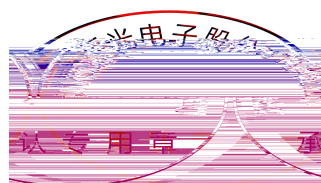


# SPECIFICATION





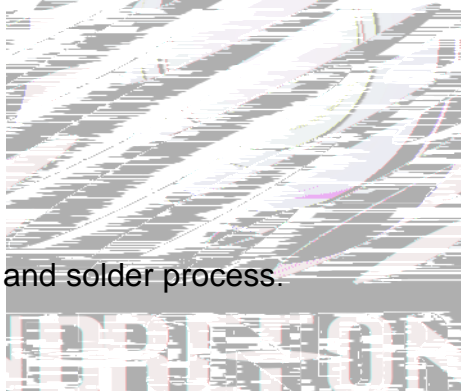
## 1. Description

### 1.1

The Red source color devices are made with AlGaInp on Substrate Light Emitting Diode .

Product Package:3.50mmX2.80mmX3.50mm.

3.50mmX2.80mmX3.50mm



### 1.2Features

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

### 1.4 Package Dimension

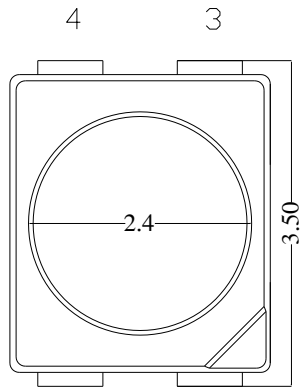


Fig.1-1 Top View

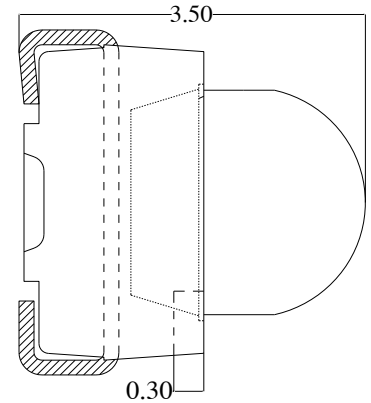


Fig.1-2 Side View

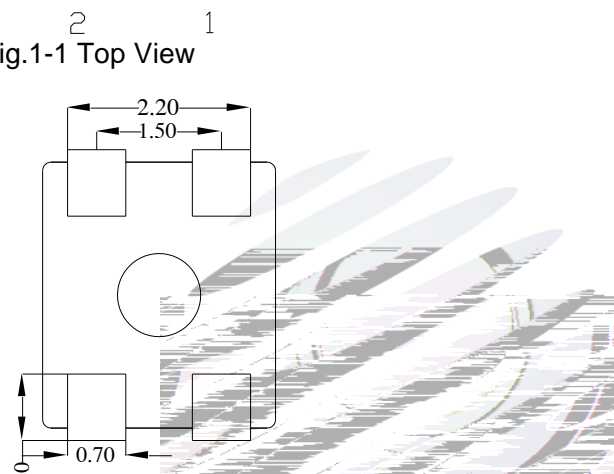


Fig.1-3 Bottom View

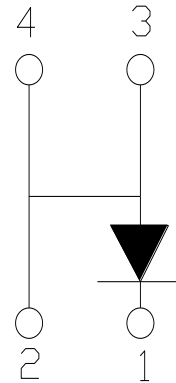


Fig.1-4 Polarity

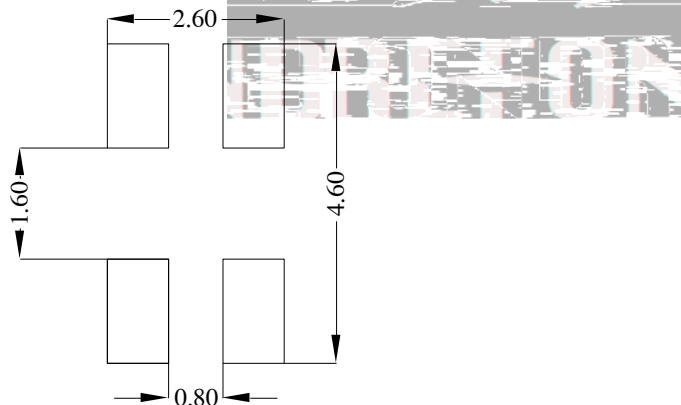


Fig.1-5 Soldering Patterns

#### Notes

All dimensions units are millimeters.

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



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## 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	$V_F$	$I_F=50\text{mA}$	2.0	2.3	2.8	V
Reverse Current	$I_R$	$V_R=5\text{V}$	---	---	10	$\mu\text{A}$
Luminous Intensity	$I_V$	$I_F=50\text{mA}$	10000	13000	23000	mcd
Dominant wavelength	$\lambda_d$	$I_F=50\text{mA}$	625	628	632.5	nm
Viewing Angle		$I_F=50\text{mA}$	---	30	---	deg
Thermal Resistance.	$R_{THJ-S}$	$I_F=50\text{mA}$	---	130	---	K/W

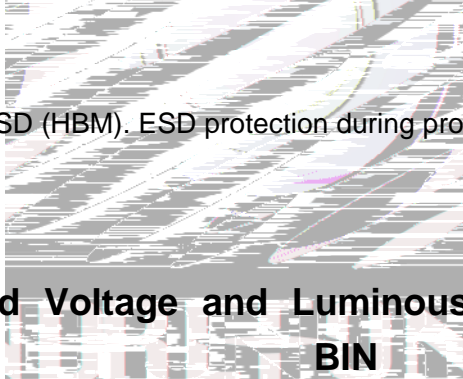
Table 1-2 Absolute Maximum Ratings at Ts=25°C

Parameter	Symbol	Rating	Units
Power Dissipation	$P_D$	196	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. 1/10 Duty cycle, 10ms pulse width.
2. The above forward voltage measurement allowance tolerance is  $\pm 0.1V$ .  $\pm 0.1V$ .
3. The above color coordinates measurement allowance tolerance is  $\pm 0.005$ .  $\pm$
4. The above luminous intensity measurement allowance tolerance  $\pm 10\%$ .  $\pm 10\%$ .
5. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.
6. All measurements were made under the standardized environment of Refond.

7. 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



8. ESD yield is over 90% at 8000V 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 <sub>F</sub> V	C1	C2	D1	D2
		2.0-2.1	2.1-2.2	2.2-2.3
IV mcd	R1	R2	S1	S2
		120 1257.4M8		

## 1.7 Typical Optical Characteristics Curves

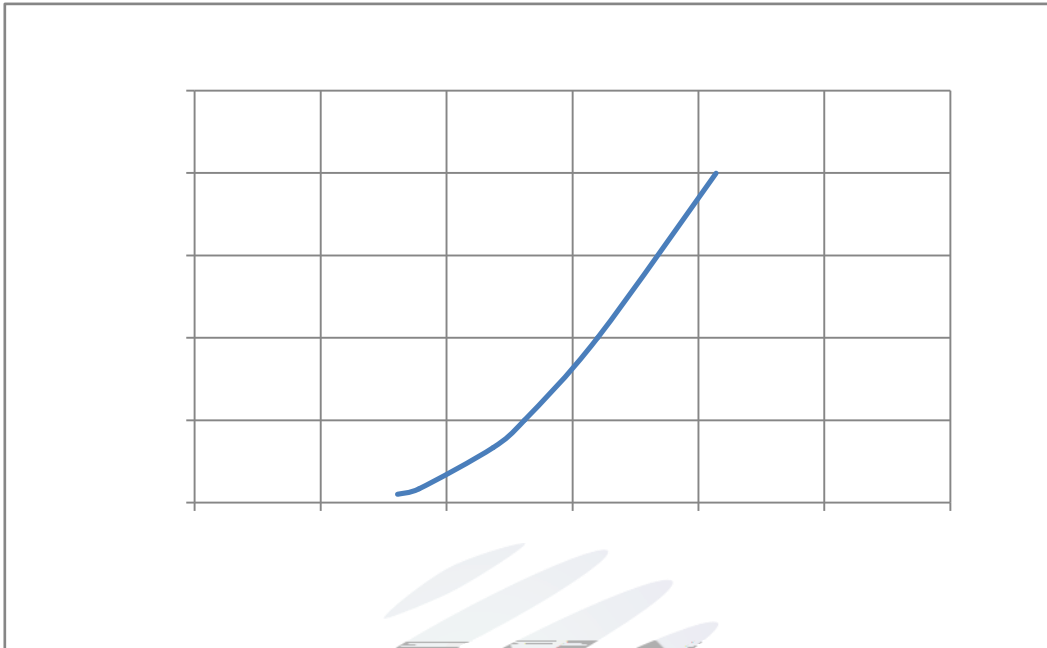


Fig. 1-7 Forward Voltage Vs Forward Current

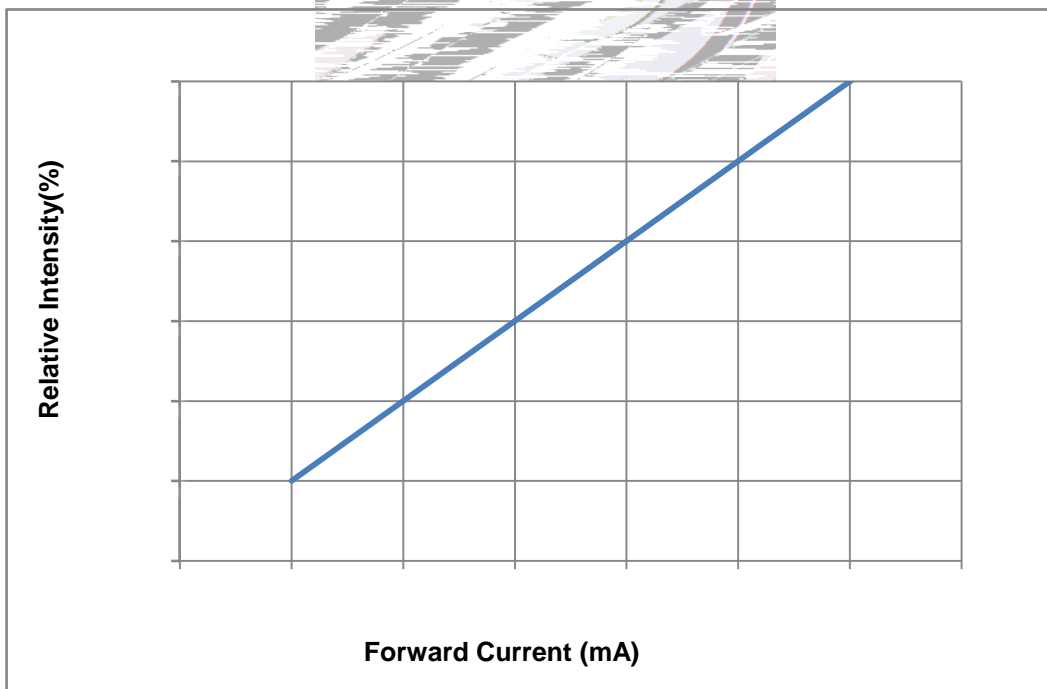


Fig. 1-8 Forward Current Vs Relative Intensity



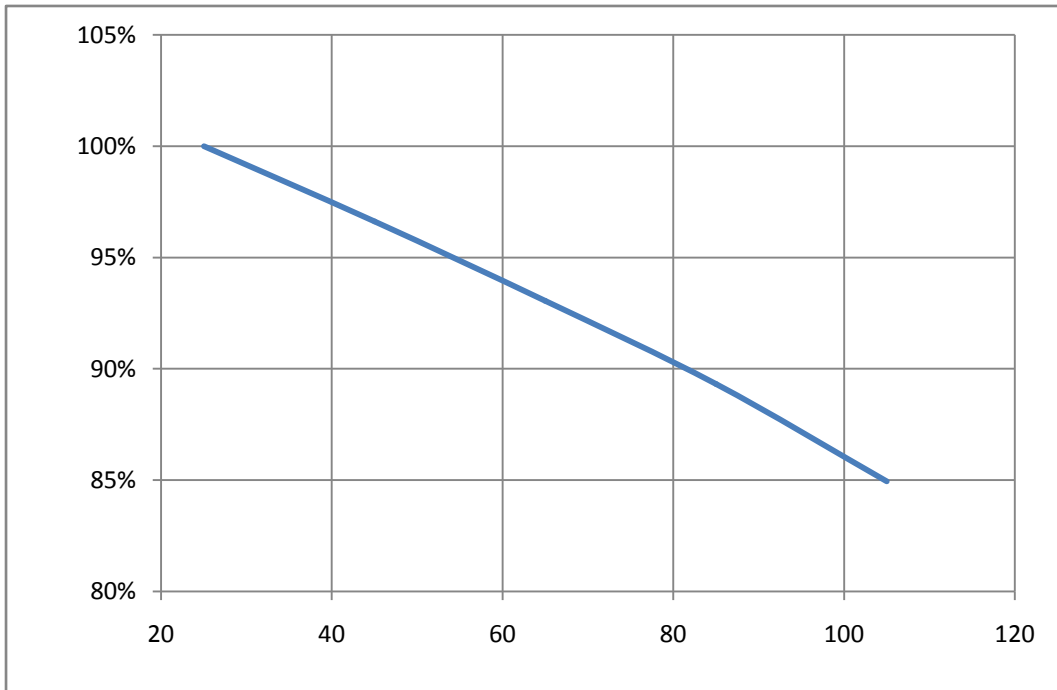


Fig. 1-9 Solder Temperature Vs Relative Intensity

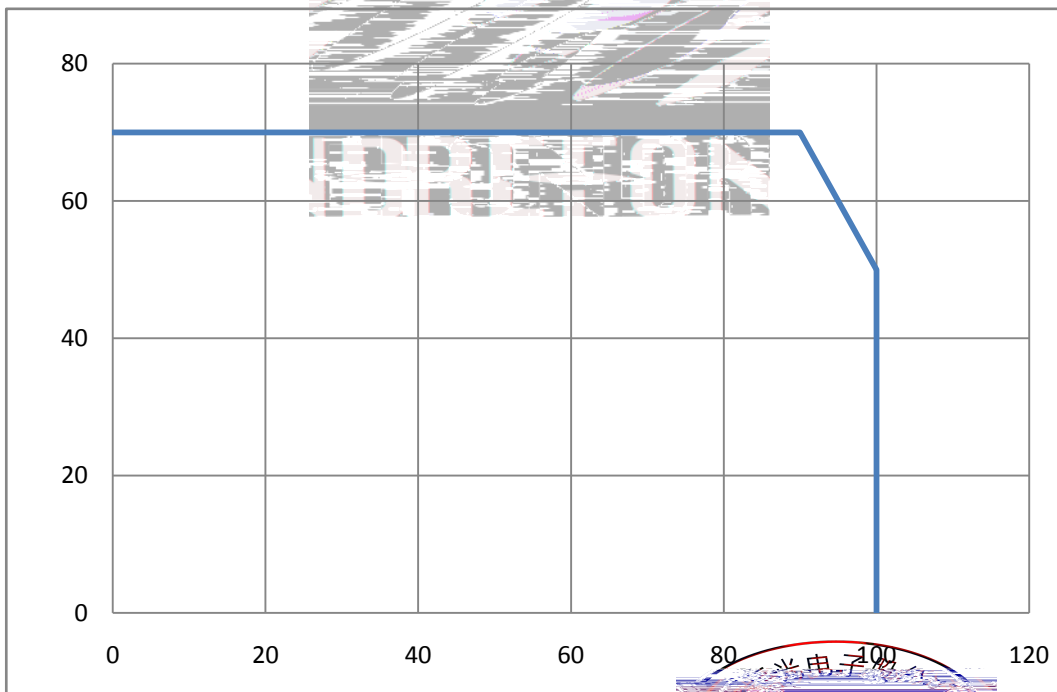


Fig. 1-10 Solder Temperature Vs Forward Current



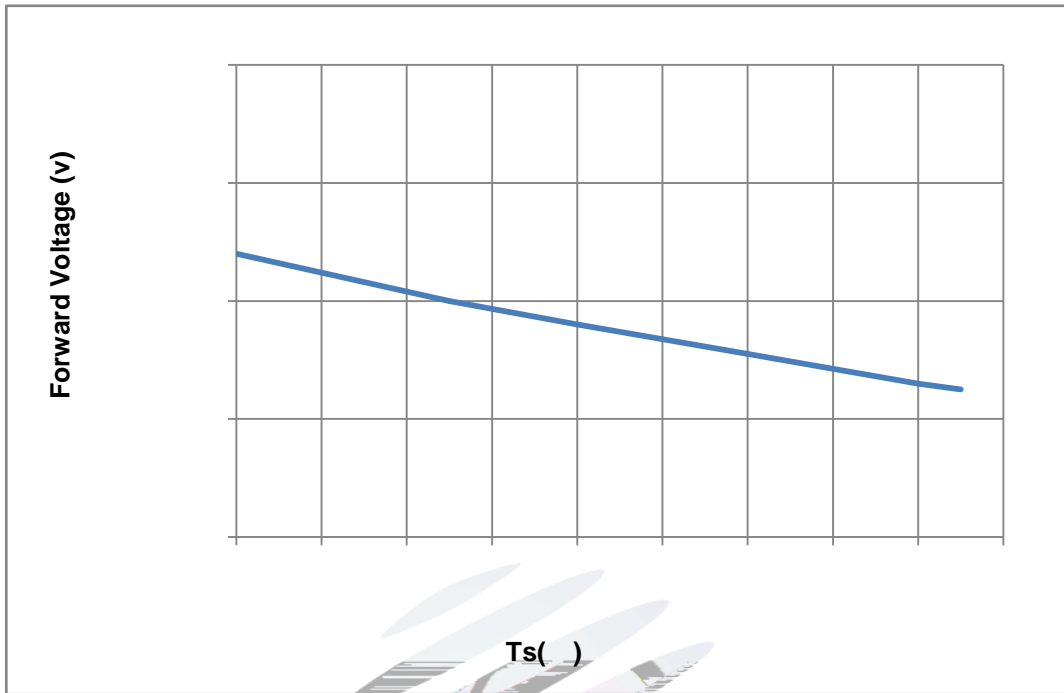


Fig. 1-11 Forward Voltage Vs Solder Temperature

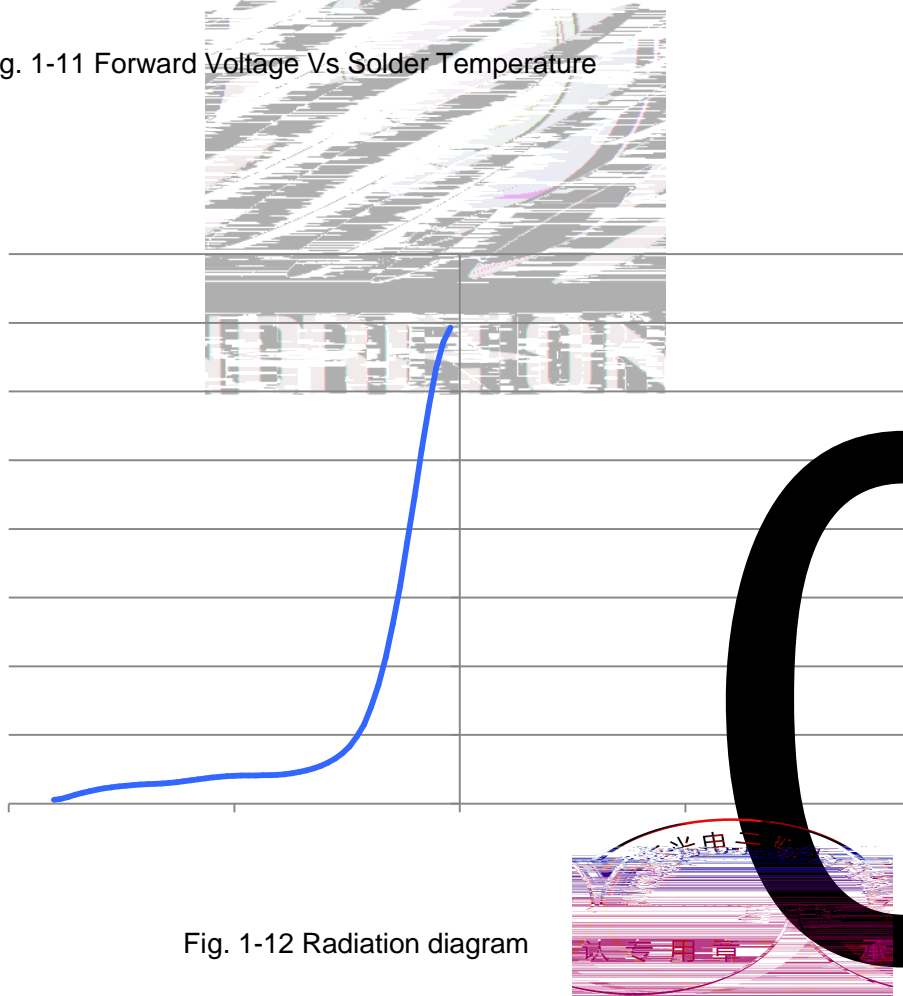


Fig. 1-12 Radiation diagram

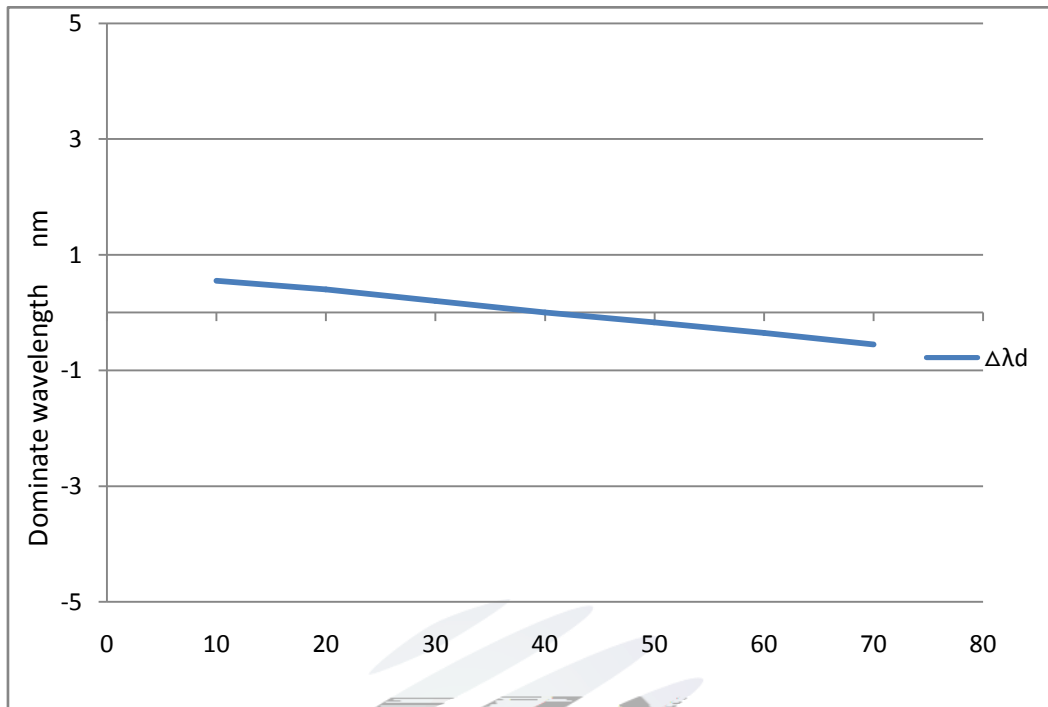


Fig. 1-13 Forward current vs. Dominate wavelength (Ts=25°C)

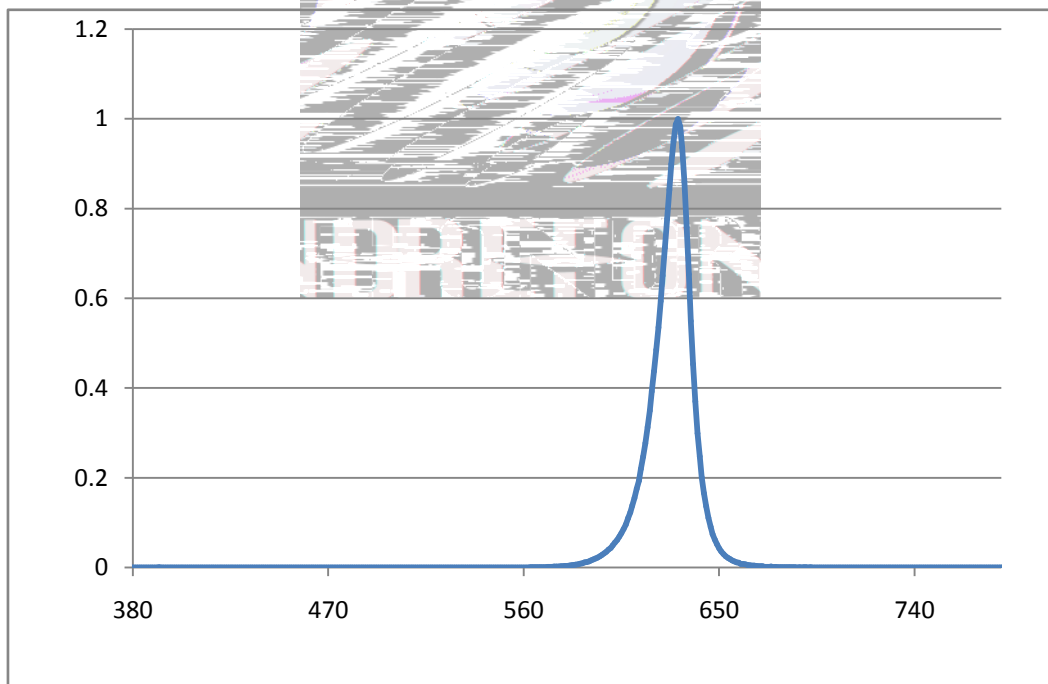
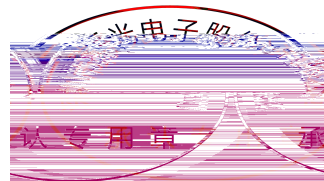


Fig. 1-14 Spectrum Distribution



## 2. Packaging

### 2.1 Packaging Specification

Package:2000pcs/reel.      2000pcs

#### 2.1.1 Carrier Tape Dimension

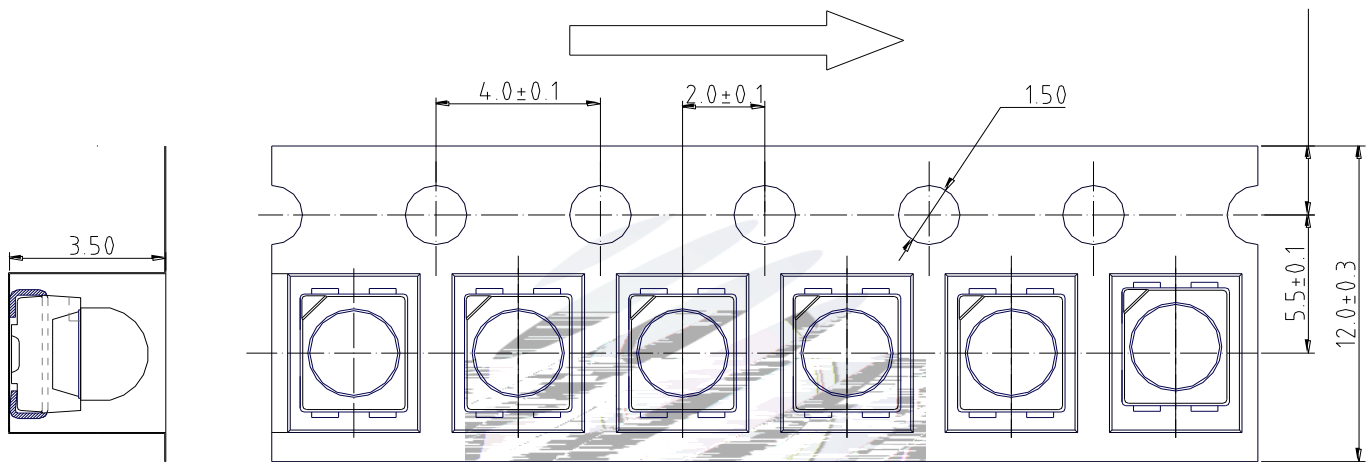


Fig.2-1 Carrier Tape Dimension

#### 2.1.2 Reel Dimension

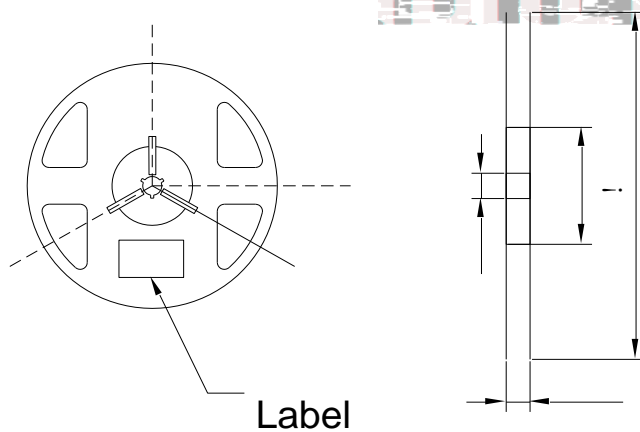


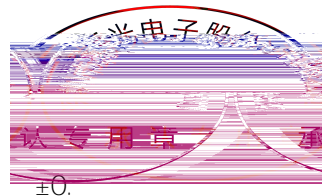
Fig.2-2 Reel Dimension

Reel Dimension

A	8.0±0.1mm
B	330±1mm
C	100±1mm
D	13.0±0.5mm

#### Notes

The tolerances unless mentioned  $\pm 0.1$ mm. Unit : mm



2.1.3 Label Form Specification

Specification	
PART NO.	Part Number
SPEC NO.	Spec Number
LOT NO.	Lot Number
BIN CODE	Bin Code

Fig. 2-3 Label

2.2 Moisture Resistant Packing



Fig.2-4 Moisture Resistant Packing



High Temperature High Humidity Life Test	JESD22-A101	85 / 85%RH I <sub>F</sub> =50mA	1000hrs.	20pcs.	0/1
Temperature Humidity Storage	JEITA ED-4701 100 103	T <sub>A</sub> =85 R <sub>H</sub> =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 <sub>F</sub>	I <sub>F</sub> =50mA	-	U.S.L*)x1.1
Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5V	-	U.S.L*)x2.0
Luminous Flux		I <sub>F</sub> =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

#### 3.1 SMT Reflow Soldering Instructions SMT

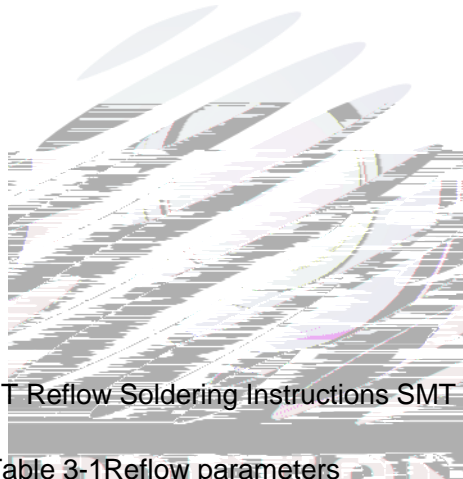


Fig.3-1 SMT Reflow Soldering Instructions SMT

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



(T <sub>P</sub> )	5 °C	Hold time within 5 °C	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 <sub>p</sub>		8	Max 8 minutes

#### Notes

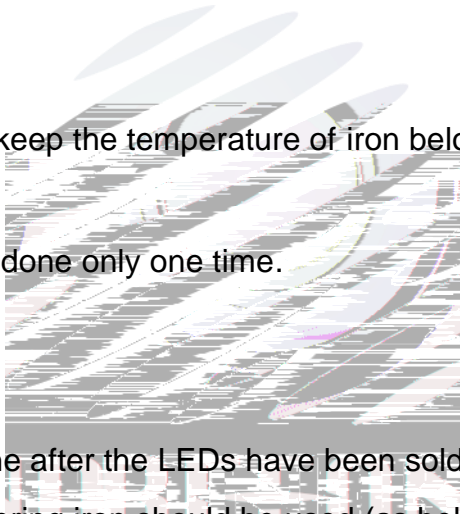
(1)Reflow soldering should not be done more than twice. If more than 24 hours between the two solderings ,LED will be damaged.

(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 less than 3 seconds

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



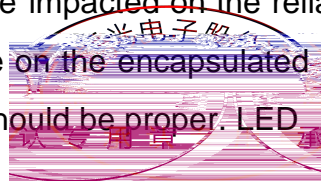
#### 3.1.2 Repairing

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

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





(2) Components should not be mounted on warped (non coplanar) portion of PCB. After soldering, do not warp the circuit board.LED

(3) Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering. Do not rapidly cool device after soldering.

#### 4.



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.



(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.

Table 4-1 Storage

Conditions		Temperature	Humidity	Time
Storage	Before Opening Aluminum Bag	30	75%	Within 1 Year From Date
	After Opening Aluminum Bag	30	60%	Recommended for use within 24 hours 24
Baking		60±5	-	24hours 24

(8) If the moisture absorbent material silica gel has faded away or the LEDs have exceeded the storage time, baking treatment should be performed after unpacking and based on the following condition 65 5 for above 24 hours.

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If the package is flatulence or damaged, please notify the sales staff to assist.



(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.







www.refond.com



Declare

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

