

## Bulk Metal<sup>®</sup> Foil Technology Surface Mount Precision Resistor



Product may not be to scale

The SMRC3D is a truly precision molded surface mountable resistor. It utilizes the Bulk Metal<sup>®</sup> Foil technology for the resistive element with its inherent low TCR and long term stability. This surface mountable product affords similar performance to the time tested VSR molded through hole product.

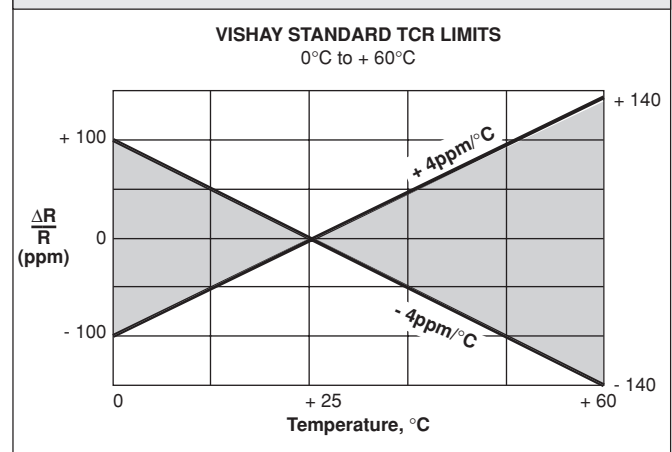
Voltage division with tight tracking  $< 5\text{ppm}/^\circ\text{C}$  can be achieved with 2 randomly selected units even with a large ratio between the two values.

The molded SMRC3D, while slightly larger and heavier than the Bulk Metal<sup>®</sup> 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.

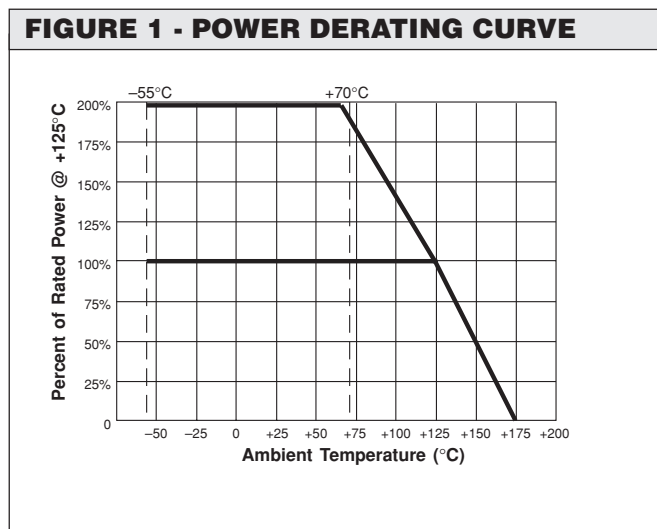
### FEATURES

- Similar Performance to the Time Tested S102 Through Hole Resistor
- Temperature Coefficient of Resistance:  $\pm 4\text{ppm}/^\circ\text{C}$  ( $0^\circ\text{C}$  to  $+60^\circ\text{C}$ )  
 $\pm 8\text{ppm}/^\circ\text{C}$  ( $-55^\circ\text{C}$  to  $+125^\circ\text{C}$ )
- Value Range  $5\Omega$  to  $80\text{K}\Omega$
- Tight Tolerances available to  $\pm 0.01$  percent
- Power 0.6 watts @  $+70^\circ\text{C}$
- Excellent Long Term Stability:  $\pm 0.02\%$
- Low Thermal EMF:  $0.1\mu\text{V}/^\circ\text{C}$  maximum
- Low Noise, High Frequency Operation

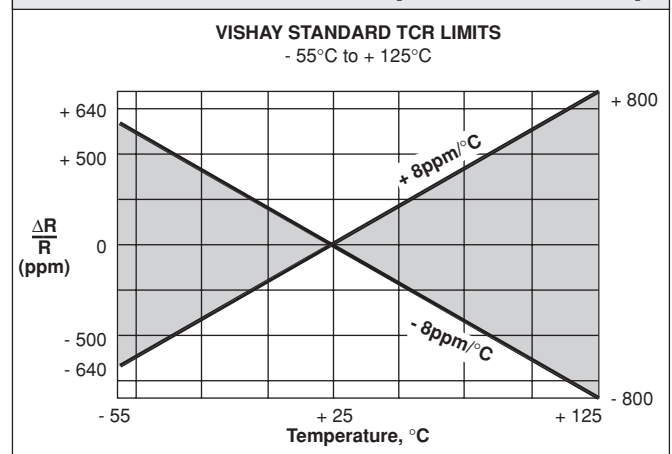
**FIGURE 2 - TEMPERATURE COEFFICIENT OF RESISTANCE CURVE**



**FIGURE 1 - POWER DERATING CURVE**



**FIGURE 3 - TEMPERATURE COEFFICIENT OF RESISTANCE CURVE (55°C TO +125°C)**

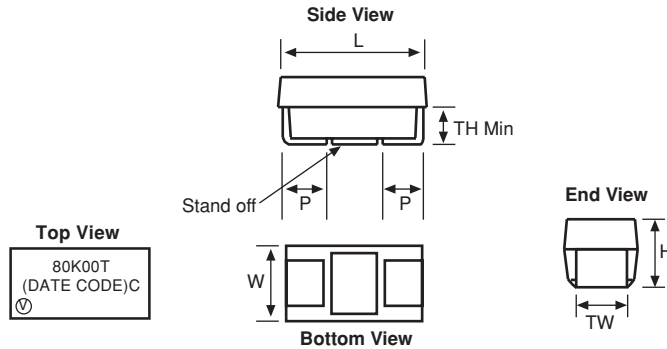



**TABLE 1 - MODEL SMRC3D SPECIFICATIONS**

TEST	CONDITIONS	MAXIMUM LIMIT
Resistance Range		5Ω to 80KΩ
Resistance Tolerance	100Ω to 80KΩ 20Ω to < 100Ω 10Ω to < 20Ω 5Ω to < 10Ω	0.01% 0.02% 0.05% 0.10%
TCR	0°C to + 25°C + 25°C to + 60°C - 55° to + 25°C + 25°C to + 125°C	See Figures 2 and 3
Rated Power	100Ω to 30K                      above 30K 0.6 watts @ + 70°C            0.4 watts 0.3 watts @ + 125°C           0.2 watts	See Figure 1
Maximum Working Voltage		300 Volts
Maximum Operating Temperature	+ 125°C	
Working Temperature Range	- 65°C 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 200V; 1 minute	± 0.01%
Insulation Resistance (MΩ)	DC 100V; 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 ~ 10Hz; 20 G; X, Y, Z each 2.5 hours	± 0.01%
Load Life Stability Order of Magnitude better than Thin Film Technology	0.3 watts @ + 125°C            2,000 hours 0.6 watts @ + 70°C             2,000 hours 0.1 watts @ + 70°C             2,000 hours	± 0.02% ± 0.02% ± 0.005%
High Temperature Exposure	+ 175°C; No Load 2,000 hours	± 0.05%
Shelf Life	15°C 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	



**FIGURE 4 - MODEL SMRC3D DIMENSIONS** in inches (millimeters)



MODEL	L	W	H
SMRC3D	0.287 ±0.012 (7.3 ±0.30)	0.170 ±0.012 (4.3 ±0.30)	0.110 ±0.012 (2.8 ±0.30)
MODEL	P	TW	TH (Minimum)
SMRC3D	0.051 ±0.012 (1.3 ±0.30)	0.095 ±0.004 (2.4 ±0.10)	0.039 (1.0)

**FIGURE 5 - RECOMMENDED MOUNTING PAD GEOMETRIES** in inches (millimeters)



METHOD	A MINIMUM	B REFERENCE	C REFERENCE	D ± 0.04 (± 1.0)	E REFERENCE
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

**TABLE 2 - ORDERING INFORMATION**

MODEL	RESISTANCE RANGE	RESISTANCE VALUE		TOLERANCE
		LETTER DESIGNATOR	MULTIPLIER FACTOR	
SMRC3D	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 <sup>3</sup>	

Delivery: Stock to 8 weeks.

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