

## FEATURES

- Rugged vitreous enamel coating withstands high humidity and temperature cycling.
- Durable construction, recommended for industrial applications where reliability is paramount.
- All-welded construction.
- Flame resistant lead free vitreous enamel coating.
- RoHS compliant product available Jan. 2006 Add "E" suffix to part number to specify.

## SPECIFICATIONS

### Material

**Coating:** Conformal lead free vitreous enamel.  
**Core:** Ceramic.

**Terminals:** Solder-coated axial lead.

### Derating

Linearly from 100% @ +25°C to 0% @ +350°C.

### Electrical

**Tolerance:** ±5% standard. Other tolerances available.

**Power rating:** Based on 25°C free air rating (other wattages available).

### Overload:

Under 7 watts: 5 times rated wattage for 5 seconds.  
 7 watts and over: 10 times rated wattage for 5 seconds.

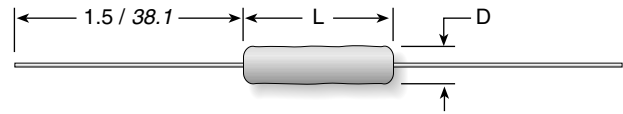
### Temperature coefficient:

1 to 9.99 ohms: ±50 ppm/°C  
 10 ohms and over: ±30 ppm/°C



# 20 Series

## Vitreous Enamel, Conformal, Axial Lead, Wirewound Resistors, 5% Tolerance Standard



| Series | Wattage | Ohms     | Dimensions (in. / mm) |              | Max. Volt. ** | Lead ga. |
|--------|---------|----------|-----------------------|--------------|---------------|----------|
|        |         |          | Length*               | Diam.*       |               |          |
| 21     | 1       | 0.1-3.2K | 0.406 / 10.3          | 0.156 / 4.0  | 75            | 24       |
| 22     | 2       | 0.1-4.4K | 0.406 / 10.3          | 0.219 / 5.6  | 65            | 20       |
| 23     | 3       | 0.1-10K  | 0.500 / 12.7          | 0.220 / 5.6  | 135           | 20       |
| 25     | 5       | 0.1-28K  | 1.000 / 25.4          | 0.276 / 7.0  | 330           | 20       |
| 27     | 7       | 0.1-62K  | 1.250 / 31.8          | 0.394 / 10.0 | 450           | 20       |
| 20     | 10      | 0.1-100K | 1.844 / 46.8          | 0.394 / 10.0 | 720           | 20       |

12.5 watt size available on special order

\*For units below 1Ω, add 15% to body diameter, 10% to body length.

\*\*Maximum Voltage is based on Ohm's Law  $[V=\sqrt{W \cdot R}]$  as limited by the resistance value of specified product

The 20 Series axial lead resistors are both durable and economical. They have all the electrical attributes of the more expensive 90 Series resistors, including an all-welded construction.

They offer the durability of a lead free conformal vitreous enamel coating and are ideal for computer, communications and industrial applications in which cost, quality and reliability are key considerations.

## ORDERING INFORMATION

RoHS Compliant

21JR10E

|  |   |                            |  |
|--|---|----------------------------|--|
| <b>20 Series</b><br>Vitreous Enamel Axial Lead Wirewound | <b>Wattage</b><br>1 = 1W<br>2<br>3<br>5<br>7<br>0 = 10W | <b>Tolerance</b><br>J = 5% | <b>Resistance Value</b><br>R10 = 0.10Ω<br>1R0 = 1.0Ω<br>10R = 10.0Ω<br>250 = 250Ω<br>1K0 = 1,000Ω<br>4K5 = 4,500Ω<br>50K = 50,000Ω |
|--|---|----------------------------|--|

## STANDARD PART NUMBERS FOR STANDARD RESISTANCE VALUES

| Ohmic value | Part No. Prefix Suffix | Wattage |   |   |   |   |    | Ohmic value | Part No. Prefix Suffix | Wattage |   |   |   |   |    | Ohmic value | Part No. Prefix Suffix | Wattage |   |   |   |   |    |
|-------------|------------------------|---------|---|---|---|---|----|-------------|------------------------|---------|---|---|---|---|----|-------------|------------------------|---------|---|---|---|---|----|
|             |                        | 1       | 2 | 3 | 5 | 7 | 10 |             |                        | 1       | 2 | 3 | 5 | 7 | 10 |             |                        | 1       | 2 | 3 | 5 | 7 | 10 |
| 0.10        | R10                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 62          | 62R                    | ✦       | ✦ | ✓ | ✓ | ✦ | ✦  | 1,800       | 1K8                    | ✓       | ✓ | ✓ | ✦ | ✦ | ✦  |
| 0.13        | R13                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 68          | 68R                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 2,000       | 2K0                    | ✦       | ✓ | ✦ | ✦ | ✓ | ✓  |
| 0.15        | R15                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 75          | 75R                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 2,200       | 2K2                    | ✓       | ✓ | ✓ | ✓ | ✦ | ✓  |
| 0.20        | R20                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 82          | 82R                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 2,500       | 2K5                    | ✦       | ✓ | ✓ | ✦ | ✦ | ✦  |
| 0.25        | R25                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 100         | 100                    | ✦       | ✦ | ✦ | ✦ | ✓ | ✓  | 2,700       | 2K7                    | ✓       | ✓ | ✓ | ✦ | ✦ | ✦  |
| 0.30        | R30                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 120         | 120                    | ✓       | ✓ | ✦ | ✦ | ✦ | ✦  | 3,000       | 3K0                    | ✓       | ✓ | ✦ | ✦ | ✦ | ✓  |
| 0.33        | R33                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 125         | 125                    | ✦       | ✦ | ✓ | ✓ | ✓ | ✓  | 3,300       | 3K3                    | ✓       | ✓ | ✓ | ✓ | ✦ | ✦  |
| 0.50        | R50                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 150         | 150                    | ✓       | ✓ | ✦ | ✦ | ✦ | ✦  | 3,500       | 3K5                    | ✓       | ✓ | ✓ | ✓ | ✦ | ✦  |
| 0.75        | R75                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 180         | 180                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 3,900       | 3K9                    | ✓       | ✓ | ✓ | ✓ | ✦ | ✦  |
| 1           | 1R0                    | ✦       | ✦ | ✦ | ✦ | ✓ | ✓  | 200         | 200                    | ✦       | ✓ | ✓ | ✓ | ✓ | ✓  | 4,000       | 4K0                    | ✓       | ✓ | ✦ | ✦ | ✦ | ✓  |
| 1.5         | 1R5                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 220         | 220                    | ✦       | ✓ | ✓ | ✓ | ✓ | ✓  | 4,500       | 4K5                    | ✓       | ✓ | ✓ | ✓ | ✦ | ✓  |
| 2           | 2R0                    | ✦       | ✓ | ✓ | ✦ | ✦ | ✓  | 225         | 225                    | ✦       | ✦ | ✦ | ✦ | ✦ | ✦  | 4,700       | 4K7                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 2.2         | 2R2                    | ✓       | ✓ | ✓ | ✓ | ✦ | ✓  | 250         | 250                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 5,000       | 5K0                    | ✓       | ✓ | ✦ | ✓ | ✓ | ✓  |
| 3           | 3R0                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 270         | 270                    | ✦       | ✓ | ✓ | ✓ | ✓ | ✓  | 6,000       | 6K0                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 4           | 4R0                    | ✓       | ✦ | ✓ | ✓ | ✓ | ✓  | 300         | 300                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 6,800       | 6K8                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 5           | 5R0                    | ✓       | ✓ | ✓ | ✦ | ✓ | ✦  | 330         | 330                    | ✦       | ✓ | ✓ | ✓ | ✓ | ✓  | 7,000       | 7K0                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 7.5         | 7R5                    | ✦       | ✓ | ✓ | ✓ | ✦ | ✓  | 350         | 350                    | ✦       | ✓ | ✦ | ✓ | ✓ | ✓  | 7,500       | 7K5                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 10          | 10R                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 390         | 390                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 8,000       | 8K0                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 12          | 12R                    | ✦       | ✦ | ✓ | ✓ | ✓ | ✓  | 400         | 400                    | ✦       | ✦ | ✓ | ✓ | ✓ | ✓  | 9,000       | 9K0                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 15          | 15R                    | ✓       | ✦ | ✓ | ✦ | ✓ | ✦  | 450         | 450                    | ✦       | ✦ | ✓ | ✓ | ✓ | ✓  | 10,000      | 10K                    | ✓       | ✓ | ✦ | ✦ | ✓ | ✓  |
| 18          | 18R                    | ✓       | ✦ | ✓ | ✓ | ✓ | ✓  | 470         | 470                    | ✦       | ✓ | ✓ | ✓ | ✓ | ✓  | 12,000      | 12K                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 20          | 20R                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 500         | 500                    | ✓       | ✓ | ✦ | ✓ | ✓ | ✓  | 13,000      | 13K                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 22          | 22R                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 560         | 560                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 15,000      | 15K                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 25          | 25R                    | ✦       | ✓ | ✓ | ✓ | ✓ | ✓  | 600         | 600                    | ✓       | ✓ | ✦ | ✓ | ✓ | ✓  | 17,000      | 17K                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 27          | 27R                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 680         | 680                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 20,000      | 20K                    | ✓       | ✓ | ✦ | ✓ | ✓ | ✓  |
| 30          | 30R                    | ✦       | ✓ | ✓ | ✓ | ✓ | ✓  | 750         | 750                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 22,000      | 22K                    | ✓       | ✓ | ✦ | ✓ | ✓ | ✓  |
| 33          | 33R                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 800         | 800                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 25,000      | 25K                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 35          | 35R                    | ✦       | ✦ | ✓ | ✓ | ✓ | ✓  | 820         | 820                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 30,000      | 30K                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✦  |
| 39          | 39R                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  | 900         | 900                    | ✦       | ✓ | ✓ | ✓ | ✓ | ✓  | 33,000      | 33K                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 40          | 40R                    | ✓       | ✦ | ✓ | ✓ | ✓ | ✓  | 1,000       | 1K0                    | ✦       | ✦ | ✦ | ✦ | ✓ | ✦  | 35,000      | 35K                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 47          | 47R                    | ✦       | ✓ | ✓ | ✓ | ✓ | ✓  | 1,100       | 1K1                    | ✓       | ✦ | ✓ | ✓ | ✓ | ✓  | 40,000      | 40K                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |
| 50          | 50R                    | ✓       | ✓ | ✓ | ✦ | ✓ | ✓  | 1,200       | 1K2                    | ✓       | ✓ | ✦ | ✓ | ✓ | ✓  | 50,000      | 50K                    | ✓       | ✓ | ✓ | ✓ | ✓ | ✦  |
| 56          | 56R                    | ✦       | ✓ | ✓ | ✓ | ✓ | ✓  | 1,500       | 1K5                    | ✦       | ✓ | ✦ | ✓ | ✓ | ✓  |             |                        |         |   |   |   |   |    |

✦ = Most popular standard values    ✓ = Standard values  
 ✦ = Non-standard values subject to minimum handling charge per item

Shaded values involve very fine resistance wire and should not be used in critical applications without burn-in and/or thermal cycling.