Extra - High Power Thick Film Chip Resistor Kit

RoHS Compliant

1. Scope: This specification for approval relates to Extra - High Power Thick Film Chip Resistors (KIT).
2. Type designation: The type designation shall be in the following form:

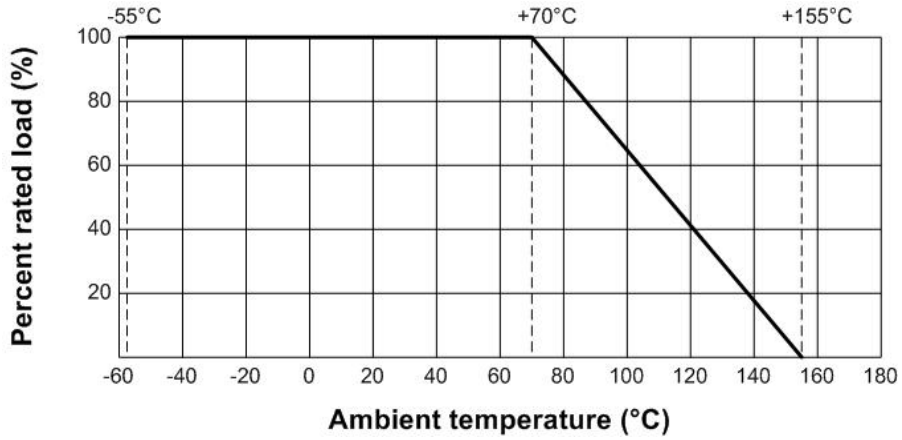
Type	Power Rating	Resistance tolerance	Nominal Resistance
2512	3W	J	10Ω

3. Ratings:

Type	2512
Power Rating at 70°C	3W
Max. Working Voltage	250 V
Max. Overload Voltage	500 V
Dielectric Withstanding Voltage	500 V
Temperature Range	-55°C to +155°C
Ambient Temperature	70°C

3.1 Power rating:
Resistors shall have a power rating based on continuous load operation at an ambient temperature of 70°C . For temperature in excess of 70°C , The load shall be derate as shown in figure 1.

Figure 1

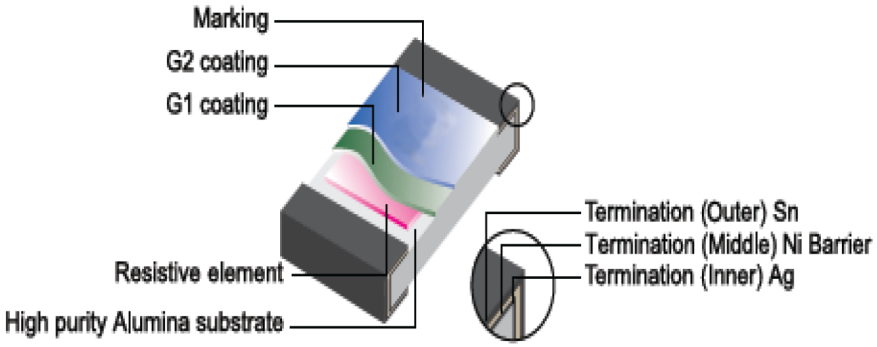


3.2 Nominal Resistance : Effective figures of nominal resistance shall be in accordance with E-24 series

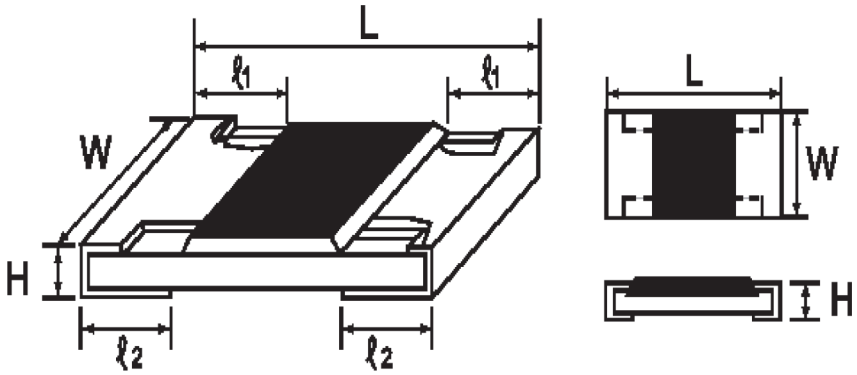
Extra - High Power Thick Film Chip Resistor Kit

multicomp PRO

4. Construction



5. Power rating and dimensions



Dimension

Type	Dimension (mm)				
	L ±0.1	W ±0.15	H ±0.1	ℓ1 ±0.25	ℓ2 ±0.2
2512	6.35	3.2	1.1	0.6	1.8

Power Rating

Type	Power Rating at 70°C	Tolerance %	Resistance Range	Standard Series
2512	3W	± 5	1Ω to 10mΩ	E-24

6. Marking:

6.1 Resistors

A. Marking for E-24 series 5% in size: 3 Digits

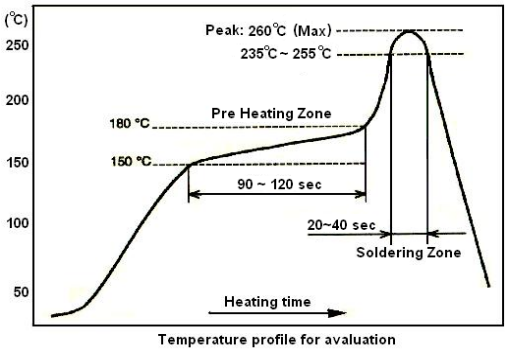
*The first 2 digits are significant figures of resistance and the 3th digit denoted number of zeros.

Ex. | | 102 | | 1KΩ

*For ohmic values below 10 Ω, letter"R" is for decimal point.

Ex.		R68		0.68Ω

7. Performance specification :

Characteristics	Limits	Test Methods (JIS C 5201-1)
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	4.7 Clamped in the trough of a 90°C metallic v-block and shall be tested at ac potential respectively specified in the type for 60-70 seconds
Temperature Coefficient	1Ω to 10Ω ≤± 200PPM/°C 10.1Ω to 10mΩ ≤± 100PPM/°C	4.8 Natural resistance change per temp. degree centigrade. $\frac{R2-R1}{R1(t2-t1)} \times 10^6$ (PPM/) R1: Resistance value at room temperature (T1) R2: Resistance value at room temp. plus 100°c (T2) Test pattern: room temp. (T1), room temp. +100°C (T2)
Short time overload	Resistance change rate is ± (2% + 0.1Ω) Max.	4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds
Soldering temp. Reference	Electrical characteristics shall be satisfied. Without distinct deformation in appearance. (95% coverage Min.)	**Wave soldering condition:** (2 cycles Max.) Pre-heat : 100°C to 120°C, 30 ±5 sec. **Suggestion solder temp.:** 235°C to 255°C, 10 sec. (Max.) **Peak temp.:** 260°C **Reflow soldering condition:** (2 cycles Max.) Pre-heat : 150°C to 180°C, 90°C to 120 sec. **Suggestion solder temp.:** 235°C to 255°C, 20 to 40 sec. **Peak temp.:** 260°C  Temperature profile for avaluation Hand soldering condition: The soldering iron tip temperature should be less than 300°C and maximum contract time should be 5 sec.

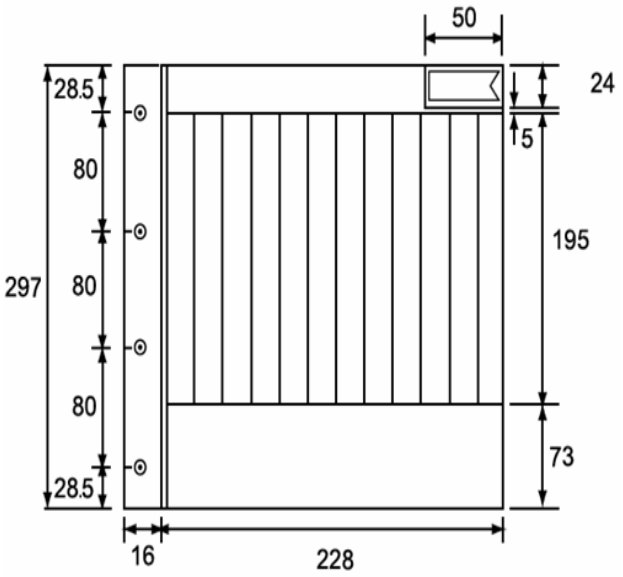
Characteristics	Limits	Test Methods (JIS C 5201-1)
Soldering heat	Resistance change rate is: ± (1%+0.05Ω) Max.	4.18 Dip the resistor into a solder bath having a temperature of 260°C±3°C and hold it for 10±1 seconds.
Temperature cycling	Resistance change rate is ± (1% + 0.1Ω) Max.	4.19 Resistance change after continuous 5 cycles for duty cycle specified below :

Step	Temperature	Time
1	-55°C ±3°C	30 mins
2	Room temp.	10 to 15 mins
3	+155°C ±2°C	30 mins
4	Room temp.	10 to 15 mins

Humidity	Resistance change rate is ± (3% + 0.1Ω) Max.	4.24 Temporary resistance change after 240 hours exposure in a humidity test chamber controlled at 40±2°C and 90-95% relative humidity
Load life in humidity	Resistance change rate is ± (3% + 0.1Ω) Max.	7.9 Resistance change after 1,000 hours (1.5 hours “on”, 0.5 hour “off”) at RCWV in a humidity chamber controlled at 40°C ±2°C and 90 to 95 % relative humidity
Load Life	Resistance change rate is ± (3% + 0.1Ω) Max.	4.25.1 Permanent resistance change after 1,000 hours operating at RCWV, with duty cycle of (1.5 hours”on”, 0.5 hour”off”) at 70°C ± 2°C ambient
Terminal bending	Resistance change rate is ± (1% + 0.05Ω) Max.	4.33 Twist of Test Board : Y/X = 3/90 mm for 60 seconds

8. Kit resistors :

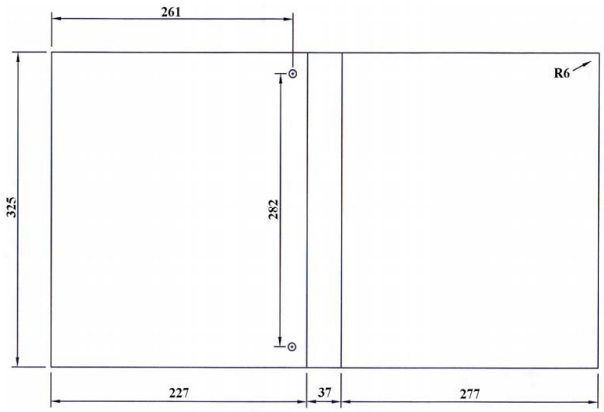
8.1 Insert for Chip Kit
Dimension (mm)



8.2 Album for Chip Kit

Dimension (mm)

* Green Album



Environment Related Substance

This product complies to EU RoHS directive, EU PAHs directive, EU PFOS directive and Halogen free.

Ozone layer depleting substances.

Ozone depleting substances are not used in our manufacturing process of this product.

This product is not manufactured using Chloro fluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), Hydrobromofluorocarbons (HBFCs) or other ozone depleting substances in any phase of the manufacturing process.

Storage Condition

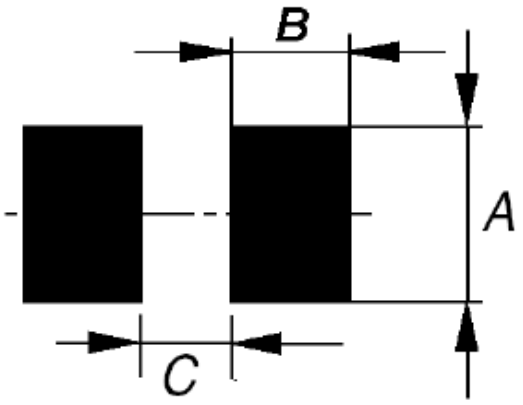
The performance of these products, including the solderability, is guaranteed for a year from the date of arrival at your company, provided that they remain packed as they were when delivered and stored at a temperature of 25°C ± 10°C and a relative humidity of 60%RH ± 10%RH, chemical and dust free atmosphere

Even within the above guarantee periods, do not store these products in the following conditions.

Otherwise, their electrical performance and/or solderability may be deteriorated, and the packaging materials (e.g. taping materials) may be deformed or deteriorated, resulting in mounting failures.

1. In salty air or in air with a high concentration of corrosive gas, such as Cl_2, H_2S, NH_3, SO_2, or NO_2
2. In direct sunlight

Recommended solder pad



A	B	C
3.7 mm.	2.8 mm.	2.7 mm.

4 layers PCB specification:

1) Outside 2 layers (Top and Bottom) with copper foil thickness at 2oz.

2) Inside 2 layers (Middle layers) with copper foil thickness at 4 oz.

Extra - High Power Thick Film Chip Resistor Kit

PRODUCT: Kit +/-5%
E24 Series = 87 values (1R to 10M)
(With resistor 1 strip per value)
Total Qty: 4,300pcs.)

NO.	Value
1	1E
2	1.2E
3	1.5E
4	1.8E
5	2.2E
6	2.7E
7	3.3E
8	3.9E
9	4.7E
10	5.6E
11	6.8E
12	8.2E
13	10E
14	12E
15	15E
16	18E
17	22E
18	27E
19	33E
20	39E
21	47E
22	56E

NO.	Value
23	68E
24	82E
25	100E
26	120E
27	150E
28	180E
29	200E
30	220E
31	270E
32	300E
33	330E
34	390E
35	470E
36	560E
37	680E
38	820E
39	1K
40	1.2K
41	1.5K
42	1.8K
43	2.2K
44	2.7K

NO.	Value
45	3.3K
46	3.9K
47	4.7K
48	5.6K
49	6.8K
50	8.2K
51	10K
52	12K
53	15K
54	18K
55	22K
56	27K
57	33K
58	39K
59	47K
60	56K
61	68K
62	82K
63	100K
64	120K
65	150K
66	180K

NO.	Value
67	220K
68	270K
69	330K
70	390K
71	470K
72	560K
73	680K
74	820K
75	1M
76	1.2M
77	1.5M
78	1.8M
79	2.2M
80	2.7M
81	3.3M
82	3.9M
83	4.7M
84	5.6M
85	6.8M
86	8.2M
87	10M

Part Number Table

Description	Part Number
Chip Resistor Kit, 3W, 5%, 1R to 10M, E24, 2512, 4300 Pcs	MP002931