

SPECIFICATION

REFOND P/N

RF-**HP32DS-FH-I3

R&D

Mass Product



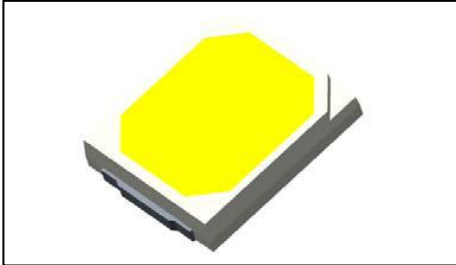
Contents

1. Description.....	3
1.1 General Description.....	3
1.2 Features.....	3
1.3 Application.....	3
1.4 Product Selection Table.....	4
1.5 Package Dimension.....	4
1.6 Product Parameters.....	5
1.7 Bin Range Of Forward Voltage and Luminous Flux (IF=100mA).....	7
1.8 Typical optical characteristics curves.....	8
2. Packaging.....	12
2.1 Packaging Specification.....	12
2.1.1 Carrier Tape Dimension.....	12
2.1.2 Reel Dimension.....	12
2.1.3 Label Form Specification.....	13
2.2 Moisture Resistant Packing.....	13
2.3 Cardboard Box.....	13
2.4 Reliability Test Items And Conditions.....	14
2.5 Criteria For Judging Damage.....	15
3. SMT Reflow Soldering Instructions.....	16
3.1 SMT Reflow Soldering Instructions.....	16
4. Handling Precautions.....	17
4.1 Handling Precautions.....	17



1. Description

1.1 General Description



The White LED which was fabricated using a blue chip and the phosphor
Product Package:2.75mmX3.5mmX0.7mm.

1.2 Features

- ▶ PLCC-2 Package.
- ▶ Extremely wide viewing angle.
- ▶ Suitable for all SMT assembly and solder process..
- ▶ Available on tape and reel.
- ▶ Moisture sensitivity level: Level 3.
- ▶ RoHS compliant.

1.3 Application

- ▶ Indoor lighting.
- ▶ Bulb lighting.
- ▶ General indoor applications.



1.4 Product Selection Table

Model NO.	CCT	Center		
		code	x	y
RF-27HP32DS-FH-I3	2700K	E27	0.4630	0.4200
RF-30HP32DS-FH-I3	3000K	E30	0.4400	0.4030
RF-40HP32DS-FH-I3	4000K	E40	0.3800	0.3800
RF-50HP32DS-FH-I3	5000K	E50	0.3460	0.3590
RF-65HP32DS-FH-I3	6500K	E65	0.3154	0.3391

1.5 Package Dimension

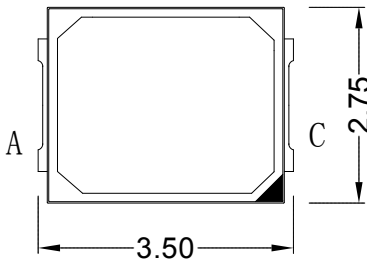


Fig.1-1 Top view

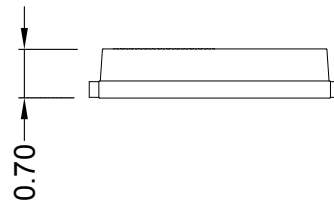


Fig.1-2 Side view

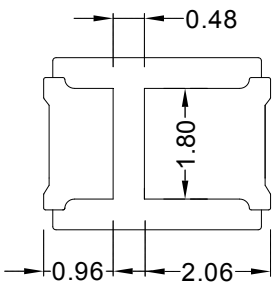


Fig.1-3 Bottom view



Polarity

A: anode

C: cathode

Fig.1-4 Polarity

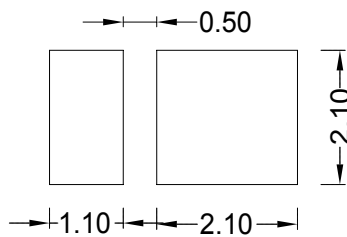


Fig.1-5 Soldering patterns

Notes:

1. All dimensions units are millimeters.
2. All dimensions tolerances are $\pm 0.05\text{mm}$ unless otherwise noted.



1.6 Product Parameters

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

Item	Code	Symbol	Test Condition	Value			Unit
				Min.	Max.	Typ.	
Forward Voltage	Rank Y0	VF	I _F =100mA	8.6	9.0	9.0	V
	Rank Z0			9.0	9.4		V
RF-27HP32DS-FH-I3 (2610-2850K)	Rank FC5	Φ	I _F =100mA	130	140	144	lm
	Rank FC6			140	150		lm
RF-30HP32DS-FH-I3 (2800-3095K)	Rank FC5	Φ	I _F =100mA	130	140	148	lm
	Rank FC6			140	150		lm
	Rank FC7			150	160		lm
RF-40HP32DS-FH-I3 (3780-4350K)	Rank FC6	Φ	I _F =100mA	140	150	156	lm
	Rank FC7			150	160		lm
	Rank FC8			160	170		lm
RF-50HP32DS-FH-I3 (4620-5470K)	Rank FC6	Φ	I _F =100mA	140	150	156	lm
	Rank FC7			150	160		lm
	Rank FC8			160	170		lm
RF-65HP32DS-FH-I3 (5900-6765K)	Rank FC6	Φ	I _F =100mA	140	150	154	lm
	Rank FC7			150	160		lm
	Rank FC8			160	170		lm
Reverse Current		I _R	V _R =15V	---	10	---	μA
Viewing Angle		2θ1/2	I _F =100mA	---	---	120	Deg
Color Rendering Index		CRI		80	---	---	---
Thermal Resistance		R _{THJ-S}		---	---	15	°C/W



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

Parameter	Symbol	Rating	Units
Power Dissipation	P _D	1080	mW
Forward Current	I _F	120	mA
Peak Forward Current	I _{FP}	220	mA
Reverse Voltage	V _R	15	V
Electrostatic Discharge(HBM)	ESD	2000	V
Operating Temperature	T _{OPR}	-40 ~ +105	°C
Storage Temperature	T _{STG}	-40 ~ +105	°C
Junction Temperature	T _J	135	°C

Notes:

1. Pulse width ≤ 0.1ms, duty cycle ≤ 1/10.
2. The above forward voltage measurement allowance tolerance is ±0.1V.
3. The above color coordinates measurement allowance tolerance is ±0.005.
4. The above luminous intensity measurement allowance tolerance ±10%.
5. The above Color rendering index measurement allowance tolerance is ±2
6. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.
7. All measurements were made under the standardized environment of Refond.
8. 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.
9. ESD yield is over 90% at 2000V ESD (HBM). ESD protection during products handing is needed.



1.7 Bin Range Of Forward Voltage and Luminous Flux (IF=100mA)

Table 1-3

V _F (V)	Y0	Z0	
	8.6-9.0	9.0-9.4	
φ (lm) RF-27HP32DS-FH-I3	FC5	FC6	
	130-140	140-150	
φ (lm) RF-30HP32DS-FH-I3	FC5	FC6	FC7
	130-140	140-150	150-160
φ (lm) RF-40HP32DS-FH-I3 RF-50HP32DS-FH-I3 RF-65HP32DS-FH-I3	FC6	FC7	FC8
	140-150	150-160	160-170

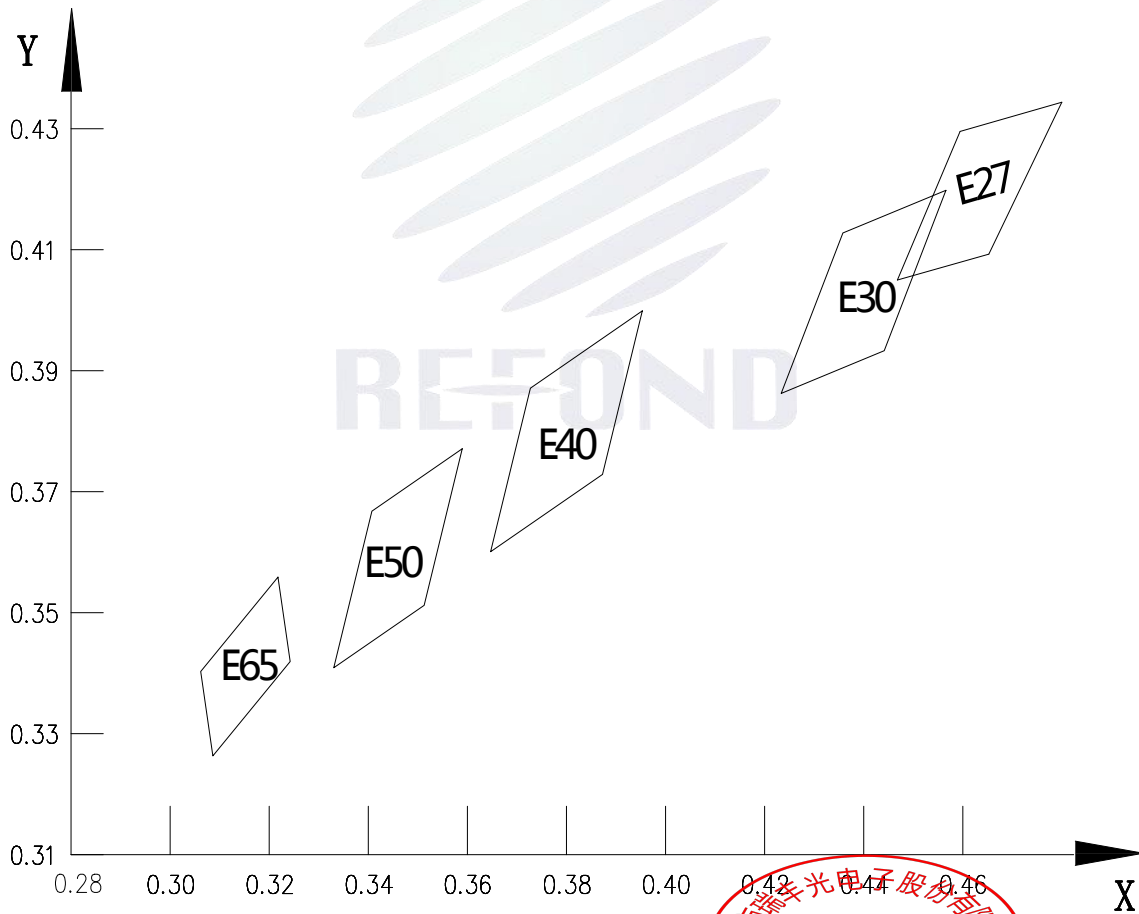


Fig 1-6 The C.I.E Chromaticity Diagram

Table 1-4

ERP 6-step								
BIN CODE	X1	Y1	X2	Y2	X3	Y3	X4	Y4
E27	0.4594	0.4296	0.4800	0.4344	0.4653	0.4093	0.4468	0.4050
E30	0.4566	0.4198	0.4358	0.4128	0.4233	0.3862	0.4441	0.3933
E40	0.3953	0.3999	0.3727	0.3871	0.3647	0.3601	0.3873	0.3729
E50	0.359	0.3771	0.3407	0.3668	0.333	0.3409	0.3513	0.3512
E65	0.3218	0.3559	0.3062	0.3403	0.3086	0.3263	0.3242	0.3419

1.8 Typical optical characteristics curves

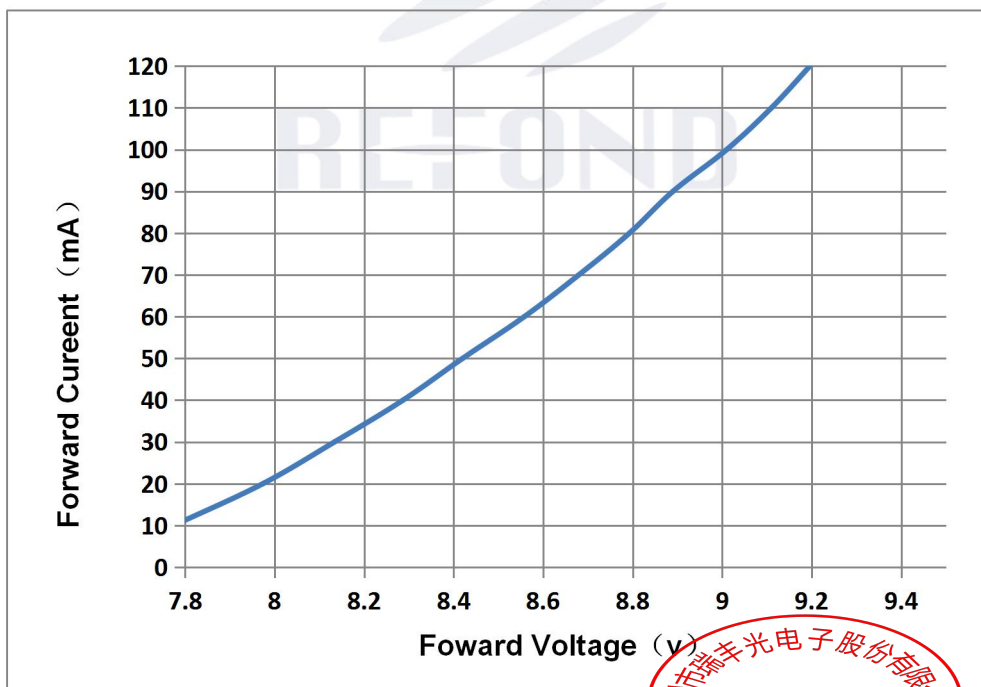


Fig 1-9 Forward Voltage Vs. Forward Current

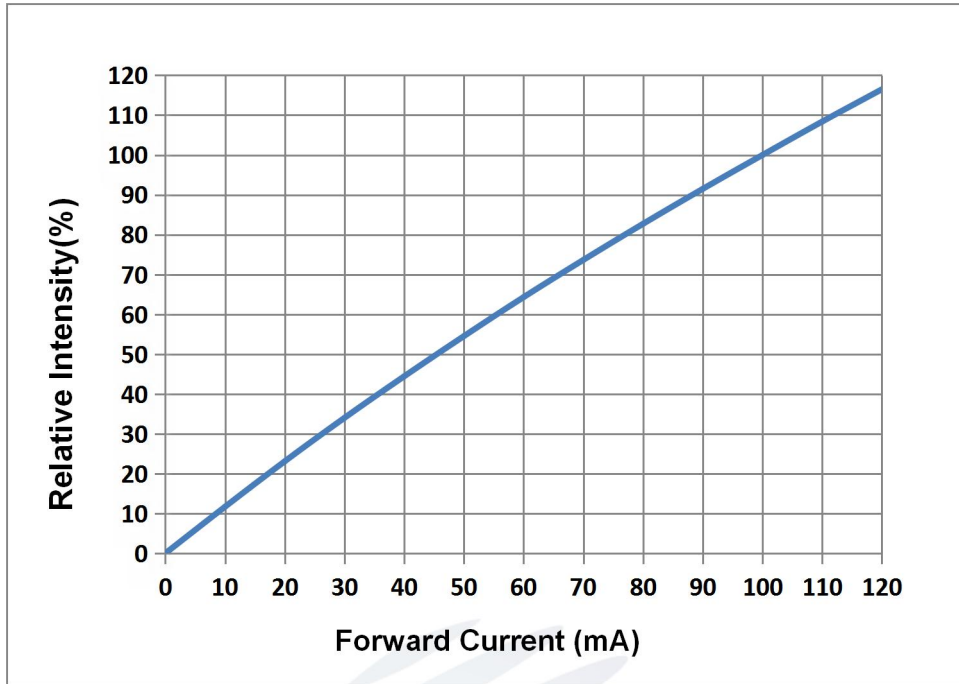


Fig 1-10 Forward Current Vs. Relative Intensity

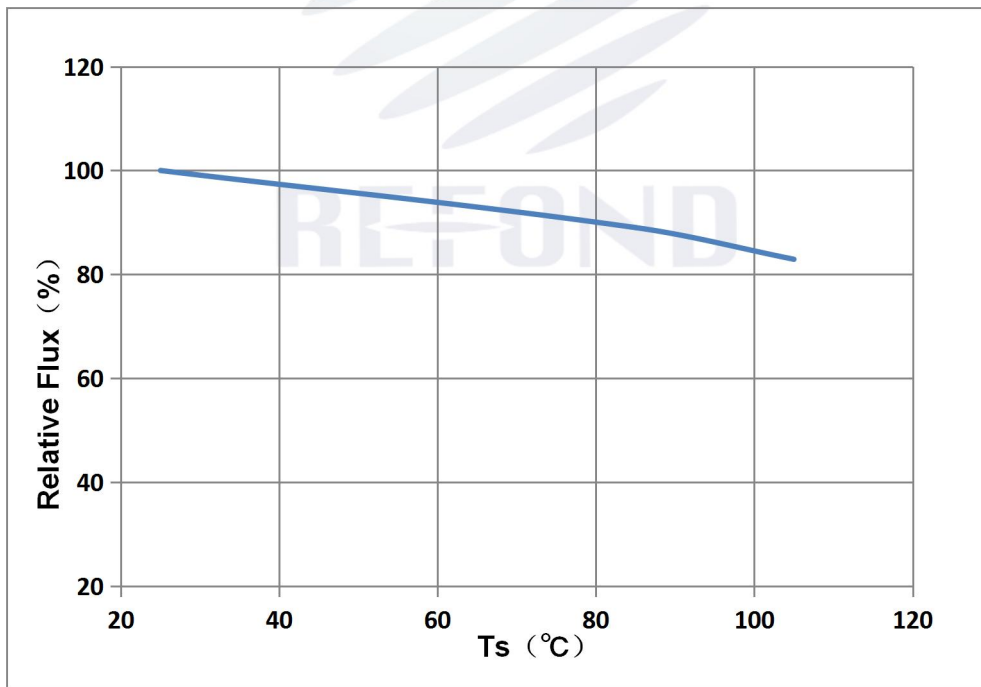
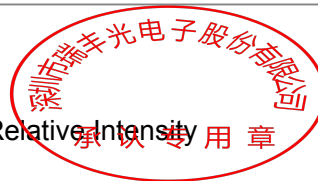


Fig 1-11 Solder Temperature Vs Relative Intensity



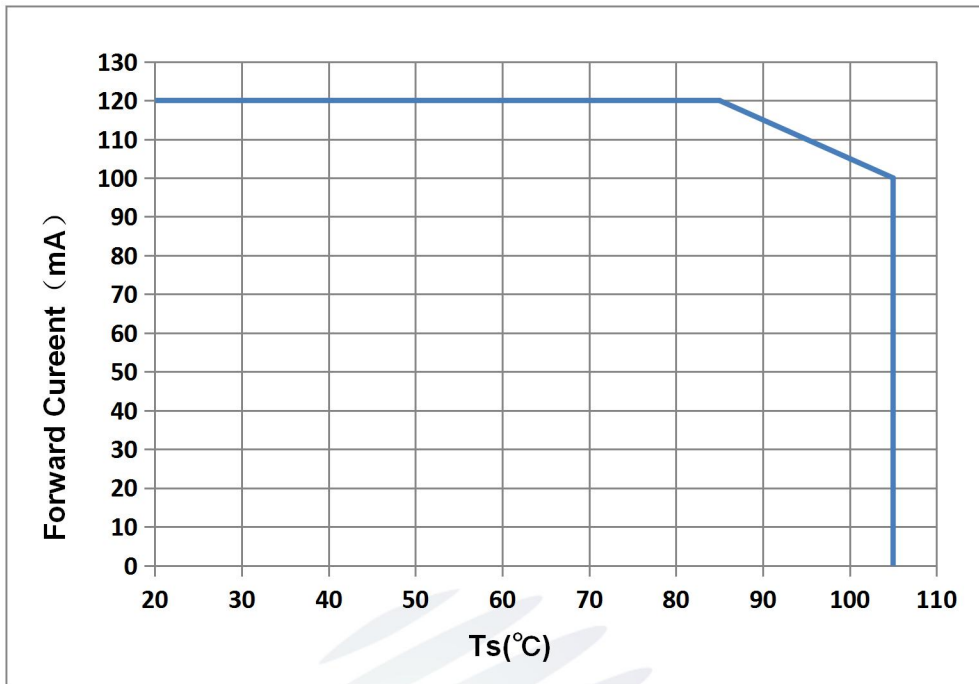


Fig 1-12 Solder Temperature Vs.Forward Current

$T_j \leq 135^\circ\text{C}$

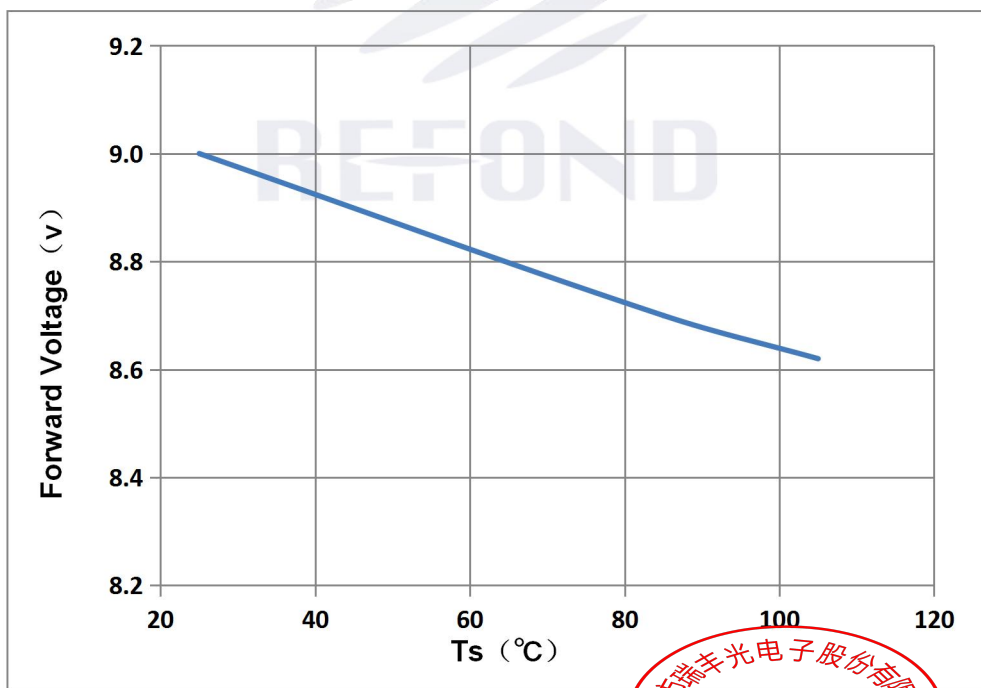
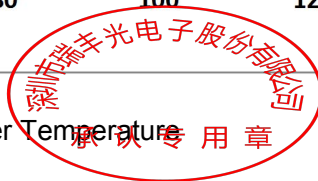


Fig 1-13 Forward Voltage Vs Solder Temperature



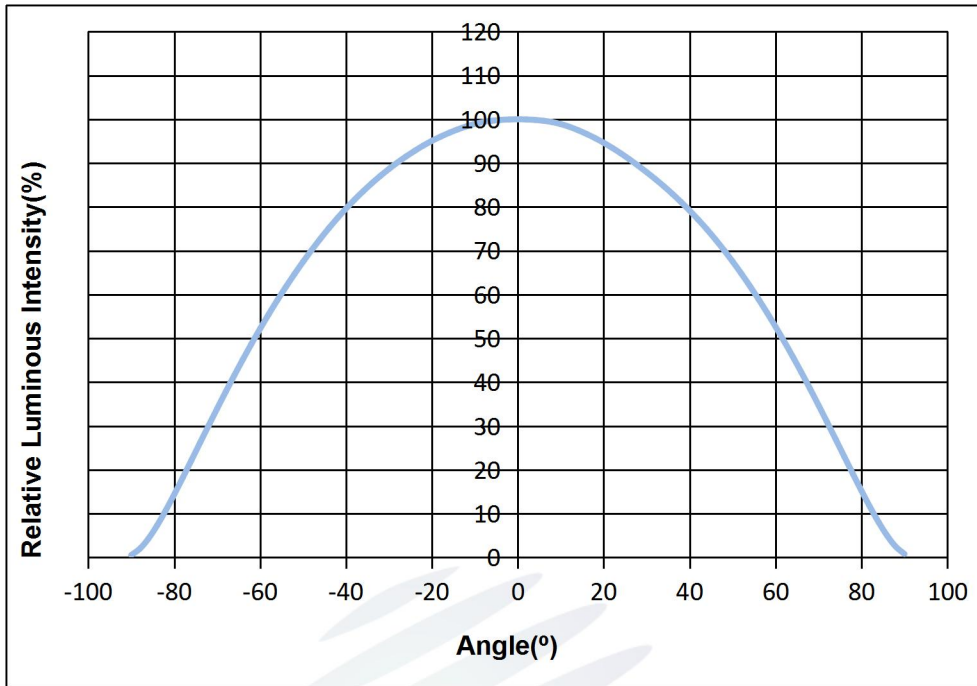


Fig 1-14 Radiation diagram

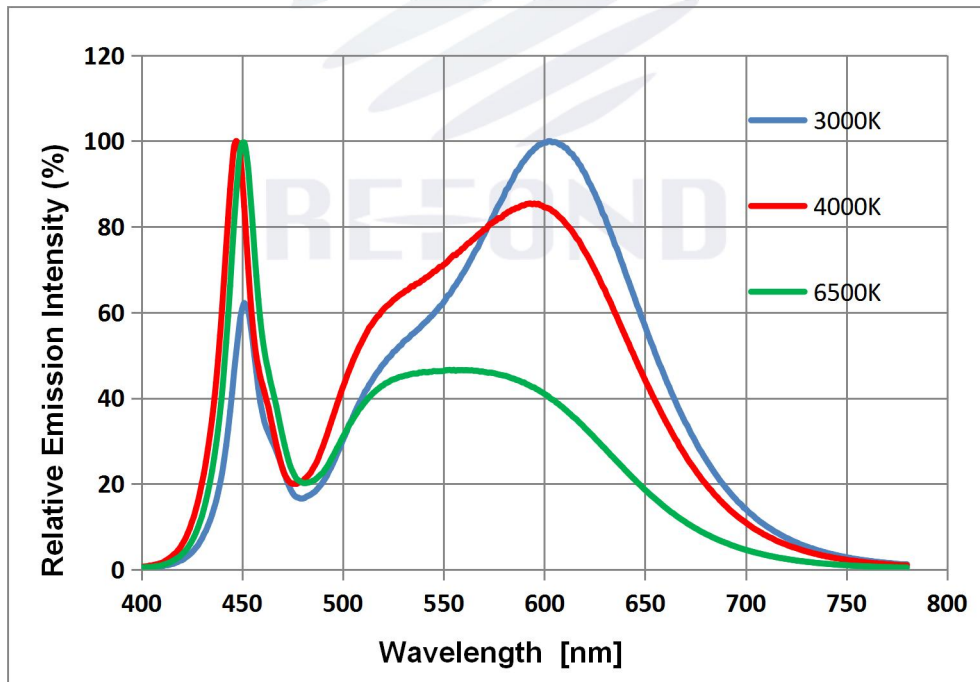


Fig 1-15 Spectrum Distribution



2. Packaging

2.1 Packaging Specification

Package: 16000pcs/reel

2.1.1 Carrier Tape Dimension

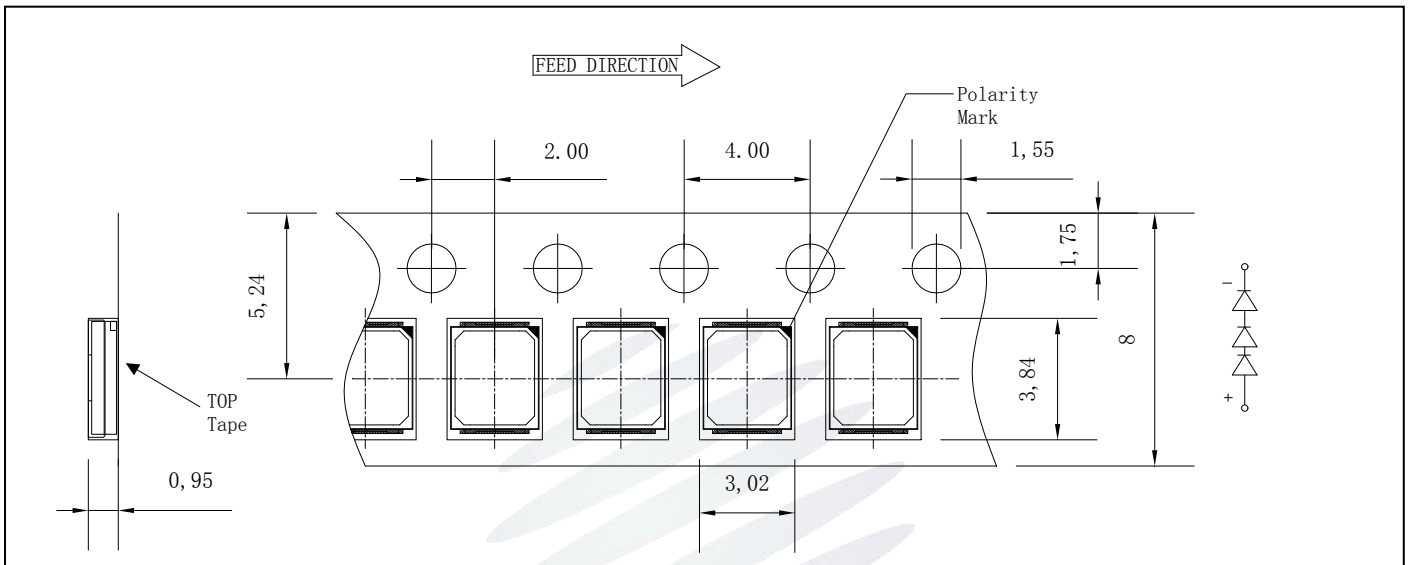


Fig.2-1 Carrier Tape Dimension

2.1.2 Reel Dimension

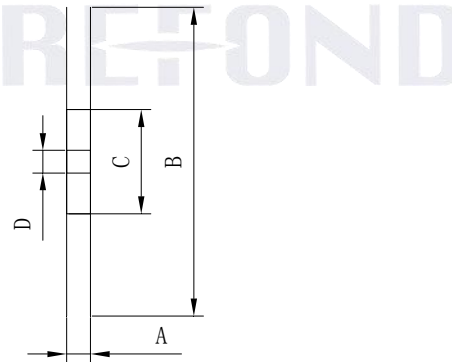
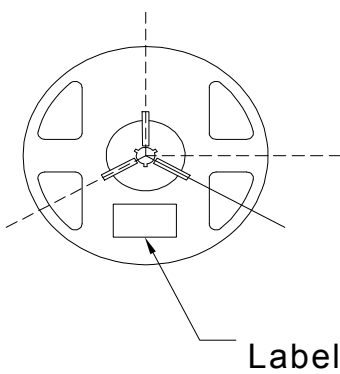


Table 2-1 Title

A	12.7±0.3mm
B	330.2±2mm
C	79.5±0.2mm
D	14.3±0.2mm

Fig.2-2Title

Notes:

The tolerances unless mentioned ±0.1mm. Unit : mm



2.1.3 Label Form Specification

Table 2-2 Title

PART NO:		
SPEC NO:		
LOT NO		
BIN CODE:		
Φ:	XY:	
VF:	WLD:	
	QTY:	
	DATE:	

PART NO.	Part Number
SPEC NO.	Spec Number
LOT NO.	Lot Number
BIN CODE	Bin Code
Φ	Luminous flux
XY	Chromaticity Bin
V _F	Forward Voltage
WLD	Wavelength
QTY	Packing Quantity
DATE	Made Date

Fig 2-3 Title

2.2 Moisture Resistant Packing

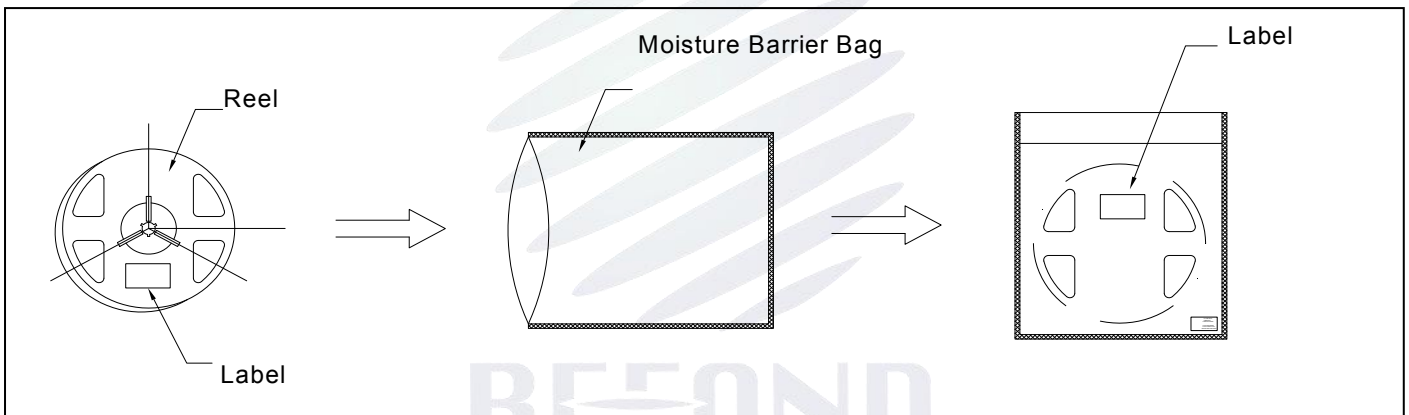


Fig.2-4Title

2.3 Cardboard Box

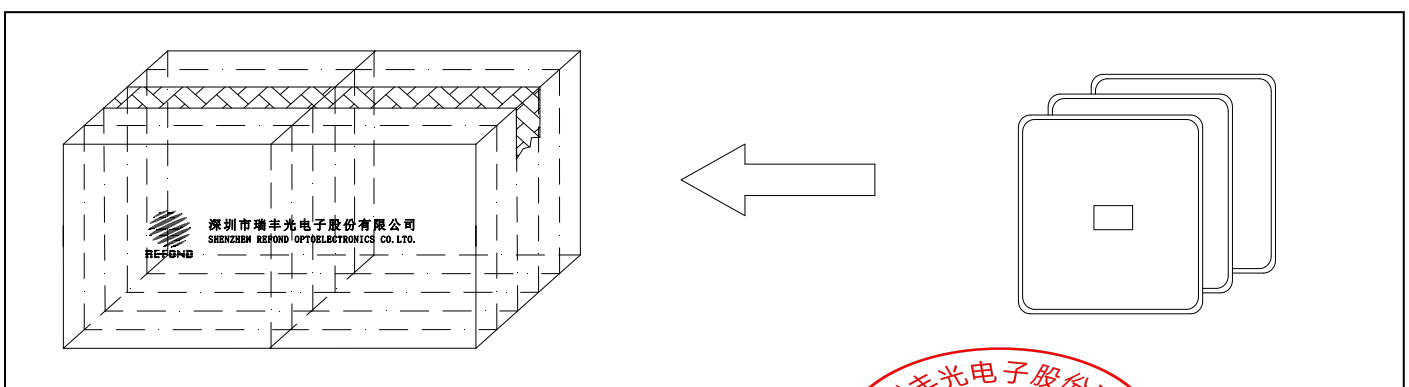


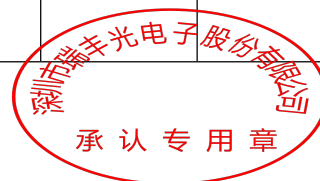
Fig.2-5Title



2.4 Reliability Test Items And Conditions

Table 2-3 Title

Test Items	Ref. Standard	Test Condition	Time	Quantity	Ac/Re
Reflow	JESD22-B106	Temp:260°Cmax T=10 sec	2times	10pcs	0/1
Thermal Shock	JEITAED-4701 300307	-40°C 15min ↑↓10s 100°C 15min	200cycles	10pcs	0/1
High Temperature Storage	JEITAED-4701 200 201	Temp:100°C	1000hrs	10pcs	0/1
Low Temperature Storage	JEITA ED-4701 200 202	Temp:-40°C	1000hrs	10pcs	0/1
Life Test	JESD22-A108	Ta=25°C If=100mA	1000hrs	10pcs	0/1
High Temperature High Humidity Life Test	JESD22-A101	60°C/ 90%RH If=100mA	1000hrs	10pcs	0/1
Temperature Humidity Storage	JEITA ED-4701 100 103	TA=85°C RH=85%	1000hrs	10pcs	0/1
Sulfur test	/	80°C, 4H, 0.6Cosan	4hrs	10pcs	0/1



2.5 Criteria For Judging Damage

Table 2-4 Title

Test Items	Symbol	Test Condition	Criteria For Judgement	
			Min.	Max.
Forward Voltage	V_F	$I_F=100\text{mA}$	-	$(\text{U.S.L}^*)\times 1.1$
Reverse Current	I_R	$V_R = 15\text{V}$	-	$(\text{U.S.L}^*)\times 2.0$
Luminous Flux	Φ	$I_F=100\text{mA}$	$(\text{L.S.L}^*)\times 0.7$	-

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

3.1 SMT Reflow Soldering Instructions

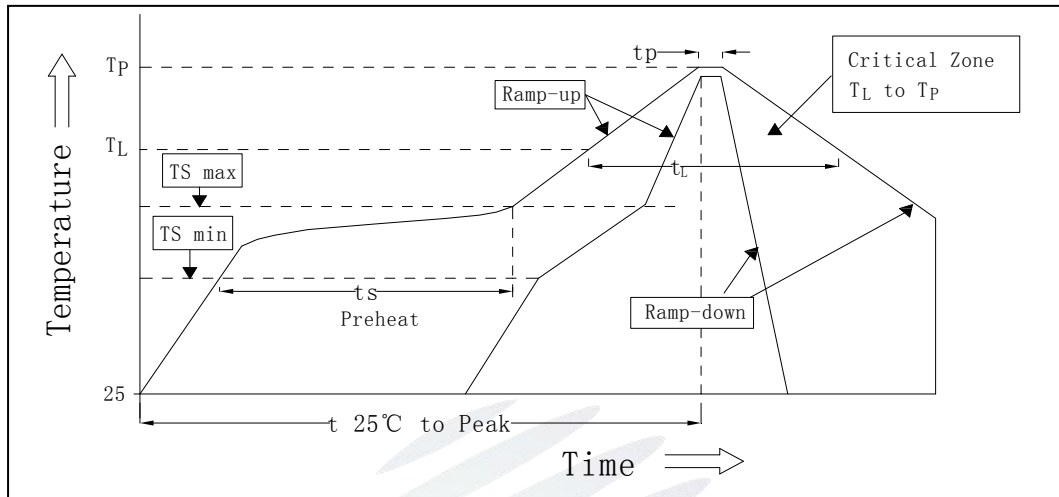


Fig.3-1Title

Table 3-1Title

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



Note:

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

3.1.1 Soldering Iron

- (1) When hand soldering, keep the temperature of iron below less 300°C less than 3 seconds
- (2) The hand solder should be done only one time.

3.1.2 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.

3.1.3 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 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.
- (2) Components should not be mounted on warped (non coplanar) portion of PCB. After soldering, do not warp the circuit board.
- (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.



(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.

(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.

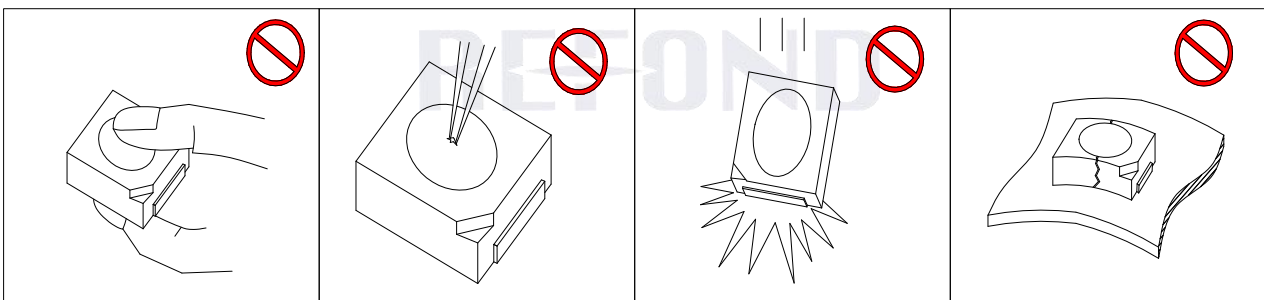


Fig 4-1 Title

(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 4-1Storage

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 the storage time , baking treatment should be performed after unpacking and based on the following condition (60±5) °C for above 24 hours.

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

REFOND

