# ***Data Sheet***

| | |
|---|---|
| Customer: | |
| Product: | Ultra Low Ohm (Metal Strip) Chip Resistor -LR Series |
| Size: | 2512 |
| Issued Date: | 12-Jan-24 |
| Edition: | REV.D3 |

RoHS Compliant


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|---|---|---|---|---|
| 12-Jan-24 | 12-Jan-24 | 12-Jan-24 | | |
| ***Alice Hsiao*** | ***Susan Huang*** | ***Susan Huang*** | | |

# Ultra Low Ohm (Metal Strip) Chip Resistor



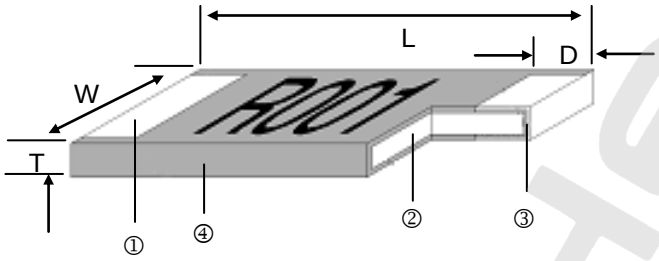

## ■Features

- —High power rating up to 3 Watts
- —Low TCR down to ±50 PPM/°C
- —Resistance values from 0.5m to 10m ohm
- —Customized resistance available
- —Wide range package sizes 2512
- —AEC-Q200 Compliance

## ■Applications

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

## ■Construction & Dimension




Black—Wave or Reflow soldering

| | | | |
|---|---|---|---|
| ① | Solder Plating | ③ | Barrier Layer |
| ② | Alloy Plate | ④ | Overcoat |

## ■Part Numbering

| LR | 12 | J | T | E | S | R002 | |
|---|---|---|---|---|---|---|---|
| Product Type | Dimensions (L×W) | Resistance Tolerance | Packaging Code | TCR (PPM/°C) | Power Rating | Resistance | Marking |
| | 12: 2512 | F: ±1%<br>H: ±3%<br>J: ±5% | T: Taping Reel | D: ±50<br>E: ±100<br>W: ±75<br>K: ±150 | : Standard<br>R: 3W<br>S: 2W | R002: 0.002Ω<br>R010: 0.01Ω<br>0M50: 0.0005Ω<br>1M50: 0.0015Ω | : Black Coating |

## ■Dimensions

Unit: mm

| Part No. | Resistance (mΩ) | L | W | T | D | Weight (g) (1000pcs) |
|---|---|---|---|---|---|---|
| LR12□T□□0M50 | 0.50 | 6.35±0.254 | 3.18±0.254 | 1.25±0.20 | 1.85±0.38 | 184.11 |
| LR12□T□□0M75 | 0.75 | 6.35±0.254 | 3.18±0.254 | 0.75±0.20 | 1.55±0.38 | 131.11 |
| LR12□T□□R001 | 1.00 | 6.35±0.254 | 3.18±0.254 | 0.65±0.20 | 1.55±0.38 | 110.85 |
| LR12□T□□1M50 | 1.50 | 6.35±0.254 | 3.18±0.254 | 0.45±0.20 | 1.55±0.38 | 67.16 |
| LR12□T□□R002 | 2.00 | 6.35±0.254 | 3.18±0.254 | 0.35±0.20 | 1.55±0.38 | 49.30 |
| LR12□T□□2M50 | 2.50 | 6.35±0.254 | 3.18±0.254 | 0.65±0.20 | 1.40±0.38 | 97.95 |
| LR12□T□□R003 | 3.00 | 6.35±0.254 | 3.18±0.254 | 0.55±0.20 | 1.40±0.38 | 83.49 |
| LR12□T□□R004 | 4.00 | 6.35±0.254 | 3.18±0.254 | 0.45±0.20 | 1.40±0.38 | 62.59 |
| LR12□T□□R005 | 5.00 | 6.35±0.254 | 3.18±0.254 | 0.35±0.20 | 1.40±0.38 | 49.84 |
| LR12□T□□R006 | 6.00 | 6.35±0.254 | 3.18±0.254 | 0.32±0.20 | 1.40±0.38 | 41.76 |
| LR12□T□□6M50 | 6.50 | 6.35±0.254 | 3.18±0.254 | 0.30±0.20 | 1.40±0.38 | 35.85 |
| LR12□T□□R007 | 7.00 | 6.35±0.254 | 3.18±0.254 | 0.27±0.20 | 1.40±0.38 | 34.01 |
| LR12□T□□R010 | 10.00 | 6.35±0.254 | 3.18±0.254 | 0.25±0.20 | 1.40±0.38 | 25.97 |

## ■Standard Electrical Specifications

| Item / Part No. | Power Rating at 70℃ | Operating Temp. Range | Resistance Range (mΩ) | | | TCR (PPM/℃) |
|---|---|---|---|---|---|---|
| | | | ±1% | ±3% | ±5% | |
| LR12□TD□□□□ | 1W | -55℃ ~ +170°C | 0.5, 0.75, 1, 1.5, 2 | | | ±50 |
| LR12□TW□□□□ | 1W | | 6, 6.5, 7 | | | ±75 |
| LR12□TE□□□□ | 1W | | 4, 5, 10 | | | ±100 |
| LR12□TK□□□□ | 1W | | 2.5, 3 | | | ±150 |

## ■High Power Rating Electrical Specifications

| Item / Part No. | Power Rating at 70℃ | Operating Temp. Range | Resistance Range (mΩ) | | | TCR (PPM/℃) |
|---|---|---|---|---|---|---|
| | | | ±1% | ±3% | ±5% | |
| LR12□TDS□□□□ | 2W | -55℃ ~ +170°C | 0.5, 0.75, 1, 1.5, 2 | | | ±50 |
| LR12□TWS□□□□ | 2W | | 6, 6.5, 7 | | | ±75 |
| LR12□TES□□□□ | 2W | | 4, 5, 10 | | | ±100 |
| LR12□TKS□□□□ | 2W | | 2.5, 3 | | | ±150 |
| LR12□TDR□□□□ | 3W | | 0.5, 0.75, 1, 1.5, 2 | | | ±50 |
| LR12□TWR□□□□ | 3W | | 6, 6.5, 7 | | | ±75 |
| LR12□TER□□□□ | 3W | | 4, 5, 10 | | | ±100 |
| LR12□TKR□□□□ | 3W | | 2.5, 3 | | | ±150 |

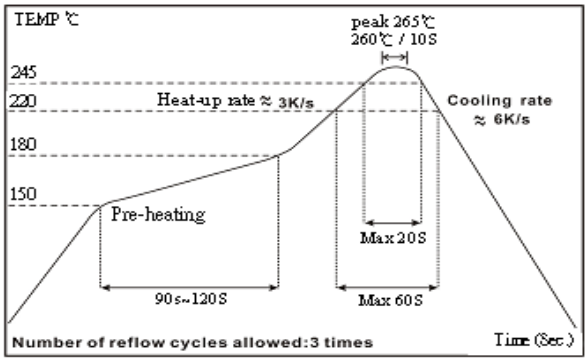
Operating Current =√(P/R), Operating Voltage=√(P*R)

■Viking has the ability of manufacture following options based on customer's requirement.

## ■Resistance codes example

| Resistance | 0.5mΩ | 1.5mΩ | 1mΩ | 2mΩ | 7mΩ | 10mΩ |
|---|---|---|---|---|---|---|
| Marking | 0M50 | 1M50 | R001 | R002 | R007 | R010 |

## ■Reflow




■Green coating "Reflow Air Convection "is available
■Green coating can't be working with wave soldering bath

## ■Environmental Characteristics

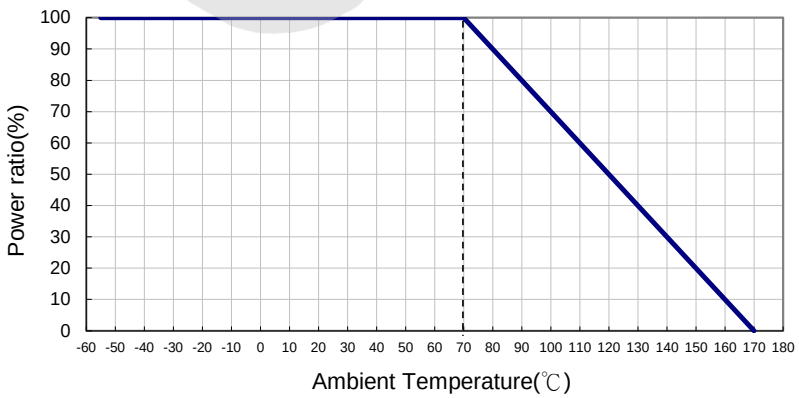
| Item | Requirement | Test Method |
|---|---|---|
| Temperature Coefficient of Resistance (T.C.R.) | As Spec. | **MIL-STD-202 Method 304**<br>+25°C ~125°C, 25°C is the reference temperature |
| Short Time Overload | ±0.5% | **JIS-C-5201-1 5.5**<br>5*rated power for 5 seconds |
| Endurance | ±1% | **MIL-STD-202 Method 108A**<br>70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF" |
| Dry Heat | ±1% | **JIS-C-5201-1 7.2**<br>at +170°C for 1000 hrs |
| Solderability | 95% min. coverage | **MIL-STD-202 Method 208H**<br>245±5°C for 3 seconds |
| Resistance to Soldering Heat | ±0.5% | **MIL-STD-202 Method 210E**<br>260±5°C for 10 seconds |
| Thermal Shock | ±0.5% | **MIL-STD-202 Method 107G**<br>-55°C ~ 150°C, 100 cycles |

**Green coating can't be work with wave soldering bath.

RCWV(Rated Continuous Working Voltage)= √(P*R) or Max. Operating Voltage whichever is lower

■**Storage Temperature: 15~28°C; Humidity < 80%RH**

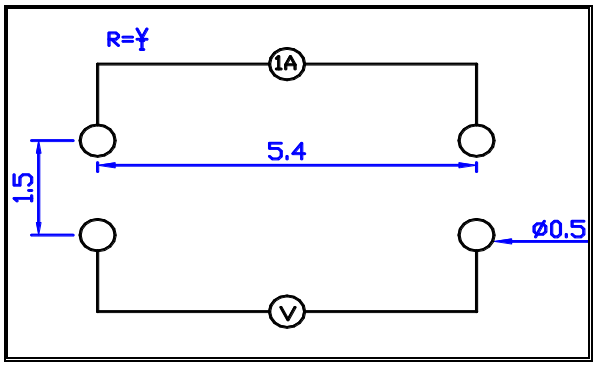
## ■Derating Curve



## ■Measurements

### 1. LR12　4-wire precision measurement

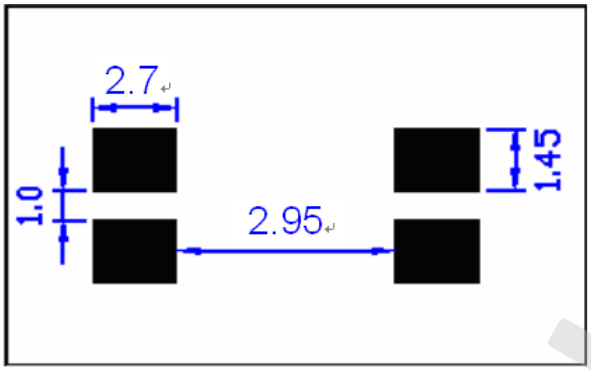
■ Equipment: ADEX AX-1152D DC Low Ohm Meter
■ Excitation Current: 3A (0.5mΩ~1.5 mΩ)
1A (2mΩ~10mΩ)




Unit: mm

### 2. LR12　4-wire pad layout (recommended for precision current sensing)

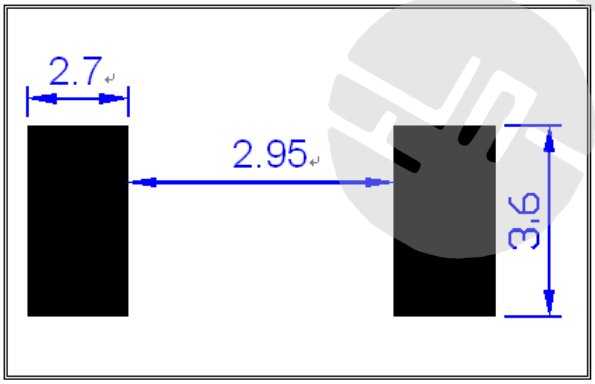
■Note: No circuits between pads to avoid short circuit




Unit: mm

### 3. LR12　2-wire pad layout

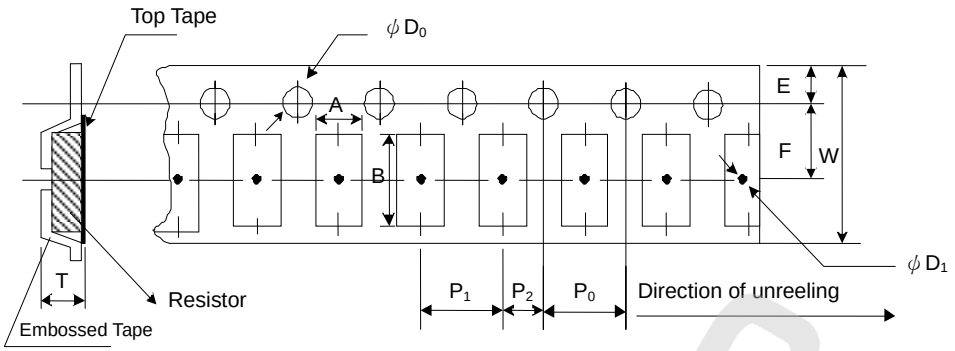
■ Note: No circuits between pads to avoid short circuit




Unit: mm

## ■Packaging

Embossed Plastic Tape Specifications




Unit: mm

| Type | Resistance (mΩ) | A | B | W | E | F | $P_0$ | $P_1$ | $P_2$ | $\Phi D_0$ | $\Phi D_1$ | T | Quantity (EA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LR12 | 0.50 - 0.75 | 3.40±0.1 | 6.75±0.1 | 12.0±0.1 | 1.75±0.1 | 5.5±0.05 | 4.0±0.1 | 4.0±0.1 | 2.0±0.05 | 1.55±0.05 | 1.4min. | 1.45±0.2 | 2,000 |
| | 1 - 10 | | | | | | | | | | | 0.81±0.1 | |

1. The cumulative tolerance of 10 sprockets hole pitch is ± 0.2mm.
2. Carrier camber shall be not more than 1mm per 100mm through a length of 250mm.
3. A & B measured 0.3mm from the bottom of the packet
4. T measured at a point on the inside bottom of the packet to the top surface of the carrier.
5. Pocket position relative to sprocket hole is measured as the true position of the pocket and not the pocket hole.