



## Features

- Low thermal resistant ceramic core
- E24 resistance values
- RoHS compliant\*
- Wide power range (1~10 W)
- Coating material meets UL 94V-0 requirements

## Applications

- Smart meters
- Renewable energy
- Industrial
- Power supplies/chargers
- Lighting
- Instruments/gauges
- White goods

# W Series Wirewound Power Resistor

## Electrical Characteristics

Resistance Range ..... See Popular Resistance Values Table  
 Tolerance ..... 5 %  
 Operating Temperature ..... -55 °C to +200 °C  
 Temperature Coefficient .....  $\pm 300$  ppm/°C  
 Maximum Voltage .....  $\sqrt{P \cdot R}$

Non-inductive version is available upon request.

## Popular Resistance Values

| Code | R Value     |
|------|-------------|
| 15R0 | 15 $\Omega$ |
| 22R0 | 22 $\Omega$ |
| 33R0 | 33 $\Omega$ |
| 39R0 | 39 $\Omega$ |
| 47R0 | 47 $\Omega$ |

| Code | R Value      |
|------|--------------|
| 56R0 | 56 $\Omega$  |
| 82R0 | 82 $\Omega$  |
| 1000 | 100 $\Omega$ |
| 1200 | 120 $\Omega$ |
| 1500 | 150 $\Omega$ |

Other E24 resistance values available upon request.

## Physical Characteristics

Resistor ..... Low thermal resistant ceramic core  
 Lead Wire ..... Tin-plated copper wire  
 Coating Material ..... Meets UL 94V-0 requirements

## Environmental Characteristics

| Test                      | Conditions                                                                               | Specification                               |
|---------------------------|------------------------------------------------------------------------------------------|---------------------------------------------|
| Short Time Overload       | 2.5 times rated voltage for 5 seconds.                                                   | $\Delta R/R \leq \pm(2 \% \pm 0.05 \Omega)$ |
| Solderability             | 245 $\pm 3$ °C for 2.5 $\pm 0.5$ seconds.                                                | Over 95 % coverage                          |
| Resistance to Solder Heat | 260 $\pm 5$ °C for 10 $\pm 1$ seconds.                                                   | $\Delta R/R \leq \pm(1 \% + 0.05 \Omega)$   |
| Dielectric Strength       | Test voltage >500 Vrms for >1 minute.                                                    | Pass                                        |
| Insulation Resistance     | Test voltage >500 Vrms for 1 minute.                                                     | >10 <sup>9</sup> $\Omega$                   |
| Load Life Humidity        | 40 $\pm 2$ °C, 90 to 95 %.<br>1.5 hours ON, 0.5 hours OFF for 1000 hours at rated power. | $\Delta R/R \leq \pm(5 \% + 0.05 \Omega)$   |
| Load Life                 | 70 $\pm 2$ °C.<br>1.5 hours ON, 0.5 hours OFF for 1000 hours at rated power.             | $\Delta R/R \leq \pm(5 \% + 0.05 \Omega)$   |

## How to Order

Product Series **W 3 M 22R0 J**  
 W = Wirewound  
 Power Rating  
 1 = 1 Watt  
 2 = 2 Watts  
 3 = 3 Watts  
 5 = 5 Watts  
 7 = 7 Watts  
 9 = 9 Watts  
 10 = 10 Watts  
 Pin Style  
 M = Axial Miniaturized Version  
 Resistance Code  
 • R<100 ohms:  
 "R" represents decimal point (examples: 56R0 = 56 ohms)  
 • R $\geq$ 100 ohms:  
 First three digits are significant, fourth digit represents number of zeros to follow (example: 1500 = 150 ohms)  
 Resistance Tolerance  
 J =  $\pm 5$  %

## Packaging Specifications

| Model | Style       | Qty. per Box (Pcs.) | Min. Order Quantity (Pcs.) |
|-------|-------------|---------------------|----------------------------|
| W1M   | Ammo Pack   | 1,000               | 5,000                      |
| W2M   |             |                     |                            |
| W3M   |             |                     |                            |
| W5M   | Ammo Pack   | 500                 | 2,000                      |
| W7M   |             |                     |                            |
| W9M   | Bulk in Box | 25 / 200            | 2,000                      |
| W10M  |             |                     |                            |

\*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

# W Series Wirewound Power Resistor

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## Product Dimensions

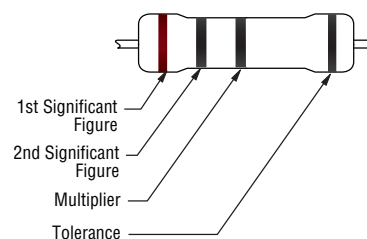


| Model | Dimensions                              |                                       |                                         |                                         |
|-------|-----------------------------------------|---------------------------------------|-----------------------------------------|-----------------------------------------|
|       | L*                                      | D                                     | W                                       | T                                       |
| W1M   | $\frac{9.5 \pm 1.0}{(.374 \pm .004)}$   | $\frac{4.0 \pm 1.0}{(.157 \pm .004)}$ | $\frac{28.0 \pm 3.0}{(1.102 \pm .118)}$ | $\frac{0.60 \pm 0.05}{(.024 \pm .002)}$ |
| W2M   | $\frac{11.5 \pm 1.0}{(.453 \pm .004)}$  | $\frac{4.5 \pm 1.0}{(.177 \pm .004)}$ | $\frac{28.0 \pm 3.0}{(1.102 \pm .118)}$ | $\frac{0.65 \pm 0.05}{(.026 \pm .002)}$ |
| W3M   | $\frac{15.5 \pm 1.0}{(.610 \pm .004)}$  | $\frac{5.5 \pm 1.0}{(.217 \pm .004)}$ | $\frac{28.0 \pm 3.0}{(1.102 \pm .118)}$ | $\frac{0.70 \pm 0.05}{(.028 \pm .002)}$ |
| W5M   | $\frac{17.5 \pm 1.0}{(.689 \pm .004)}$  | $\frac{6.5 \pm 1.0}{(.256 \pm .004)}$ | $\frac{28.0 \pm 3.0}{(1.102 \pm .118)}$ | $\frac{0.75 \pm 0.05}{(.030 \pm .002)}$ |
| W7M   | $\frac{24.5 \pm 1.0}{(.965 \pm .004)}$  | $\frac{8.5 \pm 1.0}{(.335 \pm .004)}$ | $\frac{38.0 \pm 3.0}{(1.496 \pm .118)}$ | $\frac{0.75 \pm 0.05}{(.030 \pm .002)}$ |
| W9M   | $\frac{39.5 \pm 1.0}{(1.555 \pm .004)}$ | $\frac{8.5 \pm 1.0}{(.335 \pm .004)}$ | $\frac{38.0 \pm 3.0}{(1.496 \pm .118)}$ | $\frac{0.75 \pm 0.05}{(.030 \pm .002)}$ |
| W10M  | $\frac{52.5 \pm 1.0}{(2.067 \pm .004)}$ | $\frac{8.5 \pm 1.0}{(.335 \pm .004)}$ | $\frac{38.0 \pm 3.0}{(1.496 \pm .118)}$ | $\frac{0.75 \pm 0.05}{(.030 \pm .002)}$ |

\* Larger body size available upon request.

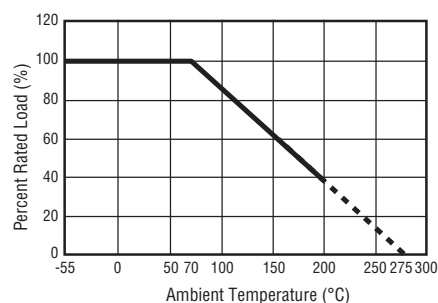
## Typical Part Marking

Resistors shall be marked with color coding. Colors shall be in accordance with JIS C 0802.



| Color  | 1st Band | 2nd Band | Multi-plier   | Tol.         |
|--------|----------|----------|---------------|--------------|
| Black  | 0        | 0        | 1 $\Omega$    |              |
| Brown  | 1        | 1        | 10 $\Omega$   | $\pm 1\%$    |
| Red    | 2        | 2        | 100 $\Omega$  | $\pm 2\%$    |
| Orange | 3        | 3        | 1K $\Omega$   |              |
| Yellow | 4        | 4        | 10K $\Omega$  |              |
| Green  | 5        | 5        | 100K $\Omega$ | $\pm 0.5\%$  |
| Blue   | 6        | 6        | 1M $\Omega$   | $\pm 0.25\%$ |
| Violet | 7        | 7        | 10M $\Omega$  | $\pm 0.10\%$ |
| Grey   | 8        | 8        |               | $\pm 0.05\%$ |
| White  | 9        | 9        |               |              |
| Gold   |          |          | 0.1 $\Omega$  | $\pm 5\%$    |
| Silver |          |          | 0.01 $\Omega$ | $\pm 10\%$   |

## Power Derating Curve

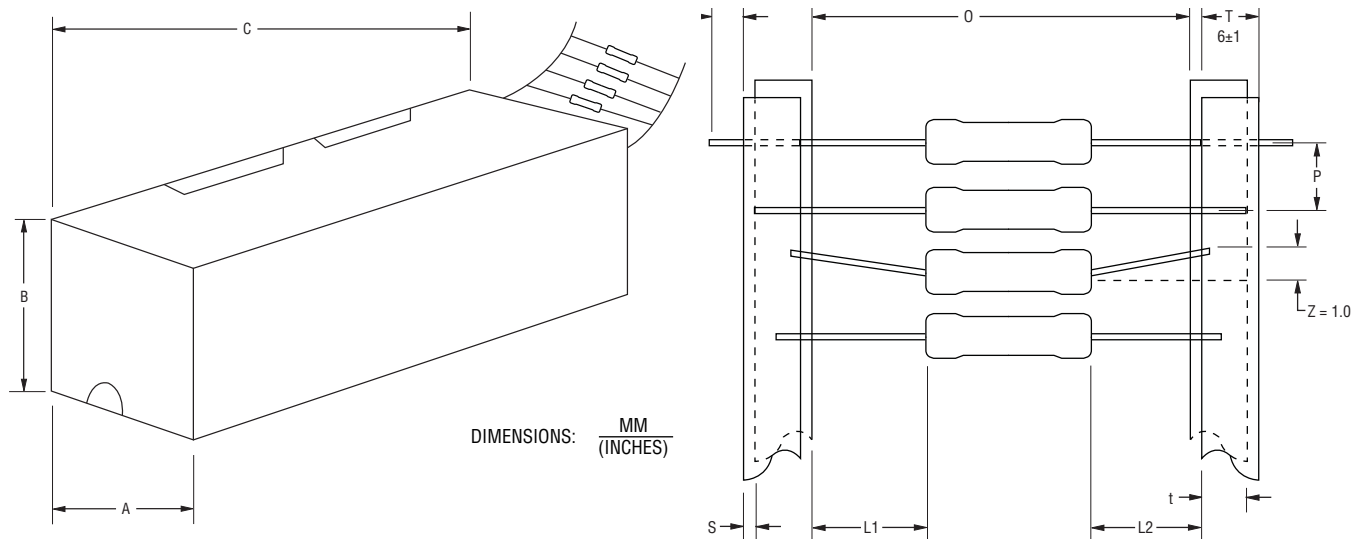


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## Packaging Specifications



| Model | O                                   | P                                    | A                                    | B                                    | C                                     | Qty./Box   |
|-------|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|------------|
| W1M   | $\frac{58 \pm 1}{(2.283 \pm .039)}$ | $\frac{5 \pm 0.3}{(.197 \pm .012)}$  | $\frac{75 \pm 5}{(2.953 \pm .197)}$  | $\frac{70 \pm 5}{(2.756 \pm .197)}$  | $\frac{255 \pm 5}{(10.039 \pm .197)}$ | 1,000 pcs. |
| W2M   | $\frac{58 \pm 1}{(2.283 \pm .039)}$ | $\frac{10 \pm 0.5}{(.394 \pm .020)}$ | $\frac{80 \pm 5}{(3.150 \pm .197)}$  | $\frac{82 \pm 5}{(3.228 \pm .197)}$  | $\frac{255 \pm 5}{(10.039 \pm .197)}$ | 1,000 pcs. |
| W3M   | $\frac{65 \pm 5}{(2.559 \pm .197)}$ | $\frac{10 \pm 0.5}{(.394 \pm .020)}$ | $\frac{90 \pm 5}{(3.543 \pm .197)}$  | $\frac{119 \pm 5}{(4.685 \pm .197)}$ | $\frac{255 \pm 5}{(10.039 \pm .197)}$ | 1,000 pcs. |
| W5M   | $\frac{65 \pm 5}{(2.559 \pm .197)}$ | $\frac{10 \pm 0.5}{(.394 \pm .020)}$ | $\frac{90 \pm 5}{(3.543 \pm .197)}$  | $\frac{88 \pm 5}{(3.465 \pm .197)}$  | $\frac{255 \pm 5}{(10.039 \pm .197)}$ | 500 pcs.   |
| W7M   | $\frac{90 \pm 5}{(3.543 \pm .197)}$ | $\frac{10 \pm 0.5}{(.394 \pm .020)}$ | $\frac{115 \pm 5}{(4.528 \pm .197)}$ | $\frac{124 \pm 5}{(4.882 \pm .197)}$ | $\frac{500 \pm 5}{(19.685 \pm .197)}$ | 500 pcs.   |

For W9M and W10M packaging specifications, please contact factory.

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