High-Precision Low-TCR Alloy Current Sensing Resistors

■MSRPF4026 series（4 terminal） AEC-Q200 Compliant

Features

- The MSRPF4026 series is based on precision resistive alloy and welded with vacuum electron beam welding equipment to ensure its characteristics and reliability.
- Precision machining and uniform welding provide a minimum tolerance of ±0.5% without trimming.
- TCR of MSRPF4026 series within the temperature range of +20°C to +120°C is ≤ ±75ppm/°C (1mΩ~2mΩ) and ±50ppm/°C (3mΩ~5mΩ).
- The "Trimming-free" technology avoids current loss and is free of hot spots.
- The thermoelectric power is extremely low and thermal fluctuations are minimized.

Lead free　Halogen free　RoHS Compliance

Applications

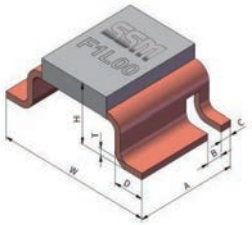
- Automotive Electronic
- Precision Power Supply
- Instrumentation
- Medical Equipment

◆Electrical Specification

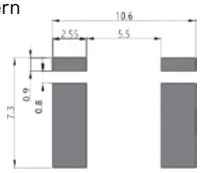
Series	Size inch. (mm)	Resistance Value	Power	Max. Current	Operating Tempertature	TCR (20°CRsef)	Torelance	Thermal Resistance	PKG.
MSRPF4026	4026 (10166)	1 mΩ	7 W	83 A	-55℃~170℃	±75 ppm/℃	± 0.5 % ±1.0 % ±5.0 %	8.6 ℃/W	1,200 pcs.
		1.3 mΩ	7 W	73 A				10.0 ℃/W	
		2 mΩ	6 W	54 A				17.6 ℃/W	
		3 mΩ	5 W	40 A		±50 ppm/℃		25.3 ℃/W	
		4 mΩ	4 W	31 A				32.1 ℃/W	
		5 mΩ	3 W	24 A				39.7 ℃/W	

◆Dimensions

Resistor



Land Pattern



Not following the recommended land pattern design can seriously affect the temperature coefficient measurement results and current sensing accuracy!

Series	Size inch. (mm)	Resistance Value	Unit:mm T	H	W	A	B	C	D
MSRPF4026	4026 (10166)	1 mΩ	0.4±0.2	3.75±0.5	10.1±0.3	6.6±0.3	1.0±0.3	0.7±0.3	2.0±0.3
		1.3 mΩ	0.4±0.2	3.5±0.5	10.1±0.3	6.6±0.3	1.0±0.3	0.7±0.3	2.0±0.3
		2 mΩ	0.4±0.2	2.98±0.5	10.1±0.3	6.6±0.3	1.0±0.3	0.7±0.3	2.0±0.3
		3 mΩ	0.4±0.2	2.85±0.5	10.1±0.3	6.6±0.3	1.0±0.3	0.7±0.3	2.0±0.3
		4 mΩ	0.4±0.2	2.85±0.5	10.1±0.3	6.6±0.3	1.0±0.3	0.7±0.3	2.0±0.3
		5 mΩ	0.4±0.2	2.85±0.5	10.1±0.3	6.6±0.3	1.0±0.3	0.7±0.3	2.0±0.3

◆ Part Number information

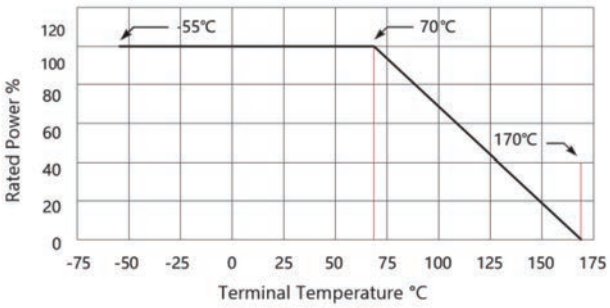
M	S	R	P	F	4	0	2	6	A	-	2	L	0	0	-	F	1	P	2

Series (5 digits)	Size (4 digits)	TCR (1 digits)	Resistance (4 digits)	Tolerance (1 digits)	Quantity (3 digits)
MSRPF	4026	A:±75 ppm/°C Q:±50 ppm/°C	1L00 = 1 mΩ 1L30 = 1.3 mΩ 2L00 = 2 mΩ 3L00 = 3 mΩ 4L00 = 4 mΩ 5L00 = 5 mΩ	D:±0.5 % F:±1 % J:±5 %	1P2 = 1,200 pcs.

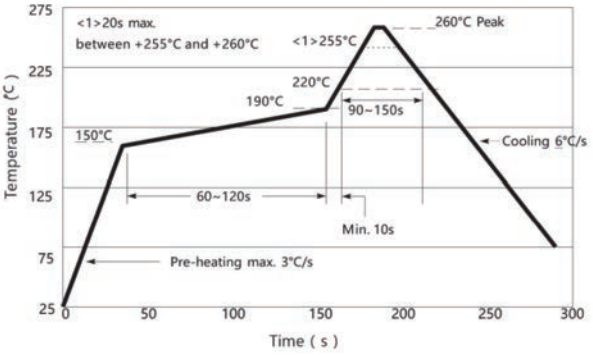
◆Performance

Test	Test Method	Standards	Typical	Max.
High Temperature Storage	1000h@+170°C, unpowered	AEC-Q200 TEST 3 MIL-STD-202 Method 108	ΔR≤±0.5%	ΔR≤±1.0%
Thermal Shock	-55℃,15min~ambient temperature〈20s~+155℃, 15min,1000 cycles	AEC-Q200 TEST 16 MIL-STD-202 Method 107	ΔR≤±0.2%	ΔR≤±0.5%
Bias Humidity	+85℃, 85%RH, powered no less than 10% rated power for 1000h	AEC-Q200 TEST 7 MIL-STD-202 Method 103	ΔR≤±0.2%	ΔR≤±0.5%
Load Life	2000h @ +70°C, rated power, 90min on, 30min off +70°C refers to terminal temperature	AEC-Q200 TEST 8 MIL-STD-202 Method 108	ΔR≤±0.5%	ΔR≤±1.0%
Resistance to Solvent	Immerse in solvent for 3 min and wipe 10 times. Three cycles ofthree solvents. Dry at ambient temperature after cleaning	AEC-Q200 TEST 12 MIL-STD-202 Method 215	Clear marking. No visible damage	
Mechanical Shock	Half Sine Wave, peak acceleration 100g's, pulse duration 6ms, 3 times in each of six directions, on three different axes	AEC-Q200 TEST 13 MIL-STD-202 Method 213	ΔR≤±0.05%	ΔR≤±0.2%
Vibration	10-2KHz, 5g's, 20min/cycle, 12 cycles in each directions of X Y Z	AEC-Q200 TEST 14 MIL-STD-202 Method 204	ΔR≤±0.05%	ΔR≤±0.2%
Resistance to Solder Heat	+260°C constant temperature heating station for 10s	AEC-Q200 TEST 15 MIL-STD-202 Method 210	ΔR≤±0.2%	ΔR≤±0.5%
Solderability	+245°C tin bath for 3s	AEC-Q200 TEST 18 IEC 60115-1 4.17	No visible damage. 95% minimum coverage	
TCR	+20°C and +120°C,+20°C Ref.	AEC-Q200 TEST 19 IEC 60115-1 4.8	Refer to tested curve, Max. value ≤ ±75ppm/°C(1mΩ~2mΩ) and ±50ppm/°C(3mΩ~5mΩ)	
Substrate Bending	2mm. Duration: 60s.	AEC-Q200 TEST 21 AEC-Q200-005	ΔR≤±0.1%	ΔR≤±0.5%
Short Time Overload	5x rated power, 5s	IEC 60115-1 4.13	ΔR≤±0.1%	ΔR≤±0.5%
Low Temperature Storage	-55℃ for 96h, unpowered	IEC 60068-2-1	ΔR=0	ΔR≤±0.1%
Moisture Resistance	Apply T=24 h/cycle, zero power,method 7a and 7b are not required	MIL-STD-202 Method 106	ΔR=0	ΔR≤±0.2%

◆ Derating Curve

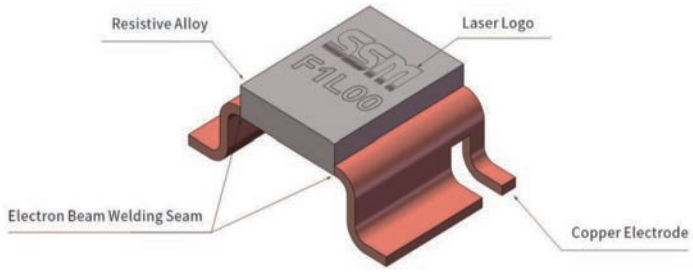


◆ Reflow Soldering Profile



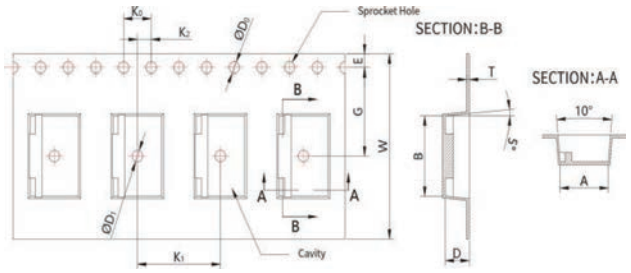
Resistor Surface Temperature:
Pre-Heat: +150℃+190℃,60~120sec.
Reflow: Above +220℃,90~150sec.
Applicable Solder Composition: Sn-Ag-Cu

◆Construction & Marking



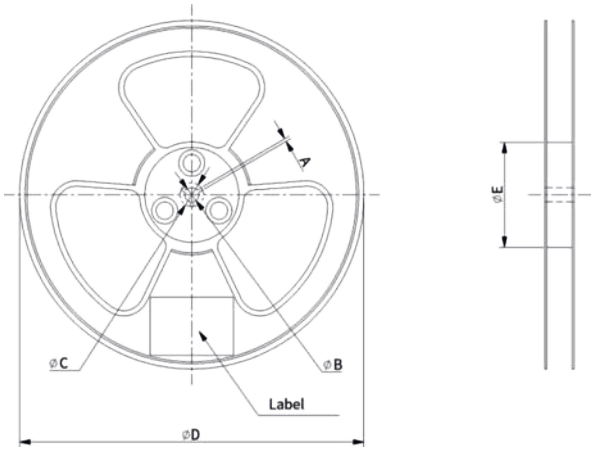
SSM:Brand
F:Tolerance
1L00:Resistance

◆Tape Specification



Series	Size inch. (mm)	Resistance Value	Unit:mm											
			A	B	φD0	φD1	K0	K1	K2	E	G	W	D	T
MSRPF 4026	4026 (10166)	1 mΩ	7.0±0.1	10.5±0.1	1.5±0.1	1.5±0.1	4.0±0.1	12.0±0.1	2.00±0.1	1.75±0.1	11.5±0.1	24.0±0.3	4.2±0.1	0.4±0.05
		1.3 mΩ	7.0±0.1	10.5±0.1	1.5±0.1	1.5±0.1	4.0±0.1	12.0±0.1	2.00±0.1	1.75±0.1	11.5±0.1	24.0±0.3	4.2±0.1	0.4±0.05
		2 mΩ	7.0±0.1	10.5±0.1	1.5±0.1	1.5±0.1	4.0±0.1	12.0±0.1	2.00±0.1	1.75±0.1	11.5±0.1	24.0±0.3	3.5±0.1	0.4±0.05
		3 mΩ	7.0±0.1	10.5±0.1	1.5±0.1	1.5±0.1	4.0±0.1	12.0±0.1	2.00±0.1	1.75±0.1	11.5±0.1	24.0±0.3	3.5±0.1	0.4±0.05
		4 mΩ	7.0±0.1	10.5±0.1	1.5±0.1	1.5±0.1	4.0±0.1	12.0±0.1	2.00±0.1	1.75±0.1	11.5±0.1	24.0±0.3	3.5±0.1	0.4±0.05
		5 mΩ	7.0±0.1	10.5±0.1	1.5±0.1	1.5±0.1	4.0±0.1	12.0±0.1	2.00±0.1	1.75±0.1	11.5±0.1	24.0±0.3	3.5±0.1	0.4±0.05

◆Reel Specification



Series	Unit:mm					
	Size inch. (mm)	A	φB	φC	φD	φE
MSRPF 4026	4026 (10166)	1.5 Min.	13.0+0.5/-0.2	20.2 Min.	330±2	100±2