



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



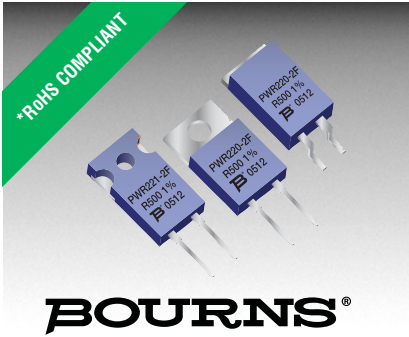
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## Features

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



Models PWR220-2FB, PWR221-2FB, and PWR220-2FA are not available and not recommended for new designs.

Models [PWR220T-35](#), [PWR221T-30](#), and [PWR263S-35](#) are suggested alternatives.

## PWR220/PWR221 F Series Power Resistors

### Material Specifications

Resistor ..... Thick film  
 Substrate ..... Alumina (AL2O3)  
 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

| Parameter   | Symbol         | Min. | Nom. | Max. | Unit   |
|---|----------------|------|------|------|--------|
| Resistance<br>(Version A)                           | R              | 0.02 |      | 100K | Ω      |
| (Version C & D)                                     | R              | 0.02 |      | 15K  | Ω      |
| Power Rating @ 70 °C in Free Air                    |                |      |      | 1.50 | W      |
| Power Rating with External Heat Sink<br>(Version A) |                |      |      | 30   | W      |
| (Version C & D)                                     |                |      |      | 50   | W      |
| Tolerance   |                |      |      |      |        |
| 0.02 Ω < R < 1.0 Ω                                  |                | 2.0  |      | 5.0  | %      |
| 1.0 Ω < R < 100K Ω                                  |                | 1.0  |      | 5.0  | %      |
| TCR   |                |      |      |      |        |
| 0.1 Ω < R < 100.0K Ω                                |                |      |      | ±100 | PPM/°C |
| 0.05 Ω < R < 0.099 Ω                                |                |      |      | ±300 | PPM/°C |
| 0.02 Ω < R < 0.049 Ω                                |                |      |      | ±600 | PPM/°C |
| Thermal Resistance – Rthj<br>(Version A)            |                |      | 3.5  |      | °C/W   |
| (Version C & D)                                     |                |      | 2.1  |      | °C/W   |
| Stability   |                |      | 0.5  |      | %      |
| Dielectric Withstanding Voltage                     |                |      |      | 2    | kV DC  |
| Operating Temperature                               | T <sub>J</sub> | -40  |      | +155 | °C     |

\*RoHS Directive 2002/95/EC Jan 27, 2003 including Annex.  
 Specifications are subject to change without notice.  
 Customers should verify actual device performance in their specific applications.

# Applications

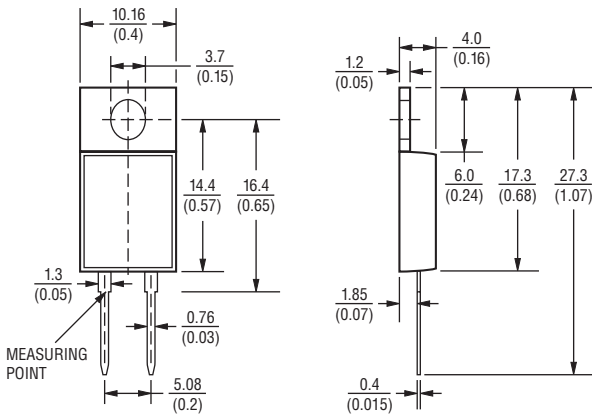
- Power supplies
- Motor drives
- Test and measurement
- Welding

## PWR220/PWR221 F Series Power Resistors

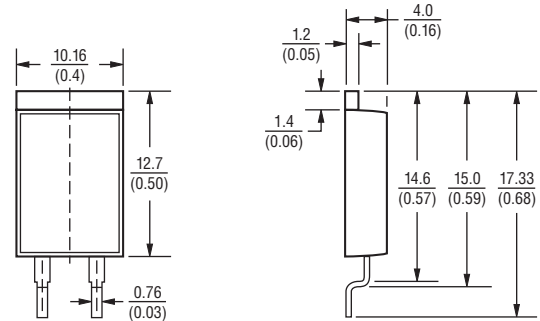


### Product Dimensions

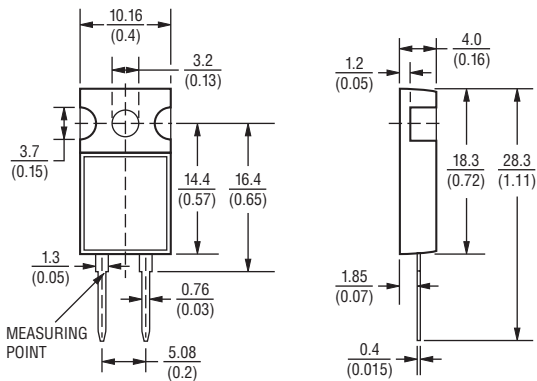
TO220 Housing: 2-Pin



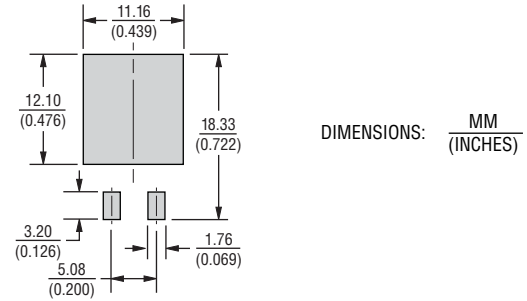
TO220 Casing: 2-Pin (Surface Mount)



TO221 Casing: 2-Pin



### Recommended Pad Layout



### How to Order

**PWR 220 - 2 F B R040 J E**

Model \_\_\_\_\_  
PWR = Power Resistor

Package \_\_\_\_\_  
220 = TO220  
221 = TO221

Number of Pins \_\_\_\_\_  
2 = 2

Function \_\_\_\_\_  
F = Thick Film

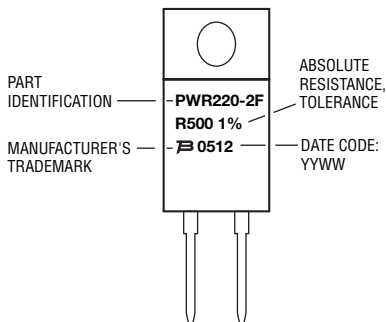
Version \_\_\_\_\_  
A = TO221 Housing, Surface Mount, 30 W (w/Heat Sink)  
C = TO220 Housing/TO221 Housing, Through-Hole, 50 W (w/Heat Sink)  
D = TO220 Housing, Surface Mount, 50 W (w/Heat Sink)

Resistor Value for all Tolerances \_\_\_\_\_  
<100 ohms ..... "R" represents decimal point (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

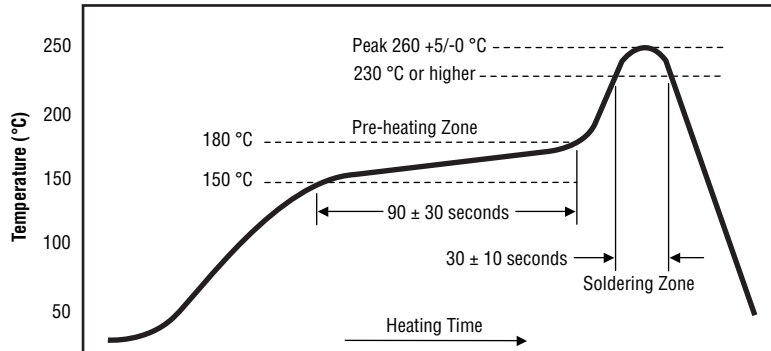
### Typical Part Marking



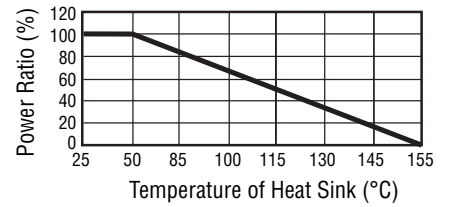
# PWR220/PWR221 F Series Power Resistors



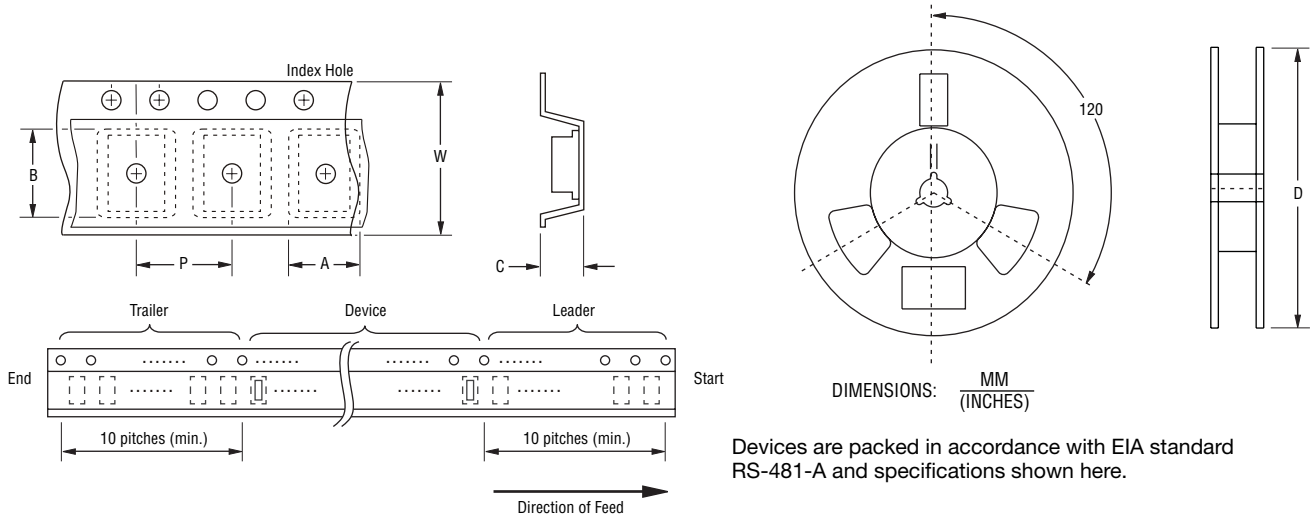
## Soldering Profile (Surface Mount Version Only)



## Derating Curve



## Packaging Dimensions



| Item                  | Symbol | Dimensions              |
|-----------------------|--------|-------------------------|
| Carrier Width         | A      | $\frac{10.4}{(0.409)}$  |
| Carrier Length        | B      | $\frac{18.4}{(0.724)}$  |
| Carrier Depth         | C      | $\frac{4.4}{(0.173)}$   |
| Reel Outside Diameter | D      | $\frac{330}{(12.992)}$  |
| Punch Hole Pitch      | P      | $\frac{16.00}{(0.630)}$ |
| Tape Width            | W      | $\frac{32}{(1.260)}$    |
| Quantity per Reel     | —      | 500                     |

REV. 06/11

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