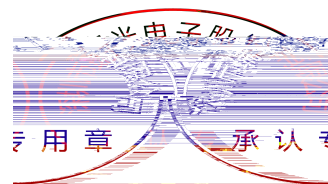
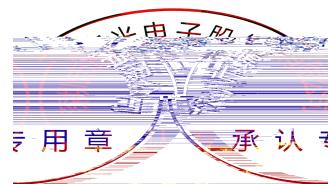


# SPECIFICATION



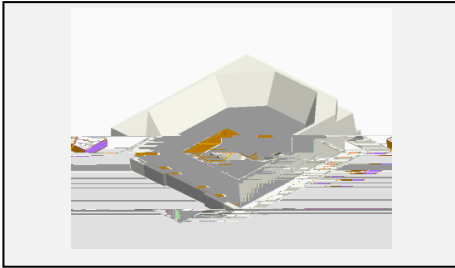
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## 1. Description

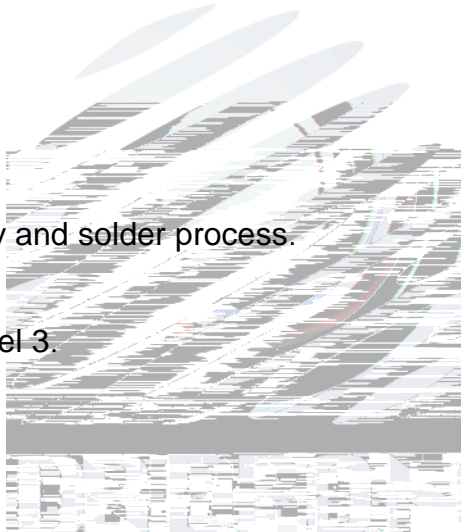
### 1.1 General Description



This production use the PLCC-2 package outline size 2.8\*3.5\*0.65mm

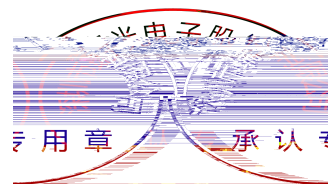
### 1.2 Features

- ▶ PLCC package.
- ▶ Viewing angle:120°.
- ▶ Suitable for all SMT assembly and solder process.
- ▶ Available on tape and reel.
- ▶ Moisture sensitivity level: Level 3.
- ▶ RoHS compliant.



### 1.3 Application

- ▶ Flower production.
- ▶ Tissue culture.
- ▶ Plant factory.
- ▶ Refreshment.
- ▶ General use.



## 1.4 Package Dimension

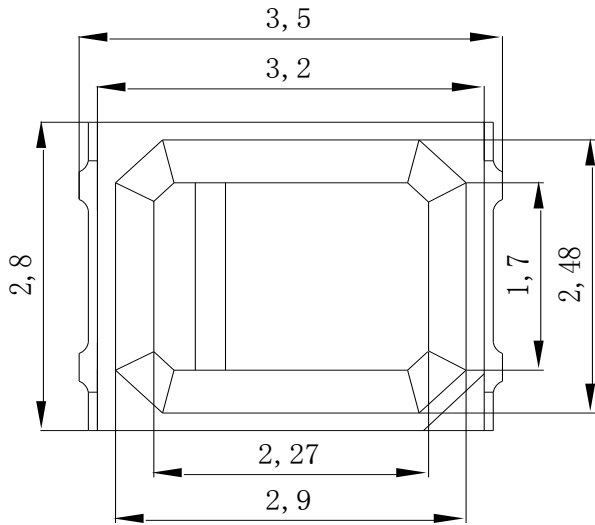


Fig.1-1 Top view

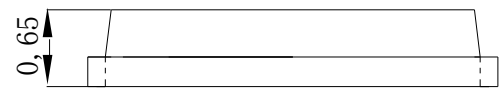


Fig.1-2 Side view



Fig.1-3 Bottom view

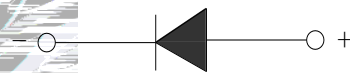


Fig.1-4 Polarity

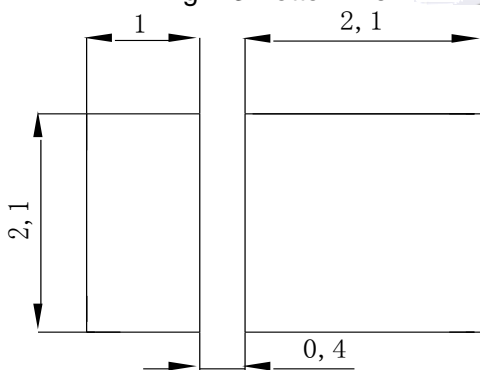
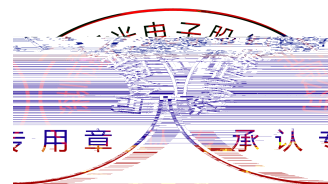


Fig.1-5 Soldering patterns

### Notes:

1. All dimensions units are millimeters.
2. 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	$V_F$	$I_F=100mA$	1.8	2.2	2.6	V
Reverse Current	$I_R$	$V_R=5V$	---	---	10	$\mu A$
Total radiant flux	$\Phi_e$	$I_F=100mA$	71	90	112	mW
Peak wavelength	$\lambda_p$	$I_F=100mA$	655	660	665	nm
Viewing Angle	2 $\theta$ 1/2	$I_F=100mA$	---	120	---	deg
Thermal Resistance.	$R_{THJ-S}$	$I_F=100mA$	---	15	---	$^{\circ}W$

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

Parameter	Symbol	Rating	Units
Power Dissipation	$P_D$	0.3	W
Forward Current	$I_F$	100	mA
Peak Forward Current	$I_{FP}$	150	mA
Reverse Voltage	$V_R$	5	V
Electrostatic Discharge (HBM)	$E_{SD}$	2000	V
Operating Temperature	$T_{OPR}$	-40 ~ +85	
Storage Temperature	$T_{OPR}$	-40 ~ +100	
Junction Temperature	$T_J$	115	

Notes:

1. 1/10 Duty cycle, 0.1ms pulse width.
2. The above forward voltage measurement allowance tolerance is  $\pm 0.1V$ .
3. The above wavelenth measurement allowance tolerance is  $\pm 2nm$ .
4. The above radiation flux 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.
8. ESD yield is over 90% at 2000V ESD (HBM). ESD protection during products handing is needed.

### 1.6 Typical optical characteristics curves

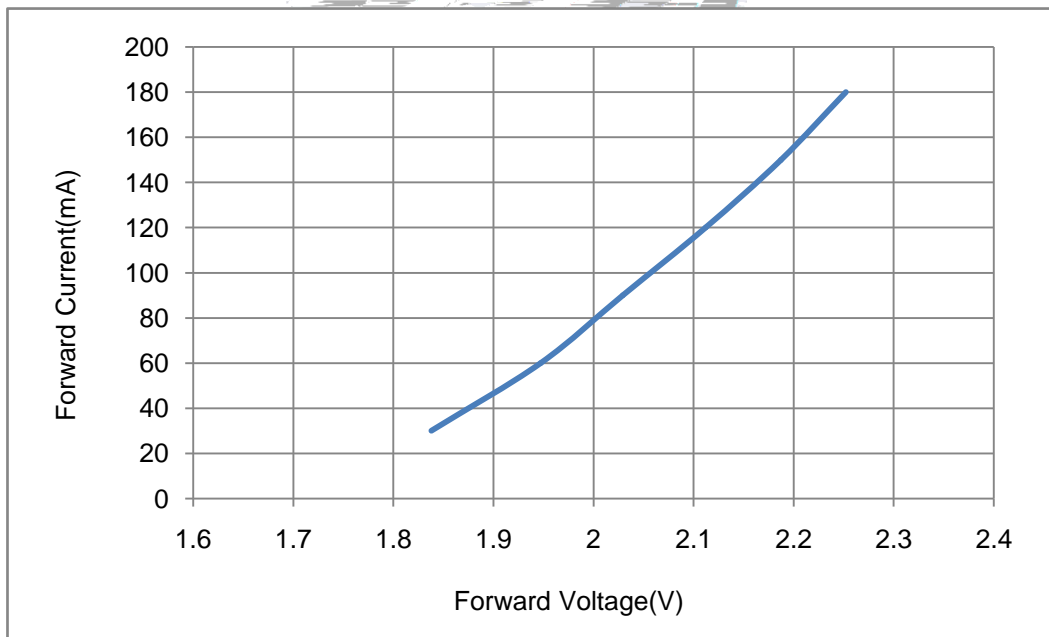
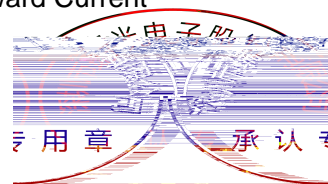


Fig.1- Forward Voltage Vs. Forward Current



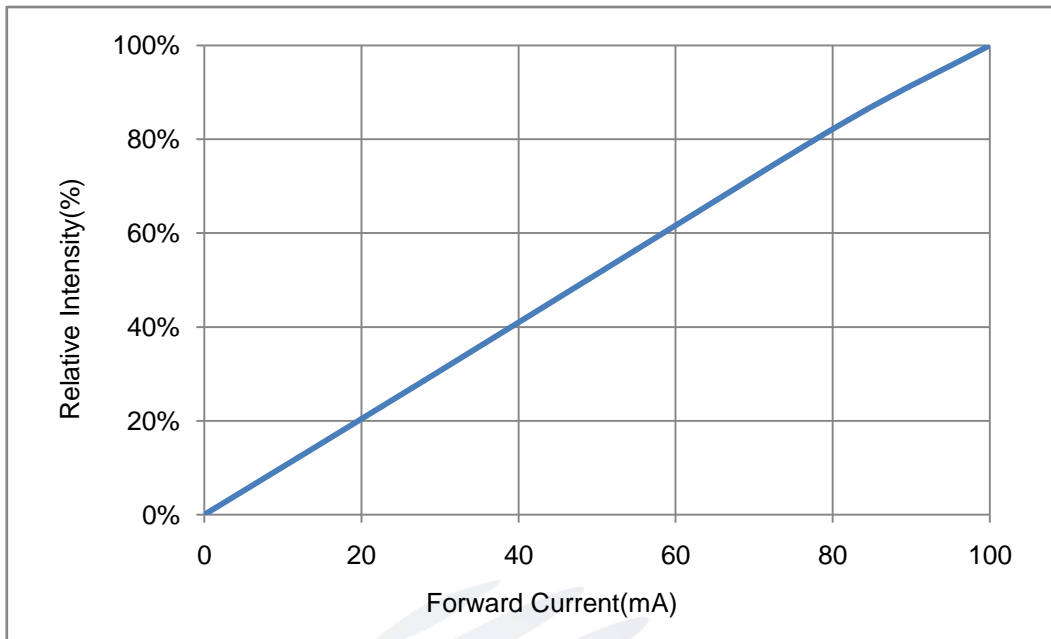


Fig.2- Forward Current Vs. Relative Power

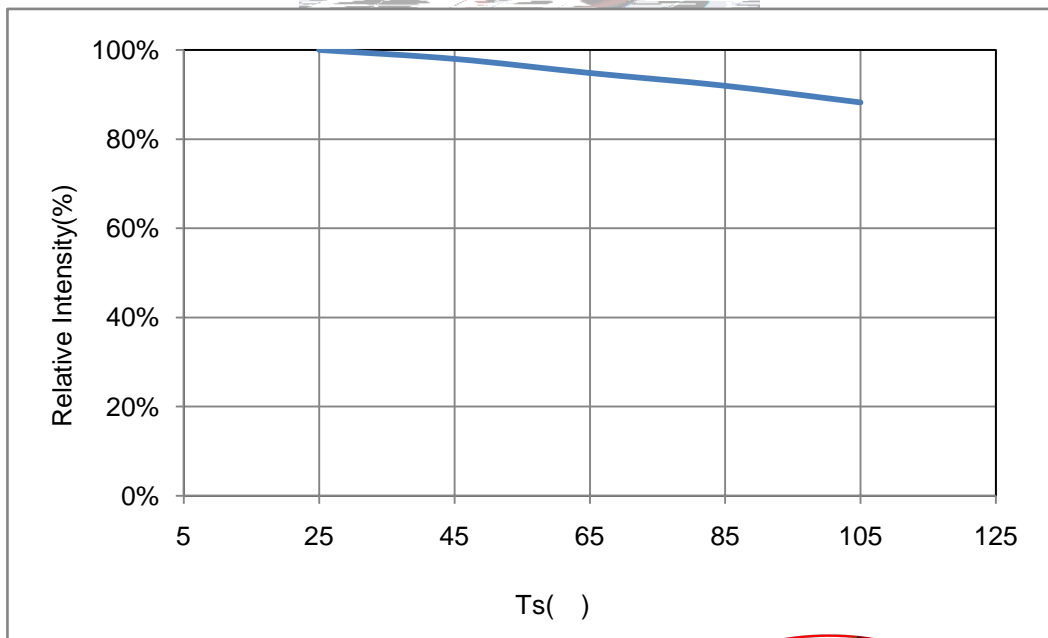
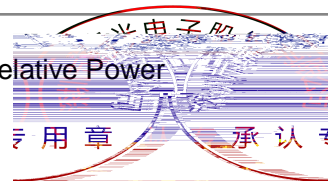


Fig.3-Solder Temperature VS. Relative Power



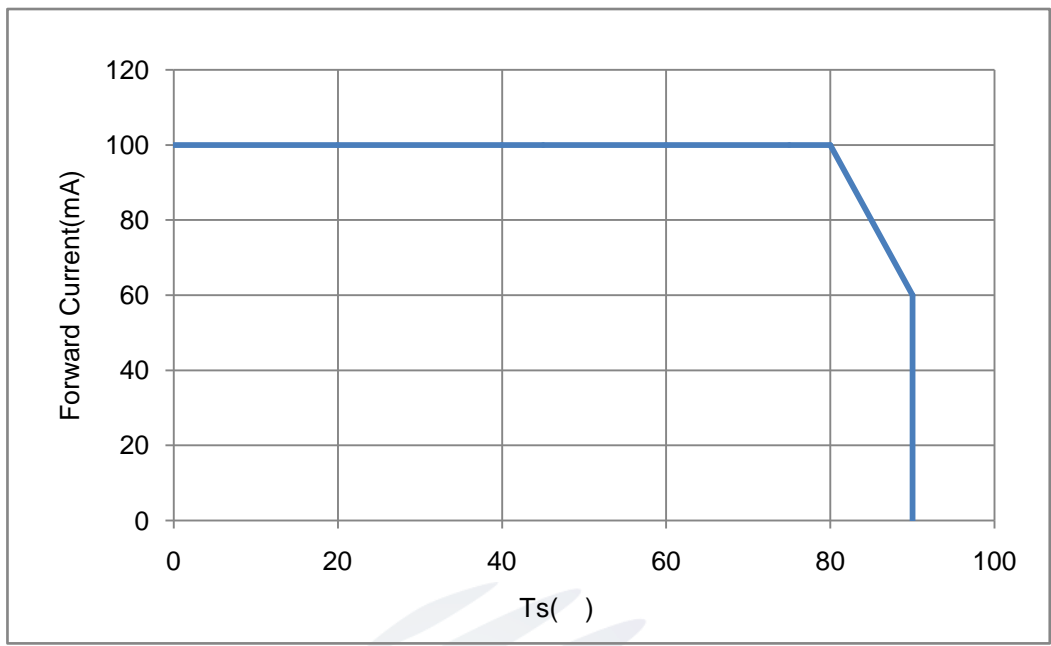


Fig.4-Ts Temperature VS. Forward Current

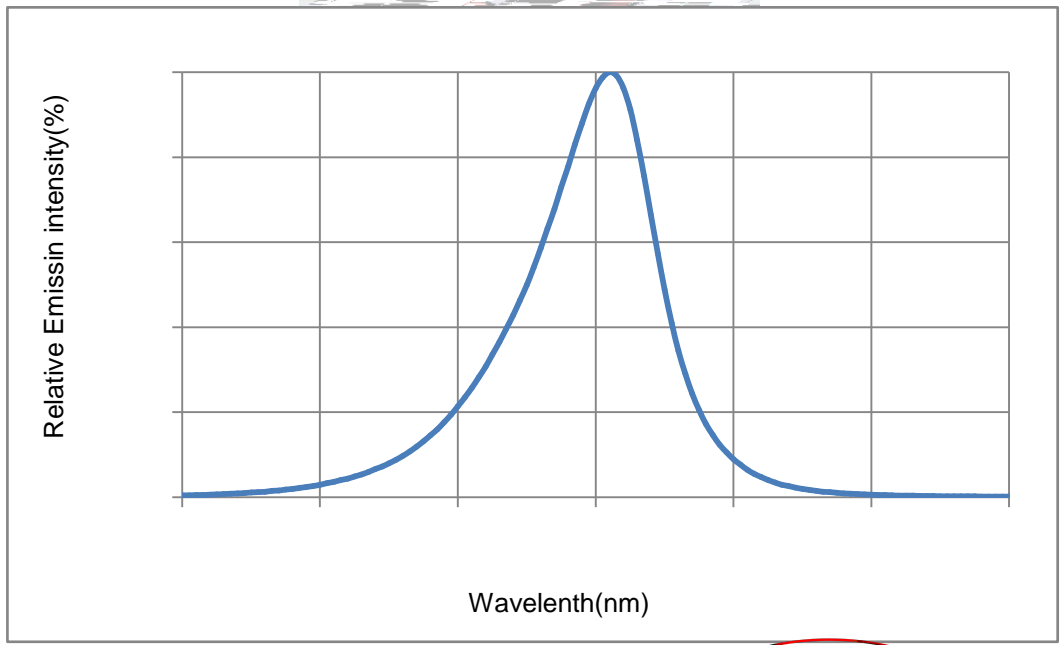
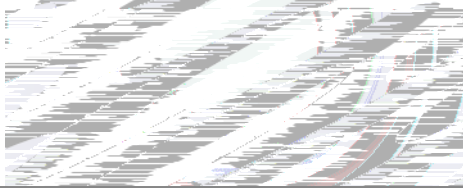
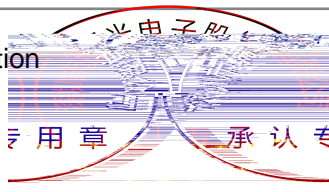


Fig.5-Spectrum Distribution





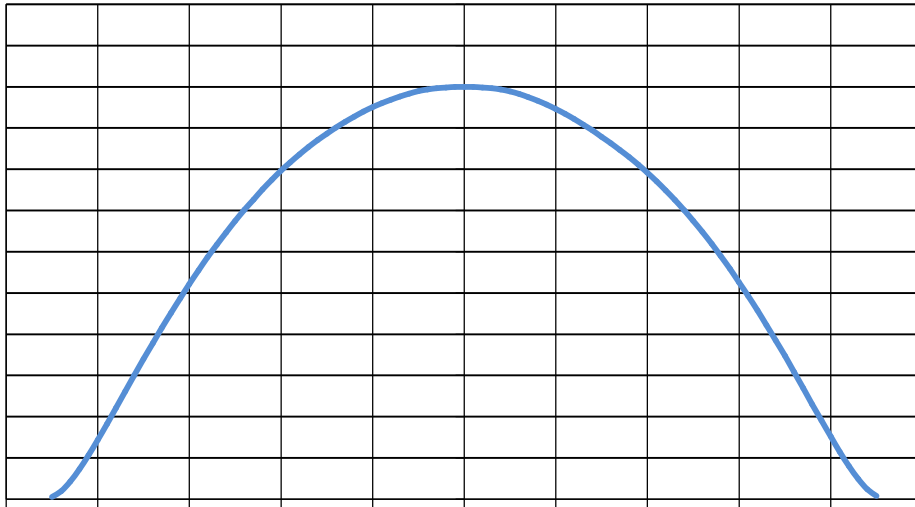
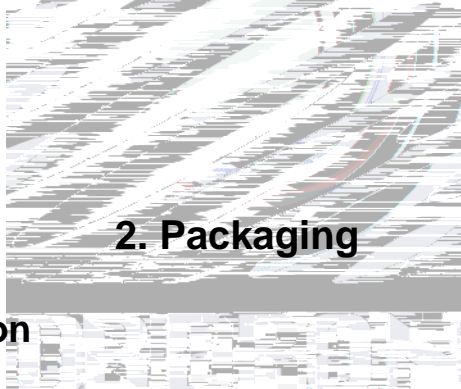


Fig.6- Radiation Diagram



## 2.1 Packaging Specification

Package:4000pcs/reel.

### 2.1.1 Carrier Tape Dimension

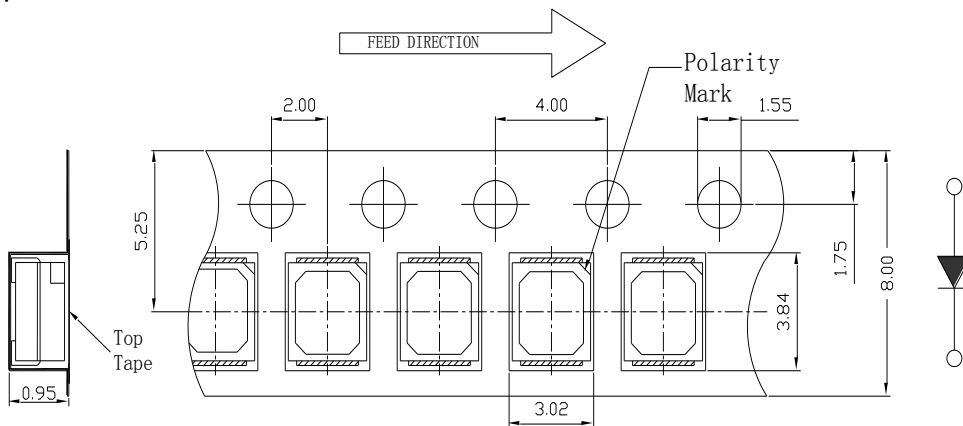


Fig.2-1 Carrier Tape Dimension

### 2.1.2 Reel Dimension

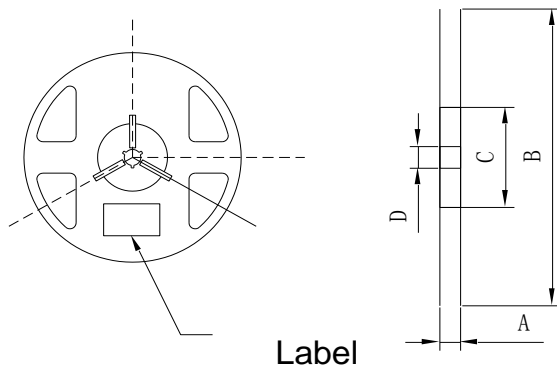


Table 2-1 Reel Dimension

A	12±0.1mm
B	178±1mm
C	60±1mm
D	13.0±0.5mm

Fig.2-2 Reel Dimension

#### Notes:

The tolerances unless mentioned ±0.1mm. Unit : mm .

### 2.1.3 Label Form Specification

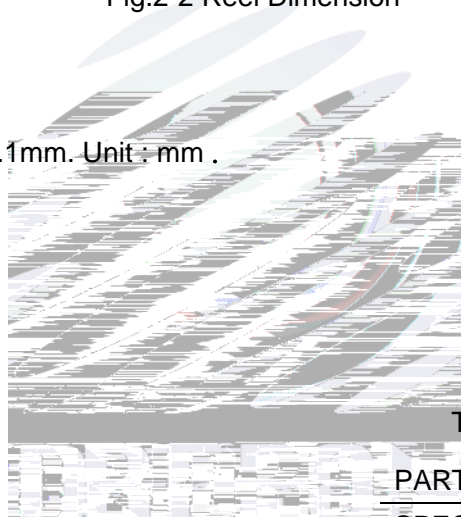


Table 2-2 Label Form Specification

PART NO.

PART NO.	Part Number
SPEC NO.	Spec Number
LOT NO.	Lot Number
BIN CODE	Bin Code
Φe	Radiation flux
V <sub>F</sub>	Forward Voltage
WLP	Wavelength
QTY	Packing Quantity
DATE	Made Date

Fig. 2-3 Label Form Specification

## 2.2 Moisture Resistant Packing

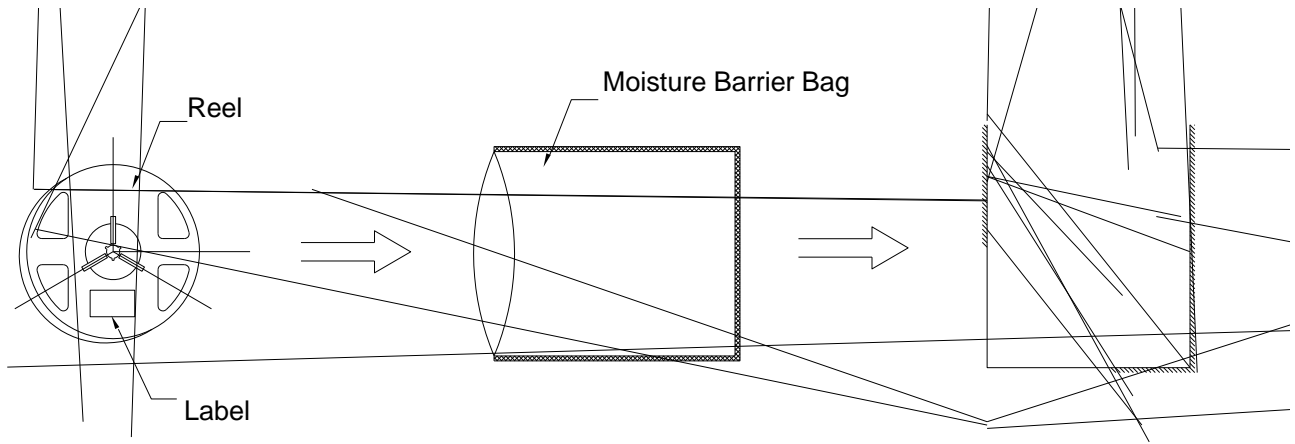


Fig.2-4 Moisture Resistant Packing Process

## 2.3 Cardboard Box

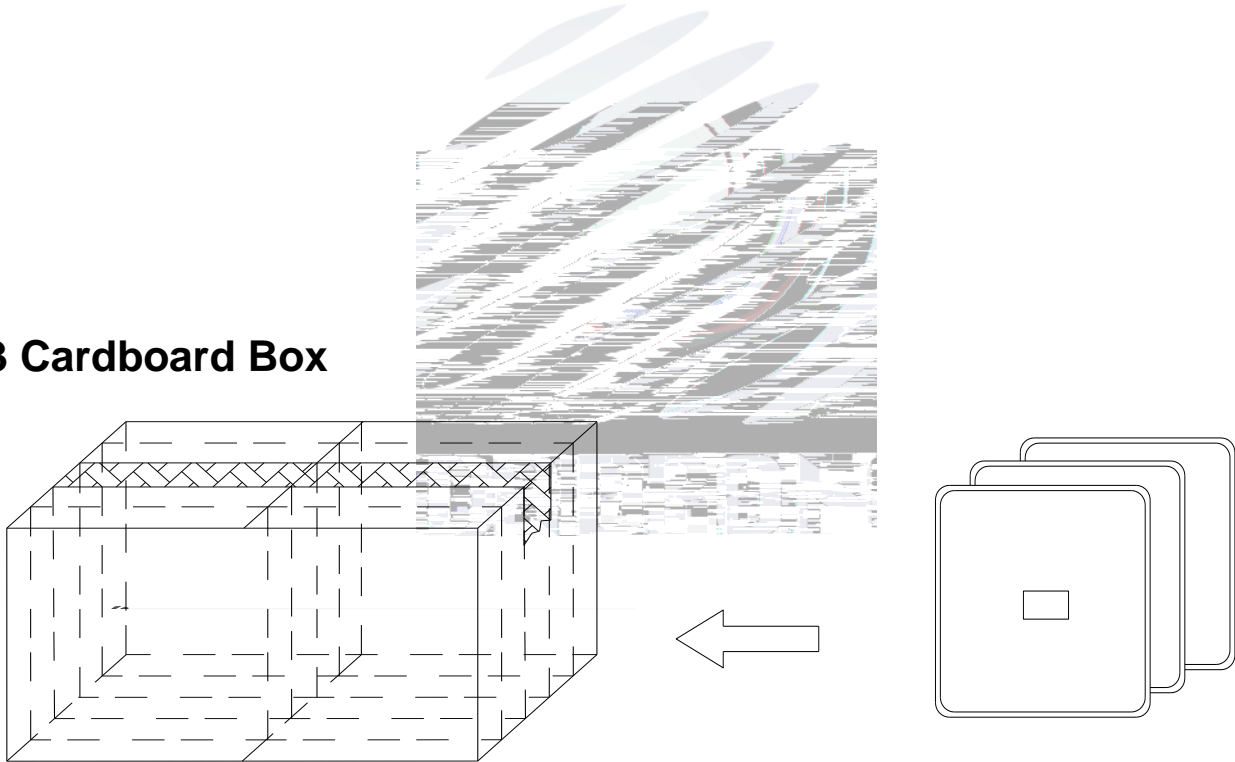
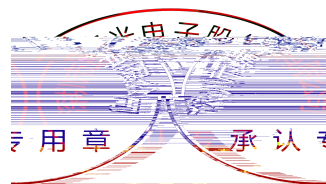


Fig.2-5 Cardboard Box



## 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	3times.	10Pcs.	0/1
Temperature Cycle	JESD22-A104	100 30 min. ↑↓5 min -40 30 min.	300 Cycles	10Pcs.	0/1
Thermal Shock	JESD22-A106	-40 15min ↑↓10s 100 15min	300 Cycles	10Pcs.	0/1
High Temperature Storage	JESD22-A103	Temp:100	1000Hrs.	10Pcs.	0/1
Low Temperature Storage	JESD22-A119	Temp:-40	1000Hrs.	10Pcs.	0/1
Life Test	JESD22-A108	T <sub>a</sub> =25 I <sub>F</sub> =100mA	1000Hrs.	10Pcs.	0/1



Notes:

1. U.S.L: Upper standard leve. 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

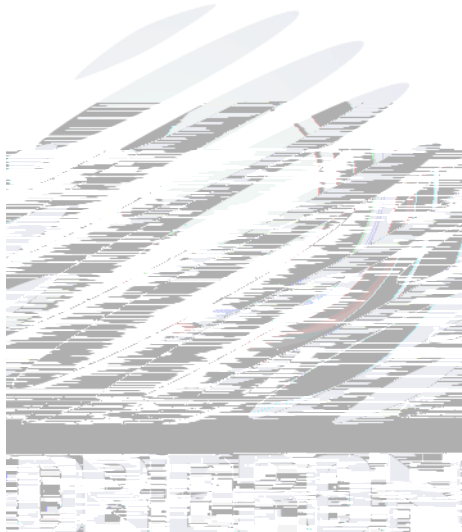
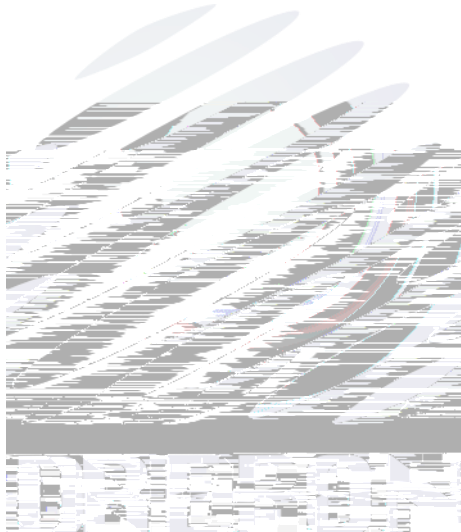
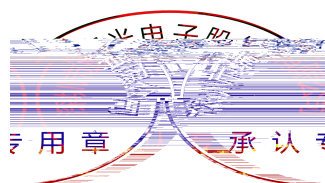


Table 3-1 SMT Reflow Soldering Instructions SMT

Average temperature rise speed (T <sub>max</sub> )	Max 3 °C/ s
Preheating: minimum temperature (T <sub>min</sub> )	150 °C
Preheating: Max temperature (T <sub>max</sub> )	200 °C
Preheating: Time (T <sub>min</sub> -T <sub>max</sub> )	60s-120s

Time limited to maintain high temperature: the temperature (T<sub>L</sub>)





(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 Operate Method

(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.

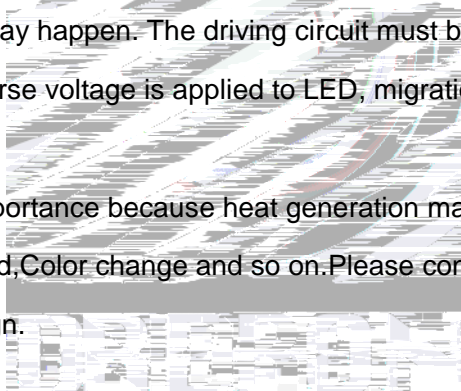




Table 4-1 Storage

Conditions		Temperature	Humidity	Time
Storage	Before Opening Aluminum Bag	≤30°C	≤75%	Within 1 Year From Date
	After Opening Aluminum Bag	≤30°C	≤60%	24hours
Baking		60±5°C	-	≥24hours

(8) If the moisture absorbent material silica gel has faded away or the LEDs have exceeded

