

# 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 | Part No.<br>Prefix<br>Suffix | Wattage |   |   |   |   |    | Ohmic value | Part No.<br>Prefix<br>Suffix | Wattage |   |   |   |   |    | Ohmic value | Part No.<br>Prefix<br>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                        | ✓       | ✓ | ✓ | ✓ | ✓ | ✓  |             |                              |         |   |   |   |   |    |

✓ = 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.





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Электрон  
Связь**

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