

High Precision Bulk Metal® Foil Surface Mount Current Sensing Chip Resistor with TCR of $\pm 2 \text{ ppm}/^\circ\text{C}$ and Load Life Stability of $\pm 0.02 \%$



INTRODUCTION

Model VCS1625 is a surface mount resistor designed with 4 pads for Kelvin connection. Utilizing Vishay Bulk Metal® foil as the resistance element, it provides performance capabilities far greater than other resistor technologies can supply in a product of comparable size.

This small device dissipates heat almost entirely through the pads so surface mount users are encouraged to be generous with the board's pads and traces. Gold terminations are available on special order.

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

FEATURES

- Temperature coefficient of resistance (TCR): $\pm 2.0 \text{ ppm}/^\circ\text{C}$ typical (- 55 °C to + 125 °C, + 25 °C ref.) (see table 1)
- Resistance range: 0.01 Ω to 10 Ω (for higher or lower values please contact us)
- Vishay Foil resistors are not restricted to standard values, we can supply specific "as required" values at no extra cost or delivery (e.g. 1.2345 Ω vs. 1 Ω)
- Tolerance: to $\pm 0.1 \%$
- Load life stability: $\pm 0.02 \%$ at 70 °C, 2000 h at rated power
- Electrostatic discharge (ESD) up to 25 000 V
- Short time overload $\leq 0.005 \%$
- Non inductive, non capacitive design
- Power rating: 0.5 W at + 70 °C (figure 1) or 5 A, whichever is lower
- Thermal EMF: 0.05 $\mu\text{V}/^\circ\text{C}$ typical
- Non hot spot design
- Current noise: < - 40 dB
- Rise time: 1 ns effectively no ringing
- Voltage coefficient: < 0.1 ppm/V
- Non inductive: < 0.08 μH
- For better performances please review VCS1625Z (Z-foil) datasheet



RoHS*
COMPLIANT

TERMINATIONS

- Two lead (Pb)-free options are available: gold plated or tin plated
- Tin/lead plated

APPLICATIONS

- Automatic test equipment (ATE)
- Airborne (in heads-up display systems)
- High precision instrumentation
- Electron beam recording equipment
- Electron microscopes
- Current sensing applications
- Forced balance electronic scales
- Applications that require superior frequency stability
- Military
- Medical

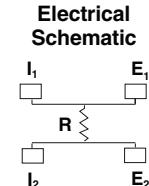
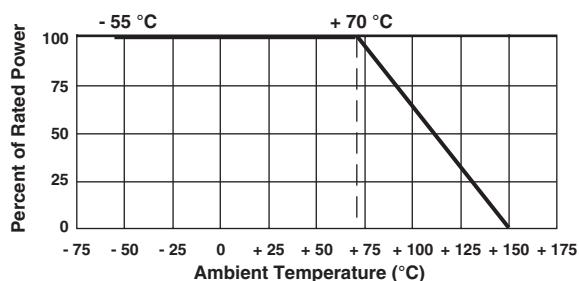


FIGURE 1 - POWER DERATING CURVE (1)



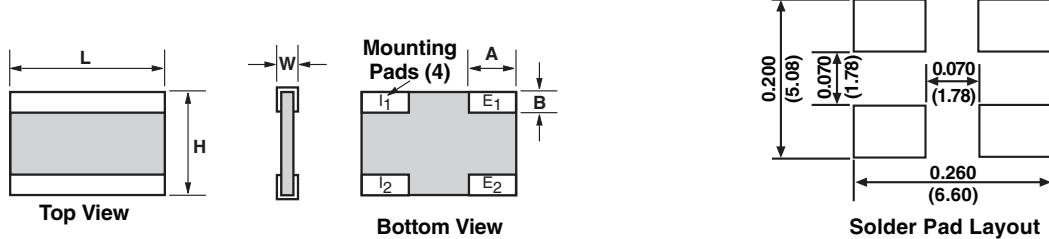
Note

(1) Power rating at + 70 °C: 0.5 W on FR4 PCB

TABLE 1 - TOLERANCE AND TCR VS. RESISTANCE VALUE (- 55 °C to + 125 °C, + 25° Ref.)

VALUE (Ω)	TOLERANCE	TYPICAL TCR	MAXIMUM TCR
> 2R000 to 10R000	0.2 %, 0.5 %, 1 %	$\pm 2 \text{ ppm}/^\circ\text{C}$	$\pm 5 \text{ ppm}/^\circ\text{C}$
> 0R500 to 2R000	0.5 %, 1 %	$\pm 2 \text{ ppm}/^\circ\text{C}$	$\pm 10 \text{ ppm}/^\circ\text{C}$
> 0R100 to 0R500	1 %	$\pm 2 \text{ ppm}/^\circ\text{C}$	$\pm 15 \text{ ppm}/^\circ\text{C}$
> 0R050 to 0R100	1 %	$\pm 2 \text{ ppm}/^\circ\text{C}$	$\pm 20 \text{ ppm}/^\circ\text{C}$
> 0R030 to 0R050	1 %	$\pm 2 \text{ ppm}/^\circ\text{C}$	$\pm 30 \text{ ppm}/^\circ\text{C}$
> 0R010 to 0R030	1 %	$\pm 2 \text{ ppm}/^\circ\text{C}$	$\pm 50 \text{ ppm}/^\circ\text{C}$

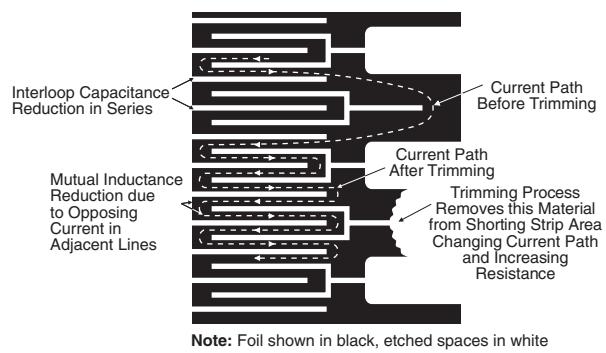
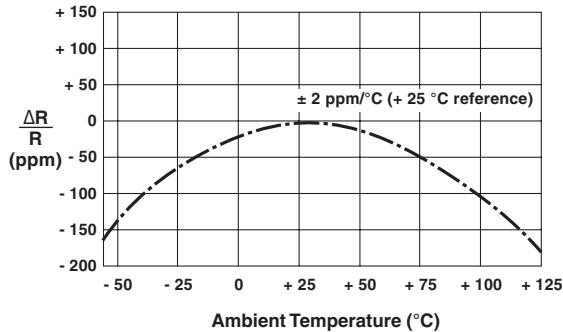
* Pb containing materials are not RoHS compliant, exemptions may apply

FIGURE 2 - DIMENSIONS in Inches (Millimeters)

	INCHES	MILLIMETERS
L	0.250 ± 0.010	6.35 ± 0.25
H	0.160 ± 0.010	4.06 ± 0.25
W	0.040 maximum	1.02 maximum
A	0.080 ± 0.005	2.03 ± 0.13
B	0.040 ± 0.010	1.02 ± 0.25

FIGURE 1 - TRIMMING TO VALUES

(Conceptual Illustration)

**FIGURE 4 - TYPICAL TCR CURVE****TABLE 2 - PERFORMANCE SPECIFICATIONS**

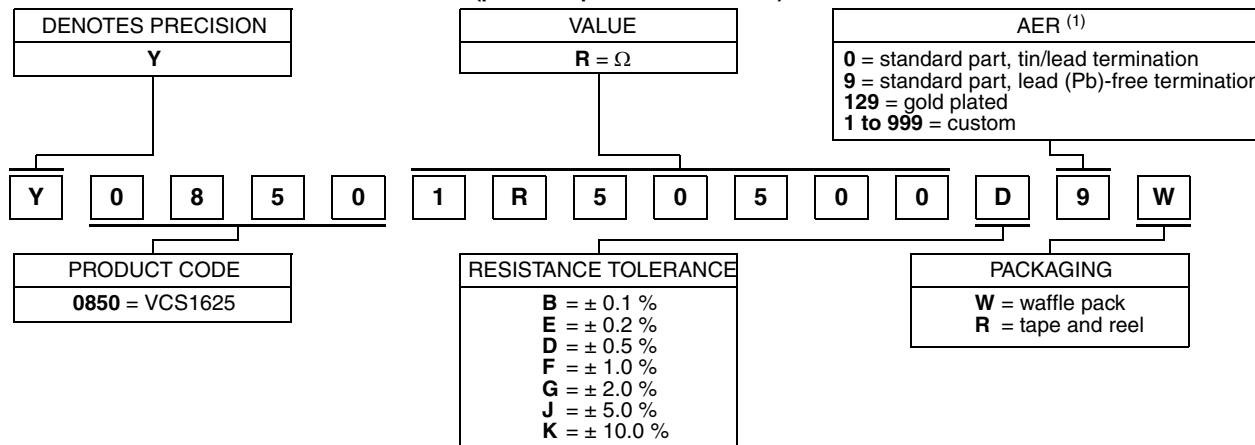
TEST	MIL-PRF-55342 ΔR LIMITS	TYPICAL ΔR LIMITS	MAXIMUM ΔR LIMITS
Thermal Shock 5 x (- 65 °C to + 150 °C)	± 0.10 %	± 0.005 % (50 ppm)	± 0.01 % (100 ppm)
Low Temperature Operation	± 0.10 %	± 0.005 % (50 ppm)	± 0.01 % (100 ppm)
Short Time Overload	± 0.10 %	± 0.005 % (50 ppm)	± 0.02 % (200 ppm)
High Temperature Exposure	± 0.10 %	± 0.01 % (100 ppm)	± 0.02 % (200 ppm)
Resistance to Soldering Heat	± 0.2 %	± 0.01 % (100 ppm)	± 0.03 % (300 ppm)
Moisture Resistance	± 0.20 %	± 0.01 % (100 ppm)	± 0.03 % (300 ppm)
Load Life 2000 h at 70 °C: Rated Power On Ceramic PCB	± 0.5 %	± 0.02 % (200 ppm)	± 0.04 % (400 ppm)

Note

- Measurement error 0.001R

TABLE 3 - GLOBAL PART NUMBER INFORMATION

NEW GLOBAL PART NUMBER: Y08501R50500D9L (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y0850 1R50500 D 9 W:

TYPE: VCS1625

VALUES: 1.505 Ω

ABSOLUTE TOLERANCE: ± 0.5 %

TERMINATION: tin plated (lead (Pb)-free)

PACKAGING: bulk pack

HISTORICAL PART NUMBER: VCS1625 1R50500 TCR2 D S W (will continue to be used)

VCS1625	1R50500	TCR2	D	S	W
MODEL	OHMIC VALUE	TEMPERATURE COEFFICIENT CHARACTERISTIC	RESISTANCE TOLERANCE	TERMINATION	PACKAGING
VCS1625	1.505 Ω		B = ± 0.1 % E = ± 0.2 % D = ± 0.5 % F = ± 1.0 % G = ± 2.0 % J = ± 5.0 % K = ± 10.0 %	S = lead (Pb)-free B = tin/lead G = gold plated	W = waffle pack T = tape and reel

Note

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

Disclaimer

ALL PRODUCTS, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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

The product specifications do not expand or otherwise modify VPG's terms and conditions of purchase, including but not limited to, the warranty expressed therein.

VPG makes no warranty, representation or guarantee other than as set forth in the terms and conditions of purchase. **To the maximum extent permitted by applicable law, VPG disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.**

Information provided in datasheets and/or specifications may vary from actual results in different applications and performance may vary over time. Statements regarding the suitability of products for certain types of applications are based on VPG's knowledge of typical requirements that are often placed on VPG products. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. You should ensure you have the current version of the relevant information by contacting VPG prior to performing installation or use of the product, such as on our website at vpgsensors.com.

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

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

Copyright Vishay Precision Group, Inc., 2014. All rights reserved.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Vishay Precision Group:

VCS1625 .5 1% Y08501R00000B9R Y08500R01000F9R Y08500R10000F9R Y08500R10000D0W
Y08500R50000F0W