

High Precision Bulk Metal® Foil Molded Surface Mount Resistor with TCR down to $\pm 2 \text{ ppm/}^{\circ}\text{C}$, Flexible Terminations, and Load Life Stability of $\pm 0.005 \%$ (50 ppm)





Any value at any tolerance available within resistance range

INTRODUCTION

The SMRxD is a precision molded surface mountable resistor offering all the elements of precision; including low TCR, tight tolerance, long term stability, low noise, low thermal EMF, and non-measurable voltage coefficient. It utilizes the Bulk Metal® Foil technology for the resistive element with its inherent low and predictable TCR and long term stability. This surface mountable product affords similar performance to the time tested S series molded through-hole product.

The flexible terminations of this product also reduce stress transference from the PCB to the resistor.

Voltage division with tight tracking < 3 ppm/°C can be achieved with 2 randomly selected units even with a large ratio between the two values.

Our Application Engineering Department is available to advise and make recommendations. For non-standard technical requirements and special applications, please contact us.

TABLE 1 - THE SMR*D SERIES IS LISTED IN THE FOLLOWING DSCC SPECIFICATIONS						
MODEL	DSCC	MIL SPEC				
SMR1D	06020	MIL-PRF-55182				
SMR3D	06021	MIL-PRF-55182				

TABLE 2 - TOLERANCE AND TCR VERSUS RESISTANCE VALUE (- 55 °C to + 125 °C, + 25 °C ref.)						
VALUE	STANDARD TOLERANCE ¹⁾	TYPICAL TCR AND MAX. SPREAD ¹⁾ (ppm/°C)				
50 Ω to 80 k Ω	± 0.01 %	±2±3				
20 Ω to < 50 Ω	± 0.02 %	± 2 ± 4				
10 Ω to < 20 Ω	± 0.05 %	±2±6				
5 Ω to < 10 Ω	± 0.1 %	± 2 ± 8				

Note

FEATURES

 Temperature coefficient of resistance (TCR): ± 2 ppm°C typical (- 55 °C to + 125 °C, + 25 °C ref.)



Tolerance: to ± 0.01 %

- Flexible terminations ensure minimal stress transference from the PCB due to a difference in thermal coefficient of expansions (TCE)
- Electrostatic discharge (ESD) above 25 000 V
- Load life stability: ± 0.005 % (70 °C, 2000 h at rated power)
- Resistance range: 5 Ω to 80 k Ω (for higher and lower values, please contact us)
- Power rating: to 600 mW at 70 °C
- Non inductive, non capacitive design
- 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 with TCR tracking are available upon request
- Any value available within resistance range (e.g. 1K234)
- Prototype samples available from 48 h. For more information, please contact foil@vishaypg.com
- For better performances please review SMRxDZ datasheet

APPLICATIONS

- · Military, airborne and space
- · Precision amplifiers
- High precision instrumentation
- Medical
- Automatic test equipment (ATE)
- Industrial
- · Audio (high end stereo equipment)
- EB application
- Pulse application
- Measurement instrumentation

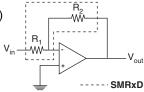


FIGURE 1 - POWER DERATING CURVE							
200	- 55 °C + 70 °C						
⊚ 175							
Percent of Rated Power (%) 22 52 52 52 52 52 52 52 52 52 52 52 52							
<u>a</u> 125	 						
100							
5 75							
ent 50							
Der 25							
0							
Ambient Temperature (°C)							

^{1.} Tighter performances are available

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

Vishay Foil Resistors

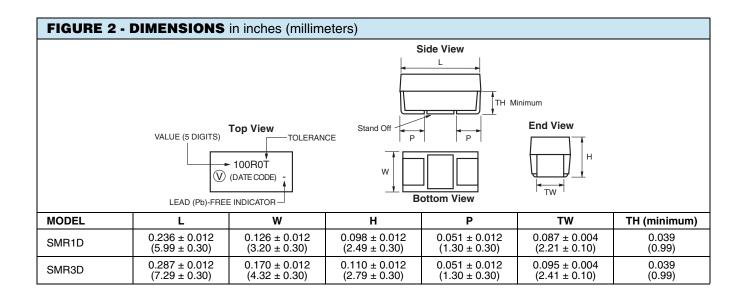


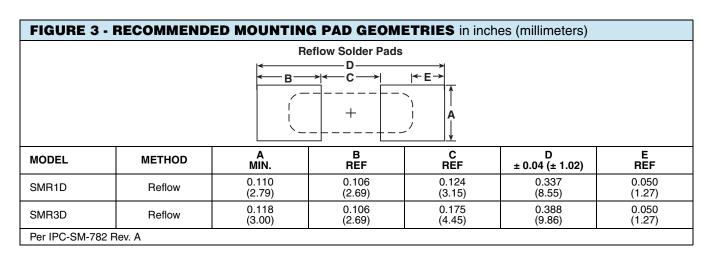
TABLE 3 - PERFORMANCE SPECIFICATIONS									
TEST		MAXIMUM LIMIT ¹⁾							
	SMF	R1D	SMR3D		SMR1D	SMR3D			
Resistance Range					5Ω to $33 k\Omega$	5 Ω to 80 kΩ			
Rated Power		10 k Ω to 33 k Ω 0.160 W at 70 °C 0.08 W at 125 °C	5 Ω to 30 kΩ 0.6 W at 70 °C 0.3 W at 125 °C	30 kΩ to 80 kΩ 0.4 W at 70 °C 0.2 W at 125 °C	°C see figure 1				
Maximum Working Voltage					73 V	180 V			
Maximum Operating Temperature									
Working Temperature Range									
Thermal Shock	- 65 °C to + 150 °C; 30 min; 5 cycles			± 0.01 % (100 ppm)					
Short Time Overload	6.25 x rated power; 5 s			± 0.01 % (100 ppm)					
Low Temperature Storage	24 h at - 65 °C			± 0.01 % (100 ppm)					
Low Temperature Operation	45 min, rated power at - 65 °C				± 0.01 % (100 ppm)				
Dielectric Withstanding Voltage	atmospheric pressure; AC 200 V; 1 min				± 0.01 % (100 ppm)				
Insulation Resistance (M Ω)	DC 100 V; 1 min			over 10 000					
Resistance to Soldering Heat (%)	260 °C; 10 s			± 0.02 %, ± 0.01 % typical					
Moisture Resistance	+ 65 °C to - 10 °C; 90 % to 98 % RH; rated power; 240 h			± 0.02 % (200 ppm)					
Shock	100 G; sawtooth			± 0.01 % (100 ppm)					
Vibration, High Frequency	10 ~ 2000 ~ 10 Hz; 20 G; Y, Z each 4 h			± 0.01 % (100 ppm)					
Load Life Stability (2000 h)	0.04 W a 0.25 W a 0.125 W a	t + 70 °C	0.6 W a	ut + 70 °C ut + 70 °C ut + 125 °C	Typical 0.005 % 0.02 % 0.02 %	Typical 0.005 % 0.015 % 0.015 %			
High Temperature Exposure	175 °C; no load 2000 h			± 0.05 % (500 ppm)					
Weight					0.1143 g	0.244 g			
Packaging	bulk (loose) or tape and reel, per EIA-481-1								

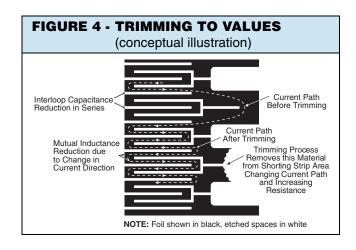
Note

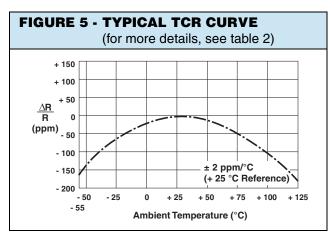
1. As shown + 0.01 Ω to allow for measurement error at low values







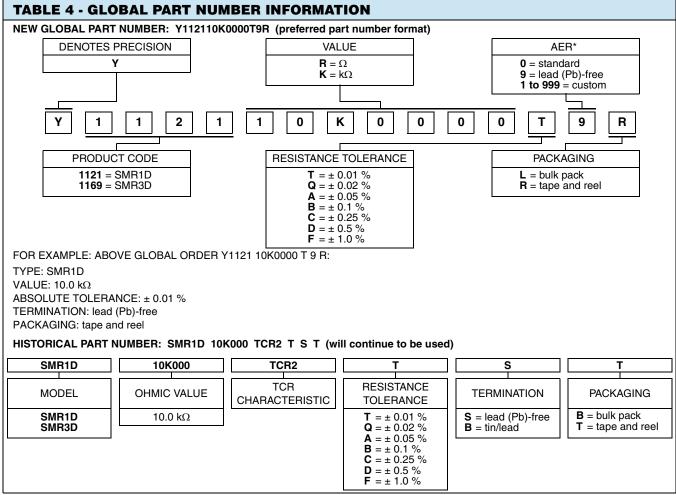




Note: The TCR values for < 80 Ω are influenced by the termination composition and the result in deviation from this curve

Vishay Foil Resistors





Note

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^{*} For non-standard requests, please contact application engineering.



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KHC201E225M76N0T00 LRC-LRF1206LF-01R025FTR1K 1812J1K00222JCT 1812J2K00102KXT 1812J2K00222KXT

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CGA3E1X7R1C474K