SPECIFICATION

REFOND P/N

RF-A3H22-W60P-E5

□ R&D

■ Mass Production

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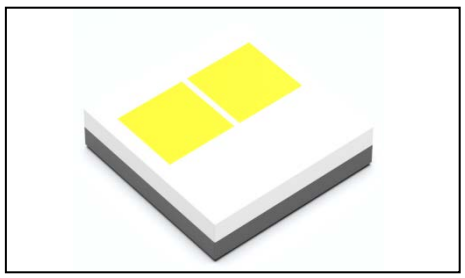
1. Description

1.1



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

Product Package:3.0mmX3.0mmX0.8mm.

LED 3.0mmX3.0mmX0.8mm

1.2 Features

► Ceramic Package.

► Extremely wide viewing angle.

► Suitable for all SMT assembly and solder process. SMT

► Available on tape and reel.

► Moisture sensitivity level: Level 2. Level2

► RoHS compliant. RoHS

► Qualifications: The product qualification test plan is based on the guidelines of AEC-Q102 Stress Test Qualification for Automotive Grade Discrete Semiconductors

AEC-Q102

1.3 Application

► Automotive Lighting Exterior.

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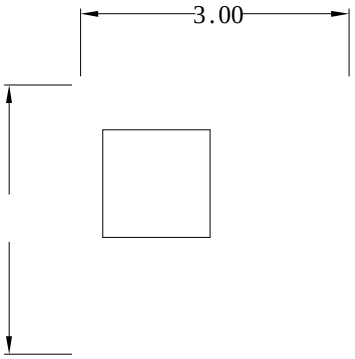
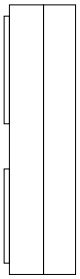
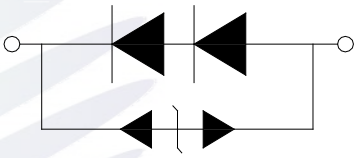
1.4 Package Dimension







Notes

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

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=1000mA	5.8	---	7.0	V
Reverse Current	IR	VR=10V	---	---	10	uA
Luminous Flux	Φ	IF=1000mA	670	---	1000	lm
Viewing Angle	2θ1/2	IF=1000mA	---	120	---	deg
Thermal Resistance.	RTHJ-S	IF=1000mA	---	1.6	2.1	/W

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

Notes

1. 1/10 Duty cycle, 10ms pulse width. 10ms, 1/10.

2. The above forward voltage measurement allowance tolerance is ±0.1V. ± 0.1V.

3. The above color coordinates measurement allowance tolerance is ± 0.005. ± 0.005.

4. The above luminous intensity measurement allowance tolerance ±10%.
± 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

8. ESD yield is over 90% at 8000V ESD (HBM). ESD protection during products handing is needed. 90% LED
ESD8000V ,

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

BIN (IF=1000mA)

Table 1-3

V_F	R0	S0	T0	/
	5.8-6.2	6.2-6.6	6.6-7.0	/
φ	CC	CD	DB	DC
	670-730	730-800	800-900	900-1000

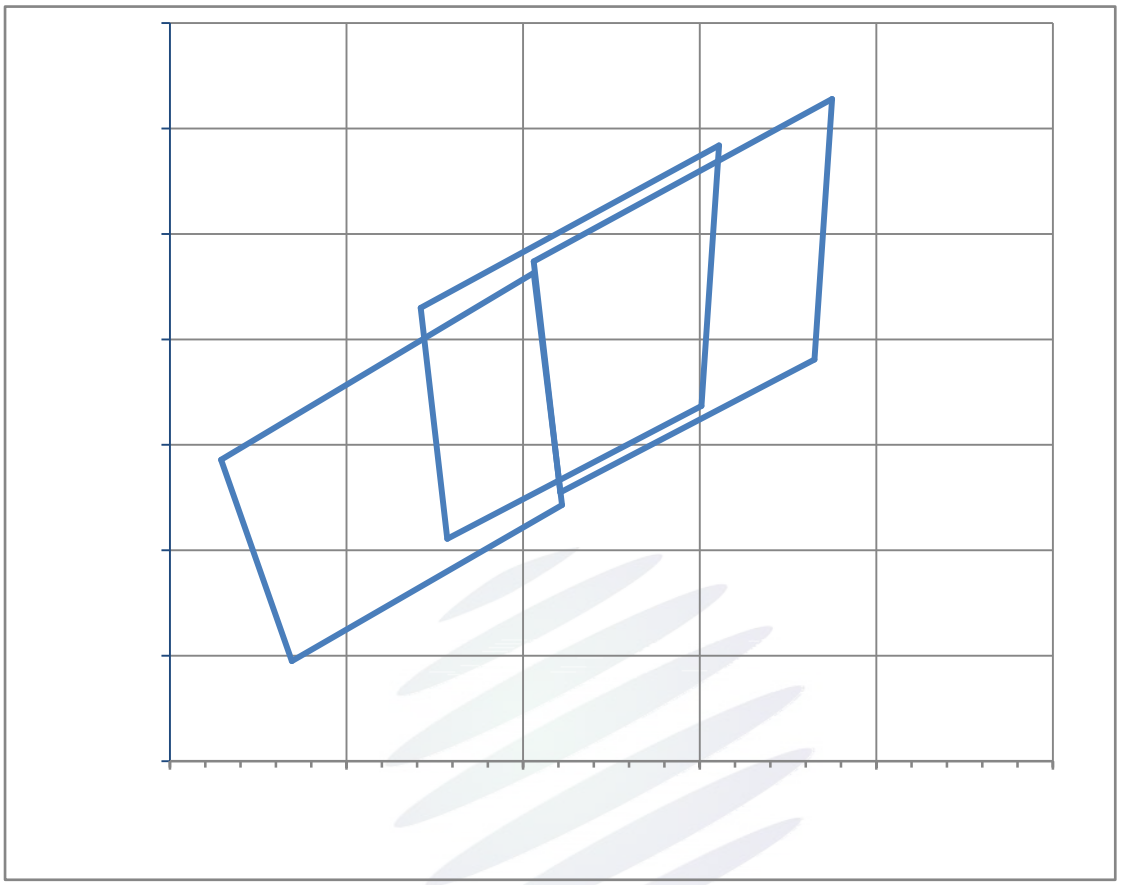


Fig. 1-6 The C.I.E Chromaticity Diagram CIE

Table 1-4

BIN CODE	CIE-X1	CIE-Y1	CIE-X2	CIE-Y2	CIE-X3	CIE-Y3	CIE-X4	CIE-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

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1.7 Typical Optical Characteristics Curves

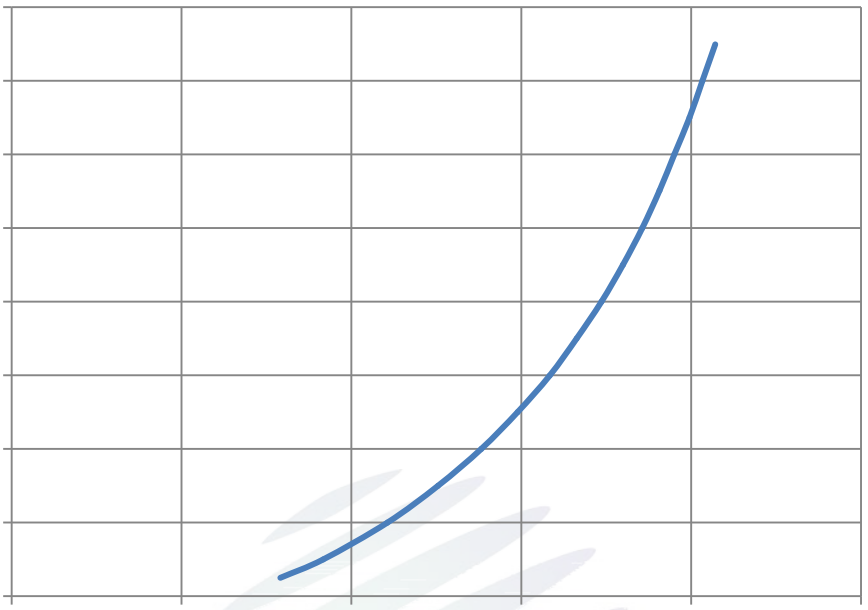

Fig. 1-7 Forward Voltage Vs Forward Current

Fig. 1-8 Forward Current Vs Relative Intensity

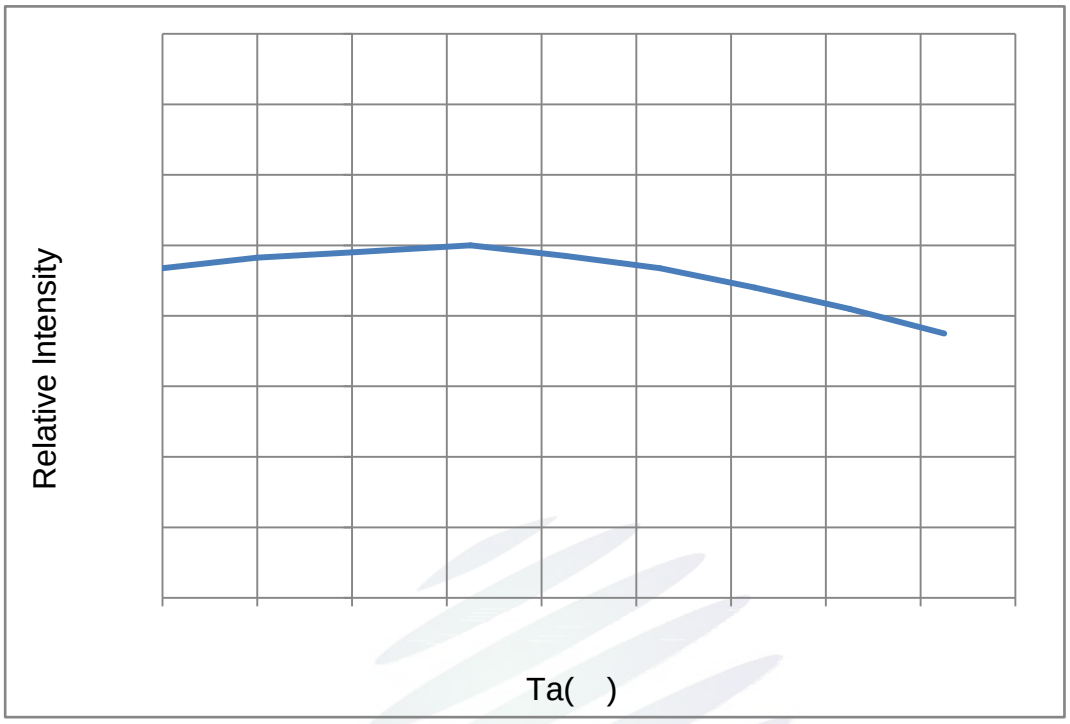

Fig. 1-9 Solder Temperature Vs Relative Intensity

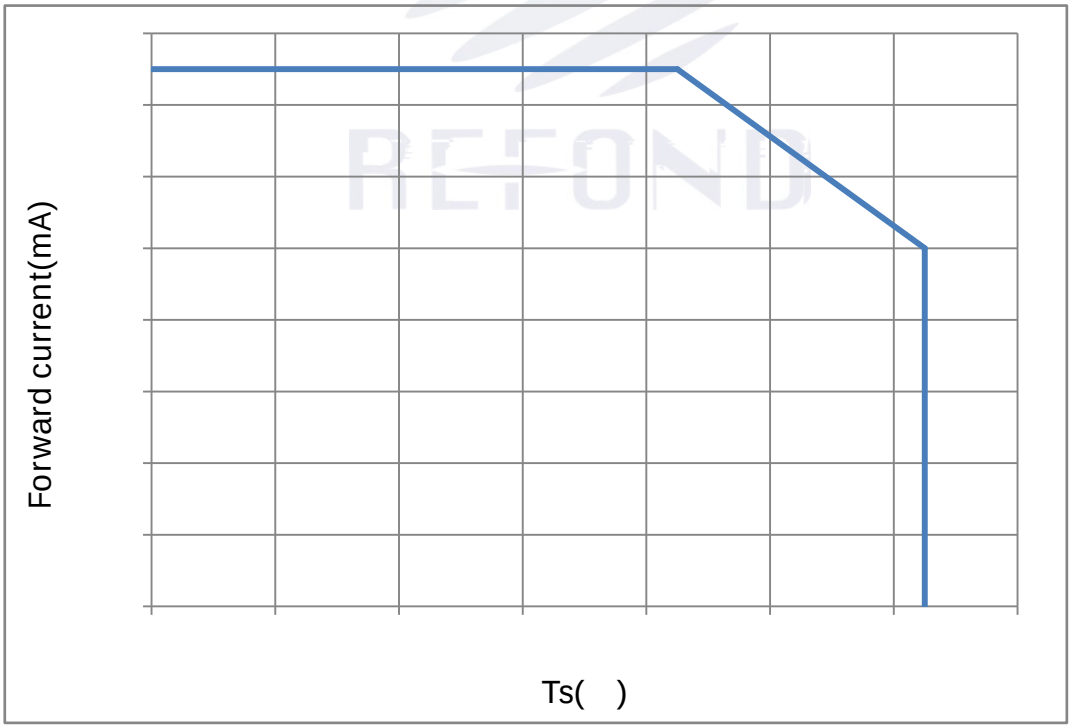

Fig. 1-10 Solder Temperature Vs Forward Current

Tj ≤ 150

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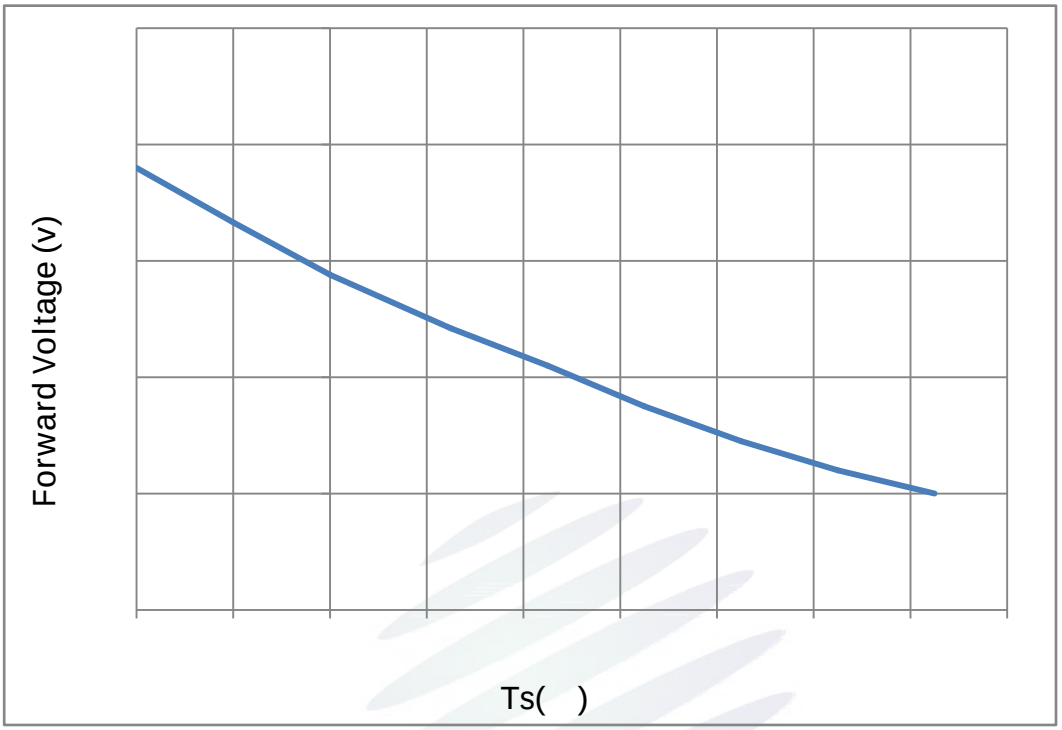

Fig. 1-11 Forward Voltage Vs Solder Temperature

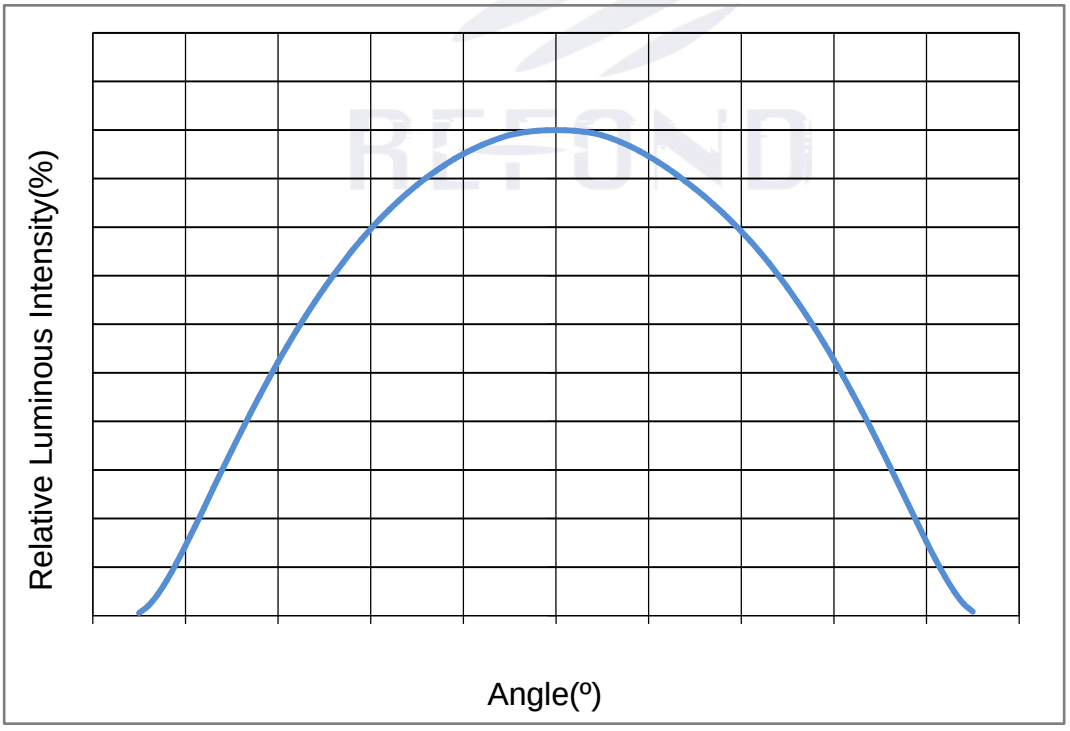

Fig. 1-12 Radiation diagram

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Fig. 1-13 Chromaticity Coordinate Vs Solder Temperature

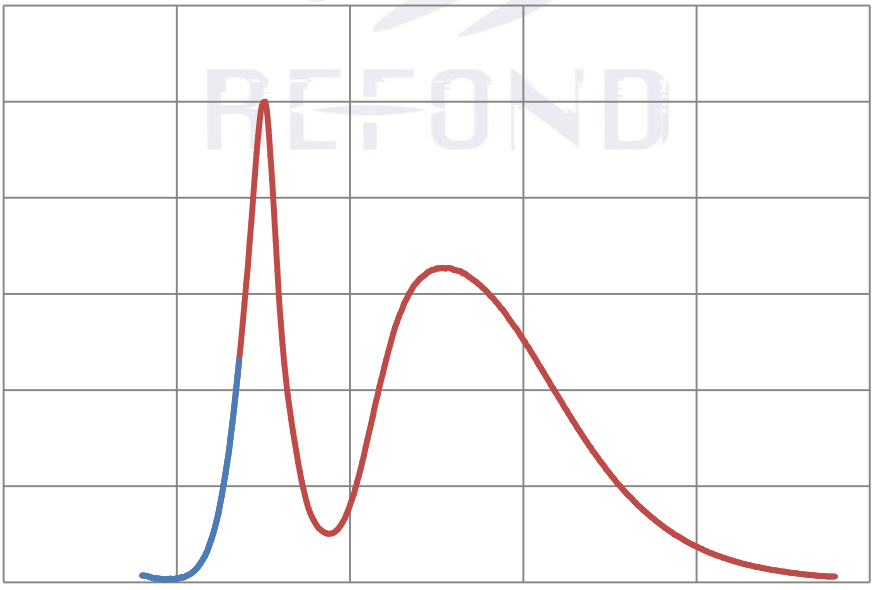


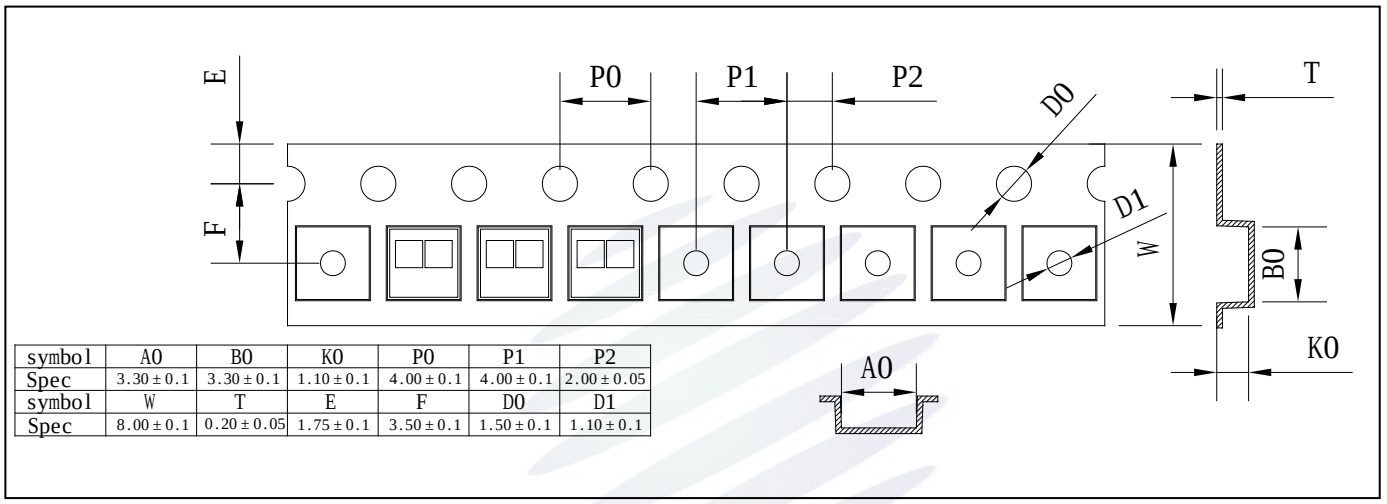
Fig. 1-14 Spectrum Distribution

2. Packaging

2.1 Packaging Specification

Package: 4000pcs/reel. 4000pcs

2.1.1 Carrier Tape Dimension



symbol	A0	B0	K0	P0	P1	P2
Spec	3.30±0.1	3.30±0.1	1.10±0.1	4.00±0.1	4.00±0.1	2.00±0.05
symbol	W	T	E	F	D0	D1
Spec	8.00±0.1	0.20±0.05	1.75±0.1	3.50±0.1	1.50±0.1	1.10±0.1

Fig.2-1 Carrier Tape Dimension

2.1.2 Reel Dimension

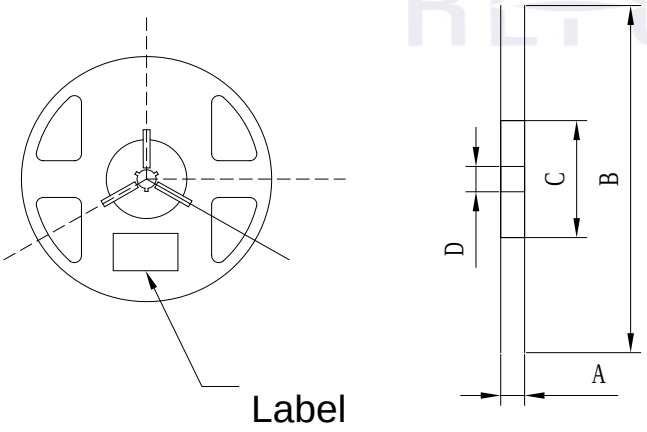


Fig.2-2 Reel Dimension

Table 2-1 Reel Dimension

A	13.6 ± 0.1mm
B	180 ± 1mm
C	100 ± 1mm
D	13.0 ± 0.5mm

Notes

The tolerances unless mentioned ±0.1mm. Unit : mm ± 0.1

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2.1.3 Label Form Specification

Table 2-2

2.4 Reliability Test Items And Conditions

Table 2-3 Reliability Test Items And Conditions

Test Items	Ref. Standard	Test Condition	Time	Quantity	Ac/Re /
Reflow	JESD22-B106	Temp:260 max T=10 sec	2times	20pcs.	0/1
MSL2 2	JESD22-A113	85 / 60%R_H	168 hrs.	20pcs.	0/1
Thermal Shock	JEITAED-4701 300307	-40 15min ↑↓10s 125 15min	1000 cycle	20pcs.	0/1
Life Test	JESD22-A108	Ta=125 I_F=1000mA	1000hrs.	20pcs.	0/1
High Temperature High Humidity Life Test	JESD22-A101	85 / 85%R_H I_F=1000mA	1000hrs.	20pcs.	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	
			Min.	Max.
Forward Voltage	V_F	I_F=1000mA	-	U.S.L*)x1.1
Reverse Current	I_R	V_R = 10V	-	U.S.L*)x2.0
Luminous Flux	Φ	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. / LED

LED

3.The technical information shown in the data sheets is 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.

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SMT Reflow Soldering Instructions SMT

3.1 SMT Reflow Soldering Instructions SMT

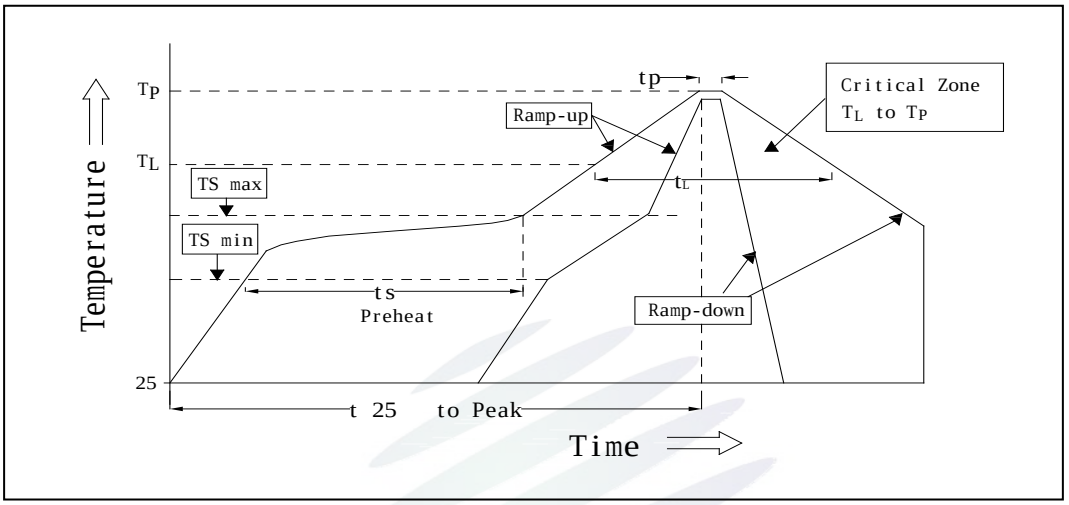

Fig.3-1 SMT Reflow Soldering Instructions SMT

Table 3-1Reflow parameters

Average temperature rise speed Tsmax TP	3 °C/ Max 3 °C/ s
Preheating: minimum temperature (Tsmin)	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
(TP) 5 °C Hold time within 5 °C with the actual peak temperature (TP)	30 Max 30s
Cooling speed	6 °C/ Max 6 °C/ s
25 °C Needed time from 25 °C to Tp	8 Max 8 minutes

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Notes

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

(2)When soldering , 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.

LED 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 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. LED LED

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

(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.

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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.LED

LED 100PPM.

(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. LED

LED 900PPM

900PPM 1500PPM.

(3) VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsEmnfAedon of LVes and7(i)3.1(1)3.1(c)-4.oChl when(e ex)1.urposnrat otsperg8(y)1..(f)-3.8Thih

elted n

Fig 4-1 Cautions

(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. LED

LED

(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 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.

LED

Table 4-1Storage

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
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. 60 ± 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). LED

(10) Other points for attention, please refer to our relevant information.

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Version History/

Date	Revisor	Version	Verifier	Remarks
2022/05/10	Xian Zhou	E0	Zhu Yiming	New issue
2023/09/28	Xian Zhou	E1	Zhu Yiming	Version update

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Declare

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