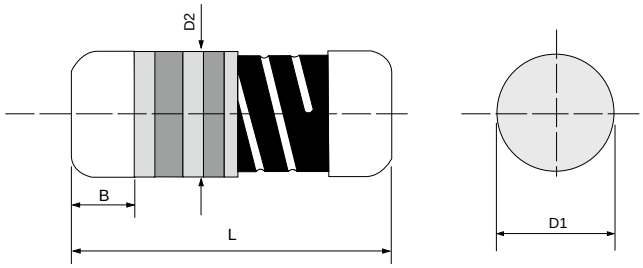
SFP(V) – Stabilized Film Power MELF Resistor, Vehicle Grade

Quality • Reliability
Cost-Down via Innovation



Specifications Per

- IEC 60115-1
- AEC-Q200 Rev. D

Features

- AEC-Q200 Compliant
- Low temperature coefficient and tolerances
- Excellent stability
- Superior power handling
- Anti-sulfuration test qualified
- Products meet RoHS requirements and do not contain substances of very high concern identified by European Chemicals Agency

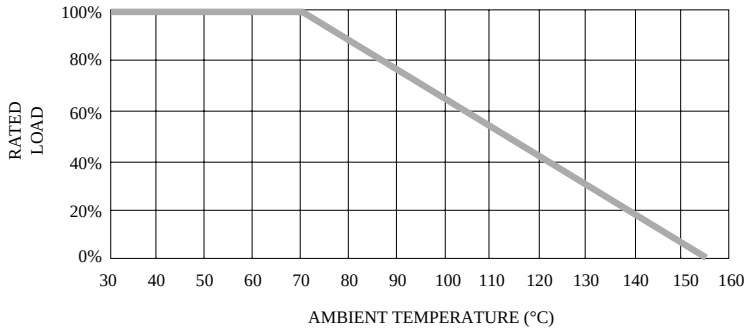
DIMENSIONS

Type	Body Length (L, mm)	Cap Diameter (D1, mm)	Body Diameter (D2, mm)	Soldering Spot (B, mm)	Net Weight Per 1000 pcs
SFP204V	3.52 ± 0.15	1.35 ± 0.1	D1+0.02/ -0.15	0.6 Min.	17 grams
SFP101V	5.90 ± 0.20	2.20 ± 0.1	D1+0.02/ -0.2	1.0 Min.	66 grams
SFP201V	8.50 ± 0.50	3.00 ± 0.2	D1+0.05/ -0.35	1.3 Min.	186 grams
SFP301V	10.50 ± 0.50	4.00 ± 0.5	D1+0.05/ -0.45	1.6 Min.	446 grams

GENERAL SPECIFICATIONS

Type	Power Rating (at 70°C)	Maximum Working Voltage	Maximum Overload Voltage	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Available Resistance Values
SFP204V	0.4W	200V	400V	0.22Ω	1MΩ	±1% ~ ±5%	E-24 / E-96
SFP101V	1W	350V	700V	0.5Ω	1MΩ	±1% ~ ±5%	E-24 / E-96
SFP201V	2W	400V	800V	0.5Ω	1MΩ	±1% ~ ±5%	E-24 / E-96
SFP301V	3W	400V	800V	0.5Ω	1MΩ	±1% ~ ±5%	E-24 / E-96

POWER DERATING CURVE



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PART NUMBER

Example: SFP204VF33R0TKQTR3K0

SFP204V	F	33R0	TKQ	TR3K0
Type	Tolerance*	Resistance	TC*	Packaging
	F (1%) G (2%) J (5%)	33R **4-character code** containing - 3 significant digits 1 letter multiplier OHM MULTIPLIER R = 1 K = 10^3 M = 10^6 G = 10^9	25ppm **3-character code** TKQ=±25PPM/°C TKR=±50PPM/°C	**5-character code** TR = Tape Reel (pieces per reel) SFP204V 3K0 = 3,000 6K0 = 6,000** 10K = 10,000** SFP101V 2K0 = 2,000 6K0 = 6,000** 10K = 10,000** SFP201V 2K5 = 2,500 SFP301V 2K0 = 2,000

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

TECHNICAL SUMMARY

Characteristics	Limits
Dielectric Withstanding Voltage, VAC or DC	SFP204V: 200 SFP101V: 500 SFP201V: 700 SFP301V: 1000
Temperature Coefficient, PPM / °C*	±25, ±50
Operating Temperature Range,°C	-55 ~ +155
Insulation Resistance, MΩ	>10^4
Failure Rate	<5 pcs / 10^9 Device Hours
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).**

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PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits	
High Temperature Exposure (Storage)	**IEC 60115-1 4.25.3** 1,000 hours at 155°C without load	<1Ω	±5%
		1Ω to <332KΩ	±2%
		332KΩ to 1MΩ	±5%
	AEC-Q200 REV D. Stress NO.3 **(refer to MIL-STD-202 Method 108)** 1,000 hours at 125°C without load	± 1.5%	
Temperature Cycling	**AEC-Q200 REV D. Stress NO.4** **(refer to IEC 60115-1 4.19/ JESD22 Method JA-104)** -55°C 30minutes, +125°C 30minutes, 1,000 cycles	±1%	
	Proprietary test speci ication FRC-AECQ-180702 -20°C 30minutes, +120°C 30minutes, 1,000 cycles (Recommended solder paste composition:96.5% Sn, 3% Ag, 0.5% Cu)	Force of 1kg for 10 secs and without distinct looseness of terminals	
Biased Humidity	**AEC-Q200 REV D. Stress NO.7** **(refer to IEC 60115-1 4.37/ MIL-STD-202 Method 103)** 1,000 hours at 85°C and 85% relative humidity with 10% operating power (not over max. working voltage)	< 10KΩ	±1.5%
		10KΩ to <332KΩ	±2%
		332KΩ to 1MΩ	±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°C	± 3%	
	AEC-Q200 REV D. Stress NO.8 **(refer to MIL-STD-202 Method 108)** 1,000 hours at 125°C with de-rated continuous working voltage (not over max. working voltage)	± 5%	
Resistance to Solvents	**AEC-Q200 REV D. Stress NO.12** **(refer to MIL-STD-202 Method 215)** Add Aqueous wash chemical-OKEM Clean or equivalent. Do not use banned solvents.	No visible damage on appearance and marking	
Mechanical Shock	**AEC-Q200 REV D. Stress NO.13** **(refer to MIL-STD-202 Method 213 Condition C)** Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen. Peak value: 100 g`s, Duration: 6 ms, Velocity change: 12.3 ft/s, Wavefrom: Half sine	±0.5%	
Vibration	**AEC-Q200 REV D. Stress NO.14** **(refer to MIL-STD-202 Method 204)** 5 g`s for 20 min., 12 cycles each of 3 orientations, Test from 10 - 2,000 Hz.	±0.5%	
Resistance to Soldering Heat	**AEC-Q200 REV D. Stress NO.15** **(refer to IEC 60115-1 4.18.2/ MIL-STD-202 Method 210)** Dip the resistor into a solder bath measured (260±5)°C and hold it for a 10±1 seconds	±0.5%	
Anti-sulfuration test	**EIA-977(conditions B)** 750 hours at (105±2)°C without load	±1% ±5%	±1% ±5%

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PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits
ESD	**AEC-Q200 REV D. Stress NO.17** **(refer to AEC-Q200-002/ ISO/DIS 10605)** **(150pF/ 2000Ohm discharge network)** Human body model, 1 positive & 1 negative discharges with 2KV source	±0.5%
Solderability	**AEC-Q200 REV D. Stress NO.18** **(refer to J-STD-002 or IEC 60115-1 4.17)** Solder area covered after (235±3)°C/(2±0.2) seconds with flux applied	95% min. coverage
Flammability	**AEC-Q200 REV D. Stress NO.20** **(refer to UL-94)** V-0 or V-1 are acceptable. Electrical test not required.	NO flaming
Board Flex	**AEC-Q200 REV D. Stress NO.21** **(refer to AEC-Q200-005)** 60 sec minimum holding time.	±0.5%
Terminal Strength	**AEC-Q200 REV D. Stress NO.22** **(refer to AEC-Q200-006)** Force of 1.8kg for 60 seconds	±0.5%
Short Time Overload	**IEC 60115-1 4.13** 5 seconds 2.5x rated voltage(not over max. working voltage)	± 0.5%
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 Min1.	±1%
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%
Single pulse high voltage overload	**IEC 60115-1 4.27** 5 pulses of 1.2/50μs at 10x rated voltage (not over max. overload voltage) with interval of 12 sec.	±0.75%
	10 pulses of 10/700μs at 10x rated voltage (not over max. overload voltage) with interval of 60 sec.	±0.75%
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	±1%

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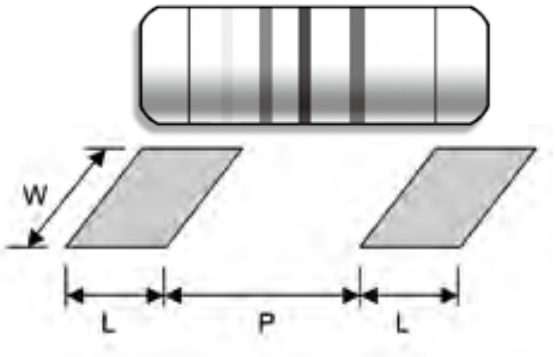
SUGGESTED PAD LAYOUT

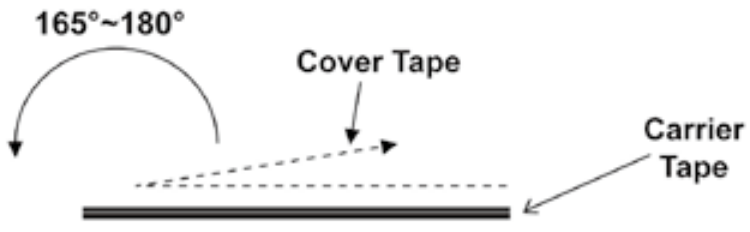


Type	Soldering Mode	Pad Length (L, mm, Min.)	Pad Spacing (P, mm)	Pad Width (W, mm, Min.)
SFP204V	Reflow	1.3	1.6 ± 0.1	1.6
	Wave	1.5	1.5 ± 0.1	1.8
SFP101V	Reflow	2.0	3.0 ± 0.1	3.0
	Wave	2.5	3.0 ± 0.1	3.0
SFP201V	Reflow	3.0	4.9 ± 0.3	3.7
	Wave	3.5	4.8 ± 0.3	4.0
SFP301V	Reflow	4.0	6.2 ± 0.4	5.0
	Wave	4.5	6.0 ± 0.4	5.0

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

COVER TAPE PEELING SPECIFICATION

Recommended peeling force:
SFP204V, SFP101V: 50±5gf SFP201V, SFP301V: 70±10gf



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