



Features:

- Automatically insertable
- High quality performance
- Flame retardant type available
- Cost effective and commonly used
- Availability of very low or very high ohmic value can be supplied on a case to case basis

Explanation of Part Numbers:

| | | | | | | |
|----------|-----------|----------|------------|----------|----------|-----------|
| R | 25 | G | 103 | J | T | XX |
| 1 | 2 | 3 | 4 | 5 | 6 | |

1 Style:

R = Carbon Film Fixed Resistors

2 Wattage:

| | | |
|---------------|---------------|---------------|
| 08 = 1/8 watt | 25 = 1/4 watt | 50 = 1/2 watt |
| 100 = 1 watt | 200 = 2 watt | 300S = 3 watt |

3 Nominal Resistance Value:

E24 Series (5% Tolerance)

The first two digits are significant figures of resistance and the third digit denotes the number of zeros (decimal point is expressed by the letter "R").

i.e. 102 = 1k
1R2 = 1.2

4 Tolerance:

J = ± 5% G = ± 2%

5 Packaging:

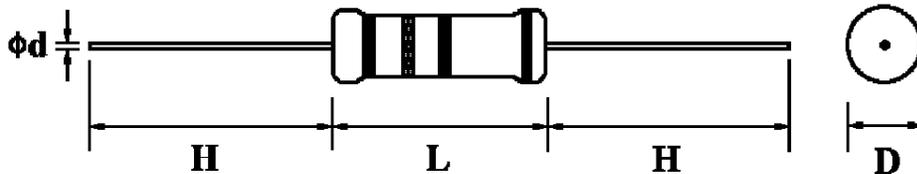
| | |
|-----------------|----------|
| T = Tape & Reel | B = Bulk |
| TB = Tape & Box | A = Ammo |

6 Lead Forming:

| | |
|----------------------|----------------------|
| PN = Panasert Type | PA1 = Avisert Type 1 |
| PA2 = Avisert Type 2 | PA3 = Avisert Type 3 |

* For all other requests, please consult factory

Dimensions:





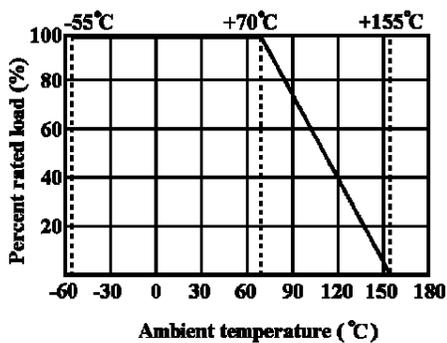
Carbon Film Resistors

| Normal Size | | | | | | Small Size | | | | | |
|-------------|----------------------|----------------|--------|---|-----------|------------|----------------------|----------------|--------|---|-----------|
| Style | Power Rating at 70°C | Dimension (mm) | | | | Style | Power Rating at 70°C | Dimension (mm) | | | |
| | | D Max. | L Max. | $\phi d \begin{smallmatrix} +0.02 \\ -0.05 \end{smallmatrix}$ | H \pm 3 | | | D Max. | L Max. | $\phi d \begin{smallmatrix} +0.02 \\ -0.05 \end{smallmatrix}$ | H \pm 3 |
| R08 | 1/8W (0.125W) | 1.85 | 3.5 | 0.5 | 28 | R25S | 1/4W (0.25W) | 1.85 | 3.5 | 0.5 | 28 |
| R25 | 1/4W (0.25W) | 2.5 | 6.8 | 0.6 | 28 | R50S | 1/2W (0.5W) | 3.0 | 9.0 | 0.6 | 28 |
| R50 | 1/2W (0.5W) | 3.5 | 10.0 | 0.6 | 28 | R50SS | 1/2W (0.5W) | 2.5 | 6.8 | 0.6 | 28 |
| R100 | 1W | 5.5 | 16.0 | 0.8 | 28 | R100SS | 1W | 5.0 | 12.0 | 0.7 | 28 |
| R200 | 2W | 6.5 | 17.5 | 0.8 | 28 | R200S | 2W | 5.5 | 16.0 | 0.8 | 28 |
| | | | | | | R300S | 3W | 6.5 | 17.5 | 0.8 | 28 |

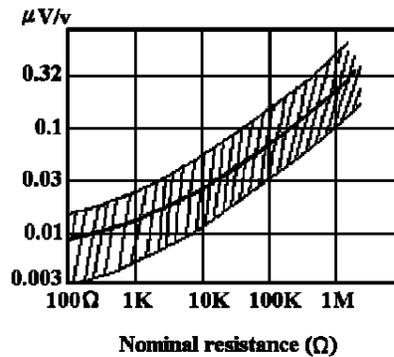
Rating

| Style | Max. Working Voltage | Max. Overload Voltage | Dielectric Withstanding Voltage | Resistance Range |
|-------------------------|----------------------|-----------------------|---------------------------------|------------------|
| R08 R25S | 200V | 400V | 400V | .22 -22M |
| R25 | 250V | 500V | 500V | .22 -22M |
| R50SS | 250V | 500V | 250V | 1 -10M |
| R50 R50S | 350V | 700V | 700V | .47 -22M |
| R100 R100S R100SS | 500V | 1000V | 1000V | .1 -10M |
| R200 R200S R300S | 500V | 1000V | 1000V | .62 -10M |

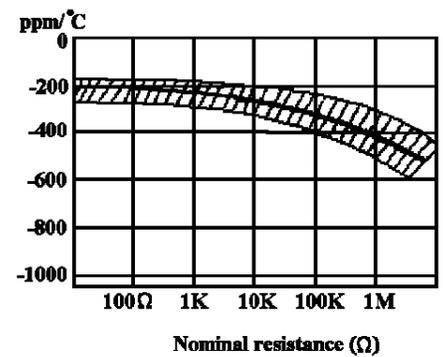
Derating Curve



Current Noise



Temp. Coefficient





Performance Specifications

| Characteristics | Test Methods | Limits | | | | | | | | | | | | | | | |
|---|---|---|-----------------------|--------|----|--------------|--------------------------------|--------------|----------------------|--------------------------------|-------------|---------------|------------|---|-----------|---------------|--|
| Temperature coefficient JIS - C - 5202 5.2 | Natural resistance change per temp. degree centigrade. $\frac{R_2 - R_1}{R_1 (t_2 - t_1)} \times 10^6 \text{ (PPM / } ^\circ\text{C)}$ R ₁ : Resistance value at room temperature (t ₁) R ₂ : Resistance value at room temp. plus 100 °C (t ₂) | <table border="1"> <thead> <tr> <th>Range</th> <th>T.C.R.</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>0~±350PPM/°C</td> </tr> <tr> <td>11 -99K</td> <td>0~±450PPM/°C</td> </tr> <tr> <td>100K -1M</td> <td>0~±700PPM/°C</td> </tr> <tr> <td>1.1M -10M</td> <td>0~±1500PPM/°C</td> </tr> </tbody> </table> | Range | T.C.R. | 10 | 0~±350PPM/°C | 11 -99K | 0~±450PPM/°C | 100K -1M | 0~±700PPM/°C | 1.1M -10M | 0~±1500PPM/°C | | | | | |
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| Dielectric withstanding voltage JIS - C - 5202 5.7 | Resistors shall be clamped in the trough of a 90° metallic V- block and shall be tested at AC potential respectively specified in the above list for 60+ 10 / -0 seconds. | No evidence of flashover, mechanical damage, arcing or insulation break down. | | | | | | | | | | | | | | | |
| Temperature cycling JIS - C - 5202 7.4 | Resistance change after continuous five cycles for duty cycle specified below: <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C ± 3°C</td> <td>30 minutes</td> </tr> <tr> <td>2</td> <td>Room temp</td> <td>10~15 minutes</td> </tr> <tr> <td>3</td> <td>+ 155°C ± 3°C</td> <td>30 minutes</td> </tr> <tr> <td>4</td> <td>Room temp</td> <td>10~15 minutes</td> </tr> </tbody> </table> | Step | Temperature | Time | 1 | -55°C ± 3°C | 30 minutes | 2 | Room temp | 10~15 minutes | 3 | + 155°C ± 3°C | 30 minutes | 4 | Room temp | 10~15 minutes | Resistance change rate is ± 1% + 0.05). No evidence of mechanical damage |
| Step | Temperature | Time | | | | | | | | | | | | | | | |
| 1 | -55°C ± 3°C | 30 minutes | | | | | | | | | | | | | | | |
| 2 | Room temp | 10~15 minutes | | | | | | | | | | | | | | | |
| 3 | + 155°C ± 3°C | 30 minutes | | | | | | | | | | | | | | | |
| 4 | Room temp | 10~15 minutes | | | | | | | | | | | | | | | |
| Short - time overload JIS - C - 5202 5.5 | Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds. | Resistance change rate is ± (1% + 0.05) No evidence of mechanical damage | | | | | | | | | | | | | | | |
| Load life in humidity JIS - C - 5202 7.9 | Resistance change after 1,000 hours operating at RCWV with duty cycle of 1.5 hours "on" 0.5 hour "off" in a humidity test chamber controlled at 40°C ± 2°C and 90to 95% relative humidity. | <table border="1"> <thead> <tr> <th colspan="3">Resistance value ▲R/R</th> </tr> </thead> <tbody> <tr> <td>NORMAL TYPE</td> <td>Less than 100K 100K or more</td> <td>±3% ±5%</td> </tr> <tr> <td>FLAME RETARDANT TYPE</td> <td>Less than 100K 100K or more</td> <td>±5% ±10%</td> </tr> </tbody> </table> | Resistance value ▲R/R | | | NORMAL TYPE | Less than 100K 100K or more | ±3% ±5% | FLAME RETARDANT TYPE | Less than 100K 100K or more | ±5% ±10% | | | | | | |
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| FLAME RETARDANT TYPE | Less than 100K 100K or more | ±5% ±10% | | | | | | | | | | | | | | | |
| Load life JIS - C - 5202 7.10 | Permanent resistance change after 1,000 hours operating at RCWV, with duty cycle of 1.5 hours "on", 0.5 hour "off" at 70°C ± 2°C ambient. | <table border="1"> <thead> <tr> <th colspan="3">Resistance value ▲R/R</th> </tr> </thead> <tbody> <tr> <td>NORMAL TYPE</td> <td>Less than 56K 56K or more</td> <td>±2% ±3%</td> </tr> <tr> <td>FLAME RETARDANT TYPE</td> <td>Less than 100K 100K or more</td> <td>±5% ±10%</td> </tr> </tbody> </table> | Resistance value ▲R/R | | | NORMAL TYPE | Less than 56K 56K or more | ±2% ±3% | FLAME RETARDANT TYPE | Less than 100K 100K or more | ±5% ±10% | | | | | | |
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| NORMAL TYPE | Less than 56K 56K or more | ±2% ±3% | | | | | | | | | | | | | | | |
| FLAME RETARDANT TYPE | Less than 100K 100K or more | ±5% ±10% | | | | | | | | | | | | | | | |
| Insulation resistance JIS - C - 5202 5.6 | Resistors shall be clamped in the trough of a 90° metallic V-block and shall be tested at DC potential respectively specified in the above list for 60 + 10/-0 seconds. | Insulation resistance is 10,000 M Min. | | | | | | | | | | | | | | | |
| Terminal strength JIS - C - 5202 6.1 | Direct load : Resistance to a 2.5 kgs direct load for 10 seconds in the direction of the longitudinal axis of the terminal leads. Twist test : Terminal leads shall be bent through 90 at point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations. | No evidence of mechanical damage | | | | | | | | | | | | | | | |
| Resistance to soldering heat JIS - C - 5202 6.4 | Permanent resistance change when leads immersed to 3.2 mm to 4.8 mm from the body in 350°C ± 10°C solder for 3 ± 0.5 seconds | Resistance change rate is ± (1% + 0.05W). No evidence of mechanical damage | | | | | | | | | | | | | | | |
| Solderability JIS - C - 5202 6.5 | The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Test temp. of solder : 235°C ± 5°C Dwell time in solder : 3 + 0.5 / - 0 seconds | 95% coverage Min. | | | | | | | | | | | | | | | |
| Resistance to solvent JIS - C - 5202 6.9 | Specimens shall be immersed in a bath of trichloroethane completely for 3 minutes with ultrasonic. | No deterioration of protective coatings and markings | | | | | | | | | | | | | | | |

*RCWV = Rated Continuous Working Voltage = $\sqrt{\text{Rated Power} \times \text{Resistance Value}}$