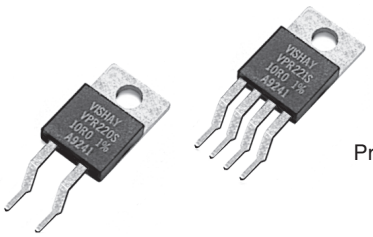
Bulk Metal® Foil Technology
Precision Foil Surface Mount Power Resistors in TO-220 Configuration



Product may not be to scale

Models VPR220S AND VPR221S, made from Vishay Bulk Metal® Foil, offer low TCR, high stability, tight tolerance and fast response time in a small, molded resistor. Model VPR220S is a 2 lead device. Model VPR221S is a 4 lead Kelvin connected device. The 4 leaded version is highly recommended for precision applications requiring ohmic values of 100R or less.

FEATURES

- Leads preformed for surface mounting
- Power: 8 watts - chassis mounted (per MIL-R-39009)
- Load Life Stability: ± 0.05% maximum ΔR at rated power and temperature for 2,000 hours
- Temperature Coefficient of Resistance: to ± 5ppm/°C
- Resistance Range: 0.5 to 10KΩ
- Tolerance: To ± 0.01%
- Low Thermal EMF: 0.15μV/°C maximum (lead effect)
- Non-Inductive Construction
- Heat sink is isolated
- Tin/Lead (Sn 60% Pb 40%) coated termination standard. Lead free (100% Sn) option available

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/year
Power Rating @ + 25°C	8 watts or 3 amps[2] on heat sink[3] 1.5 watts or 3 amps[2] in free air **Further derating not necesary.**
Current Noise	< 0.010μV (rms)/volt of applied voltage (– 40dB)
High Frequency Operation Rise/Decay Time Inductance[4] (L) Capacitance (C)	 0.2ns @ 1 Ω 0.1μH maximum: 0.03μH typical[1] 1.0pF maximum: 0.5pF typical[1]
Voltage Coefficient[5]	< 0.1ppm/V
Operating Temperature Range	– 55°C to + 150°C
Maximum Working Voltage	300 V. Not to exceed power rating.
Thermal EMF[6]	0.15μV/°C maximum (lead effect)

NOTES:

1. 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.
2. Whichever is lower.
3. 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

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

TABLE 2 - VPR220S

RESISTANCE RANGE (Ω)	TIGHTEST RESISTANCE TOLERANCE	TCR*
50 to 10K	± 0.01%	± 5ppm/°C
25 to < 50	± 0.02%	± 7ppm/°C
10 to < 25	± 0.05%	± 10ppm/°C
5 to < 10	± 0.1%	± 13ppm/°C

Weight = 1 gram Maximum

*Maximum specifications.

Lower values available but not recommended due to high TCR.

TABLE 3 - VPR221S

RESISTANCE RANGE (Ω)	TIGHTEST RESISTANCE TOLERANCE	TCR*
0.5 to < 1	± 0.05%	± 5ppm/°C
1 to < 10	± 0.02%	± 5ppm/°C
10 to 500	± 0.01%	± 5ppm/°C

Weight = 1.2 grams Maximum

*Maximum specifications.

Contact Applications Engineering for other available values.

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VPR220S, VPR221S

Vishay Foil Resistors Bulk Metal® Foil Technology

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FIGURE 1 - POWER DERATING CURVE

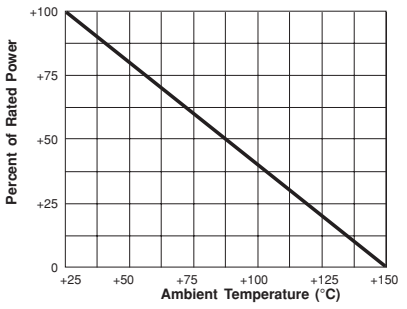

FIGURE 2 - VPR220S, VPR221S FORMING DIMENSIONS in inches (millimeters)

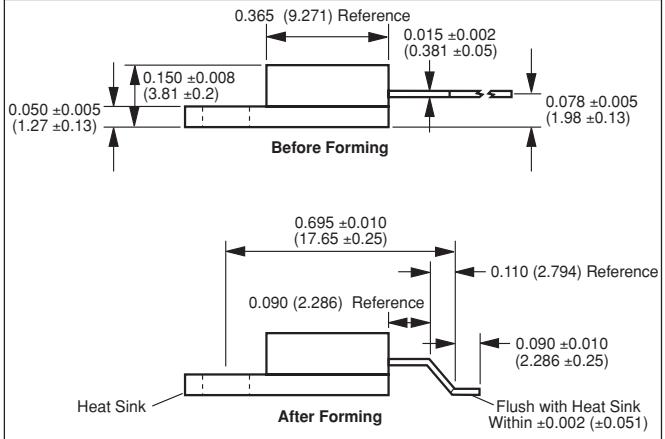

FIGURE 3 - VPR220S DIMENSIONS in inches (millimeters)

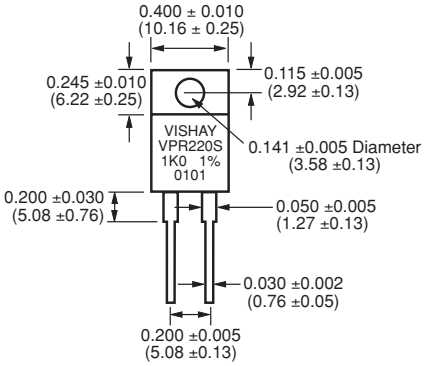

FIGURE 4 - VPR221S DIMENSIONS in inches (millimeters)

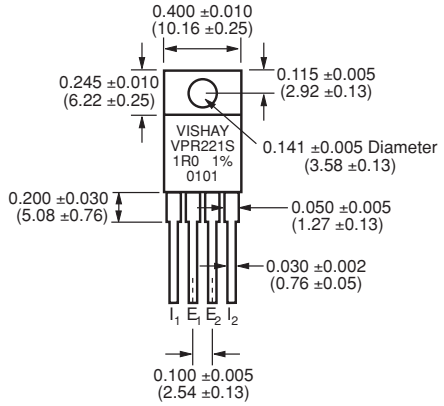

TABLE 4 - ORDERING INFORMATION

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

Example:

VPR221S	(none) = 60/40Tin/Lead T = 100% Tin	5R0000	1.0%	(none) = Bulk Pack T = Tape and Reel
MODEL NO.	TERMINATION	RESISTANCE VALUE	TOLERANCE	PACKAGING

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
0.5Ω to < 1KΩ	R	x1	100R01 = 100.01Ω
1KΩ to 10KΩ	K	$x10^3$	5K2310 = 5,231Ω

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