

# SPECIFICATION 产品规格书

REFOND P/N 产品型号

RF-AL-C3535L2K1DR-09-H

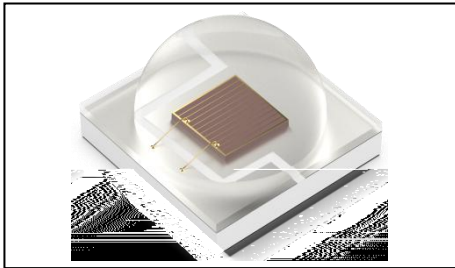
R&D 研发

Mass Product 量产供货



## 1. Description 产品介绍

### 1.1 General Description 产品描述



This product uses the ceramics package, it has a high reliability. The Deep Red source color devices are made with AlInGaP on Substrate Light Emitting Diode.

Size(mm):3.45mmX3.45mmX2.65mm.

本产品采用陶瓷封装结构，可靠性高。深红光LED由AlInGaP四种元素芯片激发而成。

产品尺寸：3.45mmX3.45mmX2.65mm.

### 1.2 Features 产品特征

Ceramics Package.陶瓷封装

Extremely wide viewing angle.发光角度大

Suitable for all SMT assembly and solder process.适用于所有的SMT组装和焊接工艺

Available on tape and reel.适用于载带及卷轴

Moisture sensitive level:Level3. 防潮等级：Level 3

RoHS compliant.满足RoHS要求

### 1.3 Application 产品应用

Plant factory.植物工厂

Tissue culture.组织培养

Landscape lighting, Stage photography light. 景观照明，舞台摄影

General use.其他适合的应用

## 1.4 Package Dimension 封装尺寸

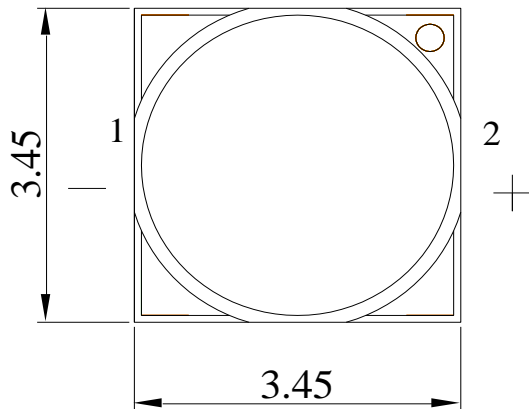


Fig.1-1 Top view 正面视图

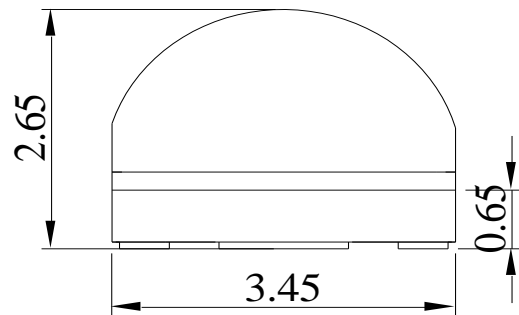


Fig.1-2 Side view 侧面视图

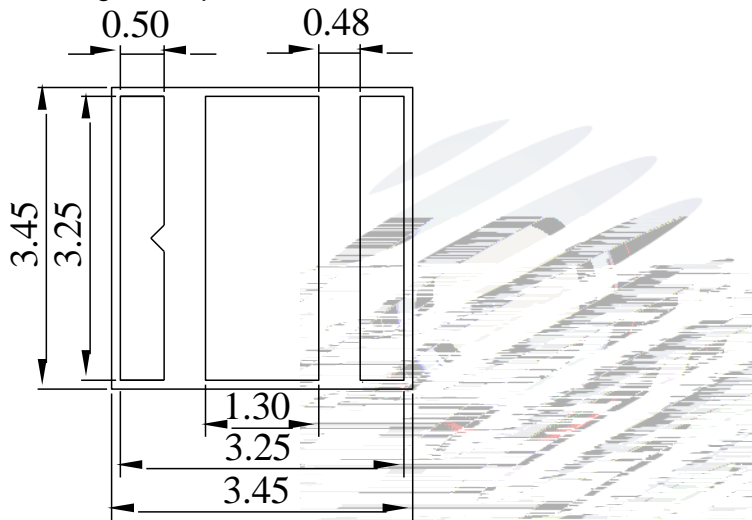


Fig.1-3 Bottom view 背面视图

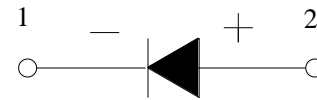


Fig.1-4 Polarity 极性

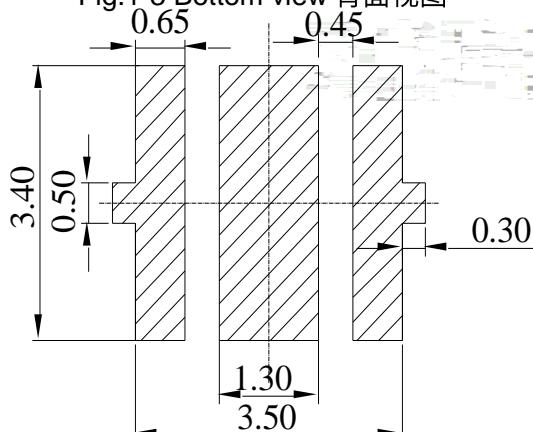


Fig.1-5 Soldering patterns 推荐焊盘

### Notes 备注:

1. All dimensions units are millimeters. 所有尺寸标注单位为毫米
2. All dimensions tolerances are  $\pm 0.2\text{mm}$  unless otherwise noted. 除特别标注外, 所有尺寸公差为  $\pm 0.2$  毫米

## 1.5 Product Parameters 产品参数

Table 1-1 Electrical / Optical Characteristics at Ts=25°C 电性与光学特性

Item 项目	Symbol 符号	Test Condition 测试条件	Value			Unit 单位
			Min. (最小值)	Typ (典型值)	Max. (最大值)	
Reverse Current (漏电流)	$I_R$	$V_R=5V$	---	---	10	$\mu A$
Forward Voltage (正向电压)	$V_F$	$I_F=700mA$	1.8	---	2.4	V
Peak Wavelength (峰值波长)	$\lambda_p$	$I_F=700mA$	650	---	665	nm
Spectrum Radiation Bandwidth 半波宽		$I_F=700mA$	---	20	---	nm
Total radiant flux (辐射功率)	e	$I_F=350mA$	500	570	650	mW
		$I_F=700mA$	1000	1120	1300	mW
Photosynthetic Photon Flux 光合光子通量	PPF	$I_F=350mA$	---	3.10	---	
		$I_F=700mA$	---	6.12	---	
Photosynthetic Photon efficacy	PPE	$I_F=350mA$	---	4.70	---	J
		$I_F=700mA$	---	4.35	---	J
Viewing Angle (发光角度)	2	$I_F=700mA$	---	120	---	deg
Thermal Resistance. (热阻)	$R_{THJ-S}$	$I_F=700mA$	---	5	---	$\text{/W}$

Table 1-2 Absolute Maximum Ratings at Ts=25°C 绝对最大值

Parameter (参数)	Symbol (符号)	Rating (值)	Units (单位)
Power Dissipation (功耗)	$P_D$	2400	mW
Forward Current (正向电流)	$I_F$	1000	mA
Peak Current (峰值电流)	$I_F$	1200	mA
Reverse Voltage (反向电压)	$V_R$	5	V
Electrostatic Discharge (HBM) (静电)	$E_{SD}$	2000	V
Operating Temperature (操作温度)	$T_{OPR}$	-40 ~ +85	
Storage Temperature (储存温度)	$T_{OPR}$	-40 ~ +100	
Junction Temperature (结温)	$T_J$	115	

Notes 备注:

- 1.1/10 Duty cycle, 0.1ms pulse width. 脉宽0.1ms,占空比1/10.
- 2.The above forward voltage measurement allowance tolerance is  $\pm 0.1V$ . 以上所示电压测量误差  $\pm 0.1V$ .
3. The above wavelength measurement allowance tolerance is  $\pm 1nm$ . 以上所示波长测量误差  $\pm 1nm$ .
4. Tolerance of measurement of Total radiant flux/ Radiant Intensity: 10%.辐射功率/强度测量公差:  $\pm 10\%$ .
5. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product. 使用功率不能超过规定的最大值。
6. All measurements were made under the standardized environment of Refond. 标准测试平台。
- 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 使用的最大电流需要根据散热条件确定, 结温不能超过最大值。

### 1.5.1 Bin Range Of Forward Voltage and Luminous Intensity (IF=700mA)电压与光强分 BIN 范围(IF=700mA)

Table 1-3



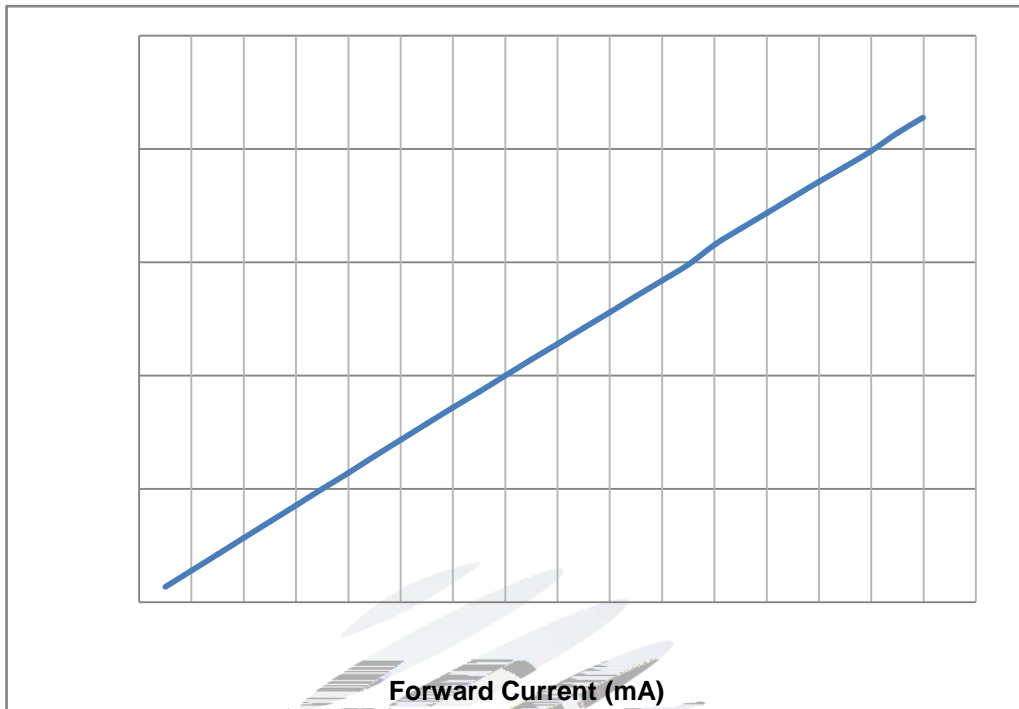


Fig 1-7 Forward Current Vs. Relative Intensity 正向电流与相对光强特性曲线

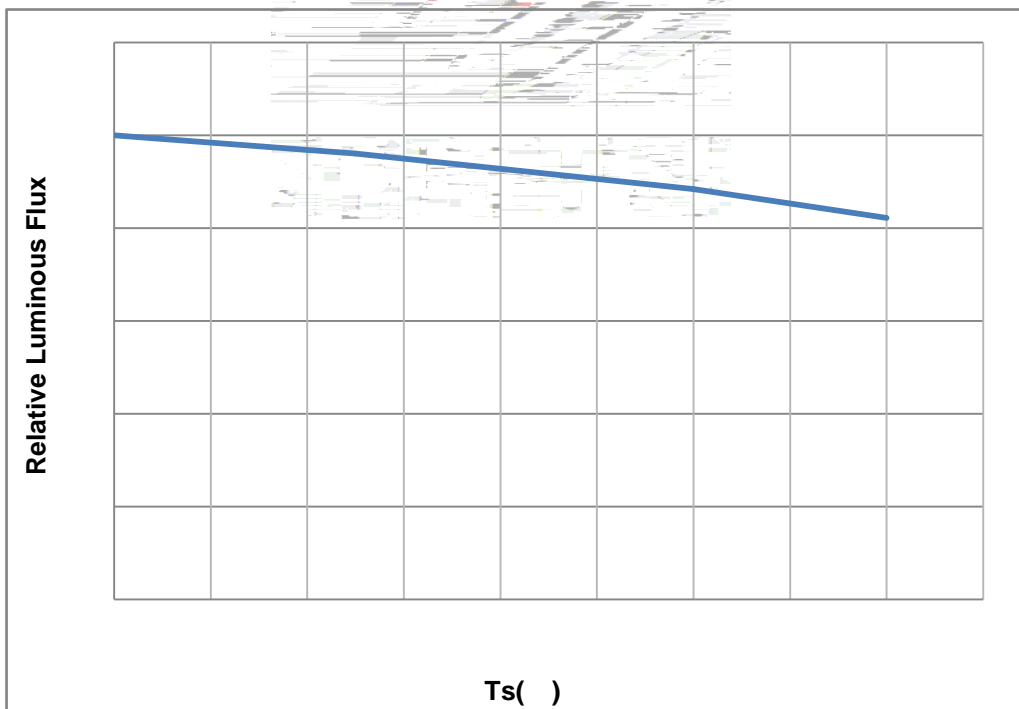


Fig 1-8 Ts Temperature Vs Relative Intensity 管脚温度与相对光强特性曲线



Fig 1-9 Ts Temperature Vs Forward Current 管脚温度与正向电流特性曲线

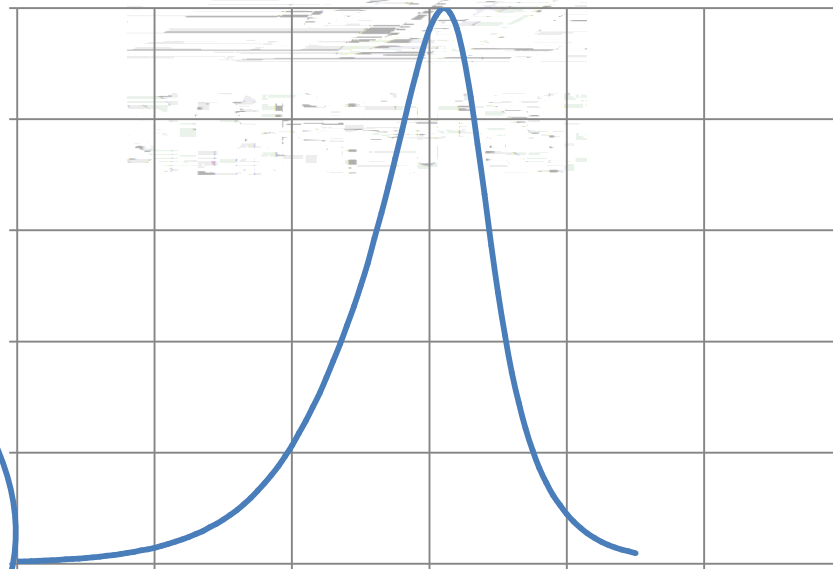
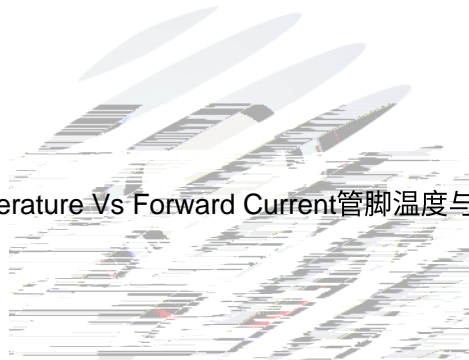


Fig 1-10 Spectrum Distribution 光谱分布特性曲线

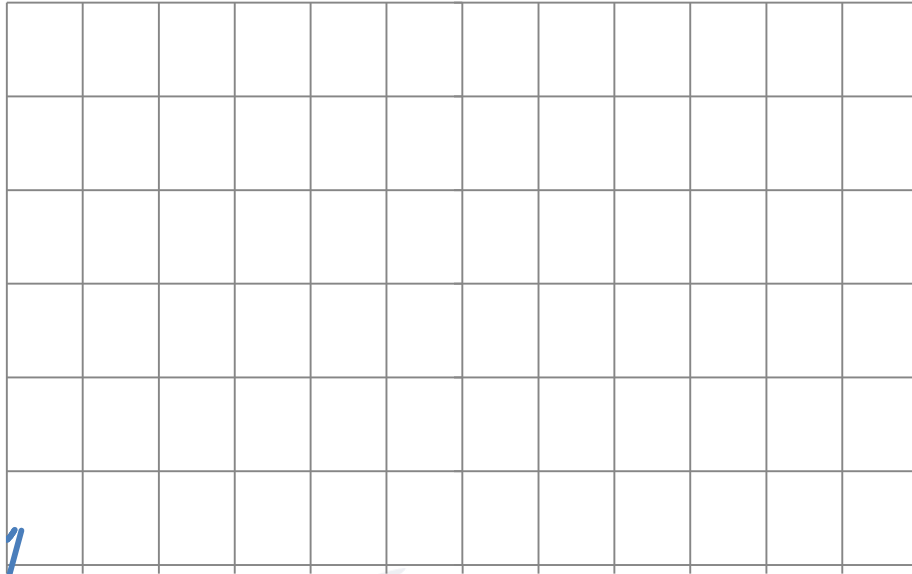


Fig 1-11 Radiation diagram 辐射特性曲线



## 2. Packaging 产品包装

### 2.1 Packaging Specification 包装规格

Package:Max 1000pcs/reel.包装每卷最多 1000pcs。

#### 2.1.1 Carrier Tape Dimension 载带尺寸

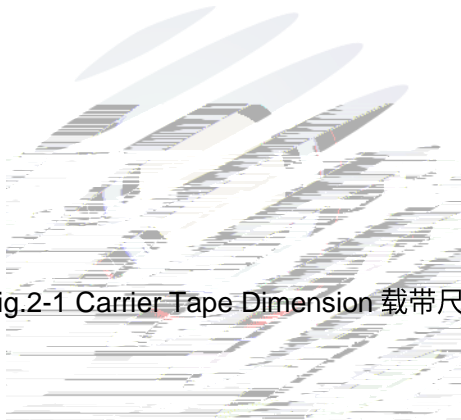
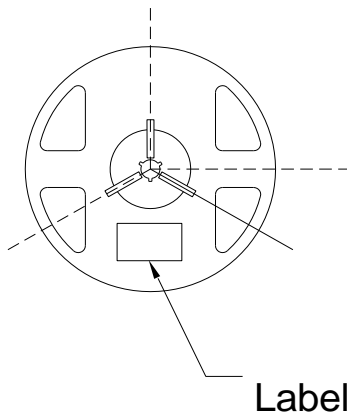


Fig.2-1 Carrier Tape Dimension 载带尺寸

#### 2.1.2 Reel Dimension 卷盘尺寸



Label



Table 2-1 Dimension 尺寸

A	12.7±0.3mm
B	330.2±2mm
C	79.5±1mm
D	14.3±0.2mm

Fig.2-2 Reel Dimension 卷盘

#### Notes 备注:

The tolerances unless mentioned  $\pm 0.1$ mm. Unit : mm

$\pm 0.1$  , .

### 2.1.3 Label Form Specification 标签规格

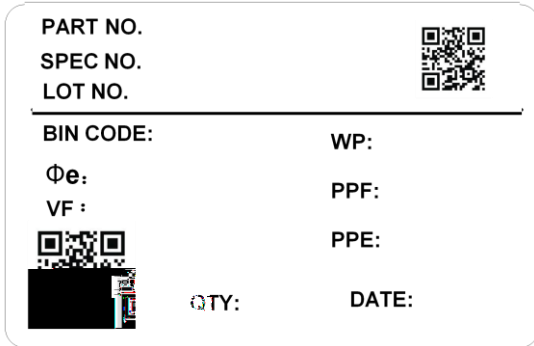


Fig 2-3 Label Form Specification 标签规格

Table 2-2 Label Form Specification 标签规格

PART NO	Part Number 品名
SPEC NO	Spec Number 规格
LOT NO	Lot Number 批次号
BIN CODE	Bin Code 色区
	Total radiant flux 辐射功率
WP	Peak Wavelength 峰值波长
PPF	光合光子通量
PPE	有效光合光子通量
VF	Forward Voltage 正向电压
QTY	Packing Quantity 数量
DATE	Made Date 生产日期

### 2.2 Moisture Resistant Packing 防潮包装

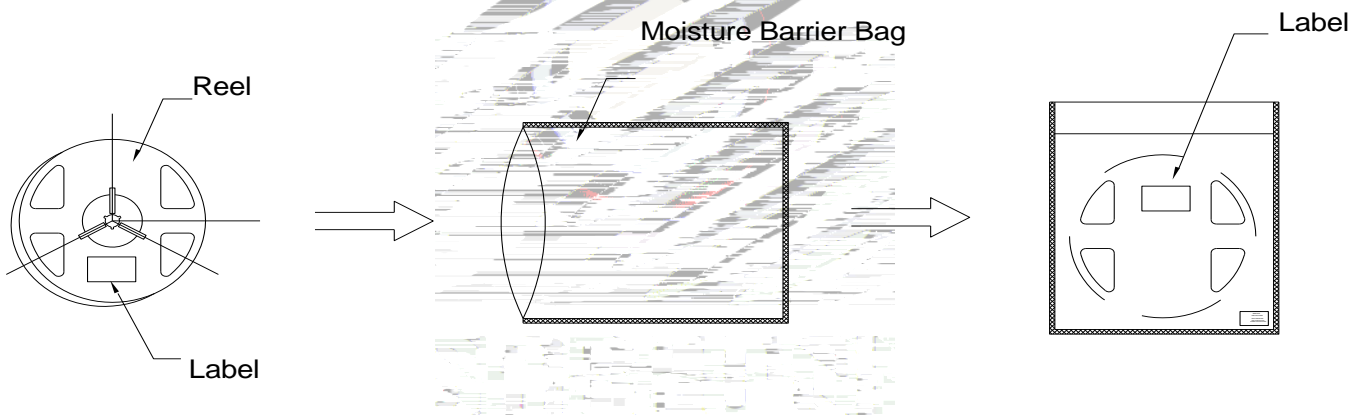
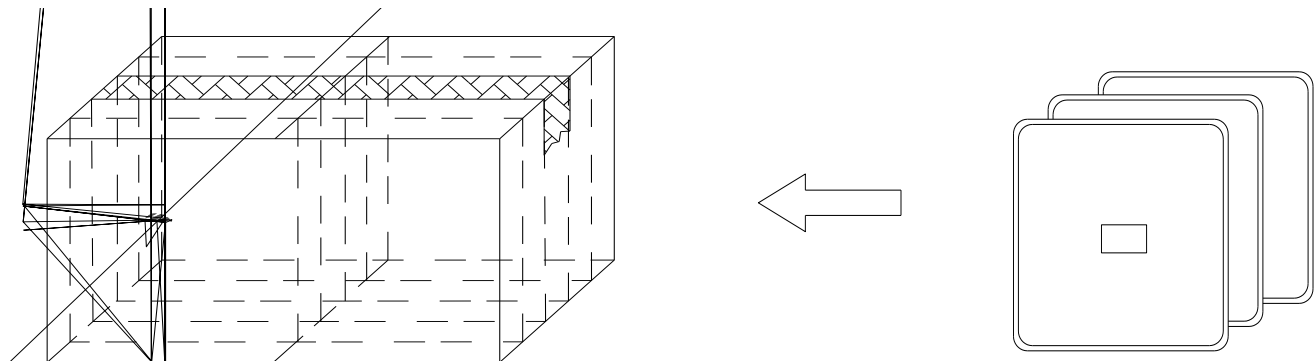


Fig.2-4 Moisture Resistant Packing 防潮包装

### 2.3 Cardboard Box 包装纸箱



REFOND OPTOELECTRONICS CO.,LTD.

Fig.2-5 Cardboard Box 包装纸箱

## 2.4 Reliability Test Items And Conditions 信赖性测试项目及条件

Table 2-3 Reliability Test Items And Conditions 信赖性测试项目及条件

Test Items 项目	Ref. Standard 参考标准	Test Condition 测试条件	Time 时间	Quantity 数量	Ac/Re 接收/拒收
Reflow 回流焊	JESD22-B106	Temp:260°Cmax T=10 sec	2times	10pcs.	0/1
Thermal Shock 冷热冲击	JESD22-A106	-40°C 15min 10s 100°C 15min	100 cycle	10pcs.	0/1
High Temperature Storage 高温保存	JESD22-A103	Temp:100°C	1000hrs.	10pcs.	0/1
Low Temperature Storage 低温保存	JESD22-A119	Temp:-40°C	1000hrs.	10pcs.	0/1
Life Test 常温测试	JESD22-A108	Ta=25°C If=700mA	1000hrs.	10pcs.	0/1
High Temperature High Humidity Life Test 高温高湿测试	JESD22-A101	60°C/ 90%RH If=700mA	1000hrs.	10pcs.	0/1

## 2.5 Criteria For Judging Damage 失效判定标准

Table Criteria For Judging Damage 失效判定标准

Test Items 项目	Symbol 符号	Test Condition 测试条件	Criteria For Judgement 判定标准	
			Min. 最小	Max. 最大
Forward Voltage 正向电压	$V_F$	$I_F=700mA$	-	U.S.L*)x1.1
Reverse Current 反向电流	$I_R$	$V_R = 5V$	-	U.S.L*)x2.0
Total radiant flux 辐射功率	e	$I_F=700mA$	L.S.L*)x0.7	-

### Notes 备注:

- 1.U.S.L: Upper standard level 规格上限 L.S.L: Lower standard level 规格下限
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. 以上可靠性测试是基于瑞丰现有实验平台单颗/条 LED 在良好散热条件验证下的结果。客户端将 LED 应用于串、并联线路时，需自行评估电流、电压分配、散热等问题。
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. 以上技术数据仅为产品的典型值，只作为参考，不作为任何应用条件及应用方式的保证。

### 3. SMT Reflow Soldering Instructions SMT 回流焊说明

#### 3.1 SMT Reflow Soldering Instructions SMT 回流焊说明

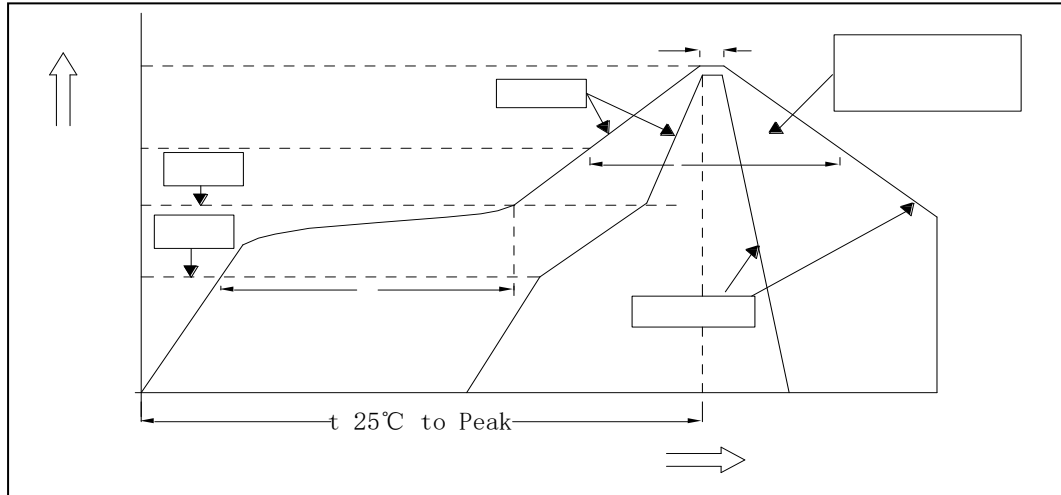


Fig.3-1 SMT Reflow Soldering Instructions SMT 回流焊说明

Table 3-1 Parameter 参数

Average temperature rise speed 平均升温速度 (T <sub>max</sub> 至 T <sub>P</sub> )	最高3 °C/秒 Max 3 °C/ s
Preheating: minimum temperature 预热: 最低温度 (T <sub>min</sub> )	150 °C
Preheating: Max temperature 预热: 最高温度 (T <sub>max</sub> )	200 °C
Preheating: Time 预热: 时间 (T <sub>min</sub> 至T <sub>max</sub> )	60 - 120秒 60s-120s
Time limited to maintain high temperature: the temperature 限时高温: 限制温度 (T <sub>L</sub> )	217 °C
Time limited to maintain high temperature: The Time 限时维持高温: 时间 (t <sub>L</sub> )	最多60秒 Max 60s
Peak /Classification of temperature: 峰值 / 分类温度 (T <sub>P</sub> )	260 °C
Time limit classification of peak temperature time 限时峰值分类温度: 时间 (t <sub>p</sub> )	最多10秒 Max 10s
Hold time within 5 °C with the actual peak temperature (T <sub>P</sub> ) 与实际峰值温度 (T <sub>P</sub> ) 相差 5 °C 以内的保持时间	最多30秒 Max 30s
Cooling speed 降温速度	最高6 °C/秒 Max 6 °C/ s
Needed time from 25 °C to T <sub>p</sub> 25 °C 升至峰值温度所需时间	最多8分钟 Max 8 minutes

Notes 备注:





## 4. Handling Precautions 产品使用注意事项

### 4.1 Handling Precautions 产品使用注意事项

(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 工作环境及与 LED 适配的材料中硫元素及化合物成份不可超过 100PPM. 这只是一个建议，不作任何品质担保。

(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



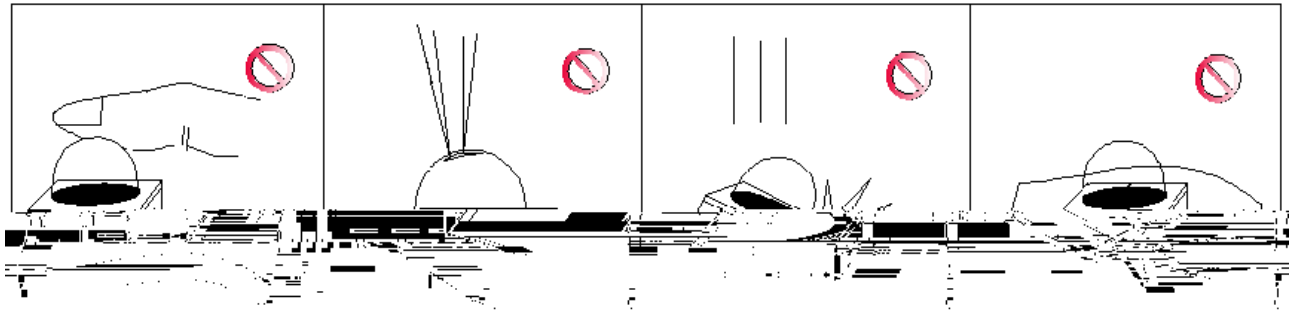


Fig 4-1

(5) In designing a circuit, the current through each LED can not be 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. 设计电路时，通过 LED 的电流不能超过规定的最大值。同时，还需使用保护电阻，否则，微小的电压变化将会引起较大电流变化，可能导致产品损毁。电路设计必须保证只有在开启或者关闭的时候出现正向电压的变化，不要施加反压，否则会损坏 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 封装胶在回流焊时会产生热量，导致 LED 发光效率，影响发光颜色，所以在设计时应充分考虑散热问题。

(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. 与其他封装胶相比，硅胶通常较软，表面易吸附脏物，应用时应特别注意，当对产品洁净度要求较高时，回流焊以后需要采用恰当的清洗方式，我们推荐用异丙醇作清洗剂，如需要用到其他清洗剂，必须保证不会破坏封装体，超声清洗可能会对 LED 带来损害，不推荐这种清洗方式。

Table 4-1 Storage 儲存

Conditions 种类		Temperature 温度	Humidity 湿度	Time 时间
Storage	Before Opening Aluminum Bag 拆包前	≤30°C	≤75%	Within 1 Year From Date 一年内
	After Opening Aluminum Bag 拆包后	≤30°C	≤60%	168hours 168小时
Baking 烘烤		60±5°C	<5%	≥24hours 大于24小时

(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. 如果干燥剂失效或产品存放时间超过24小时，需拆包后进行烘烤，烘烤条件：60±5°C，大于24小时。

If the package is flatulence or damaged, please notify the sales staff to assist. 如果包装胀气或者破损，请通知销售人员协助处理。

(9) Similar to most Solid state devices; LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS). 像其他的半导体电子器件一样，LED对静电过流击穿非常敏感，需要做好防护。

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

其它注意事项请参照瑞丰相关资料。





Declare 申明

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

产品规格书以中英文方式书写，若有冲突以中文版本为准。