



## Wirewound Resistors, Precision Power, Surface Mount



### FEATURES

- All welded construction
- Molded encapsulation
- Wraparound terminations
- Excellent stability at different environmental conditions
- High power ratings (up to 4 W)
- Available in non-inductive styles ("NI" SPECIAL) with Ayrton-Perry winding (Resistance max. value is one half standard value)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	HISTORICAL MODEL	POWER RATING $P_{70^{\circ}\text{C}}$ W	RESISTANCE RANGE $\Omega$	TOLERANCE $\pm \%$	WEIGHT (TYPICAL) g/1000 PIECES
SM-1	SM1	0.5	0.1 to 400	0.1, 0.25, 0.5, 1, 5	45
SM-2	SM2	1	0.1 to 3K	0.1, 0.25, 0.5, 1, 5	230
SM-3	SM3	3	0.1 to 25K	0.1, 0.25, 0.5, 1, 5	1360
SM-4	SM4	2	0.1 to 15K	0.1, 0.25, 0.5, 1, 5	680
SM-5	SM5	4	0.1 to 50K	0.1, 0.25, 0.5, 1, 5	2040

### TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	SM RESISTOR CHARACTERISTICS
Temperature Coefficient	ppm/ $^{\circ}\text{C}$	$\pm 20 > 10 \Omega$ , $\pm 50 1 \Omega$ to $10 \Omega$ , contact factory for $0.99 \Omega$ and below
Dielectric Withstanding Voltage	$V_{AC}$	1000
Operating Temperature Range	$^{\circ}\text{C}$	-55 to +275
Maximum Working Voltage	V	$(P \times R)^{1/2}$

### GLOBAL PART NUMBER INFORMATION

Global Part Numbering Example: SM-2R4000FE6 (visit [www.vishay.net](http://www.vishay.net) SAP parts manual for all options)

S M - 2 R 4 0 0 0 F E 6

GLOBAL MODEL (4 digits)
SM-1
SM-2
SM-3
SM-4
SM-5

VALUE (5 digits)
R = decimal
K = thousand
1R500 = 1.5 $\Omega$
4K000 = 4 k $\Omega$

TOLERANCE (1 digit)
B = $\pm 0.1 \%$
C = $\pm 0.25 \%$
D = $\pm 0.5 \%$
F = $\pm 1 \%$
J = $\pm 5 \%$

PACKAGING CODE (2 digits)
E6 = lead (Pb)-free, 7" tape and reel pack
E7 = lead (Pb)-free, 13" tape and reel pack

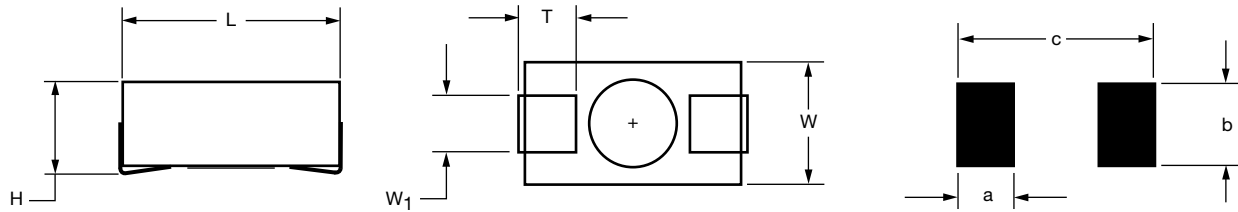
SPECIAL (up to 3 digits)
(Dash Number) From 1 to 999 as applicable
NI = Non-inductive

Historical Part Number example: SM2-0.4-1%

SM2
HISTORICAL MODEL

0.4 $\Omega$
RESISTANCE VALUE

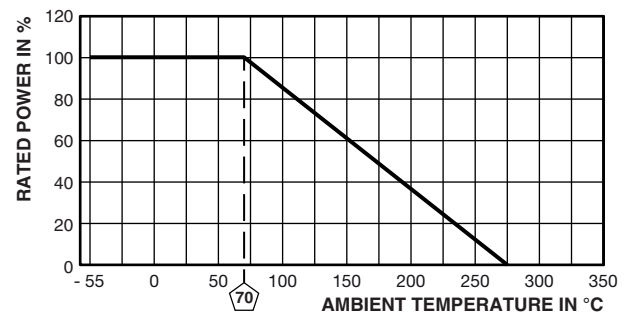
1 %
TOLERANCE

**DIMENSIONS** in inches [millimeters]

GLOBAL MODEL	DIMENSIONS in inches [millimeters]					SOLDER PAD DIMENSIONS		
	$L \pm 0.015$ [0.381]	$W \pm 0.015$ [0.381]	$H \pm 0.015$ [0.381]	$W1 \pm 0.015$ [0.381]	$T \pm 0.015$ [0.381]	$a \pm 0.015$ [0.381]	$b \pm 0.015$ [0.381]	$c \pm 0.015$ [0.381]
SM-1	0.190 [4.83]	0.130 [3.30]	0.110 [2.79]	0.060 [1.52]	0.040 [1.02]	0.062 [1.57]	0.100 [2.54]	0.250 [6.35]
SM-2	0.260 [6.60]	0.155 [3.94]	0.125 [3.18]	0.070 [1.78]	0.070 [1.78]	0.096 [2.44]	0.112 [2.84]	0.337 [8.56]
SM-3	0.625 [15.88]	0.270 [6.86]	0.250 [6.35]	0.120 [3.05]	0.135 [3.43]	0.200 [5.08]	0.150 [3.81]	0.700 [17.78]
SM-4	0.450 [11.43]	0.250 [6.35]	0.180 [4.57]	0.120 [3.05]	0.100 [2.54]	0.155 [3.94]	0.230 [5.84]	0.540 [13.72]
SM-5	0.820 [20.83]	0.295 [7.49]	0.305 [7.75]	0.150 [3.81]	0.190 [4.83]	0.220 [5.59]	0.250 [6.35]	0.900 [22.86]

**MATERIAL SPECIFICATIONS****Element:** copper-nickel alloy**Encapsulation:** molded epoxy**Core:** ceramic**Terminal:** matte tin**Part Marking:** HEI, model, value, tolerance, date code**Note**

- Due to resistor size limitations some resistors will have minimal information marked on parts

**DERATING**

PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal Shock	-55 °C to +150 °C, 1000 cycles, 15 min at each extreme	$\pm 0.5 \% + 0.05 \Omega$
Short Time Overload	5x rated power for 5 s	$\pm 0.5 \% + 0.05 \Omega$
Low Temperature Storage	-55 °C for 24 h	$\pm 0.5 \% + 0.05 \Omega$
Load Life	1000 h at rated power, +70 °C, 1.5 h "ON", 0.5 h "OFF"	$\pm 1.0 \% + 0.05 \Omega$
Resistance to Solder Heat	MIL-STD 202; 260 °C, 10 s	$\pm 0.5 \% + 0.05 \Omega$
Moisture Resistance	Per MIL-STD 202	$\pm 1.0 \% + 0.05 \Omega$

PACKAGING				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES/REEL	PACKAGE CODE
SM-1	12 mm/embossed plastic	178 mm/7"	650	E6
		330 mm/13"	3000	E7
SM-2	16 mm/embossed plastic	178 mm/7"	600	E6
		330 mm/13"	2000	E7
SM-3	24 mm/embossed plastic	178 mm/7"	125	E6
		330 mm/13"	500	E7
SM-4	24 mm/embossed plastic	178 mm/7"	250	E6
		330 mm/13"	1000	E7
SM-5	32 mm/embossed plastic	178 mm/7"	180	E6
		330 mm/13"	500	E7



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