

# SPECIFICATION

REFOND P/N

RF-A3H21-2B1P-E5

Mass Production



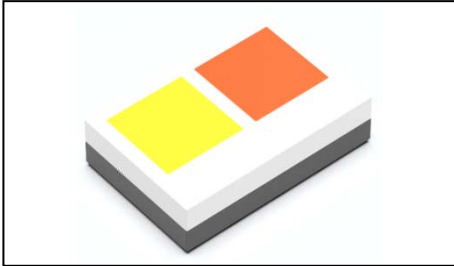
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## 1. Description

### 1.1 General Description



This product uses the ceramics package, it has a high reliability. it also be widely application for Automotive Exterior Lighting. Size(mm): 3.00X2.00X0.80mm.

3.00X2.00X0.80mm

### 1.2 Features

- ▶ Ceramic Package.
- ▶ High Power Output and High Luminance.
- ▶ Pb-free reflow soldering application.
- ▶ Moisture sensitive level:Level2. Level 2
- ▶ Compliance with RoHS and REACH.
- ▶ Qualifications: The product qualification test plan is based on the guidelines of AEC-Q102 Stress Test Qualification for Automotive Grade Discrete Semiconductors -Q102

### 1.3 Application

- ▶ Automotive Exterior Lighting, Daytime Running Lamp, Headlamp, Fog lamp.



## 1.4 Package Dimension

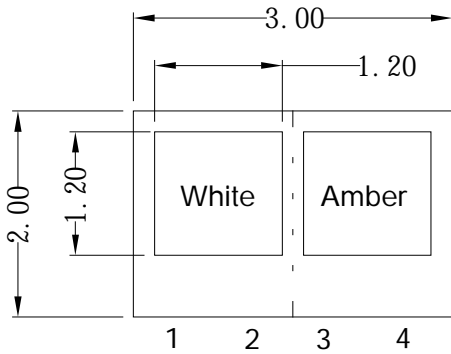


Fig.1-1 Top View

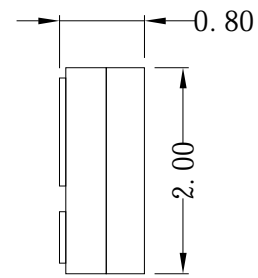


Fig.1-2 Side View

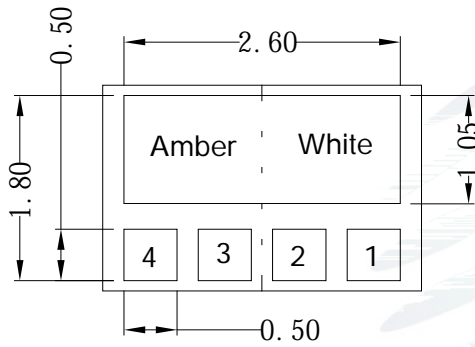


Fig.1-3 Bottom View

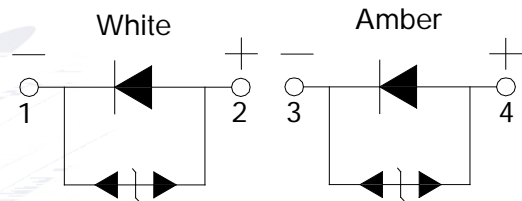


Fig.1-4 Polarity

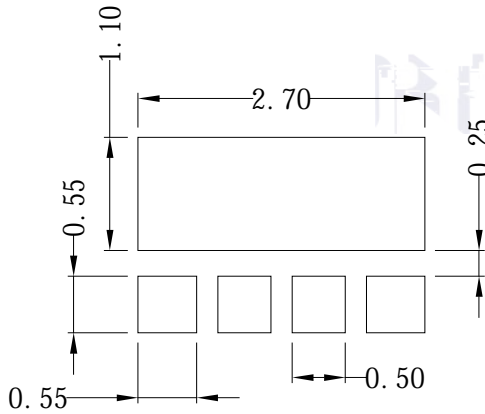


Fig.1-5 Soldering Patterns

### Notes

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



0.2

## 1.5 Product Parameters

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

Item	Symbol	Test Condition	White			Unit
			Min.	Typ	Max.	
Forward Voltage	$V_F$	$I_F=1000\text{mA}$	2.8	---	3.6	V
Reverse Current	$I_R$	$V_R=5\text{V}$	---	---	10	$\mu\text{A}$
luminous flux ( )	$\Phi$	$I_F=1000\text{mA}$	340	---	430	lm
Viewing Angle	2 $\theta$ 1/2	$I_F=1000\text{mA}$	---	120	---	deg
Color Rendering Index ( )	$R_a$	$I_F=1000\text{mA}$	---	---	---	---
Thermal Resistance.	$R_{THJ-S}$	$I_F=1000\text{mA}$	---	---	4.5	/W

Item	Symbol	Test Condition	Amber			Unit
			Min.	Typ	Max.	
Forward Voltage	$V_F$	$I_F=1000\text{mA}$	2.8	---	3.6	V
Reverse Current	$I_R$	$V_R=5\text{V}$	---	---	10	$\mu\text{A}$
luminous flux ( )	$\Phi$	$I_F=1000\text{mA}$	200	---	280	lm
Viewing Angle	2 $\theta$ 1/2	$I_F=1000\text{mA}$	---	120	---	deg
Color Rendering Index ( )	$R_a$	$I_F=1000\text{mA}$	---	---	---	---
Thermal Resistance.	$R_{THJ-S}$	$I_F=1000\text{mA}$	---	---	4.5	/W



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

Parameter	Symbol	Rating	Units
Power Dissipation	$P_D$	8640	W
Forward Current	$I_F$	1200	mA
Peak Forward Current	IFP	2000	mA
Reverse Voltage	$V_R$	5	V
Electrostatic Discharge (HBM)	$E_{SD}$	8000	V
Operating Temperature	$T_{OPR}$	-40 ~ +125	
Storage Temperature	$T_{OPR}$	-40 ~ +125	
Junction Temperature	$T_J$	150	

## Notes

- 1/10 Duty cycle, 10ms pulse width. 10ms, 1/10.
- The above forward voltage measurement allowance tolerance is  $\pm 0.1V$ .  $\pm 0.1V$ .
- The above color coordinates measurement allowance tolerance is  $\pm 0.005$ . 0.005.
- The above luminous flux measurement allowance tolerance  $\pm 10\%$ .  $\pm 10\%$ .
- 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 8000V ESD (HBM). ESD protection during products handing is needed. 90%



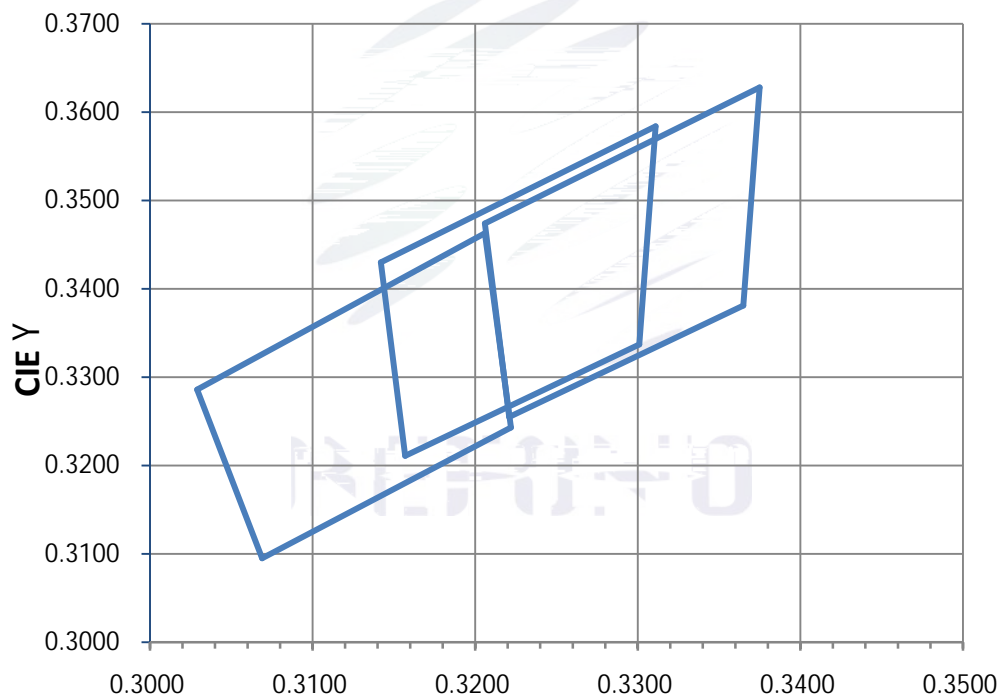
## 1.6 Bin Range Of Forward Voltage and Luminous Flux (IF=1000mA)

**BIN (IF=1000mA)**

Table 1-3

$V_F$		G0	H0	I0	J0	/	/
		2.8-3.0	3.0-3.2	3.2-3.4	3.4-3.6	/	/
$\Phi(lm)$	White	BF	BG	BH	BI	/	/
		340-360	360-380	380-400	400-430	/	/
	Amber	FB	FC	BA	BB	/	/
		200-220	220-240	240-260	260-280	/	/

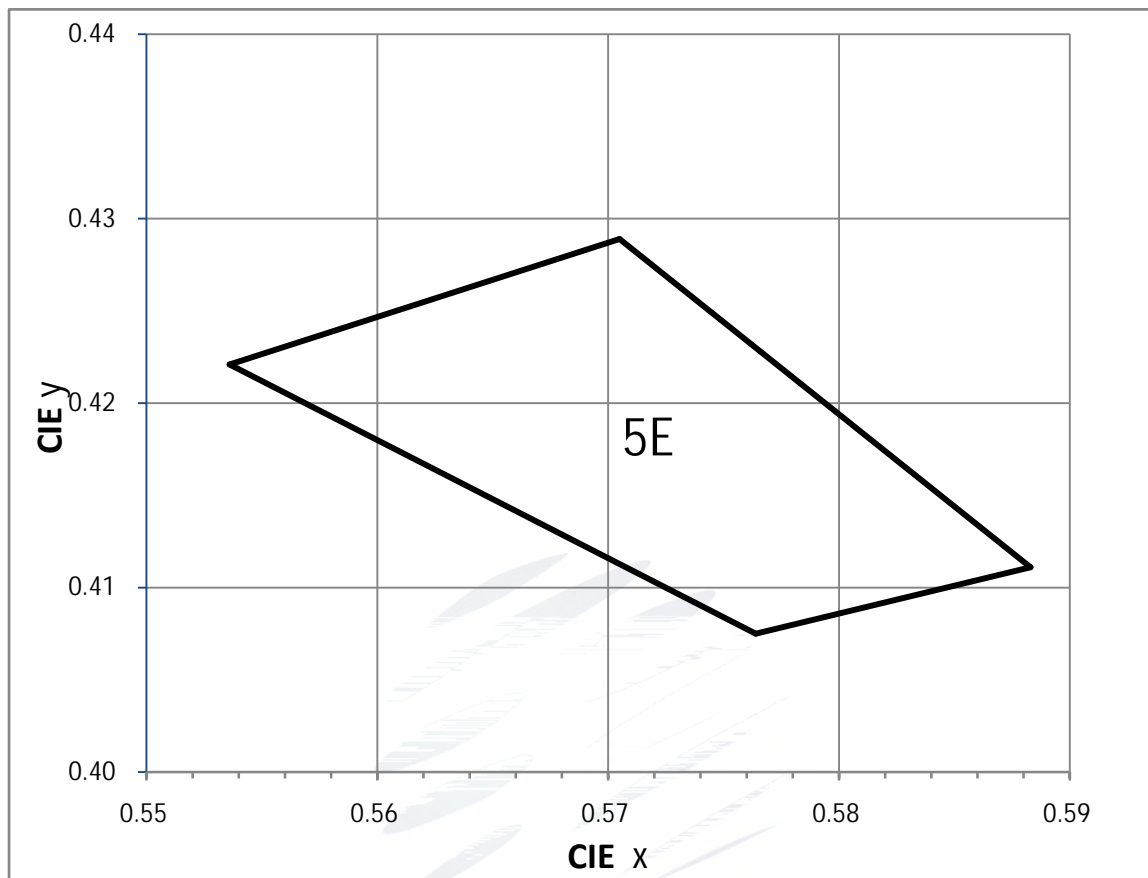
### The Chromaticity Diagram



### Bin data

BIN CODE	X1	Y1	X2	Y2	X3	Y3	X4	Y4
57N	0.3221	0.3255	0.3206	0.3474	0.3375	0.3628	0.3365	0.3381
60N	0.3157	0.3211	0.3142	0.3430	0.3311	0.3584	0.3301	0.3337
65N	0.3029	0.3286	0.3206	0.3463	0.3222	0.3243	0.3069	0.3095

## The Chromaticity Diagram



## Bin data

BIN CODE	X1	Y1	X2	Y2	X3	Y3	X4	Y4
5E	0.5536	0.4221	0.5764	0.4075	0.5883	0.4111	0.5705	0.4289





## 1.7 Typical optical characteristics curves

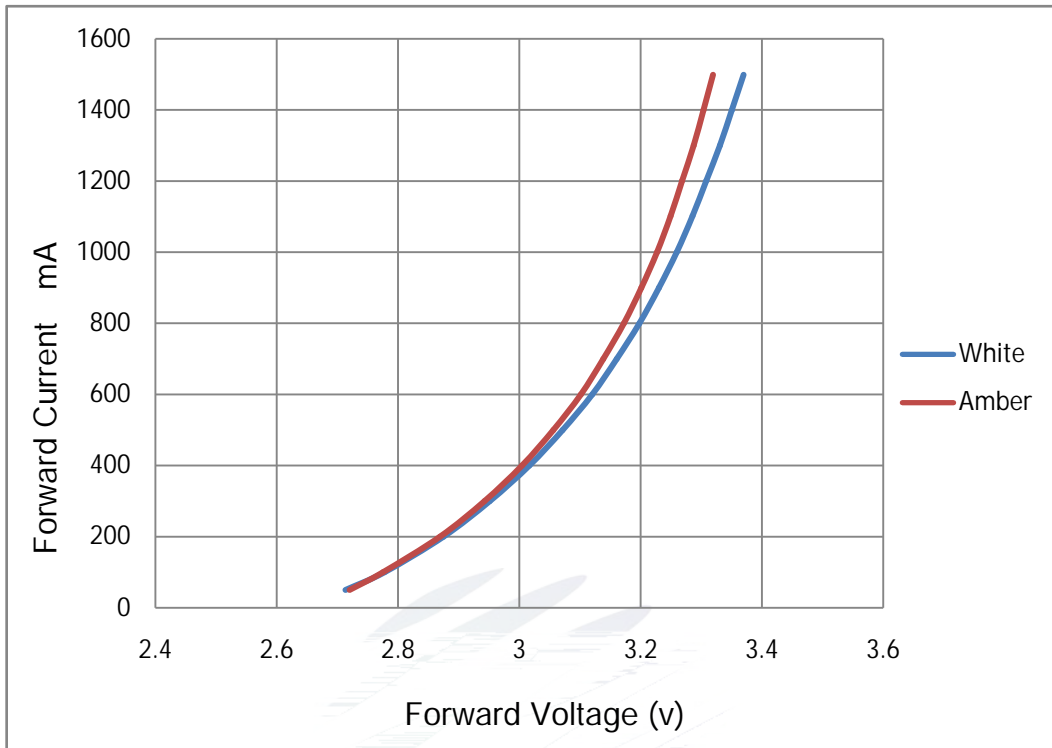


Fig 1-6 Forward Voltage Vs. Forward Current

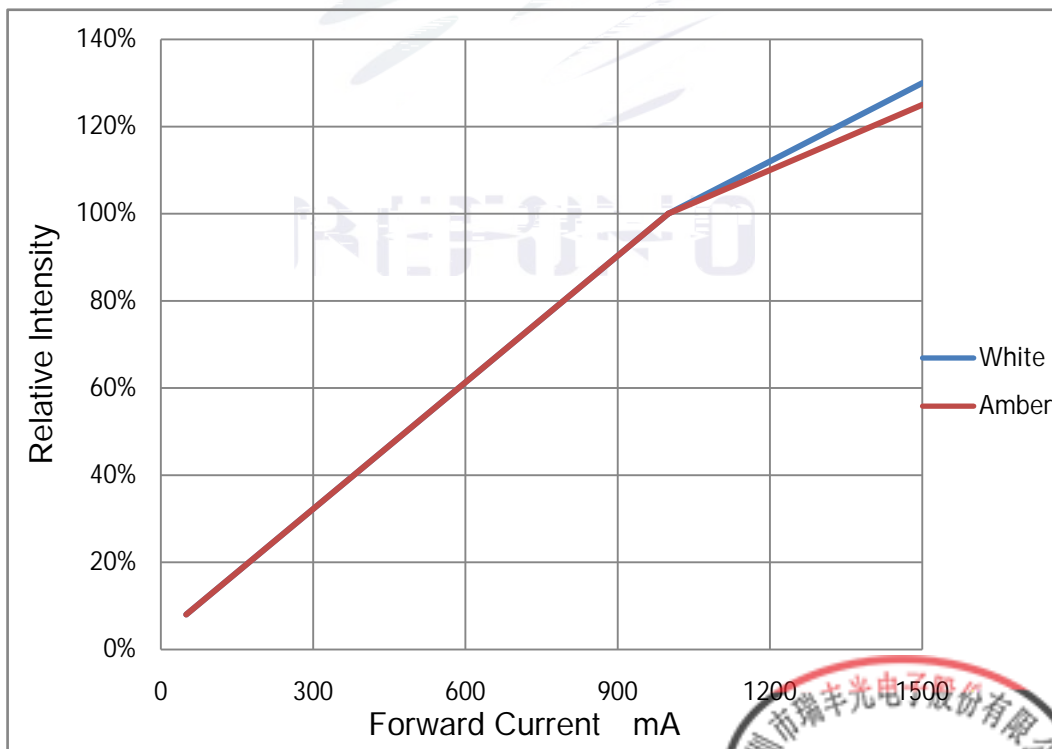


Fig 1-7 Forward Current Vs. Relative Intensity

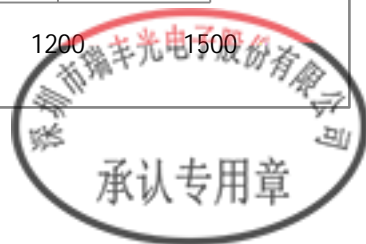




Fig 1-8 Ts Temperature Vs Relative Intensity

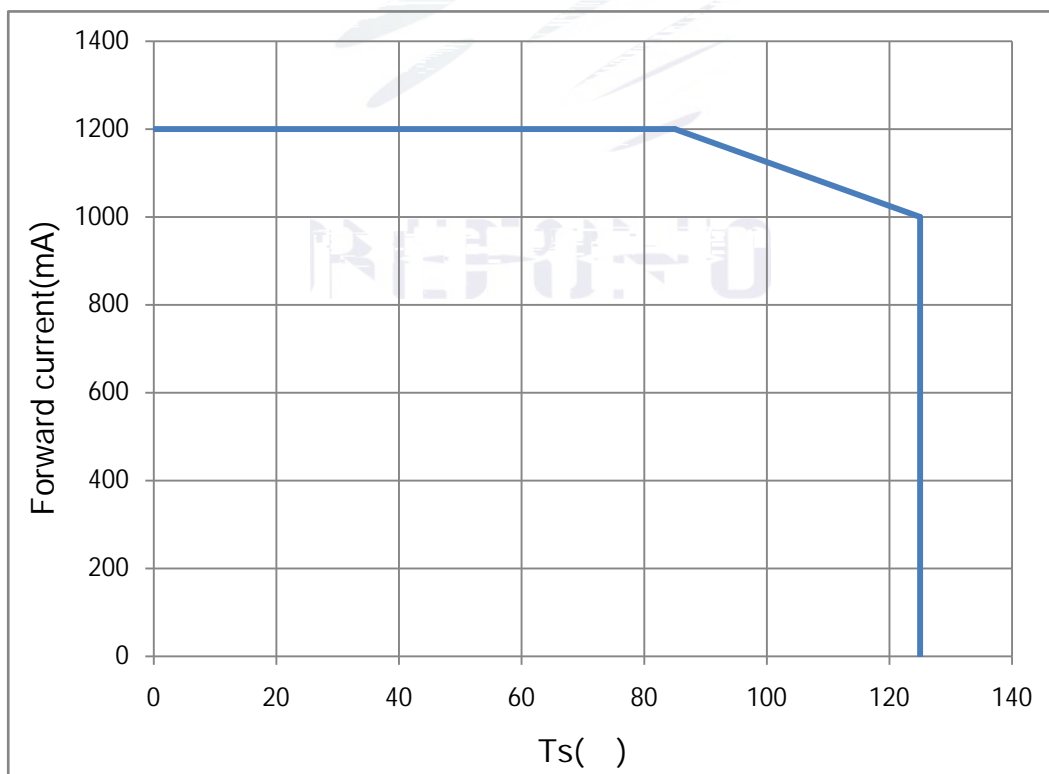


Fig 1-9 Ts Temperature Vs Forward Current

Tj 150

Fig. 1-10 Forward Voltage Vs Solder Temperature

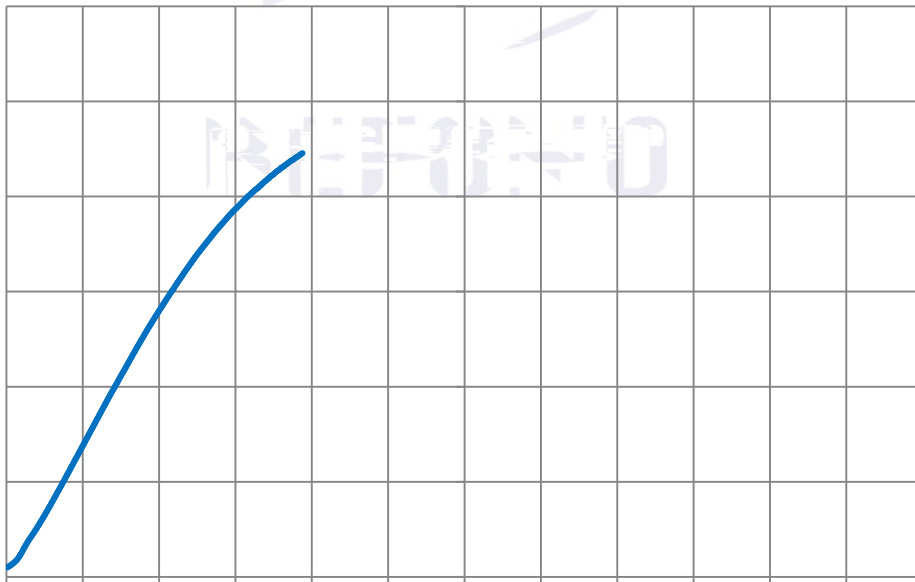


Fig 1-11 Radiation diagram



## 2. Packaging

### 2.1 Packaging Specification

Package: 4000pcs/reel. :4000pcs

#### 2.1.1 Carrier Tape Dimension



Fig.2-1 Carrier Tape Dimension

#### 2.1.2 Reel Dimension

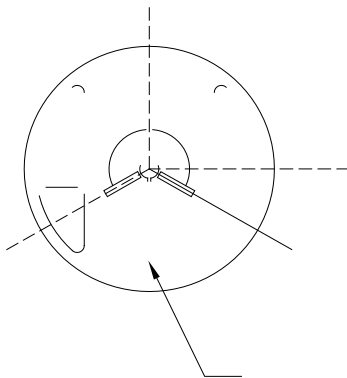


Fig.2-2 Reel Dimension

Table 2-1 Dimension

A	12± 0.3mm
B	180±2mm
C	60.0±1mm
D	13.0±0.2mm

#### Notes

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

### 2.1.3 Label Form Specification

Table 2-2 Label Form Specification

PART NO	Part Number
SPEC NO	Spec Number
LOT NO	Lot Number
BIN CODE	Bin Code
$\Phi$	Luminous flux
X/Y	Chromaticity Bin
$V_F$	Forward Voltage
QTY	Packing Quantity
DATE	Made Date

Fig 2-3 Label Form Specification

### 2.2 Moisture Resistant Packing

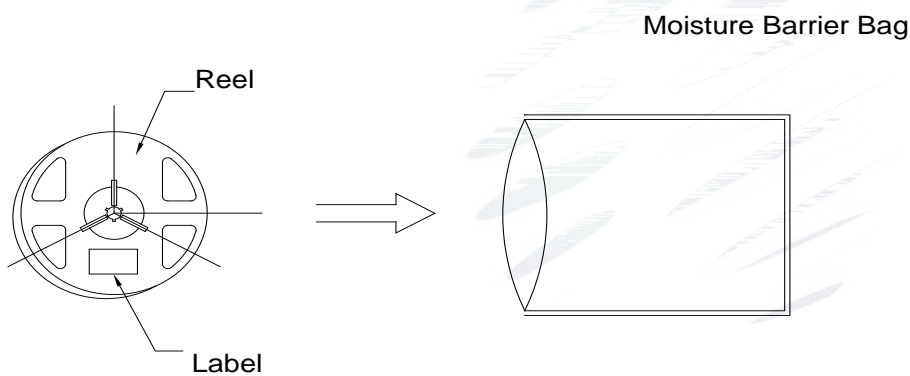


Fig.2-4 Moisture Resistant Packing

### 2.3 Cardboard Box

Fig.2-5 Cardboard Box



## 2.5 Criteria For Judging Damage

Table Criteria For Judging Damage

Test Items	Symbol	Test Condition	Criteria For Judgement	
			Min.	Max.
Forward Voltage	$V_F$	$I_F=1000mA$	-	U.S.L*)x1.1
Reverse Current	$I_R$	$V_R = 5V$	-	U.S.L*)x2.0
Luminous Flux		$I_F=1000mA$	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 are 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

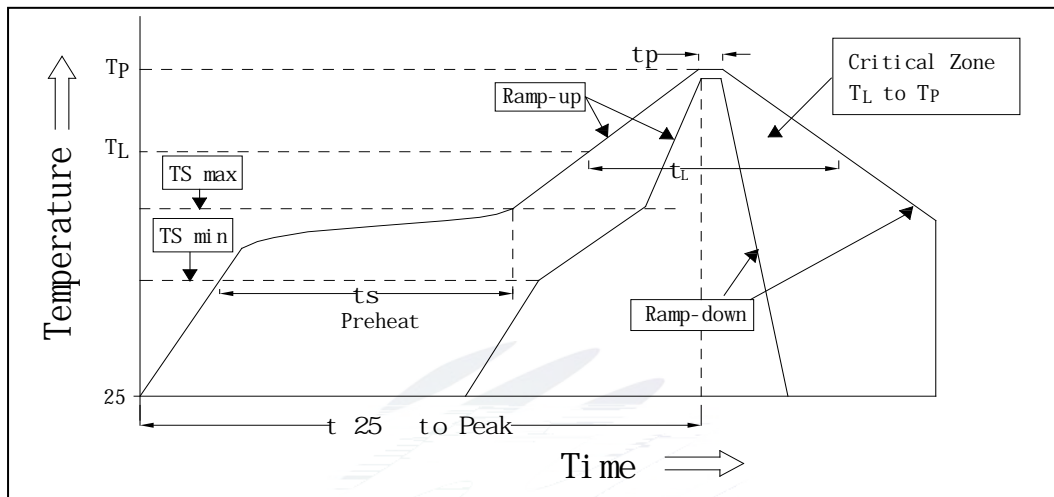
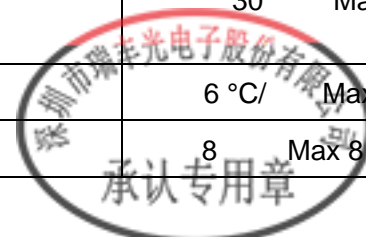


Fig.3-1 SMT Reflow Soldering Instructions SMT

Table 3-1 SMT Reflow Soldering Instructions SMT

Average temperature rise speed	Tsmax	TP	3 °C/	Max 3 °C/ s
Preheating: minimum temperature	(Tsmi n)		150 °C	
Preheating: Max temperature	(TSmax)		200 °C	
Preheating: Time	Tsmin	Tsmax	60 - 120	60s-120s
Time limited to maintain high temperature: the temperature (TL)			217 °C	
Time limited to maintain high temperature: The Time (tL)			60	Max 60s
Peak /Classification of temperature	/	(TP)	260 °C	
Time limit classification of peak temperature time		tp	10	Max 10s
Hold time within 5 °C with the actual peak temperature (TP) (TP) 5 °C			30	Max 30s
Cooling speed			6 °C/	Max 6 °C/ s
Needed time from 25 °C to TP 25 °C			8	Max 8 minutes



## Notes

(1) Reflow soldering should not be done more than two times. In the case of more than 24 hours passed soldering after first, LEDs will be damaged. 24

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

### 3.1.1 Repairing

Repair 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 will not be damaged by repairing.

LED

### 3.1.2 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 influence to the reliability. 5049.002 Tc54y-5(i)3(-3(D)6e)6( )1(rel)-3(i)(s)

## 4. 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 100PPM.

(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.

900PPM

900PPM

1500PPM

(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.

(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.



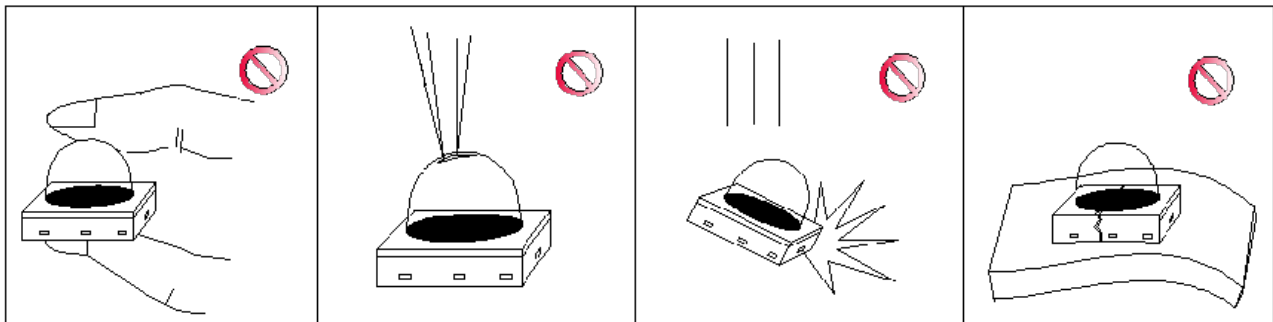


Fig 4-1

(5) In designing a circuit, the current through each LED must 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.



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 60 ± 5 for above 24 hours.

5 24

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.





