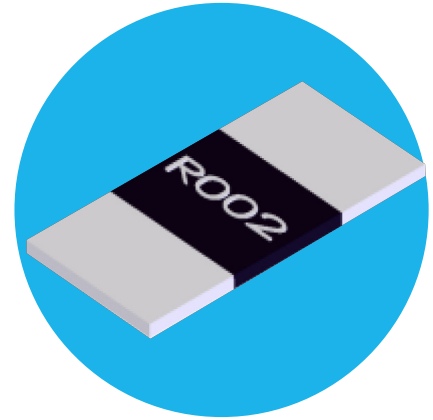



## Low Resistance Metal Alloy Resistor

### LRMA Series

- Resistance range 0.5mΩ to 300mΩ
- High temperature operation to 170°C
- Low thermal EMF version
- High power version
- Current sensing for power electronics
- RoHS compliant & halogen free
- AEC-Q200 qualified



 All parts are Pb-free and comply with EU Directive 2011/65/EU (RoHS2)

### Electrical Data

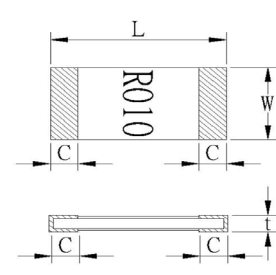
LRMA Version	T (Standard)		P (Power)
Size	2010	2512	2512
Power rating @70°C	W	1.5	≤R01: 2, >R01: 1
Overload rating (5s)	W	7.5	≤R01: 10, >R01: 5
Resistance range	mΩ	5 to 100	1 to 100
Standard values <sup>1</sup>	mΩ	5, 6, 10, 15, 20, 50, 100	1, 1.5, 2, 3, 3.5, 4, 5, 6, 7, 8, 10, 11, 12, 15, 18, 20, 25, 30, 33, 35, 40, 50, 100
Resistance tolerance	%	1, 5	
TCR (25 to 125°C)	ppm/°C	>R01: ±75	>R001 & ≤R01: ±100, R001: ±275
Ambient temperature	°C	-55 to 170	
Insulation resistance	MΩ	>100	
Element alloy		Cu-Ni	
Coating		Black	

LRMA Version	M (Low thermal EMF)			N (Inverse)	
Size	0805	1206	2512	0612	0815
Power rating @70°C	W	0.5	1	≤R01: 2, >R01: 1	1 <sup>2</sup>
Overload rating (5s)	W	2.5	5	≤R01: 10, >R01: 5	5
Resistance range	mΩ	5 to 25	1 to 50	0.5 to 60	1 to 3
Standard values <sup>1</sup>	mΩ	5, 6, 8, 9, 10, 20, 25	1, 1.2, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 18, 20, 22, 25, 30, 39, 40, 50	0.5, 0.75, 1, 1.5, 2, 3.5, 5, 10, 20, 25, 30, 40, 50, 60	1, 3
Resistance tolerance	%	1, 5			
TCR (25 to 125°C)	ppm/°C	±100	±50	>R01: ±75, >R001 & ≤R01: ±100	≤R001: ±275
Ambient temperature		-55 to 170°C			
Insulation resistance	MΩ	>100			
Element alloy		Mn-Cu		MnCu	Cu-Ni
Coating		Black	Green	Black	

Notes: 1. Non-standard values may be available for high volume requirements. 2. Requires 300mm<sup>2</sup> copper pad & trace area

### Physical Data (All dimensions in mm and nominal weight in mg)

Size	L	W	C	t	Wt
0805	2.0 ±0.1	1.25 ±0.1	0.4 ±0.2	0.6 ±0.2	5.5
1206	3.2 ±0.2	1.6 ±0.2	0.5 ±0.3	0.6 ±0.2	18.3
0612	1.7 ±0.2	3.2 ±0.2	0.4 ±0.2	0.6 ±0.2	12.9
0815	2.1 ±0.25	3.75 ±0.3	0.5 ±0.2	0.7 ±0.2	14.1
2010	5.0 ±0.2	2.5 ±0.2	0.6 ±0.3	0.6 ±0.2	35.6
2512 <R001	6.4 ±0.2	3.2 ±0.2	2.6 ±0.2	0.65 ±0.25	57 to 63
2512 ≥R001 & ≤R003			2.0 ±0.2		
2512 >R003			0.9 ±0.2		

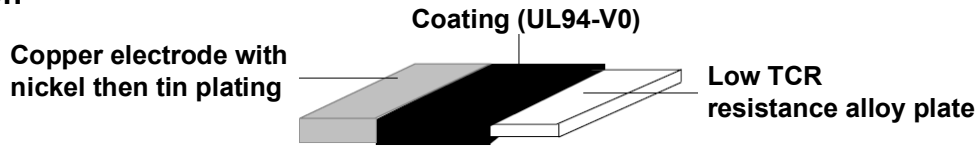


#### General Note

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LRMA Series

**Construction**



**Marking**

The components are marked with ohmic value, e.g. “R002” = 2mΩ, “R010” = 10 mΩ.  
Due to space restrictions, for LRMAM1206-R001, “01” = 1mΩ is used, and for LRMAM0805, “002” = 2mΩ, “010” = 10 mΩ are used.

**Solvent Resistance**

The component is resistant to all normal industrial cleaning solvents suitable for printed circuits.

**Performance Data**

		Maximum (%)	Typical (%)
Load at rated power (cyclic load, 1000 hours at 70°C)	±ΔR	0805: 1.5 Others 1	0.3
Short term overload (5 x rated power for 5s)	±ΔR	0.5	0.15
Humidity (1000 hours, 85°C, 85%RH)	±ΔR	0805: 1 Others 0.5	0.15
Temperature cycle (-40 to +125°C, 1000 cycles, 15 minute dwell)	±ΔR	0805: 1 Others 0.5	0.15
Resistance to solder heat (260°C ±5°C for 20s ±1s)	±ΔR	0.5	0.3
Solderability (245°C ±5°C for 2s ±0.5s)		>95% coverage	
Dry heat (1000 hours at 170°C)	±ΔR	0805: 1.5 Others 0.5	0.3
Low temperature storage (1000 hours at -55°C)	±ΔR	0.5	0.15
Substrate bending (board 1.6mm, fulcrum spacing 90mm, deflection 2mm)	±ΔR	0805: 1 Others 0.5	0.3
Insulation resistance (1 minute @ 100Vdc)		>100M	

**Thermal Performance & Mounting**

**Temperature Derating**

**Typical Temperature Rise**

**Reference Pad Dimensions (mm)**

Size	a	b	L
0612	3.8	0.7	0.7
0805	1.4	1.15	1.2
1206	1.8	1.9	1.4
0815	7.9	1.5	0.9
2010	3.4	1.5	3.5
2512 ≤R003	4.0	3.1	1.3
2512 >R003	4.0	2.1	4.1

The temperature rise shown is highly dependent on mounting conditions. Reference conditions assume 20μ copper with thermal vias to multiple layers. The self-heating in the current tracks should be kept negligible, or allowed for by temperature derating.

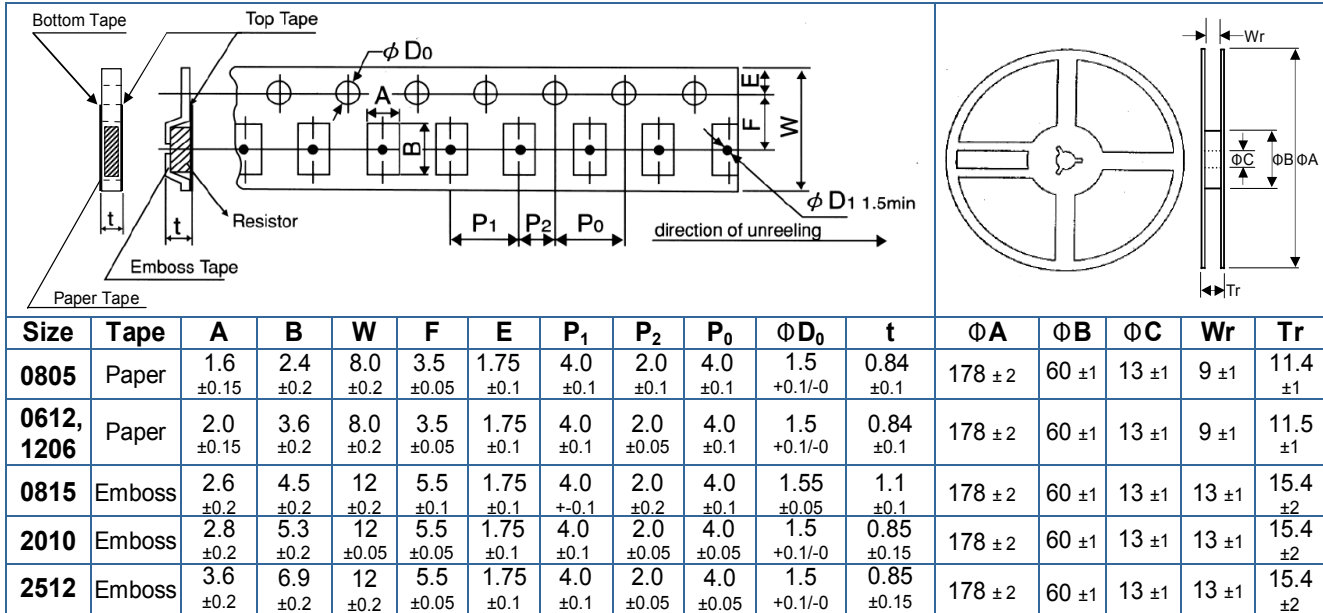
Standard 4-terminal probe pitches for measuring unmounted parts are 0.4 x 1.83mm (0805), 3.3 x 1.8mm (0815), 0.4 x 2.8mm (1206), 1.2 x 4.5mm (2010) and 1.5 x 5.8mm (2512). All probe location tolerances ±0.02mm.

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LRMA Series

Packaging



Storage

Conditions: 5°C to 35°C and 40% to 75%RH  
Shelf life: 2 years from manufacture

Processing

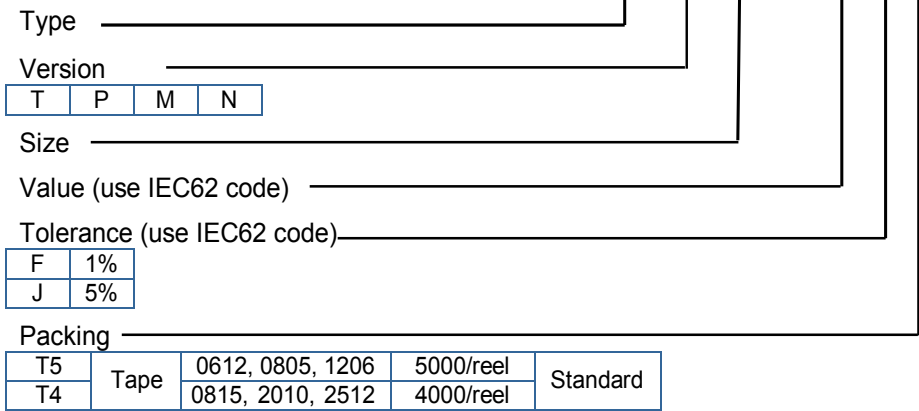
LRMA series resistors are suitable for both wave and IR reflow soldering. The recommended reflow profile for Pb-free SAC305 alloy (Sn 96.5%, Ag 3%, Cu 0.5%) soldering is as follows:

Pre-heat: 60s to 120s at 150°C to 180°C  
Soldering: 20s to 40s at ≥230°C  
Peak: 5s at 250°C to 255°C

Ordering Procedure

Example: LRMA low thermal EMF version in 2512 size and at 10 milliohms and 1% tolerance packed in tape.

**LRMAM2512-R01FT4**



Note 1: For values which require 6 characters, e.g. R00075, the hyphen is omitted.

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