

SPECIFICATION

REFOND P/N

RF-A4E31-R15H-S1

R&D

Mass Production



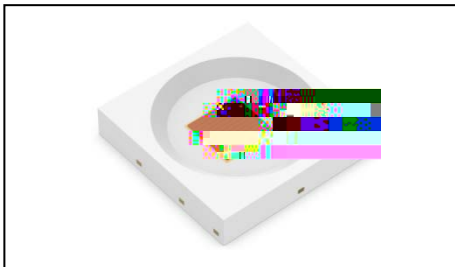
Contents

1. Description	
1.1 General Description	
1.2 Features	
1.3 Application	
1.4 Package Dimension	
1.5 Product Parameters	
1.6 Bin Range Of Forward Voltage and Luminous Flux (IF=350mA)	BIN
(IF=350mA)	
1.7 Typical Optical Characteristics Curves	
2. Packaging	
2.1 Packaging Specification	
2.1.1 Carrier Tape Dimension	11
2.1.2 Reel Dimension	11
2.1.3 Label Form Specification	12
2.2 Moisture Resistant Packing	
2.3 Cardboard Box	
2.4 Reliability Test Items And Conditions	
2.5 Criteria For Judging Damage	
3. SMT Reflow Soldering Instructions SMT	
3.1 SMT Reflow Soldering Instructions SMT	
4. Handling Precautions	
4.1 Handling Precautions	



1. Description

1.1



The red source color devices are made with AlGaInP on substrate light emitting diode.
 Product package:3.0mmX3.0mmX0.55mm.

LED AlGaInP

3.0mmX3.0mmX0.55mm

1.2Features

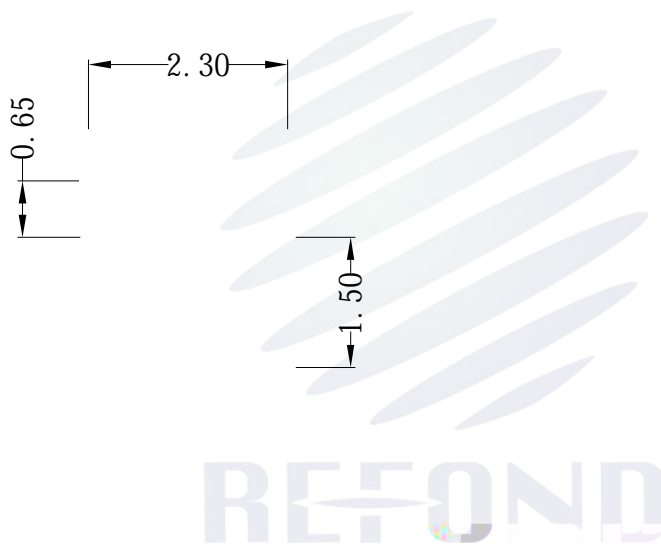
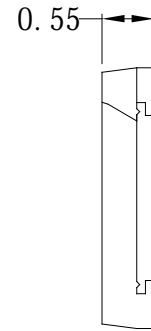
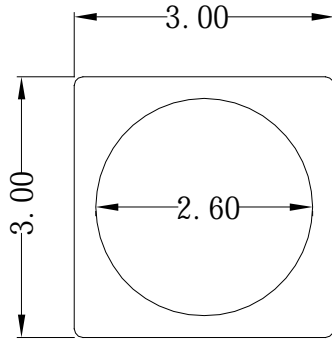
- ▶ EMC Package.EMC
- ▶ Extremely wide viewing angle.
- ▶ Suitable for all SMT assembly and solder process. SMT
- ▶ Available on tape and reel.
- ▶ Moisture sensitivity level: Level 2. Level2
- ▶ RoHS compliant. RoHS
- ▶ Qualifications: The product qualification test plan is based on the guidelines of AEC-Q102
 Stress Test Qualification for Automotive Grade Discrete Semiconductors
 AEC-Q102

1.3Application

- ▶ Automotive Lighting Interior and Exterior.



1.4 Package Dimension



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	V_F	$I_F=350\text{mA}$	2.0	2.3	2.6	V
Reverse Current	I_R	$V_R=5\text{V}$	---	---	10	μA
Luminous Flux	Φ	$I_F=350\text{mA}$	55.3	---	93.2	lm
Dominant Wavelength	λ_D	$I_F=350\text{mA}$	612.5	---	625	nm
Viewing Angle	2 θ 1/2	$I_F=350\text{mA}$	---	120	---	deg
Thermal Resistance (Junction to Solder)	Rth JS real	$I_F=350\text{mA}$	---	12	19	$^{\circ}\text{C}/\text{W}$
	Rth JS el	$I_F=350\text{mA}$	---	6	10	$^{\circ}\text{C}/\text{W}$

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

Parameter	Symbol	Rating	Units
Power Dissipation	P_D	1092	mW
Forward Current	I_F	420	mA
Peak Forward Current	I_{FP}	700	mA
Reverse Voltage	V_R	5	V
Electrostatic Discharge (HBM)	ESD	2000	V
Operating Temperature	T_{OPR}	-40 ~ +125	
Storage Temperature	T_{STG}	-40 ~ +125	
Junction Temperature	T_J	150	

Notes

1. 1/10 Duty cycle, 10ms pulse width. 10ms, 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 ± 0.005 . ± 0.005 .
4. The above luminous flux measurement allowance tolerance $\pm 10\%$. $\pm 10\%$.
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
8. At 25 °C, pulse mode test, photoelectric conversion efficiency $\eta_e=47\%$. 25 °C
47%
9. Thermal resistance values (Rth JS Electrical) measure current is 350mA, Temperature constant at 25 °C.
(Rth JS Electrical) 350mA 25°C

1.6 Bin Range Of Forward Voltage and Luminous Flux (IF=350mA)

BIN (IF=350mA)

Table 1-3

V _F (V)	C0	D0	E0		
	2.0-2.2	2.2-2.4	2.4-2.6		
φ lm	PA	PB	QA	QB	RA
	55.3-61.2	61.2-67.8	67.8-75.3	75.3-83.7	83.7-93.2
WD(nm)	C2	D1	D2	E1	E2
	612.5-615	615-617.5	617.5-620	620-622.5	622.5-625



1.7 Typical Optical Characteristics Curves

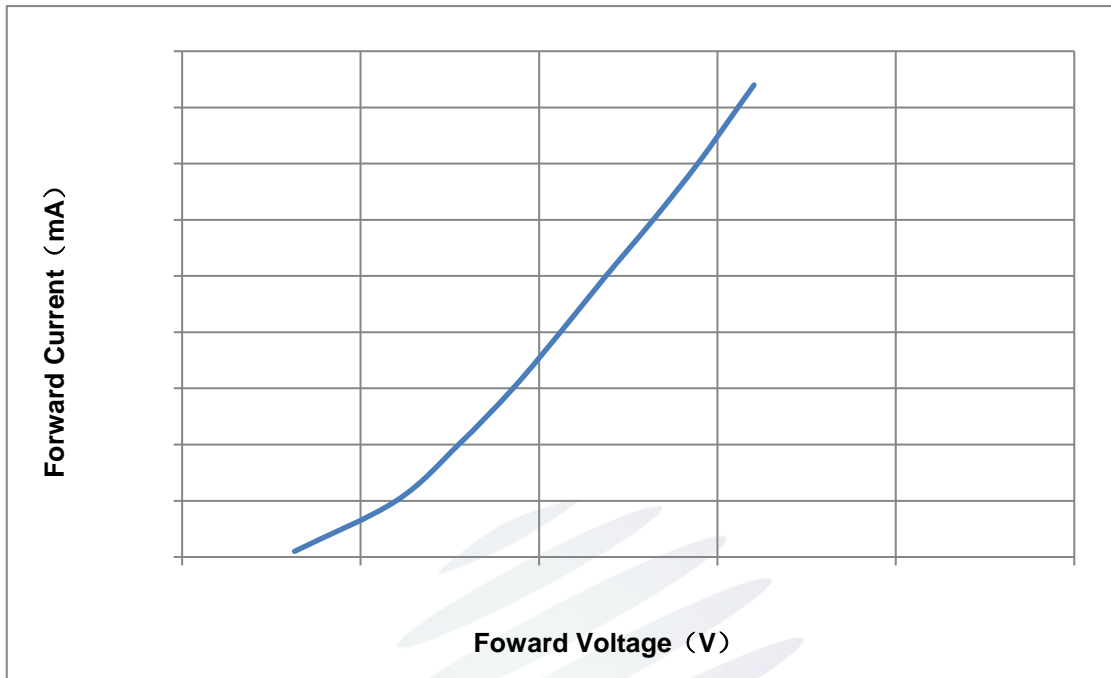


Fig. 1-6 Forward Voltage Vs Forward Current

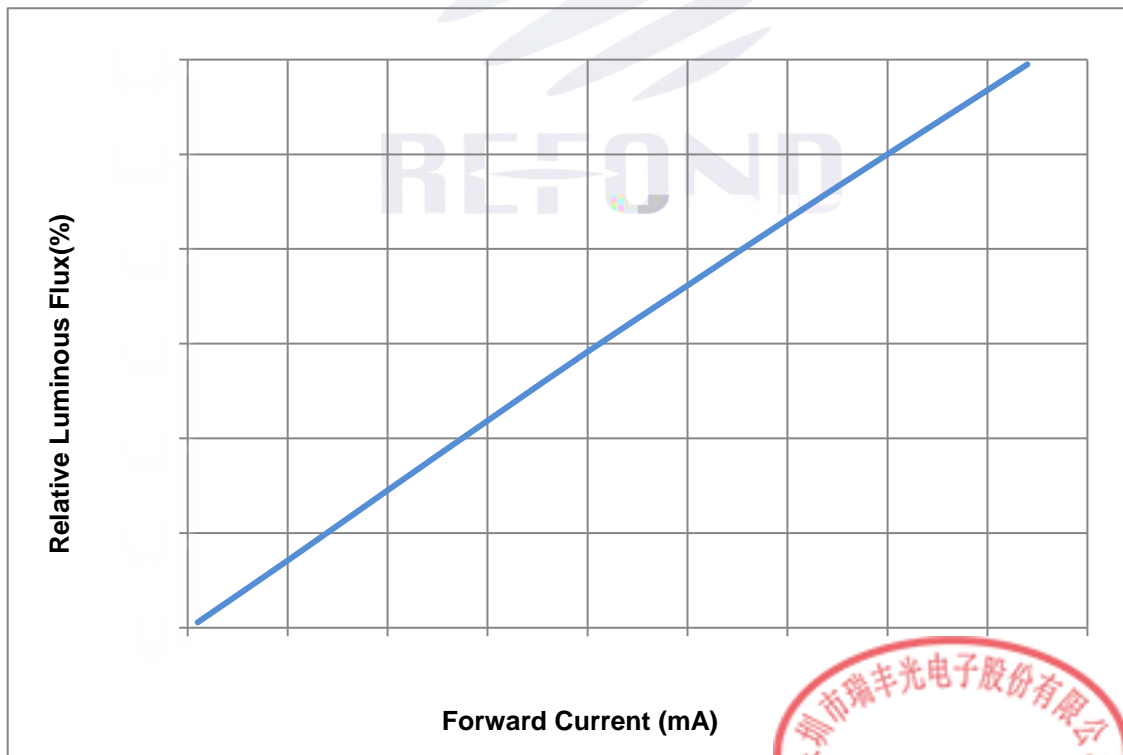


Fig. 1-7 Forward Current Vs Relative Luminous Flux



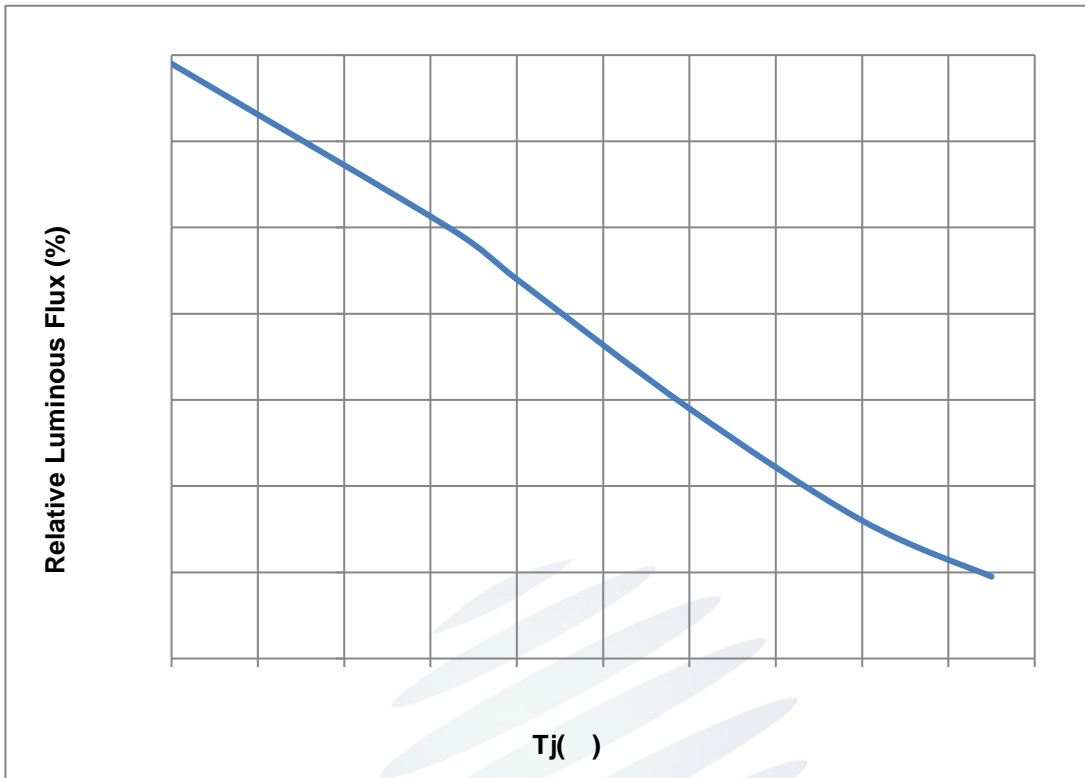


Fig. 1-8 Junction Temperature Vs Relative Luminous Flux

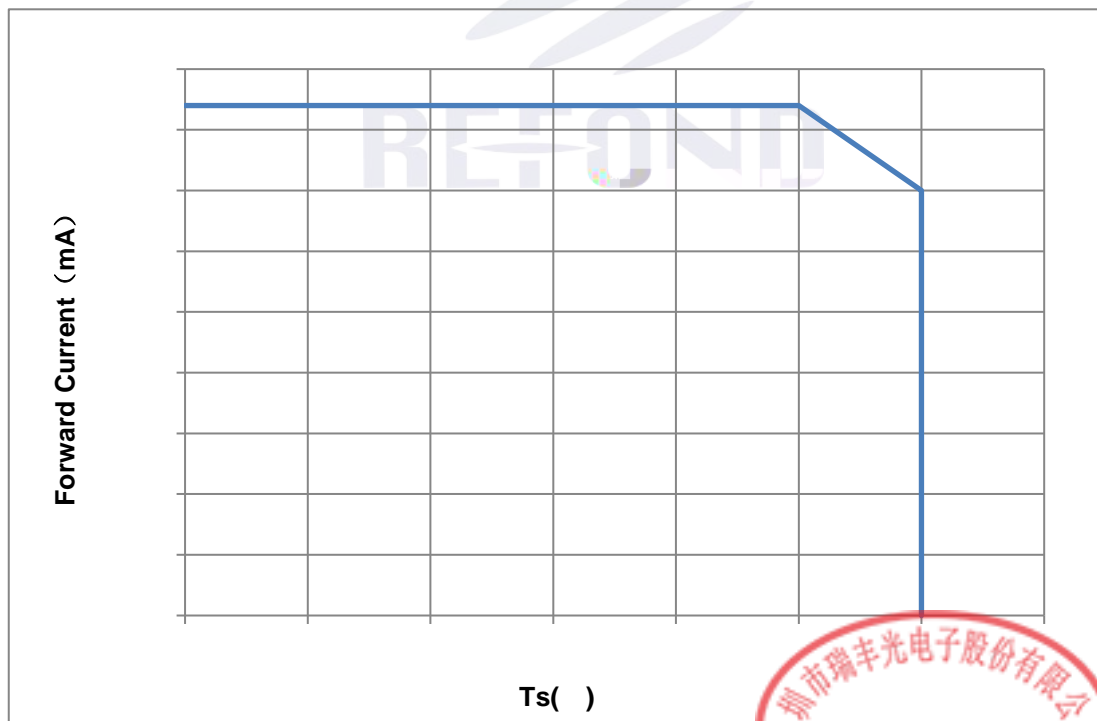


Fig. 1-9 Solder Temperature Vs Forward Current



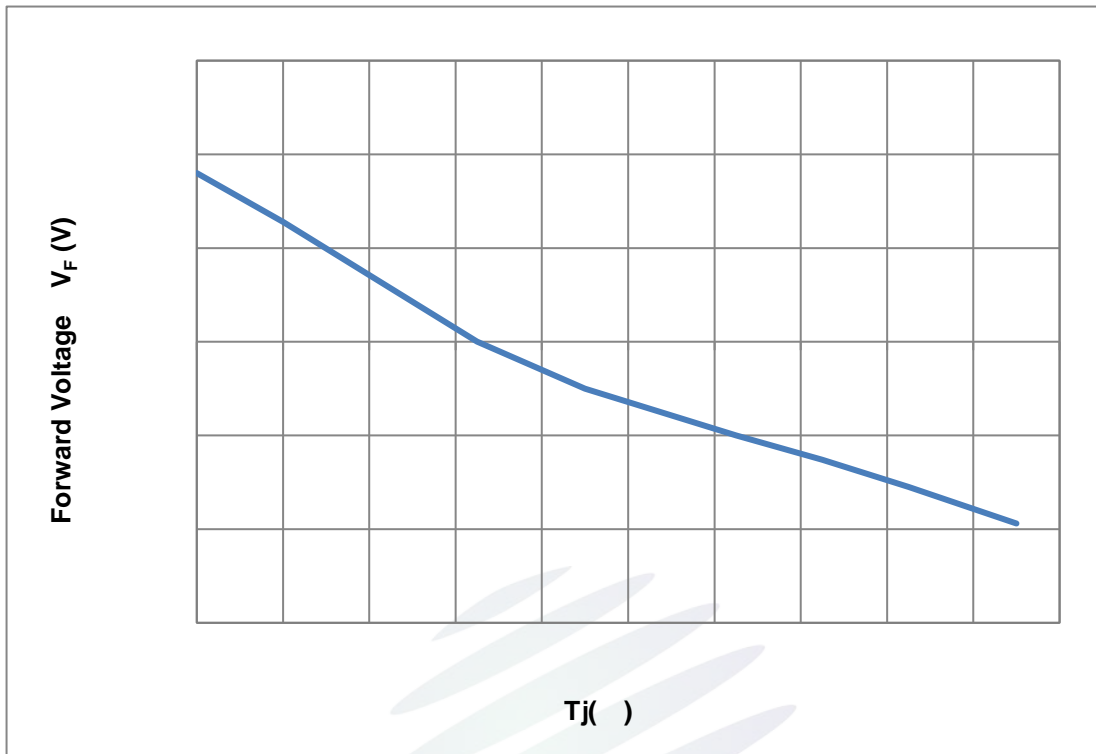


Fig. 1-10 Voltage Shift Vs Junction Temperature

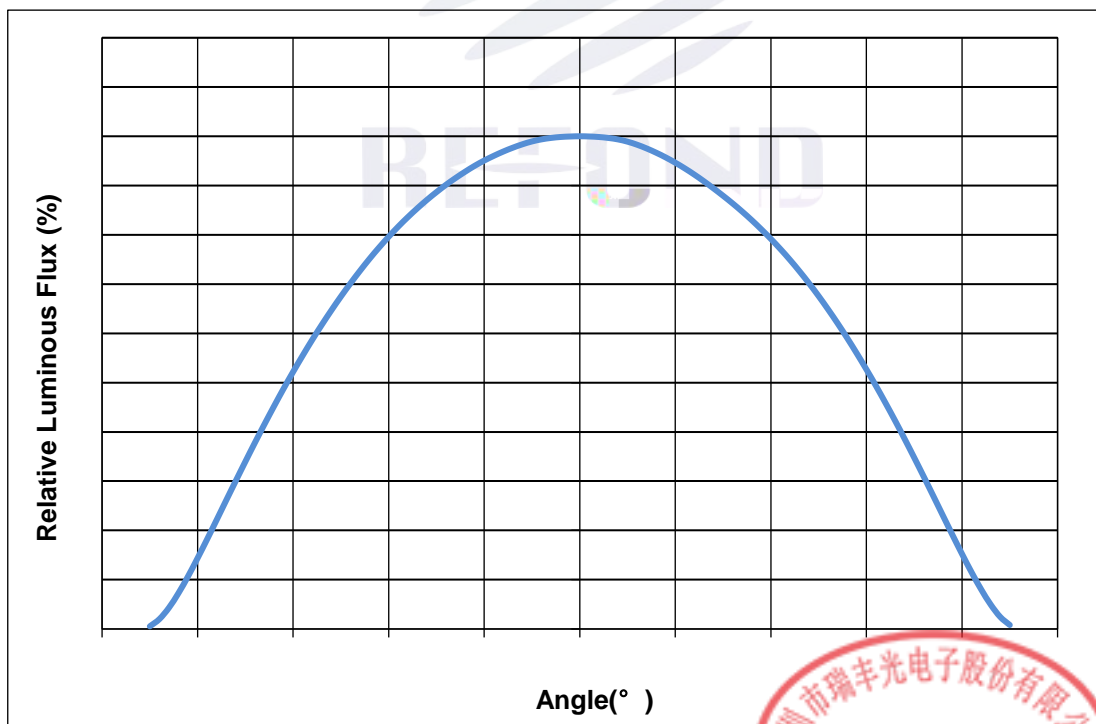


Fig. 1-11 Radiation Diagram



2.1.3 Label Form Specification



Fig. 2-3 Label Form Specification

Table 2-2 Specification

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

2.2 Moisture Resistant Packing



Fig.2-4 Moisture Resistant Packing

2.3 Cardboard Box

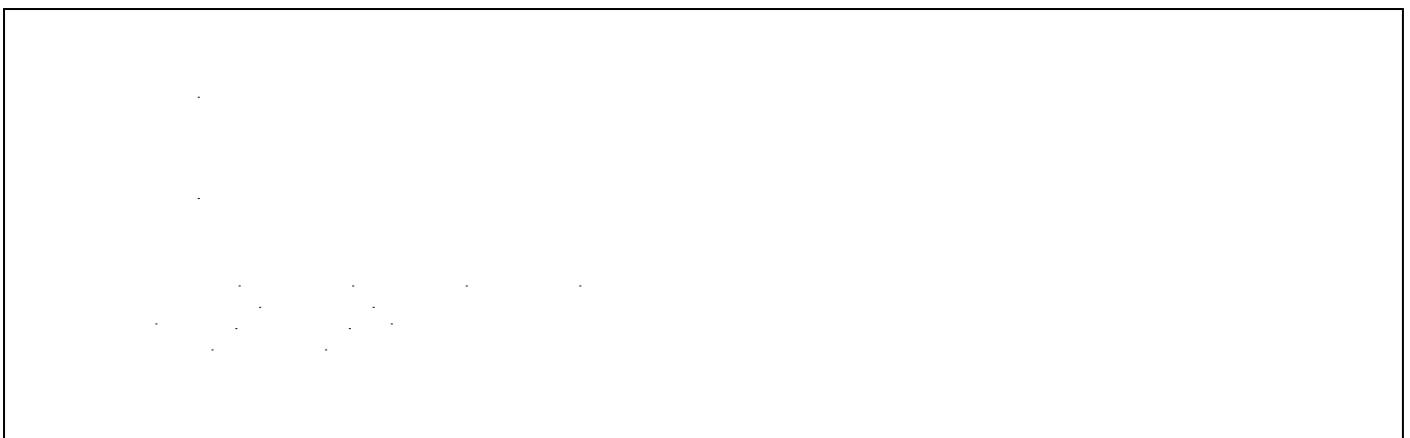


Fig.2-5 Cardboard Box

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%RH	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=105 IF=350mA	1000hrs.	20pcs.	0/1
High Temperature High Humidity Life Test	JESD22-A101	85 / 85%RH IF=350mA	1000hrs.	20pcs.	0/1



2.5 Criteria For Judging Damage

Table 2-4Cj 3.-8.9



3. SMT Reflow Soldering Instructions SMT

3.1 SMT Reflow Soldering Instructions SMT

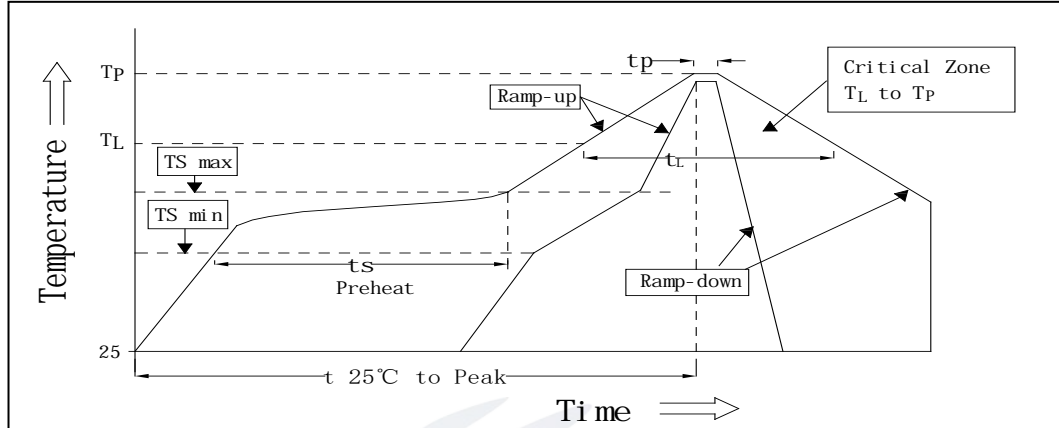
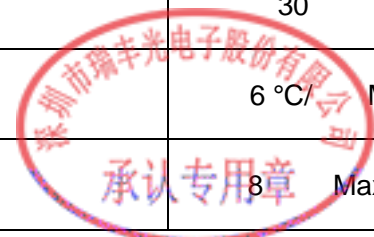


Fig.3-1 SMT Reflow Soldering Instructions SMT

Table 3-1 Reflow parameters

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
(T_P) 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 T_p		8 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.

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 use the 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.



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.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 4-1Cautions

(5) In designing a circuit,the current through each LED can not exceed the absolute maximum rating specified for each LED.In the mean while,resistors for protection should be applied,other wise 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

REFOND





Declare

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

