

Specification

Title: **FIXED CARBON COMPOSITION RESISTORS**

Style: **RC1/4,1/2**

RoHS COMPLIANCE ITEM

Halogen and Antimony Free

Product specification contained in this specification
are subject to change at any time without notice
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Agreement is necessary, please contact our sales staff.



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Note: Stock conditions

Temperature: +5°C ~ +35°C

Relative humidity: 60%R.H. max.

The period of guarantee: Within 6 month from shipment by the company.

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1. Scope

1.1 This specification covers the detail requirements for fixed carbon composition resistors; rectangular type, style of RC1/2, 1/4.

1.2 Applicable documents

JIS C 5201-1: 2011, JIS C 5201-2: 2014, JIS C 5201-2-1: 1998
IEC60115-1: 2008, IEC60115-2: 2014, IEC60115-2-1: 1982

2. Classification

Type designation shall be the following form.

(Example)

RC	1/2	104	J	B
1	2	3	4	5

Style

1 Fixed carbon composition resistors

2 Rated dissipation

3 Rated resistance

104	104→100kΩ,
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4 Tolerance on rated resistance

J	±5%
K	±10%
M	±20%

5 Packaging form

B	Bulk (loose package)
H	Horizontal forming
TB	52mm width taping box
TD	52mm width taping reel

3. Rating

3.1 The ratings shall be in accordance with Table-1.

Table-1

Style	Rated dissipation (W)	Rated resistance range (Ω)	Preferred number series for resistors	Tolerance on rated resistance
RC1/2	0.5	1~22M	E24	J(±5%)
			E12	K(±10%)
			E6	M(±20%)
RC1/4	0.25	1~5.6M	E24	J(±5%)
			E12	K(±10%)
			E6	M(±20%)

Style	Limiting element voltage (V)	Isolation voltage (V)	Category temperature range (°C)
RC1/2	350	500	-55~+125
RC1/4	250	100	

3.2 Climatic category

55/125/56

Lower category temperature

- 55 °C

Upper category temperature

+125 °C

Duration of the damp heat, steady state test

56days

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3.3 Stability class

10%

Limits for change of resistance:

- for long-term tests $\pm(10\%+0.5\Omega)$
- for short-term tests $\pm(2\%+0.1\Omega)$

3.4 Derating

The derated values of dissipation at temperature in excess of 70 °C shall be as indicated by the following curve.

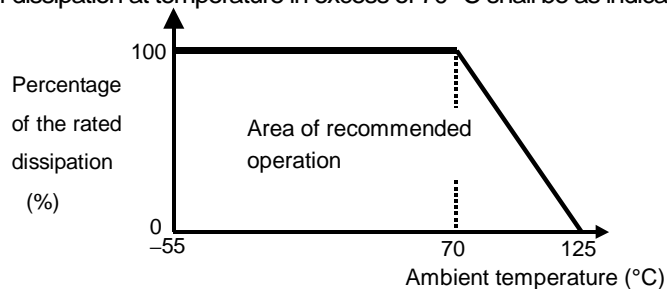


Figure-1 Derating curve

3.5 Rated voltage

d. c. or a. c. r. m. s. voltage calculated from the square root of the product of the rated resistance and the rated dissipation.

$$E = \sqrt{P \cdot R}$$

E : Rated voltage (V)

P : Rated dissipation (W)

R : Rated resistance (Ω)

Limiting element voltage can only be applied to resistors when the resistance value is equal to or higher than the critical resistance value.

At high value of resistance, the rated voltage may not be applicable.

4. Packaging form

The standard packaging form shall be in accordance with Table-2.

Table-2

Symbol	Packaging form		Standard packaging quantity / units	Application	Style
B	Bulk (Straight lead)	Loose package	500 pcs.	RC1/2	See 5.1
			1,000 pcs.	RC1/4	
H	* Horizontal forming		1,000 pcs.	RC1/4	See 8
			500 pcs.	RC1/2	
TB	52mm width taping box		2,000 pcs.	RC1/4, 1/2	See 9
TD	52mm width taping reel		3,000 pcs.	RC1/2	
			5,000 pcs.	RC1/4	

* The packaging form symbol of horizontal forming refer to Paragraph 8.

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5. Dimensions

5.1 Straight lead type

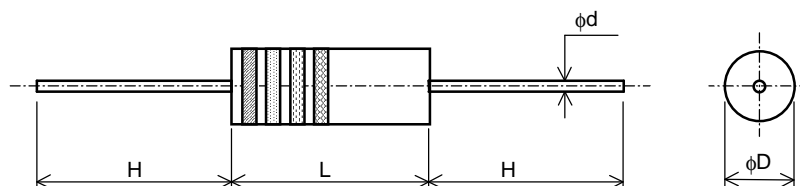


Figure-2

Table-3

Unit:mm

Style	L	ϕD	H	ϕd
RC1/2	$9.5^{+0.8}_{-0.7}$	3.6 ± 0.2	28 ± 3	$0.7^{+0.07}_{-0.05}$
RC1/4	6.3 ± 0.7	2.4 ± 0.1	30 ± 3	0.6 ± 0.05

6. Marking

6.1 Marking of product

The rated resistance and tolerance on rated resistance shall be marked by four color coding on the surface of resistor.

The color coding shall be based on JIS C 5062-2008 "Marking codes for resistors and capacitors".

The tolerance on rated resistance tolerance M($\pm 20\%$) shall be none color of the forth color code.

6.2 Marking of package

The label of a minimum package shall be legibly marked with follows;

- (1) Classification (Style, Rated resistance, Tolerance on rated resistance, Packaging form) (2) Lot No. (3) Quantity
(4) Manufacturer's name or trade mark (5) Others

7. Performance

7.1 The standard condition for tests shall be in accordance with Sub-clause 4.2, JIS C 5201-1: 2011.

7.2 The performance shall be satisfied in Table-4.

Table-4(1)

No.	Test items	Condition of test (JIS C 5201-1)	Performance requirements
1	Visual examination	Sub-clause 4.4.1 Checked by visual examination.	As in 4.4.1 The marking shall be legible, as checked by visual examination.
2	Dimension Resistance	Sub-clause 4.4.2 Sub-clause 4.5	As specified in Table-3 of this specification. As in 4.5.2 The resistance value shall correspond with the rated resistance taking into account the specified tolerance.
3	Voltage proof	Sub-clause 4.7 Method: V-block method Test voltage: Alternating voltage with a peak value of 1.42 times the insulation voltage. Duration: 60 s \pm 5 s	No breakdown or flash over

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Table-4(2)

No	Test items	Condition of test (JIS C 5201-1)	Performance requirements
4	Solderability Overload (in the mounted state)	Sub-clause 4.17 Without ageing Method: 1 (The solder bath method) Bath temperature: 235 °C ± 5 °C Immersion time: 5 s ± 0.5 s Depth immersion: A point within about 4mm from the resistor body Sub-clause 4.13 The applied voltage shall be 2.5 times the rated voltage or twice the limiting element voltage, whichever is the less severe. Duration: 5 s Visual examination Resistance	Good thinning as evidenced by free flowing of the solder with wetting of the terminations. No visible damage Legible marking $\Delta R \leq \pm (2\%+0.1\Omega)$
5	Robustness of termination Tensile Bending Torsion Resistance to soldering heat	Sub-clause 4.16 Sub-clause 4.16.2 The force; 10N Duration: 10 s ± 1 s Sub-clause 4.16.3 Method 1 Bending times: 2 times Bending force: 5N Sub-clause 4.16.4 Method A: Severity 2 (two successive Rotations of 180°) Visual examination Resistance Sub-clause 4.18 Method: 1B Solvent temperature: RC1/4: 300 °C ± 10 °C RC1/2:350 °C ± 10 °C Immersion time: 3.5 s ± 0.5 s Depth of immersion:A point within 4±0.8mm from the resistor body. Visual examination Resistance	 No visible damage $\Delta R \leq \pm (2\%+0.1\Omega)$ No visible damage Legible marking $\Delta R \leq \pm (3\%+0.1\Omega)$

Table-4(4)

No	Test items	Condition of test (JIS C 5201-1)	Performance requirements	
8	Endurance at 70 °C	Sub-clause 4.25.1 Ambient temperature: 70 °C ± 2 °C Duration: 1000 h The voltage shall be applied in cycles of 1.5 h on and 0.5 h. The applied voltage shall be the rated voltage or the limiting element voltage whichever is the smaller. Examination at 48 h, 500 h and 1000 h: Visual examination Resistance Examination at 1000 h: Insulation resistance	No visible damage $\Delta R \leq \pm (10\%+0.5\Omega)$ $R \geq 1 \text{ G}\Omega$	
9	Variation of resistance with temperature	Sub-clause 4.8 -55 °C / +20 °C +20 °C / +125°C	At -55°C	
			Resistance range(Ω)	Temperature coefficient(%)
			$R \leq 1\text{k}\Omega$	+6.5-0(%)
			$R \leq 10\text{k}\Omega$	+10-0(%)
			$R \leq 100\text{k}\Omega$	+13-0(%)
			$R \leq 1\text{M}\Omega$	+15-0(%)
			$R > 1\text{M}\Omega$	+20-0(%)
			At +125°C	
			Resistance range(Ω)	Temperature coefficient(%)
			$R \leq 1\text{k}\Omega$	+1-5(%)
			$R \leq 10\text{k}\Omega$	0-6(%)
			$R \leq 100\text{k}\Omega$	0-7.5(%)
			$R \leq 1\text{M}\Omega$	0-10(%)
$R > 1\text{M}\Omega$	0-15(%)			
10	Damp heat, steady state	Sub-clause 4.24 Ambient temperature: 40 °C ± 2 °C Relative humidity : $93 \begin{smallmatrix} +2 \\ -3 \end{smallmatrix} \%$ a) 1st group: without voltage applied. b) 2nd group: The d.c.voltage shall be applied continuously. The voltage shall be accordance with Sub-clause 4.24.2.1 b). c) 3rd group: The d.c.voltage shall be applied continuously. The voltage: 20 V ± 2 V Visual examination Resistance Insulation resistance	No visible damage Legible marking $\Delta R \leq \pm (10\%+0.5\Omega)$ $R \geq 100 \text{ M}\Omega$	

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Table-4(5)

No	Test items	Condition of test (JIS C 5201-1)	Performance requirements
11	Dimensions (detail) Endurance at upper category temperature	Sub-clause 4.4.3 Sub-clause 4.25.3 Ambient temperature: $125\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ Duration: 1000 h Examination at 48 h, 500 h and 1000 h: Visual examination Resistance Examination at 1000h: Insulation resistance	As in Table-3 No visible damage $\Delta R \leq \pm (10\% + 0.5\Omega)$ $R \geq 1\text{ G}\Omega$

8. Horizontal forming

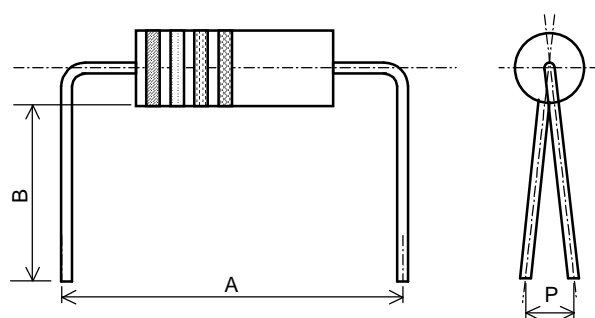


Figure-3

Table-5

Unit:mm

Style	Packaging form symbol	A	B	P
RC1/2	H	15.0 ± 0.5	5.0 ± 0.5	1.8max.
RC1/4	H60	10.0 ± 0.5	5.0 ± 0.5	1.5max.
	H62	12.5 ± 0.5		

9. Taping design and dimensions
- 9.1 Applicable document JIS C 0806-1:1999
- 9.2 Taping design and dimensions shall be in accordance with Figure-4 and Table-6.

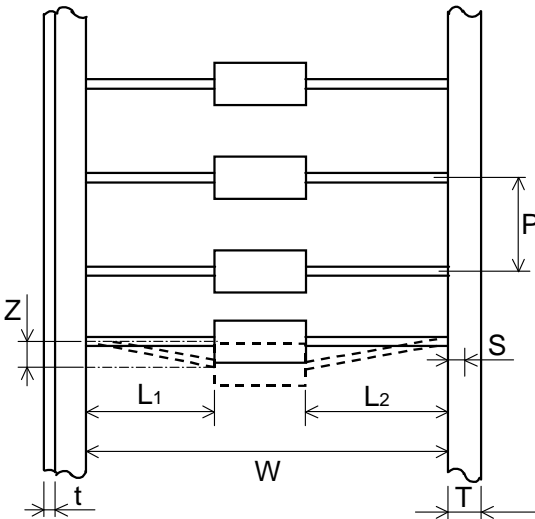


Figure-4
Table-6

Style	W	P	L ₁ -L ₂	Z	S	T	t
RC1/2	52.4 ^{+1.6} _{-1.4}	5.08 ± 0.38	1.0max.	1.0max.	3.2min.	6.0 ± 0.5	0.5max.
RC1/4							

Unit:mm

- 9.3 Notes
- 9.3.1 The direction of color codes should be on unified.
- 9.3.2 No component shall be missed.
- 9.3.3 The wire leads shall be free from kinks and bends.
- 9.3.4 Pitches tolerance is 2mm(100±2mm) for 20 pitches.
- 9.3.5 The edge waving of tape shall be not more than ±1.0mm through a length of 300mm.
- 9.3.6 The reinforcement of the tape cutting should be reinforced by a new tape (30mm min.) in 3mm limits and insuring 1 pitch dimension as shown in Figure-5.

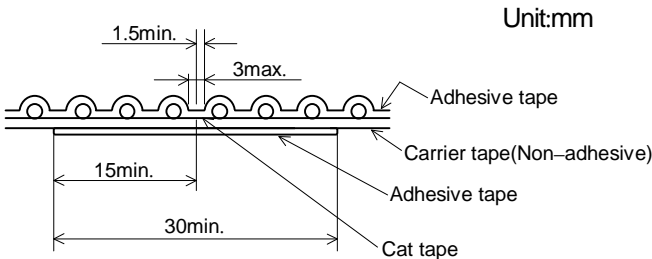


Figure-5

Unit:mm

9.2 Taped and box

The box shall be of the design and physical dimensions in accordance with Figure-6 and Table-7.
The box of materials shall be carton.

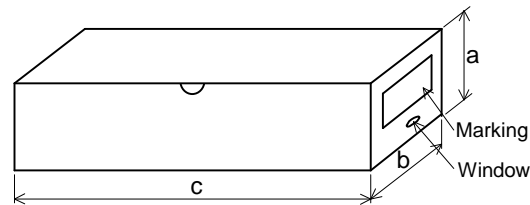


Figure-6

Table-7

Unit:mm

Style	Packaging form symbol	a	b	c
RC1/2	TB	65 ± 5	75 ± 5	455 ± 5
RC1/4		60 ± 5	75 ± 5	275 ± 5

9.3 Taping reel

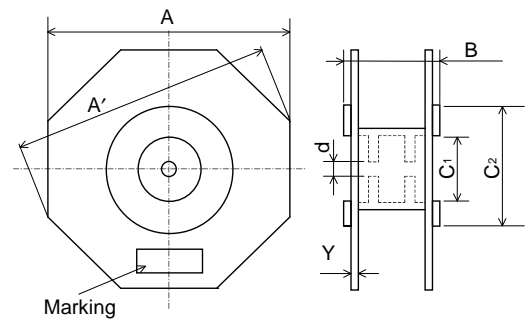


Figure-7

Table-8

Unit:mm

Style	Packaging form symbol	A	A'	B	C ₁	C ₂	d	Y
RC1/2	TD	260 ± 5	* 280	75 ± 5	60.4 ± 1.0	78 ± 1	14.5 ± 0.5	* 3
RC1/4								

*Reference

Mouser Electronics

Authorized Distributor

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Kamaya:

RC1/4104JB	RC1/4515JB	RC1/4180JB	RC1/4681JB	RC1/4471JB	RC1/4204JB	RC1/4430JB	RC1/4115JB
RC1/4565JB	RC1/4684JB	RC1/2430JB	RC1/43R9JB	RC1/4240JB	RC1/4754JB	RC1/4150JB	RC1/4391JB
RC1/48R2JB	RC1/4624JB	RC1/4134JB	RC1/47R5JB	RC1/4222JB	RC1/4113JB	RC1/4114JB	RC1/4330JB
RC1/46R8JB	RC1/4470JB	RC1/4910JB	RC1/4751JB	RC1/4304JB	RC1/4301JB	RC1/4434JB	RC1/2240JB
RC1/4101JB	RC1/4124JB	RC1/4395JB	RC1/4914JB	RC1/4474JB	RC1/4334JB	RC1/4152JB	RC1/4103JB
RC1/4112JB	RC1/45R1JB	RC1/4912JB	RC1/4562JB	RC1/4275JB	RC1/4820JB	RC1/4300JB	RC1/4510JB
RC1/4824JB	RC1/4271JB	RC1/4392JB	RC1/4181JB	RC1/4185JB	RC1/4273JB	RC1/4163JB	RC1/4335JB
RC1/43R6JB	RC1/4122JB	RC1/4560JB	RC1/4473JB	RC1/42R2JB	RC1/2164JB	RC1/42R4JB	RC1/4362JB
RC1/4302JB	RC1/4244JB	RC1/4394JB	RC1/4750JB	RC1/4620JB	RC1/4205JB	RC1/4913JB	RC1/4752JB
RC1/4155JB	RC1/4242JB	RC1/4110JB	RC1/4132JB	RC1/4622JB	RC1/43R0JB	RC1/4201JB	RC1/4390JB
RC1/4135JB	RC1/4130JB	RC1/4164JB	RC1/4911JB	RC1/4224JB	RC1/4475JB	RC1/4433JB	RC1/4120JB
RC1/4111JB	RC1/4151JB	RC1/4200JB	RC1/4100JB	RC1/4184JB	RC1/4563JB	RC1/4514JB	RC1/4202JB
RC1/4363JB	RC1/4365JB	RC1/4162JB	RC1/4753JB				