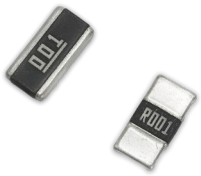
MSMA

SMD current sensing resistor- metal strip



Applications

- Switched-mode power supply (SMPS)
- Voltage regulator module
- Power management
- Stepper motor drives

Product features

- Low sensing resistance
- 0603 (1608 metric) to 2512 (6432 metric)
- High power dissipation
- AEC-Q200 compliant
- Moisture sensitivity level (MSL): 1

Environmental compliance

Pb HALOGEN HF FREE RoHS

Table 1. Part numbering configuration scheme

MSM @ xxxx Rxxxx * ? !

Family name	MSM
Grade option	A = Automotive grade
Footprint EIA option	0603, 0805, 1206, 2010, 2512 1225 = 2512 wide terminal
Resistance option	Rxxxx = xxx.x mΩ R0000 = 0, Resistance is under 0.5 mΩ for jumper resistor , R0050 = 5.0 mΩ
Resistance tolerance option	F = ±1%, J= ±5%
Power rating option	A = 1/4 W, S = 1/2 W, C = 1 W, D = 1.5 W, E = 2 W, G = 3 W
Metal material option	M = MnCu, N = NiCu, C= Cu

See electrical specification table for option details

Powering Business Worldwide

Mechanical parameters- Inches [mm]

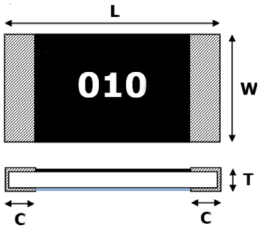


Figure A

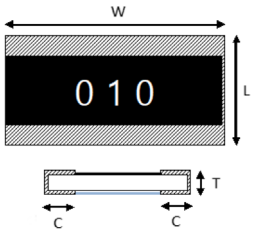
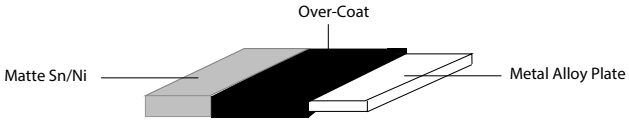


Figure B

Construction

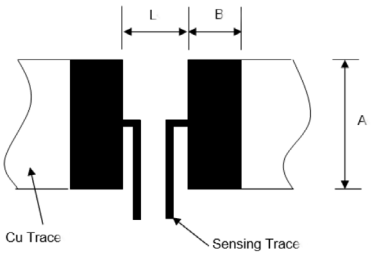


Family	Size code	L	W	C	T	Figure
MSMA0603	0603 [1608]	0.063 ± 0.004 [1.60 ± 0.10]	0.031 ± 0.004 [0.80 ± 0.10]	0.016 ± 0.008 [0.40 ± 0.20]	0.012 ± 0.008 [0.30 ± 0.20]	A
MSMA0805 R < 2	0805 [2512]	0.079 ± 0.008 [2.0 ± 0.20]	0.049 ± 0.008 [1.25 ± 0.20]	0.026 ± 0.012 [0.65 ± 0.30]	0.028 ± 0.008 [0.70 ± 0.20]	A
MSMA0805 R ≥ 2	0805 [2012]	0.079 ± 0.008 [2.0 ± 0.20]	0.049 ± 0.008 [1.25 ± 0.20]	0.016 ± 0.012 [0.40 ± 0.30]	0.028 ± 0.008 [0.70 ± 0.20]	A
MSMA1206 R = 1	1206 [3216]	0.126 ± 0.008 [3.20 ± 0.20]	0.063 ± 0.008 [1.60 ± 0.20]	0.043 ± 0.012 [1.10 ± 0.30]	0.030 ± 0.008 [0.75 ± 0.20]	A
MSMA1206 R > 1	1206 [3216]	0.126 ± 0.008 [3.20 ± 0.20]	0.063 ± 0.008 [1.60 ± 0.20]	0.020 ± 0.012 [0.50 ± 0.30]	0.024 ± 0.008 [0.60 ± 0.20]	A
MSMA2010 R ≤ 3	2010 [5025]	0.197 ± 0.008 [5.0 ± 0.20]	0.098 ± 0.008 [2.50 ± 0.20]	0.059 ± 0.012 [1.50 ± 0.30]	0.024 ± 0.008 [0.60 ± 0.20]	A
MSMA2010 R > 3	2010 [5025]	0.197 ± 0.008 [5.0 ± 0.20]	0.098 ± 0.008 [2.50 ± 0.20]	0.024 ± 0.012 [0.60 ± 0.30]	0.024 ± 0.008 [0.60 ± 0.20]	A
MSMA2512 R = 0.5	2512 [6432]	0.252 ± 0.008 [6.40 ± 0.20]	0.126 ± 0.008 [3.20 ± 0.20]	0.102 ± 0.008 [2.60 ± 0.20]	0.024 ± 0.008 [0.60 ± 0.20]	A
MSMA2512 0.5 < R ≤ 3	2512 [6432]	0.252 ± 0.008 [6.40 ± 0.20]	0.126 ± 0.008 [3.20 ± 0.20]	0.087 ± 0.008 [2.20 ± 0.20]	0.024 ± 0.008 [0.60 ± 0.20]	A
MSMA2512 3 < R ≤ 50	2512 [6432]	0.252 ± 0.008 [6.40 ± 0.20]	0.126 ± 0.008 [3.20 ± 0.20]	0.035 ± 0.008 [0.90 ± 0.20]	0.024 ± 0.008 [0.60 ± 0.20]	A
MSMA2512 3W R ≤ 4	2512 [6432]	0.252 ± 0.008 [6.40 ± 0.20]	0.126 ± 0.008 [3.20 ± 0.20]	0.087 ± 0.008 [2.2 ± 0.20]	0.035 ± 0.008 [0.90 ± 0.20]	A
MSMA2512 3W 4 < R ≤ 100	2512 [6432]	0.252 ± 0.008 [6.40 ± 0.20]	0.126 ± 0.008 [3.20 ± 0.20]	0.035 ± 0.008 [0.90 ± 0.20]	0.035 ± 0.008 [0.90 ± 0.20]	A
MSMA2512 R > 100	2512 [6432]	0.252 ± 0.008 [6.40 ± 0.20]	0.126 ± 0.008 [3.20 ± 0.20]	0.035 ± 0.008 [0.90 ± 0.20]	0.035 ± 0.008 [0.90 ± 0.20]	A
MSMA1225	1225 [3264]	0.126 ± 0.008 [3.20 ± 0.20]	0.252 ± 0.008 [6.40 ± 0.20]	0.020 ± 0.008 [0.50 ± 0.20]	0.035 ± 0.010 [0.90 ± 0.25]	B

Part marking

Family	Marking
MSMA0603	No marking
MSMA0805	Resistance value is expressed by 3 digits. 005 = 0.005 Ω or 5 mΩ 010 = 0.010 Ω or 10 mΩ White box = all values less than 2 mΩ
MSMA1206	Resistance value is expressed by 2 or 4 digits. R01 = 0.001 Ω or 1 mΩ 7R5m = 0.0075 Ω or 7.5 mΩ R050 = 0.050 Ω or 50 mΩ
MSMA2010	Resistance value is expressed by 4 digits. R001 = 0.001 Ω or 1 mΩ R050 = 0.050 Ω or 50 mΩ
MSMA2512	Resistance value is expressed by 4 digits. R50m = 0.0005 Ω or 0.5 mΩ R001 = 0.001 Ω or 1 mΩ 6R8m = 0.0068 Ω or 6.8 mΩ R050 = 0.050 Ω or 50 mΩ
MSMA1225	Resistance value is expressed by 3 or 4 digits. 2R2m= .0022 Ω or 2.2 mΩ 005 = 0.005 Ω or 5 mΩ 010 = 0.010 Ω or 10 mΩ

Recommended PCB layout- mm



Family	Resistance (mΩ)	A	L	B
MSMA0603	R = 0	2.1	0.7	0.7
MSMA0805	1 ≤ R ≤ 2	1.4	0.7	1.15
	2 ≤ R ≤ 25	1.4	1.2	1.15
MSMA1206	R = 1	1.8	1.0	2.3
	1 ≤ R ≤ 50	1.8	1.6	1.7
MSMA2010	1 ≤ R ≤ 3	3.4	2.0	3.5
	4 ≤ R ≤ 50	3.4	3.5	1.5
MSMA2512	0.5 ≤ R ≤ 3	4.0	1.3	3.1
	3 W, R = 4	4.0	1.3	3.1
	4 ≤ R	4.0	4.1	2.1
MSMA1225	1 ≤ R ≤ 40	7.0	2.3	1.0

1. The copper foil thickness of PCB needs 3 oz. minimum
2. PCB layout dimension tolerance is +/-0.1 mm.
3. The resistance will change slightly after soldered; it is dependent on PCB pad size deign and it's necessary to consider the effect of the resistance increase or decrease.

Electrical specifications

Part number	Size	Grade option	Resistance value mΩ (Part number code)	Resistance tolerance (Part number code)	Power rating (Part number code)	Metal material (Part number code)	TCR (ppm/°C)	Operating temperature
MSM@0603Rxxxx*?!	0603 (1608 metric)	A	0 (0000)*	±5% (J)	1/4 W (A)	Cu (C)	3800	-55 °C to +150 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	1 (0010)	±1% (F)	1/2 W (S)	MnCu (M)	± 100	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	1.5 (0015)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	2 (0020)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	3 (0030)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	4 (0040)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	5 (0050)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	6 (0060)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	8 (0080)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	9 (0090)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	10 (0100)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	15 (0150)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	20 (0200)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@0805Rxxxx*?!	0805 (2012 metric)	A	25 (0250)	±1% (F)	1/2 W (S)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	1 (0010)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	2 (0020)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	3 (0030)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	3.5 (0035)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	4 (0040)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	5 (0050)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	6 (0060)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	7 (0070)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	7.5 (0075)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	8 (0080)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	9 (0090)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	10 (0100)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	12 (0120)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	14 (0140)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	15 (0150)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	16 (0160)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	18 (0180)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	20 (0200)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	22 (0220)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	25 (0250)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	30 (0300)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	40 (0400)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1206Rxxxx*?!	1206 (3216 metric)	A	50 (0500)	±1% (F)	1 W (C)	MnCu (M)	± 50	-55 °C to +170 °C

@= Enter grade option from table above (A=Automotive)
Rxxxx = Enter resistance code option from table above xxxx= resistance code (R0000 = 0, Resistance is under 0.5mΩ for jumper resistor , R0050 = 5.0 mΩ)
*= Enter resistance tolerance code option from table above (F= ±1%, J= ±5%)
?= Enter power rating code option from table above (A =1/4 W, S =1/2 W, C =1 W, D = 1.5 W, E = 2 W, G= 3 W)
!=Enter metal material code option from tabel above (M = MnCu, N = NiCu, C= Cu)

Electrical specifications

Part number	Size	Grade option	Resistance value mΩ (Part number code)	Resistance tolerance (Part number code)	Power rating (Part number code)	Metal material (Part number code)	TCR (ppm/°C)	Operating temperature
MSM@2010Rxxxx*?!	2010 (5025 metric)	A	1 (0010)	±1% (F)	1.5 W (D)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2010Rxxxx*?!	2010 (5025 metric)	A	2 (0020)	±1% (F)	1.5 W (D)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2010Rxxxx*?!	2010 (5025 metric)	A	14 (0140)	±1% (F)	1.5 W (D)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2010Rxxxx*?!	2010 (5025 metric)	A	30 (0300)	±1% (F)	1.5 W (D)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2010Rxxxx*?!	2010 (5025 metric)	A	5 (0050)	±1% (F)	1.5 W (D)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2010Rxxxx*?!	2010 (5025 metric)	A	6 (0060)	±1% (F)	1.5 W (D)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2010Rxxxx*?!	2010 (5025 metric)	A	10 (0100)	±1% (F)	1.5 W (D)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2010Rxxxx*?!	2010 (5025 metric)	A	15 (0150)	±1% (F)	1.5 W (D)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2010Rxxxx*?!	2010 (5025 metric)	A	20 (0200)	±1% (F)	1.5 W (D)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2010Rxxxx*?!	2010 (5025 metric)	A	50 (0500)	±1% (F)	1.5 W (D)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	1 (0010)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	2 (0020)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	3 (0030)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	3.5 (0035)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	4 (0040)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	5 (0050)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	6 (0060)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	7 (0070)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	8 (0080)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	9 (0090)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	10 (0100)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	11 (0110)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	15 (0150)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	16 (0160)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	18 (0180)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	20 (0200)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	25 (0250)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	30 (0300)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	33 (0330)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	35 (0350)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	40 (0400)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	50 (0500)	±1% (F)	1 W (C)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	0.5 (0005)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	1 (0010)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	1.1 (0011)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	1.5 (0015)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	2 (0020)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	3 (0030)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	4 (0040)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	5 (0050)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	6 (0060)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	7 (0070)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C

@= Enter grade option from table above (A=Automotive)
Rxxxx = Enter resistance code option from table above xxxx= resistance code (R0000 = 0, Resistance is under 0.5mΩ for jumper resistor , R0050 = 5.0 mΩ)
*= Enter resistance tolerance code option from table above (F= ±1%, J= ±5%)
?= Enter power rating code option from table above (A =1/4 W, S =1/2 W, C =1 W, D = 1.5 W, E = 2 W, G= 3 W)
!=Enter metal material code option from tabel above (M = MnCu, N = NiCu, C= Cu)

Electrical specifications

Part number	Size	Grade option	Resistance value mΩ (Part number code)	Resistance tolerance (Part number code)	Power rating (Part number code)	Metal material (Part number code)	TCR (ppm/°C)	Operating temperature
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	8 (0080)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	9 (0090)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	10 (0100)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	12 (0120)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	15 (0150)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	16 (0160)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	20 (0200)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	25 (0250)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	27 (0270)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	30 (0300)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	33 (0330)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	40 (0400)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	42 (0420)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	45 (0450)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	48 (0480)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	50 (0500)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	60 (0600)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	70 (0700)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	3 (0030)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	4 (0040)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	10 (0100)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	11 (0110)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	12 (0120)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	13 (0130)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	15 (0150)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	18 (0180)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	20 (0200)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	22 (0220)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	25 (0250)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	30 (0300)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	33 (0330)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	35 (0350)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	39 (0390)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	40 (0400)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	42 (0420)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	45 (0450)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	47 (0470)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	48 (0480)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	50 (0500)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	56 (0560)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	57 (0570)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	60 (0600)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C

@= Enter grade option from table above (A=Automotive)

Rxxxx = Enter resistance code option from table above xxxx= resistance code (R0000 = 0, Resistance is under 0.5mΩ for jumper resistor , R0050 = 5.0 mΩ)

*= Enter resistance tolerance code option from table above (F= ±1%, J= ±5%)

?= Enter power rating code option from table above (A =1/4 W, S =1/2 W, C =1 W, D = 1.5 W, E = 2 W, G= 3 W)

!=Enter metal material code option from tabel above (M = MnCu, N = NiCu, C= Cu)

Electrical specifications

Part number	Size	Grade option	Resistance value mΩ (Part number code)	Resistance tolerance (Part number code)	Power rating (Part number code)	Metal material (Part number code)	TCR (ppm/°C)	Operating temperature
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	65 (0650)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	68 (0680)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	70 (0700)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	75 (0750)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	80 (0800)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	85 (0850)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	90 (0900)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	100 (1000)	±1% (F)	3 W (G)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	120 (1200)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	130 (1300)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	140 (1400)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	150 (1500)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	170 (1700)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	175 (1750)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	180 (1800)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	200 (2000)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	220 (2200)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	240 (2400)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	250 (2500)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	270 (2700)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	300 (3000)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	330 (3300)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	390 (3900)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	400 (4000)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	500 (5000)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	510 (5100)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	560 (5600)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@2512Rxxxx*?!	2512 (6432 metric)	A	680 (6800)	±1% (F)	2 W (E)	NiCu (N)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	1 (0010)	±1% (F)	3 W (G)	MnCu (M)	± 75	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	2 (0020)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	2.2 (0022)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	3 (0030)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	4 (0040)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	5 (0050)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	6 (0060)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	7 (0070)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	8 (0080)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	9 (0090)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	10 (0100)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	12 (0120)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C

@= Enter grade option from table above (A=Automotive)
Rxxxx = Enter resistance code option from table above xxxx= resistance code (R0000 = 0, Resistance is under 0.5mΩ for jumper resistor , R0050 = 5.0 mΩ)
*= Enter resistance tolerance code option from table above (F= ±1%, J= ±5%)
?= Enter power rating code option from table above (A =1/4 W, S =1/2 W, C =1 W, D = 1.5 W, E = 2 W, G= 3 W)
!=Enter metal material code option from tabel above (M = MnCu, N = NiCu, C= Cu)

Electrical specifications

Part number	Size	Grade option	Resistance value mΩ (Part number code)	Resistance tolerance (Part number code)	Power rating (Part number code)	Metal material (Part number code)	TCR (ppm/°C)	Operating temperature
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	15 (0150)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	20 (0200)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	25 (0250)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	30 (0300)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	33 (0330)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C
MSM@1225Rxxxx*?!	1225 (3264 metric)	A	40 (0400)	±1% (F)	3 W (G)	MnCu (M)	± 50	-55 °C to +170 °C

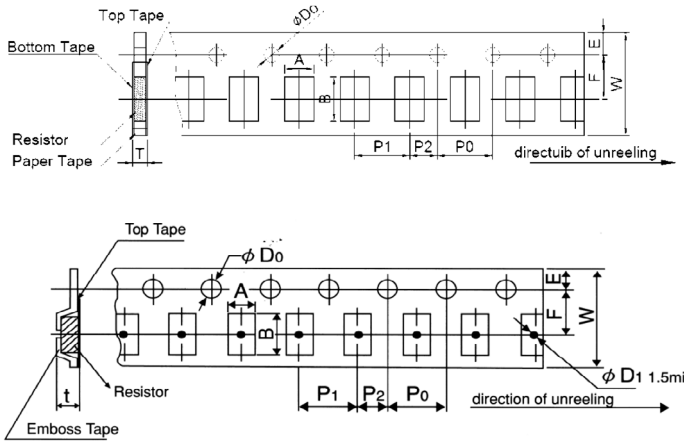
@= Enter grade option from table above (A=Automotive)
Rxxxx = Enter resistance code option from table above xxxx= resistance code (R0000 = 0, Resistance is under 0.5mΩ for jumper resistor , R0050 = 5.0 mΩ)
*= Enter resistance tolerance code option from table above (F= ±1%, J= ±5%)
?= Enter power rating code option from table above (A =1/4 W, S =1/2 W, C =1 W, D = 1.5 W, E = 2 W, G= 3 W)
!=Enter metal material code option from tabel above (M = MnCu, N = NiCu, C= Cu)

Packaging information- mm

Supplied in tape and reel on a 7.0" diameter reel (EIA-481 compliant)

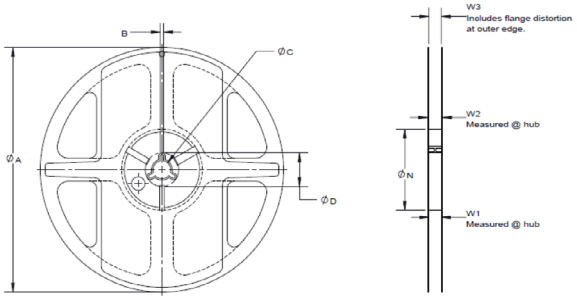
Family	Tape	Quantity
MSMA0603	7 inch paper	5K
MSMA0805	7 inch paper	5K
MSMA1206	7 inch paper	5K
MSMA2010	7 inch embossed	4K
MSMA2512	7 inch embossed	4K
MSMA1225	7 inch embossed	4K

Tape carrier and dimensions



Dimension	0603	0805	1206	2010	2512	1225
E	1.75 ± 0.1	1.75 ± 0.1	1.75 ± 0.1	1.75 ± 0.1	1.75 ± 0.1	1.75 ± 0.1
F	3.5 ± 0.05	3.5 ± 0.05	3.5 ± 0.05	5.5 ± 0.05	5.5 ± 0.05	5.5 ± 0.05
P2	2.0 ± 0.1	2.0 ± 0.1	2.0 ± 0.1	2.0 ± 0.1	2.0 ± 0.1	2.0 ± 0.1
D0	1.5 ± 0.1	1.5 ± 0.1	1.5 ± 0.1	1.5 ± 0.1	1.5 ± 0.1	1.5 ± 0.1
P0	4.0 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	4.0 ± 0.1
W	8.0 ± 0.2	8.0 ± 0.2	8.0 ± 0.2	12.0 ± 0.2	12.0 ± 0.2	12.0 ± 0.2
P1	4.0 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	4.0 ± 0.1
A	1.1 ± 0.15	1.6 ± 0.15	2.0 ± 0.15	2.8 ± 0.15	3.6 ± 0.2	3.6 ± 0.2
B	1.9 ± 0.2	2.4 ± 0.2	3.6 ± 0.2	5.3 ± 0.2	6.9 ± 0.2	6.9 ± 0.2
T	0.6 ± 0.1	0.84 ± 0.1	0.84 ± 0.1	0.85 ± 0.1	0.85 ~ 1.2 ± 0.15	1.2 ± 0.15

Reel dimensions- mm

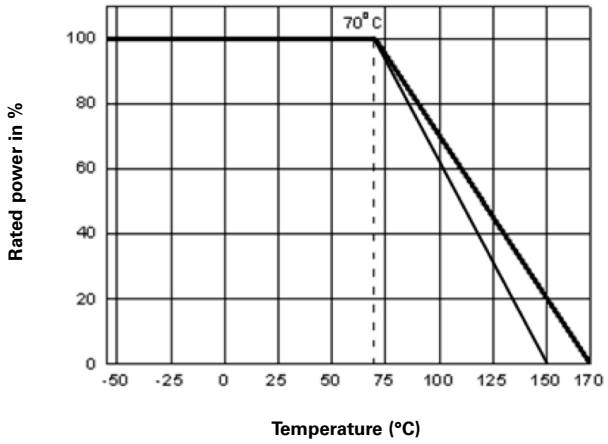


Family	A	B	C	D	N	W1	W2	W3
MSMA0603	178 ± 2.0	3.5 ± 0.5	13.0 ± 1.0	na	60 ± 1.0	9.0 ± 1.0	11.4 ± 1.0	na
MSMA0805	178 ± 2.0	3.5 ± 0.5	13.0 ± 1.0	na	60 ± 1.0	9.0 ± 1.0	11.4 ± 1.0	na
MSMA1206	178 ± 2.0	3.5 ± 0.5	13.0 ± 1.0	na	60 ± 1.0	9.0 ± 1.0	11.4 ± 1.0	na
MSMA2010	178 ± 2.0	3.5 ± 0.5	13.0 ± 1.0	na	60 ± 1.0	13.0 ± 1.0	15.4 ± 1.0	na
MSMA2512	178 ± 2.0	3.5 ± 0.5	13.0 ± 1.0	na	60 ± 1.0	13.0 ± 1.0	15.4 ± 1.0	na
MSMA1225	178 ± 2.0	3.5 ± 0.5	13.0 ± 1.0	na	60 ± 1.0	13.0 ± 1.0	15.4 ± 1.0	na

General specifications

Temperature coefficient of resistance: IEC60115-1 4.8, +25 to +125 °C
Short time overload: IEC60115-1 4.13, 5 X rated power for 5 s
High temperature exposure (storage): AEC-Q200-REV D-Test 3, MIL-STD202 Method 108, 1000 hours, Tup operation temperature
Temperature cycling: AEC-Q200-REV D-Test 4, JESD22 Method JA-104, 1000 Cycles (-55 °C to +125 °C)
Moisture resistance: AEC-Q200-REV D-Test 6 , MIL-STD-202 Method 106, T=24 hours / Cycle ,10 Cycles, Notes: Steps 7a& 7b not required. Unpowered
Biased humidity: AEC-Q200-REV D-Test 7, MIL-STD-202 Method 103, 1000 hours +85 °C/85% RH. Note: Specified conditions: 10% of operating power (not exceeding max working voltage).
Operational life: AEC-Q200-REV D-Test 8, MIL-STD-202 Method 108, 1000 hours, +125 °C at rated derating power
Resistance to solvents: AEC-Q200-REV D-Test 12, MIL-STD-202 Method 215, a: Isopropyl Alcohol : Mineral Spirits= 1 : 3, b: Terpene Defluxer (Bioact EC-7R) c: Deionized water : Propylene Glycol Monomethyl Ether : monoethanolamine = 42 : 1 : 1, Marking and protective layer cannot be detached
Mechanical shock: AEC-Q200-REV D-Test 13, MIL-STD-202 Method 213, Wave Form Peak value is 100 g's. 6 ms
Vibration: AEC-Q200-REV D-Test 14, MIL-STD-202 Method 204, 5 g's for 20 min., 12 cycles each of 3 orientations
Resistance to soldering heat: AEC-Q200-REV D-Test 15, MIL-STD-202 Method 210, Condition B : Immerse the specimens in and eutectic solder at +260 ± 5 °C for 10 ± 1 s
Thermal shock: AEC-Q200-REV D-Test 16, MIL-STD-202 Method 107, -55 °C/+155 °C. Note: Number of cycles required 300, Maximum transfer time 20 seconds, Dwell time 15 minutes. Air-Air
ESD: AEC-Q200-REV D-Test 17, AEC-Q200-002 or ISO/DIS 10605, verify the voltage setting at 500 V
Solderability: AEC-Q200-REV D-Test 18, J-STD-002, Method B, aging 4 hours at 155 °C dry heat Lead-free solder bath at 235 ± 3 °C, Dipping time: 3 ± 0.5 seconds, > 95% area covered with tin
Flammability: AEC-Q200-REV D-Test 20, UL-94, V-0 or V-1 are acceptable. Electrical test not required. V-0 or V-1
Board flex (bending): AEC-Q200-REV D-Test 21, AEC-Q200-005, The duration of the applied forces shall be 60 (+ 5) Sec, 2 mm deflection.
Terminal strength (SMD): AEC-Q200-REV D-Test 22, AEC-Q200-006, Force of 1.0 kg for 60 seconds,

Temperature derating curve



Rated current & voltage

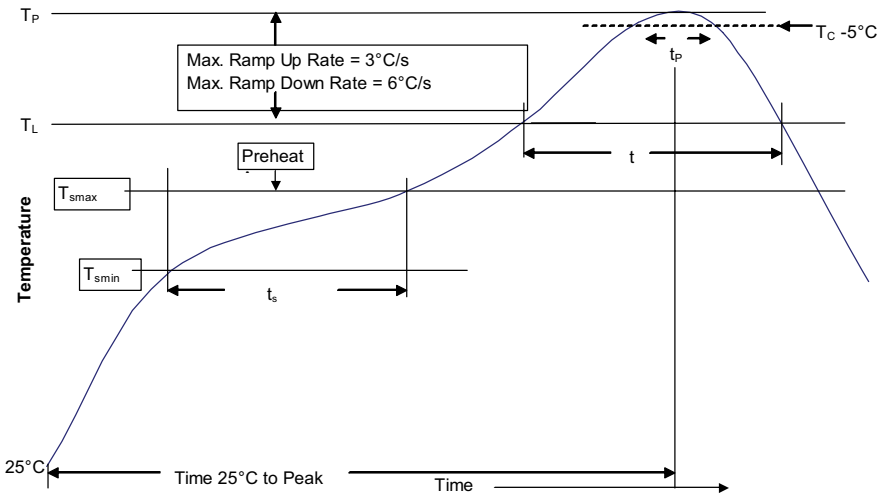
The rated Current and Voltage are calculated by the following formula:

$I=\sqrt{P \div R}$ $V=\sqrt{P \times R}$

I: Rated current (A) V: Rated voltage (V)

P: Rated power (W) R: Resistance value (Ω)

Solder reflow profile



Profile feature		Lead (Pb) free solder
Preheat and soak	• Temperature min. (T_{smin})	150 °C
	• Temperature max. (T_{smax})	200 °C
	• Time (T_{smin} to T_{smax}) (t_s)	60-150 seconds
Ramp up rate T_L to T_p		3 °C/ second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L		217 °C 60-120 seconds
Peak package body temperature (T_P)*		260 °C
Time (t_p)* within 5 °C of the specified classification temperature (T_C)		10 seconds*
Ramp-down rate (T_p to T_L)		6 °C/ second max.
Time 25 °C to peak temperature		8 minutes max.

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

Manual solder

+350 °C ±10 °C , 3 +1/-0 seconds 1 time (by soldering iron), generally manual, hand soldering is not recommended

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