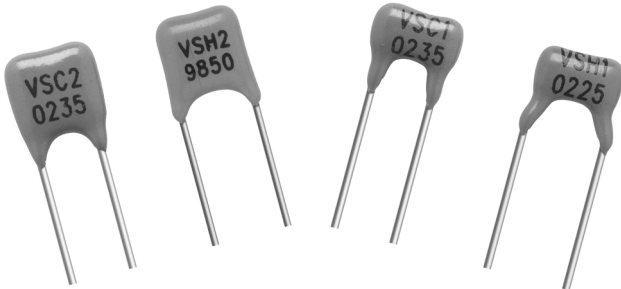


## Bulk Metal® Foil Technology Low Profile Conformally Coated High Precision Resistor with Tight Tolerance from $\pm 0.01\%$ and Load Life Stability of $\pm 0.01\%$ and Instantaneous Thermal Stabilization



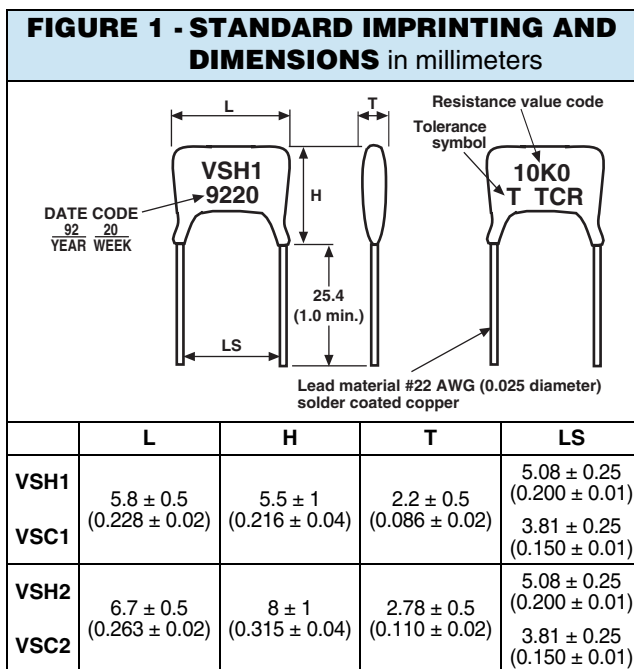
### INTRODUCTION

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.



### Note

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

### FEATURES

- Temperature coefficient of resistance (TCR):  $\pm 2.0$  ppm/°C typical (- 55 °C to + 125 °C, + 25 °C ref.) (see table 1)
- Tolerance: to  $\pm 0.01\%$
- Power rating: to 300 mW at + 70 °C
- Load life stability: to  $\pm 0.01\%$  at 70 °C, 2000 h at rated power
- Resistance range: 5  $\Omega$  to 120 k $\Omega$  (for higher and lower values, please contact us)
- 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:  $\leq 0.01\%$
- 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  $\mu$ 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](mailto:foil@vishaypg.com)
- For better performances please review **Z201** and **S102C** Series datasheets



RoHS  
COMPLIANT

### 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

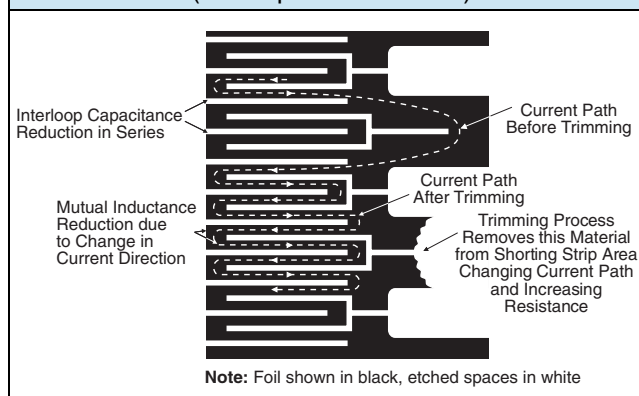
**TABLE 1 - TOLERANCE AND TCR VS. RESISTANCE VALUE (- 55 °C to + 125 °C, + 25 °C Ref.)**

| RESISTOR     | RESISTANCE VALUE (Ω) | TYPICAL TCR AND MAX. SPREAD (ppm/°C) | TOLERANCE (%) |
|--------------|----------------------|--------------------------------------|---------------|
| VSH2<br>VSC2 | 60K to 120K          | ± 2 ± 4.5                            | ± 0.01 %      |
| VSH1<br>VSC1 | 80 to < 60K          | ± 2 ± 4.5                            | ± 0.01 %      |
| VSH1<br>VSC1 | 50 to < 80           | ± 2 ± 5.5                            | ± 0.02 %      |
| VSH1<br>VSC1 | 5 to < 50            | ± 2 ± 6.5                            | ± 0.05 %      |

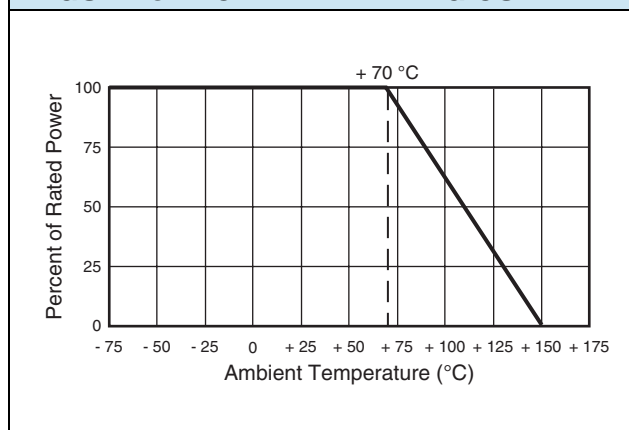
**TABLE 2 - PERFORMANCE SPECIFICATIONS**

| 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 <sub>nom</sub> , 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)

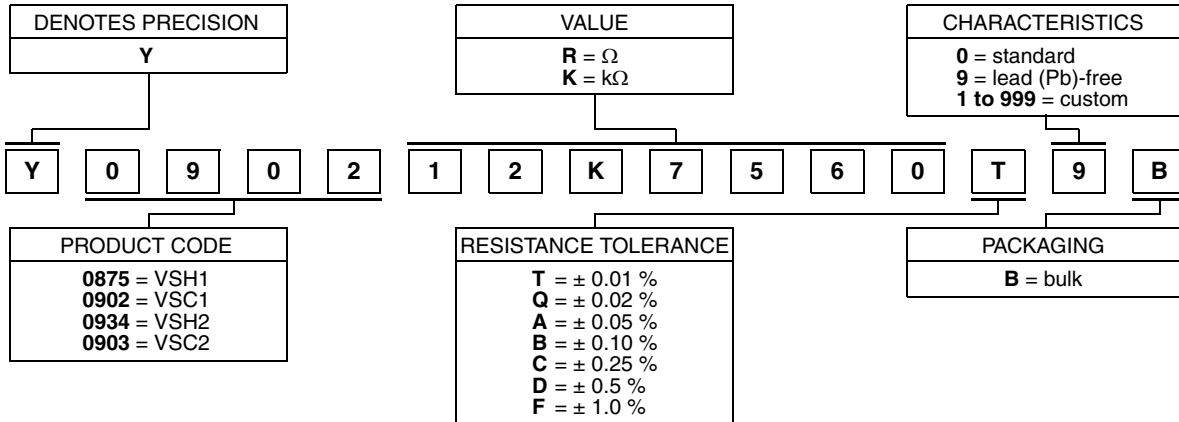


**FIGURE 3 - POWER DERATING CURVE**



**TABLE 3 - GLOBAL PART NUMBER INFORMATION (1)**

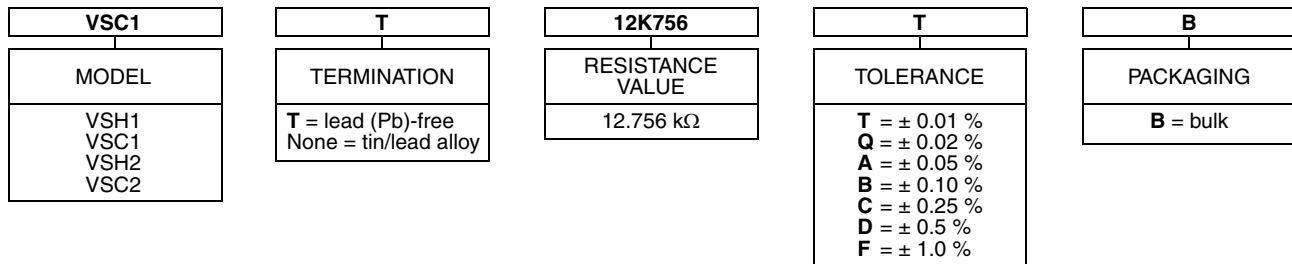
**NEW GLOBAL PART NUMBER: Y090212K7560T9B (preferred part number format)**



FOR EXAMPLE: ABOVE GLOBAL ORDER Y0902 12K7560 T 9 B:

TYPE: VSC1  
VALUES: 12.7560 kΩ  
ABSOLUTE TOLERANCE: 0.01 %  
TERMINATION: lead (Pb)-free  
PACKAGING: bulk

**HISTORICAL PART NUMBER: VSC1 T 12K756 T B (will continue to be used)**



**Note**

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

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