HITANO
ENTERPRISE CORP. ®

Data Sheet

Customer:

Product: Thick Film Chip Resistor. Low Ohmic Value (10mΩ~910mΩ) RL Series

Size : 0402/0603/0805/1206/1210/2512

Issued Date: 15-Sep.-2016

Edition: Ver. 2

Record of change

Date	Ver.	Description	Page
1-Apr.-2015	1		
15-Sep.-2016	2	Add 0402 size	

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Prepared by	Checked by	Approved by	Accepted by (customer)
1-Apr.-2015	1-Apr.-2015	1-Apr.-2015	
Andy Hsu	***Hwa Wu***	***Hwa Wu***	

THICK FILM CHIP RESISTORS RL SERIES
LOW RESISTANCE

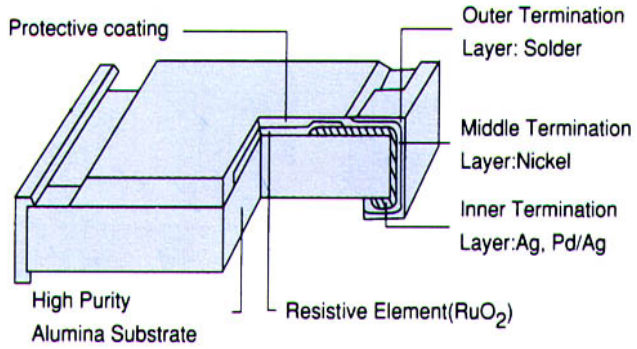
Features

- Suitable for lead free soldering.
- Compatible with flow and reflow soldering

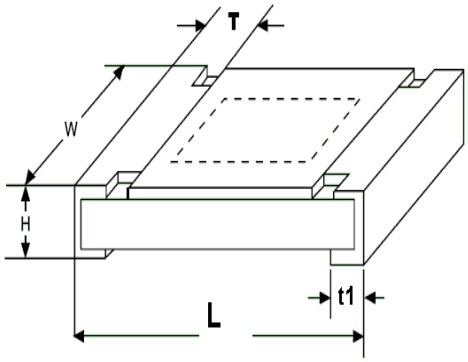
Applications

- Consumer Electronics
- Automotive industry
- Computer
- Measurement instrument
- Electronic watch and camera

Configuration



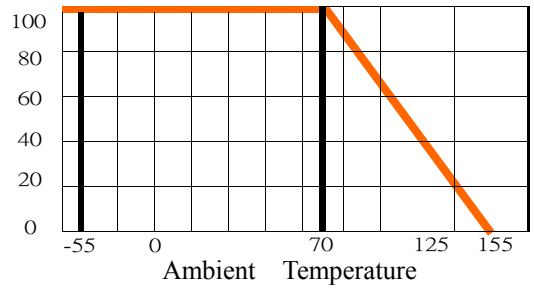
Dimensions



Size	L	W	T	t1	H
0402	1.00±0.10	0.50±0.05	0.20±0.10	0.25±0.10	0.30±0.05
0603	1.60±0.10	0.80±0.10	0.25±0.15	0.25±0.15	0.45±0.15
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.35±0.20	0.50±0.15
1206	3.10±0.10	1.60±0.10	0.50±0.25	0.40±0.20	0.60±0.15
1210	3.10±0.10	2.60±0.10	0.50±0.20	0.50±0.20	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.60±0.25	0.50±0.20	0.55±0.10
2512	6.40±0.20	3.20±0.20	0.60±0.25	0.50±0.20	0.60±0.10

Unit(mm)

Power Derating Curve



Maximum dissipation in percentage of rated power as a function of the ambient temperature.

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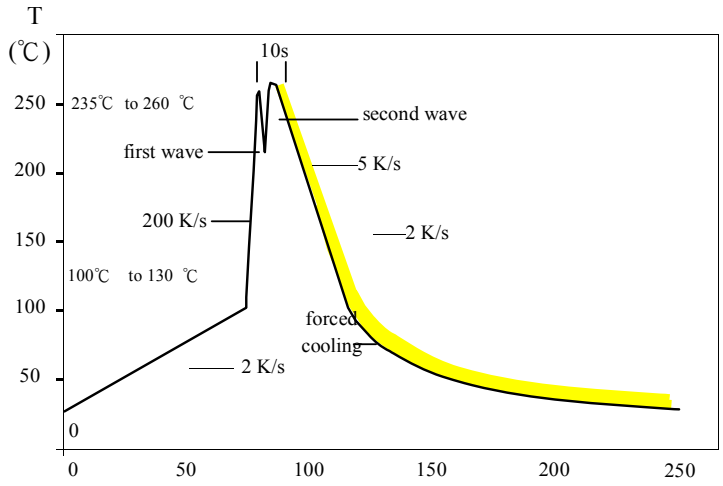
■ Rating

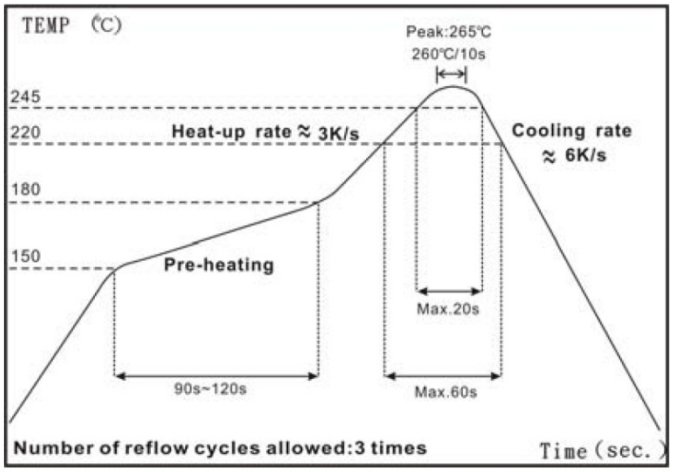
Size	Power Rating at 70℃	Tolerance (%)	T.C.R. ppm/℃)	Resistance Range		Standard Resistance Values
				Min.	Max.	
RL0402	1/16W	±1%(F) ±5%(J)	≦600	100mΩ	976mΩ	E-24 E-96 (on request)
RL0603	1/8W		±100	100mΩ	976mΩ	
			±200	20mΩ	99mΩ	
			±400	10mΩ	19mΩ	
RL0805	1/4W		±100	47mΩ	976mΩ	
			±200	10mΩ	46mΩ	
RL1206	1/3W		±100	47mΩ	976mΩ	
			±200	10mΩ	47mΩ	
RL1210	1/2W		±100	47mΩ	976mΩ	
			±200	10mΩ	47mΩ	
RL2010	1/2W		±100	47mΩ	976mΩ	
			±200	10mΩ	47mΩ	
RL2512	1W		±100	47mΩ	976mΩ	
			±200	10mΩ	47mΩ	

Note : RCWV(Rated Continuous Working Voltage) = $\sqrt{P(\text{rated power}) \times R(\text{Resistance value})}$
RCWV: Working Voltage(V). P: Rated Power (W), R: Resistance Value(Ω)

■ Soldering Temperature Curve



Process limits (dotted line). **WAVE soldering.**



IR Reflow Soldering

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Part Numbering

RL 0805 F R - 0R01

Size	Tolerance	Packing style	Special Type	Resistance Value
0402 0603 0805 1206 1210 2012 2512	F=±1% J=±5%	R = Paper K = Embossed Plastic	- = 7 inch Dia. Reel (Standard) 13 = 13 inch Reel (non preferred)	for example 0R01 0R1 0R05 0R5

GENERAL SPECIFICATION

Resistance Marking

E - 24 SERIES

4 digits marking for ±1%, ±5%
E24 (10mΩ~976mΩ)

Examples: R100 = 100mΩ
R047 = 47mΩ

3 digits marking for 0603 ±1%, ±5%
E24 (10mΩ~976mΩ)

Example: R100 = 100mΩ, R047 = 47mΩ

3 digits marking with underline for 0603 ±1%
E-96 (10mΩ~976mΩ)

Examples: 499 = 499 mΩ

No marking for 0402 size

THICK FILM CHIP RESISTORS RL SERIES
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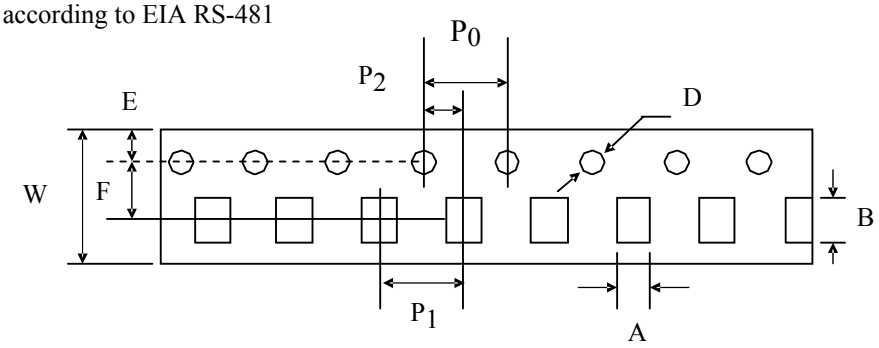
GENERAL SPECIFICATION

Tape And Reel Package

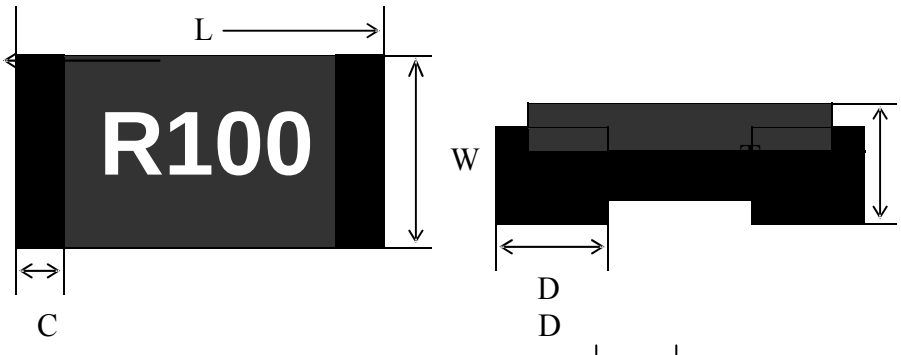
• Taping specs are according to EIA RS-481



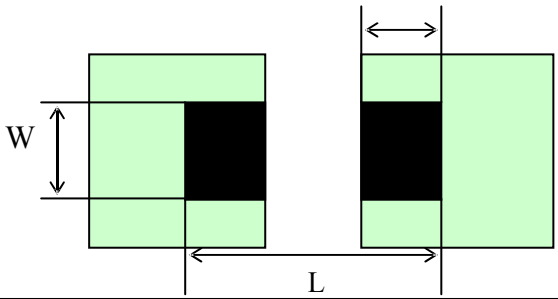
Accumulated dimensional tolerance 40±0.2mm

Size	A	B	W	F	E	P1	P2	P0	D
0402	0.65±0.1	1.15±0.1	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
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)



* 2W loading with total solder-pad and trace size of 300mm²



Type	W	D	L
RL2512	3.7mm	2.45mm	7.6mm

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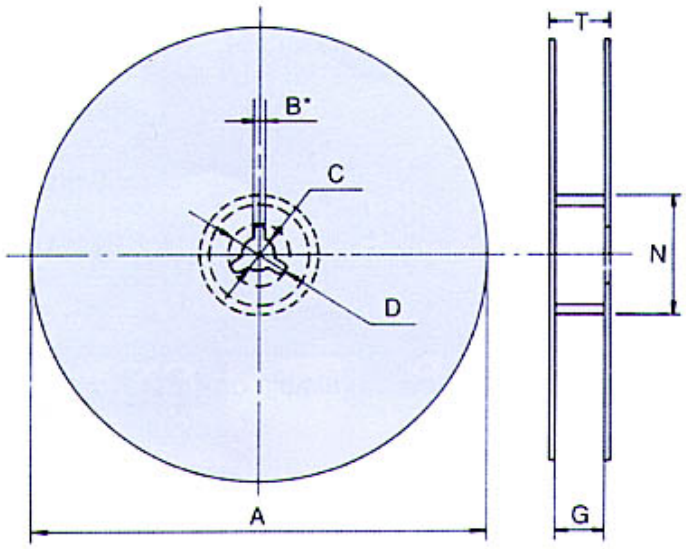
GENERAL SPECIFICATION

■ **Reel Package**



Size	Packaging Q'ty	A	N	C	D	B	G	T
0402	10Kpcs / Reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
0603 0805 1206 1210	5Kpcs / Reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
	20Kpcs / Reel	330.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
2010 2512	4Kpcs / Reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	13.8±1.5	16.7 max.
	16Kpcs / Reel	330.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	13.8±1.5	20.0 max.

(unit: mm)

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■ RL < 1Ω Specification And Test Methods

ITEM	SPECIFICATION	TEST METHOD
DC Resistance	J : ±5% , F: ±1%	**IEC 60115-1 / JIS C 5201-1 , Clause 4.5** Measure the resistance value.
Short time Overload	J: △R ≦ ±(2% + 0.5mΩ) F: △R ≦ ±(1% + 0.5mΩ)	**IEC 60115-1 / JIS C 5201-1 , Clause 4.13** 2.5×Rated voltage or Max. Overload Voltage for 5 sec. measure resistance after 30 minutes
Solderability	Over 95% of termination must be covered with solder	**IEC 60115-1 / JIS C 5201-1 , Clause 4.17** After immersing flux, dip in the 235±2℃ molten solder bath for 2±0.5 sec.
Resistance to Solder Heat	J: △R ≦ ±(1% + 0.5mΩ) F: △R ≦ ±(0.5% + 0.5mΩ) No mechanical damage	**IEC 60115-1 / JIS C 5201-1 , Clause 4.18** With 260±5℃ for 10±1 sec.
Temperature Coefficient of esistance (TCR)	As Spec.	**IEC 60115-1 / JIS C 5201-1 , Clause 4.8** -55℃～+125℃, 25℃ is the reference temperature
Load Life Humidity	J: △R ≦ ±(3% + 0.5mΩ) F: △R ≦ ±(1% + 0.5mΩ)	**IEC 60115-1 / JIS C 5201-1 , Clause 4.24** Maintain the temperature of the resistor at 40±2℃ and 90～95% R.H. with the rated voltage applied. Cycle ON for 1.5 hours and OFF for 0.5 hour for 1000+48/-0 hours. After 1～4 hour, measure
Load Life	J: △R ≦ ±(3% + 0.5mΩ) F: △R ≦ ±(1% + 0.5mΩ)	**IEC 60115-1 / JIS C 5201-1 , Clause 4.25** Permanent resistance change after 1000+48/-0 hours (1.5 hours ON , 0.5 hour OFF) at RCWV or Max. Keep the resistor at 70±2℃ ambient
Temperature Cycle	J: △R ≦ ±(1% + 1mΩ) F: △R ≦ ±(0.5% + 1mΩ) No mechanical damage	**IEC 60115-1 / JIS C 5201-1 , Clause 4.19** Repeat 5 cycles as follows -55℃(30 min.) + 25℃(2～3 min.) +125℃(30 min.) + 25℃(2～3 min.) for 0201 55℃(30 min.) + 25℃(2～3 min.) +155℃(30 min.) + 25℃(2～3 min.) for others
Insulation Resistance	Between termination and coating must be over 1000MΩ	**IEC 60115-1 / JIS C 5201-1 , Clause 4.6** Test voltage: 100±15V
Bending Strength	J: △R ≦ ±(1% + 1mΩ) F: △R ≦ ±(0.5% + 1mΩ) No mechanical damage	**IEC 60115-1 / JIS C 5201-1 , Clause 4.33** Resistance change after bended on the 90mm PCB Bend: 3mm for 0603、0805 2mm for 1206、1210、2010、2512