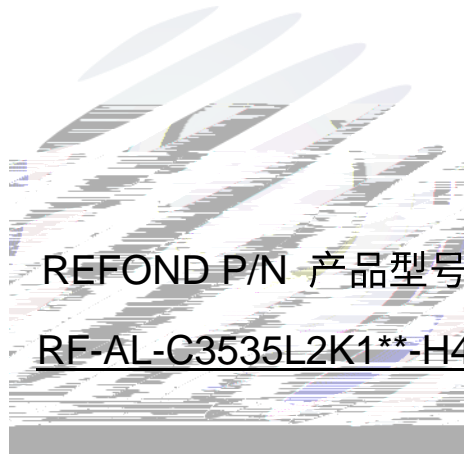


SPECIFICATION

产品规格书



REFOND P/N 产品型号

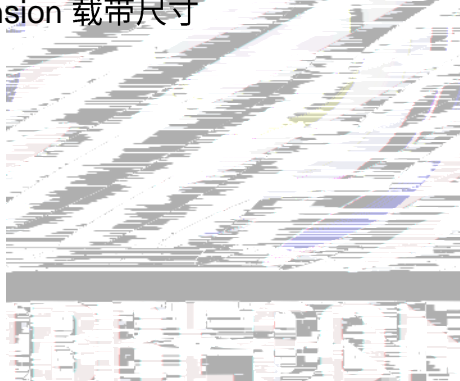
RF-AL-C3535L2K1**-H4

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
 - 1.2 Features 产品特征
 - 1.3 Application 产品应用
 - 1.4 Package Dimension 封装尺寸
 - 1.5 Product Parameters 产品参数
 - 1.5.1 Bin Range Of Forward Voltage and Luminous Intensity (IF=350mA) 电压与光强分 BIN 范围 (IF=350mA)
 - 1.6 Typical optical characteristics curves 典型光学特性曲线
- 2. Packaging 产品包装
 - 2.1 Packaging Specification 包装规格
 - 2.1.1 Carrier Tape Dimension 载带尺寸



1. Description 产品介绍

1.1 产品描述



The White LED which was fabricated by using a blue chip and phosphors.

白光LED是由蓝光芯片激发荧光粉而形成。

The LED package dimension: 3.45mmX3.45mmX2.20mm.

产品尺寸：3.45mmX3.45mmX2.20mm。

1.2 Features 产品特征

Ceramics Package.陶瓷封装

viewing angle:120°.发光角度120°

High reliability.高可靠性

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

RoHS compliant.满足RoHS要求

1.3 Application 产品应用

Warning lights, Downlights, Wash wall lights, Spot lights, Street lights. 警报器、筒射灯、洗墙灯、天花灯、路灯

Plant lighting, Landscape lighting, Stage photography light. 植物照明、景观照明、舞台摄影

Hotels, markets, offices, household and other indoor uses.酒店、商场、办公室、家用及其它室内用途

General use.

1.4 Package Dimension 封装尺寸

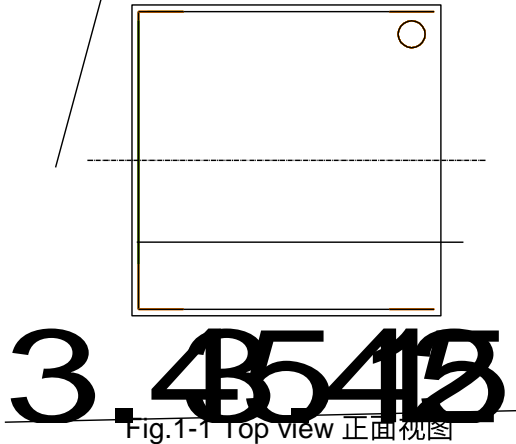


Fig.1-1 Top view 正面视图

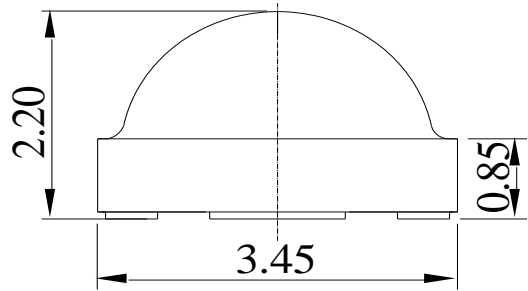


Fig.1-2 Side view 侧面视图

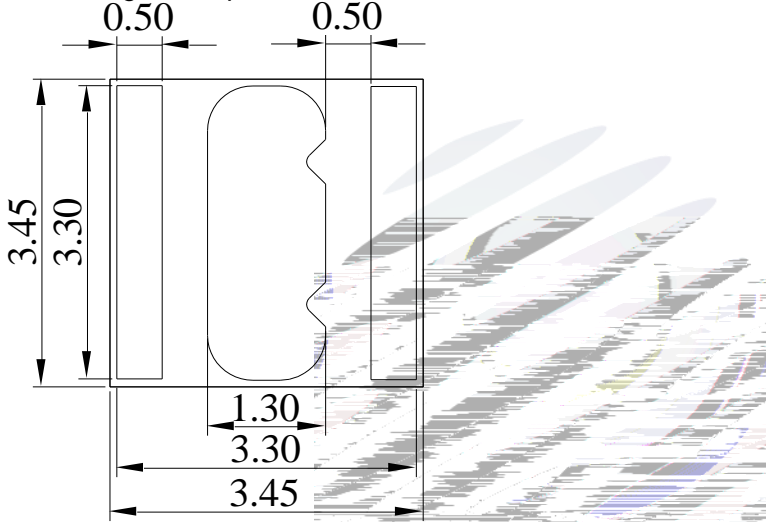


Fig.1-3 Bottom view 背面视图

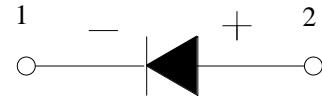


Fig.1-4 Polarity 极性

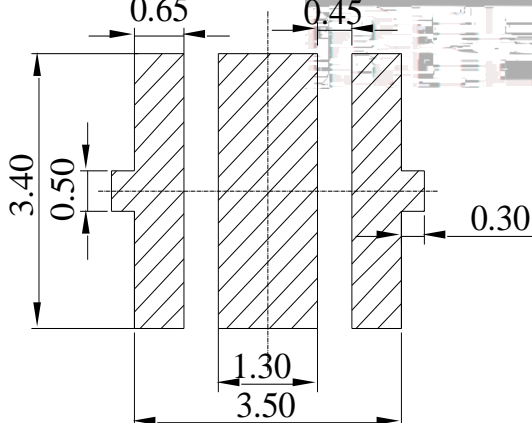


Fig.1-5 Soldering patterns 推荐焊盘

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 ± 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	$I_F=350mA$	2.6	---	3.4	V
RF-AL-C3535L2K127-H4 Luminous Flux (光通量)	I_v	$I_F=350mA$	140	---	170	lm
		$I_F=700mA$	260	---	320	lm
RF-AL-C3535L2K130-H4 Luminous Flux (光通量)	I_v	$I_F=350mA$	150	---	180	lm
		$I_F=700mA$	280	---	340	lm
RF-AL-C3535L2K135-H4 Luminous Flux (光通量)	I_v	$I_F=350mA$	160	---	190	lm
		$I_F=700mA$	300	---	360	lm
RF-AL-C3535L2K140-H4 Luminous Flux (光通量)	I_v	$I_F=350mA$	160	---	190	lm
		$I_F=700mA$	300	---	360	lm
RF-AL-C3535L2K145-H4 Luminous Flux (光通量)	I_v	$I_F=350mA$	160	---	190	lm
		$I_F=700mA$	300	---	360	lm
RF-AL-C3535L2K150-H4 Luminous Flux (光通量)	I_v	$I_F=350mA$	160	---	190	lm
		$I_F=700mA$	300	---	360	lm
RF-AL-C3535L2K157-H4 Luminous Flux (光通量)	I_v	$I_F=350mA$	160	---	190	lm
		$I_F=700mA$	300	---	360	lm
RF-AL-C3535L2K160-H4 Luminous Flux (光通量)	I_v	$I_F=350mA$	160	---	190	lm
		$I_F=700mA$	300	---	360	lm
RF-AL-C3535L2K165-H4 Luminous Flux (光通量)	I_v	$I_F=350mA$	150	---	180	lm
		$I_F=700mA$	280	---	340	lm
RF-AL-C3535L2K127-H4 Correlated Color Temperature (色温)	CCT	$I_F=350mA$	---	2700	---	K
RF-AL-C3535L2K130-H4 Correlated Color Temperature (色温)	CCT	$I_F=350mA$	---	3000	---	K

RF-AL-C3535L2K135-H4 Correlated Color Temperature (色温)	CCT	I _F =350mA	---	3500	---	K
RF-AL-C3535L2K140-H4 Correlated Color Temperature (色温)	CCT	I _F =350mA	---	4000	---	K
RF-AL-C3535L2K145-H4 Correlated Color Temperature (色温)	CCT	I _F =350mA	---	4500	---	K
RF-AL-C3535L2K150-H4 Correlated Color Temperature (色温)	CCT	I _F =350mA	---	5000	---	K
RF-AL-C3535L2K157-H4 Correlated Color Temperature (色温)	CCT	I _F =350mA	---	5700	---	K
RF-AL-C3535L2K160-H4 Correlated Color Temperature (色温)						

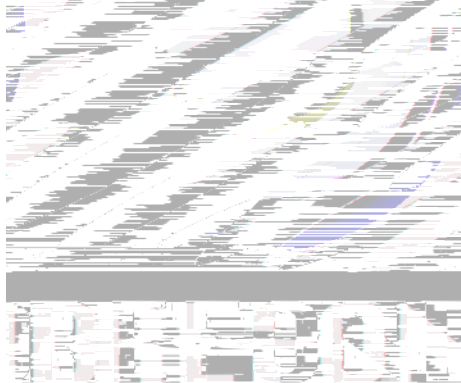


Table 1-2 Absolute Maximum Ratings at Ts=25°C 绝对最大值

Parameter (参数)	Symbol (符号)	Rating (值)	Units (单位)
Power Dissipation (功耗)	P_D	6800	mW
Forward Current (正向电流)	I_F	2000	mA
Peak Forward Current (峰值电流)	I_{FP}	3000	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 ~ +85	
Junction Temperature (结温)	T_J	125	

Notes 备注:

- 1/10 Duty cycle, 0.1ms pulse width. 脉宽0.1ms,占空比1/10.
- The above forward voltage measurement allowance tolerance is $\pm 0.1V$. 以上所示电压测量误差 $\pm 0.1V$.
- The above Dominant Wavelength measurement allowance tolerance is $\pm 1nm$. 以上所示波长测量误差 $\pm 1nm$.
- The above luminous intensity measurement allowance tolerance $\pm 10\%$. 上述发光强度的测试允许公差为 $\pm 10\%$.
- 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。
- All measurements were made under the standardized environment of Refond. 是基于瑞丰现有的所有测试都标准测试平台。

7. When the LEDs a

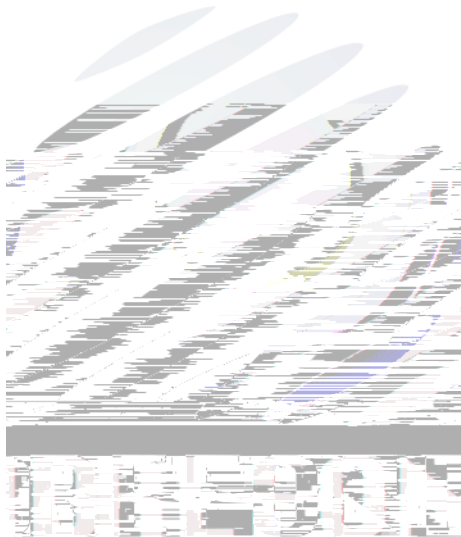
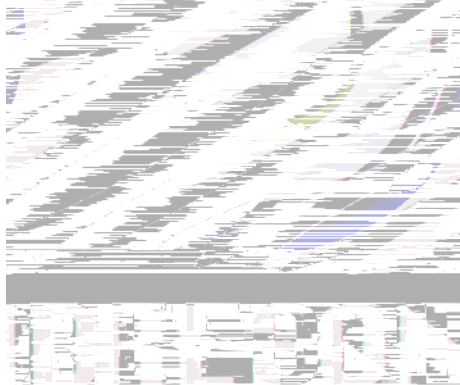
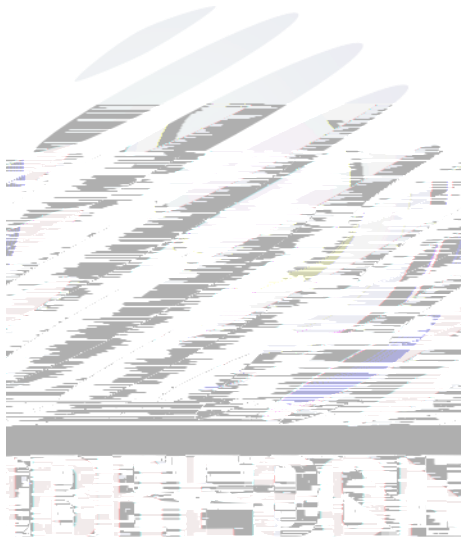


Table 1-4 Chromaticity Region & Coordinates

Region	CIE-X	CIE-Y	Region	CIE-X	CIE-Y	Region	CIE-X	CIE-Y	Region	CIE-X	CIE-Y
2700K			3000K			3500K			4000K		
27A	0.4373	0.3893	30A	0.4147	0.3814	35A	0.3889	0.3690	40A	0.3670	0.3578
	0.4465	0.4071		0.4221	0.3984		0.3941	0.3848		0.3702	0.3722
	0.4582	0.4099		0.4342	0.4028		0.4080	0.3916		0.3825	0.3798
	0.4483	0.3919		0.4259	0.3853		0.4017	0.3751		0.3783	0.3646
27B	0.4465	0.4071	30B	0.4221	0.3984	35B	0.3941	0.3848	40B	0.3702	0.3722
	0.4562	0.4260		0.4299	0.4165		0.3996	0.4015		0.3736	0.3874
	0.4687	0.4289									



	0.3615	0.3659		0.3451	0.3554		0.3290	0.3417		0.3130	0.3290
	0.3590	0.3521		0.3440	0.3427		0.3290	0.3300		0.3144	0.3186
	0.3512	0.3465		0.3366	0.3369						



				0.3376	0.3616		0.3207	0.3462		0.3028	0.3304
						57T	0.3290	0.3690	65T	0.3099	0.3509
							0.3381	0.3762		0.3196	0.3602
							0.3376	0.3616		0.3205	0.3481
							0.3290	0.3538		0.3115	0.3391
						57U	0.3290	0.3300	65U	0.3144	0.3186
							0.3366	0.3369		0.3221	0.3261
							0.3361	0.3245		0.3231	0.3120
							0.3290	0.3180		0.3161	0.3059

1.6 Typical optical characteristics curves 典型光学特性曲线

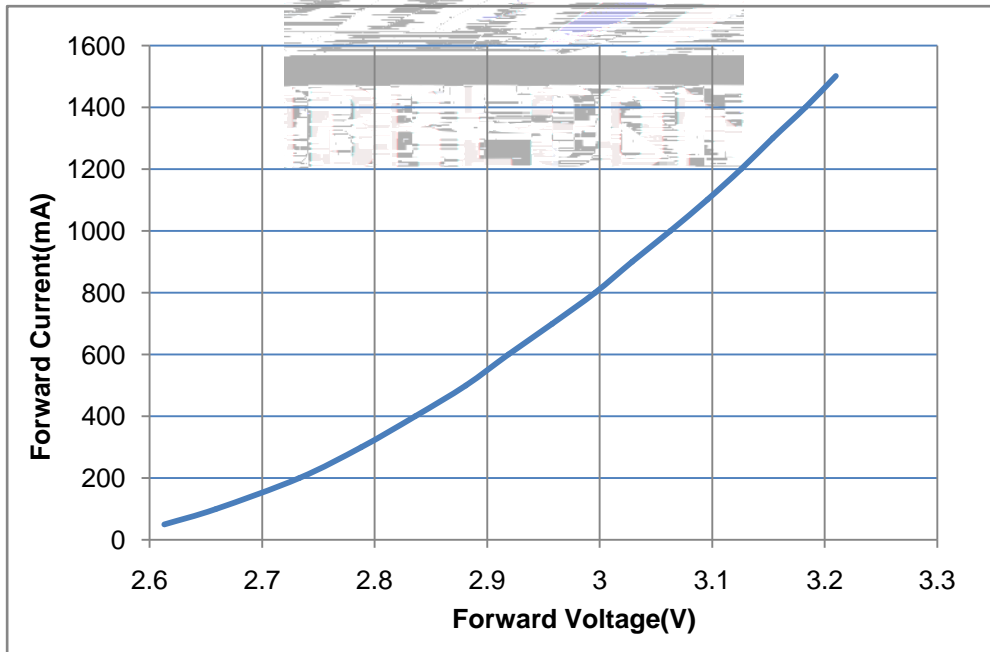


Fig 1-6 Forward Voltage Vs Forward Current伏安特性曲线

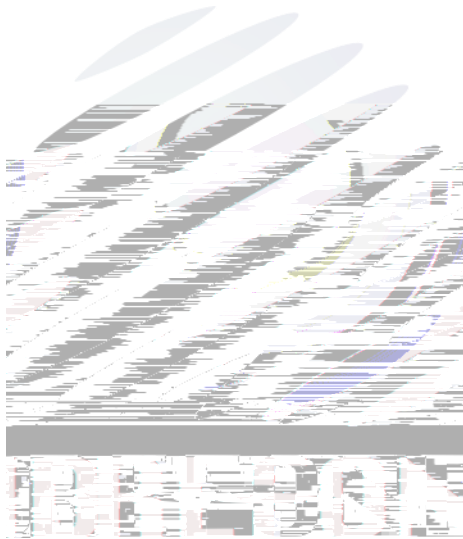


Fig 1-9 Ts Temperature Vs Forward Current 管脚温度与正向电流特性曲

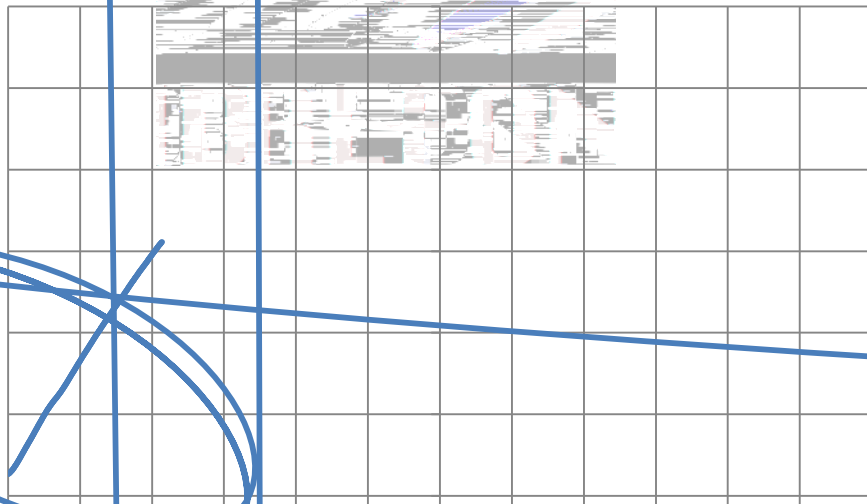


Fig 1-10 Radiation diagram 辐射特性曲线

54 5 54 5 5 54 5

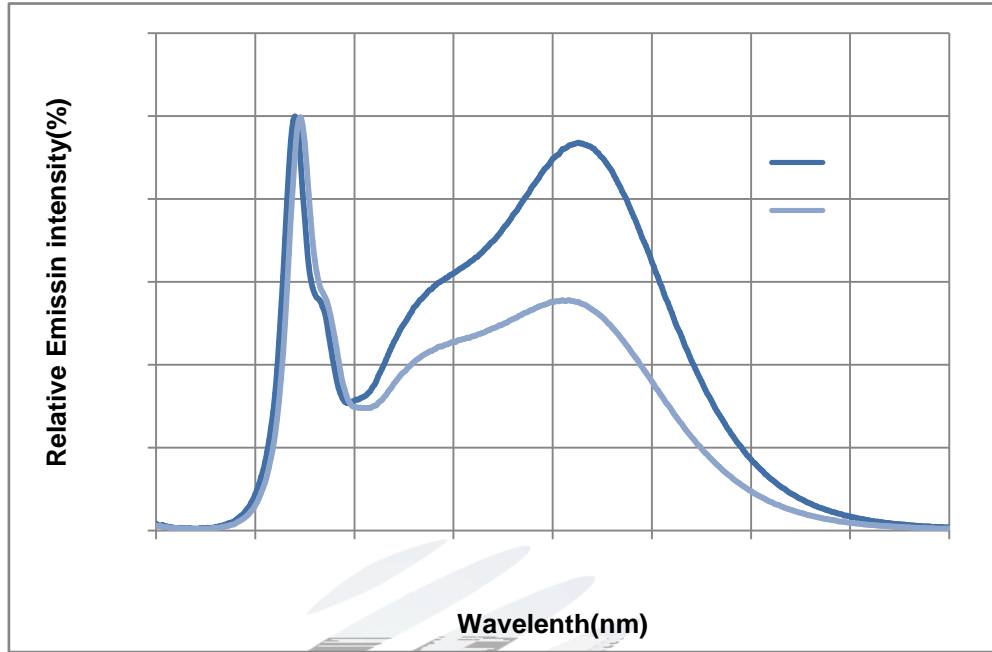
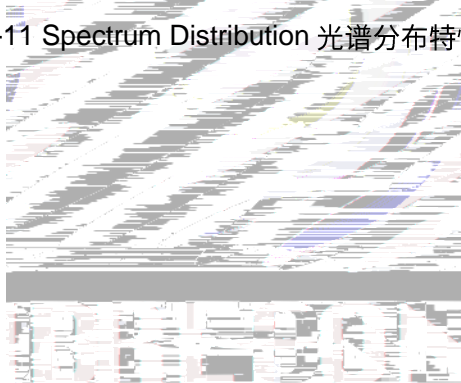


Fig 1-11 Spectrum Distribution 光谱分布特性曲线



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

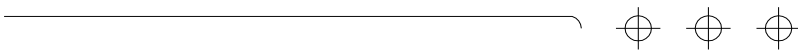


Fig.2-1 Carrier Tape Dimension 载带尺寸

2.1.2 Reel Dimension 卷盘尺寸

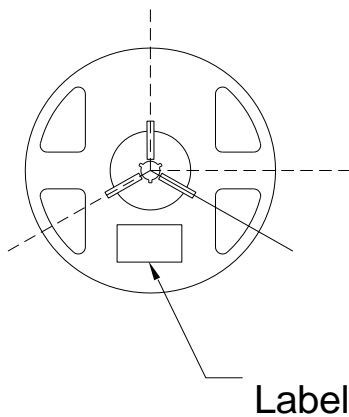


Fig.2-2 Reel 卷盘

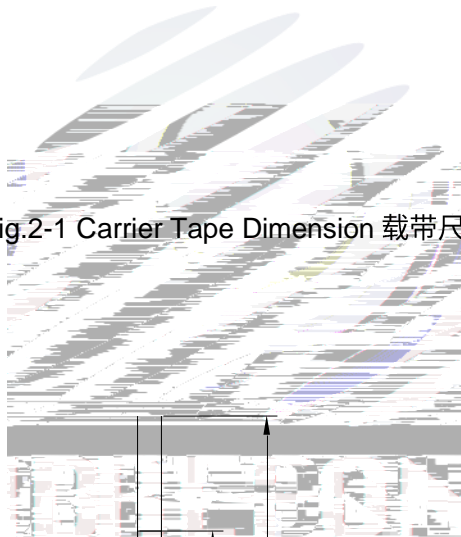


Table 2-1 Reel Dimension 卷盘尺寸

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

Notes 备注:

The tolerances unless mentioned ± 0.1 mm. Unit : mm 注: 未注公差为 ± 0.1 毫米 尺寸单位: 毫米

2.1.3 Label Form Specification 标签规格

Table 2-2 Label Parameter 标签参数

PART NO.	Part Number 品名
SPEC NO.	Spec Number 规格
LOT NO.	Lot Number 批次号
BIN CODE	Bin Code 参数代码
	Luminous flux 光通量
XY	Chromaticity Bin 色区
V _F	Forward Voltage 正向电压
QTY	Packing Quantity 数量
DATE	Made Date 生产日期

Fig 2-3 Label Form 标签模板

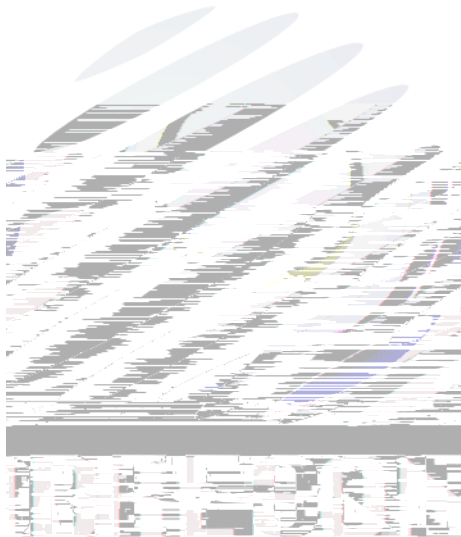
2.2 Moisture Resistant Packing 防潮包装



Fig.2-4 Packing specification 包装说明

2.3 Cardboard Box 包装纸箱

Fig.2-5 Cardboard Box 包装纸箱



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	$I_F=350mA$	$\leq \pm 10\%$	Reflow Thermal Shock
Luminous Flux W		$I_F=350mA$	Maintenance $\geq 80\%$	High and Low Temperature Storage
Lamp Bead Light Test 灯珠点亮测试	/	$I_F=350mA$	No open circuit short circuit or flicke 无开路、短路、闪变	High Temperature High Humidity Life Test

Notes 备注

1. 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。

2. 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。

3. SMT Reflow Soldering Instructions SMT 回流焊说明

3.1 SMT Reflow Soldering Instructions SMT 回流焊说明

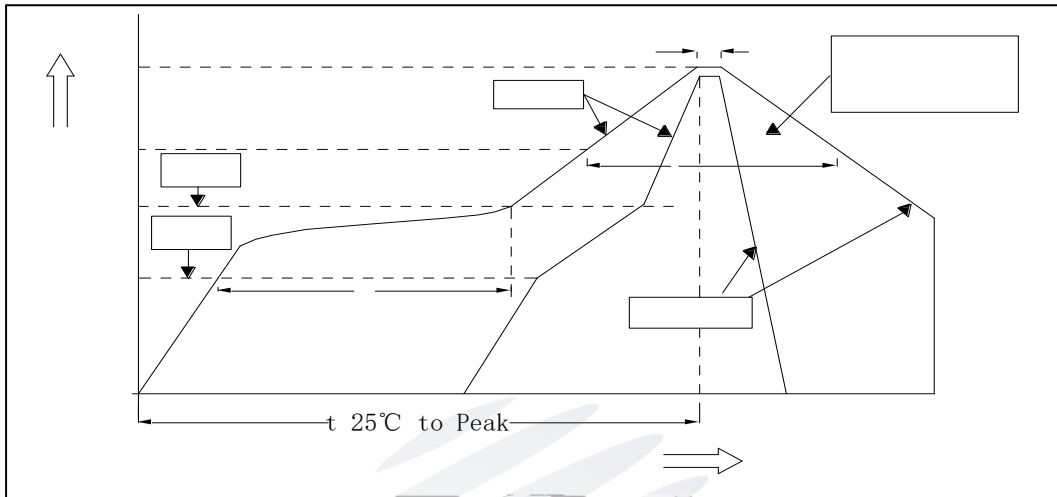


Fig.3-1 SMT Reflow Soldering Instructions SMT 回流焊说明

Table 3-1 SMT Reflow Soldering Parameter SMT 回流焊参数

Average temperature rise speed 平均升温速度 (T _{max} 至 T _P)	Max 3 °C/ s 最高3 °C/秒
Preheating: minimum temperature 预热: 最低温度 (T _{min})	150 °C
Preheating: Max temperature 预热: 最高温度 (T _{max})	200 °C
Preheating: Time 预热: 时间 (T _{min} 至 T _{max})	60 - 120秒 60s-120s
Time limited to maintain high temperature: the temperature 限时维持高温: 温度 (T _L)	217 °C
Time limited to maintain high temperature: The Time 限时维持高温: 时间 (t _L)	Max 60s 最多60秒
Peak /Classification of temperature: 峰值 / 分类温度 (T _P)	260 °C
Time limit classification of peak temperature time 限时峰值分类温度: 时间 (t _p)	Max 10s 最多10秒

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去压胶体表面


3.1.1 Soldering Iron 烙铁焊接

(1) When do soldering by hand, keep the temperature of iron below less 300 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。

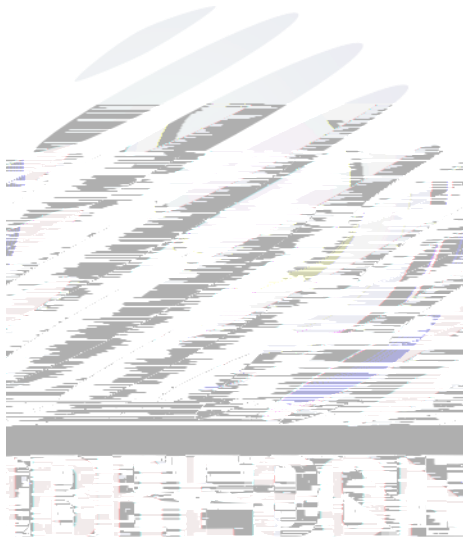
3.1.2 Repairing

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  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,



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 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. 为了防止外界物质进入 LED 内部以造成 LED 的损伤，所处环境及所用套件等等，单一的溴元素含量要求小于 900PPM，单一氯元素含量要求小于 900PPM，溴元素与氯元素总含量必须小于 1500PPM. 这只是一个建议，不作任何品质担保。

(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.

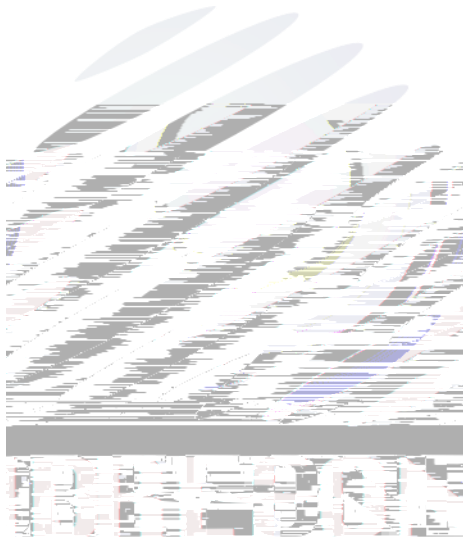
LED 内部，在通电产生光子及热的条件下，会导致 LED 变色，进而造成严重光衰，提前了解套件材料能够避免产生这些问题。瑞丰反对使用任何对 LED 器件的性能或者可靠性有害的物质或材料。不管这些材料是已经证实了的，还是仅仅怀疑有害。针对特定的用途和使用环境，瑞丰建议对所有的物质和材料进行相容性的测试。在贴装 LED 时候，不要使用能产生有机挥发性气体的粘结剂。

(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，不可直接用手或尖锐金属压胶体表面，它可能会损坏内部电路。

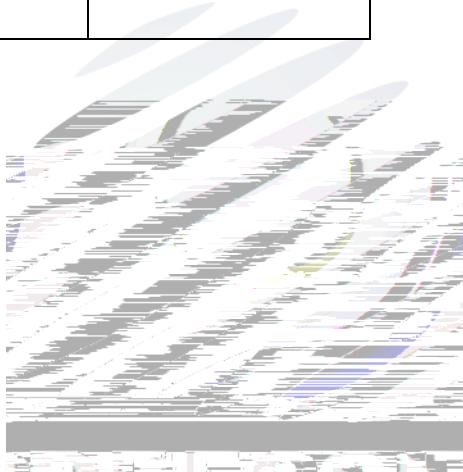
Fig 4-1 Misoperation 错误操作

(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



Date日期	Revisor修订者	Version版本	Verifier审核	Remarks备注
2022-05-13	刘明	E0	姚胜坚	





Declare 申明

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