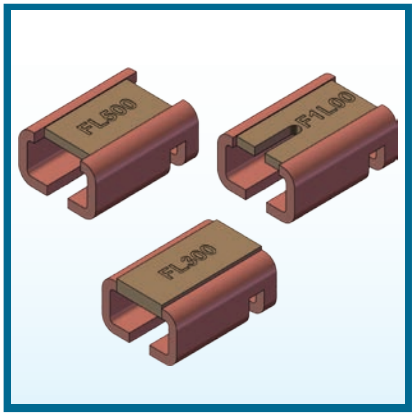


Lead free | Halogen free | RoHS Compliance

High-Precision Low-Inductance Alloy Current Sensing Resistor

■MSRPM 1216

AEC-Q200 Compliant

Features

- The MSRPM 1216 series is based on precision resistive alloy and welded with vacuum electron beam welding equipment to ensure its characteristics and reliability.
- The MSRPM 1216 series product can achieve a maximum target tolerance of ± 0.5% after precision trimming.
- TCR of MSRPM 1216 series is ≤±50ppm/°C within the operating temperature range from -55°C to +170°C and inductance is less than 3nH.
- The MSRPM 1216 series successfully achieves the independent and controllable production, stable quality, and timely delivery relying on our self-developed raw materials,core equipment and core processes.
- Providing standard specifications and custom solutions to meet various industry needs.

Applications

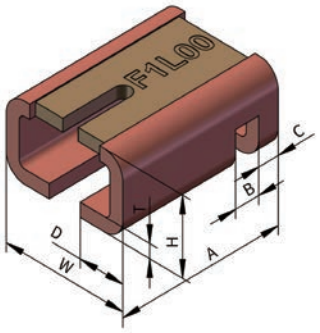
- Automotive Electronics
- Precision Power Supply
- Instrumentation
- Formation & Sorting of Battery
- Medical Equipment

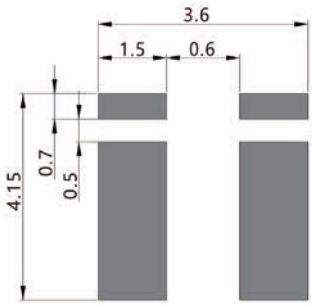
◆Electrical Specification

Series	Resistance Value	Power (+70°C)	Max.Operating Current	Operating Tempertature	TCR ppm/°C+20°C Ref)	Thermal Resistance	Weight	Tolerance	PKG.
MSRPM 1216	0.3mΩ	10 W	182A	-55℃~+170℃	±100(+20℃~+170℃)	7.8 ℃/W	0.1±0.05g	± 0.5 % ± 1.0 % ± 5.0 %	Tape 3,000 pcs.
	0.5mΩ	9 W	134A	-55℃~+170℃	±100(+20℃~+170℃)	12.1 ℃/W	0.1±0.05g		
	1.0mΩ	7 W	83A	-55℃~+170℃	±100(+20℃~+170℃)	12.7 ℃/W	0.07±0.03g		

◆Dimensions

Resistor





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

Series	Resistance Value	Unit:mm						
		T	H	W	A	B	C	D
MSRPM 1216	0.3mΩ	0.33 ± 0.2	1.92 ± 0.5	3.0 ± 0.2	4.0 ± 0.2	0.6 ± 0.2	0.5 ± 0.1	1.1 ± 0.2
	0.5mΩ	0.33 ± 0.2	1.8 ± 0.5	3.0 ± 0.2	4.0 ± 0.2	0.6 ± 0.2	0.5 ± 0.1	1.1 ± 0.2
	1.0mΩ	0.33 ± 0.2	1.8 ± 0.5	3.0 ± 0.2	4.0 ± 0.2	0.6 ± 0.2	0.5 ± 0.1	1.1 ± 0.2

◆ Part Number information

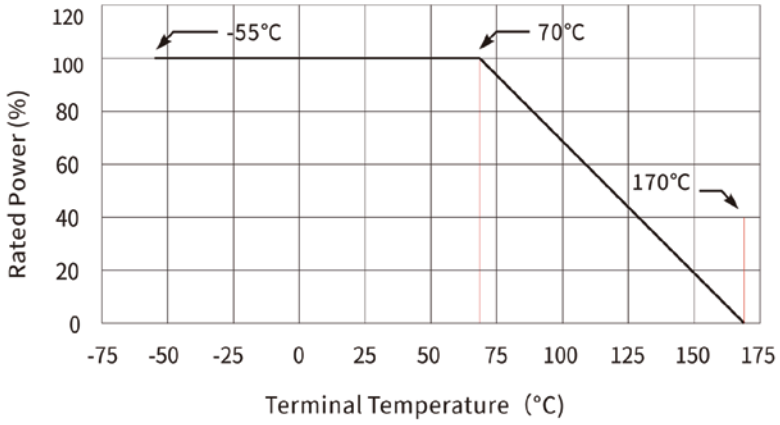
M	S	R	P	M	1	2	1	6	R	-	L	3	0	0	-	J	3	P	0

Series (5 characters)	Size (4 characters)	TCR (1 character)	Resistance (6 characters)	Tolerance (1 characters)	Quantity (3 characters)
MSRPM	1216	R = ±100 ppm/°C (+20°CRef) (+20°C~+170°C)	-L300- = 0.3 mΩ -L500- = 0.5 mΩ -1L00- = 1.0 mΩ	D = ±0.5 % F = ±1.0 % J = ±5.0 %	3P0 = 3,000 pcs.

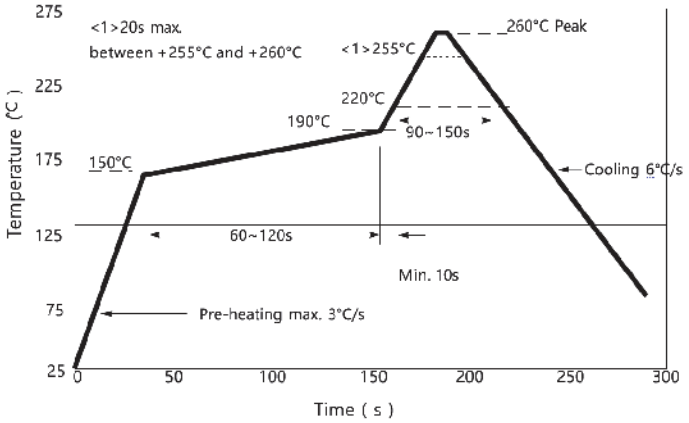
◆Performance

Test	Test Method		Standards	Max.
High Temperature Storage	+170°C for 1000h, unpowered	AEC-Q200 TEST 3 MIL-STD-202 Method 108	ΔR≤±0.5%	ΔR≤±1.0%
Thermal Shock	-55°C, 15min~ambient temperature <20s~+155°C, 15min, 1000 cycles	MIL-STD-202 Method 107	ΔR≤±0.5%	ΔR≤±1.0%
Bias Humidity	+85°C, 85%RH, powered 10% rated power for 1000h	AEC-Q200 TEST 7 MIL-STD-202 Method 103	ΔR≤±0.2%	ΔR≤±0.5%
Load Life	+70°C for 2000h, rated power, 90min on, 30min off +70℃ 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, 20 min per cycle, 12 cycles in each of the three directions of X.Y.Z loops	AEC-Q200 TEST 14 MIL-STD-202 Method 204	ΔR≤±0.05%	ΔR≤±0.2%
Resistance to Solder Heat	+260°C , 10s	AEC-Q200 TEST 15 MIL-STD-202 Method 210	ΔΔR≤±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	-55℃ and +170℃, +20℃ Ref.	AEC-Q200 TEST 19 IEC 60115-1 4.8	In the range of ±100ppm/°C	
Substrate Bending	2mm. Duration: 60s.	AEC-Q200 TEST 21 AEC-Q200-005	ΔR≤±0.1%	ΔR≤±0.5%
Short Time Overload	2.5x rated voltage, 5s	IEC 60115-1 4.13	ΔR≤±0.5%	ΔR≤±1.0%
Low Temperature Storage	-55℃ for 96h, unpowered	IEC 60068-2-1	ΔR=0	ΔR≤±0.1%
Moisture Resistance	Apply T = 24 hours/cycle, zero power, 7a and 7b are not required in the method	MIL-STD-202 Method 106	ΔR=0	ΔR≤±0.2%

◆Derating Curve



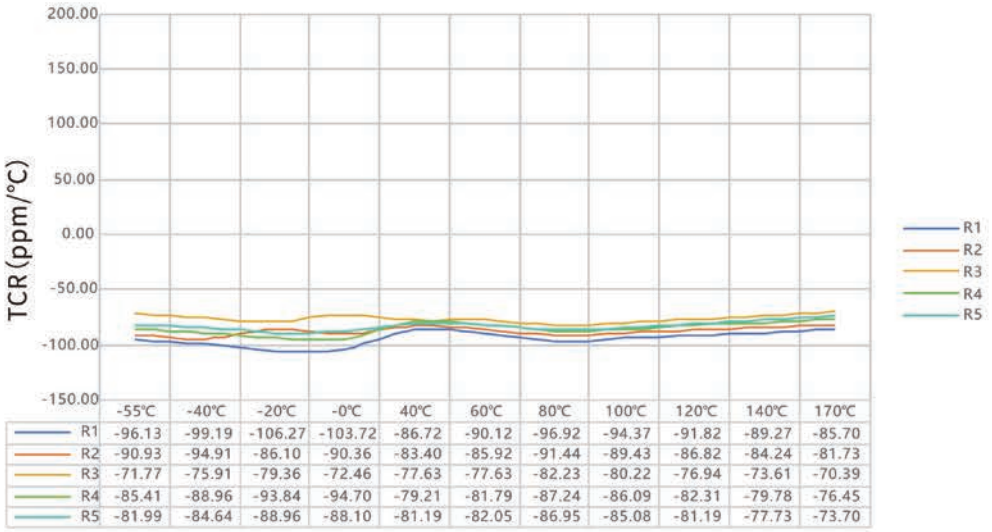
◆Reflow Soldering Profile



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

◆Temperature Coefficient of Resistance Test Curve

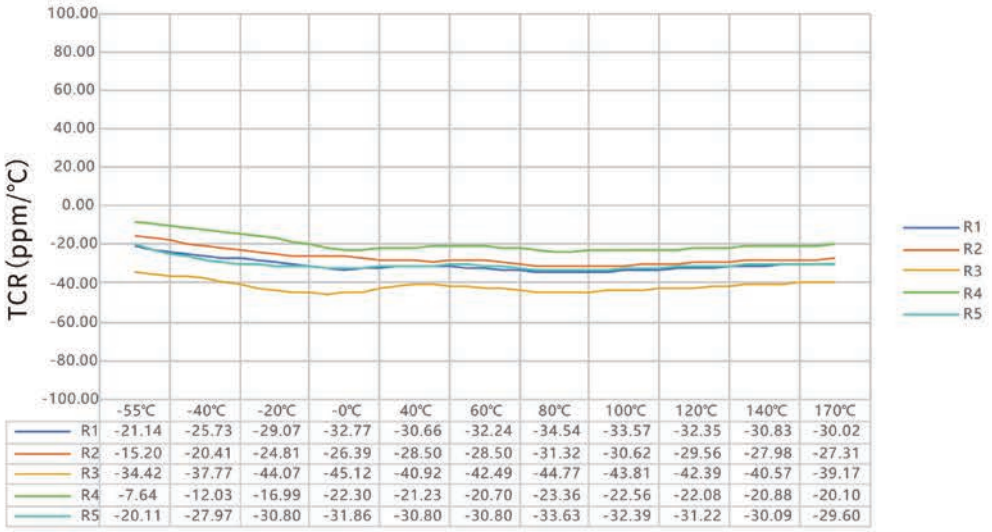
TCR Test Curve -MSRPM 1216 0.3mΩ



	-55℃	-40℃	-20℃	-0℃	40℃	60℃	80℃	100℃	120℃	140℃	170℃
R1	-96.13	-99.19	-106.27	-103.72	-86.72	-90.12	-96.92	-94.37	-91.82	-89.27	-85.70
R2	-90.93	-94.91	-86.10	-90.36	-83.40	-85.92	-91.44	-89.43	-86.82	-84.24	-81.73
R3	-71.77	-75.91	-79.36	-72.46	-77.63	-77.63	-82.23	-80.22	-76.94	-73.61	-70.39
R4	-85.41	-88.96	-93.84	-94.70	-79.21	-81.79	-87.24	-86.09	-82.31	-79.78	-76.45
R5	-81.99	-84.64	-88.96	-88.10	-81.19	-82.05	-86.95	-85.08	-81.19	-77.73	-73.70

Temperature (°C)

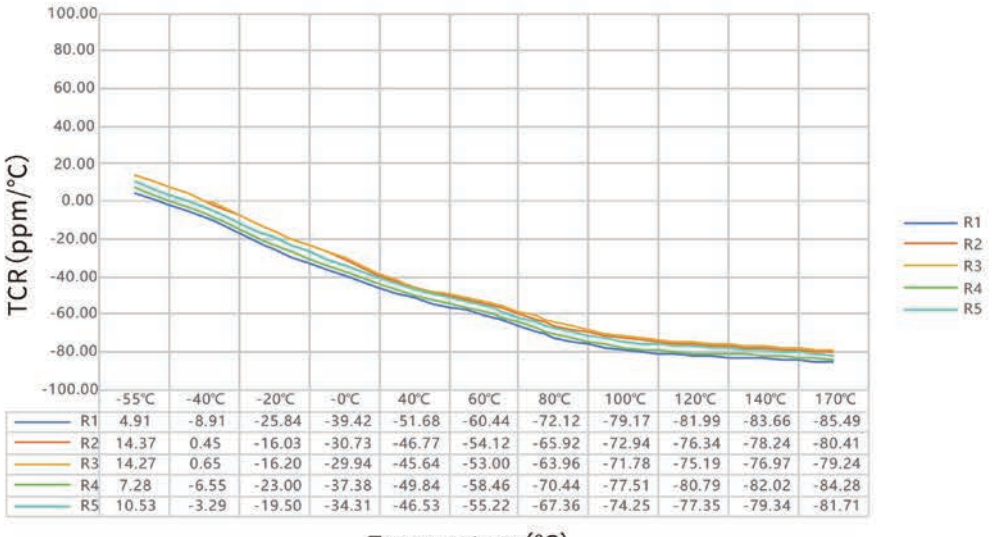
TCR Test Curve -MSRPM 1216 0.5mΩ



	-55℃	-40℃	-20℃	-0℃	40℃	60℃	80℃	100℃	120℃	140℃	170℃
R1	-21.14	-25.73	-29.07	-32.77	-30.66	-32.24	-34.54	-33.57	-32.35	-30.83	-30.02
R2	-15.20	-20.41	-24.81	-26.39	-28.50	-28.50	-31.32	-30.62	-29.56	-27.98	-27.31
R3	-34.42	-37.77	-44.07	-45.12	-40.92	-42.49	-44.77	-43.81	-42.39	-40.57	-39.17
R4	-7.64	-12.03	-16.99	-22.30	-21.23	-20.70	-23.36	-22.56	-22.08	-20.88	-20.10
R5	-20.11	-27.97	-30.80	-31.86	-30.80	-30.80	-33.63	-32.39	-31.22	-30.09	-29.60

Temperature (°C)

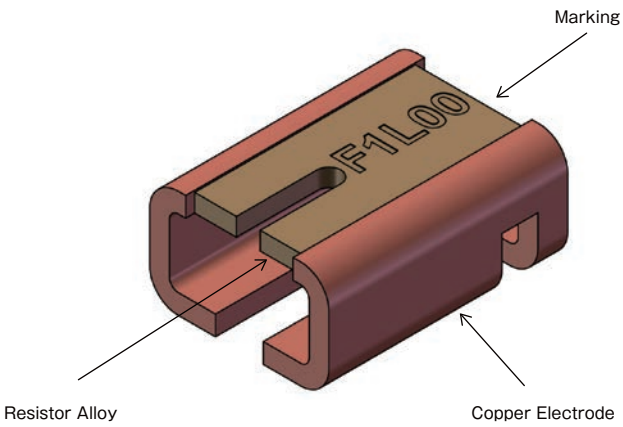
TCR Test Curve -MSRPM 1216 1.0mΩ



	-55℃	-40℃	-20℃	-0℃	40℃	60℃	80℃	100℃	120℃	140℃	170℃
R1	4.91	-8.91	-25.84	-39.42	-51.68	-60.44	-72.12	-79.17	-81.99	-83.66	-85.49
R2	14.37	0.45	-16.03	-30.73	-46.77	-54.12	-65.92	-72.94	-76.34	-78.24	-80.41
R3	14.27	0.65	-16.20	-29.94	-45.64	-53.00	-63.96	-71.78	-75.19	-76.97	-79.24
R4	7.28	-6.55	-23.00	-37.38	-49.84	-58.46	-70.44	-77.51	-80.79	-82.02	-84.28
R5	10.53	-3.29	-19.50	-34.31	-46.53	-55.22	-67.36	-74.25	-77.35	-79.34	-81.71

Temperature (°C)

◆Construction & Marking



Marking: Tolerance+Resistance

F：Tolerance

1L00：Resistance

◆ Storage Instructions

(1) Resistors should be stored at a temperature of 5 to 35°C, with a humidity of <60% RH. The humidity should be kept as low as possible.

(2) Resistors should be protected from direct sunlight.

(3) Resistors should be stored in a clean and dry environment free of harmful gases (HCl, Sulfuric acid, H2S, etc.)

(4) Do not move the resistor from the packaging unless use it.

(5) Under the above storage conditions, the resistor can be stored for at least 1 year.

◆Usage Suggestions

(1) Please protect the surface of the resistor during use. Prevent defects such as scratches, bumps, and oil stains on the surface.

(2) Do not use sharp tweezers to move the resistor. Scratches on the surface can cause resistance drift and resistor failure.

(3) When installing and using resistors, avoid the impact of mechanical stress on the resistor.

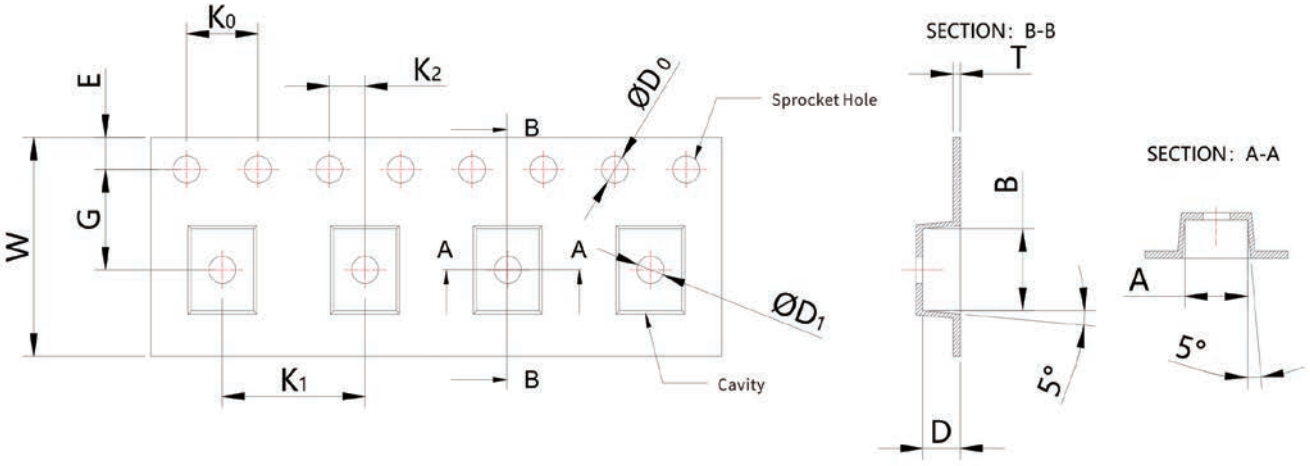
(4) The long-term operating power of resistors should be ≤ rated power to avoid resistance drift caused by long-term overload.

(5) Please refer to the derating curve when operating under high temperature conditions or poor heat dissipation environment.

(6) If the operating conditions exceed the pulse specified in the pulse curve, a systematic evaluation is required.

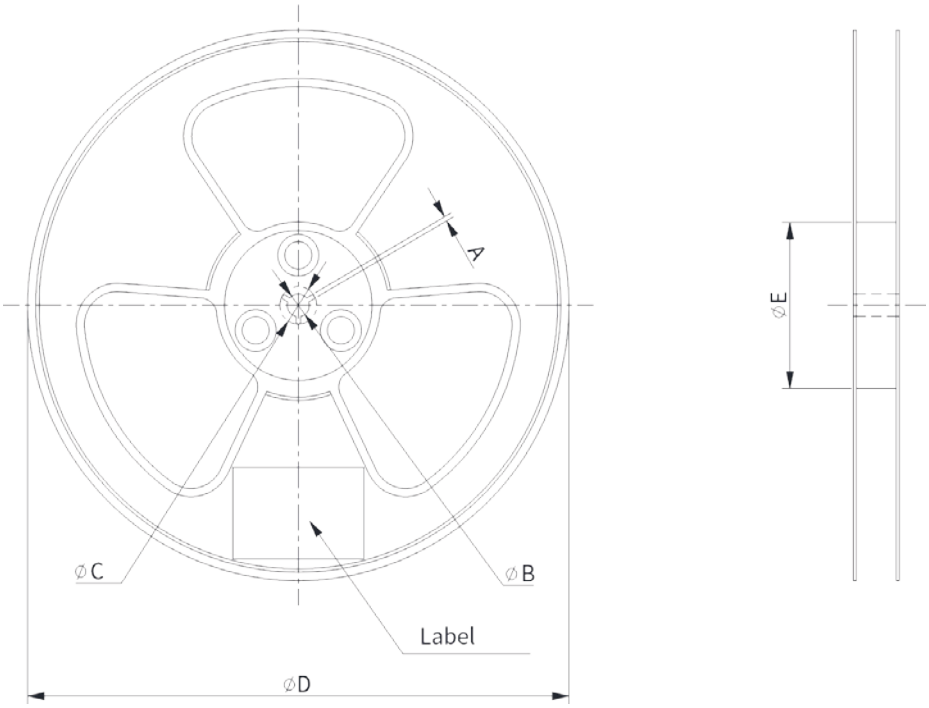
(7) If the resistor is not used after being moved from the packaging, it should be stored under vacuum to avoid risks such as poor welding caused by oxidation of the resistor.

◆Tape Specification



Series	Resistance Value	Unit:mm											
		A	B	ϕD0	ϕD1	K0	K1	K2	E	G	W	D	T
MSRPM 1216	0.3 mΩ~1.0 mΩ	3.5±0.1	4.5±0.1	1.5±0.1	1.5±0.1	4.00±0.1	8.0±0.1	2.0±0.1	1.75±0.1	5.5±0.1	12.0±0.3	2.1±0.1	0.4±0.05

◆Reel Specification



Series	Unit:mm				
	A	ϕB	ϕC	ϕD	ϕE
MSRPM 1216	1.5 Min.	13.0+0.5/-0.2	20.2 Min.	330±2	100±2

◆Popular Part Numbers

Part Number	Size	Tolearance	Resistance	TCR (+20°C Ref)	Power	Quantity	Max. Operating Current
MSRPM1216R-L300-D3P0	1216	±0.5%	0.3mΩ	±100ppm/℃	10W	3000pcs	182A
MSRPM1216R-L300-F3P0	1216	±1.0%	0.3mΩ	±100ppm/℃	10W	3000pcs	182A
MSRPM1216R-L300-J3P0	1216	±5.0%	0.3mΩ	±100ppm/℃	10W	3000pcs	182A
MSRPM1216R-L500-D3P0	1216	±0.5%	0.5mΩ	±100ppm/℃	9W	3000pcs	134A
MSRPM1216R-L500-F3P0	1216	±1.0%	0.5mΩ	±100ppm/℃	9W	3000pcs	134A
MSRPM1216R-L500-J3P0	1216	±5.0%	0.5mΩ	±100ppm/℃	9W	3000pcs	134A
MSRPM1216R-1L00-D3P0	1216	±0.5%	1.0mΩ	±100ppm/℃	7W	3000pcs	83A
MSRPM1216R-1L00-F3P0	1216	±1.0%	1.0mΩ	±100ppm/℃	7W	3000pcs	83A
MSRPM1216R-1L00-J3P0	1216	±5.0%	1.0mΩ	±100ppm/℃	7W	3000pcs	83A