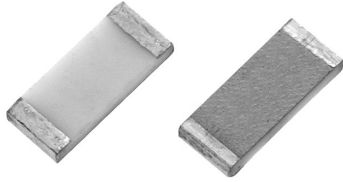


## Bulk Metal<sup>®</sup> Foil Technology Discrete High Precision Surface Mount Chip Resistor



Product may not be to scale

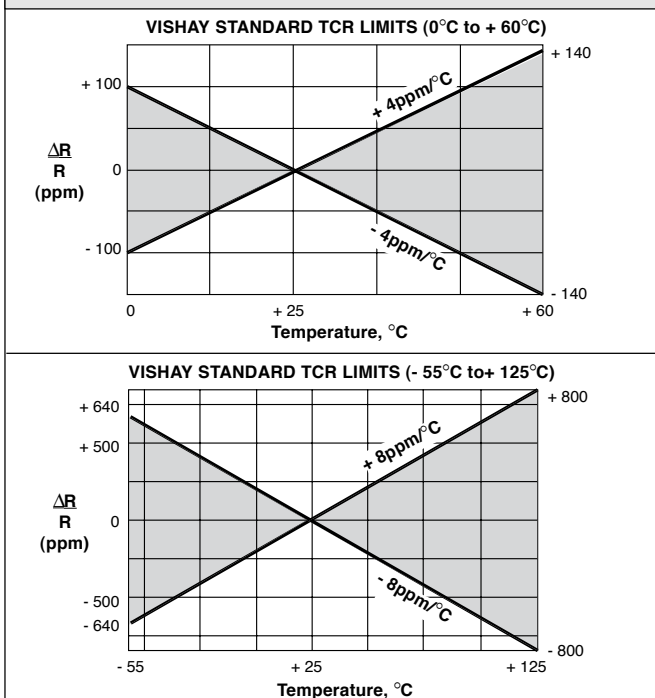
The VSMC1506 Precision Surface Mount Chip Resistor utilizes the Vishay Bulk Metal<sup>®</sup> Foil technology with its inherent low TCR and stability. It provides a level of performance not provided in other resistor technologies.

This is a commercial version of the VSM1506 resistor. The significant difference is in the expression of the redefined limits of the TCR. The VSMC1506 has a  $\pm$  envelope of limits compared to the standard Vishay TCR curve.

The VSMC1506 with its robust full width wrap around termination ensures safe handling and provides stability during the installation process and multiple thermal excursions it will encounter in use. The excellent performance specifications of this product makes it ideal for precision analog applications.

Utilizing its low TCR characteristics a voltage divider can be fashioned by using two VSMC1506 chip resistors resulting in a tracking specification < 5ppm/ $^{\circ}$ C.

**FIGURE 1 - TEMPERATURE COEFFICIENT**



**FEATURES**

- High Precision, Low TCR
- Temperature Coefficient of Resistance:  
Nominal TCR:  $\pm$  4ppm/ $^{\circ}$ C (0 $^{\circ}$ C to + 60 $^{\circ}$ C)  
 $\pm$  8ppm/ $^{\circ}$ C (- 55 $^{\circ}$ C to + 125 $^{\circ}$ C)  
+ 25 $^{\circ}$ C Reference
- Resistance Range: 10 $\Omega$  to 40K $\Omega$
- Tolerance: to  $\pm$  0.01% (See table)
- Load Life Stability:  $\pm$  0.01% maximum  $\Delta$ R under full rated power @ + 70 $^{\circ}$ C for 2000 hours.
- Shelf Life Stability: 50ppm/year (0.005%) maximum  $\Delta$ R non-hermetically sealed
- Voltage Coefficient: < 0.00001%/volt (< 0.1ppm/V)
- Current Noise: < 0.010 $\mu$ V(rms)/volt of applied voltage
- Non Inductive: < 0.08 $\mu$ H

**TABLE 1 - TOLERANCE VERSUS RESISTANCE VALUE**

| VALUE ( $\Omega$ )            | STANDARD TOLERANCE* (%) |
|-------------------------------|-------------------------|
| 100 $\Omega$ to 40k $\Omega$  | $\pm$ 0.01              |
| 50 $\Omega$ to < 100 $\Omega$ | $\pm$ 0.05              |
| 25 $\Omega$ to < 50 $\Omega$  | $\pm$ 0.1               |
| 10 $\Omega$ to < 25 $\Omega$  | $\pm$ 0.25              |

\*Tighter tolerances are available. Please contact Application Engineering. Soldering temperatures used during installation may cause resistance to shift up to 0.01%.

**TABLE 2 - TYPICAL PERFORMANCE SPECIFICATIONS**

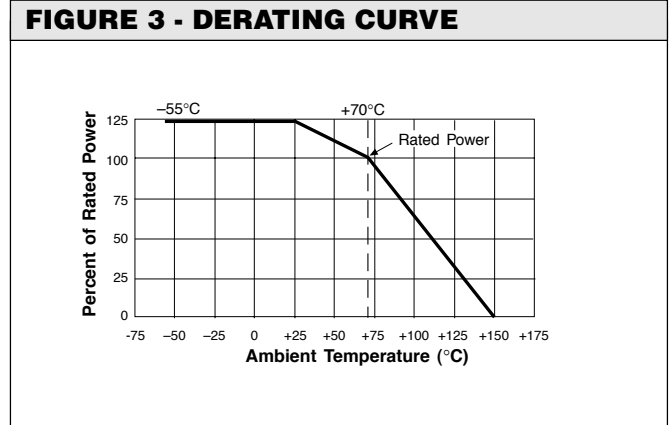
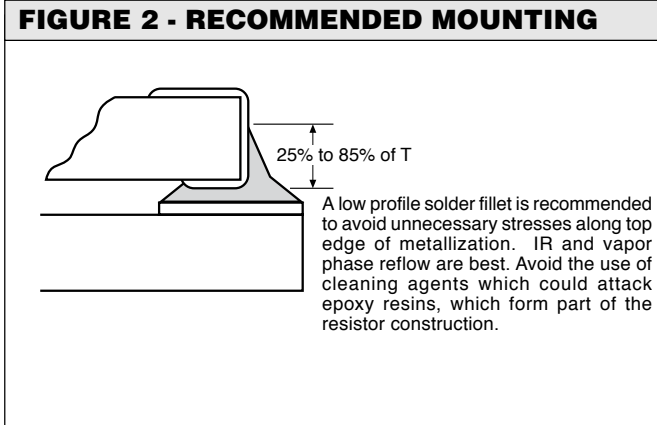
| TEST                                | VSMC1506 MAXIMUM $\Delta$ R LIMITS* |
|-------------------------------------|-------------------------------------|
| Thermal Shock                       | $\pm$ 0.02%                         |
| Low Temperature Operation           | $\pm$ 0.02%                         |
| Short Time Overload                 | $\pm$ 0.02%                         |
| High Temperature Exposure           | $\pm$ 0.03%                         |
| Resistance to Bonding               | $\pm$ 0.01%                         |
| Moisture Resistance                 | $\pm$ 0.03%                         |
| Life 2000 hours @ + 70 $^{\circ}$ C | $\pm$ 0.01%                         |
| Power @ + 70 $^{\circ}$ C (mW)      | 100                                 |
| Maximum Voltage (V)                 | 63 max.                             |
| Maximum Weight (mg)                 | 12 max.                             |

\*As shown + 0.01 Ohms to allow for measurement errors at low values.

VISHAY FOIL • FRANCE +33.4.93.37.28.24 FAX: +33.4.93.37.27.31  
• GERMANY +49.9287.710 FAX: +49.9287.70435  
• ISRAEL +972.3.557.0945 FAX: +972.3.558.9121

• ITALY + 39.2.300.11919 FAX: +39.2.300.11999  
• JAPAN +81.42.729.0661 FAX: +81.42.729.3400  
• SINGAPORE +65.788.6668 FAX: +65.788.0988

• SWEDEN +46.8.594.70590 FAX: +46.8.594.70581  
• UK +44 191 514 8237 FAX: +44 1953 457 722  
• USA +1 610 407-4800 FAX: +1 610 640-9081



**TABLE 3 - CHIP SIZE AND LAND PATTERN DIMENSIONS** in inches [millimeters]

Bottom View for Mounting

Recommended Land Pattern

| L               | W               | T               | D               | Z*               | G*               | X*               |
|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| ± 0.005 [0.13]  | ± 0.005 [0.13]  | MAXIMUM         | ± 0.005 [0.13]  | MAXIMUM          | MINIMUM          | MAXIMUM          |
| 0.150<br>[3.81] | 0.062<br>[1.57] | 0.025<br>[0.64] | 0.020<br>[0.50] | 0.199<br>[5.046] | 0.083<br>[2.108] | 0.071<br>[1.806] |

\*Land Pattern Dimensions are per IFC-782

**TABLE 4 - ORDERING INFORMATION**

| MODEL | CHIP SIZE | RESISTANCE VALUE                      |                   |                   | TOLERANCE  | TERMINATION    | PACKAGING                            |
|-------|-----------|---------------------------------------|-------------------|-------------------|--|----------------|--------------------------------------|
| VSMC  | 1506      | RESISTANCE RANGE                      | LETTER DESIGNATOR | MULTIPLIER FACTOR | T ± 0.01%<br>Q ± 0.02%<br>A ± 0.05%<br>B ± 0.1%<br>C ± 0.25%<br>D ± 0.5%<br>F ± 1.0% | B - Solderable | T = Tape and Reel<br>W = Waffle Pack |
|       |           | 5Ω to < 1kΩ<br>Example: 249R00 = 249Ω | R                 | x 1.0             |  |                |                                      |
|       |           | 1k to 40k<br>Example: 40K000 = 40.0kΩ | K                 | x 10 <sup>3</sup> |  |                |                                      |

VISHAY FOIL • FRANCE +33.4.93.37.28.24 FAX: +33.4.93.37.27.31 • ITALY + 39.2.300.11919 FAX: +39.2.300.11999 • SWEDEN +46.8.594.70590 FAX: +46.8.594.70581  
 • GERMANY +49.9287.710 FAX: +49.9287.70435 • JAPAN +81.42.729.0661 FAX: +81.42.729.3400 • UK +44 191 514 8237 FAX: +44 1953 457 722  
 • ISRAEL +972.3.557.0945 FAX: +972.3.558.9121 • SINGAPORE +65.788.6668 FAX: +65.788.0988 • USA +1 610 407-4800 FAX: +1 610 640-9081