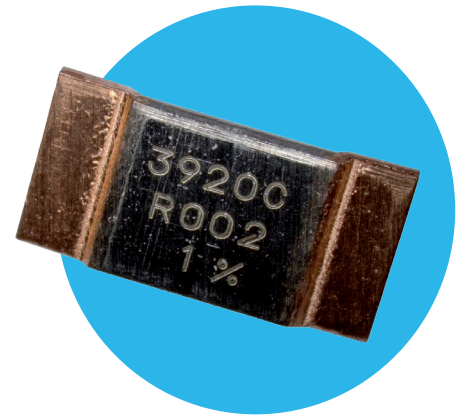


Low Resistance Metal Alloy Power Resistors



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

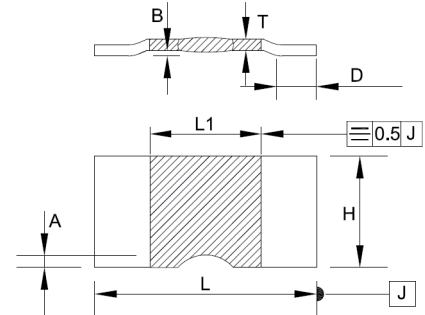
| | | LRMAP3920 | | | | | | | | |
|---|--------|------------|------|-----|-----|----|----|-----|----|----|
| Alloy type | | A | B | | | | C | | | |
| Resistance value | mΩ | 0.2 | 0.3 | 0.5 | 0.7 | 1 | 1 | 1.5 | 2 | 3 |
| Power rating (standard), P_{r120}^1 | W | 5 | | | | 4 | 5 | 4.5 | 4 | 3 |
| Power rating (thermal substrate), P_{rts70}^2 | W | 10 | | | | 7 | | | | 5 |
| Overload rating (5s) ¹ | 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 | 4.0 | 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

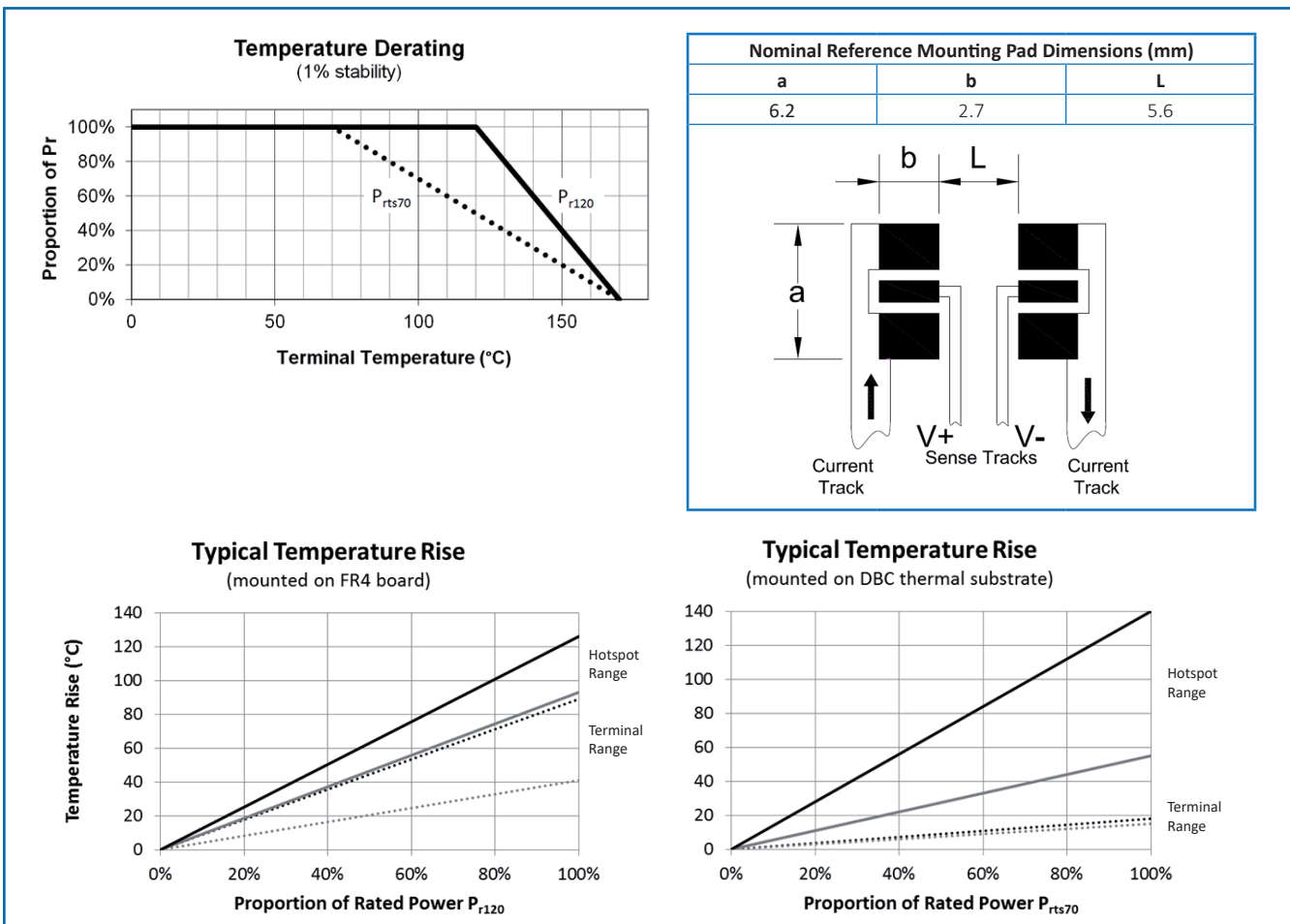
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All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

Performance Data

| Test | Method | ±DR% | |
|---------------------------|---|--------------|---------|
| | | 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



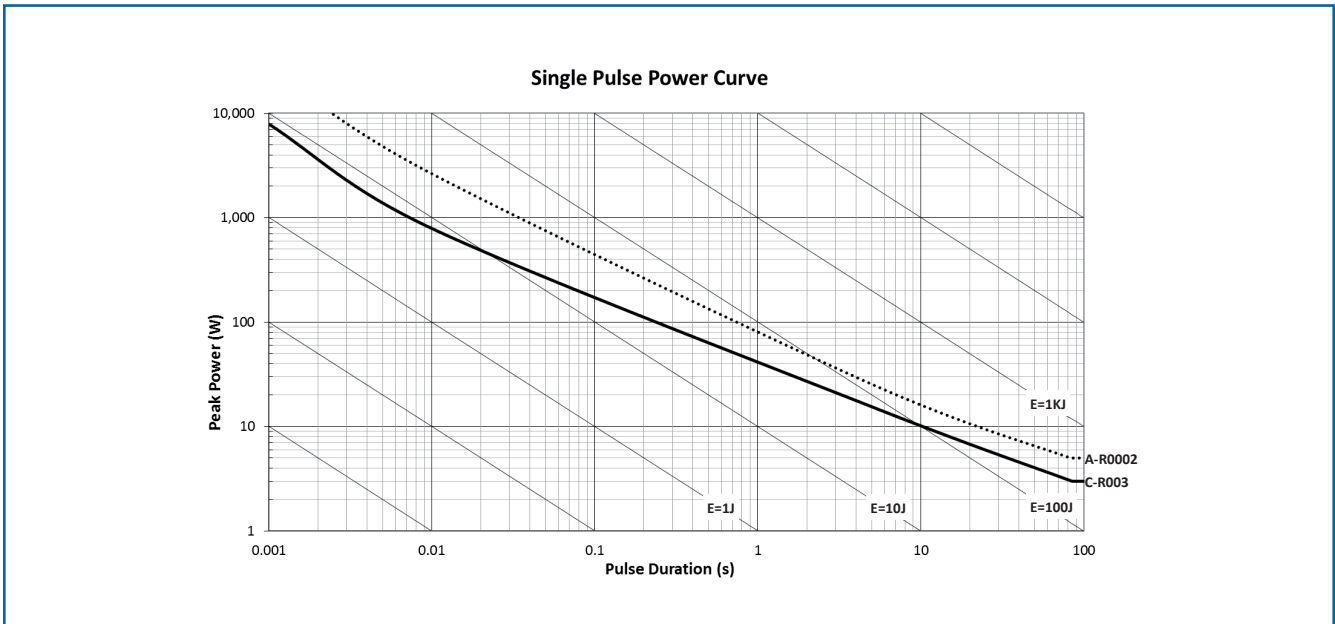
FR4 board details: 102x51mm, high T_g FR4 board with 70 μ m (2 ounce) inner and outer Cu planes or similar substrate, such that terminal temperature is maintained at $\leq 120^\circ\text{C}$.

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

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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 | <p>4-terminal ohm meter</p> <p>Resistor contact probes</p> |
| 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

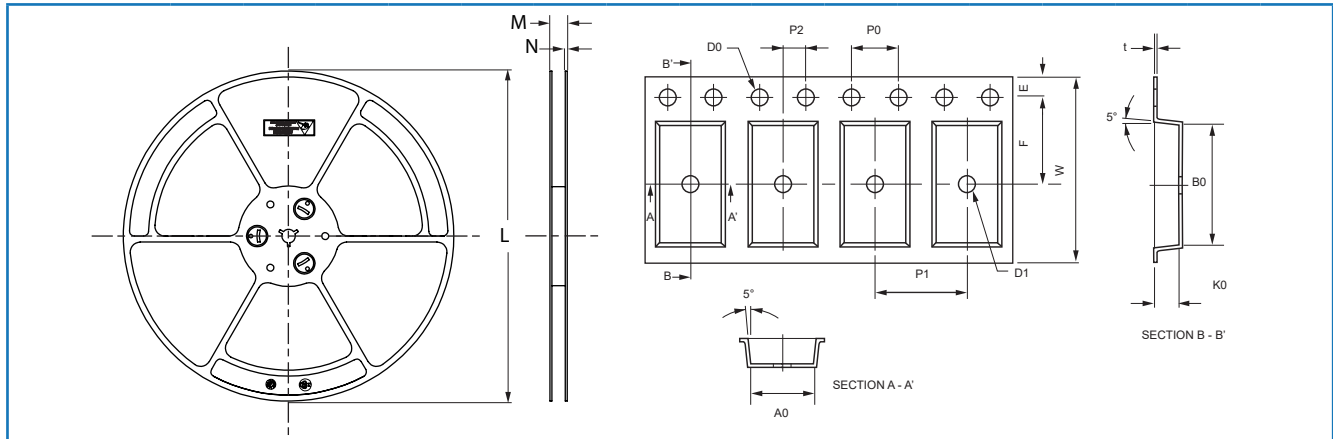
General Note

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LRMAP3920

Packaging

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

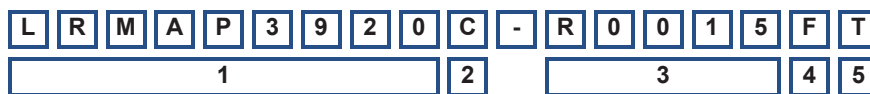


All dimensions in mm

| LRMAP3920 Type | L | M | N | W | E | F | D0 | D1 | P0 | P1 | P2 | P0x10 | t | A0 | B0 | K0 |
|---|-------|-------|-----------------|-----------------|-------|-------|----------------|----------------|-------|-------|-------|-------|-----------------|-----------------|-------|-------|
| | ±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 |
| (B)-R001 (B)-R0007 (C)-R002 (C)-R003 | 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 |

Ordering Procedure

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



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

General Note

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