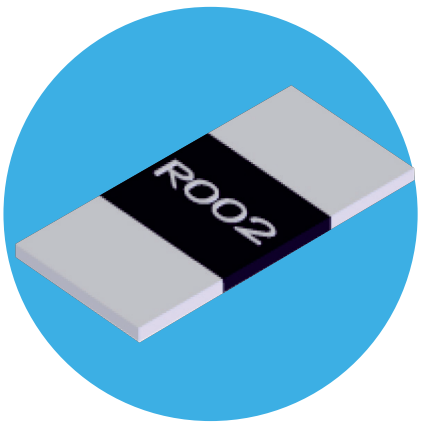
Resistors

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

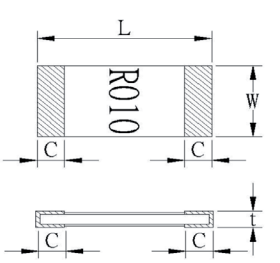
LRMA Version		T (Standard)		P (Power)
Size		2010	2512	2512
Power rating @70°C	W	1.5	≤R01: 2, >R01: 1	≤R10: 3, >R10: 2
Overload rating (5s)	W	7.5	≤R01: 10, >R01: 5	≤R10: 15, >R10: 10
Resistance range	mΩ	5 to 100	1 to 100	0.5 to 300
Standard values [1]	mΩ	5, 6, 10, 15, 20, 50, 100	1, 1.5, 2, 3, 3.5, 4, 5, 6, 7, 8, 10, 11, 12, 15, 18, 20, 25, 30, 33, 35, 40, 50, 100	0.5, 0.75, 1, 1.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 18, 20, 22, 25, 27, 30, 33, 39, 40, 45, 47, 50, 57, 60, 68, 70, 75, 80, 85, 90, 100, 120, 130, 140, 150, 180, 200, 220, 240, 250, 270, 280, 300
Resistance tolerance	%	1, 5		
TCR (25 to 125°C)	ppm/°C	≥R01: ±75	>R001 & <R01: ±100, ≤R001: ±275	±50
Ambient temperature	°C	-55 to 170		
Insulation resistance	MΩ	>100		
Element alloy		Cu-Ni		Cu-Ni / Mn-Cu
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 [2]	
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	3 to 30
Standard values [1]	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	3, 4, 5, 10, 15, 20, 25, 30
Resistance tolerance	%	1, 5				
TCR (25 to 125°C)	ppm/°C	±100	±50	≥R01: ±75, >R001 & <R01: ±100 ≤R001: ±275	±100	
Ambient temperature		-55 to 170°C				
Insulation resistance	MΩ	>100				
Element alloy		Mn-Cu			Mn-Cu / Cu-Ni	
Coating		Black		Green	Black	

Notes: 1. Non-standard values may be available for high volume requirements. 2. Requires 300mm² 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 <R002	3.2 ±0.2	1.6 ±0.2	1.1 ±0.3	0.75 ±0.2	18.3
1206 ≥R002			0.5 ±0.3	0.6 ±0.2	
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

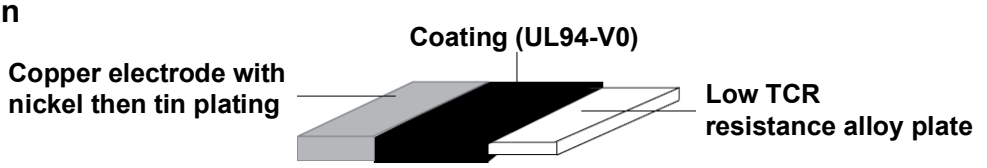
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BI Technologies IRC Welwyn

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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

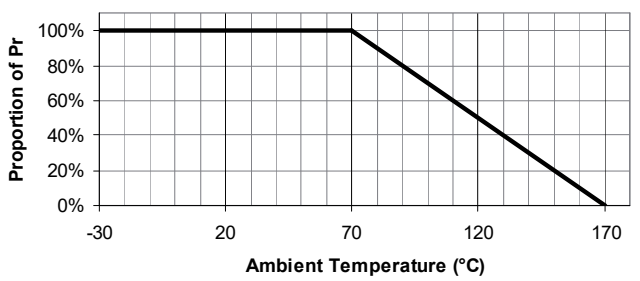
The component is resistant to all normal industrial cleaning solvents suitable for printed circuits.

Performance Data

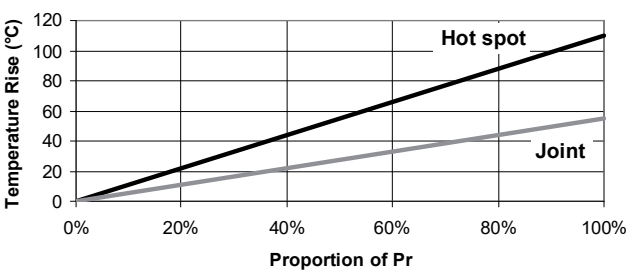
		Maximum (%)	Typical (%)
Load at rated power (cyclic load, 1000 hours at 70°C)	±ΔR	0805: 1.5 Others 1	0.3
Short term overload (5 x rated power for 5s)	±ΔR	0.5	0.15
Humidity (1000 hours, 85°C, 85%RH)	±ΔR	0805: 1 Others 0.5	0.15
Temperature cycle (-40 to +125°C, 1000 cycles, 15 minute dwell)	±ΔR	0805: 1 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

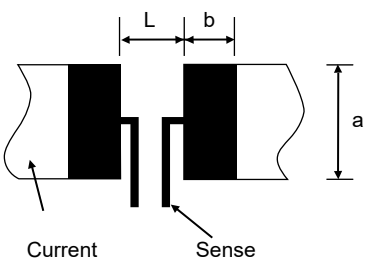


Typical Temperature Rise



Reference Pad Dimensions (mm)

Size	a	b	L
0612	3.8	0.7	0.7
0805	1.4	1.15	1.2
1206 <R002	1.8	2.3	1.0
1206 ≥R002	1.8	1.7	1.6
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



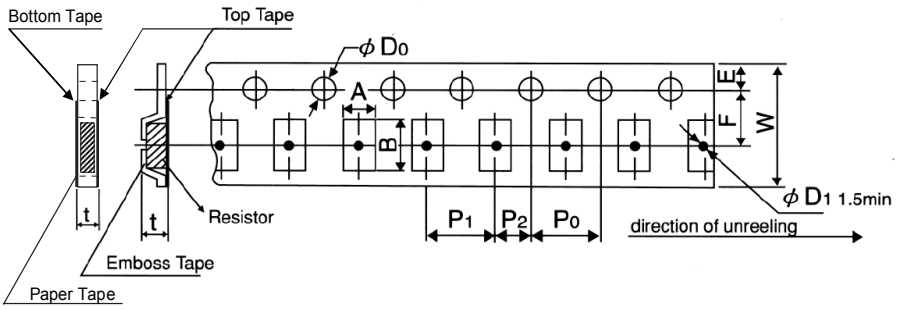
The temperature rise shown is highly dependent on mounting conditions. Reference conditions assume 20µ copper with thermal vias to multiple layers.
The self-heating in the current tracks should be kept negligible, or allowed for by temperature derating.

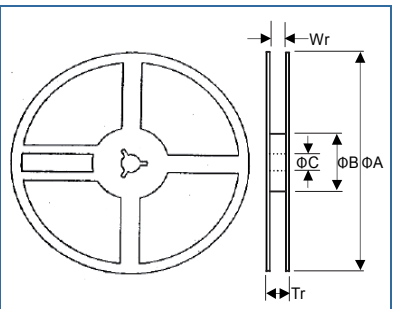
Standard 4-terminal probe pitches for measuring unmounted parts are 2.8 x 1.7mm (0612), 0.4 x 1.83mm (0805) 0.4 x 2.8mm (1206), 1.2 x 4.5mm (2010) and 1.5 x 5.8mm (2512). All probe location tolerances ±0.02mm.

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Packaging





Size	Tape	A	B	W	F	E	P_1	P_2	P_0	ΦD_0	t	ΦA	ΦB	ΦC	Wr	Tr
0805	Paper	1.6 ±0.15	2.4 ±0.2	8.0 ±0.2	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.1	4.0 ±0.1	1.5 +0.1/-0	0.84 ±0.1	178 ± 2	60 ±1	13 ±1	9 ±1	11.4 ±1
0612, 1206	Paper	2.0 ±0.15	3.6 ±0.2	8.0 ±0.2	3.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	1.5 +0.1/-0	0.84 ±0.1	178 ± 2	60 ±1	13 ±1	9 ±1	11.5 ±1
0815	Emboss	2.6 ±0.2	4.5 ±0.2	12 ±0.2	5.5 ±0.1	1.75 ±0.1	4.0 +-0.1	2.0 ±0.2	4.0 ±0.1	1.55 ±0.05	1.1 ±0.1	178 ± 2	60 ±1	13 ±1	13 ±1	15.4 ±2
2010	Emboss	2.8 ±0.2	5.3 ±0.2	12 ±0.05	5.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.05	1.5 +0.1/-0	0.85 ±0.15	178 ± 2	60 ±1	13 ±1	13 ±1	15.4 ±2
2512	Emboss	3.6 ±0.2	6.9 ±0.2	12 ±0.2	5.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.05	1.5 +0.1/-0	0.85 ±0.15	178 ± 2	60 ±1	13 ±1	13 ±1	15.4 ±2

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.

L R M A M 2 5 1 2 – [1] R 0 1 F T 4

Type

Version

T	P	M	N

Size

Value (use IEC62 code)

Tolerance (use IEC62 code)

F	1%
J	5%

Packing

T5	Tape	0612, 0805, 1206	5000/reel	Standard
T4		0815, 2010, 2512	4000/reel	

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

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