

LOW OHM (METAL STRIP) CHIP RESISTOR

- LOR SERIES -

FEATURES

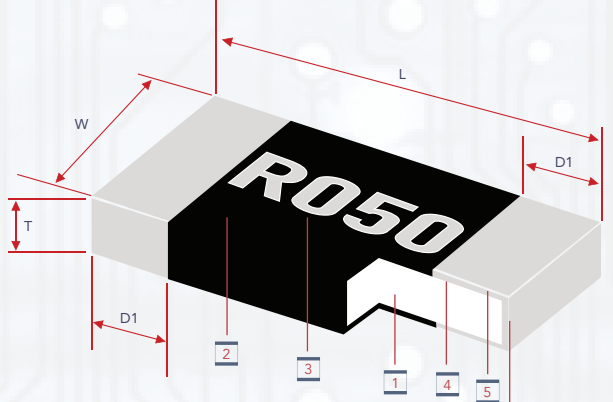
- Low TCR down to ± 25 PPM/ $^{\circ}$ C
- Customized resistance available
- Low inductance < 5nH
- AEC Q200 Compliance
- Sulfur resistance unaffected by sulfur environments
- Lead free and RoHS compliant

APPLICATIONS

- NB (for Power Management)
- MB (for Power Management)
- SWPS (DC-DC Converter, Charger, Adaptor)
- Monitor (For Power Management)



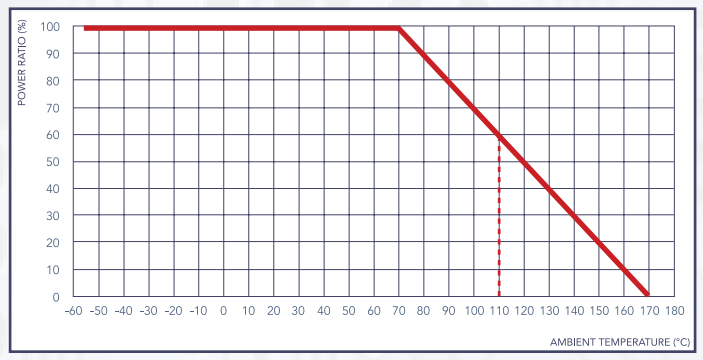
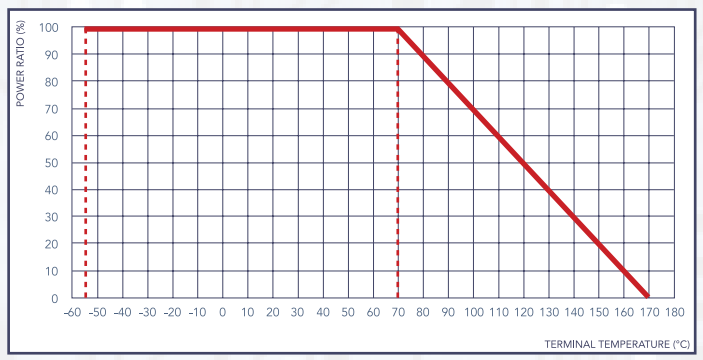
CONSTRUCTION & DIMENSIONS



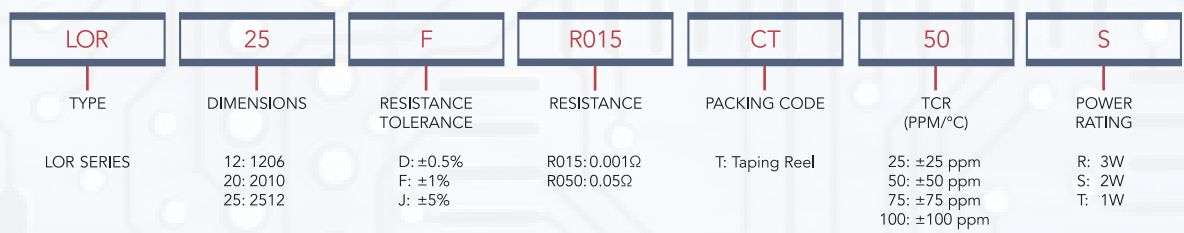
- 1 Alloy Plate
- 2 Overcoat (moulding)
- 3 Marking
- 4 Internal Electrode (Cu)
- 5 Barrier Layer (Ni)
- 6 Solder Plating (Sn)

| TYPE | SIZE (INCH) | L (MM) | W (MM) | T (MM) | D1 (MM) | D2 (MM) | WEIGHT (G) (1000PCS) |
|--------------------------|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------------|
| LOR12 | 1206 | 3.15 \pm 0.10 | 1.45 \pm 0.10 | 0.55 \pm 0.10 | 0.55 \pm 0.15 | 0.55 \pm 0.15 | 10.5 |
| LOR20 | 2010 | 5.00 \pm 0.15 | 2.40 \pm 0.15 | 0.55 \pm 0.15 | 0.80 \pm 0.20 | 0.80 \pm 0.20 | 40 |
| LOR25 (2-200M Ω) | 2512 | | | | | 0.90 \pm 0.30 | |
| LOR25 (1.5M Ω) | 2512 | 6.40 \pm 0.25 | 3.20 \pm 0.25 | 0.70 \pm 0.20 | 0.90 \pm 0.30 | 1.45 \pm 0.30 | 52.6 |
| LOR25 (1M Ω) | 2512 | | | | | 1.85 \pm 0.30 | |

DERATING CURVE



PART NUMBERING



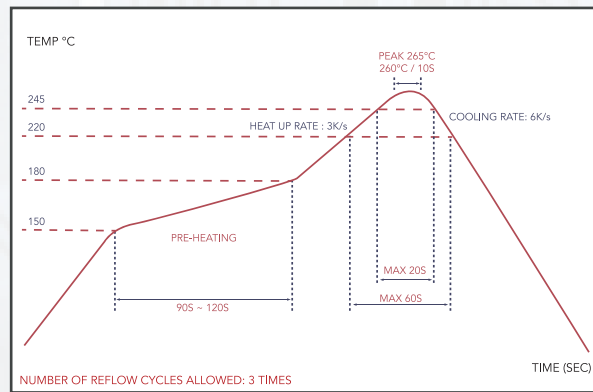
ELECTRICAL SPECIFICATIONS

| TYPE | ITEM | POWER RATING AT 70°C | RATED TERMINAL TEMPERATURE | OPERATING TEMP RANGE | RESISTANCE RANGE (mΩ) | | | T.C.R. (PPM / °C) |
|-------|------|----------------------|----------------------------|----------------------|---|-----|-----|-------------------|
| | | | | | ±0.5% | ±1% | ±5% | |
| LOR12 | 1206 | 1W | 110°C | -55 ~ +170°C | 8, 10, 12, 15, 20, 25, 30, 33, 40 | | | ±50 |
| | | | | | 3, 4, 5, 7, 8, 10, 12, 15, 20, 25, 30, 33, 40 | | | ±75 ±100 |
| LOR20 | 2010 | 1W | 110°C | -55 ~ +170°C | 4, 5, 10, 15, 20, 30, 50, 68, 75, 100 | | | ±75 |
| | | 2W | | | 4, 5, 10, 15, 20, 30, 50, 68, 75 | | | |
| LOR25 | 2512 | 2W, 3W | 110°C | -55 ~ +170°C | 3, 4, 5, 6, 7, 18, 20, 22, 25, 30, 33, 35, 39, 40, 47, 50, 60, 68, 70, 75, 80, 82, 90, 91, 100, 120, 150, 180, 200 | | | ±25 |
| | | | | | 1, 1.5, 2, 2.5, 3, 4, 5, 6, 7, 8, 8.5, 9, 10, 12, 15, 18, 20, 22, 25, 30, 33, 35, 39, 40, 47, 50, 60, 68, 70, 75, 80, 82, 90, 91, 100, 120, 150, 180, 200 | | | ±50 ±75 |

Operating Current - $\sqrt{(P/R)}$ | Operating Voltage - $\sqrt{(P \cdot R)}$

- Cal-Chip is capable of manufacturing the optional spec based on customer's requirement

SOLDERING CONDITION



(1) Time of IR reflow soldering at maximum temperature point 260°C : 10s

ENVIRONMENTAL CHARACTERISTICS

| ITEMS | REQUIREMENT | TEST METHOD |
|--|-------------------|--|
| Temperature Coefficient of Resistance (T.C.R.) | As Spec. | IEC-60115-1 4.8 JIS-C-5201-1 4.8 +25°C ~ 125°C, 25°C is the reference temperature |
| Short Time Overload | ±1.0% | IEC-60115-1 4.13 JIS-C-5201-1 4.13 5* rated power for 5 seconds |
| Insulation Resistance | ≥10G | IEC-60115-1 4.6 JIS-C-5201-1 4.13 100V DC for 1 minute |
| Endurance | ±1.0% | IEC60115 - 1 4.25 JIS-C 5201 1 4.25.1 70±2°C, rated power for 1000 hrs with 1.5hrs "ON" and 0.5 hrs "OFF" |
| Biased Humidity | ±1.0% | MIL - STD - 202 Method 103 1000 hrs 85°C /85%RH 10% of operating power |
| Dry Heat | ±1.0% | IEC-60115-1 4.23.2 JIS-C-5201-1 4.23.2 at + 170°C for 1000hrs |
| Bending Strength | ±1.0% | JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending width 2mm once for 60 seconds |
| Solderability | 95% min. coverage | JIS-C-5201-1 4.17 IEC-60115-1 4.17 245±5°C for 3 seconds |
| Resistance to Soldering Heat | ±0.5% | JIS-C-5201-1 4.18 IEC-60115-1 4.18 260±5°C for 10 seconds |
| Rapid Change of Temperature | ±1.0% | JIS-C-5201-1 4.19 IEC-60115-1 4.19 -55°C to +155°C, 5 cycles |
| Low Temperature Storage | ±1.0% | IEC60115-1 4.23.4 JIS-C-5201-1 4.23.4 at -55°C for 2 hrs |

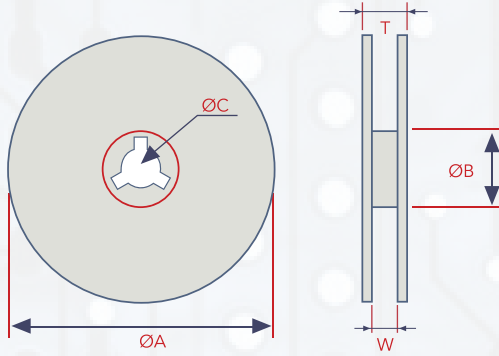
RCWW (Rated Continuous Working Voltage) - $\sqrt{(P \cdot R)}$ or Max. Operating Voltage whichever is lower

- Storage Temperature: 15~28°C ; Humidity < 80%RH
- Shelf life: 2 years from production date



PACKAGING

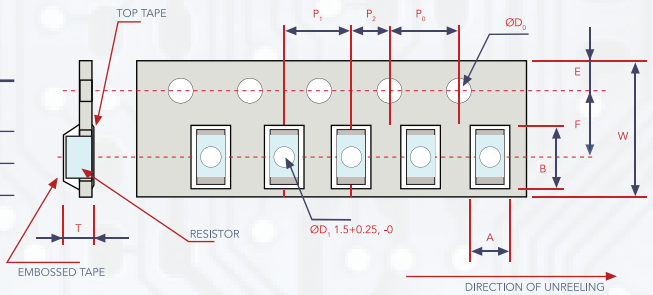
- Reel Specifications & Packaging Quantity



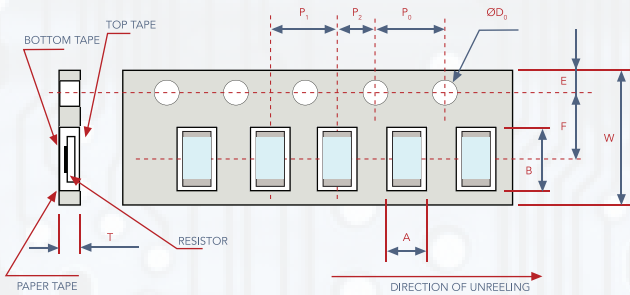
| TYPE | RESISTANCE (MΩ) | PACKAGING QUANTITY | | TAPE WIDTH | REEL DIAMETER | ØA (mm) | ØB (mm) | ØC (mm) | W (mm) | T (mm) |
|-------|-----------------|--------------------|----|------------|---------------|-------------|--------------------|---------|---------|----------|
| LOR12 | 3-40 | Paper | 5K | 8mm | 7 inch | 178.5±1.5 | 60 ^{+1.0} | 13±0.2 | 9.0±0.5 | 12.5±0.5 |
| LOR20 | 4-100 | Embossed | | 4K | 7 inch | 178.5+/-1.5 | 60±1.0 | 13±0.5 | 13±1.0 | 15.5±0.5 |
| LOR25 | 1-200 | Embossed | | 4K | 7 inch | 178.5+/-1.5 | | 13±0.5 | | 15.5±0.5 |

- Embossed Plastic Tape Specifications

| TYPE | A (MM) | B (MM) | W (MM) | E (MM) | F (MM) | P ₀ (MM) | P ₁ (MM) | P ₂ (MM) | ØD ₀ (MM) | T (MM) |
|-------|-----------|-----------|-----------|-----------|----------|---------------------|---------------------|---------------------|----------------------|--------|
| LOR20 | 2.80±0.10 | 5.40±0.20 | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.50+0.1,-0 | 1.20+0 |
| LOR25 | 3.50±0.10 | 6.70±0.10 | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.50+0.1,-0 | 1.20+0 |

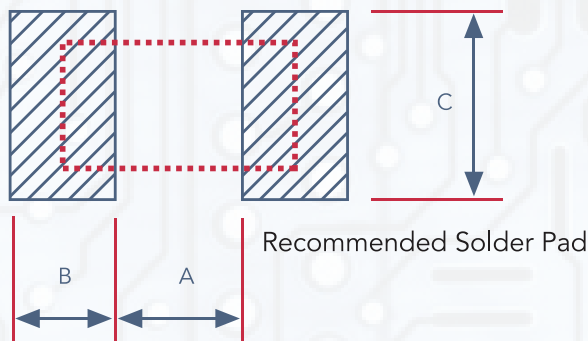


- Paper Tape Specifications



| TYPE | A (MM) | B (MM) | W (MM) | E (MM) | F (MM) | P ₀ (MM) | P ₁ (MM) | P ₂ (MM) | ØD ₀ (MM) | T (MM) |
|-------|-----------|-----------|----------|-----------|-----------|---------------------|---------------------|---------------------|----------------------|-----------|
| LOR12 | 1.90±0.10 | 3.50±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 4.00±0.05 | 2.00±0.05 | 1.50+0.1,-0 | 0.85±0.10 |

RECOMMENDED LAND PATTERN



| TYPE | A (MM) | B (MM) | C (MM) |
|-------|--------|--------|--------|
| LOR12 | 1.50 | 1.40 | 1.7 |
| LOR20 | 3.60 | 1.40 | 2.5 |
| LOR25 | 4.00 | 2.00 | 3.5 |
| LOR25 | 2.30 | 2.65 | 3.5 |