



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 Ω to 130 K Ω
Power Rating @ 25 °C Case Temperature	30 W**
Tolerance	$\pm 1\%$ ***, $\pm 5\%$
TCR	
0.100 Ω < R < 130.0 K Ω	± 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 - R _{thj}	4.2 °C/W
Inductance	0.1 μ H maximum
Operating Voltage	$\sqrt{P \cdot R}$ with a maximum of 250 V
Dielectric Strength	2 KV AC
Insulation Resistance	10 G Ω
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 Ω , 1.6 x Pr for R $\geq$ 2 Ω , V < 1.5 x Operating Voltage)	ΔR $\pm 0.25\%$
Load Life (2000 hours at rated power)	ΔR $\pm 1.0\%$
Thermal Shock (-55 °C to 155 °C, 5 cycles)	ΔR $\pm 0.5\%$
Resistance to Soldering Heat (10 seconds at 270 °C)	ΔR $\pm 0.5\%$
Vibration (20 G 10-2000 Hz .06" D.A.)	ΔR $\pm 0.25\%$
Terminal Strength (MIL-STD-202, Method 211 Test A1)	ΔR $\pm 0.2\%$
Shock (Saw Tooth: 100 g/6 ms)	ΔR $\pm 0.5\%$
Humidity (Steady State) 1000 hrs. 85 °C/85 % RH	ΔR $\pm 0.5\%$
High Temperature Exposure (100 hrs - 40 % Pr @ +125 °C)	ΔR $\pm 0.5\%$

Material Characteristics

Resistor Thick film
 Substrate Alumina (AL203)
 Housing Epoxy
 Pins Tinned Copper (Sn/Cu)
 Flammability Conforms to UL-94V0
 Moisture Sensitivity Level 1
 ESD Classification (HBM) 3B

Packaging

..... 50 pcs./tube

Additional Information

Click these links for more information:



[PRODUCT](#)



[TECHNICAL
LIBRARY](#)



[INVENTORY](#)



[SAMPLES](#)



[CONTACT](#)

Popular Resistance Values

Code	Resistance Value	Code	Resistance Value
R020	0.02 Ω ***	1000	100 Ω
R025	0.025 Ω ***	1200	120 Ω
R030	0.03 Ω ***	1500	150 Ω
R033	0.033 Ω ***	2000	200 Ω
R040	0.04 Ω ***	2500	250 Ω
R050	0.05 Ω ***	3000	300 Ω
R075	0.075 Ω ***	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 K Ω
R400	0.4 Ω	1501	1.5 K Ω
R500	0.5 Ω	2001	2.0 K Ω
R750	0.75 Ω	2501	2.5 K Ω
1R00	1 Ω	3001	3.0 K Ω
1R50	1.5 Ω	3301	3.3 K Ω
2R00	2 Ω	4001	4.0 K Ω
2R50	2.5 Ω	5001	5.0 K Ω
3R00	3 Ω	7501	7.5 K Ω
3R30	3.3 Ω	1002	10 K Ω
4R00	4 Ω	1502	15 K Ω
5R00	5 Ω	2002	20 K Ω
7R50	7.5 Ω	2502	25 K Ω
8R00	8 Ω	3002	30 K Ω
10R0	10 Ω	3302	33 K Ω
12R0	12 Ω	4002	40 K Ω
15R0	15 Ω	4702	47 K Ω
20R0	20 Ω	5002	50 K Ω
25R0	25 Ω	5602	56 K Ω
27R0	27 Ω	6802	68 K Ω
30R0	30 Ω	7502	75 K Ω
33R0	33 Ω	8202	82 K Ω
40R0	40 Ω	1003	100 K Ω
47R0	47 Ω	1153	115 K Ω
50R0	50 Ω	1203	120 K Ω
56R0	56 Ω	1253	125 K Ω
75R0	75 Ω	1303	130 K Ω

*** 5 % Tolerance



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

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

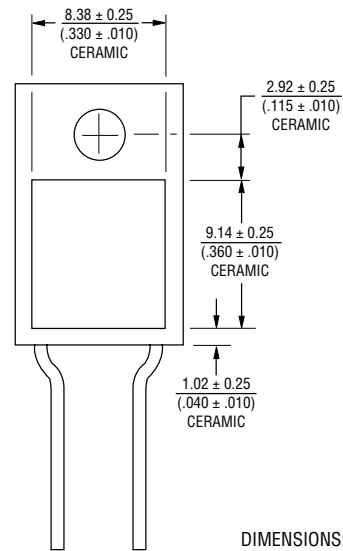
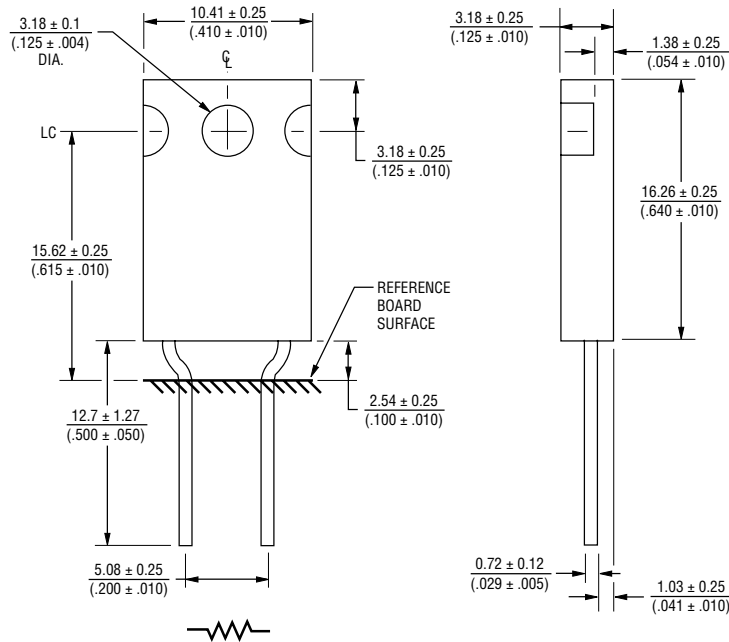
Specifications are subject to change without notice. Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

PWR221T-30 Series Power Resistor

BOURNS®

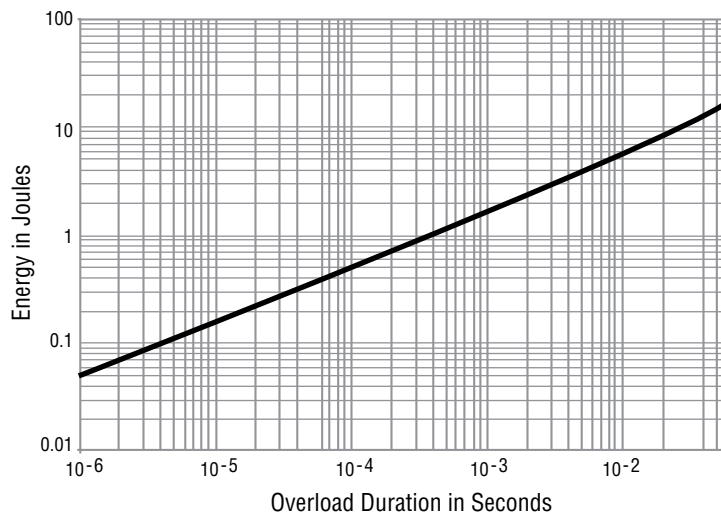
Product Dimensions



DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$

TOLERANCE: $\pm \frac{0.38}{(0.015)}$ UNLESS OTHERWISE NOTED

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 Ω; R500 = 0.5 Ω)
≥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.

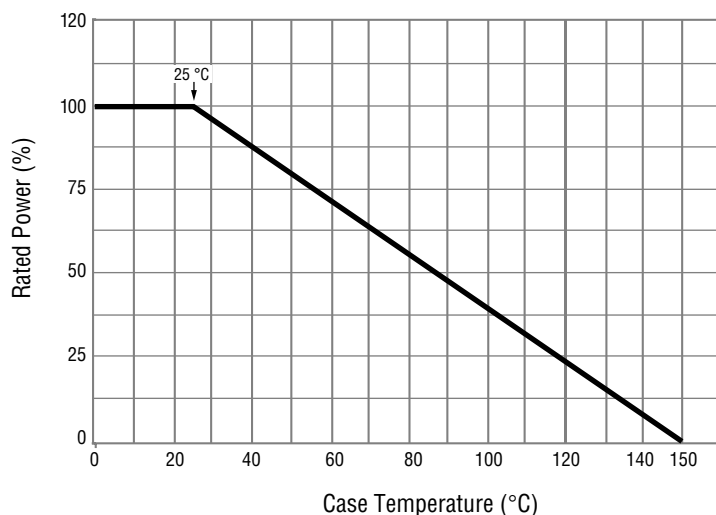
Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

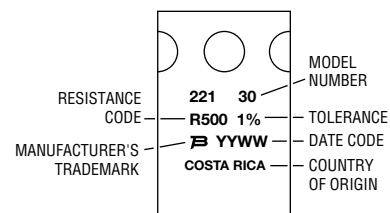
PWR221T-30 Series Power Resistor

BOURNS®

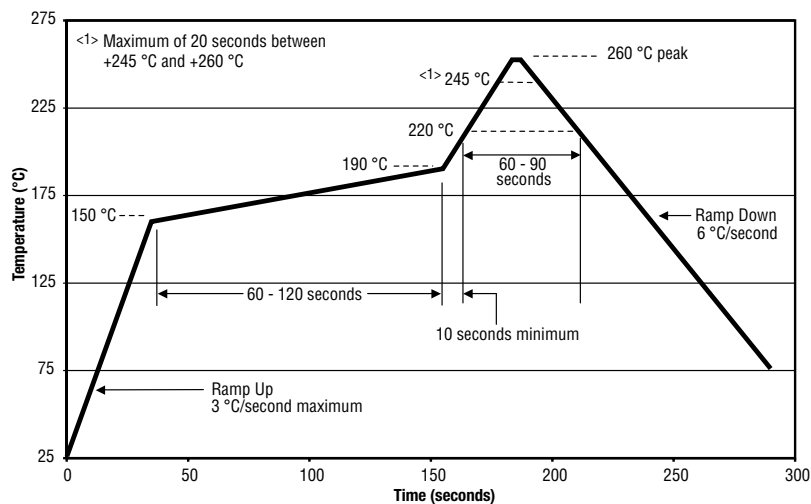
Power Derating Curve



Typical Part Marking



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 µm of copper, 39 x 30 x 1.6 mm.

BOURNS®

Asia-Pacific: Tel: +886-2 2562-4117 • Email: asiacus@bourns.com

EMEA: Tel: +36 88 885 877 • Email: eurocus@bourns.com

The Americas: Tel: +1-951 781-5500 • Email: americus@bourns.com

www.bourns.com

REV. 07/21

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

This legal disclaimer applies to purchasers and users of Bourns® products manufactured by or on behalf of Bourns, Inc. and its affiliates (collectively, "Bourns").

Unless otherwise expressly indicated in writing, Bourns® products and data sheets relating thereto are subject to change without notice. Users should check for and obtain the latest relevant information and verify that such information is current and complete before placing orders for Bourns® products.

The characteristics and parameters of a Bourns® product set forth in its data sheet are based on laboratory conditions, and statements regarding the suitability of products for certain types of applications are based on Bourns' knowledge of typical requirements in generic applications. The characteristics and parameters of a Bourns® product in a user application may vary from the data sheet characteristics and parameters due to (i) the combination of the Bourns® product with other components in the user's application, or (ii) the environment of the user application itself. The characteristics and parameters of a Bourns® product also can and do vary in different applications and actual performance may vary over time. Users should always verify the actual performance of the Bourns® product in their specific devices and applications, and make their own independent judgments regarding the amount of additional test margin to design into their device or application to compensate for differences between laboratory and real world conditions.

Unless Bourns has explicitly designated an individual Bourns® product as meeting the requirements of a particular industry standard (e.g., ISO/TS 16949) or a particular qualification (e.g., UL listed or recognized), Bourns is not responsible for any failure of an individual Bourns® product to meet the requirements of such industry standard or particular qualification. Users of Bourns® products are responsible for ensuring compliance with safety-related requirements and standards applicable to their devices or applications.

Bourns® products are not recommended, authorized or intended for use in nuclear, lifesaving, life-critical or life-sustaining applications, nor in any other applications where failure or malfunction may result in personal injury, death, or severe property or environmental damage. Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any Bourns® products in such unauthorized applications might not be safe and thus is at the user's sole risk. Life-critical applications include devices identified by the U.S. Food and Drug Administration as Class III devices and generally equivalent classifications outside of the United States.

Bourns expressly identifies those Bourns® standard products that are suitable for use in automotive applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard products in an automotive application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk. If Bourns expressly identifies a sub-category of automotive application in the data sheet for its standard products (such as infotainment or lighting), such identification means that Bourns has reviewed its standard product and has determined that if such Bourns® standard product is considered for potential use in automotive applications, it should only be used in such sub-category of automotive applications. Any reference to Bourns® standard product in the data sheet as compliant with the AEC-Q standard or "automotive grade" does not by itself mean that Bourns has approved such product for use in an automotive application.

Bourns® standard products are not tested to comply with United States Federal Aviation Administration standards generally or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aircraft or space applications. Bourns expressly identifies Bourns® standard products that are suitable for use in aircraft or space applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard product in an aircraft or space application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk.

The use and level of testing applicable to Bourns® custom products shall be negotiated on a case-by-case basis by Bourns and the user for which such Bourns® custom products are specially designed. Absent a written agreement between Bourns and the user regarding the use and level of such testing, the above provisions applicable to Bourns® standard products shall also apply to such Bourns® custom products.

Users shall not sell, transfer, export or re-export any Bourns® products or technology for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor shall they use Bourns® products or technology in any facility which engages in activities relating to such devices. The foregoing restrictions apply to all uses and applications that violate national or international prohibitions, including embargos or international regulations. Further, Bourns® products and Bourns technology and technical data may not under any circumstance be exported or re-exported to countries subject to international sanctions or embargoes. Bourns® products may not, without prior authorization from Bourns and/or the U.S. Government, be resold, transferred, or re-exported to any party not eligible to receive U.S. commodities, software, and technical data.

To the maximum extent permitted by applicable law, Bourns disclaims (i) any and all liability for special, punitive, consequential, incidental or indirect damages or lost revenues or lost profits, and (ii) any and all implied warranties, including implied warranties of fitness for particular purpose, non-infringement and merchantability.

For your convenience, copies of this Legal Disclaimer Notice with German, Spanish, Japanese, Traditional Chinese and Simplified Chinese bilingual versions are available at:

Web Page: <http://www.bourns.com/legal/disclaimers-terms-and-policies>

PDF: <http://www.bourns.com/docs/Legal/disclaimer.pdf>

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Bourns:

PWR221T-30-1000F	PWR221T-30-1000J	PWR221T-30-1001F	PWR221T-30-1001J	PWR221T-30-1002F
PWR221T-30-1002J	PWR221T-30-1003F	PWR221T-30-1003J	PWR221T-30-10R0F	PWR221T-30-10R0J
PWR221T-30-1303F	PWR221T-30-1303J	PWR221T-30-15R0F	PWR221T-30-15R0J	PWR221T-30-1R00F
PWR221T-30-1R00J	PWR221T-30-1R50F	PWR221T-30-1R50J	PWR221T-30-2000F	PWR221T-30-2000J
PWR221T-30-20R0F	PWR221T-30-20R0J	PWR221T-30-2R00F	PWR221T-30-2R00J	PWR221T-30-2R20F
PWR221T-30-2R20J	PWR221T-30-2R50F	PWR221T-30-2R50J	PWR221T-30-3002F	PWR221T-30-3002J
PWR221T-30-30R0F	PWR221T-30-30R0J	PWR221T-30-3300F	PWR221T-30-3300J	PWR221T-30-3301F
PWR221T-30-3301J	PWR221T-30-33R0F	PWR221T-30-33R0J	PWR221T-30-3R00F	PWR221T-30-3R00J
PWR221T-30-3R30F	PWR221T-30-3R30J	PWR221T-30-4700F	PWR221T-30-4700J	PWR221T-30-47R0F
PWR221T-30-47R0J	PWR221T-30-4R70F	PWR221T-30-4R70J	PWR221T-30-50R0F	PWR221T-30-50R0J
PWR221T-30-56R0F	PWR221T-30-56R0J	PWR221T-30-5R00F	PWR221T-30-5R00J	PWR221T-30-7500F
PWR221T-30-7500J	PWR221T-30-75R0F	PWR221T-30-75R0J	PWR221T-30-7R50F	PWR221T-30-7R50J
PWR221T-30-8R20F	PWR221T-30-8R20J	PWR221T-30-R020J	PWR221T-30-R050J	PWR221T-30-R100J
PWR221T-30-R500F	PWR221T-30-R500J	PWR221T-30-R750F	PWR221T-30-R750J	PWR221T-30-R100F
PWR221T-30-25R0F	PWR221T-30-1200F	PWR221T-30-12R0F	PWR221T-30-1501F	PWR221T-30-1502F
PWR221T-30-2001F	PWR221T-30-2002F	PWR221T-30-2501F	PWR221T-30-2502F	PWR221T-30-3000F
PWR221T-30-3001F	PWR221T-30-4000F	PWR221T-30-4001F	PWR221T-30-4002F	PWR221T-30-40R0F
PWR221T-30-4702F	PWR221T-30-4R00F	PWR221T-30-5000F	PWR221T-30-5001F	PWR221T-30-5600F
PWR221T-30-7501F	PWR221T-30-8R00F	PWR221T-30-R030J	PWR221T-30-R033J	PWR221T-30-R040J
PWR221T-30-R150F	PWR221T-30-R200F	PWR221T-30-R250F	PWR221T-30-R300F	PWR221T-30-R330F