

## 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 (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

Parameter	Symbol	Min.	Nom.	Max.	Unit
Resistance (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 (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 (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



**WARNING Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://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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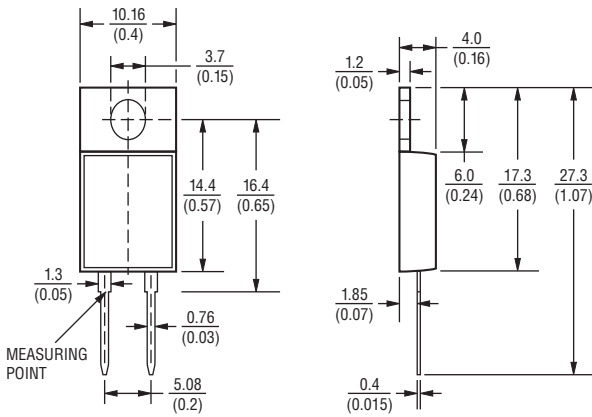
# Applications

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

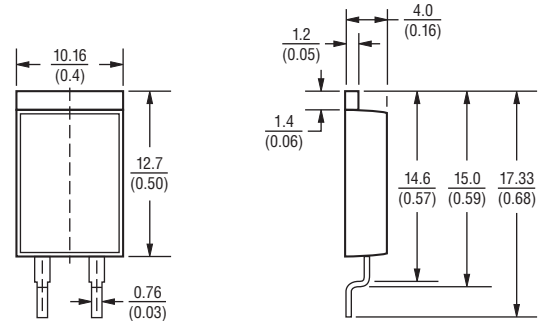
## PWR220/PWR221 F Series Power Resistors **BOURNS®**

### Product Dimensions

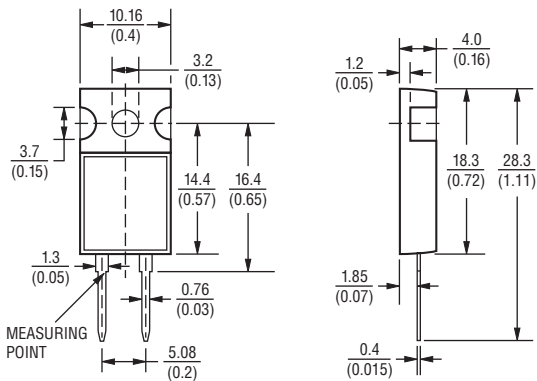
**TO220 Housing: 2-Pin**



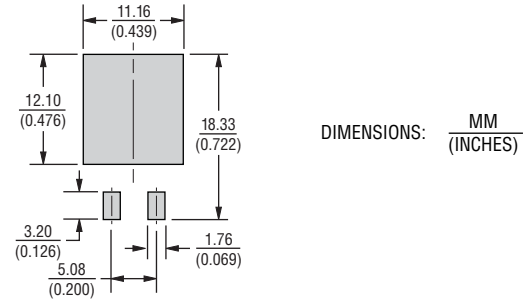
**TO220 Casing: 2-Pin (Surface Mount)**



**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

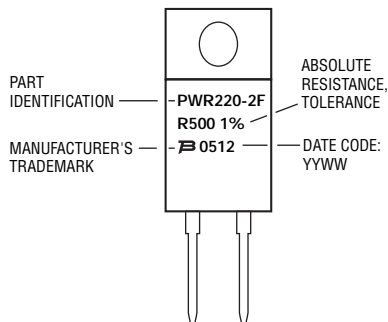
Version \_\_\_\_\_  
 A = TO221 Housing, Surface Mount, 30 W (w/Heat Sink)  
 C = TO220 Housing/TO221 Housing, Through-Hole, 50 W (w/Heat Sink)  
 D = TO220 Housing, Surface Mount, 50 W (w/Heat Sink)

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

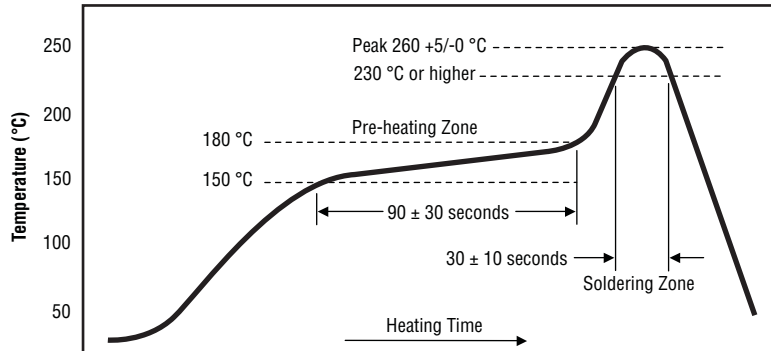


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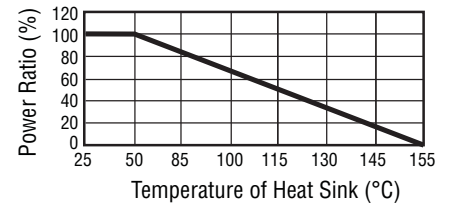
# PWR220/PWR221 F Series Power Resistors



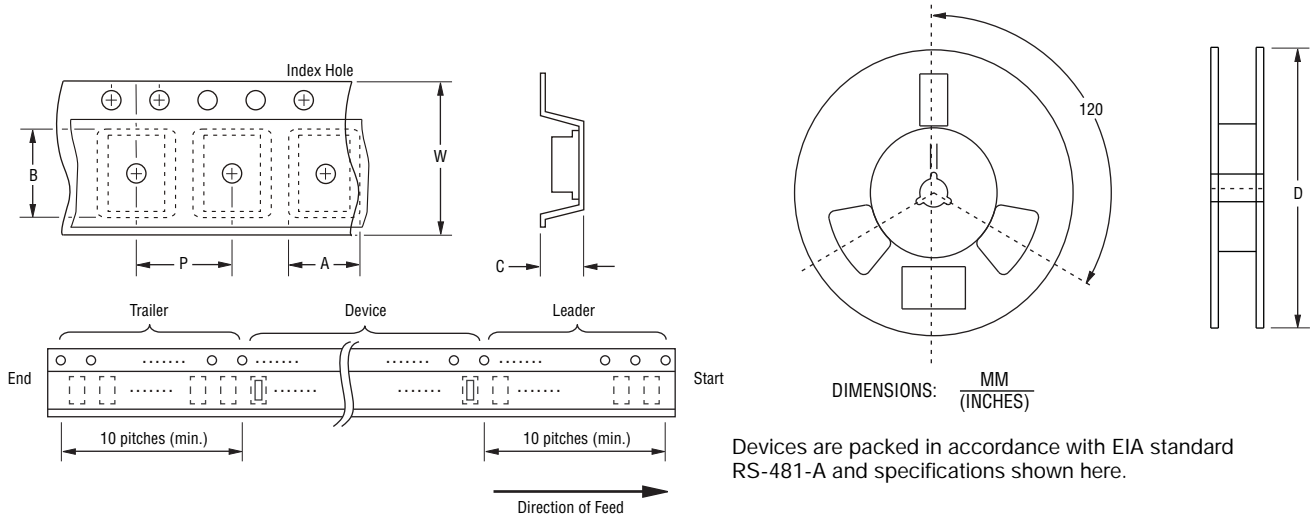
## Soldering Profile (Surface Mount Version Only)



## 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



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