Datasheet

V1_0717_01_en

1. Scope:

This specification for approval relates to Thick Film Chip Resistors (Terminal Lead Free).

2. Type designation:

The type designation shall be in the following form:

All part numbers in the coding below start with "TC-" and end with "203"

	Type	Power Rating	Resistance tolerance	Nominal Resistance
Ex.	RMC 0402	1/16W	J	75Ω

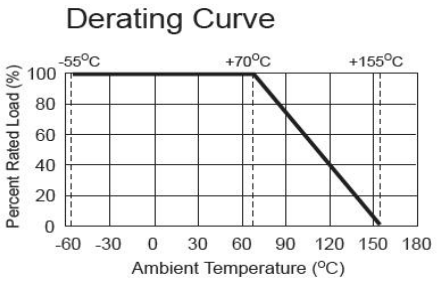
3. Ratings:

Type	RMC 0402	RMC 0603	RMC 0805	RMC 1206
Power Rating	1/16W	1/10W-S	1/8W-S	1/4W-S
Rated Current(Jumper)	1A	1A	2A	2A
Max. Overload Current(Jumper)	2A	2A	5A	10A
Max. Working Voltage	50 V	75 V	150 V	200 V
Max. Overload Voltage	100 V	150 V	300 V	400 V
Dielectric Withstanding Voltage	100 V	300 V	500 V	500 V
Temperature Range	-55℃～+155℃			
Ambient Temperature	70 ℃			

3.1 Power rating:

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

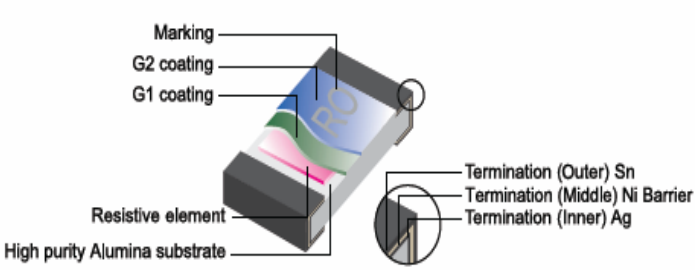
Figure 1



3.2 Nominal Resistance

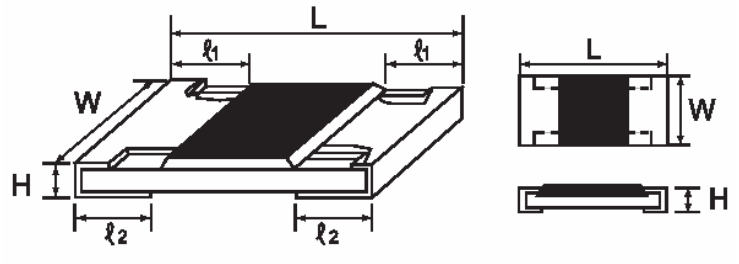
Effective figures of nominal resistance shall be in accordance with E-24 and E-96 series for 1 % and E-24 series for 2 % and 5 %

4. Construction :



Chip Kit Resistors

5. Power rating and dimensions:



Dimension :

Type	Dimension (mm)				
	L	W	H	ℓ1	ℓ2
RMC 0402	1.00 ± 0.10	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.10
RMC 0603	1.60 ± 0.10	0.80 + 0.15 - 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
RMC 0805	2.00 ± 0.15	1.25 + 0.15 - 0.10	0.55 ± 0.10	0.40 ± 0.20	0.40 ± 0.20
RMC 1206	3.10 ± 0.15	1.55 + 0.15 - 0.10	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20

Power Rating :

Type	Power Rating at 70 ℃	Tolerance	Resistance Range	Standard Series
RMC 0402	1/16W	Jumper	< 50mΩ	E-24
		± 5	10Ω ~ 1MΩ	
RMC 0603	1/10W-S	Jumper	< 50mΩ	E-24
		± 5	10Ω ~ 1MΩ	
RMC 0805	1/8W-S	Jumper	< 50mΩ	E-24
		± 5	10Ω ~ 1MΩ	
RMC 1206	1/4W-S	Jumper	< 50mΩ	E-24
		± 5	10Ω ~ 1MΩ	

For E - 24 Series (see page 9 for value detail)

± 5%	E-24	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1

Chip Kit Resistors

6. Marking :

6.1 Resistors

A. Marking for E-24 series in 0603, 0805, 1206 size : 3 Digits

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

Ex. | | 181 | | 180Ω

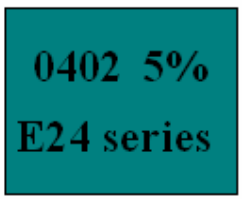
B. For ohmic values below 10 Ω, letter"R" is for decimal point.

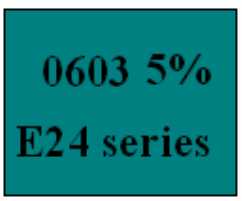
Ex. | | 4R7 | | 4.7Ω

C. Chip Resistors type 0402 No marking

6.2 Labels

Ex.





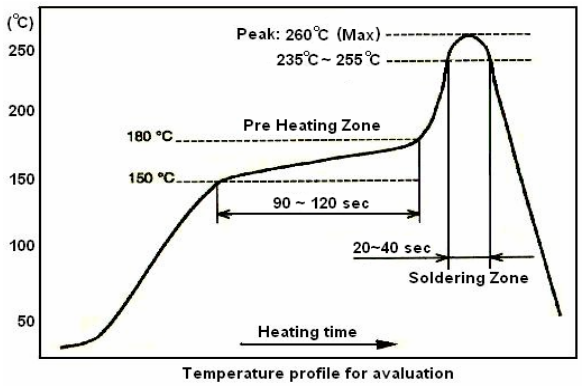
Chip Kit Resistors

7. Performance specification :

Characteristics	Limits	Test Methods (JIS C 5201-1)
*Insulation resistance	1,000 MΩ or more	Apply 500V DC between protective coating and termination for 1 min, then measure (Sub-clause 4.6)
*Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	Apply 100V(0402) 300V(0603) & 500V (0805,1206,1210,2010, 2512) AC between protective coating and termination for 1 minute (Sub-clause 4.7)
Temperature coefficient	1Ω~10Ω : ± 400 PPM/℃ 10.1Ω~100Ω : ± 200 PPM/℃ >100Ω : ± 100 PPM/℃	Natural resistance change per temp. degree centigrade. $\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6$ (PPM/℃) R_1: Resistance value at room temperature (t1) R_2: Resistance value at room temp. plus 100 ℃ (t2) (Sub-clause 4.8)
Short time overload	Resistance change rate is ± (2.0% + 0.1Ω) Max.	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds (Sub-clause 4.13)

Chip Kit Resistors

7. Performance specification :

Characteristics	Limits	Test Methods (JIS C 5201-1)
*Solderability	95 % coverage Min.	Test temperature of solder : 245 ± 3℃ Dipping them solder : 2-3 seconds (Sub-clause 4.17)
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 ~ 120 ℃, 30 ± 5 sec. Suggestion solder temp.: 235 ~ 255 ℃, 10 sec. (Max.) Peak temp.: 260 ℃ Reflow soldering condition: (2 cycles Max.) Pre-heat : 150 ~ 180 ℃, 90 ~ 120 sec. Suggestion solder temp.: 235 ~ 255 ℃, 20 ~ 40 sec. Peak temp.: 260 ℃  Temperature profile for avaluation Hand soldering condition: The soldering iron tip temperature should be less than 300℃and maximum contract time should be 5 sec.

Chip Kit Resistors

7. Performance specification :

Characteristics	Limits	Test Methods (JIS C 5201-1)
Soldering Heat	Resistance change rate is: ±(1.0%+0.05Ω) Max.	Dip the resistor into a solder bath having a temperature of 260°C±3°C and hold it for 10±1 seconds. (Sub-clause 4.18)
Temperature cycling	Resistance change rate is ± (1.0% + 0.05Ω) Max.	Resistance change after continuous 5 cycles for duty cycle specified below :

Step	Temperature	Time
1	-55℃ ± 3℃	30 mins
2	Room temp.	10～15 mins
3	+155℃ ± 2℃	30 mins
4	Room temp.	10～15 mins

(Sub-clause 4.19)

Load life in humidity	Resistance change rate is ± (3.0% + 0.1Ω) Max.	Resistance change after 1,000 hours (1.5 hours "on", 0.5 hour "off") at RCWV in a humidity chamber controlled at 40℃ ± 2℃ and 90 to 95 % relative humidity (Sub-clause 4.24.2.1)
Load Life	Resistance change rate is ± (3.0% + 0.1Ω) Max.	Permanent resistance change after 1,000 hours operating at RCWV, with duty cycle of (1.5 hours"on", 0.5 hour"off") at 70℃ ± 2℃ ambient (Sub-clause 4.25.1)
Terminal bending	Resistance change rate is ± (1.0% + 0.05Ω) Max.	Twist of Test Board : Y/X = 5/90 mm for 10 seconds (Sub-clause 4.33)

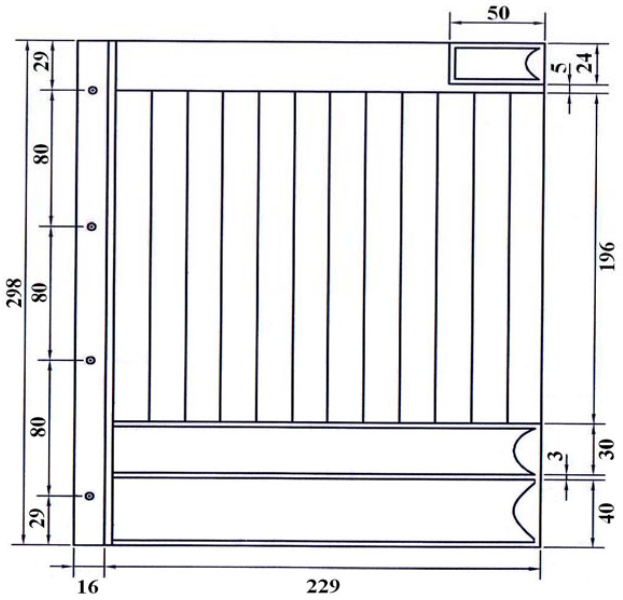
The resistors of 0Ω only can do the characteristic noted of *

Chip Kit Resistors

8. Kit resistors :

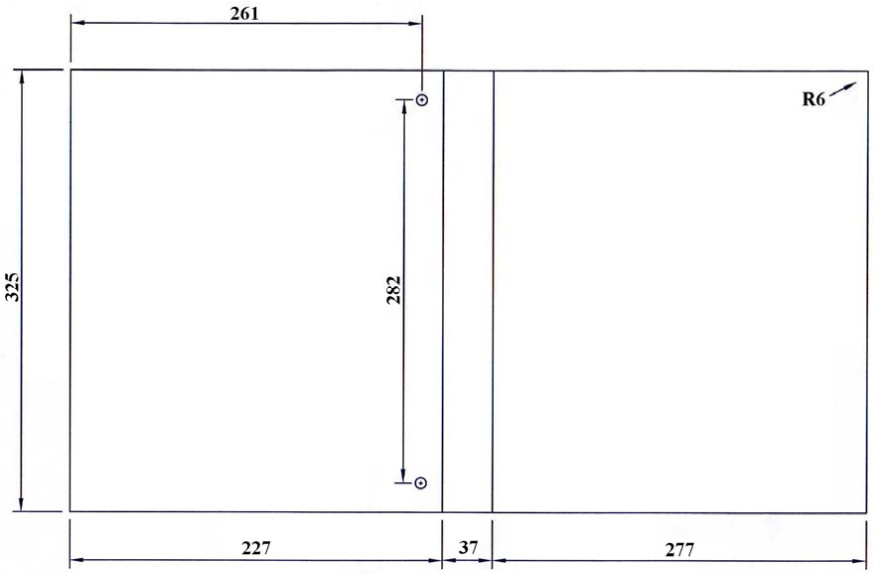
8.1 Insert for Chip Kit

Dimension (mm)



8.2 Album for Chip Kit

Dimension (mm)



Part Number System

Explanation of Part Number System

Chip Kit Resistors

All part numbers in the coding below start with "TC-" and end with "203"

1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	4	0	2	W	G	J	E	0	2	4	K	I	T

Product Type:
Fill-in these 4 digits with the Chip resistor types as follows:
0402
0603
0805
1206

Wattage:
Fill-in these 2 digits with the codes as follows:

Normal size:
WG = 1/16W
WA = 1/10W
W8 = 1/8W
W4 = 1/4W
W2 = 1/2W
1W = 1W

Small size:
SA = 1/10W-S
S8 = 1/8W-S
S4 = 1/4W-S
S2 = 1/2W-S

Tolerance:
F ~ ± 1%
J ~ ± 5%

Resistance Value:
Boxes no 8, 9, 10, 11
For SMD Kit resistor
-E6 series: E006
-E12 series: E012
-E24 series: E024

Special Feature:
Fill-in these 3 digits with the chip resistor types as follows:
- KIT: Kit resistor (with resistor)
- K0N: Album only (no resistor)
- KIL: Index Only
- KIN: Insert Only
- KIC: Insert and Album, Cover Lid (no resistor)

Sample : Kit resistor 1/16W (0402) +/- 5% E-24 series (with resistor) → 0402WGJE024KIT
Kit resistor 1/10W-S (0603) +/- 5% E-24 series (with resistor) → 0603SAJE024KIT
Kit resistor 1/8W-S (0805) +/- 5% E-24 series (with resistor) → 0805S8JE024KIT
Kit resistor 1/4W-S (1206) +/- 5% E-24 series (with resistor) → 1206S4JE024KIT

Chip Kit Resistors

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 ± 5°C and a relative humidity of 60%RH ± 10%RH

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 Kit Resistors

PRODUCT: RMC Kit (0402, 0603, 0805, 1206) +/-5%
E24 Series = 121 values (0R&10R to 1M)
(With resistor 1 strip per value)
Total Qty: (0402) 12,100pcs. / (0603, 0805, 1206) 6,050pcs.)

NO.	Value
1	0R
2	10R
3	11R
4	12R
5	15R
6	16R
7	18R
8	20R
9	22R
10	24R
11	27R
12	30R
13	33R
14	36R
15	39R
16	43R
17	47R
18	51R
19	56R
20	62R
21	68R
22	75R
23	82R
24	91R
25	100R
26	110R
27	120R
28	130R
29	150R
30	160R
31	180R
32	200R
33	220R
34	240R
35	270R

NO.	Value
36	300R
37	330R
38	360R
39	390R
40	430R
41	470R
42	510R
43	560R
44	620R
45	680R
46	750R
47	820R
48	910R
49	1K
50	1K1
51	1K2
52	1K3
53	1K5
54	1K6
55	1K8
56	2K
57	2K2
58	2K4
59	2K7
60	3K
61	3K3
62	3K6
63	3K9
64	4K3
65	4K7
66	5K1
67	5K6
68	6K2
69	6K8
70	7K5

NO.	Value
71	8K2
72	9K1
73	10K
74	11K
75	12K
76	13K
77	15K
78	16K
79	18K
80	20K
81	22K
82	24K
83	27K
84	30K
85	33K
86	36K
87	39K
88	43K
89	47K
90	51K
91	56K
92	62K
93	68K
94	75K
95	82K
96	91K
97	100K
98	110K
99	120K
100	130K
101	150K
102	160K
103	180K
104	200K
105	220K

NO.	Value
106	240K
107	270K
108	300K
109	330K
110	360K
111	390K
112	430K
113	470K
114	510K
115	560K
116	620K
117	680K
118	750K
119	820K
120	910K
121	1M

Datasheet

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