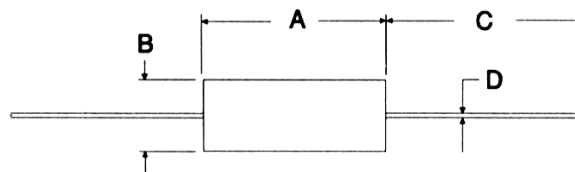


- Features:
- Non-inductive design
  - Molded body for package uniformity
  - Ideal for pulse-load handling characteristics
  - 1W now available
  - RoHS compliant / lead-free



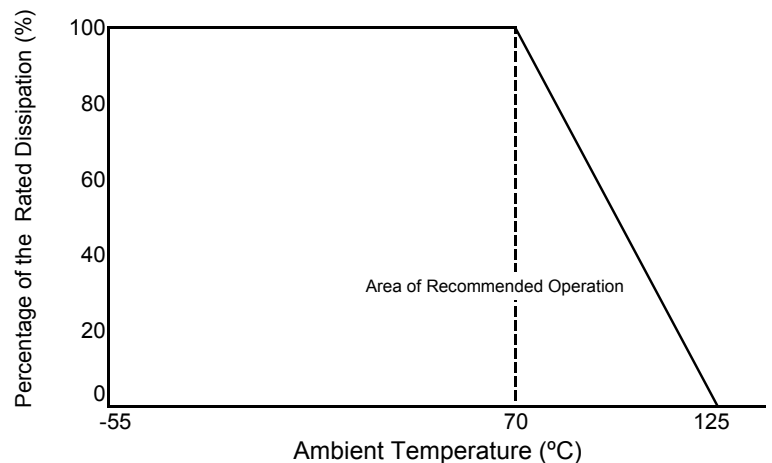
| Electrical Specifications |                                |                                              |                          |                                    |                                        |          |
|---------------------------|--------------------------------|----------------------------------------------|--------------------------|------------------------------------|----------------------------------------|----------|
| Type / Code               | Power Rating<br>(Watts) @ 70°C | Maximum<br>Continuous<br>Working Voltage (1) | Maximum<br>Pulse Voltage | Dielectric Withstanding<br>Voltage | Ohmic Range ( $\Omega$ ) and Tolerance |          |
|                           |                                |                                              |                          |                                    | 5%                                     | 10%      |
| RC14                      | 0.25W                          | 250V                                         | 400V                     | 500V                               | 2.2 - 5.6M                             | 1 - 5.6M |
| RC12                      | 0.5W                           | 350V                                         | 700V                     | 700V                               | 1 - 22M                                | 1 - 22M  |
| RC1                       | 1W                             | 500V                                         | 1,000V                   | 1,000V                             | -                                      | 2.2 - 1M |

(1) Lesser of  $\sqrt{PR}$  or maximum working voltage.



| Mechanical Specifications |                        |                    |                         |                        |        |
|---------------------------|------------------------|--------------------|-------------------------|------------------------|--------|
| Type / Code               | A<br>Body Length       | B<br>Body Diameter | C<br>Lead Length (Bulk) | D<br>Lead Diameter     | Unit   |
| RC14                      | 0.248 $\pm$ 0.028      | 0.094 $\pm$ 0.004  | 1.181 $\pm$ 0.118       | 0.024 $\pm$ 0.002      | inches |
|                           | 6.30 $\pm$ 0.70        | 2.40 $\pm$ 0.10    | 30.00 $\pm$ 3.00        | 0.60 $\pm$ 0.050       | mm     |
| RC12                      | 0.374 + 0.031 / -0.028 | 0.142 $\pm$ 0.008  | 1.102 $\pm$ 0.118       | 0.028 + 0.003 / -0.002 | inches |
|                           | 9.50 + 0.80 / -0.70    | 3.60 $\pm$ 0.20    | 28.00 $\pm$ 3.00        | 0.70 + 0.070 / -0.05   | mm     |
| RC1                       | 0.563 $\pm$ 0.028      | 0.224 $\pm$ 0.012  | 1.024 $\pm$ 0.118       | 0.035 $\pm$ 0.002      | inches |
|                           | 14.30 $\pm$ 0.70       | 5.70 $\pm$ 0.30    | 26.00 $\pm$ 3.00        | 0.90 $\pm$ 0.050       | mm     |

Power Derating Curve:



| Resistance Temperature Characteristics |            |           |                                                                 |
|----------------------------------------|------------|-----------|-----------------------------------------------------------------|
| Resistance Range                       | -55°C      | +105°C    | Maximum % resistance change from room temperature (+25°C) value |
| Under 1K                               | +2 to + 5  | -4 to -2  |                                                                 |
| 1K to 9.1K                             | +5 to +9   | -5 to -3  |                                                                 |
| 10K to 91K                             | +8 to +11  | -7 to -5  |                                                                 |
| 100K to 910K                           | +10 to +14 | -9 to -7  |                                                                 |
| 1M to 10M                              | +13 to +20 | -14 to -9 |                                                                 |

| Performance Characteristics (JISC 5201 - 1:1998) |                                                                                                                            |                                                                                                                      |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Test                                             | Test Results                                                                                                               | Test Method                                                                                                          |
| Voltage Proof                                    | No breakdown or flashover                                                                                                  | V-block method RC 1/4 100 VAC, 60 seconds<br>RC 1/2 500 VAC, 60 seconds                                              |
| Overload                                         | ±2% +0.05Ω<br>No visible damage, legible markings                                                                          | 2.5 times the rated voltage or twice the limiting element voltage, whichever is less. Severe, 5 seconds.             |
| Termination Strength                             | Tensile: ±2% +0.05Ω. No visible damage<br>Bending: ±2% +0.05Ω. No visible damage<br>Torsion: ±2% +0.05Ω. No visible damage | 10N for 5 - 10 seconds<br>5N, twice<br>180°C, two rotations                                                          |
| Solderability                                    | In accordance with Clause 4.17.4.5                                                                                         | 235°C, 5 seconds                                                                                                     |
| Resistance to Soldering Heat                     | ±3% +0.05Ω<br>No visible damage, legible markings                                                                          | After immersion into flux, the immersion into solder shall be carried out 4mm from the body at 350°C for 3.5 seconds |
| Temperature Shock                                | ±2% +0.05Ω<br>No visible damage.                                                                                           | 5 cycles between -55°C to 125°C                                                                                      |
| Climatic Sequence                                | ±10% +0.5Ω                                                                                                                 | Dry/Damp heat: 12 +12 hour cycle, first cycle<br>Cold/Damp heat: 12 + 12 hour cycle, remaining cycle D.C. load       |
| Damp Test, Steady State                          | ±10% +0.5Ω<br>Insulation resistance: R ≥100M ohm.<br>No visible damage, legible markings                                   | 40°C 95% relative humidity for 56 days, test a, b and c of Clause 4.24.2.1                                           |
| Endurance @ 70°C                                 | ±10% +0.5Ω<br>Insulation resistance: R ≥1G ohm.<br>No visible damage.                                                      | Rated voltage, 1.5 hours ON, 0.5 hours OFF at 70°C, 1,000 hours                                                      |
| Endurance @ 125°C                                | ±10% +0.5Ω<br>Insulation resistance: R ≥1G ohm.<br>No visible damage.                                                      | 125°C, no load, 1,000 hours                                                                                          |

Operating Temperature Range: -55°C to +125°C

| Reliability Test – Load Life in Moisture |     |                     |                          |                           |               |           |                                                |
|------------------------------------------|-----|---------------------|--------------------------|---------------------------|---------------|-----------|------------------------------------------------|
| Criteria (%)                             |     | Load Ratio P/Pn (%) | Total Testing Time (Hrs) | Number of Fractures (pcs) | Failure Ratio |           | Average Lifetime (60% reliability level) (Hrs) |
|                                          |     |                     |                          |                           | λ             | λCL (60%) |                                                |
| Δ R/R                                    | ±5  | 0                   | 2.984 x 10 <sup>6</sup>  | 6                         | 0.201         | 0.244     | 4.098 x 10 <sup>5</sup>                        |
|                                          |     | 20                  | 2.990 x 10 <sup>6</sup>  | 4                         | 0.134         | 0.176     | 5.682 x 10 <sup>5</sup>                        |
|                                          |     | 60                  | 2.997 x 10 <sup>6</sup>  | 2                         | 0.067         | 0.104     | 9.615 x 10 <sup>5</sup>                        |
|                                          |     | 100                 | 2.992 x 10 <sup>6</sup>  | 3                         | 0.1           | 0.139     | 7.194 x 10 <sup>5</sup>                        |
|                                          |     | Total               | 1.196 x 10 <sup>7</sup>  | 15                        | 0.125         | 0.138     | 7.209 x 10 <sup>5</sup>                        |
|                                          | ±10 | Total               | 1.2 x 10 <sup>7</sup>    | 0                         | 0.0055        | 0.0077    | 1.299 x 10 <sup>7</sup>                        |

**Technical Guide:**

**1. Storage Conditions:**

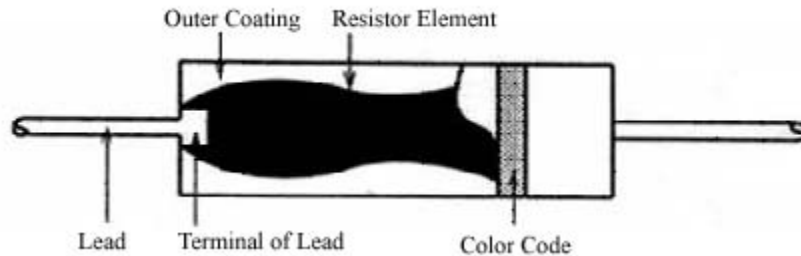
Temperature: 5 to 35°C (40 to 95°F)  
Humidity: 25 – 60% relative humidity  
Term: Two years in factory poly-bag with desiccant. If parts are removed from the poly-bag, they should be used immediately or resealed in the bag.  
Environment: Clean, dry environment, free of corrosive gases

**2. Application precautions:**

Lead forming: Forming is recommended at least 2mm or farther from the base of the lead  
Soldering: Soldering is recommended at least 4mm or farther from the base of the lead

**3. Washing:**

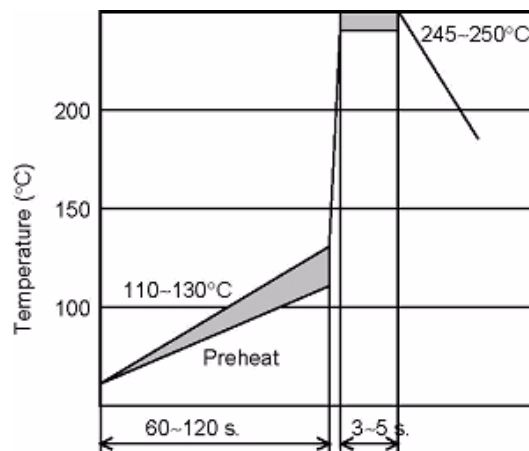
Carbon composition resistors are highly hygroscopic and changes in resistance value can occur if too much moisture is absorbed. For this reason it is recommended not to use water or water-soluble solvents to clean these components. Alcohol or hydrocarbon solvents are recommended for rinsing.



**4. Soldering Recommendations:**

Note: The conditions shown below are for reference. Please perform a mounting evaluation to assure compatibility.

**a. Flow soldering (recommended profile for Sn and Sn/Pb solders)**



**b. Soldering iron (recommended for Sn and Sn/Pb solders)**

Temperature of soldering tip: 300°C, duration: 10 sec. max.  
Temperature of soldering tip: 350°C, duration: 3 sec. max.

**Other:**

1. Evaluate and confirm the compatibility of your assembly process with this product.
2. Refer to the catalog, the product news, and the specifications for details on the RC series resistors.
3. If you have any questions, please contact our sales staff.

## How to Order

| 1              |             | 2    |       | 3            |     | 4         |  | 5    |               | 6         |  | 7        |  | 8                                                                                                                      |  | 9 |  | 10               |  |
|----------------|-------------|------|-------|--------------|-----|-----------|--|------|---------------|-----------|--|----------|--|------------------------------------------------------------------------------------------------------------------------|--|---|--|------------------|--|
| R              |             | C    |       | 1            |     | 2         |  | J    |               | T         |  | 5        |  | M                                                                                                                      |  | 6 |  | 0                |  |
| Product Series |             | Size |       | Power Rating |     | Tolerance |  |      |               | Packaging |  |          |  |                                                                                                                        |  |   |  | Resistance Value |  |
| RC             | Carbon Comp | 14   | 0.25W | Code         | Tol | Value     |  | Code | Description   | Size      |  | Quantity |  | Four characters with the multiplier used as the decimal holder.<br><br>1 ohm = 1R00<br>10 Kohm = 10K0<br>1 Mohm = 1M00 |  |   |  |                  |  |
|                |             | 12   | 0.5W  | J            | 5%  | E24       |  | T    | Tape and Reel | 14, 12    |  | 5,000    |  |                                                                                                                        |  |   |  |                  |  |
|                |             | 1    | 1W    | K            | 10% |           |  | B    | Bulk          | All Sizes |  | 1,000    |  |                                                                                                                        |  |   |  |                  |  |

Legacy Part Number (before January 3, 2011):

| SEI Type  |             | Code       |         | Nominal Resistance |        | Tolerance | Packaging |       |               |      |
|-----------|-------------|------------|---------|--------------------|--------|-----------|-----------|-------|---------------|------|
| <b>RC</b> |             | <b>1/2</b> |         | <b>5.6M</b>        |        | <b>5%</b> | <b>R</b>  |       |               |      |
| Type      | Description | Code       | Wattage | Tolerance          | Values |           | Type      | Qty   | Description   | Code |
| RC        | Carbon Comp | 1/4        | 0.25W   | 5%                 | E24    |           | 14, 12    | 5,000 | tape and reel | R    |
|           |             | 1/2        | 0.5W    | 10%                |        |           | all       | 1,000 | bulk          | A    |
|           |             | 1          | 1W      |                    |        |           |           |       |               |      |