

# 20 Series



## Vitreous Enamel Conformal Axial Terminal Wirewound, 5% Tolerance Std.

The 20 Series axial terminal resistors are both durable and economical. They have all the electrical attributes of the more expensive 90 Series resistors, including 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.



### 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; Add "E" suffix to part number to specify.

### SERIES SPECIFICATIONS

| Series | Wattage | Ohms     | Max. Voltage* |
|--------|---------|----------|---------------|
| 21     | 1       | 1.0-3.0K | 75            |
| 22     | 2       | 1.0-3.0K | 65            |
| 23     | 3       | 0.1-10K  | 135           |
| 25     | 5       | 0.1-28K  | 330           |
| 27     | 7       | 0.1-25K  | 450           |
| 20     | 10      | 0.1-100K | 720           |

12.5 watt size available on special order

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

### CHARACTERISTICS

|                                |                                                                                                            |
|--------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Coating</b>                 | Conformal lead free vitreous enamel                                                                        |
| <b>Core</b>                    | Ceramic.                                                                                                   |
| <b>Terminals</b>               | Solder-coated axial. RoHS solder composition is 96% Sn, 3.5% Ag, 0.5% Cu                                   |
| <b>Derating</b>                | Linearly from 100% @ +25°C to 0% @ +350°C                                                                  |
| <b>Tolerance</b>               | ±5% standard; other tolerances available                                                                   |
| <b>Power rating</b>            | Based on 25°C free air rating (other wattages available)                                                   |
| <b>Overload</b>                | Under 7 watts: 5 times rated wattage for 5 seconds; 7 watts and over: 10 times rated wattage for 5 seconds |
| <b>Temperature coefficient</b> | 1 to 9.99 ohms: ±50 ppm/°C; 10 ohms and over: ±30 ppm/°C                                                   |

### DIMENSIONS

(in./mm max.)



| Series | Wattage | Length* (max.) | Diam.* (max.) | Lead ga. |
|--------|---------|----------------|---------------|----------|
| 21     | 1       | 0.421 / 10.7   | 0.156 / 4.0   | 24       |
| 22     | 2       | 0.421 / 10.7   | 0.219 / 5.6   | 20       |
| 23     | 3       | 0.515 / 13.1   | 0.220 / 5.6   | 20       |
| 25     | 5       | 1.015 / 25.8   | 0.276 / 7.0   | 20       |
| 27     | 7       | 1.265 / 32.1   | 0.394 / 10.0  | 20       |
| 20     | 10      | 1.859 / 47.2   | 0.394 / 10.0  | 20       |

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

(continued)

# 20 Series

Vitreous Enamel Conformal Axial  
Terminal Wirewound, 5% Tolerance Std.

## ORDERING INFORMATION

### Standard part numbers

| Ohmic value | Wattage                      |   |   |   |   |   |    | Ohmic value | Wattage                      |   |   |   |   |   |    | Ohmic value  | Wattage                      |   |   |   |   |   |    |
|-------------|------------------------------|---|---|---|---|---|----|-------------|------------------------------|---|---|---|---|---|----|--------------|------------------------------|---|---|---|---|---|----|
|             | Part No.<br>Prefix<br>Suffix | 1 | 2 | 3 | 5 | 7 | 10 |             | Part No.<br>Prefix<br>Suffix | 1 | 2 | 3 | 5 | 7 | 10 |              | Part No.<br>Prefix<br>Suffix | 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 | ✓                            | ✓ |   | ✓ | ✓ | ✓ | ✓  |              |                              |   |   |   |   |   |    |

✓ = 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.

