Ultra High Precision Bulk Metal® Z-Foil Technology Power Current Sensing Resistors with TCR of ± 0.05 ppm/°C and Power Rating up to 7 W

INTRODUCTION

These Bulk Metal® Z-Foil power current sensing resistors are direct replacements for certain wirewound devices but without the inductive characteristics of wirewounds. The anodized aluminum housing is drilled and countersunk to accept flat head screws for thermal mounting. Because the device is internally Kelvin connected, there is no restriction on the lead lengths as would be the case if this were a two terminal device. Frequently used in YIG oscillator circuits these devices contribute to superior frequency stability.

FEATURES

Pb-free Available

RoHS* COMPLIANT

- Temperature coefficient of resistance (TCR):
  ± 0.05 ppm/°C (0 °C to 60 °C)
  ± 0.2 ppm/°C (- 55 °C to + 125 °C, + 25 °C ref.)
- Tolerance: ± 0.01 %
- Resistance range: 5 Ω to 100 KΩ
- Vishay Foil Resistors are not restricted to standard values; specific “as required” values can be supplied at no extra cost or delivery (e.g. 1K2345 vs. 1K)
- Load life stability: ± 0.01 % (100 ppm) at 70 °C, 2000 h at rated power
- Electrostatic discharge (ESD) up to 25 000 V
- Non-inductive, non-capacitive design
- Rise time: 1 ns effectively no ringing
- Current noise: 0.010 μV_{RMS}/V of applied voltage (< - 40 dB)
- Thermal stabilization time < 1 s (nominal value achieved within 10 ppm of steady state value)
- Thermal EMF: 0.05 µV/°C typical
- Voltage coefficient: < 0.1 ppm/V
- Non-inductive: < 0.08 µH
- Pattern design minimizing hot spots
- Terminal finish available: lead (Pb)-free or tin/lead alloy*
- Prototype quantities available in just 5 working days or sooner. For more information, please contact foil@vishaypg.com

TABLE 1 - TOLERANCE AND TCR VS. RESISTANCE

MODEL NUMBER	RESISTANCE RANGE (Ω)	BEST TOLERANCE (%)	TYPICAL TCR AND MAXIMUM SPREAD (- 55 °C to + 125 °C, + 25 °C ref.) (ppm/°C)	MAXIMUM WORKING VOLTAGE (V)	POWER RATING AT 25 °C (1) (W)
VPR5Z	5 to 10	± 0.1	± 0.2 ± 4.3	300	5
	> 10 to 50	± 0.05	± 0.2 ± 3.8		
	> 50 to 100	± 0.05	± 0.2 ± 2.8		
	> 100 to 100K	± 0.01	± 0.2 ± 1.8		
VPR7Z	5 to 10	± 0.1	± 0.2 ± 4.3	300	7
	> 10 to 50	± 0.05	± 0.2 ± 3.8		
	> 50 to 100	± 0.05	± 0.2 ± 2.8		
	> 100 to 100K	± 0.01	± 0.2 ± 1.8		

Note

(1) Mounted on aluminum chassis (6" L x 4" W x 2" H x 0.040" Th) per MIL-PRF-39009/1B.

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

FIGURE 1 - POWER DERATING CURVE

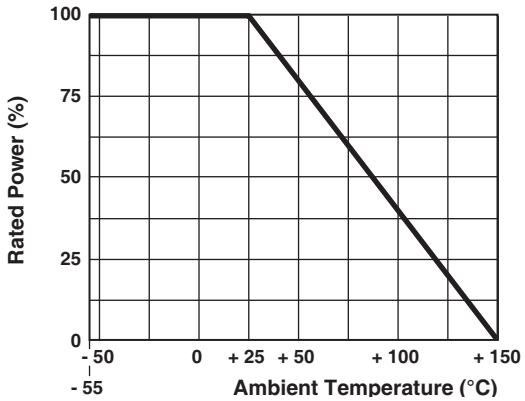
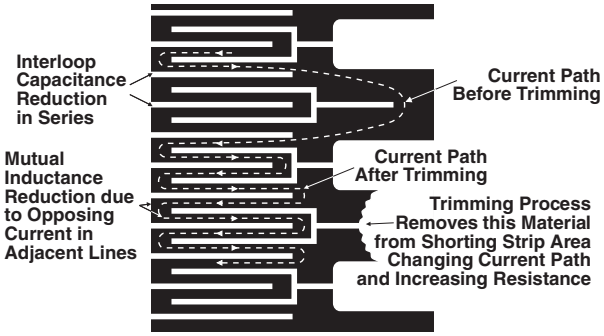


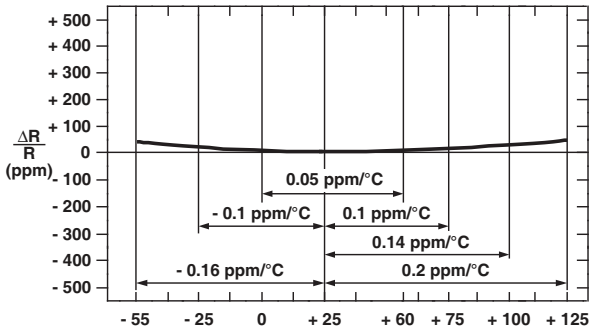
FIGURE 2 - TRIMMING TO VALUES

(conceptual illustration)



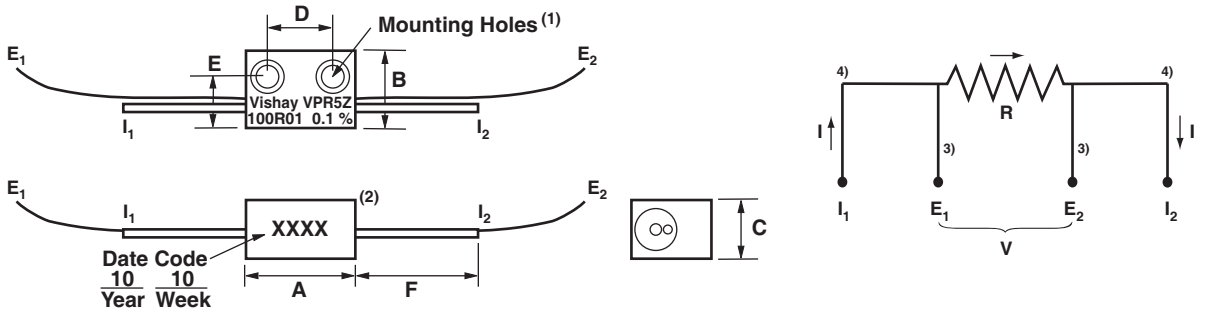
Note: Foil shown in black, etched spaces in white

FIGURE 3 - TYPICAL RESISTANCE/ TEMPERATURE CURVE (Z-FOIL)



TCR Chord Slopes for Different Temperature Ranges

TABLE 2 - STANDARD IMPRINTING AND DIMENSIONS



DIMENSIONS												
A		B		C		D		E		F (min)	
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
0.625	15.88	0.450	11.43	0.312	7.93	0.400	10.16	0.350	8.89	1.500	38.10
1.030	26.16	0.450	11.43	0.312	7.93	0.788	20.02	0.350	8.89	1.375	34.90

Notes

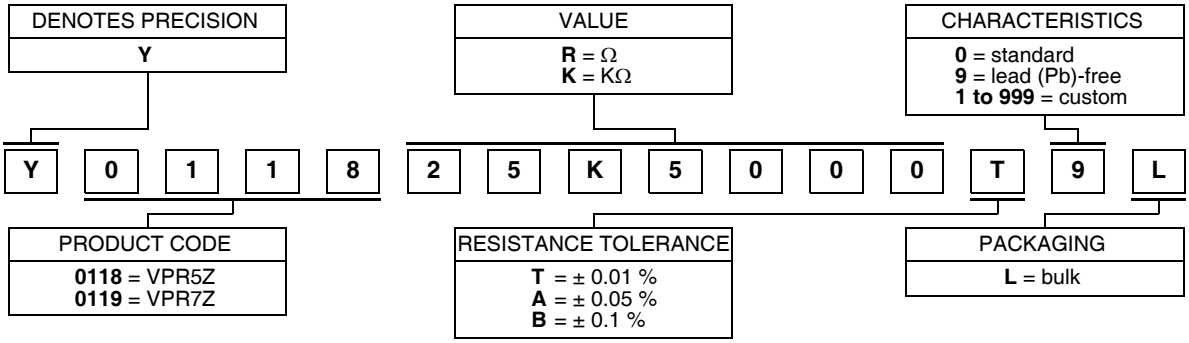
(1) #4-40 F.H. machine screw (not included)
(2) Anodized aluminum housing
(3) #26 AWG, teflon coated, 4" min.
(4) #20 AWG, solder coated copper

POST MANUFACTURING OPERATIONS (PMO)

Many analog applications can include requirements for performance under conditions of stress beyond the normal and over extended periods of time. This calls for more than just selecting a standard device and applying it to a circuit. The standard device may turn out to be all that is needed but an analysis of the projected service conditions should be made and it may well dictate a routine of stabilization known as post manufacturing operations or PMO. The PMO operations that will be discussed are only applicable to Bulk Metal Foil resistors. They stabilize Bulk Metal Foil resistors while they are harmful to other types. Short time overload, accelerated load life, and temperature cycling are the three PMO exercises that do the most to remove the anomalies down the road. Vishay Bulk Metal Foil resistors are inherently stable as manufactured. These PMO exercises are only of value on Bulk Metal Foil resistors and they improve the performance by small but significant amounts. Users are encouraged to contact Vishay Foil applications engineering for assistance in choosing the PMO operations that are right for their application.

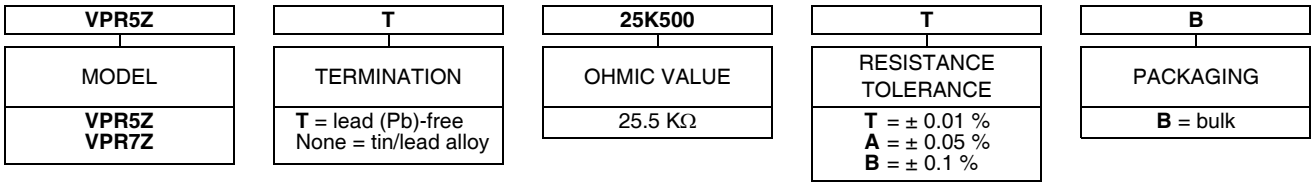
TABLE 4 - GLOBAL PART NUMBER INFORMATION (1)

NEW GLOBAL PART NUMBER: Y011825K5000T9L (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y0118 25K5000 T 9 L:
TYPE: VPR5Z
VALUE: 25.5 kΩ
ABSOLUTE TOLERANCE: ± 0.01 %
TERMINATION: lead (Pb)-free
PACKAGING: bulk

HISTORICAL PART NUMBER: VPR5Z T 25K500 T B (will continue to be used)



Note

(1) For non-standard requests, please contact application engineering.

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