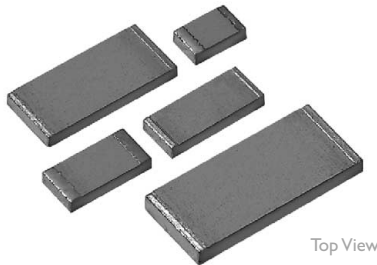


Foil Wrap Around Surface Mount Chip Resistor with TCR of ± 2 ppm/ $^{\circ}$ C and Load Life Stability of $\pm 0.01\%$



INTRODUCTION

Bulk Metal[®] Foil (BMF) Technology out-performs all other resistor technologies available today for applications that require high precision and high stability.

This technology has been invented, patented and pioneered by Vishay. Products based on this technology are the most suitable for a wide range of applications.

BMF technology allows to produce customer oriented products designed to satisfy challenging and specific technical requirements.

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

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

The VSM has a full wrap around termination which insures safe handling during the manufacturing process, as well providing stability during multiple thermal cyclings.

Our Application Engineering Department is available to advise and make recommendations for non-standard technical requirements and special applications.

FEATURES

- TCR: ± 2.0 ppm/ $^{\circ}$ C typical (see Table 1)
- Load Life Stability (70 $^{\circ}$ C for 2000 hours): $\pm 0.01\%$
- Power Rating to: 400 mW at +70 $^{\circ}$ C
- Resistance Range: 10 Ω to 125K Ω (for higher and lower values, please contact us)
- Tolerance: to $\pm 0.01\%$
- Shelf Life Stability: 0.005%
- Low Current Noise: - 42dB "Noise free component"
- Low Voltage Coefficient < 0.1 ppm/V
- Non Inductive: < 0.08 μ H
- Thermal EMF: < 0.05 μ V/ $^{\circ}$ C
- Terminal Finishes Available:
RoHS Compliant
Tin/Lead Alloy
- Matched sets are available per request
- For higher performances please review VSMP datasheet

APPLICATIONS

- Automatic Test Equipment (ATE)
- High Precision Instrumentation
- Laboratory, Industrial and Medical
- Audio
- EB Applications (electron beam scanning and recording equipment, electron microscopes)
- Military and Space
- Airborne
- Down Hole instrumentation
- Communication

TABLE 1 - TOLERANCE AND TCR VS RESISTANCE VALUE**

RESISTANCE VALUE (Ω)	TOLERANCE (%)	TYPICAL AND MAX. SPREAD (ppm/ $^{\circ}$ C)
250 to 125K	± 0.01	$\pm 2 \pm 2$
100 to < 250	± 0.02	$\pm 2 \pm 3$
50 to < 100	± 0.05	$\pm 2 \pm 3$
25 to < 50	± 0.1	$\pm 2 \pm 4$
10 to < 25	± 0.25	$\pm 2 \pm 6$

**For Tighter performances, please contact our Application Engineering department.

TABLE 2 - SPECIFICATIONS

CHIP SIZE	MAXIMUM POWER (mW) at +70 $^{\circ}$ C	MAXIMUM VOLTAGE RATING ($\leq \sqrt{P \times R}$)	RESISTANCE RANGE (Ω)	MAXIMUM WEIGHT (mg)
0805	100	28V	10 to 8K	6
1206	150	61V	10 to 25K	11
1506	200	78V	10 to 30K	12
2010	300	145V	10 to 70K	27
2512	400	220V	10 to 125K	40

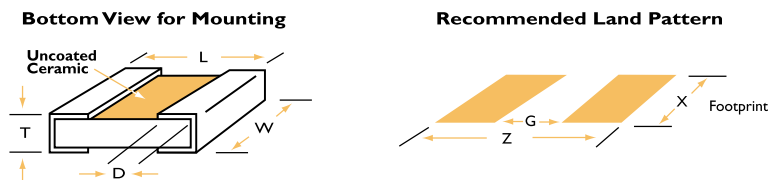
Foil Wrap Around Surface Mount Chip Resistor with
TCR of $\pm 2 \text{ ppm}/^\circ\text{C}$ and Load Life Stability of $\pm 0.01\%$

TABLE 3 - ENVIRONMENTAL PERFORMANCE SPECIFICATIONS

TEST	MIL-PRF-55342 H CHARACTERISTIC E ΔR LIMITS	VSM MAXIMUM ΔR LIMITS**
Thermal Shock	$\pm 0.1\%$	$\pm 0.02\%$
Low Temperature Operation	$\pm 0.1\%$	$\pm 0.02\%$
Short Time Overload	$\pm 0.1\%$	$\pm 0.02\%$
High Temperature Exposure	$\pm 0.1\%$	$\pm 0.03\%$
Resistance to Soldering Heat	$\pm 0.2\%$	$\pm 0.01\%$
Moisture Resistance	$\pm 0.2\%$	$\pm 0.03\%$
Load Life Stability +70°C for 2000 hours	$\pm 0.5\%$	$\pm 0.01\%$
Maximum Working Voltage (V)		$\sqrt{P \times R}$

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

TABLE 4 - DIMENSIONS AND LAND PATTERN in millimeters



CHIP SIZE	L ± 0.13	W ± 0.13	THICKNESS MAXIMUM	D ± 0.13	Z*** MAXIMUM	G*** MINIMUM	X*** MAXIMUM
0805	2.03	1.27	0.64	0.38	3.10	0.70	1.27
1206	3.20	1.57	0.64	0.50	4.40	1.50	1.80
1506	3.81	1.57	0.64	0.50	5.05	2.10	1.80
2010	5.03	2.46	0.64	0.64	6.27	2.92	2.63
2512	6.32	3.22	0.64	0.81	7.40	3.80	3.22

***Land Pattern Dimensions are per IPC-782

FIGURE 1 - POWER DERATING CURVE

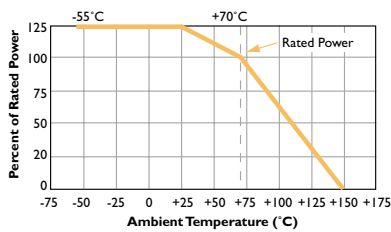


FIGURE 3 - TYPICAL TCR CURVE (For more details, see Table 1)

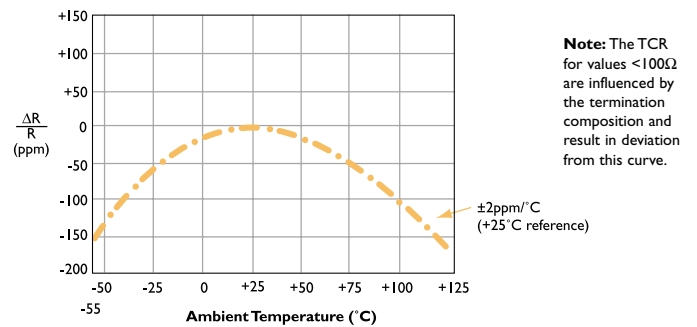
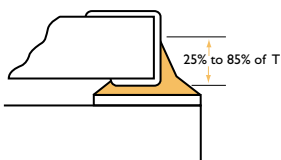


FIGURE 2 - RECOMMENDED MOUNTING



A low profile solder fillet is recommended to avoid unnecessary stresses along top edge of metallization. IR and vapor phase reflow are best. Avoid the use of cleaning agents which could attack epoxy resins, which form part of the resistor construction.

Ordering information example:

CE-VSM0805 1K000 TCR2 TSW Model: CE-VSM0805 Value: 1KΩ
TCR2: 2 ppm/°C typical refers to any value in the resistance range (see table 1)
Tolerance: $\pm 0.01\%$ Termination: RoHS compliant Packaging: Waffle Pack

TABLE 5 - ORDERING INFORMATION

MODEL	CHIP SIZE	RESISTANCE VALUE			TCR	TOLERANCE	TERMINATION	PACKAGING
		RESISTANCE RANGE	LETTER DESIGNATOR	MULTIPLIER FACTOR				
CE-VSM	0805	10Ω to < 1KΩ	R	X 1.0	TCR2	T = 0.01% Q = 0.02% A = 0.05% B = 0.1% C = 0.25% D = 0.5% F = 1.0%	S= RoHS compliant B = Tin/Lead alloy	T = Tape and Reel W = Waffle Pack
CE-VSM	1206	Example: 249R00 = 249Ω						
CE-VSM	1506							
CE-VSM	2010							
CE-VSM	2512	1KΩ to 125KΩ	K	X 10 ³				
		Example: 10K000 = 10.0KΩ						