



RiDEE TECH COMPANY LIMITED

APPROVAL SHEET

Product Name : Metal Strip Current Sensing Chip Resistor

Part No. : RML (Ultra Low Resistance)

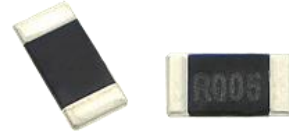
Description : Size 1206, 2512

For more contact information, please refer to our website: www.rideetech.com

Metal Strip Current Sensing Chip Resistor — RML Series

■ Application

- Entertainment product
- Power supply
- Measuring instrument
- Industrial product
- Battery management system



■ Features

- Ultra Low Resistance / Low TCR
- Excellent long term stability
- RoHS compliant and halogen free
- Lead free
- AEC-Q200 Compliant
- Low Inductance less than 3nH

■ Parts Number Explanation

| RML | 2512 | 20 | F | R005 | T | S |
|---|--------------|--|------------------------------------|--|----------------------|--|
| Product | Size (Inch) | Rated Power | Tolerance | Resistance | Packaging | Functional |
| Metal Strip Current Sensing Chip Resistor | 1206 2512 | 05=0.50W 10=1.00W 20=2.00W 30=3.00W | D=±0.5% F=±1% G=±2% J=±5% | 0R00=0R R005=5mR R020=20mR R100=100mR | T=7" Taped & Reel | S= Standard Type SB= Standard Type (Low EMF) M= Meet AEC-Q200 MB= Meet AEC-Q200 (Low EMF) |

Standard Electrical Specifications

| Type | Item | Rating Power at 70°C | T.C.R. (ppm/°C) | Max. Rating Current | Max. Overload Current | Alloy Type | Resistance Range (mΩ) | |
|----------|------|----------------------|------------------|---------------------|-----------------------|--|----------------------------------|----------------------------------|
| | | | | | | | 0.5% (D) | 1.0% (F) 2.0% (G) 5.0% (J) |
| RML1206 | 0.5W | ≤ ±75 | 22.4A (111mV) | 50.0A (250mV) | Low EMF | - | 1,2 | |
| | | ≤ ±70 | | | | - | 3,4,5,6,7,8,9, 10,12,15,20,25 | |
| | | ≤ ±50 | 10.0A (111mV) | 22.4A (250mV) | Standard | - | 5,10,15,18 20,25,30 | |
| | 1W | ≤ ±75 | 31.6A (158mV) | 70.7A (354mV) | Low EMF | - | 1,2 | |
| | | ≤ ±70 | | | | - | 3,4,5,6,7,8,9, 10,12,15,20,25 | |
| | | ≤ ±50 | 14.1A (173mV) | 31.6A (387mV) | Standard | - | 0, 5,10,15 18,20,25,30 | |
| RML 2512 | 1W | ≤ ±70 | 31.6A (158mV) | 70.7A (354mV) | Low EMF | 1,2,2.5,3,4,5 10,15,20,25 | | |
| | | ≤ ±50 | 18.3A (469mV) | 40.8A (1049mV) | Standard | 3,4,5,6,7,8,9,10 12,15,18,20,22,25 30,33,35,40,50,60 70,75,80,100 | | |
| | 2W | ≤ ±70 | 44.7A (224mV) | 100A (500mV) | Low EMF | 1,2,2.5,3,4,5 10,15,20,25 | | |
| | | ≤ ±50 | 25.8A (548mV) | 57.7A (1225mV) | Standard | 0,3,4,5,6,7,8,9,10 12,15,18,20,22,25 30,33,35,40,50,60 70,75,80,100,150 | | |
| | 3W | ≤ ±70 | 77.5A (47mV) | 173.2A (106mV) | Low EMF | 0.5,0.75 | | |
| | | ≤ ±70 | 54.8A (245mV) | 122.5A (548mV) | | 1,2,2.5,3,4,5 6,7,8,9,10 | | |
| | | ≤ ±50 | | | | 20 | | |
| | 3W | ≤ ±70 | 24.5A (812mV) | 54.8A (1817mV) | Standard | 5,6,8,10 | | |
| | | ≤ ±50 | | | | 12,14,15,16,18,20 25,30,33,35,40,50 60,75,80,100 | | |

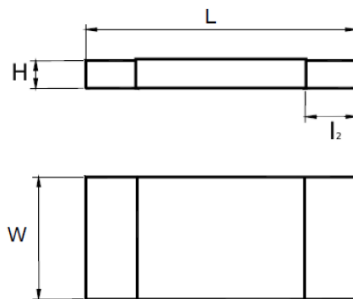
Jumper Specifications

| Type | Max. Working Current | Max. Overload Current | Resistance |
|---------|----------------------|-----------------------|--------------|
| RML1206 | 80A | 100A | 0.2mΩ (Max.) |
| RML2512 | 120A | 150A | 0.1mΩ (Max.) |

Notes:

- Beyond the above specification also can meet the special requirements. For detail questions, please contact us freely.
- $E = \sqrt{P \cdot R}$ or Max. Working Voltage whichever is lower.
- E : Working Voltage(V) · P : Rated Power (W) · R : Resistance Value(Ω)
- Please keep the surface temperature do not exceed 105°C when operating.

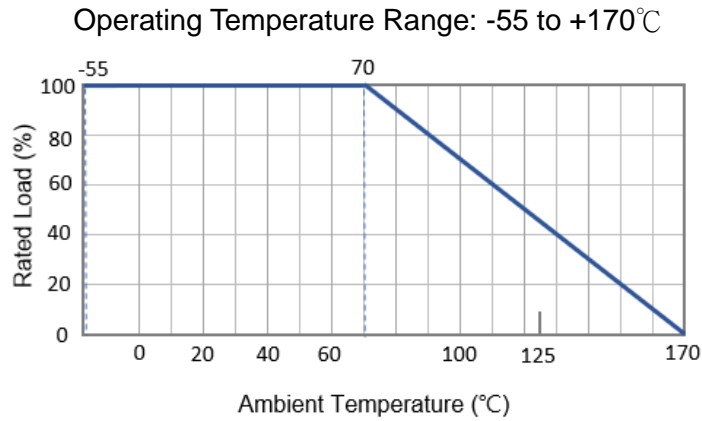
Dimension



Unit : mm

| Size | Power Rating | Resistance Range | L | W | H | l2 |
|------|--------------|------------------|-----------|-----------|-----------|-----------|
| 1206 | 0.5W | 1~2mΩ | 3.20±0.20 | 1.70±0.20 | 0.70±0.20 | 1.10±0.25 |
| | 1W | 0 & 3~30mΩ | 3.10±0.20 | 1.65±0.20 | 0.60±0.20 | 0.60±0.20 |
| 2512 | 1W | 0 & 4~100mΩ | 6.20±0.20 | 3.25±0.20 | 0.60±0.20 | 0.80±0.20 |
| | 2W | 1~3 mΩ | 6.40±0.20 | 3.25±0.20 | 0.75±0.20 | 2.00±0.20 |
| | 3W | 4~100 mΩ | 6.20±0.20 | 3.25±0.20 | 0.65±0.20 | 0.80±0.20 |
| | | 2~3 mΩ | 6.40±0.20 | 3.25±0.20 | 0.75±0.20 | 2.00±0.20 |
| | | 1 mΩ | 6.40±0.20 | 3.25±0.20 | 0.80±0.20 | 2.00±0.20 |
| | | 0.5~0.75mΩ | 6.30±0.20 | 3.25±0.20 | 0.80±0.20 | 2.25±0.20 |

Power Derating Curve



Recommended Customer Soldering Parameters

Recommended IR Reflow Soldering Conditions

Preliminary heating: 150°C ~180°C, 120s max

Soldering: 220°C, 60s max

Peak temperature: 245°C, 15s max

Recommended WAVE Soldering Conditions

Reservoir Temperature: 260°C, 10s max

Number of times: two times max

Rating Current

The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards (paragraph 5), the highest normal rated power is to be used.

$$I = \sqrt{P/R}$$

I = Rating current (A)
 P = Rating Power (W)
 R = Resistance(Ω)

Marking

1206/2512 : 4 digits marking

| | | | |
|----------------------|------|------|-------|
| Resistance | 5mΩ | 1mΩ | 2.5mΩ |
| 4 digits code | R005 | R001 | 2L50 |

■ Reliability Test and Requirement - AEC-Q200 type

| Test Item | Test Method | Procedure | Requirements |
|-------------------------------------|----------------------------------|--|---|
| High Temperature Exposure (Storage) | AEC-Q200 7.3 | 1000 hrs. @ T=170°C. Unpowered. Measurement at 24 ±2 hours after test conclusion. | J、G: $\Delta R \leq \pm 3\%$ F、D: $\Delta R \leq \pm 1\%$ |
| Temperature Cycling | AEC-Q200 7.4 IEC 60115-1 4.19 | For AEC-Q200 Type 1000 Cycles (-55°C to +125°C). Measurement at 24±2 hours after test conclusion. For Standard Type Repeat 5 cycles as follows -55°C (30min.)→25°C (2~3min.)→155°C (30min.)→25°C (2~3min.) | J、G: $\Delta R \leq \pm 1\%$ F、D: $\Delta R \leq \pm 0.5\%$ No mechanical damage. |
| Moisture Resistance | AEC-Q200 7.6 | Test 65°C/80~100%RH/10Cycles. Measurement at 24±2 hours after test conclusion. (t=24hrs/cycle). | J、G: $\Delta R \leq \pm 1\%$ F、D: $\Delta R \leq \pm 0.5\%$ |
| Biased Humidity | AEC-Q200 7.7 | 1000 hours 85°C/85%RH. 10% of operating power. Measurement at 24 ±2 hours after test conclusion. | J、G: $\Delta R \leq \pm 3\%$ F、D: $\Delta R \leq \pm 1\%$ |
| Operational Life | AEC-Q200 7.8 | Test 1000hr @ T=125°C at specified rated power. Measurement at 24±2 hours after test conclusion. | J、G: $\Delta R \leq \pm 3\%$ F、D: $\Delta R \leq \pm 1\%$ |
| External Visual | AEC-Q200 7.9 | Inspect device construction, marking and workmanship. | No visual damage and refer Ridee marking code. |
| Physical Dimension | AEC-Q200 7.10 | Verify physical dimensions to the applicable device detail specification. | Within the spec. |

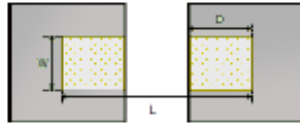
■ Reliability Test and Requirement - AEC-Q200 type

| Test Item | Test Method | Procedure | Requirements |
|------------------------------|---|---|---|
| Mechanical Shock | AEC-Q200 7.13 | Test Peak value:100g's,Wave:Hail-sine, Duration:6ms,Velocity:12.3ft/sec. | Within product specification tolerance and no visible damage. |
| Vibration | AEC-Q200 7.14 | 5 g's for 20 min., 12 cycles each of 3 orientations. Test from 10-2000 Hz. | No mechanical damage. |
| Resistance to Soldering Heat | AEC-Q200 7.15 | Solder dipping @ 270°C±5°C for 10sec.±1sec. | J、G: $\Delta R \leq \pm 1\%$ F、D: $\Delta R \leq \pm 0.5\%$ No mechanical damage. |
| Thermal Shock | AEC-Q200 7.16 | -55 to 155°C/ dwell time 15min/ Max transfer time 20sec/ 300cycles. | J、G: $\Delta R \leq \pm 1\%$ F、D: $\Delta R \leq \pm 0.5\%$ No mechanical damage. |
| ESD | AEC-Q200-002 | Test contact min. 1KV. | $\Delta R \leq \pm 1\%$ No mechanical damage. |
| Solder Ability | AEC-Q200 7.18 | a) Baking 155°C 4H, dipping 235°C 5s b) Steam 1H, dipping 215°C 5s c) Steam 1H, dipping 260°C 7s | Over 95% of termination must be covered with solder. |
| Flammability | AEC-Q200 7.20 | UL-94 V-0 or V-1 are acceptable | Refer UL-94. |
| Board Flex | AEC-Q200 7.21 | Bending 2mm 2512.1206 | J、G: $\Delta R \leq \pm 1\%$ F、D: $\Delta R \leq \pm 0.5\%$ No mechanical damage. |
| Terminal Strength | AEC-Q200 7.22 | Force 1 Kg for 60 seconds. | No mechanical damage |
| Anti-Sulfur | ASTM-B-809-95 (Modified) EIA-977(Test B) | ASTM-B-809-95 Sulfur 1000 hours, 90±2°C EIA-977(Test B): Sulfur 750 hours, 105±2°C | $\Delta R \leq \pm 1\%$ |

Reliability Test and Requirement - Standard type

| Test Item | Test Method | Procedure | Requirements |
|---|---------------------------------|--|---|
| Short Time Overload | IEC 60115-1 / JIS C 5201-1 4.13 | 5 × Rated power for 5 seconds Measure resistance after 30 minutes | J、G: $\Delta R \leq \pm 2\%$ F、D: $\Delta R \leq \pm 1\%$ |
| Solderability | IEC 60115-1 / JIS C 5201-1 4.17 | After immersing flux, dip in the $235 \pm 2^\circ\text{C}$ molten solder bath for 3 ± 0.5 sec. | Over 95% of termination must be covered with Solder |
| Resistance to Soldering Heat | IEC 60115-1/JIS C 5201-1 4.18 | With $260 \pm 5^\circ\text{C}$ for 10 ± 1 sec. | $\Delta R \leq \pm(1\% + 0.1\text{m}\Omega)$ No mechanical damage |
| Temperature Cycle | IEC 60115-1/JIS C 5201-1 4.19 | Repeat 5 cycles as follows -55°C (30min.) $\rightarrow 25^\circ\text{C}$ (2~3min.) $\rightarrow 155^\circ\text{C}$ (30 min.) $\rightarrow 25^\circ\text{C}$ (2~3min.) | J、G: $\Delta R \leq \pm 1\%$ F、D: $\Delta R \leq \pm 0.5\%$ No mechanical damage. |
| Damp Heat | IEC 60115-1 / JIS C 5201-1 4.24 | $40 \pm 2^\circ\text{C}$ with relative humidity 90% ~ 95% DC rated voltage for 1.5 hours On 30 minutes Off. Cycle repeated 1000 hours. (Not applicable if 3W R value $< 1\text{m}\Omega$) | J、G: $\Delta R \leq \pm 3\%$ F、D: $\Delta R \leq \pm 1\%$ |
| Temperature Coefficient of Resistance (TCR) | IEC 60115-1 4.8 | Temperature: (T1. $+25^\circ\text{C}$) ~ (T2. $+155^\circ\text{C}$) $\text{TCR}(\text{ppm}/^\circ\text{C}) = (R2-R1)/R1 \times 1/(T2-T1) \times 10^6$ ($+25 \sim -55^\circ\text{C}$ please contact factory) | Refer Rating Table. |
| Load Life | IEC 60115-1 4.25 | Rated voltage for 1.5 hours then a pause 0.5 hours at $T=70 \pm 2^\circ\text{C}$. Cycle repeated 1000 hours. | J、G: $\Delta R \leq \pm 3\%$ F、D: $\Delta R \leq \pm 1\%$ |
| Insulation Resistance | IEC 60115-1 4.6 | Test voltage: $100 \pm 15\text{V}$ | Between termination and coating must over $1000\text{M}\Omega$ |
| Bending strength | IEC 60115-1 / JIS C 5201-1 4.33 | Resistance change after bended on the 90mm PCB. Bending :2mm | J、G: $\Delta R \leq \pm 1\%$ F、D: $\Delta R \leq \pm 0.5\%$ No mechanical damage. |

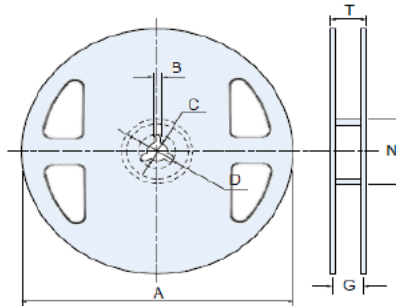
Recommend Land Pattern Design



Unit: mm

| TYPE | Resistance Range | W | D | L |
|---------|------------------|------|------|------|
| RML1206 | 1~2 mR | 1.80 | 2.30 | 5.60 |
| | Other | 1.80 | 1.30 | 4.70 |
| RML2512 | 0.5~3 mR | 4.00 | 3.00 | 7.30 |
| | Other | 3.70 | 1.60 | 7.60 |

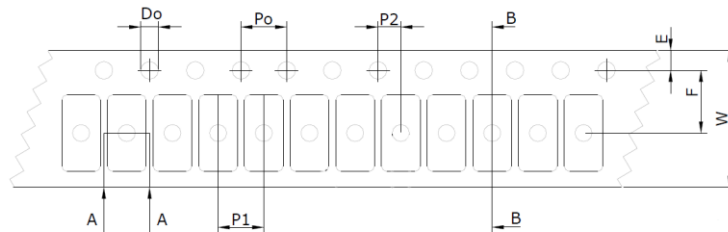
Packaging Information



Unit: mm

| Size | Packaging Q'ty | A | N | C | D | B | G | T |
|------|----------------|-----------|----------|----------|----------|---------|----------|----------|
| 1206 | 4kpcs/Reel | 178.0±2.0 | 60.0±0.5 | 13.0±0.5 | 20(Min.) | 2.0±0.5 | 10.0±1.5 | 14.9max. |
| 2512 | 4kpcs/Reel | 178.0±2.0 | 60.0±0.5 | 13.0±0.5 | 20(Min.) | 2.0±0.5 | 13.8±1.5 | 16.7max. |

Tapping Specification



Unit: mm

| Size | A | B | W | F | E | P1 | P2 | P0 | D | T1 |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1206 | 2.00±0.20 | 3.60±0.20 | 8.00±0.30 | 3.50±0.05 | 1.75±0.10 | 4.00±0.10 | 2.00±0.05 | 4.00±0.10 | 1.50±0.10 | 1.00±0.10 |
| 2512 | 3.50±0.20 | 6.75±0.20 | 12.0±0.30 | 5.50±0.05 | 1.75±0.10 | 4.00±0.10 | 2.00±0.05 | 4.00±0.10 | 1.50±0.10 | 1.15±0.10 |