

# SPECIFICATION

REFOND P/N

RF-W\*TI32DS-EF-2N

R&D

Mass Product

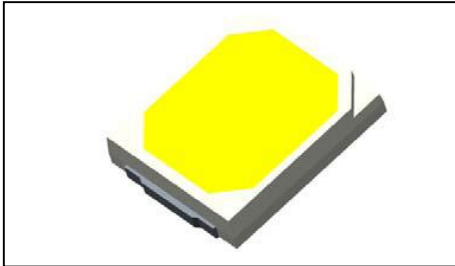
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## 1. Description

### 1.1



The White LED which was fabricated using a blue chip and the phosphor

Product Package: 2.8mmX3.5mmX0.7mm.

LED

2.8mmX3.5mmX0.7mm

### 1.2 Features

PLCC Package.

Extremely wide viewing angle.

Suitable for all SMT assembly and solder process. SMT

Available on tape and reel.

Moisture sensitivity level: Level 3. Level 3

RoHS compliant. RoHS

### 1.3 Application

Indoor lighting.

Bulb lighting.

General indoor applications.

### 1.4 Package Dimension

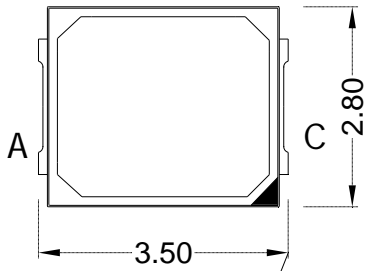


Fig.1-1 Top view



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 0.05mm unless otherwise noted.

±0.05

## 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	VF	IF=60mA	2.7	2.78	3.0	V
Reverse Current	IR	VR=5V	---	---	10	uA
RF-W4T132DS-EF-2N (3760-4350K)		IF=60mA	24	25.8	28	lm
RF-W5T132DS-EF-2N (4620-5410K)		IF=60mA	24	25.8	28	lm
Viewing Angle	2 1/2	IF=60mA	---	120	---	deg
Color Rendering Index	CRI	IF=60mA	90	91.5	---	---
Electrostatic Discharge	ESD	HBM	2000	---	---	V
Thermal Resistance.	RTHJ-S	IF=60mA	---	---	35	°W

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

Parameter	Symbol	Rating	Units
Power Dissipation	P <sub>D</sub>	540	mW
Forward Current	I <sub>F</sub>	180	mA
Peak Forward Current	I <sub>FP</sub>	300	mA
Reverse Voltage	V <sub>R</sub>	5	V
Operating Temperature	T <sub>OPR</sub>	-40 ~ +85	
Storage Temperature	T <sub>STG</sub>	-40 ~ +100	
Junction Temperature	T <sub>J</sub>	125	

Notes

1. 1/10 Duty cycle, 0.1ms pulse width. 0.1ms, 1/10.
2. The above forward voltage measurement allowance tolerance is  $\pm 0.1V$ .  $\pm 0.1V$
3. The above color coordinates measurement allowance tolerance is  $\pm 0.005$ .  $\pm 0.005$
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. LED D
8. ESD yield is over 90% at 2000V ESD (HBM). ESD protection S ng

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## 1.6 Bin Range Of Forward Voltage and Luminous Flux

## BIN

Table 1-3

VF(V)	F2	G1	G2
	2.7-2.8	2.8-2.9	2.9-3.0
(LM)	QHA	QIA	
	24.0-26.0	26.0-28.0	

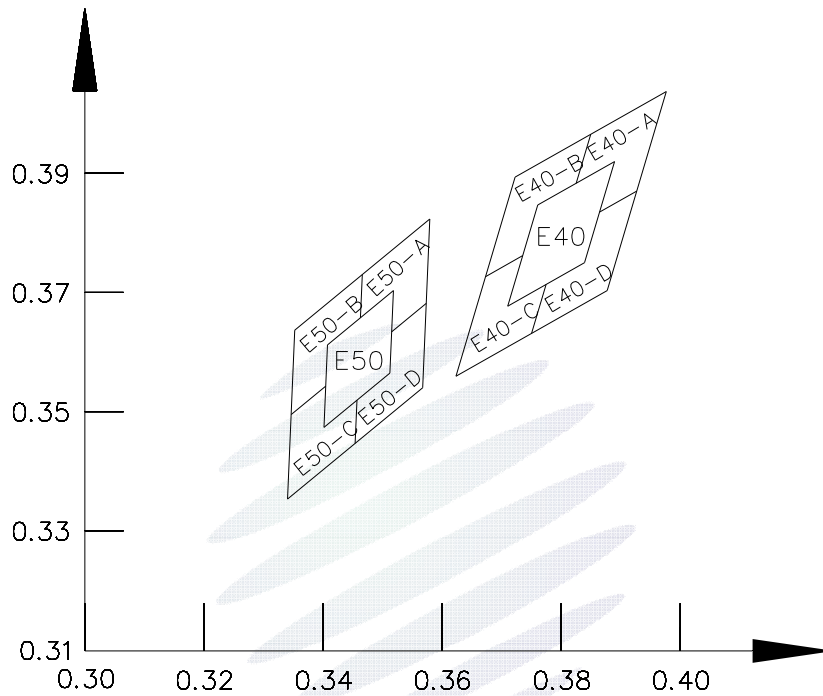


Fig 1-6 The C.I.E Chromaticity Diagram CIE

Table 1-4

BIN CODE	X1	Y1	X2	Y2	X3	Y3	X4	Y4				
E40	0.3871	0.3894	0.3769	0.3838	0.3729	0.3704	0.3832	0.3761				
E50	0.3518	0.3705	0.3408	0.3614	0.3402	0.3475	0.3512	0.3566				
BIN CODE	X1	Y1	X2	Y2	X3	Y3	X4	Y4	X5	Y5	X6	Y6
E40-A	0.3977	0.4039	0.385	0.3967	0.382	0.3866	0.3871	0.3894	0.3852	0.3829	0.3927	0.3872
E40-B	0.385	0.3967	0.3723	0.3895	0.3673	0.3728	0.3749	0.3771	0.3769	0.3838	0.382	0.3866
E40-C	0.378	0.3732	0.3729	0.3704	0.3749	0.3771	0.3673	0.3728	0.3623	0.3561	0.375	0.3633
E40-D	0.3852	0.3829	0.3832	0.3761	0.378	0.3732	0.375	0.3633	0.3877	0.3705	0.3927	0.3872
E50-A	0.3579	0.3825	0.3466	0.3732	0.3463	0.3659	0.3518	0.3705	0.3515	0.3636	0.3573	0.3683
E50-B	0.3466	0.3732	0.3353	0.3638	0.3347	0.3497	0.3405	0.3544	0.3408	0.3614	0.3463	0.3659
E50-C	0.3347	0.3497	0.3341	0.3355	0.3454	0.3448	0.3457	0.3521	0.3402	0.3475	0.3405	0.3544
E50-D	0.3515	0.3636	0.3512	0.3566	0.3457	0.3521	0.3454	0.3448	0.3567	0.3542	0.3573	0.3683

### 1.7 Typical optical characteristics curves

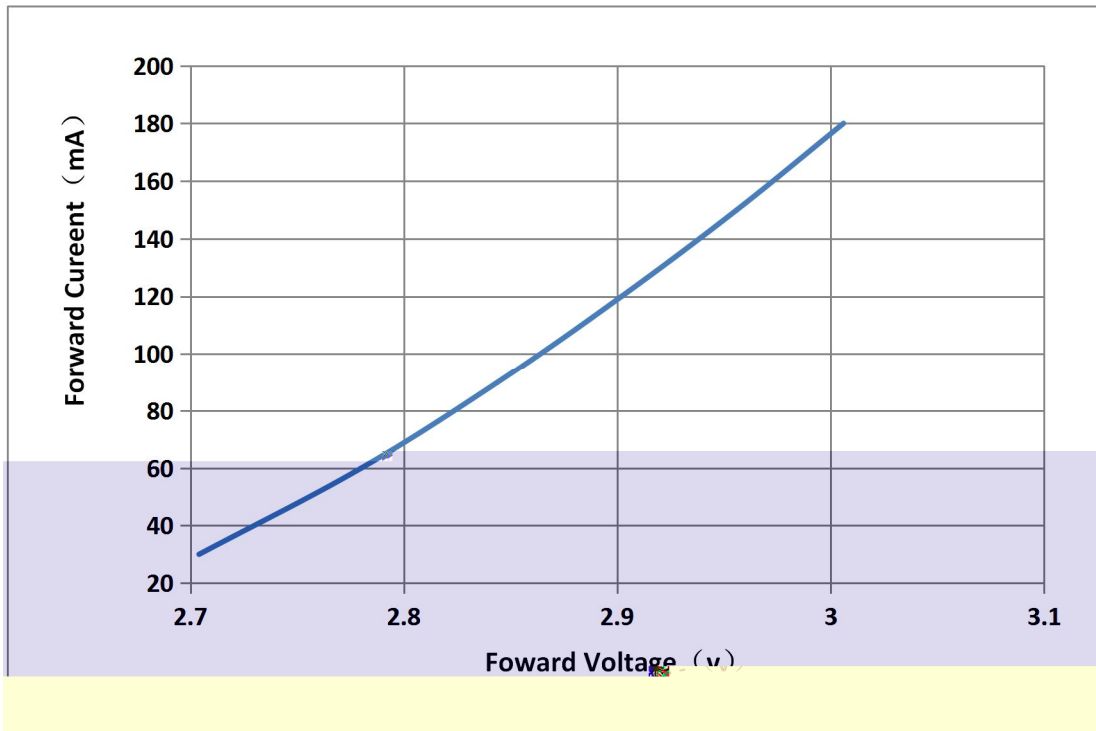


Fig 1-7 Forward Voltage Vs. Forward Current

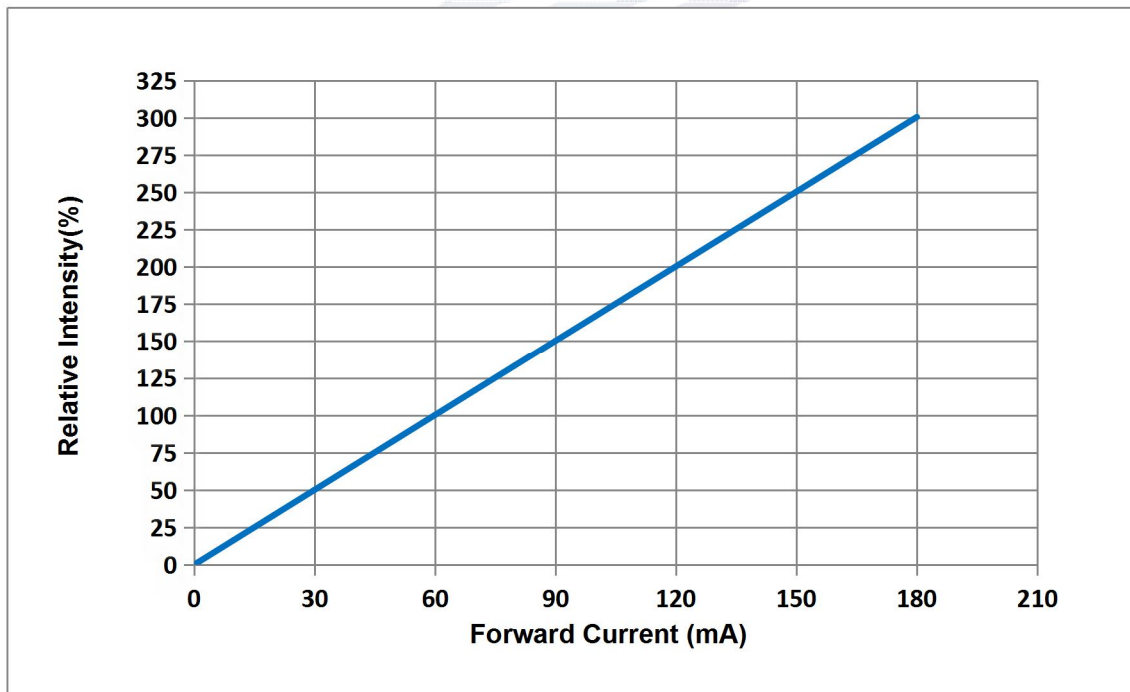


Fig 1-8 Forward Current Vs. Relative Intensity

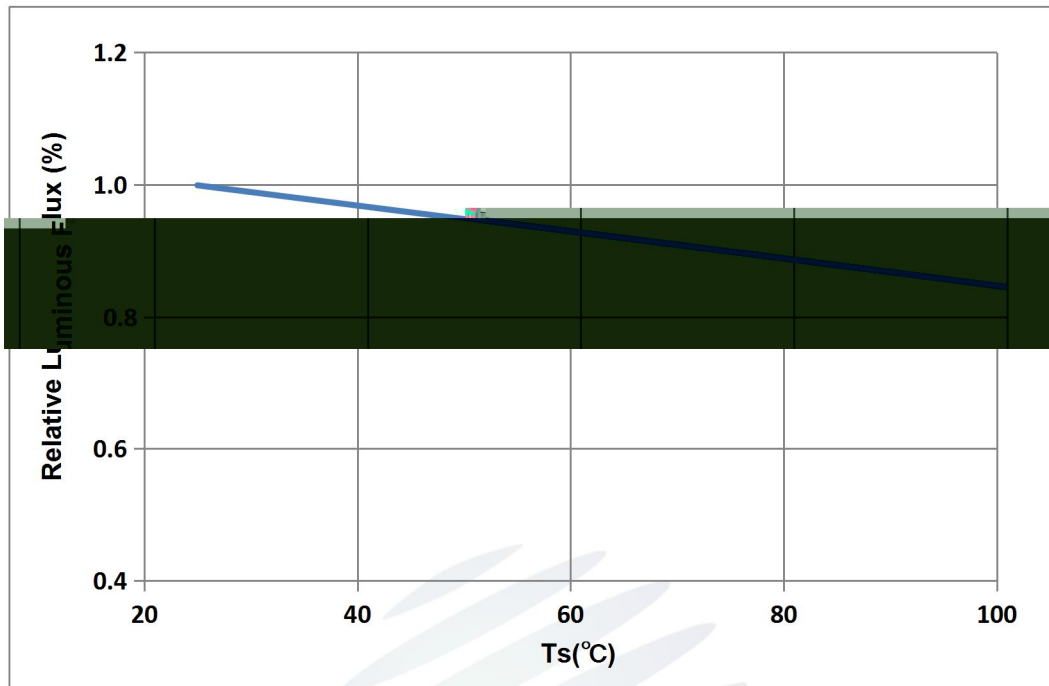


Fig 1-9 Solder Temperature Vs Relative Intensity

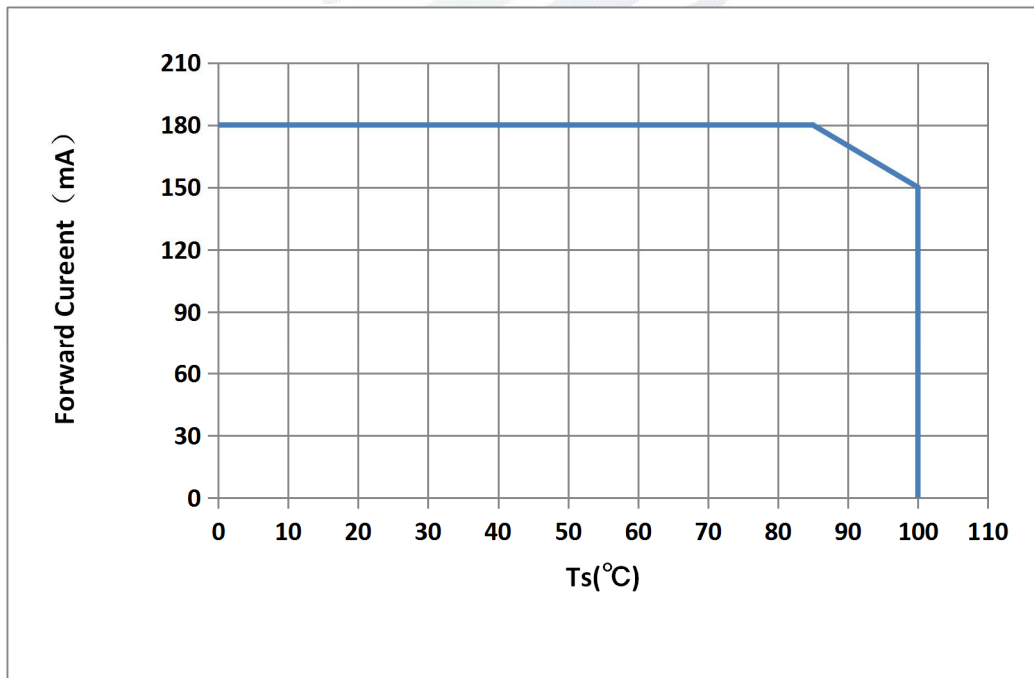


Fig 1-10 Solder Temperature Vs Forward Current

Tj 125

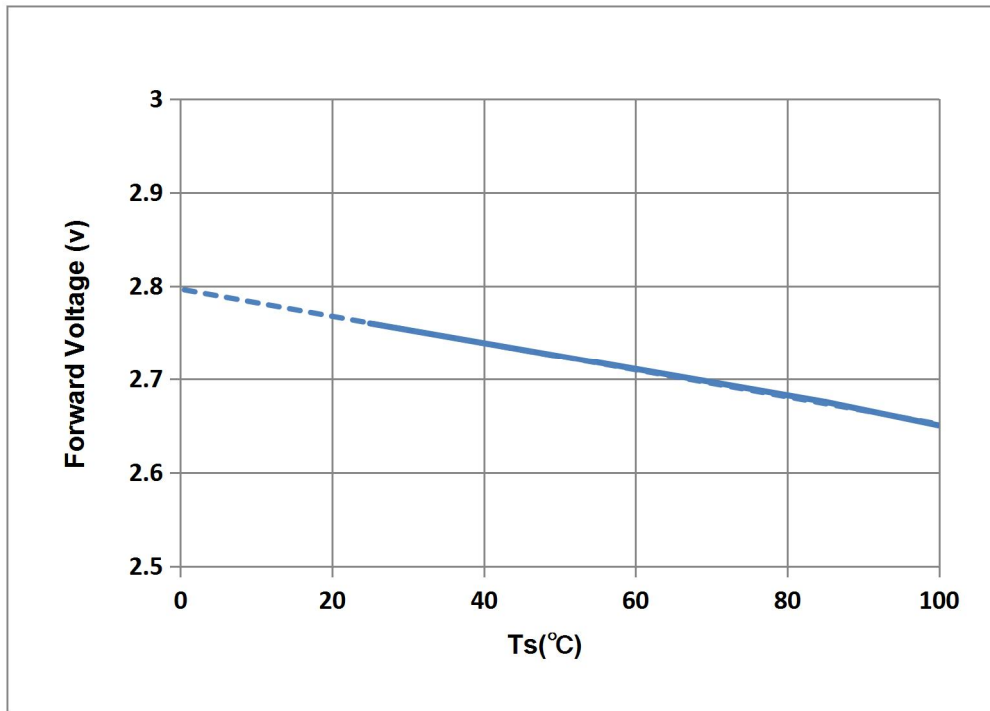


Fig 1-11 Forward Voltage Vs Solder Temperature

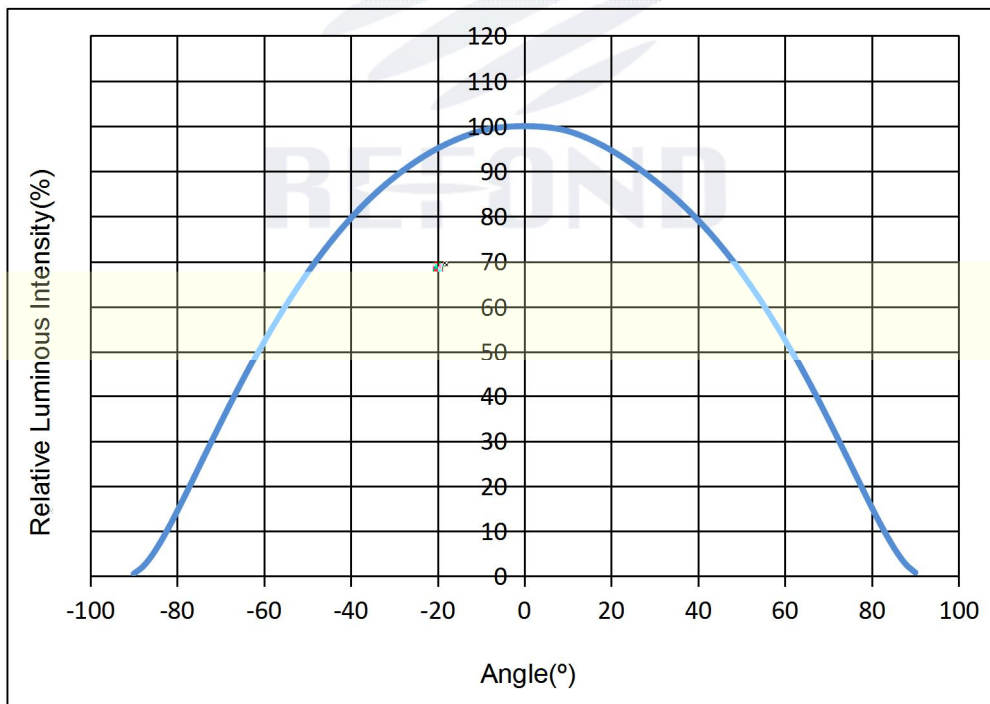


Fig 1-12 Radiation diagram

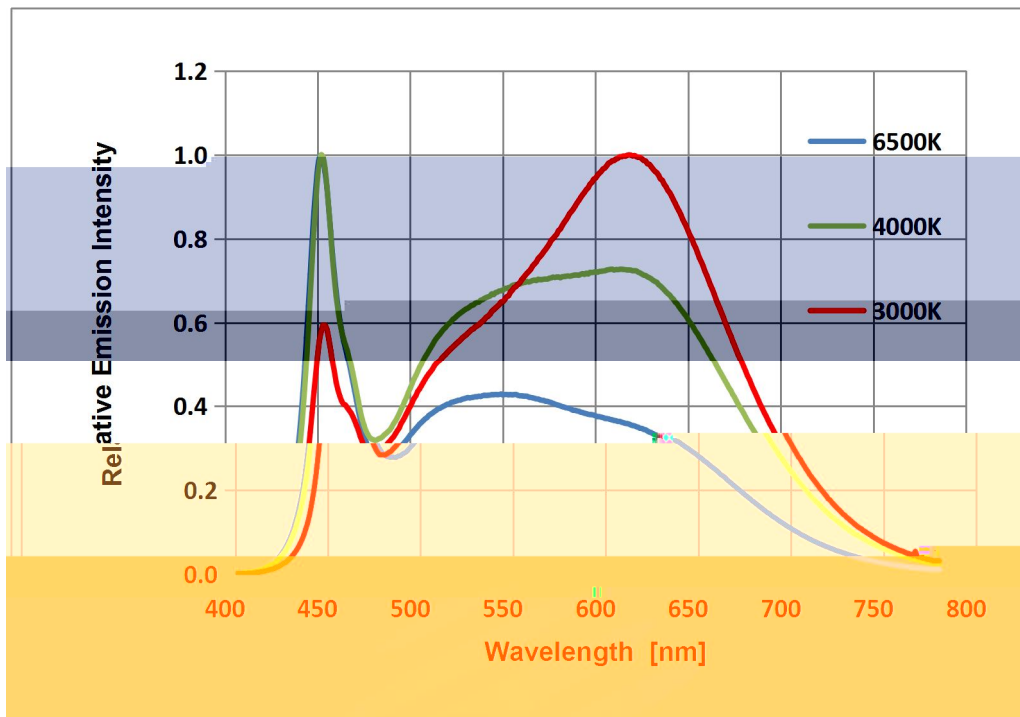


Fig 1-13 Spectrum Distribution

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## 2 . Packaging

### 2.1 Packaging Specification

Package:12000/4000pcs/reel.

12000/4000pcs

#### 2.1.1Carrier Tape Dimension

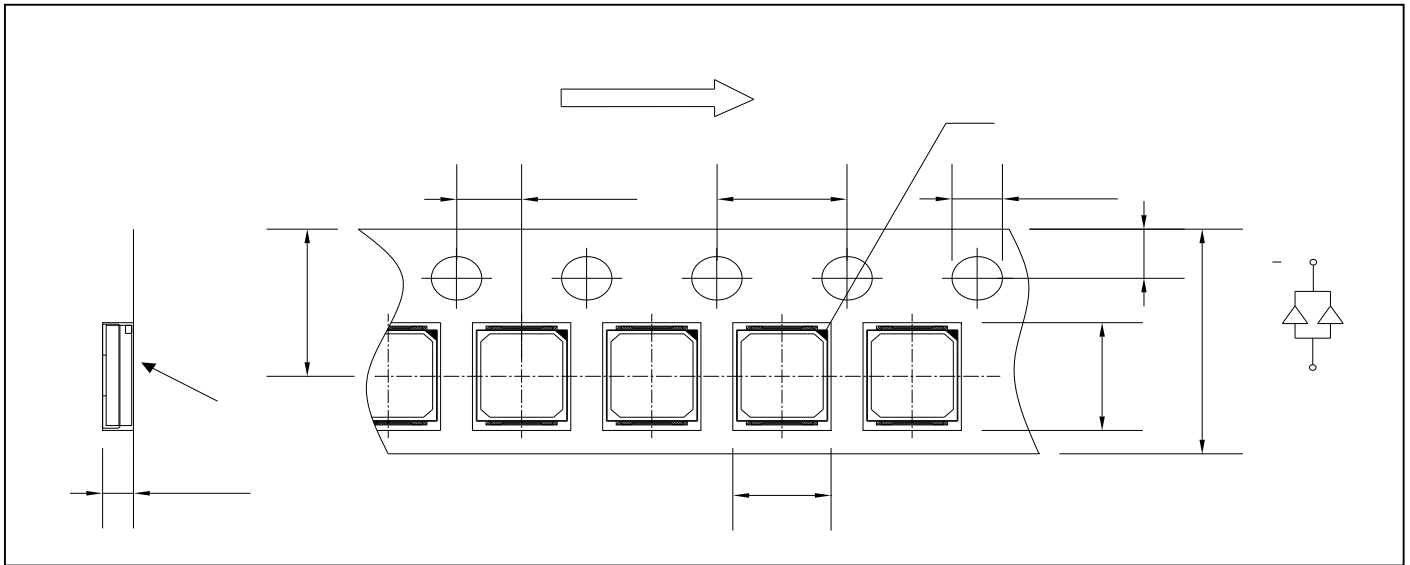


Fig.2-1 Carrier Tape Dimension

#### 2.1.2Reel Dimension

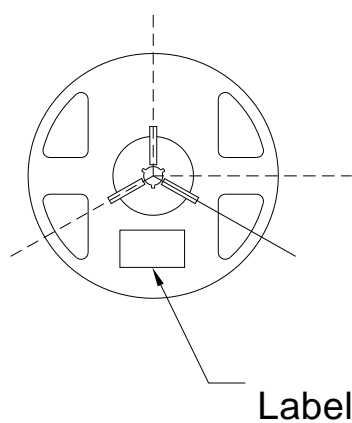


Fig.2-2Title

Table 2-1 Title

A	8.7±0.3mm	A	8.5±0.3mm
B	290±2.0mm	B	178±1.0mm
C	79.6±0.2mm	C	59±1.0mm
D	14.2±0.2mm	D	13.5±0.3mm
12K		4K	

#### Notes

The tolerances unless mentioned ±0.1mm. Unit : mm

±0.1

3.Label Form Specification



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

Table 2-2 Title

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 Title

Moisture Resistant Packing

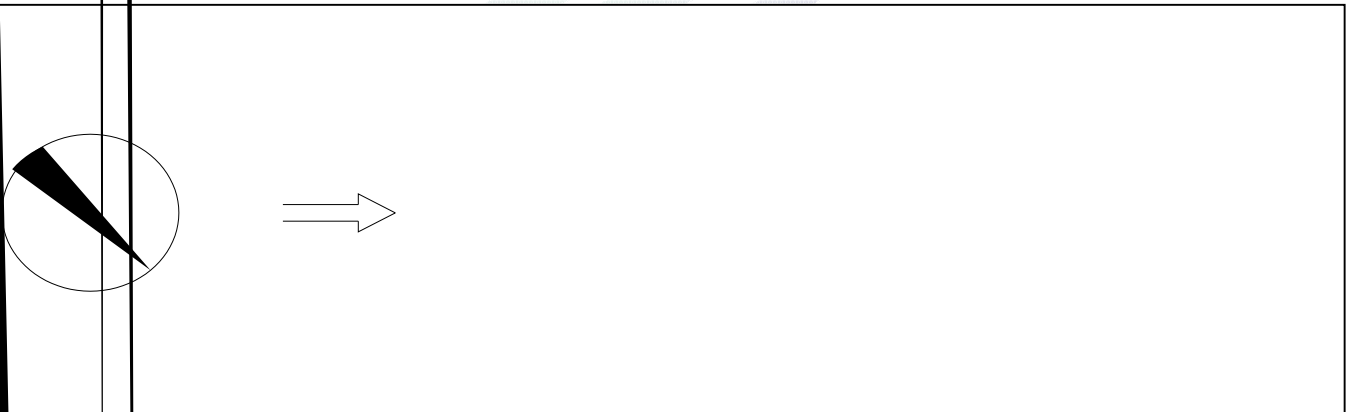


Fig.2- Title

Cardboard Box

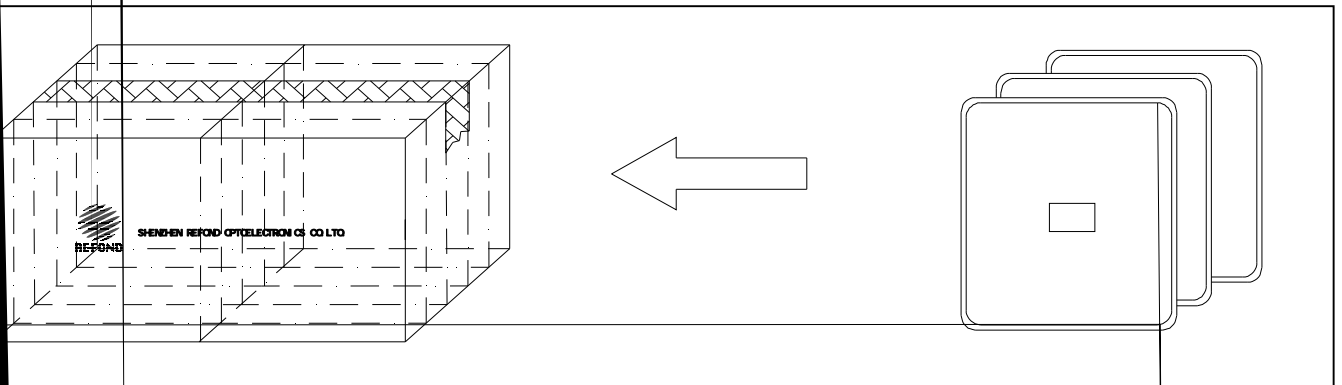


Fig.2- Title

## 2.4 Reliability Test Items And Conditions

Table 2-3 Title

TestItems	Ref.Standard	Test Condition	Time	Quantity	Ac/Re /
Reflow	JESD22-B106	Temp:260 max T=10 sec	2times	10pcs	0/1
Thermal Shock	JEITAED-4701 300307	-40 15min 10s 100 15min	200cycles	10pcs	0/1
High Temperature Storage	JEITAED-4701 200 201	Temp:100	1000hrs	10pcs	0/1
Low Temperature Storage	JEITA ED-4701 200 202	Temp:-40	1000hrs	10pcs	0/1
Life Test	JESD22-A108	Ta=25 If=60mA	1000hrs	10pcs	0/1
High Temperature High Humidity Life Test	JESD22-A101	60 / 90%RH If=60mA	1000hrs	10pcs	0/1
Temperature Humidity Storage	JEITA ED-4701 100 103	TA=85 RH=85%	1000hrs	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	$V_F$	$I_F=60\text{mA}$	-	$(\text{U.S.L}^*)\times 1.1$
Reverse Current	$I_R$	$V_R = 5\text{V}$	-	$(\text{U.S.L}^*)\times 2.0$
Luminous Flux		$I_F=60\text{mA}$	$(\text{L.S.L}^*)\times 0.7$	-

### 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. / LED  
LED
- 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.

## SMT Reflow Soldering Instructions SMT

### 3.1 SMT Reflow Soldering Instructions SMT

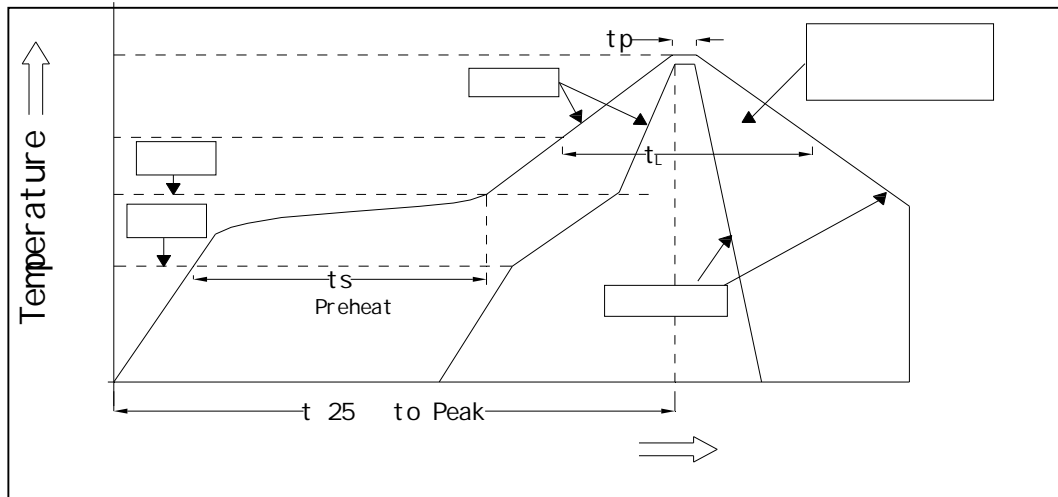


Fig.3-1Title

Table 3-1Title

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
Hold time within 5 °C with the actual peak temperature ( $T_P$ )	( $T_P$ ) 5 °C	30	Max 30s
Cooling speed		6 °C/	Max 6 °C/ s
Needed time from 25 °C to $T_p$	25 °C	8	Max 8 minutes



(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.

## 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 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. LED LED 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. LED

LED

LED

LED

(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.

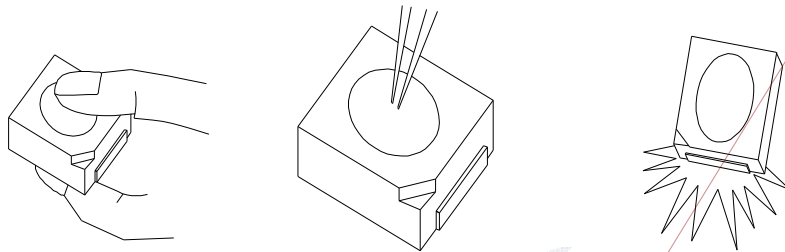


Fig 4-1 Title

(5) In designing a circuit, the current through each LED can not be rating specified for each LED. In the mean while, resistors for protection otherwise slight voltage shift will cause big current change, burn circuit must be designed to allow forward voltage only when it is voltage is applied to LED, migration can be generated resulting in

LED

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LED

(6) Thermal Design is paramount importance because heat generation Characteristics decline, such as brightness decreased, Color change the heat generation of the LEDs when making the system design

LED

(7) Compared to standard encapsulants, silicone to attract dust, requiring special care dust particles cannot be guaranteed after the soldering of components

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.

### 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%	24hours 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





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Declare

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