



**RIDEE TECH COMPANY LIMITED**

# **APPROVAL SHEET**

**Product Name : Metal Film Low Resistance Chip Resistor**  
**Part No. : RTL-M (AEC-Q200 qualified)**  
**Description : Size 0603~2512**

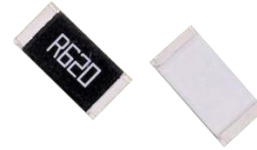
For more contact information, please refer to our website: [www.rideetech.com](http://www.rideetech.com)

## Metal Film Low Resistance Chip Resistor – RTL-M Series

**AEC-Q200 qualified**

### Applications

- Consumer electronics
- Communication devices
- Measuring instrument
- Industrial / Power supply
- Battery management system



### Features

- Low Resistance / TCR / Inductance
- Precision current sensing
- High power capability
- Halogen free and lead free
- RoHS compliant, AEC Q200 qualified

### Part Number Explanation

RTL	2512	X2	F	R005	T	SM
Product	Size (Inch)	Rated Power	Tolerance	Resistance	Packaging	Functional
Metal Film Low Resistance Chip Resistor	0603 0805 1206 1210 2010 2512	X1 : 1/8W X2 : 1/4W 03 : 1/3W 05 : 1/2W 06 : 2/3W 07 : 3/4W 10 : 1W 20 : 2W	F : ±1.0% G : ±2.0% J : ±5.0%	R020=020mR R150=150mR	T=Tape & Reel	SM= Standard Type (Meet AEC-Q200)  PM= Power Type (Meet AEC-Q200)

## Standard Electrical Specifications

Type	Power Rating at 70°C	Max. RCWV (mV)	Max. Overload Voltage (mV)	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/°C)	Resistance Range	Standard Resistance Values
RTL0603	0.125W	337	754	±1, ±2, ±5	±200	$50\text{m}\Omega \leq R \leq 91\text{m}\Omega$	E-24
					±100	$100\text{m}\Omega \leq R \leq 910\text{m}\Omega$	
RTL0805	0.25W	477	1067	±1, ±2, ±5	±100	$50\text{m}\Omega \leq R \leq 910\text{m}\Omega$	E-24
RTL1206	0.33W	551	1232	±1, ±2, ±5	±100	$50\text{m}\Omega \leq R \leq 910\text{m}\Omega$	E-24
RTL1210	0.66W	779	1742	±1, ±2, ±5	±100	$50\text{m}\Omega \leq R \leq 910\text{m}\Omega$	E-24
RTL2010	0.75W	826	1847	±1, ±2, ±5	±100	$50\text{m}\Omega \leq R \leq 910\text{m}\Omega$	E-24
RTL2512	1W	954	2133	±1, ±2, ±5	±100	$50\text{m}\Omega \leq R \leq 910\text{m}\Omega$	E-24

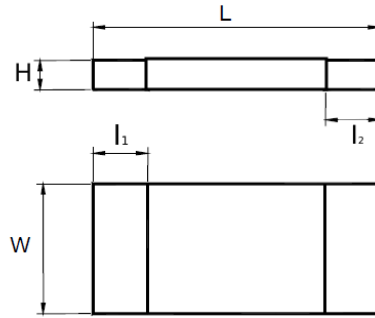
• Functional code: SM

## Power Type Electrical Specifications

Type	Power Rating at 70°C	Max. RCWV (mV)	Max. Overload Voltage (mV)	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/°C)	Resistance Range	Standard Resistance Values
RTL0603	0.25W	477	1067	±1, ±2, ±5	±200	$50\text{m}\Omega \leq R \leq 91\text{m}\Omega$	E-24
					±100	$100\text{m}\Omega \leq R \leq 910\text{m}\Omega$	
RTL0805	0.5W	675	1508	±1, ±2, ±5	±100	$50\text{m}\Omega \leq R \leq 910\text{m}\Omega$	E-24
RTL1206	0.75W	826	1847	±1, ±2, ±5	±100	$50\text{m}\Omega \leq R \leq 910\text{m}\Omega$	E-24
RTL1210	0.75W	826	1847	±1, ±2, ±5	±100	$50\text{m}\Omega \leq R \leq 910\text{m}\Omega$	E-24
RTL2010	1W	954	2133	±1, ±2, ±5	±100	$50\text{m}\Omega \leq R \leq 910\text{m}\Omega$	E-24
RTL2512	2W	1349	3016	±1, ±2, ±5	±100	$50\text{m}\Omega \leq R \leq 910\text{m}\Omega$	E-24

• Functional code: PM

## ■ Type Dimension



Unit: mm

Size	L	W	I1	I2	H
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
1210	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
2512	6.30±0.20	3.10±0.20	0.60±0.25	0.90±0.25	0.60±0.15

## ■ Recommend Land Pattern Design

Type	W	D	L
RTL0603	0.90	1.00	3.00
RTL0805	1.30	1.15	3.50
RTL1206	1.80	1.30	4.70
RTL1210	3.00	1.30	4.70
RTL2010	3.00	1.50	6.80
RTL2512	3.70	1.60	7.60

Unit:mm



## ■ Marking

### 0805/1206/1210/2010/2512: 4 digits marking

Example:

<b>Resistance</b>	68mΩ	120mΩ
<b>Digits Code</b>	R068	R120

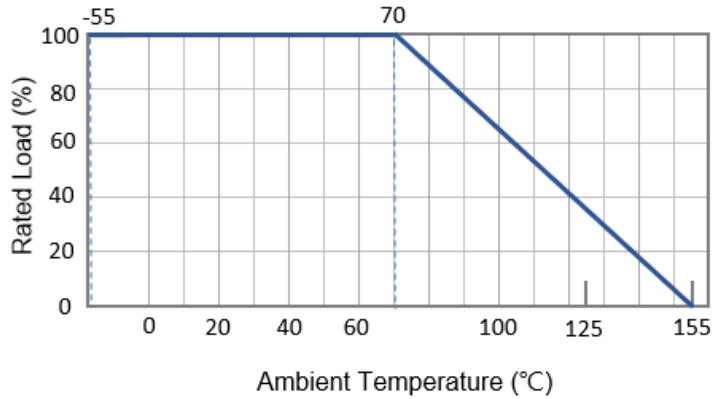
### 0603: 3 digits marking

Example:

<b>Resistance</b>	68mΩ	120mΩ
<b>Digits Code</b>	68M	R12

## Derating curve

Operating Temperature Range: -55 to +155°C



## 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

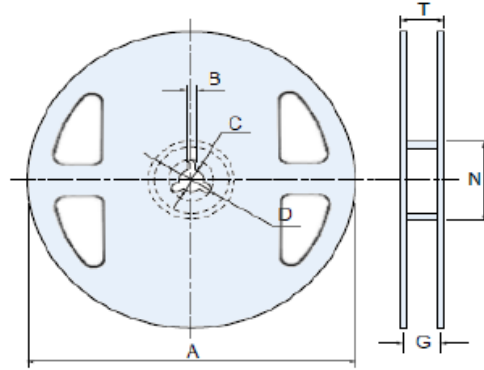
## Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
DC Resistance	AEC-Q200 7.1 IEC 60115-1 JIS C 5201-1 4.5	Measure the resistance Value.	F: $\pm 1\%$ G: $\pm 2\%$ J: $\pm 5\%$
High Temperature Exposure (Storage)	AEC-Q200 7.3	1000 hrs. @ T=155°C. Unpowered. Measurement at 24 $\pm 2$ hours after test conclusion.	$\Delta R \leq \pm(3\%+0.5m\Omega)$ F: $\Delta R \leq \pm(1\%+0.5m\Omega)$
Temperature Cycling	AEC-Q200 7.4	1000 Cycles (-55°C to +125°C). Measurement at 24 $\pm 2$ hours after test conclusion.	$\Delta R \leq \pm(1\%+0.5m\Omega)$ F: $\Delta R \leq \pm(0.5\%+0.5m\Omega)$ No mechanical damage.
Moisture Resistance	AEC-Q200 7.6	Test 65°C/80~100%RH/10Cycles. Measurement at 24 $\pm 2$ hours after test conclusion. (t=24hrs/cycle).	$\Delta R \leq \pm(1\%+0.5m\Omega)$ F: $\Delta R \leq \pm(0.5\%+0.5m\Omega)$
Biased Humidity	AEC-Q200 7.7	1000 hours 85°C/85%RH. 10% of operating power. Measurement at 24 $\pm 2$ hours after test conclusion.	J: $\Delta R \leq \pm(3\%+0.5m\Omega)$ F: $\Delta R \leq \pm(1\%+0.5m\Omega)$
Operational Life	AEC-Q200 7.8	Test 1000hr @ TA=125°C at specified rated power. Measurement at 24 $\pm 2$ hours after test conclusion.	$\Delta R \leq \pm(3\%+0.5m\Omega)$ F: $\Delta R \leq \pm(1\%+0.5m\Omega)$
External Visual	AEC-Q200 7.9	Inspect device construction, marking and workmanship.	No visual damage and refer PDC marking code.
Physical Dimension	AEC-Q200 7.10	Verify physical dimensions to the applicable device detail specification.	Within the spec.
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 Solder Heat	AEC-Q200 7.15	Solder dipping @ 270°C $\pm 5^\circ\text{C}$ for 10sec. $\pm 1$ sec.	$\Delta R \leq \pm(1\%+0.5m\Omega)$ F: $\Delta R \leq \pm(0.5\%+0.5m\Omega)$ No mechanical damage.
Thermal Shock	AEC-Q200 7.16	-55 to 155°C/ dwell time 15min/ Max transfer time 20sec/ 300cycles.	$\Delta R \leq \pm(1\%+0.5m\Omega)$ F: $\Delta R \leq \pm(0.5\%+0.5m\Omega)$ No mechanical damage.



Test Item	Test Method	Procedure	Requirements
ESD	AEC-Q200-002	Test contact min. 1KV.	$\Delta R \leq \pm(1\% + 0.5m\Omega)$ 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.
Board Flex	AEC-Q200 7.21	Bending 2mm 2512.2010.1210.1206, 3mm 0805.0603.	$\Delta R \leq \pm(1\% + 0.5m\Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.5m\Omega)$ No mechanical damage.
Terminal Strength	AEC-Q200 7.22	Force 1 Kg for 60 seconds.	No mechanical damage
Short Time Overload	IEC 60115-1 4.13	5 × Rated power for 5 seconds	J: $\Delta R \leq \pm(2\% + 0.5m\Omega)$ F: $\Delta R \leq \pm(1\% + 0.5m\Omega)$
Temperature Coefficient of Resistance (TCR)	IEC 60115-1 4.8	Test temperature: $25^{\circ}\text{C} \sim +155^{\circ}\text{C}$ $\text{TCR}(\text{ppm}/^{\circ}\text{C}) = (R_2 - R_1) / R_1 \times 1 / (T_2 - T_1) \times 10^6$	Within the spec.

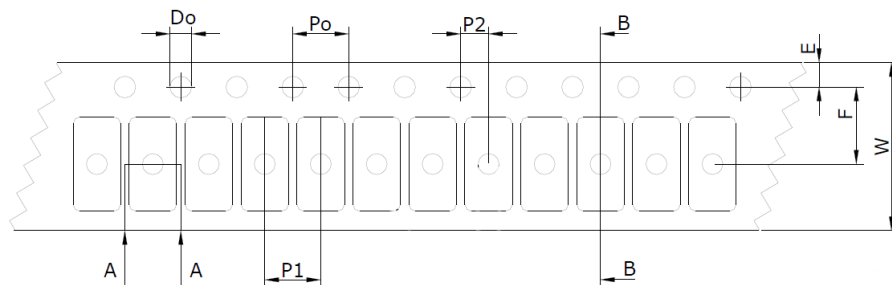
## ■ Packaging Information



Unit : mm

Size	Packaging Q'ty	A	N	C	D	B	G	T
0603 0805 1206 1210	5kpcs/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.
2010 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
0603	1.10±0.20	1.90±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/-0
0805	1.65±0.20	2.40±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/-0
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/-0
1210	3.00±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/-0
2010	2.80±0.20	5.50±0.20	12.00±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/-0
2512	3.50±0.20	6.70±0.20	12.00±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/-0