

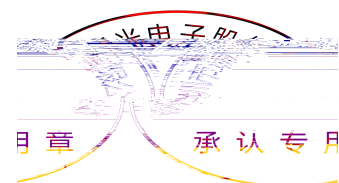
SPECIFICATION



REFOND P/N

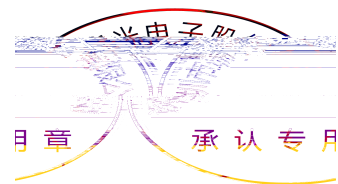
RF-A4E31-R22H-S4

Mass Production



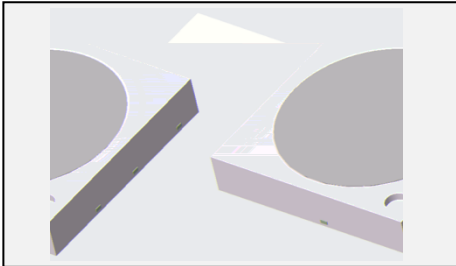
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1. Description

1.1



The Red source color devices are made with AlGaInP on Substrate Light Emitting Diode .
 Product Package: 3.0*3.0*0.55mm.

LED AlGaInP

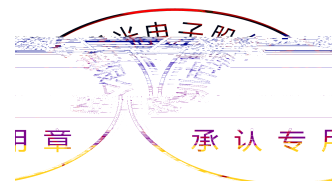
: 3.0*3.0*0.55mm。

1.2 Features

- ▶ 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
- ▶ Compliance with RoHS and REACH. RoHS REACH
- ▶ 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 Interior and Exterior.



1.4 Package Dimension

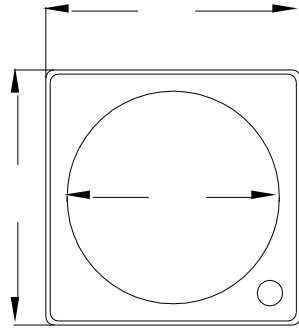


Fig.1-1 Top View

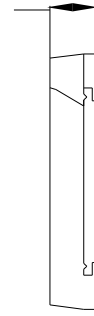


Fig.1-2 Side View

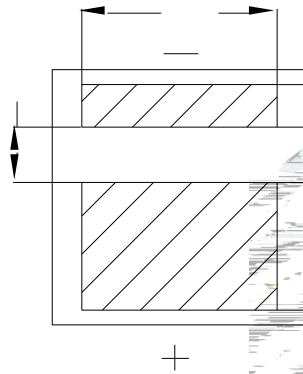


Fig.1-3 Bottom View

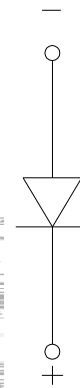


Fig.1-4 Polarity

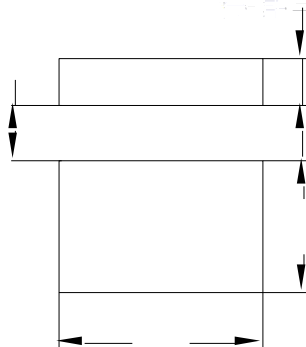
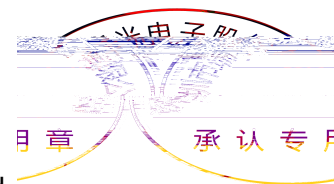


Fig.1-5 Soldering Patterns

Notes

1. All dimensions units are millimeters.
2. All dimensions tolerances are $\pm 0.2\text{mm}$ unless otherwise noted.



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	$I_F=350\text{mA}$	1.8	2.15	2.4	V
Reverse Current	I_R	$V_R=5\text{V}$	---	---	10	μA
Luminous Flux	Φ	$I_F=350\text{mA}$	37	45	55.3	lm
Dominant wavelength	λ_d	$I_F=350\text{mA}$	617.5	619.5	627.5	nm
Viewing Angle	$2\theta_{1/2}$	$I_F=350\text{mA}$	---	120	---	deg
Thermal Resistance.	R_{THJ-S}	$I_F=350\text{mA}$	---	---	20	$^{\circ}\text{C}/\text{W}$

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

Parameter	Symbol	Rating	Units
Power Dissipation	P_D	1200	mW
Forward Current	I_F	500	mA
Peak Forward Current	I_{FP}	700	mA
Reverse Voltage	V_R	5	V
Electrostatic Discharge (HBM)	E_{SD}	8000	V
Operating Temperature	T_{OPR}	-40 ~ +125	
Storage Temperature	T_{OPR}	-40 ~ +125	
Junction Temperature	T_J	150	

Notes

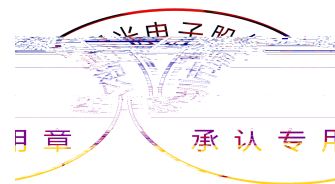
1. 1/10 Duty cycle, 10ms pulse width. 10ms, 1/10.
2. The above forward voltage measurement allowance tolerance is $\pm 0.1V$.
3. The above color coordinates measurement allowance tolerance is ± 0.005 . ± 0.005 .
4. The above luminous intensity measurement allowance tolerance $\pm 10\%$.
5. Care is to 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
8. ESD yield is over 90% at 8000V ESD (HBM). ESD protection during products handling is needed. 90% LED
ESD8000V

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

BIN (IF=350mA)

Table 1-3

V _F V	B1	B2	C1	C2	D1	D2
	1.8-1.9	1.9-2.0	2.0-2.1	2.1-2.2	2.2-2.3	2.3-2.4
φ lm	NA	NB	OA	OB		
	37-40.9	40.9-45.3	45.3-50	50-55.3		
WD(nm)	D2	E1	E2	F1		
	617.5-620	620-622.5	622.5-625	625-627.5		



1.7 Typical Optical Characteristics Curves

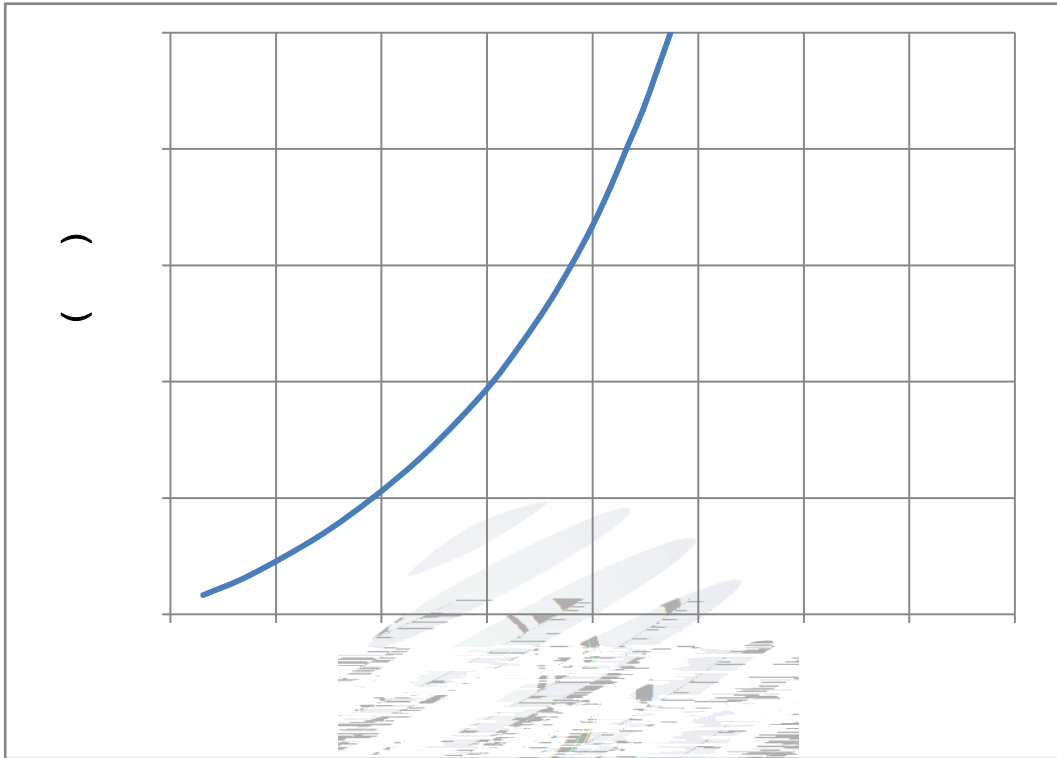


Fig. 1-7 Forward Voltage Vs Forward Current

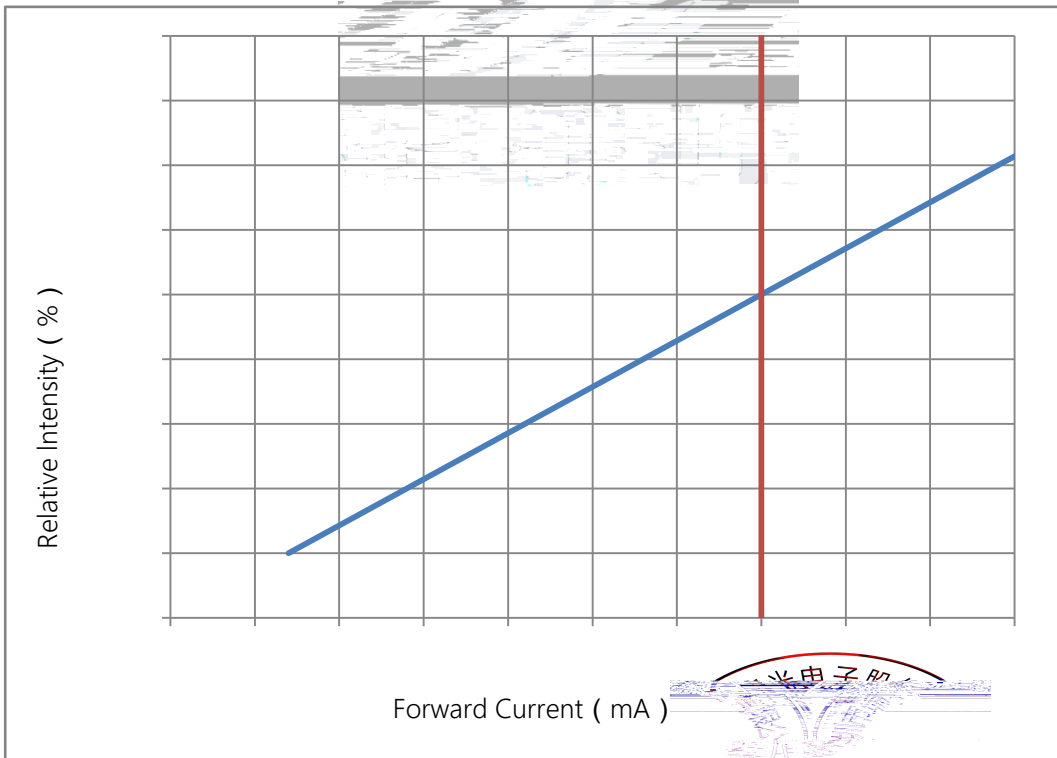


Fig. 1-8 Forward Current Vs Relative Intensity

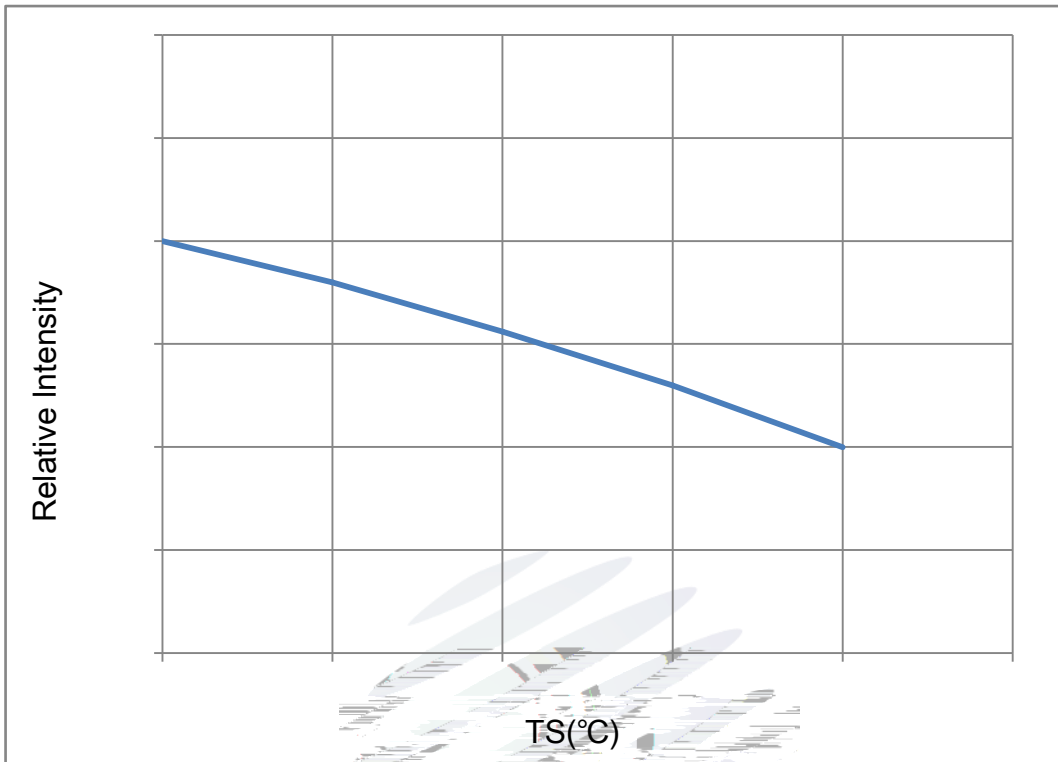


Fig. 1-9 Solder Temperature Vs Relative Intensity

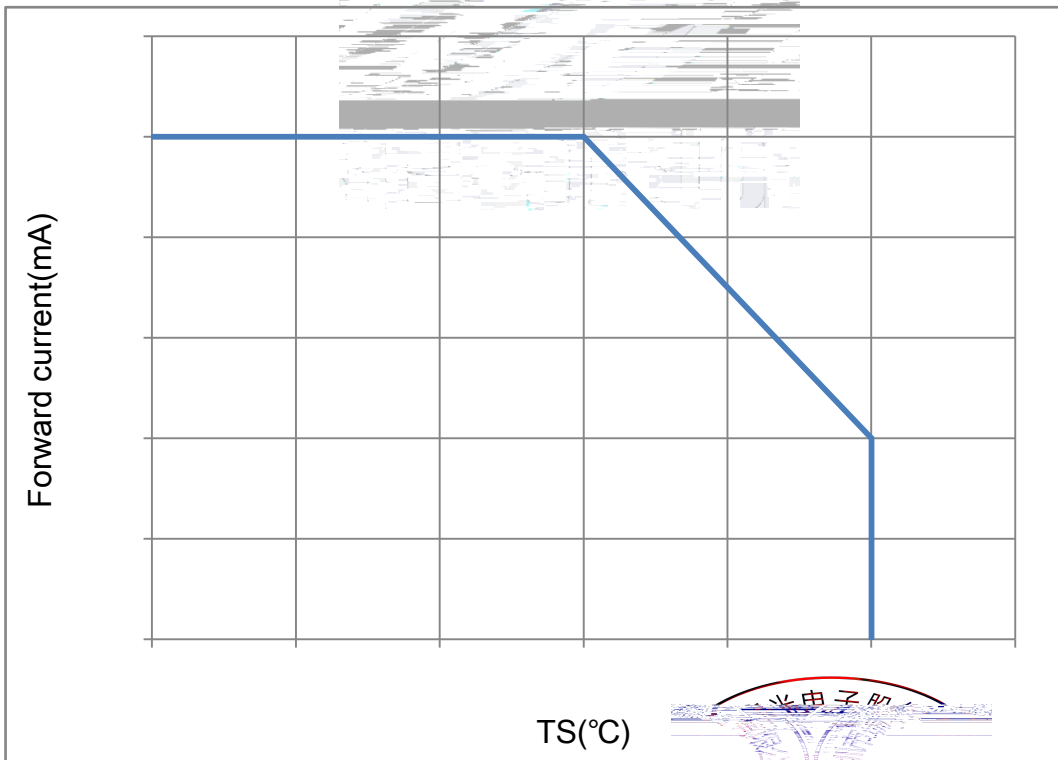


Fig. 1-10 Solder Temperature Vs Forward Current
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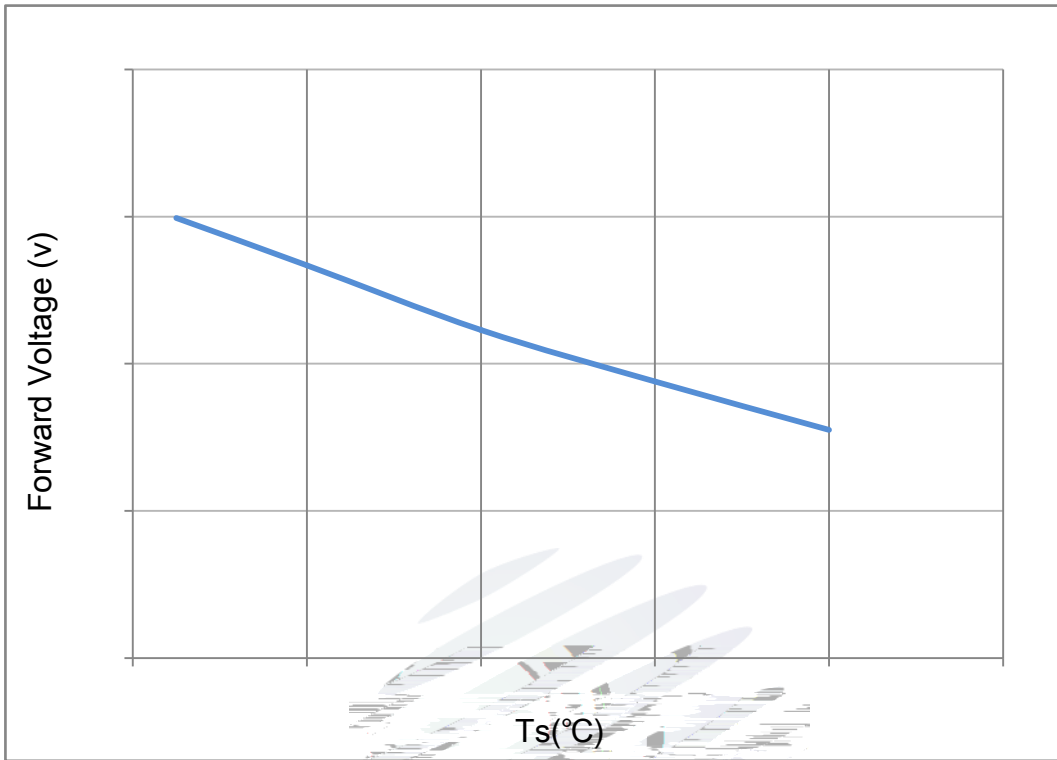


Fig. 1-11 Forward Voltage Vs Solder Temperature

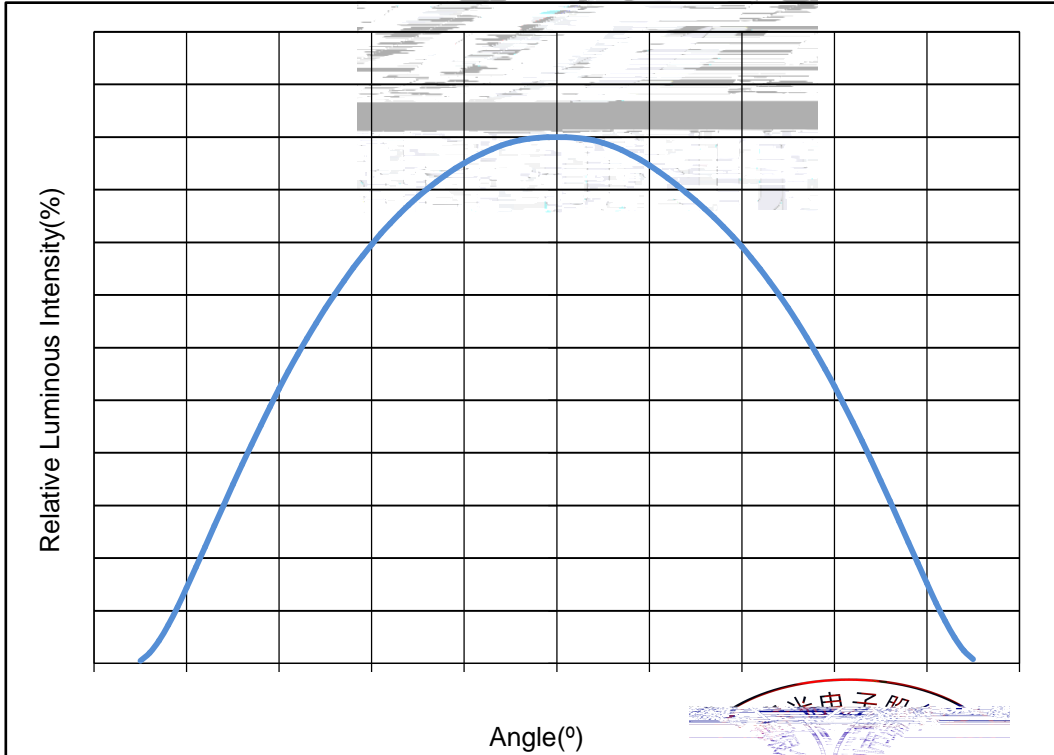


Fig. 1-12 Radiation diagram

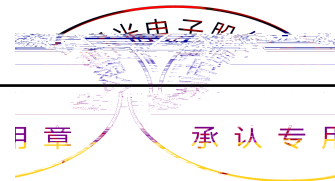


Fig. 1-12 Forward current vs. Dominate wavelength

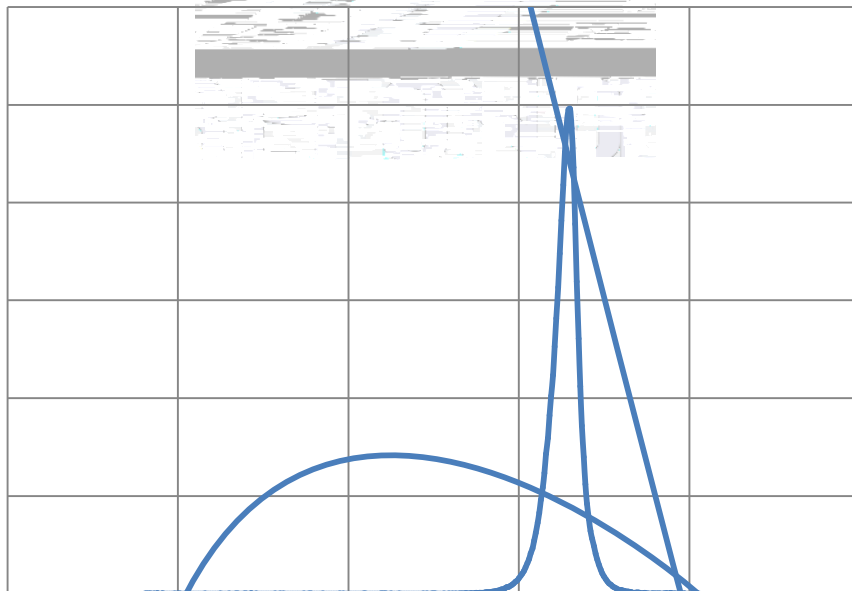


Fig. 1-14 Spectrum Distribution

2.1.3 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	

Fig. 2-3 Label Form Specification

2.2 Moisture Resistant Packing

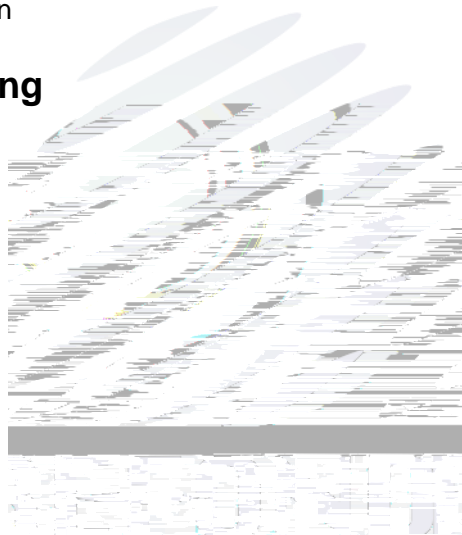


Fig.2-4 Moisture Resistant Packing

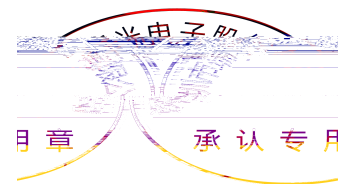
2.3 Cardboard Box

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
Thermal Shock	JEITAED-4701 300307	-40 15min ↑↓10s 125 15min	1000 cycle	20pcs.	0/1
High Temperature Storage	JEITAED-4701 200 201	Temp:125	1000hrs.	20pcs.	0/1
Low Temperature Storage	JEITA ED-4701 200 202	Temp:-40	1000hrs.	20pcs.	0/1
Life Test	JESD22-A108	Ta=25 If=350mA	1000hrs.	20pcs.	0/1
High Temperature High Humidity Life Test	JESD22-A101	85 / 85%RH If=350mA	1000hrs.	20pcs.	0/1
Temperature Humidity Storage	JEITA ED-4701 100 103	TA=85 RH=85%	1000hrs.	20pcs.	0/1



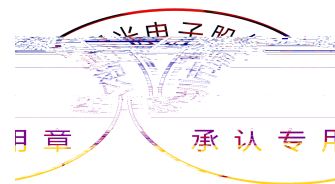
2.5 Criteria For Judging Damage

Table 2-4 Criteria For Judging Damage

Test Items	Symbol	Test Condition	Criteria For Judgement	
			Min.	Max.
Forward Voltage	V_F	$I_F=350\text{mA}$	-	U.S.L*)x1.1
Reverse Current	I_R	$V_R = 5\text{V}$	-	U.S.L*)x2.0
Luminous Flux	Φ	$I_F=350\text{mA}$	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



3. SMT Reflow Soldering Instructions SMT

3.1 SMT Reflow Soldering Instructions SMT

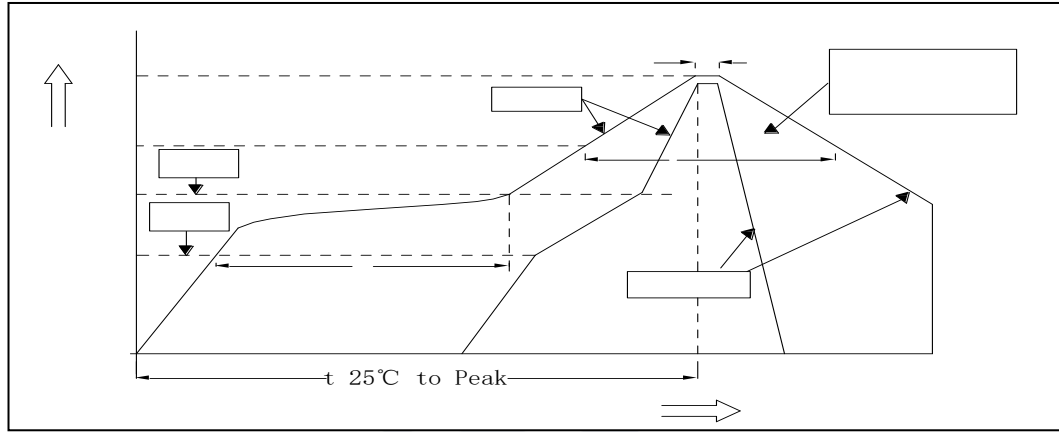


Fig.3-1 SMT Reflow Soldering Instructions SMT

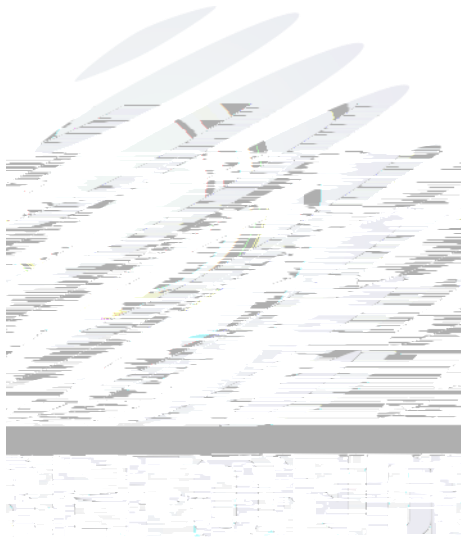
Table 3-1 Reflow parameters

Average temperature rise speed	$T_{max} - T_P$	3 °C/ s	Max 3 °C/ s
Preheating: minimum temperature	(T_{min})	150 °C	
Preheating: Max temperature	(T_{max})	200 °C	
Preheating: Time	$T_{min} - T_{max}$	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	30	Max 30s
5 °C with the actual peak temperature (T_P)			
Cooling speed		6 °C/ s	Max 6 °C/ s
25 °C	Needed time from 25 °C to T_p	8	Max 8 minutes

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Notes

(1)Reflow soldering should not be done more than twice. If more than 24 hours



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.

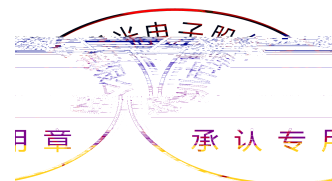
(2) In order to prevent external material from getting into the inside of LED, which may cause the malfunction of LED, the single content of Bromine element is required to be less than 900PPM, the single content of Chlorine element is required to be less than 900PPM, the total content of Bromine element 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.

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%	Recommended for use within 24 hours 24
Baking		60 ± 5	-	24 hours 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 (65±5) °C for above 24 hours.

60 ± 5 24

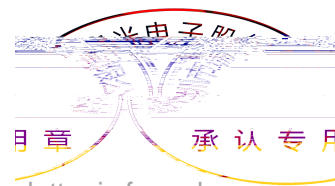
If the package is flatulence or damaged, please notify the sales staff to assist.

(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.





Declare

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