### Features
- TO220 or TO221 housing
- Low inductance
- SMD and through hole versions
- High power rating

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### PWR220/PWR221 F Series Power Resistors

#### Material Specifications
- Resistor: Thick film
- Substrate: Alumina (AL203)
- Housing: Epoxy/PPS
- Lead Frame: Tinned Copper (Sn/Cu)
- Maximum Torque: 1.0 Nm
- Packaging:
  - Tubes: 50 pcs./tube
  - Tape & Reel**: 500 pcs./reel

**Tape & Reel is only available for Versions A and D.

#### General Information
The Bourns® PWR220 F Series is a TO220 style Power Resistor; PWR221 F is a TO221 style Power Resistor. Manufactured using thick film on Alumina ceramic technology, it is used in applications such as power supplies, motor drives and measurements.

#### Electrical & Thermal Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Min.</th>
<th>Nom.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance (Version A)</td>
<td>R</td>
<td>0.02</td>
<td></td>
<td>100K</td>
<td>Ω</td>
</tr>
<tr>
<td>Resistance (Version C &amp; D)</td>
<td>R</td>
<td>0.02</td>
<td></td>
<td>15K</td>
<td>Ω</td>
</tr>
<tr>
<td>Power Rating @ 70 °C in Free Air</td>
<td>R</td>
<td></td>
<td>1.50</td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Power Rating with External Heat Sink (Version A)</td>
<td>R</td>
<td></td>
<td>30</td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Power Rating with External Heat Sink (Version C &amp; D)</td>
<td>R</td>
<td></td>
<td>50</td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Tolerance</td>
<td></td>
<td>2.0</td>
<td>5.0</td>
<td>5.0</td>
<td>%</td>
</tr>
<tr>
<td>0.02 Ω &lt; R &lt; 1.0 Ω</td>
<td></td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>%</td>
</tr>
<tr>
<td>1.0 Ω &lt; R &lt; 100K Ω</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>TCR</td>
<td></td>
<td>±100</td>
<td>±300</td>
<td>±600</td>
<td>PPM/°C</td>
</tr>
<tr>
<td>0.1 Ω &lt; R &lt; 100K Ω</td>
<td></td>
<td>±100</td>
<td>±300</td>
<td>±600</td>
<td>PPM/°C</td>
</tr>
<tr>
<td>0.05 Ω &lt; R &lt; 0.099 Ω</td>
<td></td>
<td>±100</td>
<td>±300</td>
<td>±600</td>
<td>PPM/°C</td>
</tr>
<tr>
<td>0.02 Ω &lt; R &lt; 0.049 Ω</td>
<td></td>
<td>±100</td>
<td>±300</td>
<td>±600</td>
<td>PPM/°C</td>
</tr>
<tr>
<td>Thermal Resistance – Rthj (Version A)</td>
<td></td>
<td>3.5</td>
<td></td>
<td></td>
<td>°C/W</td>
</tr>
<tr>
<td>(Version C &amp; D)</td>
<td></td>
<td>2.1</td>
<td></td>
<td></td>
<td>°C/W</td>
</tr>
<tr>
<td>Stability</td>
<td></td>
<td>0.5</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Dielectric Withstanding Voltage</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td>kV DC</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>T&lt;sub&gt;J&lt;/sub&gt;</td>
<td>-40</td>
<td></td>
<td>+155</td>
<td>°C</td>
</tr>
</tbody>
</table>

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.

This series is unavailable and not recommended for new designs.
Applications
- Power supplies
- Motor drives
- Test and measurement
- Welding

PWR220/PWR221 F Series Power Resistors

How to Order

Model
PWR = Power Resistor

Package
220 = TO220
221 = TO221

Number of Pins
2 = 2

Function
F = Thick Film

Version
A = TO221 Housing, Surface Mount, 30 W (w/Heat Sink)
C = TO220 Housing/TO221 Housing, Through-Hole, 50 W (w/Heat Sink)
D = TO220 Housing, Surface Mount, 50 W (w/Heat Sink)

Resistor Value for all Tolerances
<100 ohms ...... "R" represents decimal point
First three digits are significant, fourth digit represents number of zeros to follow
(examples: 7R50 = 7.5 ohms; R040 = 0.040 ohms)

≥100 ohms ...... First three digits are significant, fourth digit represents number of zeros to follow
(examples: 2000 = 200 ohms; 2002 = 20K ohms)

Absolute Tolerance
J = 5 %  G = 2 %  F = 1 %

Packaging
E = Tape & Reel (Available only for Versions A and D)
_ = Tubes

Product Dimensions

TO220 Housing: 2-Pin

TO220 Casing: 2-Pin (Surface Mount)

Recommended Pad Layout

DIMENSIONS: MM (INCHES)

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PWR220/PWR221 F Series Power Resistors

Soldering Profile (Surface Mount Version Only)

Derating Curve

Packaging Dimensions

 Devices are packed in accordance with EIA standard RS-481-A and specifications shown here.

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrier Width</td>
<td>A</td>
<td>10.4 (0.409)</td>
</tr>
<tr>
<td>Carrier Length</td>
<td>B</td>
<td>18.4 (0.724)</td>
</tr>
<tr>
<td>Carrier Depth</td>
<td>C</td>
<td>4.4 (0.173)</td>
</tr>
<tr>
<td>Reel Outside Diameter</td>
<td>D</td>
<td>330 (12.992)</td>
</tr>
<tr>
<td>Punch Hole Pitch</td>
<td>P</td>
<td>16.00 (0.630)</td>
</tr>
<tr>
<td>Tape Width</td>
<td>W</td>
<td>32 (1.260)</td>
</tr>
<tr>
<td>Quantity per Reel</td>
<td></td>
<td>500</td>
</tr>
</tbody>
</table>

REV. 10/15

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OBSOLETE