

Special Request

SWM200N - Anti-Surge Wire Wound MELF Resistors

Specifications per

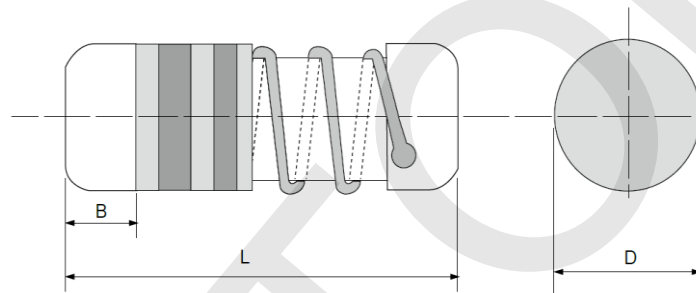
- IEC 60115-1, 60115-4

Applications

- High rush current protection for power capacitor
- Motor start-up protection, car & motorcycle engine ignition, etc. to absorb harmful surge, so to prevent hazard of circuit damage caused by surge

Feature

- AEC-Q200 compliant
- SMD enabled structure
- Excellent in heat dissipation than chip resistor
- Stronger mechanical structure to vibration and thermal shock
- Flameproof multi-layer coating is equivalent to UL 94 V-0
- Enhanced welded spot is reliable against surge
- RoHS/ REACH compliant



[*Patents approval]

Taiwan patent number: I637420

China patent number: ZL201780088781. 6

Japan patent number: 6836669

United States patent number: US10170266B2

India patent number: 528474

■ DIMENSIONS

Type	Body Length (L , mm)	Body Diameter (D , mm)	Soldering Spot (B , mm)
SWM200N	10.5 ± 0.5	4.0 ± 0.5	1.6 Min.

■ GENERAL SPECIFICATIONS

Type	Power Rating (at 70°C)	Maximum Working Voltage*	Maximum Overload Voltage**	Resistance	Resistance Tolerance	Standard Resistance Values
SWM200N	2W	\sqrt{PxR}	$2.5x\sqrt{PxR}$	1K Ω	±5%	E-24

For a better life cycle under normal usage, 50% of the rated power is recommended.

* Rated Continuous Maximum Working Voltage (RCWV) should be determined from

$$RCWV = \sqrt{Power\ Rating \times Resistance\ Values}$$

** Short-time Overload (STOL) test should be determined from $STOL=2.5 \times RCWV$

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■ PART NUMBER

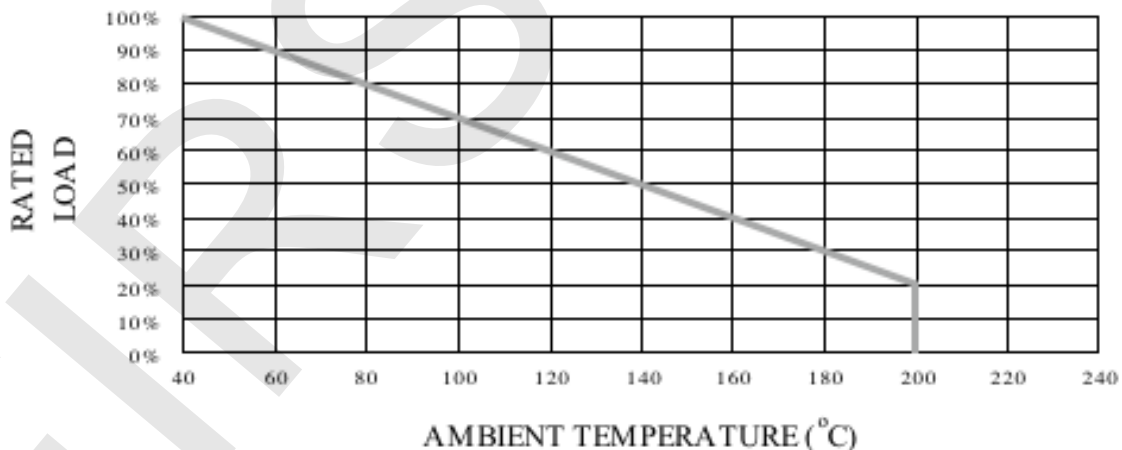
Example : SWM200NJ1K00TKZTR2K0

SWM200N	J	1K00	TKZ	TR2K0
Type	Tolerance	Resistance	TCR	Packaging
	J (5%)	1K Ω 4-character code containing - 3 significant digits 1 letter multiplier <u>MULTIPLIER</u> R = 1 K = 10 ³ M = 10 ⁶ G = 10 ⁹	3-character code TKZ = Default Product Temperature Coefficient.	5-character code TR = Tape Reel (pieces per reel) 2K0 = 2,000

■ TECHNICAL SUMMARY

Characteristics	Limits
Temperature Coefficient, PPM / °C	±100, ±200
Operating Temperature Range, °C	-55~ +200
Insulation Resistance, M Ω	10 ⁴
Failure Rate in Time, pcs / 10 ⁹ device hours	< 0.5

■ POWER DERATING CURVE



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■ **PERFORMANCE SPECIFICATIONS**

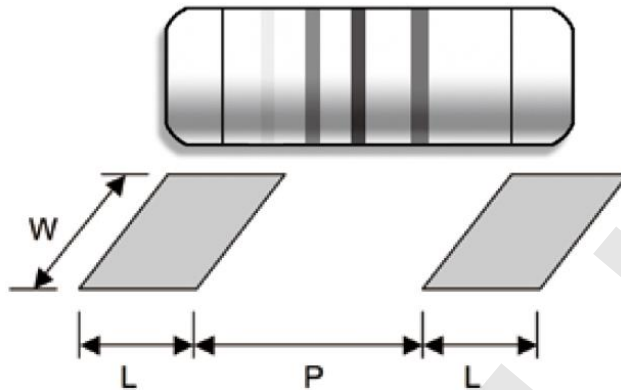
Characteristics	Test Conditions	Limits
High Temperature Exposure (Storage)	refer to MIL-STD-202 Method 108 1,000 hours at 125°C without load	±(5%+0.01Ω)
Temperature Cycling	refer to IEC 60115-1 4.19/ JESD22 Method JA-104 -55°C 30minutes, +125°C 30minutes, 1,000 cycles	±(5%+0.01Ω)
	Proprietary test specification FRC-AECQ-180702 -20°C 30minutes, +120°C 30minutes, 1,000 cycles (Recommended solder paste composition:96.5% Sn, 3% Ag, 0.5% Cu)	Force of 1kg for 10 seconds and without distinct looseness of terminals
Biased Humidity	refer to IEC 60115-1 4.37/ MIL-STD-202 Method 103 1,000 hours at 85°C and 85% relative humidity with 10% operating power (not over 100 voltage)	±(5%+0.01Ω)
Load Life	refer to IEC 60115-1 4.25.1 Rated load (not over max. working voltage) 1,000 hours with 1.5 hours ON, 0.5 hours OFF, at 70°C	±(5%+0.01Ω)
	refer to MIL-STD-202 Method 108 1,000 hours at 125°C with de-rated continuous working voltage (not over max. working voltage)	±(5%+0.01Ω)
Resistance to Solvents	refer to MIL-STD-202 Method 215 Add Aqueous wash chemical-OKEM Clean or equivalent. Do not use banned solvents.	No visible damage on appearance and marking
Mechanical Shock	refer to MIL-STD-202 Method 213 Condition C Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen. Peak value: 100 g`s, Duration: 6 ms, Velocity change: 12.3 ft/s, Waveform: Half sine	±(0.25%+0.01Ω)
Vibration	refer to MIL-STD-202 Method 204 5 g`s for 20 min., 12 cycles each of 3 orientations, Test from 10 - 2,000 Hz.	±(0.25%+0.01Ω)
Resistance To Soldering Heat	refer to IEC 60115-1 4.18.2 Dip the resistor into a solder bath measured (260±5)°C and hold it for a 10±1 seconds	±(1.5%+0.01Ω)
ESD	refer to AEC-Q200-002/ ISO/DIS 10605 (150pF/ 2,000Ohm discharge network) Human body model, 1 positive & 1 negative discharges with 2KV source	±(0.5%+0.01Ω)
Solderability	refer to J-STD-002 or IEC 60115-1 4.17 Solder area covered after (235±3)°C/(2±0.2) seconds with flux applied	95% min. coverage
Board Flex	refer to AEC-Q200-005 60 sec minimum holding time.	±(0.5%+0.01Ω)

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Terminal Strength	refer to AEC-Q200-006 Force of 1.8kg for 60 seconds	$\pm(0.5\%+0.01\Omega)$
Short Time Overload	refer to IEC 60115-1 4.13 5 seconds 2.5x rated voltage (not over max. overload voltage)	$\pm(2\%+0.01\Omega)$
Load Life In Humidity	refer to IEC 60115-1 4.24 56 days rated load (not over max. working voltage) at $(40\pm 2)^{\circ}\text{C}$ and $(93\pm 3)\%$ relative humidity	$\pm(5\%+0.01\Omega)$
Periodic Electric Overload	refer to IEC 60115-1 4.39 3.9x rated voltage (not over max. overload voltage) with 0.1s ON, 2.5s OFF for 1,000 cycles	$\pm(5\%+0.01\Omega)$
Surge Test	Proprietary test specification FRC-TR-010113 = $\sqrt{10,000 \times P \times R}$ P is power rating, R is resistance value Surge spec = 1.2/50 μs Period = 60 sec Number of surges = 50	$\pm(5\%+0.01\Omega)$

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■ SUGGESTED PAD LAYOUT



Type	Soldering Mode*	Pad Length (L, mm, min.)	Pad Spacing (P, mm)	Pad Width (W, mm, min.)
SWM200N	Reflow (Solder thickness recommended)	4.0	6.2 ± 0.4	5.0
	Wave	4.5	6.0 ± 0.4	5.0

For better heat dissipation / lower heat resistance, increase W & L

**Wave soldering is highly recommended for all SWM types.*

■ COVER TAPE PEELING SPECIFICATION

Recommended peeling force: 70±10gf

