

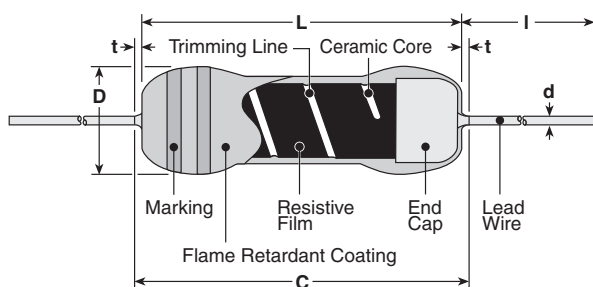
## anti-surge power type leaded resistor



## features

- Excellent anti-surge characteristics
- Stable characteristics of moisture resistance up to high resistance range
- RCR50 (+1M $\Omega$  - 12M $\Omega$ ), RCR50EN (1M $\Omega$  - 12M $\Omega$ ) and RCR60 (1M $\Omega$  - 12M $\Omega$ ) are discharge resistors recognized by UL1676 and c-UL(CSA-C22.2 No.1-M94)
- RCR25EN (100 $\Omega$ ~33M $\Omega$ ), RCR50EN (100k $\Omega$  - 33M $\Omega$ ) and RCR60 (470k $\Omega$  - 56M $\Omega$ ) is approved by EN60065 14.1 safety
- Marking: Blue-gray body color with color-coded bands
- Products with lead-free terminations meet EU RoHS requirements. EU RoHS regulation is not intended for Pb-glass contained in electrode, resistor element and glass.
- Surface mount style "N" forming is suitable for automatic mounting

## dimensions and construction



\* Lead length changes depending on taping and forming.

| Type                | Dimensions inches (mm)                     |               |               |                                            |                |                          |
|---------------------|--------------------------------------------|---------------|---------------|--------------------------------------------|----------------|--------------------------|
|                     | L                                          | C (max.)      | t (max.)      | D                                          | d (nom.)       | I*                       |
| RCR16               | .126 $\pm$ .008<br>(3.2 $\pm$ 0.2)         | .134<br>(3.4) | —             | .067 $\pm$ .008<br>(1.7 $\pm$ 0.2)<br>-0.1 | .018<br>(0.45) | .787 Min.<br>(20.0 Min.) |
| RCR25<br>RCR25EN    | .248 $\pm$ .02<br>(6.3 $\pm$ 0.5)          | .28<br>(7.1)  | —             | .098 $\pm$ .02<br>(2.5 $\pm$ 0.5)          | .024<br>(0.6)  |                          |
| RCR50(+)<br>RCR50EN | .374 $\pm$ .039<br>(9.5 $\pm$ 1.0)         | —             | .118<br>(3.0) | .138 $\pm$ .016<br>(3.5 $\pm$ 0.4)         | .028<br>(0.7)  |                          |
| RCR60               | .374 $\pm$ .039<br>(9.5 $\pm$ 1.0)<br>-0.2 | —             | .118<br>(3.0) | .157 $\pm$ .02<br>(4.0 $\pm$ 0.5)          | .031<br>(0.8)  |                          |
| RCR75               | .472 $\pm$ .039<br>(12 $\pm$ 1.0)          | —             | .118<br>(3.0) | .236 $\pm$ .039<br>(6.0 $\pm$ 1.0)<br>-0.4 | .031<br>(0.8)  |                          |
| RCR100              | .610 $\pm$ .039<br>(15.5 $\pm$ 1.0)        | —             | .118<br>(3.0) |                                            |                |                          |

## ordering information

| New Part # | RCR | 50                                                                | EN                                                    | C                    | T52                                                                                                                                   | A                                                        | 105                                                                                                    | J                          |
|------------|-----|-------------------------------------------------------------------|-------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------|
| Type       | RCR | Power Rating                                                      | Safety Appr. Marking                                  | Termination Material | Taping and Forming                                                                                                                    | Packaging                                                | Nominal Resistance                                                                                     | Tolerance                  |
|            |     | 16: 0.25W<br>25: 0.25W<br>50: 0.5W<br>60: 1W<br>75: 2W<br>100: 3W | RCR50+: +<br>RCR25EN,<br>RCR50EN: EN<br>Blank: Others | C: SnCu              | RCR16: T26, T52<br>RCR25, RCR25EN: T26, T52<br>RCR50(+, EN): T52<br>RCR60: T52<br>RCR75: T52<br>RCR100: T521, T631<br>L, M, N Forming | A: Ammo<br>R: Reel<br>TEB: Plastic embossed<br>N forming | 2 significant figures + 1 multiplier for $\pm$ 5%<br>3 significant figures + 1 multiplier for $\pm$ 1% | F: $\pm$ 1%<br>J: $\pm$ 5% |

## applications and ratings

| Part Designation     | Power Rating @ 70°C | Minimum Dielectric Withstanding Voltage | Resistance Range E-24, E-96 (F±1%) | Resistance Range E-24 (J±5%) | Absolute Maximum Working Voltage | Absolute Maximum Overload Voltage | Operating Temperature Range |
|----------------------|---------------------|-----------------------------------------|------------------------------------|------------------------------|----------------------------------|-----------------------------------|-----------------------------|
| RCR16                | 0.25W               | 300V                                    | 100kΩ - 5.1MΩ                      | 100kΩ - 5.1MΩ                | 500V                             | 1000V                             | -55°C to +155°C             |
| RCR25<br>NEW RCR25EN |                     | 700V                                    | 100kΩ - 9.1MΩ                      | 100kΩ - 33MΩ                 | DC 1600V<br>AC 1150V             | DC 2000V<br>AC 1500V              |                             |
| RCR50                | 3.3Ω - 910kΩ        |                                         | 3.3Ω - 910kΩ                       | 2000V                        | 2500V                            |                                   |                             |
|                      |                     |                                         |                                    |                              |                                  | 13MΩ - 33MΩ                       |                             |
| RCR50+               | 1MΩ - 9.1MΩ         |                                         | 1MΩ - 12MΩ                         |                              |                                  |                                   |                             |
| RCR50EN              | 100kΩ - 9.1MΩ       |                                         | 100kΩ - 33MΩ                       |                              |                                  |                                   |                             |
| RCR60                | 1.0W                |                                         | 100kΩ - 9.1MΩ                      | 100kΩ - 56MΩ                 | 4000V                            | 5000V                             |                             |
| RCR75                | 2.0W                | 100kΩ - 9.1MΩ                           | 100kΩ - 100MΩ                      | 5000V                        |                                  |                                   |                             |
| RCR100               | 3.0W                | 1000V                                   | 100kΩ - 9.1MΩ                      |                              | 100kΩ - 33MΩ                     |                                   |                             |

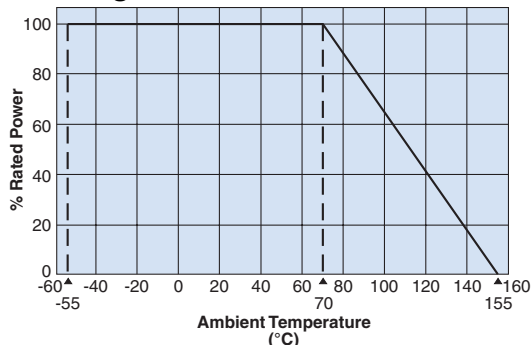
For further information on packaging, please refer to Appendix C.

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

1/03/14

## environmental applications

### Derating Curve



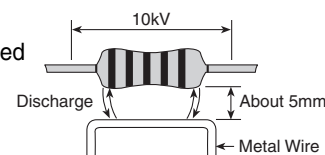
For resistors operated at an ambient temperature of 70°C or above, a power rating shall be derated in accordance with the above derating curve.

### Notice of Surge Load

Surge withstanding load voltage for the resistors cannot be guaranteed when the undermentioned 4 items get to a remarkable overload in comparison with the conditions shown by surge withstanding voltage in Anti-surge characteristics. Please contact KOA 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

For example: In the figure, a metal wire is placed 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 Characteristics

| Parameter                          | Requirement $\Delta R \pm(\% + 0.05\Omega)$         |              |                  | Typical | Test Method                                                                                                   |       |                  |                   |                               |
|------------------------------------|-----------------------------------------------------|--------------|------------------|---------|---------------------------------------------------------------------------------------------------------------|-------|------------------|-------------------|-------------------------------|
|                                    | Limit                                               |              |                  |         |                                                                                                               |       |                  |                   |                               |
| Resistance                         | Within regulated tolerance                          |              |                  | —       | Measuring points are 10mm ± 1mm from the end cap                                                              |       |                  |                   |                               |
| T.C.R.                             | Type                                                | T.C.R.       | Resistance Range | —       | Room temperature/100°C up                                                                                     |       |                  |                   |                               |
|                                    | RCR16                                               | ±200ppm/°C   | 100kΩ - 5.1MΩ    |         |                                                                                                               |       |                  |                   |                               |
|                                    | RCR25 (EN)                                          | ±350ppm/°C   | 100kΩ - 33MΩ     |         |                                                                                                               |       |                  |                   |                               |
|                                    | RCR50 (+)                                           | ±500ppm/°C   | 3.3Ω - 91kΩ      |         |                                                                                                               |       |                  |                   |                               |
|                                    |                                                     | ±350ppm/°C   | 100kΩ - 33MΩ     |         |                                                                                                               |       |                  |                   |                               |
|                                    | RCR50EN                                             | ±350ppm/°C   | 100kΩ - 33MΩ     |         |                                                                                                               |       |                  |                   |                               |
|                                    | RCR60                                               | ±350ppm/°C   | 100kΩ - 56MΩ     |         |                                                                                                               |       |                  |                   |                               |
|                                    | RCR75                                               | ±350ppm/°C   | 100kΩ - 100MΩ    |         |                                                                                                               |       |                  |                   |                               |
| RCR100                             | ±200ppm/°C                                          | 100KΩ - 33MΩ |                  |         |                                                                                                               |       |                  |                   |                               |
| Overload                           | 1%                                                  |              |                  | 0.5%    | Rated voltage x 2.5 or maximum overload voltage for 5 seconds, whichever is less                              |       |                  |                   |                               |
| Resistance to Solder Heat          | 1%                                                  |              |                  | 0.5%    | 260°C ± 5°C, 10 seconds ± 1 second or 350°C ± 10°C, 3.5 seconds ± 0.5 seconds                                 |       |                  |                   |                               |
| Terminal Strength                  | No mechanical damage                                |              |                  | —       | Twist 360°, 5 times                                                                                           |       |                  |                   |                               |
| Rapid Change of Temperature        | 1%                                                  |              |                  | 0.5%    | -55°C (30 minutes)/+155°C (30 minutes), 5 cycles                                                              |       |                  |                   |                               |
| Moisture Resistance                | 5%                                                  |              |                  | 2.5%    | 40°C ± 2°C, 90-95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle<br>RCR16, 25, 50 (+), 60: W; RCR75, 100: Wx0.1 |       |                  |                   |                               |
| Endurance @ 70°C                   | 5%                                                  |              |                  | 2.5%    | 70°C ± 2°C, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle                                                           |       |                  |                   |                               |
| Resistance to Solvent              | No visible damage to protective coating and marking |              |                  | —       | Isopropyl alcohol with ultrasonic washing, 2 minutes<br>Power: 0.3W/cm², f: 28kHz, Temperature: 35°C ± 5°C    |       |                  |                   |                               |
| Surge Withstanding                 | 10%                                                 |              |                  | 2.5%    | Discharge test: 2kV - 10kV, 0.01μF capacitor discharge pulse, 10 times (1 pulse/5 seconds maximum)            |       |                  |                   |                               |
|                                    |                                                     |              |                  |         | Type                                                                                                          | RCR16 | RCR25<br>RCR25EN | RCR50, RCR50+     | RCR50EN, RCR60, RCR75, RCR100 |
|                                    |                                                     |              |                  |         | Applied Voltage                                                                                               | 2kV   | 3kV              | 3.3Ω - 6.2Ω: 10kV | 10kV                          |
|                                    |                                                     |              |                  |         |                                                                                                               |       |                  | 6.8Ω - 10Ω: 7kV   |                               |
|                                    |                                                     |              |                  |         |                                                                                                               |       |                  | 11Ω - 9.1kΩ: 5kV  |                               |
|                                    |                                                     |              |                  |         |                                                                                                               |       |                  | 10kΩ - 91kΩ: 7kV  |                               |
| 100kΩ - 33MΩ: 10kV                 |                                                     |              |                  |         |                                                                                                               |       |                  |                   |                               |
| EN60065 Test (RCR50EN, RCR60 only) | 20%                                                 |              |                  | —       | Discharge test: 10kV, 1000pF capacitor discharge pulse, 50 times (1 pulse/5 seconds maximum)                  |       |                  |                   |                               |

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