SPECIFICATION

REFOND P/N

RF-W2SA50TS-RXXW

□R&D

■Mass Product

深圳市瑞丰光电子股份有限公司 承认专用章

Contents

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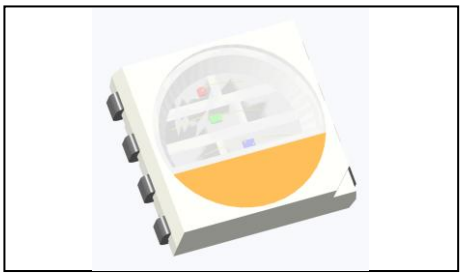
1. Description

1.1General Description



The Red source color devices are made with AlGaInP on Substrate Light Emitting Diode

The Green source color devices are made with InGaN on Substrate Light Emitting Diode

The Blue source color devices are made with InGaN on Substrate Light Emitting Diode

The White LED which was fabricated using a blue chip

The LED package dimension: 5.4mmX5.0mmX1.55mm.

1.2Features

►PLCC-8 Package.

►Extremely wide viewing angle.

►Suitable for all SMT assembly and solder process.

►Available on tape and reel.

►Moisture sensitivity level: Level 5a.

►RoHS compliant.

1.3Application

► Article color lamp,lamp belt.

► Landscape lighting,Trademark logo.

► Hotels,markets,offices,household and other architectural uses.

►General use.

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1.4Package Dimension

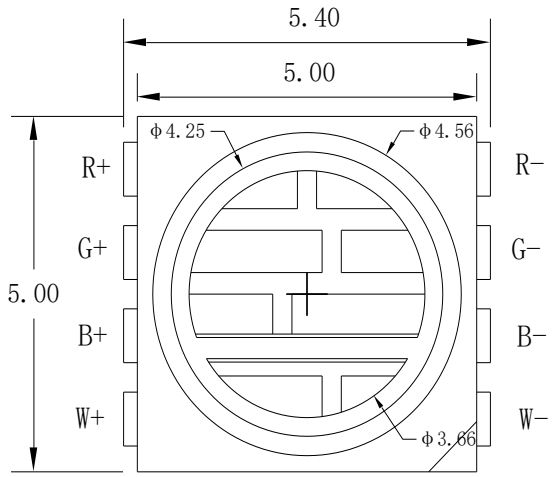

Fig.1-1 Top view

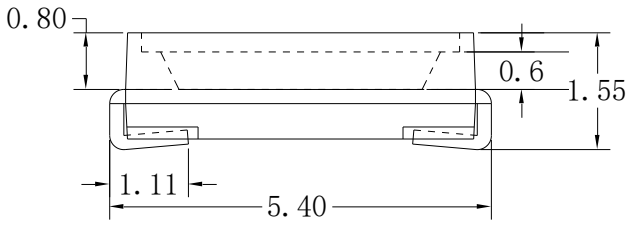

Fig.1-2Side view

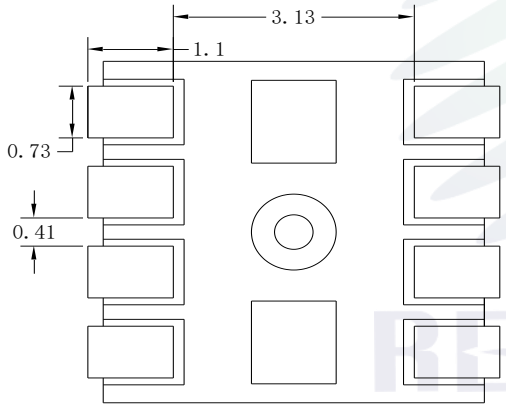

Fig.1-3Bottom view

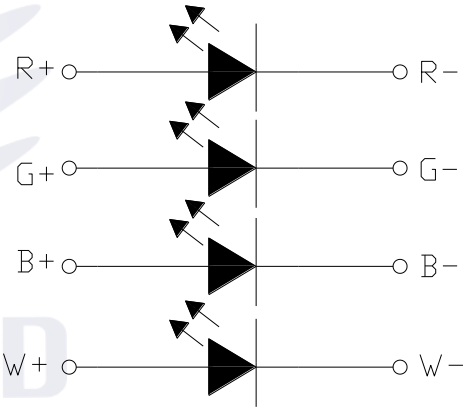

Fig.1-4Polarity

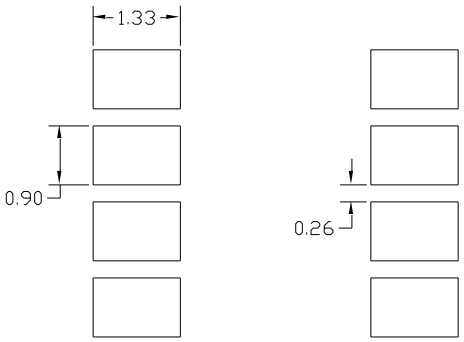

Fig.1-5Soldering patterns

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Notes：

1. All dimensions units are millimeters.

2. All dimensions tolerances are ±0.2mm unless otherwise noted.

1.5Product Parameters

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

Item	Symbol	Test Condition	Value			Unit
			Min.	Typ	Max.	
Forward Voltage R	V_F	I_F=20mA	2.0	---	2.3	V
Forward Voltage G			2.95	---	3.25	V
Forward Voltage B			2.85	---	3.25	V
Forward Voltage W			2.75	---	3.05	V
Luminous Intensity R	I_V	I_F=20mA	700	---	1000	mcd
Luminous Intensity G			1800	---	2400	mcd
Luminous Intensity B			350	---	650	mcd
Luminous Flux RF-W2SA50TS-R30W (3000K)	Φ_v	I_F=20mA	6.5	---	9.5	lm
Luminous Flux RF-W2SA50TS-R40W (4000K)			6.5	---	9.5	lm
Luminous Flux RF-W2SA50TS-R42W (4100K)			6.5	---	9.5	lm

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Luminous Flux RF-W2SA50TS-R60W (6000K)			6.5	---	9.5	lm
Luminous Flux RF-W2SA50TS-R27W (2700K)			6.5	---	9.5	lm
Dominant Wavelength R	λ_D	I_F=20mA	618	---	623	nm
Dominant Wavelength G			521	---	526	nm
Dominant Wavelength B			467	---	472	nm
Reverse Current	I_R	V_R=5V	---	---	10	uA
Viewing Angle R	2θ1/2	I_F=20mA	---	121	---	deg
Viewing Angle G			---	123	---	deg
Viewing Angle B	2θ1/2	I_F=20mA	---	120	---	deg
Viewing Angle W			---	117	---	deg
Color Rendering Index	R_a	I_F=20mA	80	---	---	---
Thermal Resistance R	R_{THJ-S}	I_F=20mA	---	120	---	℃/W
Thermal Resistance G			---	105	---	℃/W
Thermal Resistance B			---	85	---	℃/W
Thermal Resistance W			---	75	---	℃/W

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

Parameter	Symbol	Rating	Units
Power Dissipation	P_D	293.75	mW
Forward Current	I_F	R/G/B/W：25	mA
Peak Forward Current	I_{FP}	80	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 ~ +85	℃
Junction Temperature R	T_J	94	℃
Junction Temperature G	T_J	94	℃
Junction Temperature B	T_J	94	℃
Junction Temperature W	T_J	93	℃

Notes：

1. 1/10 Duty cycle, 0.1ms pulse width.
2. The above forward voltage measurement allowance tolerance is ±0.1V.
3. The above wavelength measurement allowance tolerance is ±1nm.
4. The above color coordinates measurement allowance tolerance is±0.005.
5. The above luminous intensity measurement allowance tolerance ±10%.
6. The above color rending index measurement allowance tolerance is ±1.
7. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.
8. All measurements were made under the standardized environment of Refond.

9.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.

10. ESD yield is over 80% at 2000V ESD (HBM). ESD protection during products handing is needed.

1.5.1 Bin Range Of Forward Voltage and Luminous Intensity (IF=20mA)

Table 1-3

Forward Voltage R	V_F（V）R	Rv
		2.0-2.3
Forward Voltage G	V_F（V）G	Gv
		2.95-3.25
Forward Voltage B	V_F（V）B	Bv
		2.85-3.25
Forward Voltage W	V_F（V）W	Cv
		2.75-3.05
Dominant Wavelength R	WLD-R (nm)	RL
		618-623
Dominant Wavelength G	WLD-G (nm)	GL1
		521-526
Dominant Wavelength B	WLD-B (nm)	BL
		467-472
Luminous Intensity R	I_V (mcd）R	RI
		700-1000
Luminous Intensity G	I_V (mcd) G	GI
		1800-2400
Luminous Intensity B	I_V (mcd) B	BI
		350-650
RF-W2SA50TS-R30W Φ_v	Φ_v (lm)	CI
		6.5-9.5
RF-W2SA50TS-R40W Φ_v	Φ_v (lm)	CI
		6.5-9.5
RF-W2SA50TS-R42W Φ_v	Φ_v (lm)	CI
		6.5-9.5
RF-W2SA50TS-R60W Φ_v	Φ_v (lm)	CI
		6.5-9.5
RF-W2SA50TS-R27W Φ_v	Φ_v (lm)	CI
		6.5-9.5

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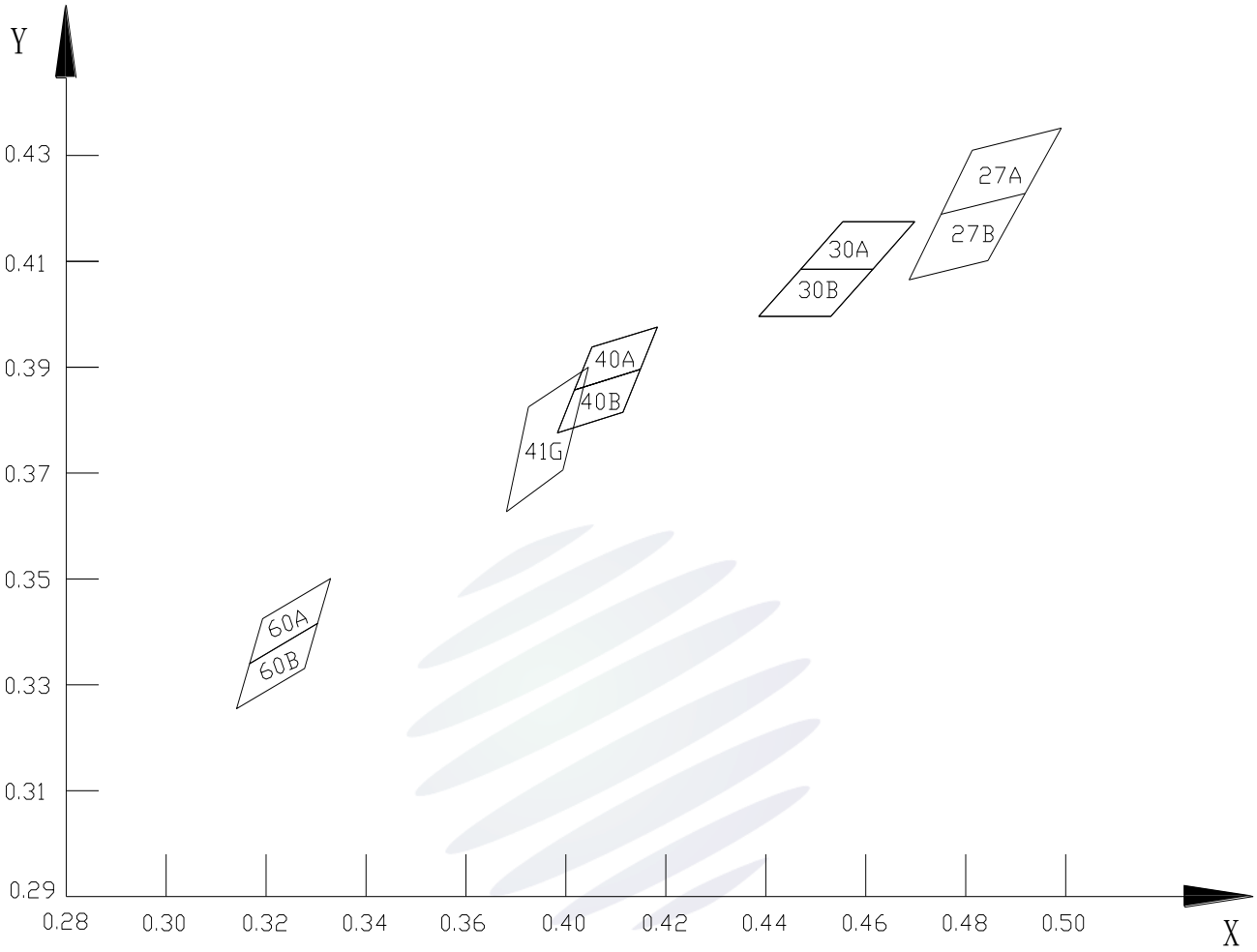

Fig 1-6 The C.I.E Chromaticity Diagram

1.5.2 BIN and parameter comparison table

Table 1-4

Bin code	XY	VF-W	VF-G	VF-R	VF-B	IV-W	IV-G	IV-R	IV-B	WLD-G	WLD-R	WLD-B
RF-W2SA50TS-R30W												
K1	30A	2.75-3.05	2.95-3.25	2.0-2.3	2.85-3.25	6.5-9.5	1800-2400	700-1000	350-650	521-526	618-623	467-472
K2	30B	2.75-3.05	2.95-3.25	2.0-2.3	2.85-3.25	6.5-9.5	1800-2400	700-1000	350-650	521-526	618-623	467-472
RF-W2SA50TS-R40W												
M1	40A	2.75-3.05	2.95-3.25	2.0-2.3	2.85-3.25	6.5-9.5	1800-2400	700-1000	350-650	521-526	618-623	467-472
M2	40B	2.75-3.05	2.95-3.25	2.0-2.3	2.85-3.25	6.5-9.5	1800-2400	700-1000	350-650	521-526	618-623	467-472
RF-W2SA50TS-R60W												
N1	60A	2.75-3.05	2.95-3.25	2.0-2.3	2.85-3.25	6.5-10	1800-2400	700-1000	350-650	521-526	618-623	467-472
N2	60B	2.75-3.05	2.95-3.25	2.0-2.3	2.85-3.25	6.5-10	1800-2400	700-1000	350-650	521-526	618-623	467-472
RF-W2SA50TS-R27W												
P1	27A	2.75-3.05	2.95-3.25	2.0-2.3	2.85-3.25	6.5-9.5	1800-2400	700-1000	350-650	521-526	618-623	467-472
P2	27B	2.75-3.05	2.95-3.25	2.0-2.3	2.85-3.25	6.5-9.5	1800-2400	700-1000	350-650	521-526	618-623	467-472
RF-W2SA50TS-R42W												
L1	41G	2.75-3.05	2.95-3.25	2.0-2.3	2.85-3.25	6.5-9.5	1800-2400	700-1000	350-650	521-526	618-623	467-472

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1.6 Typical optical characteristics curves

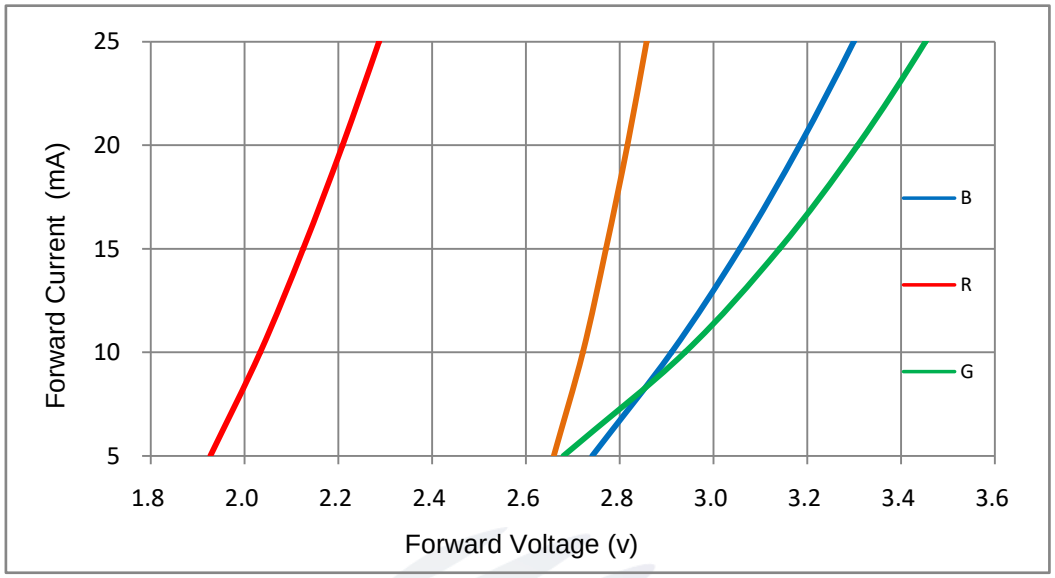

Fig 1-7 Forward Voltage Vs. Forward Current

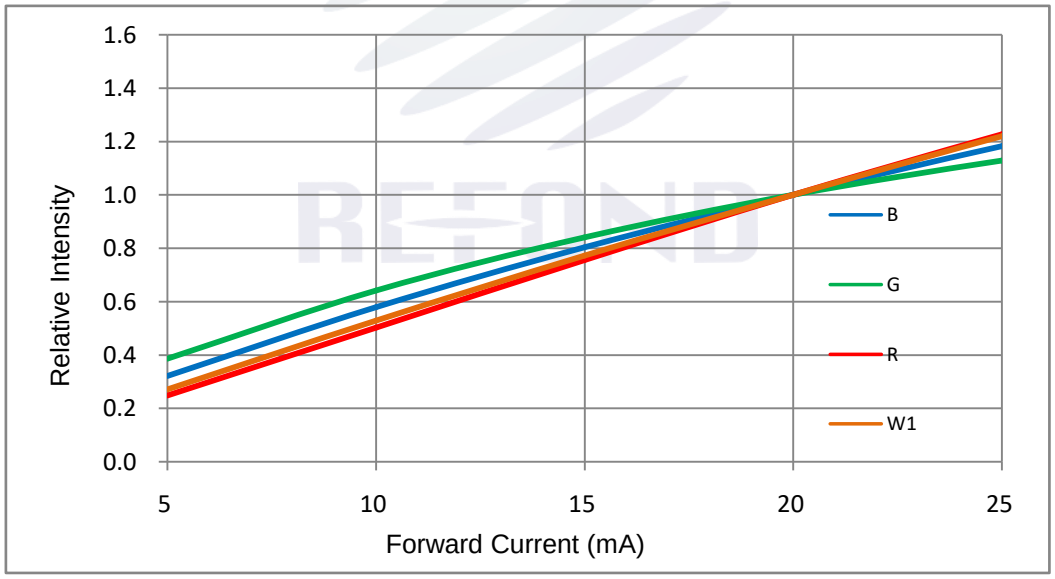

Fig 1-8 Forward Current Vs. Relative Intensity

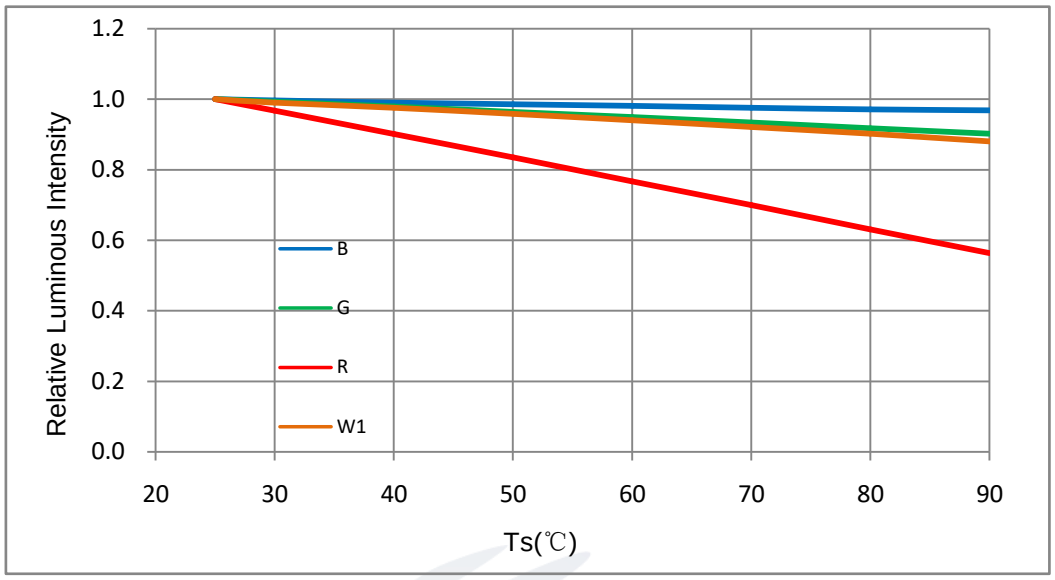

Fig 1-9 Solder Temperature Vs Relative Intensity

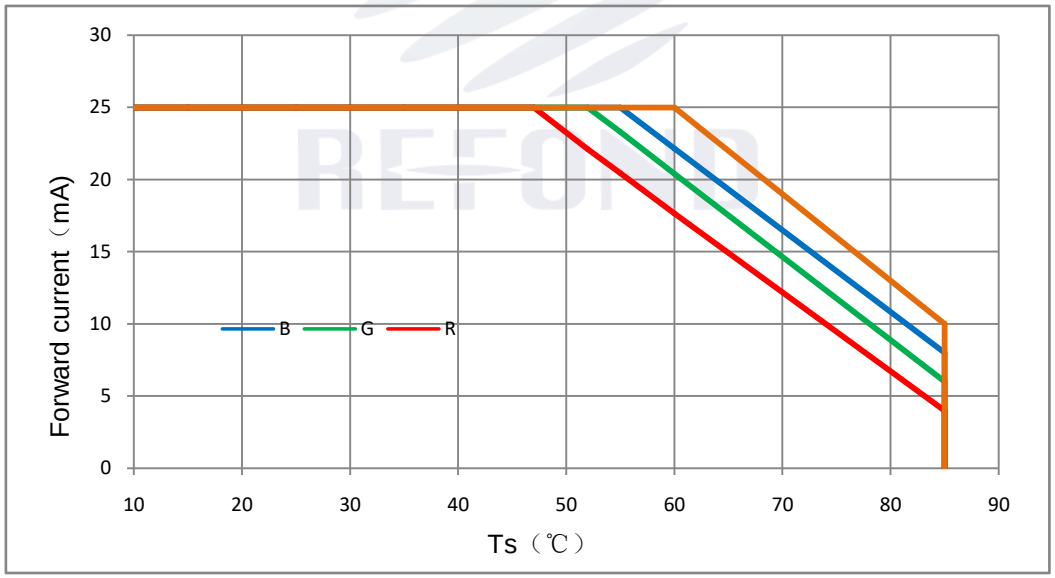

Fig 1-10 Solder Temperature Vs Forward Current

R &G&B Tj≤94℃

W1 Tj≤93℃

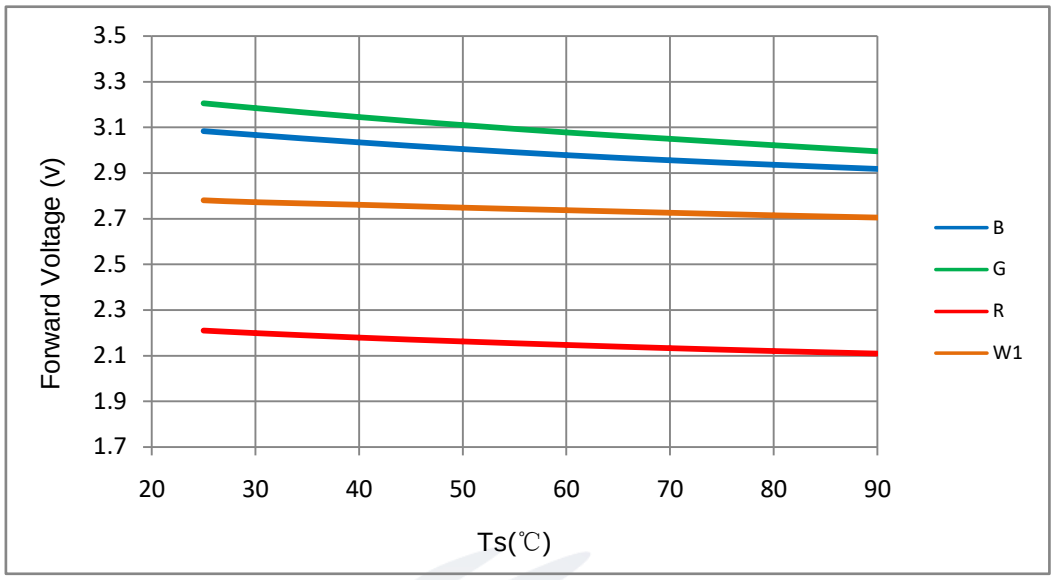

Fig 1-11 Forward Voltage Vs Solder Temperature

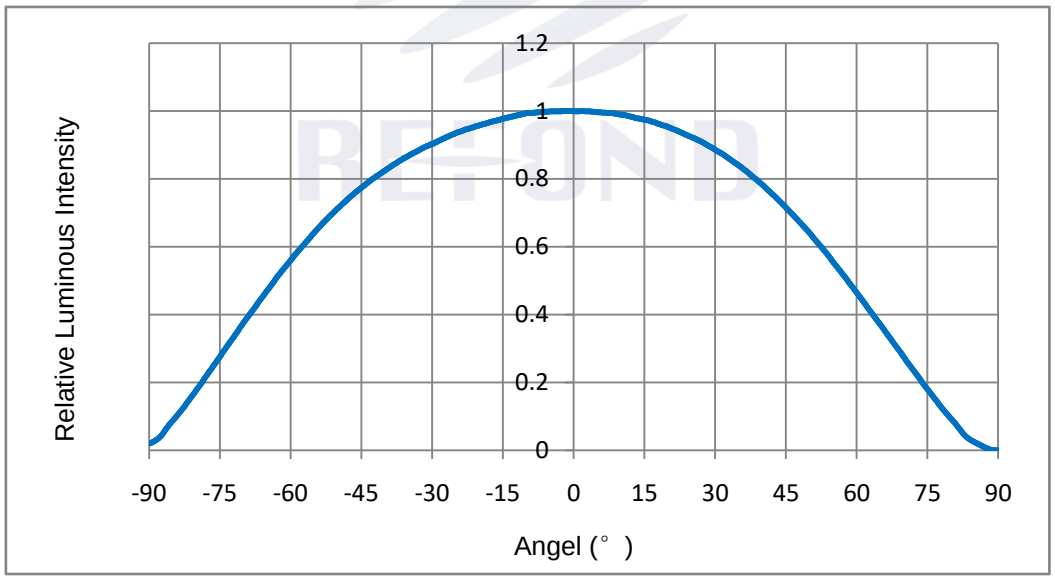

Fig 1-12 Radiation diagram

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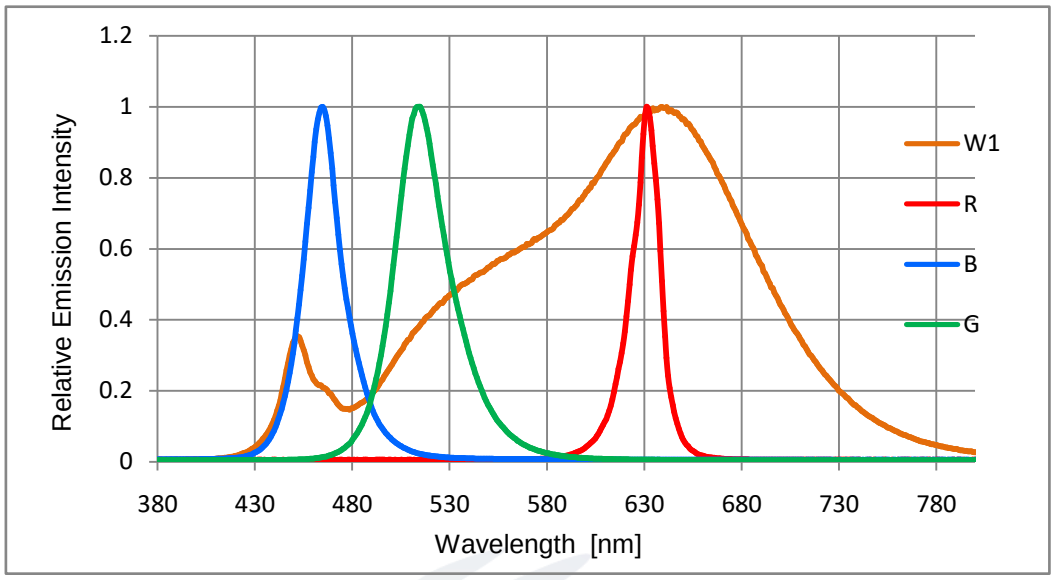

Fig 1-13 Spectrum Distribution

2. Packaging

2.1 Packaging Specification

Package:1000pcs/reel.

2.1.1Carrier Tape Dimension

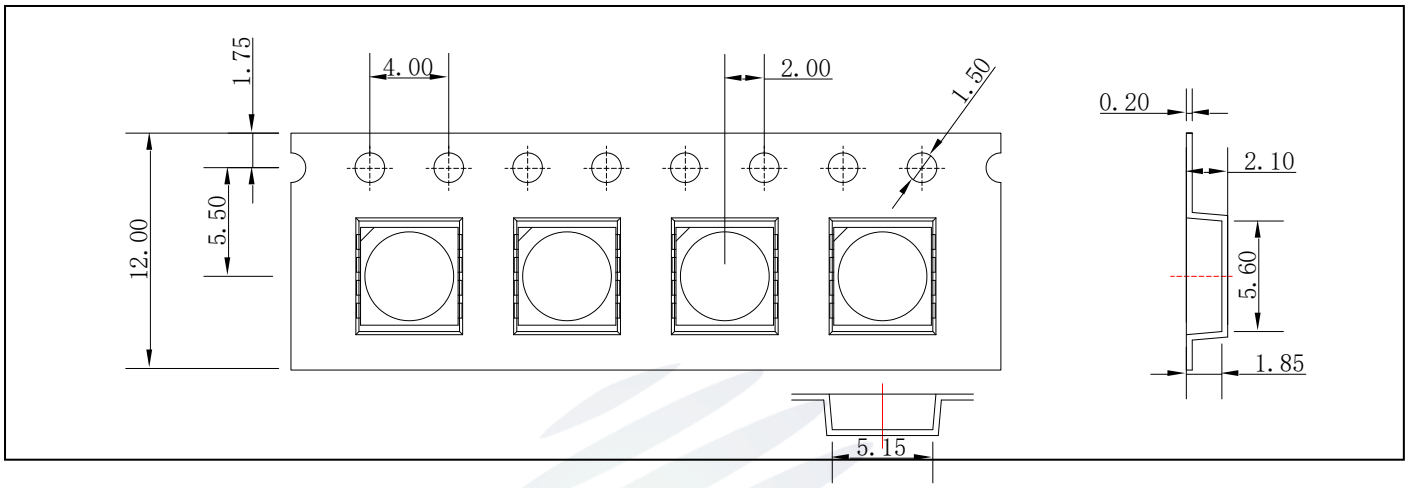

Fig.2-1 Carrier Tape Dimension

2.1.2Reel Dimension

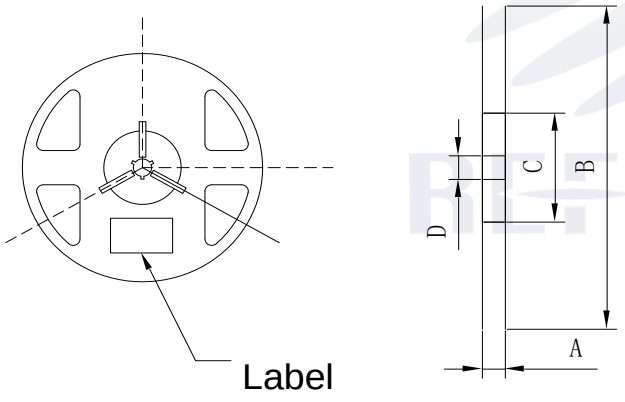

Fig.2-2Reel

Table 2-1 Reel Dimension

A	12.4±0.3mm
B	178±1mm
C	58.5±1mm
D	13.5±0.5mm

Notes：

The tolerances unless mentioned ±0.1mm. Unit : mm

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2.1.3Label Form Specification

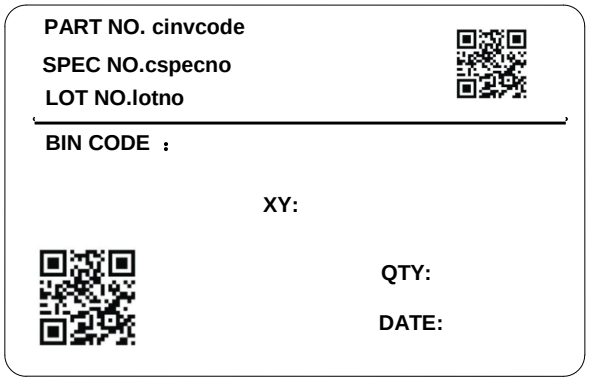

Fig 2-3 Label Form

Table 2-2 Label Parameter

PART NO.	Part Number
SPEC NO.	Spec Number
LOT NO.	Lot Number
BIN CODE	Bin Code
XY	Chromaticity Bin
QTY	Packing Quantity
DATE	Made Date

2.2Moisture Resistant Packing

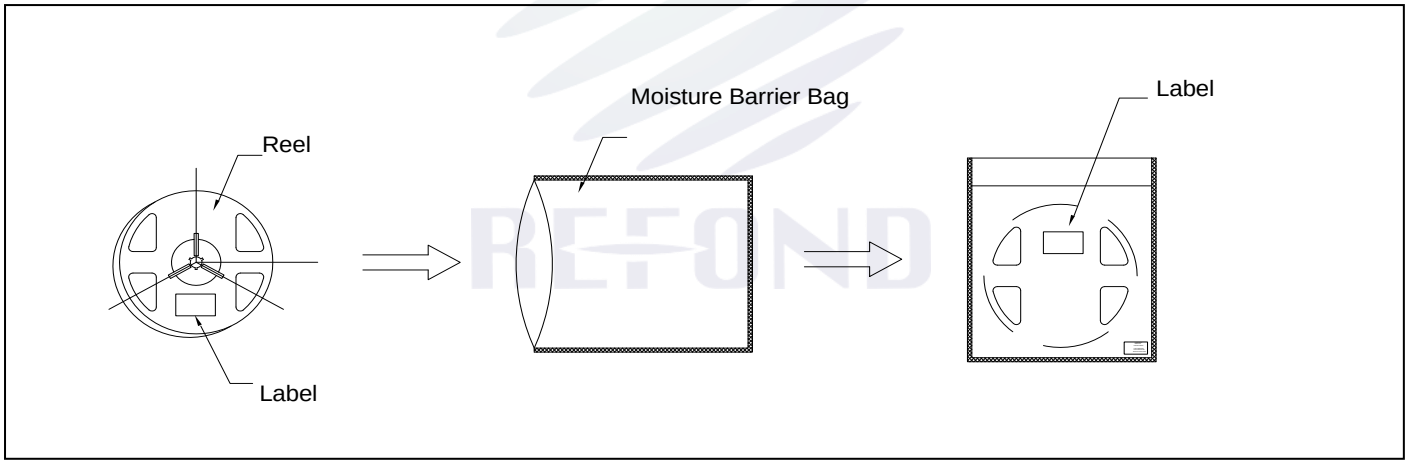

Fig.2-4 Packing specification

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2.3Cardboard Box

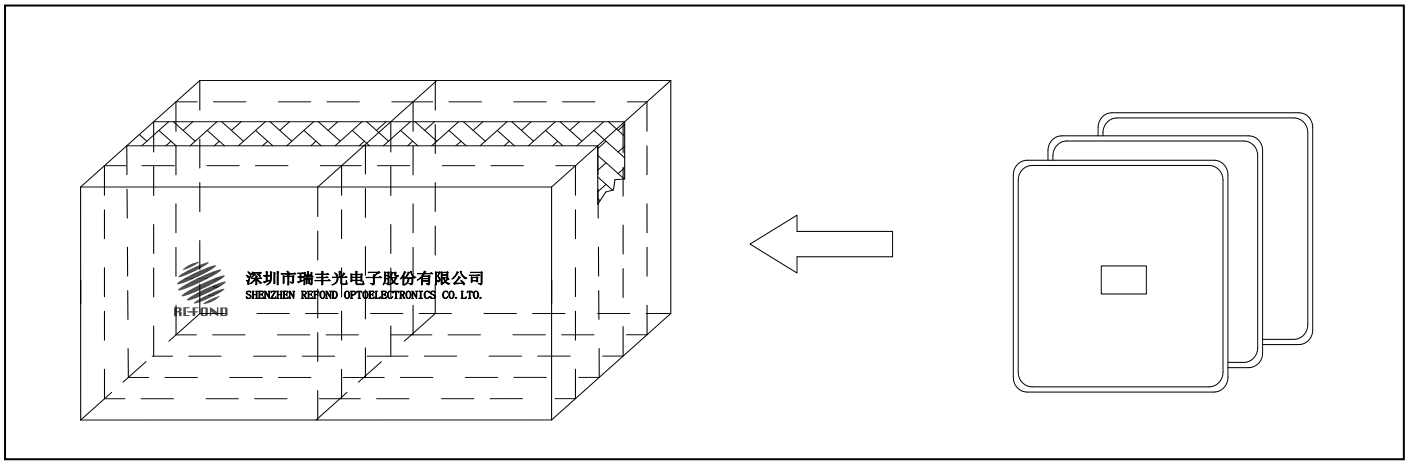

Fig.2-5Cardboard Box

2.4 Reliability Test Items And Conditions

Table 2-3 Test items and conditions

Test Items	Ref. Standard	Test Condition	Time	Quantity	Ac/Re
Reflow	JESD22-B106	T_{emp}:260℃max T=10 sec	2times.	10pcs.	0/1
Thermal Shock	JEITAED-4701 300307	-40℃ 15min ↑↓10s 100℃ 15min	100 cycle.	10pcs.	0/1
High Temperature Storage	JEITAED-4701 200 201	T_{emp}:100℃	1000hrs.	10pcs.	0/1
Low Temperature Storage	JEITA ED-4701 200 202	T_{emp}:-40℃	1000hrs.	10pcs.	0/1
Life Test	JESD22-A108	T_A=25℃ I_F=20mA	1000hrs.	10pcs.	0/1
High Temperature High Humidity Life Test	JESD22-A101	60℃/ 90%R_H I_F=20mA	500hrs.	10pcs.	0/1

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2.5 Criteria For Judging Damage

Table 2-4 Criteria for judging damage

Test Items	Symbol	Test Condition	Criteria For Judgement	Applicable project
Forward Voltage	V_F	I_F=20mA	≤±10%	Reflow Thermal Shock High and Low Temperature Storage Life Test
Luminous Intensity R	I_V	I_F=20mA	Maintenance≥70%	
Luminous Intensity G			Maintenance≥70%	
Luminous Intensity B			Maintenance≥50%	
Luminous Flux W	Φ	I_F=20mA	Maintenance≥88%	
Lamp Bead Light Test	/	I_F=20mA	No open circuit short circuit or flicke	High Temperature High Humidity Life Test

Notes：

1.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.

2.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

3.1SMT Reflow Soldering Instructions

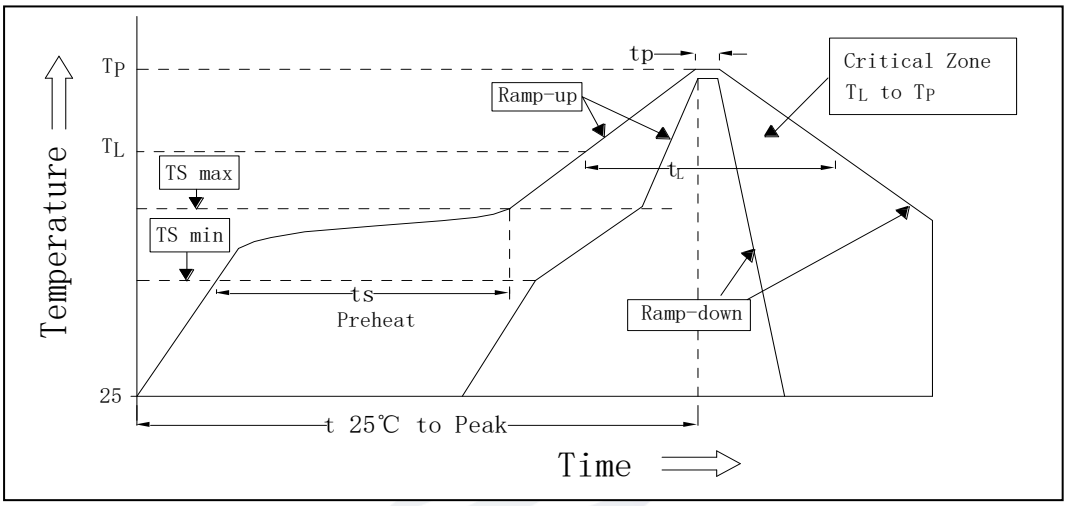

Fig.3-1 SMT Reflow Soldering Instructions

Table 3-1 SMT Reflow Soldering Parameter

Average temperature rise speed	Max 3 °C/ s
Preheating: minimum temperature	150 °C
Preheating: Max temperature	200 °C
Preheating: Time	60s-120s
Time limited to maintain high temperature: the temperature	217 °C
Time limited to maintain high temperature: The Time	Max 60s
Peak /Classification of temperature:	260 °C
Time limit classification of peak temperature time	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 25 °C	Max 8 minutes

Notes：

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

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

3.1.1 Soldering Iron

(1) When do soldering by hand, keep the temperature of iron below less 300℃ less than 3 seconds.

(2) Soldering by hand should be done only one time.

3.1.2 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.

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 impacted on the reliability of the LEDs. Precautions should be taken to avoid the strong pressure on the encapsulated part. So when usethe 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 LEDmating usage material. This is provided for informational purposes only and is not a warranty or endorsement.

(2) In order to prevent ex-ternal 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 elementis 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 theuse of any chemicals or materials that have been found or are suspected to have an adverse affect on device performance or reliability. To verifycompatibility, Refond recommends that all chemicals and materials be tested in the specific application and environment for which they are intended tobe 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 directlytouch or Handle the silicone lens surface, it may damage the internal circuitry.

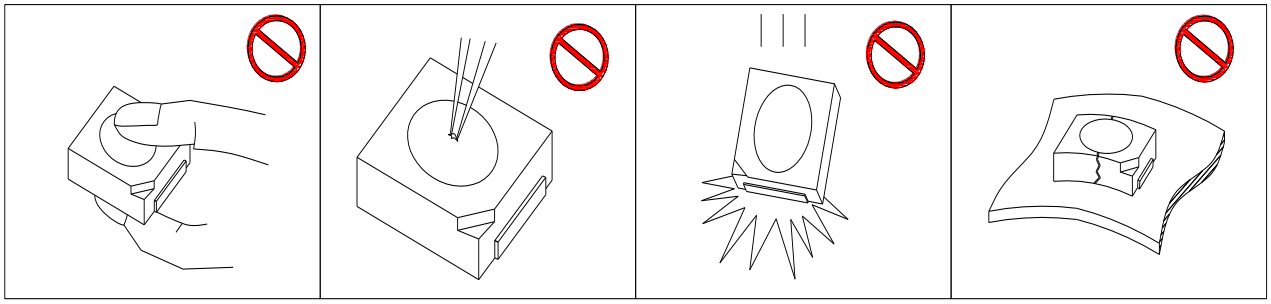

Fig 4-1 Misoperation

(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℃	≤75%	Within 4 Months From Date
	After Opening Aluminum Bag	≤30℃	≤60%	24hours
Baking		60±5℃	-	≥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) ℃ 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.

深圳市瑞丰光电子股份有限公司 承认专用章

Version History

Date	Revisor	Version	Verifier	Remarks
2021-06-02	Xionghanting	E0	Yaoshengjian	Releas

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