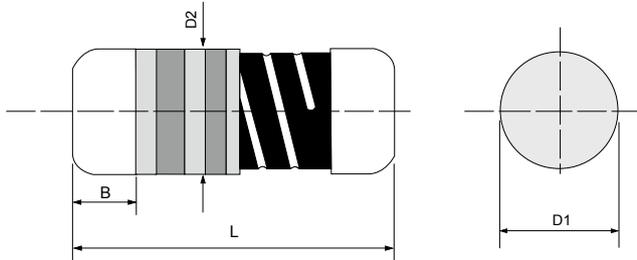


Quality • Reliability
Cost-Down via Innovation

SFP



Specifications Per

• IEC 60115-1

Features

- Excellent in heat dissipation than chip resistor
- 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. | 66 grams |
| SFP201 | 8.50 ± 0.50 | 3.00 ± 0.2 | D1+0.02/ -0.15 | 1.3 Min. | 186 grams |
| SFP301 | 10.5 ± 0.50 | 4.00 ± 0.5 | D1+0.02/ -0.15 | 1.6 Min. | 446 grams |

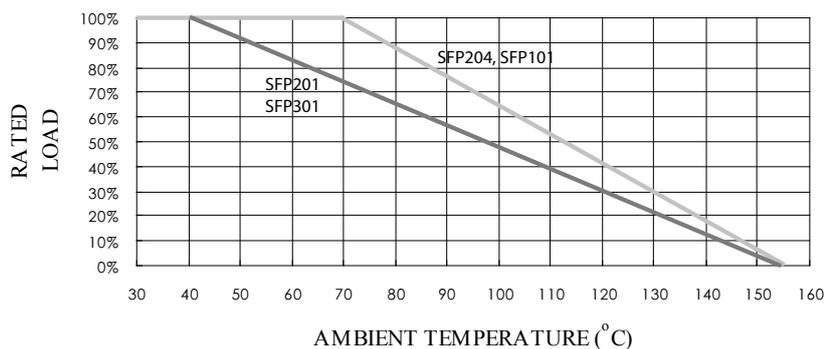
GENERAL SPECIFICATIONS

| 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 |

* 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.

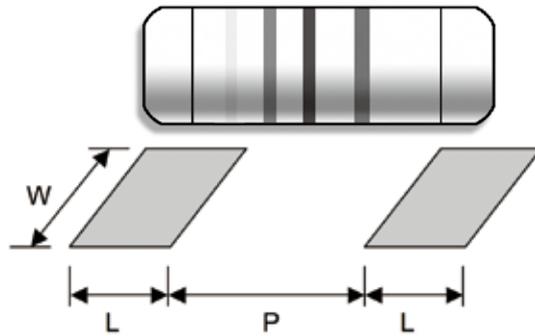
POWER DERATING CURVE



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■ SUGGESTED PAD LAYOUT

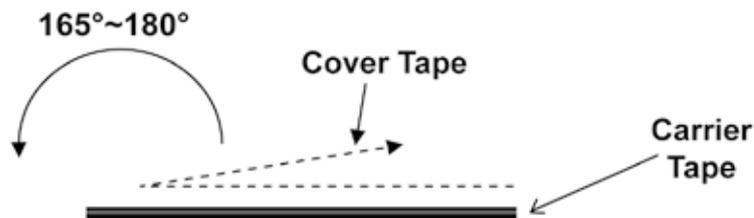


| Type | Soldering Mode | Pad Length (L, mm, Min.) | Pad Spacing (P, mm) | Pad Width (W, mm, Min.) |
|--------|----------------|--------------------------|---------------------|-------------------------|
| SFP204 | Reflow | 1.3 | 1.6 ± 0.1 | 1.6 |
| | Wave | 1.5 | 1.5 ± 0.1 | 1.8 |
| SFP101 | Reflow | 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



■ 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 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 | 100ppm 3-character code TKQ = ± 25 ppm TKR = ± 50 ppm TKS = ± 100 ppm TK2 = ± 200 ppm | 5-character code TR = Tape Reel (pieces per reel) <u>SFP204</u> 3K0 = 3,000 6K0 = 6,000** 10K = 10,000** <u>SFP101</u> 2K0 = 2,000 6K0 = 6,000** 10K = 10,000** <u>SFP201</u> 2K5 = 2,500 <u>SFP301</u> 2K0 = 2,000 |

* 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 ⁴ |
| Failure Rate in Time, pcs / 10 ⁹ device hours | <5 |
| Tin Whisker (JESD201 Temperature Cycling & High Temp. / Humidity Storage), μm | <5 |

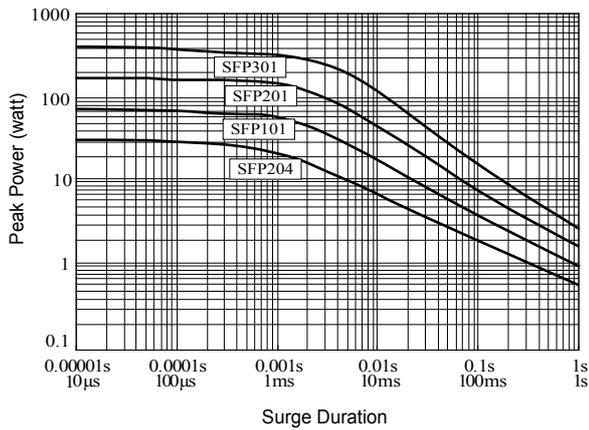
* Not applicable to all resistance values. Please check with us regarding the PPM of specific resistance value(s).

■ PERFORMANCE SPECIFICATIONS

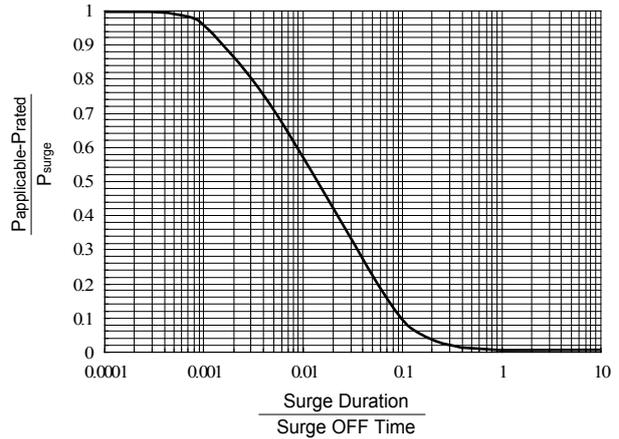
| Characteristics | Test Conditions | Limits | |
|--|---|----------------------|-------|
| Short Time Overload | IEC 60115-1 4.13 2 seconds 2.5x rated voltage (not over max. overload voltage) | ±0.5% | |
| Load Life In Humidity | IEC 60115-1 4.24 56 days rated load (not over max. working voltage) at (40±2)°C and (93±3)% relative humidity | ±3.0% | |
| Load Life In Humidity (accelerated mode) | IEC 60115-1 4.37 1,000 hours at 85°C and 85% relative humidity with 0.1x rated voltage (not over 100V) | SFP204 SFP101 | ±2.5% |
| | | SFP201 SFP301 | ±3.5% |
| 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 for SFP204, SFP101 ; (40±2)°C for SFP201 and SFP301. | ±3.0% | |
| Periodic Electric Overload | IEC 60115-1 4.39 3.9x rated voltage (not over max. overload voltage) with 0.1s ON, 2.5s OFF for 1,000 cycles | ±0.75% | |
| 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 | ±0.5% | |
| Solderability | IEC 60115-1 4.17.2 Solder area covered after (235±3)°C/(2±0.2) seconds with flux applied | 95% min.coverage | |
| Vibration | IEC 60115-1 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 155°C without load | ±2.0% | |
| Thermal Shock | IEC 60115-1 4.19 -55°C 30minutes, +155°C 30minutes, 5 cycles | ±0.25% | |
| Single pulse high voltage overload | IEC 60115-1 4.27 10 pulses of 10/700µs at 10x rated voltage (not over max. overload voltage) with interval of 60 sec. | ±0.5% | |
| Electrostatic discharge (Human body model) | IEC 60115-1 4.38 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% | |
| Climatic test | IEC 60115-1 4.23 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% | |
| Bending test | IEC 60115-1 4.33 Pressing depth 2mm, 3 times | ±0.25% | |
| Flammability | IEC 60115-1 4.35 Needle flame test 10s | No burning after 30s | |

■ SINGLE SURGE PERFORMANCE

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 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.

SFP