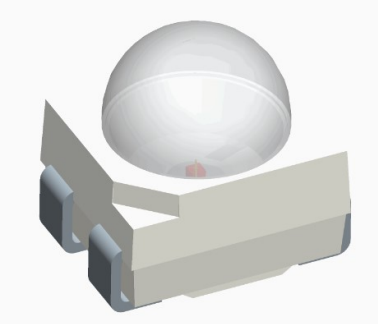
RF-GNRL30TS-CG-G

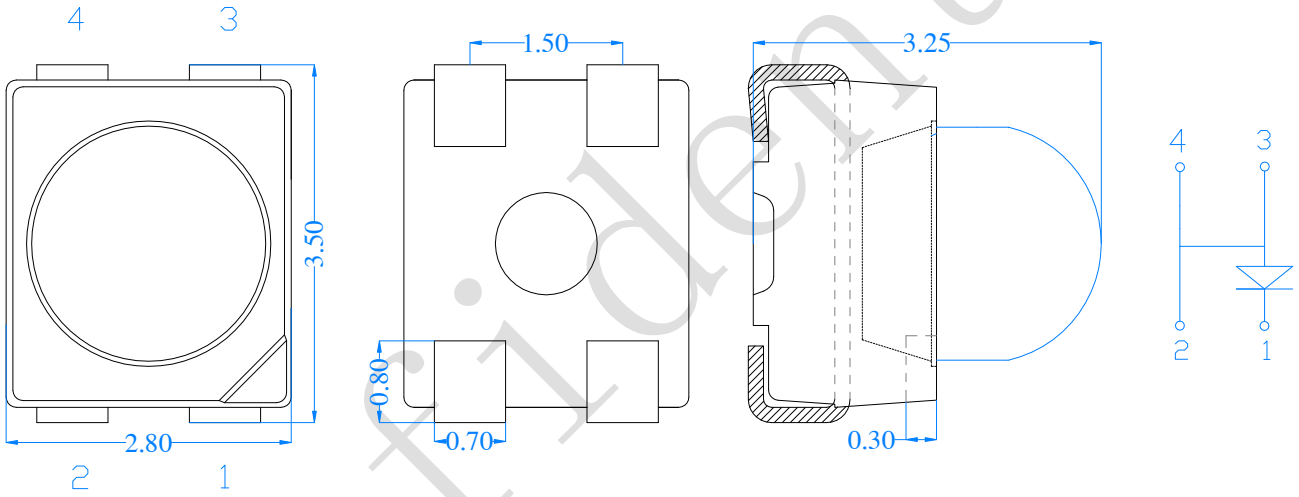


PLCC-4 with Lens 30° Series

Feature

- MSL:2
- RoHS compliant
- 3.50mm×2.80mm×3.5mm
- The materials of the LED die is InGaN
- Qualifications: The product qualification test plan is based on the guidelines of AEC-Q101 Stress Test Qualification for Automotive Grade Discrete Semiconductors.

Package Outline



ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
SENSITIVE DEVICES

NOTES:

1. All dimensions are in millimeters (inches);
2. Tolerances are ±0.2mm (0.008inch) unless otherwise noted.

Absolute maximum ratings at Ts=25℃

Parameter	Symbol	Value	Unit
Forward current	If	70	mA
Reverse voltage	Vr	5	V
Operating temperature range	Top	-40 ~+100	℃
Storage temperature range	Tstg	-40 ~+100	℃
Electrostatic Discharge	ESD	2000(HBM)	V
Junction temperature	Tj	120	℃
Thermal resistance	Rth J-S	130	K/W

Electro-optical characteristics at Ts=25℃

Parameter	Test Condition	Symbol	Value			Unit
			Min.	Typ.	Max.	
Forward voltage	If=50mA	Vf	2.9	--	3.0	V
			3.0	--	3.1	
			3.1	--	3.2	
			3.2	--	3.3	
			3.3	--	3.4	
			3.4	--	3.5	
			3.5	--	3.6	
Luminous intensity	If=50mA	Iv	23000	--	28000	mcd
			28000	--	33000	
			33000	--	38000	
Dominant wavelength	If=50mA	Wd	515.0	--	517.5	nm
			517.5	--	520.0	
			520.0	--	522.5	
			522.5	--	525.0	
Reverse current	Vr=5V	Ir	--	--	10	uA
Viewing angle at 50% Iv	If=50mA	2 θ 1/2	--	30	--	Deg

NOTE:

1. (Tolerance: Iv ±10%, λd ±2nm, Vf ±0.05V, X, Y ±0.005)

2.IFP Conditions: Pulse Width≦10msec. and Duty ≦1/10.

3.All the datas are just for reference, specific parameters please refer to the label.

4.Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.

5.When the LEDs are in operation the maximum current should be decided after measuring the package temperature, junction temperature should not exceed the maximum rate.

Typical optical characteristics curves

Fig.1 Maximum Forward Current vs. Ambient Temperature

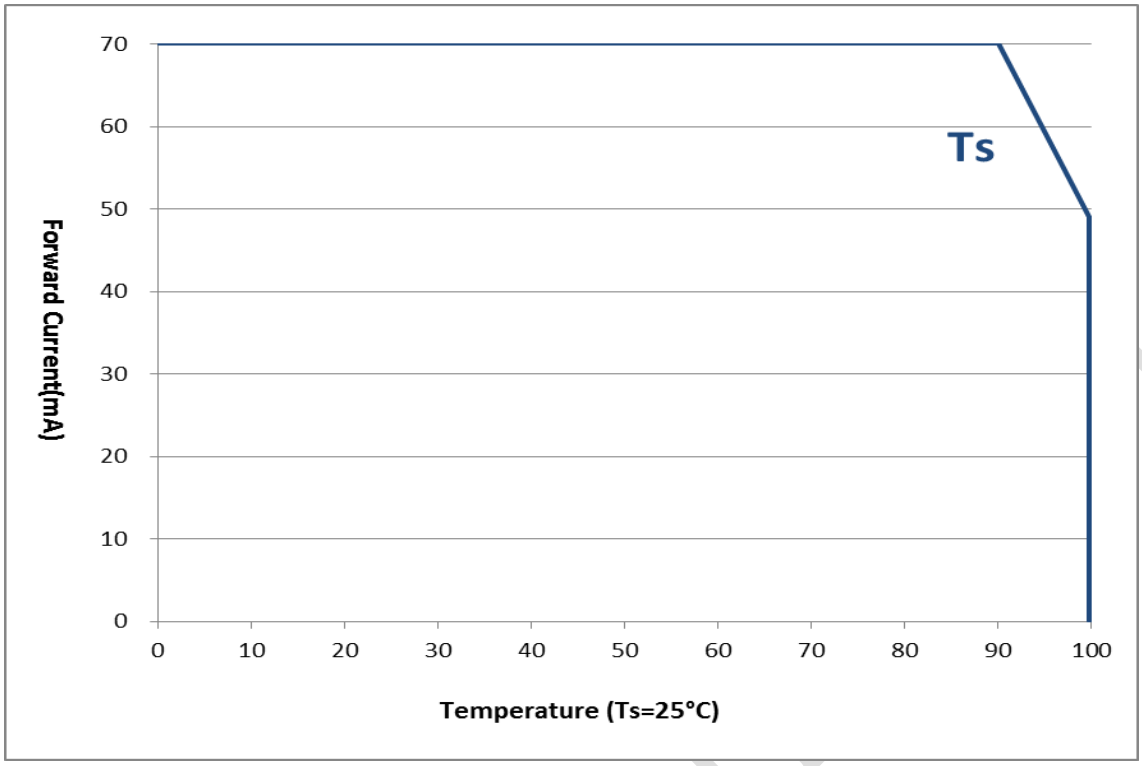


Fig.2 Relative Intensity vs. Forward Current (Ts=25°C)

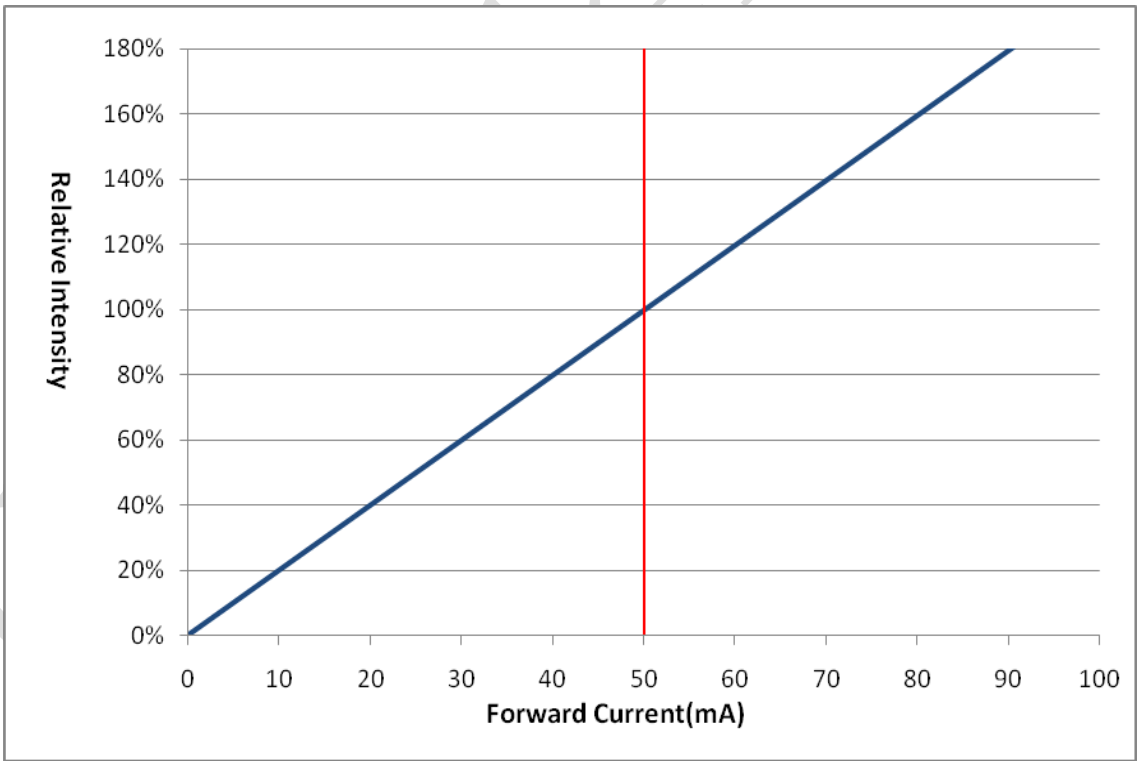


Fig.3 Forward Current vs. Forward Voltage (Ts=25°C)

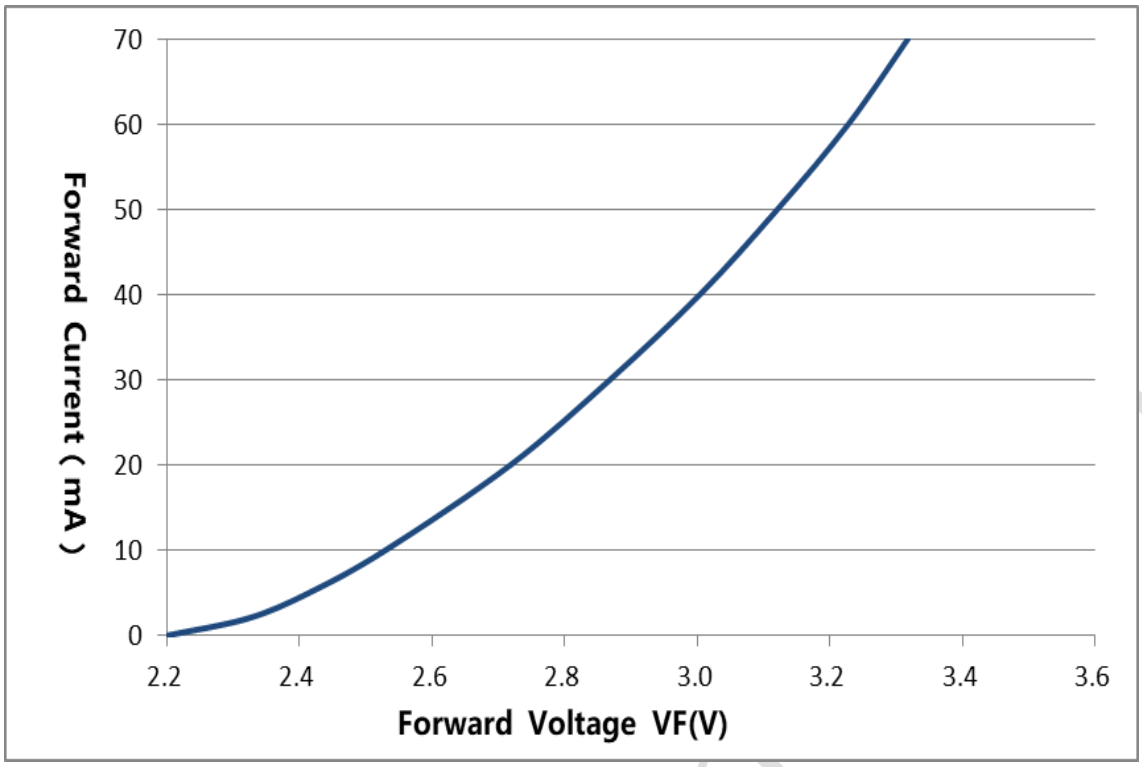


Fig.4 Forward current vs.Dominate wavelength (Ts=25°C)

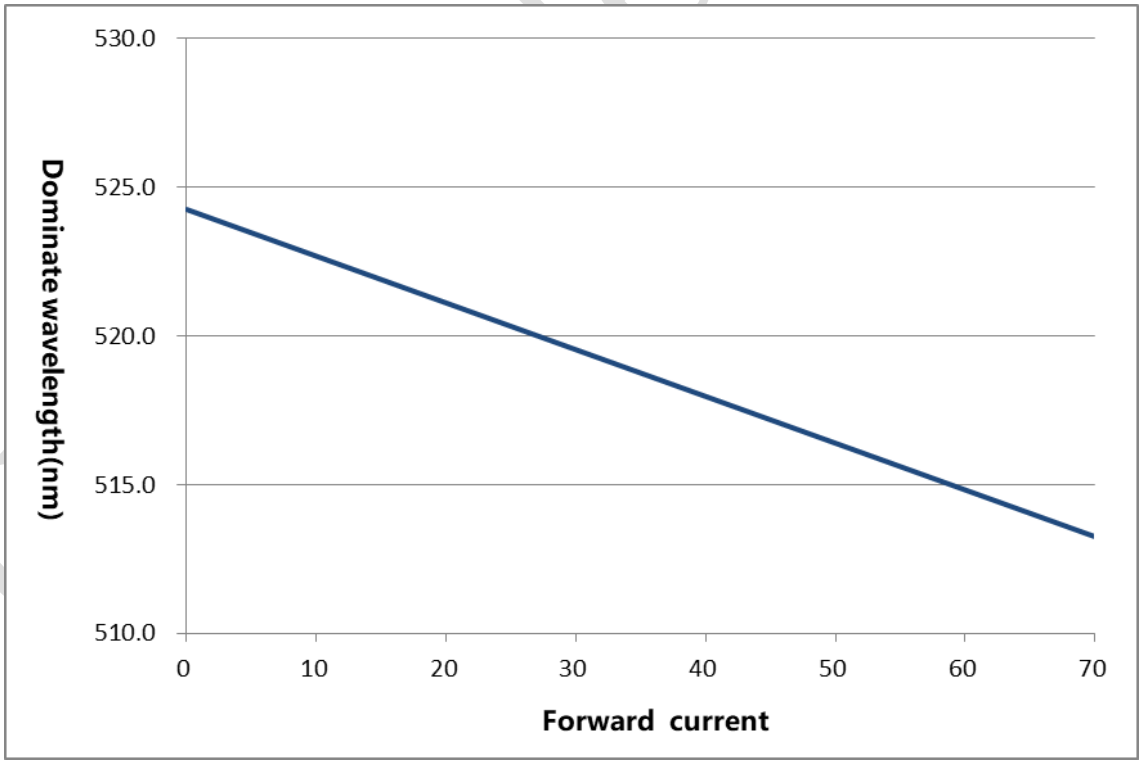


Fig.5 Relative Intensity vs. Wavelength (Ts=25℃)

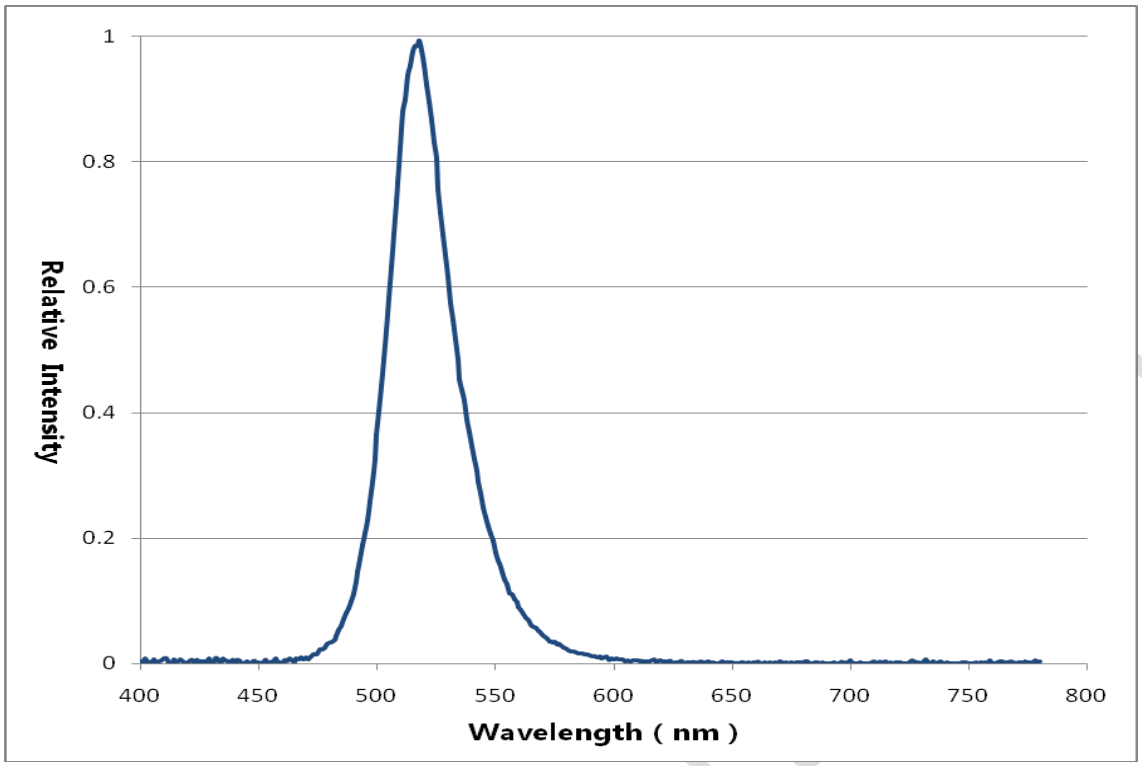
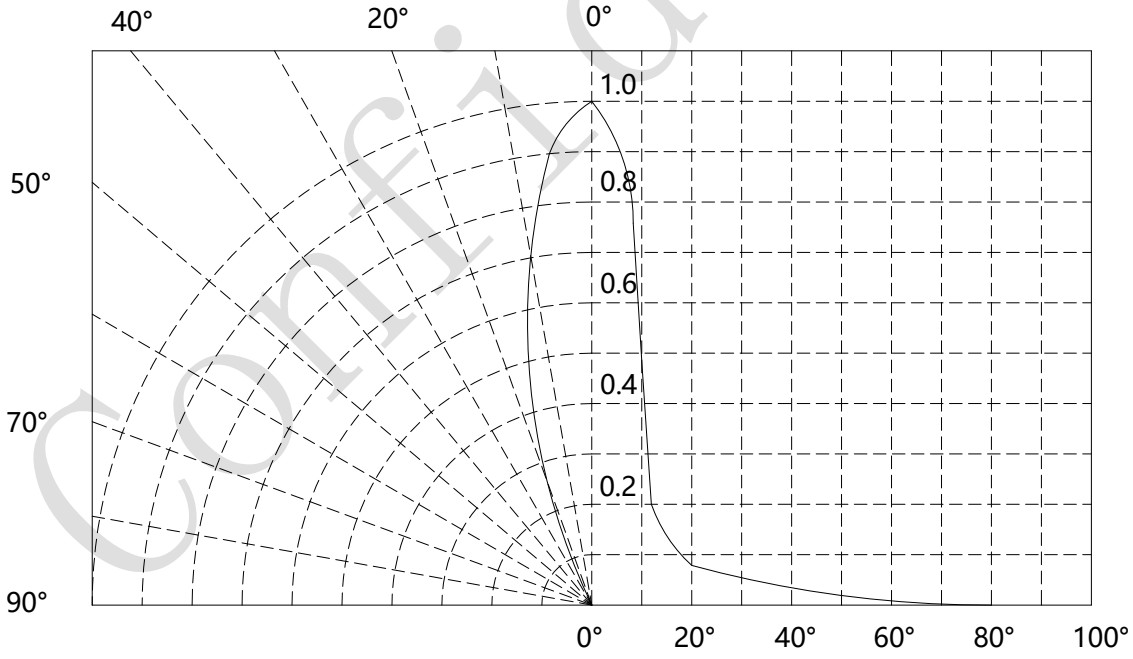
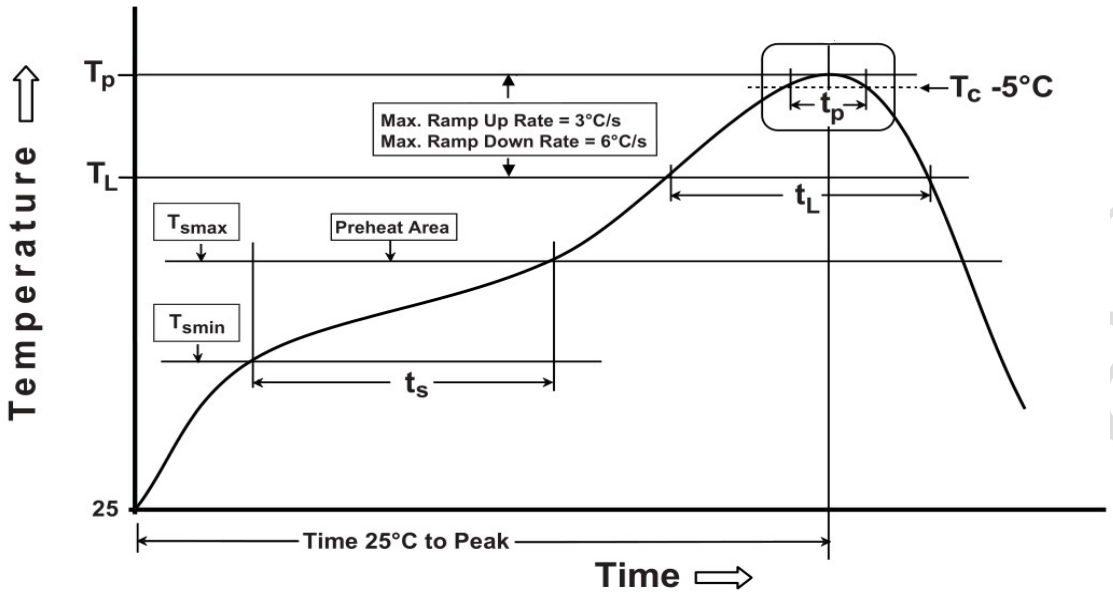


Fig.6 Diagram characteristics of radiation



Reference Soldering Conditions

■ Maximum Body Case Temperature Profile for evaluation of Reflow Profile.

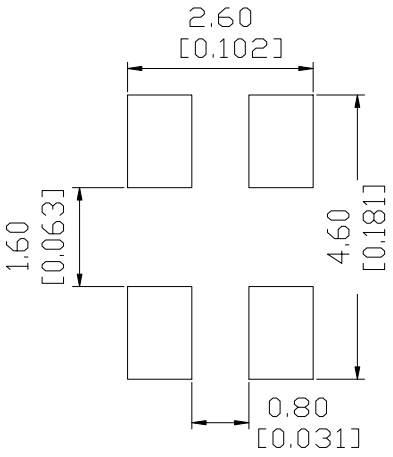


Note:

Preheat	
Temperature min (Tsmin)	150 °C
Temperature max (Tsmax)	200°C
Time (Tsmin to Tsmax) (ts)	60-120 seconds
Average ramp-up rate (Tsmax to Tp)	3 °C/second max.
Other	
Liquidus Temperature (TL)	217 °C
Time above liquidus Temperature (tL)	60-150sec
Peak Temperature(Tp)	260°C
Time within 5°C of Actual Peak Temperature:Tp-5°C	30s
Ramp-Down Rate form Peak Temperature	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.
Reflow times	3 times

All parameters are maximum body case temperature values and cannot be considered as a soldering profile. The body case temperature was measured by soldering a thermal couple to the soldering point of LEDs.

RECOMMEND PAD DESIGN (Units: mm)

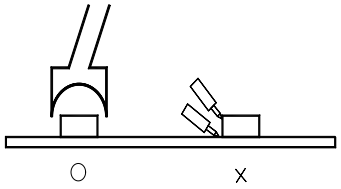


■ Soldering iron

1. When hand soldering, keep the temperature of the iron under 300℃, and at that temperature keep the time under 3 sec.
2. The hand soldering should be done only a time
3. The basic spec is ≤5 sec. when the temperature of 260℃, do not contact the resin when hand soldering

■ Rework

1. Customer must finish rework within 5 sec under 260℃
2. The head of iron can not touch the resin
3. Twin-head type is preferred.



Reliability

(1)TEST ITEMS AND RESULTS

Test Item	Ref. Standard	Test Conditions	Note	Number of Damaged
High Temperature Storage	JEITA ED-4701200 201/AEC-Q101	100℃	1000hr.	0/22
Low Temperature Storage	JEITA ED-4701200 202/AEC-Q101	-40℃	1000hr.	0/22
Temp.Humidity Storage	JEITA ED-4701 100 103/ AEC-Q101	60℃/90%RH	1000hr.	0/22
Steady State Operating Life	EIA/JESD 22-A108-B/AEC-Q101	25℃/50mA	1000 hr.	0/22
High Temperature Operating Life	EIA/JESD 22-A108B/AEC-Q101	85℃/50mA	1000 hr.	0/22
Low Temperature Operating Life	EIA/JESD 22-A108B/AEC-Q101	-40℃/50mA	1000 hr.	0/22
Steady State Operating life of High Humidity Heat	JEITA ED-4701 100 102/AEC-Q101	85℃/85%HR/50mA	1000 hr.	0/22
Temperature Cycle	JEITA ED-4701 100 105	-40℃ 30min ↑↓5min 100℃ 30min	1000 hr.	0/22
ElectroStatic Discharge	EIA/JESD 22A114-A:Class 2/AEC-Q101	HBM:100Pf/1.5Kohm 2KV	3times	0/22

(2)CRITERIA FOR JUDGING THE DAMAGE

Item	Symbol	Test Conditions	Criteria for Judgement	
			Min.	Max.
Forward Voltage	VF	IF=50mA	_	U.S.L*)×1.1
Reverse Current	IR	VR=5V	_	U.S.L*)×2.0
Luminous Intensity	IV	IF=50mA	L.S.L**)×0.7	_

U.S.L.: Upper Standard Level **L.S.L.: Lower Standard Level**

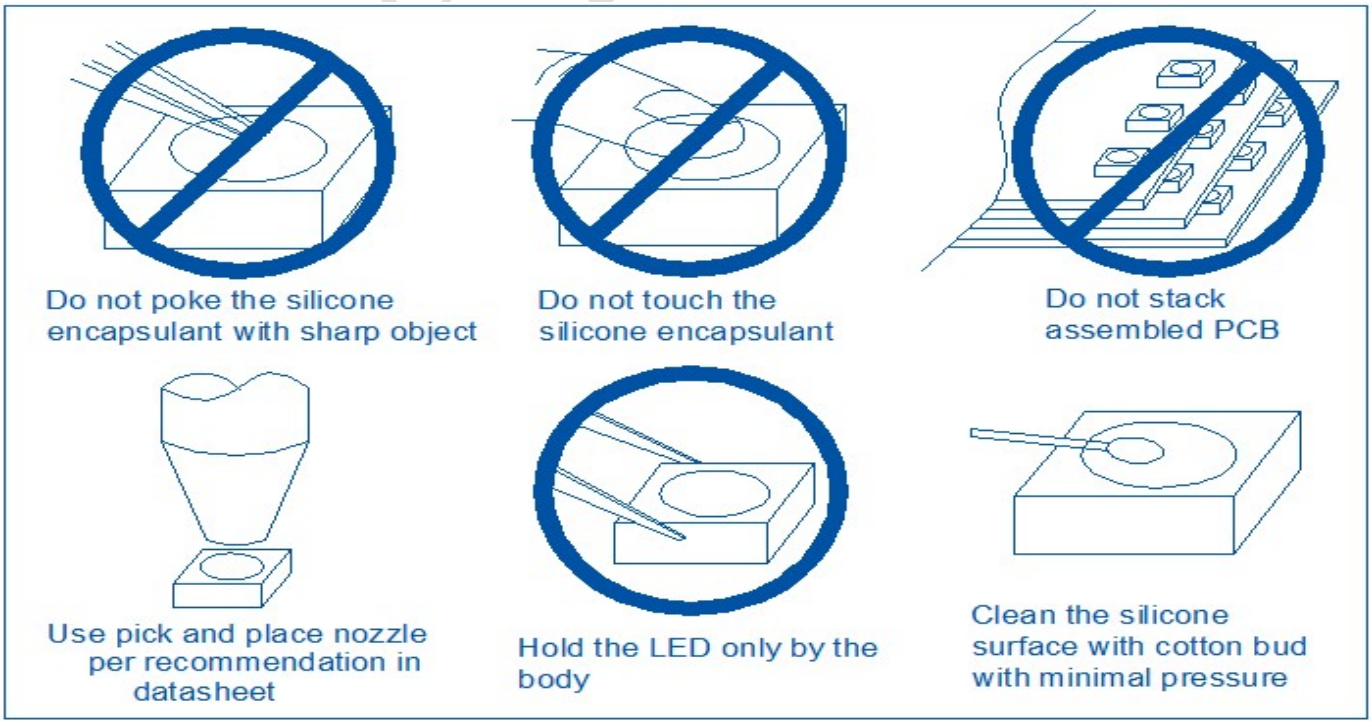
Note:

1.The Reliability tests are based on Refond existing test platform.

2.The technical information shown in the data sheets are limited to the typical characteristics and circuit examples of the referenced products. It does not constitute the warranting of industrial property nor the granting of any license.

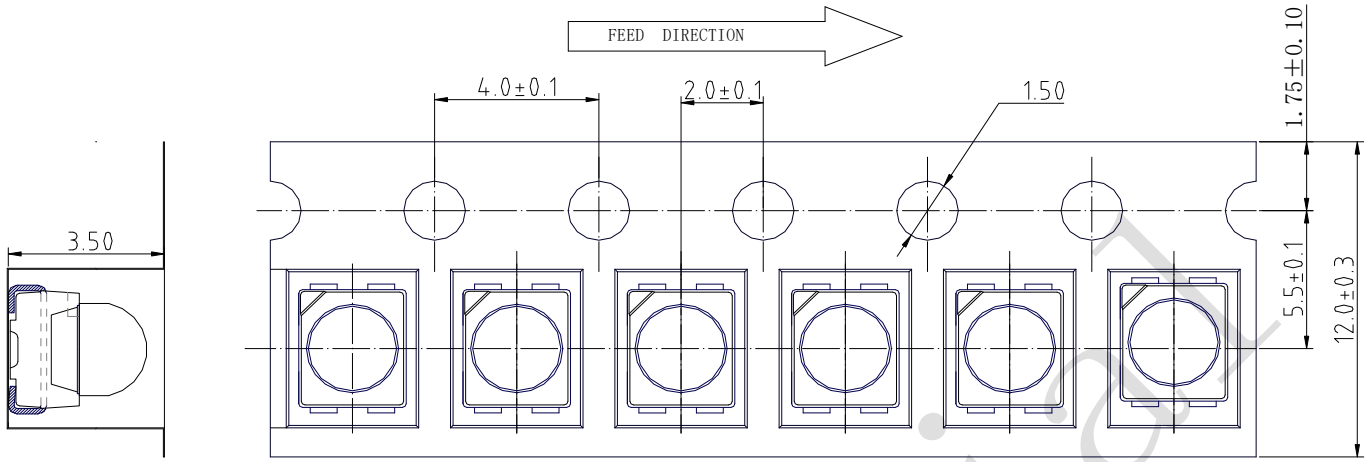
Handling Precautions

1. LED operating environment and sulfur element composition cannot be over 100PPM in the LED mating usage material. This is provided for informational purposes only and is not a warranty or endorsement. LED.
2. In order to prevent external material from getting into the inside of LED, which may damage the LEDs. the single content of Bromine element requires less than 900PPM, the single content of Chlorine element requires less than 900PPM,the total content of Bromine element and Chlorine element in the external materials of the application products requires less than 1500PPM. This is provided for informational purposes only and is not a warranty or endorsement.
3. Compared to standard encapsulants , silicone is generally softer, and the surface is more likely to attract dust，requiring special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after the soldering of components. Refond suggests using isopropyl alcohol for cleaning. In case other solvents are used, it must be assured that these solvents do not dissolve the package or resin. Ultrasonic cleaning is not recommended. Ultrasonic cleaning may cause damage to the LED.
4. In designing a circuit, the current through each LED must be exceed the absolute maximum rating specified for each LED. In the meanwhile, resistors for protection should be applied, otherwise slight voltage shift will cause big current change, burn out may happen. The driving circuit must be designed to allow forward voltage only when it is ON or OFF. If the reverse voltage is applied to LED, migration can be generated resulting in LED damage.
5. Thermal Design is paramount importance because heat generation may result in the Characteristics decline, such as brightness decreased, Color change and so on. Please consider the heat generation of the LEDs when making the system design.
6. When you have special quality requirement for the product, please kindly contact to our sales.
7. When using LED, clients shall pay attention to the defined specs and using environment requires. Refond will give no quality guarantee on the situation: if using in conditions that out of specs or over reference conditions which without verifying.
8. The customer shall not disassemble or analyze the LEDs without having consent from Refond. When defective LEDs are found, the customer shall inform Refond in writing directly before disassembling or analysis.
9. Other points for attention, please refer to our LED user manual.

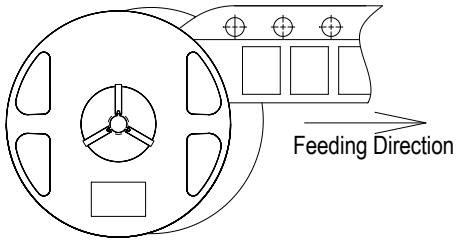


Packaging Specifications

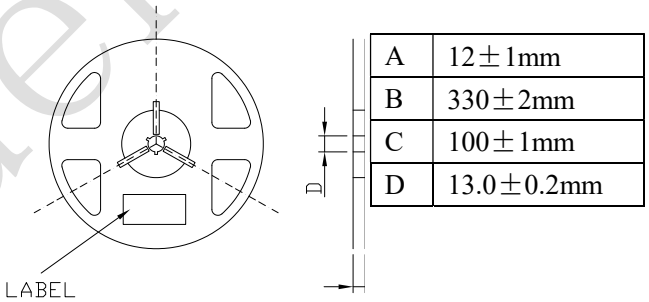
- **Dimensions of Tape (Unit: mm)**



- **Feeding Direction**



- **Dimensions of Reel (Unit: mm)**

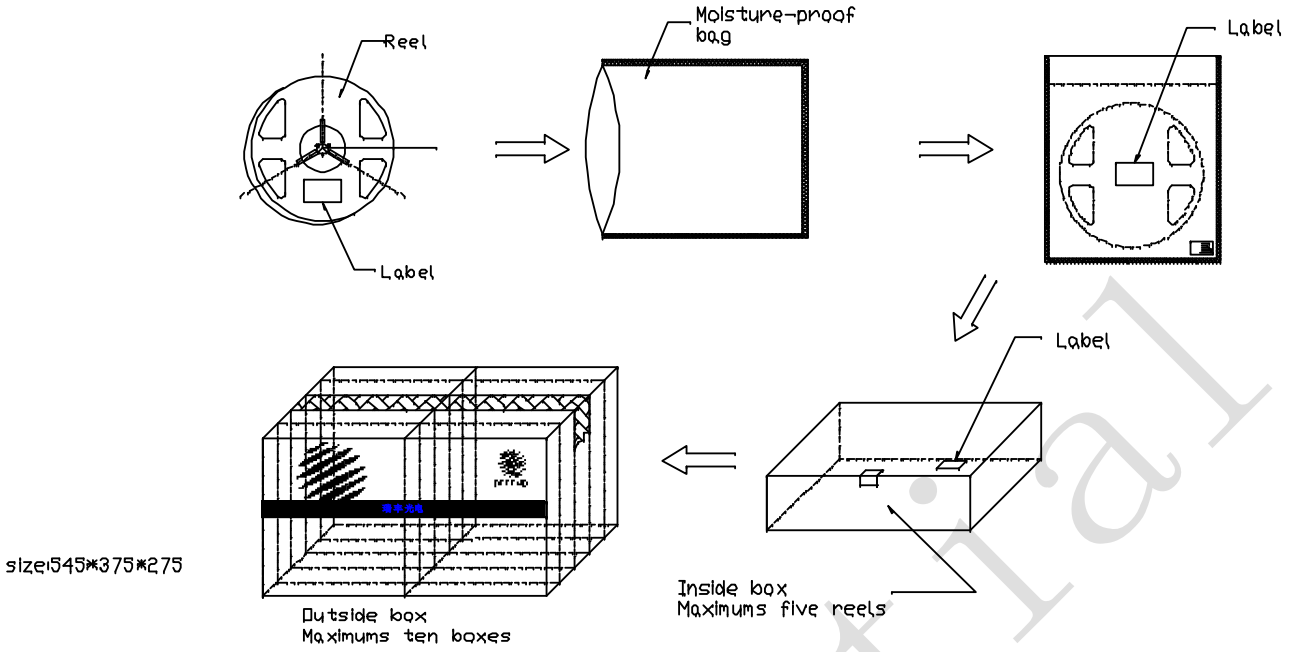


A	12±1mm
B	330±2mm
C	100±1mm
D	13.0±0.2mm

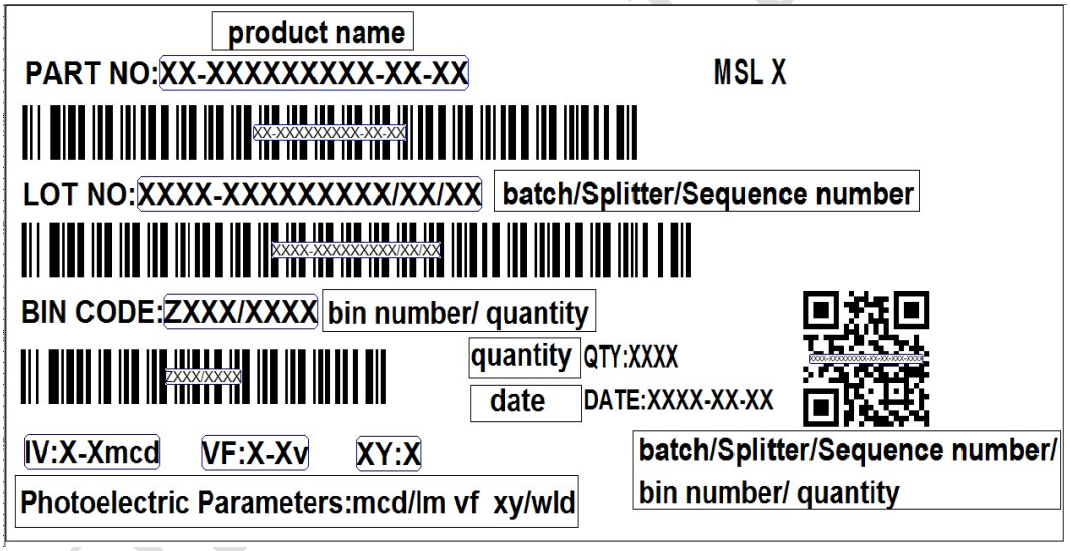
NOTES

1. Empty component pockets are sealed with top cover tape;
2. The maximum number of missing lamps is two;
3. The cathode is oriented towards the tape sprocket hole in accordance with ANSI/EIA RS-481 specifications.
4. 2000 pcs/ Reel.

Packaging specifications



■ Label



Using Guide

1. Storage

- ●Moisture proof and anti-electrostatic package with moisture absorbent material is used, Packaged products have one year to save time.
- ●Before opening the package, the product should be kept at30℃ or less and humidity less the60%RH. Seal anti-electrostatic bag humidity card should immediately check bag humidity indicator card in the open the bag after, Humidity is greater than or equal to 30%, Must be baked before use
- ●After opening the package, the product should be soldered within 24 hours. If not, please store at 30℃or less and humidity less than 10%RH. It is recommended that the product be operated at the workshop condition of 30℃ or less and humidity less than 60%RH.
- ●If the moisture absorbent material has fade away or the LEDs have exceeded the storage time, baking treatment should be performed based on the following condition : 65±5℃ for 24 hours.

2. Static Electricity

- ●The following procedures may decrease the possibility of ESD damage.
- ●Minimize friction between the product and surroundings to avoid static buildup.
  All production machinery and test instruments must be electrically grounded.
- ●Operators must wear anti-static bracelets
- ●Wear anti-static suit when entering work areas with conductive machinery.

3. Reverse voltage protection

In generally the reverse current of LED is very small, it can’ t effect using the component normally, but when it often suffered the reverse voltage which exceed the limits of the component than it will be damaged, the reverse current increases rapidly causing the string light display gray scale so when designing, please pay attention to control the reverse voltage we suggest the reverse voltage less than 10V.

4. The safe temperature for LEDs working

The high temperature will make the LED’s Luminous Intensity deceased radically, if LEDs worked in hot environment for a long time, they will be disabled easily. When LEDs are working in a closed array, we suggest that the LED’s surface temperature should be lower than 55℃ and the leg’s temperature should be lower than75℃.

Declare

Both the customers and Refond will agree on official specifications of supplied products before a customer’s volume production. The specification is valid only after be signed. And Refond reserves the right to further modify the specification for technical reference and sample without noticing the customers.

Revision History:

Rev.	Modified date	File modified contents
0	2018/1/15	New Spec