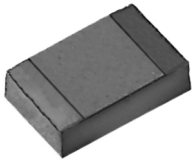
Ultra High Precision Foil Wraparound Surface Mount Chip Resistor with Temperature Coefficient of Resistance of ± 0.05 ppm/°C, Load Life Stability to ± 0.005 % (50 ppm) and ESD Immunity up to 25 kV



Top View

Vishay Foil resistors are not restricted to standard values, we can supply specific "as required" values at no extra cost or delivery (e.g. 1K234 vs. 1K).

INTRODUCTION

VSMP series is the industry's first device to provide high rated power, excellent load life stability along with extremely low TCR all in one resistor.

One of the most important parameters influencing stability is the temperature coefficient of resistance (TCR). Although the TCR of foil resistors is considered extremely low, this characteristic has been further refined over the years. The VSMP series utilizes ultra high precision Bulk Metal® Z-foil. The Z-foil technology provides a significant reduction of the resistive element's sensitivity to ambient temperature variations (TCR) and to self heating when power is applied (power coefficient). Along with the inherently low PCR and TCR, Z-foil technology also provides remarkably improved load life stability, low noise and availability of tight tolerance.

The VSMP0603 has a full wraparound termination which ensures 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 address in the footer below.

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

RESISTANCE VALUE (Ω)	TOLERANCE (%)	TYPICAL TCR AND MAX. SPREAD (ppm/°C)
250 to 5K	± 0.01	± 0.2 ± 1.8
100 to < 250	± 0.02	± 0.2 ± 1.8

Note

(1) For tighter performances, please contact Vishay application engineering using the e-mail address in the footer below.

FEATURES

Pb-free Available

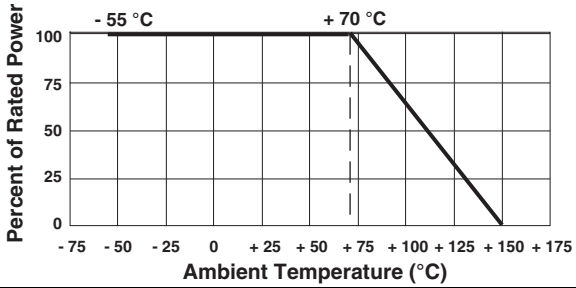
RoHS* COMPLIANT

- Temperature coefficient of resistance (TCR): 0.05 ppm/°C typical (0 °C to + 60 °C) 0.2 ppm/°C typical (- 55 °C to + 125 °C, + 25 °C ref.)
- Tolerance: to ± 0.01 %
- Power coefficient "ΔR due to self heating": 5 ppm at rated power
- Power rating: to 100 mW at + 70 °C
- Load life stability: to ± 0.005 % at 70 °C, 2000 h at rated power
- Resistance range: 100 Ω to 5 kΩ
- Electrostatic discharge (ESD) up to 25 000 V
- Short time overload: ≤ 0.005 %
- Non inductive, non capacitive design
- Rise time: 1 ns effectively no ringing
- **Special design which reduces circuit signal distortion**
- Current noise: - 40 dB
- Voltage coefficient < 0.1 ppm/V
- Non inductive: < 0.08 µH
- Non hot spot design
- Terminal finishes available: lead (Pb)-free, tin/lead alloy
- Matched sets are available on request
- Prototype samples available from 72 h. For more information, please contact foil@vishaypg.com
- For better performances please contact us

APPLICATIONS

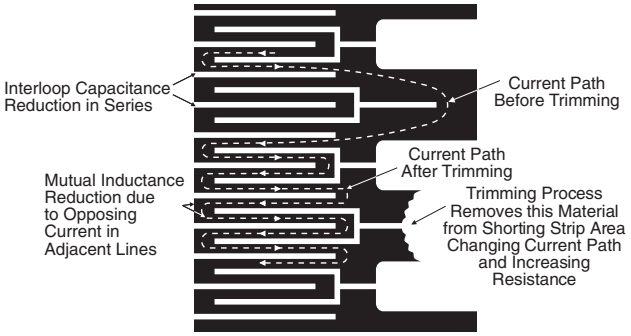
- Automatic test equipment (ATE)
- High precision instrumentation
- Laboratory, industrial and medical
- Audio
- EB applications (electron beam scanning and recording equipment, electron microscopes)
- Down hole instrumentation
- Communication

FIGURE 1 - POWER DERATING CURVE



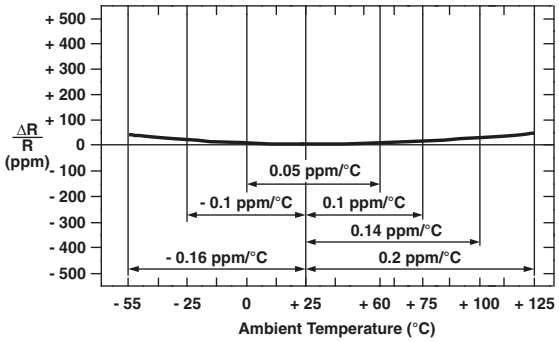
* Pb containing terminations are not RoHS compliant, exemptions may apply

FIGURE 2 - TRIMMING TO VALUES
(Conceptual Illustration)



Note: Foil shown in black, etched spaces in white

FIGURE 3 - TYPICAL TCR CURVE Z-FOIL

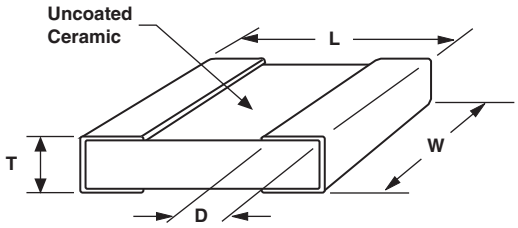


Note

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

TABLE 2 - DIMENSIONS AND LAND PATTERN in Inches (Millimeters)

Bottom View for Mounting



CHIP SIZE	L ± 0.005 (0.13)	W ± 0.005 (0.13)	THICKNESS MAXIMUM	D ± 0.005 (0.13)
0603	0.063 (1.60)	0.032 (0.81)	0.025 (0.64)	0.011 (0.28)

Note

- Land pattern dimensions are per IPC-782.

TABLE 3 - PERFORMANCES

TEST OR CONDITIONS PER MIL-PRF-55342	MIL-PRF-55342 CHARACTERISTIC E ΔR LIMITS	TYPICAL ΔR LIMITS	MAXIMUM ΔR LIMITS
Thermal shock: 100 x (- 65 °C to + 150 °C)	± 0.2 %	± 0.005 % (50 ppm)	± 0.01 % (100 ppm)
Low temperature operation: - 65 °C, 45 min, rated power	± 0.1 %	± 0.005 % (50 ppm)	± 0.01 % (100 ppm)
Short time overload: 6.25 x rated power, 5 s	± 0.1 %	± 0.005 % (50 ppm)	± 0.01 % (100 ppm)
High temperature exposure: 100 h, 150 °C	± 0.1 %	± 0.01 % (100 ppm)	± 0.03 % (300 ppm)
Resistance to soldering heat	± 0.2 %	± 0.005 % (50 ppm)	± 0.02 % (200 ppm)
Moisture resistance	± 0.2 %	± 0.03 % (300 ppm)	± 0.1 % (1000 ppm)
Load life stability + 70 °C for 2000 h at rated power	± 0.5 %	± 0.005 % (50 ppm)	± 0.01 % (100 ppm)

Note

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

FIGURE 4 - VSMP0603 100 CYCLE THERMAL SHOCK - 65 °C TO 150 °C, 10 UNITS EACH VALUE

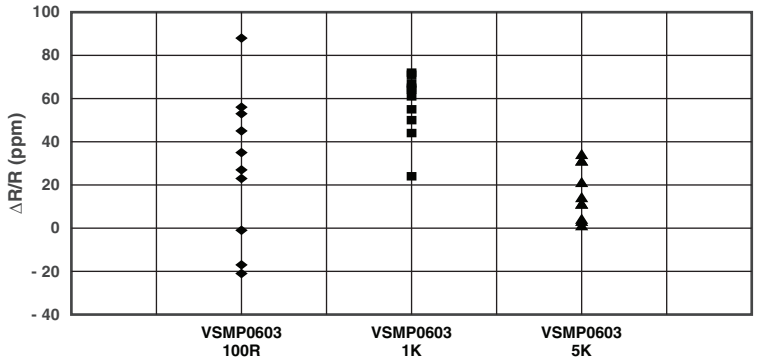


FIGURE 5 - LOAD LIFE STABILITY 2000 h AT + 70 °C, 0.1 W, 20 UNITS EACH VALUE

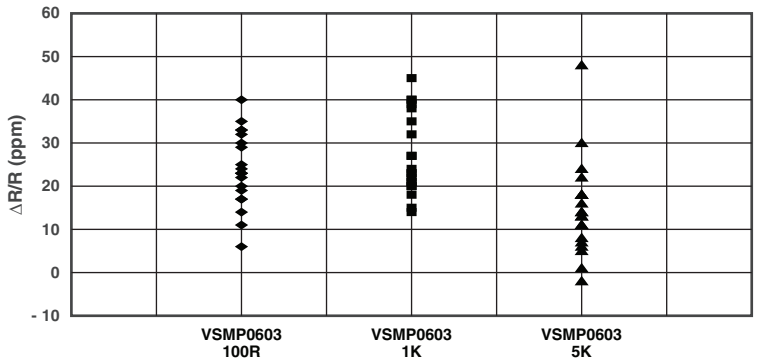
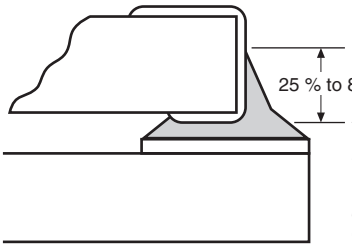


FIGURE 6 - RECOMMENDED MOUNTING



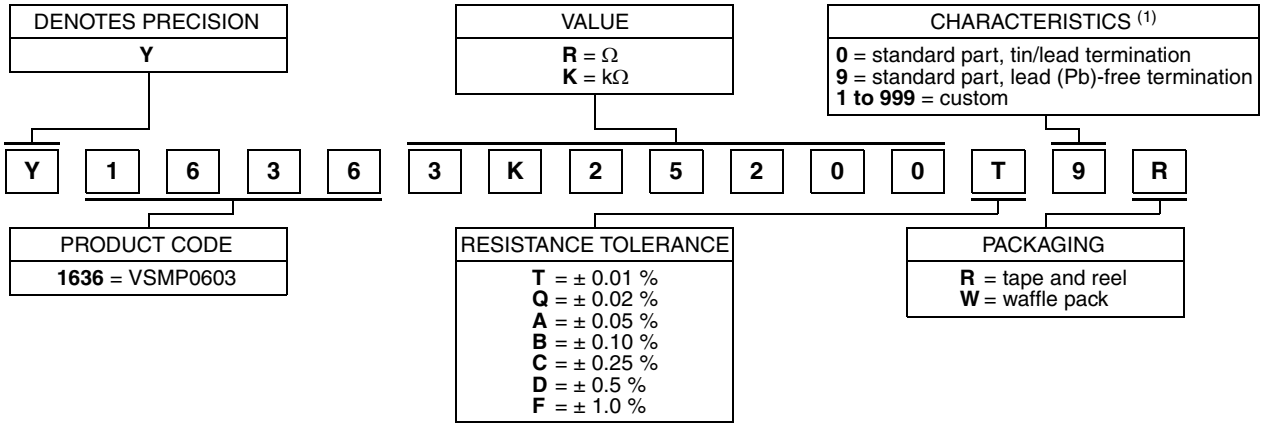
A low profile solder fillet is recommended to avoid unnecessary stresses along top edge of metallization. IR and vapor phase reflow are best. Avoid the use of cleaning agents which could attack epoxy resins, which form part of the resistor construction.

Notes

(1) Avoid the use of cleaning agents which could attack epoxy resins, which form part of the resistor construction
(2) Vacuum pick up is recommended for handling
(3) Soldering iron may damage the resistor

TABLE 4 - GLOBAL PART NUMBER INFORMATION

NEW GLOBAL PART NUMBER: Y16363K25200T9R (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1636 3K25200 T 9 R:

TYPE: VSMP0603
VALUES: 3.252 kΩ
ABSOLUTE TOLERANCE: 0.01 %
TERMINATION: lead (Pb)-free
PACKAGING: tape and reel

Note

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

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