

Lighting & Display for SMD Top View LED Product



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Lighting & Display for SMD Top View LED Series

1. Description

The RL.. series is designed for high current operation and high flux output applications. Furthermore, its thermal management characteristic is better than other LED solutions by package SMD design and good thermal emission material. According to these advantages, it enables to apply various lighting applications and design solution, automotive lighting etc.

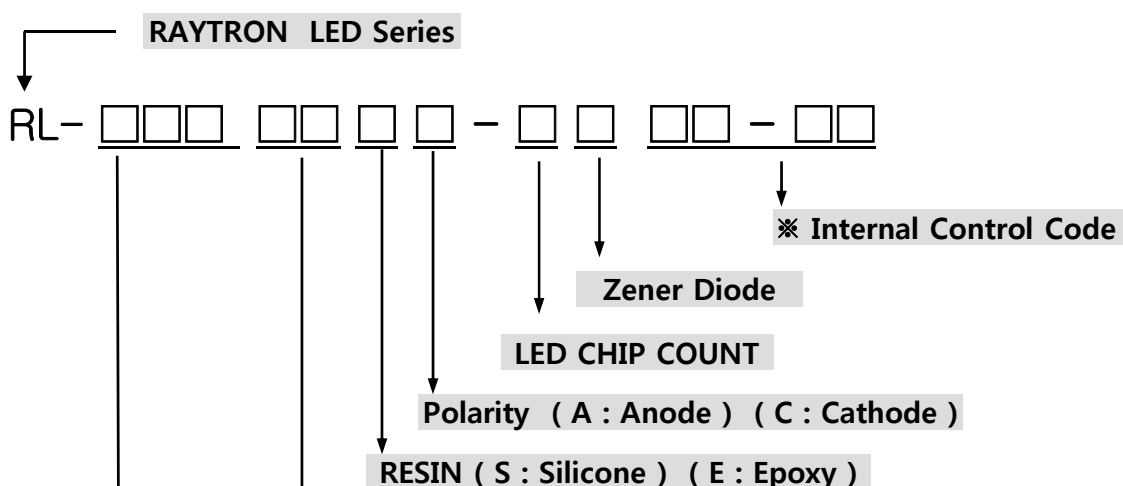
2. Applications

- AV equipment & Multimedia (LCD-TV etc.)
- Automotive exterior & Interior
- Signboard
- Traffic Signal

3. Features

- White colored PLCC SMT package.
- Pb-Free Reflow Soldering application
- RoHS Compliant
- Wide viewing angle : 120° lambertian emitter

4. LED Product Code

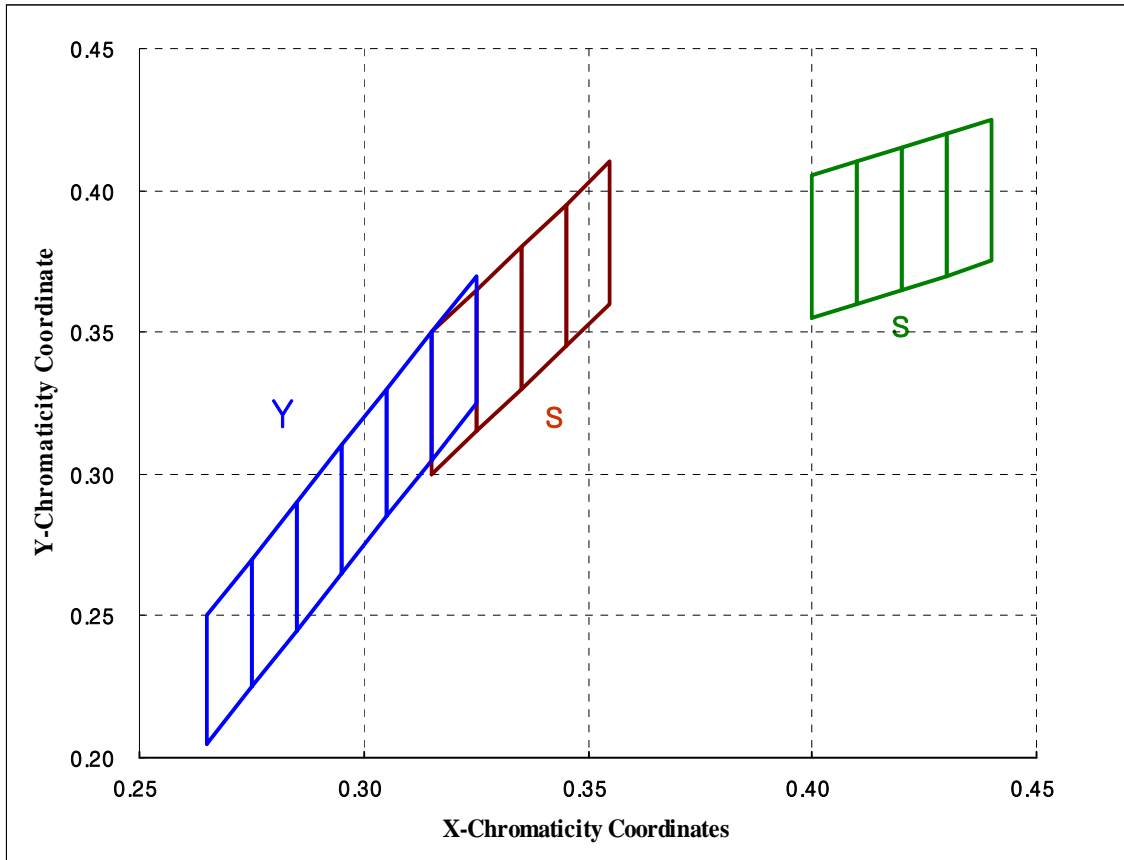


U1	B1	G1	Y1	A1	O1	R1
300~400	401~495	496~540	541~565	576~600	601~620	621~680
UV	Blue	P-Green	Yellow	Amber	Orange	Red
I1	X1	CW	PW	WW	D1	F1
680~1,600	566~575	X:0.1~0.30	X:0.30~0.37	X:0.37~ 0.48		
IR	Y-Green	Cool White	Pure white	Warm White	Dual	R.G.B

Package Type

Symbol	Package No	Remark
T11	3528 size - 2PIN	C1X : Chip LED PKG S1X : Side View PKG P1X : POWER PKG
T12	3528 size - 4PIN	
T21	5450 size - 4PIN	
T22	5450 size - 6PIN (1.6t)	
T23	5450 size - 6PIN (1.9t)	
T24	5450 size - 6PIN (1.2t H.S)	

■ Chromaticity Coordinates (1/2)





RANK		Color Coordinate			
A	x	0.265	0.265	0.275	0.275
	y	0.205	0.250	0.27	0.225
B	x	0.275	0.275	0.285	0.285
	y	0.225	0.270	0.290	0.245
C	x	0.285	0.285	0.295	0.295
	y	0.245	0.290	0.310	0.265
D	x	0.295	0.295	0.305	0.305
	y	0.265	0.310	0.330	0.285
E	x	0.305	0.305	0.315	0.315
	y	0.285	0.330	0.350	0.305
F	x	0.315	0.315	0.325	0.325
	y	0.305	0.350	0.370	0.325



■ Chromaticity Coordinates (2/2)

RANK		Color Coordinate			
G	x	0.315	0.315	0.325	0.315
	y	0.300	0.350	0.365	0.315
H	x	0.325	0.325	0.335	0.335
	y	0.315	0.365	0.380	0.330
I	x	0.335	0.335	0.345	0.345
	y	0.330	0.380	0.395	0.345
J	x	0.345	0.345	0.355	0.355
	y	0.345	0.395	0.410	0.360
K	x	0.400	0.400	0.410	0.410
	y	0.355	0.405	0.410	0.360
L	x	0.410	0.410	0.420	0.420
	y	0.360	0.410	0.415	0.365
M	x	0.420	0.420	0.430	0.430
	y	0.365	0.415	0.420	0.370
N	x	0.430	0.430	0.440	0.440
	y	0.370	0.420	0.425	0.375


5. RL Series (Top View White SMD LED)

Part No.	Package		Viewing Angle	Electrical and Optical Characteristics						Remark
	Size(mm)	Picture		Iv (mcd)		CCT WD(nm)	Vf (v)		If(mA)	
				Min	Typ		Min	Max		
RL-T1*W (1chip)	3.5 x 2.8 x 1.8		120°	1,500	2,200	10,000K~ 3,200K	2.9	3.5	20	
RL-T1*W (2chip)				3,000	4,000		2.9	3.5	40	
RL-T1*W (3chip)				5,500	7,500		2.9	3.5	60	
RL-T2*W (1chip)	5.4 x 5.0 x 1.6 (4pin) (6pin)		120°	1,800	2,400	10,000K~ 3,200K	2.9	3.5	20	
RL-T2*W (2chip)				3,500	4,500		2.9	3.5	40	
RL-T2*W (3chip)				6,000	8,000		2.9	3.5	60	
RL-T2*W (4chip)				7,000	9,000		2.9	3.5	80	

6. RL Series (Full Color SMD LED 3 in 1)

Part No.	Package		Viewing Angle	Electrical and Optical Characteristics						Remark
	Size(mm)	Picture		Iv (mcd)			Vf (v)		If(mA)	
				Min	Typ	Max	Min	Max		
RL-T12*F	3.5 x 2.8 x 1.8		120°	400	550	800	1.9	2.5	20	R
				1,000	1,200	1,600	2.9	3.5	20	G
				150	250	400	2.9	3.5	20	B
RL-T22*F	5.4 x 5.0 x 1.6 (6pin)		120°	400	600	800	1.9	2.5	20	R
				1,000	1,300	1,700	2.9	3.5	20	G
				200	300	400	2.9	3.5	20	B

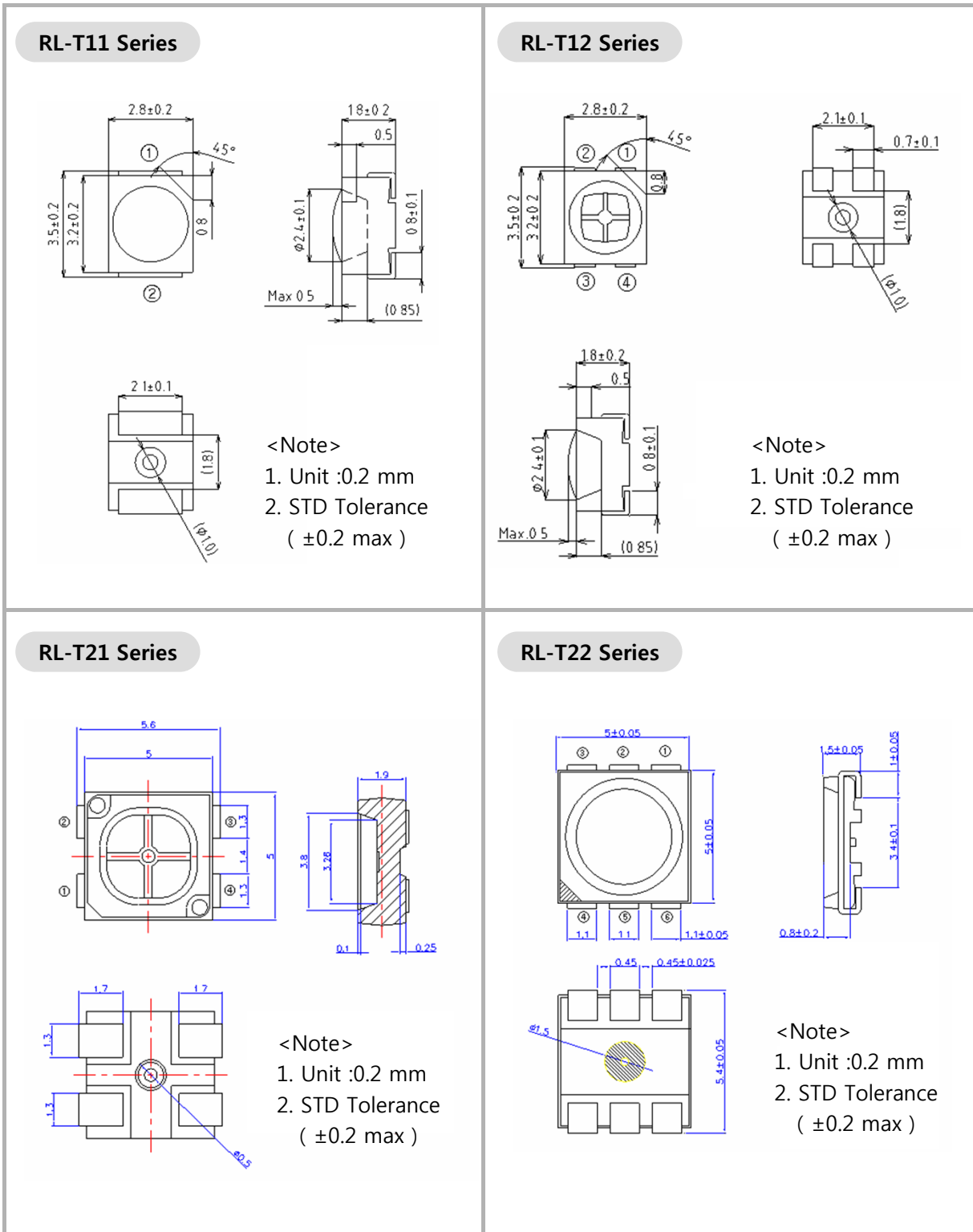
7. RL Series (Mono Color SMD LED)

Part No.	Package		Viewing Angle	Electrical and Optical Characteristics						Remark
	Size(mm)	Picture		Iv (mcd)			Vf (v)		If(mA)	
				Min	Typ	Max	Min	Max		
RL-T22*B (3chip)	5.4 x 5.0 x 1.6 (6pin)		120°	600	900	1,200	2.9	3.5	60	B
RL-T22*G (3chip)				3,500	4,200	5,000	2.9	3.5	60	G
RL-T22*R (3chip)				1,500	1,900	2,500	1.9	2.5	60	R
RL-T22*A (3chip)				1,200	1,500	2,200	1.9	2.5	60	A

8. Reliability Test Items

Parameter	Standard Test Method	Test Conditions	Number Of Damaged
Temperature Cycle	JEITA ED – 4701100 105	-40°C ~ 25°C ~ 100°C ~ 25°C (30min) (5min) (30min) (5min) 100cycle	0/22
High temperature Storage	JEITA ED – 4701200 201	Ta = 100°C t=1,000hrs	0/22
Low temperature Storage	JEITA ED – 4701200 202	Ta=-40°C t=1,000hrs	0/22
Temperature Humidity Storage	JEITA ED – 4701100 103	Ta=+60°C, RH=90% t=1,000hrs	0/22
Resistance to Soldering Heat (Reflow Soldering)	JEITA ED – 4701300 301	Tsld = 260 , 10sec. (Pre treatment 30, 70% 168hrs) 2tims°C	0/22
Soldering Ability (Reflow Soldering)	JEITA ED – 4701300 303	Tsld = 215°C±5°C , 3sec. (Lead Solder) 1tim over 95°C	0/22
Steady State Operating Life of Low Temperature		Ta=-30°C, If=20mA t=1,000hrs	0/22
Steady State Operating Life of High Temperature		Ta=+85°C, If=5mA t=1,000hrs	0/22
Steady State Operating Life of High Humidity Heat		Ta=-60°C, If=15mA, RH=90%, t=500hrs	0/22
Steady State Operating Life Condition 1		Ta=+25°C, If=20mA t=500hrs	0/22
Steady State Operating Life Condition 2		Ta=+25°C, If=30mA t=500hrs	0/22

9. Outline Dimension



10. Caution

1) Moisture-proof Package

When moisture is absorbed into the SMT package it may vaporize and expend products during soldering. There is a possibility that this may cause exfoliation of the contacts and damage to the optical characteristics of the LEDs. For this reason, the moisture-proof package is used to keep moisture to minimum in the package.

A package of a moisture-absorbent material (silica gel) is inserted into the shielding bag. the silica gel changes its color from blue to pink as absorbs moisture.

2) Storage Condition

☞ Before opening the package

The LEDs should be kept at 30°C or less and 90%RH or less. The LEDs should be used within a year When storing the LEDs, moisture-proof packaging with moisture-absorbent material (silica gel) is recommended.

☞ After opening the package

The LEDs should be kept at 30°C or less and 70%RH or less. The LEDs should be soldered within 168 hours (7days) after opening the package. If unused LEDs remain, they should be stored in moisture-proof packages, such as return the LEDs to the original moisture-proof bag and to reseal the moisture-proof bag again.

If the moisture-absorbent material (silica gel) has faded away or the LEDs have exceeded the recommended storage time, baking treatment should be performed using the following conditions. (baking treatment : more then 24 hours at 65±5°C)

RAYTRON LED electrode selection are comprised of a silver plated copper alloy. The silver surface may be affected by environments which contain corrosive gases and so on.

Please avoid rapid transition in ambient temperature, especially in high humidity environments where condensation can occur.

3) Heat Generation

Thermal design of the end product is of paramount importance.

please consider the heat generation of the LED when making the system design.

the coefficient of the circuit board and density of LED placement on the board, as well as other components.

it is necessary to avoid intense heat generation and operation within the maximum ratings given in this specification.

the operating current should be decided after considering the ambient maximum temperature of LEDs.

4) Static Electricity

Static electricity or surge voltage damage the LEDs.

it is recommended that a wrist band or an anti-electrostatic glove be used when handling the LEDs. When inspecting the final products in which LEDs were assembled, it is easy to find static-damaged LEDs by a light-on test or a VF test at a lower current

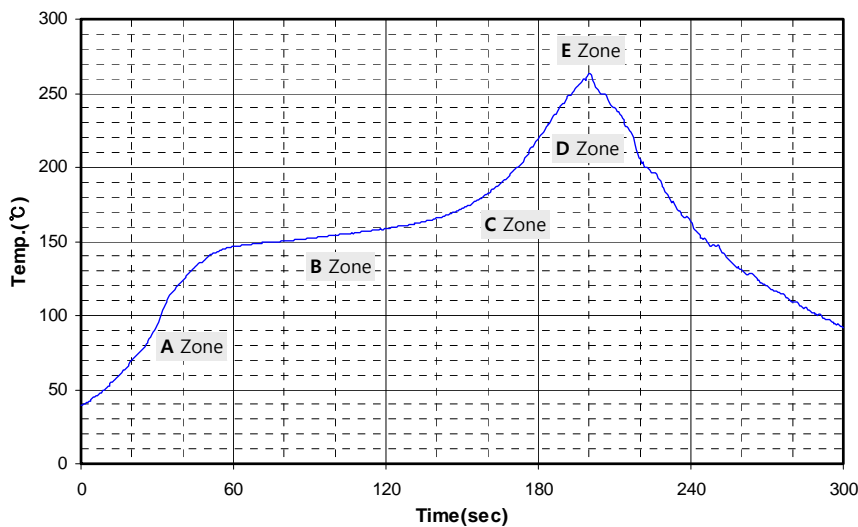
(below 1mA is recommended) damaged LEDs will show some unusual characteristics such as the leak current remarkably increases, the forward voltage become lower, or the LEDs do not light at the lower current. Criteria : (VF > 2.0V at IF= 0.5mA)

11. Soldering Condition

The LEDs can be soldered in place using the reflow soldering method. Raytron cannot make a guarantee on the LEDs after they have been assembled using the dip soldering method.

1) Reflow Soldering

- ① Following soldering paste recommended.
 - Melting temperature : 245 ~ 260°C
 - Composition : Pb-Free
- ② The below illustrated temperature profile at the top surface of the product is requested for soldering.



Zone	Time	Temperature
A	70 ~ 100sec	4°C/s max.
B	60 ~ 120sec	140 ~ 160°C
C	50 ~ 70sec	4°C/s max.
D	40sec max.	210 ~ 230°C
E	10sec max.	260°C max.

Reflow System : Japan pulse Laboratories Inc.(RF-430)
 Temp. Profile : SEF Eletronic GmbH (Mesh 3.0)

2) Manual Soldering

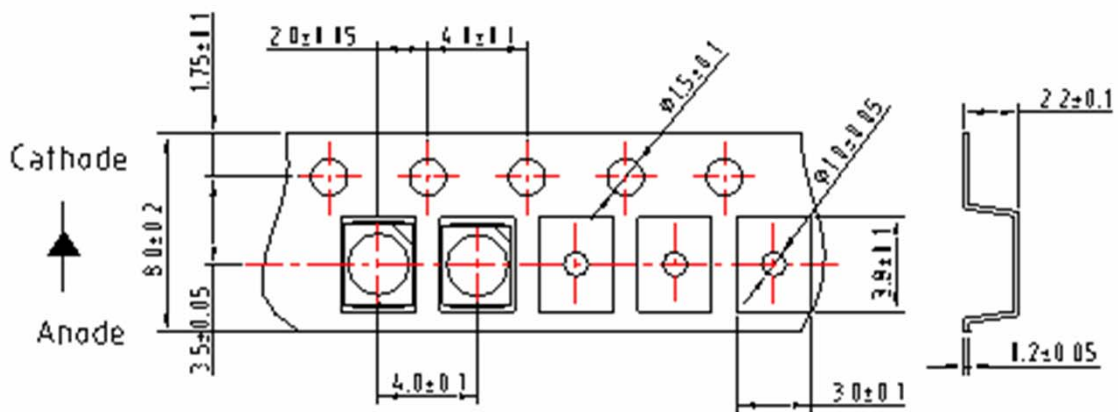
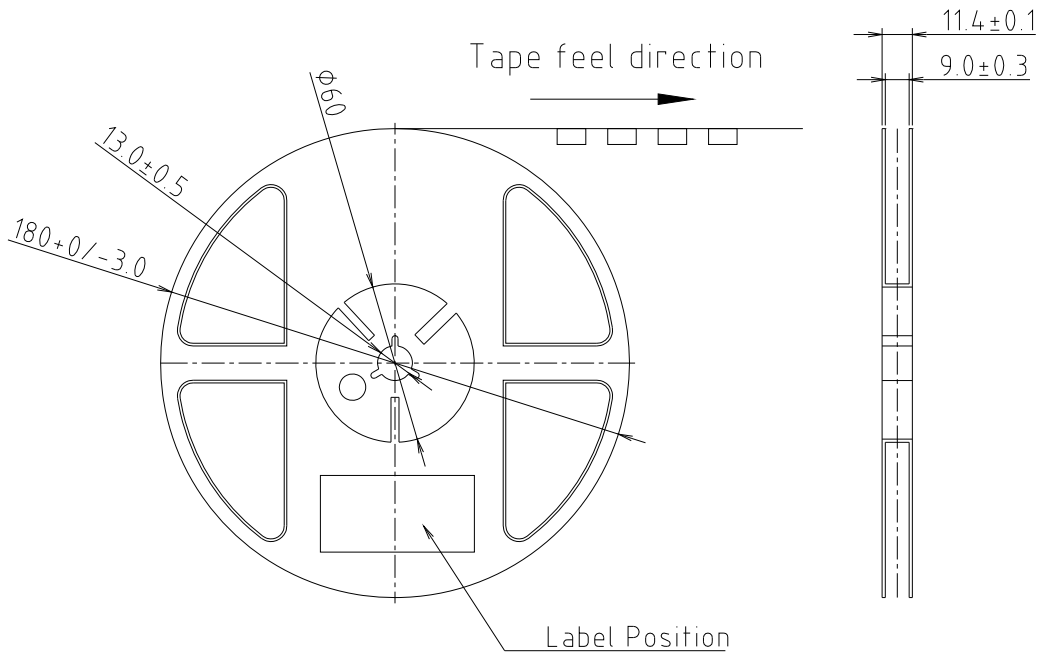
- ① Use the Pb-Free solder or the solder containing silver.
- ② Use a soldering iron of 25W or smaller.
Adjust the temperature of the soldering iron below 270°C
- ③ Finish soldering within 3 seconds. (one time only)
- ④ Handle products only after the temperature is cooled off.

3) Cleaning

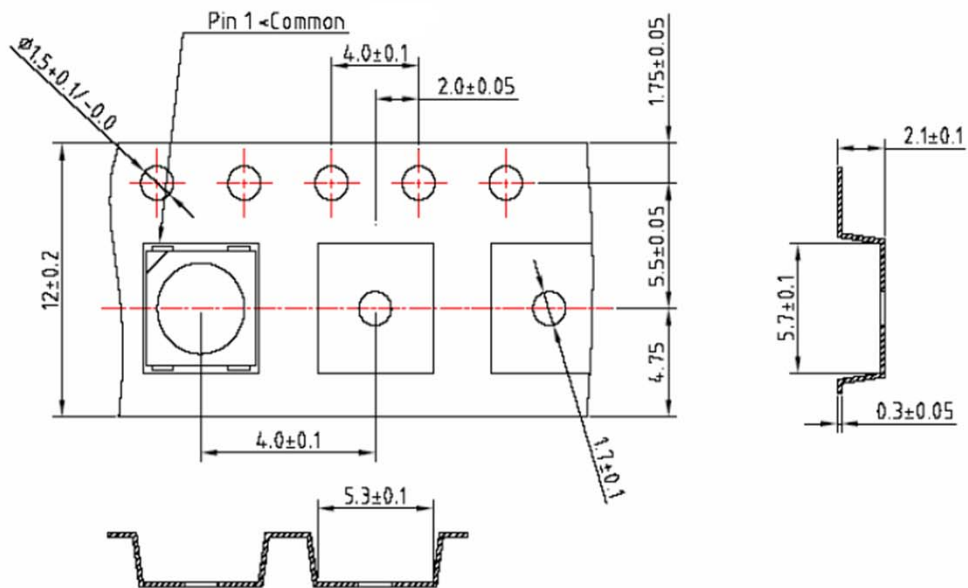
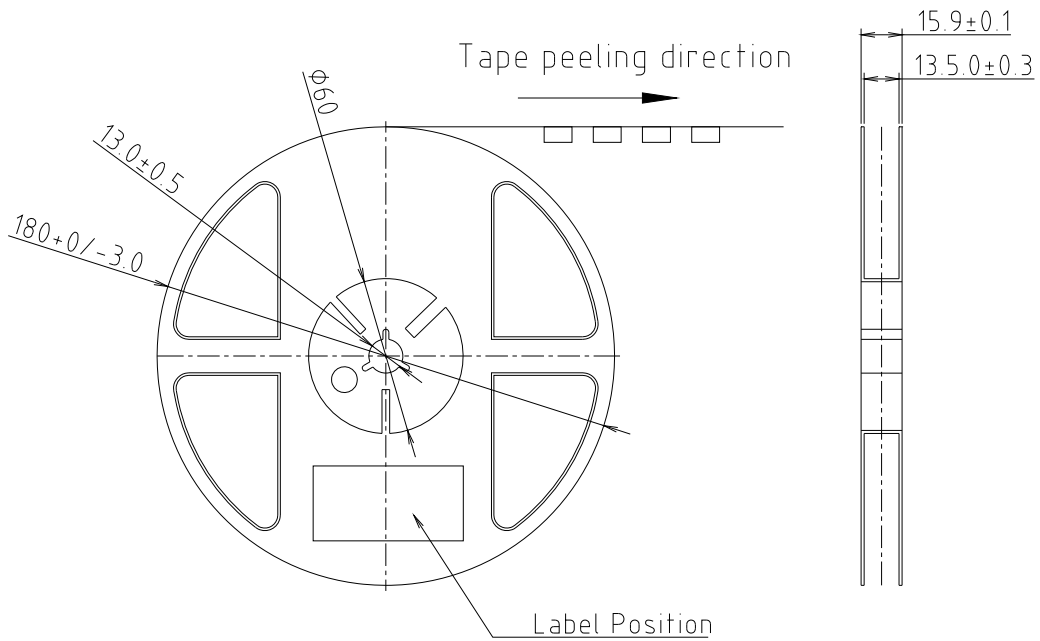
It is recommended that isopropyl alcohol be used as a solvent for cleaning the LEDs. when using other solvent, it should be confirmed beforehand whether the solvent will dissolve the package and the resin or not. Freon solvents should not be used to clean the LEDs because of worldwide regulations. Do not clean the LEDs by the ultrasonic. when it is absolutely necessary, the influence of ultrasonic cleaning on the LEDs depends on factors such as ultrasonic power and the assembled condition. Before cleaning, a pre-test should be done to confirm whether any damage to the LEDs will occur.

12. Carrier Tape & Wheel Dimension

RL-T1* (3528 PKG)



RL-T2* (5450 PKG)



Tolerance : ± 0.1 mm