

Features

- T0-220 housing
- Low inductance
- Ceramic backplane
- High power rating
- RoHS compliant*

Applications

- Power supplies
- Motor drives
- Test and measurement
- Rectifiers

PWR221T-50 Series Power Resistor

General Information

Bourns® PWR221T-50 Series is a TO-220 style power resistor made using thick film on alumina ceramic technology. It is used in current limiting, capacitor discharge or current measurement circuits in power supplies for telecom and industrial applications.

Electrical & Thermal Characteristics

| Parameter | Value(s) | | |
|--|---------------------------------------|--|--|
| Resistance (See Popular Resistance Values table) | 0.02 Ω to 130 KΩ | | |
| Power Rating @ 25 °C Case Temperature | 50 W ⁽¹⁾ | | |
| Tolerance | ±1 % ⁽²⁾ , ±5 % | | |
| Hot TCR | | | |
| 0.100 Ω ≤ R ≤ 130.0 KΩ | ±100 PPM/°C | | |
| 0.050 Ω ≤ R ≤ 0.100 Ω | ±300 PPM/°C | | |
| 0.020 Ω ≤ R ≤ 0.050 Ω | ±600 PPM/°C | | |
| Thermal Resistance - Rthj | 4.2 °C/W | | |
| Inductance | 0.1 µH maximum | | |
| Operating Voltage | $\sqrt{P^*R}$ with a maximum of 250 V | | |
| Dielectric Strength | 2 KV AC | | |
| Insulation Resistance | 10 GΩ | | |
| Operating Temperature | -55 °C to +150 °C | | |

⁽¹⁾ Power rating of 2.25 W when mounted free to air (no heat sink).

⁽²⁾ Available for most values. Check Popular Resistance Values table.

Reliability Characteristics

| | 1 | |
|--|---------------|--|
| Parameter | Specification | |
| Short Term Overload (2x Pr for $R < 2 \Omega$, | ΔR ±0.25 % | |
| 1.6 x Pr for R \ge 2 Ω , V < 1.5 x Operating Voltage) | | |
| Load Life (2000 hours at rated power) | ΔR ±1.0 % | |
| Thermal Shock (-55 °C to 155 °C, 5 cycles) | ΔR ±0.5 % | |
| Resistance to Soldering Heat (10 seconds at | ΛB ±0.5 % | |
| 270 °C) | | |
| Vibration (20 G 10-2000 Hz .06 " D.A.) | ΔR ±0.25 % | |
| Terminal Strength (MIL-STD-202, Method 211 | ΔR ±0.2 % | |
| Test A1) | | |
| Shock (Saw Tooth: 100 g/6 ms) | ΔR ±0.5 % | |
| Humidity (Steady State) 1000 hrs. 85 °C/85 % RH | ΔR ±0.5 % | |
| High Temperature Exposure | ΛB ±0.5 % | |
| (100 hrs - 40 % Pr @ +125 °C) | | |

Packaging

Material Characteristics

| Resistor | Thick film |
|-----------------|-----------------------|
| Substrate | Alumina (AL203) |
| Housing | Epoxy |
| Pins | Tinned Copper (Sn/Cu) |
| Flammability | Conforms to UL-94V0 |
| Moisture Sensit | ivity Level1 |

WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

Specifications are subject to change without notice. Users should verify actual device performance in their specific applications.

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Additional Information

Click these links for more information:



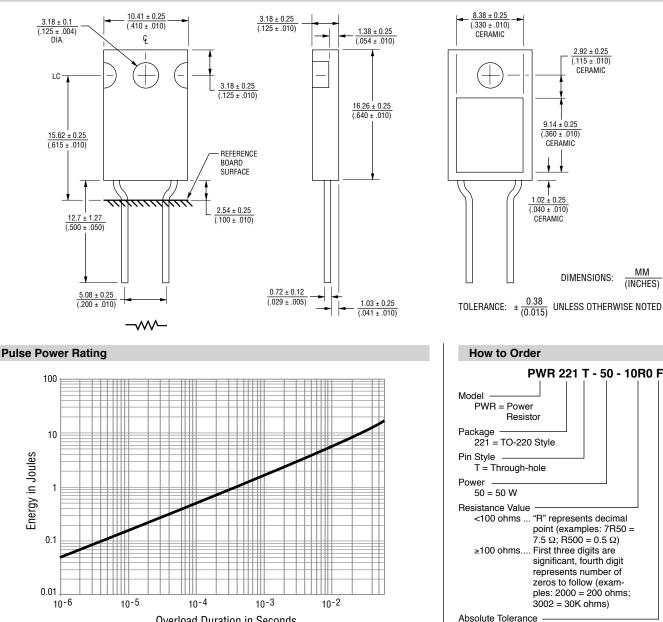
Popular Resistance Values

| Code | Resistance Value | Code | Resistance Value |
|------|------------------------|------|---------------------|
| R020 | 0.02 Ω ⁽³⁾ | 1000 | 100 Ω |
| R025 | 0.025 Ω ⁽³⁾ | 1200 | 120 Ω |
| R030 | 0.03 Ω ⁽³⁾ | 1500 | 150 Ω |
| R033 | 0.033 Ω ⁽³⁾ | 2000 | 200 Ω |
| R040 | 0.04 Ω ⁽³⁾ | 2500 | 250 Ω |
| R050 | 0.05 Ω ⁽³⁾ | 3000 | 300 Ω |
| R075 | 0.075 Ω ⁽³⁾ | 3300 | 330 Ω |
| R100 | 0.1 Ω | 4000 | 400 Ω |
| R150 | 0.15 Ω | 4700 | 470 Ω |
| R200 | 0.2 Ω | 5000 | 500 Ω |
| R250 | 0.25 Ω | 5600 | 560 Ω |
| R300 | 0.3 Ω | 7500 | 750 Ω |
| R330 | 0.33 Ω | 1001 | 1.0 KΩ |
| R400 | 0.4 Ω | 1501 | 1.5 KΩ |
| R500 | 0.5 Ω | 2001 | 2.0 KΩ |
| R750 | 0.75 Ω | 2501 | 2.5 KΩ |
| 1R00 | 1 Ω | 3001 | 3.0 KΩ |
| 1R50 | 1.5 Ω | 3301 | 3.3 KΩ |
| 2R00 | 2 Ω | 4001 | 4.0 KΩ |
| 2R50 | 2.5 Ω | 5001 | 5.0 KΩ |
| 3R00 | 3Ω | 7501 | 7.5 KΩ |
| 3R30 | 3.3 Ω | 1002 | 10 KΩ |
| 4R00 | 4 Ω | 1502 | 15 KΩ |
| 5R00 | 5 Ω | 2002 | 20 KΩ |
| 7R50 | 7.5 Ω | 2502 | 25 KΩ |
| 8R00 | 8 Ω | 3002 | 30 KΩ |
| 10R0 | 10 Ω | 3302 | 33 KΩ |
| 12R0 | 12 Ω | 4002 | 40 KΩ |
| 15R0 | 15 Ω | 4702 | 47 ΚΩ |
| 20R0 | 20 Ω | 5002 | 50 KΩ |
| 25R0 | 25 Ω | 5602 | 56 KΩ |
| 27R0 | 27 Ω | 6802 | 68 KΩ |
| 30R0 | 30 Ω | 7502 | 75 KΩ |
| 33R0 | 33 Ω | 8202 | 82 KΩ |
| 40R0 | 40 Ω | 1003 | 100 KΩ |
| 47R0 | 47 Ω | 1153 | 115 KΩ |
| 50R0 | 50 Ω | 1203 | 120 KΩ |
| 56R0 | 56 Ω | 1253 | 125 KΩ |
| 75R0 | 75 Ω | 1303 | 130 KΩ |

(3) 5 % Tolerance

PWR221T-50 Series Power Resistor

Product Dimensions



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The energy absorbed by the resistor expressed in Joules can be calculated by multiplying the peak power of the pulse in watts times the length of the pulse in seconds.

The energy should not exceed the limits shown in the graph. The overload voltage should not exceed 1.5 times the maximum operating voltage.

Overload Duration in Seconds

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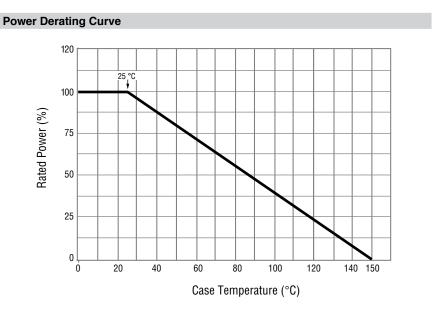
J = 5 %

F = 1 % (Available for most values.

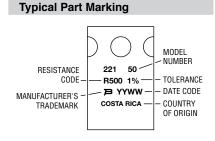
Values table.

Check Popular Resistance

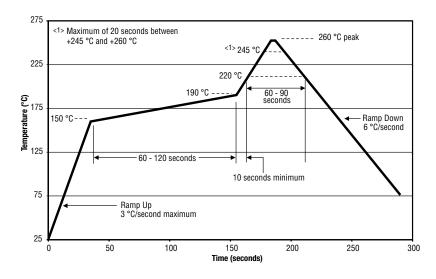
PWR221T-50 Series Power Resistor



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Soldering Profile



Power dissipation is 2.8 W at an ambient temperature of 25 °C when mounted on a double-sided copper board using FR4 standard, 70 μ m of copper, 39 x 30 x 1.6 mm.

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