Ultra High Precision Z-Foil Power Current Sensing Resistor with Absolute TCR of ± 0.05 ppm/°C, PCR of 5 ppm at Rated Power and Tolerance of ± 0.02 %



Any value at any tolerance available within resistance range

INTRODUCTION

VCS232Z is the industry's first device to provide high rated power, excellent load life stability, and low TCR - all in one resistor.

The Z-Foil Technology provides a significant reduction of the resistive component's sensitivity to ambient temperature variations (TCR) and applied power changes (PCR).

The latest developments in Foil resistors technology have reduced the temperature coefficient of Resistance (TCR): ± 0.05 ppm/°C Absolute TCR removes error due to temperature gradients.

By taking advantage of the overall stability and reliability of Vishay's Bulk Metal® Z-Foil resistors, designers can significantly reduce circuit errors and greatly improve overall circuit performances.

Model VCS232Z is a 4 lead kelvin connected device.

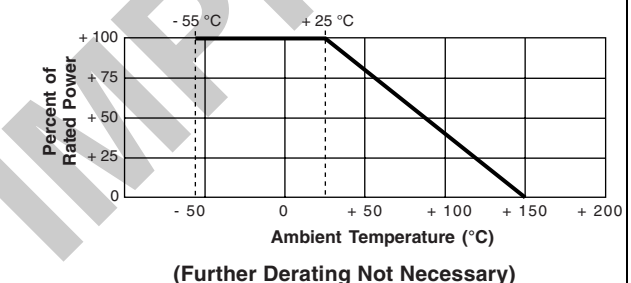
Our Application Engineering Department is available to advise and make recommendations. For non-standard technical requirements and special applications, please contact us.

TABLE 1 - TOLERANCE AND TCR

RESISTANCE RANGE (Ω)	TIGHTEST RESISTANCE TOLERANCE	TYPICAL TCR AND MAX. SPREAD (ppm/°C)[1)]
0.25 to < 10	± 0.05 %	± 0.2 ± 2.8
10 to 500	± 0.02 %	± 0.2 ± 1.8

Notes
1. MIL-Range (- 55 °C to + 125 °C, + 25 °C Ref.)
- Contact Applications Engineering for other available values

FIGURE 1 - POWER DERATING CURVE



(Further Derating Not Necessary)

FEATURES

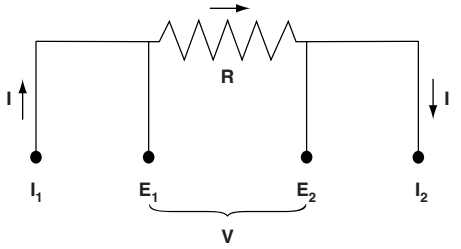
Pb-free Available

RoHS* COMPLIANT

- Temperature Coefficient of Resistance (TCR): ± 0.05 ppm/°C typical (0 °C to 60 °C) ± 0.2 ppm/°C typical (- 55 °C to + 125 °C, + 25 °C Ref.)
- Power Coefficient "ΔR due to self heating": 4 ppm/W typical
- Power Rating at + 25 °C: 2 Watts
- Tolerance: to ± 0.02 %
- Load Life Stability: to ± 0.005 %, 25 °C for 2000 hours at rated power
- Maximum Current: 3 Amps
- Resistance Range: 0.25 Ω to 500 Ω
- Electrostatic Discharge (ESD) above 25 000 Volts
- Short Time Overload ≤ 0.005 %
- Non Inductive, Non Capacitive Design
- Rise Time: 1 ns without ringing
- Current Noise < - 40 dB
- Thermal EMF: 0.05 μV/°C
- Voltage Coefficient < 0.1 ppm/V
- Non Inductive: 0.08 μH
- Non Hot Spot Design
- Terminal Finishes available: Lead (Pb)-free, Tin/Lead Alloy
- For better performances please contact us

APPLICATIONS

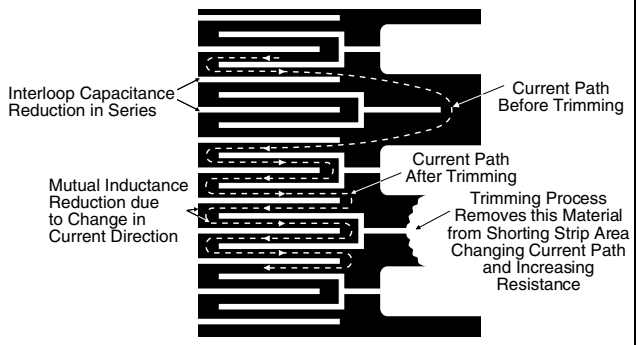
- Automatic Test Equipment (ATE)
- High Precision Instrumentation
- Electron Beam Application
- Current Sensing Applications
- Pulse Applications
- Military
- Power Amplifier
- Power Supplies



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

IMPROVED PRODUCT

FIGURE 2 - TRIMMING TO VALUES
(Conceptual Illustration)



Note: Foil shown in black, etched spaces in white

FIGURE 3 -TYPICAL TCR CURVE Z-FOIL
(For more details, see table 1)

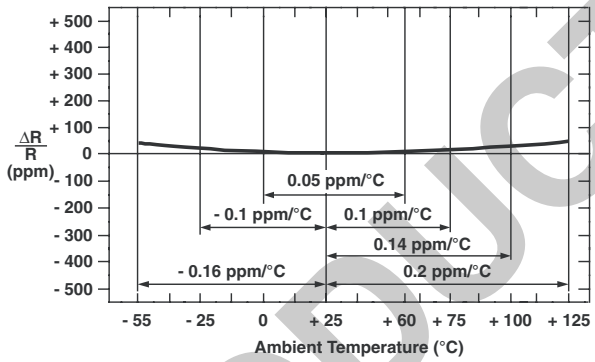
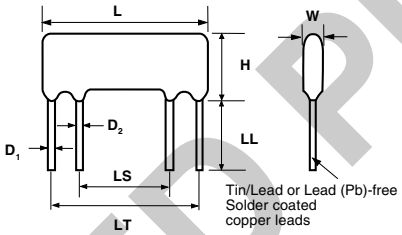


FIGURE 4 - DIMENSIONS in inches (millimeters)



MODEL	L MAXIMUM	H MAXIMUM	W MAXIMUM	LL MINIMUM	LS ± 0.20 (± 0.5)	LT ± 0.20 (± 0.5)	D_1 NOMINAL	D_2 NOMINAL
VCS232Z	1.240 (31.50)	0.512 (13.00)	0.177 (4.50)	0.500 (12.70)	0.688 (17.48)	1.083 (27.51)	0.040 (1.02)	0.032 (0.81)

TABLE 2 - PERFORMANCES[1)]

TEST OR CONDITION	TYPICAL ΔR	MAXIMUM ΔR
Low temperature storage (24 hours at - 55 °C)	± 0.002 % (20 ppm)	± 0.005 % (50 ppm)
Short time overload (5 x rated power)	± 0.002 % (20 ppm)	± 0.005 % (50 ppm)
DWV	± 0.002 % (20 ppm)	± 0.005 % (50 ppm)
Moisture resistance (+ 65 °C to - 10 °C; 90 % to 98 % RH; 0.1 x rated power; 240 hours)	± 0.01 % (100 ppm)	± 0.02 % (200 ppm)
Terminal Strength	± 0.002 % (20 ppm)	± 0.005 % (50 ppm)
Load life stability (2 Watt, + 25 °C, 2000 hours)	± 0.005 % (50 ppm)	± 0.01 % (100 ppm)
High temperature exposure (2000 hours at + 150 °C)	± 0.01 % (100 ppm)	± 0.02 % (200 ppm)
Weight	1.2 g maximum	

Note

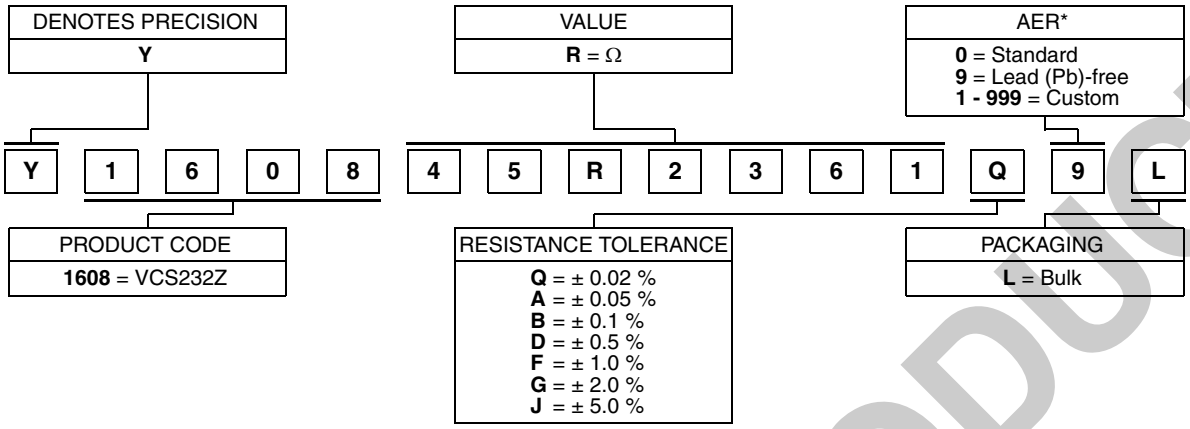
1. Measurement error 0.0005R

IMPROVED PRODUCT

Ultra High Precision Z-Foil Power Current Sensing Resistor with Absolute TCR of ± 0.05 ppm/°C, PCR of 5 ppm at Rated Power and Tolerance of ± 0.02 %

TABLE 3 - GLOBAL PART NUMBER INFORMATION

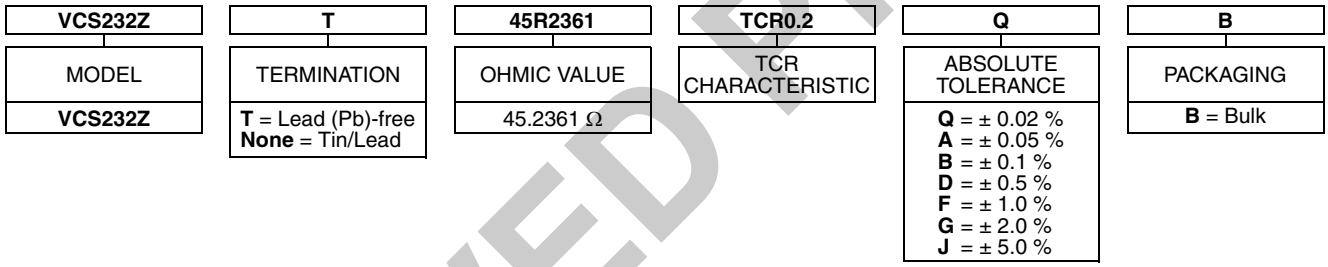
NEW GLOBAL PART NUMBER: Y160845R2361Q9L (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1608 45R2361 Q 9 L:

TYPE: VCS232Z
VALUES: 45.2361 Ω
ABSOLUTE TOLERANCE: ± 0.02 %
TERMINATION: Lead (Pb)-free
PACKAGING: Bulk Pack

HISTORICAL PART NUMBER: VCS232ZT 45R2361 TCR0.2 Q B (will continue to be used)



Note

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

IMPROVED PRODUCT

Disclaimer

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

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.