



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=0Ω M750=0.75mΩ R005=5mΩ R020=20mΩ R100=100mΩ	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

Item Type	Rating Power at 70℃	T.C.R. (ppm/℃)	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	-	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	0.75,3,4,5,6,7,8,9,10 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	

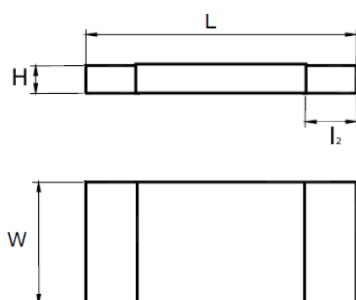
■ Jumper Specifications

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℃when operating.

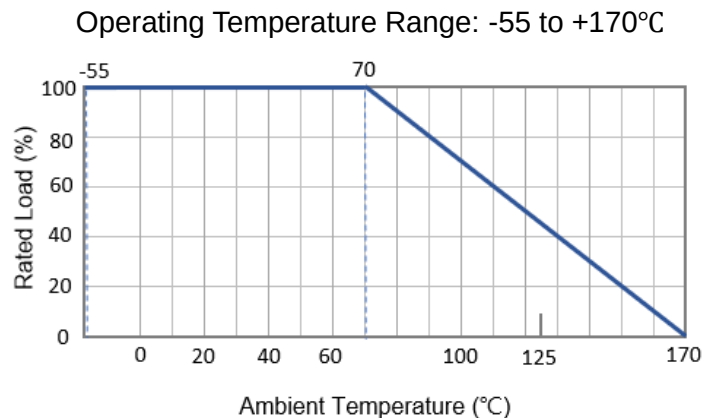
■ Dimension



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
	2W	0.75 mΩ	6.40±0.20	3.18±0.26	0.75±0.20	1.30±0.38
	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.

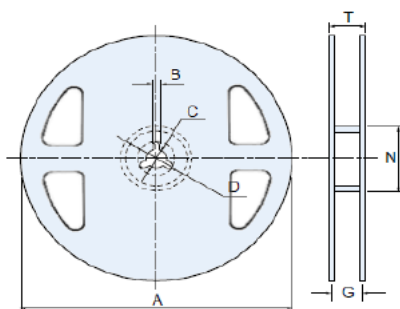
■ Recommend Land Pattern Design



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

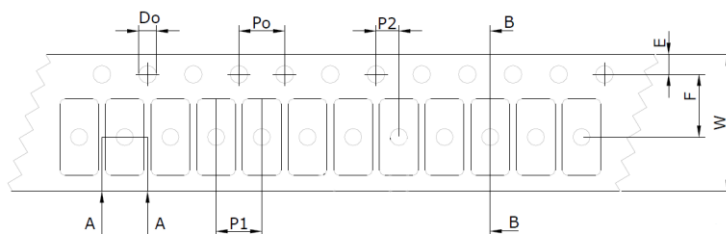
■ Packaging Information



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