**Key Features**

**High Power with Small Size for Space Saving**

**Excellent Long Term Stability**

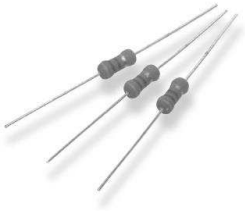
**Complete Flameproof Construction**

**Controlled Temperature Capability**

**Solvent Resistant Coat and Code**

**Special Lead Formations Possible**

# Type ROX Series



The resistive element comprises a metal oxide film deposited on a ceramic former. The element is protected by a flameproof coating which will withstand overload conditions without flame or mechanical damage. They are recommended for use in applications such as line protection etc

## Characteristics – Electrical

| Type | | Rated Power @ 70°C | Max. Working Voltage | Max. Overload Voltage | Dielectric Withstand Voltage | Resistance Range Ω | Operating Temp. Range |
|---|---|---|---|---|---|---|---|
| Normal Size | ROX025 | 0.25W | 250V | 400V | 250V | 0.3 ~ 50K | -55 ~ 155°C |
| | ROX05 | 0.5W | 250V | 400V | 250V | 0.3 ~ 330K | |
| | ROX1 | 1W | 350V | 600V | 350V | 0.1 ~ 470K | |
| | ROX2 | 2W | 350V | 600V | 350V | 0.1 ~ 560K | |
| | ROX3 | 3W | 500V | 800V | 500V | 5.0 ~ 100K | |
| | ROX5 | 5W | 750V | 1000V | 750V | 5.0 ~ 150K | |
| | ROX7 | 7W | 750V | 1000V | 750V | 20 ~ 150K | |
| | ROX8 | 8W | 750V | 1000V | 750V | 30 ~ 200K | |
| | ROX9 | 9W | 750V | 1000V | 750V | 50 ~ 200K | |
| Small Size | ROX05S | 0.5W | 250V | 400V | 250V | 0.3 ~ 50K | |
| | ROX1S | 1W | 350V | 600V | 350V | 0.1 ~ 270K | |
| | ROX2S | 2W | 350V | 600V | 350V | 0.1 ~ 470K | |
| | ROX3S | 3W | 350V | 600V | 350V | 0.3 ~ 560K | |
| | ROX4S | 4W | 500V | 800V | 500V | 5.0 ~ 100K | |
| | ROX5SS | 5W | 500V | 800V | 500V | 5.0 ~ 100K | |
| | ROX5S | 5W | 500V | 800V | 500V | 5.0 ~ 560K | |

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial line frequency and waveform corresponding to the power rating , as determined from the following formula :

$RCWV = \sqrt{P} \times R$

Where : RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

P = Power Rating (watt)

R = Nominal Resistance (ohm)

Rated Voltage = RCWV or Max. Working Voltage, whichever is smaller

## Environmental Characteristics

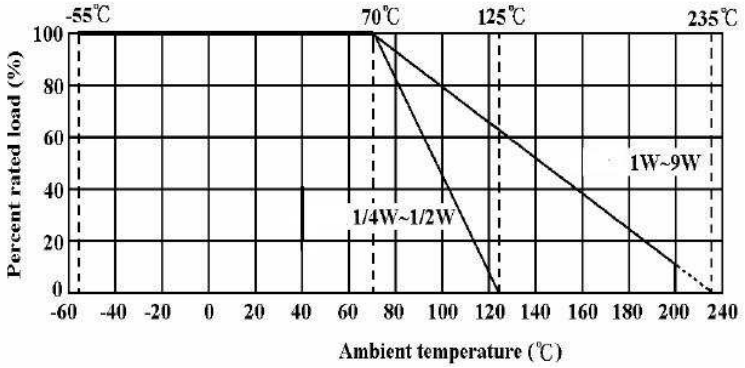
<table>
<tr><th>Characteristics</th><th>Specification</th><th>Test Methods<br>( JIS C 5201-1 )</th></tr>
<tr><td>DC. Resistance</td><td>Must be within the specified tolerance</td><td>5.1 The limit of error of measuring apparatus shall not exceed allowable range or 5% of resistance tolerance</td></tr>
<tr><td>Temperature Coefficient</td><td><table><tr><th>Range Ω</th><th>TCR (PPM/°C)</th></tr><tr><td>0.1Ω ~ 12Ω</td><td>±200</td></tr><tr><td>12.1Ω ~ 100K</td><td>±350</td></tr><tr><td>101K ~ 1M</td><td>-700</td></tr><tr><td>1.1M ~ 10M</td><td>-1500</td></tr></table></td><td>5.2 Natural resistance change per temp. degree centigrade.<br>$\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6$ (PPM/°C)<br>$R_1$: Resistance value at room temperature ($t_1$)<br>$R_2$: Resistance value at room temp. plus 100 °C ($t_2$)</td></tr>
<tr><td>Short time overload</td><td>Resistance change rate is<br>Normal Size : ± (1% + 0.05Ω) Max.<br>Small Size : ± (2% + 0.05Ω) Max.<br>with no evidence of mechanical damage</td><td>5.5 Permanent resistance change after the application of a potential of 2.5 times RCWV or the max. overload voltage respectively specified in the above list, whichever less for 5 seconds</td></tr>
<tr><td>Dielectric Withstanding Voltage</td><td>No evidence of flashover mechanical damage, arcing or insulation break down</td><td>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 electrical characteristics table for<br>60 + 10/ -0 seconds</td></tr>
<tr><td>Terminal Strength</td><td>No Evidence of mechanical damage</td><td>6.1 Direct load:<br>Resistance to a 2.5 kgs direct load for 10 secs. in the direction of the longitudinal axis of the terminal leads<br>Twist test:<br>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.</td></tr>
<tr><td>Resistance to soldering heat</td><td>Resistance change rate is:<br>± (1% + 0.05Ω) Max. with no evidence of mechanical damage</td><td>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</td></tr>
<tr><td>Solderability</td><td>95 % coverage Min.</td><td>6.5 The area covered with a new , smooth, clean , shiny and continuous surface free from concentrated pinholes.<br>Test temp. of solder: 245°C ± 3°C<br>Dwell time in solder : 2 ~ 3 seconds</td></tr>
</table>

## Environmental Characteristics (continued)

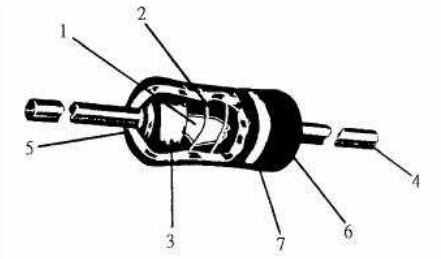
<table>
<tr><th>Characteristics</th><th>Specification</th><th>Test Methods<br>( JIS C 5201-1 )</th></tr>
<tr><td>Resistance to Solvent</td><td>No deterioration of protective coatings and marking</td><td>6.9 Specimens shall be immersed in a bath of trichroethane completely for 3 minutes with ultrasonic</td></tr>
<tr><td>Temperature cycling</td><td>Resistance change rate is:<br>± (2% + 0.05Ω) Max. with no evidence of mechanical damage</td><td>7.4 Resistance change after continuous 5 cycles for duty shown below:<br><table><tr><th>Step</th><th>Step</th><th>Step</th></tr><tr><td>1</td><td>1</td><td>1</td></tr><tr><td>2</td><td>2</td><td>2</td></tr><tr><td>3</td><td>3</td><td>3</td></tr><tr><td>4</td><td>4</td><td>4</td></tr></table></td></tr>
<tr><td>Load life in humidity</td><td><table><tr><th>Resistance Value</th><th>ΔR/R</th></tr><tr><td>Less than 100KΩ</td><td>± 5 %</td></tr><tr><td>100KΩ or more</td><td>± 10 %</td></tr></table></td><td>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 ℃ ± 2 ℃ and 90 to 95 % relative humidity</td></tr>
<tr><td>Load life</td><td><table><tr><th>Resistance Value</th><th>ΔR/R</th></tr><tr><td>Less than 100KΩ</td><td>± 5 %</td></tr><tr><td>100KΩ or more</td><td>± 10 %</td></tr></table></td><td>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℃ ± 2℃ ambient</td></tr>
<tr><td>Pulse overload</td><td>Resistance change rate is:<br>Normal Size : ± (2% + 0.05Ω) Max.<br>Small Size : ± (5% + 0.05Ω) Max.<br>with no evidence of mechanical damage</td><td>5.8 Resistance change after 10,000 cycles (1 second "on", 25 seconds "off") at 4 times RCWV or the max. pulse overload voltage</td></tr>
</table>

## Derating:

In ambient temperatures greater than 70°C the load shall de-rate as shown in the graph below:

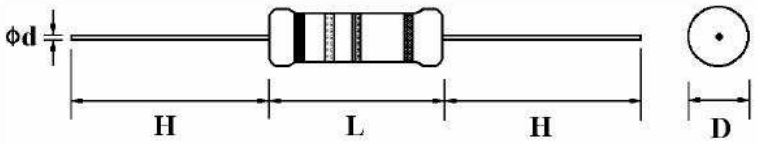


## Construction:




| No. | Name | Material |
|---|---|---|
| 1 | Basic Body | Rod Type Ceramics |
| 2 | Resistance Film | 0.1Ω ≤ R ≤ 12Ω : CNP film<br>10Ω ≤ R ≤ 100kΩ : Metal oxide film<br>R > 100kΩ : Carbon film |
| 3 | End Cap | Steel (Tin plated iron surface) |
| 4 | Lead Wire | Annealed copper wire coated with tin |
| 5 | Joint | By welding |
| 6 | Coating | Normal size:<br>--Insulated & Non-Flame Paint (Color : Gray )<br>Small size:<br>--Insulated & Non-Flame Paint (Color : Sea-Blue ) |
| 7 | Color Code | Non-Flame epoxy resin |

## Dimensions:

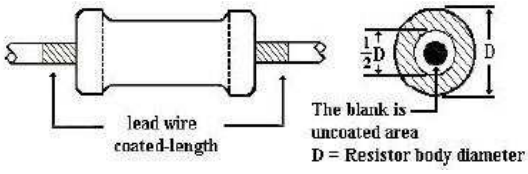



| Type | | Dimensions (MM) | | | |
|---|---|---|---|---|---|
| | | D (max.) | L (max.) | d ±0.05 | H ±3 |
| Normal Size | ROX025 | 2.5 | 7.5 | 0.54 | 28 |
| | ROX05 | 3.5 | 10 | 0.54 | 28 |
| | ROX1 | 5 | 12 | 0.70 | 25 |
| | ROX2 | 5.5 | 16 | 0.70 | 28 |
| | ROX3 | 6.5 | 17.5 | 0.75 | 28 |
| | ROX5 | 8.5 | 26 | 0.75 | 38 |
| | ROX7 | 8.5 | 32 | 0.75 | 38 |
| | ROX8 | 8.5 | 41 | 0.75 | 38 |
| | ROX9 | 8.5 | 54 | 0.75 | 38 |
| Small Size | ROX05S | 2.5 | 7.5 | 0.54 | 28 |
| | ROX1S | 3.5 | 10 | 0.54 | 28 |
| | ROX2S | 5 | 12 | 0.70 | 25 |
| | ROX3S | 5.5 | 16 | 0.70 | 28 |
| | ROX4S | 6.5 | 17.5 | 0.75 | 28 |
| | ROX5SS | 6.5 | 17.5 | 0.75 | 28 |
| | ROX5S | 8 | 25 | 0.75 | 38 |

**NB. Pre-formed leads available on request.**

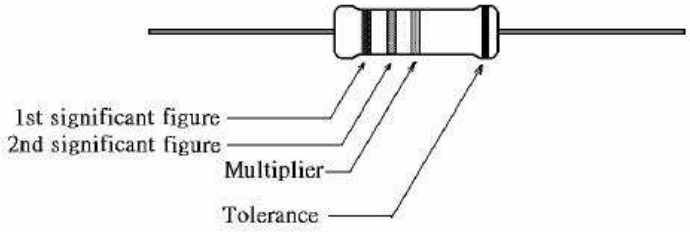
## Painting method:

Welding point, terminal and lead wire, is permissible to be exposed without the outer coated cover. The extent should be within 1/2 of the resistor body diameter.

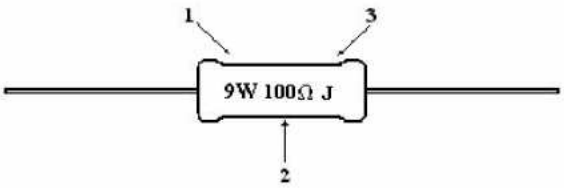



## Marking:

For 1/4W, 1/2W, 1W, 2W, 3W, 4W, 5W and all of small size Resistors shall be marked with color coding. colors shall be in accordance with JIS C 0802




For 7W, 8W, 9W marking shall be in text format:




Code description and regulation

1. Wattage rating.
2. Nominal resistance value.
3. Resistance Tolerance.

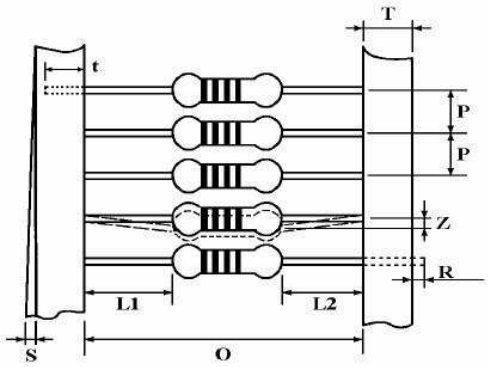
   G: ± 2 %

   J: ± 5 %

   K: ± 10 %

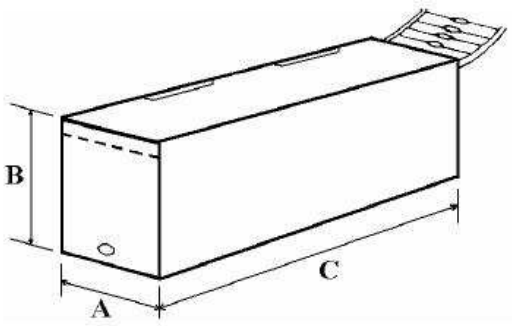
## Packing Specification:

Taping:




| | Type | Style | O±1 | P | L1-L2 | T | Z | R | t | S |
|---|---|---|---|---|---|---|---|---|---|---|
| Normal Size | ROX025 | PT-52 | 52 | 5±0.3 | 1 Max | 6±1 | 1 Max | 0 | 4±1 | 0.5 max |
| | ROX05 | PT-52 | 52 | 5±0.3 | 1 Max | 6±1 | 1 Max | 0 | 4±1 | 0.5 max |
| | ROX1 | PT-52 | 52 | 5±0.3 | 1 Max | 6±1 | 1 Max | 0 | 4±1 | 0.5 max |
| | ROX2 | PT-64 | 64 | 10±0.5 | 1 Max | 6±1 | 1 Max | 0 | 5±1 | 0.5 max |
| | ROX3 | PT-64 | 64 | 10±0.5 | 1 Max | 6±1 | 1 Max | 0 | 5±1 | 0.5 max |
| Small Size | ROX05S | PT-52 | 52 | 5±0.3 | 1 Max | 6±1 | 1 Max | 0 | 4±1 | 0.5 max |
| | ROX1S | PT-52 | 52 | 5±0.3 | 1 Max | 6±1 | 1 Max | 0 | 4±1 | 0.5 max |
| | ROX2S | PT-52 | 52 | 5±0.3 | 1 Max | 6±1 | 1 Max | 0 | 4±1 | 0.5 max |
| | ROX3S | PT-64 | 64 | 10±0.5 | 1 Max | 6±1 | 1 Max | 0 | 5±1 | 0.5 max |
| | ROX4S | PT-64 | 64 | 10±0.5 | 1 Max | 6±1 | 1 Max | 0 | 5±1 | 0.5 max |
| | ROX5SS | PT-64 | 64 | 10±0.5 | 1 Max | 6±1 | 1 Max | 0 | 5±1 | 0.5 max |

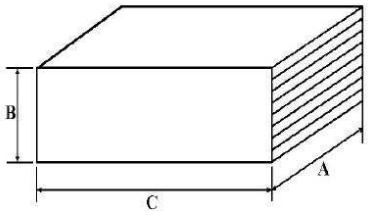
Tape in box packing (Ammopack):




| Type | C ± 5 | A ± 5 | B ± 5 | Pack Quantity |
|---|---|---|---|---|
| ROX025 | 250 | 75 | 96 | 5000 |
| ROX05 | 260 | 85 | 70 | 1000 |
| ROX1 | 262 | 86 | 80 | 1000 |
| ROX2 | 262 | 92 | 108 | 1000 |
| ROX3 | 256 | 92 | 80 | 500 |
| ROX05S | 250 | 75 | 96 | 5000 |
| ROX1S | 260 | 85 | 70 | 1000 |
| ROX2S | 262 | 86 | 80 | 1000 |
| ROX3S | 262 | 92 | 108 | 1000 |
| ROX4S | 256 | 92 | 80 | 500 |
| ROX5SS | 256 | 92 | 80 | 500 |

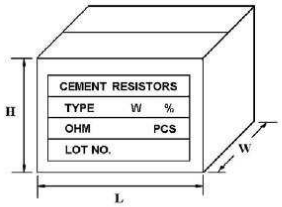
NB Certain products can be supplied reeled on request.

Plastic cases in box:

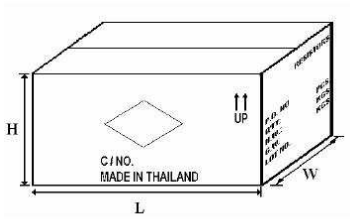



| Type | C ±5 | A ±5 | B ±5 | Quantity | |
|---|---|---|---|---|---|
| | | | | Plastic Case | Box |
| ROX5S | 36 | 20 | 8 | 100 | 1000 |
| ROX5 | 36 | 20 | 8 | 100 | 1000 |

Bulk packaging (plastic bag in inner box):




Inner Box of Plastic bag.




Carton Box

| Type | Qty/Bag (Pcs) | Qty/Box (Pcs) | Qty/Carton Pcs | Box size LxWxH (±5) | Carton size LxWxH (±5) | Gross wt ±2 Kgs |
|---|---|---|---|---|---|---|
| ROX7 | 8 | 32 | 1600 | 150 x 75 x 33 | 432 x 308 x 215 | 9.5 |
| ROX8 | 8 | 32 | 1600 | 150 x 75 x 33 | 432 x 308 x 215 | 11.5 |
| ROX9 | 10 | 300 | 1800 | 200 x 171 x 113 | 520 x 215 x 250 | 15 |

## How To Order

ROX 1S J 100K

| Common Part | Power Rating | | Tolerance | Resistance Value | Special Request |
|---|---|---|---|---|---|
| | **Normal size** | **Small size** | | | |
| ROX – Flame proof power metal oxide film resistor | 025 - 1/4W<br>05 – 1/2W<br>1 – 1W<br>2 – 2W<br>3 – 3W<br>5 – 5W<br>7 – 7W<br>8 – 8W<br>9 – 9W | 05S – 1/2W<br>1S – 1W<br>2S – 2W<br>3S – 3W<br>4S – 4W<br>5SS – 5W<br>5S – 5W | G – 2%<br>J – 5% | R33 -0.33Ω<br>1R0 - 1Ω<br>10R - 10Ω<br>100R - 100Ω<br>1K0 – 1KΩ<br>(1000Ω)<br>100K – 100KΩ<br>(100,000Ω) | BL * – Pre-formed Leads<br><br>TR - Reeled |



Dimensions in millimetres unless otherwise specified

Dimensions Shown for reference purposes only. Specifications subject to change

For Email, phone or live chat, go to: www.te.com/help

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AVIC JONHON

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Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А