

## Low Resistance Metal Alloy Power Resistors

### LRMAP3920

- Resistance range 0.2mΩ to 3mΩ
- 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

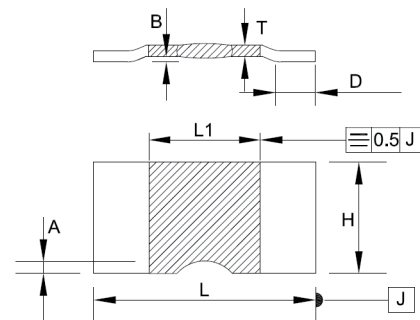
		LRMAP3920									
Alloy type		A			B			C			
Resistance value	mΩ	0.2	0.3	0.5	0.7	1	1	1.5	2	3	
Power rating (standard), $P_{r120}^1$	W	5			4			5	4.5	4	3
Power rating (thermal substrate), $P_{rts70}^2$	W	10			7			5			
Overload rating (5s) <sup>1</sup>	W	25			20			25	23	20	15
Continuous pulse energy	J	11	13	8	6	4	12	9	6	4	
Internal thermal impedance, $R_{thi}$	°C/W	2.5	4	6	9	12	7	11	14	17	
Resistance tolerance	%	1									
TCR (20 to 60°C)	ppm/°C	±200	±150	±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	5.0	5.2	0.6	2.0	0.5	1.50	694
LRMAP3920B-R0003							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
LRMAP3920C-R003							0.45	180



#### 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

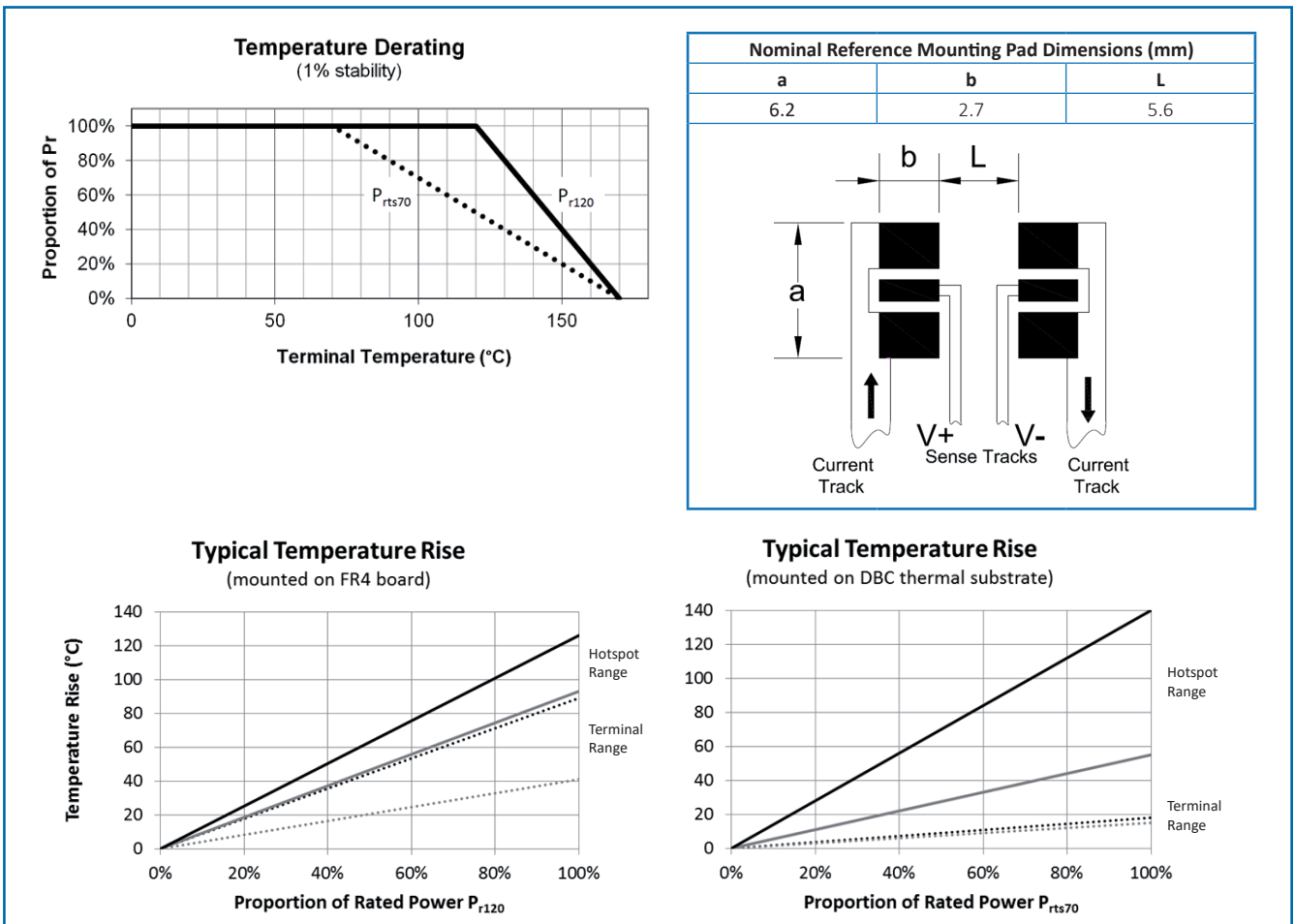
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## LRMAP3920

### 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	0.3	0.5
Solderability	J-STD-002	95% coverage	
Resistance to Solvents	MIL-STD-202 Method 215	No damage	

### Thermal Data & Mounting



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  $\leq 120^\circ\text{C}$ .

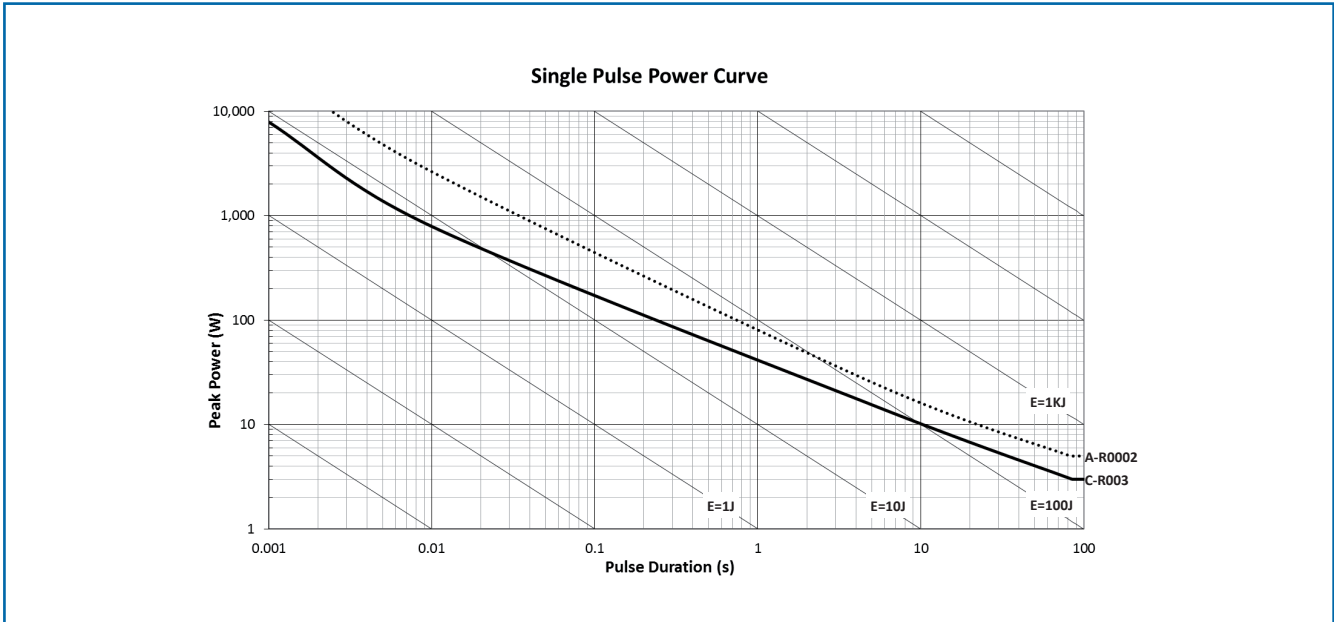
Thermal substrate details: DBC or similar thermal substrate, such that terminal temperature is maintained at  $\leq 70^\circ\text{C}$ .

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## LRMAP3920

### 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	

### 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

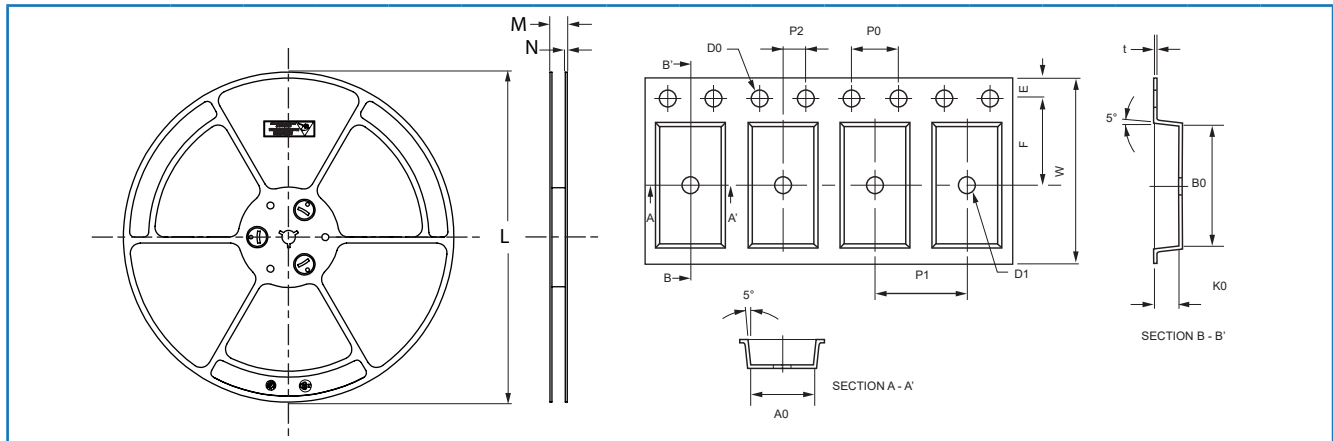
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## LRMAP3920

### Packaging

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

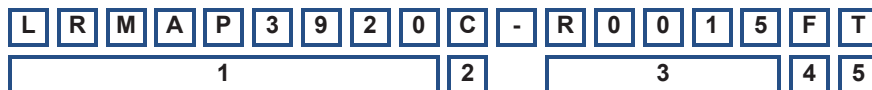


All dimensions in mm

LRMAP3920 Type	L	M	N	W	E	F	D0	D1	P0	P1	P2	P0x10	t	A0	B0	K0	
(B)-R001 (B)-R0007 (C)-R002 (C)-R003	±1.00	±1.00	+0.30/ -0.10	+0.30/ -0.05	±0.10	+0.10	+0.10/ -0.0	+0.10/ -0.0	±0.10	±0.10	±0.10	±0.20	+0.15/ -0.10	+0.15/ -0.10	±0.13	±0.10	
All remaining values	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	
																	2.20

### 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
	B	R = ohms		3000/reel
	C			

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