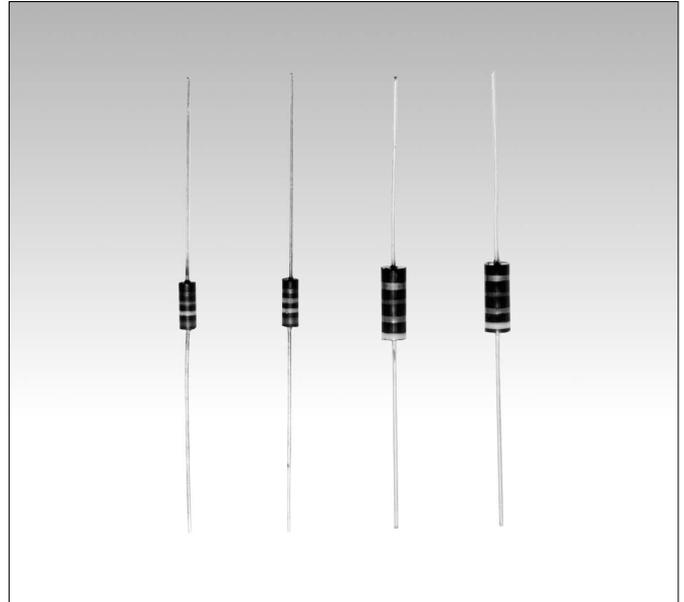


# RC1/4, 1/2

## ●Features

1. Improved pulse endurance characteristics compared to carbon film devices.
2. Wide resistance range is available, 1ohm to 22M ohm.
3. Stability class : 10%



## ●Dimensions

Style	L	D	H	d	*Unit weight/pc.
RC1/4	6.3±0.7	2.4±0.1	30±3	0.6±0.05	222mg
RC1/2	9.5 <sup>+0.8</sup> <sub>-0.7</sub>	3.6±0.2	28±3	0.7 <sup>+0.07</sup> <sub>-0.05</sub>	422mg

Unit : mm  
\*Values for reference

## ●Product Classification

Example

RC	1/4
①Product Type	②Rated power
Style	
①Product Type	②Rated power
Code	Rated power
1/4	0.25W
1/2	0.5W

102
③Rated Resistance
3Digit : E24, 12, 6 Series e.g : 2R2=2.2 ohm 102=1k ohm

J	
④Tolerance on Rated Resistance	
Code	Tolerance on Rated Resistance
J	±5%
K	±10%
M	±20%

B	
⑤Packaging	
*⑤Packaging	
Code	Packaging
B	Bulk (Straight)
H	Horizontal Forming
TB	52 mm Width Taping(Fan Fold Box)
TD	52 mm Width Taping(Red)

\*Refer to Taping and Packaging information in page 62. 63. 64

FIXED CARBON COMPOSITION RESISTORS RC1/4, 1/2

●Ratings

Style	Rated Dissipation at 70°C W	Limiting Element Voltage V	Rated Resistance	Tolerance on Rated Resistance and Perferred Number Series for Resistors.	Isolation Voltage V	Category Temperature Range °C
RC1/4	0.25	250	1 ohm~5.6M ohm	J (± 5%) : E24 Series K (±10%) : E12 Series M(±20%) : E6 Series	100	-55~+125
RC1/2	0.5	350	1 ohm~22M ohm		500	

Note.1 Rated Voltage =  $\sqrt{(\text{Rated Dissipation}) \times (\text{Rated Resistance})}$ .(d.c. or a.c. r.m.s. Voltage)

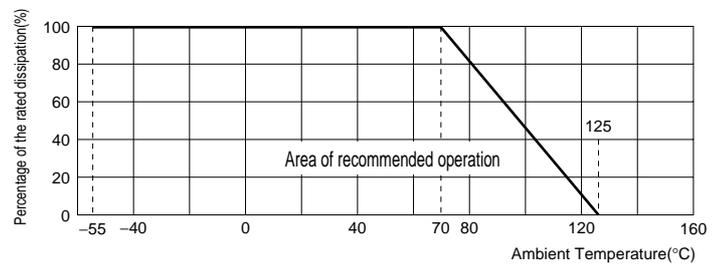
Note.2 Limiting Element Voltage can only be applied to resistors when the resistance value is equal to or higher than the critical resistance value.

●Strage

Temperature 20±15°C Humidity 60% RH, Max. Storing Term 6 months.

●Derating Curve

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



●Climatic Category

55/125/56

Lower Category Temperature -55°C

Upper Category Temperature +125°C

Duration of the Damp heat, Steady-State Test 56days

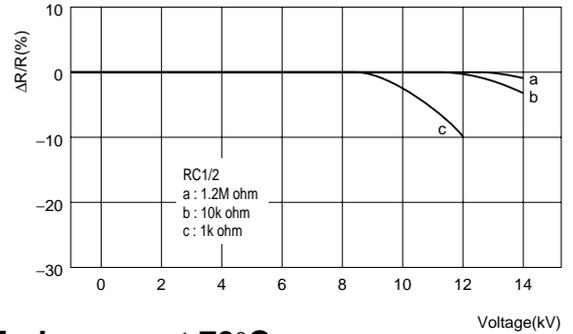
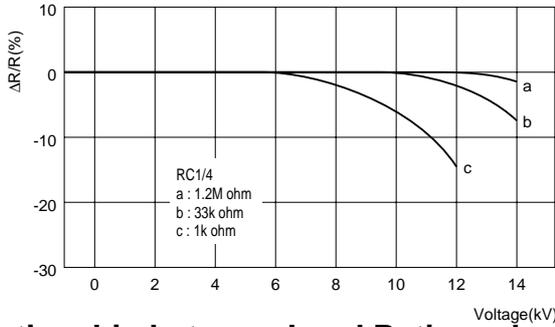
●Performance Characteristics JIS C 5201-1 : 1998

Description	Requirements	Test Methods																
Voltage proof	No breakdown or flashover	Clause 4.7 V-block method RC1/4 100Va.c.,60s RC1/2 500Va.c.,60s																
Variation of resistance with Temperature	Resistance Range	Clause 4.8 Measuring temperature : +20°C/-55°C/ +20°C/+125°C/+20°C																
	<table border="1"> <thead> <tr> <th></th> <th>at -55°C(%)</th> <th>at +125°C(%)</th> </tr> </thead> <tbody> <tr> <td>R≤1k ohm</td> <td>+6.5-0</td> <td>+1-5</td> </tr> <tr> <td>1k ohm &lt;R≤10k ohm</td> <td>+10-0</td> <td>0-6</td> </tr> <tr> <td>10k ohm &lt;R≤100k ohm</td> <td>+13-0</td> <td>0-7.5</td> </tr> <tr> <td>100k ohm &lt;R≤1M ohm</td> <td>+15-0</td> <td>0-10</td> </tr> <tr> <td>R≤1M ohm</td> <td>+20-0</td> <td>0-15</td> </tr> </tbody> </table>			at -55°C(%)	at +125°C(%)	R≤1k ohm	+6.5-0	+1-5	1k ohm <R≤10k ohm	+10-0	0-6	10k ohm <R≤100k ohm	+13-0	0-7.5	100k ohm <R≤1M ohm	+15-0	0-10	R≤1M ohm
	at -55°C(%)	at +125°C(%)																
R≤1k ohm	+6.5-0	+1-5																
1k ohm <R≤10k ohm	+10-0	0-6																
10k ohm <R≤100k ohm	+13-0	0-7.5																
100k ohm <R≤1M ohm	+15-0	0-10																
R≤1M ohm	+20-0	0-15																
Overload	$\Delta R \leq \pm(2\%+0.05 \text{ ohm})$ No visible damage, legible marking	Clause 4.13 The applied voltage shall be 2.5 times of the rated voltage or twice of the limiting element voltage, whichever is the less Severe, 5s																
Robustness of Terminations	Tensile	Clause 4.16.2 10N for 5~10s																
	Bending	Clause 4.16.3 5N twice																
	Torsion	Clause 4.16.4 180°C 2 rotation																
Solderability	In accordance with Clause 4.17.4.5	Clause 4.17 235°C, 5s																
Resistance to soldering heat	$\Delta R \leq \pm(3\%+0.05 \text{ ohm})$ No visible damage, legible marking	Clause 4.18 After immersion into the flux, the immersion into solder shall be carried out 4mm from the body at 350°C for 3.5s.																
Rapid change of temperature	$\Delta R \leq \pm(2\%+0.05 \text{ ohm})$ No visible damage	Clause 4.19 5 cycles between -55°C and +125°C.																
Climatic sequence	$\Delta R \leq \pm(10\%+0.5 \text{ ohm})$ Insulation resistance : $R \geq 100M \text{ ohm}$ No visible damage	Clause 4.23 Dry/Damp heat(12+12h cycle), first cycle./ Cold/Damp heat(12+12h cycle), remaining cycle./ D.C.Load.																
Damp test, steady state	$\Delta R \leq \pm(10\%+0.5 \text{ ohm})$ Insulation resistance : $R \geq 100M \text{ ohm}$ No visible damage, legible marking	Clause 4.24 40°C 95%R.H. 56 days, test a) , b) and c) of Clause 4.24.2.1																
Endurance at 70°C	$\Delta R \leq \pm(10\%+0.5 \text{ ohm})$ No visible damage Insulation resistance : $R \geq 1G \text{ ohm}$	Clause 4.25.1 Rated voltage, 1.5h "ON", 0.5h "OFF", 70°C, 1000h.																
Endurance at the upper Category temperature	$\Delta R \leq \pm(10\%+0.5 \text{ ohm})$ No visible damage Insulation resistance : $R \geq 1G \text{ ohm}$	Clause 4.25.3 125°C, no-load, 1000h.																

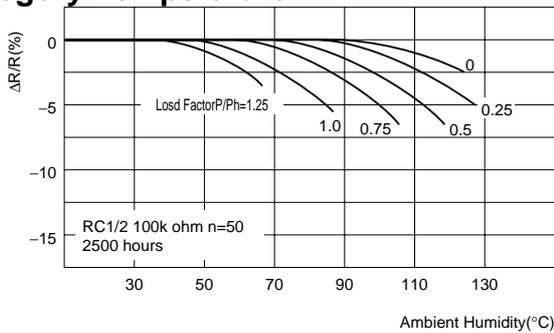
●Typical Characteristics

●Surge Resistance Characteristics

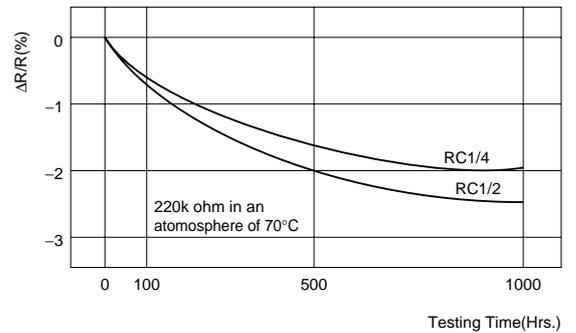
Charging and discharging a 2,000 pF capacitor for 100 cycles.



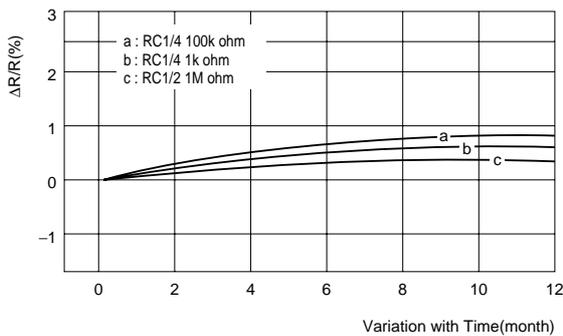
●Relationship between Load Ratio and Category Temperature



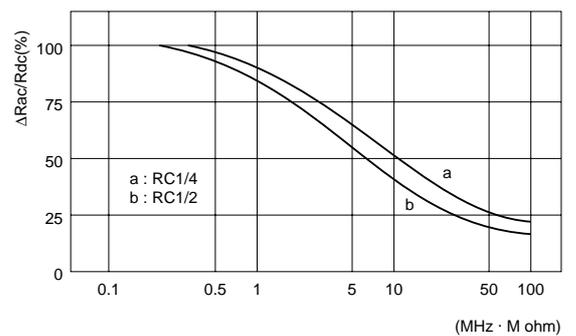
●Endurance at 70°C



●Variation with Time



●Frequency Characteristics



"Typical characteristics indicate the mean values of ΔR/R etc."

●Reliability Test

Endurance in humidity

Samples : RC1/4J,100 ohm,1k ohm,10k ohm,100k ohm×150each. Total 2,400.

Conditions : Direct current voltage equivalent to the following load ratings in cycles on "ON" for 1.5h and "OFF" for 0.5h for a total of 5.000h in an atmosphere of 40°C, 90 to 95%RH.

Criterion (%)	Load Ratio P/Pn (%)	Total Testing Time T(Hrs. )	Number of Failures r(pcs.)	Failure Ratio		Average Lifetime (60% reliability level) (Hrs.)	
				$\hat{\lambda}$	$\lambda_{CL}(60\%)$		
ΔR/R	±5	0	2.984X10 <sup>6</sup>	6	0.201	0.244	4.098×10 <sup>5</sup>
		20	2.990X10 <sup>6</sup>	4	0.134	0.176	5.682×10 <sup>5</sup>
		60	2.997X10 <sup>6</sup>	2	0.067	0.104	9.615×10 <sup>5</sup>
		100	2.992X10 <sup>6</sup>	3	0.100	0.139	7.194×10 <sup>5</sup>
		Total	1.196X10 <sup>7</sup>	15	0.125	0.138	7.209×10 <sup>5</sup>
	±10	Total	1.20X10 <sup>7</sup>	0	0.0055	0.007	1.299×10 <sup>7</sup>