

## LRMAP3920



### Features:

- Resistance range 0.2mΩ to 5mΩ
- 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 amended by (EU) 2015/863 (RoHS3)

### Electrical Data

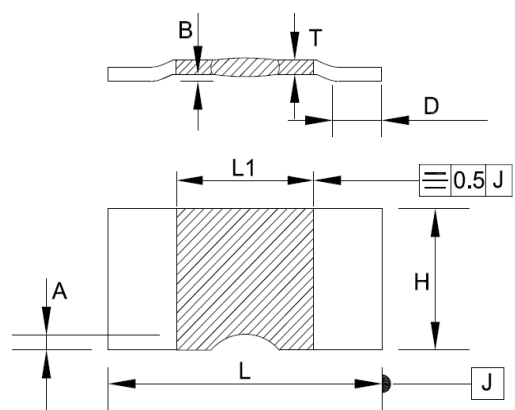
Alloy type	LRMAP3920											
	A	B				C						
Resistance value	mΩ	0.2	0.3	0.5	0.7	1	1	1.5	2	3	4	5
Power rating (standard), $P_{r120}$ <sup>1</sup>	W	5				4	5	4.5	4	3		2
Power rating (thermal substrate), $P_{rts70}$ <sup>2</sup>	W	10				7				5		3
Overload rating (5s) <sup>1</sup>	W	25				20	25	23	20	15		10
Continuous pulse energy	J	11	13	8	6	4	12	9	6	4	3	2
Internal thermal impedance	°C/W	2.5	4	6	9	12	7	11	14	17	30	39
Resistance tolerance	%	1										
TCR (20 to 60°C)	ppm/°C	±200	±150	±50								
Thermal EMF	μV/°C	<2										
Inductance	nH	<3										
Ambient temperature range	°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 g									
Value	Alloy	L ±0.3	L1 +0.3 -0.2	H +0.3 -0.2	A max.	D ±0.5	B ±0.1	T nom.	Wt. nom.
R0002	A	10	4	5.2	0.6	2	0.5	1.50	694
R0003	B							1.43	608
R0005			0.85					380	
R0007			0.62					271	
R001			0.43					188	
R001	C		5					1.36	542
R0015			0.90					361	
R002			0.67					277	
R003			0.45					180	
R004			0.34					144	
R005			0.27	115					



### Marking

The component is laser marked with "3920", alloy type, ohmic value (using R to indicate decimal position in ohms) 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.

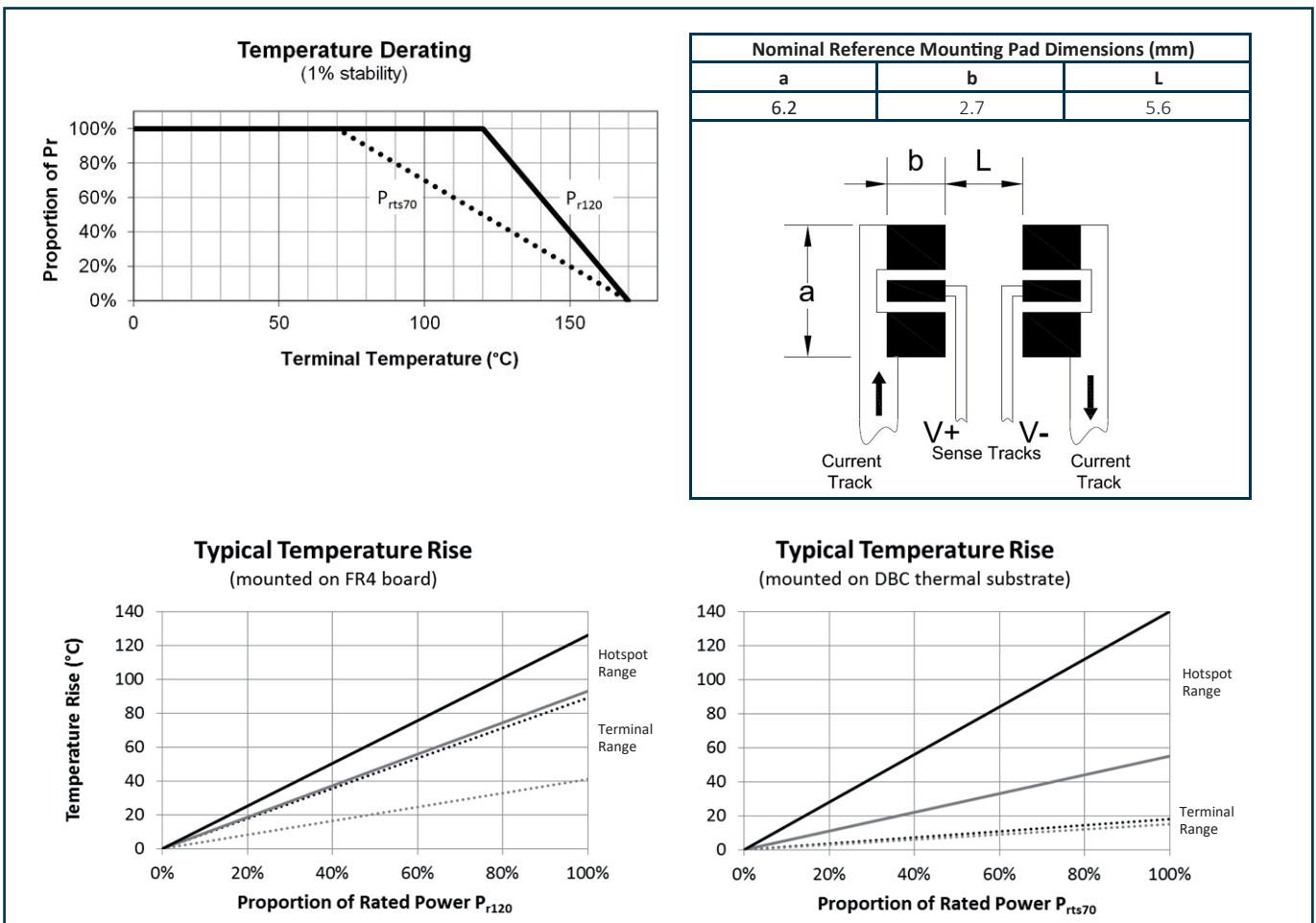
#### General Note

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, $5 \times P_{r120}$	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		
Solderability	J-STD-002	95% coverage	
Resistance to Solvents	MIL-STD-202 Method 215	No damage	

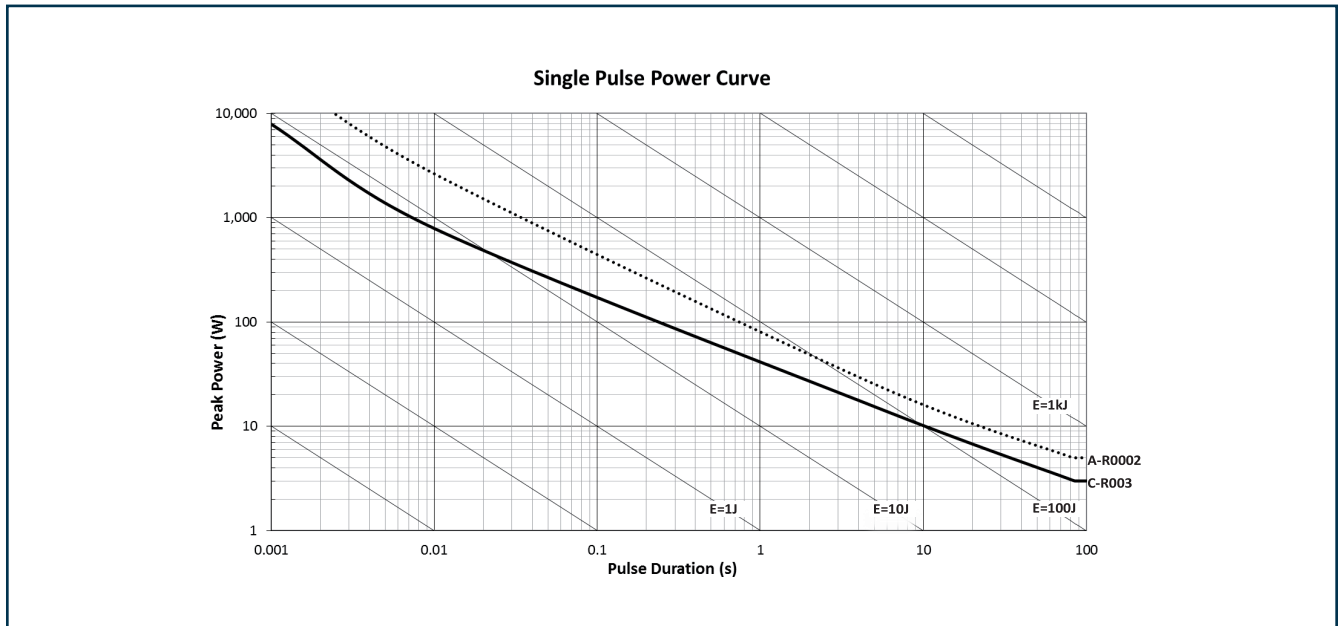
### Thermal Data & Mounting



Note 1: FR4 board details: 102x51mm, high  $T_g$  FR4 board with 70 $\mu$ m (2 ounce) inner and outer Cu planes or similar substrate, such that terminal temperature is maintained at  $\leq 120^\circ\text{C}$ .

Note 2: Thermal substrate details: DBC or similar thermal substrate, such that terminal temperature is maintained at  $\leq 70^\circ\text{C}$ .

### Pulse and Overload Performance



### 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

The diagram illustrates the measurement setup. A 4-terminal ohm meter is connected to the resistor using four probes. The voltage probes (V+ and V-) are connected to the inner contacts, and the current probes (I+ and I-) are connected to the outer contacts. The resistor is shown with its copper contacts and the probes are positioned to measure the resistance across the component length and width.

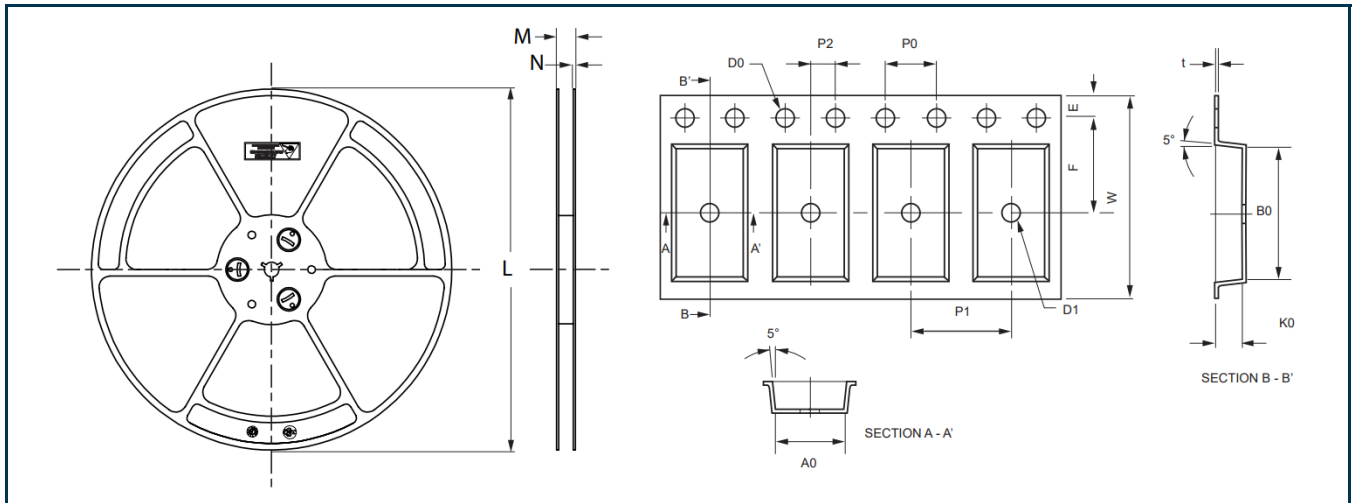
### Processing

LRMAP3920 series resistors are suitable for IR reflow soldering. The recommended reflow profile for Pb-free soldering, for example using SAC387 alloy (Sn95.5%, 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

## LRMAP3920

### Packaging

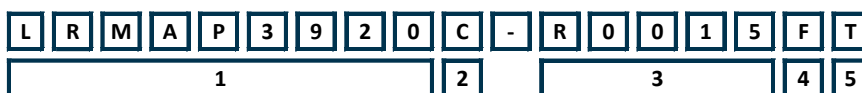


All dimensions in mm

LRMAP3920 alloy & value	L ±1	M ±1	N +0.3/ -0.1	W +0.3/ -0.05	E ±0.1	F +0.1	D0 +0.1/ -0	D1 +0.1/ -0	P0 ±0.1	P1 ±0.1	P2 ±0.1	P0x10 ±0.2	t +0.15/ -0.1	A0 +0.15/ -0.1	B0 ±0.13	K0 ±0.1
B-R001 B-R0007 C-R002 C-R003 C-R004 C-R005	330	21.4	2	16	1.75	7.5	1.5	1.5	4	8	2	40	0.3	5.55	10.47	1.25
All remaining values																2.2

### Ordering Procedure

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



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