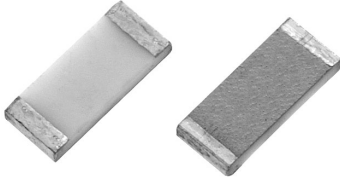


# Bulk Metal<sup>®</sup> Foil Technology

## Discrete High Precision Surface Mount Chip Resistor



Product may not be to scale

The VSM1506 Discrete Precision Chip Resistor uses the Bulk Metal<sup>®</sup> Foil (BMF) Technology for the resistance element. The BMF provides inherently a low and predictable temperature coefficient of resistance (TCR) and remarkable load life stability for precision analog applications. The predictable TCR variation is independent of value, date code, time and is expressed via the curve shown below.

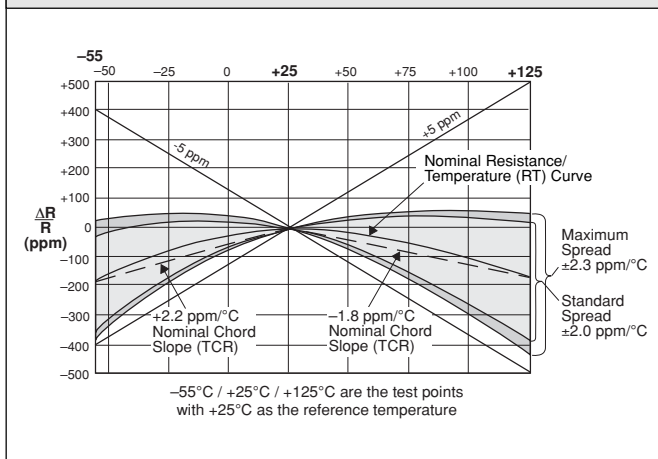
The VSM1506 has a newly designed, robust termination which insures safe handling during the manufacturing process as well as providing stability during the multiple thermal cyclings it will see over its service life.

The load life specification has been improved providing even greater life stability and the ohmic value has been extended from 33K to 40K Ohms.

A voltage divider can be fashioned by using two arbitrarily selected VSM1506s; with a resultant tracking specification of < 3ppm/°C.

The VSM1506 replaces the VSM1505 for new designs.

**FIGURE 1 - NOMINAL TCR CURVE**



The TCR for values < 100Ω are influenced by the termination composition and result in a deviation from this curve. Contact our application engineering department for detailed specification on low values

**FEATURES**

- High Precision, Low TCR
- Temperature Coefficient of Resistance:
  - Nominal TCR: + 0.6ppm/°C (0°C to + 25°C)
  - 0.6ppm/°C (+ 25°C to + 60°C)
  - + 2.2ppm/°C (- 55°C to + 25°C)
  - 1.8ppm/°C (+ 25°C to + 125°C)
- Resistance Range: 10Ω to 40KΩ
- Tolerance: to ± 0.01% (See table 1)
- Load Life Stability: ± 0.01% maximum ΔR under full rated power @ + 70°C for 2000 hours.
- Shelf Life Stability: 50ppm/year (0.005%) maximum ΔR non-hermetically sealed
- Voltage Coefficient: < 0.00001%/volt (< 0.1ppm/V)
- Current Noise: < 0.010μV(rms)/volt of applied voltage
- Non Inductive: < 3.0nH
- Terminal Finishes Available:
  - Lead (Pb)-free (Sn 99.3% Cu 0.7%)
  - Tin/Lead Alloy (Sn 62% Pb 36% Ag 2%)

**TABLE 1 - TOLERANCE VERSUS RESISTANCE VALUE**

VALUE (Ω)	STANDARD TOLERANCE* (%)
100Ω to 40KΩ	± 0.01
50Ω to < 100Ω	± 0.05
25Ω to < 50Ω	± 0.1
10Ω to < 25Ω	± 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	MIL-PRF-55342G CHARACTERISTIC E ΔR LIMITS	VSM1506 MAXIMUM ΔR LIMITS*
Thermal Shock	± 0.10%	± 0.02%
Low Temperature Operation	± 0.10%	± 0.02%
Short Time Overload	± 0.10%	± 0.02%
High Temperature Exposure	± 0.10%	± 0.03%
Resistance to Bonding	± 0.20%	± 0.01%
Moisture Resistance	± 0.20%	± 0.03%
Life 2000 hours @ + 70°C	± 0.50%	± 0.01%
Power @ + 70°C (mW)		100
Maximum Voltage (V)		63
Maximum Weight (mg)		12

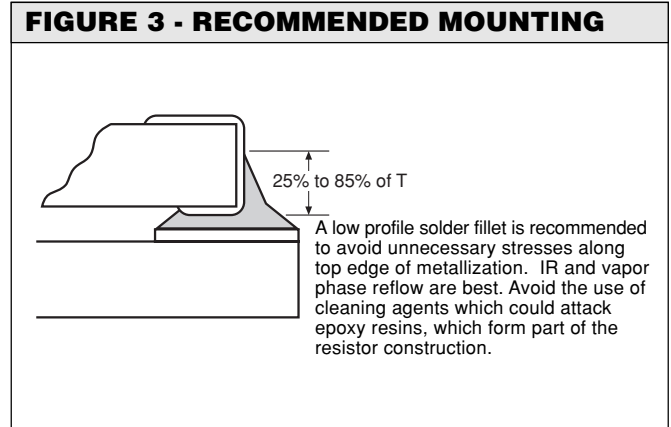
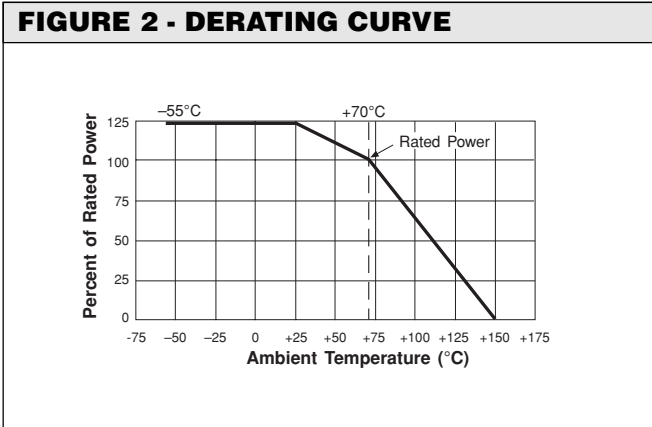
\*As shown + 0.01 Ohms to allow for measurement errors at low values.

SALES

- ISRAEL: foilsales.israel@vishay.com
- FRANCE/SWITZERLAND/SOUTHERN EUROPE: foilsales.eusouth@vishay.com
- AMERICAS: foilsales.usa@vishay.com
- ASIA/JAPAN: foilsales.asia@vishay.com
- UK/HOLLAND/SCANDANAVIA: foilsales.eunorth@vishay.com
- GERMANY/CZECH REPUBLIC/AUSTRIA: foilsales.eucentral@vishay.com



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



**TABLE 3 - CHIP SIZES AND SPECIFICATIONS** in inches (millimeters)

Bottom View for Mounting				Recommended Land Pattern		
<b>L</b>	<b>W</b>	<b>T</b>	<b>D</b>	<b>Z*</b>	<b>G*</b>	<b>X*</b>
± 0.005 [0.13]	± 0.005 [0.13]	MAXIMUM	± 0.005 [0.13]	MAXIMUM	MINIMUM	MAXIMUM
0.150 [3.81]	0.062 [1.57]	0.025 [0.64]	0.020 [0.50]	0.199 [5.046]	0.083 [2.108]	0.071 [1.806]

\*Land Pattern Dimensions are per IPC-782

**TABLE 4 - ORDERING INFORMATION**

MODEL	CHIP SIZE	RESISTANCE VALUE			TOLERANCE	TERMINATION	PACKAGING
VSM	1506	<b>RESISTANCE RANGE</b>	<b>LETTER DESIGNATOR</b>	<b>MULTIPLIER FACTOR</b>	T ± 0.01% Q ± 0.02% A ± 0.05% B ± 0.1% C ± 0.25% D ± 0.5% F ± 1.0%	<b>S</b> - Lead (Pb)-free <b>B</b> - Tin/Lead	T = Tape and Reel W = Waffle Pack
		5Ω to < 1KΩ Example: 249R00 = 249Ω	R	x 1.0			
		1K to 40K Example: 10K000 = 10.0KΩ	K	x 10 <sup>3</sup>			

SALES  
 • ISRAEL: [foilsales.israel@vishay.com](mailto:foilsales.israel@vishay.com) • FRANCE/SWITZERLAND/SOUTHERN EUROPE: [foilsales.eusouth@vishay.com](mailto:foilsales.eusouth@vishay.com) • AMERICAS: [foilsales.usa@vishay.com](mailto:foilsales.usa@vishay.com)  
 • ASIA/JAPAN: [foilsales.asia@vishay.com](mailto:foilsales.asia@vishay.com) • UK/HOLLAND/SCANDANAVIA: [foilsales.eunorth@vishay.com](mailto:foilsales.eunorth@vishay.com) • GERMANY/CZECH REPUBLIC/AUSTRIA: [foilsales.eucentral@vishay.com](mailto:foilsales.eucentral@vishay.com)