

Low Ohm (Metal Strip) Chip Resistor- LRM Series

■ Features

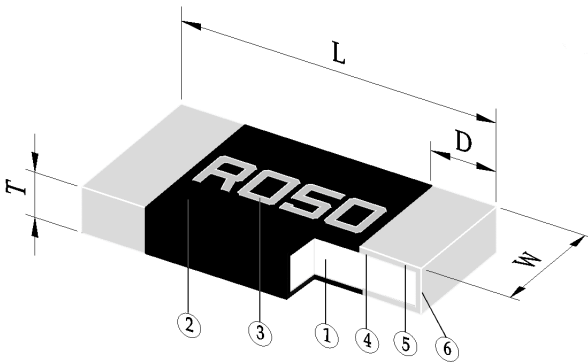
- High power rating up to 3 Watts
- Low TCR down to ± 100 PPM/ $^{\circ}$ C
- Resistance values from 10m to 50m ohm
- Customized resistance available

■ Applications

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



■ Construction



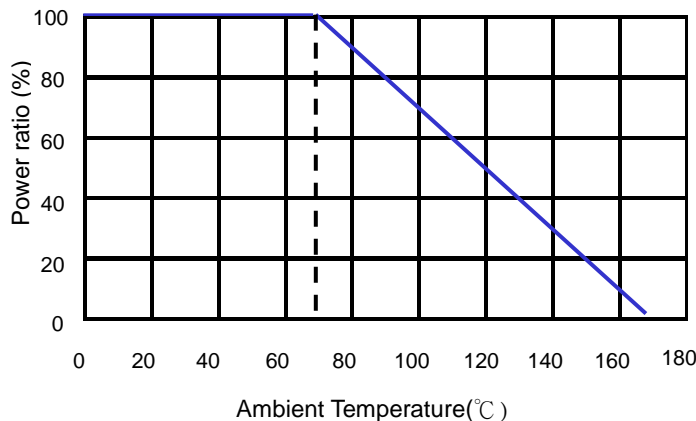
| | |
|----------------------|---------------------------|
| ① Alloy Plate | ④ Internal Electrode (Cu) |
| ② Overcoat (molding) | ⑤ Barrier Layer (Ni) |
| ③ Marking | ⑥ Solder Plating (Sn) |

Black – Wave or IR reflow soldering

■ Dimensions

| Type | Size (Inch) | L (mm) | W (mm) | T (mm) | D (mm) | Weight (g) (1000pcs) |
|-------|-------------|-----------------|-----------------|-----------------|-----------------|----------------------|
| LRM06 | 1206 | 3.20 \pm 0.20 | 1.60 \pm 0.20 | 0.60 \pm 0.20 | 0.50 \pm 0.30 | 18.80 |
| LRM10 | 2010 | 5.00 \pm 0.20 | 2.50 \pm 0.20 | 0.60 \pm 0.20 | 0.60 \pm 0.30 | 40.50 |
| LRM12 | 2512 | 6.20 \pm 0.20 | 3.20 \pm 0.20 | 0.60 \pm 0.20 | 1.10 \pm 0.30 | 90.90 |

■ Derating Curve



Low Ohm (Metal Strip) Chip Resistor

Part Numbering

| | | | | | | | |
|--------------|----------------------------------|----------------------------|----------------|-------------------|---|--|----------------------------------|
| LRM | 12 | J | T | E | S | R010 | |
| Product Type | Dimensions (LxW) | Resistance Tolerance | Packaging Code | TCR (PPM/°C) | Power Rating | Resistance | Marking |
| | 06: 1206 10: 2010 12: 2512 | F: ±1% G: ±2% J: ±5% | T: Taping Reel | E: ±100 W: ±75 | R: 3W S: 2W A: 1.5W T: 1W Q: 3/4W U: 1/2W O: 1/3W V: 1/4W W: 1/8W | R010: 0.01Ω R050: 0.05Ω R100: 0.1Ω | : Black Coating N: No Marking |

Standard Electrical Specifications

| Type | Item | Power Rating at 70°C | Operating Temp. Range | Resistance Range (mΩ) | | | TCR (PPM/°C) |
|--------------|------|----------------------|-----------------------|-----------------------|-----|-----|--------------|
| | | | | ±1% | ±2% | ±5% | |
| LRM06 (1206) | | 1/4W 1/2W 1W | -55 ~ +170°C | 5-10 | | | ±100 |
| | | | | 11-30 | | | ±75 |
| LRM10 (2010) | | 3/4W 1W | -55 ~ +170°C | 5-10 | | | ±100 |
| | | | | 11-30 | | | ±75 |
| LRM12 (2512) | | 1W 2W | -55 ~ +170°C | 10-100 | | | ±75 |

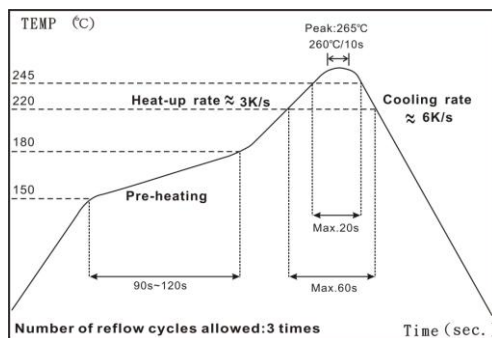
High Power Rating Electrical Specifications

| Type | Item | Power Rating at 70°C | Operating Temp. Range | Resistance Range (mΩ) | | | TCR (PPM/°C) |
|--------------|------|----------------------|-----------------------|-----------------------|-----|-----|--------------|
| | | | | ±1% | ±2% | ±5% | |
| LRM10 (2010) | | 1.5W | -55 ~ +170°C | 10-30 | | | ±75 |
| LRM12 (2512) | | 3W | -55 ~ +170°C | 10-100 | | | ±75 |

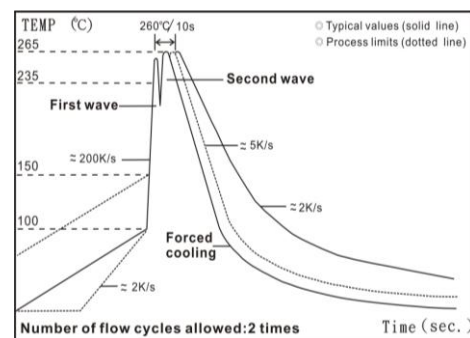
Operating Current = $\sqrt{P/R}$, Operating Voltage = $\sqrt{P \cdot R}$

■ Viking is capable of manufacturing the optional spec based on customer's requirement.

Soldering Condition



IR Reflow Soldering



Wave Soldering (Flow Soldering)

- (1) Time of IR reflow soldering at maximum temperature point 260°C : 10s
- (2) Time of wave soldering at maximum temperature point 260°C : 10s
- (3) Time of soldering iron at maximum temperature point 410°C : 5s

■ Environmental Characteristics

| Item | Requirement | Test Method |
|--|-------------------|---|
| Temperature Coefficient of Resistance (T.C.R.) | As Spec. | MIL-STD-202 Method 304 +25/-55/+25/+125/+25°C |
| Short Time Overload | ±0.5% | JIS-C-5201-1 5.5 5*rated power for 5 seconds |
| Insulation Resistance | ≥1G | JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. Overload Voltage for 1 minute |
| Endurance | ±1.0% | MIL-STD-202 Method 108A 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| Dry Heat | ±1.0% | JIS-C-5201-1 7.2 at +170°C for 1000 hrs |
| Bending Strength | ±1.0% | JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending width 2mm once for 5 seconds |
| Solderability | 95% min. coverage | MIL-STD-202 Method 208H 245±5°C for 3 seconds |
| Resistance to Soldering Heat | ±0.5% | MIL-STD-202 Method 210E 260±5°C for 10 seconds |
| Thermal Shock | ±0.5% | MIL-STD-202 Method 107G -55°C ~ 150°C, 100 cycles |

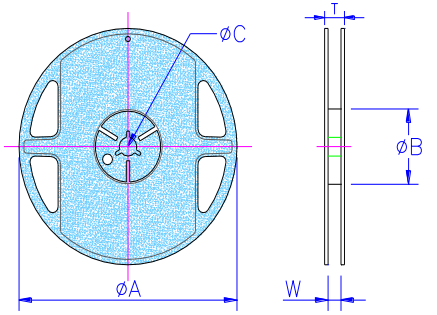
RCWV(Rated continuous working voltage)= $\sqrt{P \cdot R}$ or Max. Operating voltage whichever is lower

■ Storage Temperature: 25±3°C; Humidity < 80%RH

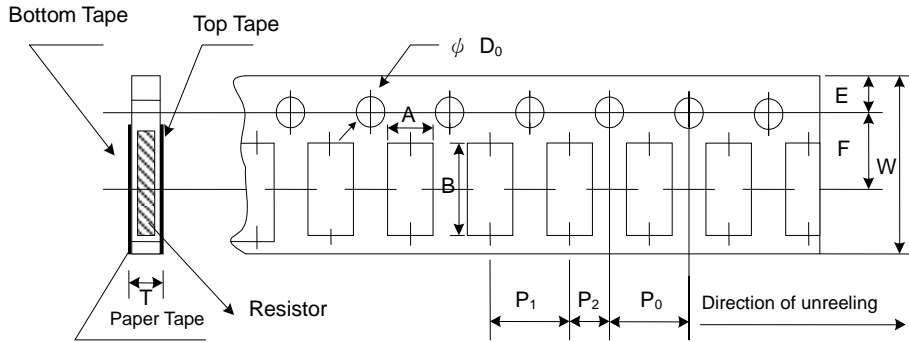
■ Packaging

Reel Specifications & Packaging Quantity

| Type | Packaging Quantity | Tape Width | Reel Diameter | ΦA (mm) | ΦB (mm) | ΦC (mm) | W (mm) | T (mm) | |
|-------|--------------------|------------|---------------|---------|-----------|---------------------|----------|----------|----------|
| LRM06 | Paper | 5K | 8mm | 7 inch | 178.5±1.5 | 60 ^{+1/-0} | 13.0±0.5 | 9.0±0.5 | 11.5±0.5 |
| LRM10 | Embossed | 4K | 12mm | 7 inch | 178.5±1.5 | 60 ^{+1/-0} | 13.0±0.5 | 13.0±0.5 | 15.5±0.5 |
| LRM12 | Embossed | 4K | 12mm | 7 inch | 178.5±1.5 | 60 ^{+1/-0} | 13.0±0.5 | 13.0±0.5 | 15.5±0.5 |

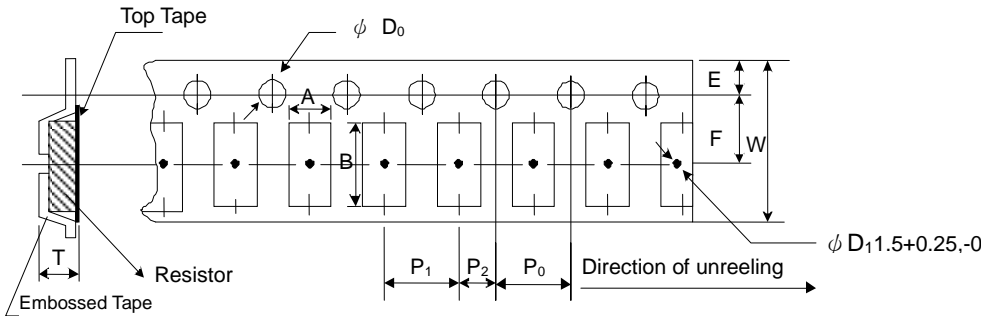


Paper Tape Specifications



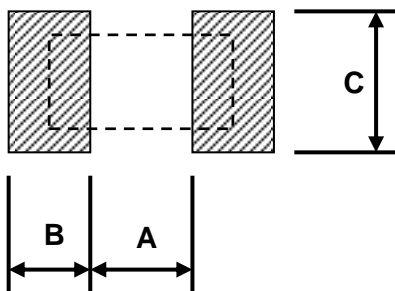
| Type | A (mm) | B (mm) | W (mm) | E (mm) | F (mm) | P ₀ (mm) | P ₁ (mm) | P ₂ (mm) | ΦD ₀ (mm) | T (mm) |
|-------|-----------|-----------|-----------|-----------|-----------|---------------------|---------------------|---------------------|----------------------|-----------|
| LRM06 | 2.00±0.15 | 3.60±0.20 | 8.00±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.50+0.1/-0 | 0.85±0.10 |

Embossed Plastic Tape Specifications



| Type | A (mm) | B (mm) | W (mm) | E (mm) | F (mm) | P ₀ (mm) | P ₁ (mm) | P ₂ (mm) | ΦD ₀ (mm) | T (mm) |
|-------|-----------|-----------|-----------|-----------|----------|---------------------|---------------------|---------------------|----------------------|-------------------|
| LRM10 | 2.80±0.20 | 5.30±0.20 | 12.0±0.20 | 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 | 1.2 ⁺⁰ |
| LRM12 | 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 | 1.2 ⁺⁰ |

■ Recommend Land Pattern



| Type | A (mm) | B (mm) | C (mm) |
|--------------------|--------|--------|--------|
| LRM06 | 1.40 | 1.90 | 1.80 |
| LRM10 | 3.50 | 1.50 | 2.80 |
| LRM12 (10-50mΩ) | 3.80 | 1.60 | 3.50 |
| LRM12 (51-100mΩ) | 4.10 | 2.10 | 4.00 |
| LRM12 (High Power) | 4.10 | 2.10 | 4.00 |