



**RoHS
Compliant**

1. Scope

This specification for approve relates to the Common Quality Lead-Free and Anti-Sulfurated Thick Film Chip Resistors. Used in automobile. The test items follow the test standard of AEC-Q200.

2. Type designation

The type designation shall be in the following form:

Type	Power Rating	Resistance tolerance	Nominal Resistance
0603	0.1W (1/10W)	F	10Ω

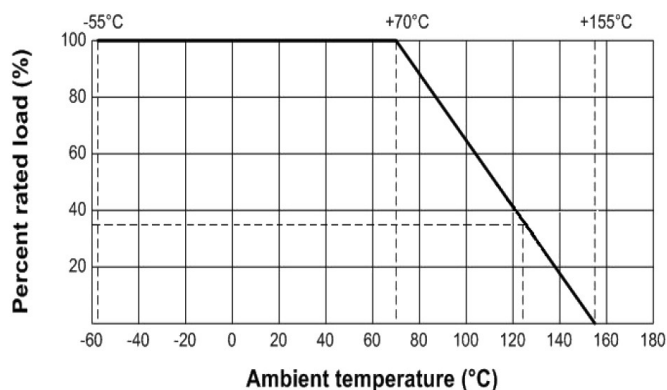
3. Ratings:

Type	0402	0603	0805	1206	1210	2010	2512
Power Rating	1/16W	1/10W	1/8W	1/4W	1/2W	3/4W	1W
Jumper Rated Current	1A	1A	2A	2A	2A	2A	2A
Max. Jumper Rated Current	2A	2A	5A	10A	10A	10A	10A
Max. Working Voltage	50V	75V	150V	200V	200V	200V	200V
Max. Overload Voltage	100V	150V	300V	400V	500V	500V	500V
Dielectric Withstanding Voltage	100V	300V	500V	500V	500V	500V	500V
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 from -55°C to 70°C. For temperature in excess of 70°C, the load shall be derate as shown in figure 1

Figure 1



3.2 Voltage rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial line frequency and waveform corresponding to the power rating, as determined from the following formula:

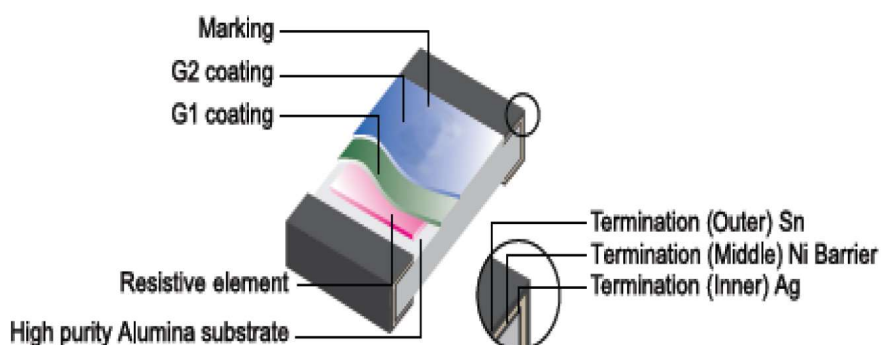
$$RCWV = \sqrt{P \times R}$$

Where: RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

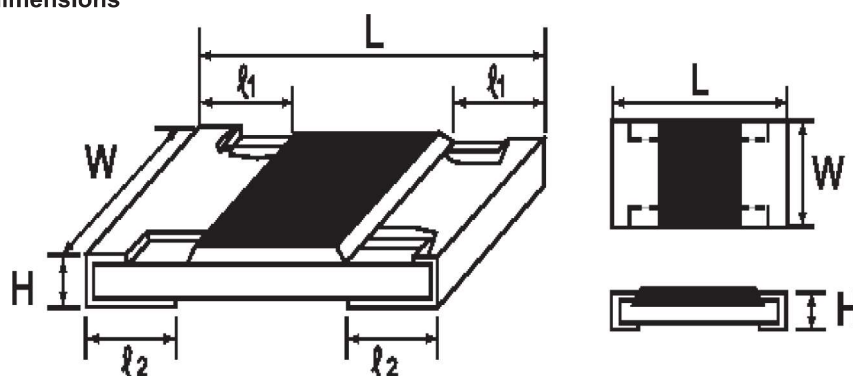
P = Power Rating (watt)

R = Nominal Resistance (ohm)

4. Construction :



5. Power rating and dimensions



Dimension

Type	Dimension (mm)				
	L	W	H	l1	l2
0402	1 ±0.1	0.5 ±0.05	0.35 ±0.05	0.2 ±0.1	0.25 ±0.1
0603	1.6 ±0.1	0.8 ±0.1	0.45 ±0.1	0.3 ±0.2	0.3 ±0.2
0805	2 ±0.15	1.25 ±0.15 -0.1	0.55 ±0.1	0.4 ±0.2	0.4 ±0.2
1206	3.1 ±0.15	1.55 ±0.15 -0.1	0.55 ±0.1	0.45 ±0.2	0.45 ±0.2
1210	3.1 ±0.1	2.6 ±0.2	0.55 ±0.1	0.5 ±0.25	0.5 ±0.2
2010	5 ±0.1	2.5 ±0.2	0.55 ±0.1	0.6 ±0.25	0.5 ±0.2
2512	6.35 ±0.1	3.2 ±0.2	0.55 ±0.1	0.6 ±0.25	0.5 ±0.2

Power Rating :

Type	Power Rating at 70	Tolerance	Resistance Range	Standard Series
		Jumper	< 50mΩ	
0402	1/16W	±1%	1Ω to 10MΩ	E-24
0603	1/10W			
0805	1/8W			
1206	1/4W			
1210	1/2W			
2010	3/4W			
2512	1W			

6. Marking :

6.1 Resistors

A. Chip Resistors type 0402 No marking

B. Standard E-96 series values(±1% tolerance) of 0603 size. Due the small size of the resistor's body, 3 digits marking will be used to indicate the accurate resistance value by using the following multiplier & resistance code

Marking for CQ03 E-96 series, the resistance value that no have multiplier code indicate marking follow this:

The first two digits are significant figures of resistance and the third one denoted number of zeros and under line the marking letters.

Ex.

	<u>122</u>	
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1.2KΩ

C. Marking for E-96 series in 0805, 1206, 1210, 2010 , 2512 size : 4 Digits

*The first 3 digits are significant figures of resistance and the 4th digit denotes number of zeros.

Ex.

	1003	
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100KΩ

*For ohmic values below 100 Ω, letter "R" is for decimal point.

Ex.

	1R80	
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1.8Ω

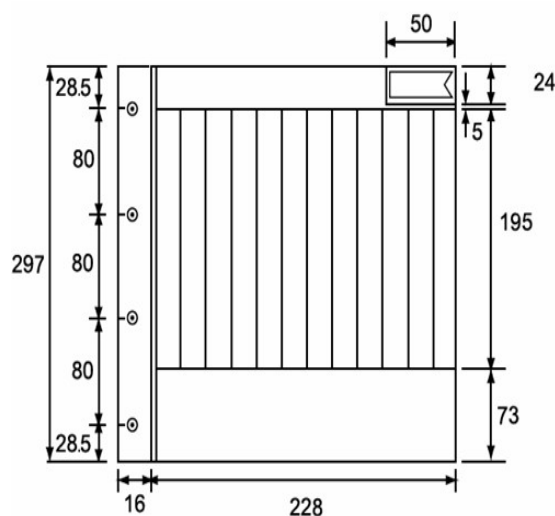
7. Performance specification :

Characteristics	Limits	Test Methods
Load life	$\pm 1\%: \pm(1\% + 0.1\Omega)\text{Max.}$	125°C, 35% power, at RCWV or Max. Working Voltage whichever less, 1,000 hours (1.5 hours "ON", 0.5 hours "OFF"), Measurement at 24 \pm 2 hours after test conclusion. (MIL-STD-202 Method 108)
Temperature Coefficient	$1\Omega \leq R \leq 100\Omega : \pm 200\text{PPM}/^\circ\text{C}$ $>10\Omega : \pm 100\text{PPM}/^\circ\text{C}$	Measure between -55°C to +125°C
Short time overload	$\pm 1\%: \pm(1\% + 0.1\Omega)\text{Max.}$	2.5x Rated voltage or Max. Overload Voltage whichever is lower for 5 seconds, then check the resistance.
Terminal Bending	$\pm(1\% + 0.05\Omega)\text{Max}$	Bending Distance 3mm, Duration: 60s \pm 5s, then check the resistance.
Solderability	95% coverage Min.	245 \pm 3°C; 2~3s
Soldering heat	$\pm(1\% + 0.05\Omega)\text{Max}$	260 \pm 5°C; 10 \pm 1s
Biased Humidity	1%: $\pm(1\% + 0.05\Omega)\text{Max.}$	10% rated power, 85°C/85%RH, 1000Hr, Measurement at 24 hours after test conclusion. (MIL-STD-202 Method 103)
Dielectric withstanding voltage	No evidence of flashover, mechanical damage, arcing or insulation breakdown	Resistor shall be clamped in the trough of 90° metallic V-block and shall be tested at AC potential respectively specified in the given list of each product type for 60~70s.
Temperature cycling	1%: $\pm(0.5\% + 0.1\Omega)\text{Max.}$	-55 \pm 3°C 30min ~normal temperature 10min-15min ~155 \pm 2°C 30min ~normal temperature 10min-15min 100 cycles, Measurement at 24 hours after test conclusion. (JESD22 Method JA-104)
ESD	$\pm(1\% + 0.05\Omega)\text{Max}$	With the electrometer in direct contact with the discharge tip, verify the voltage setting at levels of $\pm 500\text{V}$, $\pm 1\text{KV}$, $\pm 2\text{KV}$, $\pm 4\text{KV}$, $\pm 8\text{KV}$, The electrometer reading shall be within $\pm 10\%$ for voltages from 500V to $\leq 800\text{V}$. (AEC-Q200-002)
Sulfuration test	1%: $\pm(1\% + 0.05\Omega)\text{Max.}$	H2S 3 to 5PPM 50°C \pm 2°C 91% to 93% RH 1000H

8. Kit resistors :

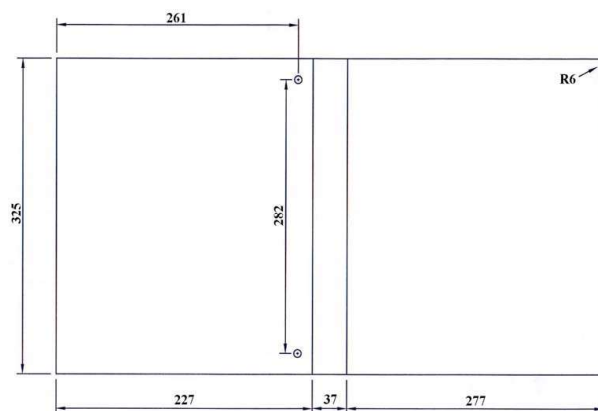
8.1 Insert for Chip Kit

Dimension (mm)



8.2 Album for Chip Kit

Dimension (mm)



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 $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ and a relative humidity of $60\%\text{RH} \pm 10\%\text{RH}$, 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

Chip Resistor Kits

multicompPRO

PRODUCT: 1206 Kit +/-1%
E24 Series = 99 values (0R & 1R to 1M)
(With 50 resistors 2 strip per value)
Total Qty: 9,900pcs.)

NO.	Value
1	0R
2	1R
3	2R2
4	3R
5	3R3
6	4R7
7	9R1
8	10R
9	12R
10	15R
11	18R
12	22R
13	27R
14	30R
15	33R
16	39R
17	47R
18	56R
19	68R
20	75R
21	82R
22	91R
23	100R
24	120R
25	130R
26	140R
27	150R
28	160R
29	180R
30	200R
31	220R
32	240R
33	270R
34	300E
35	330E

NO.	Value
36	360E
37	390E
38	430E
39	470E
40	510E
41	560E
42	604E
43	620E
44	680E
45	750E
46	820E
47	910E
48	1K
49	1K1
50	1K2
51	1K3
52	1K5
53	1K6
54	1K8
55	2K
56	2K2
57	2K4
58	2K7
59	3K
60	3K3
61	3K6
62	3K9
63	4K7
64	5K6
65	6K8
66	7K5
67	8K2
68	10K
69	11K
70	12K

NO.	Value
71	13K
72	15K
73	18K
74	22K
75	24K
76	27K
77	33K
78	36K
79	39K
80	43K
81	47K
82	51K
83	56K
84	68K
85	82K
86	100K
87	120K
88	150K
89	180K
90	200K
91	220K
92	270K
93	330K
94	390K
95	470K
96	560K
97	680K
98	820K
99	1M