

[*structure pending patent approval]
 Taiwan patent number: M530462
 Japan patent number: 3208923
 China patent number: 6433867
 Korean patent number: 20-0486309
 United States patent number: US9978483B2

Specifications Per

• IEC 60115-1, 60115-4

Features

- SMD enabled structure
- Flameproof multi-layer coating equivalent to UL 94 V-0
- Flameproof feature equivalent to overload test UL 1412
- Enhanced weld spot is reliable against surge
- Products meet RoHS requirements and do not contain substances of very high concern identified by European Chemicals Agency
- SWM series is applied in high surge applications such as high rush current protection for power capacitor, motor start-up protection, car & motorcycle engine ignition, etc. to absorb harmful surge energy, so to prevent hazard of circuit damage caused by surge energy

■ DIMENSIONS

Type	Body Length (L, mm)	Body Diameter (D, mm)	Soldering Spot (B, mm)
SWM100	8.50 ± 0.5	3.0 ± 0.3	1.3 Min.
SWM200	10.5 ± 0.5	4.0 ± 0.5	1.6 Min.
SWM300	12.6 ± 0.6	4.6 ± 0.5	1.8 Min.
SWM400	14.6 ± 0.6	5.1 ± 0.5	2.0 Min.

■ GENERAL SPECIFICATIONS

Type	Power Rating (at 70°C)	Maximum Working Voltage	Maximum Overload Voltage	Maximum Permissible Surge Voltage	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Available Resistance Values
SWM100	1W	350	700	7.5KV	1 Ω	1.2KΩ	± 5%	E-24
SWM200	2W	400	800	8.5KV	1 Ω	1.2KΩ	± 5%	E-24
SWM300	3W	400	800	9KV	1 Ω	1.2KΩ	± 5%	E-24
SWM400	4W	450	900	11KV	1 Ω	1.2KΩ	± 5%	E-24

Special sizes, values, and specifications not listed available on special order.

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■ PART NUMBER

Example: SWM200J100RTKZBK2K0

SWM200	J	100R	TKZ	BK2K0
Type	Tolerance	Resistance	TCR	Packaging
	J (5%)	100Ω 4-character code containing - 3 significant digits 1 letter multiplier <u>OHM MULTIPLIER</u> R = 1 K = 10 ³ M = 10 ⁶ G = 10 ⁹	3-character code TKZ = Default Product Temperature Coefficient. Information of typical product temperature coefficient can be found in the Technical Summary section of the datasheet.*	5-character code TR= Tape Reel (pieces per reel) SWM100 2K5=2,500 SWM200 2K0=2,000 BK = Bulk SWM100/SWM200 SWM300/SWM400 BK + Quantity

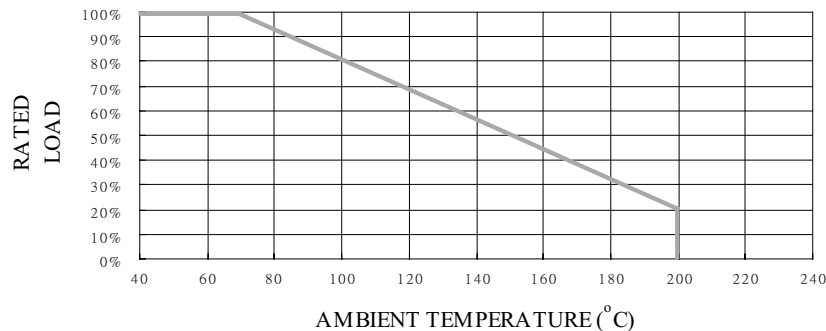
* For the availabilities of non-default temperature coefficient, please check with us. Reference for TCR letter codes can be found in section (4) of Part Number Construction in the Appendices.

■ TECHNICAL SPECIFICATIONS

Characteristics	Limits	
Dielectric Withstanding Voltage, VAC or DC	SWM100 / SWM200 / SWM300	700
	SWM400	1000
Temperature Coefficient, PPM / °C*	±100, ±300	
Operating Temperature Range, °C	-55~+200	
Insulation Resistance, MΩ	10 ⁴	

* Not applicable to all resistance values. Please check with us regarding the PPM of specific resistance value(s).

■ POWER DERATING CURVE



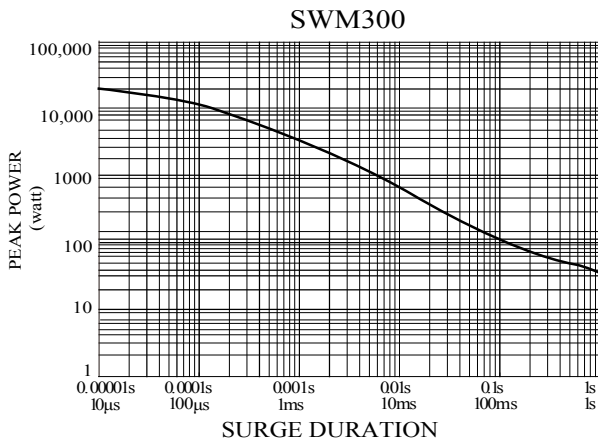
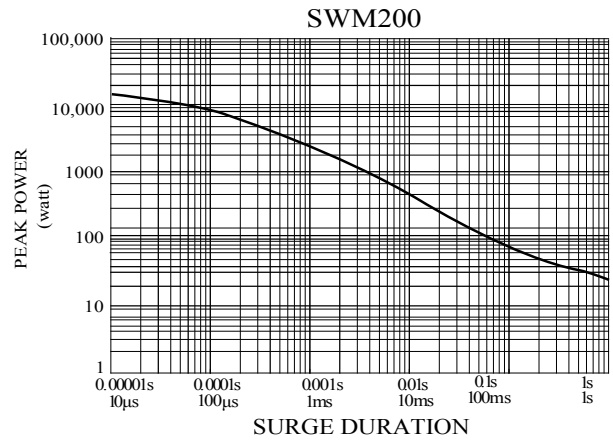
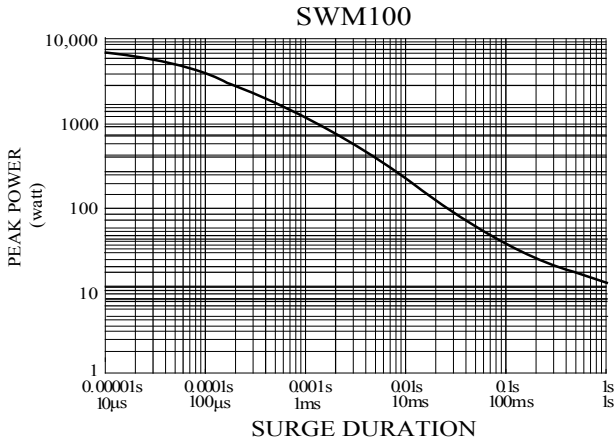
■ PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits
Short Time Over Load	IEC 60115-1 4.13 5 seconds 2.5x rated voltage (not over max. overload voltage)	±2%
Load Life In Humidity	IEC 60115-1 4.24 56 days rated load (not over max. working voltage) at (40±2)°C and (93±3)% relative humidity	±5%
Load Life	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±2)°C	±5%
Resistance To Soldering Heat	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%
Solderability	IEC 60115-1 4.17.2 Solder area covered after (230±3)°C/(2±0.2) seconds with flux applied	95% min. coverage
Vibration	IEC 60115 4.22 Six hours in each parallel and axial direction with a simple harmonic motion having an amplitude of 0.75mm and 10 to 500 Hz.	±1%
Thermal Endurance	IEC 60115-1 4.25.3 1000 hours at 200°C without load	±3%
Thermal Shock	IEC 60115-1 4.19 -55°C 30minutes, +155°C 30minutes, 5 cycles	±3%
Surge Test	Surge voltage = $\sqrt{(10,000 PR)}$ DC P is power rating, R is resistance value, surge voltage is not more than listed at right. Surge spec = 1.2/50µs Period = 60 sec Number of surges = 100	±5%

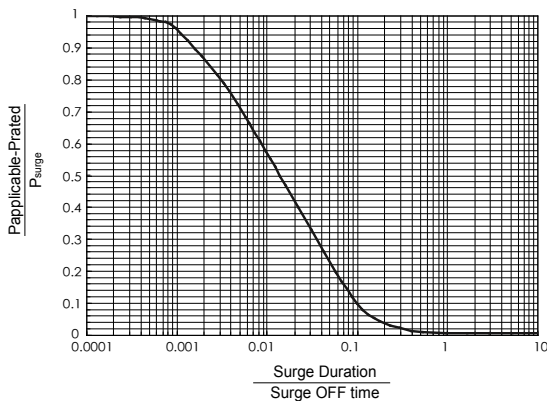
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■ SINGLE SURGE PERFORMANCE



■ SURGE POWER DERATING CURVE



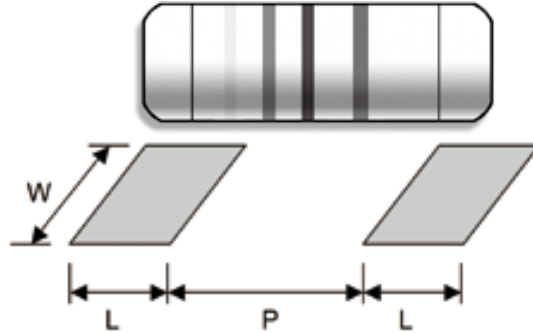
Notes:

- SINGLE SURGE PERFORMANCE graph is good for NON REPETITIVE applications operating in an ambient temperature of 70°C or less. For temperatures above 70°C, the graph power must be derated further linearly down to zero at 150 °C.
- To determine applicable surge power in continuous-surge applications:
 1. Identify allowable duration and peak power P_{surge} of single surge;
 2. Determine ratio of surge duration/surge OFF time in application;
 3. Calculate $P_{applicable}$ backwardly according to Y-axis of SURGE POWER DERATING CURVE.

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■ SUGGESTED PAD LAYOUT



Type	Soldering Mode*	Pad Length (L, mm, Min.)	Pad Spacing (P, mm)	Pad Width (W, mm, Min.)
SWM100	Reflow (Solder thickness recommended)	3.0	4.9 ± 0.3	3.7
	Wave	3.5	4.8 ± 0.3	4.0
SWM200	Reflow (Solder thickness recommended)	4.0	6.2 ± 0.4	5.0
	Wave	4.5	6.0 ± 0.4	5.0
SWM300	Reflow (Solder thickness recommended)	4.5	8.0 ± 0.4	5.5
	Wave	5.0	7.7 ± 0.4	5.5
SWM400	Reflow (Solder thickness recommended)	5.0	9.3 ± 0.4	6.5
	Wave	5.0	9.0 ± 0.4	6.0

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:

SWM100, SWM200: 70±10gf

SWM300, SWM400: 80±10gf

