

[ \*Patent approval ]

Taiwan patent number: I637420

United States patent number: US10170266B2

China patent number: ZL201780088781.6

Japan patent number: 6836669

## Applications

- Lighting devices
- Motor start-up protection
- Power supplies & Power adapters
- High rush current protection for power capacitor

## Specifications Per

• IEC 60115-1, 60115-4

## Features

- Worldwide patent pending
- Enhanced welded spot is reliable against surge
- Fast-acting fuse device for high-power applications
- Advanced combined anti- surge & fast-fuse 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
- Thermal fuse to protect against over-heating in electronic products
- SMD enabled structure
- RoHS / REACH Compliant

## DIMENSIONS

| Type    | Body Length<br>(L, mm) | Body Diameter<br>(D, mm) | Soldering Spot<br>(B, mm) |
|---------|------------------------|--------------------------|---------------------------|
| SWMT100 | 8.50 ± 0.5             | 3.0 ± 0.2                | 1.3 Min.                  |
| SWMT200 | 10.5 ± 0.5             | 4.0 ± 0.5                | 1.6 Min.                  |
| SWMT300 | 12.6 ± 0.6             | 4.6 ± 0.5                | 1.8 Min.                  |
| SWMT400 | 14.6 ± 0.6             | 5.1 ± 0.5                | 2.0 Min.                  |

## GENERAL SPECIFICATIONS

| Type    | Power Rating<br>( at 70°C ) | Maximum Working Voltage* | Maximum Overload Voltage**     | Maximum Permissible Surge Voltage | Minimum Resistance | Maximum Resistance | Resistance Tolerance | Available Resistance Values |
|---------|-----------------------------|--------------------------|--------------------------------|-----------------------------------|--------------------|--------------------|----------------------|-----------------------------|
| SWMT100 | 1W                          | $\sqrt{P \times R}$      | $2.5 \times \sqrt{P \times R}$ | 7.5KV                             | 1 Ω                | 470Ω               | ± 5%                 | E-24                        |
| SWMT200 | 2W                          | $\sqrt{P \times R}$      | $2.5 \times \sqrt{P \times R}$ | 8.5KV                             | 1 Ω                | 470Ω               | ± 5%                 | E-24                        |
| SWMT300 | 3W                          | $\sqrt{P \times R}$      | $2.5 \times \sqrt{P \times R}$ | 9KV                               | 1 Ω                | 470Ω               | ± 5%                 | E-24                        |
| SWMT400 | 4W                          | $\sqrt{P \times R}$      | $2.5 \times \sqrt{P \times R}$ | 11KV                              | 1 Ω                | 470Ω               | ± 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  $STOL = 2.5 \times RCWV$

## PART NUMBER

Example: SWMT200J2R80TKZBK2K0

| SWMT200 | J         | 2R80  | TKZ   | BK2K0   |
|---------|-----------|---|---|---|
| Type    | Tolerance | Resistance  | TCR   | Packaging   |
|         | J (5%)    | 2.8Ω<br><b>4-character code</b><br>containing -<br>3 significant digits<br>1 letter multiplier<br><u>OHM MULTIPLIER</u><br>R = 1<br>K = 10 <sup>3</sup><br>M = 10 <sup>6</sup><br>G = 10 <sup>9</sup> | <b>3-character code</b><br>TKZ = Default Product<br>Temperature Coefficient.<br>Information of typical<br>product temperature<br>coefficient can be found<br>in the Technical Summary<br>section of the datasheet.* | <b>5-character code</b><br>TR= Tape Reel<br>(pieces per reel)<br><u>SWMT100</u><br>2K5=2,500<br><u>SWMT200</u><br>2K0=2,000<br>BK = Bulk<br><u>SWMT100/SWMT200</u><br><u>SWMT300/SWMT400</u><br>BK + Quantity |

\* For the availabilities of non-default temperature coefficient, please check with us.

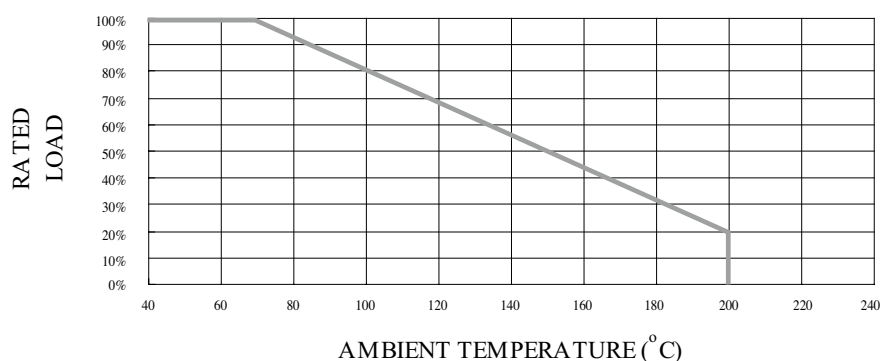
## TECHNICAL SPECIFICATIONS

| Characteristics                           |                  | Limits   |
|---|------------------|--|
| Temperature Coefficient, PPM / °C*        |                  | ±100, ±200   |
| Operating Temperature Range, °C           |                  | -55~+200   |
| Insulation Resistance, MΩ                 |                  | 10 <sup>4</sup>  |
| Fusing Characteristics**<br>(Preliminary) | constant voltage | Interrupts in max. 15 seconds at 40 times rated power                          |
|   | thermal fuse     | Interrupts in max. 5 minutes at 3.5 times rated amp at 265°C (special request) |

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

\*\* Recommended to install a fuse holder if fusing function is required

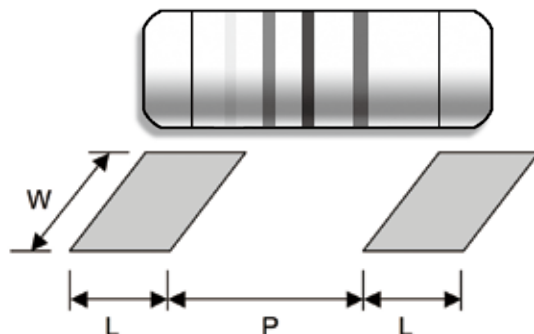
## POWER DERATING CURVE



## ■ PERFORMANCE SPECIFICATIONS

| Characteristics              | Test Conditions  | Limits            |
|------------------------------|--|-------------------|
| Short Time Over Load         | <b>IEC 60115-1 4.13</b><br>5 seconds 2.5x rated voltage (not over max. overload voltage)   | ±3%               |
| Load Life In Humidity        | <b>IEC 60115-1 4.24</b><br>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><br>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><br>Dip the resistor into a solder bath measured (260±5)°C and hold it for a 10±1 seconds   | ±3%               |
| Solderability                | <b>IEC 60115-1 4.17.2</b><br>Solder area covered after (230±3)°C/(2±0.2) seconds with flux applied   | 95% min. coverage |
| Vibration                    | <b>IEC 60115 4.22</b><br>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            | <b>IEC 60115-1 4.25.3</b><br>1000 hours at 125°C without load  | ±5%               |
| Thermal Shock                | <b>IEC 60115-1 4.19</b><br>-55°C 30minutes, +155°C 30minutes, 5 cycles   | ±5%               |
| Surge Test                   | <b>Proprietary test specification FRC-TR-010113</b> = $\sqrt{(8,000 PR)}$ DC P<br>is power rating, R is resistance value.<br>Surge spec = 1.2/50µs<br>Period = 60 sec<br>Number of surges = 10 | ±5%               |

## ■ SUGGESTED PAD LAYOUT



| Type    | Soldering Mode*                       | Pad Length (L, mm, Min.) | Pad Spacing (P, mm) | Pad Width (W, mm, Min.) |
|---------|---------------------------------------|--------------------------|---------------------|-------------------------|
| SWMT100 | Reflow (Solder thickness recommended) | 3.0                      | 4.9 ± 0.3           | 3.7                     |
|         | Wave                                  | 3.5                      | 4.8 ± 0.3           | 4.0                     |
| SWMT200 | Reflow (Solder thickness recommended) | 4.0                      | 6.2 ± 0.4           | 5.0                     |
|         | Wave                                  | 4.5                      | 6.0 ± 0.4           | 5.0                     |
| SWMT300 | Reflow (Solder thickness recommended) | 4.5                      | 8.0 ± 0.4           | 5.5                     |
|         | Wave                                  | 5.0                      | 7.7 ± 0.4           | 5.5                     |
| SWMT400 | 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.

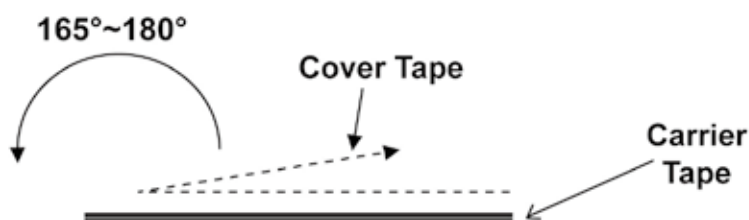
\*Wave soldering is highly recommended for all SWMT types.

## ■ COVER TAPE PEELING SPECIFICATION

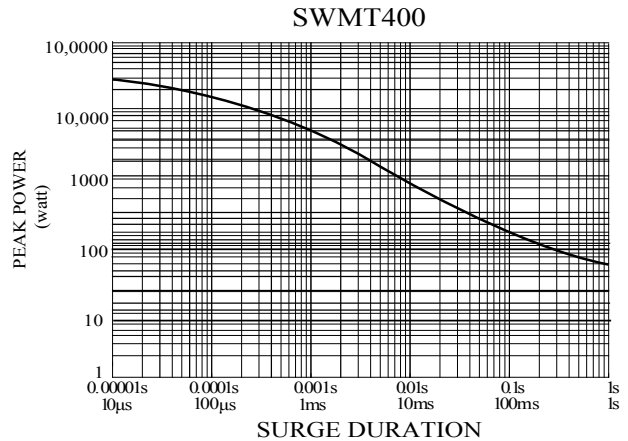
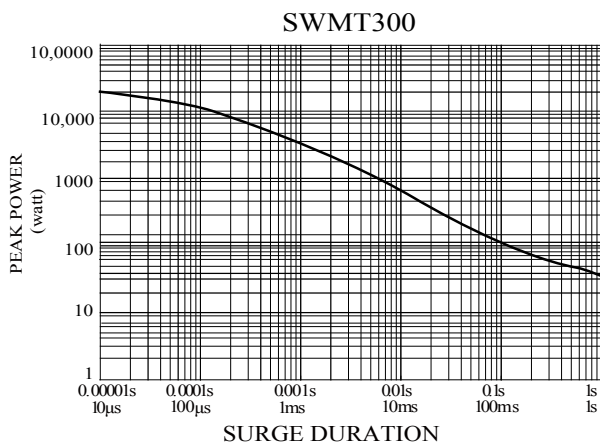
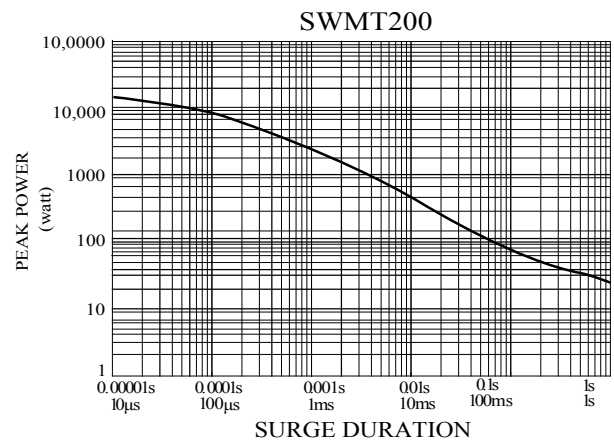
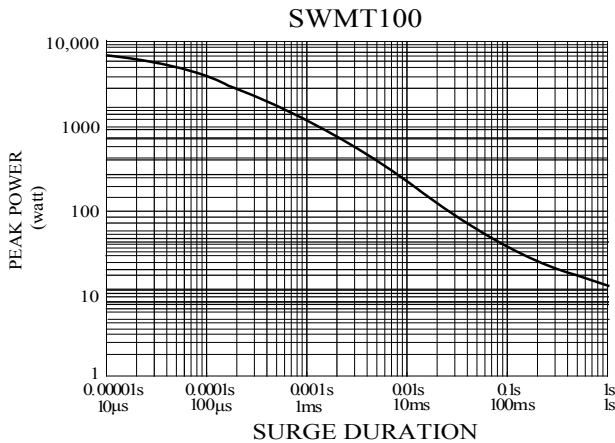
Recommended peeling force:

SWMT100, SWMT200: 70±10gf

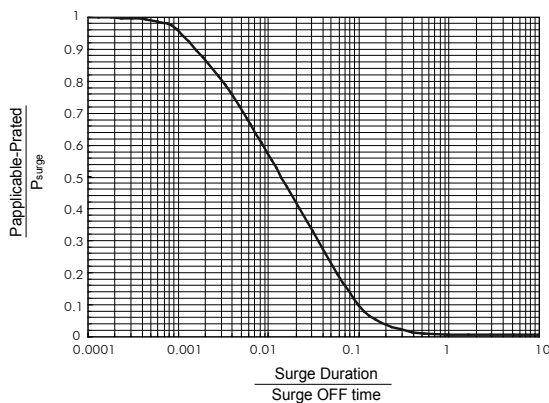
SWMT300, SWMT400: 80±10gf



## ■ 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:
  - Identify allowable duration and peak power  $P_{surge}$  of single surge;
  - Determine ratio of surge duration/surge OFF time in application;
  - Calculate  $P_{applicable}$  backwardly according to Y-axis of SURGE POWER DERATING CURVE.