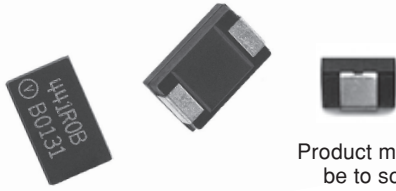


Bulk Metal[®] Foil Technology Precision Molded Surface Mount Resistor



Product may not be to scale

The SMR3D is a truly precision molded surface mountable resistor offering all the elements of precision; including lowest TCR, tight tolerances, 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 and legendary low predictable TCR* and long term stability. This surface mountable product affords similar performance to the time tested S102 molded through-hole product.

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

The molded SMR3D, while slightly larger and heavier than the Bulk Metal[®] Foil VSM surface mountable chip resistor, has a rugged construction capable of withstanding significant thermal cycling and allows for board installation without concern for tolerance shifts due to manufacturing processes or mechanical stresses.

*Reference Reason 1 in "7 Technical Reasons to specify BULK METAL[®] FOIL Resistors."

FEATURES

- Performance Similar to Time Tested S102 Through Hole Resistor
- 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)
- Value Range: 5Ω to 80KΩ
- Tight Tolerances: available to ± 0.01 percent
- Power: 0.6 watts @ + 70°C
- Excellent Long Term Stability: ± 0.015%
- Low Thermal EMF: 0.1μV/°C maximum
- Low Noise, High Frequency Operation
- Matched Sets Available

TABLE 1 - TOLERANCE VERSUS RESISTANCE VALUE

VALUE (Ω)	STANDARD TOLERANCE (%)
100Ω to 80kΩ	± 0.01
20Ω to < 100Ω	± 0.02
10Ω to 20Ω	± 0.05
5Ω to 10Ω	± 0.10

FIGURE 1 - NOMINAL TCR

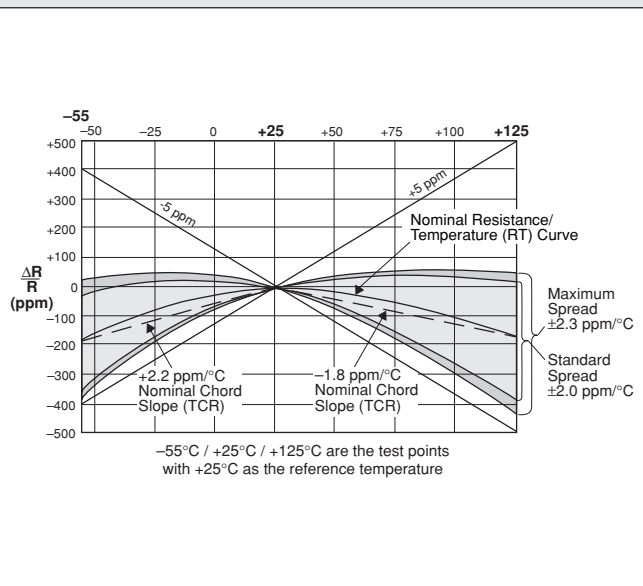


FIGURE 2 - POWER DERATING CURVE

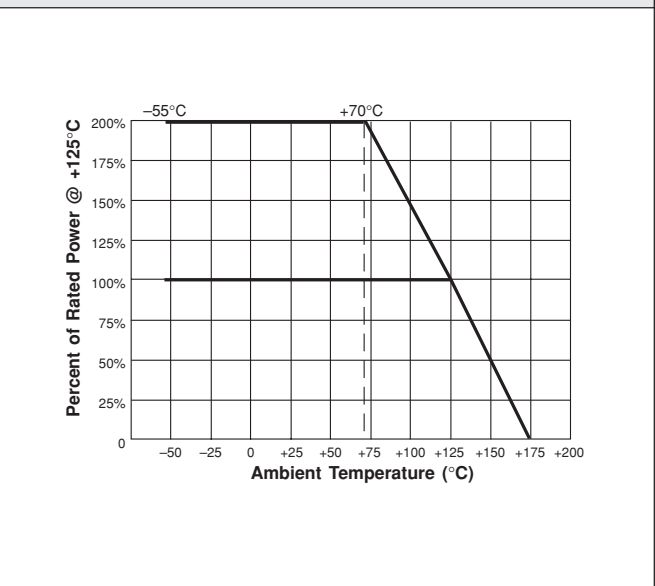


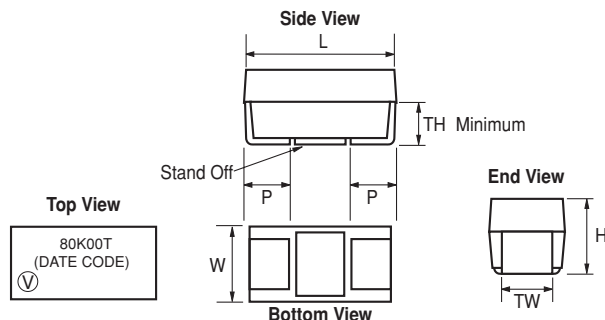


TABLE 2 - MODEL SMR3D SPECIFICATIONS

TEST	CONDITIONS	MAXIMUM LIMIT
Resistance Range		5Ω to 80KΩ
TCR	0°C to + 25°C + 25°C to + 60°C – 55 to + 25°C + 25°C to + 125°C	See Figure 1
Rated Power	5Ω to 30K above 30K 0.6 watts @ 70°C 0.4 watts 0.3 watts @ 125°C 0.2 watts	See Figure 2, Previous page
Maximum Working Voltage		300 Volts
Maximum Operating Temperature	+ 125°C	
Working Temperature Range	– 65 to + 125°C	
Thermal Shock	– 65°C to + 175°C; 30 minutes; 5 cycles	± 0.01%
Overload	2.5 x Rated Voltage; 5 Seconds	± 0.01%
Low Temperature Operation	– 65°C; 45 minutes @ Rated Power	± 0.01%
Dielectric Withstanding Voltage	Atmospheric Pressure; AC 200 V; 1 minute	± 0.01%
Insulation Resistance (MΩ)	DC 100 V; 1 minute	over 10,000
Resistance to Soldering Heat (%)	+ 260°C; 10 seconds	± 0.03%, ± 0.01% Typical
Moisture Resistance	+ 65°C to – 10°C; 90 to 98% RH; Rated Power; 240 hours	± 0.05%
Shock	100 G; Sawtooth	± 0.01%
Vibration, High Frequency	10~ 2,000~ 10 Hz; 20 G; X, Y, Z each 2.5 hours	± 0.01%
Load Life Stability	0.3 watts @ + 125°C 2,000 hours	± 0.015%
Order of Magnitude better than Thin Film Technology	0.6 watts @ + 70°C 2,000 hours	± 0.015%
	0.1 watts @ + 70°C 2,000 hours	± 0.005%
High Temperature Exposure	+ 175°C; No Load 2,000 hours	± 0.05%
Shelf Life	15 to 35°C; 15 to 75% RH; No Load; 10,000 hours	± 0.0025% (1 year) ± 0.005% (3 years)
Weight		0.244 Grams
Packaging	Bulk (Loose) or Tape & Reel, per EIA-481-1	

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FIGURE 3 - MODEL SMR3D DIMENSIONS in inches (millimeters)



MODEL	L	W	H	P	TW	TH (MINIMUM)
SMR3D	0.287 ± 0.012 (7.3 ± 0.30)	0.170 ± 0.012 (4.3 ± 0.30)	0.110 ± 0.012 (2.8 ± 0.30)	0.051 ± 0.012 (1.3 ± 0.30)	0.095 ± 0.004 (2.4 ± 0.10)	0.039 (1.0)

FIGURE 4 - RECOMMENDED MOUNTING PAD GEOMETRIES in inches (millimeters)



METHOD	A	B	C	D	E	METHOD	A	B	C	D	E
	MINIMUM	REF	REF	± 0.04 (± 1.0)	REF		MINIMUM	REF	REF	± 0.04 (± 1.0)	REF
Wave	0.066 (1.68)	0.106 (2.70)	0.175 (4.45)	0.388 (9.85)	0.050 (1.28)	Reflow	0.118 (3.00)	0.106 (2.70)	0.175 (4.45)	0.388 (9.85)	0.050 (1.28)

Per IPC-SM-782 Rev A

TABLE 3 - ORDERING INFORMATION

MODEL	RESISTANCE RANGE	RESISTANCE VALUE		TOLERANCE
		LETTER DESIGNATOR	MULTIPLIER FACTOR	
SMR3D	5Ω to < 1KΩ Example: 249R00 - 249Ω	R	x 1.0	T = ± 0.01% Q = ± 0.02% A = ± 0.05% B = ± 0.1% C = ± 0.25% D = ± 0.5% F = ± 1.0%
	1K to 80KΩ Example: 80K000 = 80KΩ	K	x 10 ³	