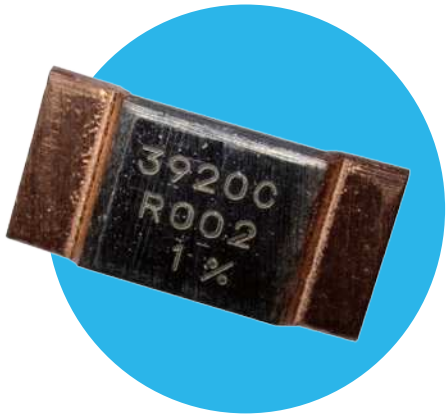
Resistors

Low Resistance Metal Alloy Power Resistors



LRMAP3920

- Resistance range 0.2mΩ to 2mΩ
- Excellent long-term stability
- Standard power rating up to 5W
- Thermal substrate power rating up to 10W
- Current sensing for power electronics
- AEC-Q200 qualified

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

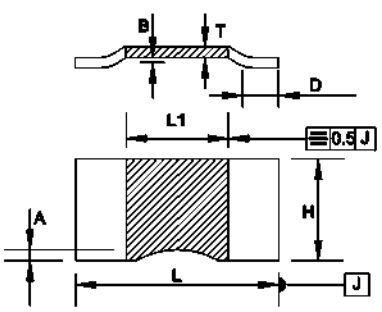
Electrical Data

		LRMAP3920							
Alloy type		A	B				C		
Resistance value	mΩ	0.2	0.3	0.5	0.7	1	1	1.5	2
Power rating (standard), P_{r120} [1]	W	5				4	5	4.5	4
Power rating (thermal substrate), P_{rts70} [2]	W	10				7			
Overload rating (5s) [1]	W	25				20	25	23	20
Continuous pulse energy	J	11	13	8	6	4	12	9	6
Internal thermal impedance, R_{thi}	°C/W	2.5	4	6	9	12	7	11	14
Resistance tolerance	%	1, 5							
TCR (20 to 60°C)	ppm/°C	±200	±150	±70	±60	±50			
Thermal EMF	µV/°C	<2							
Inductance	nH	<3							
Ambient temperature	°C	-55 to 170							

Note 1: Mounted on FR4 board. See Thermal Data and Mounting section for details.
Note 2: Mounted on thermal substrate. See Thermal Data and Mounting section for details.

Physical Data

Dimensions in mm and weight in mg								
Type	L ±0.3	L1 +0.2 -0.3	H +0.3 -0.2	A max	D ±0.5	B ±0.1	T nom	Wt. nom
LRMAP3920A-R0002	10.0	4.0	5.2	0.6	2.0	0.5	1.50	694
LRMAP3920B-R0003		5.0					1.43	608
LRMAP3920B-R0005							0.85	380
LRMAP3920B-R0007							0.62	271
LRMAP3920B-R001							0.43	188
LRMAP3920C-R001							1.36	542
LRMAP3920C-R0015							0.90	361
LRMAP3920C-R002							0.67	277



Marking
The component is laser marked with “3920”, alloy type, ohmic value and tolerance.

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

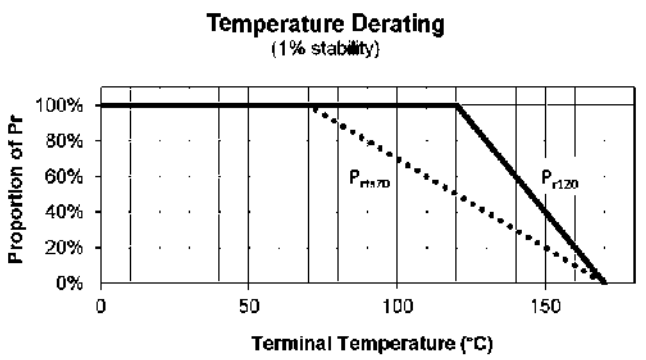
Construction
The component is formed from a continuous band of E-beam welded precision resistive strip. Various alloys are used based on the resistance value.

General Note
TT Electronics reserves the right to make changes in product specification without notice or liability.
All information is subject to TT Electronics’ own data and is considered accurate at time of going to print.

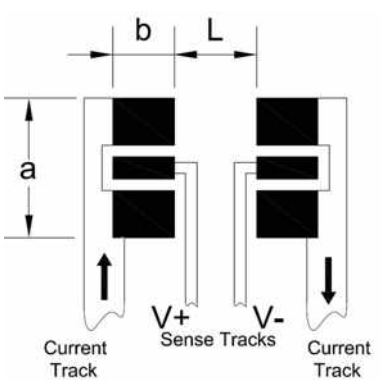
Performance Data

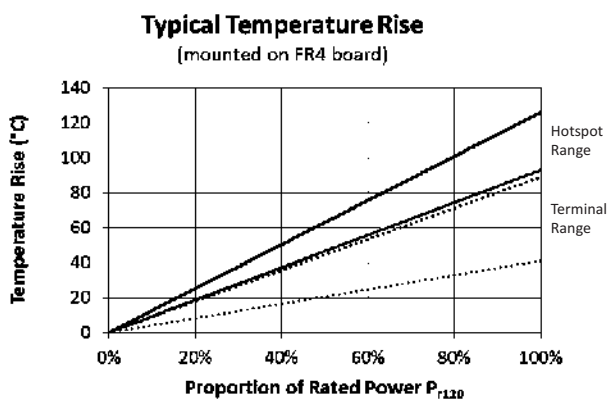
Test	Method	±ΔR%	
		Typical	Maximum
Load Life	1000 hours, cyclic load at P_{r120}	0.5	1.0
Short Term Overload	5 seconds, 5 x P_{r120}	0.1	0.5
High Temperature Exposure	1000 hours, 170°C	0.3	1.0
Temperature Cycle	1000 cycles,-55 to +125°C, 15 minute dwell	0.1	0.5
Low Temperature Storage	1000 hours,-55°C	0.1	0.2
Biased Humidity	1000 hours, 85°C, 85%RH	0.2	1.0
Moisture Resistance	MIL-STD-202 method 106	0.1	0.2
Vibration	MIL-STD-202 Method 204	0.1	0.2
Mechanical Shock	MIL-STD-202 Method 213	0.1	0.5
Board Flex	AEC Q200-005	No damage	
Terminal Strength	AEC Q200-006	No damage	
Resistance to Solder Heat	MIL-STD-202 Method 210	0.3	0.5
Solderability	J-STD-002	95% coverage	
Resistance to Solvents	MIL-STD-202 Method 215	No damage	

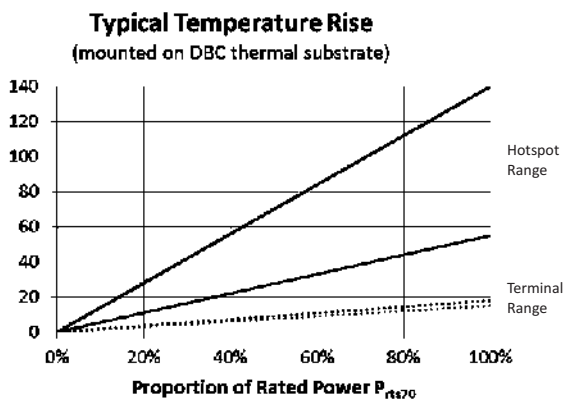
Thermal Data & Mounting



Nominal Reference Mounting Pad Dimensions (mm)		
a	b	L
6.2	2.7	5.6





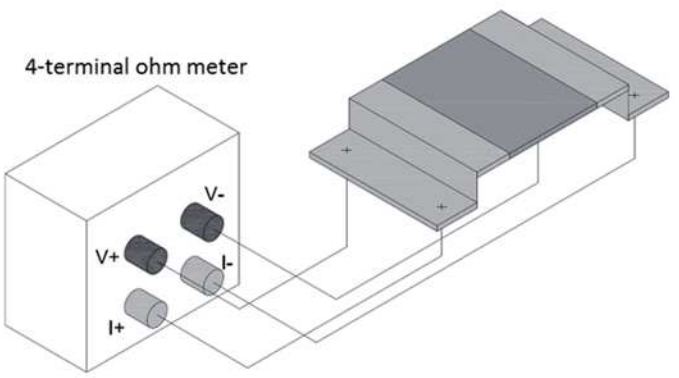


FR4 board details: 102x51mm, high T_g FR4 board with 70µm (2 ounce) inner and outer Cu planes or similar substrate, such that terminal temperature is maintained at ≤120°C.
Thermal substrate details: DBC or similar thermal substrate, such that terminal temperature is maintained at ≤70°C.

Measurement

Resistance testing for the LRMAP3920 is performed on the underside of the copper contacts using the following method.

Measurement current	≥1.5mΩ: 1A <1.5mΩ: 3A
Probe spacing along component length	8.80mm
Probe spacing across component width	2.44mm
Probe tip diameter	≤0.5mm



Resistor contact probes

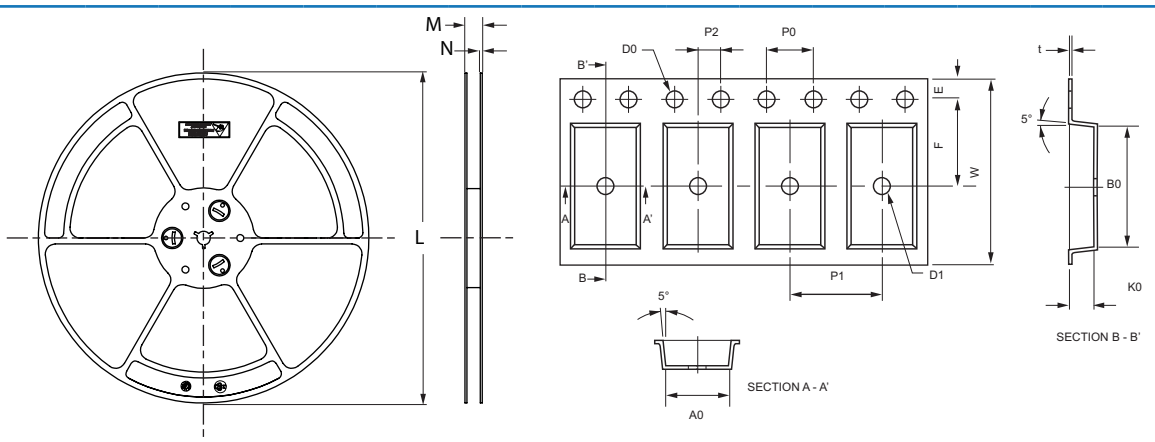
Processing

LRMAP3920 series resistors are suitable for IR reflow soldering. The recommended reflow profile for Pb-free soldering, for example using SAC387 alloy (Sn 95.5%, Ag 3.8%, Cu 0.7%), is as follows:

Pre-heat: 30s to 45s at 180°C
Soldering: 20s to 40s at 250°C
Peak: 260°C

Packaging

LRMAP3920 resistors are packed in 16mm plastic tape, 3000 pieces per reel.



All dimensions in mm

LRMAP3920 Type	L ±1.00	M ±1.00	N +0.30/ -0.10	W +0.30/ -0.05	E ±0.10	F +0.10	D0 +0.10/ -0.0	D1 +0.10/ -0.0	P0 ±0.10	P1 ±0.10	P2 ±0.10	P0x10 ±0.20	t +0.15/ -0.10	A0 +0.15/ -0.10	B0 ±0.13	K0 ±0.10
(B)-R001 (B)-R0007 (C)-R002	330	21.4	2.0	16.00	1.75	7.50	1.50	1.50	4.00	8.00	2.00	40.00	0.30	5.55	10.47	1.25
All remaining values																2.20

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Ordering Procedure

Example: LRMAP3920C-R0015FT (1.5 milliohms ±1%, Pb-free)

L	R	M	A	P	3	9	2	0	C	-	R	0	0	1	5	F	T
1									2		3					4	5

1 Type	2 Alloy	3 Value	4 Tolerance	5 Packing
LRMAP3920	A	4 / 5 characters R = ohms	F = ±1%	T = Plastic tape 3000/reel
	B		J = ±5%	
	C			