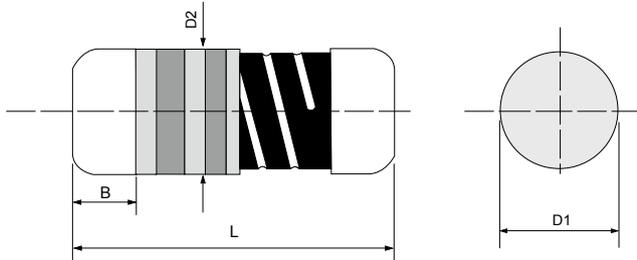


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## Specifications Per

• IEC 60115-1

## Features

- Excellent in heat dissipation than chip resistor
- Anti-sulfuration test qualified
- Stronger mechanical structure to endure vibration and thermal shock
- Low temperature coefficient and tolerances
- Excellent stability
- Superior power handling
- Products meet RoHS requirements and do not contain substances of very high concern identified by European Chemicals Agency

## DIMENSIONS

Type	Body Length (L, mm)	Cap Diameter (D1, mm)	Body Diameter (D2, mm)	Soldering Spot (B, mm)	Net Weight Per 1000 pcs
SFP204	3.52 ± 0.15	1.35 ± 0.1	D1+0.02/ -0.15	0.6 Min.	17 grams
SFP101	5.90 ± 0.20	2.20 ± 0.1	D1+0.02/ -0.15	1.0 Min.	80 grams
SFP201	8.50 ± 0.50	3.00 ± 0.2	D1+0.02/ -0.15	1.3 Min.	230 grams
SFP301	10.5 ± 0.50	4.00 ± 0.5	D1+0.02/ -0.15	1.6 Min.	520 grams

## GENERAL SPECIFICATIONS

Type	Power Rating*	Maximum Working Voltage*	Maximum Overload Voltage**	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Available Resistance Values
SFP204	0.4W	200V	400V	0, 0.5Ω	10MΩ	±0.5%~5%	E-192/E-24
SFP101	1W	350V	700V	0, 0.5Ω	10MΩ	±0.5%~5%	E-192/E-24
SFP201	2W	400V	800V	0, 0.5Ω	1MΩ	±0.5%~5%	E-192/E-24
SFP301	3W	400V	800V	0, 0.5Ω	1MΩ	±0.5%~5%	E-192/E-24

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

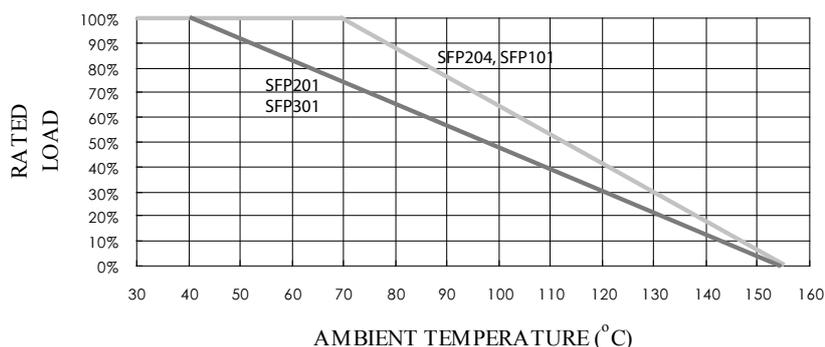
At 70°C, with the exception of SFP201 and SFP301, derating of which starts at 40°C. Please refer to the Power Derating Curve.

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

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

\*\* Short-time Overload (STOL) test should be determined from  $STOL = 2.5 \times \sqrt{\text{Power Rating} \times \text{Resistance Values}}$  or maximum overload voltage listed above, whichever is lower.

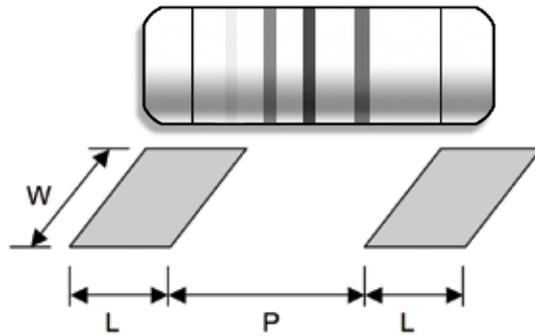
## POWER DERATING CURVE



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■ SUGGESTED PAD LAYOUT

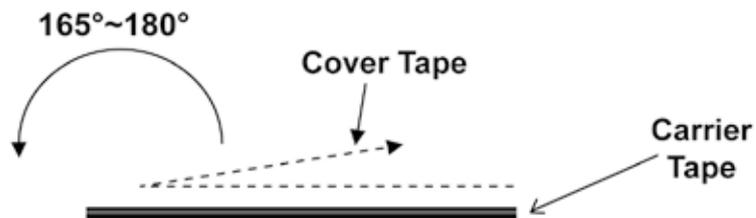


Type	Soldering Mode	Pad Length (L, mm, Min.)	Pad Spacing (P, mm)	Pad Width (W, mm, Min.)
SFP204	Reflow	1.3	1.6 ± 0.1	1.6
	Wave	1.5	1.5 ± 0.1	1.8
SFP101	Reflow	2.0	3.0 ± 0.1	3.0
	Wave	2.5	3.0 ± 0.1	3.0
SFP201	Reflow	3.0	4.9 ± 0.3	3.7
	Wave	3.5	4.8 ± 0.3	4.0
SFP301	Reflow	4.0	6.2 ± 0.4	5.0
	Wave	4.5	6.0 ± 0.4	5.0

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

■ COVER TAPE PEELING SPECIFICATION

Recommended peeling force: SFP204, SFP101: 50±5gf SFP201, SFP301: 70±10gf



# SFP – Stabilized Film Power MELF Resistor

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## ■ PART NUMBER

Example: SFP101F46R4TKSTR2K0

SFP101	F	46R4	TKS	TR2K0
Type	Tolerance*	Resistance	TCR*	Packaging
	Z (Jumper) D (0.5%) F (1%) G (2%) J (5%)	46.4Ω <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>	100ppm <b>3-character code</b>  TKQ = ± 25 ppm TKR = ± 50 ppm TKS = ± 100 ppm TK2 = ± 200 ppm	<b>5-character code</b>  TR = Tape Reel  (pieces per reel) <u>SFP204</u> 3K0 = 3,000 pcs 6K0 = 6,000 pcs** 10K = 10,000 pcs**  <u>SFP101</u> 2K0 = 2,000 pcs 6K0 = 6,000 pcs** 10K = 10,000 pcs**  <u>SFP201</u> 2K5 = 2,500 pcs  <u>SFP301</u> 2K0 = 2,000 pcs

\* Listed values may not be applicable across product types or to all resistance values. Please check with us before placing order.

\*\* upon request

## ■ TECHNICAL SUMMARY

Characteristics	Limits
Dielectric Withstanding Voltage, VAC or DC	SFP204: 200 SFP101: 500 SFP201: 700 SFP301: 1000
Temperature Coefficient, PPM / °C*	±25, ±50, ±100, ±200
Operating Temperature Range, °C	-55 ~ +155
Insulation Resistance, MΩ	>10 <sup>4</sup>
Failure Rate in Time, pcs / 10 <sup>9</sup> device hours	<5
Tin Whisker (JESD201 Temperature Cycling & High Temp. / Humidity Storage), μm	<5

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

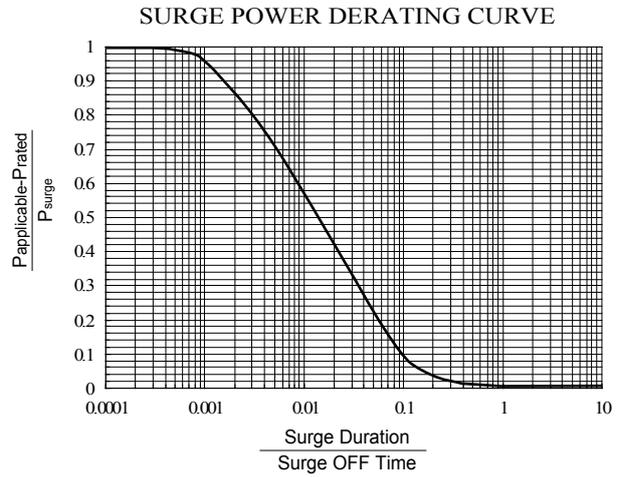
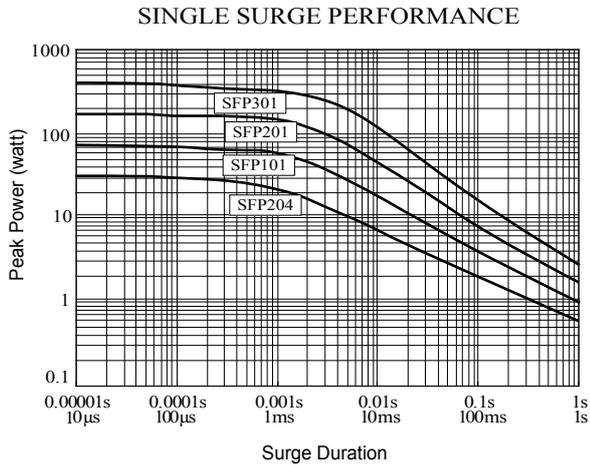
## ■ PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits	
Short Time Overload	<b>IEC 60115-1 4.13</b> 2 seconds 2.5x rated voltage (not over max. overload voltage)	±(0.5%+0.01Ω)	
Load Life In Humidity	<b>IEC 60115-1 4.24</b> 56 days rated load with 1.5 hours ON, 0.5 hours OFF (not over max. working voltage) at (40±2)°C and (93±3)% relative humidity	±(3.0%+0.01Ω)	
Load Life In Humidity (accelerated mode)	<b>IEC 60115-1 4.37</b> 1,000 hours at 85°C and 85% relative humidity with 0.1x rated voltage (not over 100V)	SFP204 SFP101	±(2.5%+0.01Ω)
		SFP201 SFP301	±(3.5%+0.01Ω)
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 for SFP204, SFP101 ; (40±2)°C for SFP201 and SFP301.	±(3.0%+0.01Ω)	
Periodic Electric Overload	<b>IEC 60115-1 4.39</b> 3.9x rated voltage (not over max. overload voltage) with 0.1s ON, 2.5s OFF for 1,000 cycles	±(0.75%+0.01Ω)	
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	±(0.5%+0.01Ω)	
Solderability	<b>IEC 60115-1 4.17.2</b> Solder area covered after (235±3)°C/(2±0.2) seconds with flux applied	95% min.coverage	
Vibration	<b>IEC 60115-1 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.	±(0.25%+0.01Ω)	
Thermal Endurance	<b>IEC 60115-1 4.25.3</b> 1000 hours at 155°C without load	±(2.0%+0.01Ω)	
Thermal Shock	<b>IEC 60115-1 4.19</b> -55°C 30minutes, +155°C 30minutes, 5 cycles	±(0.25%+0.01Ω)	
Single pulse high voltage overload	<b>IEC 60115-1 4.27</b> 10 pulses of 10/700µs at 10x rated voltage (not over max. overload voltage) with interval of 60 sec.	±(0.5%+0.01Ω)	
Electrostatic discharge (Human body model)	<b>IEC 60115-1 4.38</b> 3 positive & 3 negative discharges with 2KV for SFP204 or 4KV for SFP101, SFP201 & SFP301 (For continuous surge application please see Surge Performance paragraph)	±(0.25%+0.01Ω)	
Climatic test	<b>IEC 60115-1 4.23</b> 4.23.2 - dry heat: 16 hours 155°C 4.23.3 - damp heat: 24 hours 55°C with 95% relative humidity 4.23.4 - cold: 2 hours -55°C 4.23.5 - negative air pressure: 2 hour 8.5kPa at (25±10)°C 4.23.6 - damp heat cyclic: 5 days 55°C with 95% relative humidity 4.23.7 - DC load: rated voltage at -55°C and 155°C each 1 Min.	±(1.0%+0.01Ω)	
Bending test	<b>IEC 60115-1 4.33</b> Pressing depth 2mm, 3 times	±(0.25%+0.01Ω)	
Flammability	<b>IEC 60115-1 4.35</b> Needle flame test 10s	No burning after 30s	

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## ■ SINGLE SURGE PERFORMANCE



**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 155°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.