

# VPR220SZ (Z-Foil)



Vishay Foil Resistors

## Ultra High Precision Z-Foil Surface Mount Power Resistors in TO-220 Configuration with TCR of $\pm 0.05$ ppm/ $^{\circ}$ C, Tolerance to $\pm 0.01$ % and Power Rating to 8 W



**Any value at any tolerance available within resistance range**

Model VPR220SZ, made from Vishay Bulk Metal<sup>®</sup> Z-Foil, offers very low TCR, high stability, tight tolerance, low PCR and fast response time in a small surface mount molded resistor.

The Z-Foil technology provides a significant reduction of the resistive components sensitivity to ambient temperature variations and applied power changes. Designers now can guarantee a high degree of stability and accuracy in fixed resistor applications using solutions based on Vishay's revolutionary Z-Foil technology.

Our Application Engineering Department is available to advise and make recommendations. For non-standard technical requirements and special applications, please contact us.

### FEATURES

- Temperature Coefficient of Resistance (TCR):  $\pm 0.05$  ppm/ $^{\circ}$ C typical (0  $^{\circ}$ C to + 60  $^{\circ}$ C)  
 $\pm 0.2$  ppm/ $^{\circ}$ C typical (- 55  $^{\circ}$ C to + 125  $^{\circ}$ C, - 25  $^{\circ}$ C Ref.)
- Tolerance: to  $\pm 0.01$  %
- Power Coefficient of Resistance (PCR) "ΔR due to self heating": 5 ppm at rated power
- Electrostatic Discharge (ESD) above 25 000 V
- Load Life Stability:  $\pm 0.005$  % (25  $^{\circ}$ C, 2000 hours at Rated Power)
- Resistance Range: 5  $\Omega$  to 10 k $\Omega$
- Power Rating: 8 W chassis mounted (per MIL-PRF-39009)
- Non Inductive, Non Capacitive Design
- Current Noise: < - 40 dB
- Voltage Coefficient: < 0.1 ppm/V
- Non Inductive: < 0.08  $\mu$ H
- Non Hot Spot Design
- Thermal EMF: 0.05  $\mu$ V/ $^{\circ}$ C typical
- Terminal Finishes Available: Lead (Pb)-free  
Tin/Lead Alloy
- For higher performances please contact us



**RoHS\***  
COMPLIANT

TABLE 1 - SPECIFICATIONS	
Load Life Stability at 2000 h	$\pm 0.05$ % max ΔR under full rated power at + 25 $^{\circ}$ C
Power Rating at + 25 $^{\circ}$ C	8 W or 3 A <sup>1)</sup> on heat sink <sup>2)</sup> 1.5 W or 3 A <sup>1)</sup> in free air <b>Further derating not necessary.</b>
Current Noise	< 0.010 $\mu$ V (rms)/V of applied voltage (- 40 dB)
High Frequency Operation Rise Time Inductance <sup>3)</sup> (L) Capacitance (C)	1 ns 0.1 $\mu$ H maximum: 0.03 $\mu$ H typical 1.0 pF maximum: 0.5 pF typical
Voltage Coefficient <sup>4)</sup>	< 0.1 ppm/V
Operating Temperature Range	- 55 $^{\circ}$ C to + 150 $^{\circ}$ C
Maximum Working Voltage	300 V. Not to exceed power rating.
Thermal EMF <sup>5)</sup>	0.15 $\mu$ V/ $^{\circ}$ C maximum (lead effect)

### Notes

1. Whichever is lower.
  2. Heat sink chassis dimensions and requirements per MIL-PRF-39009:
- | DIMENSION | INCHES | mm    |
|-----------|--------|-------|
| L         | 6.00   | 152.4 |
| W         | 4.00   | 101.6 |
| H         | 2.00   | 50.8  |
| T         | 0.04   | 1.0   |
3. Inductance (L) due mainly to the leads.
  4. The resolution limit of existing test equipment (within the measurement capability of the equipment, or "essentially zero").
  5.  $\mu$ V/ $^{\circ}$ C relates to EMF due to lead temperature difference.

TABLE 2 - VPR220SZ		
RESISTANCE RANGE ( $\Omega$ )	TIGHTEST RESISTANCE TOLERANCE	TCR <sup>1)</sup> - 55 $^{\circ}$ C to + 125 $^{\circ}$ C, Ref. + 25 $^{\circ}$ C
50 to 10K	$\pm 0.01$ %	$\pm 2.5$ ppm/ $^{\circ}$ C
25 to < 50	$\pm 0.02$ %	
10 to < 25	$\pm 0.05$ %	
5 to < 10	$\pm 0.1$ %	

Weight = 1 g Maximum

### Note

1. Maximum specifications.

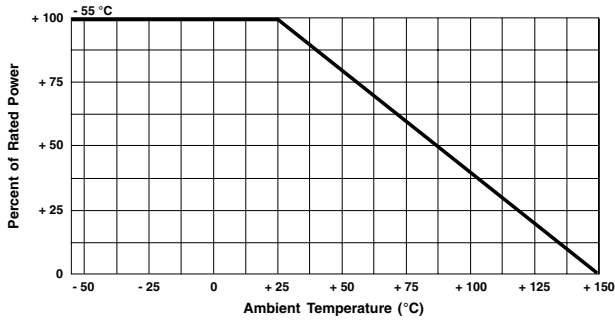
\* Pb containing terminations are not RoHS compliant, exemptions may apply



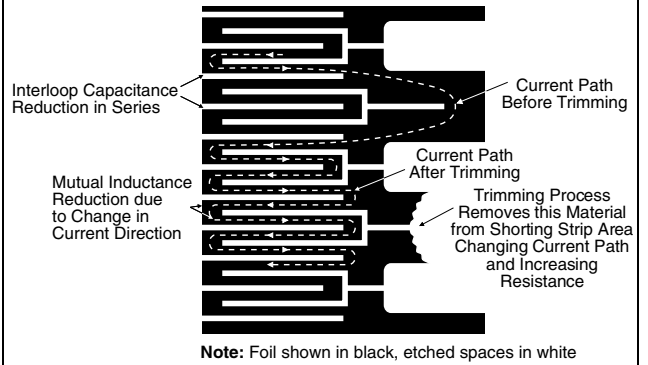
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 in TO-220 Configuration with TCR of  $\pm 0.05$  ppm/ $^{\circ}\text{C}$ ,  
 Tolerance to  $\pm 0.01$  % and Power Rating to 8 W

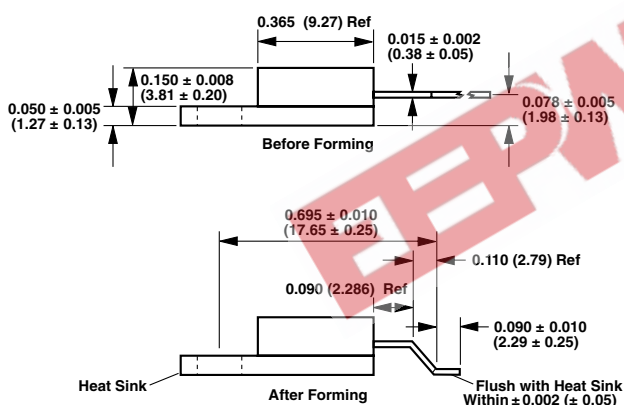
**FIGURE 1 - POWER DERATING CURVE**



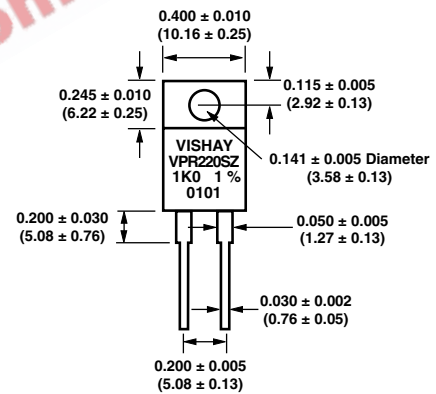
**FIGURE 2 - TRIMMING TO VALUES**  
(Conceptual Illustration)



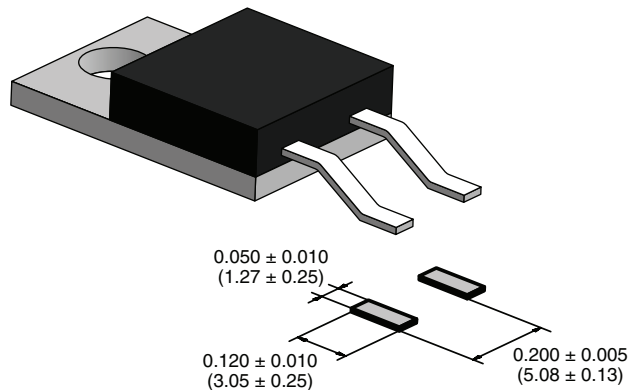
**FIGURE 3 - VPR220SZ FORMING DIMENSIONS** in inches (millimeters)



**FIGURE 4 - VPR220SZ DIMENSIONS** in inches (millimeters)



**FIGURE 5 - LAND PATTERN DIMENSIONS** in inches (millimeters)



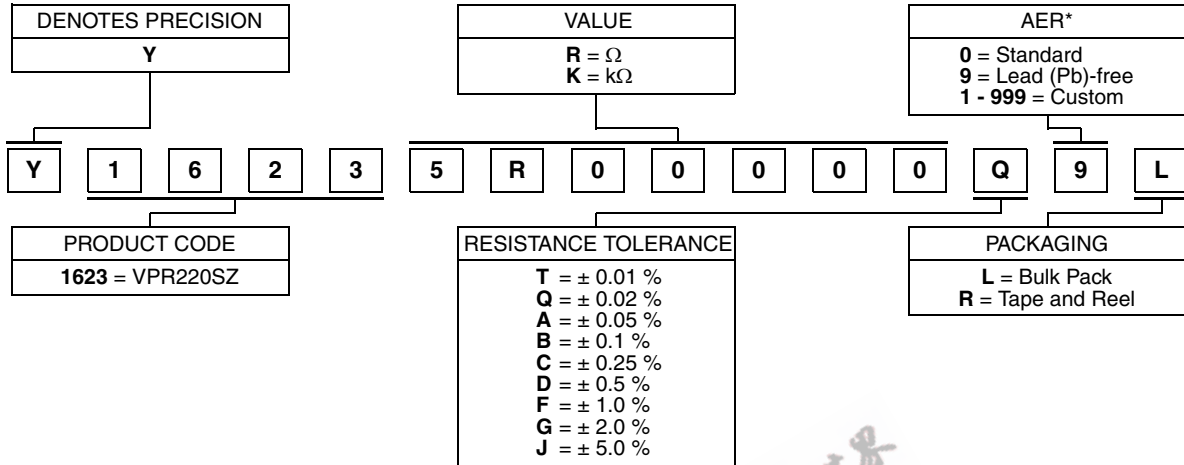
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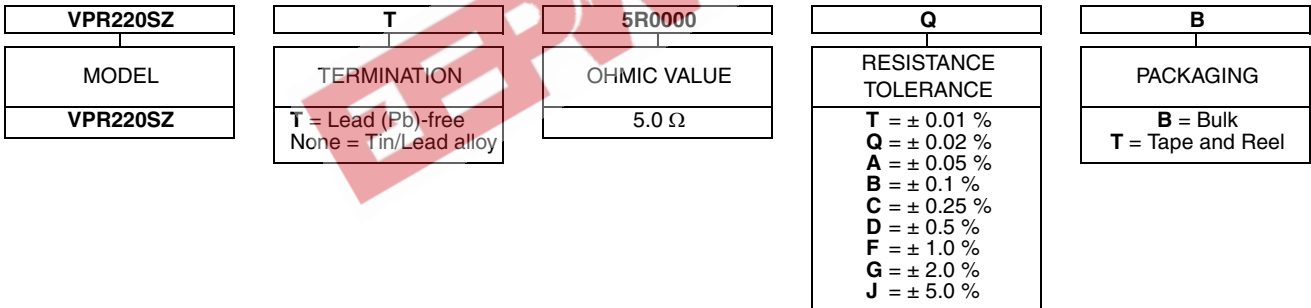
**TABLE 3 - GLOBAL PART NUMBER INFORMATION**

NEW GLOBAL PART NUMBER: Y16235R00000Q9L (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1623 5R00000 Q 9 L:  
TYPE: VPR220SZ  
VALUE: 5.0  $\Omega$   
ABSOLUTE TOLERANCE:  $\pm 0.02$  %  
TERMINATION: Lead (Pb)-free  
PACKAGING: Bulk

HISTORICAL PART NUMBER: VPR220SZT 5R0000 Q B (will continue to be used)



**Note**

\* For non-standard requests, please contact Application Engineering.



### Disclaimer

All product specifications and data are subject to change without notice.

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