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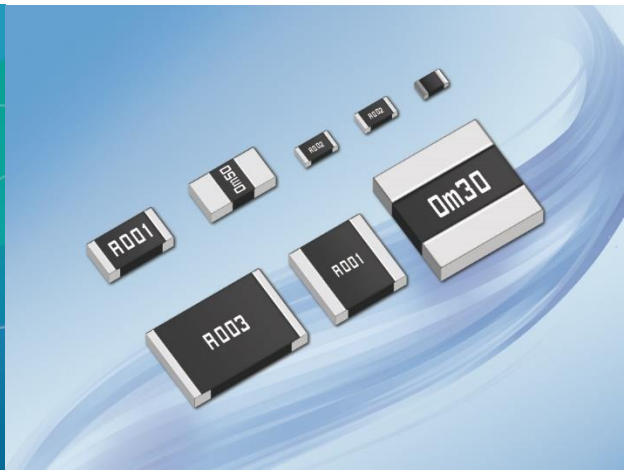
PRODUCT
DATASHEET

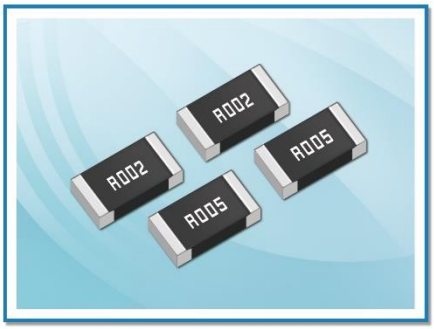


MRA1206 Series Current Sensing Resistor

MRA1206 Series Current Sensing Resistor

Description

MRA is a metal based current sensing resistor. Metal alloyed with epoxy overcoat construction carries long term stability is ideal for high current sensing. Precise resistance tolerance and wide operating temperature make this product suitable for various applications to meet the growing high-power electronics nowadays.



Features

- Chip size from 0805 to 4527
- Resistance value from 0.2mΩ (MRA2725) to 500mΩ (MRA4527)
- Low thermal EMF
- Low TCR
- Lead free, RoHS compliant without exemption
- High precision current sensing and voltage division

Application

- Switching model power supply
- Li-ion battery management
- Notebook, personal computer
- Test Instrument
- Motor controls

Environmental Compliance

Regulation	Standard
RoHS	2011/65/EU
Halogen Free	IEC 61249-2-21:2003

Electrical Characteristics

Size Type	Power Rating at 70°C (W)	Resistance Range (mΩ)	Max. TCR (ppm/°C)	Resistance tolerance	Operating Temp. Range
1206	1	1~50	±50	±1% (F)	-55°C ~ +170°C

Part Number System

MRA	12	P	1	M	F	R002	–	□□
[1]	[2]	[3]	[4]	[5]	[6]	[7]		[8]

[1] Series name, Metal Resistor for current sensing, series A
[2] Chip size, 12:1206
[3] Polytronics symbol
[4] Power code, 1:1W, Q: 0.5W, V: 0.75W, W: 1.5W
[5] Material code, M:MnCu, S: SnMnCu, F: FeCrAl
[6] Resistance tolerance, F: ±1%
[7] Resistance code, R002=2 mΩ, 2M50=2.5 mΩ
[8] Options code

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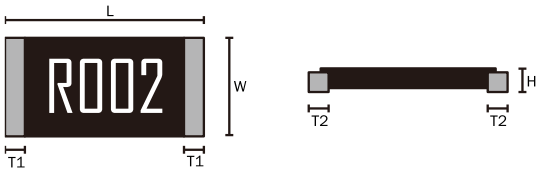
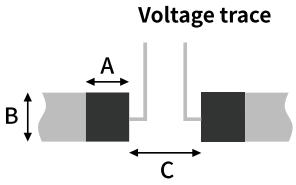
Physical Dimensions (mm)

Series	Power Rating	Resistance	L	W	H	T1	T2
MRA1206	1W	1 mΩ	3.200±0.254	1.650±0.254	0.820±0.254	0.508±0.254	0.508±0.254
		2 mΩ	3.200±0.254	1.650±0.254	0.700±0.254	0.508±0.254	0.508±0.254
		3 mΩ	3.200±0.254	1.650±0.254	0.600±0.254	0.508±0.254	0.508±0.254
		4~20 mΩ	3.200±0.254	1.650±0.254	0.550±0.254	0.508±0.254	0.508±0.254
		21~50 mΩ	3.200±0.254	1.650±0.254	0.470±0.254	0.508±0.254	0.508±0.254



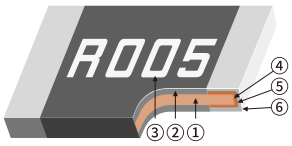
Recommended Solder Pad Layout (mm)

Size Type	Resistance	A	B	C
1206	1~75 mΩ	1.46	2.15	1.68

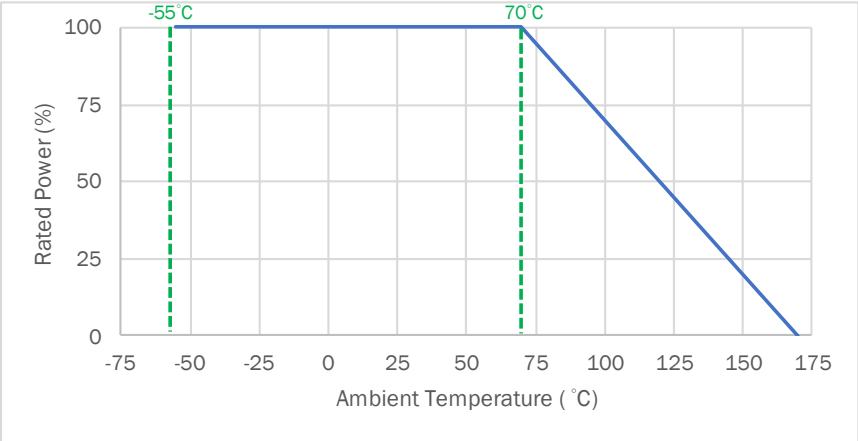


Physical Specifications

Materials	Element: ① MnCu / SnMnCu / FeCrAl Package: ② PI & Epoxy ③ Epoxy Electrode: ④ Copper, plated with ⑤ Ni and ⑥ Sn
Solderability	MIL-STD-202



Thermal Derating Curve



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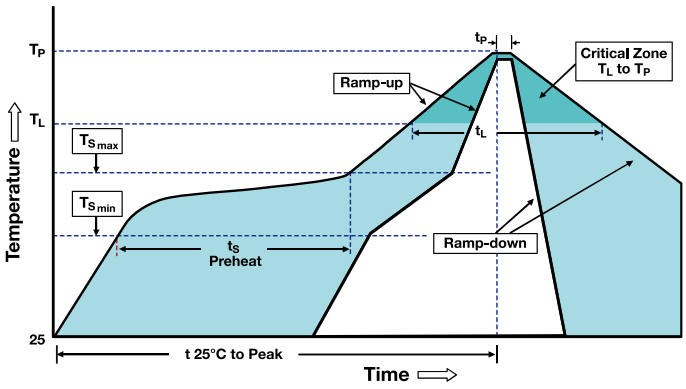
Marking and Packaging Quantity

Chip Size & Wattage	Resistance (mΩ)	Part Number (Partially Listed)	Packing Quantity (mΩ)	Marking
1206 1W	1	MRA12P1SFR001	4000	R001
	2	MRA12P1MFR002	5000	R002
	3	MRA12P1MFR003		R003
	4	MRA12P1MFR004		R004
	5	MRA12P1MFR005		R005
	6	MRA12P1MFR006		R006
	7	MRA12P1MFR007		R007
	8	MRA12P1FFR008		R008
	10	MRA12P1FFR010		R010

Soldering Parameters

Reflow Soldering	Pb-free assembly
Average Ramp-Up Rate (Ts_{max} to T_P)	3°C/second max.
Preheat -Temperature Min (Ts_{min}) -Temperature Max (Ts_{max}) -Time (Ts_{min} to Ts_{max})	 150°C 200°C 60-180 seconds
Time maintained above: -Temperature (T_L) -Time (t_L)	 217°C 60-150 seconds
Peak Temperature (T_P)	260°C
Time within 5°C of actual Peak Temperature (t_P)	20 seconds max.
Ramp-Down Rate	6°C /second max.
Time 25°C to Peak Temperature	8 minutes max.



Wave Soldering	260°C peak temperature, 10 second max.
Hand Soldering	350°C peak temperature, 3 second max.

Note: If temperatures exceed the recommended profile,devices may not meet the performance requirements.

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Reliability Test

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25°C /+150°C, 25°C is the reference temperature	As Spec
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	5 times of rated power	ΔR/R1 ≤ ±0.5%
High Temperature Exposure	JIS-C5201-1 4.25 IEC 60068-2-2	At 170°C for 1000 hours.	ΔR/R1 ≤ ±1.0%
Resistance to solder heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260°C± 5°C, duration time: 10sec	ΔR/R1 ≤ ±0.5%
Thermal cycling	JESD22 Method JA-104	1000 Cycles (-55°C to +155°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme.	ΔR/R1 ≤ ±0.5%
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	ΔR/R1 ≤ ±0.5%
Load life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70±2°C, RCWV or Max. working voltage whichever is less for 1000 hours with 1.5 hours ON and 0.5 hour OFF.	ΔR/R1 ≤ ±1.0%
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	245±5°C for 3 seconds	> 95% coverage
Dielectric Withstanding Voltage	JIS-C5201-1 4.7	Apply 500VAC for 1 minute	No short or burned on the appearance
Core Body Strength	JIS-C5201-1 4.15	Central part pressurizing force: 5N, 10 seconds	No broken
Terminal Strength (SMD)	AEC Q200-006	Pressurizing force 17.7N for 60 seconds	No broken
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once 2mm for 10 seconds	ΔR/R1 ≤ ±0.5% No broken
Moisture resistance	MIL-STD 202 Method 106	T=24 hours per Cycle, 10 Cycles, unpowered. Steps 7a & 7b not required.	ΔR/R1 ≤ ±0.5%

Storage

- The ambient temperature recommended for storage shall between 20°C~30°C.
- The relative humidity recommended for storage shall be between 40%RH~80%RH.
- Sealed plastic bags with desiccant shall be used to reduce the oxidation of the terminals and shall only be opened prior to use.
- The products shall not be stored in areas where harmful gases containing sulfur or chlorine are present.

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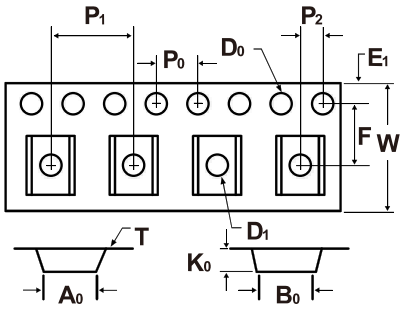
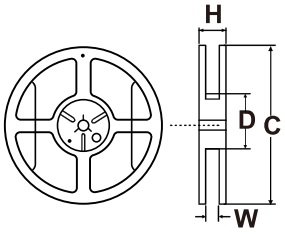
Tape & Reel Specification (mm.)

Devices are packaged per EIA481 and EIA-2 standard





Tape measurements

Size Type	W	F	E_1	D_0	D_1	P_0
1206 (1 mΩ)	8.00 ± 0.20	3.50 ± 0.10	1.75 ± 0.10	1.50 ± 0.10	1.00 ± 0.10	4.00 ± 0.10
1206 (2~75 mΩ)	8.00 ± 0.20	5.50 ± 0.05	1.75 ± 0.10	1.50 ± 0.10	1.50 ± 0.10	4.00 ± 0.10

Size Type	P_1	P_2	A_0	B_0	T	K_0
1206 (1 mΩ)	4.00 ± 0.10	2.00 ± 0.10	2.03 ± 0.10	3.55 ± 0.10	0.20 ± 0.05	1.10 ± 0.10
1206 (2~75 mΩ)	4.00 ± 0.10	2.00 ± 0.10	2.03 ± 0.10	3.55 ± 0.10	0.20 ± 0.05	0.85 ± 0.10

Reel measurements

Size Type	H	W	D	C
1206	12.0 ± 1.0	9.0 ± 0.5	60.0 ± 1.5	178.0 ± 2.0