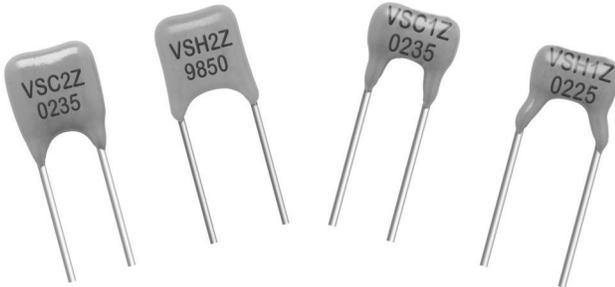


Ultra High Precision Z-Bulk Metal® Foil Technology Low Profile Conformally Coated High Precision Resistor with TCR down to ± 0.05 ppm/°C, Tight Tolerance from ± 0.01 % and Load Life Stability of ± 0.01 %



INTRODUCTION

Bulk Metal® Foil (BMF) technology out-performs all other resistor technologies available today for applications that require high precision and high stability, and allows production of customer oriented products designed to satisfy challenging and specific technical requirements.

The BMF provides an inherently low and predictable Temperature Coefficient of Resistance (TCR) and excellent load life stability for high precision analog applications.

Model VSH offers low TCR, excellent load life stability, tight tolerance, excellent shelf life stability, low current noise and low voltage coefficient, all in the same resistor.

Our application engineering department is available to advise and make recommendations. For non-standard technical requirements and special applications, please contact us using the e-mail address in the footer below.

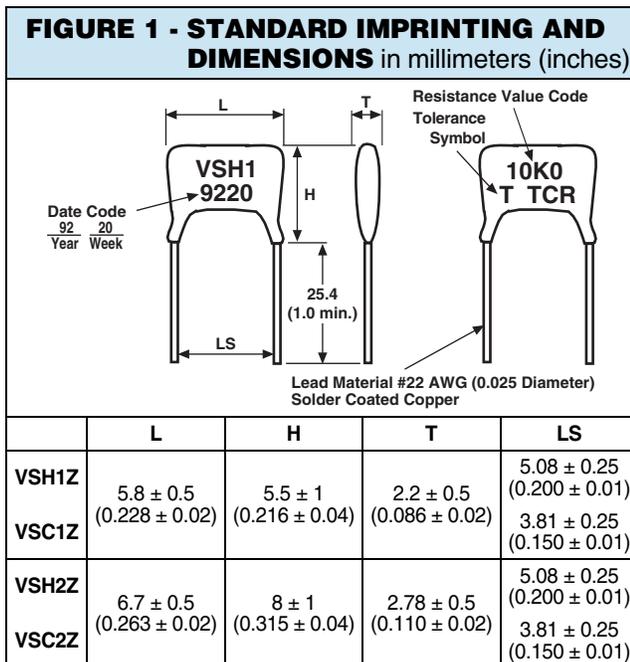
FEATURES

- Temperature coefficient of resistance (TCR): ± 0.2 ppm/°C typical (- 55 °C to + 125 °C, + 25 °C ref.) (see table 1)
- Tolerance: to ± 0.01 %
- Power rating: to 300 mW at + 70 °C
- Load life stability: to ± 0.01 % at 70 °C, 2000 h at rated power
- Resistance range: 5 Ω to 120 k Ω
- 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)
- Thermal stabilization time < 1 s
- **Electrostatic discharge (ESD) up to 25 000 V**
- Short time overload: ≤ 0.01 %
- Maximum working voltage: 300 V
- Non-inductive, non-capacitive design
- Rise time: 1 ns effectively no ringing
- Current noise: < - 42 dB
- Voltage coefficient < 0.1 ppm/V
- Non-inductive: < 0.08 μ H
- Non hot spot design
- Terminal finish: lead (Pb)-free or tin/lead alloy
- Matched sets are available per request
- Compliant to RoHS directive 2002/95/EC
- Prototype quantities available in just 5 working days or sooner. For more information, please contact foil@vishaypg.com
- For better performances please review **VHP203** Series datasheet



RoHS
COMPLIANT

FIGURE 1 - STANDARD IMPRINTING AND DIMENSIONS in millimeters (inches)



Note

- Letters H and C indicate a difference in lead spacing and -2 is an extension range

APPLICATIONS

- Automatic test equipment (ATE)
- High precision instrumentation
- Laboratory, industrial and medical
- Audio
- EB applications (electron beam scanning and recording equipment, electron microscopes)
- Commercial aviation
- Airborne
- Down hole instrumentation
- Communication

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

| RESISTOR | RESISTANCE VALUE (Ω) | TYPICAL TCR AND MAX. SPREAD (ppm/°C) | TOLERANCE (%) |
|----------------|----------------------|--------------------------------------|---------------|
| VSH2Z VSC2Z | 60K to 120K | ± 0.2 ± 1.8 | ± 0.01 % |
| VSH1Z VSC1Z | 50 to < 60K | ± 0.2 ± 1.8 | ± 0.01 % |
| VSH1Z VSC1Z | 20 to < 50 | ± 0.2 ± 2.8 | ± 0.02 % |
| VSH1Z VSC1Z | 10 to < 20 | ± 0.2 ± 4.8 | ± 0.02 % |
| VSH1Z VSC1Z | 5 to < 10 | ± 0.2 ± 6.8 | ± 0.05 % |

TABLE 2 - PERFORMANCE SPECIFICATIONS

| TEST | CONDITIONS | ΔR (%) - TYPICAL | ΔR (%) - MAXIMUM |
|---------------------------------|---|------------------|------------------|
| Moisture Resistance | MIL-STD-202, method 106 | ± 0.005 | ± 0.03 |
| Pressure Cooker Test | 2 atmospheres absolute pressure, 121 °C, 100 % R.H. for 100 h | ± 0.2 | ± 0.4 |
| Short Time Overload | 6.25 x P _{nom} , 5 s | ± 0.005 | ± 0.05 |
| Resistance to Solder Heat | + 260 °C, 20 s | ± 0.01 | ± 0.03 |
| Terminal Strength | 2 lbs, 10 s | ± 0.0025 | ± 0.03 |
| Insulation Resistance | DC 100 V, 2 min | > 10 000M | > 10 000M |
| Dielectric Withstanding Voltage | AC 300 V, 1 min | ± 0.0025 | ± 0.03 |
| Thermal Shock | - 65 °C to + 150 °C, 5 cycles | ± 0.01 | ± 0.02 |
| Shock | MIL-STD-202, method 213, condition I | ± 0.005 | ± 0.03 |
| Vibration | MIL-STD-202, method 204, condition D | ± 0.01 | ± 0.03 |
| Load Life Stability | 0.3 W, + 70 °C, 2000 h | ± 0.01 | ± 0.015 |
| Thermal EMF | - | 0.07 μV/°C | 0.1 μV/°C |
| Current Noise | Quan-Tech | - 42 dB | - 32 dB |
| Low Temperature Storage | 24 h at - 65 °C | ± 0.005 | ± 0.01 |
| Low Temperature Operation | 45 min at - 65 °C | ± 0.005 | ± 0.01 |
| High Temperature Exposure | + 150 °C | ± 0.01 | ± 0.03 |

FIGURE 2 - TRIMMING TO VALUES
(conceptual illustration)

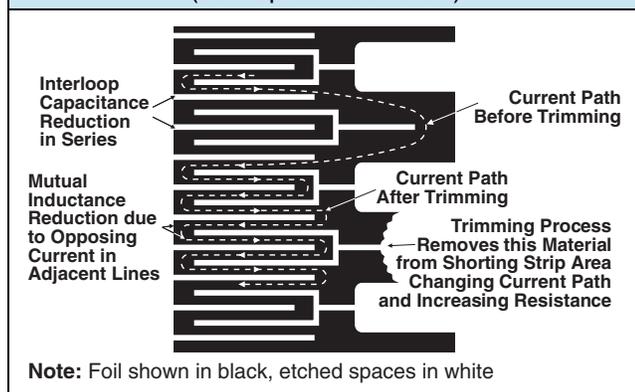


FIGURE 3 - POWER DERATING CURVE

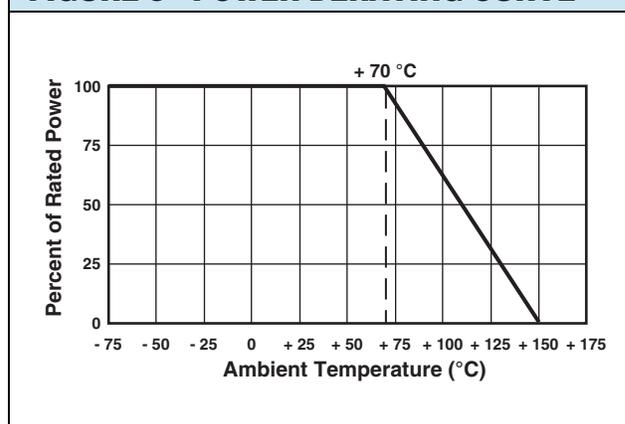
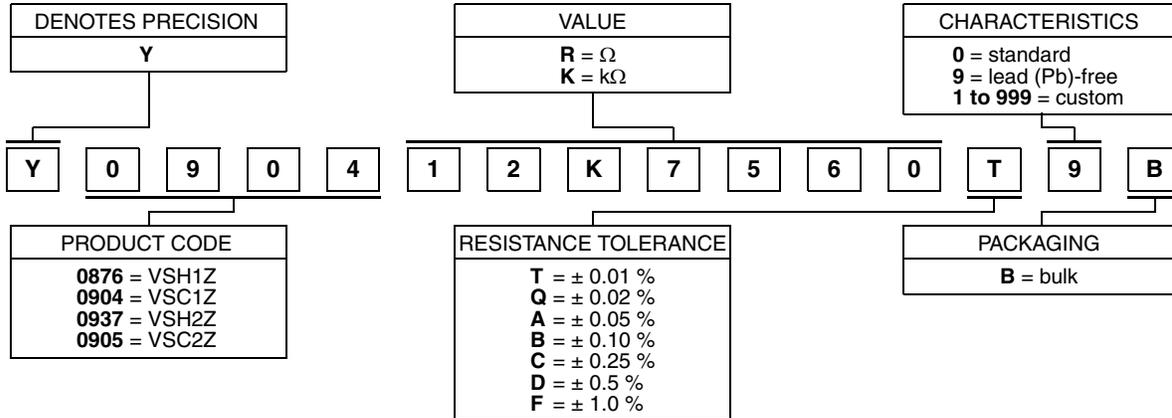


TABLE 3 - GLOBAL PART NUMBER INFORMATION (1)

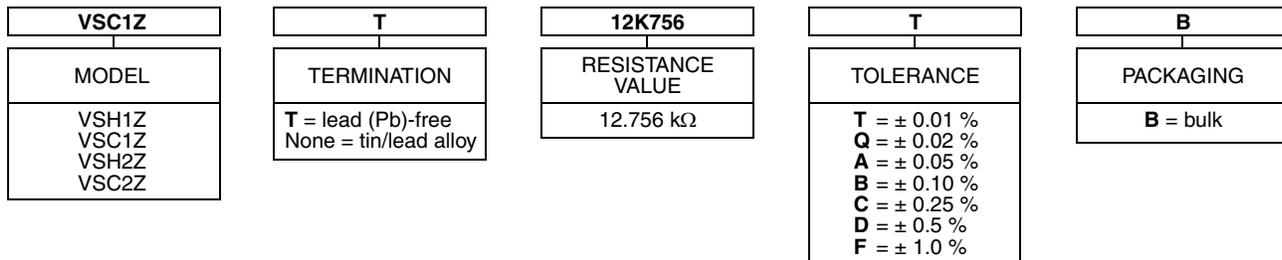
NEW GLOBAL PART NUMBER: Y090412K7560T9R (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y0904 12K7560 T 9 B:

TYPE: VSC1Z
VALUES: 12.7560 kΩ
ABSOLUTE TOLERANCE: 0.01 %
TERMINATION: lead (Pb)-free
PACKAGING: bulk

HISTORICAL PART NUMBER: VSC1Z T 12K756 T B (will continue to be used)



Note

(1) For non-standard requests, 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.