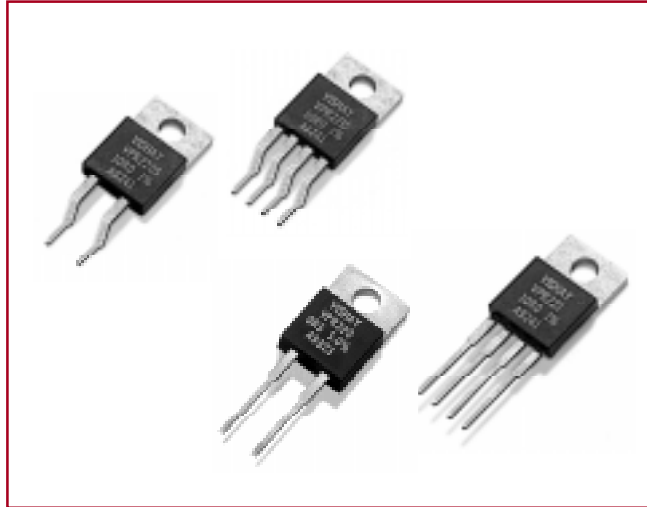




# VISHAY MODELS VPR220 AND VPR221

## Precision Foil Power Resistors in TO 220 Configuration



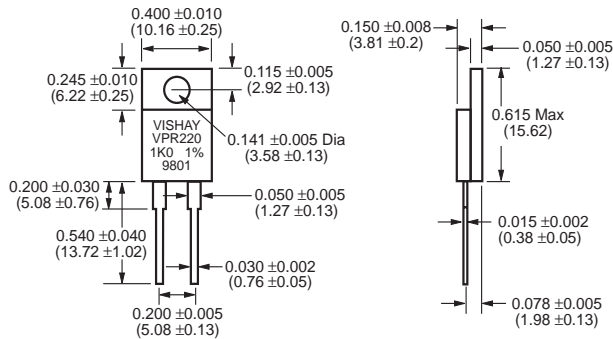
Models VPR220 AND VPR221, made from Vishay Bulk Metal® foil, offer low TCR, high stability, tight tolerance and fast response time in a small, molded resistor. Model VPR220 is a 2 lead device. Model VPR221 is a 4 lead Kelvin connected device. The 4 lead version is highly recommended for precision applications requiring ohmic values of 100R or less.

### FEATURES

- Power: 8 watts chassis mounted (per MIL-R-39009)
- Load Life Stability:  $\pm 0.05\%$  maximum  $\Delta R$  at rated power and temperature for 2,000 hours
- Temperature Coefficient of Resistance: to  $\pm 5$  ppm/ $^{\circ}\text{C}$
- Resistance Range: 0.5 to 10K  $\Omega$
- Tolerance: To  $\pm 0.01\%$
- Low Thermal EMF: 0.15  $\mu\text{V}/^{\circ}\text{C}$  maximum (lead effect)
- Non-Inductive Construction
- Heat sink is Isolated

THROUGH HOLE

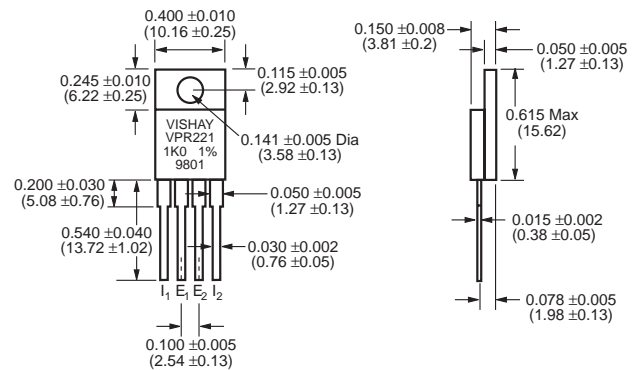
FIGURE 1 - VPR220 DIMENSIONS



Resistance Range ( $\Omega$ )	Tightest Resistance Tolerance	TCR*
50 to 10K	$\pm 0.01\%$	$\pm 5$ ppm/ $^{\circ}\text{C}$
25 to <50	$\pm 0.02\%$	$\pm 7$ ppm/ $^{\circ}\text{C}$
10 to <25	$\pm 0.05\%$	$\pm 10$ ppm/ $^{\circ}\text{C}$
5 to <10	$\pm 0.1\%$	$\pm 13$ ppm/ $^{\circ}\text{C}$

Weight = 1 gm Max. \* Maximum specifications. Lower values available but not recommended due to high TCR.

FIGURE 2 - VPR221 DIMENSIONS



Resistance Range ( $\Omega$ )	Tightest Resistance Tolerance	TCR*
10 to 500	$\pm 0.01\%$	$\pm 5$ ppm/ $^{\circ}\text{C}$
1 to <10	$\pm 0.02\%$	$\pm 5$ ppm/ $^{\circ}\text{C}$
0.5 to <1	$\pm 0.05\%$	$\pm 5$ ppm/ $^{\circ}\text{C}$

Weight = 1.2 gms Max. \* Maximum specifications. Higher values available. 0.1 Ohms Available soon.



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THROUGH HOLE

TABLE 1 - SPECIFICATIONS

Load Life Stability at 2,000 hrs	±0.05% max ΔR under full rated power @ +25°C
Shelf Life Stability	±0.0025% ΔR/yr
Power Rating @ +25°C	8 watts or 3 amps <sup>2</sup> on heat sink <sup>3</sup> 1.5 watts or 3 amps <sup>2</sup> in free air <i>Further derating not necessary.</i>
Current Noise	<0.010 μV (rms)/volt of applied voltage (-40 dB)
High Frequency Operation Rise/Decay Time Inductance <sup>4</sup> (L) Capacitance (C)	0.2 ns @ 1 Ω 0.1 μH maximum: 0.03 μH typical <sup>1</sup> 1.0 pF maximum: 0.5 pF typical <sup>1</sup>
Voltage Coefficient <sup>5</sup>	<0.1 ppm/V
Operating Temperature Range	-55°C to +150°C
Maximum Working Voltage	300 V. Not to exceed power rating.
Thermal EMF <sup>6</sup>	0.15 μV/°C maximum (lead effect)

NOTES:

- Maximum is 1.0% A.Q.L. standard for all specifications except TCR. Typical is a designers reference which represents that 85% of the units supplied, over a long period of time, will be at least the figure shown or better.
- Whichever is lower.
- Heat sink chassis dimensions and requirements per MIL-R-39009/1B:

Dimension	Inches	mm
L	6.00	152.4
W	4.00	101.6
H	2.00	50.8
T	0.04	1.0

- Inductance (L) due mainly to the leads.
- The resolution limit of existing test equipment (within the measurement capability of the equipment, "essentially zero").
- μV/°C relates to EMF due to lead temperature difference.

FIGURE 3 - VPR221S DIMENSIONS

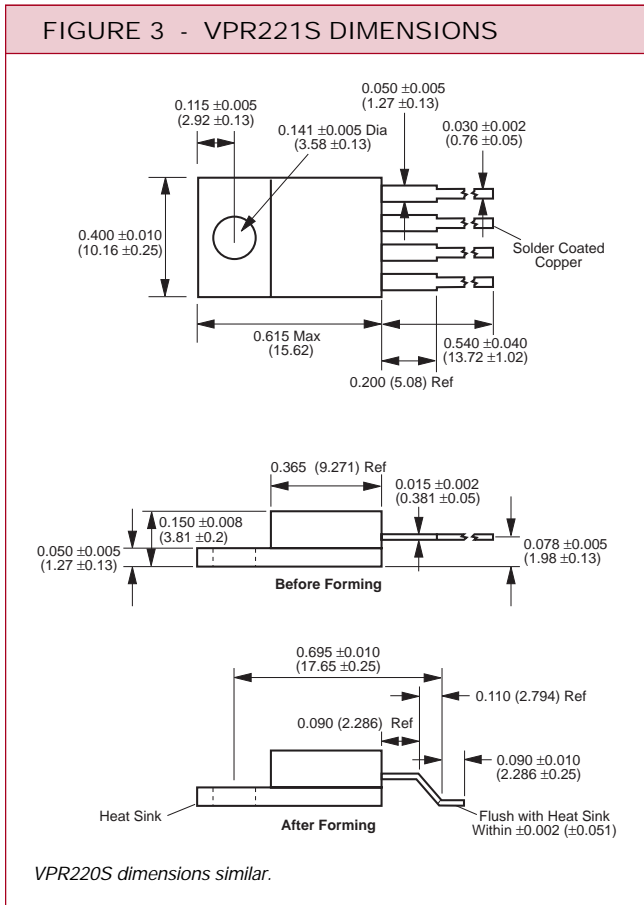
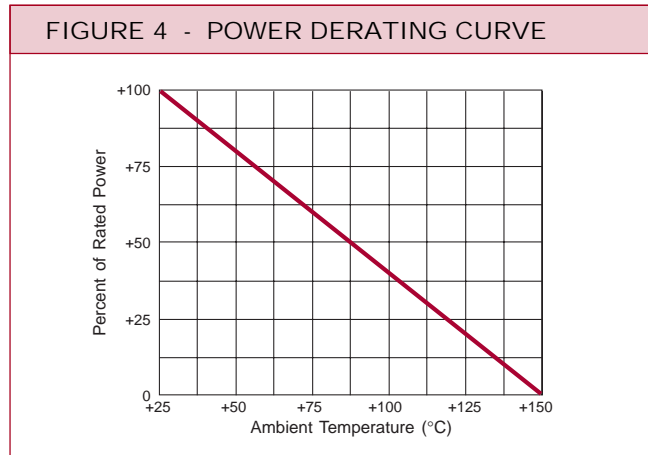


FIGURE 4 - POWER DERATING CURVE



HOW TO ORDER VPR220 AND VPR221 PARTS:

Specify Vishay VPR220 or VPR221 resistors as follows:

Example: **VPR221**      **5R0000**      **1.0%**  
 Model No.      Resistance Value      Tolerance

Specify Vishay VPR220S or VPR221S for surface mount resistors as follows:

Example: **VPR221S**      **5R0000**      **1.0%**  
 Model No.      Resistance Value      Tolerance

Resistance value, in ohms, is expressed by a series of 6 characters, 5 of which represent significant digits while the 6th is a dual purpose letter that designates both the multiplier and the location of the comma or decimal.

Resistance Range	Letter Designator	Multiplier Factor	Example
0.5 Ω to < 1K Ω	R	x1	100R01 = 100.01 Ω
1K Ω to 10K Ω	K	x10 <sup>3</sup>	5K2310 = 5,231 Ω