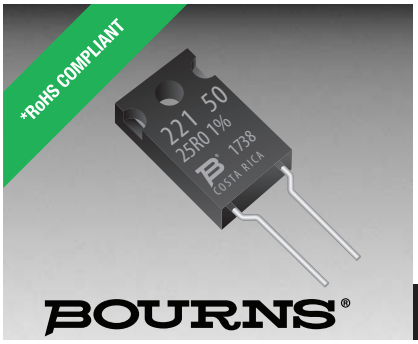


Features

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

Applications

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

PWR221T-50 Series Power Resistor

General Information

Bourns® PWR221T-50 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

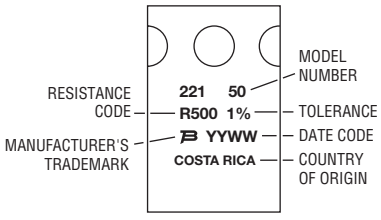
Parameter	Value(s)
Resistance (See Popular Resistance Values table)	0.02 Ω to 130 KΩ
Power Rating @ 25 °C Case Temperature	50 W(1)
Tolerance	±1 %(2), ±5 %
Hot TCR 0.100 Ω ≤ R ≤ 130.0 KΩ 0.050 Ω ≤ R ≤ 0.100 Ω 0.020 Ω ≤ R ≤ 0.050 Ω	 ±100 PPM/˚C ±300 PPM/˚C ±600 PPM/˚C
Thermal Resistance - R_{thj}	4.2 °C/W
Inductance	0.1 μH maximum
Operating Voltage	√P*R with a maximum of 250 V
Dielectric Strength	2 KV AC
Insulation Resistance	10 GΩ
Operating Temperature	-55 °C to +150 °C

(1) Power rating of 2.25 W when mounted free to air (no heat sink).
(2) 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 ≥ 2 Ω, V < 1.5 x Operating Voltage)	ΔR ±0.25 %
Load Life (2000 hours at rated power)	ΔR ±1.0 %
Thermal Shock (-55 °C to 155 °C, 5 cycles)	ΔR ±0.5 %
Resistance to Soldering Heat (10 seconds at 270 °C)	ΔR ±0.5 %
Vibration (20 G 10-2000 Hz .06 " D.A.)	ΔR ±0.25 %
Terminal Strength (MIL-STD-202, Method 211 Test A1)	ΔR ±0.2 %
Shock (Saw Tooth: 100 g/6 ms)	ΔR ±0.5 %
Humidity (Steady State) 1000 hrs. 85 °C/85 % RH	ΔR ±0.5 %
High Temperature Exposure (100 hrs - 40 % Pr @ +125 °C)	ΔR ±0.5 %

Typical Part Marking



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

Popular Resistance Values

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

(3) 5 % Tolerance

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.
Specifications are subject to change without notice. Users should verify actual device performance in their specific applications.
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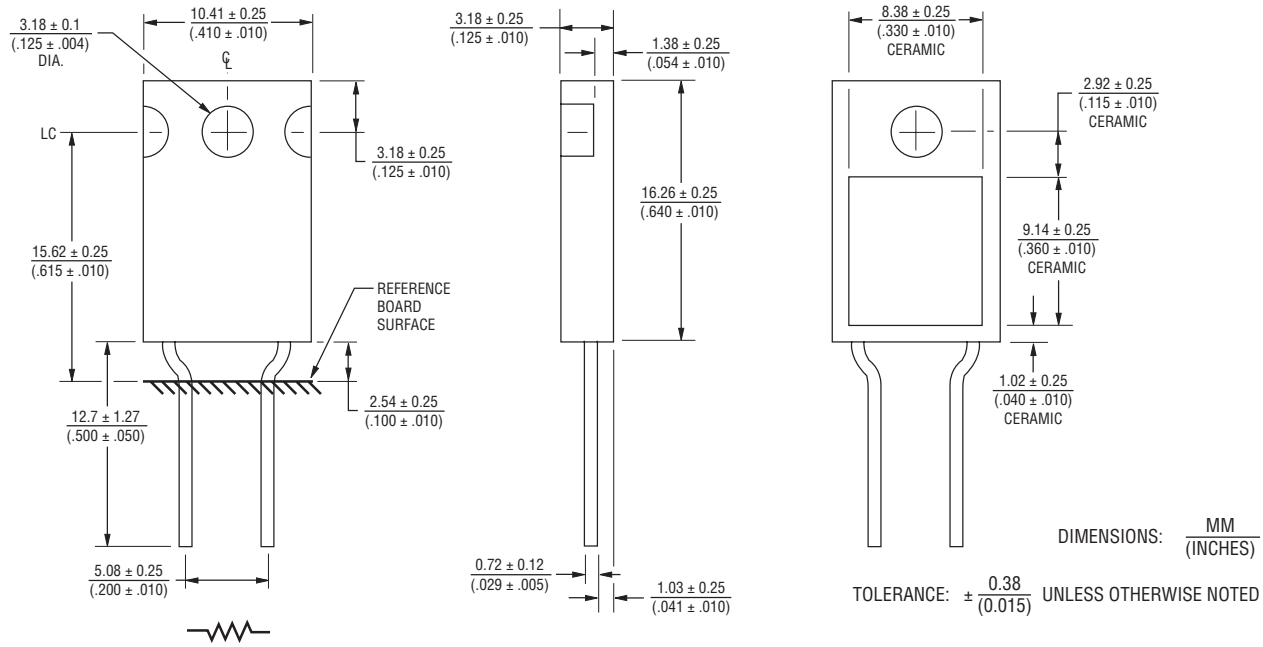
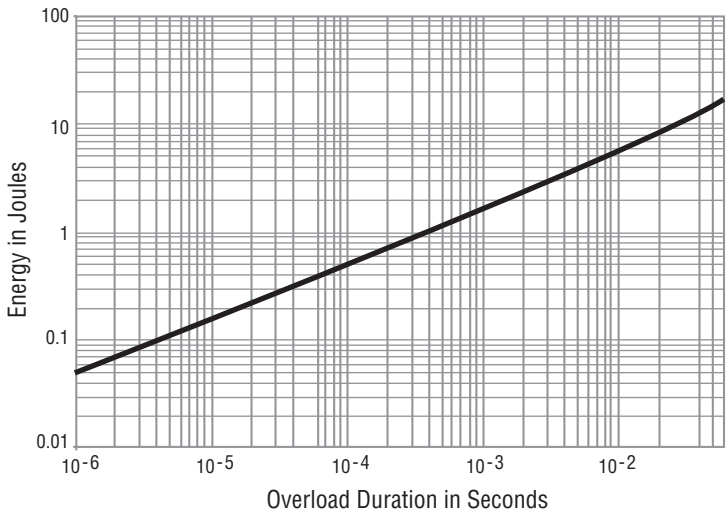
WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

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 - 50 - 10R0 F

Model
PWR = Power Resistor

Package
221 = TO-220 Style

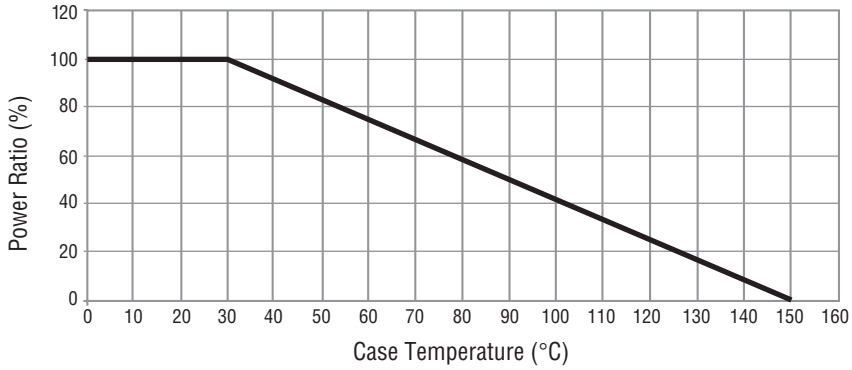
Pin Style
T = Through-hole

Power
50 = 50 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 % (Available for most values. Check Popular Resistance Values table.

Derating Curve



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