PROSEMI

Metal Alloy Short Terminal Resistor

MSR ~Series

Description

- Metal Alloy Short Terminal Low-Resistance Resistor
- Low thermal EMF
- Low TCR
- Low inductance

Applications

- Battery pack
- Inverter/Converter
- Consumer electronics
- Laptops

Part number

MSR 12 A 1 R002 F 1

【1】【2】【3】【4】【5】【6】【7】

【1】Series Name: Metal alloy Short terminal Resistor

【2】Chip Size: 08:0805 12: 1206

【3】Terminals: A:2 terminals , B:4 terminals

【4】Power Rating: D=0.75W, E=0.5W, F=0.25W, 1=1W, 2=2W

【5】Resistance Code: R002: 2mΩ , 1M50: 1.5mΩ

【6】Resistance Precision: D:±0.5%, F:±1%, G:±2%, J: ±5%

【7】Marking Code: 1:No marking 2: Marking

Electrical Characteristics

Part number	Power Rating at 70℃(W)	Resistance Range (mΩ)	TCR (ppm/℃)	Resistance Tolerance (%)	Rating Current	Operation Temperature Range
MSR12A	1.0	1.5~4	±75	±0.5; ±1.0	$(P/R)^{1/2}$	-55℃~+150℃
		5~20	±50			
MSR08A	0.75	1.5~2	±100			
		3~5	±75			
		6~20	±50			

Note: P=Rating Power ; R=Resistance Value

Physical Dimensions

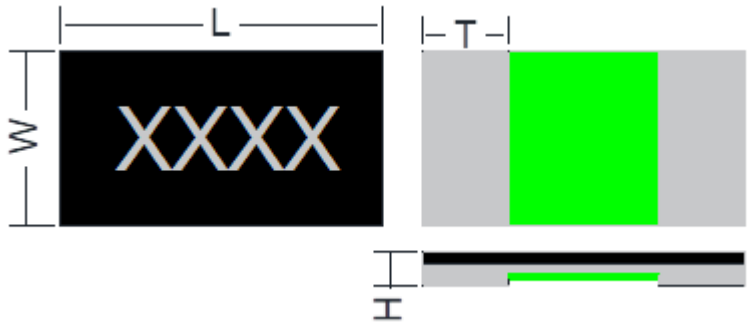


Fig.1

Unit: mm

Part number	L	W	H	T
MSR12A11M50	3.20±0.20	1.60±0.20	Max 0.50	1.10±0.15
MSR12A1R002	3.20±0.20	1.60±0.20	Max 0.40	1.10±0.15
MSR12A1R003	3.20±0.20	1.60±0.20	Max 0.40	0.85±0.15
MSR12A1R004~R005	3.20±0.20	1.60±0.20	Max 0.35	0.85±0.15
MSR12A1R006~R020	3.20±0.20	1.60±0.20	Max 0.35	0.58±0.15

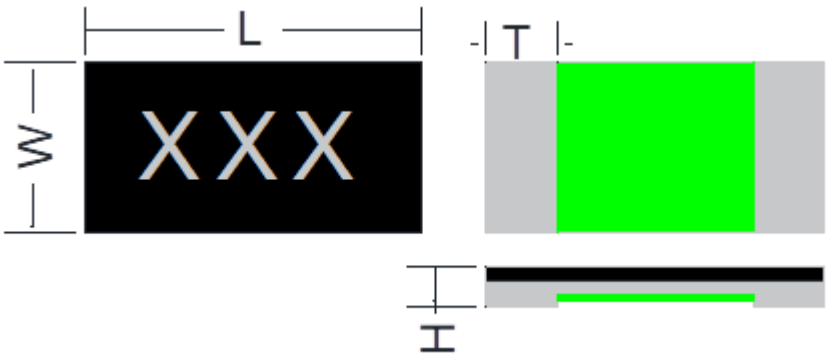


Fig.2

Unit: mm

Part number	L	W	H	T
MSR08AD1M50	2.06±0.20	1.26±0.20	Max 0.50	0.73±0.15
MSR08ADR002	2.06±0.20	1.26±0.20	Max 0.40	0.63±0.15
MSR08ADR003~R004	2.06±0.20	1.26±0.20	Max 0.40	0.43±0.15
MSR08ADR005~R020	2.06±0.20	1.26±0.20	Max 0.35	0.43±0.15

Marking Instructions

MSR12A is marked with four digit(Ref to Fig.1). We have two different ways of marking:

a. "**R**" designates the decimal location in ohms

e.g. 2mΩ : R002; 10mΩ : R010;

b. "**m**" designates the decimal location in milliohms

e.g. 2.5mΩ : 2m50; 5.5mΩ : 5m50;

MSR08A is marked with three digit(Ref to Fig.2). We have two different ways of marking:

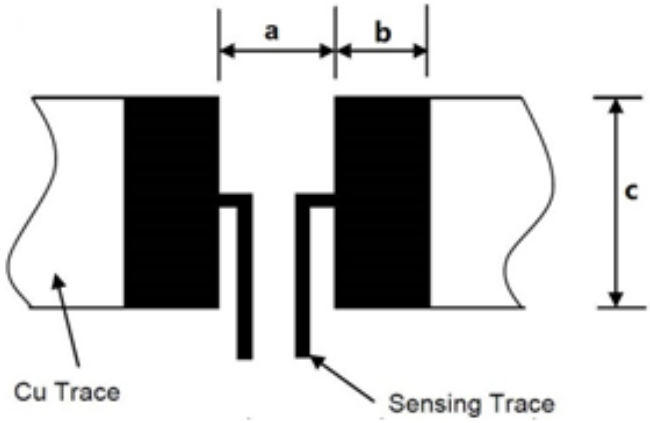
a. "**R**" designates the decimal location in ohms

e.g. 2mΩ : 002; 10mΩ : 010

b. "**m**" designates the decimal location in milliohms

e.g. 2.5mΩ : 2m5; 5.5mΩ : 5m5

Recommended Solder Pad Layout

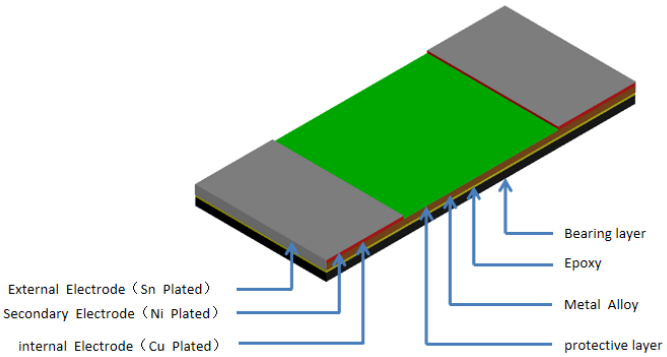


Unit: mm

Part number	a	b	c
MSR12A11M50~R002	0.70	2.00	1.84
MSR12A1R003~R005	1.00	1.85	1.84
MSR12A1R006~R020	1.20	1.75	1.84

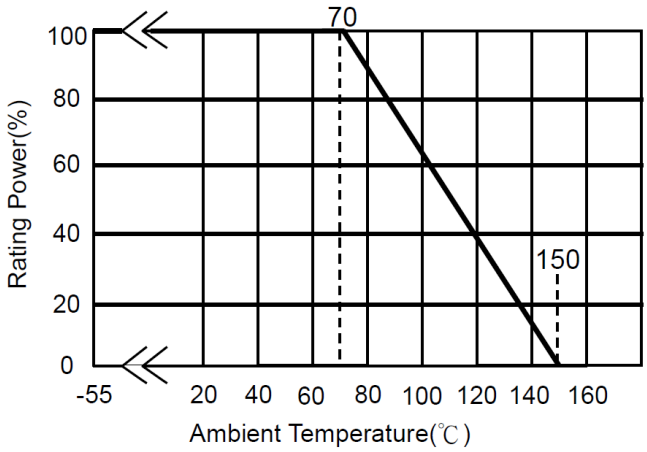
Part number	a	b	c
MSR08AD1M50	0.50	1.65	1.52
MSR08ADR002	0.60	1.55	1.52
MSR08ADR003~R020	0.80	1.45	1.52

Construction

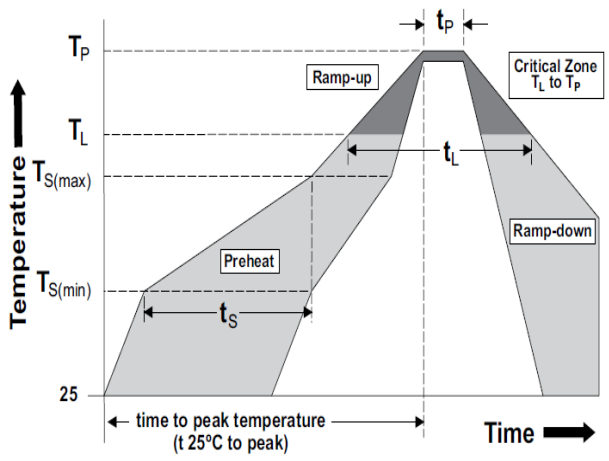


Power Derating Curve

For resistors operated in ambient temperatures 70°C, power rating shall be derated in according with the curve below:



Recommended Solder Curve



Reflow Condition		Pb – Free assembly
Pre heat	- Temperature Min ($T_{S(min)}$)	150°C
	- Temperature Max ($T_{S(max)}$)	200°C
	- Time (Min to Max) (t_S)	60 – 120 secs
Average ramp up rate (Liquidus Temp (T_L) to peak		5°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		5°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		260°C
Time within 5°C of actual peak Temperature (t_P)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Wave Soldering		Not applicable
Hand Soldering		350°C, 5 seconds max.

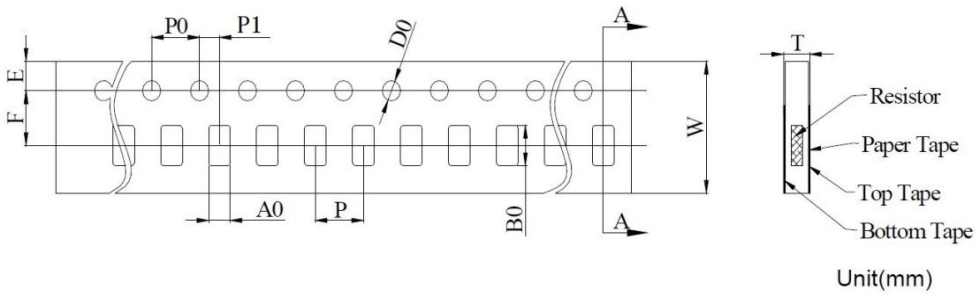
Product Characteristics

<table>
<tr><th>Item</th><th>Test condition/ Methods</th><th>Limited</th><th>Standard</th></tr>
<tr><td>Temperature coefficient of resistance</td><td>TCR =(R-R0)/R0(T2-T1)X 10^6
R0: resistance of room temperature
R: resistance of 125℃
T1: Room temperature
T2: Temperature at 125℃</td><td>Refer to Spec</td><td>MIL-STD-202 Method 304</td></tr>
<tr><td>Short time Overload</td><td>Applied Overload for 5 seconds , then measure its resistance variance rate. (Test condition refer to below):
<table>
<tr><th>Type</th><th>Resistance(mΩ)</th><th>Rated power</th></tr>
<tr><td rowspan="2">1206</td><td>1.5≤R≤10</td><td>4 times</td></tr>
<tr><td>10＜R≤20</td><td>3 times</td></tr>
<tr><td rowspan="2">0805</td><td>1.5≤R≤10</td><td>4 times</td></tr>
<tr><td>10＜R≤20</td><td>3 times</td></tr>
</table></td><td>≤±1.0%</td><td>IEC60115-1 4.13</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>260℃± 5℃ time：12sec± 0.5sec</td><td>≤±0.5%</td><td>MIL-STD-202 Method 210</td></tr>
<tr><td>Solderability</td><td>Temperature of Solder：245±5℃
Dipping time:3±0.5s</td><td>Solder coverage over 95%</td><td>IEC60115-1 4.17</td></tr>
<tr><td>Temperature Cycling</td><td>-55℃ (15min)/+150℃(15min), 300 cycles</td><td>≤±1.0%</td><td>MIL-STD-202 Method107G</td></tr>
<tr><td>Low temperature Storage</td><td>-55℃ for 1000hours, No power</td><td>≤±1.0%</td><td>IEC60115-1 4.23.4</td></tr>
<tr><td>High Temperature Storage</td><td>150℃ for 1000hours, No power</td><td>≤±1.0%</td><td>IEC60115-1 4.25</td></tr>
<tr><td>Bias Humidity</td><td>+85℃，85% RH，10%bias, 1000hours</td><td>1.5~10mR,△R≤±1%
11~20mR,△R≤±2%</td><td>MIL-STD-202 Method103</td></tr>
<tr><td>Vibration</td><td>5g's for 20 minutes
12 cycles each of 3 orientations.
Test from 10 Hz - 2000 Hz</td><td>≤±0.5%</td><td>MIL-STD-202 Method 204</td></tr>
<tr><td>Operational life</td><td>70℃± 2℃, 1000 hours, at rated power 1.5 hours “ON”, 0.5 hours “OFF”</td><td>1206:
1.5~9mR , △R≤±1%
10~14mR , △R≤±3%
15~20mR , △R≤±4%
0805：
1.5~10mR,△R≤±1%
11~20mR,△R≤±3%</td><td>MIL-STD-202 Method 108</td></tr>
<tr><td>Moisture resistance</td><td>MIL-STD-202,method106， No power, 7b not required</td><td>≤±0.5%</td><td>MIL-STD-202 Method 106</td></tr>
</table>

Note : Measurement at 24±4 hours after test conclusion for all reliability tests-parts.

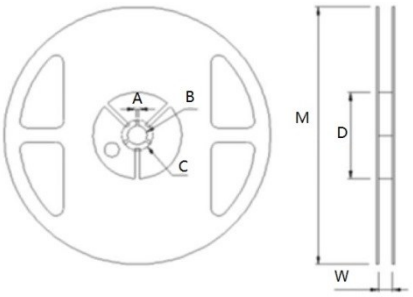
Packaging

Tape Dimensions



Type	MSR12A	MSR08A
A0	2.00±0.20	1.66±0.20
B0	3.60±0.20	2.46±0.20
E	1.75±0.10	1.75±0.10
F	3.50±0.05	3.50±0.05
W	8.00±0.20	8.00±0.20
P0	4.00±0.10	4.00±0.10
P	4.00±0.10	4.00±0.10
P1	2.00±0.05	2.00±0.05
D0	1.50±0.10	1.50±0.10
T	0.55±0.20	0.55±0.20

Reel Dimensions



Unit: mm

Type	M	W	A	B	C	D
7 inch reel	178.0±2.0	8.4+0.5/-0	2.0±0.5	13.2±0.5	17.70±0.5	60.0±1.0

Quantity of Package

Type	MSR12A	MSR08A
Quantity(pcs）	5000	5000

Storage

The temperature condition must be controlled less than 40℃, The R.H. must be controlled less than 75%. Store in accordance with this requirement, and the validity period is two years after the date of manufacture.

Please avoid the mentioned harsh environment below when storing to ensure product performance and its' weldability. Places exposed to sea breeze or other corrosive gas, such as Cl_2, H_2S, NH_3, SO_2 and NO_2.

When the product is moved and stored, please ensure the correct orientation of the box. Do not drop or squeeze the box. Otherwise, the electrode or the body of the product may be damaged.

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