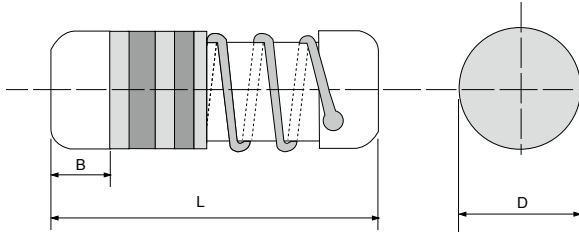


Safety • Quality • Reliability  
Cost-Down via Innovation

SWM



[\*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

- AEC-Q200 Compliant
- SMD enabled structure
- Excellent in heat dissipation than chip resistor
- Stronger mechanical structure to seismic vibration and thermal shock
- 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 ± 0.2	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	$\sqrt{P \times R}$	$2.5 \times \sqrt{P \times R}$	7.5KV	1 Ω	1.2KΩ	± 5%	E-24
SWM200	2W	$\sqrt{P \times R}$	$2.5 \times \sqrt{P \times R}$	8.5KV	1 Ω	1.2KΩ	± 5%	E-24
SWM300	3W	$\sqrt{P \times R}$	$2.5 \times \sqrt{P \times R}$	9KV	1 Ω	1.2KΩ	± 5%	E-24
SWM400	4W	$\sqrt{P \times R}$	$2.5 \times \sqrt{P \times R}$	11KV	1 Ω	1.2KΩ	± 5%	E-24

\* Rated Continuous Maximum Working Voltage (RCWV) should be determined from  $RCWV = \sqrt{\text{Power Rating} \times \text{Resistance Values}}$

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

Safety • Quality • Reliability  
Cost-Down via Innovation

## ■ PART NUMBER

Example: SWM200J100RTKZBK2K0

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

SWM

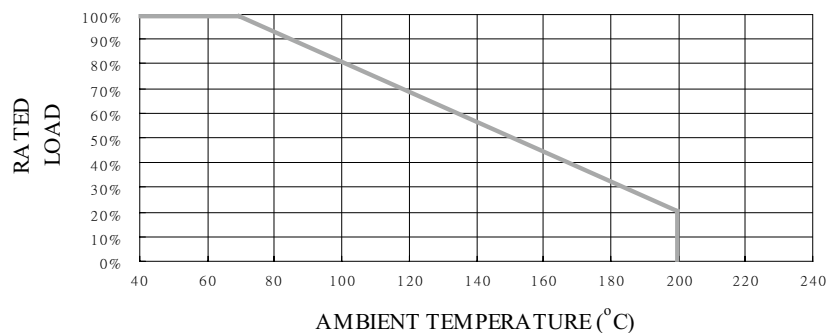
\* For the availabilities of non-default temperature coefficient, please check with us. Reference for TCR letter codes can be found in section (4) of Part Number Construction in the Appendices.

## ■ 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 <sup>4</sup>	
Failure Rate in Time, pcs / 10 <sup>9</sup> device hours	<0.5	

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

## ■ POWER DERATING CURVE



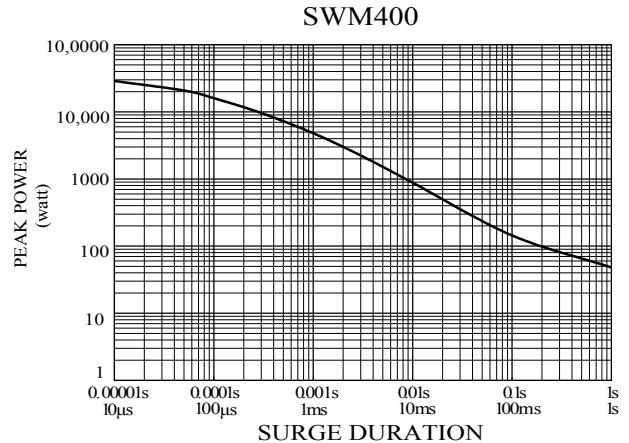
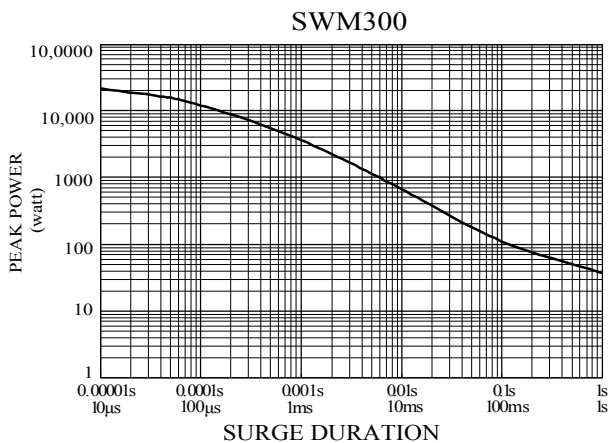
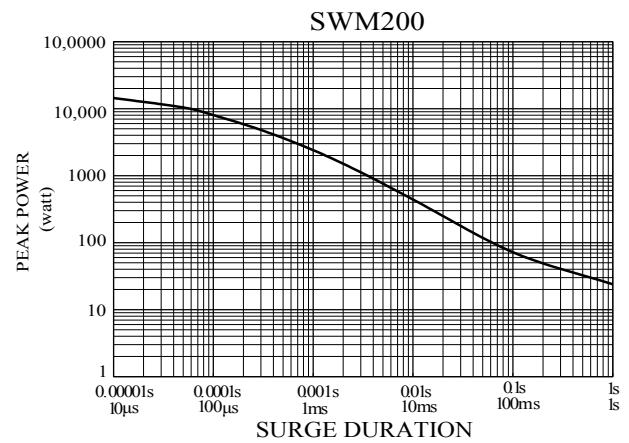
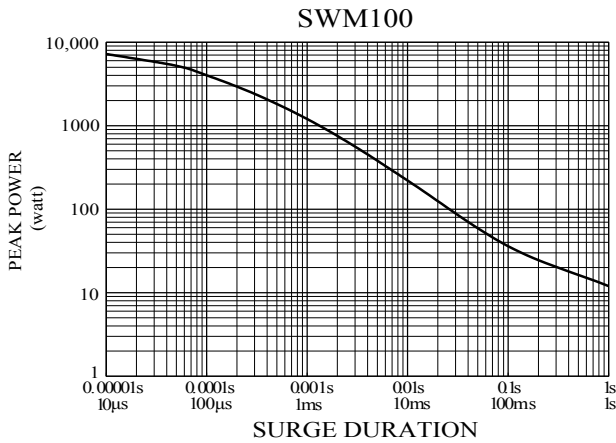
## ■ PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits
Short Time Over Load	<b>IEC 60115-1 4.13</b> 5 seconds 2.5x rated voltage (not over max. overload voltage)	±2%
Load Life In Humidity	<b>IEC 60115-1 4.24</b> 56 days rated load (not over max. working voltage) at (40±2)°C and (93±3)% relative humidity	±5%
Load Life	<b>IEC 60115-1 4.25.1</b> 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	<b>IEC 60115-1 4.18.2</b> Dip the resistor into a solder bath measured (260±5)°C and hold it for a 10±1 seconds	±1.5%
Solderability	<b>IEC 60115-1 4.17.2</b> Solder area covered after (230±3)°C/(2±0.2) seconds with flux applied	95% min. coverage
Vibration	<b>IEC 60115 4.22</b> 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	<b>IEC 60115-1 4.25.3</b> 1000 hours at 200°C without load	±3%
Thermal Shock	<b>IEC 60115-1 4.19</b> -55°C 30minutes, +155°C 30minutes, 5 cycles	±3%
Surge Test	<b>Surge voltage = <math>\sqrt{(10,000 PR)}</math> DC</b> 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%

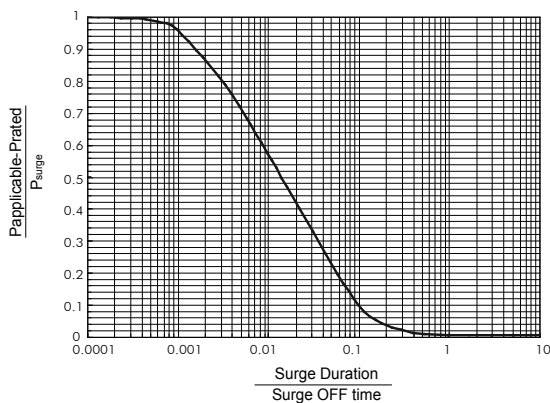
Safety • Quality • Reliability  
Cost-Down via Innovation

SWM

## ■ SINGLE SURGE PERFORMANCE



## ■ SURGE POWER DERATING CURVE



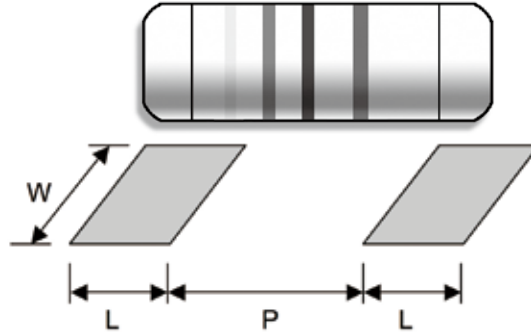
### Notes:

- 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.

Safety • Quality • Reliability  
Cost-Down via Innovation

SWM

## ■ 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

