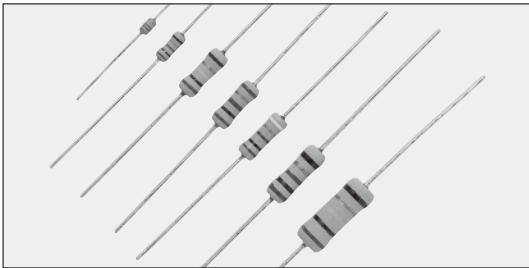


# DISCHARGE PATH RESISTOR



## RCR Coat-Insulated Fixed Anti Surge Resistors



Coating color : Blue gray

Marking : Excluding RCR16...4 line color codes +5th color code<sup>\*1</sup>

RCR16...4 line color codes

\*1 RCR50+, RCR50EN (1MΩ~12MΩ) : Green, RCR60 : White, Others : Black

Please confirm contents on technical specifications about the color code of F grade product.

### Features

- Excellent anti-surge characteristics.
- Stable characteristics of moisture resistance up to high resistance range.
- RCR50+(1MΩ~12MΩ), RCR50EN (1MΩ~12MΩ) and RCR60 (1MΩ~12MΩ) are conductive-path and Discharge-path Resistors recognized by UL1676 and c-UL (CSA-C22.2 No.1-M94).
- RCR25EN (100kΩ~33MΩ), RCR50EN (100kΩ~33MΩ) and RCR60 (100kΩ~56MΩ) is approved by EN62368-1 G.10 safety.
- Products meet EU-RoHS requirement. EU-RoHS regulation is not intended for Pb-glass contained in resistor element.
- Automatic mounting machine is applicable by surface mounted device style lead forming.

### Applications

- TV
- Copy machines
- LBP
- Switching power supplies
- AC adapters

### Approvals Awarded

Type	UL1676 & c-UL (CSA-C22.2 No.1-M94)	EN62368-1 G.10
RCR25EN	—	○
RCR50+	—	—
RCR50EN	○ (1MΩ~12MΩ)	—
RCR60	—	○

### Ratings

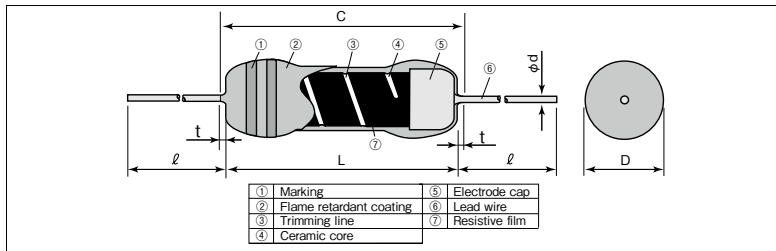
Type	Power Rating	Resistance Range (Ω)		Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Taping & Q'ty/AMMO (pcs)			
		F:±1% (E24 · E96)	J:±5% (E24)				T26	T52	T521	T631
RCR16	0.25W	100k~5.1M	100k~5.1M	500V	1000V	300V	5000	3000	—	—
RCR25		100k~9.1M	100k~33M	D.C. 1600V A.C. 1150V	D.C. 2000V A.C. 1500V	700V	2000	2000	—	—
RCR25EN										
RCR50	0.5W	3.3Ω~910k	3.3~910k	2000V	2500V	700V	—	2000	—	—
RCR50+			13M~33M							
RCR50EN		1M~9.1M	1M~12M							
RCR60		100k~9.1M	100k~33M							
RCR75		100k~9.1M	100k~100M							
RCR100	3W	100k~9.1M	100k~51M	5000V	5000V	1000V	—	—	500	1000

Rated Ambient Temperature : +70°C

Operating Temperature Range : -55°C~+155°C

Rated voltage= $\sqrt{\text{Power Rating} \times \text{Resistance value}}$  or Max. working voltage, whichever is lower.

### Construction



### Dimensions

Type	Dimensions (mm)						Weight (g) (1000pcs)
	L	C Max.	t Max.	D	d (Nominal)	ℓ <sup>*2</sup>	
RCR16	3.2±0.2	3.4	—	1.7 <sup>+0.07</sup>	0.45	20min.	150
RCR25	6.3±0.5	7.1	—	2.5±0.5	0.6		240
RCR25EN							
RCR50(+)	9.5±1.0	—	3.0	3.5±0.4	0.7		520
RCR50EN							
RCR60	9.5 <sup>+1.0</sup>	—	3.0	3.5±0.4	0.7		520
RCR75	12.0±1.0	—	3.0	4.0±0.5	0.8		800
RCR100	15.5±1.0	—	3.0	6.0 <sup>+1.2</sup>	0.8		1400

\*2 Lead length changes depending on taping and forming type.

### Type Designation

Example

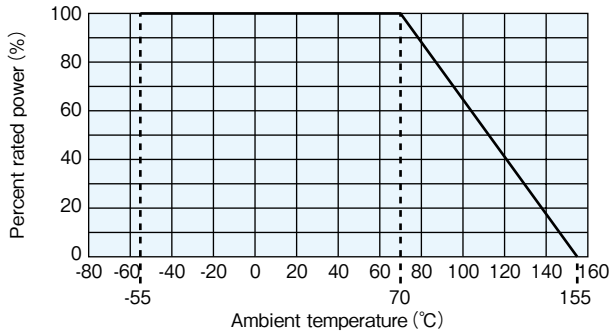
RCR	50	EN	C	T52	A	106	J
Product Code	Power Rating	Safety Approvals Marking	Terminal Surface Material	Taping & Forming	Packaging Forming	Nominal Resistance	Resistance Tolerance
	16:0.25W 25:0.25W 50:0.5W 60:1W 75:2W 100:3W	+ : RCR50+ EN : RCR25EN, RCR50EN Nil : Others	C:SnCu	See table below	A: AMMO R: REEL TEB: TEG: Plastic embossed (N forming) Nil: BOX	F: 4 digits J: 3 digits	F: ±1% J: ±5%

Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS. For further information on taping and forming, please refer to APPENDIX C on the back pages.

### Taping & Forming Matrix

Type	Axial Taping				L Forming			M Forming				N Forming	
	T26	T52	T521	T631	L15A	L20A	L25A	M5	M10	M15	M20	N17	N20
RCR16	○	○	—	—	—	—	—	M5F	—	—	—	—	—
RCR25	○	○	—	—	—	—	—	—	M10F	—	—	—	—
RCR25EN	○	○	—	—	—	—	—	—	M10F	—	—	—	—
RCR50	—	○	—	—	○	—	—	—	—	M15F	—	—	—
RCR50+	—	○	—	—	○	—	—	—	—	M15F	—	—	—
RCR50EN	—	○	—	—	○	—	—	—	—	M15F	—	—	—
RCR60	—	○	—	—	○	—	—	—	—	M15F	—	—	—
RCR75	—	○	—	—	○	—	—	—	—	—	—	○	—
RCR100	—	—	○	○	—	○	○	—	—	—	M20E	—	○

### Derating Curve



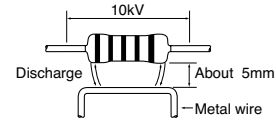
For resistors operated at an ambient temperature of 70°C or higher, the power shall be derated in accordance with the above derating curve.

### Notice on Surge Load

Surge withstanding load voltage for the resistors cannot be guarantee when the undermentioned 4 items get to a remarkable overload in comparison with the conditions shown by surge withstanding voltage in Anti-surge characteristics. You are kind by requested to contact to us in advance if such a case is anticipated.

- (1) Peak voltage to be applied
- (2) Pulse width
- (3) Conditions of protecting insulation around the resistor
- (4) Situation of proximity conductivity object

As the fig. below for instance when a metal wire is placed at less than 5mm away from the resistor body, there is such a case that causes an electric discharge by a surge load 10kV and then destroys the outer coating.



### Performance

Test Items	Performance Requirements $\Delta R \pm (\% + 0.05\Omega)$		Test Methods																													
	Limit	Typical																														
Resistance	Within specified		Measuring points are at 10mm $\pm$ 1mm from the end cap.																													
T.C.R.	<table border="1"> <thead> <tr> <th>Type</th> <th>T.C.R.</th> <th>Resistance Range</th> </tr> </thead> <tbody> <tr> <td>RCR16</td> <td><math>\pm 200 \times 10^{-6}/K</math></td> <td>100k<math>\Omega</math> ~ 5.1M<math>\Omega</math></td> </tr> <tr> <td>RCR25</td> <td><math>\pm 350 \times 10^{-6}/K</math></td> <td>100k<math>\Omega</math> ~ 33M<math>\Omega</math></td> </tr> <tr> <td>RCR25EN</td> <td><math>\pm 350 \times 10^{-6}/K</math></td> <td>100k<math>\Omega</math> ~ 33M<math>\Omega</math></td> </tr> <tr> <td rowspan="2">RCR50 (+)</td> <td><math>\pm 500 \times 10^{-6}/K</math></td> <td>3.3<math>\Omega</math> ~ 91k<math>\Omega</math></td> </tr> <tr> <td><math>\pm 350 \times 10^{-6}/K</math></td> <td>100k<math>\Omega</math> ~ 33M<math>\Omega</math></td> </tr> <tr> <td>RCR50EN</td> <td><math>\pm 350 \times 10^{-6}/K</math></td> <td>100k<math>\Omega</math> ~ 33M<math>\Omega</math></td> </tr> <tr> <td>RCR60</td> <td><math>\pm 350 \times 10^{-6}/K</math></td> <td>100k<math>\Omega</math> ~ 56M<math>\Omega</math></td> </tr> <tr> <td>RCR75</td> <td><math>\pm 350 \times 10^{-6}/K</math></td> <td>100k<math>\Omega</math> ~ 100M<math>\Omega</math></td> </tr> <tr> <td>RCR100</td> <td><math>\pm 200 \times 10^{-6}/K</math></td> <td>100k<math>\Omega</math> ~ 5.1M<math>\Omega</math></td> </tr> </tbody> </table>	Type	T.C.R.	Resistance Range	RCR16	$\pm 200 \times 10^{-6}/K$	100k $\Omega$ ~ 5.1M $\Omega$	RCR25	$\pm 350 \times 10^{-6}/K$	100k $\Omega$ ~ 33M $\Omega$	RCR25EN	$\pm 350 \times 10^{-6}/K$	100k $\Omega$ ~ 33M $\Omega$	RCR50 (+)	$\pm 500 \times 10^{-6}/K$	3.3 $\Omega$ ~ 91k $\Omega$	$\pm 350 \times 10^{-6}/K$	100k $\Omega$ ~ 33M $\Omega$	RCR50EN	$\pm 350 \times 10^{-6}/K$	100k $\Omega$ ~ 33M $\Omega$	RCR60	$\pm 350 \times 10^{-6}/K$	100k $\Omega$ ~ 56M $\Omega$	RCR75	$\pm 350 \times 10^{-6}/K$	100k $\Omega$ ~ 100M $\Omega$	RCR100	$\pm 200 \times 10^{-6}/K$	100k $\Omega$ ~ 5.1M $\Omega$	—	+ 25°C / + 125°C
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Overload (Short time)	1	0.5	Rated voltage $\times$ 2.5 or Max. overload vol., whichever is lower, for 5s																													
Resistance to soldering heat	1	0.5	260°C $\pm$ 5°C, 10s $\pm$ 1s or 350°C $\pm$ 10°C, 3.5s $\pm$ 0.5s																													
Terminal strength	No lead-coming off and loose terminals		Twist 360°, 5 times																													
Rapid change of temperature	1	0.5	-55°C (30min.) / +155°C (30min.) 5 cycles																													
Moisture resistance	5	2.5	40°C $\pm$ 2°C, 90%~95%RH, 1000h 1.5h ON/0.5h OFF cycle RCR16, 25, 50(+), 60 : Rated Voltage RCR75, 100 : Power Rating $\times$ 0.1																													
Endurance at 70°C	5	2.5	70°C $\pm$ 2°C, 1000h, Rated Voltage 1.5h ON/0.5h OFF cycle																													
Resistance to solvent	No abnormality in appearance. Marking shall be easily legible.		Ultrasonic washing with Isopropyl alcohol for 2 min. Power : 0.3W/cm <sup>2</sup> , f : 28kHz, Temp. : 35°C $\pm$ 5°C																													
Anti-surge characteristics	10	2.5	Discharge test : 2kV~10kV 0.01 $\mu$ F capacitor discharge pulse 10 times. (1pulse/5s max.) <table border="1"> <thead> <tr> <th>Type</th> <th>RCR16</th> <th>RCR25 - RCR25EN</th> <th>RCR50 - RCR50+</th> <th>RCR50EN</th> <th>RCR60</th> <th>RCR75</th> <th>RCR100</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Applied voltage</td> <td rowspan="4">2kV</td> <td rowspan="4">3kV</td> <td>3.3<math>\Omega</math>~6.2<math>\Omega</math> : 10kV</td> <td rowspan="4">10kV</td> <td rowspan="4">10kV</td> <td rowspan="4">10kV</td> <td rowspan="4">10kV</td> </tr> <tr> <td>6.8<math>\Omega</math>~10<math>\Omega</math> : 7kV</td> </tr> <tr> <td>11<math>\Omega</math>~9.1k<math>\Omega</math> : 5kV</td> </tr> <tr> <td>10k<math>\Omega</math>~91k<math>\Omega</math> : 7kV</td> </tr> <tr> <td></td> <td></td> <td></td> <td>100k<math>\Omega</math>~33M<math>\Omega</math> : 10kV</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Type	RCR16	RCR25 - RCR25EN	RCR50 - RCR50+	RCR50EN	RCR60	RCR75	RCR100	Applied voltage	2kV	3kV	3.3 $\Omega$ ~6.2 $\Omega$ : 10kV	10kV	10kV	10kV	10kV	6.8 $\Omega$ ~10 $\Omega$ : 7kV	11 $\Omega$ ~9.1k $\Omega$ : 5kV	10k $\Omega$ ~91k $\Omega$ : 7kV				100k $\Omega$ ~33M $\Omega$ : 10kV						
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EN60065 test (RCR50EN, RCR60 Only)	20	—	Discharge test : 10kV 1000pF capacitor discharge pulse 50 times. (1pulse/5s max.)																													

High Voltage Type Resistors

### Precautions for Use

- Be careful to handle these resistors because outer coatings are comparatively weak to outer shock due to flameproof special coats. Please wash them to a minimum. No external force is given to the coating films until they are well dried because the coating films become weaker right after washing. The original strength will be returned after they are dried, so please pay attention not to apply any external force onto the coating film of resistors for 20 minutes after drying. Especially no PC boards shall be piled up.
- Do not touch the resistors with high-resistance value by hand to prevent surface-leakage current.
- Consult with us when there are electric conductors near to because it may cause corona and short-circuit by discharge.
- Please do not apply resistors under such bad conditions as high temperature, high humidity, and foul adhesion, or with resin molding, because it may cause the change of resistance value.
- The resistance film of less than RCR50 100k $\Omega$  is different. Therefore, the characteristic might decrease when it is polluted by a remarkable moisture environment and the ionic material so inquire of our company beforehand, please.