SPECIFICATION
产品规格书

REFOND P/N 产品型号

RF-TVH*EA14FBN-****

□R&D 研发

■Mass Product 量产供货

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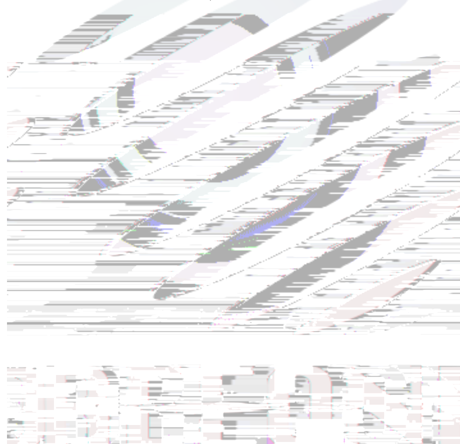
1. Description 产品介绍

1.1 Description 描述

The White LED which was fabricated using a blue chip and the phosphor, outline size 4.0mmX1.4mmX0.6mm.该产品为白光LED，是由蓝光芯片激发荧光粉而形成，产品尺寸：4.0mmX1.4mmX0.6mm。



1.1.1 Features 特征

PLCC Package. PLCC

1.2 Package Dimension 产品尺寸

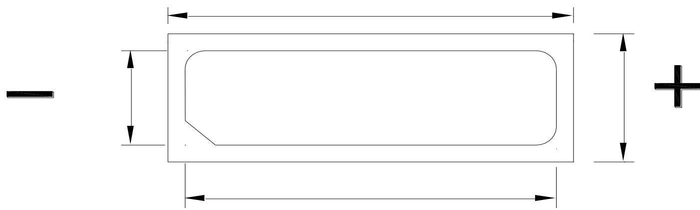


Fig.1-1 Top view 正面视图

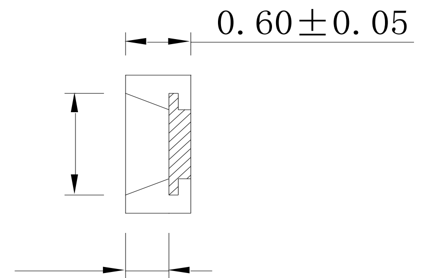


Fig.1-2 Side view 侧面视图

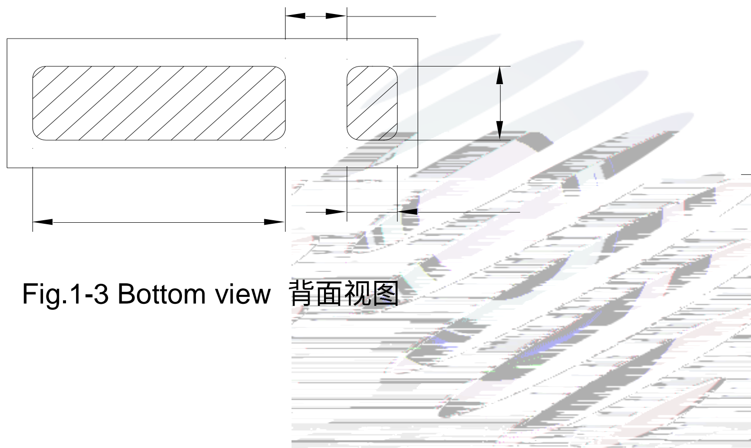


Fig.1-3 Bottom view 背面视图

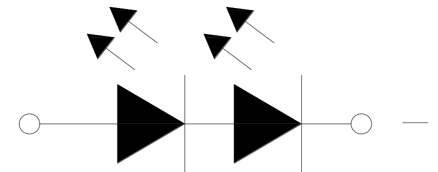


Fig.1-4 Polarity 极性

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

1.3 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=120mA	5.8	---	6.6	V
Reverse Current (漏电流)	I_R	V_R=10V	---	---	10	uA
Luminous Flux (光通量)	Φ	I_F=120mA	64	---	85	Lm
Viewing Angle (发光角度)	2 1/2	I_F=120mA	---	120	---	deg
Thermal Resistance. (热阻)	R_{THJ-S}	I_F=120mA	---	15	---	℃/W

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

Parameter (参数)	Symbol (符号)	Rating (值)	Units (单位)
Power Dissipation (功耗)	P_D	990	mW
Forward Current (正向电流)	I_F	150	mA
Peak Forward Current (峰值电流)	I_{FP}	240	mA
Reverse Voltage (反向电压)	V_R	10	V
Electrostatic Discharge (HBM) (静电)	E_{SD}	2000	V
Operating Temperature (操作温度)	T_{OPR}	-40 ~ +85	℃
Storage Temperature and Humidity (储存温湿度)	/	T_A=5-30℃&RH≤60%	/
Junction Temperature (结温)	T_J	100	℃

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.

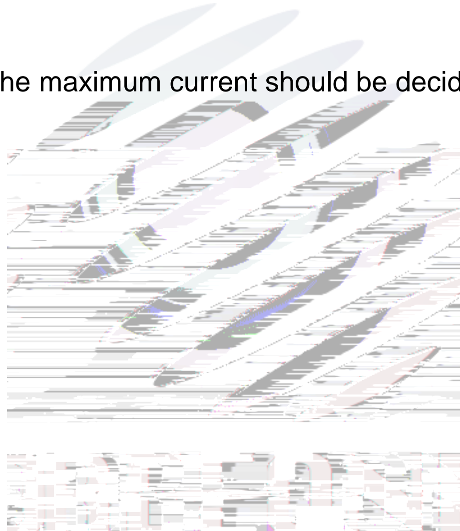
(3) The above color coordinates measurement allowance tolerance is 0.005. 以上所示坐标测量误差 0.005.

(4) The above luminous intensity measurement allowance tolerance ±5%. 上述发光强度的测试允许公差为±5%.

(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. 所有测试都是基于瑞丰现有的标准测试平台。

(7) When the LEDs are in operation the maximum current should be decided after measuring the package temperature



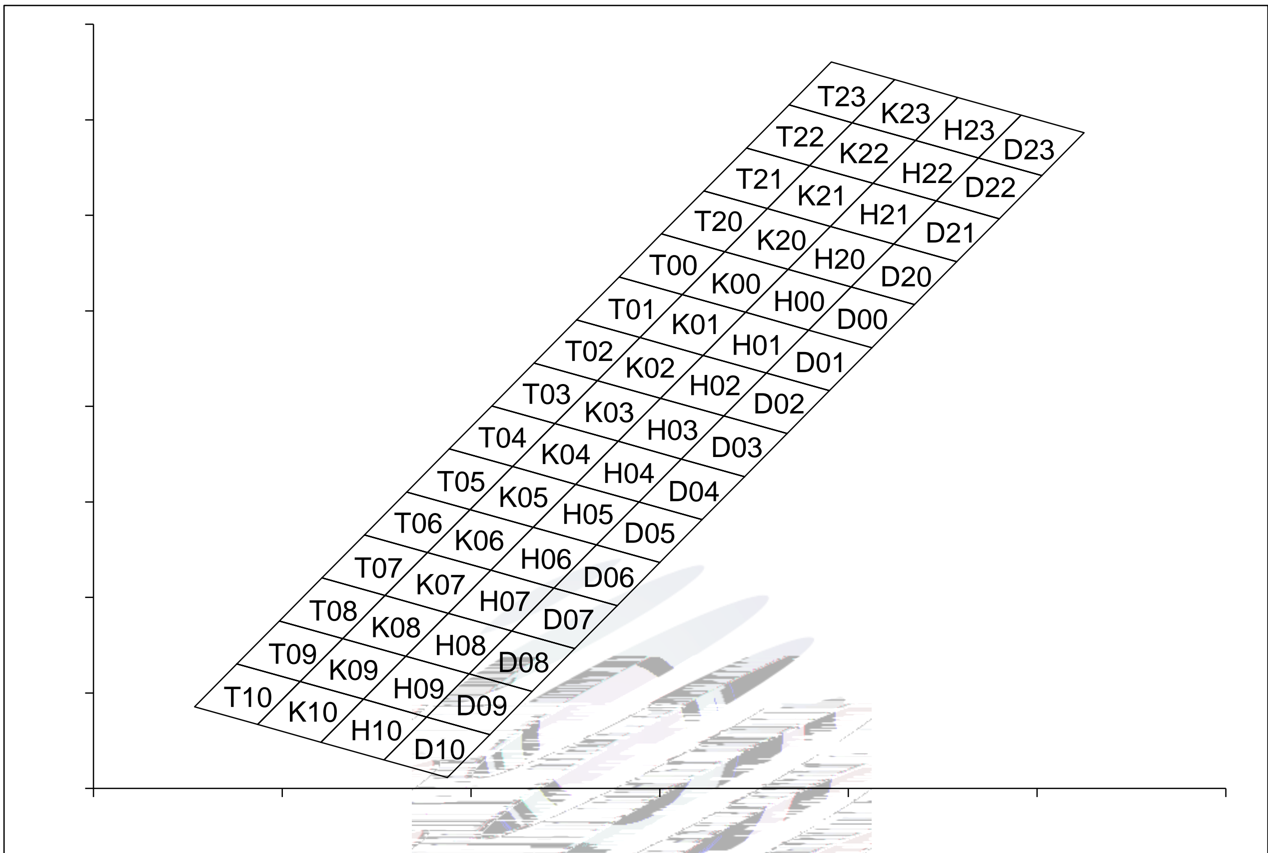
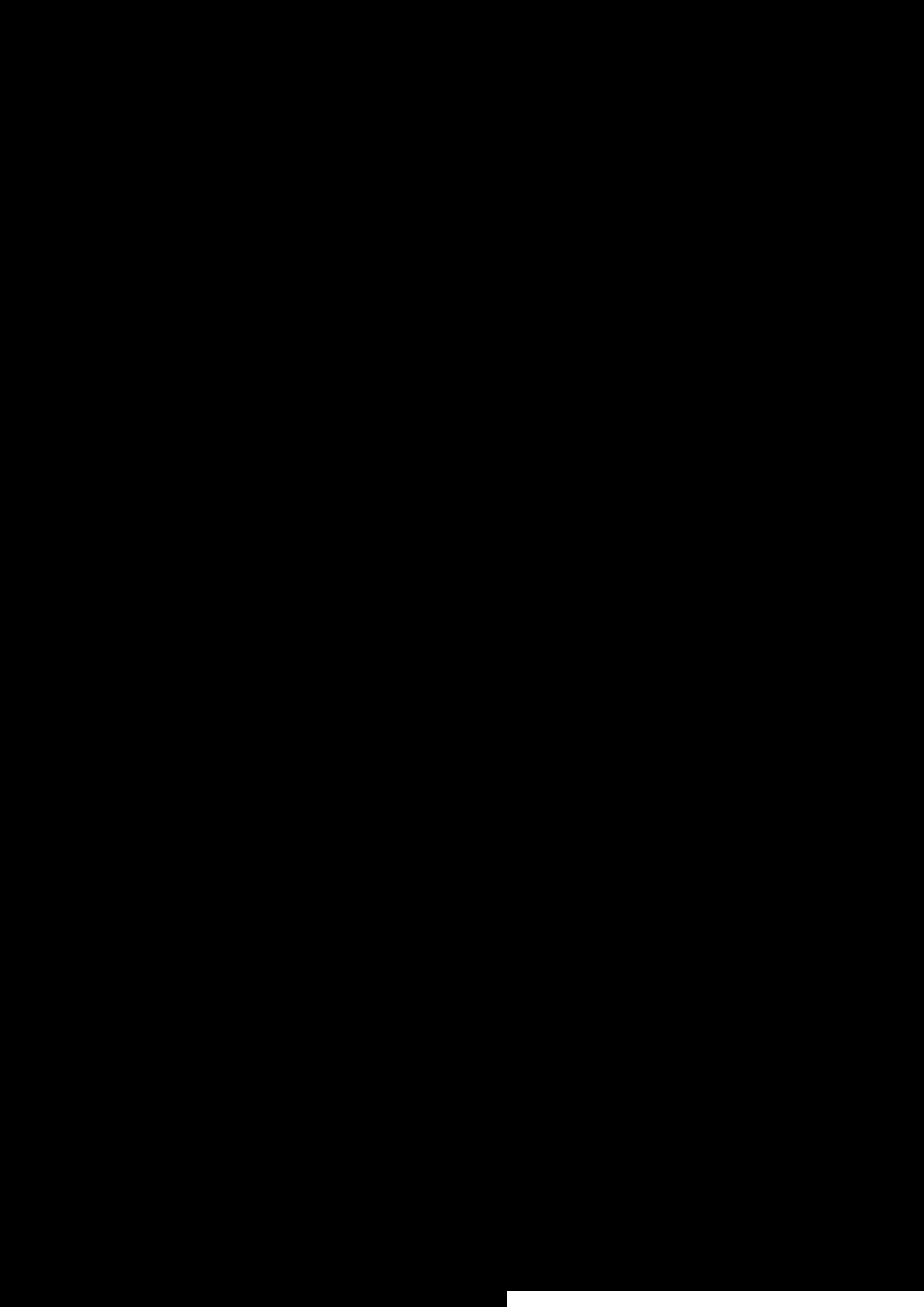


Fig 1-6 The C.I.E Chromaticity Diagram CIE色度图

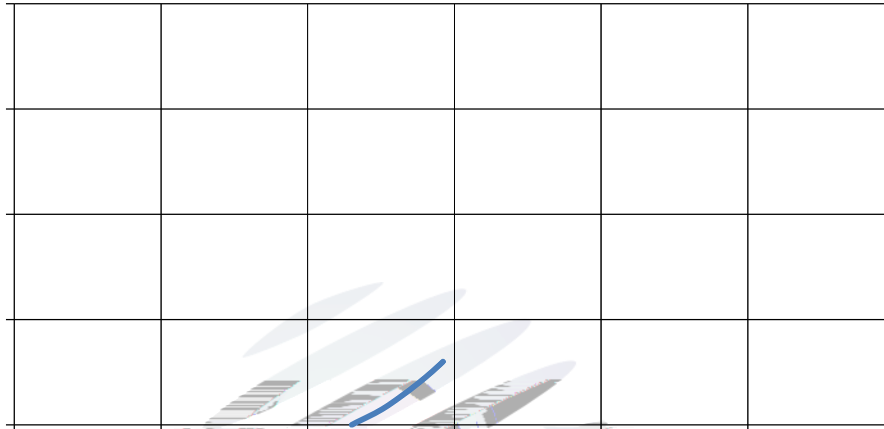
Table 1-4 The C.I.E Chromaticity Diagram CIE色度图

BIN CODE	CIE-X1	CIE-Y1	CIE-X2	CIE-Y2	CIE-X3	CIE-Y3	CIE-X4	CIE-Y4
H00	0.2958	0.276	0.2891	0.2797	0.2936	0.2887	0.3003	0.285
H01	0.2913	0.267	0.2846	0.2707	0.2891	0.2797	0.2958	0.276
H02	0.2868	0.258	0.2801	0.2617	0.2846	0.2707	0.2913	0.267
H03	0.2823	0.249	0.2756	0.2527	0.2801	0.2617	0.2868	0.258
H04	0.2778	0.24	0.2711	0.2437	0.2756	0.2527	0.2823	0.249
H05	0.2733	0.231	0.2666	0.2347	0.2711	0.2437	0.2778	0.24
H06	0.2688	0.222	0.2621	0.2257	0.2666	0.2347	0.2733	0.231
H07	0.2643	0.213	0.2576	0.2167	0.2621	0.2257	0.2688	0.222
H08	0.2598	0.204	0.2531	0.2077	0.2576	0.2167	0.2643	0.213
H09	0.2553	0.195	0.2486	0.1987	0.2531	0.2077	0.2598	0.204
H10	0.2508	0.186	0.2441	0.1897	0.2486	0.1987	0.2553	0.195
H20	0.3003	0.285	0.2936	0.2887	0.2981	0.2977	0.3048	0.294
H21	0.3048	0.294	0.2981	0.2977	0.3026	0.3067	0.3093	0.303



D21	0.3115	0.2903	0.3048	0.294	0.3093	0.303	0.316	0.2993
D22	0.316	0.2993	0.3093	0.303	0.3138	0.312	0.3205	0.3083
D23	0.3205	0.3083	0.3138	0.312	0.3183	0.321	0.325	0.3173

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



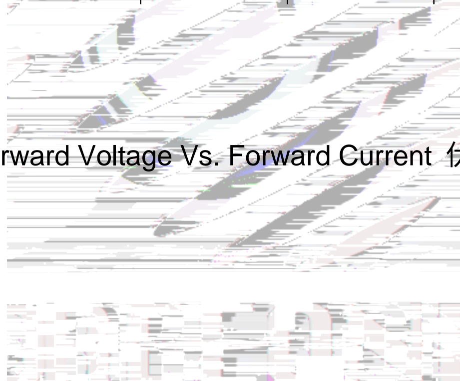


Fig 1-7 Forward Voltage Vs. Forward Current 伏安特性曲线

Fig 1-8 Forward Current Vs. Relative Intensity 正向电流与相对光强特性曲线

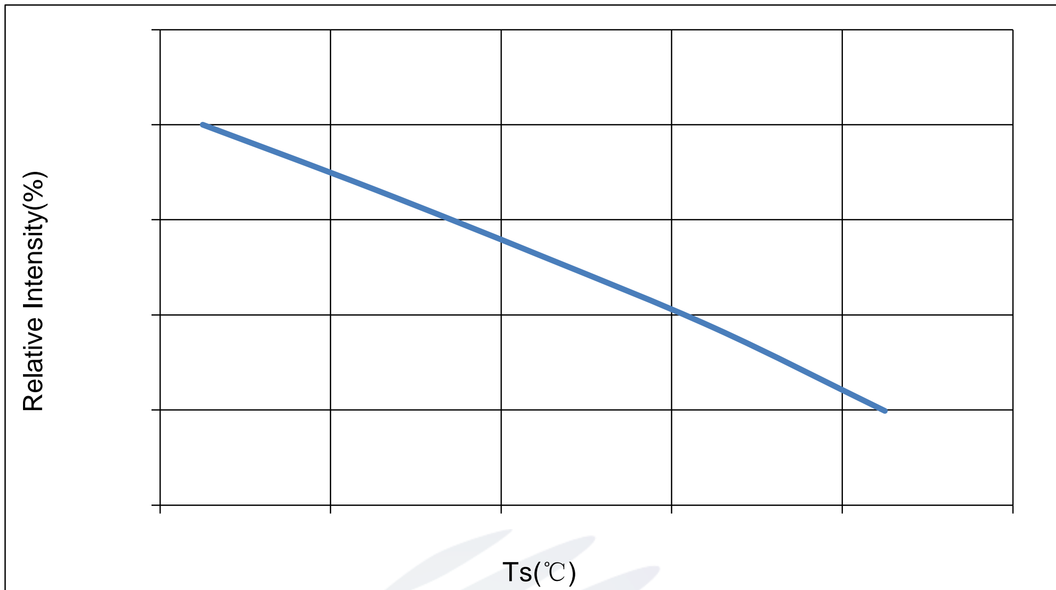


Fig 1-9 Solder Temperature Vs Relative Intensity 管脚温度与相对光强特性曲线

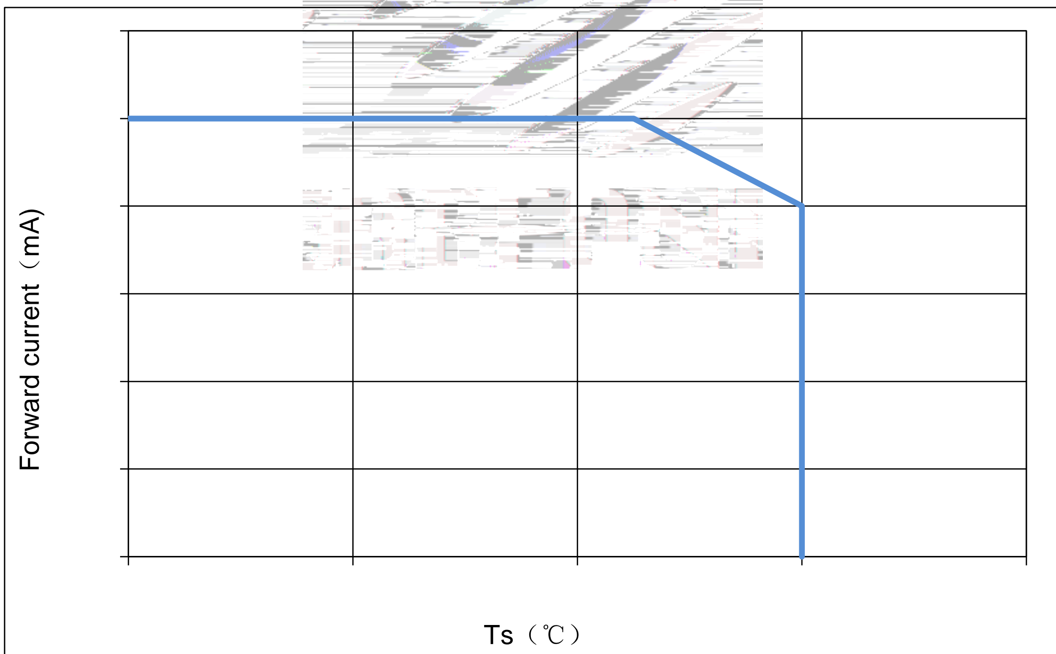


Fig 1-10 Solder Temperature Vs Forward Current 管脚温度与正向电流特性曲线

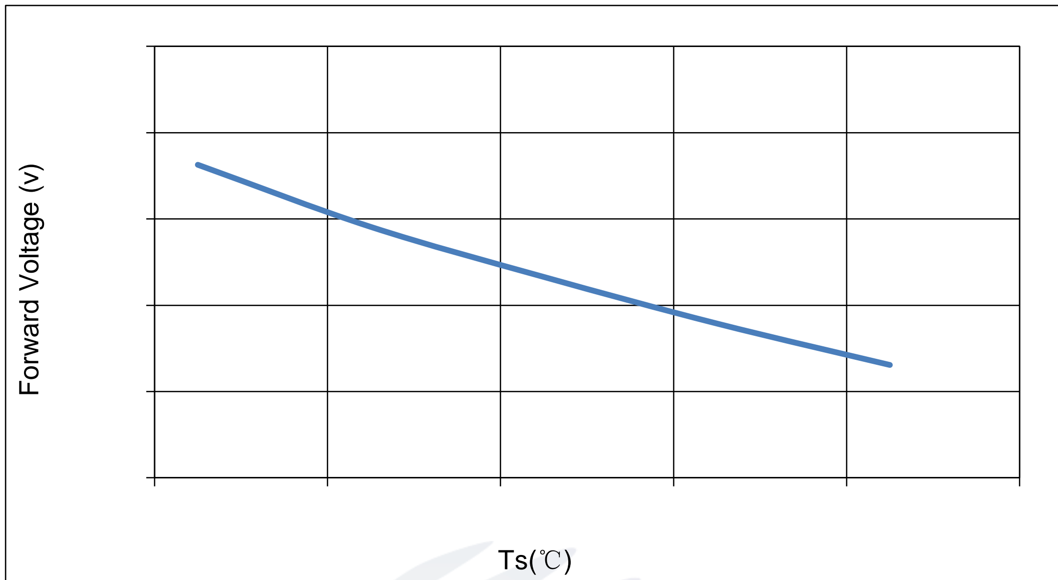


Fig 1-11 Forward Voltage Vs Solder Temperature电压与管脚温度特性曲线

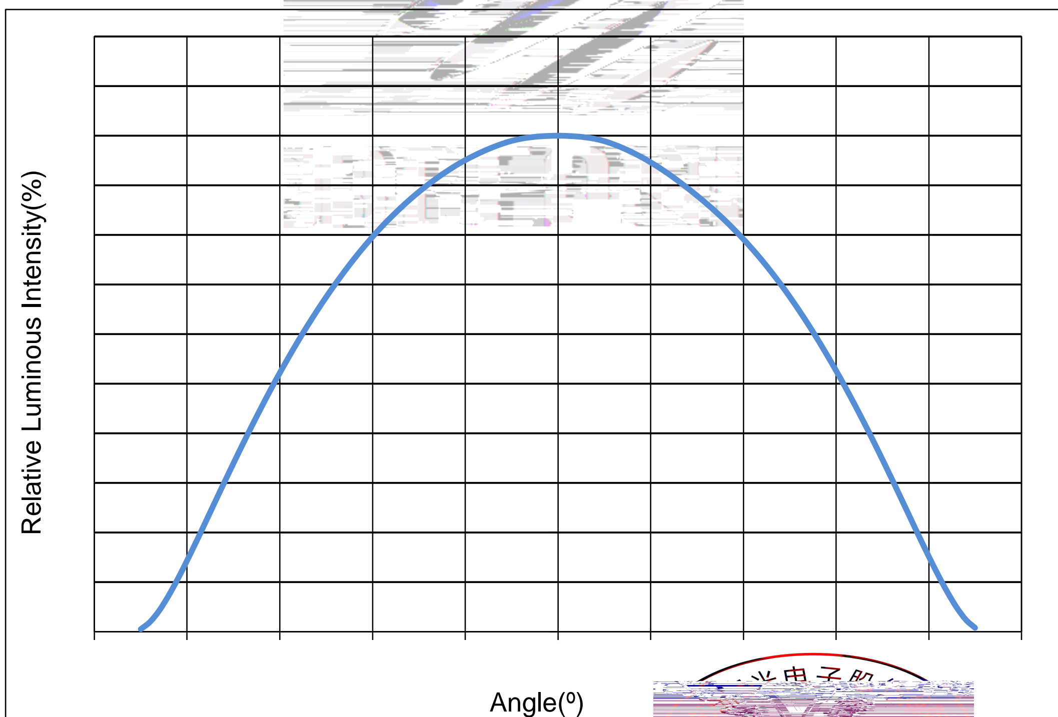


Fig 1-12 Radiation diagram 辐射特性曲线

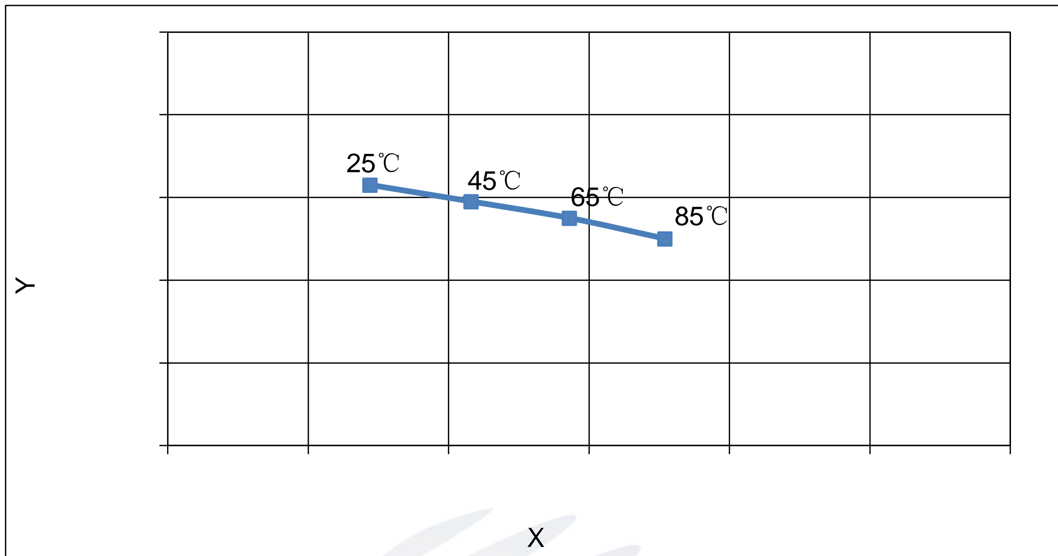


Fig 1-13 Chromaticity Coordinate Vs Solder Temperature 色坐标与管脚温度特性曲线

2. Packaging 产品包装

2.1 Packaging Specifications 包装规格

Package:4000pcs/reel.包装每卷4000pcs。

2.1.1 Carrier Tape Dimensions 载带尺寸

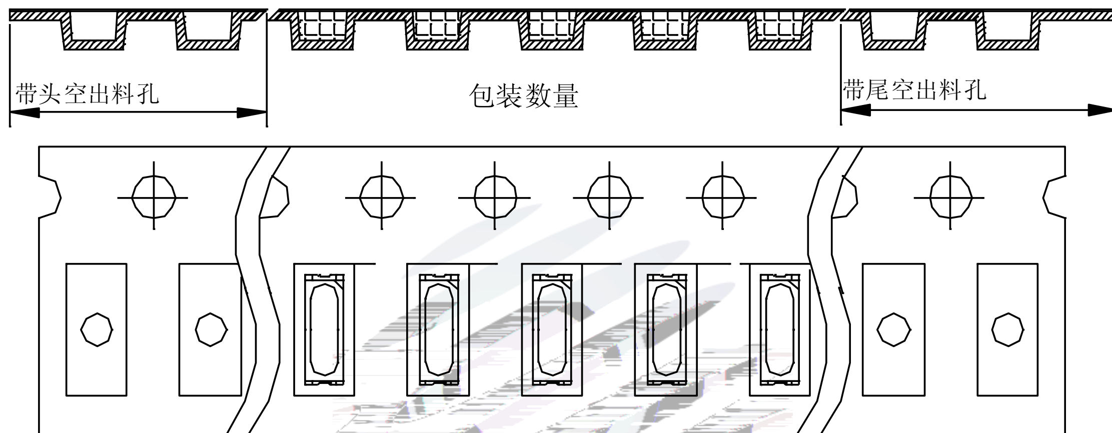


Fig 2-1 Carrier Tape Dimensions 载带尺寸

2.1.2 Reel Dimension 卷盘尺寸

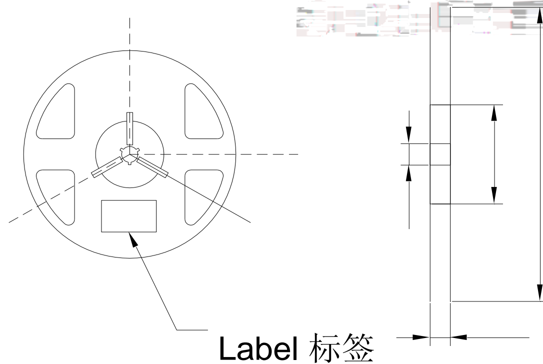


Fig 2-2 Reel Dimension 卷盘尺寸

Table 2-1 Reel Dimension 卷盘尺寸

A	12±0.1mm
B	178±1mm
C	60±1mm
D	13.0±0.5mm

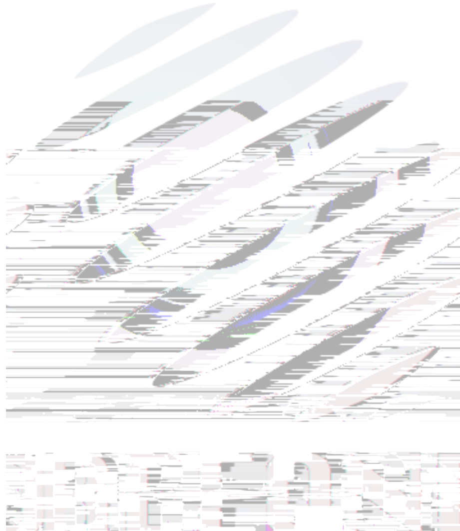
NOTES 备注:

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

2.1.6 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



3. SMT Reflow Soldering Instructions SMT回流焊说明

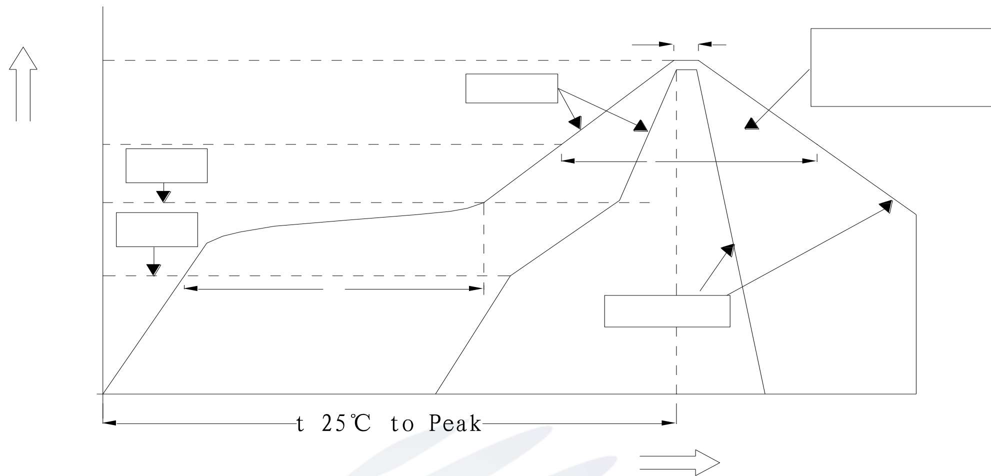


Fig 3-1 3. SMT Reflow Soldering Instructions SMT 回流焊说明

Table 3-1 SMT Reflow Soldering Instructions SMT 回流焊说明

平均升温速度（Tsmax 至 Tp）	最高 3 °C/ 秒
预热：最低温度 (Tsmin)	150 °C
预热：最高温度 (Tsmax)	200 °C
预热：时间（Tsmin 至 Tsmax）	60 - 120 秒
限时维持高温：温度 (TL)	217 °C
限时维持高温：时间 (tL)	最多60 秒
峰值 / 分类温度 (Tp)	260 °C
限时峰值分类温度：时间（tp）	最多10 秒
与实际峰值温度 (Tp) 相差 5 °C 以内的保持时间	最多30 秒
降温速度	最高 6 °C/ 秒
25 °C 升至峰值温度所需时间	最多 8 分钟

NOTES 备注:

(1) Reflow soldering should not be done more than two times. In the case of more than 24 hours passed soldering after first, LEDs 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。

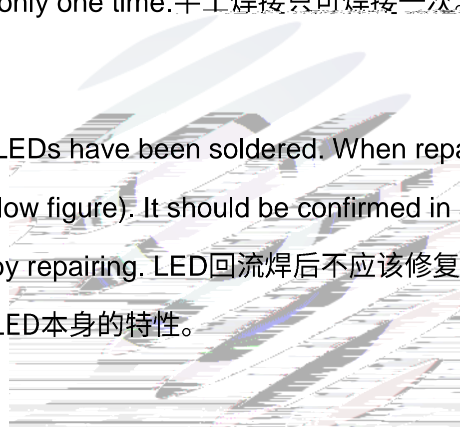
(2) When soldering , do not put stress on the LEDs during heating.当焊接时，不要在材料受热时用力压胶体表面。

3.1.1 Soldering Iron 烙铁焊接

(1) When hand soldering, keep the temperature of iron below less 300 less than 3 seconds [illegible]300°C，时间不可超过3秒。

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

3.1.2 Repairing [illegible]



Repair 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 will 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 influence to 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[illegible]

(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 [illegible]

(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 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 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 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 helD4( )5(K)-14.006(f)-5(,c6.004(he3)()4.006(mnl)-3.996(edge)-14.006( )5fnd

Fig 4-1

(6) 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 [illegible] 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

Table 4-1 Storage 储存

Conditions 种类		Temperature 温度	Humidity 湿度	Time 时间
Storage 储存	Before Opening Aluminum Bag 拆包前	≤30℃	≤75%	Within 1 Year From Date 一年内
	After Opening Aluminum Bag 拆包后	≤30℃	≤60%	24hours 24小时
Baking 烘烤		60±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 65 5 for above 24 hours.如果干燥剂或包装失效，或者产品不符合以上存储条件，需拆包后进行烘烤，烘烤条件：60±5℃，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。

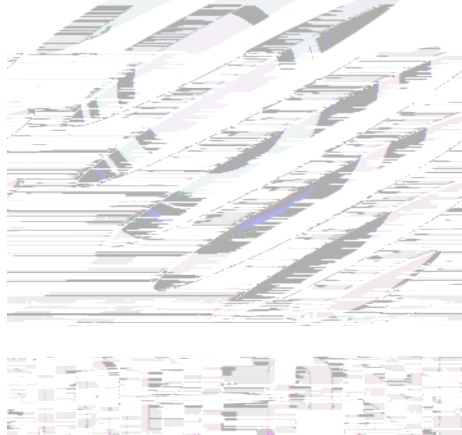
(10) Other points for attention, please refer to our relevant information.

其它注意事项请参照瑞丰相关资料。

Version History/ 修订历史

Date 日期	Revisor 修订者	Version 版本	Verifier 审核	Remarks 备注
2018-11-20	冯升	E0	刘娟	

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。