# 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

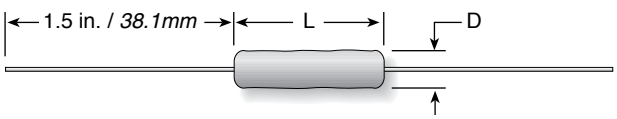
*Maximum Voltage is based on Ohm's Law [$V=\sqrt{(P*R)}$] as limited by the resistance value of specified product

## CHARACTERISTICS

| | |
|---|---|
| **Coating** | Conformal lead free vitreous enamel |
| **Core** | Ceramic. |
| **Terminals** | Solder-coated axial. RoHS solder composition is 96% Sn, 3.5% Ag, 0.5% Cu |
| **Derating** | Linearly from 100% @ +25°C to 0% @ +350°C |
| **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 |

## 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. Prefix ➤ Suffix ▼ | Wattage 1 (21J) | 2 (22J) | 3 (23J) | 5 (25J) | 7 (27J) | 10 (20J) |
|---|---|---|---|---|---|---|---|
| 0.10 | R10 | | | ✔ | ✔ | | ✔ |
| 0.13 | R13 | | | ✔ | ✔ | | ✔ |
| 0.15 | R15 | | | ✔ | ✔ | | ✔ |
| 0.20 | R20 | | | ✔ | ✔ | | ✔ |
| 0.25 | R25 | | | ✔ | ✔ | | ✔ |
| 0.30 | R30 | | | ✔ | ✔ | | ✔ |
| 0.33 | R33 | | | ✔ | ✔ | | ✔ |
| 0.50 | R50 | | | ✔ | ✔ | | ✔ |
| 0.75 | R75 | | | ✔ | ✔ | | ✔ |
| 1 | 1R0 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 1.5 | 1R5 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 2 | 2R0 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 2.2 | 2R2 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 3 | 3R0 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 4 | 4R0 | ✔ | ✣ | ✔ | ✔ | ✣ | ✔ |
| 5 | 5R0 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 7.5 | 7R5 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 10 | 10R | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 12 | 12R | ✣ | ✣ | ✔ | ✔ | ✣ | ✔ |
| 15 | 15R | ✔ | ✣ | ✔ | ✣ | ✔ | ✔ |
| 18 | 18R | ✔ | ✣ | ✔ | ✔ | ✣ | ✔ |
| 20 | 20R | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 22 | 22R | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 25 | 25R | ✣ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 27 | 27R | ✔ | ✔ | ✔ | ✔ | ✣ | ✣ |
| 30 | 30R | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 33 | 33R | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 35 | 35R | ✣ | ✣ | ✣ | ✔ | ✣ | ✣ |
| 39 | 39R | ✔ | ✔ | ✔ | ✣ | ✣ | ✔ |
| 40 | 40R | ✔ | ✣ | ✔ | ✔ | ✣ | ✔ |
| 47 | 47R | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 50 | 50R | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 56 | 56R | ✣ | ✔ | ✔ | ✔ | ✣ | ✣ |
| 62 | 62R | ✣ | ✣ | ✔ | ✔ | ✣ | ✔ |
| 68 | 68R | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 75 | 75R | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 82 | 82R | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 100 | 100 | ✔ | ✣ | ✔ | ✔ | ✔ | ✔ |
| 120 | 120 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 125 | 125 | ✣ | ✣ | ✔ | ✔ | ✔ | ✔ |
| 150 | 150 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 180 | 180 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 200 | 200 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 220 | 220 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 225 | 225 | ✣ | ✣ | ✣ | ✣ | ✣ | ✣ |
| 250 | 250 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 270 | 270 | ✔ | ✔ | ✔ | ✔ | ✣ | ✣ |
| 300 | 300 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 330 | 330 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 350 | 350 | ✣ | ✔ | ✣ | ✔ | ✣ | ✔ |
| 390 | 390 | ✔ | ✣ | ✔ | ✣ | ✣ | ✣ |
| 400 | 400 | ✣ | ✣ | ✔ | ✔ | ✣ | ✔ |
| 450 | 450 | ✣ | ✣ | ✣ | ✔ | ✣ | ✔ |
| 470 | 470 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 500 | 500 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 560 | 560 | ✔ | ✔ | ✔ | ✔ | ✣ | ✣ |
| 600 | 600 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 680 | 680 | ✔ | ✣ | ✔ | ✔ | ✣ | ✔ |
| 750 | 750 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 800 | 800 | ✔ | ✣ | ✔ | ✔ | ✣ | ✣ |
| 820 | 820 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 900 | 900 | ✣ | ✔ | ✔ | ✔ | ✣ | ✣ |
| 1,000 | 1K0 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 1,100 | 1K1 | ✣ | ✣ | ✔ | ✔ | ✣ | ✔ |
| 1,200 | 1K2 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 1,500 | 1K5 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 1,800 | 1K8 | ✔ | ✔ | ✔ | ✣ | ✣ | ✣ |
| 2,000 | 2K0 | ✣ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 2,200 | 2K2 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 2,500 | 2K5 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 2,700 | 2K7 | ✔ | ✔ | ✔ | ✣ | ✣ | ✔ |
| 3,000 | 3K0 | ✔ | ✔ | ✔ | ✔ | ✣ | ✔ |
| 3,300 | 3K3 | | | ✔ | ✔ | ✣ | ✣ |
| 3,500 | 3K5 | | | ✣ | ✔ | ✣ | ✣ |
| 3,900 | 3K9 | | | ✔ | ✔ | ✣ | ✔ |
| 4,000 | 4K0 | | | ✔ | ✔ | ✣ | ✔ |
| 4,500 | 4K5 | | | ✣ | ✔ | ✣ | ✣ |
| 4,700 | 4K7 | | | ✔ | ✔ | ✣ | ✔ |
| 5,000 | 5K0 | | | ✔ | ✔ | ✔ | ✔ |
| 6,000 | 6K0 | | | ✔ | ✔ | ✔ | ✔ |
| 6,800 | 6K8 | | | ✔ | ✔ | ✣ | ✣ |
| 7,000 | 7K0 | | | ✔ | ✔ | ✣ | ✣ |
| 7,500 | 7K5 | | | ✔ | ✔ | ✣ | ✔ |
| 8,000 | 8K0 | | | ✔ | ✔ | ✣ | ✔ |
| 9,000 | 9K0 | | | ✔ | ✣ | ✣ | ✣ |
| 10,000 | 10K | | | ✔ | ✔ | ✣ | ✔ |
| 12,000 | 12K | | | | ✔ | ✣ | ✔ |
| 13,000 | 13K | | | | | ✣ | ✔ |
| 15,000 | 15K | | | | ✔ | ✣ | ✔ |
| 17,000 | 17K | | | | | ✣ | ✣ |
| 20,000 | 20K | | | | ✔ | ✔ | ✔ |
| 22,000 | 22K | | | | ✔ | ✣ | ✣ |
| 25,000 | 25K | | | | ✔ | ✣ | ✔ |
| 30,000 | 30K | | | | | | ✔ |
| 33,000 | 33K | | | | | | ✣ |
| 35,000 | 35K | | | | | | ✣ |
| 40,000 | 40K | | | | | | ✔ |
| 50,000 | 50K | | | | | | ✔ |

✔ = 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.

RoHS Compliant

**21JR10E**

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

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