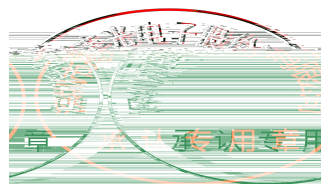
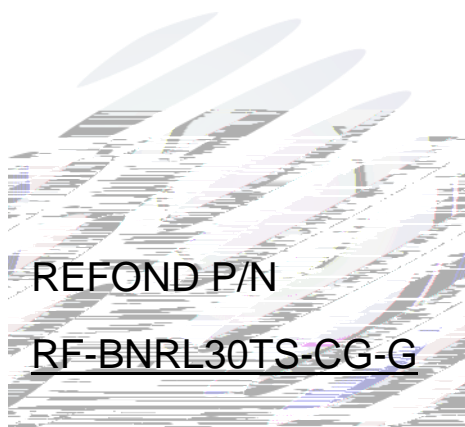
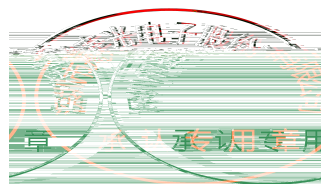


SPECIFICATION



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1. Description

1.1 General Description



The Blue source color devices are made with GaN on Substrate Light Emitting Diode .
Product Package:3.50mmX2.80mmX3.50mm.

GaN

: 3.50mmX2.80mmX3.50mm °

1.2 Features

PLCC4 Package.

Extremely wide viewing angle.

Suitable for all SMT assembly and solder process.

Available on tape and reel.

Moisture sensitivity level: Level 2.

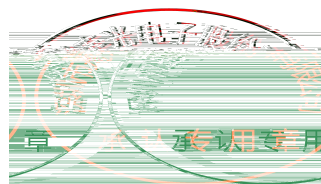
Compliance with RoHS and REACH. 符合RoHS和REACH要求

Qualifications: The product qualification test plan is based on the guidelines of AEC-Q101 Stress Test Qualification for Automotive Grade Discrete Semiconductors

1.3 Application

Automotive Interior Lighting. 汽 内 照 明

Switches. 开 关



1.4 Package Dimension

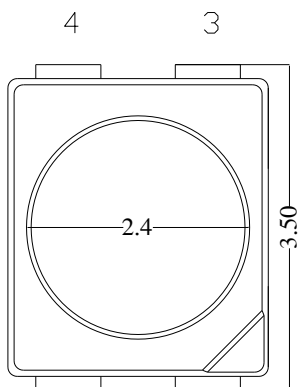


Fig.1-1 Top View

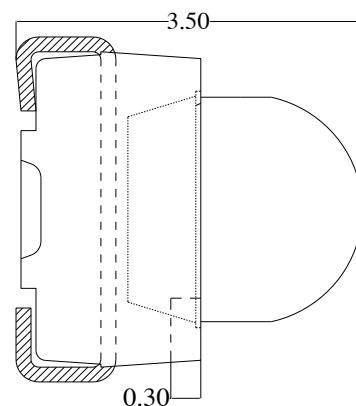


Fig.1-2 Side View

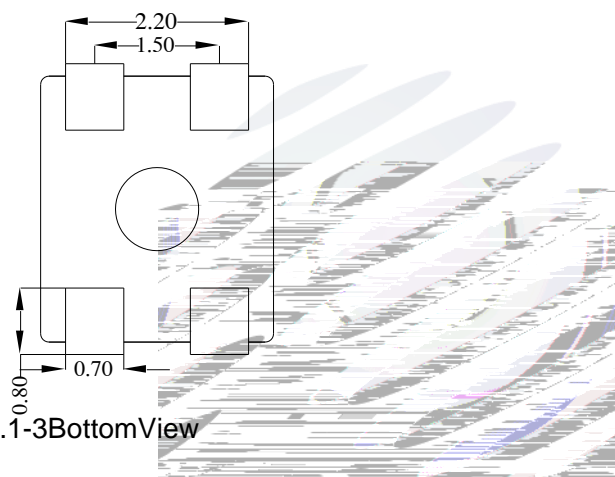


Fig.1-3 Bottom View

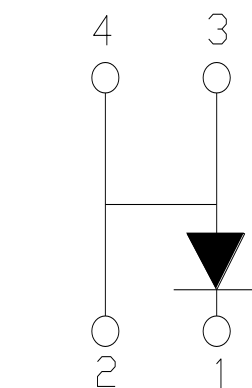


Fig.1-4 Polarity

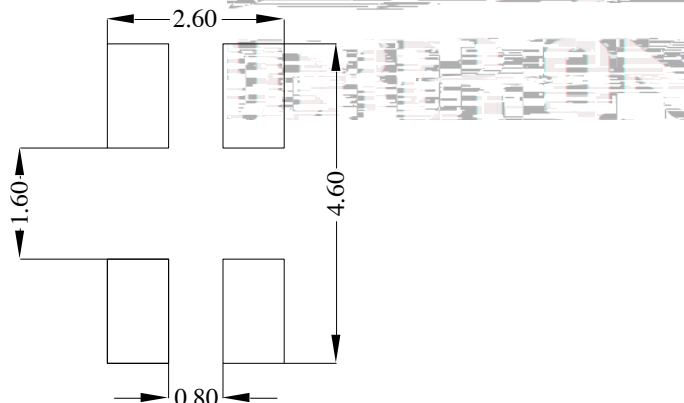
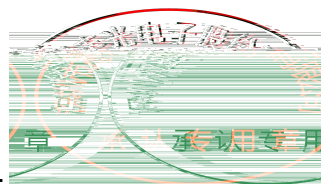


Fig.1-5 Soldering Patterns

Notes

All dimensions units are millimeters.

All dimensions tolerances are $\pm 0.2\text{mm}$ unless otherwise noted.



1.5 Product Parameters

Table 1-1 Electrical / Optical Characteristics at Ts=25°C

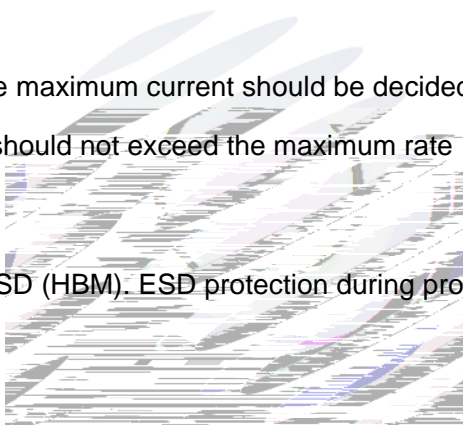
Item	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=50\text{mA}$	2.8	3.1	3.5	V
Reverse Current	I_R	$V_R=5\text{V}$	---	---	10	μA
Luminous Intensity	I_V	$I_F=50\text{mA}$	5300	7500	10000	mcd
Dominant wavelength	λ_d	$I_F=50\text{mA}$	465	467	475	nm
Viewing Angle		$I_F=50\text{mA}$	---	30	---	deg
Thermal Resistance.	R_{THJ-S}	$I_F=50\text{mA}$	---	---	130	$^{\circ}\text{C}/\text{W}$

Table 1-2 Absolute Maximum Ratings at Ts=25°C

Parameter	Symbol	Rating	Units
Power Dissipation	P_D	245	mW
Forward Current	I_F	70	mA
Peak Forward Current	I_{FP}	100	mA
Reverse Voltage	V_R	5	V
Electrostatic Discharge (HBM)	E_{SD}	2000	V
Operating Temperature	T_{OPR}	-40 ~ +100	
Storage Temperature	T_{OPR}	-40 ~ +100	
Junction Temperature	T_J	120	

Notes

- 1/10 Duty cycle, 10ms pulse width.
- The above forward voltage measurement allowance tolerance is $\pm 0.1V$.
- The above color coordinates measurement allowance tolerance is ± 0.005 . \pm
- The above luminous intensity measurement allowance tolerance $\pm 10\%$.
- Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.
- All measurements were made under the standardized environment of Refond.
- 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
- ESD yield is over 90% at 2000V ESD (HBM). ESD protection during products handling is needed.

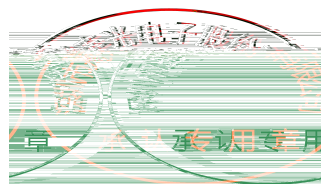


1.6Bin Range Of Forward Voltage and Luminous Intensity and Dominant wavelength (IF=50mA)

BIN (IF=50mA)

Table 1-3

V _F V	G1	G2	H1	H2	I1	I2	J1
	2.8-2.9	2.9-3.0	3.0-3.1	3.1-3.2	3.2-3.3	3.3-3.4	3.4-3.5
IV mcd	P2	Q1	Q2				
	5300-6500	6500-8000	8000-10000				
WD(nm)	D1	D2	E1	E2			
	465-467.5	467.5-470	470-472.5	472.5-475			



1.7 Typical Optical Characteristics Curves

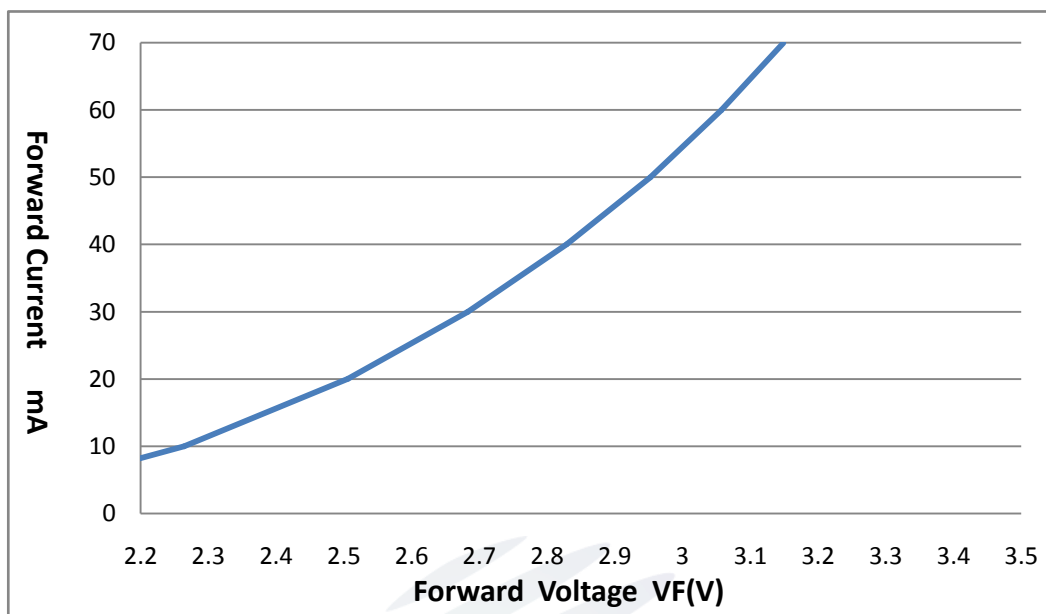


Fig. 1-7 Forward Voltage Vs Forward Current

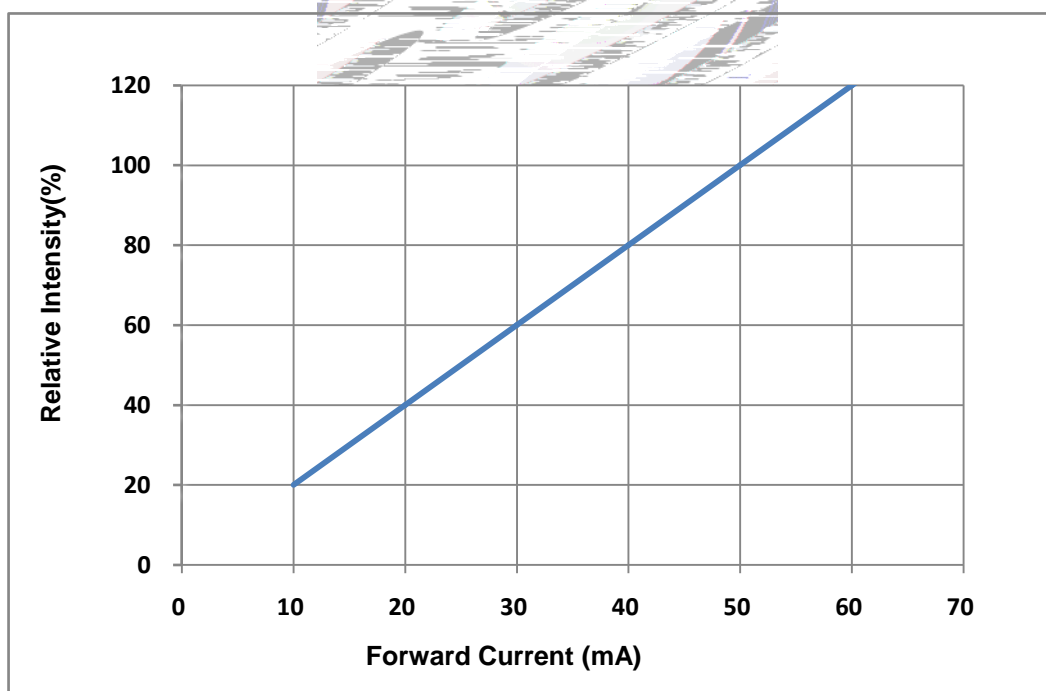
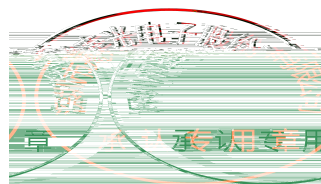


Fig. 1-8 Forward Current Vs Relative Intensity





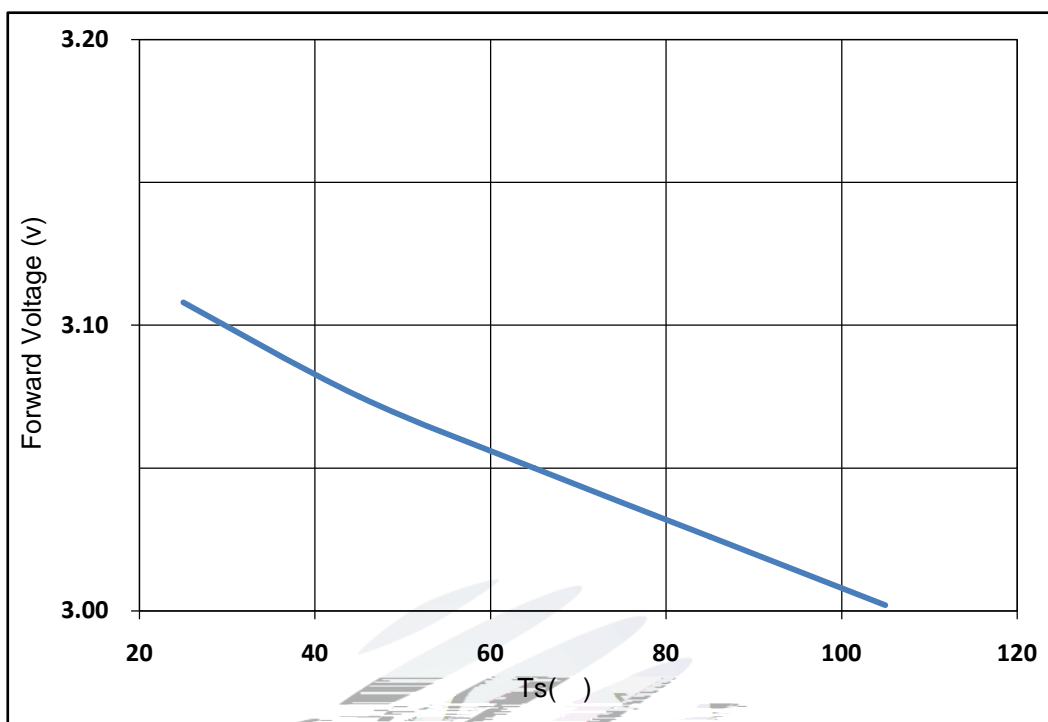


Fig. 1-11 Forward Voltage Vs Solder Temperature

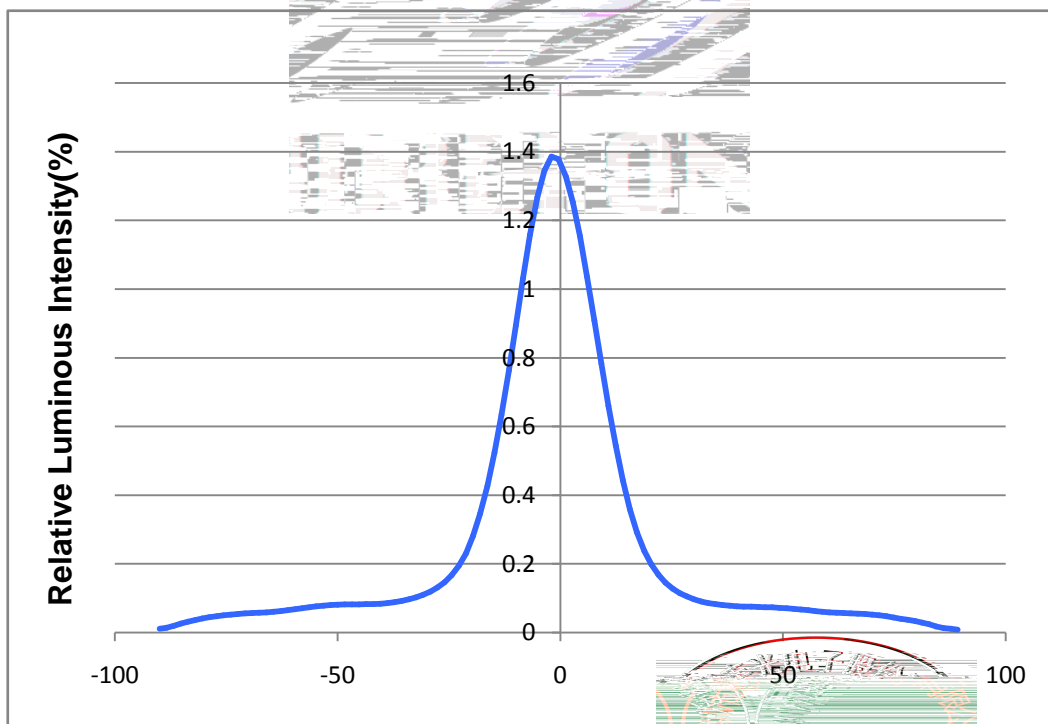


Fig. 1-12 Radiation diagram

Fig. 1-13 Forward current vs. Dominate wavelength

(Ts=25°C)

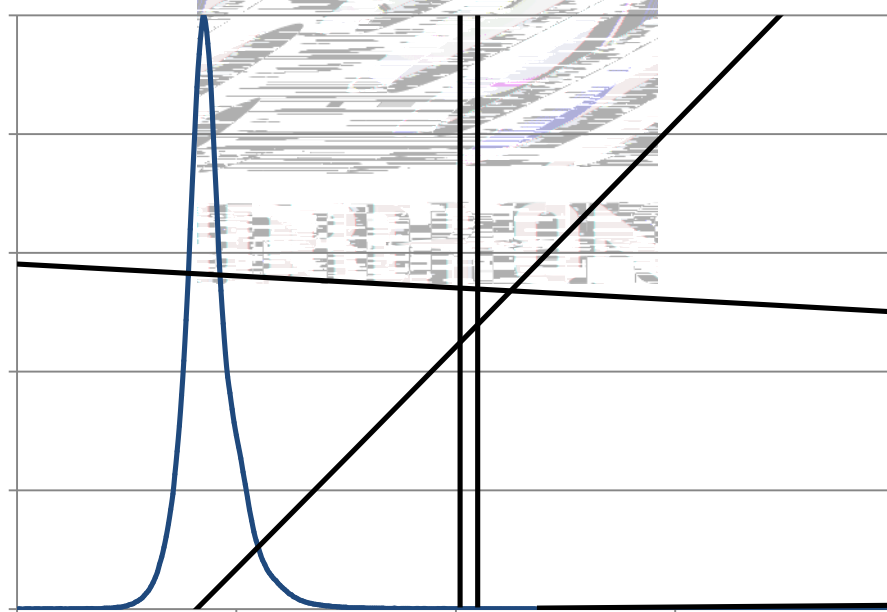


Fig. 1-14 Spectrum Distribution

2. Packaging

2.1 Packaging Specification

Package: 2000pcs/reel. 2000pcs

2.1.1 Carrier Tape Dimension

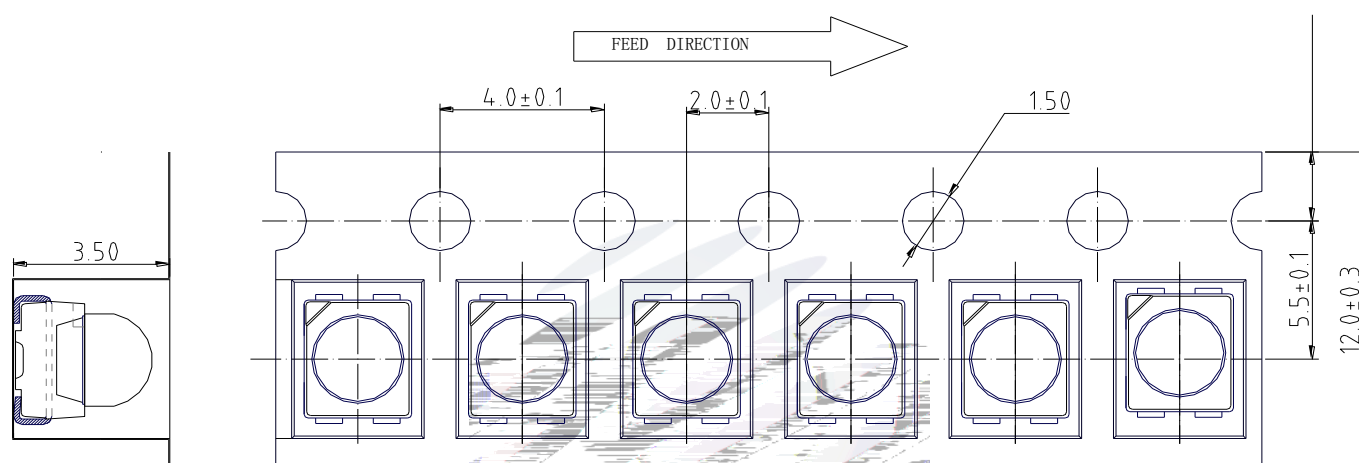


Fig.2-1 Carrier Tape Dimension

2.1.2 Reel Dimension

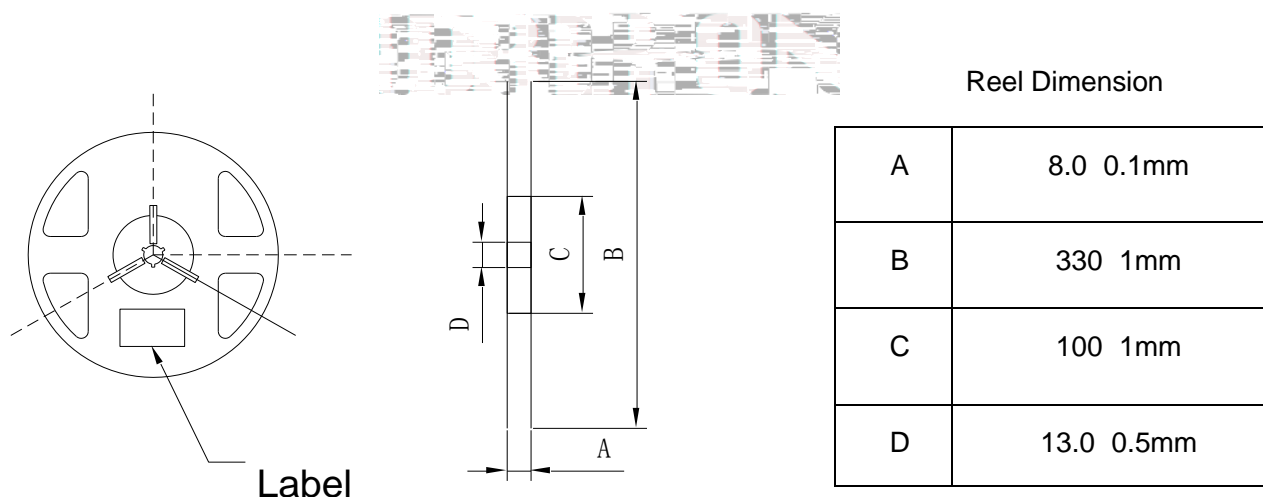
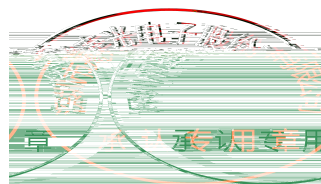


Fig.2-2 Reel Dimension

Notes

The tolerances unless mentioned ± 0.1 mm. Unit : mm



2.1.3 Label Form Specification

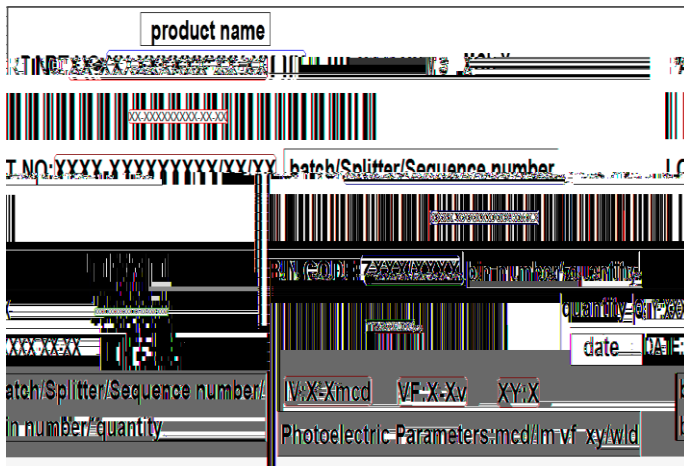


Fig. 2-3 Label

Specification

PART NO.	Part Number
SPEC NO.	Spec Number
LOT NO.	Lot Number
BIN CODE	Bin Code
	Luminous flux
XY	Chromaticity Bin
V _F	Forward Voltage
WLD	Wavelength
QTY	Packing Quantity
DATE	Made Date

2.2 Moisture Resistant Packing

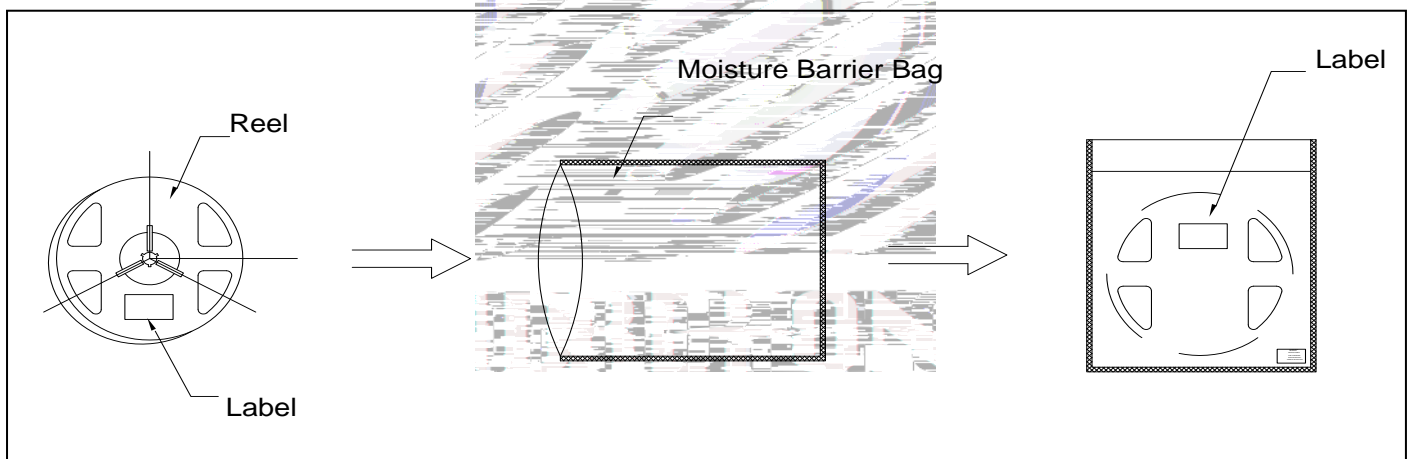


Fig.2-4Moisture Resistant Packing



2.3 Cardboard Box

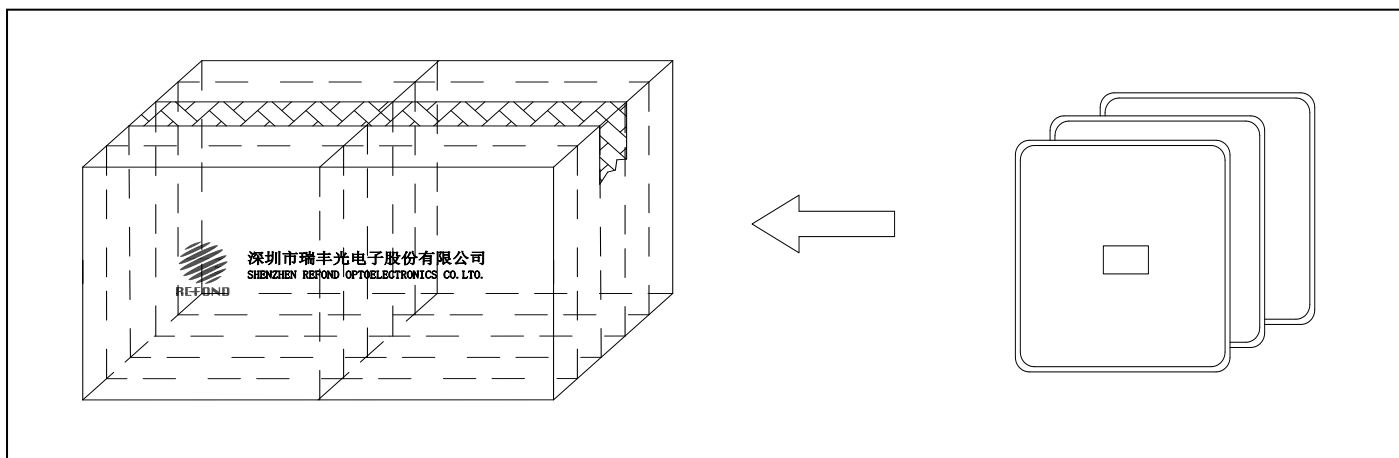


Fig.2-5 Cardboard Box 包装纸箱

2.4 Reliability Test Items And Conditions

Table 2-3 Reliability Test Items And Conditions

Test Items	Ref.Standard	Test Condition	Time	Quantity	Ac/Re /
Reflow	JESD22-B106	Temp:260 max T=10 sec	2times	20pcs.	0/1
Thermal Shock	JEITAED-4701 300307	-40 15min 10s 125 15min	1000 cycle	20pcs.	0/1
High Temperature Storage	JEITAED-4701 200 201	Temp:125	1000hrs.	20pcs.	0/1
Low Temperature Storage	JEITA ED-4701 200 202	Temp:-40	1000hrs.	20pcs.	0/1
Life Test	JESD22-A108	Ta=25 If=50mA	1000hrs.	20pcs.	0/1

High Temperature High Humidity Life Test	JESD22-A101	85 / 85%RH I _F =50mA	1000hrs.	20pcs.	0/1
Temperature Humidity Storage	JEITA ED-4701 100 103	T _A =85 R _H =85%	1000hrs.	20pcs.	0/1

2.5 Criteria For Judging Damage

Table 2-4 Criteria For Judging Damage

Test Items	Symbol	Test Condition	Criteria For Judgement	
			Min.	Max.
Forward Voltage	V _F	I _F =50mA	-	U.S.L*)x1.1
Reverse Current	I _R	V _R = 5V	-	U.S.L*)x2.0
Luminous Flux		I _F =50mA	L.S.L*)x0.7	-

Notes

- 1.U.S.L: Upper standard level L.S.L: Lower standard level
- 2.The above reliability tests is based on the verification of a single/strip LED of Refond's existing experimental platform,the reliability experiment was taken under good heat dissipation conditions. when customers applies the LED to the series and parallel circuit, should take consideration of all the factors such as the current, voltage distribution, heat dissipation and others.



3.The technical information shown in the data sheets is 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.

3. SMT Reflow Soldering Instructions SMT 回流焊说明

3.1 SMT Reflow Soldering Instructions SMT

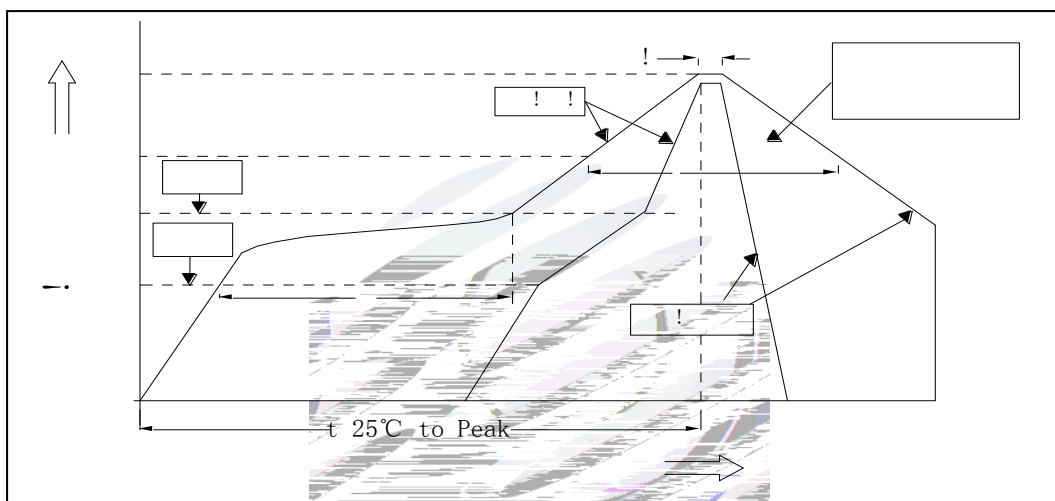


Fig.3-1 SMT Reflow Soldering Instructions SMT

Table 3-1 Reflow parameters

Average temperature rise speed	$T_{smax} - T_P$	3 °C/ s	Max 3 °C/ s
Preheating: minimum temperature	(T_{smin})	150 °C	
Preheating: Max temperature	(T_{smax})	200 °C	
Preheating: Time	$T_{smin} - T_{smax}$	60 - 120	60s-120s
Time limited to maintain high temperature: the temperature	(T_L)	217 °C	
Time limited to maintain high temperature: The Time	(t_L)	60	Max 60s
Peak /Classification of temperature:	(T_P)	260 °C	
Time limit classification of peak temperature time	t_p	10	Max 10s

(T _p)	5 °C	Hold time within 5	30	Max 30s
C with the actual peak temperature (TP)				
Cooling speed			6 °C/	Max 6 °C/ s
25 °C	Needed time from 25 °C to T _p		8	Max 8 minutes

Notes

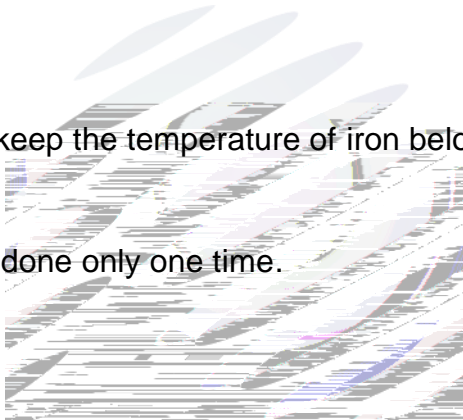
(1)Reflow soldering should not be done more than twice. If more than 24 hours between the two solderings ,LED will be damaged.

(2)When soldering , do not put stress on the LEDs during heating.

3.1.1 Soldering Iron

(1) When do soldering by hand, keep the temperature of iron below less 300°C less than 3 seconds.

(2) Soldering by hand should be done only one time.



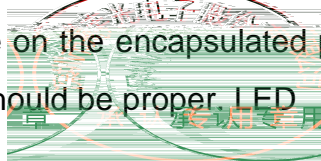
3.1.2 Repairing

Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable,a double-head soldering iron should be used (as below figure). It should be confirmed in advance whether the characteristics of LEDs will or not be damaged by repairing.

LED

3.1.3 Cautions

(1) The encapsulated material of the LEDs is silicone. Therefore the LEDs have a soft surface on the top of package. The pressure to the top surface will be impacted on the reliability of the LEDs. Precautions should be taken to avoid the strong pressure on the encapsulated part. So when use the picking up nozzle, the pressure on the silicone resin should be proper. LED



compatibility, Refond recommends that all chemicals and materials be tested in the specific application and environment for which they are intended to be used. Attaching LEDs, do not use adhesives that outgas organic vapor.

(4) Handle the component along the side surface by using forceps or appropriate tools; Do not directly touch or Handle the silicone lens surface, it may damage the internal circuitry.

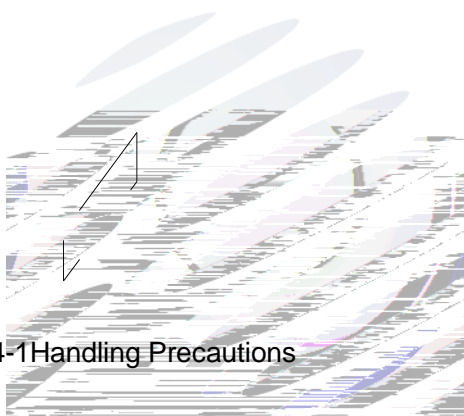


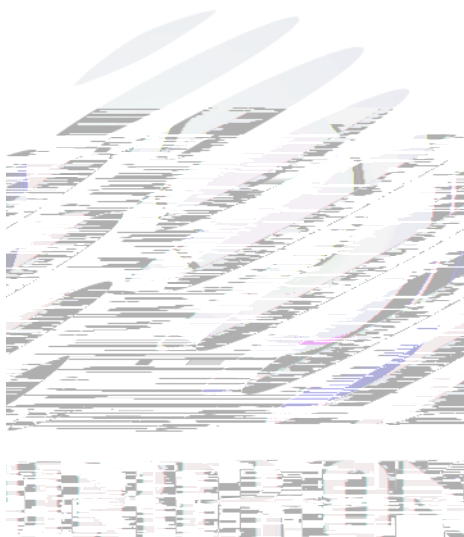
Fig 4-1 Handling Precautions

(5) In designing a circuit, the current through each LED can not 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.

(6) 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. LED

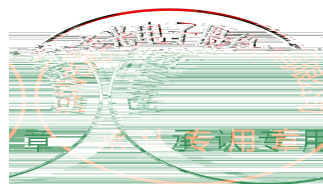
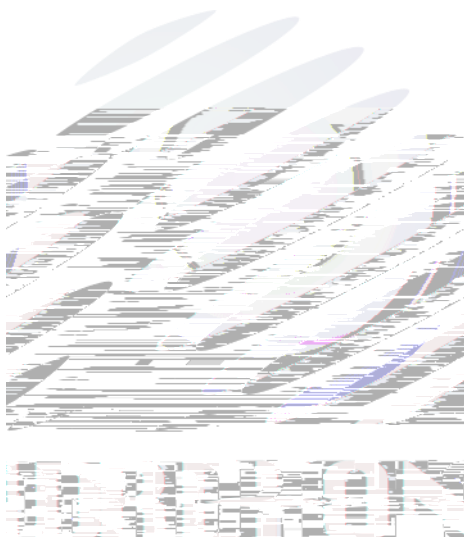


(7) Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust, requiring special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after 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.



(9) Similar to most Solid state devices; LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS).

(10) Other points for attention, please refer to our relevant information.



Date	Revisor	Version	Verifier	Remarks
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2021/03/11





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Declare

This specification is written both in English and in Chinese and the latter is formal.