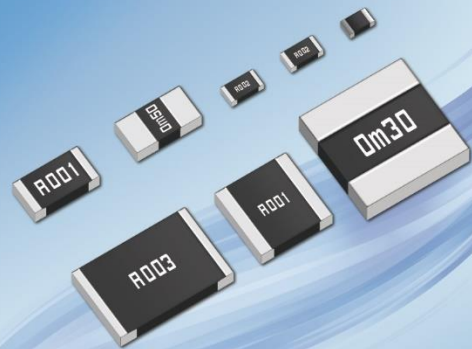


**PRODUCT
DATASHEET**

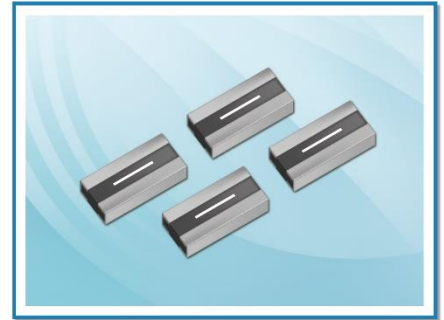


MRA0612 Series Current Sensing Resistor

MRA0612 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



2011/65/EU



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
0612	1	1, 1.5, 2	±75	±1% (F)	-55 °C ~ +170 °C
	1.5	1, 1.5, 2	±75	±1% (F)	-55 °C ~ +170 °C

Part Number System

MRA 6L P 1 M F R002 - □□

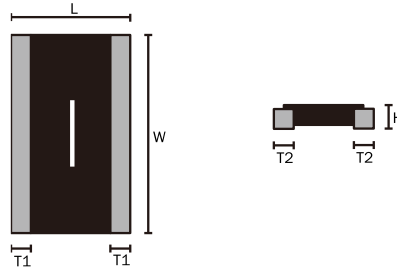
[1] [2] [3] [4] [5] [6] [7] [8]

- [1] Series name, Metal Resistor for current sensing, series A
- [2] Chip size, 6L: 0612
- [3] Polytronics symbol
- [4] Power code, 1:1W, W: 1.5W
- [5] Material code, M:MnCu
- [6] Resistance tolerance, F: ±1%
- [7] Resistance code, R002=2 mΩ, 1M50=1.5 mΩ
- [8] Options code

MRA0612 Series Current Sensing Resistor

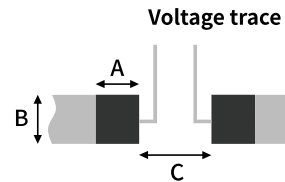
Physical Dimensions (mm)

Series	Power Rating	Resistance	L	W	H	T1	T2
MRA0612	1W	1 mΩ	1.60±0.25	3.20±0.25	0.50±0.25	0.30±0.25	0.30±0.25
	1.5W	1.5 ~ 2mΩ	1.60±0.25	3.20±0.25	0.45±0.25	0.30±0.25	0.30±0.25



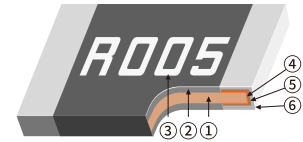
Recommended Solder Pad Layout (mm)

Size Type	Resistance	A	B	C
0612	1~2 mΩ	1.05	3.50	0.68

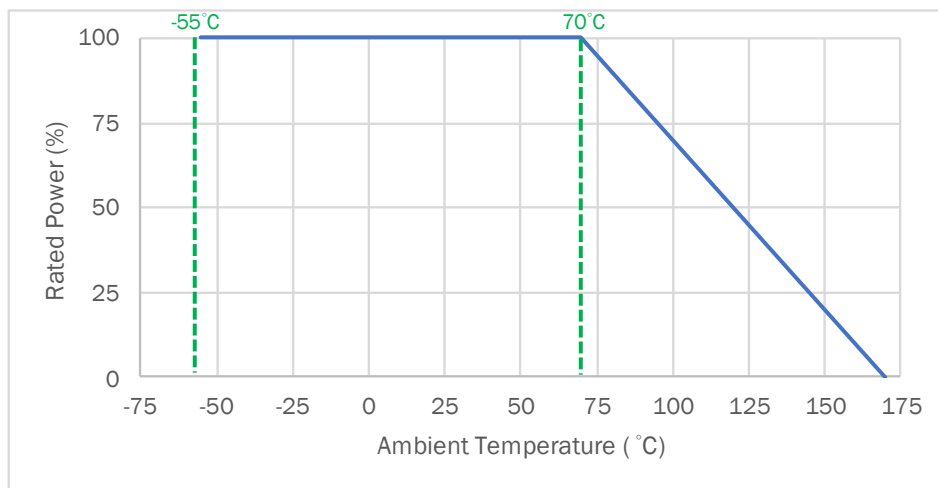


Physical Specifications

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



Thermal Derating Curve



MRA0612 Series Current Sensing Resistor

Marking and Packaging Quantity

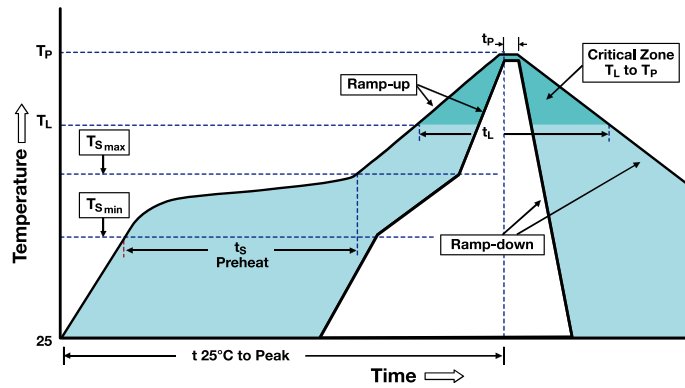
Chip Size & Wattage	Resistance (mΩ)	Part Number	Packing Quantity	Marking
0612 1W	1	MRA6LP1MFR001	5000	
	1.5	MRA6LP1MF1M50		
	2	MRA6LP1MFR002		
0612 1.5W	1	MRA6LPWMFR001		
	1.5	MRA6LPWMF1M50		
	2	MRA6LPWMFR002		

Soldering Parameters

Reflow Soldering	Pb-free assembly
Average Ramp-Up Rate ($T_{S_{max}}$ to T_P)	3°C/second max.
Preheat	
-Temperature Min ($T_{S_{min}}$)	150°C
-Temperature Max ($T_{S_{max}}$)	200°C
-Time ($T_{S_{min}}$ to $T_{S_{max}}$)	60-180 seconds
Time maintained above:	
-Temperature (T_L)	217°C
-Time (t_L)	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.



MRA0612 Series Current Sensing Resistor

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	$\Delta R/R1 \leq \pm 0.5\%$
High Temperature Exposure	JIS-C5201-1 4.25 IEC 60068-2-2	At 170°C for 1000 hours.	$\Delta R/R1 \leq \pm 1.0\%$
Resistance to solder heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260°C± 5°C, duration time: 10sec	$\Delta R/R1 \leq \pm 0.5\%$
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.	$\Delta R/R1 \leq \pm 0.5\%$
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.	$\Delta R/R1 \leq \pm 0.5\%$
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.	$\Delta R/R1 \leq \pm 1.0\%$
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 300VAC 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	$\Delta R/R1 \leq \pm 0.5\%$ No broken
Moisture resistance	MIL-STD 202 Method 106	T=24 hours per Cycle, 10 Cycles, unpowered. Steps 7a & 7b not required.	$\Delta R/R1 \leq \pm 0.5\%$

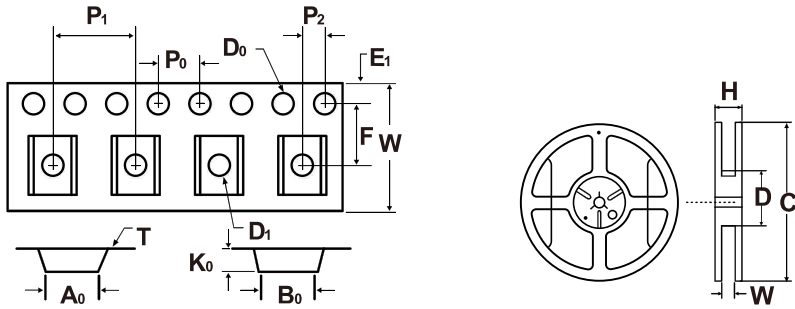
Storage

- 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.

MRA0612 Series Current Sensing Resistor

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
0612	8.00 ± 0.20	3.50 ± 0.10	1.75 ± 0.10	1.50 ± 0.10	1.00 ± 0.10	4.00 ± 0.10

Size Type	P ₁	P ₂	A ₀	B ₀	T	K ₀
0612	4.00 ± 0.10	2.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.10	0.22 ± 0.05	0.70 ± 0.10

Reel measurements

Size Type	H	W	D	C
0612	12.0 ± 1.0	9.0 ± 0.5	60.0 ± 1.5	178.0 ± 2.0