

## Data Sheet

Customer: \_\_\_\_\_

Product: 0 H W D O      3 D V W H      / R Z      2 K P      & X

Size :      0603/0805/1206/1210/2010/2512 \_\_\_\_\_

Issued Date: 0      -      Ø2ℱ W.-2 \_\_\_\_\_

Edition: Ver. \_\_\_\_\_

### Record of change

Date	Ver.	Description	Page
S U	\$		
H S	6	\$G G      V L ] H	
D \	0	3 D U W      1 R      G H V L J Q D W L	R Q
F W	2	& K D Q J H      W K H      W L W O H	R I W
F W	2		

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05-Oct.-2023	05-Oct.-2023	05-Oct.-2023	
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# Metal Paste Low Ohm Current Sense Chip Resistor (High Power)-HPL Series

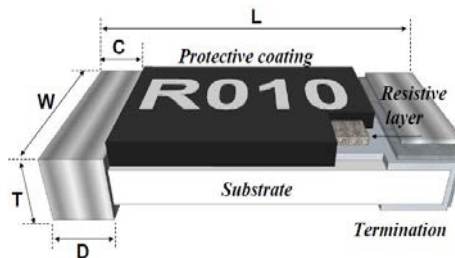
## ■ Features

- Low resistance and high precision (1%).
- Excellent reliability and suitable cost.
- Suitable for lead free soldering.
- RoHS compliant & Halogen Free.

## ■ Applications

- Consumer electronics, M/B.
- Battery pack, BTC.
- Notebook, Tablet PC.
- Portable Device, Electronic Equipment.

## ■ Dimensions and Constructions



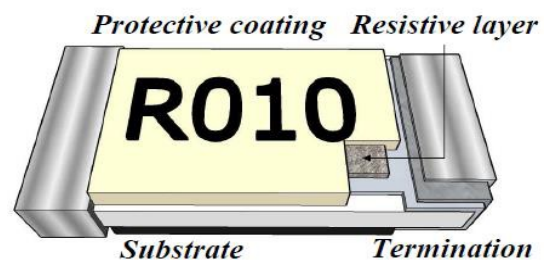
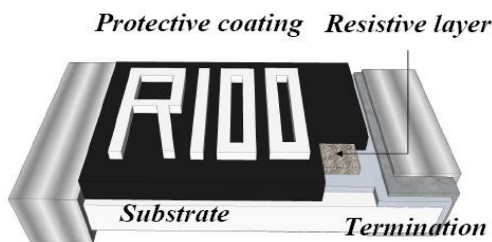
Unit:mm

Type 1.	L	W	C	D	T
RL0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
RL0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
RL1206	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
RL1210	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
RL2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
RL2512	6.30±0.20	3.10±0.20	0.60±0.25	0.90±0.25	0.60±0.15

Type 2.	L	W	C	D	T
RL0603	1.60±0.10	0.80±0.10	0.30±0.20	0.50±0.20	0.50±0.10
RL0805	2.00±0.10	1.25±0.10	0.40±0.20	0.65±0.20	0.60±0.10
RL1206	3.10±0.10	1.60±0.10	0.50±0.25	0.90±0.25	0.65±0.10
RL1210	3.10±0.10	2.60±0.10	0.50±0.25	0.90±0.25	0.65±0.10
RL2010	5.00±0.20	2.50±0.20	0.60±0.25	1.25±0.25	0.65±0.10
RL2512	6.30±0.20	3.10±0.20	0.60±0.25	1.90±0.25	0.65±0.15

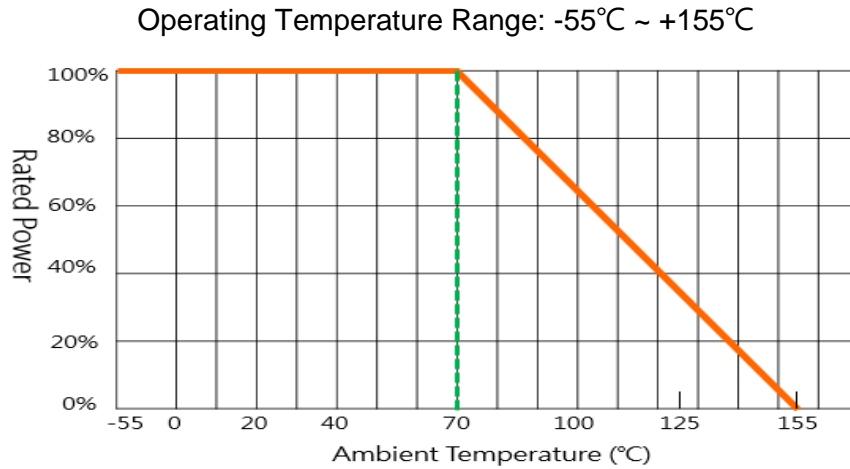
Type 1. Resistance  $\geq 40m\Omega$

Type 2. Resistance  $\leq 39m\Omega$



# Metal Paste Low Ohm Current Sense Chip Resistor (High Power)-HPL Series

## ■ Power Derating Curve



## ■ Marking

Resistance value identify :

0805/1206/1210/2010/2512

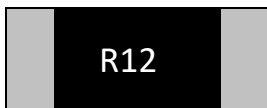
Top Marking. ( 4 Digits marking to identify the resistance value. )



R068=68mΩ · R120=120mΩ

0603

Top Marking. ( 3 Digits marking to identify the resistance value. )



R12=120mΩ · 68M=68mΩ

## ■ Part Numbering

<u>RL</u>	<u>0805</u>	<u>F</u>	<u>R</u>	<u>-</u>	<u>0R01</u>
Series	Size 0603 0805 1206 1210 2010 2512	Tolerance F= ±1% J= ±5%	Packing style R = Paper K = Embossed Plastic	Special Type - = 7 inch Dia. Reel (Standard) 13 = 13 inch Reel (non preferred)	Resistance Value for example: 0R01    0R1 0R05    0R5

## Metal Paste Low Ohm Current Sense Chip Resistor (High Power)-HPL Series

### ■ Rating

Type	Size	Power Rating at 70°C	Max. RCWV (mV)	Max. Overload Voltage (mV)	Resistance Tolerance (%) *	TCR (ppm/°C) **	Resistance Range (mΩ)		Standard Resistance Values
							Min.	Max.	
HPL0603	0603	1/4W	477	1067	±1 ±2、±5	±200 ±100	40	91	E-24
							100	910	
HPL0805	0805	1/2W	675	1508	±1 ±2、±5	±400 / ±200 ±100	10	46	E-24
							47	910	
HPL1206	1206	3/4W	826	1847	±1 ±2、±5	±400 / ±200 ±100	10	46	E-24
							47	910	
HPL1210	1210	3/4W	826	1847	±1 ±2、±5	±400 / ±200 ±100	10	46	E-24
							47	910	
HPL2010	2010	1W	954	2133	±1 ±2、±5	±400 / ±200 ±100	10	46	E-24
							47	910	
HPL2512	2512	2W	1349	3017	±1 ±2、±5	±400 / ±200 ±100	10	46	E-24
							47	910	

#### Notes:

1. RCWV is Rated Voltage,  $V = \sqrt{P \cdot R}$  or Max. Working Voltage whichever is lower.
2. V : Working Voltage(V), P : Rated Power (W), R : Resistance Value(Ω)
3. Before use low ohm resistors, please consider the resistance variance from soldering pad/trace/amount, and keep the surface temperature do not exceed 105°C when working.
4. \*: ±400 / ±200 means 10mΩ~18mΩ: TCR ±400ppm, 20mΩ~46mΩ: TCR ±200ppm
5. \*\*: ±0.5% available items please refer below.

Type	Available Resistance (mΩ)
RL1206	50,100

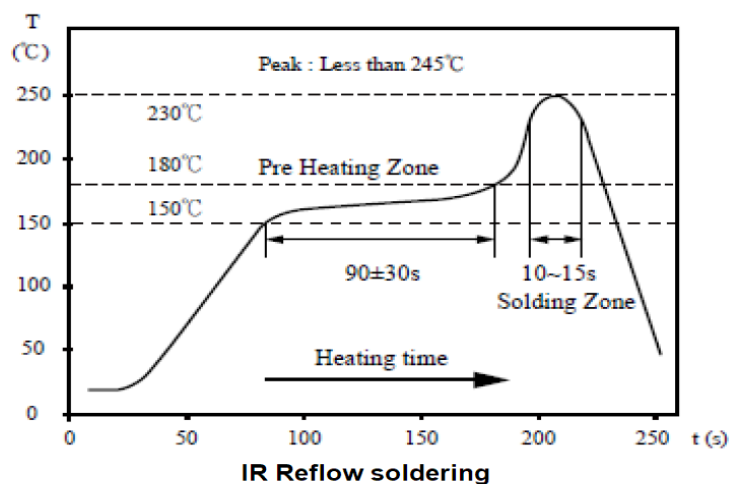
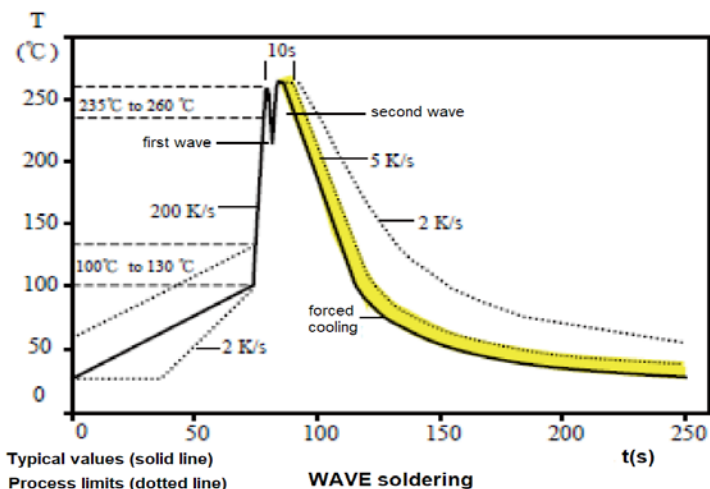
# Thick Film Low Ohm Current Sense Chip Resistors - RL Series

## ■ Reliability Performance

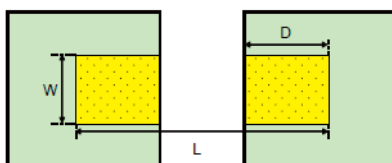
Test Item	Specification	Test Method
<b>DC Resistance</b>	D : ±0.5%      F : ±1% G : ±2%      J : ±5%	<b>IEC 60115-1 / JIS C 5201-1 , Clause 4.5</b> Measure the resistance Value.
<b>Resistance to Solder Heat</b>	$\Delta R \leq \pm(1\% + 0.5m\Omega)$ D.F : $\Delta R \leq \pm(0.5\% + 0.5m\Omega)$ No mechanical damage	<b>IEC 60115-1, Clause 4.18</b> Solder dipping @ 260°C±5°C for 10sec.±1sec.
<b>Solder Ability</b>	Over 95% of termination must be covered with Solder.	<b>IEC 60115-1, Clause 4.17</b> After immersing flux, dip in the 245±2°C molten solder bath for 3±0.5 sec.
<b>Short Time Overload</b>	$\Delta R \leq \pm(2\% + 0.5m\Omega)$ D.F : $\Delta R \leq \pm(1\% + 0.5m\Omega)$	<b>IEC 60115-1, Clause 4.13</b> 5 × Rated power for 5 seconds
<b>Temperature Coefficient of Resistance (TCR)</b>	Within the spec.	<b>IEC 60115-1, Clause 4.8</b> T1    T2 Test temperature : 25°C~ 155°C $TCR(ppm/^{\circ}C) = (R_2 - R_1) / R_1 \times 1 / (T_2 - T_1) \times 10^6$
<b>Load Life</b>	$\Delta R \leq \pm(3\% + 0.5m\Omega)$	<b>IEC 60115-1, Clause 4.25</b> Rated voltage for 1.5 hours for followed by a pause 0.5 hour at 70±2°C. Cycle repeated 1000 hours.
<b>Bending Strength</b>	$\Delta R \leq \pm(1\% + 0.5m\Omega)$ D.F : $\Delta R \leq \pm(0.5\% + 0.5m\Omega)$ No mechanical damage.	<b>IEC 60115-1 / JIS C 5201-1 , Clause 4.33</b> Resistance variance after bended on the 90mm PCB. Bending width : 3mm for 0603 0805 2mm for 1206 2010 2512
<b>Insulation Resistance</b>	Between termination and coating must over 1000MΩ	<b>IEC 60115-1, Clause 4.6</b> Test voltage : 100±15V

# Thick Film Low Ohm Current Sense Chip Resistors - RL Series

## ■ Soldering Reference



## ■ Recommend Solder Pad Dimensions



Type	W	D	L
RL0603	0.90	1.00	3.00
RL0805	1.30	1.15	3.50
RL1206	1.80	1.30	4.70
RL1210	3.00	1.30	4.70
RL2010	3.00	1.50	6.80
RL2512	3.70	1.60	7.60

Unit : mm

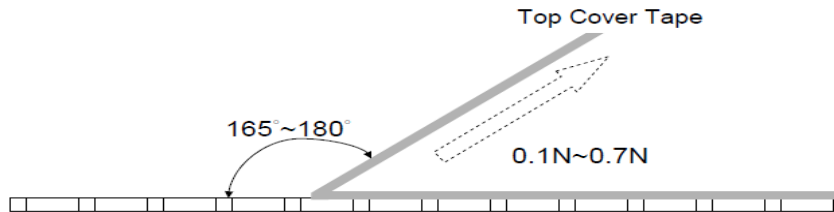
# Thick Film Low Ohm Current Sense Chip Resistors - RL Series

## ■ Packaging

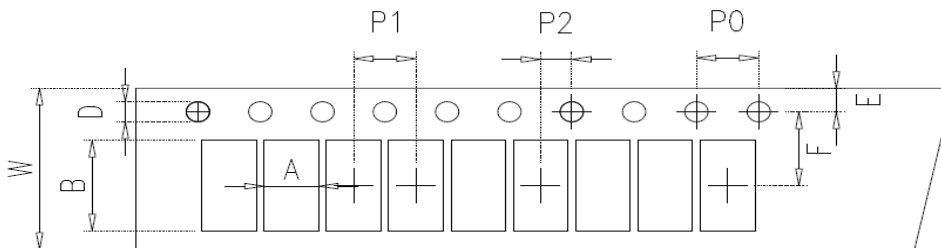
### 1. Peel Strength of Top Cover Tape

The peel speed shall be about 300 mm/min

The peel force of top cover tape shall be between 0.1 to 0.7N



### 2. Tape Packaging Dimensions

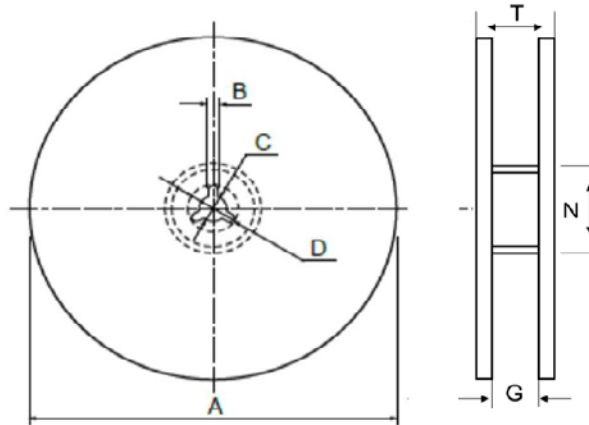


Size	A	B	W	F	E	P1	P2	P0	D
0603	1.10±0.20	1.90±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
0805	1.65±0.20	2.40±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1206	2.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	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

Unit : mm

## Thick Film Low Ohm Current Sense Chip Resistors - RL Series

### 3. Reel Dimensions



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.
	10kpcs/Reel	254.0±2.0	100.0±1.0	13.5±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
	20kpcs/Reel	330.0±2.0	100.0±1.0	13.5±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.
	8kpcs/Reel	254.0±2.0	100.0±0.5	13.5±0.5	20(Min.)	2.0±0.5	13.8±1.5	20.0max.
	16kpcs/Reel	330.0±2.0	100.0±1.0	13.5±0.5	20(Min.)	2.0±0.5	13.8±1.5	20.0max.

Unit : mm

### ■ Storage & Handling

... Products are recommended to be used up within one year as ensured shelf life.

Check solder ability in case shelf life extension is needed.

... To store products with following condition:

Temperature: 5 to 40°C ; Humidity: 20 to 70% relative humidit