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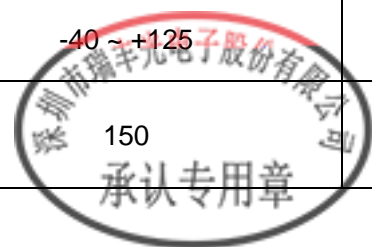
## 1.5 Product Parameters

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

Item	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	$V_F$	$I_F=350\text{mA}$	2.0	---	2.6	V
Reverse Current	$I_R$	$V_R=5\text{V}$	---	---	10	$\mu\text{A}$
Dominant Wavelength	$\lambda_D$	$I_F=350\text{mA}$	587.5	---	595	nm
Luminous Flux		$I_F=350\text{mA}$	40.9	---	55.3	lm
Viewing Angle	2 1/2	$I_F=350\text{mA}$	---	120	---	deg
Thermal Resistance.	$R_{THJ-S}$	$I_F=350\text{mA}$	---	---	25	/W

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

Parameter	Symbol	Rating	Units
Power Dissipation	$P_D$	1092	mW
Forward Current	$I_F$	420	mA
Peak Forward Current	$I_{FP}$	500	mA
Reverse Voltage	$V_R$	5	V
Electrostatic Discharge (HBM)	$E_{SD}$	2000	V
Operating Temperature	$T_{OPR}$	-40 ~ +125	
Storage Temperature	$T_{STG}$	-40 ~ +125	
Junction Temperature	$T_J$	150	



Notes

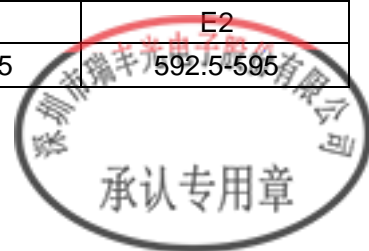
1. 1/10 Duty cycle, 10ms pulse width.      # " \_ et      #!#" ž
2. The above forward voltage measurement allowance tolerance is  $\pm 0.1V$ .      f " ž#Hž
3. The above color coordinates measurement allowance tolerance is  $\pm 0.005$ .       $\pm " ž" " ž$
4. The above luminous intensity measurement allowance tolerance  $\pm 10\%$ .  
f # " . ž
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  $\dot{\theta} > 76$
8. ESD yield is over 90% at 2000V ESD (HBM). ESD protection during products handing is needed. + " . >76  
7E6\$ " " " H      †

**1.6 Bin Range Of Forward Voltage and Luminous Flux (IF=350mA)**

**BIN (IF=350mA)**

Table 1-3

V <sub>F</sub>	C0	D0	E0
	2.0-2.2	2.2-2.4	2.4-2.6
I <sub>m</sub>	NB	OA	OB
	40.9-45.3	45.3-50	50-55.3
WD(nm)	D2	E1	E2
	587.5-590	590-592.5	592.5-595





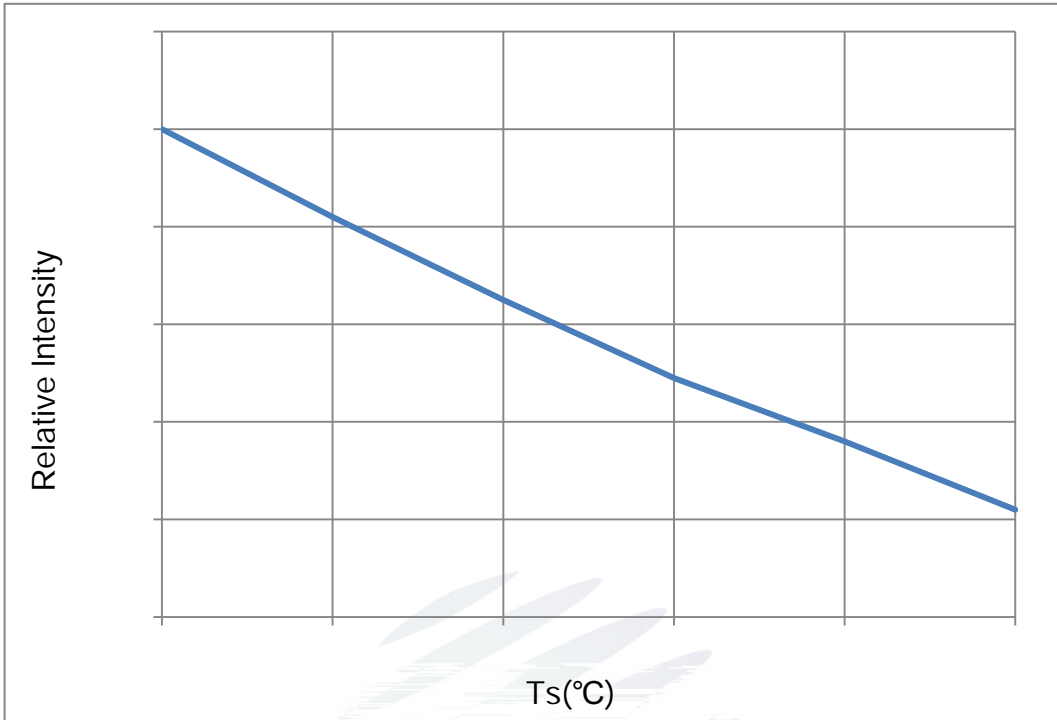


Fig. 1-9 Solder Temperature Vs Relative Intensity

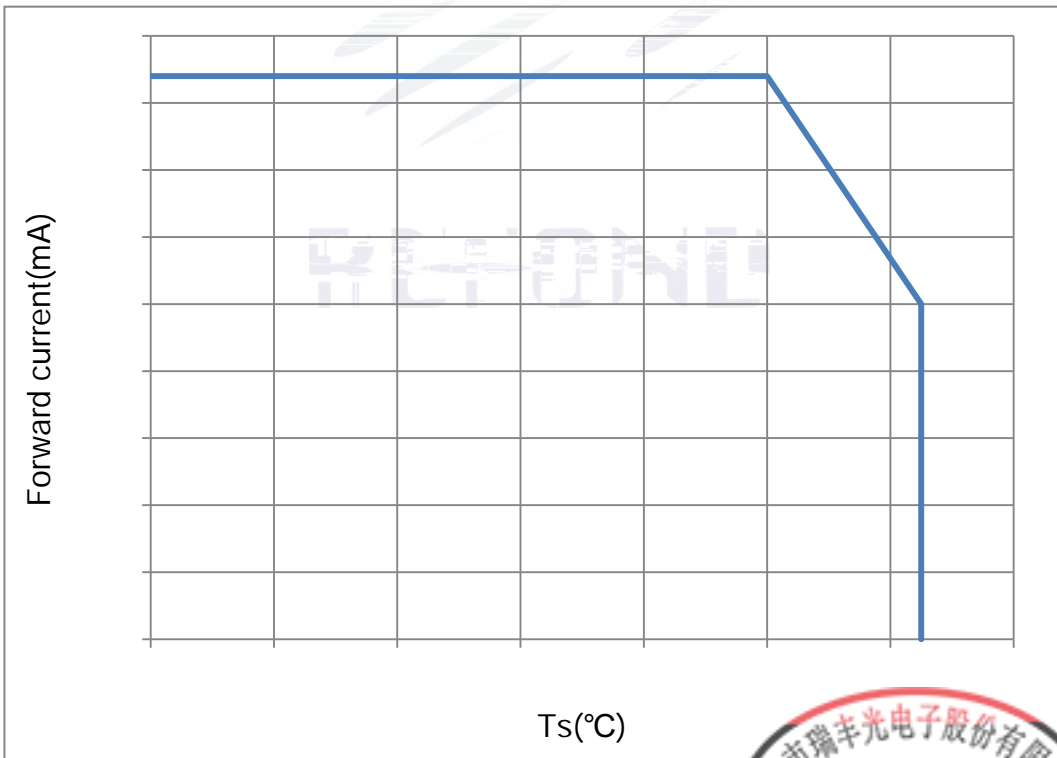
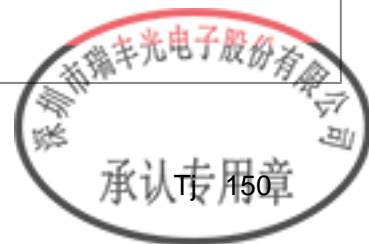


Fig. 1-10 Solder Temperature Vs Forward Current





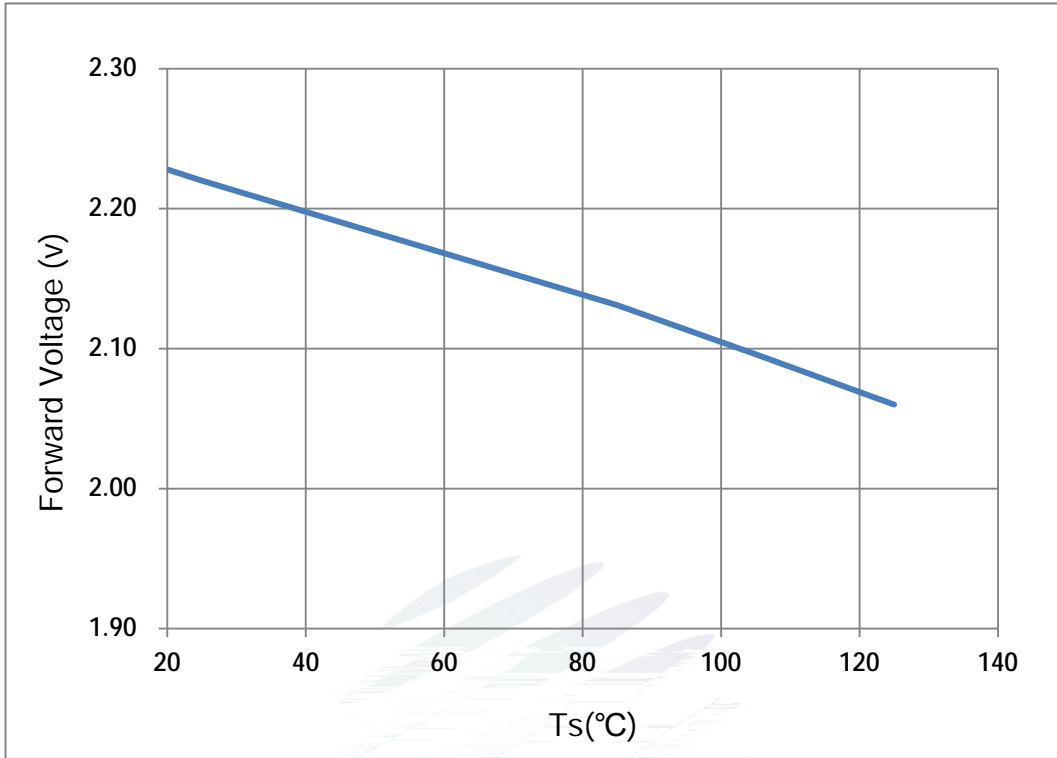


Fig. 1-11 Forward Voltage Vs Solder Temperature

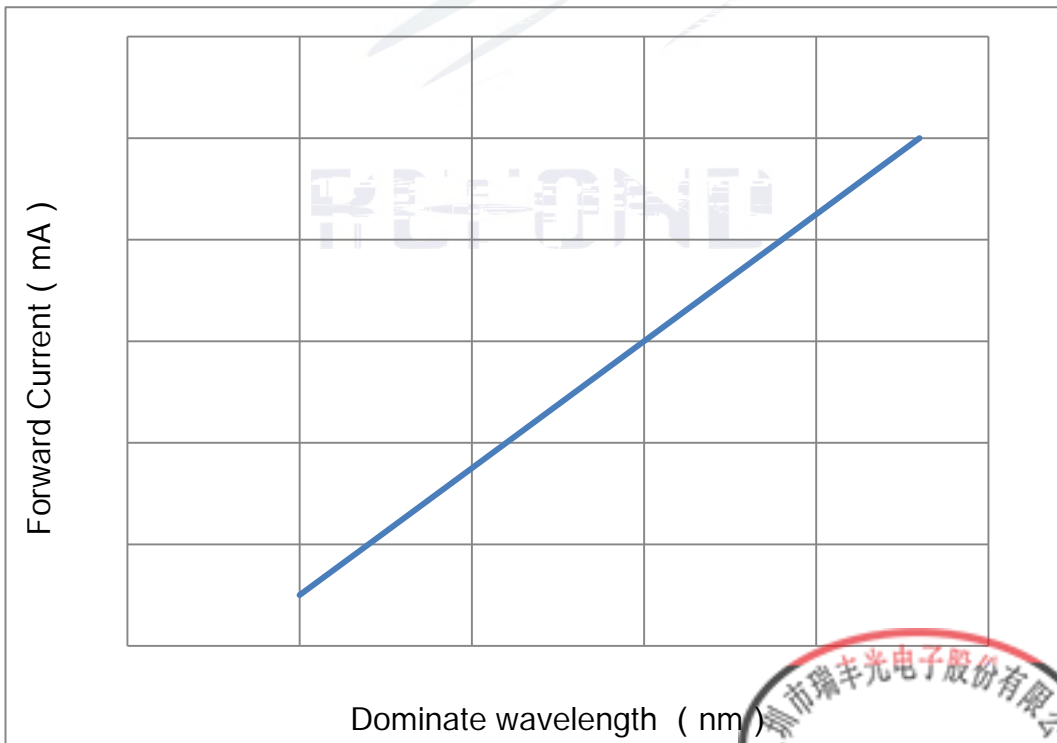
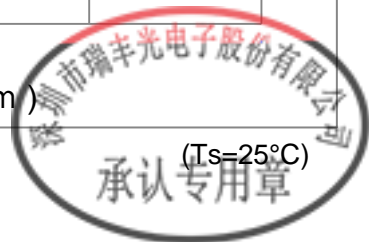


Fig. 1-12 Forward current vs. Dominate wavelength (nm) (Ts=25°C)



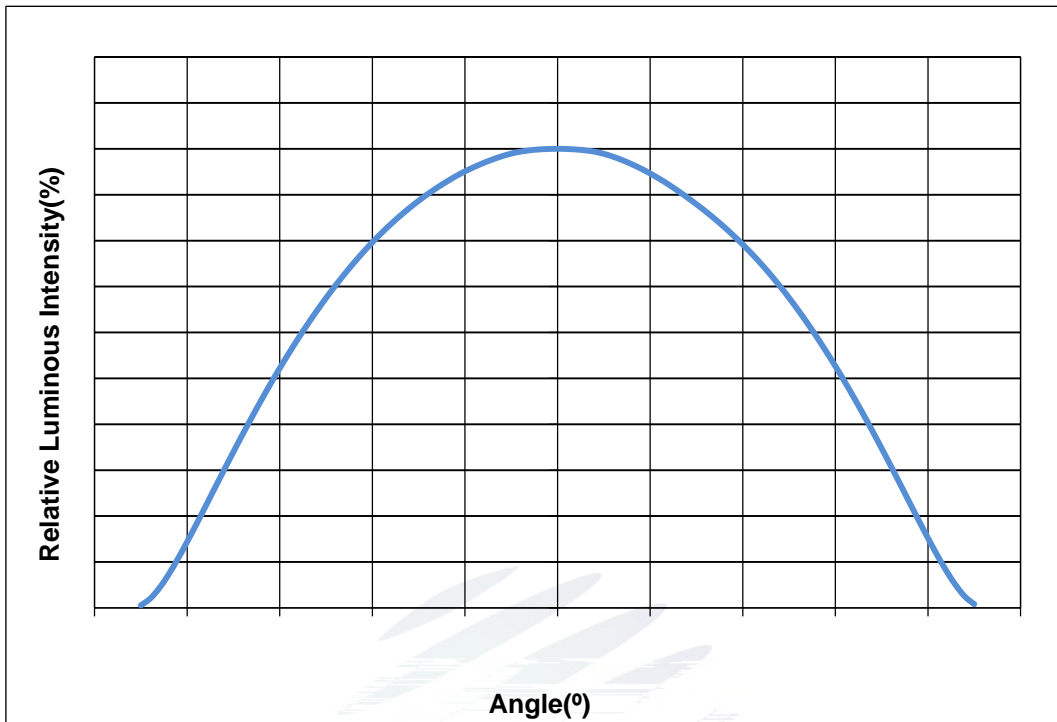


Fig. 1-13 Radiation diagram

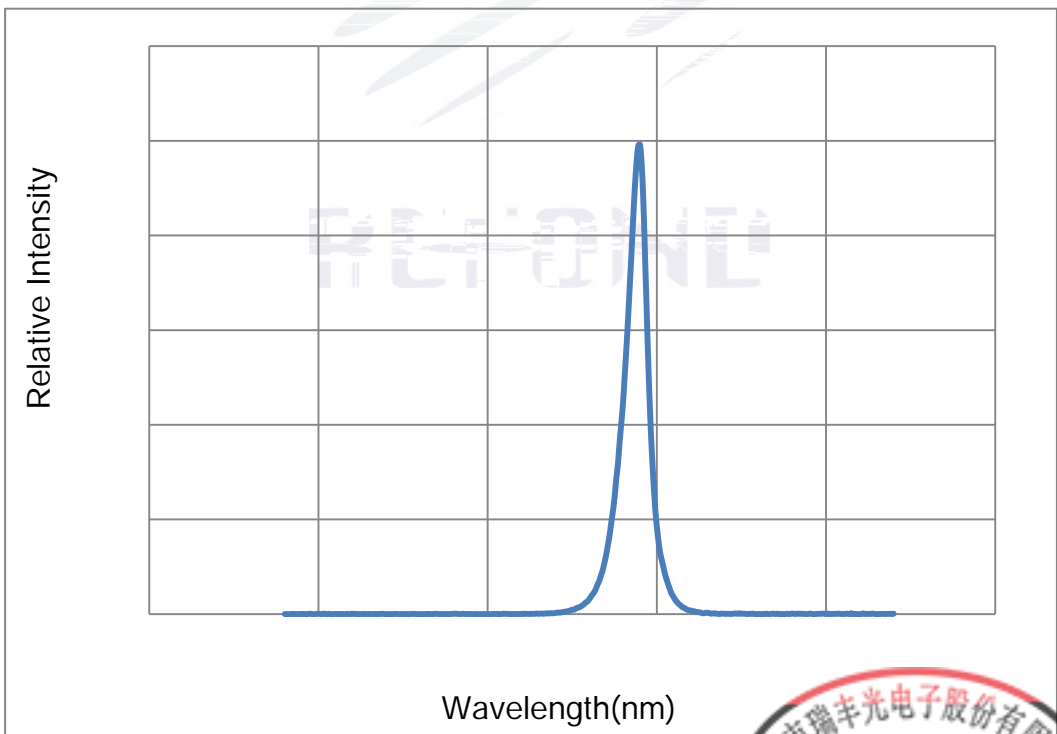


Fig. 1-14 Spectrum Distribution



## 2. Packaging

### 2.1 Packaging Specification

Package:4000pcs/reel.

#### 2.1.1 Carrier Tape Dimension

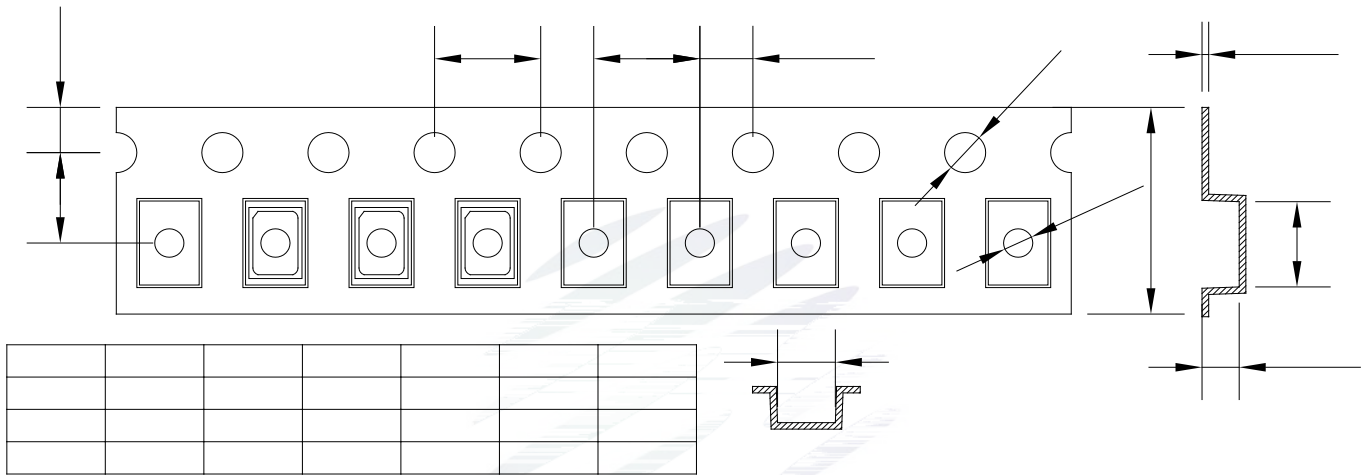


Fig.2-1 Carrier Tape Dimension

#### 2.1.2 Reel Dimension

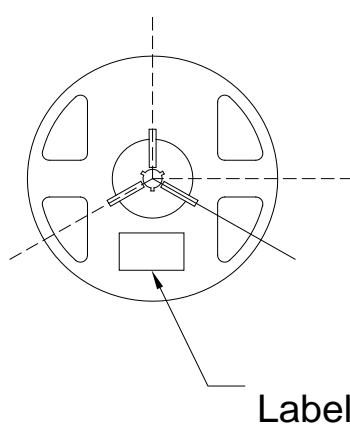


Fig.2-2 Reel Dimension

FST W\$# Reel Dimension

A	12f 0.1mm
B	180f 1mm
C	60f 1mm
D	13.0f 0.5mm

#### Notes

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



### 2.1.3 Label Form Specification

#### FST WLS 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

Fig. 2-3 Label

### 2.2 Moisture Resistant Packing

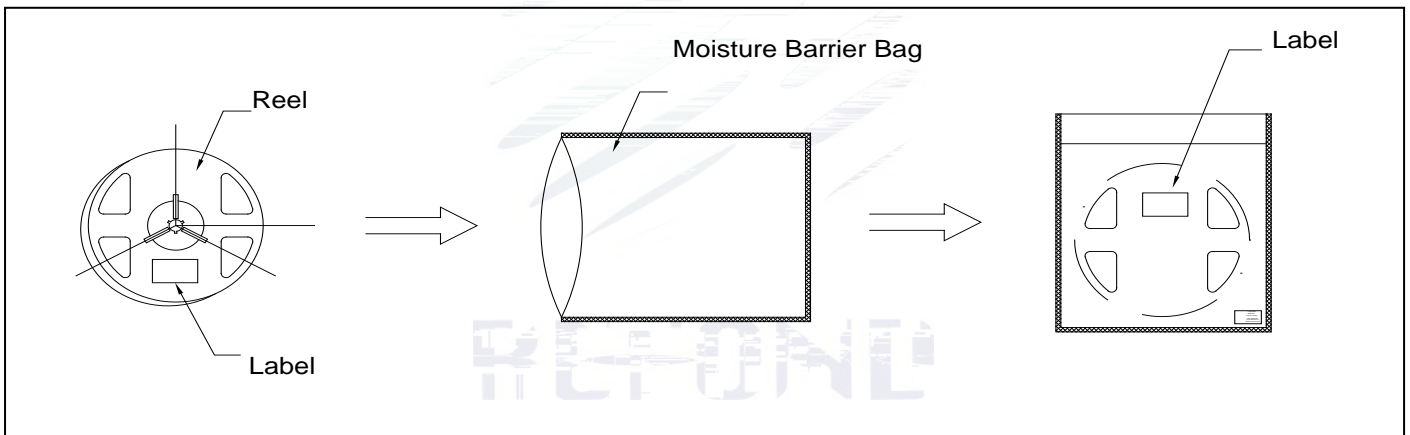


Fig.2-4 Moisture Resistant Packing

### 2.3 Cardboard Box

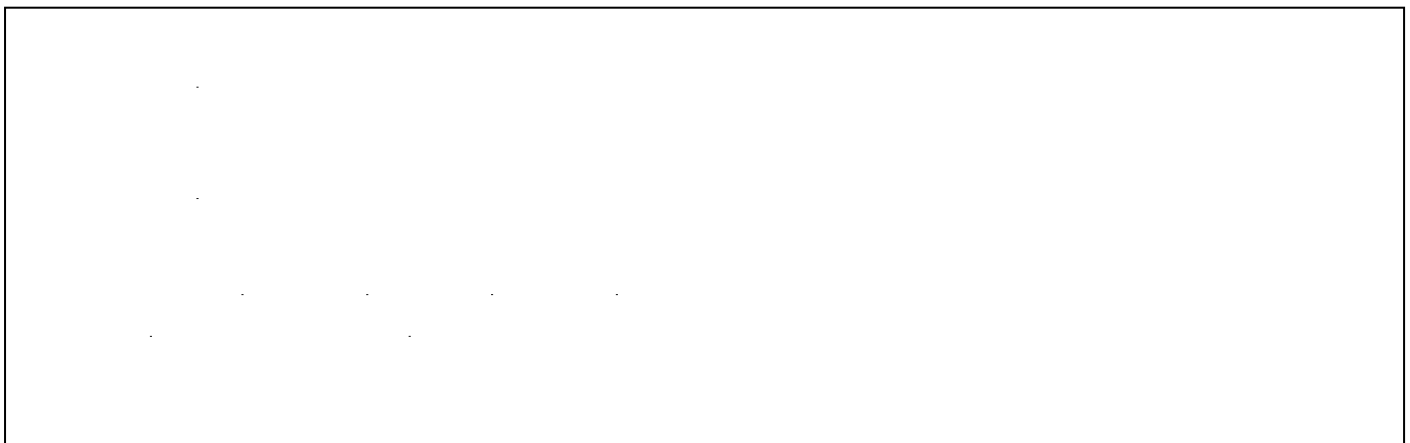


Fig.2- Cardboard Box





### 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 <sub>max</sub>	T <sub>P</sub>	3 °C/	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>	60 - 120	60s-120s

Time limited to maintain high temperature: the temperature

## Notes

(1)Reflow soldering should not be done more than twice. If more than 24 hours between the two solderings , LED will be damaged. \$& >76

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

### 3.1.1 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.

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### 3.1.2 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 >76

(2) Components should not be mounted on warped (non coplanar) portion of PCB. After soldering, do not warp the circuit board.LED B54

(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

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(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.

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(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 effect 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.

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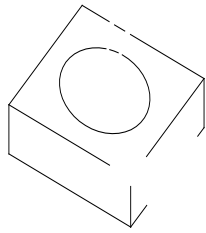


Fig 4-1 Handling Precautions

(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.

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(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

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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.

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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 $\pm$ 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 un

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Declare

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