

# SPECIFICATION

# 产品规格书



REFOND P/N 产品型号

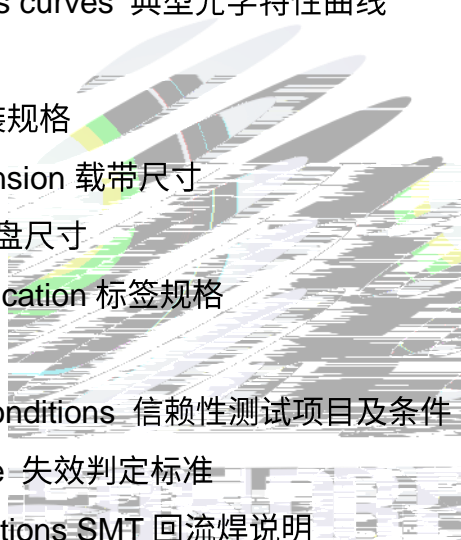
RF-AL-C3535L2K1FR-04

R&D 研发

Mass Product 量产供货

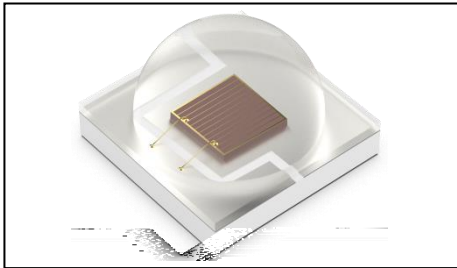
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# 1. Description 产品介绍

## 1.1 General Description 产品描述

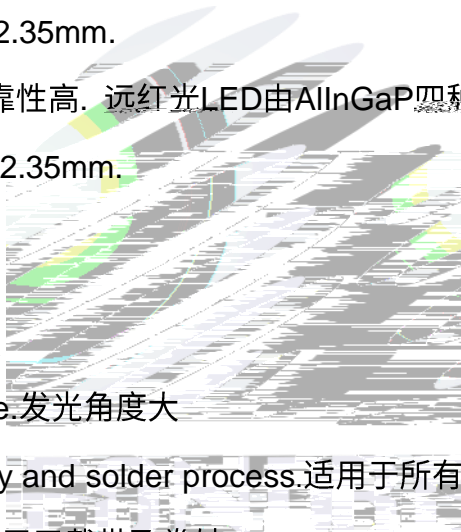


This product uses the ceramics package, it has a high reliability. The Far Red source color devices are made with AlInGaP on Substrate Light Emitting Diode.

Size(mm): 3.45mmX3.45mmX2.35mm.

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

产品尺寸：3.45mmX3.45mmX2.35mm.



## 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,

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

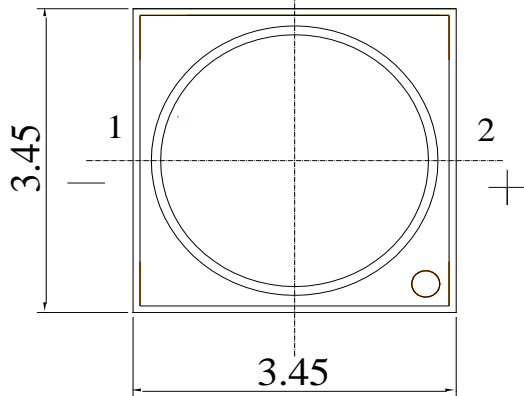


Fig.1-1 Top view 正面视图

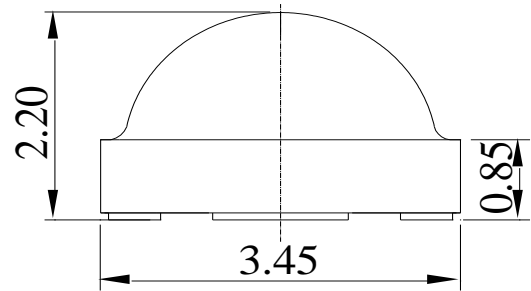


Fig.1-2 Side view 侧面视图

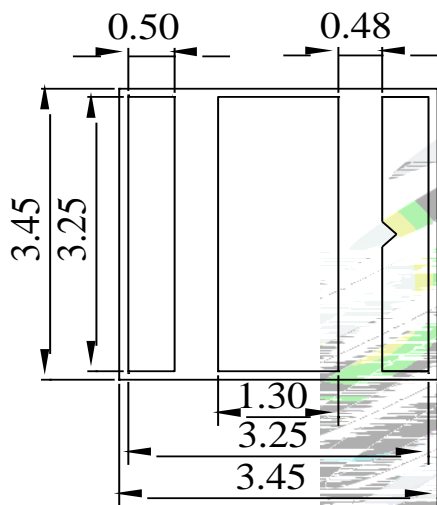


Fig.1-3 Bottom view 背面视图

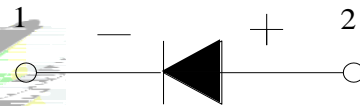


Fig.1-4 Polarity 极性

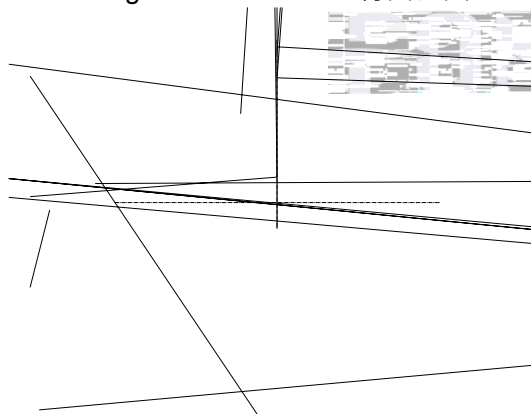


Fig.1-5 Soldering patterns 推荐焊盘

### 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)	
Forward Voltage (正向电压)	$V_F$	$I_F=350\text{mA}$	1.8	---	2.4	V
Peak Wavelength (峰值波长)	$\lambda_p$	$I_F=350\text{mA}$	725	---	740	nm
Total radiant flux (辐射功率)	$\Phi_e$	$I_F=350\text{mA}$	300	420	500	mW
Photosynthetic Photon Flux (光合光子通量)	PPF	$I_F=350\text{mA}$	---	2.60	---	
Photosynthetic Photon efficacy (光合光子效率)	PPE	$I_F=350\text{mA}$	---	3.65	---	J
Reverse Current (漏电流)	$I_R$	$V_R=5\text{V}$	---	---	10	$\mu\text{A}$
Viewing Angle	2	$I_F=350\text{mA}$	---	120	---	deg
Thermal Resistance. (热阻)	$R_{THJ-S}$	$I_F=350\text{mA}$	---	5	---	- /W

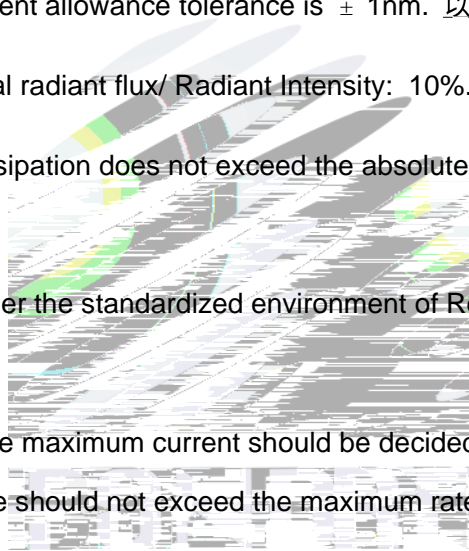
Table 1-2 Absolute Maximum Ratings at Ts=25°C 绝对最大值

Parameter	Symbol (符号)	Rating (值)	Units (单位)
Power Dissipation (功耗)	$P_D$	1800	mW
Forward Current (正向电流)	$I_F$	750	mA
Peak Forward Current (峰值电流)	$I_{FP}$	850	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 <sub>OPR</sub>	-40 ~ +85	-
Storage Temperature (储存温度)	T <sub>OPR</sub>	-40 ~ +100	-
Junction Temperature (结温)			

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. 所有的测试都是在标准测试平台。
- 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=350mA)电压与光强分 BIN 范围(IF=350mA)

Table 1-3

1.8-1.9
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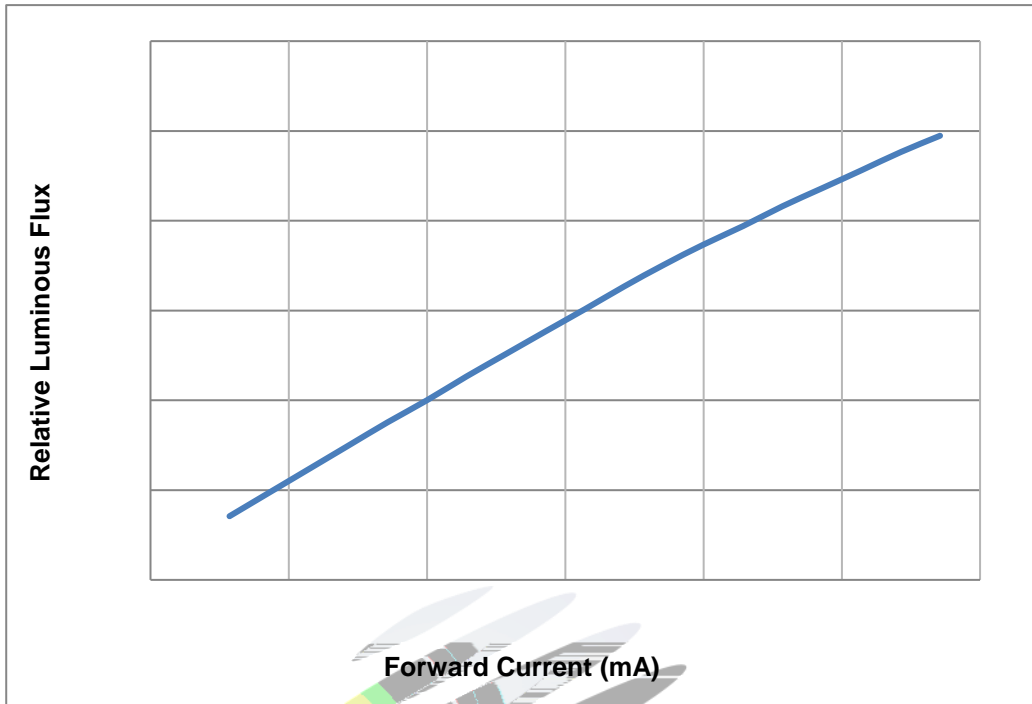


Fig 1-7 Forward Current Vs. Relative Intensity 正向电流与相对光强特性曲线

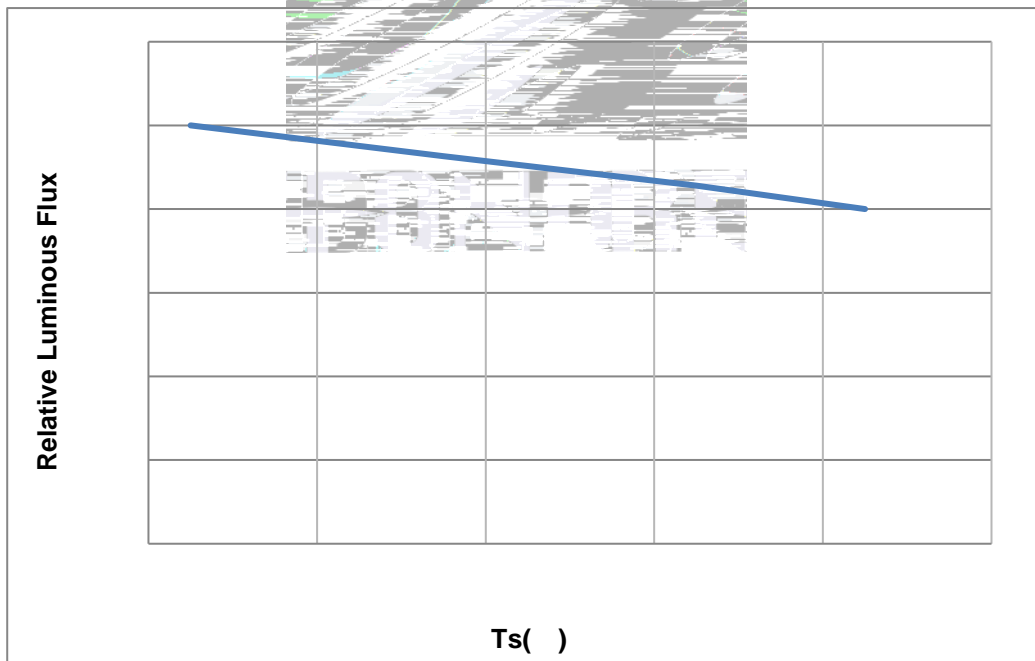


Fig 1-8 Ts Temperature Vs Relative Intensity 管脚温度与相对光强特性曲线



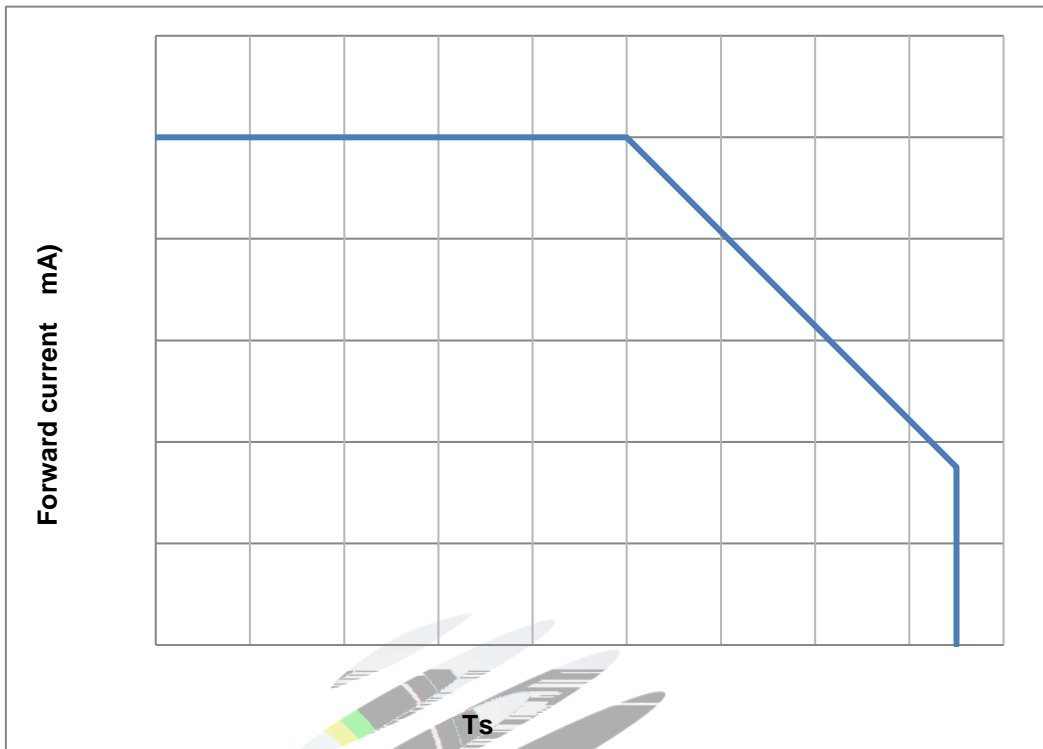


Fig 1-9 Ts Temperature Vs Forward Current管脚温度与正向电流特性曲线

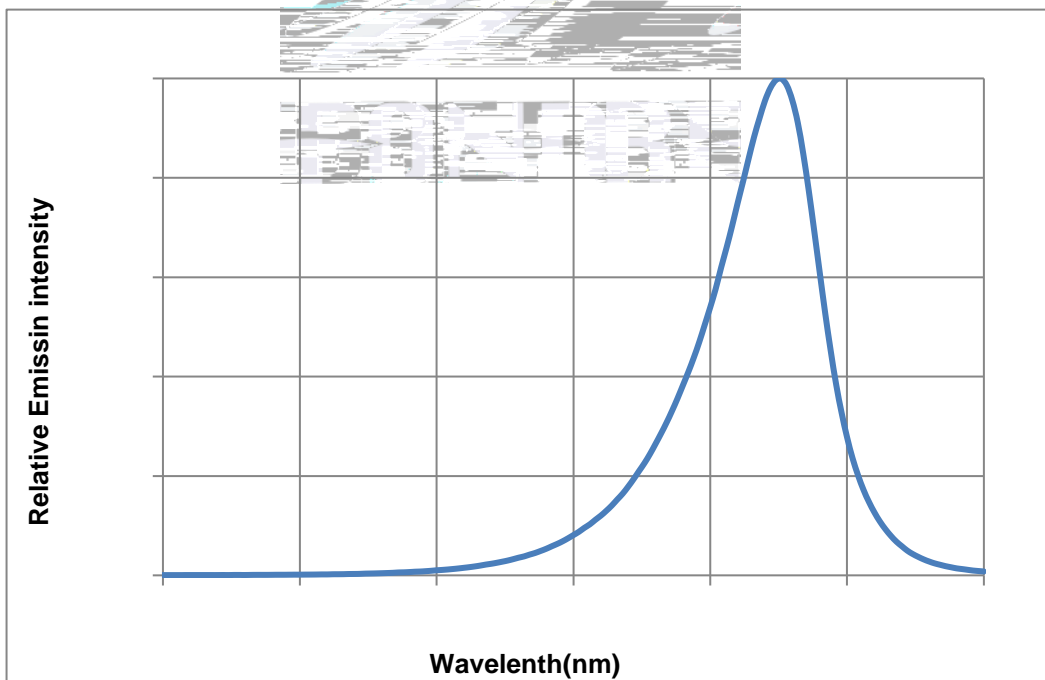


Fig 1-10 Spectrum Distribution光谱分布特性曲线

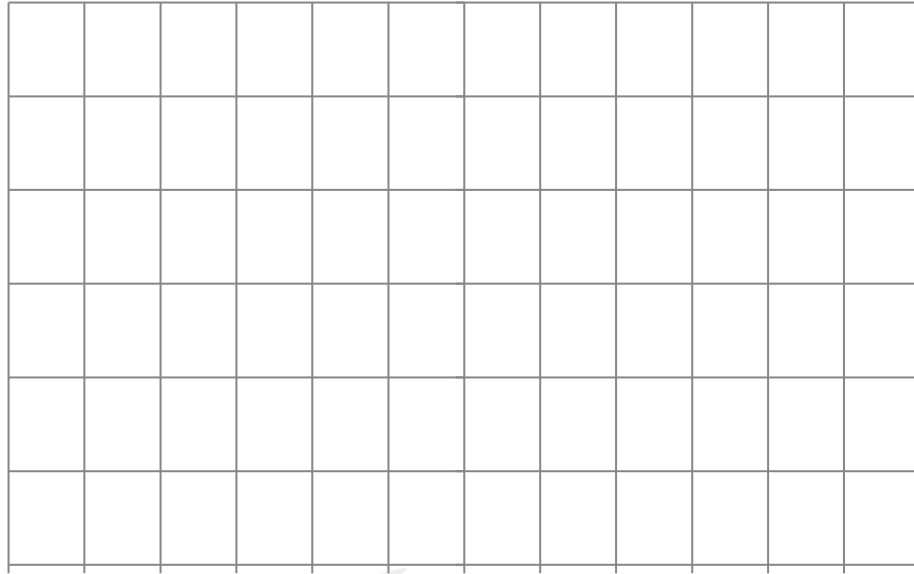
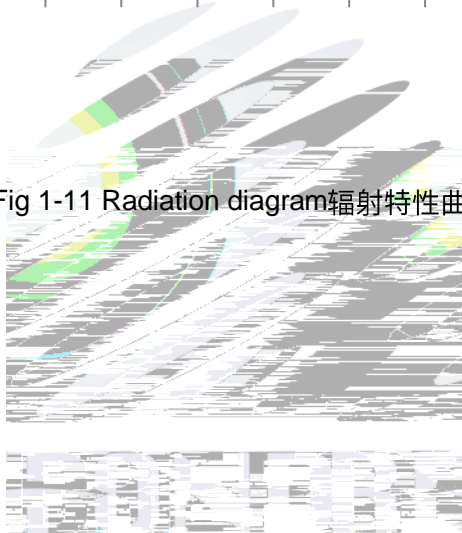


Fig 1-11 Radiation diagram 辐射特性曲线



## 2. Packaging 产品包装

### 2.1 Packaging Specification 包装规格

Package: 1000pcs/reel. 包装每卷

#### 2.1.1 Carrier Tape Dimension 载带尺寸

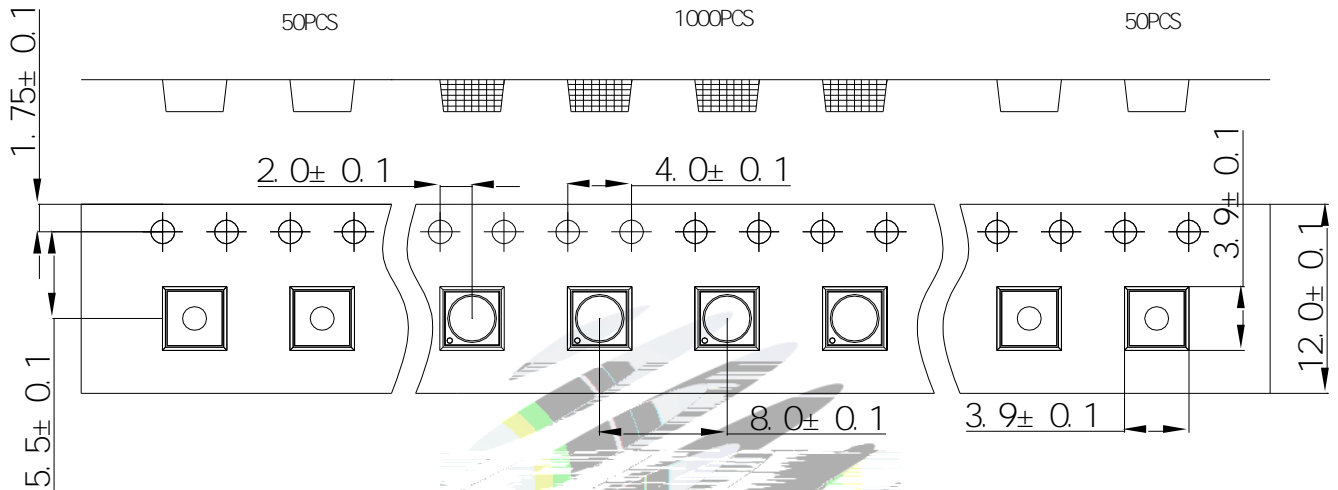


Fig.2-1 Carrier Tape Dimension 载带尺寸

#### 2.1.2 Reel Dimension 卷盘尺寸

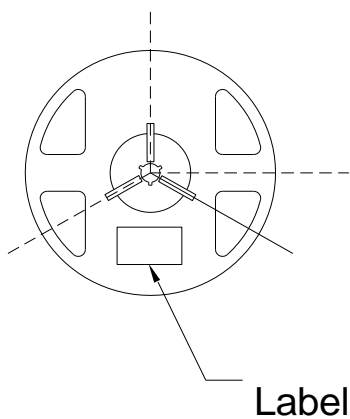


Fig.2-2 Reel 卷盘

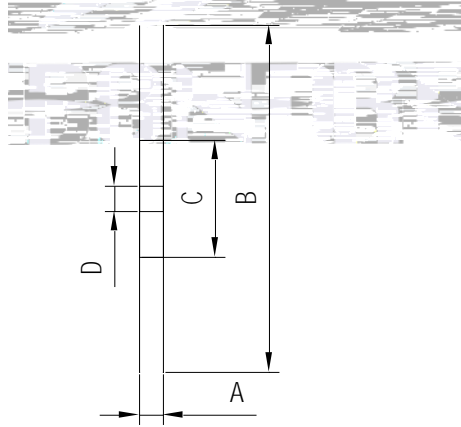


Table 2-1 Reel Dimension 卷盘尺寸

A	14.0±0.5mm
B	178±1mm
C	59±1mm
D	13.9±0.5mm

Notes 备注:

The tolerances unless mentioned  $\pm 0.1$ mm. Unit : mm 注: 未注公差为  $\pm 0.1$ 毫米, 尺寸单位: 毫米。

### 2.1.3 Label Form Specification 标签规格

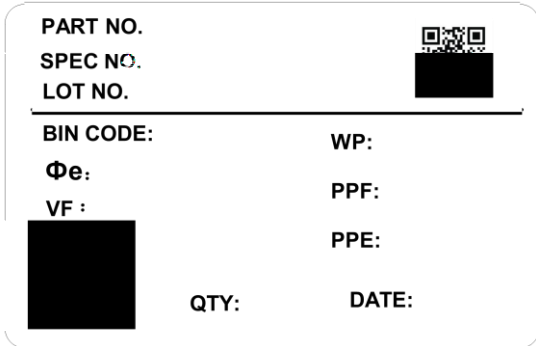


Fig 2-3 Label Form Specification 标签规格

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

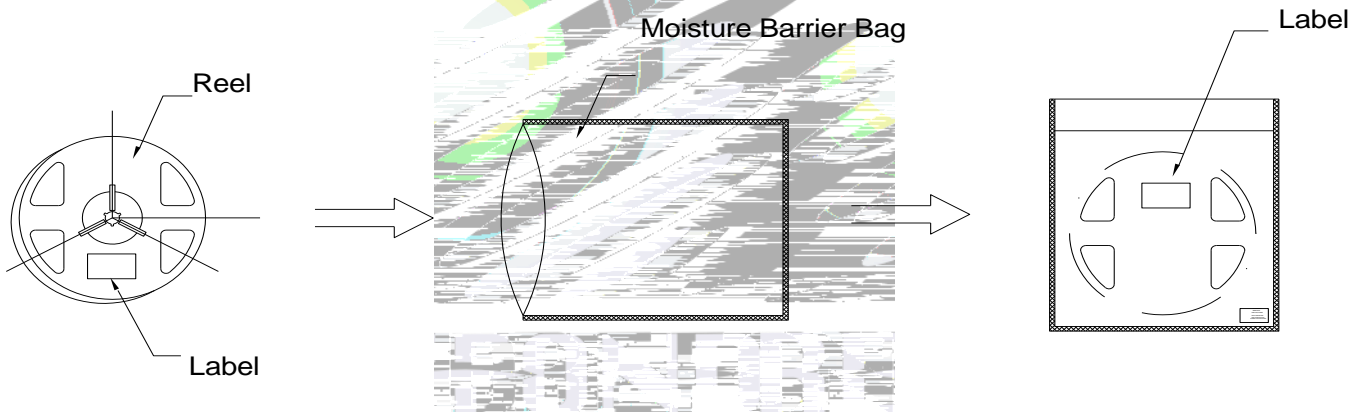


Fig.2-4 Moisture Resistant Packing 防潮包装

### 2.3 Cardboard Box 包装纸箱

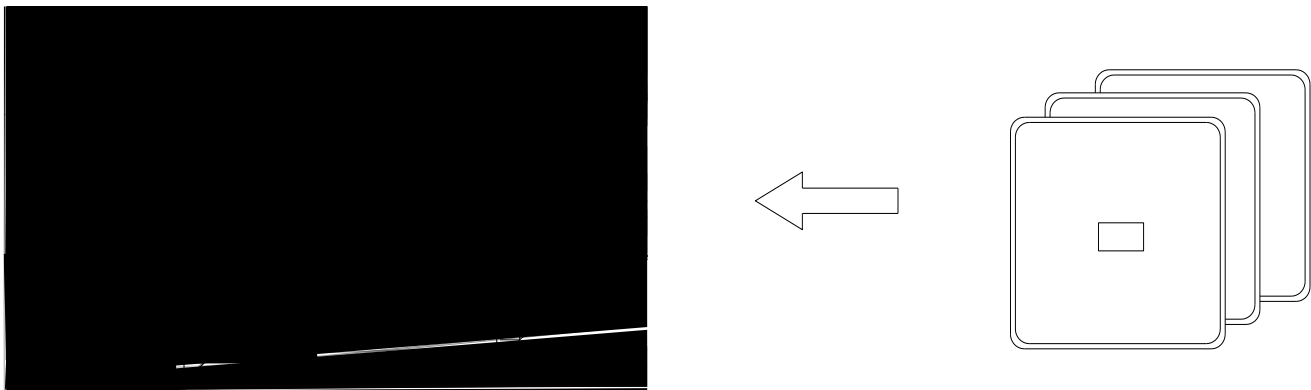


Fig.2-5 Cardboard Box 包装纸箱

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

Table 2-3 Test items and conditions 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	$T_{emp}: 260^{\circ}\text{Cmax}$ $T=10\text{ sec}$	2times.	10pcs.	0/1
Thermal Shock 冷热冲击	JEITAED-4701 300307	$-40^{\circ}\text{C}$ 15min 10s $100^{\circ}\text{C}$ 15min	100 cycle.	10pcs.	0/1
High Temperature Storage 高温保存	JEITAED-4701 200 201	$T_{emp}: 100^{\circ}\text{C}$	1000hrs.	10pcs.	0/1
Low Temperature Storage 低温保存	JEITA ED-4701 200 202	$T_{emp}: -40^{\circ}\text{C}$	1000hrs.	10pcs.	0/1
Life Test 常温通电	JESD22-A108	$T_A=25^{\circ}\text{C}$ $I_F=350\text{mA}$	1000hrs.	10pcs.	0/1
High Temperature High Humidity Life Test 高温高湿通电	JESD22-A101	$60^{\circ}\text{C}/90\%\text{RH}$ $I_F=350\text{mA}$	500hrs.	10pcs.	0/1

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

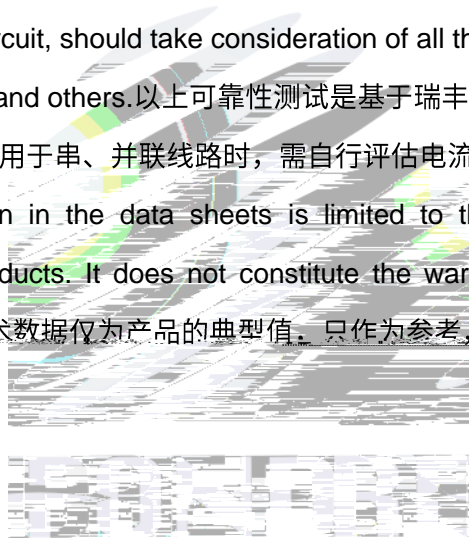
Table 2-4 Criteria for judging damage 失效判定标准

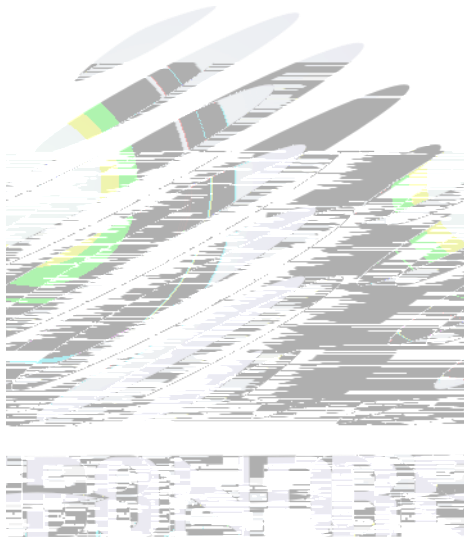
Test Items 项目	Symbol 符号	Test Condition 测试条件	Criteria For Judgement 判定标准	Applicable project 适用项目
Forward Voltage 电压	$V_F$	$I_F=350\text{mA}$	$\leq \pm 10\%$	Reflow

Radiant Flux	e	I <sub>F</sub> =350mA	Maintenance ≥80% 辐射通量维持率	Thermal Shock High and Low Temperature Storage
Lamp Bead Light Test 灯珠点亮测试	/	I <sub>F</sub> =350mA	No open circuit short circuit or flicke 无开路、短路、闪变	High Temperature High Humidity Life Test

Notes 备注:

- 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。
- 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. 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。





Hold time within 5 °C with the actual peak temperature (TP) 与实际峰值温度 (TP) 相差 5 °C 以内的保持时间	Max 30s 最多30秒
Cooling speed 降温速度	Max 6 °C/ s 最高6 °C/秒
Needed time from 25 °C to Tp 25 °C 升至峰值温度所需时间	Max 8 minutes 最多8分钟

Notes 备注:

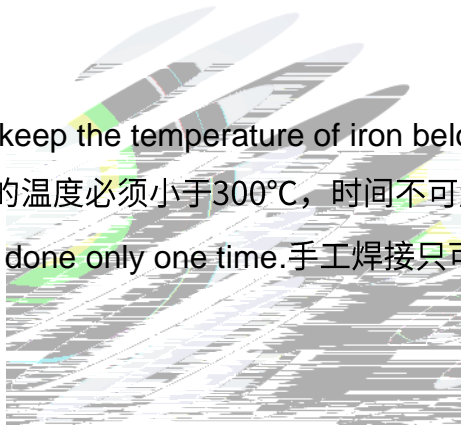
(1)Reflow soldering should not be done more than twice. If more than 24 hours between the two solderings , LED will be damaged. 回流焊次数不可以超过两次，两次回流焊的时间间隔如果超过24小时，LED可能由于吸湿而损坏。

(2)Whensoldering , do not put stress on the LEDs during heating. 当焊接时，不要在材料受热时用力同时使表面产生应力。

### 3.1.1 Soldering Iron 烙铁焊接

(1) When do soldering by hand, keep the temperature of iron below less 300 °C less than 3 seconds. 当手工焊接时,烙铁的温度必须小于300°C，时间不可超过3秒。

(2) Soldering by hand should be done only one time.手工焊接只可焊接一次。



### 3.1.2 Repairing 修补

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封装胶为硅胶，当焊接时，用力同时使表面产生应力，会损坏LED本身的特性。

### 3.1.3 Cautions 注意事项

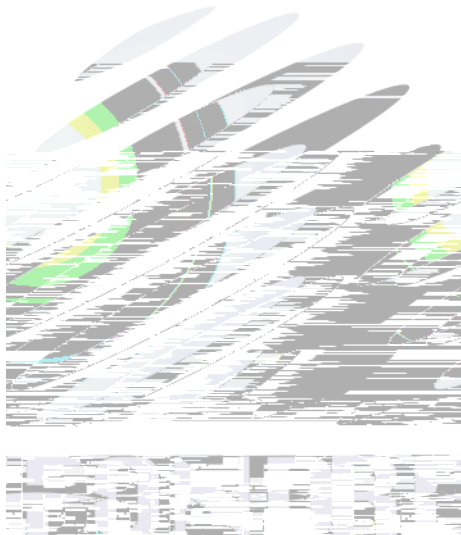
(1) The encapsulated material of the LEDs is silicone. Therefore the LEDs have a soft surface on the top of package. The pressure to the top surface will be impacted on the reliability of the LEDs. Precautions should be taken to avoid the strong pressure on the encapsulated part. So when use the picking up nozzle, the pressure on the silicone resin should be proper. LED封装胶为硅胶，

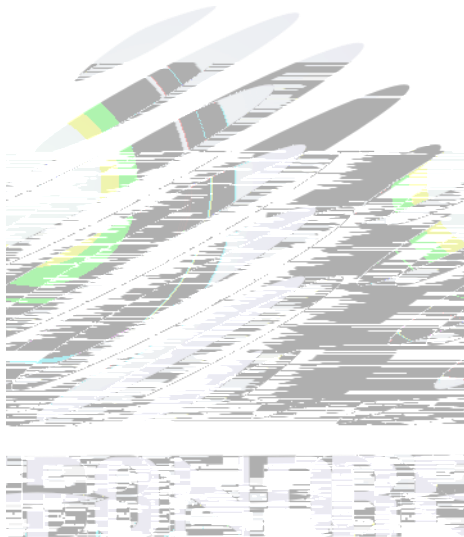


表面较软，用力按压胶体表面会影响LED可靠性，因此应有预防措施避免在按压器件，当使用吸嘴时，胶体表面的压力应是恰当的。

(2) Components should not be mounted on warped (non coplanar) portion of PCB. After soldering, do not warp the circuit board. LED 灯珠不要焊接在弯曲的 PCB 板上，焊接之后，也不要弯曲线路板。

(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.回流焊之后冷却过程中，不要对材料施加外力，也不要震动，回流焊后，不要采用激剧冷却的方式。





(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. 通过使用适当的工具从侧面握住元件，不要直接用手或尖锐金属压胶体表面，它可能会损坏内部电路。

Fig 4-1 Misoperation 错误操作

(5) In designing a circuit, the current through each LED must 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，可能导致元件烧毁。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 容易因为自身的发热和环境的温度改变而改变，温度升高会降低 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

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 储存

Conditions 种类		Temperature	Humidity 湿度	Time 时间
Storage	Before Opening Aluminum Bag 拆包前	30°C	75%	Within 6 Months From Date 6个月内
	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

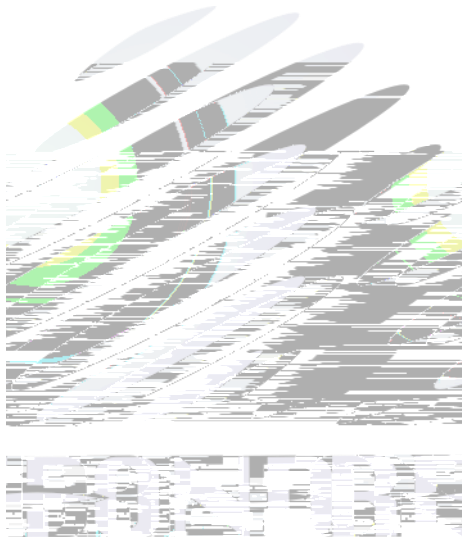
(8) If the moisture absorbent material silica gel has faded away or the LEDs have exceeded the storage time, baking treatment should be performed after unpacking and based on the following condition 60±5°C and less than 5%RH for above 24 hours. 如果干燥剂或包装失效，或者产品存放时间超过存储条件，需拆包后进行烘烤，烘烤条件为60±5°C，小于5%RH，大于24小时。

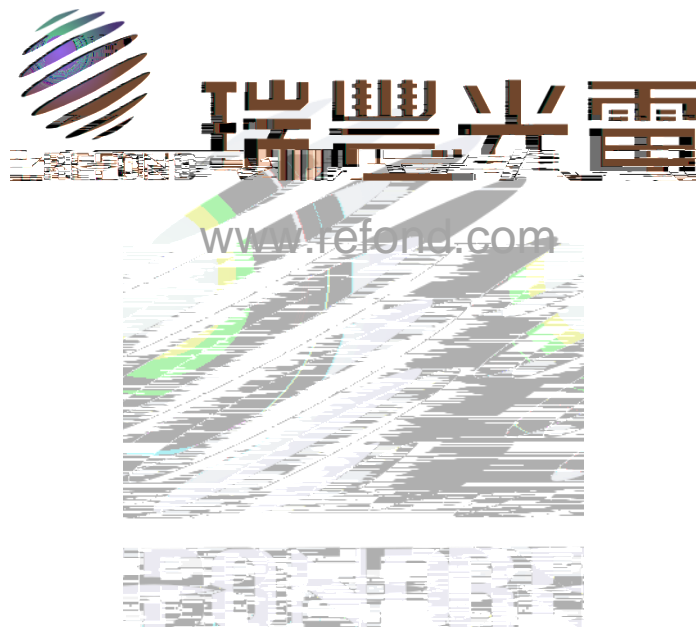
If the package is flatulence or damaged, please notify the sales staff to assist. 如果包装胀气或者破损，请及时通知销售人员处理。

(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文档。

Date日期	Revisor修订者	Version版本	Verifier审核	Remarks备注
2022-8-18	刘明	E0	姚胜坚	





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，**繁体本为基准**，若有冲突以**繁体**为准。