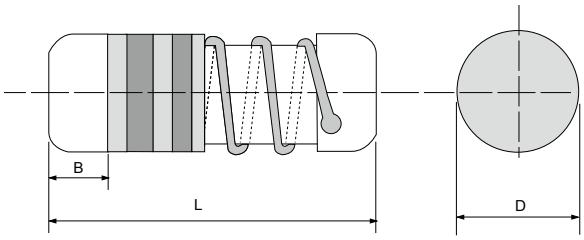
SWM – Anti-Surge Wire Wound MELF Resistors

Quality • Reliability
Cost-Down via Innovation



[*Patent approval]
Taiwan patent number: M530462
Japan patent number: 3208923
China patent number: ZL201490001291.X
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 endure 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, so to prevent hazard of circuit damage caused by surge.

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	$\sqrt{PxR}$	$2.5x\sqrt{PxR}$	7.5KV	1 Ω	1.2KΩ	±1% ~ ±5%	E-96/E-24
SWM200	2W	$\sqrt{PxR}$	$2.5x\sqrt{PxR}$	8.5KV	1 Ω	1.2KΩ	±1% ~ ±5%	E-96/E-24
SWM300	3W	$\sqrt{PxR}$	$2.5x\sqrt{PxR}$	9KV	1 Ω	1.2KΩ	±1% ~ ±5%	E-96/E-24
SWM400	4W	$\sqrt{PxR}$	$2.5x\sqrt{PxR}$	10KV	1 Ω	1.2KΩ	±1% ~ ±5%	E-96/E-24

*** Rated Continuous Maximum Working Voltage (RCWV) should be determined from RCWV = $\sqrt{\text{Power Rating x Resistance Values}}$**
**** Short-time Overload (STOL) test should be determined from STOL=2.5 × RCWV**

SWM – Anti-Surge Wire Wound MELF Resistors

PART NUMBER

Example: SWM200J100RTKZTR2K0

SWM200	J	100R	TKZ	TR2K0
Type	Tolerance	Resistance	TCR	Packaging
	F (1%) G (2%) J (5%)	100Ω **4-character code** containing - 3 significant digits 1 letter multiplier OHM MULTIPLIER 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 SWM300/SWM400 1K0 = 1,000 BK = Bulk SWM100/SWM200 SWM300/SWM400 BK + Quantity

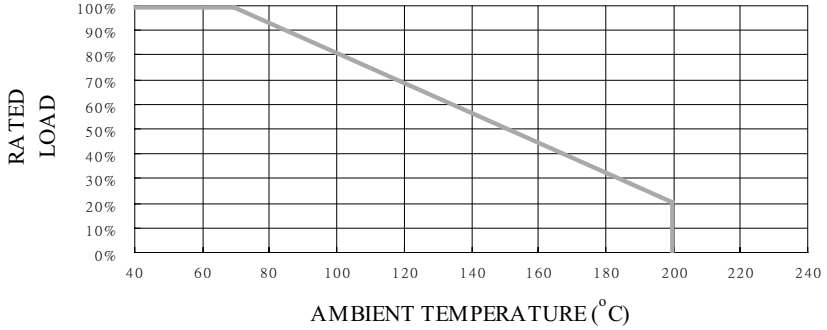
*** For the availabilities of non-default temperature coefficient, please check with us. Reference for TCR letter codes can be found in section (4) of Part Number Construction in the Appendices.**

TECHNICAL SPECIFICATIONS

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

**** Please contact us for special request on fusing characteristics.**

POWER DERATING CURVE



SWM – Anti-Surge Wire Wound MELF Resistors

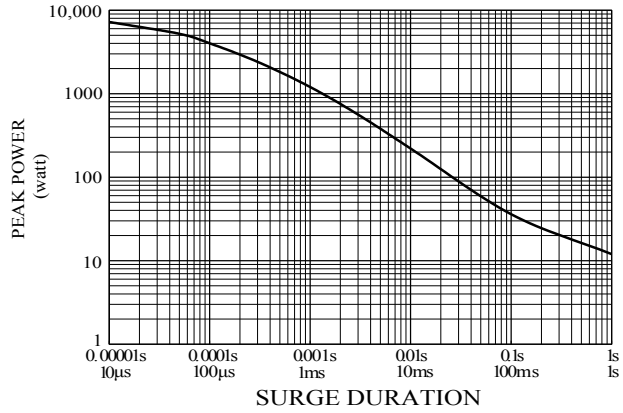
PERFORMANCE SPECIFICATIONS

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.	±0.25%
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	**Proprietary test speci ication FRC-TR-010113 = $\sqrt{(10{,}000\,PR)}$ DC** P is power rating, R is resistance value. Surge spec = 1.2/50μs Period = 60 sec Number of surges = 50	±5%

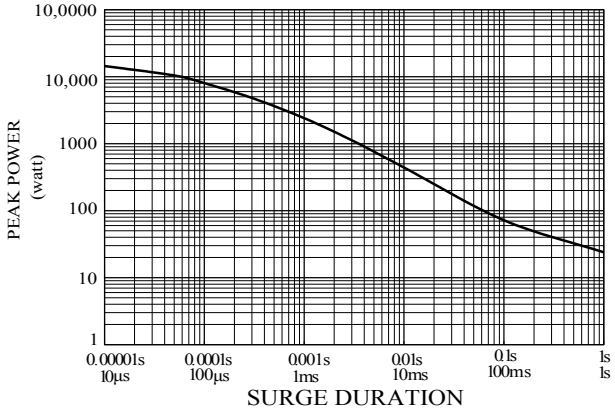
SWM – Anti-Surge Wire Wound MELF Resistors

SINGLE SURGE PERFORMANCE

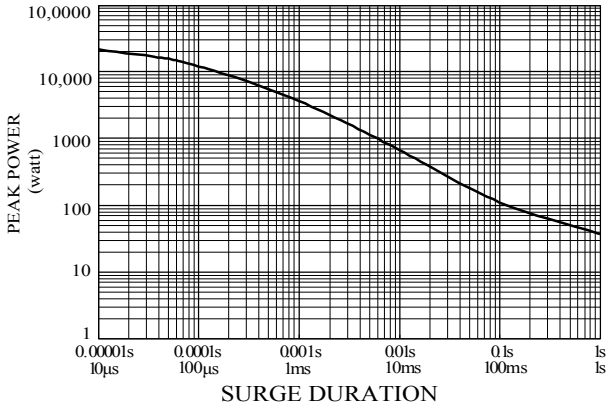
SWM100



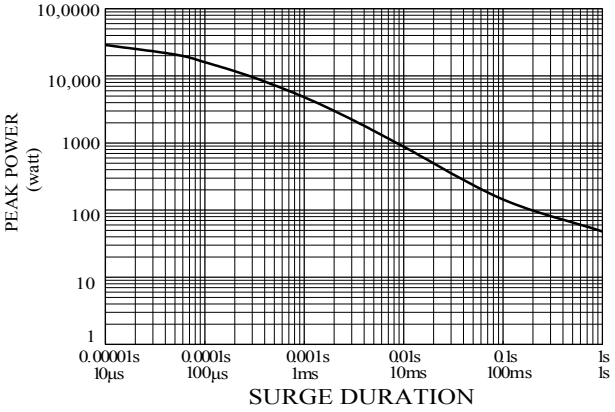
SWM200



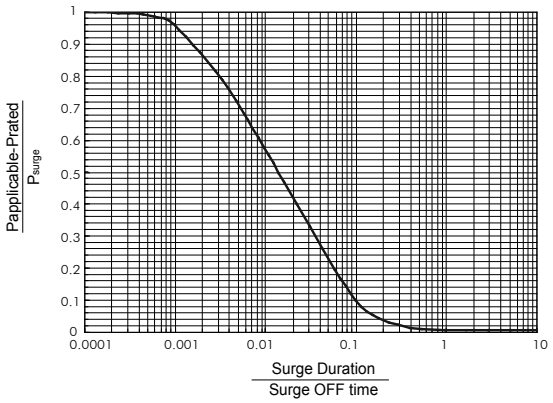
SWM300



SWM400



SURGE POWER DERATING CURVE



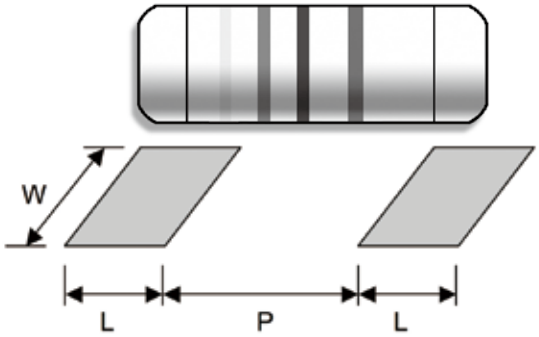
Notes:

- 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.

SWM – Anti-Surge Wire Wound MELF Resistors

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