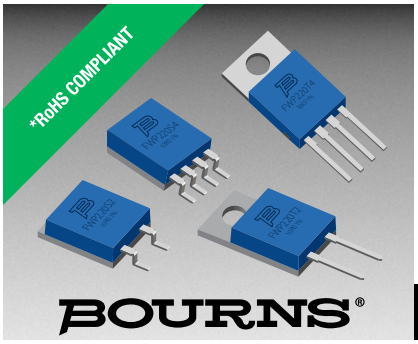

Features

- Formerly a Riedon™ product
- Resistances from 0.002 to 10 Ω
- Resistance tolerances to ±0.1 %
- TCR to ±50 PPM/°C
- Power rating to 15 watts
- Load stability to 0.1 %
- TO-220, TO-221 housing
- Convenient SMD D²Pak available
- Isolated backplate
- Non-inductive planar construction
- RoHS compliant*

FWP220/221 Series – Riedon™ Precision Power Foil Shunt Resistors by Bourns

Specifications

Bourns Model	FWP220/221 T-2	FWP220 S-2	FWP220/221 T-4	FWP220 S-4
Resistance Range (Ω)	0.002 to 10 (other resistance values possible on request)			
Power Rating (W) - Free Air @ 70 °C With Heat Sink	1.5 15			
Thermal Resistance R_{thj-c} (°C/W)	4.8			
Tolerances from 0.002 Ω from 0.01 Ω from 0.1 Ω	2 % / 5 % 1 % / 2 % / 5 % 0.5 % / 1 % / 2 % / 5 %		1 % / 2 % / 5 % 0.1 % / 0.25 % / 0.5 % / 1 % / 2 % / 5 % —	
Stability	0.1 % / 0.2 % / 0.5 % (depends on stress)			
Temperature Coefficient	All from (+20 to +60 °C) ±50 PPM/°C		All from (+20 to +60 °C) R< 5 Ω: ±25 PPM/°C R≥ 5Ω: ±70 PPM/°C	±25 PPM/°C (+20 to +60 °C) ±50 PPM/°C (-40 to +130 °C)
Max. Current (A)	50			
Voltage Proof (VDC)	300			
Thermal EMF	< 0.1 µV/K			
Operating Temperature Range	-40 to +130 °C			
Resistor Material	CuNiMn-Foil			
Substrate	Al_2O_3 or anodized aluminium			
Housing	Epoxy or PPS			
Connector Material	Cu / tinned			
Terminals	2		4	
Max. Torque	T220: 1 Nm / T221: 0.8 Nm			

How To Order

FWP 220 T 2 - R002 - F

Model
FWP

Housing
220
221

Terminal Style
T = THT (Through-hole)
S = SMD (Surface Mount)

Terminals
2
4

Resistance
"R" represents decimal point
(example: R002 = 0.002 Ω,
5R00 = 5.00 Ω, 10R0 = 10 Ω)
"L" represents mΩ for resistance
(example: 3L20=0.0032)

Tolerance
B = ±0.1 %
C = ±0.25 %
D = ±0.5 %
F = ±1 %
G = ±2 %
J = ±5 %

Packaging Information

THT Terminals (T):
Tube ..... 50 pcs. per tube
SMD Terminals (S):
Tape and Reel ..... 500 pcs. per reel

Additional Information

Click these links for more information:

PRODUCT | TECHNICAL LIBRARY | INVENTORY | SAMPLES | CONTACT

CALIFORNIA WARNING: Can expose you to lead, a carcinogen and reproductive toxicant. See 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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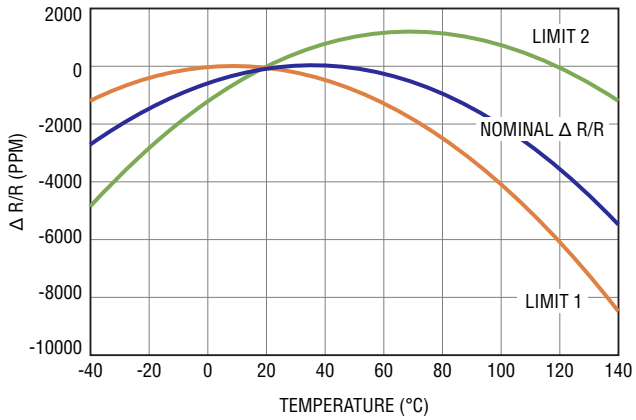
Applications

- Battery management systems
- Power supplies
- Power modules
- Frequency converters

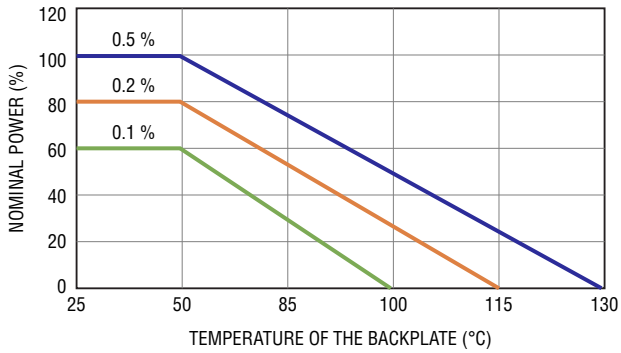
FWP220/221 Series – Riedon™ Precision Power Foil Shunt Resistors by Bourns

BOURNS®

Temperature Coefficient



Power Derating Curve



Power Rating Notes

The FWP Series Resistors must be attached to a suitable heat sink. The maximum internal resistor temperature is 130 °C.
To specify an appropriate heat sink use the following formula:

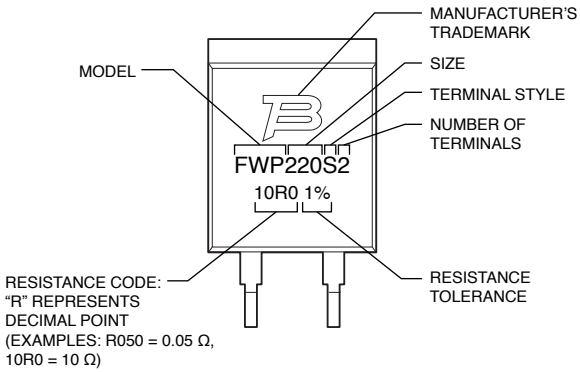
$$R_{\theta H} = \frac{T_{MAX} - (P \times R_{\theta R}) - T_A}{P}$$

Where: $R_{\theta H}$ = Thermal Resistance of Heat Sink (K/W)
$R_{\theta R}$ = Thermal Resistance of Resistor (K/W)
T_{MAX} = Maximum Temperature of Resistor
T_A = Ambient Temperature of Heat Sink (°C)
P = Power Through Resistor (W)

Performance Characteristics

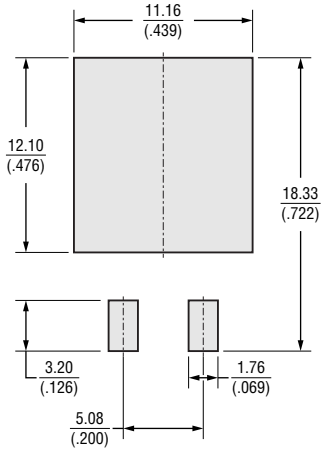
Test	Conditions	Test Method	
		Reference	Limit
Load Life	1000 hours, ON/OFF with rated power at +25 °C	MIL-STD-202 Method 108	ΔR < ±1 %
High Temperature Exposure	+155 °C for 1000 hours	MIL-STD-202 Method 303	ΔR < ±1 %
Low Temperature Storage	-55 °C for 24 hours	MIL-STD-202 Method 303	ΔR < ±0.5 %
Thermal Shock	-55 °C to +155 °C, 5 cycles	MIL-STD-202 Method 107	ΔR < ±0.5 %
Humidity Resistance	+40 °C / 90 % for 240 hours	MIL-STD-202 Method 103	ΔR < ±0.5 %
Resistance to Solder Heat	Solder dipping at 260 °C for 10 sec.	MIL-STD-202 Method 210	ΔR < ±0.5 %
Short Time Overload	2.5x rated power for 5 sec.	MIL-STD-202 Method 303	ΔR < ±0.5 %

Typical Part Marking



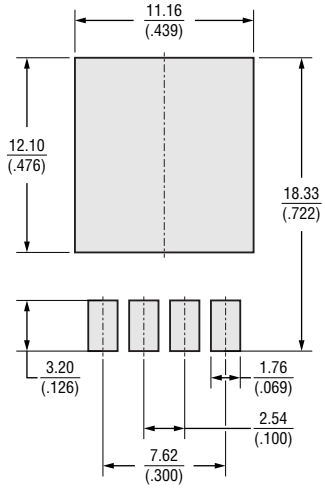
Suggested Layout

FWP220S2



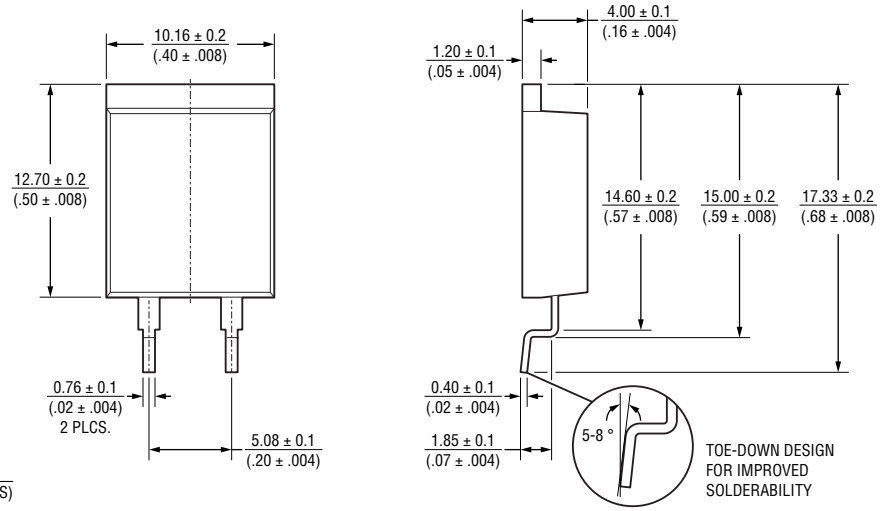
DIMENSIONS: MM (INCHES)

FWP220S4



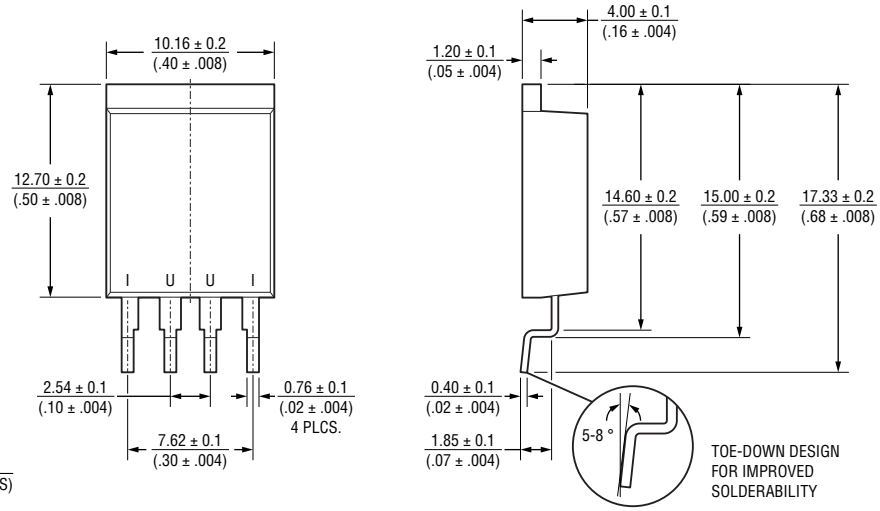
Product Dimensions

FWP220S2



DIMENSIONS: MM / (INCHES)

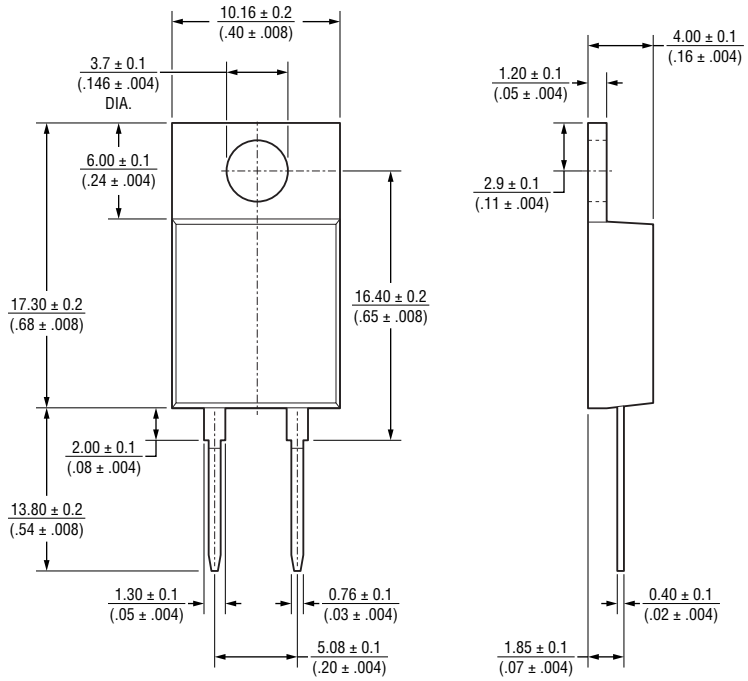
FWP220S4



DIMENSIONS: MM / (INCHES)

Product Dimensions (continued)

FWP220T2



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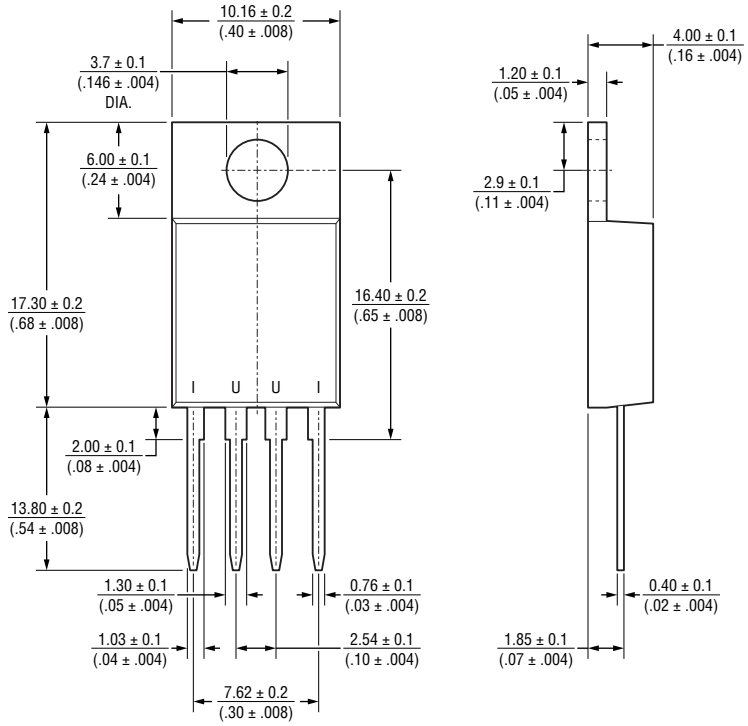
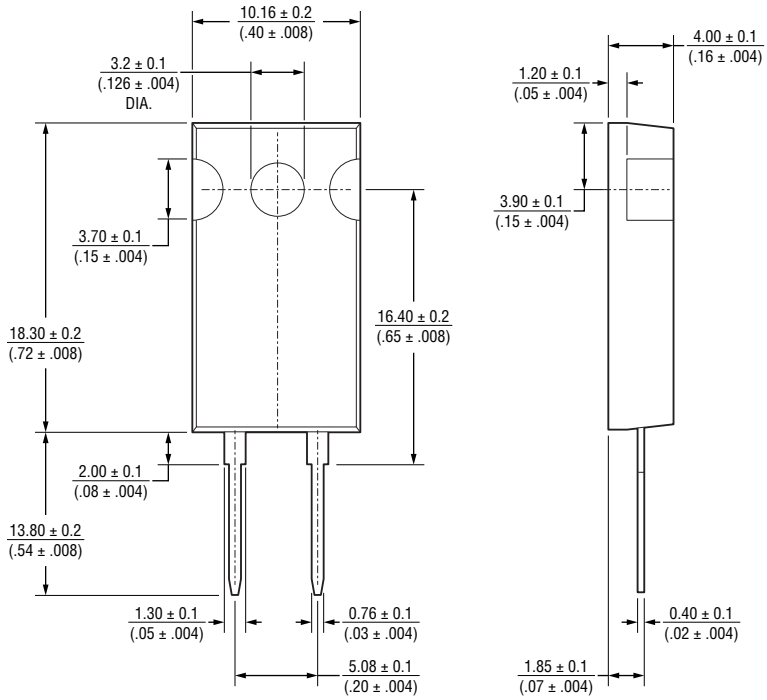
FWP220T4



DIMENSIONS: MM / (INCHES)

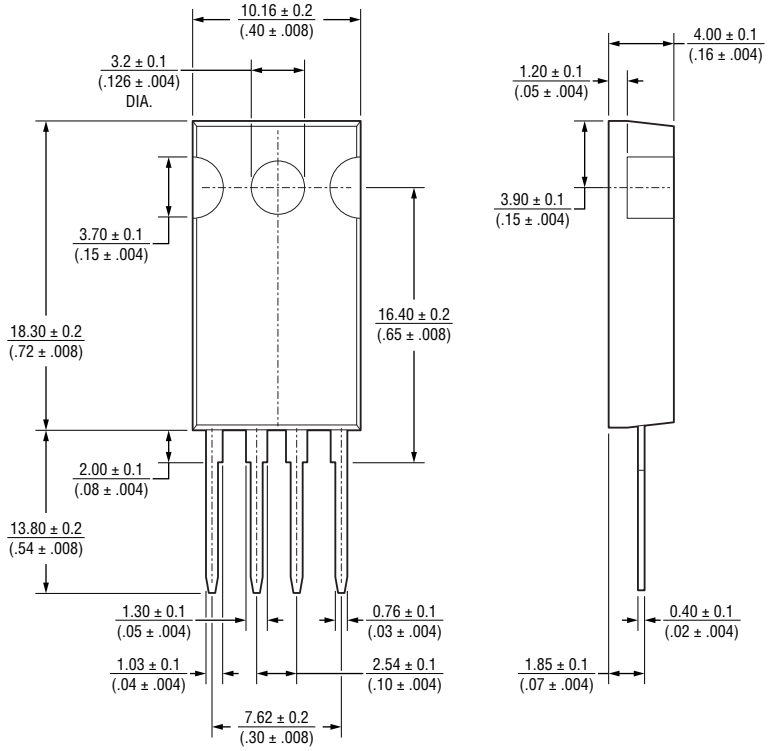
Product Dimensions (continued)

FWP221T2



DIMENSIONS: MM / (INCHES)

FWP221T4



DIMENSIONS: MM / (INCHES)

REV. 11/25

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