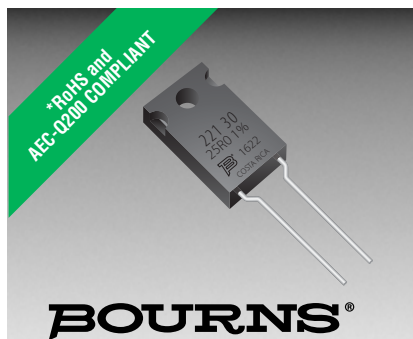




## Features

- TO-220 housing
- Low inductance
- Ceramic backplane
- High power rating
- AEC-Q200 compliant
- RoHS compliant\*

## Applications

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

# PWR221T-30 Series Power Resistor

## General Information

Bourns® PWR221T-30 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 $\Omega$ to 130 K $\Omega$            |
| Power Rating @ 25 °C Case Temperature            | 30 W**                                     |
| Tolerance                                        | $\pm 1\%$ ***, $\pm 5\%$                   |
| TCR                                              |                                            |
| 0.100 $\Omega$ < R < 130.0 K $\Omega$            | $\pm 100$ PPM/°C                           |
| 0.050 $\Omega$ < R < 0.100 $\Omega$              | $\pm 300$ PPM/°C                           |
| 0.020 $\Omega$ < R < 0.050 $\Omega$              | $\pm 600$ PPM/°C                           |
| Thermal Resistance - R <sub>thj</sub>            | 4.2 °C/W                                   |
| Inductance                                       | 0.1 $\mu$ H maximum                        |
| Operating Voltage                                | $\sqrt{P \cdot R}$ with a maximum of 250 V |
| Dielectric Strength                              | 2 KV AC                                    |
| Insulation Resistance                            | 10 G $\Omega$                              |
| Operating Temperature                            | -55 °C to +150 °C                          |

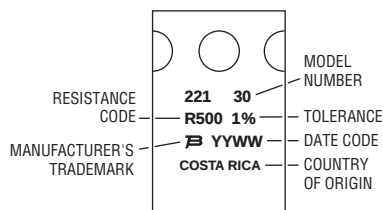
\*\* Power rating of 2.25 W when mounted free to air (no heat sink).

\*\*\* Available for most values. Check Popular Resistance Values table.

## Reliability Characteristics

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

## Typical Part Marking



## Material Characteristics

Resistor ..... Thick film  
 Substrate ..... Alumina (AL2O3)  
 Housing ..... Epoxy  
 Pins ..... Tinned Copper (Sn/Cu)  
 Flammability ..... Conforms to UL-94V0  
 Moisture Sensitivity Level ..... 1  
 ESD Classification (HBM) ..... 3B

## Packaging

..... 50 pcs./tube

## Popular Resistance Values

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

\*\*\* 5 % Tolerance

\*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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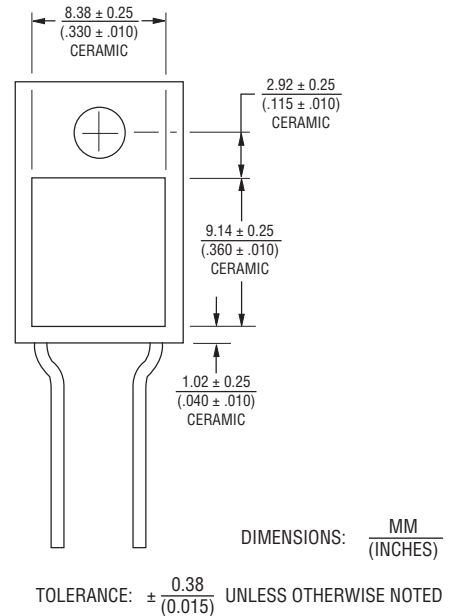
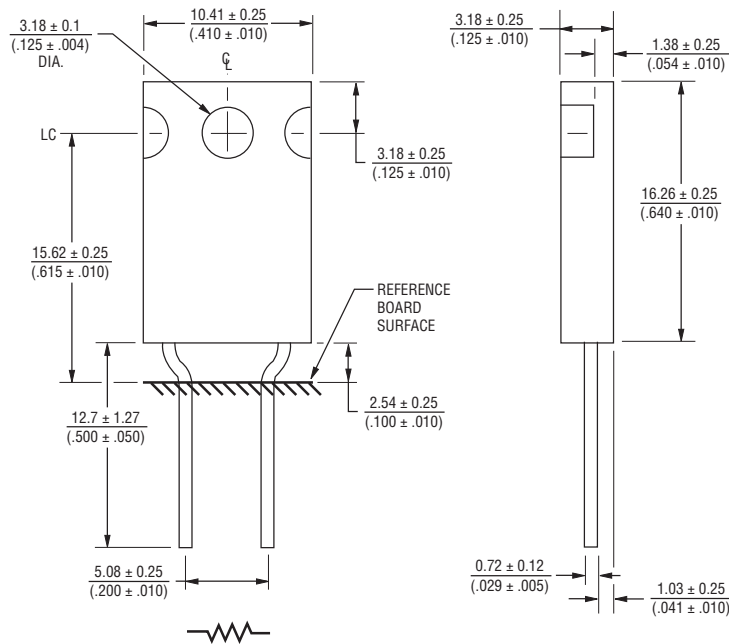


**WARNING** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

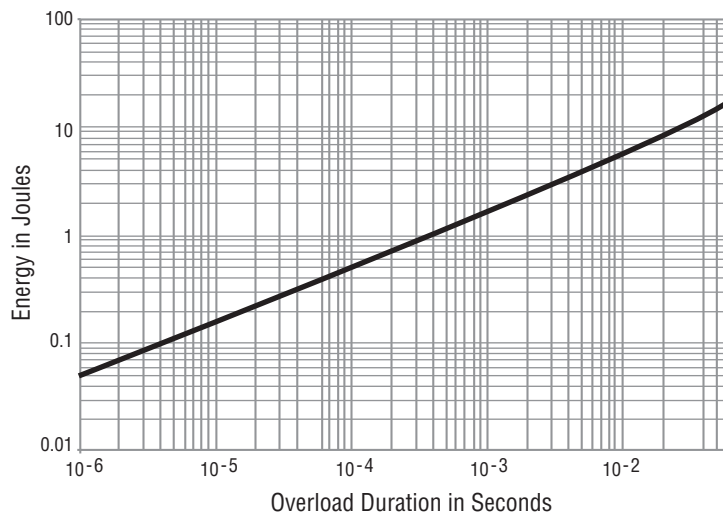
# PWR221T-30 Series Power Resistor

**BOURNS®**

## Product Dimensions



## Pulse Power Rating



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.

## How to Order

**PWR 221 T - 30 - 10R0 F**

Model \_\_\_\_\_

PWR = Power Resistor

Package \_\_\_\_\_

221 = TO-220 Style

Pin Style \_\_\_\_\_

T = Through-hole

Power \_\_\_\_\_

30 = 30 W

Resistance Value \_\_\_\_\_

<100 ohms ... "R" represents decimal point (examples: 7R50 = 7.5  $\Omega$ ; R500 = 0.5  $\Omega$ )

$\geq 100$  ohms.... First three digits are significant, fourth digit represents number of zeros to follow (examples: 2000 = 200 ohms; 3002 = 30K ohms)

Absolute Tolerance \_\_\_\_\_

J = 5 %

F = 1 %

Specifications are subject to change without notice.

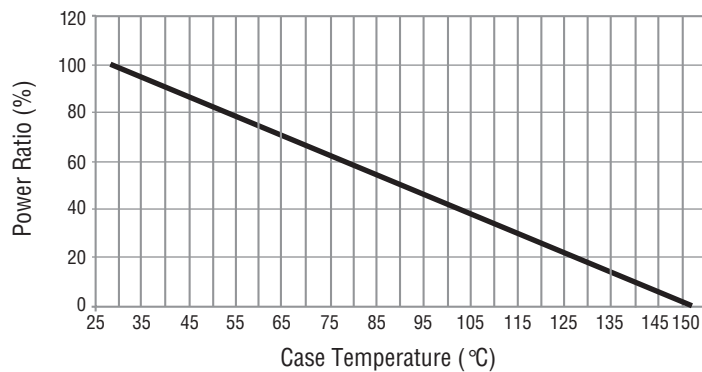
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## PWR221T-30 Series Power Resistor

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### Derating Curve



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