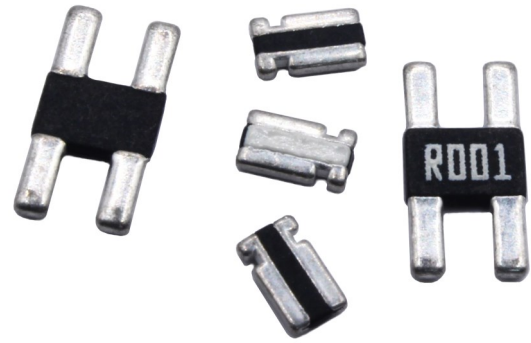


LRMAK

Features:

- 4 separate contacts for true Kelvin connection
- Inverse (long side) terminations
- Compact footprint
- Resistance range 0.5mΩ to 5mΩ
- Tolerance to 0.5%
- Power rating up to 2W
- AEC-Q200 qualified



All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

Electrical Data

		0612	1225
Power rating at 70°C	W	1	2
Resistance range	mΩ	0.5 to 5	1 to 3
Standard values		L50, L75, 1L0, 2L0, 3L0, 5L0	1L0, 3L0
Resistance tolerance	%	1, 5	0.5, 1, 5
TCR (25 to 125°C)	ppm/°C	≥R003: ±150 <R003: ±200	100
Ambient temperature range	°C	-55 to 170	
Insulation resistance	MΩ	>100	

Physical Data

Dimensions in mm and weight in mg							
All tolerances ±0.2mm unless otherwise stated.							
Size	L	W	H	T	A	B	Wt. nom.
0612	1.65	3.05 ±0.25	0.65	0.4 ±0.25	0.51 ±0.13	0.34 ±0.13	18
1225	3.2	6.4	0.7	0.95	2.2	2.1	61

Recommended Pad Dimensions in mm					
All tolerances ±0.1mm.					
Size	A	B	C	L	F
0612	2.3	1	0.8	0.7	0.4
1225	2.6	1.5	2.6	1.4	2.3

Cu thickness to be 3oz (105µm)

Construction

LRMAK is formed from a metal alloy plate with the central body covered by an insulating overcoat. The four terminations are plated with nickel and matt tin.

General Note

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LRMAK

Marking

0612 parts are unmarked and white. 1225 parts are legend marked white on black with 4 characters, e.g. R001.

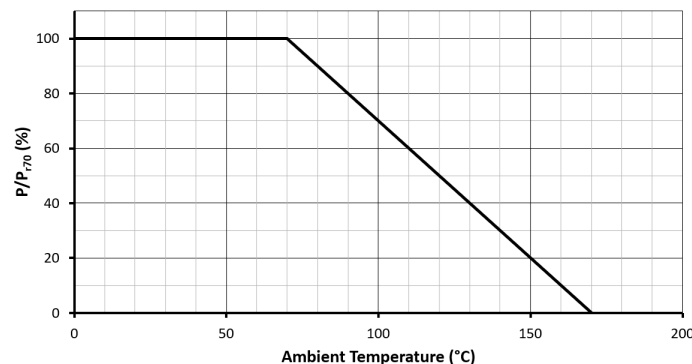
Solvent Resistance

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

Performance Data

Test	Methods	Reference	ΔR max
High temperature exposure	T=125°C, 1000hrs, measurement at 24hrs after test conclusion	AEC-Q200 - Test 3 MIL-STD-202 - Method 108	±1%
Temperature cycling	1000 cycles (-55°C to 125°C), measurements at 24hrs after test conclusion	AEC-Q200 - Test 4 JESD22 - Method JA-104	±1%
Short time overload	5W for 5s (both sizes)	IEC60115-1 4.13	±0.5%
Moisture resistance	T=24 hours/cycle, 10 cycles, unpowered, steps 7a & b not required	AEC-Q200 - Test 6 MIL-STD-202 - Method 106	±1%
Biased humidity	10% rated power at 85°C, RH:85%, 1000hrs, measurement at 24hrs after test conclusion	AEC-Q200 - Test 7 MIL-STD-202 - Method 103	±1%
Operational life	1000hrs, T _A =125°C at 45% rated power, measurement at 24 hours after test conclusion	AEC-Q200 - Test 8 MIL-STD-202 – Method 108	±2%
Resistance to solvents	A: Isopropyl alcohol: mineral spirits (1:3) B: Terpene defluxer (bioact EC-7R) C: Deionized water: propylene glycol monomethyl ether: monoethanolamine (42:1:1)	AEC-Q200 - Test 12 MIL-STD-202 – Method 215	No damage to protection or marking
Resistance to solder heat	T=260 ± 5°C solder, 10 ± 1s dwell	AEC-Q200 - Test 15 MIL-STD-202 – Method 210	±0.5%
Mechanical shock	100g, 6ms, half-sine shock pulse	AEC-Q200 - Test 13 MIL-STD-202 – Method 213	±0.5%
Resistance to vibration	5g for 20 minutes, 12 cycles, 10-2000Hz	AEC-Q200 - Test 14 MIL-STD-202 – Method 204	±0.5%
Board flex	Minimum 2mm deflection, 60 secs	AEC-Q200 - Test 21 AEC-Q200-005	±0.5%
Flammability	V-0 or V-1 acceptable, electrical test not required	AEC-Q200 – Test 20 UL-94	V-0
ESD	500V	AEC-Q200 - Test 17 MIL-STD-202-002	±1%
Solderability	Method B, aging 4 hours at 155°C dry heat, Pb-free solder bath at 235 ± 3°C, dipping time 3 ± 0.5s	AEC-Q200 - Test 18 J-STD-002	95% area coverage
Terminal strength	1.8kg for 60 seconds	AEC-Q200 - Test 22 AEC-Q200-006	±1%

Temperature Derating

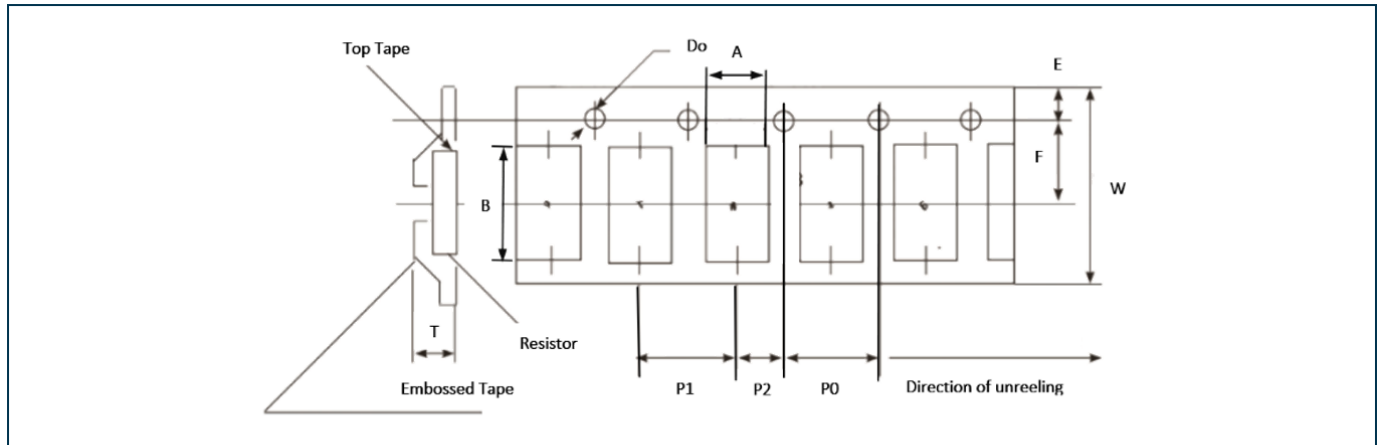


General Note

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LRMAK

Packaging



All dimensions in mm											All tolerances $\pm 0.1\text{mm}$ unless otherwise stated.	
Size	A	B	W	E	F	P ₀	P ₁	P ₂	D ₀	T	Reel dia.	Qty.
0612	1.77	3.4	8	1.75	3.5 ± 0.05	4	4	2	1.5 ± 0.15	1.26 ± 0.15	178	4000
1225	3.6 ± 0.2	6.9 ± 0.2	12 ± 0.2		5.5 ± 0.05					1.2 ± 0.15		

Storage

LRMAK series resistors have MSL level 1 and should be stored at temperatures between 5 and 35°C and humidity between 40 and 75%.

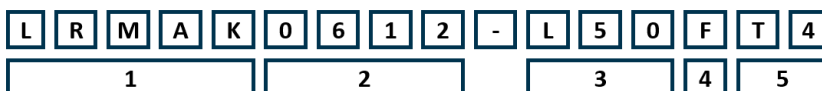
Soldering

LRMAK series resistors are suitable for IR reflow soldering. To avoid discoloration, reflow in nitrogen is recommended, but reflow in air is also possible. The recommended reflow profile for Pb-free soldering using SAC alloy (Sn 96.5%, Ag 3%, Cu 0.5%) is as below.

- Pre-heat:** 60 to 120s at 150 to 200°C
- Ramp-up rate:** 3°C/s max.
- Soldering:** 60s to 150s above 217°C
- Peak temperature:** 260°C
- Peak duration:** 10s within 5°C of peak
- Ramp-down rate:** -6°C/s max.
- Time from ambient to peak:** 8 mins max.
- Reflow cycles:** ≤ 3

Ordering Procedure

Example: LRMAK0612-L50FT4 (0.5 milliohm $\pm 1\%$, Pb-free)



1	2	3	4	5
Type	Size	Value	Tolerance	Packing
LRMAK	0612	3 characters	D = $\pm 0.5\%$	T4 = plastic tape, 4000/reel
	1225	L = milliohms	F = $\pm 1\%$	
			J = $\pm 5\%$	