SPECIFICATION
产品规格书

REFOND P/N 产品型号

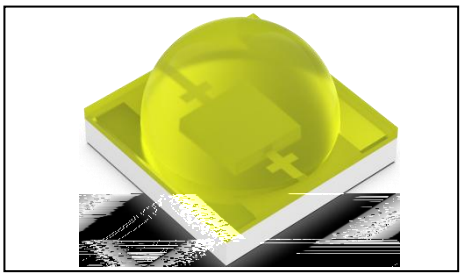
RF-AL-C3535L2K1**-M4

☐R&D 研发

Mass Product 量产供货

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。

1.2Features 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

1.3Application 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.

1.4Package Dimension 封装尺寸

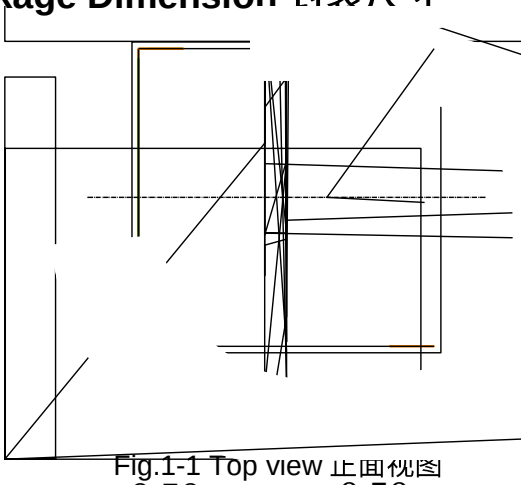


Fig.1-1 Top view 正面视图

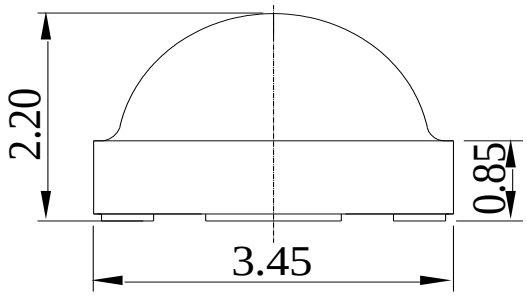


Fig.1-2 Side view 侧面视图

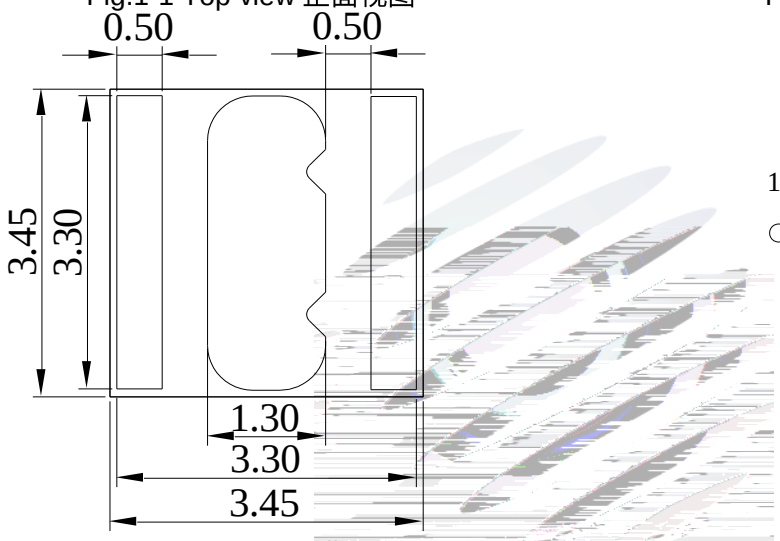


Fig.1-3Bottom view 背面视图

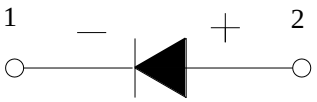


Fig.1-4 Polarity 极性

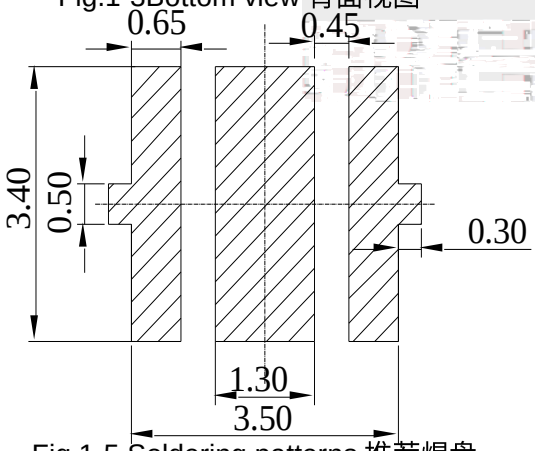


Fig.1-5 Soldering patterns 推荐焊盘

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 ±0.2mm unless otherwise noted.除特别标注外，所有尺寸公差为±0.2 毫米

1.5Product 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-M4 Luminous Flux （光通量）	I_V	I_F=350mA	150	---	180	lm
		I_F=700mA	280	---	340	lm
RF-AL-C3535L2K130-M4 Luminous Flux （光通量）	I_V	I_F=350mA	160	---	190	lm
		I_F=700mA	300	---	360	lm
RF-AL-C3535L2K135-M4 Luminous Flux （光通量）	I_V	I_F=350mA	170	---	200	lm
		I_F=700mA	320	---	380	lm

RF-AL-C3535L2K1

RF-AL-C3535L2K160-M4
Luminous Flux
（光通量）

Viewing Angle （发光角度）		I_F=350mA	---	120	---	deg
Thermal Resistance. （热阻）	R_{THJ-S}	I_F=700mA Ta=25	---	1.90	---	/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	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		

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 ±0.1V. 以上所示电压测量误差 ±0.1V.

3. The above Dominant Wavelength measurement allowance tolerance is±1nm.以上所示波长测量误差±1nm.

4. The above luminous intensity measurement allowance tolerance ±10%. [redacted]
±10%.

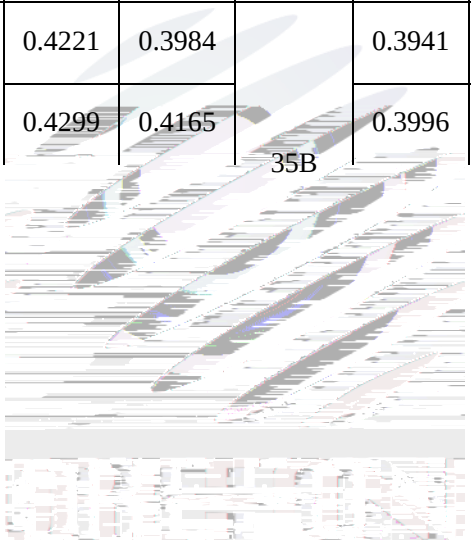
5. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product. 使用功率不能超过规定的最大值。

6. All measurements were made under the standardized environment of Refond. 详见有效 所有测试都是基于标准测试平台。

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。

Table 1-4 Chromaticity Region & Coordinates

	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									

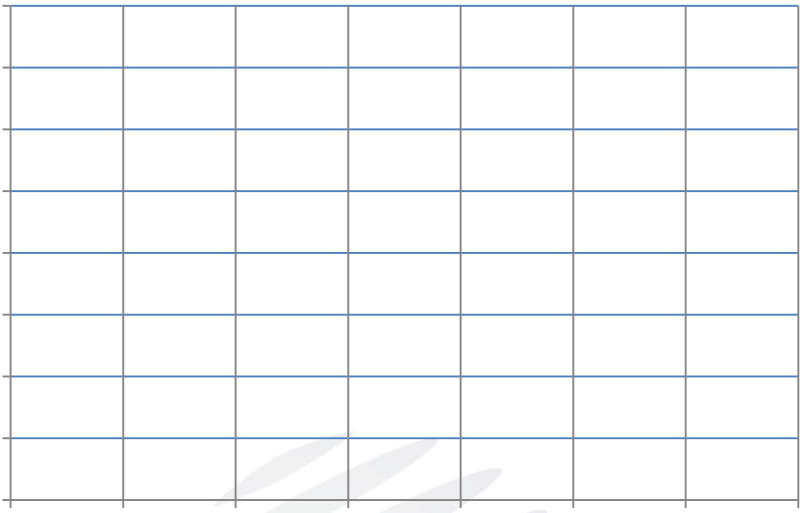


45A	0.3530	0.3597	50A	0.3371	0.3490	57A	0.3215	0.3350	65A	0.3048	0.3207
	0.3615	0.3659		0.3451	0.3554		0.3290	0.3417		0.3130	0.3290
	0.3590	0.3521		0.3440	0.3427		0.3290	0.3300		0.3144	0.3186
	0.3512	0.3465		0.3366	0.3369		0.3222	0.3243		0.3068	0.3113
45B	0.3548	0.3736	50B	0.3376	0.3616	57B	0.3207	0.3462	65B	0.3028	0.3304
	0.3641	0.3804		0.3463	0.3687		0.3290	0.3538		0.3115	0.3391
	0.3615	0.3659		0.3451	0.3554		0.3290	0.3417		0.3130	0.3290
	0.3530	0.3597		0.3371	0.3490		0.3215	0.3350		0.3048	0.3207
45C	0.3641	0.3804	50C	0.3463	0.3687	57C	0.3290	0.3538	65C	0.3115	0.3391
	0.3736	0.3874		0.3551	0.3760		0.3376	0.3616		0.3205	0.3481
	0.3702	0.3722		0.3533	0.3620		0.3371	0.3490		0.3213	0.3373
	0.3615	0.3659		0.3451	0.3554		0.3290	0.3417		0.3130	0.3290
45D	0.3615	0.3659	50D	0.3451	0.3554	57D	0.3290	0.3417	65D	0.3130	0.3290
	0.3702	0.3722		0.3533	0.3620		0.3371	0.3490		0.3213	0.3373
	0.3670	0.3578		0.3515	0.3487		0.3366	0.3369		0.3221	0.3261
	0.3590	0.3521		0.3440	0.3427		0.3290	0.3300		0.3144	0.3186
			50R	0.3366	0.3369	57R	0.3222	0.3243	65R	0.3068	0.3113
				0.3440	0.3428		0.3290	0.3300		0.3144	0.3186
				0.3429	0.3307		0.3290	0.3180		0.3161	0.3059
				0.3361	0.3245		0.3231	0.3120		0.3093	0.2993
			50S	0.3381	0.3762	57S	0.3196	0.3602	65S	0.3005	0.3415
				0.3480	0.3840		0.3290	0.3690		0.3099	0.3509

				0.3463	0.3687		0.3290	0.3538		0.3115	0.3391
				0.3376	0.3616		0.3207	0.3462		0.3028	0.3304
							0.3290	0.3690		0.3099	0.3509

57T 65T

optical characteristics curves 典型光学特性曲线



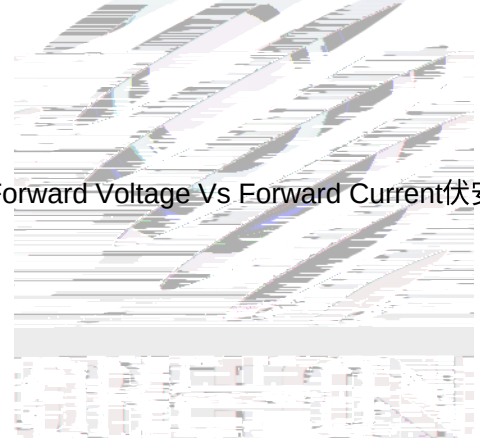


Fig 1-6 Forward Voltage Vs Forward Current伏安特性曲线

Fig.1-7 Forward Current Vs Relative Intensity

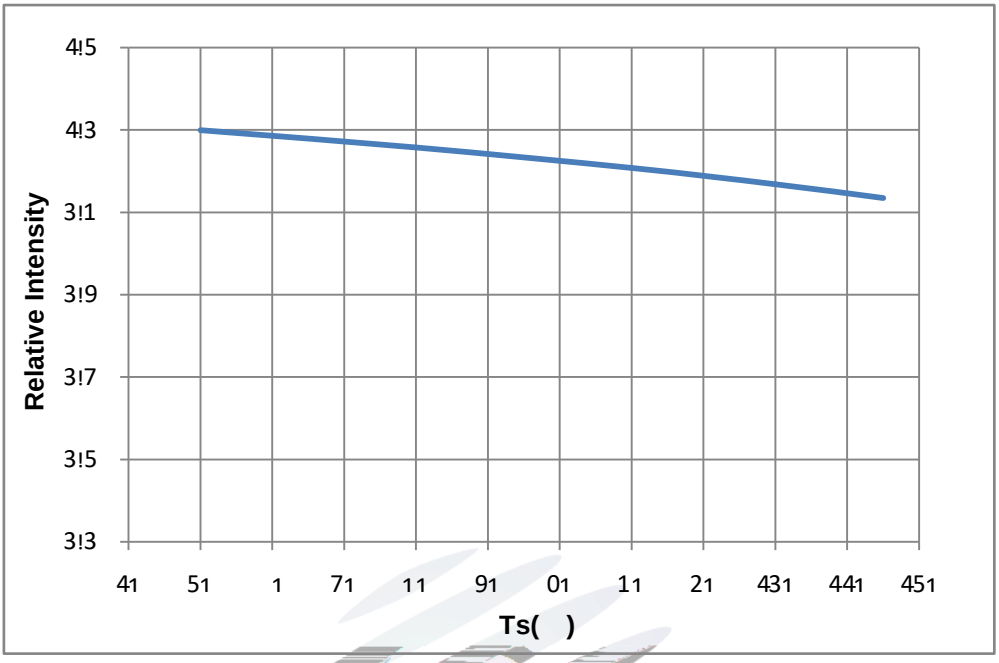


Fig.1-8 Temperature Vs Relative Intensity

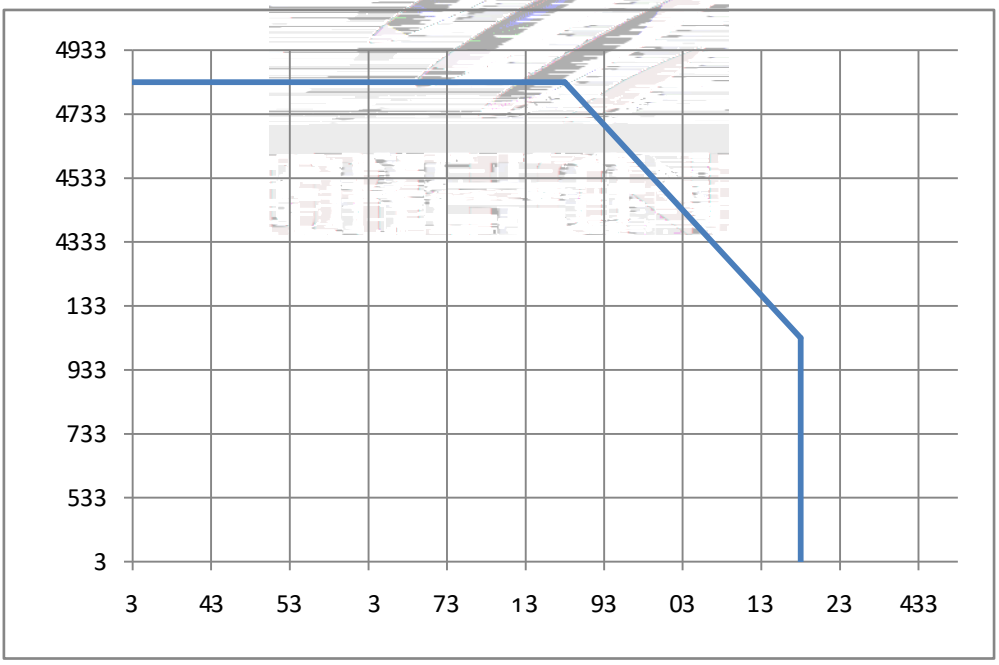


Fig 1-9 Ts Temperature Vs Forward Current 管脚温度与正向电流特性曲

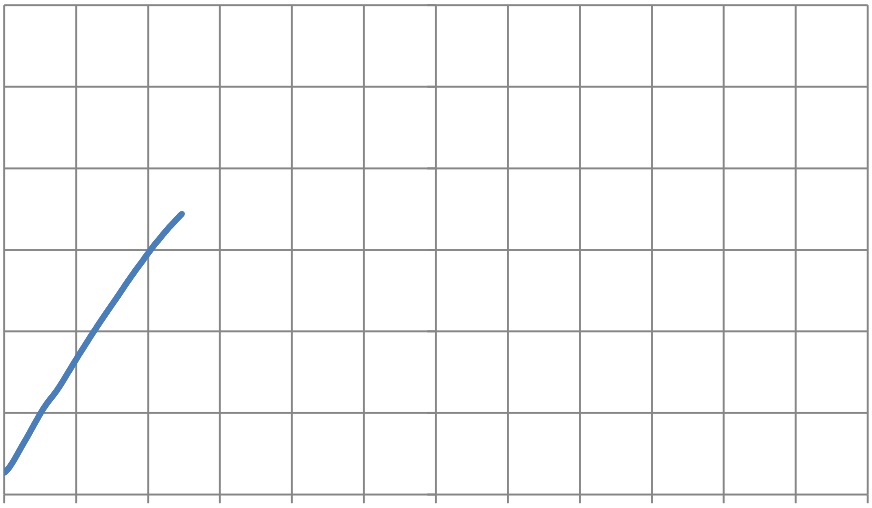


Fig 1-10 Radiation diagram 辐射特性曲线

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 4333 p

2.1.1Carrier Tape Dimension 载带尺寸

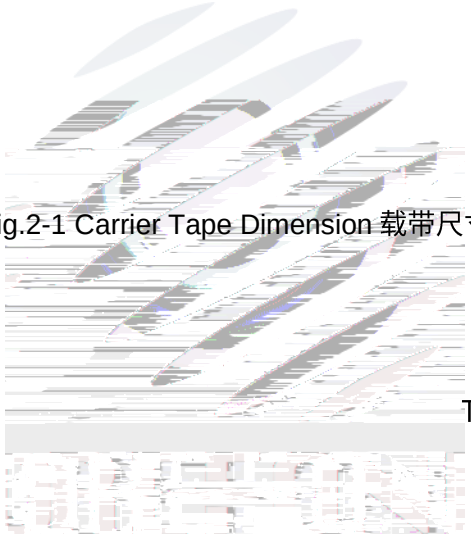


Fig.2-1 Carrier Tape Dimension 载带尺寸

2.1.2Reel Dimension 卷盘尺寸

Table 2-

2.1.3Label 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

Fig 2-3 Label Form 标签模板

2.2Moisture Resistant Packing 防潮包装

Fig.2-4Packing specification 包装说明

2.3Cardboard Box 包装纸箱

Fig.2-5Cardboard 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

TestItems 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℃max T=10 sec	2times.	10pcs.	0/1
Thermal Shock 冷热冲击	JEITAED-4701 300307	-40℃ 15min 10s 100℃ 15min	1000 cycle.	10pcs.	0/1
High Temperature Storage 高温保存	JEITAED-4701 200 201	T_{emp}:100℃	1000hrs.	10pcs.	0/1
Low Temperature Storage 低温保存	JEITA ED-4701 200 202	T_{emp}:-40℃	1000hrs.	10pcs.	0/1
Life Test 常温通电	JESD22-A108	T_A=25℃ I_F=350mA	1000hrs.	10pcs.	0/1
High Temperature High Humidity Life Test 高温高湿通电	JESD22-A101	60℃/ 90%R_H I_F=350mA	1000hrs.	10pcs.	0/1

2.5 Criteria For Judging Damage 失效判定标准

3. SMT Reflow Soldering Instructions SMT 回流焊说明

3.1SMT Reflow Soldering Instructions SMT 回流焊说明

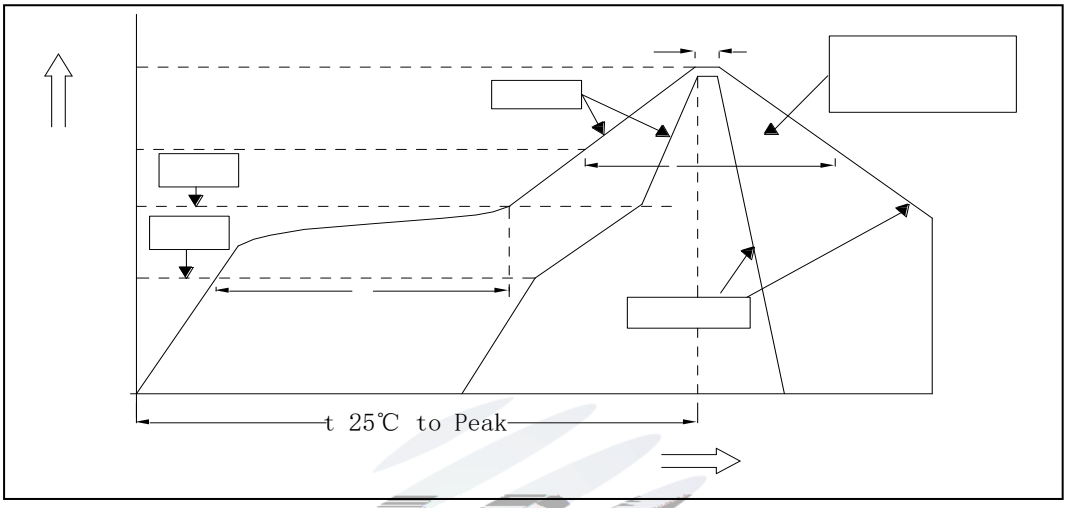


Fig.3-1SMT Reflow Soldering Instructions SMT 回流焊说明图

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

Average temperature rise speed平均升温速度（Tsmax 至T_P）	Max 3 °C/ s 最高3 °C/秒
Preheating: minimum temperature预热：最低温度 (Tsmin)	150 °C
Preheating: Max temperature预热：最高温度 (Tsmax)	200 °C
Preheating: Time预热：时间（Tsmin 至Tsmax）	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 (T_P) 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℃，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 维修

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回流焊后不应该修复。当必须修复时，必须使用双头烙铁。而且事先应确认此种方式会不会损坏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 usethe 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，也不要弯折线路板。

(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，不要对材料实加外力，也不要有震动，回流焊后，不要采用激剧冷却的方式。

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 LEDmating 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 ex- ternal 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 elementis 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 theuse of any chemicals or materials that have been found or are suspected to have an adverse affect on device performance or reliability. To verifycompatibility, Refond recommends that all chemicals and materials be tested in the specific application and environment for which they are intended tobe 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。

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	

www.refond.com

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。