

LRF4W Series

Features:

- 4W in 1225 package
- Resistance range from 3 to 100mΩ
- Tolerances to ±1%
- AEC-Q200 pending
- Low thermal impedance
- Wide terminations to enhance robustness

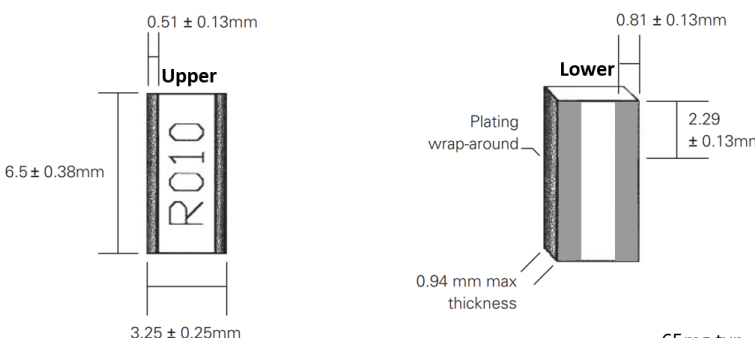
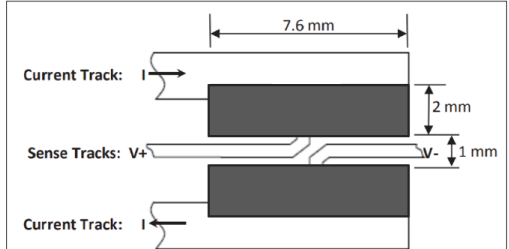


All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

Electrical Data

| | | LRF4W |
|---|--------|---|
| Power rating @ 110°C terminal temperature | W | 4 |
| Resistance range | Ω | R003 to R10 |
| Resistance tolerance | % | <R004: 5, ≥R004: 1, 2, 5 |
| TCR | ppm/°C | <R004: ±550, ≥R004: ±100 |
| Dielectric withstand | V | 200 |
| Standard values | | E24 and integer multiples of R001 up to R01, of R005 up to R05 and of R01 preferred |
| Ambient temperature range | °C | -55 to +150 |

Physical Data

| Dimensions and Weight | Mounting Pad Dimensions and Example Kelvin Tracking |
|---|--|
|  <p>0.51 ± 0.13mm Upper 6.5 ± 0.38mm 3.25 ± 0.25mm 0.81 ± 0.13mm Lower Plating wrap-around 2.29 ± 0.13mm 0.94 mm max thickness 65mg typ.</p> |  <p>7.6 mm Current Track: I Sense Tracks: V+ V- 2 mm 1 mm Current Track: I</p> |

Construction

Proprietary non-noble copper-based thick-film material and organic protection are screen printed on a 96% alumina substrate. The components are laser trimmed to achieve the required resistance tolerance.

Terminations

The wrap-around terminations have an electroplated nickel barrier and matte tin or tin - lead finish. This ensures excellent leach resistance properties and solderability. Chips can withstand immersion in solder at 250°C for 90 seconds and are suitable for reflow or wave solder mounting processes.

Marking

The body protection and marking are resistant to all normal industrial cleaning solvents suitable for printed circuits. Chips are packed and mounted with marking side up.

Processing

LRF4W chips are placed on the termination pads with the actual resistor element mounted face down. For reflow of LRF4W parts, a solder paste thickness of not less than 100µm is recommended.

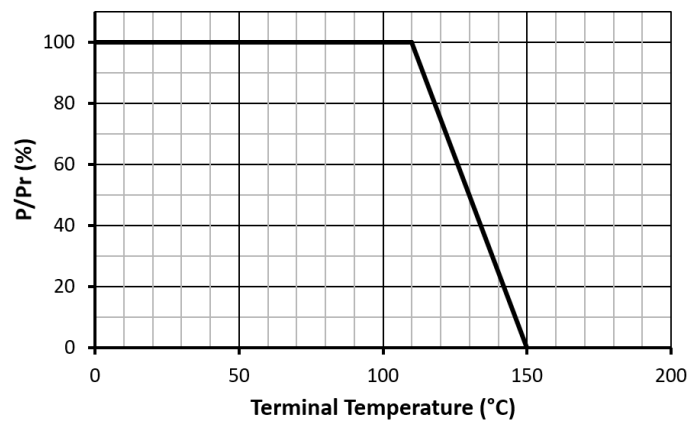
Performance Data

| AEC-Q200 Table 7 Reference | Test | Method | | Maximum (add R05) | Typical (@R20) |
|-------------------------------|--------------------------------|--------------------------|-----------------|----------------------|-------------------|
| 3 | High temperature exposure | MIL-STD-202 Method 108 | $\pm\Delta R\%$ | 0.5 | 0.2 |
| 4 | Temperature cycling | JESD22 Method JA-104 | $\pm\Delta R\%$ | 0.25 | 0.1 |
| 6 | Moisture resistance | MIL-STD-202 Method 106 | $\pm\Delta R\%$ | 0.5 | 0.2 |
| 7 | Biased humidity | MIL-STD-202 Method 103 | $\pm\Delta R\%$ | 0.5 | 0.2 |
| 8 | Operational life (cyclic load) | MIL-STD-202 Method 108 | $\pm\Delta R\%$ | 3 | 1 |
| 14 | Vibration | MIL-STD-202 Method 204 | $\pm\Delta R\%$ | 0.5 | 0.05 |
| 15 | Resistance to solder heat | MIL-STD-202 Method 210 | $\pm\Delta R\%$ | 0.25 | 0.05 |
| 16 | Thermal shock | MIL-STD-202 Method 107 | $\pm\Delta R\%$ | 0.25 | 0.1 |
| 18 | Solderability | J-STD-002 | | >95% coverage | |
| 21 | Board flex | AEC-Q200-005 | $\pm\Delta R\%$ | 0.5 | 0.2 |
| 22 | Terminal strength | AEC-Q200-006 | $\pm\Delta R\%$ | 0.25 | 0.1 |
| | Short term overload | 4 x Pr for 5s | $\pm\Delta R\%$ | 2 | - |
| | Low temperature storage | -65°C for 100 hours | $\pm\Delta R\%$ | 0.5 | |
| | Shelf life test | Room temp. for 12 months | $\pm\Delta R\%$ | 0.1 | |
| | Leach resistance | Solder dip at 250°C | | 90s minimum | |

Note: Full AEC-Q200 qualification applies to ohmic values $\geq R02$

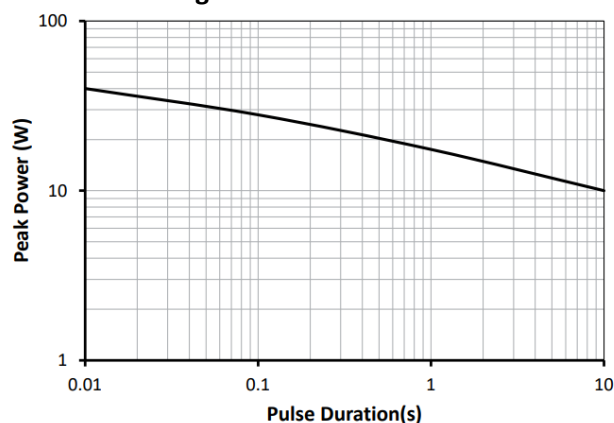
Thermal Data

Temperature Derating



Pulse Data

Single Pulse Performance

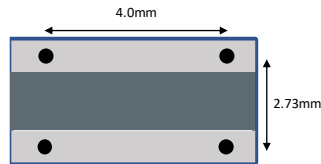


General Note

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.

Value Measurement

LRF4W resistors are measured using 4-terminal probes on the lower side of the chip, centred on the chip and at the spacings shown below.



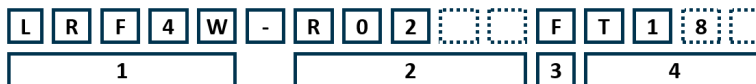
Packaging

LRF4W resistors are supplied taped and reeled as per IEC 286-3. The standard quantity per reel is 1800 parts. For full details of tape and reel dimensions see:

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Application-Note/PS003-Packing-of-Specialist-Chip-Resistors.pdf>

Ordering Procedure

Example: LRF4W-R02FT18 (20mΩ ±1%, Pb-free)



| 1 Type | 2 Value | 3 Tolerance | 4 Termination & Packing | | | |
|-----------|---------------------------------|----------------|----------------------------|-------------|-----------|----------------------|
| LRF4W | E24 =3-5 characters R = ohms | F = ±1% | T18 | Pb-free | 1800/reel | Standard packing |
| | | G = ±2% | PB | SnPb finish | | |
| | | J = ±5% | T1 | Pb-free | 1000/reel | Non-standard packing |
| | | | T1PB | SnPb finish | | |