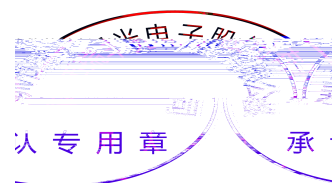


# SPECIFICATION



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## 1. Description

### 1.1

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

Product Package:3.50mmX2.80mmX1.85mm.

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: 3.50mmX2.80mmX1.85mm °

### 1.2Features

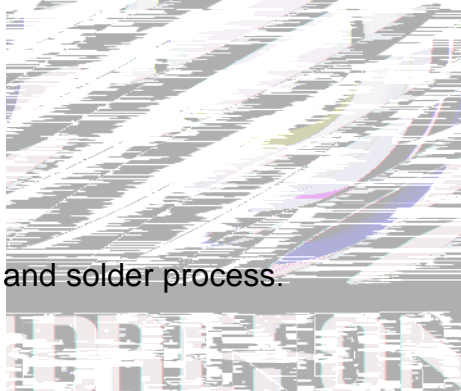
PLCC4 Package. I E -

Extremely wide viewing angle.

Suitable for all SMT assembly and solder process.

Available on tape and reel.

Moisture sensitivity level: Level 2.



LFM

## 1.4 Package Dimension



Fig.1-3BottomView

Fig.1-4Polarity

Fig.1-5Soldering Patterns

### Notes

All dimensions units are millimeters.

## 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	$V_F$	$I_F=50\text{mA}$	1.8	2.2	2.4	V
Reverse Current	$I_R$	$V_R=5\text{V}$	---	---	10	$\mu\text{A}$
Luminous Intensity	$I_V$	$I_F=50\text{mA}$	1800	2900	3500	mcd
Dominant wavelength	$\lambda_d$	$I_F=50\text{mA}$	610	615	620	nm
Viewing Angle		$I_F=50\text{mA}$	---	120	---	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	$P_D$	168	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**

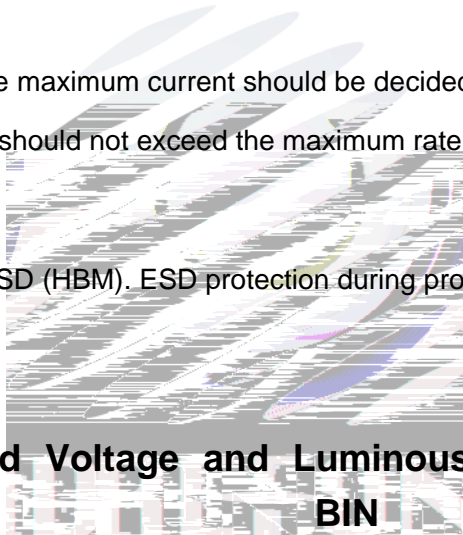
1. 1/10 Duty cycle, 10ms pulse width.
2. The above forward voltage measurement allowance tolerance is  $\pm 0.1V$ .
3. The above color coordinates measurement allowance tolerance is  $\pm 0.005$ .
4. The above luminous intensity measurement allowance tolerance  $\pm 10\%$ .
5. Care is to be taken that 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 E

8. ESD yield is over 90% at 2000V ESD (HBM). ESD protection during products handing is needed. 2 E

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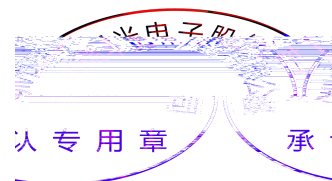
### 1.6Bin Range Of Forward Voltage and Luminous Intensity and Dominant wavelength (IF=50mA)



**BIN (IF=50mA)**

Table 1-3

V <sub>F</sub> V	B1	B2	C1	C2	D1	D2
	1.8-1.9	1.9-2.0	2.0-2.1	2.1-2.2	2.2-2.3	2.3-2.4
IV mcd	N1	N2	O1			
	1800-2300	2300-2800	2800-3500			
WD(nm)	C1	C2	D1	D2		
	610-612.5	612.5-615	615-617.5	617.5-620		



### 1.7 Typical Optical Characteristics Curves

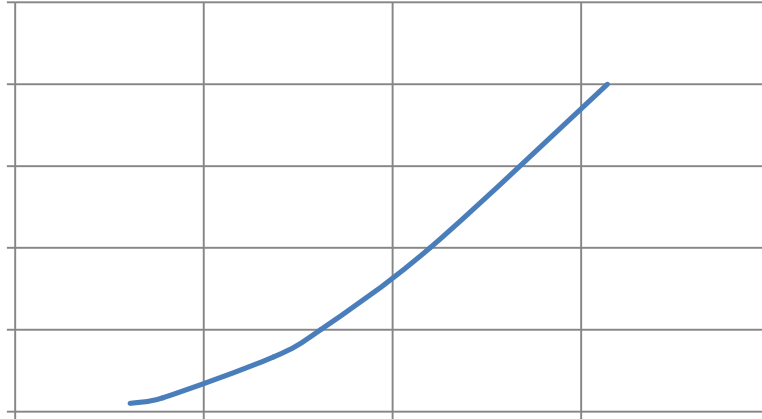


Fig. 1-7 Forward Voltage Vs Forward Current

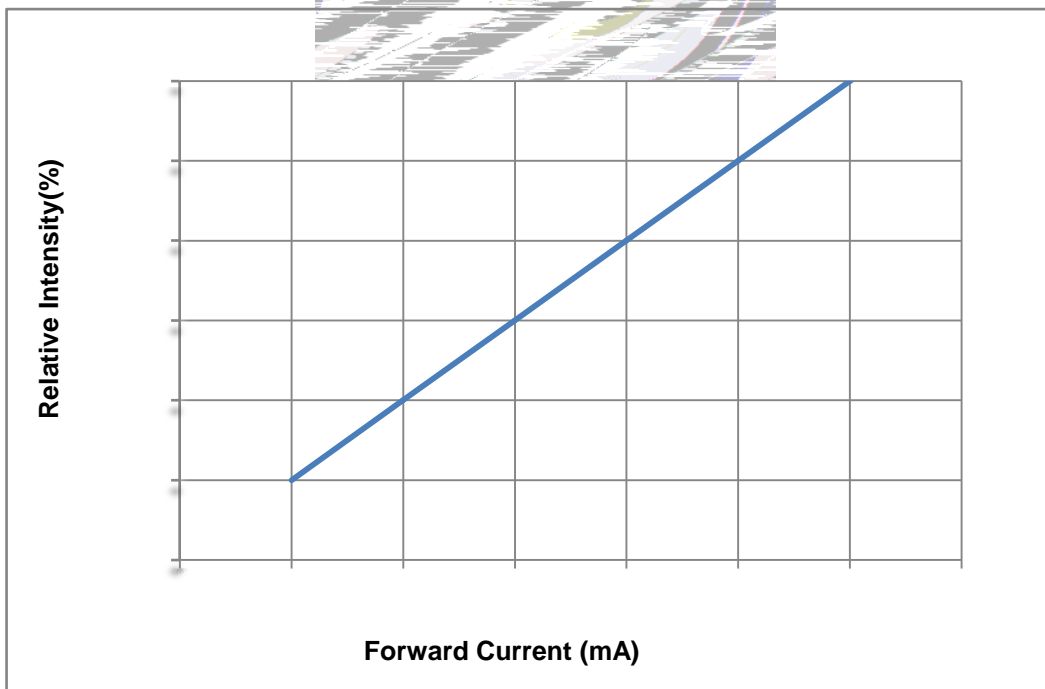


Fig. 1-8 Forward Current Vs Relative Intensity

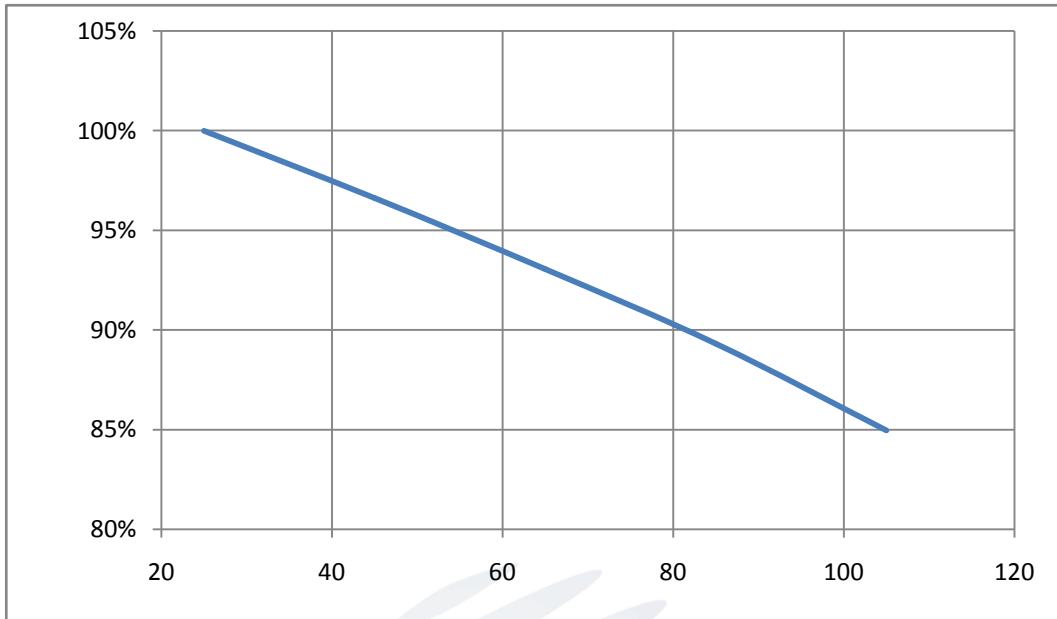


Fig. 1-9 Solder Temperature Vs Relative Intensity

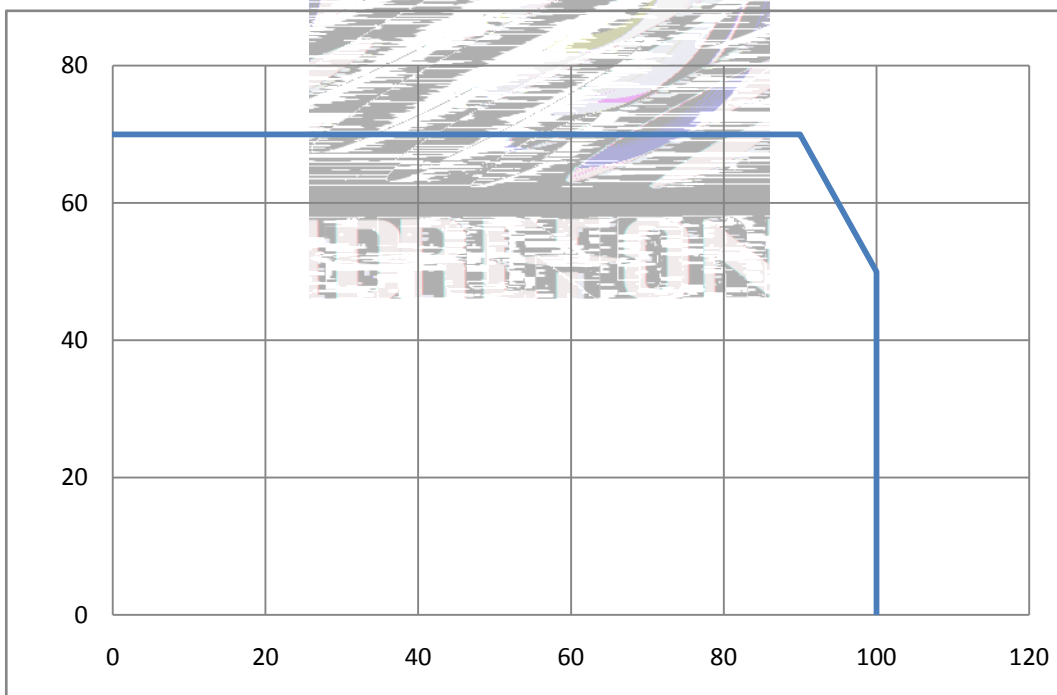


Fig. 1-10 Solder Temperature Vs Forward Current



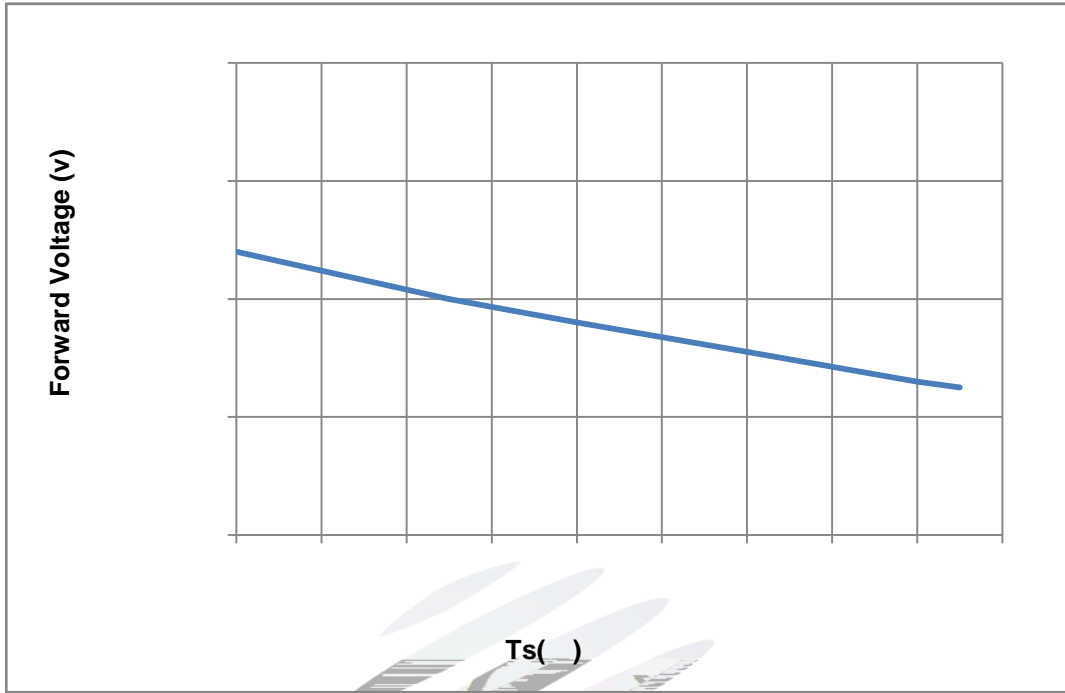


Fig. 1-11 Forward Voltage Vs Solder Temperature

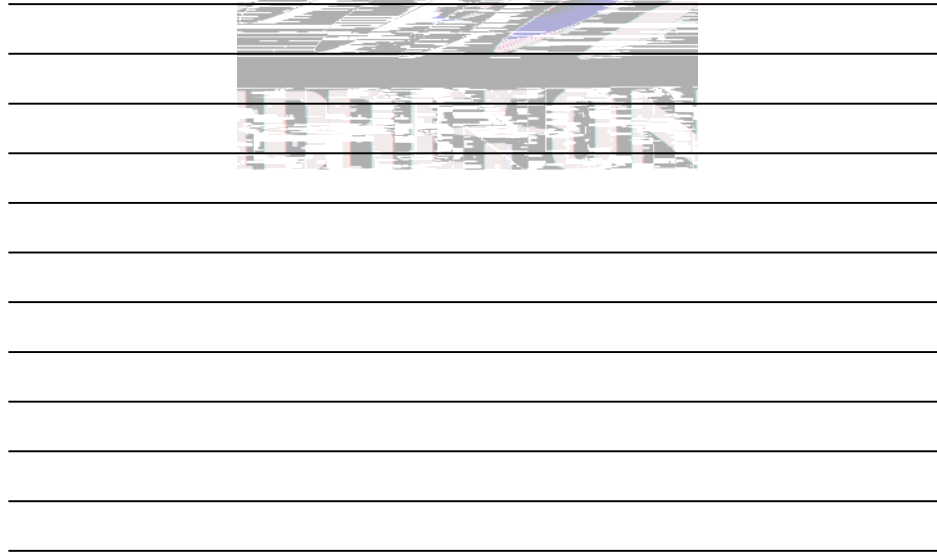
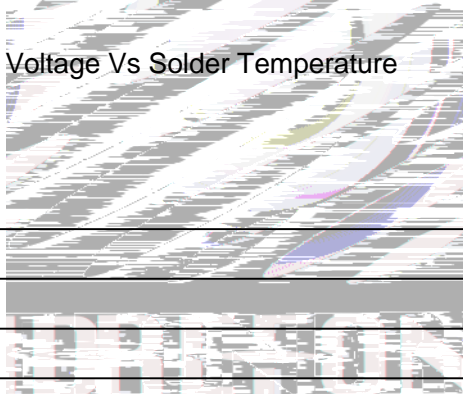


Fig. 1-12 Radiation diagram

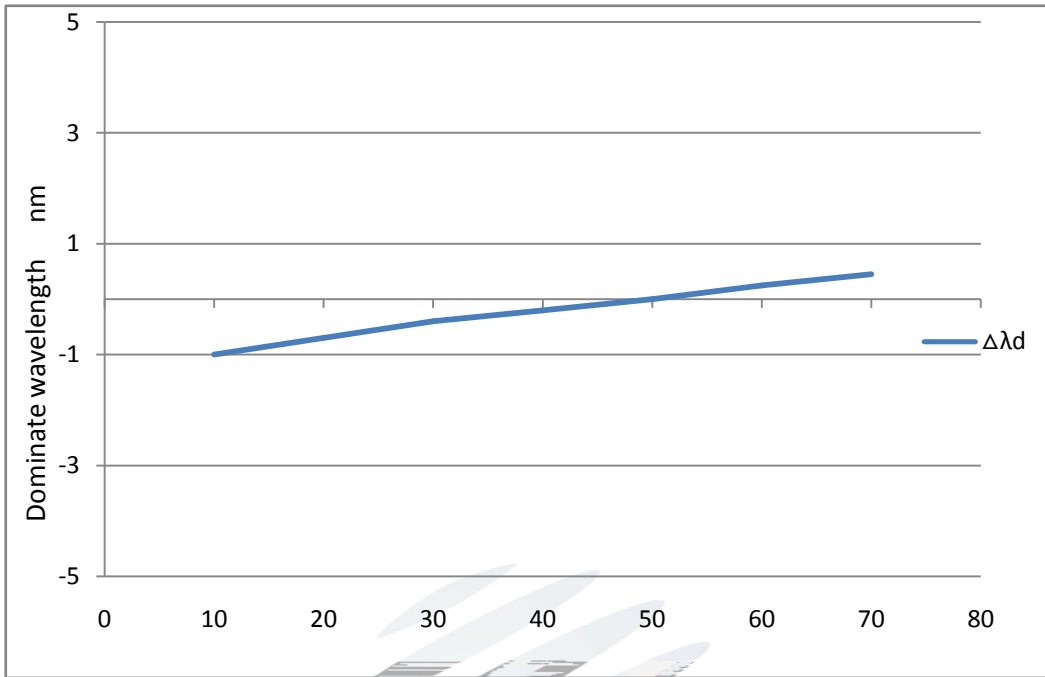


Fig. 1-13 Forward current vs. Dominate wavelength (Ts=25°C)

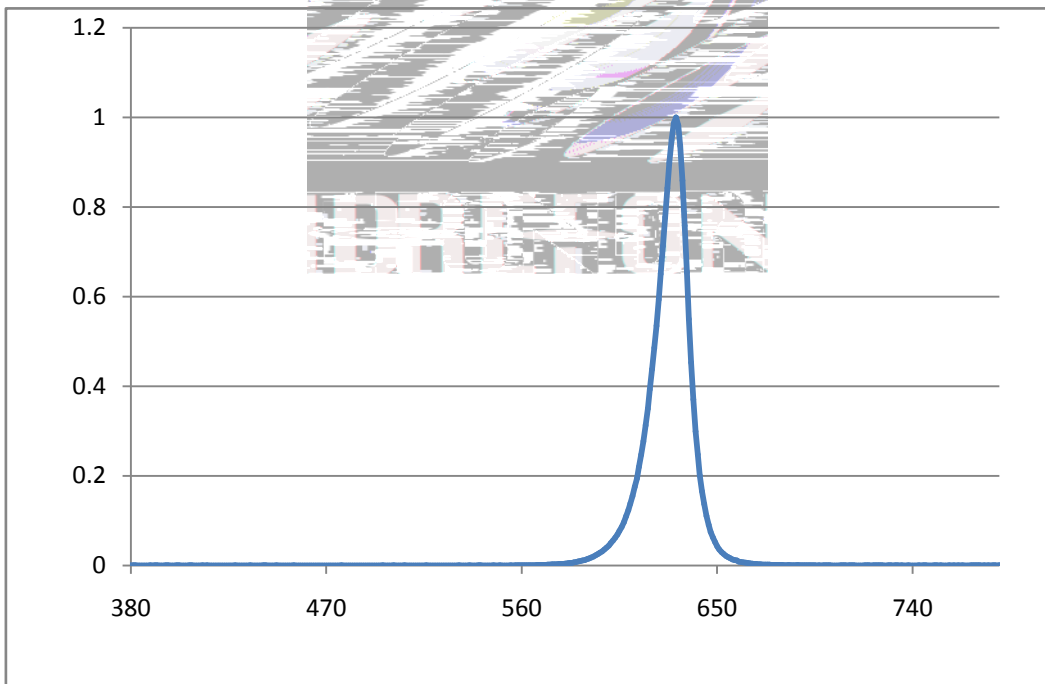
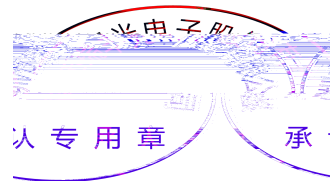


Fig. 1-14 Spectrum Distribution



## 2. Packaging

### 2.1 Packaging Specification

Package:2000pcs/reel.                      2000pcs

#### 2.1.1



### 2.1.3 Label Form Specification

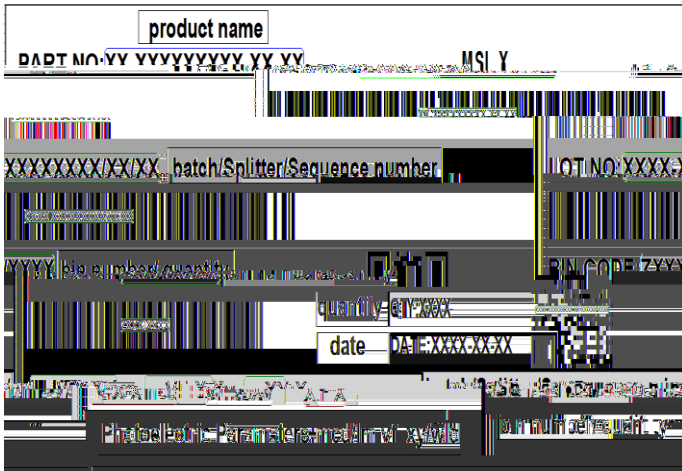


Fig. 2-3 Label

MZ	Specification
PART NO.	Part Number
SPEC NO.	Spec Number
LOT NO.	Lot Number
BIN CODE	Bin Code
	Luminous flux
XY	Chromaticity Bin
V <sub>F</sub>	Forward Voltage
WLD	Wavelength
QTY	Packing Quantity
DATE	Made Date

### 2.2 Moisture Resistant Packing

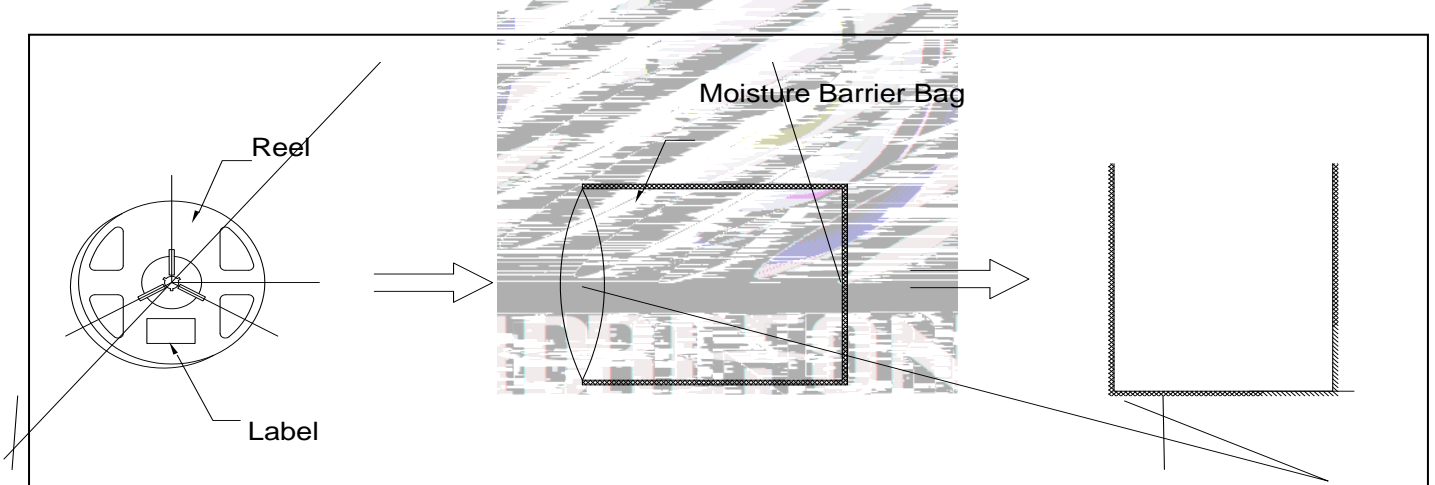
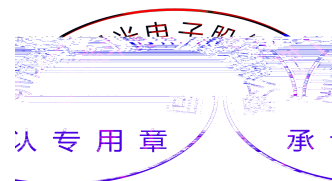


Fig.2-4 Moisture Resistant Packing





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

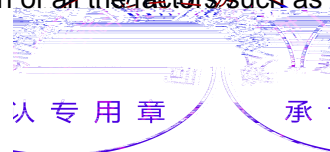
Table 2-4 Criteria For Judging Damage

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.

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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

#### 3.1SMT Reflow Soldering Instructions SMT

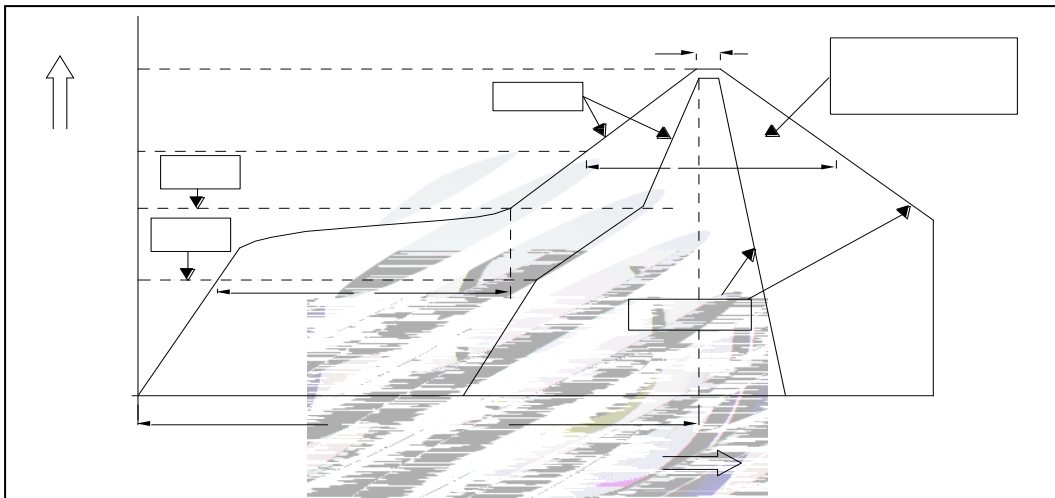


Fig.3-1SMT Reflow Soldering Instructions SMT

Table 3-1Reflow parameters

Average temperature rise speed	$T_{smax} - T_p$	3 °C/ 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 <sub>P</sub> )	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 <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.

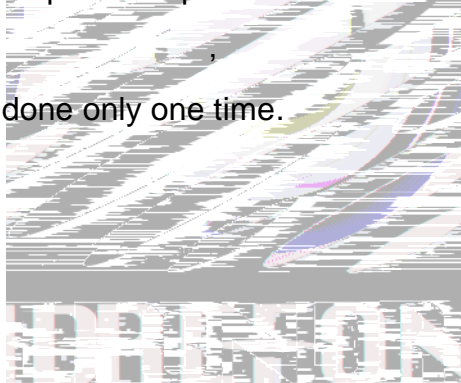
- E

(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.





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

(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. Handling Precautions

### 4.1 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 E I I F

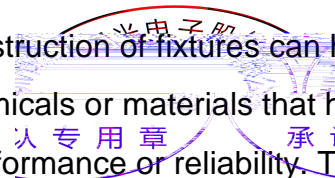
(2) In order to prevent external material from getting into the inside of LED, which may cause the malfunction of LED, the single content of Bromine element is required to be less than 900PPM, the single content of Chlorine element is required to be less than 900PPM, the total content of Bromine element and Chlorine element in the external materials of the application products is required to be less than 1500PPM. This is provided for informational purposes only and is not a warranty or endorsement. E E

2 I I F

2 I I F

. I I F

(3) VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsulants of LEDs and discolor when exposed to heat and photonic energy. The result can be a significant loss of light output from the fixture. Knowledge of the properties of the materials selected to be used in the construction of fixtures can help prevent these issues. Refond advises against the use of any chemicals or materials that have been found or are suspected to have an adverse affect on device performance or reliability. To verify



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. E

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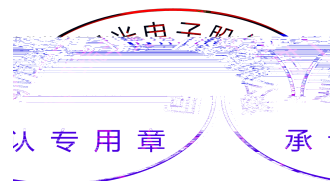


(7) Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust, requiring special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after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

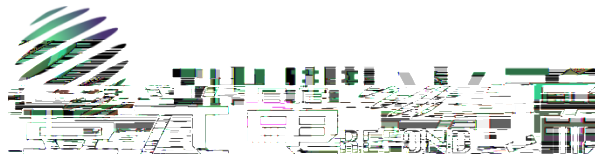


(9) Similar to most Solid state devices; LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS). E

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







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Declare

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

