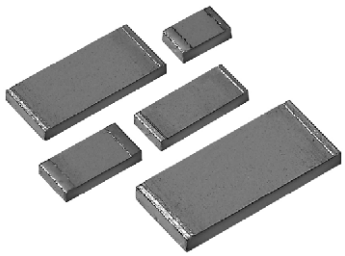
Foil Wrap Around Surface Mount Chip Resistor with TCR of ± 2 ppm/°C and Load Life Stability of ± 0.01% (100 ppm)



Top View

Any value at any tolerance within resistance range

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.

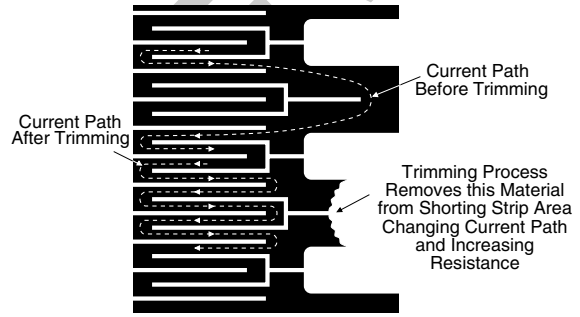
The BMF provides inherently a low and predictable Temperature Coefficient of Resistance (TCR) and excellent load life stability for high precision analog applications.

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 as 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, please contact us using the e-mail addresses in the footer below.

FIGURE 1 - TRIMMING TO VALUES (CONCEPTUAL ILLUSTRATION)



NOTE: Foil shown in black, etched spaces in white

FEATURES

Pb-free Available

RoHS* COMPLIANT

- TCR: ± 2.0 ppm/°C (see Table 1)
- Load Life Stability (70°C for 2000 hours): ± 0.01%
- Power Rating to: 400 mW at +70°C
- Resistance Range: 10Ω to 150KΩ (for higher and lower values, please contact us)
- Short time overload: ≤ ± 0.01%
- Tolerance: to ± 0.01%
- Non Inductive/Capacitive design
- Rise time: 1ns without ringing
- Current Noise: - 40dB
- Electrostatic Discharge (ESD) above 25 000 Volts
- Voltage Coefficient < 0.1 ppm/V
- Non Inductive: < 0.08µH
- Thermal EMF: < 0.05µV/°C
- Non hot spot design
- Terminal Finishes Available:
  - Lead (Pb)-Free
  - Tin/Lead Alloy
- Matched sets are available per request
- For better performances please review **VSMP** and **VFCP** Series datasheets

TABLE 1 - TOLERANCE AND TCR VS RESISTANCE VALUE**

RESISTANCE VALUE (Ω)	TOLERANCE (%)	TYPICAL TCR AND MAX. SPREAD (ppm/°C)
250 to 150K	± 0.01	± 2 ± 2
100 to < 250	± 0.02	± 2 ± 3
50 to < 100	± 0.05	± 2 ± 3
25 to < 50	± 0.1	± 2 ± 4
10 to < 25	± 0.25	± 2 ± 6

**For Tighter performances, please contact Vishay Application Engineering using the e-mail addresses in the footer below.

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

* Pb containing terminations are not RoHS compliant, exemptions may apply

SALES

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• GERMANY/CZECH REPUBLIC/AUSTRIA: foilsales.eucentral@vishay.com • FRANCE/SWITZERLAND/SOUTHERN EUROPE: foilsales.eusouth@vishay.com • ISRAEL: foilsales.israel@vishay.com

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TABLE 2 - SPECIFICATIONS

CHIP SIZE	RATED POWER (mW) at +70°C	MAX VOLTAGE RATING ($\leq \sqrt{PxR}$)	RESISTANCE RANGE (Ω)	MAXIMUM WEIGHT (mg)
0805	100	34V	10 to 12K	6
1206	150	67V	10 to 30K	11
1506	200	89V	10 to 40K	12
2010	300	173V	10 to 100K	27
2512	400	220V	10 to 150K	40

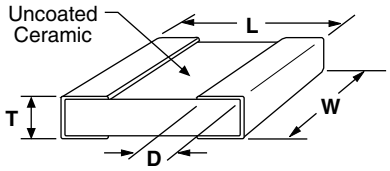
TABLE 3 - PERFORMANCES

TEST OR CONDITIONS	MIL-PRF-55342 H CHARACTERISTIC E ΔR LIMITS	TYPICAL ΔR LIMITS	MAXIMUM ΔR LIMITS**
Thermal Shock	± 0.1%	± 0.005% (50 ppm)	± 0.02% (200 ppm)
Low Temperature Operation	± 0.1%	± 0.01% (100 ppm)	± 0.02% (200 ppm)
Short Time Overload	± 0.1%	± 0.01% (100 ppm)	± 0.02% (200 ppm)
High Temperature Exposure	± 0.1%	± 0.01% (100 ppm)	± 0.03% (300 ppm)
Resistance to Soldering Heat	± 0.2%	± 0.005% (50 ppm)	± 0.01% (100 ppm)
Moisture Resistance	± 0.2%	± 0.005% (50 ppm)	± 0.03% (300 ppm)
Load Life Stability +70°C for 2000 hours at Rated Power	± 0.5%	± 0.005% (50 ppm)	± 0.01% (100 ppm)

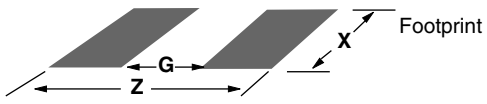
**As shown + 0.01Ω to allow for measurement errors at low values.

TABLE 4 - DIMENSIONS AND LAND PATTERN in inches (millimeters)

Bottom View for Mounting



Recommended Land Pattern



CHIP SIZE	L ± 0.005 (0.13)	W ± 0.005 (0.13)	THICKNESS MAXIMUM	D ± 0.005 (0.13)	Z*** MAXIMUM	G*** MINIMUM	X*** MAXIMUM
0805	0.080 (2.03)	0.050 (1.27)	0.025 (0.64)	0.015 (0.38)	0.122 (3.10)	0.028 (0.70)	0.050 (1.27)
1206	0.126 (3.2)	0.062 (1.57)	0.025 (0.64)	0.020 (0.50)	0.175 (4.4)	0.059 (1.5)	0.071 (1.80)
1506	0.150 (3.81)	0.062 (1.57)	0.025 (0.64)	0.020 (0.50)	0.199 (5.05)	0.083 (2.1)	0.071 (1.80)
2010	0.198 (5.03)	0.097 (2.46)	0.025 (0.64)	0.025 (0.64)	0.247 (6.27)	0.115 (2.92)	0.103 (2.63)
2512	0.249 (6.32)	0.127 (3.22)	0.025 (0.64)	0.032 (0.81)	0.291 (7.40)	0.150 (3.8)	0.127 (3.22)

***Land Pattern Dimensions are per IPC-782

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FIGURE 1 - POWER DERATING CURVE

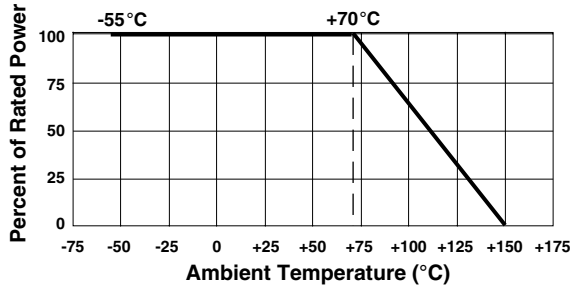
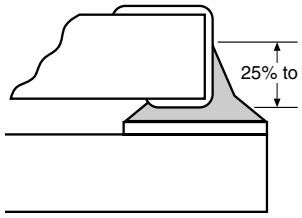
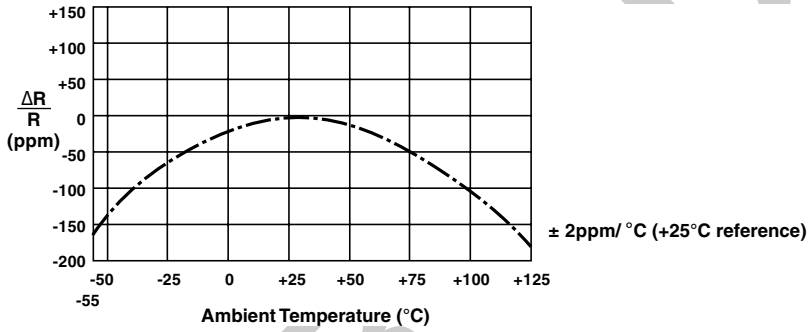


FIGURE 2 - RECOMMENDED MOUNTING



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.

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



Note: The TCR values for < 100Ω are influenced by the termination composition and result in deviation from this curve

TABLE 5 - ORDERING INFORMATION

MODEL	CHIP SIZE	RESISTANCE VALUE			TCR	TOLERANCE	TERMINATION	PACKAGING
VSM	0805	RESISTANCE RANGE	LETTER DESIGNATOR	MULTIPLIER FACTOR	TCR2	T = 0.01%	S = Lead (Pb)-free	T = Tape and Reel
	1206					Q = 0.02%	B = Tin/Lead	W = Waffle Pack
	1506	10Ω to < 1KΩ	R	X 1.0		A = 0.05%		
	2010	Example: 249R00 = 249Ω				B = 0.1%		
	2512	1KΩ to 150KΩ	K	X 10^3		C = 0.25%		
		Example: 10K000 = 10.0KΩ				D = 0.5%		
						F = 1.0%		

Example:
VSM0805 10K000 TCR2 TSW
Model: VSM0805
Value: 10KΩ
TCR2: 2 ppm/°C typical refers to any value in the resistance range (see table 1)
Tolerance: ± 0.01%
Termination: Lead (Pb)-free
Packaging: Waffle Pack

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