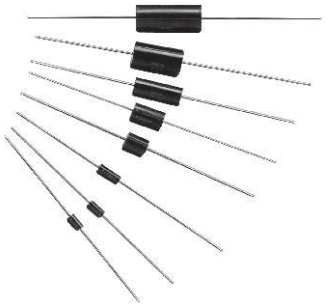
Ultra High Precision Bulk Metal® Z-Foil Technology Tubular Axial Lead Resistors with TCR of ± 0.05 ppm/°C, Tolerance to ± 0.01 % and Load Life Stability of ± 0.005 %



INTRODUCTION

This series of axial resistors uses the same Foil technology as the Z201 but with axial leads instead of radial leads. Axial leads have the advantage of using readily available auto insertion equipment while the radial leaded devices may require additional tooling. Also, when converting from metal film (RNC 55) to Bulk Metal® Foil (VMTA55Z) boards may already be laid out for the axial leaded device.

Our application engineering department is available to advise and to make recommendations. For non-standard technical requirements and special applications, please contact us.

FEATURES

Pb-free Available

RoHS* COMPLIANT

- Temperature coefficient of resistance (TCR): (see table 1)
  ± 0.2 ppm/°C typical (- 55 °C to + 125 °C, + 25 °C ref.)
  ± 0.05 ppm/°C typical (0 °C to + 60 °C)
- Resistance range: 5 Ω to 300 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)
- Tolerance: to ± 0.01 %
- Load life stability:
  ± 0.005 % (50 ppm) at 70 °C, 2000 h at rated power
- Electrostatic discharge (ESD) up to 25 000 V
- Power rating: 0.2 W to 1.0 W at 70 °C
- Non-inductive, non-capacitive design (low noise)
- Thermal EMF: 0.1 µV/°C maximum, 0.05 µV/°C typical
- Voltage coefficient: < 0.1 ppm/V
- Thermal stabilization time < 1 s (nominal value achieved within 10 ppm of steady state value)
- Terminal finish: lead (Pb)-free, tin/lead
- Compliant to RoHS directive 2002/95/EC
- For better performances, please contact application engineering
- Prototype quantities available in just 5 working days or sooner. For more information, please contact foil@vishaypg.com

TABLE 1 - TYPICAL TCR ppm/°C AND MAXIMUM SPREAD (1)

VALUES	- 55 °C to + 125 °C, + 25 °C Ref.
5R to < 15R	± 0.2 ± 4.8
15R to < 25R	± 0.2 ± 3.8
25R to < 50R	± 0.2 ± 2.8
50R to < 100R	± 0.2 ± 2.3
> 100R	± 0.2 ± 1.8

Note

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

FIGURE 1 - POWER DERATING CURVE

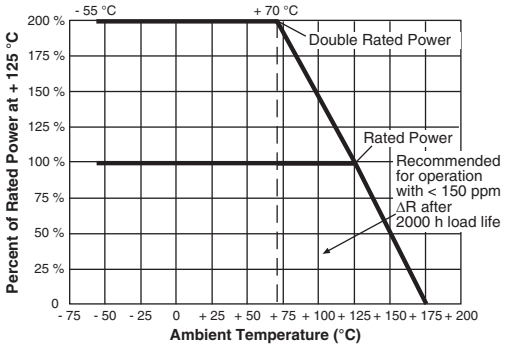


TABLE 2 - MODEL SELECTION

VISHAY MODEL	MIL STYLE	POWER at + 70 °C	POWER at + 125 °C	MAXIMUM WORKING VOLTAGE	RESISTANCE RANGE (Ω)	TIGHTEST TOLERANCE
VTA56Z	RBR56	0.25 W	0.125 W	300 V	5 to 24R9 25 to 100K	± 0.1 % ± 0.01 %
VTA55Z	RBR55	0.3 W	0.15 W	300 V	5 to 24R9 25 to 100K	± 0.1 % ± 0.01 %
VTA54Z	RBR54	0.5 W	0.25 W	300 V	5 to 24R9 25 to 200K	± 0.1 % ± 0.01 %
VTA53Z	RBR53	0.66 W	0.33 W	300 V	5 to 24R9 25 to 200K	± 0.1 % ± 0.01 %
VTA52Z	RBR52	1.0 W	0.5 W	300 V	5 to 24R9 25 to 300K	± 0.1 % ± 0.01 %
VMTA55Z	RNC55	0.2 W	0.1 W	200 V	5 to 49R9 50 to 30K	± 0.1 % ± 0.01 %
VMTB60Z	RNC60	0.25 W	0.125 W	250 V	5 to 49R9 50 to 60K	± 0.1 % ± 0.01 %

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

FIGURE 2 - VTAZ/VMTAZ SERIES STANDARD PRINTING

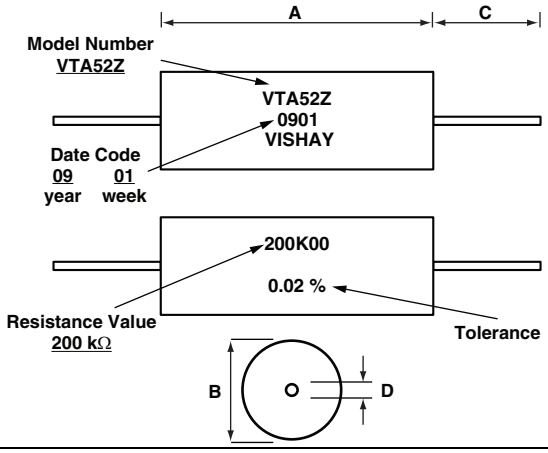
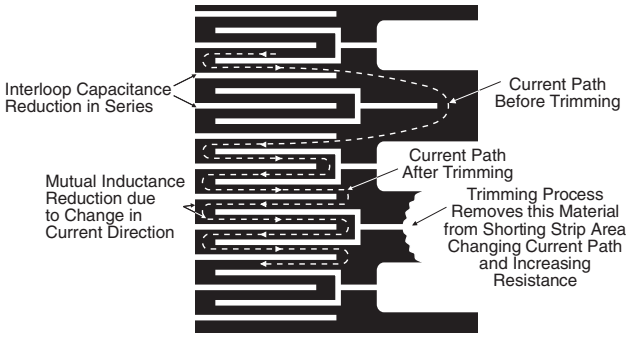


FIGURE 3 - TRIMMING TO VALUES

(conceptual illustration)

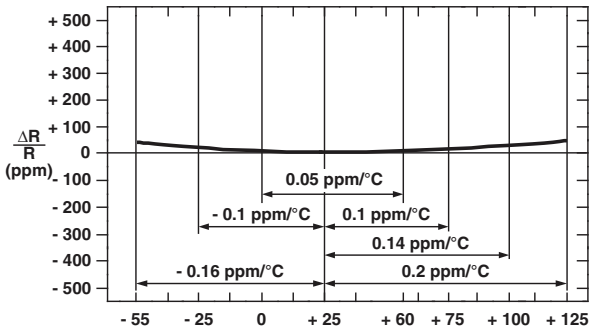


Note: Foil shown in black, etched spaces in white

TABLE 3 - VTAZ/VMTXZ DIMENSIONS

VISHAY MODEL	MIL SIZE	BODY								LEAD			
		LENGTH (A)				DIAMETER (B)				LENGTH (C)		DIAMETER (D)	
		INCH		mm		INCH		mm		INCH	mm	INCH	mm
VTA56Z	RBR56	0.356	+ 0.005 / - 0.010	9.04	+ 0.13 / - 0.25	0.260	+ 0.005 / - 0.015	6.60	+ 0.13 / - 0.38	1.5 min.	38.10	0.032	0.81
VTA55Z	RBR55	0.500 ± 0.020		12.70 ± 0.51		0.260	+ 0.005 / - 0.010	6.60	+ 0.13 / - 0.25	1.5 min.	38.10	0.032	0.81
VTA54Z	RBR54	0.750	+ 0.020 / - 0.032	19.05	+ 0.51 / - 0.81	0.260	+ 0.005 / - 0.010	6.60	+ 0.13 / - 0.25	1.5 min.	38.10	0.032	0.81
VTA53Z	RBR53	0.750 ± 0.020		19.05 ± 0.51		0.375	± 0.015	9.53	± 0.38	1.5 min.	38.10	0.032	0.81
VTA52Z	RBR52	1.000	+ 0.020 / - 0.032	25.40	+ 0.51 / - 0.81	0.375	± 0.015	9.53	± 0.38	1.35 min.	34.29	0.032	0.81
VMTA55Z	RNC55	0.270 ± 0.005		6.86 ± 0.13		0.120	+ 0.005 / - 0.010	3.05	+ 0.13 / - 0.25	1.5 min.	38.10	0.025	0.64
VMTB60Z	RNC60	0.375 ± 0.005		9.53 ± 0.13		0.160	± 0.005	4.06	± 0.13	1.5 min.	38.10	0.025	0.64

FIGURE 4 - TYPICAL RESISTANCE/TEMPERATURE CURVE



Ambient Temperature (°C) and TCR Chord Slopes for Different Temperature Ranges

POST MANUFACTURING OPERATIONS OR 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: Y009320K1230Q9L (preferred part number format)

DENOTES PRECISION	VALUE	CHARACTERISTICS
Y	**R** = Ω **K** = kΩ	**0** = standard **9** = lead (Pb)-free **1 to 999** = custom

Y	0	0	9	3	2	0	K	1	2	3	0	Q	9	L

PRODUCT CODE	RESISTANCE TOLERANCE	PACKAGING
0090 = VTA52Z **0091** = VTA53Z **0092** = VTA54Z **0093** = VTA55Z **0095** = VTA56Z **0096** = VMTA55Z **0097** = VMTB60Z	**T** = ± 0.01 % **Q** = ± 0.02 % **A** = ± 0.05 % **B** = ± 0.1 % **C** = ± 0.25 % **D** = ± 0.5 % **F** = ± 1.0 %	**L** = bulk

FOR EXAMPLE: ABOVE GLOBAL ORDER Y0093 20K1230 Q 9 L:

TYPE: VTA55Z
VALUE: 20.123 kΩ
ABSOLUTE TOLERANCE: ± 0.02 %
TERMINATION: lead (Pb)-free
PACKAGING: bulk

Note

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