

Data Sheet

Customer: _____

Product: Thick Film Low Ohm Current Sense Chip Resistors - RL Series

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

Issued Date: 08-Sep.-2023

Edition: Ver. 4

Record of change

Date	Ver.	Description	Page
01-Apr.-2015	1		
15-Sep.-2016	2	Add 0402 size	
19-Nov-2020	3	Revise T.C.R.	2
08-Sep.-2023	4	Add Dimension & Rating	1,3

HITANO ENTERPRISE CORP.

7F-7, No. 3, Wu Chuan 1st Road, New Taipei Industrial Park,

New Taipei City, TAIWAN, R.O.C.

Tel: +886 2 2299 1331 (Rep.)

Fax: +886 2 2298 2466, 2298 2969

Prepared by	Checked by	Approved by	Accepted by (customer)
08-Sep.-2023	08-Sep.-2023	08-Sep.-2023	
Hwa Wu	Andy Hsu	Arthur Su	

Thick Film Low Ohm Current Sense Chip Resistors - RL Series

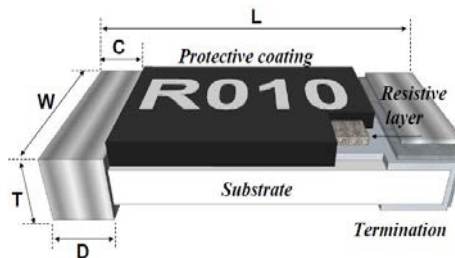
■ Features

- 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



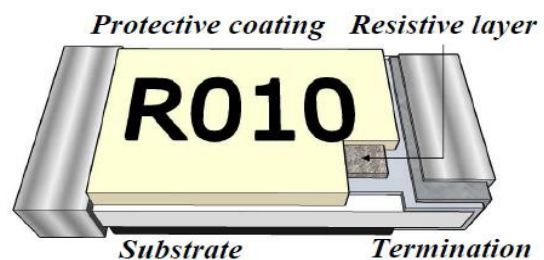
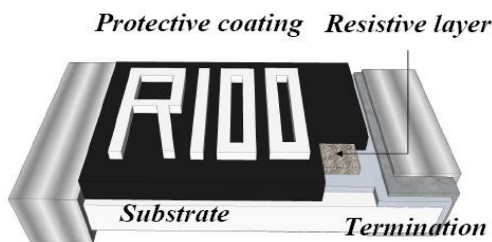
Unit:mm

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

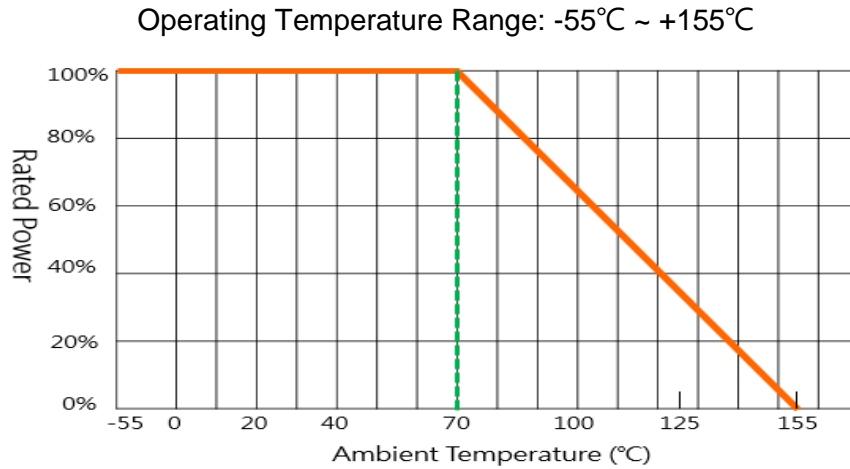
Type 1. Resistance $\geq 40m\Omega$

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



Thick Film Low Ohm Current Sense Chip Resistors - RL Series

■ Power Derating Curve



■ Marking

Resistance value identify :

0805/1206/1210/2010/2512

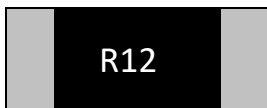
Top Marking. (4 Digits marking to identify the resistance value.)



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	Tolerance	Packing style	Special Type	Resistance Value
	0603 0805 1206 1210 2010 2512	D=±0.5% F=±1% G=±2% J=±5%	R = Paper K = Embossed Plastic	- = 7 inch Dia. Reel (Standard) 13 = 13 inch Reel (non preferred)	for example: 0R01 0R1 0R05 0R5

Thick Film Low Ohm Current Sense Chip Resistors - RL 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.	
RL0603	0603	1/8W	337	754	±1	±200	40	91	E-24
					±2、±5	±100	100	910	
RL0805	0805	1/4W	477	1067	±1	±400 / ±200	10	46	E-24
					±2、±5	±100	47	910	
RL1206	1206	1/3W	551	1232	±1	±400 / ±200	10	46	E-24
					±2、±5	±100	47	910	
RL1210	1210	2/3W	779	1742	±1	±400 / ±200	10	46	E-24
					±2、±5	±100	47	910	
RL2010	2010	3/4W	826	1847	±1	±400 / ±200	10	46	E-24
					±2、±5	±100	47	910	
RL2512	2512	1W	954	2133	±1	±400 / ±200	10	46	E-24
					±2、±5	±100	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

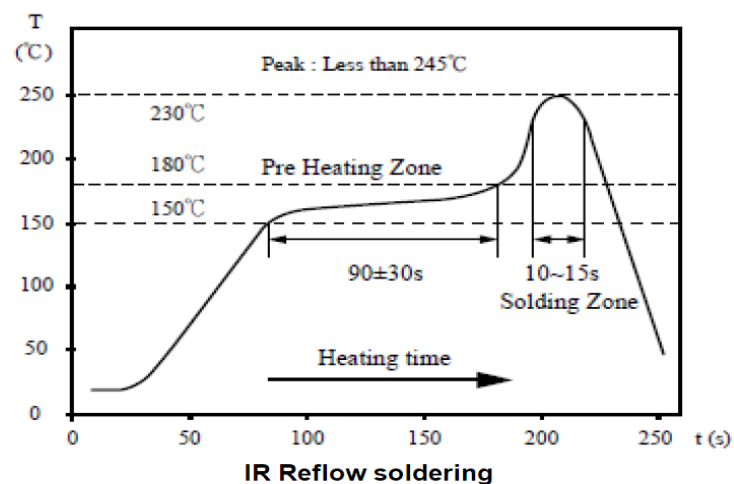
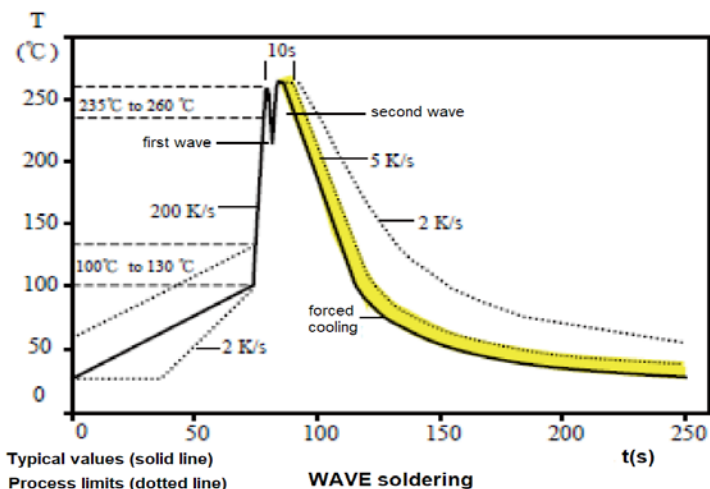
Thick Film Low Ohm Current Sense Chip Resistors - RL Series

■ Reliability Performance

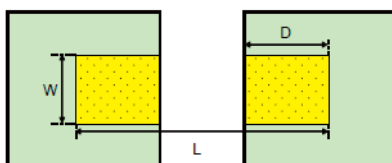
Test Item	Specification	Test Method
DC Resistance	D : ±0.5% F : ±1% G : ±2% J : ±5%	IEC 60115-1 / JIS C 5201-1 , Clause 4.5 Measure the resistance Value.
Resistance to Solder Heat	$\Delta R \leq \pm(1\% + 0.5m\Omega)$ D.F : $\Delta R \leq \pm(0.5\% + 0.5m\Omega)$ No mechanical damage	IEC 60115-1, Clause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

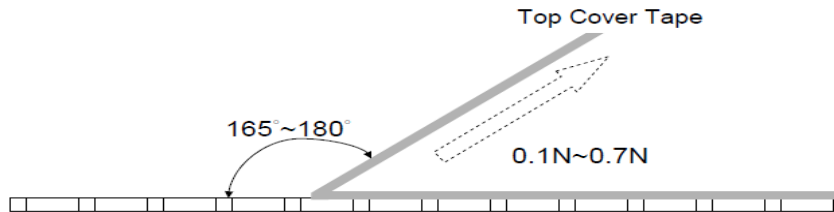
Thick Film Low Ohm Current Sense Chip Resistors - RL Series

■ Packaging

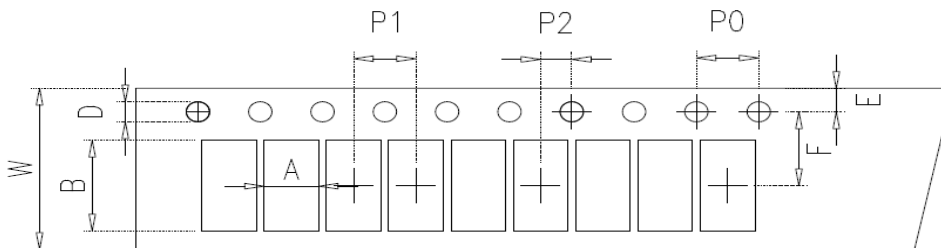
1. Peel Strength of Top Cover Tape

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

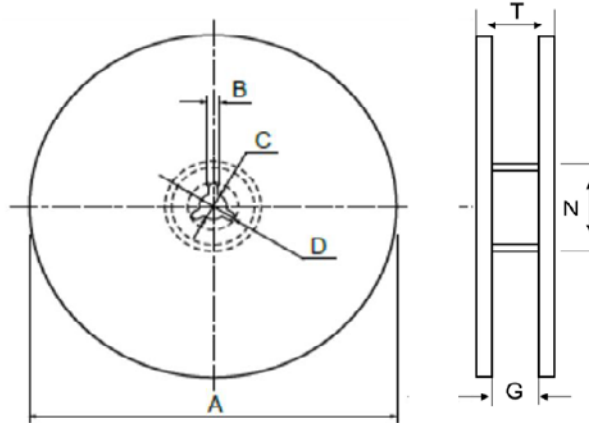


Size	A	B	W	F	E	P1	P2	P0	D
0603	1.10±0.20	1.90±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
0805	1.65±0.20	2.40±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1206	2.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10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