Film Chip Fuse

RoHS Compliant

CF0402/CFS0402 Rating and Characteristic

Parts Designation	Marking	Rated Current	Fusing Time	Resistance (mΩ) Tolerance±25%	Rated Voltage	Breaking Capacity	Body Temperature rising
CF04V3TR315	D	0.315A	Open within 1min. at 200% rated current	690	DC 32V	DC 32V / 35A	<75°C at 100% rated current
CF04V3TR50	F	0.50A		340			
CF04V3TR75**	V	0.75A		140			
CF04V3TR80	K	0.80A		100			
CF04V3T1R0	L	1.00A		95			
CF04V3T1R25	M	1.25A		57			
CF04V3T1R50	P	1.50A		45			
CF04V3T1R60	N	1.60A		44			
CF04V3T2R0	S	2.00A		33			
CF04V3T2R50	T	2.50A		25			
CF04V3T3R0	3	3.00A		19			
CF04V3T3R15	U	3.15A		18			
CF04V3T4R0	W	4.00A		12			
CFS04V3TR50	F	0.50A	Open within 5secs. at 250% rated current	300	DC 32V	DC 32V / 35A	
CFS04V3TR80	K	0.80A		78			
CFS04V3T1R0	L	1.00A		75			
CFS04V3T1R25	M	1.25A		44			
CFS04V3T1R50	P	1.50A		34.5			
CFS04V3T1R60	N	1.60A		29.5			
CFS04V3T2R0	S	2.00A		23			
CFS04V3T2R50	T	2.50A		18			
CFS04V3T3R0	3	3.00A		15			
CFS04V3T3R15	U	3.15A		14			
CFS04V3T4R0	W	4.00A		10			

* Resistance value was measured with less than 10% of rated current.

** CF 04V3TR75 is still under UL application.

CF/CFS Thin Film Chip Fuse

RoHS Compliant

CF0603/CFS0603 Rating and Characteristic

Parts Designation	Marking	Rated Current	Fusing Time	Resistance (mΩ) Tolerance±25%	Rated Voltage	Breaking Capacity	Body Temperature rising
CF06V5TR40	E	0.40A	Open within 1min. at 200% rated current	495	DC 50V	DC 50V / 50A	<75°C at 100% rated current
CF06V5TR50	F	0.50A		290			
CF06V3TR63	I	0.63A		205	DC 32V	DC 32V / 50A	
CF06V3TR80	K	0.80A		131			
CF06V3T1R0	L	1.00A		84			
CF06V3T1R25	M	1.25A		63			
CF06V3T1R50	P	1.50A		50			
CF06V3T1R60	N	1.60A		45			
CF06V3T2R0	S	2.00A		34			
CF06V3T2R50	T	2.50A		24.5	DC 32V	DC 32V / 50A	
CF06V3T3R00	3	3.00A		20			
CF06V3T3R15	U	3.15A		19			
CF06V3T4R0	W	4.00A		13			
CF06V3T5R0	Y	5.00A		11			
CFS06V5TR40	E	0.40A	Open within 5secs. at 250% rated current	443	DC 50V	DC 50V / 50A	
CFS06V5TR50	F	0.50A		232			
CFS06V3TR63	I	0.63A		130	DC 32V	DC 32V / 50A	
CFS06V3TR70	J	0.70A		148			
CFS06V3TR80	K	0.80A		113			
CFS06V3T1R0	L	1.00A		67			
CFS06V3T1R25	M	1.25A		50.5			
CFS06V3T1R50	P	1.50A		42			
CFS06V3T1R60	N	1.60A		40			
CFS06V3T2R0	S	2.00A		27			
CFS06V3T2R50	T	2.50A		19.5			
CFS06V3T3R00	3	3.00A		16			
CFS06V3T3R15	U	3.15A		15			
CFS06V3T4R0	W	4.00A		11			
CFS06V3T5R0	Y	5.00A		8			

CF/CFS Thin Film Chip Fuse

RoHS Compliant

CF1206/CFS1206 Rating and Characteristic

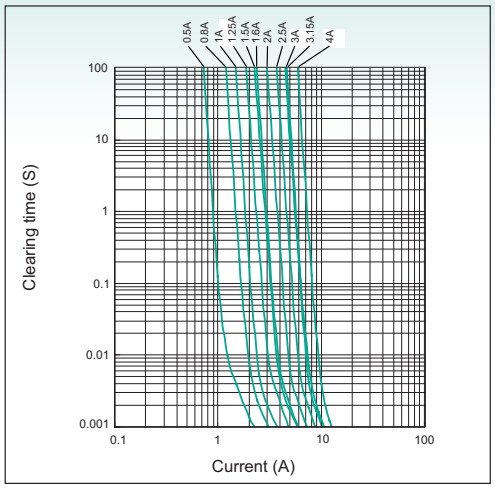
Parts Designation	Marking	Rated Current	Fusing Time	Resistance (mΩ) Tolerance±25%	Rated Voltage	Breaking Capacity	Body Temperature rising
CF12V6TR50	F	0.50A	Open within 1min. at 200% rated current	516	DC 63V	DC 63V / 50A	<75°C at 100% rated current
CF12V6TR80	K	0.80A		211			
CF12V6T1R0	L	1.00A		132			
CF12V6T1R25	M	1.25A		95			
CF12V6T1R50	P	1.50A		75			
CF12V6T2R0	S	2.00A		40.5			
CF12V3T2R50	T	2.50A		31.5	DC 32V	DC 32V / 50A	
CF12V3T3R00	3	3.00A		23			
CF12V3T4R0	W	4.00A		16			
CF12V3T5R0	Y	5.00A		12			
CF12V3T7R0	Z	7.00A		7.5			
CFS12V6TR50	F	0.50A	Open within 5secs. at 250% rated current	596	DC 63V	DC 63V / 50A	
CFS12V6TR80	K	0.80A		165			
CFS12V6T1R0	L	1.00A		132			
CFS12V6T1R25	M	1.25A		90			
CFS12V6T1R50	P	1.50A		79			
CFS12V6T2R0	S	2.00A		41			
CFS12V3T2R50	T	2.50A		33	DC 32V	DC 32V / 50A	
CFS12V3T3R00	3	3.00A		23			
CFS12V3T4R0	W	4.00A		15.5			
CFS12V3T5R0	Y	5.00A		13			
CFS12V3T7R0	Z	7.00A		7			

* Resistance valve was measured with less than 10% of rated current.

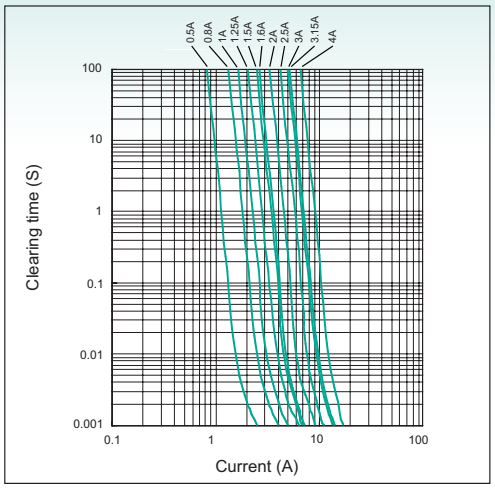
CF/CFS Thin Film Chip Fuse

RoHS Compliant

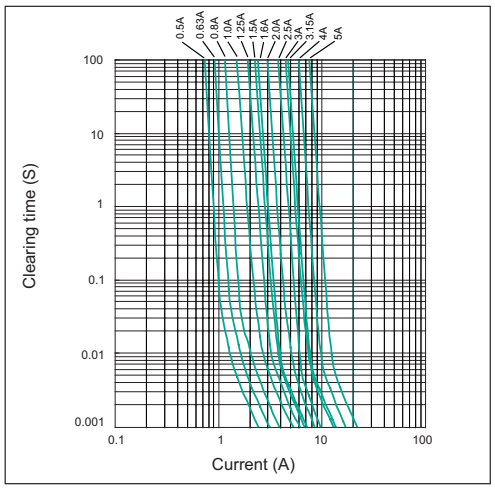
CF04 I-t Curve



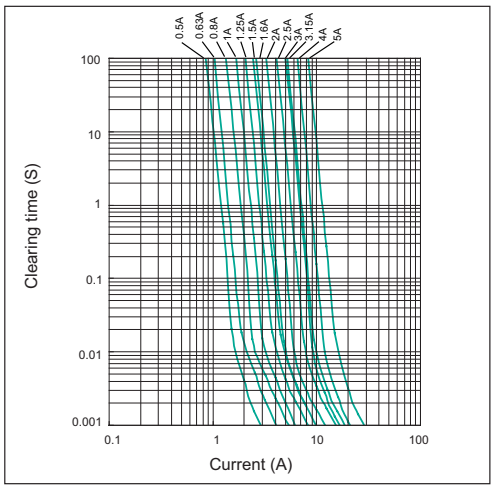
CFS04 I-t Curve



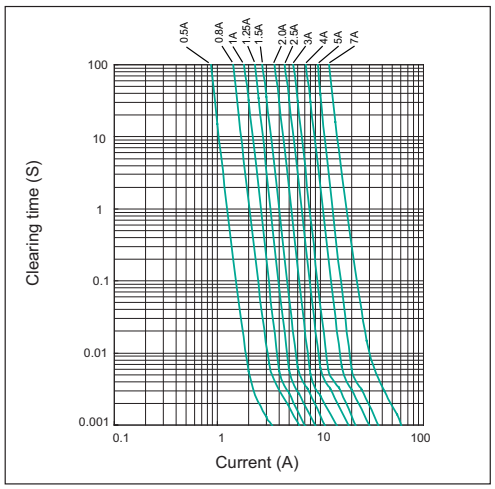
CF06 I-t Curve



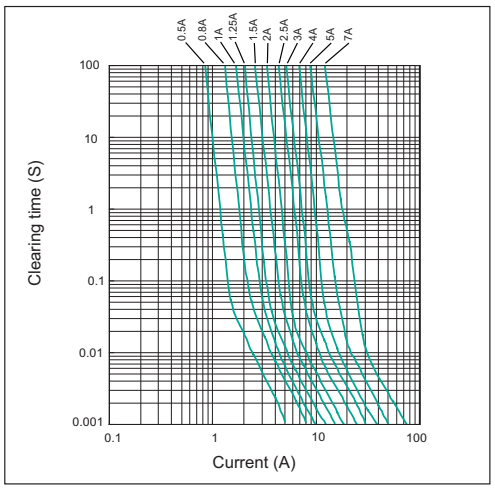
CFS06 I-t Curve



CF12 I-t Curve



CFS12 I-t Curve



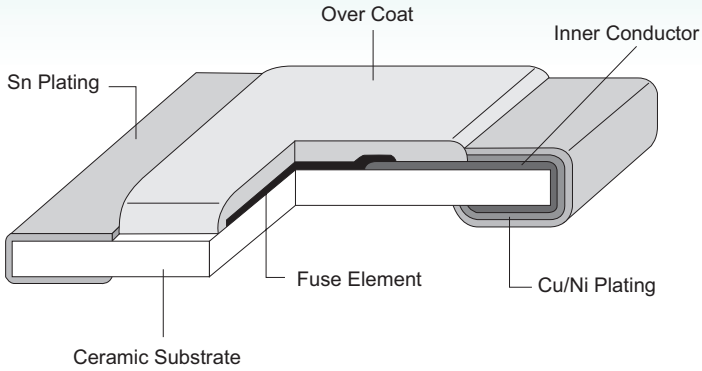
CP Lead Free Thin Film Chip Fuse

RoHS Compliant

Features

- Small and light weight design
- Thin film manufacturing method stabilizing fusing characteristics
- Low internal resistance
- Suitable for over current protection
- Recognized standard: UL248-14 file No. E241710

Construction



Application

- PC related equipment and peripherals (PC, Hard Drive, ODD, Printer etc.)
- Small portable devices, mobile phone, PDA, battery charger etc.
- Digital camera
- Game equipment
- LCD monitors, LCD modules (Backlight inverter)
- Battery package

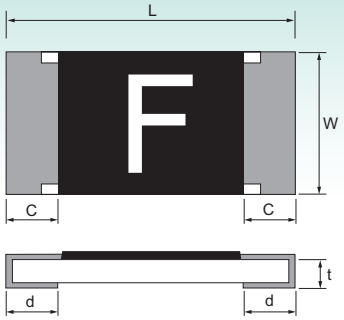
Type Designation

CP	06	V5	T	R50
Product Code	**Size**	**Rated Voltage**	**Packaging**	**Rated Current**
Lead Free Thin Film Chip Fuse	04: 0402(1.0x0.52mm) 06: 0603(1.6x0.8mm) 12: 1206(3.2x1.6mm)	V6: 63V V5: 50V V3: 32V	T: Paper Tape (5K/10K)	R50: 0.5A 1R0: 1A

CP Lead Free Thin Film Chip Fuse

RoHS Compliant

Dimensions



Unit: mm

Type (inch)	L	W	C	d	t
CP04V (0402)	1.0±0.1	0.52±0.05	0.2±0.1	0.25±0.1	0.35±0.05
CP06V (0603)	1.6±0.1	0.8±0.1	0.3±0.2	0.35±0.2	0.45±0.1
CP12V (1206)	3.1±0.1	1.55±0.1	0.5±0.3	0.5±0.2	0.6±0.1

Rating & Characteristic

Parts Designation	Marking	Rated Current	Fusing Time	Resistance (mΩ) Tolerance±25%	Rated Voltage	Breaking Capacity	Body Temperature rising
CP04V3TR50	F	0.50A	Open within 5sec. at 200% rated current	380	DC 32V	DC 32V 35A	<75°C at 100% rated current
CP04V3TR80	K	0.80A		120			
CP04V3T1R0	L	1.00A		95			
CP04V3T1R25	M	1.25A		67			
CP04V3T1R50	P	1.50A		51			
CP04V3T1R60	N	1.60A		46			
CP04V3T2R0	S	2.00A		33			
CP04V3T2R50	T	2.50A		22.5			
CP04V3T3R0	3	3.00A		20			
CP04V3T3R15	U	3.15A		19			
CP04V3T4R0	W	4.00A		16			
CP06V5TR50	F	0.50A		260	DC 50V	DC 50V 50A	
CP06V3TR63	I	0.63A		218	DC 32V	DC 32V 50A	
CP06V3TR80	K	0.80A		132			
CP06V3T1R0	L	1.00A		84			
CP06V3T1R25	M	1.25A		63			
CP06V3T1R50	P	1.50A		50.5			
CP06V3T1R60	N	1.60A		46.5			
CP06V3T2R0	S	2.00A		32			
CP06V3T2R50	T	2.50A		25.5			
CP06V3T3R00	3	3.00A		20			
CP06V3T3R15	U	3.15A		19			
CP06V3T4R0	W	4.00A		13			
CP06V3T5R0	Y	5.00A		10			

* Resistance valve was measured with less than 10% of rated current.

CP Lead Free Thin Film Chip Fuse

RoHS Compliant

TA-I TECHNOLOGY CO., LTD.

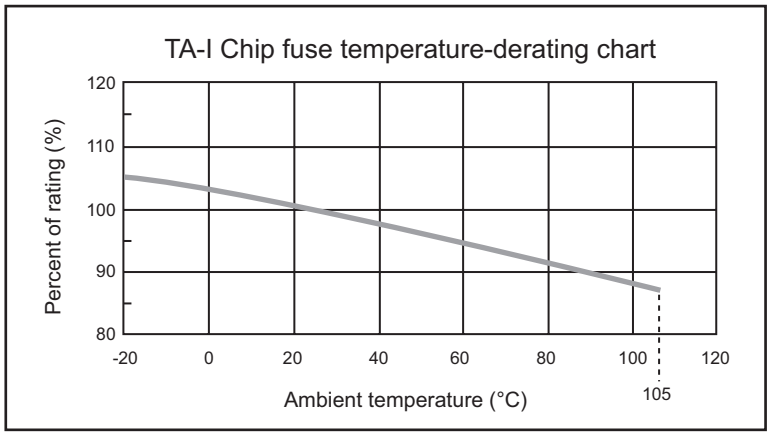
Rating & Characteristic

Parts Designation	Marking	Rated Current	Fusing Time	Resistance (mΩ) Tolerance±25%	Rated Voltage	Breaking Capacity	Body Temperature rising
CP12V6TR50	F	0.5A	Open within 5sec. at 200% rated current	527.5	DC 63V	DC 63V 50A	<75°C at 100% rated current
CP12V6TR80	K	0.8A		211			
CP12V6T1R0	L	1.00A		145.5			
CP12V6T1R25	M	1.25A		90			
CP12V6T1R50	P	1.5A		83			
CP12V6T2R0	S	2A		57			
CP12V3T2R50	T	2.5A		37	DC 32V	DC 32V 50A	
CP12V3T3R00	3	3A		26			
CP12V3T4R0	W	4A		18			
CP12V3T5R0	Y	5A		13			
CP12V3T7R0	Z	7A		9			

* Resistance valve was measured with less than 10% of rated current.

Temperatuer Derating Curve

- Normal Ambient Temperature: 25°C
- Operating Temperature: -20°C~105°C, whit proper Derating factor as below:



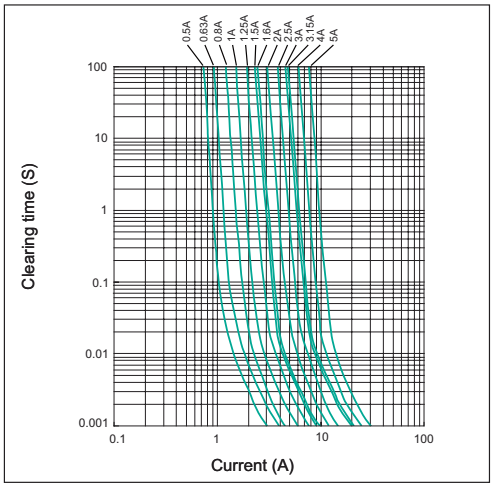
CP Lead Free Thin Film Chip Fuse

RoHS Compliant

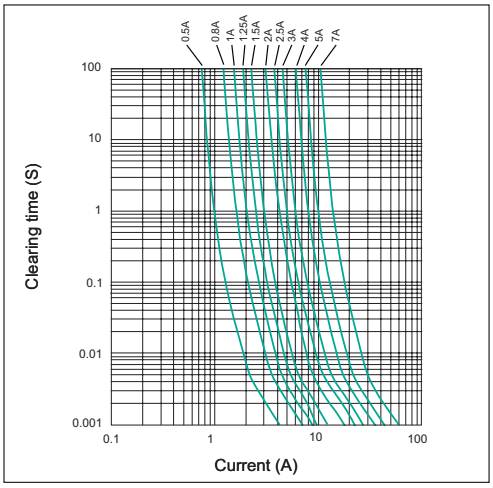
Reliability Test

Parameter	Requirement	Test Method
Carrying capacity	No fusing	Rated current ,4hr
Fusing Time	Within 5sec.	200% of its rated current
Interrupting Ability	No mechanical damages	After the fuse is interrupted ,rated voltage applied for 30sec again
Bending Test	No mechanical damages	Distance between holding points: 90mm, Bending:3mm,1time ,30sec
Resistance to solder Heat	±20%	260°C ± 5°C, 10seconds ± 1second
Solderability	95% coverage minimum	235°C ± 5°C, 2±0.5second 245°C ± 5°C, 2 ± 0.5second (Lead Free)
Temperature Rise	<75°C	100% of its rated current, Measure of surface temperature
Resistance to Dry Heat	±20%	105°C±5°C, 1000 hrs
Resistance to Solvent	No evident damages on protective coating and marking	23°C±5°C of Isopropyl alcohol 90second
Insulation Resistance	10kΩ and more	Measure DC resistance after fusing
Thermal Shock	ΔR<10%	-20°C / +25°C / +125°C / +25°C, 10 cycles

CP06 Chip Fuse I-t Curve



CP12 Chip Fuse I-t Curve



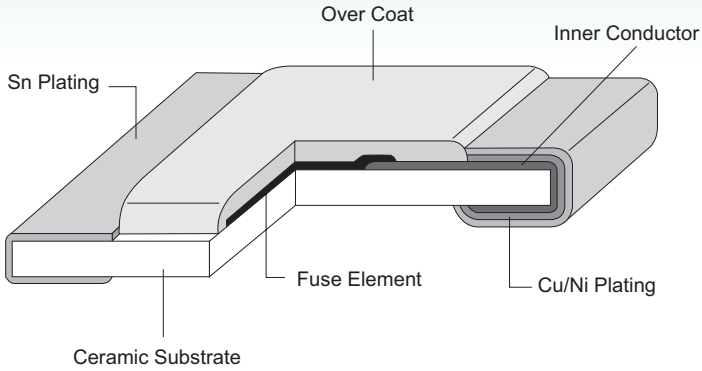
CPS Lead Free Thin Film Chip Fuse

RoHS Compliant

Features

- Small and light weight design
- Thin film manufacturing method stabilizing fusing characteristics
- Low internal resistance
- Suitable for over current protection
- Recognized standard: UL248-14 file No. E241710

Construction



Application

- PC related equipment and peripherals (PC, Hard Drive, ODD, Printer etc.)
- Small portable devices, mobile phone, PDA, battery charger etc.
- Digital camera
- Game equipment
- LCD monitors, LCD modules (Backlight inverter)
- Battery package

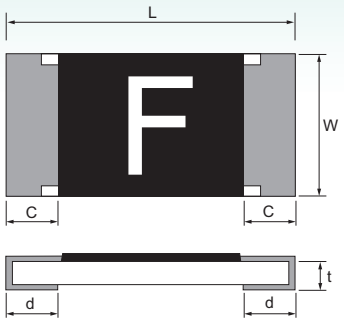
Type Designation

CPS	06	V5	T	R50
Product Code	**Size**	**Rated Voltage**	**Packaging**	**Rated Current**
Chip Fuse Open with 1~120 sec. at 200% rated current	06: 0603(1.6x0.8mm) 12: 1206(3.2x1.6mm)	V6: 63V V5: 50V V3: 32V	T: Paper Tape (5K)	R50: 0.5A 1R0: 1A

CPS Lead Free Thin Film Chip Fuse

RoHS Compliant

Dimensions



Unit: mm

Type (inch)	L	W	C	d	t
CPS06V (0603)	1.6±0.1	0.8±0.1	0.3±0.2	0.35±0.2	0.45±0.1
CPS12V (1206)	3.1±0.1	1.55±0.1	0.5±0.3	0.5±0.2	0.6±0.1

Rating & Characteristic

Parts Designation	Marking	Rated Current	Fusing Time	Resistance (mΩ) Tolerance±25%	Rated Voltage	Breaking Capacity	Body Temperature rising
CPS06V5TR50	F	0.50A	Open within 1~120sec. at 200% rated current	263	DC50V	DC50V 50A	<75°C at 100% rated current
CPS06V3TR63	I	0.63A		200.5	DC 32V	DC 32V 50A	
CPS06V3TR80	K	0.80A		143.5			
CPS06V3T1R0	L	1.00A		83			
CPS06V3T1R25	M	1.25A		54			
CPS06V3T1R50	P	1.50A		42			
CPS06V3T1R60	N	1.60A		40			
CPS06V3T2R0	S	2.00A		28			
CPS06V3T2R50	T	2.50A		21.5			
CPS06V3T3R00	3	3.00A		18			
CPS06V3T3R15	U	3.15A		16			
CPS06V3T4R0	W	4.00A		13			
CPS06V3T5R0	Y	5.00A		9.5			
CPS06V3T6R0	6	6.00A		6			

* Resistance valve was measured with less than 10% of rated current.

CPS Lead Free Thin Film Chip Fuse

RoHS Compliant

TA-I TECHNOLOGY CO., LTD.

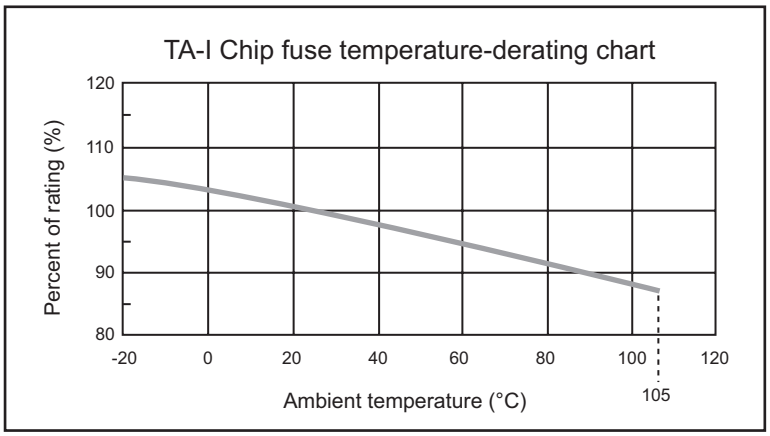
Rating & Characteristic

Parts Designation	Marking	Rated Current	Fusing Time	Resistance (mΩ) Tolerance±25%	Rated Voltage	Breaking Capacity	Body Temperature rising
CPS12V6TR50	F	0.50A	Open within 1~120sec. at 200% rated current	738.5	DC 63V	DC63V 50A	<75°C at 100% rated current
CPS12V6TR80	K	0.80A		215			
CPS12V6T1R0	L	1.00A		163.5			
CPS12V6T1R25	M	1.25A		100			
CPS12V6T1R50	P	1.50A		68.5			
CPS12V6T2R0	S	2.00A		48.5			
CPS12V3T2R50	T	2.50A		27	DC 32V	DC32V 50A	
CPS12V3T3R00	3	3.00A		27			
CPS12V3T4R0	W	4.00A		14			
CPS12V3T5R0	Y	5.00A		11			
CPS12V3T7R0	Z	7.00A		7.5			

* Resistance valve was measured with less than 10% of rated current.

Temperatuer Derating Curve

- Normal Ambient Temperature: 25°C
- Operating Temperature: -20°C~105°C, whit proper Derating factor as below:



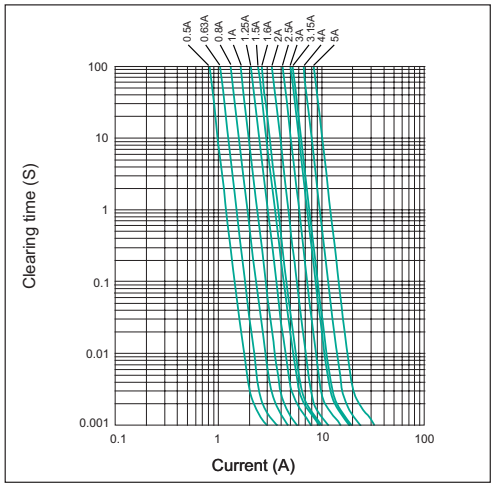
CPS Lead Free Thin Film Chip Fuse

RoHS Compliant

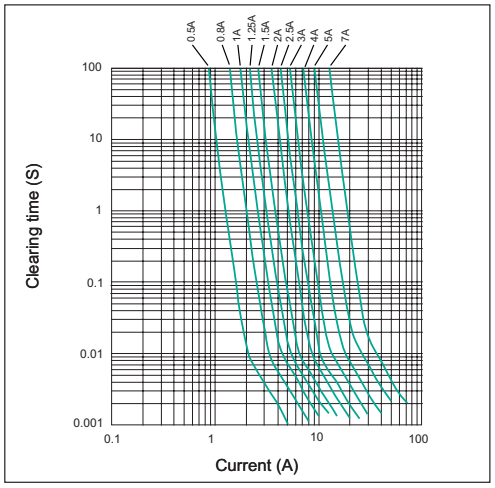
Reliability Test

Parameter	Requirement	Test Method
Carrying capacity	No fusing	Rated current ,4hr
Fusing Time	Within 1~120sec.	200% of its rated current
Interrupting Ability	No mechanical damages	After the fuse is interrupted , rated voltage applied for 30sec again
Bending Test	No mechanical damages	Distance between holding points: 90mm, Bending:3mm,1time, 30sec
Resistance to solder Heat	±20%	260°C±5°C,10seconds ± 1second
Solderability	95% coverage minimum	235°C±5°C, 2±0.5second 245°C±5°C, 2±0.5second (Lead Free)
Temperature Rise	<75°C	100% of its rated current, Measure of surface temperature
Resistance to Dry Heat	±20%	105°C±5°C,1000 hrs
Resistance to Solvent	No evident damages on protective coating and marking	23°C±5°C of Isopropyl alcohol 90second
Insulation Resistance	10kΩ and more	Measure DC resistance after fusing
Thermal Shock	ΔR<10%	-20°C/+25°C /+125°C/+25°C, 10 cycles

CPS06 Chip Fuse I-t Curve



CPS12 Chip Fuse I-t Curve



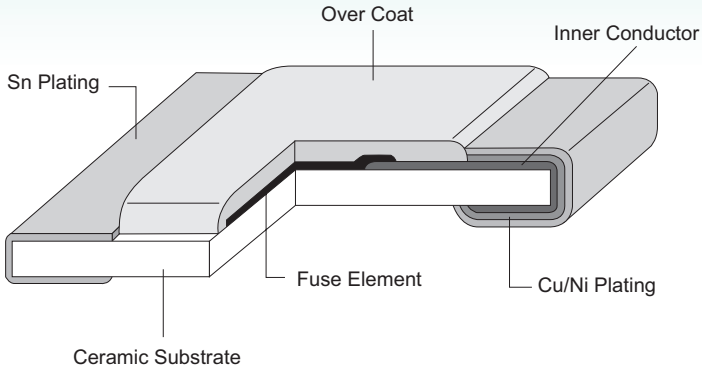
CH Lead Free Thin Film Chip Fuse

RoHS Compliant

Features

- Small and light weight design
- Thin film manufacturing method stabilizing fusing characteristics
- Low internal resistance
- Suitable for over current protection
- Recognized standard: UL248-14 file No. E241710

Construction



Application

- PC related equipment and peripherals (PC, Hard Drive, ODD, Printer etc.)
- Small portable devices, mobile phone, PDA, battery charger etc.
- Digital camera
- Game equipment
- LCD monitors, LCD modules (Backlight inverter)
- Battery package

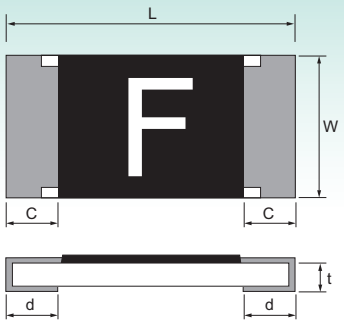
Type Designation

CH	06	V5	T	R50
Product Code	**Size**	**Rated Voltage**	**Packaging**	**Rated Current**
Chip Fuse Open with 1~60 sec. at 200% rated current	06: 0603(1.6x0.8mm) 12: 1206(3.2x1.6mm)	V6: 63V V5: 50V V3: 32V	T: Paper Tape (5K)	R50: 0.5A 1R0: 1A

CH Lead Free Thin Film Chip Fuse

RoHS Compliant

Dimensions



Type (inch)	L	W	C	d	t Unit: mm
CH06V (0603)	1.6±0.1	0.8±0.1	0.3±0.2	0.35±0.2	0.45±0.1
CH12V (1206)	3.1±0.1	1.55±0.1	0.5±0.3	0.5±0.2	0.6±0.1

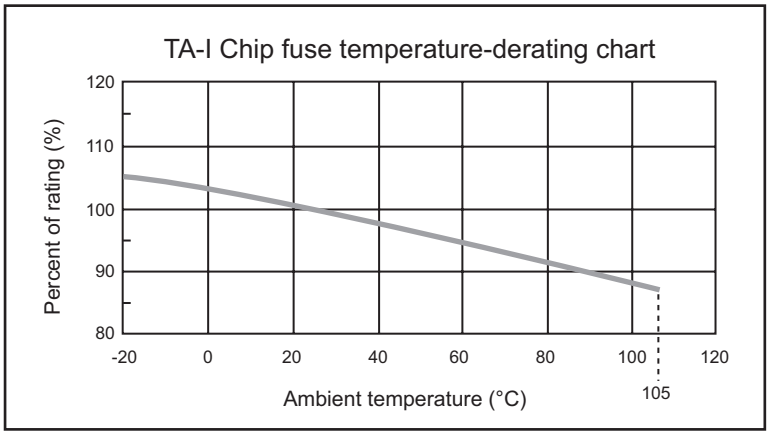
Rating & Characteristic

Parts Designation	Marking	Rated Current	Fusing Time	Resistance (mΩ) Tolerance±25%	Rated Voltage	Breaking Capacity	Body Temperature rising
CH06V5TR50	F	0.50A	Open within 1~60sec. at 200% rated current	270	DC50V	DC50V 50A	<75°C at 100% rated current
CH06V3T1R50	P	1.50A		42	DC32V	DC32V 50A	
CH06V3T3R00	3	3.00A		16			
CH06V3T4R0	W	4.00A		11			
CH12V6TR50	F	0.50A		416	DC63V	DC63V 50A	

* Resistance valve was measured with less than 10% of rated current.

Temperatuer Derating Curve

- Normal Ambient Temperature: 25°C
- Operating Temperature: -20°C~105°C, whit proper Derating factor as below:



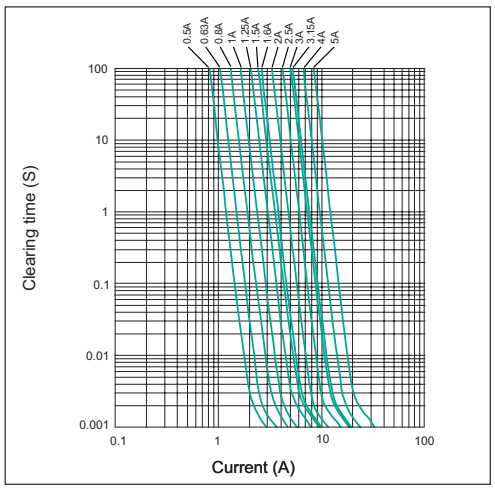
CH Lead Free Thin Film Chip Fuse

RoHS Compliant

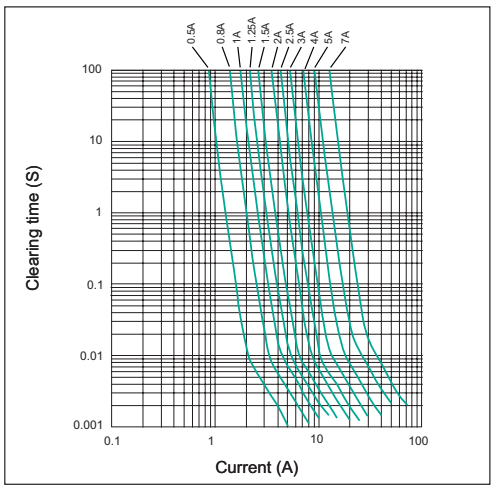
Reliability Test

Parameter	Requirement	Test Method
Carrying capacity	No fusing	Rated current ,4hr
Fusing Time	Within 1~60sec.	200% of its rated current
Interrupting Ability	No mechanical damages	After the fuse is interrupted , rated voltage applied for 30sec again
Bending Test	No mechanical damages	Distance between holding points: 90mm, Bending:3mm,1time, 30sec
Resistance to solder Heat	±20%	260°C±5°C,10seconds ± 1second
Solderability	95% coverage minimum	235°C±5°C, 2±0.5second 245°C±5°C, 2±0.5second (Lead Free)
Temperature Rise	<75°C	100% of its rated current, Measure of surface temperature
Resistance to Dry Heat	±20%	105°C±5°C,1000 hrs
Resistance to Solvent	No evident damages on protective coating and marking	23°C±5°C of Isopropyl alcohol 90second
Insulation Resistance	10kΩ and more	Measure DC resistance after fusing
Thermal Shock	ΔR<10%	-20°C/+25°C /+125°C/+25°C, 10 cycles

CH06 Chip Fuse I-t Curve



CH12 Chip Fuse I-t Curve



TRF SMD Resettable Fuse

RoHS Compliant

Features

- Small size results in very fast time to react to fault events
- Low profile
- RoHS compliant and halogen free
- Compatible with Pb and Pb-free solder reflow profiles
- Symmetrical design
- UL File Number: E244408

Construction

Application

- USB port protection
- HDMI 1.4 Source protection
- PC motherboards - Plug and Play protection
- Mobile phones - Battery and port protection
- PDAs / digital cameras
- Game console port protection

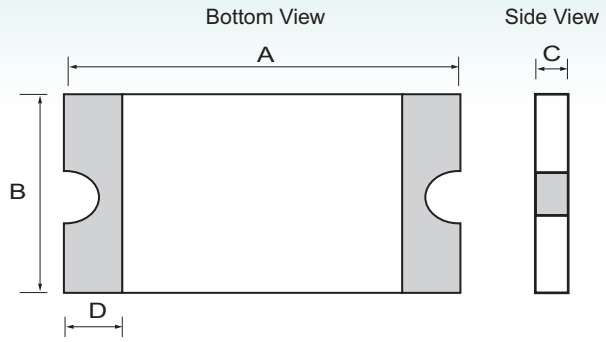
Type Designation

TRF	12	035	V06	–	E	F
Product Coble	**Size**	**I-hold**	**Vmax (Vdc)**		**Packaging**	**Lead Free**
SMD Resettable Fuse	06: 0603(1608) 10: 0805(2012) 12: 1206(3216) 18: 1812(4532)	035: 0.35A	V06: 6V V08: 8V V12: 12V V13: 13.2V V15: 15V V16: 16V V30: 30V V60: 60V		E: Embossed Tape T: Paper Tape	

TRF SMD Resettable Fuse

RoHS Compliant

Dimensions



Unit: mm

Part Designation	A		B		C		D
	Min.	Max.	Min.	Max.	Min.	Max.	Min.
TRF06	1.45	1.85	0.65	1.05	0.30	1.00	0.20
TRF10	2.00	2.30	1.20	1.50	0.48	1.25	0.20
TRF12	3.00	3.50	1.40	1.80	0.40	1.60	0.25
TRF18	4.37	4.83	3.07	3.41	0.45	1.60	0.30

Rating & Characteristic

Part Designation	V_{max} (Vdc)	I_{max} (A)	I_{hold} at 23°C (A)	I_{trip} at 23°C (A)	P_d Typ. (W)	Maximum Time To Trip at 23°C		Resistance at 23°C	
						Current (A)	Time (Sec)	R_{imin} (Ω)	$R1_{max}$ (Ω)
TRF06-020V09-TF	9	40	0.20	0.50	0.5	1	0.6	0.55	3.5
TRF06-035V06-TF	6	40	0.35	0.75	0.5	8	0.1	0.20	1.4
TRF06-050V06-TF	6	40	0.50	1.00	0.5	8	0.1	0.10	0.8

Part Designation	V_{max} (Vdc)	I_{max} (A)	I_{hold} at 23°C (A)	I_{trip} at 23°C (A)	P_d Typ. (W)	Maximum Time To Trip at 23°C		Resistance at 23°C	
						Current (A)	Time (Sec)	R_{imin} (Ω)	$R1_{max}$ (Ω)
TRF10-010V15-EF	15	40	0.10	0.30	0.5	0.5	1.50	1.00	7.50
TRF10-020V09-EF	9	40	0.20	0.50	0.5	8	0.02	0.65	3.50
TRF10-035V06-EF	6	40	0.35	0.75	0.5	8	0.10	0.25	1.20
TRF10-050V06-EF	6	40	0.50	1.00	0.5	8	0.10	0.15	0.90
TRF10-075V06-EF	6	40	0.75	1.50	0.6	8	0.20	0.09	0.35
TRF10-110V06-EF	6	40	1.10	2.20	0.6	8	0.30	0.06	0.21

TRF SMD Resettable Fuse

RoHS Compliant

Part Designation	V_{max} (Vdc)	I_{max} (A)	I_{hold} at 23°C (A)	I_{trip} at 23°C (A)	P_d Typ. (W)	Maximum Time To Trip at 23°C		Resistance at 23°C	
						Current (A)	Time (Sec)	Ri_{min} (Ω)	$R1_{max}$ (Ω)
TRF12-012V30-EF	30	10	0.12	0.29	0.4	1	0.20	1.35	8.50
TRF12-020V24-EF	24	10	0.20	0.46	0.6	1	0.60	0.60	2.60
TRF12-020V30-EF	30	60	0.20	0.40	0.6	1	0.60	0.60	3.30
TRF12-035V06-EF	6	100	0.35	0.75	0.6	8	0.10	0.30	1.20
TRF12-035V16-EF	16	20	0.35	0.75	0.6	3.5	0.10	0.30	1.40
TRF12-050V13-EF	13.2	100	0.50	1.00	0.4	8	0.10	0.15	0.70
TRF12-075V06-EF	6	100	0.75	1.50	0.4	8	0.10	0.10	0.40
TRF12-110V06-EF	6	100	1.10	2.20	0.6	8	0.10	0.06	0.20
TRF12-150V06-EF	6	100	1.50	3.00	0.6	8	0.30	0.03	0.13
TRF12-200V06-EF	6	100	2.00	4.00	0.7	8	1.00	0.02	0.085

Part Designation	V_{max} (Vdc)	I_{max} (A)	I_{hold} at 23°C (A)	I_{trip} at 23°C (A)	P_d Typ. (W)	Maximum Time To Trip at 23°C		Resistance at 23°C	
						Current (A)	Time (Sec)	Ri_{min} (Ω)	$R1_{max}$ (Ω)
TRF18-010V60-EF	60.0	40	0.10	0.30	0.8	0.5	1.50	0.70	15.00
TRF18-014V60-EF	60.0	40	0.14	0.34	0.8	1.5	0.15	0.40	6.50
TRF18-020V30-EF	30.0	80	0.20	0.40	0.8	6.0	0.06	0.40	6.00
TRF18-020V60-EF	60.0	40	0.20	0.40	0.8	1.5	0.15	0.40	6.00
TRF18-030V30-EF	30.0	10	0.30	0.60	0.8	8.0	0.10	0.30	3.00
TRF18-050V15-EF	15.0	100	0.50	1.00	0.8	8.0	0.15	0.15	1.00
TRF18-075V13-EF	13.2	100	0.75	1.50	0.8	8.0	0.20	0.11	0.45
TRF18-075V24-EF	24.0	40	0.75	1.5	0.8	8.0	0.20	0.11	0.45
TRF18-110V06-EF	6.0	100	1.10	2.2	0.8	8.0	0.30	0.04	0.21
TRF18-110V16-EF	16.0	100	1.10	2.2	0.8	8.0	0.30	0.04	0.21
TRF18-110V24-EF	24.0	20	1.10	2.2	0.8	8.0	0.50	0.06	0.18
TRF18-125V06-EF	6.0	100	1.25	2.5	0.8	8.0	0.40	0.035	0.14
TRF18-150V06-EF	6.0	100	1.50	3.0	0.8	8.0	0.5	0.03	0.12
TRF18-150V24-EF	24.0	20	1.50	3.0	1.0	8.0	1.5	0.03	0.12
TRF18-160V08-EF	8.0	100	1.60	2.8	0.8	8.0	2.0	0.035	0.099
TRF18-200V08-EF	8.0	40	2.00	4.0	0.8	8.0	3.0	0.020	0.08
TRF18-250V16-EF	16.0	100	2.50	5.0	1.2	8.0	5.0	0.015	0.10
TRF18-260V06-EF	6.0	100	2.60	5.2	0.8	8.0	5.0	0.015	0.08

TRF SMD Resettable Fuse

RoHS Compliant

I_{hold} = Hold Current. Maximum current device will sustain for 30min without tripping in 23°C still air.
I_{trip} = Trip Current. Minimum current at which the device will trip in 23°C still air.
V_{max} = Maximum voltage device can withstand without damage at rated current.
I_{max} = Maximum fault current device can withstand without damage at rated voltage.
P_d = Power dissipated from device when in the tripped state at 23°C still air.
Ri_{min} = Typical resistance of device in initial (un-soldered) state.
$R1_{max}$ = Maximum resistance of device at 23°C measured one hour post reflow.
CAUTION: Operation beyond the specified ratings may result in damge and possible arcing and flame.

Environment

Operating Conditions

Operating Temperature: -40°C to 85°C
Device Surface Temperature in Tripped State: 125°C max

Environmental Specifications

TEST ITEM	Condition	Resistance Change
Passive aging	85°C,1000hr	±5% typical
Humidity aging	85°C, 85%R.H, 1000hr	±5% typical
Thermal shock	85°C to -40°C, 20times	±10% typical
Resistance to solvent	MIL-STD-202,Method215	No change
Vibration	MIL-STD-883C,Method2007.1 Condition A	No change

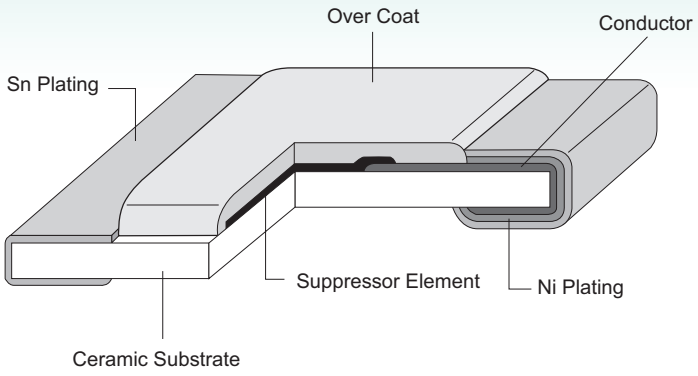
UMS Ultra-Low Capacitance MAX Guard® ESD Suppressor (High Frequency Type)

RoHS Compliant

Features

- Ultra low capacitance (<0.05pF)
- Ultra-low leakage current (<1nA)
- Zero signal distortion
- Fast response time
- Bi-direction protection device

Construction



Application

- Mobile / smart phone
- Computers / N/B PC
- Digital cameras
- PDA / MID / UMPC
- Plasma display panel / LCD TV / HDTV / PDP
- MP3 / Multimedia players / Game device
- Scanner / Printer
- Ultra-high speed data ports
  USB 2.0, IEEE1394, DVI
  HDMI, High speed Ethernet

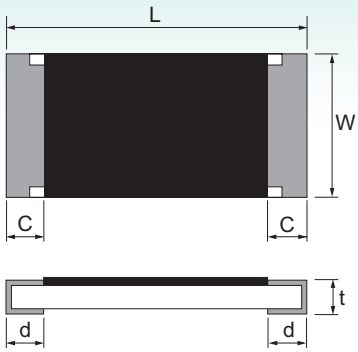
Type Designation

UMS	06	A	05	T	1	V1
Product Code	**Size**	**Safety Certificaion**	**Operating Voltage**	**Packaging**	**Typical Clamping Voltage**	**Typical Trigger Voltage**
Ultra-Low Capacitance MAX Guard Suppressor	04:0402 (1.0x0.5mm) 06: 0603 (1.6x0.8mm)	A: Suit for IEC61000-4-2 B: Suit for IEC61000-4-2 25KV Air-discharge C: Suit for IEC61000-4-2 & AEC-Q200	03: 3.3V 05: 5.5V 12: 12V 24: 24V	T: Paper Tape (5K/10K)	1: 17V 2: 25V	V1: 150V V2: 250V

UMS Ultra-Low Capacitance MAX Guard® ESD Suppressor (High Frequency Type)

RoHS Compliant

Dimension



Unit: mm

Type (inch)	L	W	C	d	t
UMS04 (0402)	1.00±0.1	0.52±0.05	0.20±0.1	0.25±0.1	0.36±0.05
UMS06 (0603)	1.6±0.1	0.80±0.1	0.35±0.2	0.30±0.2	0.45±0.1

Rating & Characteristic

Type	Continuous Operating Voltage (Max.)	ESD Capability*1	Trigger Voltage (Typ.)*2	Clamping Voltage (Typ.)*2	Capacitance*3	Leakage Current (Typ.)	Response Time	ESD Pulse Withstand (Typ.)*4
UMS04A03T1V1	3.3 VDC	Direct Discharge: 8KV Air Discharge:15KV	150V	17V	<0.05pF	<1nA	<1ns	>1000 pulses
UMS06A03T1V1								
UMS04A03T2V2			250V	25V				
UMS06A03T2V2								
UMS04A05T1V1	5.5 VDC		150V	17V				
UMS06A05T1V1								
UMS04A05T2V2			250V	25V				
UMS06A05T2V2								
UMS04A12T1V1	12 VDC		150V	17V				
UMS06A12T1V1								
UMS04A12T2V2			250V	25V				
UMS06A12T2V2								
UMS04A24T2V2	24 VDC		250V	25V				
UMS06A24T2V2								

Note:

*1. The function meets with the requirement of IEC 61000-4-2 specification.

*2. Trigger measurement made using Transmission Line Pulse method.

*3. Capacitance measured at 1 M~1.8 GHz.

*4. Performing under IEC 61000-4-2 level 4 (8KV contact discharge, 15KV air discharge).

UMS Ultra-Low Capacitance MAX Guard® ESD Suppressor (High Frequency Type)

RoHS Compliant

Rating & Characteristic

Type	Continuous Operating Voltage (Max.)	ESD Capability*1	Trigger Voltage (Typ.)*2	Clamping Voltage (Typ.)*2	Capacitance*3	Leakage Current (Typ.)	Response Time	ESD Pulse Withstand (Typ.)*4
UMS04C03T1V1	3.3 VDC	Direct Discharge: 8KV Air Discharge:15KV	150V	17V	<0.05pF	<1nA	<1ns	>1000 pulses
UMS06C03T1V1								
UMS04C03T2V2			250V	25V				
UMS06C03T2V2								
UMS04C05T1V1	5.5 VDC		150V	17V				
UMS06C05T1V1								
UMS04C05T2V2			250V	25V				
UMS06C05T2V2								
UMS04C12T1V1	12 VDC		150V	17V				
UMS06C12T1V1								
UMS04C12T2V2			250V	25V				
UMS06C12T2V2								
UMS04C24T2V2	24 VDC		250V	25V				
UMS06C24T2V2								

Note:

*1. The function meets with the requirement of IEC 61000-4-2 specification.

*2. Trigger measurement made using Transmission Line Pulse method.

*3. Capacitance measured at 1 M~1.8 GHz.

*4. Performing under IEC 61000-4-2 level 4 (8KV contact discharge, 15KV air discharge).

MS

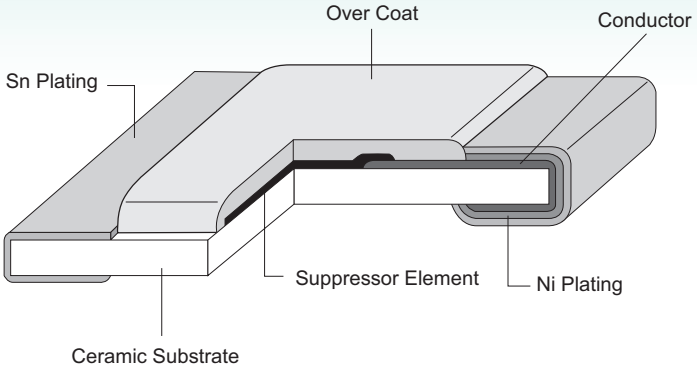
Low Capacitance MAX Guard® ESD Suppressor

RoHS Compliant

Features

- Low capacitance (<0.2pF)
- Ultra low leakage current (<1nA)
- Fast response time
- Bi-direction protection device

Construction



Application

- Mobile / smart phone
- Computers / N/B PC
- Digital cameras
- PDA / MID / UMPC
- Plasma display panel / LCD TV / HDTV / PDP
- MP3 / Multimedia players / Game device
- Scanner / Printer
- High speed data ports
  USB 2.0, IEEE1394

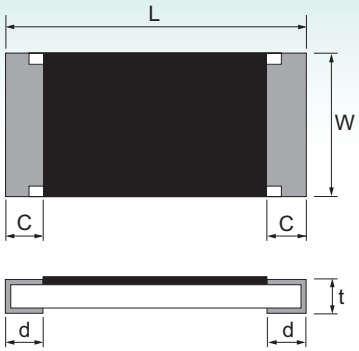
Type Designation

MS	06	A	05	T	2	V2
Product Code	**Size**	**Safety Certification**	**Operating Voltage**	**Packaging**	**Typical Clamping Voltage**	**Typical Trigger Voltage**
MAX Guard Suppressor	04: 0402 (1.0x0.5mm) 06: 0603 (1.6x0.8mm)	A: Suit For IEC61000-4-2 C: Suit For IEC61000-4-2 & AEC-Q200	03: 3.3V 05: 5.5V 12: 12V 24: 24V	T: Paper Tape (5K/10K)	1: 17V 2: 25V	V1: 150V V2: 250V

MS Low Capacitance MAX Guard® ESD Suppressor

RoHS Compliant

Dimensions



Unit: mm

Type (inch)	L	W	C	d	t
MS04 (0402)	1.00±0.1	0.52±0.05	0.20±0.1	0.25±0.1	0.36±0.05
MS06(0603)	1.6±0.1	0.80±0.1	0.30±0.2	0.35±0.2	0.45±0.1

Rating & Characteristic

Type	Continuous Operating Voltage (Max.)	ESD Capability*1	Trigger Voltage (Typ.)*2	Clamping Voltage (Typ.)*2	Capacitance*3	Leakage Current (Typ.)	Response Time	ESD Pulse Withstand (Typ.)*4
MS04A03T1V1	3.3 VDC	Direct Discharge: 8KV Air Discharge:15KV	150V	17V	<0.2pF	<1nA	<1ns	>1000 pulses
MS06A03T1V1								
MS04A03T2V2			250V	25V				
MS06A03T2V2								
MS04A05T1V1	5.5 VDC		150V	17V				
MS06A05T1V1								
MS04A05T2V2			250V	25V				
MS06A05T2V2								
MS04A12T1V1	12 VDC		150V	17V				
MS06A12T1V1								
MS04A12T2V2			250V	25V				
MS06A12T2V2								
MS04A24T2V2	24 VDC		250V	25V				
MS06A24T2V2								

Note:

*1. The function meets with the requirement of IEC 61000-4-2 specification.

*2. Trigger measurement made using Transmission Line Pulse method.

*3. Capacitance measured at 1 M~1.8 GHz.

*4. Performing under IEC 61000-4-2 level 4 (8KV contact discharge, 15KV air discharge).

MS Low Capacitance MAX Guard® ESD Suppressor

RoHS Compliant

Rating & Characteristic

Type	Continuous Operating Voltage (Max.)	ESD Capability*1	Trigger Voltage (Typ.)*2	Clamping Voltage (Typ.)*2	Capacitance*3	Leakage Current (Typ.)	Response Time	ESD Pulse Withstand (Typ.)*4
MS04C03T1V1	3.3 VDC	Direct Discharge: 8KV Air Discharge:15KV	150V	17V	<0.2pF	<1nA	<1ns	>1000 pulses
MS06C03T1V1								
MS04C03T2V2			250V	25V				
MS06C03T2V2								
MS04C05T1V1	5.5 VDC		150V	17V				
MS06C05T1V1								
MS04C05T2V2			250V	25V				
MS06C05T2V2								
MS04C12T1V1	12 VDC		150V	17V				
MS06C12T1V1								
MS04C12T2V2			250V	25V				
MS06C12T2V2								
MS04C24T2V2	24 VDC		250V	25V				
MS06C24T2V2								

Note:

*1. The function meets with the requirement of IEC 61000-4-2 specification.

*2. Trigger measurement made using Transmission Line Pulse method.

*3. Capacitance measured at 1 M~1.8 GHz.

*4. Performing under IEC 61000-4-2 level 4 (8KV contact discharge, 15KV air discharge).

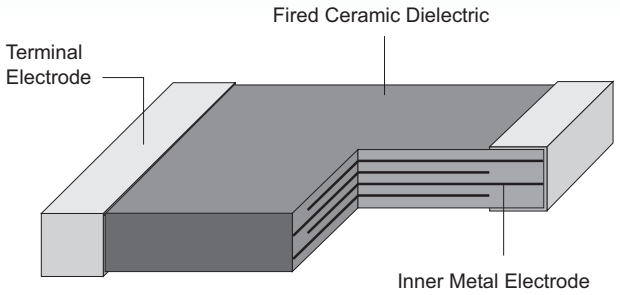
MVL

RoHS Compliant

Features

- No polarity due to symmetrical current-voltage characteristics
- Excellent electro static absorption capability
- Variable capacitance
- Suitable for ESD Protection

Construction



Application

- USB2.0 Power and Data lines I/O Port protection
- Notebook PC, Computers
- Monitors and Flat Panel Displays
- IEEE 1394 Firewire Ports
- Video Graphics Cards
- SIM ports Mobile phone
- Digital Camera
- MP3/MP4 player
- LCD Module
- HUB/ Telecom/ Wireless LAN
- Keyboard

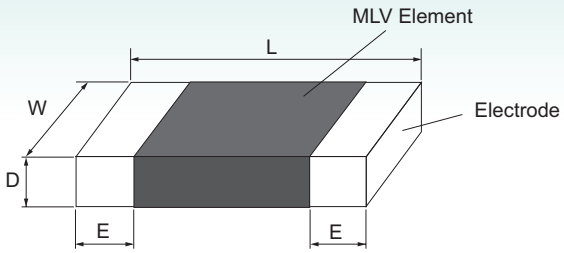
Type Designation

MV	06	L	04	T	–	080
Product Code	**Size**	**Type Series**	**Max. Working Voltage**	**Packaging**	**Internal Code**	**Varistor Voltage**
Multilayer Varistor	04: 0402 06: 0603 08: 0805 12: 1206 18: 1812	Surge/ESD Protention	04: 4V 11: 11V 25: 25V	T: Paper tape 0402: 10K 0603: 4K 0805: 3K 1206: 3K		080: 8V 120: 12V 330: 33V

MVL Multilayer Chip Varistor for Surge and ESD Protection- L Type Series

RoHS Compliant

Dimension



Unit: mm

Type	L	W	D	E
0402	1.0±0.10	0.5±0.10	0.6 max	0.25±0.10
0603	1.6±0.15	0.8±0.15	0.9 max	0.3±0.10
0805	2.00±0.20	1.25±0.20	1.0 max	0.40±0.20
1206	3.20±0.20	1.60±0.15	1.2 max	0.50±0.20

Rating & Characteristic

Part No.	Size	Working Voltage (MAX)		Varistor Voltage	Peak Current	Clamping Voltage (MAX)		Energy Absorption (MAX)	Typical Capacitance
Unit Condition		AC (V_{RMS})	DC (V)	V1mA (V)	8/20μs (A)	(A)	(V)	10/1000μs (J)	1KHz (pF)
MV04L04T-080	0402	4	5.5	8 (8~11)	20	1	20	0.05	295
MV04L06T-120		6	9	12 (10.2~13.8)	20	1	23	0.05	190
MV04L08T-150		8	11	15 (12.75~17.25)	20	1	25	0.05	160
MV04L11T-180		11	14	18 (15.3~20.7)	20	1	30	0.05	135
MV04L14T-240		14	18	24 (21.6~26.4)	20	1	40	0.05	93
MV04L17T-270		17	22	27 (24.3~29.7)	30	1	44	0.1	235
MV06L04T-080	0603	4	5.5	8 (8~11)	30	1	20	0.1	800
MV06L06T-120		6	9	12 (10.2~13.8)	30	1	23	0.1	680
MV06L11T-180		11	14	18 (15.3~20.7)	30	1	30	0.1	350
MV06L14T-240		14	18	24 (21.6~26.4)	30	1	39	0.1	270
MV06L17T-270		17	22	27 (24.3~29.7)	30	1	44	0.1	235
MV06L20T-330		20	26	33 (29.7~36.3)	30	1	54	0.1	200
MV06L25T-390		25	30	39 (35.1~42.9)	30	1	65	0.1	120
MV06L30T-470		30	38	47 (42.3~51.7)	30	1	77	0.1	100
MV06L35T-560		35	45	56 (50.4~61.6)	80	1	90	0.3	195

*If your request is out of this range, please feel free to contact with our factory.

MVL Multilayer Chip Varistor for Surge and ESD Protection- L Type Series

RoHS Compliant

Rating & Characteristic

Part No.	Size	Working Voltage (MAX)		Varistor Voltage	Peak Current	Clamping Voltage (MAX)		Energy Absorption (MAX)	Typical Capacitance
Unit Condition		AC (V_{RMS})	DC (V)	V1mA (V)	8/20μs (A)	(A)	(V)	10/1000μs (J)	1KHz (pF)
MV08L04T-080	0805	4	5.5	8 (8~11)	80	1	20	0.1	1600
MV08L06T-120		6	9	12 (10.2~13.8)	80	1	23	0.1	1180
MV08L08T-150		8	11	15 (12.75~17.25)	100	1	25	0.1	1050
MV08L11T-180		11	14	18 (15.3~20.7)	100	1	30	0.1	750
MV08L14T-240		14	18	24 (21.6~26.4)	100	1	39	0.2	550
MV08L17T-270		17	22	27 (24.3~29.7)	100	1	44	0.2	400
MV08L20T-330		20	26	33 (29.7~36.3)	100	1	54	0.3	350
MV08L25T-390		25	30	39 (35.1~42.9)	100	1	65	0.3	310
MV08L30T-470		30	38	47 (42.3~51.7)	100	1	77	0.3	280
MV08L35T-560		35	45	56 (50.4~61.6)	80	1	90	0.3	195
MV12L04T-080	1206	4	5.5	8 (8~11)	100	1	20	0.2	3200
MV12L11T-180		11	14	18 (15.3~20.7)	100	1	30	0.3	1150
MV12L14T-240		14	18	24 (21.6~26.4)	100	1	39	0.3	900
MV12L17T-270		17	22	27 (24.3~29.7)	100	1	44	0.4	840
MV12L20T-330		20	26	33 (29.7~36.3)	100	1	54	0.5	490
MV12L25T-390		25	30	39 (35.1~42.9)	100	1	65	0.6	440
MV12L30T-470		30	38	47 (42.3~51.7)	100	1	77	0.7	400
MV12L35T-560		35	45	56 (50.4~61.6)	100	1	90	0.8	310
MV12L40T-680		40	56	68 (61.2~74.8)	100	1	110	1.0	280
MV12L50T-820		50	65	82 (73.8~90.2)	100	1	135	0.5	240
MV12L60T-101		60	85	100 (90~110)	100	1	165	0.6	160
MV18L14T-240	1812	14	18	24 (21.6~26.4)	500	5	38	1.7	2000
MV18L30T-470		30	38	47 (42.3~51.7)	500	5	77	3.5	2200

*If your request is out of this range, please feel free to contact with our factory.

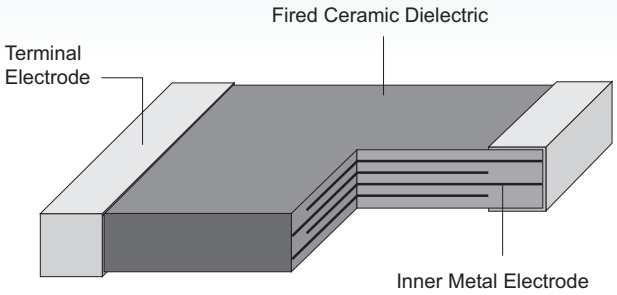
MVE Multilayer Chip Varistor for ESD Protection-E Type Series

RoHS Compliant

Features

- No polarity due to symmetrical current-voltage characteristics
- Excellent electro static absorption capability
- Variable capacitance
- Suitable for ESD Protection

Construction



Application

- USB2.0 Power and Data lines I/O Port protection
- Notebook PC, Computers
- Monitors and Flat Panel Displays
- IEEE 1394 Firewire Ports
- Video Graphics Cards
- SIM ports Mobile phone
- Digital Camera
- MP3/MP4 player
- LCD Module
- HUB/ Telecom/ Wireless LAN
- Keyboard

Type Designation

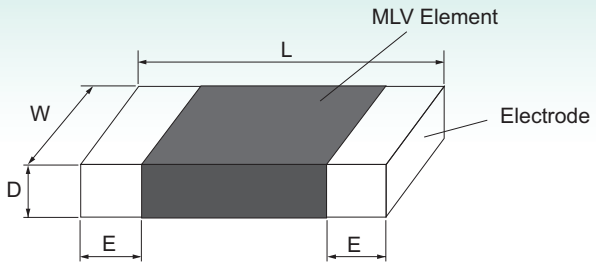
MV	06	E	050	T	050	–
Product Code	**Size**	**Type Series**	**Max. Working Voltage**	**Packaging**	**Capacitance**	**Internal Code**
Multilayer Varistor	04: 0402 (1.0x0.5mm) 06: 0603 (1.6x0.8mm)	ESD Protention	050: 5V 120: 12V 240: 24V	T: Paper tape 0402: 10K 0603: 4K	050: 5(pF) 100: 10(pF) 2R5: 2.5(pF)	

TA-I TECHNOLOGY CO., LTD.

MVE Multilayer Chip Varistor for ESD Protection-E Type Series

RoHS Compliant

Dimension



Unit: mm

Type	L	W	D	E
0402	1.0 ± 0.10	0.5 ± 0.10	0.6 max	0.25+0.1/-0.1
0603	1.6 ± 0.15	0.8 ± 0.15	0.9 max	0.3+0.1/-0.1

Rating & Characteristic

Part No.	Size	Maximum Working Voltage	Maximum Clampingc Voltage	Leakage Current	Capacitance	Cap. Tolerance
Unit Condition		(VDC)	(V)	(μA)	(pF)	(%)
MV04E050T101-	0402	5	30	< 1	100	±30%
MV04E050T560-		5	50	< 1	56	±30%
MV04E050T330-		5	50	< 1	33	±30%
MV04E050T220-		5	50	< 1	22	±30%
MV04E050T100-		5	50	< 1	10	±30%
MV04E050T050-		5	50	< 1	5	+80%/-20%
MV04E120T101-		12	50	< 1	100	±30%
MV04E120T330-		12	40	< 1	33	±30%
MV04E120T220-		12	40	< 1	22	±30%
MV04E120T100-		12	60	< 1	10	±30%
MV04E120T050-		12	80	< 1	5	+80%/-20%
MV04E240T3R0-		24	100	< 1	3	+80%/-20%
MV04E240T2R5-		24	198	< 1	2.5	+80%/-20%
MV04E240T0R8-		24	200	< 1	0.8	+80%/-20%
MV06E050T101-	0603	5	30	< 1	100	±30%
MV06E050T560-		5	50	< 1	56	±30%
MV06E050T330-		5	50	< 1	33	±30%
MV06E050T220-		5	50	< 1	22	±30%
MV06E050T100-		5	50	< 1	10	±30%
MV06E050T050-		5	50	< 1	5	+80%/-20%
MV06E120T101-		12	50	< 1	100	±30%
MV06E120T330-		12	40	< 1	33	±30%
MV06E120T220-		12	40	< 1	22	±30%
MV06E120T100-		12	60	< 1	10	±30%
MV06E120T050-		12	80	< 1	5	+80%/-20%
MV06E240T3R0-		24	240	< 1	3	+80%/-20%
MV06E240T2R5-		24	198	< 1	2.5	+80%/-20%
MV06E240T0R8-		24	200	< 1	0.8	+80%/-20%

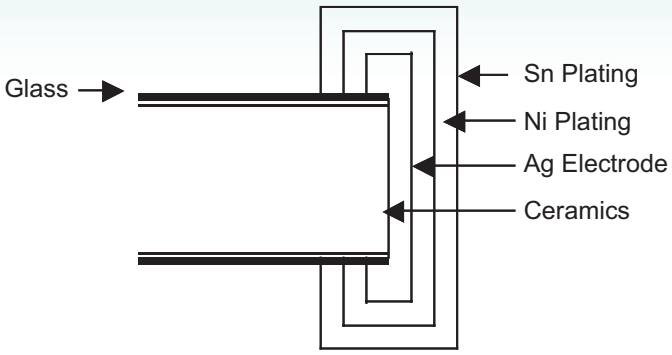
MTR Muti-Layer Thermistor (Negative Temperature Coefficient)

RoHS Compliant

Features

- Small and light weight design
- Thin film manufacturing method stabilizing fusing characteristics
- Low internal resistance
- Suitable for over current protection
- Recognized standard: UL248-14 file No. E241710

Construction



Application

- PC related equipment and peripherals (PC, Hard Drive, ODD, Printer etc.)
- Small portable devices, mobile phone, PDA, battery charger etc.
- Digital camera
- Game equipment
- LCD monitors, LCD modules (Backlight inverter)
- Battery package

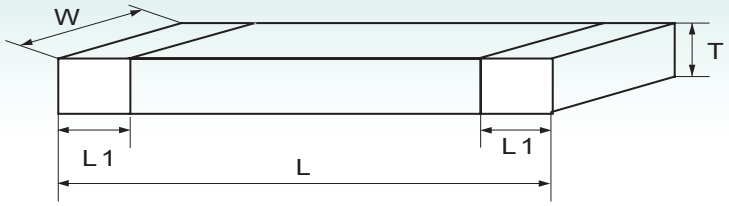
Type Designation

MTR	06	F	T	F	344	B	103
Product Code	Size	Tolerance of Resistance at 25°C	Packaging	Tolerance of B Value at 25(°C)	B Value (K)	Temp Range of B Value (°C)	Resistance at 25°C
Multi-Layer Thermistor	04: 0402 (1.0x0.5mm) 06: 0603 (1.6x0.8mm) 10: 0805 (2.0x1.2mm)	F: ±1.0% G: ±2.0% H: ±3.0% J: ±5.0%	T: Paper	F: ±1.0% G: ±2.0% H: ±3.0% J: ±5.0%	344:3435 380:3800 395:3950 405:4050 415:4150 440:4400	B: 25-85	102: 1KΩ 103: 10KΩ

MTR Muti-Layer Thermistor (Negative Temperature Coefficient)

RoHS Compliant

Dimensions



Unit: mm

Item	L(mm)	W(mm)	T(mm)	L1(mm)
0402 (1005)	1.00 ±0.10	0.50 ±0.10	0.60 max	0.15~0.30
0603 (1608)	1.60 ±0.15	0.80 ±0.15	0.95 max	0.20~0.50
0805 (2012)	2.00 ±0.20	1.25 ±0.20	1.20 max	0.20~0.60

Rating & Characteristic

Part Designation	Zero Power Resistance at 25°C (KΩ)	Tolerance of Resistance (±%)	B value (25-85) (K)	Tolerance of B value (±%)	Max Power Rated at 25°C (mW)	Typical Dissipation Constant (mW/°C)	Operation Temperature range (°C)
MTR04□T□410B102	1	3, 5	4100	3	250 mW	Approx. 2.5 mW/°C	-40~125
MTR04□T□344B103	10	1, 3, 5	3435	1, 3			
MTR04□T□390B103	10	3, 5	3900	3			
MTR04□T□410B103	10		4100	1, 3			
MTR04□T□405B473	47	2, 3, 5	4050	3			
MTR04□T□415B683	68		4150	3			
MTR04□T□405B104	100		4050	3			
MTR04□T□430B104	100		4300				
MTR04□T□405B474	470	2, 3, 5	4050	1, 3			
MTR06□T□295B102	1	1, 2, 3, 5	2950	1, 3	350 mW	Approx. 3.5 mW/°C	-40~125
MTR06□T□415B202	2	3, 5	4150	3			
MTR06□T□315B332	3.3		3300	1, 3			
MTR06□T□334B472	4.7	1, 2, 3, 5	3340				
MTR06□T□334B502	5		3340				
MTR06□T□344B682	6.8	2, 3, 5	3435				
MTR06□T□344B103	10	1, 2, 3, 5	3435				
MTR06□T□355B103	10		3550				
MTR06□T□397B103	10		3970				
MTR06□T□390B223	22	3, 5	3900				
MTR06□T□395B473	47	2, 3, 5	3950				
MTR06□T□405B473	47		4050	3			
MTR06□T□405B503	50		4050	1, 3			
MTR06□T□415B683	68		4150				
MTR06□T□395B104	100	3, 5	3950				
MTR06□T□405B104	100	2, 3, 5	4050	3			
MTR06□T□440B104	100		4400				
MTR06□T□410B204	200	3, 5	4055	1, 3			
MTR06□T□410B224	220		4055				
MTR06□T□405B474	470	2, 3, 5	4050	3			
MTR06□T□410B564	560	3, 5	4100	1, 3			

MTR Muti-Layer Thermistor (Negative Temperature Coefficient)

RoHS Compliant

Part Designation	Zero Power Resistance at 25°C (KΩ)	Tolerance of Resistance (±%)	B value (25-85) (K)	Tolerance of B value (±%)	Max Power Rated at 25°C (mW)	Typical Dissipation Constant (mW/°C)	Operation Temperature range (°C)
MTR10□T□344B472	4.7	2, 3, 5	3435	1, 3	400 mW	Approx. 4 mW/°C	-40~125
MTR10□T□344B502	5.0		3435				
MTR10□T□344B103	10	1, 2, 3, 5	3435				
MTR10□T□355B103	10	2, 3, 5	3550				
MTR10□T□397B103	10	1, 2, 3, 5	3970				
MTR10□T□390B223	22	3, 5	3900				
MTR10□T□400B473	47	2, 3, 5	4000				
MTR10□T□400B503	50		4000				
MTR10□T□400B104	100		4000				
MTR10□T□410B204	200		4055				

Note:
R25: F(1%) & B25/85: F(1%), G(2%), H(3%)
R25: G(2%) & B25/85: F(1%), G(2%), H(3%)
R25: H(3%) & B25/85: F(1%), G(2%), H(3%)
R25: J(5%) & B25/85: H(3%), J(5%)

Reliability Tests

Performance	Test Method	Appraise
Life	MIL – STD – 202F, Method 108A 1000 hours at 70°C NTC WV intermittent	Within ±3 %
Humidity	MIL – STD – 202F, Method 103B 1000 hours at Temperature: 40°C Humidity: 95%	Within ±3 %
Thermal Shock	MIL – STD – 202F, Method 107 10 cycles, -40°C to +125°C	Within ±3 %
Solderability	MIL – STD – 202F, Method 208H 235°C for 2 seconds	95% min. coverage
Resistance to Soldering Heat	MIL – R – 55342D , Para 4.7.7 Soldered to test board at 260°C for 10 seconds	Within ±3 %
Bending Strength	JIS C 5202 6.1.4 Pressurizing rod at a rate at 1mm/sec for 1mm	Within ±3 %
Resistance to flexure of Substrate	JIS C 5202 6.2.1 Pressurizing force shall be 3kg (min.)	Over 3 kg
Insulation Resistance	MIL – STD – 202F, Method 302 DC 250V For 10 seconds	Over 1000MΩ
Dielectric Withstand Voltage	MIL – STD – 202F, Method 301 DC 250V For 10 seconds	Not Short

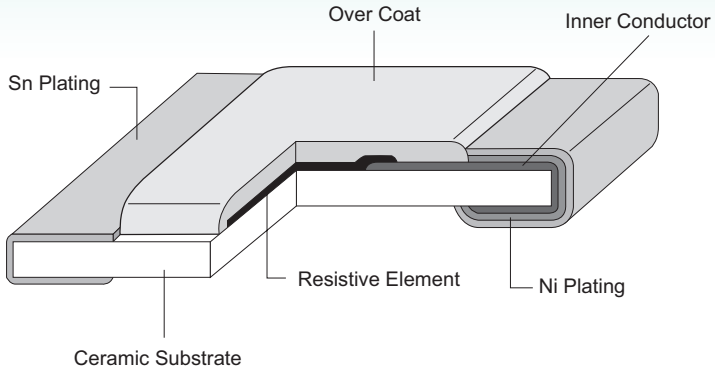
RM Thick Film Chip Resistors (General Purpose)

RoHS Compliant

Features

- High density
- High reliability
- Automatic placement

Construction



Application

- General Purpose

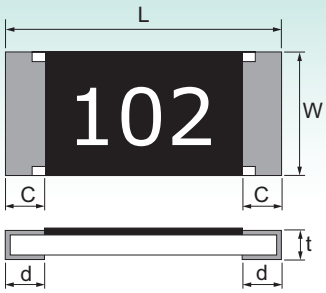
Type Designation

RM	10	J	T N	103
Product Code	**Size Power Rating (at 70°C)**	**Tolerance**	**Packaging**	**Nominal Resistance**
Thick Film Chip Resistors	01: 01005 (0.4x0.2mm) 1/32W 02: 0201 (0.6x0.3mm) 1/20W 04: 0402 (1.0x0.5mm) 1/16W 06: 0603 (1.6x0.8mm) 1/10W 10: 0805 (2.0x1.2mm) 1/8W 12: 1206 (3.2x1.6mm) 1/4W 13: 1210 (3.2x2.6mm) 1/3W 20: 2010 (5.0x2.5mm) 1/2W 25: 2512 (6.4x3.2mm) 1W	B : ±0.1% D : ±0.5% F : ±1% G : ±2% J : ±5%	T : Paper Tape E : Embossed Tape B : Bulk Cassette N: Lead Free Special L : 06-2mm Pitch Paper Tape	3 Digits (E-24) e.g., 103=10kΩ 4 Digits (E-96) e.g., 1002=10kΩ

RM Thick Film Chip Resistors (General Purpose)

RoHS Compliant

Dimensions



Unit: mm

Type	L	W	C	d	t
RM01	0.40±0.03	0.20±0.03	0.10±0.05	0.10±0.05	0.13±0.05
RM02	0.60±0.03	0.30±0.03	0.10±0.05	0.15±0.05	0.25±0.05
RM04	1.00 $^{+0.10}_{-0.05}$	0.50±0.05	0.20±0.10	0.25±0.10	0.32±0.05
RM06	1.60±0.10	0.80±0.10	0.30±0.20	0.30 $^{+0.2}_{-0.1}$	0.45±0.10
RM10	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
RM12	3.10±0.10	1.55±0.10	0.50±0.30	0.40±0.20	0.55±0.10
RM13	3.10±0.10	2.55±0.10	0.50±0.30	0.40±0.20	0.60±0.10
RM20	5.00±0.15	2.50±0.15	0.60±0.30	0.50±0.25	0.60±0.10
RM25	6.30±0.20	3.20±0.20	0.60±0.30	0.50±0.25	0.60±0.10

Rating and Characteristic

Type	Power Rating at 70°C	MAX. Working Voltage	MAX. Over-Load Voltage	T.C.R (PPM/°C)	Resistance Range (Ω)				
					B (±0.1%) E-96&E-24	D (±0.5%) E-96&E-24	F (±1%) E-96	G (±2%) E-24	J (±5%) E-24
RM01	1/32W	15V	30V	±300			10Ω≤R<100Ω		10Ω≤R<100Ω
				±200			100Ω≤R≤1MΩ		100Ω≤R≤1MΩ
RM02	1/20W	25V	50V	±200		100Ω-10KΩ	10Ω-2MΩ	10Ω-1MΩ	10Ω-10MΩ
				+600 -200			1Ω-9.1Ω		1Ω-9.1Ω
RM04	1/16W	50V	100V	±100	100Ω-499kΩ	100Ω-1MΩ	100Ω-1MΩ		
				±200	10Ω≤R<100Ω	10Ω≤R<100Ω	10Ω≤R<100Ω 1MΩ<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
				+500 -200			1Ω-9.1Ω	1Ω-9.1Ω	1Ω-9.1Ω
				±400				10MΩ≤R≤20MΩ	10MΩ≤R≤20MΩ
RM06	1/10W	50V	100V	±100	10Ω-560kΩ	10Ω-1MΩ	10Ω-1MΩ		
				±200			1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
				±400		10MΩ≤R<20MΩ	1Ω-9.1Ω	1Ω-9.1Ω	1Ω ~ 9.1Ω 10MΩ<R≤20MΩ
RM10	1/8W	150V	300V	±100	10Ω-560kΩ	10Ω-1MΩ	10Ω-1MΩ		
				±200			1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
				±400			1Ω-9.1Ω	1Ω-9.1Ω	1Ω ~ 9.1Ω 10MΩ<R≤20MΩ
RM12	1/4W	200V	400V	±100	10Ω-560kΩ	10Ω-1MΩ	10Ω-1MΩ		
				±200			1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
				±400			1Ω-9.1Ω	1Ω-9.1Ω	1Ω ~ 9.1Ω 10MΩ<R≤20MΩ
RM13	1/3W	200V	400V	±100	10Ω-560kΩ	10Ω-1MΩ	10Ω-1MΩ		
				±200			1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
				±400			1Ω-9.1Ω	1Ω-9.1Ω	1Ω ~ 9.1Ω 10MΩ<R≤20MΩ
RM20	1/2W	200V	400V	±100	10Ω-560kΩ	10Ω-1MΩ	10Ω-1MΩ		
				±200			1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
				±400			1Ω-9.1Ω	1Ω-9.1Ω	1Ω ~ 9.1Ω 10MΩ<R≤20MΩ
RM25	1W	200V	400V	±100	10Ω-560kΩ	10Ω-1MΩ	10Ω-1MΩ		
				±200			1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
				±400			1Ω-9.1Ω	1Ω-9.1Ω	1Ω ~ 9.1Ω 10MΩ<R≤20MΩ

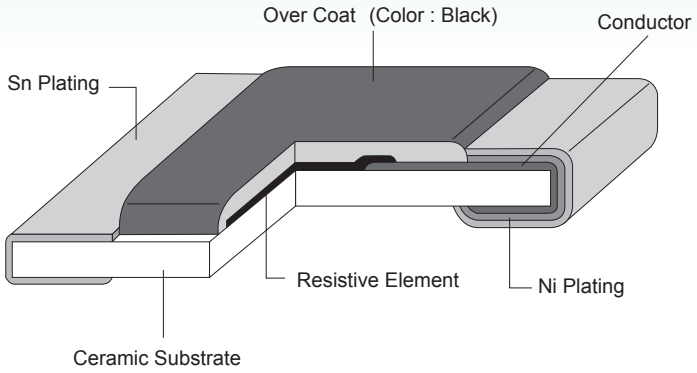
RMH High Power Chip Resistors

RoHS Compliant

Features

- Reinforce power rating
- Lead-free 100%
- Competitive price

Construction



Application

- Audio, Automotive, RF, NB, Main-board, Printer, Server, HDD, Scanner, DC-DC power converter, Testing & Measuring equipment, LCD panel, Tuner.

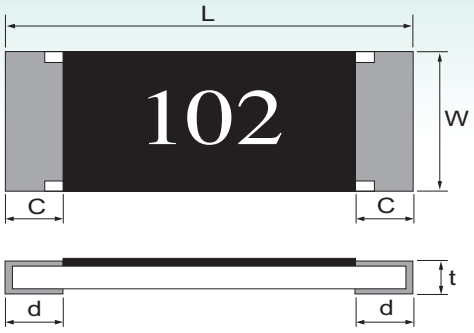
Type Designation

RMH	10	J	T	103
Product Code	**Size Power Rating**	**Tolerance**	**Packaging**	**Nominal Resistance**
High Power Chip Resistors	04:0402(1005) 1/10W 06:0603(1608) 1/8W 10:0805(2012) 1/4W 12:1206(3216) 1/2W 25:2512(6432) 2W	F: ±1% J: ±5% G: ±2%	T: Paper tape E: Embossed tape	3 Digits, e.g.,: (E-24) 101 = 100Ω 103 = 10kΩ 0 = 0Ω 4 Digits, e.g.,: (E-96) 1540 = 154Ω 43R2 = 43.2Ω

RMH High Power Chip Resistors

RoHS Compliant

Dimension



Unit: mm

Type	L	W	C	d	t
RMH04	1.00 $^{+0.1}_{-0.05}$	0.50±0.05	0.20±0.10	0.25±0.10	0.32±0.05
RMH06	1.60±0.10	0.80±0.10	0.30±0.20	0.30 $^{+0.2}_{-0.1}$	0.45±0.10
RMH10	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
RMH12	3.10±0.10	1.55±0.10	0.50±0.30	0.40±0.20	0.55±0.10
RMH25	6.30±0.20	3.20±0.20	0.60±0.30	0.50±0.25	0.60±0.10

Rating & Characteristics

Type	Power Rating at 70°C	Rating Voltage	MAX. Working Voltage	MAX. Over-Load Voltage	T.C.R (PPM °C)	Resistance Range (Ω)		
						F (±1%) E-96	J (±5%) E-24	G (±2%) E-24
RMH04	1/10W	Refer 5.2	50V	100V	±100	100Ω~1MΩ		
					±200	10Ω≤R<100Ω 1MΩ<R≤10MΩ	10Ω~10MΩ	10Ω~10MΩ
					+500 -200	1Ω~9.1Ω	1Ω~9.1Ω	1Ω~9.1Ω
					±400		10MΩ≤R≤20MΩ	10MΩ≤R≤20MΩ
RMH06	1/8W	Refer 5.2	50V	100V	±100	10Ω~1MΩ		
					±200		10Ω-1MΩ	
					±400	1Ω-9.1Ω	1Ω-9.1Ω	
RMH10	1/4W	Refer 5.2	150V	300V	±100	10Ω-1MΩ		
					±200		10Ω-1MΩ	
					±400	1Ω-9.1Ω	1Ω-9.1Ω	
RMH12	1/2W	Refer 5.2	200V	400V	±100	10Ω-1MΩ		
					±200		10Ω-1MΩ	
					±400	1Ω-9.1Ω	1Ω-9.1Ω	
RMH25	2W	Refer 5.2	200V	400V	±100	10Ω-100Ω		
					±200		10Ω-100Ω	
					±400	1Ω-9.1Ω	1Ω-9.1Ω	

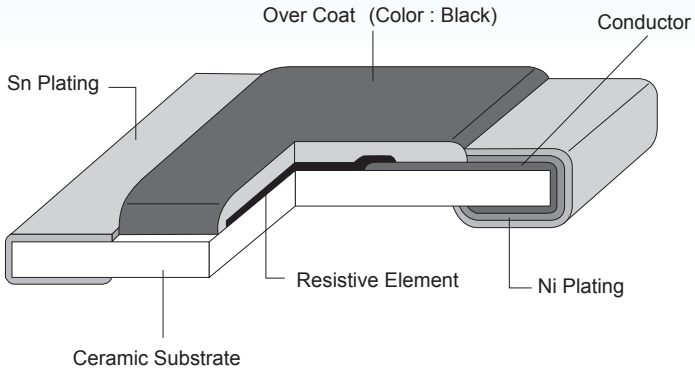
RMS Anti-Sulfurated Thick Film Chip Resistors

RoHS Compliant

Features

- Low parastics
- Low profile
- High integration potential

Construction



Application

- Audio and video equipment
- Telecommunications equipment
- EDP equipment
- Automotive electronics
- Voltage control in power supplies
- Test & Measurment equipment

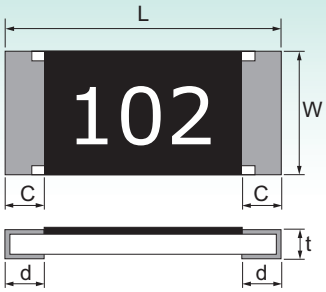
Type Designation

RMS	10	J	T	103
Product Code	**Size Power Rating**	**Tolerance**	**Packaging**	**Nominal Resistance**
Anti-Sulfurated Chip Resistor	04:0402(1005) 1/16W 06:0603(1608) 1/10W 10:0805(2012) 1/8W 12:1206(3216) 1/4W 13:1210(3226) 1/3W 20:2010(5025) 1/2W 25:2512(6432) 1 W	J: ±5% G: ±2% F: ±1%	T-Paper Tape E-Embossed Tape Special L: 06-2mm pitch paper Tape	3 Digits (E-24) e.g., 103 = 10kΩ 0 = 0Ω 4 Digits (E-96) e.g., 1540 = 154Ω 43R2 = 43.2Ω

RMS Anti-Sulfurated Thick Film Chip Resistors

RoHS Compliant

Dimension



Unit: mm

Type	L	W	C	d	t
RMS04	$1.00^{+0.10}_{-0.05}$	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05
RMS06	1.60±0.10	0.80±0.10	0.30±0.20	$0.30^{+0.20}_{-0.10}$	0.45±0.10
RMS10	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
RMS12	3.10±0.10	1.55±0.10	0.50±0.30	0.40±0.20	0.55±0.10
RMS13	3.10±0.10	2.55±0.10	0.50±0.30	0.40±0.20	0.60±0.10
RMS20	5.00±0.15	2.50±0.15	0.60±0.30	0.50±0.25	0.60±0.10
RMS25	6.30±0.20	3.20±0.20	0.60±0.30	0.50±0.25	0.60±0.10

Rating & Characteristics

Type	Power Rating at 70°C	Rating Voltage	MAX. Working Voltage	MAX. Over-Load Voltage	T.C.R (PPM °C)	Resistance Range (Ω)		
						F (±1%) E-96&E-24	G (±2%) E-24	J (±5%) E-24
RMS04	1/16W	Refer 5.2	50V	100V	±100	100Ω~1MΩ		
					±200	10Ω≤R<100Ω	10Ω-10MΩ	10Ω-10MΩ
					+500 -200	1Ω-9.1Ω	1Ω-9.1Ω	1Ω-9.1Ω
					±400		10MΩ≤R≤20MΩ	10MΩ≤R≤20MΩ
RMS06	1/10W	Refer 5.2	50V	100V	±100	10Ω-1MΩ		
					±200	1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
					±400	1Ω-9.1Ω	1Ω-9.1Ω	1Ω-9.1Ω 10MΩ<R≤20MΩ
RMS10	1/8W	Refer 5.2	150V	300V	±100	10Ω-1MΩ		
					±200	1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
					±400	1Ω-9.1Ω	1Ω-9.1Ω	1Ω-9.1Ω 10MΩ<R≤20MΩ
RMS12	1/4W	Refer 5.2	200V	400V	±100	10Ω-1MΩ		
					±200	1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
					±400	1Ω-9.1Ω	1Ω-9.1Ω	1Ω-9.1Ω 10MΩ<R≤20MΩ
RMS13	1/3W	Refer 5.2	200V	400V	±100	10Ω-1MΩ		
					±200	1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
					±400	1Ω-9.1Ω	1Ω-9.1Ω	1Ω-9.1Ω 10MΩ<R≤20MΩ
RMS20	1/2W	Refer 5.2	200V	400V	±100	10Ω-1MΩ		
					±200	1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
					±400	1Ω-9.1Ω	1Ω-9.1Ω	1Ω-9.1Ω 10M<R≤20MΩ
RMS25	1W	Refer 5.2	200V	400V	±100	10Ω-1MΩ		
					±200	1M<R≤10MΩ	10Ω-10MΩ	10Ω-10MΩ
					±400	1Ω-9.1Ω	1Ω-9.1Ω	1Ω-9.1Ω 10M<R≤20MΩ

Operating Temp (°C): -55°C~+155°C

Note: Except for the Above Standardized Products, We Also Provide Customized Products.

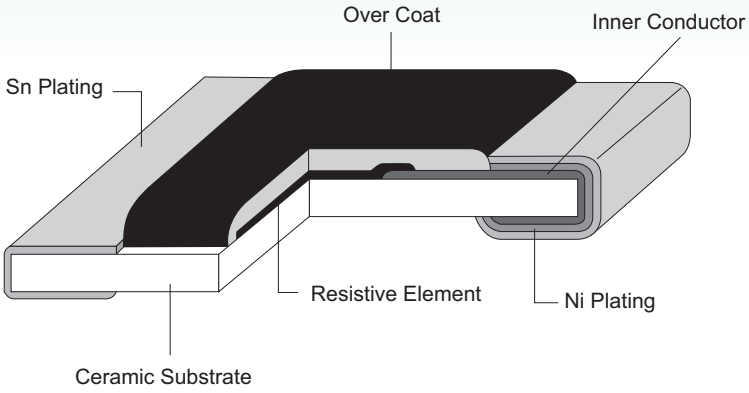
RB Thin Film Chip Resistors (RB series Standard)

RoHS Compliant

Features

- Precision of ±0.1% is available
- Low T.C.R. ±25ppm is available
- Low current noise

Construction



Application

- Mother-board, Printer, Server, HDD, Scanner
- DC-DC power converter, Test & measuring equipment
- Base station, Switching, Access system
- Air-bag, ABS, Fuel injection
- LCD panel
- Audio, Tuner

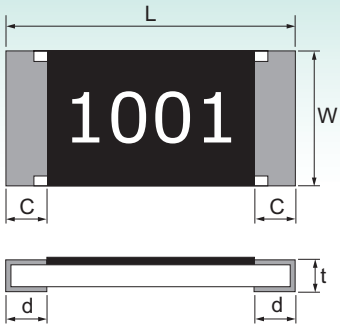
Type Designation

RB	10	B	T	P	1001
Product Code	**Size, Power Rating (at 70°C)**	**Tolerance**	**Packaging**	**TCR (ppm/°C)**	**Nominal Resistance**
Thin Film Chip Resistors	04: 0402 (1.0x0.5mm)1/16W 06: 0603 (1.6x0.8mm)1/10W 10: 0805 (2.0x1.2mm)1/8W 12: 1206 (3.2x1.6mm)1/4W	A: ±0.05% B: ±0.10% C: ±0.25% D: ±0.50% F: ±1.00%	T: Paper Tape	J: ±5ppm K: ±10ppm M: ±15ppm P: ±25ppm S: ±50ppm R: ±100ppm	4 Digits (E-96) e.g., 1001=1kΩ

RB Thin Film Chip Resistors (High Precision)

RoHS Compliant

Dimensions



Unit: mm

Type	L	W	C	d	t
RB04	1.00±0.05	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05
RB06	1.60±0.10	0.80±0.10	0.30±0.20	0.30+0.20/-0.10	0.45±0.10
RB10	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
RB12	3.10±0.10	1.55±0.10	0.50±0.30	0.40±0.20	0.55±0.10

Rating & Characteristic

Type	Power Rating at 70°C	Rated* Voltage	Max. Working Voltage	Max. Over- Load Voltage	T.C.R (PPM/°C)	Resistance Range	Resistance tolerance (%)
RB04	1/16 W	$(P*R)^{1/2}$	50V	100V	±5 ±10 ±25 ±50 ±100	10Ω~100KΩ	±0.1~ ±1.0
RB06	1/10 W	$(P*R)^{1/2}$	75V	150V	±5 ±50 ±100	1Ω~9.1Ω	±0.5~1
RB06	1/10 W	$(P*R)^{1/2}$	75V	150V	±5 ±10 ±25 ±50 ±100	10Ω~390KΩ	±0.1~ ±1.0
RB10	1/8 W	$(P*R)^{1/2}$	150V	300V	±5 ±50 ±100	1Ω~9.1Ω	±0.5~±1.0
RB10	1/8 W	$(P*R)^{1/2}$	150V	300V	±5 ±10 ±25 ±50 ±100	10Ω~800KΩ	±0.1~ ±1.0
RB12	1/4 W	$(P*R)^{1/2}$	150V	300V	±5 ±50 ±100	1Ω~9.1Ω	±0.5~1
RB12	1/4 W	$(P*R)^{1/2}$	150V	300V	±5 ±10 ±25 ±50 ±100	10Ω~1MΩ	±0.1~ ±1.0

Operating Temp (°C): -55°C~+155°C

Note: 1. $E=\sqrt{P*R}$, E=Rated Voltage(V); P=Rated Power(W); R=Resistance Value(Ω)

2. Except for the Above Standardized Products, We Also Provide Customized Products.

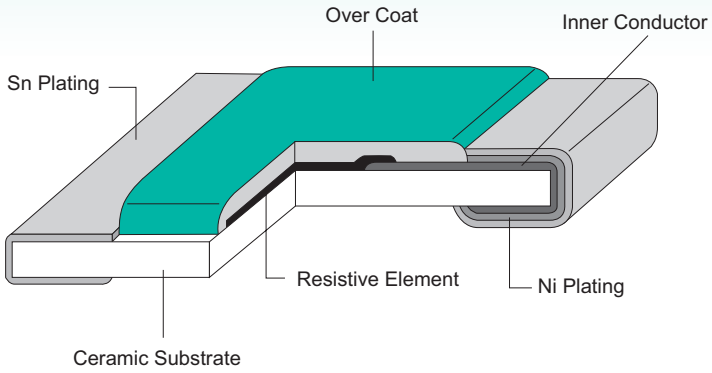
RBP Metal Thin Film Chip Resistors

RoHS Compliant

Features

- Low parastics
- Excellent high-frequency stability
- Low noise
- Narrow tolerance
- Low profile
- High integration potential

Construction



Application

- Audio and video equipment
- Telecommunications equipment
- EDP equipment
- Automotive electronics
- Voltage control in power supplies
- Test & Measurment equipment

Type Designation

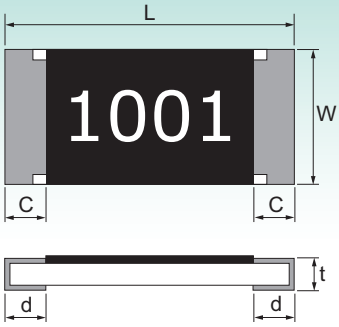
RBP	10	B	T	P	1001
Product Code	**Size, Power Rating (at 70°C)**	**Tolerance**	**Packaging**	**TCR (ppm/°C)**	**Nominal Resistance**
Metal Thin Film	06: 0603 (1.6x0.8mm) 1/8W 10: 0805 (2.0x1.2mm)1/4W 12: 1206 (3.2x1.6mm) 1/2W 13: 1210 (3.2x2.6mm) 1/2W 20: 2010 (2.0x2.5mm) 1W 25: 2512 (6.4x3.2mm) 2W	B: ±0.10% C: ±0.25% D: ±0.50% F: ±1.00% G: ±2.00% J: ±5.00%	T: Paper Tape E: Emboss Tape	J: ±5ppm K: ±10ppm M: ±15ppm P: ±25ppm S: ±50ppm R: ±100ppm	e.g., 1001=1kΩ

RBP Metal Thin Film Chip Resistors

RoHS Compliant

TA-I TECHNOLOGY CO., LTD.

Dimensions



Unit: mm

Type	L	W	C	d	t
RBP06	1.60±0.10	0.80±0.10	0.30±0.20	0.40+0.20/-0.10	0.45±0.10
RBP10	2.00±0.10	1.25±0.10	0.40±0.20	0.45±0.20	0.50±0.10
RBP12	3.10±0.10	1.55±0.10	0.50±0.30	0.50±0.20	0.55±0.10
RBP13	3.10±0.10	2.55±0.10	0.50±0.30	0.50±0.20	0.60±0.10
RBP20	5.10±0.15	2.50±0.15	0.60±0.30	1.40±0.25	0.60±0.10
RBP25	6.30±0.20	3.20±0.20	0.60±0.30	1.85±0.25	0.60±0.10

Rating & Characteristic

Type	Power Rating at 70°C	Rated* Voltage	Max. Working Voltage	Max. Over- Load Voltage	T.C.R (PPM/°C)	Resistance Range	Resistance tolerance (%)
RBP06	1/8 W	$(P*R)^{1/2}$	75V	150V	±50 ±100	1Ω~9.1Ω	±0.5~±5.0
RBP06	1/8 W	$(P*R)^{1/2}$	75V	150V	±10 ±25 ±50 ±100	10Ω~390KΩ	±0.1~ ±5.0
RBP10	1/4 W	$(P*R)^{1/2}$	150V	300V	±50 ±100	1Ω~9.1Ω	±0.5~±5.0
RBP10	1/4 W	$(P*R)^{1/2}$	150V	300V	±10 ±25 ±50 ±100	10Ω~800KΩ	±0.1~ ±5.0
RBP12	1/2 W	$(P*R)^{1/2}$	150V	300V	±50 ±100	1Ω~9.1Ω	±0.5~±5.0
RBP12	1/2 W	$(P*R)^{1/2}$	150V	300V	±10 ±25 ±50 ±100	10Ω~1MΩ	±0.1~ ±5.0
RBP13	1/2 W	$(P*R)^{1/2}$	150V	300V	±50 ±100	1Ω~9.1Ω	±0.5~±5.0
RBP13	1/2 W	$(P*R)^{1/2}$	150V	300V	±10 ±25 ±50 ±100	10Ω~1MΩ	±0.1~ ±5.0
RBP20	1 W	$(P*R)^{1/2}$	150V	300V	±50 ±100	1Ω~9.1Ω	±0.5~±5.0
RBP20	1 W	$(P*R)^{1/2}$	150V	300V	±10 ±25 ±50 ±100	10Ω~1MΩ	±0.1~ ±5.0
RBP25	2 W	$(P*R)^{1/2}$	150V	300V	±50 ±100	1Ω~9.1Ω	±0.5~±5.0
RBP25	2 W	$(P*R)^{1/2}$	150V	300V	±10 ±25 ±50	10Ω~1MΩ	±0.1~ ±5.0

Operating Temp (°C): -55°C~+155°C

Note: 1. $E=\sqrt{P*R}$, E=Rated Voltage(V); P=Rated Power(W); R=Resistance Value(Ω)

2. Except for the Above Standardized Products, We Also Provide Customized Products.

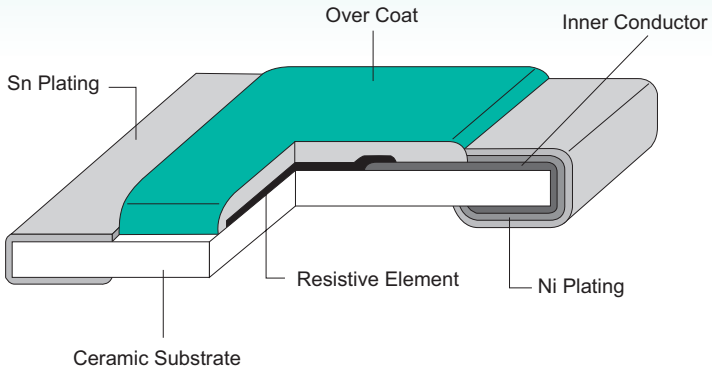
RBS Anti Sulfuration Chip Resistors

RoHS Compliant

Features

- Low parastics
- Excellent high-frequency stability
- Low noise
- Narrow tolerance
- Low profile
- High integration potential

Construction



Application

- Audio and video equipment
- Telecommunications equipment
- EDP equipment
- Automotive electronics
- Voltage control in power supplies
- Test & Measurment equipment

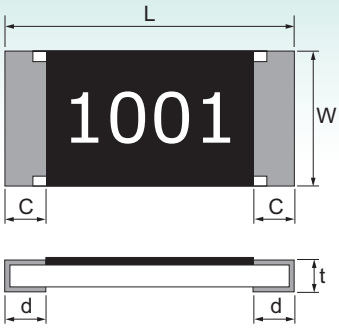
Type Designation

RBS	10	B	T	P	1001
Product Code	**Size, Power Rating (at 70°C)**	**Tolerance**	**Packaging**	**TCR (ppm/°C)**	**Nominal Resistance**
Anti Sulfuration	04: 0402 (1.0x0.5mm) 1/16W 06: 0603 (1.6x0.8mm) 1/0W 10: 0805 (2.0x1.2mm) 1/8W 12: 1206 (3.2x1.6mm) 1/4W	B: ±0.10% C: ±0.25% D: ±0.50% F: ±1.00% G: ±2.00% J: ±5.00%	T: Paper Tape	P: ±25ppm S: ±50ppm R: ±100ppm	e.g., 1001=1kΩ

RBS Anti Sulfuration Chip Resistors

RoHS Compliant

Dimensions



Unit: mm

Type	L	W	C	d	t
RBS04	1.00±0.05	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05
RBS06	1.60±0.10	0.80±0.10	0.30±0.20	0.30+0.20/-0.10	0.45±0.10
RBS10	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
RBS12	3.10±0.10	1.55±0.10	0.50±0.30	0.40±0.20	0.55±0.10

Rating & Characteristic

Type	Power Rating at 70°C	Rated* Voltage	Max. Working Voltage	Max. Over- Load Voltage	T.C.R (PPM/°C)	Resistance Range	Resistance tolerance (%)
RBS04	1/16 W	$(P*R)^{1/2}$	50V	100V	±25 ±50 ±100	100Ω~50KΩ	±0.1%~ ±1.0%
					±100		±2.0%~±5.0%
RBS06	1/10 W	$(P*R)^{1/2}$	75V	150V	±25 ±50 ±100	100Ω~300KΩ	±0.1%~ ±1.0%
					±100		±2.0%~±5.0%
RBS10	1/8 W	$(P*R)^{1/2}$	150V	300V	±25 ±50 ±100	100Ω~400KΩ	±0.1%~ ±1.0%
					±100		±2.0%~±5.0%
RBS12	1/4 W	$(P*R)^{1/2}$	150V	300V	±25 ±50 ±100	100Ω~400KΩ	±0.1%~ ±1.0%
					±100		±2.0%~±5.0%

Operating Temp (°C): -55°C~+125°C

Note: 1. $E=\sqrt{P*R}$, E=Rated Voltage(V); P=Rated Power(W); R=Resistance Value(Ω)

2. Except for the Above Standardized Products, We Also Provide Customized Products.

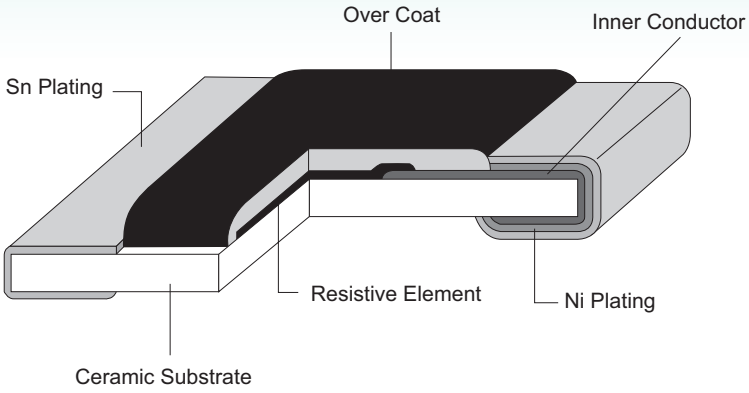
RH Thick Film High Voltage Chip Resistors

RoHS Compliant

Features

- The application of RH series resistors can reduce the numbers and space of resistor used in circuits
- Compared to RM series resistors, RH series can stand twice the maximum operating voltage

Construction



Application

- Power supply

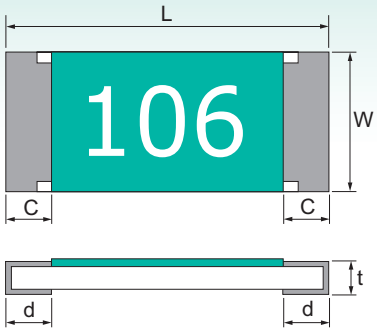
Type Designation

RH	12	F	T N	4993
Product Code	**Size, Power Rating (at 70°C)**	**Tolerance**	**Packaging**	**Nominal Resistance**
High Voltage Chip Resistors	12: 1206 (3.2x1.6mm) 1/4W 20: 2010 (5.0x2.5mm) 1/2W 10: 0805(2012) 1/8W	0805 F : ±1% G: ±2% J : ±5% 1206 F : ±1% G: ±2% J : ±5% 2010 J :±5%	1206 T: Paper Tape TN: Lead Free & Paper Type 2010 E : Emboss Tape EN: Lead Free & Emboss Tape	3 Digits (E-24) e.g., 105=1MΩ 4 Digits (E-96) e.g., 4993=499kΩ

RH Thick Film High Voltage Chip Resistors

RoHS Compliant

Dimension



Unit: mm

Type	L	W	C	d	t
RH10	2.00±0.10	1.25±0.10	0.35±0.20	0.40±0.20	0.50±0.10
RH12	3.10±0.20	1.55±0.10	0.40±0.25	0.40±0.20	0.55±0.10
RH20	5.00±0.20	2.50±0.20	0.40±0.25	0.50±0.25	0.55±0.10

Rating & Characteristic

Characteristics	Feature			Measurement Method
	RH10	RH12	RH20	
Power Ratings (W)	1/8W	1/4W	1/2W	JIS Code 3A/JIS Code 3D
Resistance Value (Ω)	10kΩ~10MΩ	47Ω~22MΩ	47Ω~22MΩ	Refer to JIS C 5201 4.5
T.C.R (ppm/°C)	±200			Refer to JIS C 5201 4.8
Operation Temperature Range (°C)	-55~+155			
Resistance Tolerance (%)	±1, ±2, ±5	±1, ±2, ±5	±5	JIS C 5201 4.2.5
Maximum Working Voltage (V)	400	500	1500	
Maximum Overload Voltage (V)	800	1000	3000	Remark RH20: DC 3000V, AC 2122V

*Note 1: Measure method refer to JIS C 5202 4.5
*Note 2: Measure method refer to JIS C 5202 4.8
*Note 3: Remark RH20: DC 3000V, AC 2122V

RT

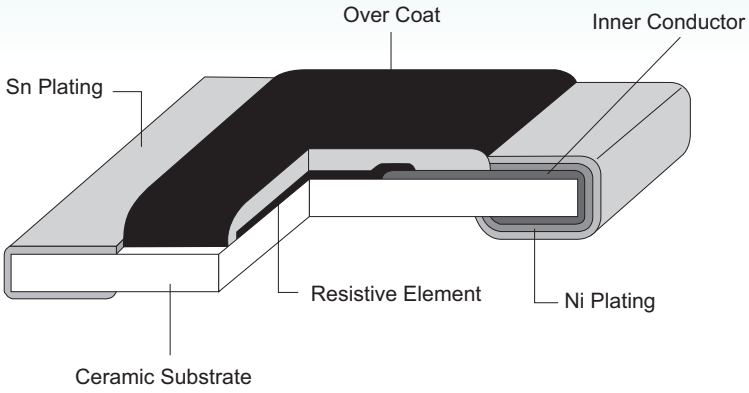
Thick Film Trimmable Chip Resistors

RoHS Compliant

Features

- Suitable for laser trimming
- High reliability

Construction



Application

- Chip resistor for functional trimming

Type Designation

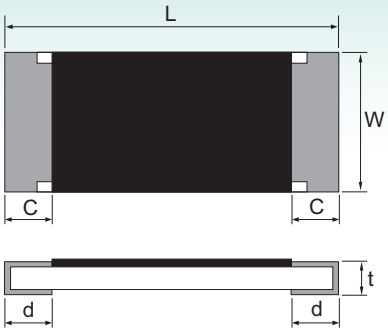
RT	10	P	T N	103
Product Code	**Size, Power Rating (at 70°C)**	**Tolerance**	**Packaging**	**Nominal Resistance**
Trimmable Chip Resistors	04: 0402 1/16W 06: 0603 1/10W 10: 0805 1/8W 12: 1206 1/4W 13: 1210 1/3W	K: ±10% M: ±20% N: ±30% P: 0~30%	T: Paper Tape Special L: 06: 2mm Pitch Paper Tape N : Lead Free	3 Digits (E-24) e.g., 103=10kΩ 4 Digits (E-96) e.g., 1540=154Ω 43R2=43.2Ω

RT

Thick Film Trimmable Chip Resistors

RoHS Compliant

Dimension



Unit: mm

Type	L	W	C	d	t
RT04	1.0 +0.1/-0.05	0.5±0.05	0.2±0.1	0.25±0.1	0.35±0.05
RT06	1.6±0.1	0.8±0.1	0.3±0.2	0.3 +0.2/-0.1	0.45±0.1
RT10	2.0±0.1	1.25±0.1	0.4±0.2	0.4±0.2	0.5±0.1
RT12	3.1±0.1	1.55±0.1	0.5±0.3	0.4±0.2	0.6±0.1
RT13	3.1±0.1	2.55±0.1	0.5±0.3	0.4±0.2	0.6±0.1

Rating & Characteristics

Type	Power Rating at 70°C	MAX. Working Voltage	MAX. Over-Load Voltage	Operating Temp. (°C)	Resistance Tolerance (%)	Resistance Range (Ω)	Std Res. Value	T.C.R. ppm/°C
RT04	1/16W	50V	100V	-55°C~+125°C	K: ±10% M: ±20% N: ±30% P: 0~30%	10Ω~1MΩ on quest: 0805: 3MΩ	E-24	±200
RT06	1/10W	50V	100V					
RT10	1/8W	150V	300V					
RT12	1/4W	200V	400V					
RT13	1/3W	200V	400V					

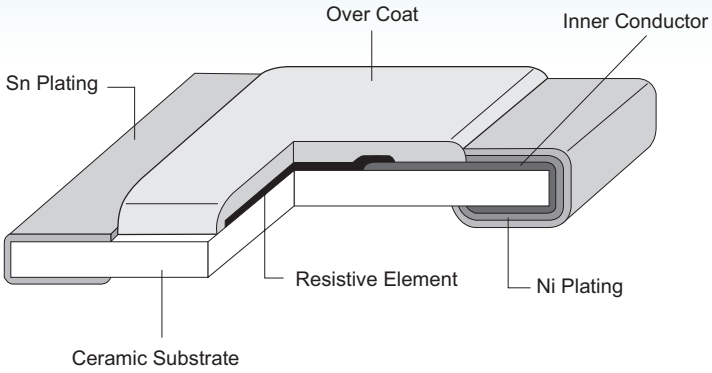
RL Low Ohmic Chip Resistors

RoHS Compliant

Features

- Low resistance and high accuracy resistor for current detection

Construction



Application

- Power supply
- Mobile-phone
- Portable devices
- PC, N/B PC, UMPC
- HDD

Type Designation

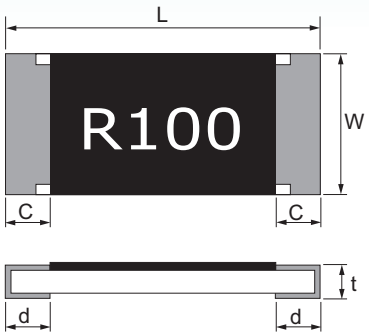
RL	10	F	T N	R100
Product Code	**Size, Power Rating (at 70°C)**	**Tolerance**	**Packaging**	**Nominal Resistance**
Low Ohmic Chip Resistor	04: 0402 1/16W 06: 0603 1/8W 10: 0805 1/4W 12: 1206 1/2W 20: 2010 3/4W 25: 2512 1W	F: ±1% G:±2% J: ±5%	T: Paper Tape E: Embossed Tape N: Lead Free	3 Digits e.g.,(5%) R10=0.1Ω 4 Digits e.g.,(1%) R100=0.1Ω Standard: E-24 Series

RL Low Ohmic Chip Resistors

RoHS Compliant

Dimensions

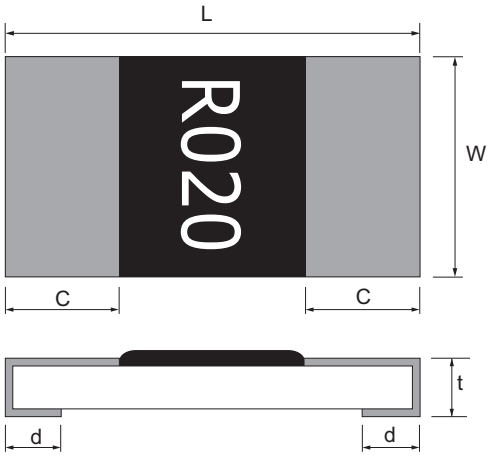
1. Standard products



Unit: mm

Type	L	W	C	d	t
RL04	1.00 +0.10/-0.05	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05
RL06	1.60±0.10	0.80±0.10	0.30±0.20	0.35±0.20	0.45±0.10
RL10	2.00±0.10	1.25±0.10	0.40±0.20	0.35±0.20	0.50±0.10
RL12	3.10±0.20	1.55±0.10	0.50±0.30	0.40±0.20	0.55±0.10
RL20	5.00±0.20	2.50±0.20	0.60±0.30	0.50±0.25	0.55±0.10
RL25	6.30±0.20	3.20±0.20	0.60±0.30	0.50±0.25	0.55±0.10

2. 1206 Type for 20mΩ~91mΩ



Unit: mm

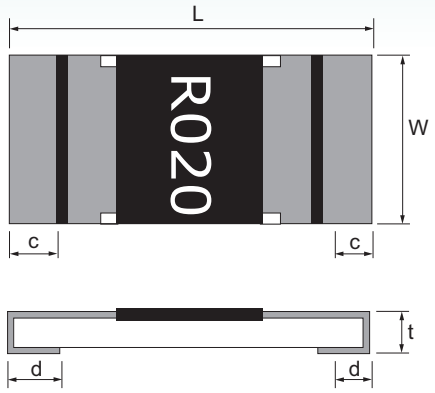
Type	L	W	C	d	t
RL12	3.10±0.20	1.55±0.10	0.90±0.30	0.50±0.20	0.50±0.10

RL Low Ohmic Chip Resistors

RoHS Compliant

Dimension

3. 2010 & 2512 Type for 20mΩ-91mΩ



Unit: mm

Type	L	W	C	d	t
RL20	5.00±0.20	2.50±0.20	0.60±0.30	0.50±0.25	0.55±0.10
RL25	6.30±0.20	3.20±0.20	0.60±0.30	0.50±0.25	0.55±0.10

Rating & Characteristic

Type	Power Ratings	Resistance Value (mΩ)	Resistance Tolerance (%)	Operation Temperature Range(°C)	T.C.R. (ppm/°C)
RL04	1/16W	200~910	±1% ±2% ±5%	-55~+155	±300 (200~500mΩ) ±200 (501~910mΩ)
RL06	1/8W	100~910			±200
RL10	1/4W				
RL12	1/2W				
RL20	3/4W				
RL25	1W				
RL10	1/4W	50~91			±800
RL12	1/2W	20			±800
RL12	1/2W	21~50			±600
RL12	1/2W	51~91			±400
RL20	3/4W	20 21~50 51~91			±600 ±400 ±200
RL25	1W	20 21~50 51~91			±600 ±400 ±200

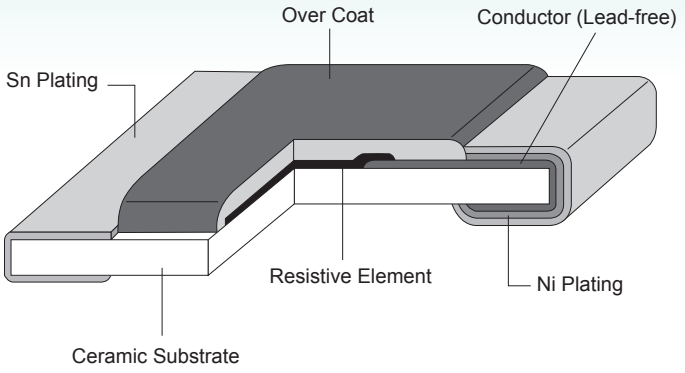
RLH High Power Low Resistance Chip Resistors

RoHS Compliant

Features

- Low Resistance and High Accuracy Resistor for Current Detection
- Large Electrode (All series)
- Good Performance for Heat Dissipation
- High Purity Alumina Substrate for High Power Dissipation
- Pb-free to Meet RoHS Requirements

Construction



Application

- Power Management Applications
- Switching Power Supply
- DC-DC Converter, Battery Pack, Charger, Adaptor
- Portable Instruments (PDA and Cell Phone)
- Voltage Regulation Module (VRM)
- Computer

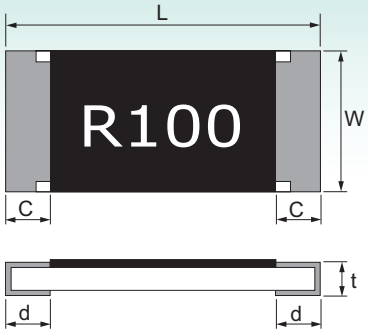
Type Designation

RLH	20	F	E	C	R100
Product Code	**Size**	**Tolerance of Resistance at**	**Packaging**	**Power Rating (70°C)**	**Nominal Resistance**
High Power Low Resistance Chip Resistors	20: 2010 25: 2512 (6.4x3.2mm) 12; 1206	F: ±1.0% G: ±2.0% J: ±5.0%	E: Embossed Tape T: Paper Tape	C=1W D=1.5W E=2W	R100: 100mΩ

RLH High Power Low Resistance Chip Resistors

RoHS Compliant

Dimension



Unit: mm

Type	L	W	C	d	t
RLH12	3.10±0.2	1.55±0.1	0.5±0.30	0.4±0.2	0.55±0.1
RLH20	5±0.20	2.5±0.25	0.6±0.30	0.5±0.25	0.6±0.10
RLH25	6.30±0.2	3.20±0.2	0.6±0.3	0.5±0.25	0.55±0.1

Rating & Characteristics

Type	RLH 12	RLH 20	RLH 25
Power Rating	1W	1W & 1.5W	1W & 1.5W & 2W
Resistance Value	100mΩ~910mΩ	100mΩ~910mΩ	100mΩ~910mΩ
Operation Temperature Range	-55°C~ +155°C	-55°C~ +155°C	-55°C~ +155°C
Temperature Coefficient of Resistance	100ppm/°C	100ppm/°C	100ppm/°C
Tolerance	±1% , ±2% , ±5%	±1% , ±2% , ±5%	±1% , ±2% , ±5%
Insulation Resistance	Over 100M Ω	Over 100M Ω	Over 100M Ω
Maximum Working Voltage(V)	$(P*R)^{1/2}$	$(P*R)^{1/2}$	$(P*R)^{1/2}$

RBL Low Ohm Chip Resistors (Ultra Low)

RoHS Compliant

Scope

Low ohm (10~91mΩ) chip resistors (RBL Series) are made in chip size from 0603 to 2512 by TA-I. These resistors apply as current detecting resistor for applications such as power supplies, computers, HDDs, Cellular telephones, etc.

Features

- Low Resistance and High Accuracy Resistor for Current Detection
- Large Electrode (All series)
- Good Performance for Heat Dissipation
- High Purity Alumina Substrate for High Power Dissipation
- Pb-free to Meet RoHS Requirements

Application

- Power Management Applications
- Switching Power Supply
- DC-DC Converter, Battery Pack, Charger, Adaptor
- Portable Instruments (PDA and Cell Phone)
- Voltage Regulation Module (VRM)
- Computer

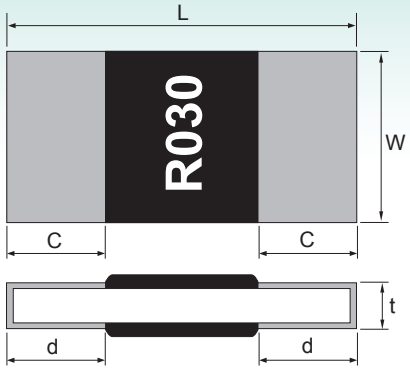
Type Designation

RBL	12	F	T	R020
Product Code	**Size/Power Rating**	**Tolerance Of Resistance at 25°C**	**Packaging**	**Nominal Resistance**
Low Ohmic Chip Resistor	06: 0603/0.25W 10: 0805/0.5W 12: 1206/0.5W 20: 2010/0.75W 25: 2512/1W	F: ±1.0% G:±2.0% J: ±5.0%	T: Paper E: Embossed	R020: 20mΩ

RBL Low Ohm Chip Resistors

RoHS Compliant

Dimension



Unit: mm

Type	L	W	C	d	t
RBL06	1.60±0.1	1.80±0.1	0.47±0.2	0.47±0.2	0.47±0.1
RBL10	2.00±0.1	1.30±0.1	0.55±0.2	0.55±0.2	0.52±0.1
RBL12	3.00±0.1	1.60±0.1	1.10±0.2	1.10±0.2	0.62±0.1
RBL20	5.00±0.2	2.60±0.2	1.80±0.2	1.80±0.2	0.62±0.1
RBL25	6.30±0.2	3.20±0.2	2.0±03	2.0±0.2	0.65±0.1

Electrical Characteristics

Chip Size	Power Rating	TCR (ppm/°C)	Resistance Range (mΩ)			Operating Temp. Range
			F: ±1%	G: ±2%	J: ±5%	
0603	0.25W	±200	10~20			-55°C~ +125°C
		±100	21~91			
0805	0.5W	±200	10~20			
		±100	21~91			
1206	0.5W	±200	10~20			
		±100	21~91			
2010	0.75W	±200	10~20			
		±100	21~91			
2512	1W	±200	10~20			
		±100	21~91			

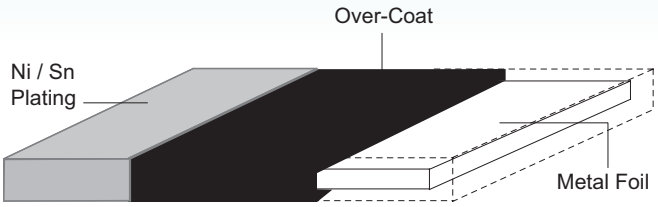
RLM Metal Foil Current Sensing Chip Resistors

RoHS Compliant

Features

- Ultra low resistance (down to 1mΩ), Suitable for large current detecting
- Extremely low TCR
- Over coating: Molding compound UL-94 V-0 grade

Construction



Application

- Power module (VRM) for CPU
- Battery chargers
- Power supply
- DC/DC converter

Type Designation

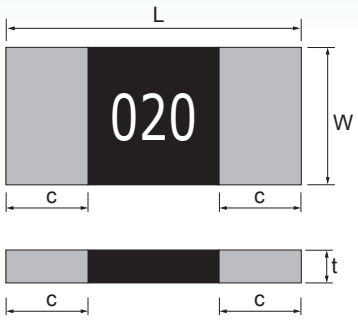
RLM	25	F	E	C	R002
Product Code	**Size**	**Resistance Tolerance**	**Packaging**	**Power Rating (at 70°C)**	**Resistance**
Current Sensing Resistors	10: 0805 (2.0x1.0mm) 12: 1206 (3.2x1.6mm) 20: 2010 (5.0x2.5mm) 25: 2512 (6.4x3.2mm)	F: ±1% G: ±2% J: ±5%	T: Paper E: Embossed Tape	A=1/4W S=1/2W C= 1W D= 3/2W E= 2W B=1/8W I =3/4W	4 Digits (E-96) e.g., R002=2mΩ R010=10mΩ

RLM Metal Foil Current Sensing Chip Resistors

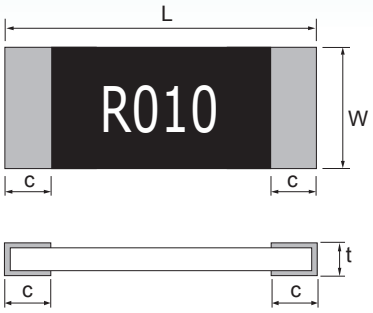
RoHS Compliant

Dimension

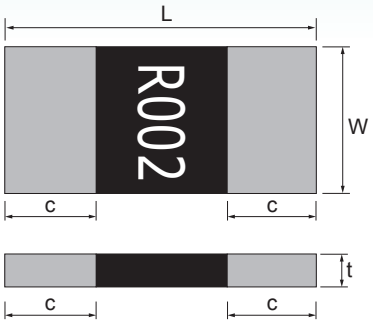
RLM10



RLM20



RLM12/RLM25



Unit: mm

Type	L	W	C	t	Material
RLM 10	2.0±0.1	1.25±0.1	0.4±0.2	0.6±0.2	Metal: Copper-Nickel Alloy or Copper-Manganese Alloy Over Coating: molding Compound UL-94 V-0 grade
RLM 12	3.2±0.2	1.6±0.2	0.5±0.3	0.6±0.2	
RLM 20	5.0±0.2	2.5±0.2	0.6±0.3	0.6±0.2	
RLM 25	6.4±0.2	3.2±0.2	2.0±0.2 (≤3mΩ) 0.9±0.2 (R>3mΩ)	0.6±0.2	

Rating & Characteristic

Type	Power ratings	Resistance Value (mΩ)	Operation Temperature Range(°C)	T.C.R. (ppm/°C)	Tolerance (%)	Insulation Resistance	Maximum Working Voltage (V)
RLM10	1/8W 1/4W 1/2W	5~20	-55°C~+170°C	±100	±1% ±2% ±5%	Over 100MΩ	$(P*R)^{1/2}$
RLM12	1/4W 1/2W 1W	2~30		±100 (2mΩ<R≤10mΩ) ±75 (R>10mΩ)			
RLM20	3/4W 3/2W 1W	5~30		±100 (5mΩ<R≤10mΩ) ±75 (R>10mΩ)			
RLM25	1W	1~50		±275 (R≤1mΩ) ±100 (1mΩ<R≤10mΩ) ±75 (R>10mΩ)			
	2W	1~10					

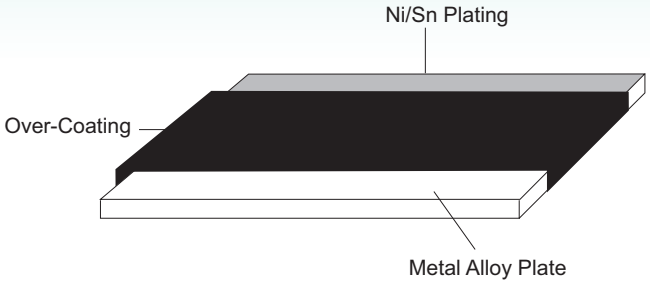
RLN Metal Foil Current Sensing Chip Resistors

RoHS Compliant

Features

- Ultra low resistance, Suitable for large current detecting
- Low temperature rise for high power application
- Extremely low TCR
- Over coating: Molding compound UL-94 V-0 grade

Construction



Application

- Power module (VRM) for CPU
- Battery chargers
- Power supply
- DC/DC converter

Type Designation

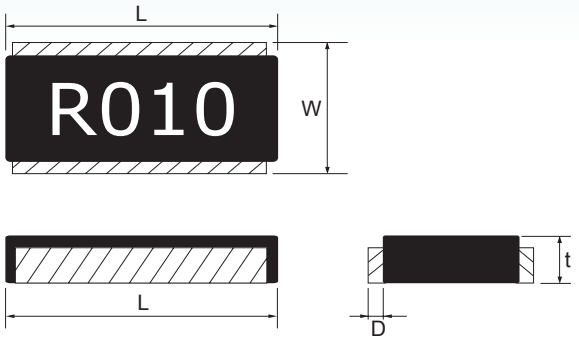
RLN	37	F	E	C	R010
Product Code	**Size**	**Resistance Tolerance**	**Packaging**	**Power Rating (at 70°C)**	**Resistance**
Current Sensing Resistors	37: 3720 06: 0612	F: ±1% G: ±2% J: ±5%	E: Embossed Tape T: paper Tape	S= 1/2W C= 1W	4 Digits (E-96) e.g: R010= 10mΩ R005= 5mΩ

RLN Metal Foil Current Sensing Chip Resistors

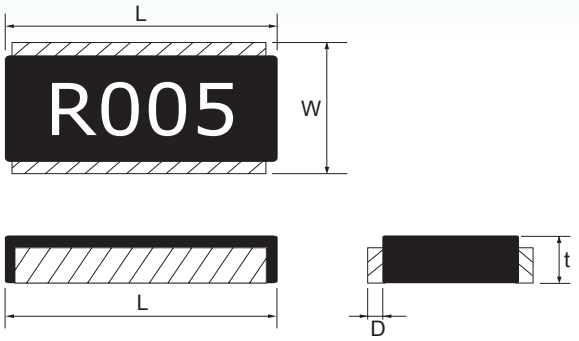
RoHS Compliant

Dimension

RLM3720



RLM0612



Unit: mm

Type	L	W	D	t	Material
RLN37	3.75±0.3	2.3±0.2	0.5±0.2	0.7±0.2	Metal: Copper-Nickel Alloy or Copper-Manganese Alloy Over Coating: molding Compound UL-94 V-0 grade
RLN06	3.2±0.2	1.6±0.2	0.4±0.2	0.6±0.2	Metal: Copper-Nickel Alloy Over Coating: molding Compound UL-94 V-0 grade

Rating & Characteristic

Type	Power ratings	Resistance Value (mΩ)	Operation Temperature Range(°C)	T.C.R. (ppm/°C)	Tolerance (%)	Insulation Resistance	Maximum Working Voltage (V)
RLN37	1/2W 1W*	1~30	-55°C~+170°C	±100	±1% ±2% ±5%	Over 100MΩ	$(P*R)^{1/2}$
RLN06	1/2W 1W	1~10	-55°C~+170°C	±100	±1% ±2% ±5%	Over 100MΩ	$(P*R)^{1/2}$

Note: 1 Watts with total Solder pad and trace size of 300mm²

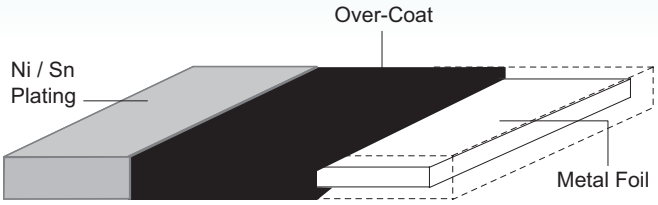
RLP Metal Foil High Power Current Sensing Resistors RLP Series

RoHS Compliant

Features

- Ultra low resistance, Suitable for large current detecting
- Ultra low device surface temperature
- Extremely low TCR
- Over coating: Molding compound UL-94 V-0 grade

Construction



Application

- Power module (VRM) for CPU
- Battery chargers
- Power supply
- DC/DC converter

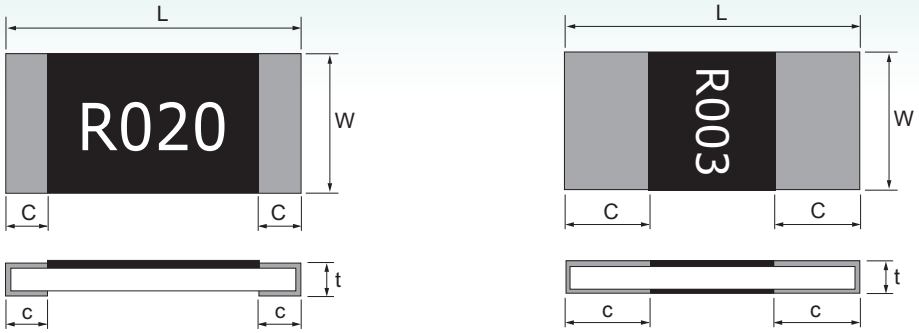
Type Designation

RLP	25	F	E	E	R010
Product Code	**Size**	**Resistance Tolerance**	**Packaging**	**Power Rating (at 70°C)**	**Resistance**
Current Sensing Resistors	25: 2512	F: ±1% G: ±2% J: ±5%	E: Embossed Tape	C= 1W D=1.5W E= 2W G= 3W	e.g: R010= 10mΩ

RLP Metal Foil High Power Current Sensing Resistors RLP Series

RoHS Compliant

Dimension



Unit: mm

Type	L	W	C	t	Material
RLP25	6.4±0.2	3.2±0.2	0.9±0.2 (>3mΩ) 2.0±0.2 (≤3m)	0.7±0.2	Metal: Copper-Nickel Alloy or Copper-Manganese Alloy Over Coating: Molding Compound UL-94 V-0 Grade

Rating & Characteristic

Type	Power ratings	Resistance Value (mΩ)	Operation Temperature Range(°C)	T.C.R. (ppm/°C)	Tolerance (%)	Insulation Resistance	Maximum Working Voltage (V)
RLP25	1W 2W 3W	10~100	-55~+170	±75	±1% ±2% ±5%	Over 100MΩ	$(P*R)^{1/2}$

RLF Four-Terminal Current Sensing Resistors

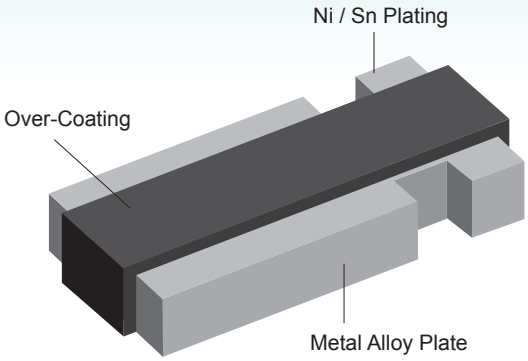
RoHS Compliant

TA-I TECHNOLOGY CO., LTD.

Features

- Ultra low resistance (down to 1mΩ), Suitable for large current detecting
- Extremely low TCR
- Over coating: Molding compound UL-94 V-0 grade
- Accuracy and precision in current sensing

Construction



Application

- Power module (VRM) for CPU
- Battery chargers
- Power supply
- DC/DC converter

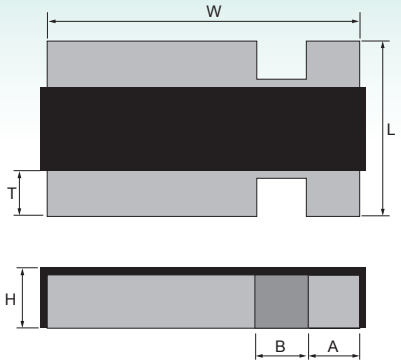
Type Designation

RLF	06	F	E	C	M	R001
Item	Size No	Resistance Tolerance	Packaging	Power Rating	Metal	Resistance
	06: 0612	F: ±1% G: ±2% J: ±5%	E: Embossed tape	S=1/2W C=1 W	M=MnCu	e.g., R001=1mΩ R0005=0.5mΩ

RLF Lead-Free Current Sensing Resistors

RoHS Compliant

Dimension



Unit: mm

Type	L	W	H	T	A	B	Material
RLF06	1.65±0.2	3.05±0.25	0.6±0.2	0.4±0.25	0.51±0.13	0.51±0.13	Metal: Copper-Nickel Alloy Over Coating: molding Compound UL-94V-O grade

Type	RLF
Power Rating	1/2 W & 1W
Resistance Value	0.5mΩ~1mΩ (MnCn) / 1mℓ<R≤5mΩ (NiCu)
Operation Temperature Range	-55°C~ +170°C
Temperature Coefficient of Resistance	± 200ppm/°C (0.5mΩ~0.75mΩ)
	±150ppm/°C→ (1mΩ)
Tolerance	±1% , ±2% , ±5%
Insulation Resistance	Over 100M Ω
Maximum Working Voltage(V)	$(P*R)^{1/2}$

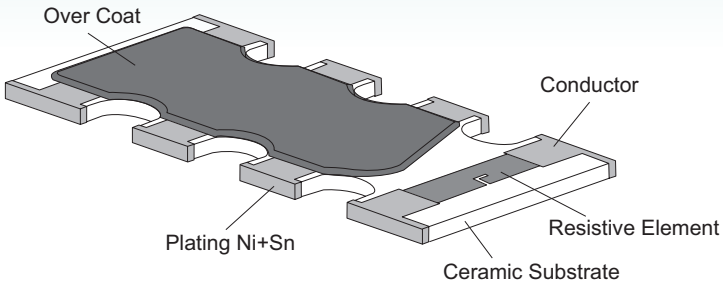
CN Thick Film Chip Resistor Arrays (Networks)-Convex Type

RoHS Compliant

Features

- Less board space than individual chip resistor
- Integrated 2~8 elements for Pull-up / Pull-down circuits

Construction



Application

- Pull-up / Pull-down resistance for digital circuit

Type Designation

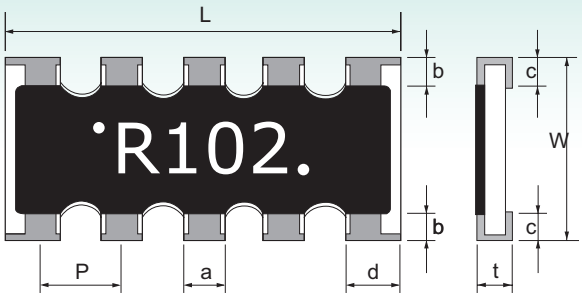
CN	34	J	T N	103
Product Code	**Size**	**Tolerance**	**Packaging**	**Nominal Resistance**
Chip Resistor Arrays (Networks) Convex Type	12: 0201*2 22: 0402*2 24: 0402*4 28: 0402*8 32: 0603*2 34: 0603*4 35: 0603*5	F: ±1% G: ±2% J: ±5%	T: Paper Tape N: Lead Free R: 10P8R (R circuits) S: 10P8R (S circuits) D: 9P8R	3 Digits (E-24) e.g.: 103= 10kΩ 4 Digits (E-96) e.g.: 1540=154Ω

CN

Thick Film Chip Resistor Arrays (Networks)-Convex Type

RoHS Compliant

Dimension



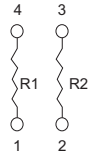
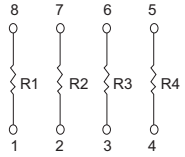
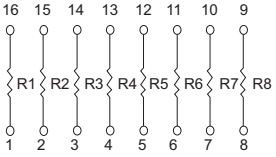
Unit: mm

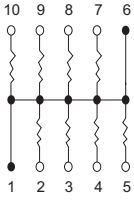
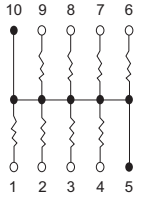
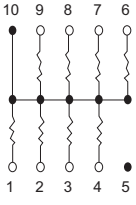
Type	L	W	t	P	a	b	c	d
CN12	0.82±0.1	0.57±0.1	0.35±0.1	0.47±0.1	0.33±0.1	0.15±0.1	0.15±0.1	0.33±0.1
CN22	1.0±0.1	1.0±0.1	0.35±0.1	0.65±0.1	0.33±0.1	0.15±0.1	0.25±0.1	0.33±0.1
CN24	2.0±0.1	1.0±0.1	0.4±0.1	0.5±0.05	0.3±0.1	0.15±0.1 0.25±0.1	0.25±0.1	0.4±0.1
CN28	4.0±0.2	1.6±0.15	0.4±0.1					
CN32	1.6±0.15	1.6±0.15	0.45±0.1	0.76±0.1	0.45±0.1	0.3±0.2	0.3±0.2	0.45±0.1
CN34	3.2±0.2	1.6±0.15	0.50±0.1	0.8±0.05	0.45±0.1	0.3±0.2	0.3±0.2	0.6±0.1
CN35				0.64±0.05	0.35±0.1			0.5±0.1

Rating & Characteristic

Type	Power Rating at 70°C	Rating Voltage	MAX. Working Voltage	MAX. Over-Load Voltage	Operating Temp. (°C)	Resistance Tolerance (%)	Resistance Range (Ω)	Temp Co-efficient ppm/°C
CN12	1/32W	Refer 4.2	12.5V	25V	-55~+125°C	±5% ±2% ±1%	10Ω~1MΩ	±300
CN22	1/16W		25V	50V			10Ω~1MΩ	±250
CN24								
CN28								
CN32			50V	100V			10Ω~1MΩ	±200
CN34			50V	100V				
CN35			25V	50V		±5%	56Ω~100kΩ	±200
CN34			50V	100V			3.0Ω~9.1MΩ	±400
CN32								
CN22			25V	50V				±500
CN24								

Schematic

CN12, CN22, CN32	CN24, CN34	CN28, 16P8R
 R1= R2	 R1=R2=R3=R4	 R1=R2.....R8

CN35 10P8R		9P8R
(S Circuit)	(R Circuit)	(D Circuit)
		

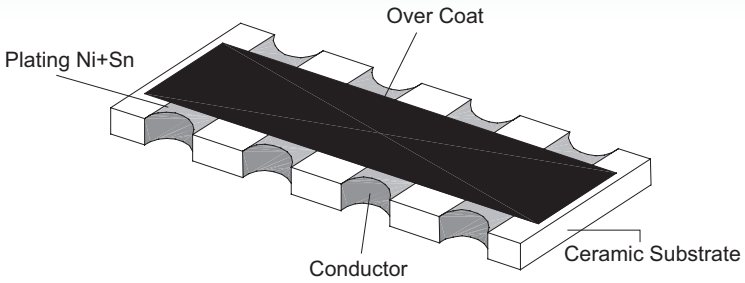
CNC Thick Film Chip Resistors Arrays (Networks)-Concave Type

RoHS Compliant

Features

- Less board space than individual chip resistor
- Integrated 2~4 elements for Pull-up / Pull-down circuits

Construction



Application

- Pull-up / Pull-down resistance for digital circuit

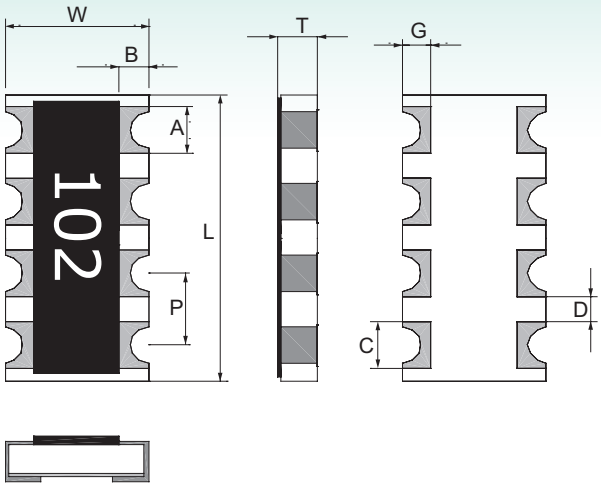
Type Designation

CNC	34	J	T N	102
Product Code	**Size**	**Tolerance**	**Packaging**	**Nominal Resistance**
Chip Resistor Arrays (Network) Concave Type	22: 0402-X2 24: 0402-X4 34: 0603-X4	J: ±5%	T: Paper Tape N: Lead Free	3 digits e.g., (E-24) 102=1kΩ

CNC Thick Film Chip Resistors Arrays (Networks)-Concave Type

RoHS Compliant

Dimension



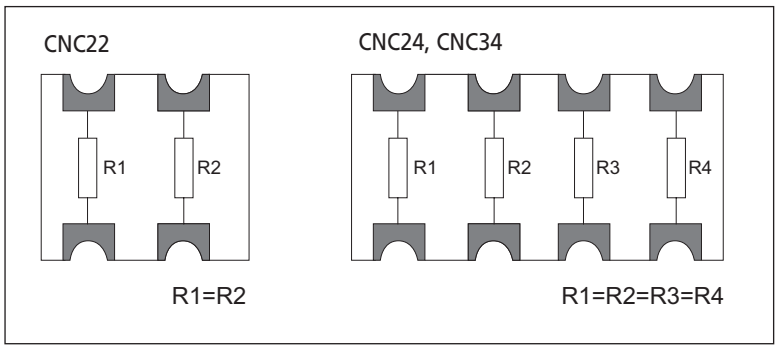
Unit: mm

Type	L	W	T	P	A	B	C	D	G
CNC22	1.0±0.1	1.0±0.1	0.3±0.1	0.5±0.1	0.35±0.1	0.25±0.15	0.35±0.1	0.15±0.1	0.25±0.15
CNC24	2.0±0.1	1.0±0.1	0.4±0.1	0.5±0.1	0.3±0.1	0.2±0.1	0.3±0.1	0.15±0.1	0.25±0.15
CNC34	3.2±0.2	1.5±0.2	0.55±0.1	0.8±0.1	0.6±0.1	0.3±0.2	0.5±0.1	0.25±0.1	0.35±0.15

Rating & Characteristic

Type	Power Rating at 70°C	MAX. Working Voltage	MAX. Over-Load Voltage	Operating Temp. (°C)	Resistance Tolerance (%)	Resistance Range (Ω)	Temp Co-efficient ppm/°C
CNC22	1/16W	25V	50V	-55~+125°C	±5%	10Ω~1MΩ	≤±300
CNC24							≤±300
CNC34		50V	100V				±200

Schematic



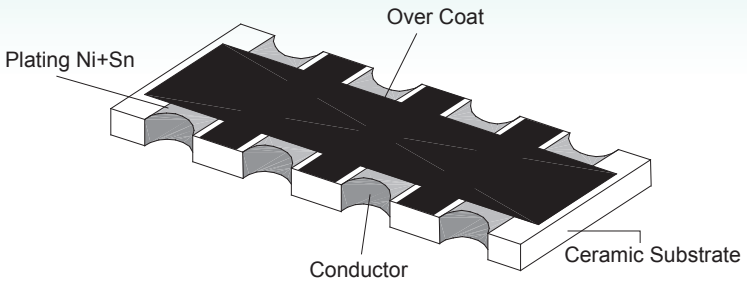
CNCS Anti-Sulfurated Thick Film Chip Resistor Arrays

RoHS Compliant

Features

- Less board space than individual chip resistor
- Integrated 2~4 elements for Pull-up / Pull-down circuits
- Low Profile
- Low Paratics
- High Integration Potential

Construction



Application

- Pull-up / Pull-down resistance for digital circuit
- RAM Module

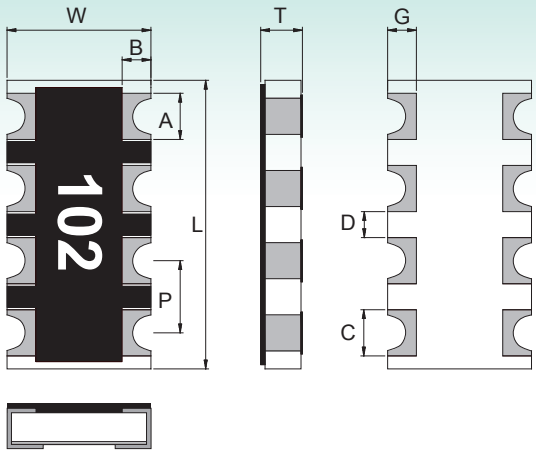
Type Designation

CNCS	34	J	T	102
Product Code	**Size Power Rating**	**Tolerance**	**Packaging**	**Nominal Resistance**
Thick Anti-Sulfurated Chip Resistor Arrays Concave type	34: 0603 x 4	J: ±5%	T: Paper tape	3 digits (E-24) e.g., 102=1kΩ

CNCS Anti-Sulfurated Thick Film Chip Resistor Arrays

RoHS Compliant

Dimension

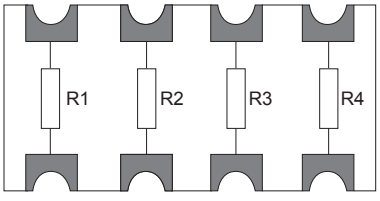


Type	L	W	T	P	A	B	C	D	G
CNCS34	3.2±0.2	1.5±0.2	0.55±0.1	0.8±0.1	0.6±0.1	0.3±0.2	0.5±0.1	0.25±0.1	0.35±0.15

Rating & Characteristics

Type	Power Rating at 70°C	Rating Voltage	MAX. Working Voltage	MAX. Over-Load Voltage	T.C.R (PPM °C)	Resistance Tolerance(%)	Resistance Range (Ω)	Temp Coefficient PPM/°C
CNCS34	1/16W	Refer 4.2	50V	100V	-55~+125°C	±5%	10Ω~1MΩ	±200

Schematic



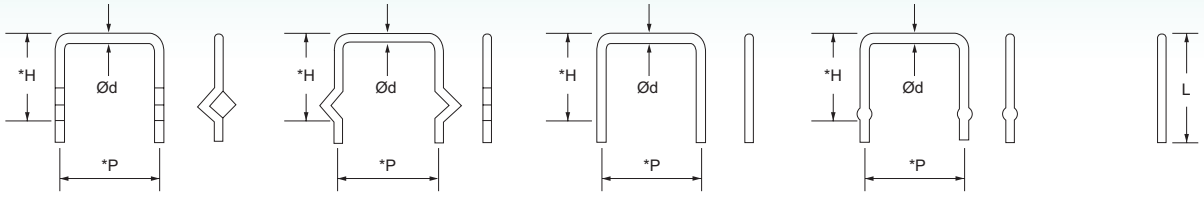
R1=R2=R3=R4

MR Mini Ohmic Resistors (Wire Type)

RoHS Compliant

TA-I TECHNOLOGY CO., LTD.

Construction



M Type H Type C Type N Type E Type

Features

- Customized Pitch and height are available.

Application

- Low resistance for power supply current detection.

Type Designation

MR	08	J	M	A	0200	F
Product Code	**Diameter**	**Tolerance**	**Forming Type**	**Pitch**	**Resistance**	**Plating**
Mini Ohmic Resistors	0.8: 0.8mm wire	J : ±5% K: ±10% N: No Tolerance	M H C N E	A=5 B=10 C=12.5 D=15 E=2.50 F=20 G=25 H=7.2 I=17.74 J=17 K=20.32 M=7.5 N=13.15/13.6 S=26 unit: mm	0200=20mΩ	N=Unplated F=Lead Free

MR Mini Ohmic Resistors (Wire Type)

RoHS Compliant

Rating & Characteristic

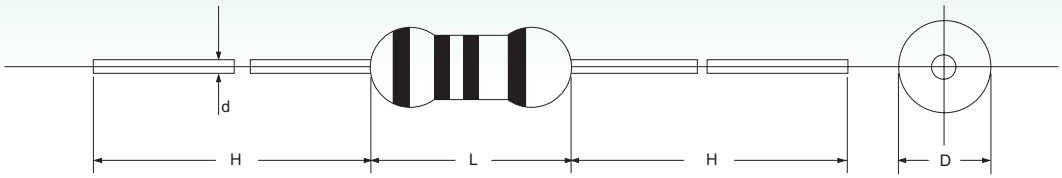
Ød (mm)	Max Current Rating	Resistance Tolerance	Operating Temp (°C)	Temp Coefficient PPM/°
0.4	2.0	J: ±5% K: ±10%	-55~+155°C	CMW Wire: ±50ppm/°C CN49 Wire: ±100ppm/°C CN30 Wire: ±200ppm/°C CN Wire: ±300ppm/°C (Raw material)
0.5	2.5			
0.6	3.0			
0.7	4.0			
0.8	4.5			
0.9	5.0			
1.0	5.5			
1.1	6.0			
1.2	7.0			
1.3	7.5			
1.4	8.0			
1.5	9.0			
1.6	9.5			
1.8	11.0			
2.0	12.0			

Note: Except for the above standardized products, We also provide the Customized products.

RDF Flameproof Carbon Film Resistors

RoHS Compliant

Dimension



Unit: mm

Type	L	D	H	d
RDF16 RDF25S	3.2±0.5	1.7±0.3	28±2	0.45±0.05
RDF25 RDF50S	5.7±0.5	2.3±0.3	26±2	0.55±0.05
RDF50	9.0±0.5	3.2±0.5	26±2	0.6±0.05

Type Designation

RDF	25 S	J	X	103
Product Code	**Series**	**Resistance Tolerance**	**Forming and Packaging**	**Nominal Resistance**
Flameproof Carbon Film Resistors	16: 1/8W (1/6W) 25: 1/4W 50: 1/2W S : miniature Size	G:±2% J: ±5%	X: T52 Y: T26 H: H Type M: M Type U: U Type R: Radial Tape P: P Type	10KΩ

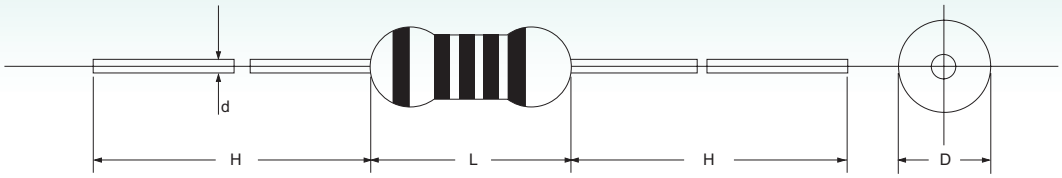
Rating & Characteristic

Type		Power Rating at 70°C	MAX. Working Voltage	MAX. Over-Load Voltage	Operating Temp. (°C)	Resistance Range (Ω)	Temp Co-efficient ppm/°C
RDF16		1/8W	200V	400V	-55~+155 °C	±2% 10Ω~1MΩ ±5% 1Ω~10MΩ	<100K +350 -500 >100K +350 I 1MΩ -500 >1MΩ +350 -700
RDF25	RDF25S	1/4W	250V	500V			
RDF50	RDF50S	1/2W	350V	600V			

RN Metal Film Resistors

RoHS Compliant

Dimension



Unit: mm

Type	L	D	H	d
RN16 RN25S	3.3±0.5	1.7±0.3	28±2	0.45±0.05
RN25 RN50S	6.5±0.5	2.4±0.3	28±2	0.56±0.05
RN20	9.2±0.5	3.3±0.5	28±2	0.6±0.05

Type Designation

RN	25 S	F	X	1002
Product Code	**Series**	**Resistance Tolerance**	**Forming and Packaging**	**Nominal Resistance**
Metal Film Resistors	16: 1/8W (1/6W) 25: 1/4W 50: 1/2W S : Miniature Size	D: ±0.5% F: ±1% B: ±0.1% J: ±5%	X: T52 Y: T26 M: M Type U: U Type R: Radial Tape H: H Type	10KΩ

Rating & Characteristic

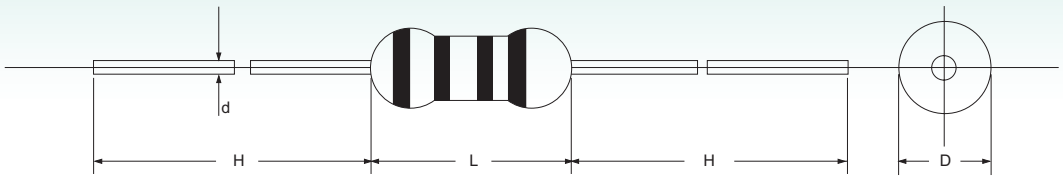
Type		Power Rating at 70°C	MAX. Working Voltage	MAX. Over-Load Voltage	Operating Temp. (°C)	Resistnce Tolerance (%)	Resistance Range (Ω)	Std Res. Value	Temp Co-efficient ppm/°C
RN16		1/8W	200V	400V	-55~+155	±0.5% ±1%	10Ω~1MΩ	E-96	±50 ±100
RN25	RN25S	1/4W	250V	500V					
RN50	RN50S	1/2W	350V	700V					

RS Metal Oxide Film Resistors (Flame Proof)

RoHS Compliant

TA-I TECHNOLOGY CO., LTD.

Dimension



Unit: mm

Type		L	D	H	d
RS50S		6.5±0.5	2.4±0.5	28±2	0.6±0.05
RS50	RS1BS	9±1	3.5±0.5	30±3	0.6±0.05
RS1B	RS2BS	11±1	4.5±1	30±3	0.8±0.05
RS2B	RS3BS	15±1	6.0±1	30±3	0.8±0.05
RS3B	RS5BS	25±1	9.0±1	30±3	0.8±0.05
RS5B		41±1	9.0±1	30±3	0.8±0.05

Type Designation

RS	1B[S]	J	X	103
Product Code	**Series**	**Resistance Tolerance**	**Forming and Packaging**	**Nominal Resistance**
Metal Oxide Film Resistors	50-1/2W 3B-3W 1B-1W 5B-5W 2B-2W [S]: Miniature Size	G: ±2% J: ±5%	X: T52 Y: T26 M: M Type U: U Type R: Radial Tape P: P Type Z: T73	10KΩ

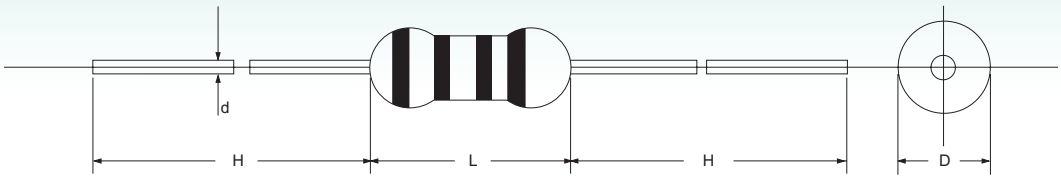
Ratings & Characteristics

Type		Power Rating at 70°C	MAX. Working Voltage	MAX. Over-Load Voltage	Operating Temp. (°C)	Resistnce Tolerance (%)	Resistance Range (Ω)	Std Res. Value	Temp Co-efficient ppm/°C
RS50	RS50S	1/2W	250V	400V	-55~+155	±2% ±5%	0~100KΩ	E-24	±350
RS1B	RS1BS	1W	350V	600V					
RS2B	RS2BS	2W	350V	600V			0~120KΩ		
RS3B	RS3BS	3W	500V	800V			0~150KΩ		
RS5B	RS5BS	5W	750V	1000V					

FKN Fusible Wire Wound Resistors (Flame Proof)

RoHS Compliant

Dimension



Unit: mm

Type	Power Rating	D±1	L±1	H±3	d±0.05	Resistance Range (Ω)	Temp Co-efficient PPM/°C
FKN1BS	1W	3.5	6.5	28	0.6	0.1 - 100	±300
FKN2BS	2W	4.0	9	30	0.8	0.1 - 120	

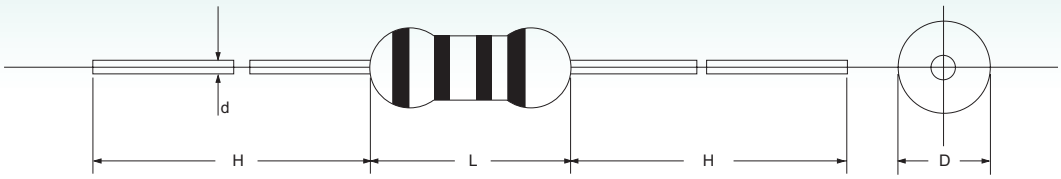
Type Designation

FKN	1B	J	X	100
Product Code	**Series**	**Resistance Tolerance**	**Forming and Packaging**	**Nominal Resistance**
Fusible Wire Wound Resistors	1B: 1W 2B: 2W [S]: Miniature Size	G: ±2% J: ±5%	X: T52 M: M Type U: U Type Z: T73 P: P Type	10Ω

KN Wire Wound Resistors (Flame Proof)

RoHS Compliant

Dimension



Unit: mm

Type	Power Rating	D±1	L±1	H±3	d±0.05	Resistance Range (Ω)	Temp Co-efficient PPM/°C
KN1B	1W	4.0	11	30	0.8	0.1 - 100	±300
KN2B	2W	5.0	15	30	0.8	0.1 - 120	
KN3B	3W	6.0	17	38	0.8	0.1 - 180	
KN4B	4W	6.0	17	38	0.8	0.1 - 180	
KN5B	5W	8.0	24	38	0.8	0.1 - 300	
KN6B	6W	8.0	24	38	0.8	0.1 - 300	
KN7B	7W	8.0	24	38	0.8	0.1 - 300	
KN8B	8W	8.0	40	38	0.8	0.3 - 2K	
KN10B	10W	8.0	52	38	0.8	0.3 - 2K	
KN50	0.5W	3.0	9	30	0.6	0.1 - 100	

Type Designation

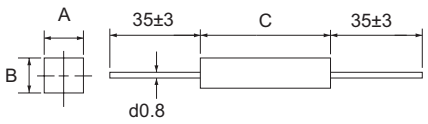
KN	P	1B	J	X	100
Product Code	**Type**	**Series**	**Resistance Tolerance**	**Forming and Packaging**	**Nominal Resistance**
Wire Wound Resistors	P: Inductance D: Non-Inductance	1B: 1W 2B: 2W 3B: 3W | 10B: 10W 50: 1/2W S: Miniature Size	F: ±1% G: ±2% J: ±5%	X: T52 M: M Type U: U Type Z: T73	10Ω

SQ Cement Type Resistors (Wire Wound & Metal Oxide Film)

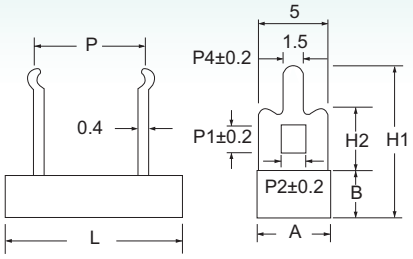
RoHS Compliant

Dimension

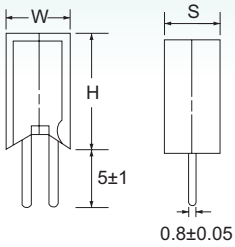
P Type



Z Type



M Type



Unit: mm

Type (SQP/SQZ/SQM)	A±1	B±1	C±1	L±1.5	W±1	H±1	S	P±1.5	P1	P2	H±1	H2±2
3B	8	8	22		12	25	8					
5B	9.5	9.5	22	27	13	25	9	15	4.0	2	25	10.5
7B	9.5	9.5	35	35	13	39	9	22	4.0	2	25	10.5
10B	9.5	9.5	48	48	13	51	9	32	4.0	2	25	10.5

Type Designation

SQ	3B	J	P	102
Product Code	**Series**	**Forming and Packaging**	**Type**	**Nominal Resistance**
Cement Type Resistors	3B: 3W 5B: 5W 7B: 7W 10: 10W 2B: 2W	J: ±5% K: ±10%	P: P Type Z: Z Type M: M Type	1KΩ

Rating & Characteristic

Type	Power Rating at 70°C	MAX. Working Voltage	MAX. Over-Load Voltage	Resistnce Tolerance (%)	Resistance Range Ω)	Std Res. Value
3B	3W	350V	700V	J±5% K±10%	0.05Ω~100KΩ	E-24
5B	5W	350V	700V		0.05Ω~100KΩ	
7B	7W	500V	1000V		0.1Ω~1KΩ	
10B	10W	750V	1500V		0.1Ω~10KΩ	

SMD Marking

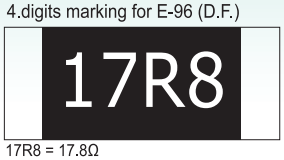
RoHS Compliant

Resistance Marking for SMD Resistors

3.digits marking for E-24 (G.J.)

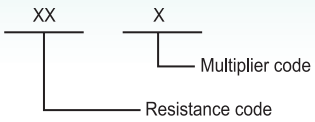
683 = 68000Ω = 68KΩ

4.digits marking for E-96 (D.F.)



17R8 = 17.8Ω

Coding Formula



3. Rx06 E-96 marking
3 digits marking for E-96 (F)

50C = 32.4KΩ

Size ≤ Rx0402, Size ≤ Cx22
Size ≤ Cx14

NO marking

Example (0603):

$10.2K\Omega = \frac{102}{02} \times \frac{10^{2}}{C}\Omega = 02C$

$33.2\Omega = \frac{332}{51} \times \frac{10^{-1}}{X}\Omega = 51X$

Multiplier code

Type	A	B	C	D	E	F	X	Y	Z
Multiplier	10^{0}	10^{1}	10^{2}	10^{3}	10^{4}	10^{5}	10^{-1}	10^{-2}	10^{-3}

Rx06 Resistance code

Value	Code	Value	Code	Value	Code	Value	Code
100	01	178	25	316	49	562	73
102	02	182	26	324	50	576	74
105	03	187	27	332	51	590	75
107	04	191	28	340	52	604	76
110	05	196	29	348	53	619	77
113	06	200	30	357	54	634	78
115	07	205	31	365	55	649	79
118	08	210	32	374	56	665	80
121	09	215	33	383	57	681	81
124	10	221	34	392	58	698	82
127	11	226	35	402	59	715	83
130	12	232	36	412	60	732	84
133	13	237	37	422	61	750	85
137	14	243	38	432	62	768	86
140	15	249	39	442	63	787	87
143	16	255	40	453	64	806	88
147	17	261	41	464	65	825	89
150	18	267	42	475	66	845	90
154	19	274	43	487	67	866	91
158	20	280	44	499	68	887	92
162	21	287	45	511	69	909	93
165	22	294	46	523	70	931	94
169	23	301	47	536	71	953	95
174	24	309	48	549	72	976	96

SMD E12 ~ E96 Values

RoHS Compliant

Standard Resistance Values & Symbols for SMD Resistors

E12	E24	E96	E12	E24	E96
10	10	100	33	33	
		102			332
		105			340
		107			348
	11	110			357
		113		36	
		115			365
		118			374
12	12				383
		121	39	39	
		124			392
		127			402
	13	130			412
		133			422
		137		43	
		140			432
		143			442
		147			453
15	15	150			464
		154	47	47	
		158			475
	16				487
		162			499
		165		51	
		169			511
		174			523
		178			536
18	18				549
		182	56	56	
		187			562
		191			576
		196			590
	20	200			604
		205			619
		210		62	
		215			634
22	22				649
		221			665
		226	68	68	
		232			681
		237			698
	24				715
		243			732
		249		75	750
		255			768
		261			787
		267			806
27	27		82	82	
		274			825
		280			845
		287			866
		294			887
	30				909
		301		91	
		309			931
		316			953
		324			976

SMD Package Reel Quantity & Size

RoHS Compliant

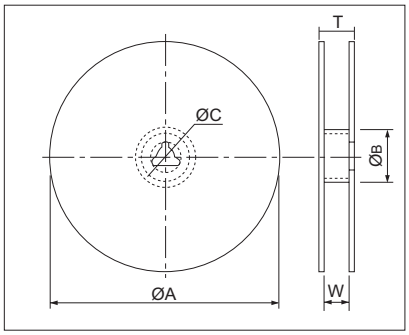
Packaging for SMD Components

Packaging

Unit: pcs

Type \ Package Series		Package Tape		Embossed Plastic Tape 4mm pitch
		4mm pitch 178mm/R	2mm pitch 178mm/R	
RM	01		10000	
RM	02		10000	
CF,CFS,RM,RT,RB,MS,UMS,NT	04		10000	
CF,CFS,RM,RL,RT,RB,MS,UMS,NT	06	5000	10000	
RM,RL,RT,RB	10	5000		
CF,CFS,RM,RL,RT,RB,RH	12	5000		
RM,RT	13	5000		
RM,RL,RH,RLP	20			4000
RM,RL,RLM,RLP	25			4000
CN,CNC	22		10000	
CN,CNC,MSA,UMSA	24		10000	
CN	28	5000		
CN	32	5000		
CN,CNC,MSA,UMSA	34	5000		
CN	35	5000		
RLN	37			4000

Reel Specifications



Unit: mm

Package	ØA	ØB	ØC	W	T
MSA 24, 34 UMSA 24, 34 MS 04, 06 UMS 04, 06 CF 04, 06, 12 CFS 04, 06, 12 NT 04, 06 RX 01, 02, 04, 06, 10, 12, 13 CN 12/22/24/28/32/34/35 CNC 22/24/34	178±2	60 or more	13.0±1.0	9.0±1.0	11.5±1
RX 20, 25				13.0±1.0	15.5±1

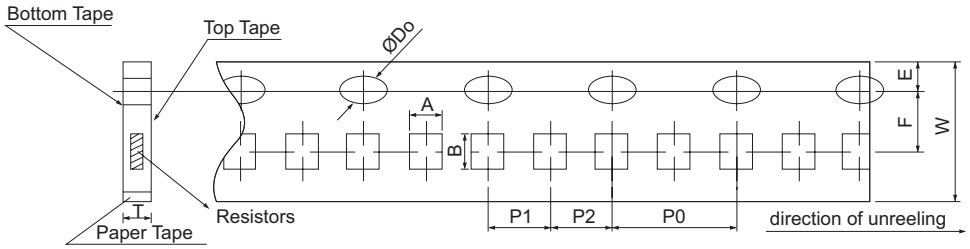
SMD Paper Tape Reel Dimension

RoHS Compliant

Packaging for SMD Components

Paper Tape Specifications

2mm pitch paper

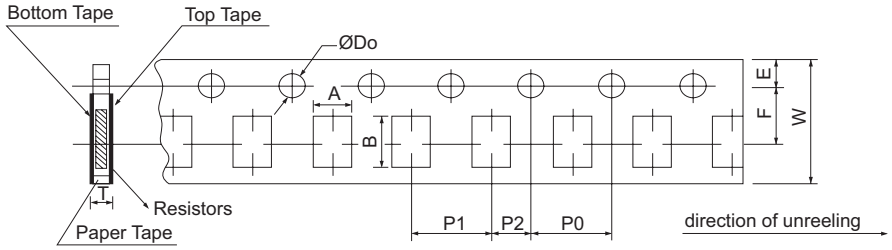


Unit: mm

Type	A	B	W	F	E	P_1	P_2	P_0	$ØD_0$	T
01	0.24±0.05	0.45±0.1	8.0±0.2	3.5±0.05	1.75±0.1	2.0±0.1	2.0±0.05	4.0±0.1	$1.5^{+0.1}_{-0}$	0.40±0.1
02	0.37±0.05	0.67±0.1				2.0±0.1	2.0±0.05			0.37±0.1
04	0.7±0.05	1.2±0.05				2.0±0.1	2.0±0.1			0.45±0.1
06	1.1±0.1	1.9±0.1				2.0±0.1	2.0±0.1			0.64±0.1

Type	A	B	W	F	E	P_1	P_2	P_0	$ØD_0$	T
CN12	0.7±0.1	1.0±0.1	8.0±0.2	3.5±0.05	1.75±0.1	2.0±0.1	2.0±0.05	4.0±0.1	$1.5^{+0.1}_{-0}$	0.40±0.1
CN22	1.2±0.15	1.2±0.1								0.45±0.1
CN24		2.2±0.2								0.64±0.1
CNC22	1.2±0.1	1.2±0.1								0.45±0.1
CNC24	1.2±0.1	2.2±0.1								$0.6^{+0.2}_{-0}$

4mm pitch paper



Unit: mm

Type	A	B	W	F	E	P_1	P_2	P_0	$ØD_0$	T
06	1.1±0.1	1.9±0.1	8.0±0.2	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.1	$1.5^{+0.1}_{-0}$	0.64±0.1
10	1.6±0.15	2.4±0.2								0.84±0.1
12	2.0±0.15	3.6±0.2								
13	2.8±0.2	3.6±0.2								

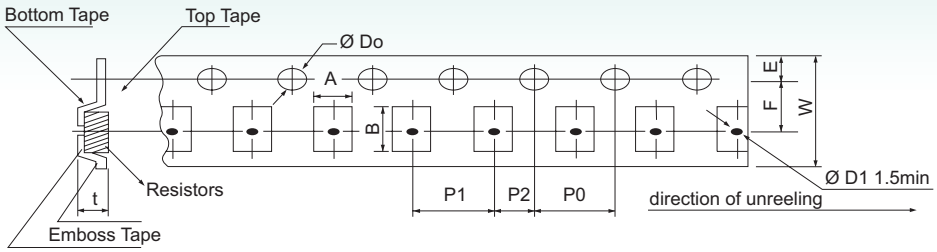
Type	A	B	W	F	E	P_1	P_2	P_0	$ØD_0$	T
CN28	1.9±0.2	4.3±0.2	8.0±0.2	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.1	$1.5^{+0.1}_{-0}$	0.84±0.1
CN32	1.8±0.2	1.8±0.2								
CN34, 35	2.0±0.15	3.6±0.2								
CNC34	2.0±0.15	3.6±0.2								

SMD Embossed Plastic Tape Dimension & Land Patterns

RoHS Compliant

Embossed Plastic Tape Specifications

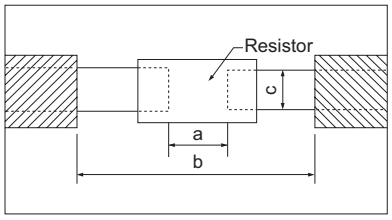
4mm pitch paper



Unit: mm

Type	A	B	W	F	E	P_1	P_2	P_0	$ØD_0$	t
20	2.8±0.2	5.3±0.2	12.0±0.2	5.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.05	$1.5^{+0.1}_{-0}$	0.85±0.15
25	3.6±0.2	6.9±0.2								
37	2.6±0.2	4.5±0.2	12.0±0.2	5.5±0.1	1.75±0.1	4.0±0.1	2.0±0.2	4.0±0.1	1.55±0.05	1.1±0.1

Recommended land patterns for SMD Resistors

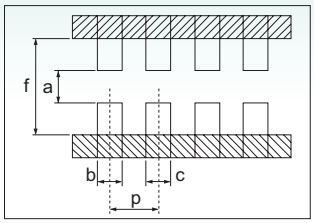


Land pattern / Type	Series	Dimension (mm) a	b	c
RM	01 (01005)	0.15~0.2	0.5~0.7	0.20~0.25
RM	02 (0201)	0.25~0.3	0.7~0.9	0.4~0.5
CF CFS NT MS UMS RM RT RB	04 (0402)	0.50~0.6	1.4~1.6	0.5~0.6
CF CFS NT MS UMS RM RL RT RB	06 (0603)	0.7~0.9	2.0~2.2	0.8~1.0
RM RL RT RB	10 (0805)	1.0~1.4	3.2~3.8	0.9~1.4
CF CFS RM RL RT RB RH	12 (1206)	2.0~2.4	4.4~5.0	1.2~1.8
RM RT	13 (1210)	2.0~2.4	4.4~5.0	2.3~3.5
RLP RM RL RH	20 (2010)	3.3~3.7	5.7~6.5	2.3~3.5
RLM RLP RM RL	25 (2512)	3.6~4.0	7.6~8.6	2.3~3.5

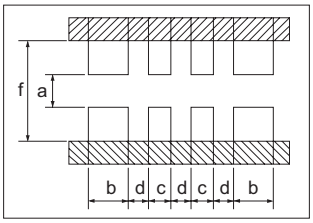
SMD Land Patterns & Solder Pad

RoHS Compliant

Recommended land patterns for SMD Array Products

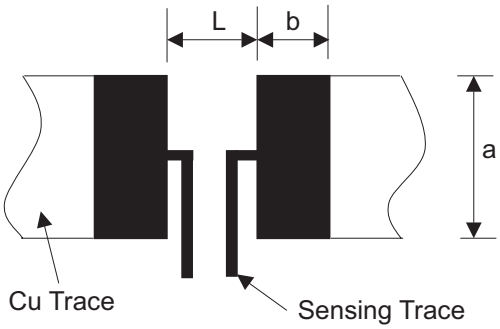


Type \ Land pattern / Series	Dimension (mm)				
	a	b	c	p	f
CN 12	0.3	0.3	0.3	0.5	0.9
CN 22	0.5	0.35~0.4	0.35~0.4	0.65	1.4~1.5
CN 32	0.7~0.9	0.4~0.5	0.4~0.5	0.8	2.2~2.6
CN 34	0.7~0.9	0.4~0.5	0.4~0.5	0.8	2.2~2.6
CN 35	0.7~0.9	0.4~0.5	0.3~0.4	0.64	2.2~2.6
CNC 22	0.4~0.5	0.25~0.3	0.25~0.3	0.5	2.0
CNC 24	0.4~0.5	0.25~0.3	0.25~0.3	0.5	2.0
CNC 34	07~0.9	0.40~0.45	0.40~0.45	0.8	2.2~2.6



Type \ Land pattern / Series	Dimension (mm)				
	a	b	c	d	f
CN 24	0.4	0.525	0.25	0.25	1.4
CN 28	1.0	0.425	0.25	0.25	2.0

Recommanded Solder Pad Dimension For Current Sensing Products



Unit: mm

	Parameters	a	b	L
RLM/P 25	1~2 mΩ	4.0	3.1	1.3
	3~100mΩ	4.0	2.1	4.1
RLN 37	1/2 W	4.2	1.3~1.6	0.5~1.2
	1 W	7.9	1.3~1.6	0.5~1.2
RLM/P 20	-	3.1	2.7	3.1
RLM 12	-	1.8	1.3	1.4

Leaded Type Resistor Spec.

RoHS Compliant

Colorcode

COLOR	1ST BAND	2ND BAND	3RD BAND	MULTIPLIEN	TOLERANCE
BLACK	0	0	0	1Ω	
BROWN	1	1	1	10Ω	±1% (F)
RED	2	2	2	100Ω	±2% (G)
ORANGE	3	3	3	1KΩ	
YELLOW	4	4	4	10KΩ	
GREEN	5	5	5	100KΩ	±0.5% (D)
BLUE	6	6	6	1MΩ	±0.25% (C)
VIOLET	7	7	7	10MΩ	±0.10% (B)
GRAY	8	8	8		±0.05%
WHITE	9	9	9		
GOLD				0.1	±5% (J)
SILVER				0.01	±10% (K)

Temperature Coefficient

Unit: ppm

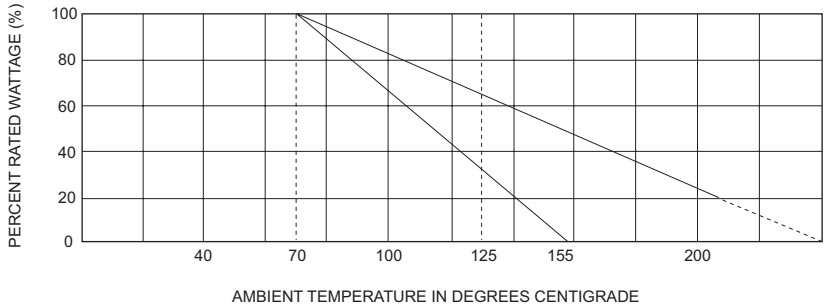
Symbol	T	E	C.H	D.K	J	L	D
T.C.R	±10	±25	±50	±100	±150	±200	+200 -500

Resistance Tolerance

Unit: %

Symbol	A	B	C	D	F	G	J	K	M
Resistance Tolerance	±0.05	±0.1	±0.25	±0.5	±1	±2	±5	±10	±20

Derating Curve

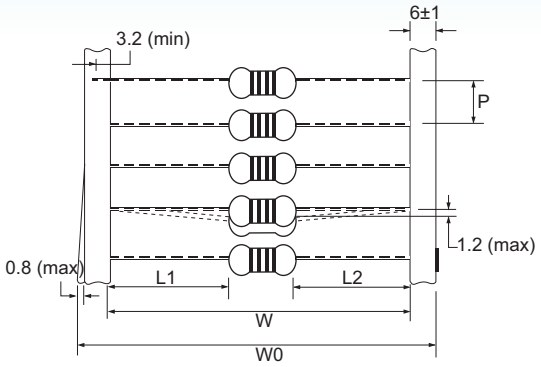


Leaded Type Resistor Package

RoHS Compliant

Standard Packaging

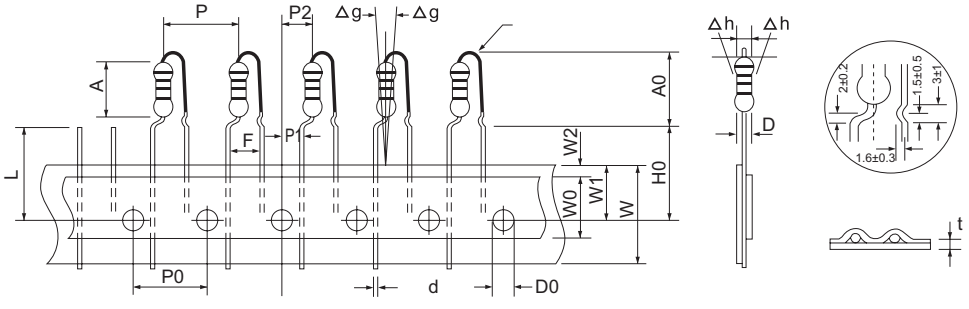
Axial Tape



Unit: mm

Series	W ±1	W0 ±1	P ±3	L1-L2 max
16, 25S	52	64	5	0.8
	26	38		
25, 50S	52	64	5	0.8
	26	38		
50, 1BS	52	64	5	1.2
1B, 2BS	73	85	5	1.5
	52	64		
2B, 3BS	73	85	10	1.5
	52	64		

Radial Tape



Series: 25, 50S, 1BS, 50

Unit: mm

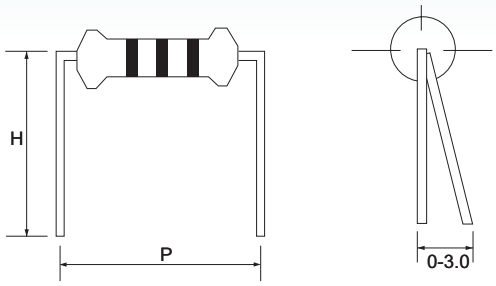
Code	Dimension	Code	Dimension	Code	Dimension	Code	Dimension
P	12.7±1.0	W_2	3mm (max)	W	18.0±1.0	Δh	0±2
P_0	12.7±0.3	H_0	16.5±0.5	W_0	5mm (min)	D	2.5mm (max)
P_1	3.85±0.7	A_0	1.25mm (max)	W_1	9.0±0.5	A	7.0mm (max)
P_2	6.35±0.4	D_0	4.0±0.2	t	0.7±0.2	d	0.60±0.06
F	$5.08^{+0.6}_{-0.2}$	L	11mm (max)	Δg	0±3.0°		

Leaded Type Resistor Forming

RoHS Compliant

Forming

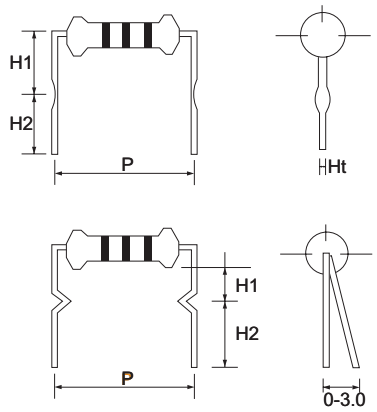
H Type



Unit: mm

Series	Dimension	
	P±1	H±1
16, 25S	5.0	5.0
25, 50S	10.0	10.0
50, 1BS	12.5	10.0
1B, 2BS	15.0	10.0
2B, 3BS	20.0	15.0

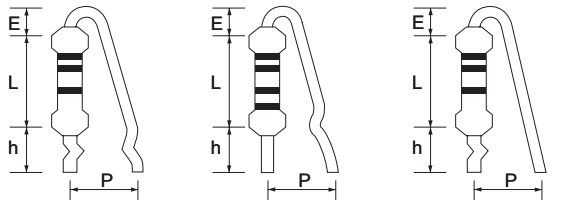
M Type



Unit: mm

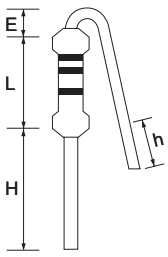
Series	Dimension			
	P±1	H_1±1	H_2±1	t±0.2
50, 1BS	12.5	6.0	5.0	1.1
1B,2BS	15	6.0	5.0	1.4
2B, 3BS	20	7.0	5.0	1.4
3B, 5BS	30	13.0	5.0	1.4

U Type



Unit: mm

Series	Dimension			
	P±1	h±1	L±1	E max
25, 50S	5-7	10	6.5	3.5
50, 1BS	5-7	10	9	3.5
1B, 2BS	5-7	10	12	3.5
2B, 3BS	5-7	10	16	3.5
3B, 5BS	10-12	10	25	3.5



Unit: mm

Series	Dimension			
	L±0.2	H±0.1	h min	E max
16, 25S	3.2	15	9	3.5