

# SPECIFICATION

# 产品规格书

REFOND P/N 产品型号

RF-W1SA27IS-A48L

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

Surface brush design

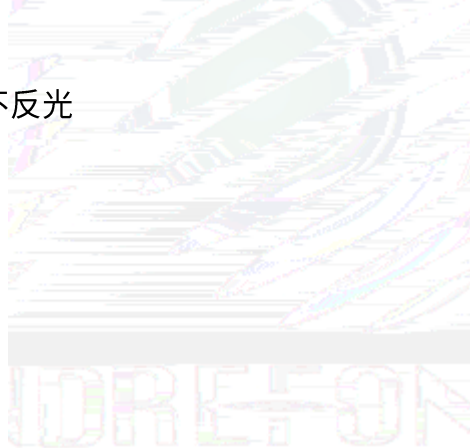
2.8mmx2.7mmx3.0mm

该产品为全彩 LED 器件，高对比度(五面刷墨设计)，产品尺寸: 2.8mmx2.7mmx3.0mm。

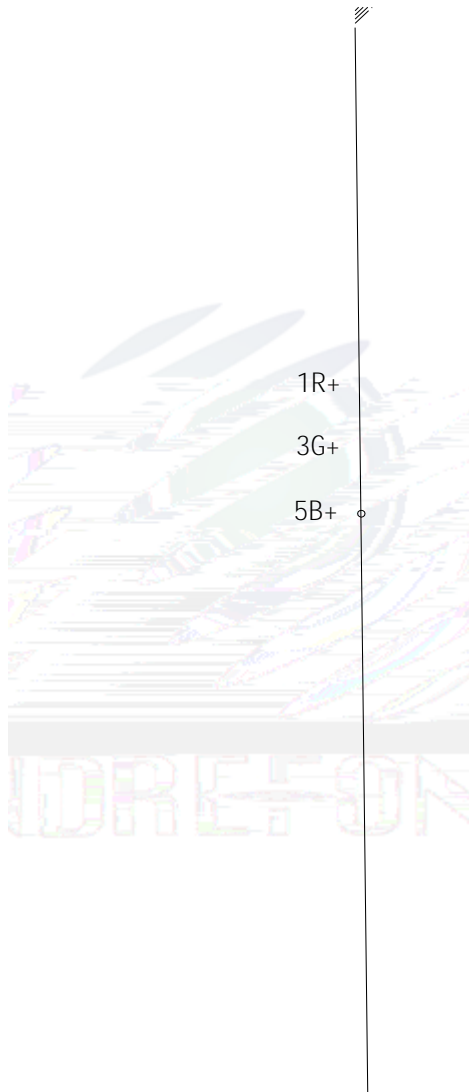
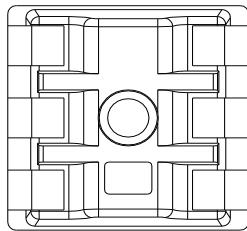
### 1.2 Features 产品特征

Surface not reflective. 表面不反光

High I



## 1.4 Package Dimension 封装尺寸



1R+

2R-

3G+

4G-

5B+

6B-

### 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  $\pm 0.1\text{mm}$  unless otherwise noted.除特别标注外,所有尺寸公差为 $\pm 0.1$ 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<br>项目                             | Symbol<br>符号 | Test Condition<br>测试条件                                      | Value    |         |         | Unit 单位 |
|--|--------------|---|----------|---------|---------|---------|
|  |              |   | R        | G       | B       |         |
| Reverse Current<br>(漏电流)               | $I_R$        | $V_R=5V$  | 6        | 6       | 6       |         |
| Forward Voltage<br>(正向电压)              | $V_F$ (min)  | R<br>$I_F = 20mA$<br>G<br>$I_F = 20mA$<br>B<br>$I_F = 20mA$ | 1.7      | 2.7     | 2.7     | V       |
|  | $V_F$ (max)  |   | 2.4      | 3.4     | 3.4     | V       |
| Dominant Wavelength<br>主波长             | $\lambda_D$  |   | 617~ 628 | 520~545 | 460~475 | nm      |
| Spectrum Radiation<br>Bandwidth<br>半波宽 |              |   | 24       | 38      | 30      | nm      |
| Luminous Intensity<br>光强               | $I_V$ (min)  |   | 800      | 2000    | 400     | mcd     |
|  | $I_V$ (avg)  |   | 1200     | 3000    | 600     | mcd     |
|  | $I_V$ (max)  |   | 1800     | 4500    | 900     | mcd     |
| Viewing Angle<br>(发光角度)                |              | 70~80   | 60-70    | 75-85   | deg     |         |

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

| Parameter (参数)                        | Symbol (符号) | Rating (值) |    |    | Unit 单位 |
|---------------------------------------|-------------|------------|----|----|---------|
|                                       |             | R          | G  | B  |         |
| Forward Current<br>(正向电流)             | $I_F$       | 25         | 20 | 20 | mA      |
| Peak Forward Current<br>(峰值电流)        | $I_{FP}$    | 80         | 80 | 80 | mA      |
| Reverse Voltage<br>(反向电压)             | $V_R$       | 5          | 5  | 5  | V       |
| Operating Temperature<br>(操作温度)       | $T_{OPR}$   | -30 ~ +85  |    |    |         |
| Storage Temperature<br>(储存温度)         | $T_{STQ}$   | -40 ~ +100 |    |    |         |
| Power Dissipation<br>(功耗)             | $P_D$       | 60         | 68 | 68 | mW      |
| Electrostatic Discharge<br>(HBM) (静电) | $E_{SD}$    | 1000V      |    |    |         |

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 . 以上所示波长测量公差  $\pm 1nm$ .
- 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. 所有测试都是在标准环境下以符合标准测试平台。
- All the datas are just for reference, specific parameters please refer to the label. 以上参数仅供参考,请以实物标签为准。

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

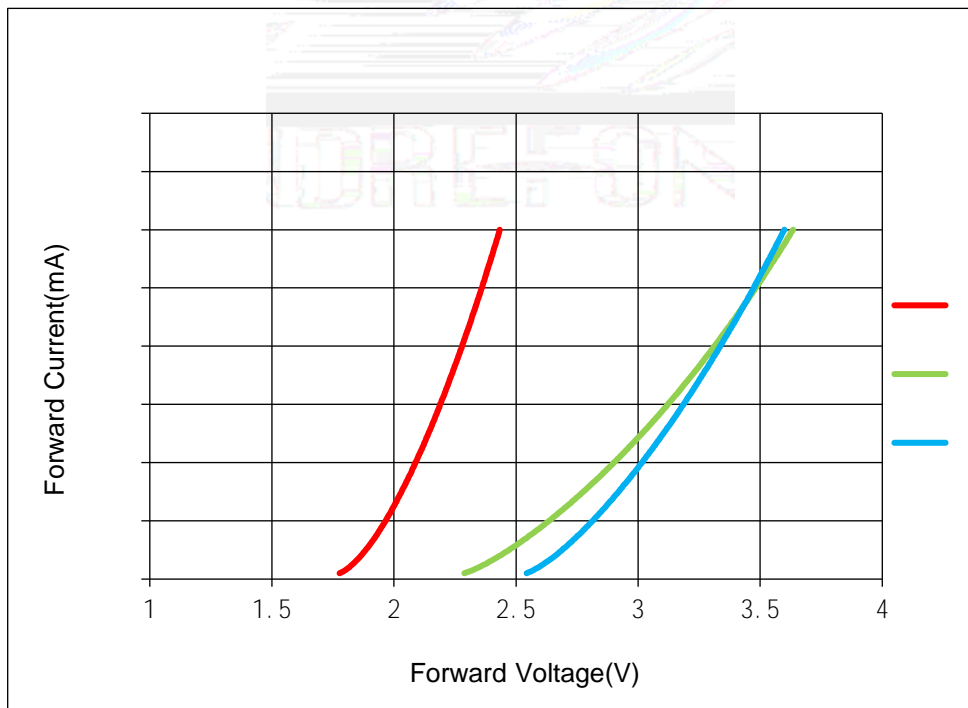


Fig 1-6 Forward Voltage Vs. Forward Current 伏安特性曲线

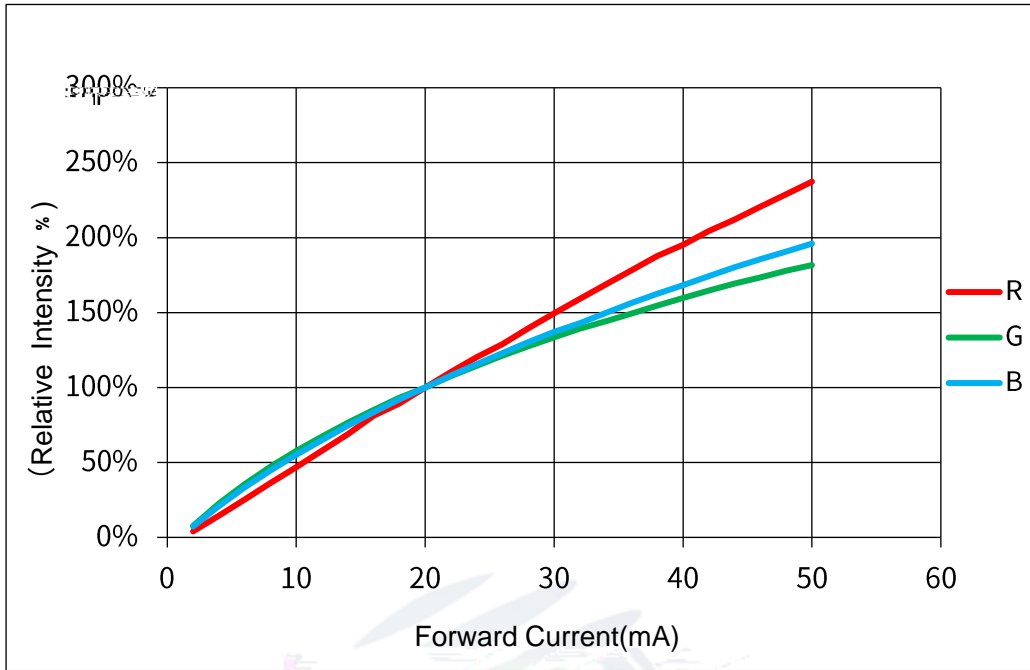


Fig 1-7 Forward Current Vs. Relative Intensity 正向电流与相对光强特性曲线

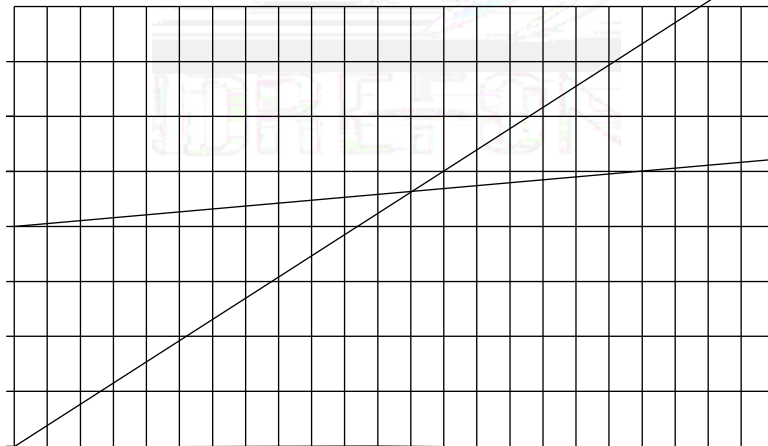
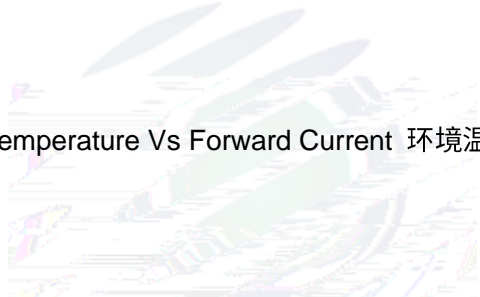


Fig 1-8 Luminous Intensity VS Ambient Temperature 光强与环境温度曲线



Fig 1-9 Solder Temperature Vs Forward Current 环境温度与正向电流特性曲线



|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

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

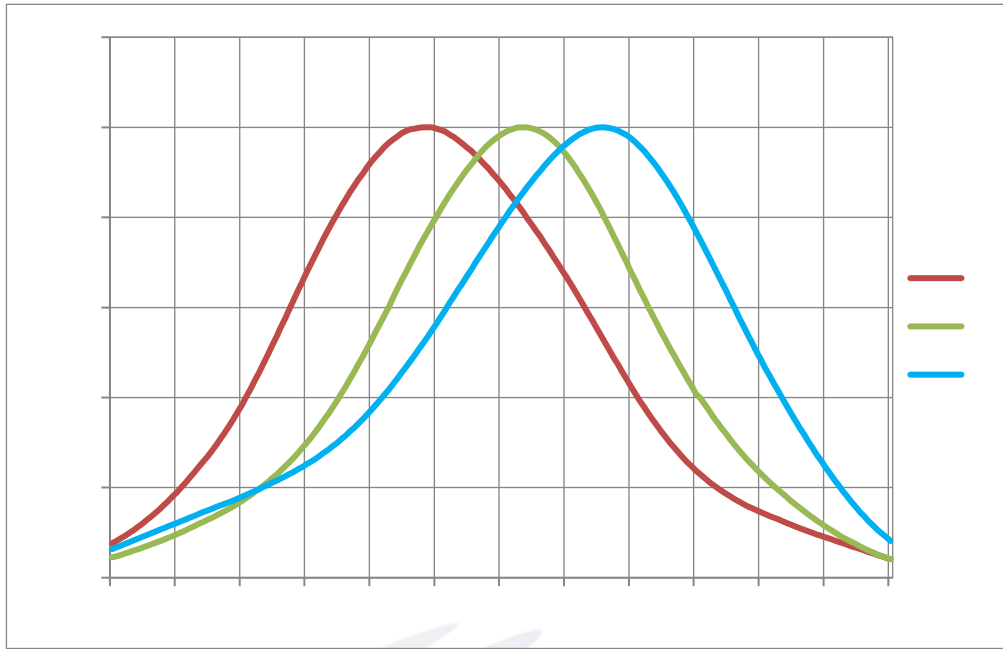


Fig 1-11 Directivity X-X radiation angle X轴方向辐射角度

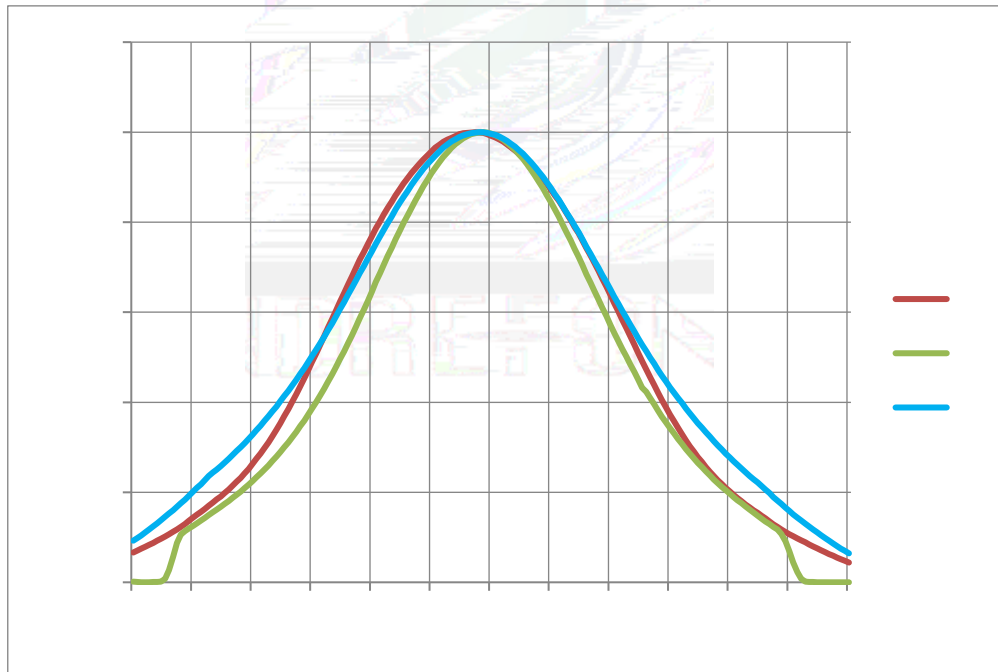


Fig 1-12 Directivity Y-Y radiation angle Y轴方向辐射角度

## 2. Packaging 产品包装

### 2.1 Packaging Specification 包装规格

Package:2000pcs/reel.包装每卷 2000pcs。

#### 2.1.1 Carrier Tape Dimension 载带尺寸

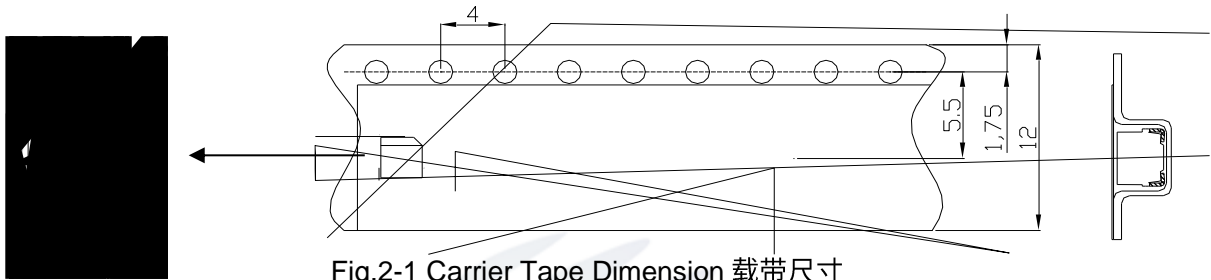


Fig.2-1 Carrier Tape Dimension 载带尺寸

#### 2.1.2 Reel Dimension 卷盘尺寸

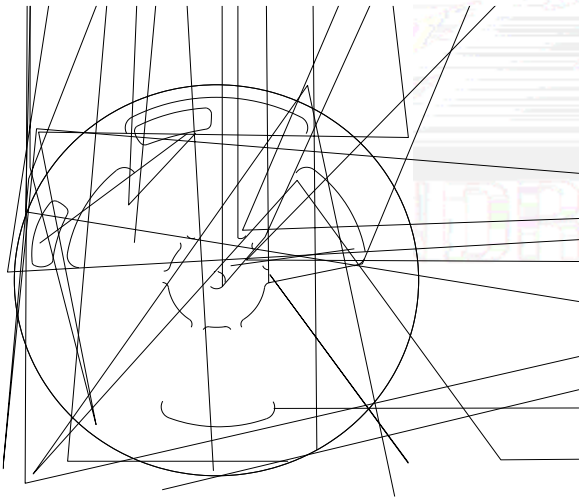


Fig.2-2 Reel

Table 2-1 Dimension 尺寸

|   |            |
|---|------------|
| A | 330.2±2mm  |
| B | 79.5±0.2mm |
| C | 14.3±0.2mm |
| D | 2.7±0.2mm  |
| E | 16.7±0.3mm |
| F | 12.7±0.3mm |
| T | 2.0±0.2mm  |

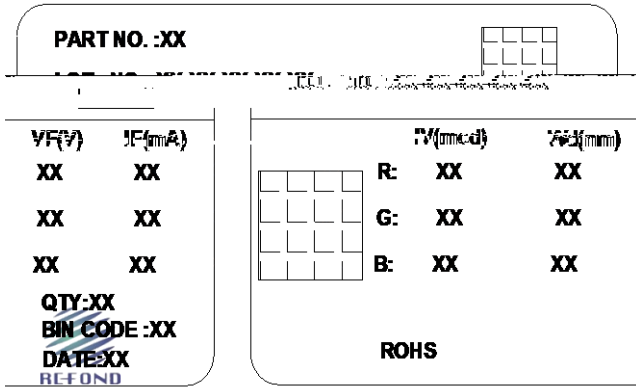
Notes 备注:

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

$\pm 0.1$  , .

### 2.1.3 Label Form Specification 标签规格

Table 2-2 Description 标签说明



|          |   |
|----------|---|
| PART NO. | Part Number 品名  |
| LOT NO.  | Lot Number + Packing Machine No. + Serial Number +BIN No. + Quantity (K)<br>批次号 +包装机台号+流水号+BIN 号+数量 (K) |
| BIN CODE | Bin Code 参数代码   |
| IV       | Llight intensity 光强   |
| VF       | Forward Voltage 正向电压  |
| Wd       | Wavelength 波长代码   |
| IF       | Forward current 正向电流  |
| QTY      | Packing Quantity 数量   |
| DATE     | Made Date 生产日期  |

Fig 2-3 Label 标签

### 2.2 Moisture Resistant Packing 防潮包装

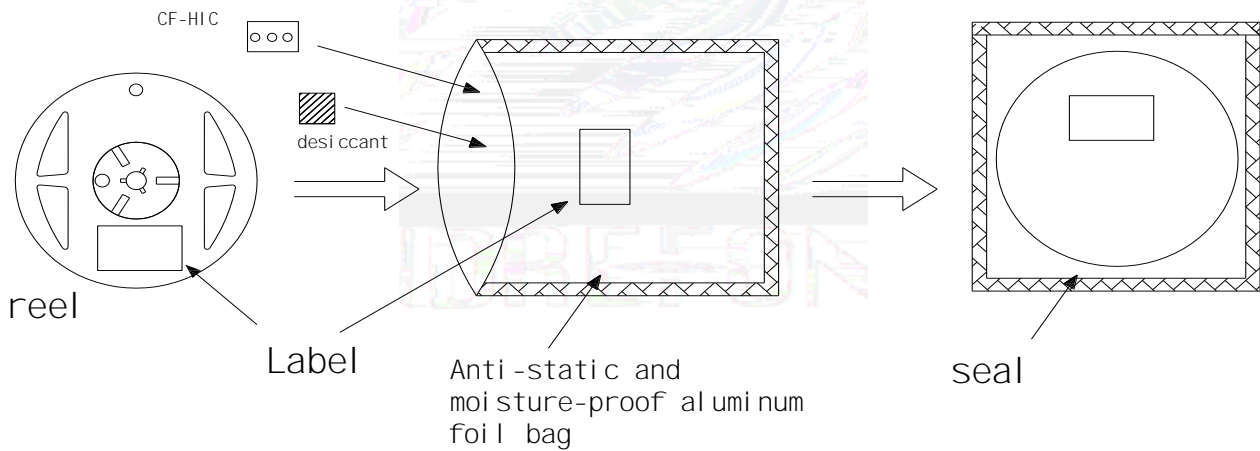


Fig.2-4 Packing 防潮包装

## 2.3 Cardboard Box 包装纸箱

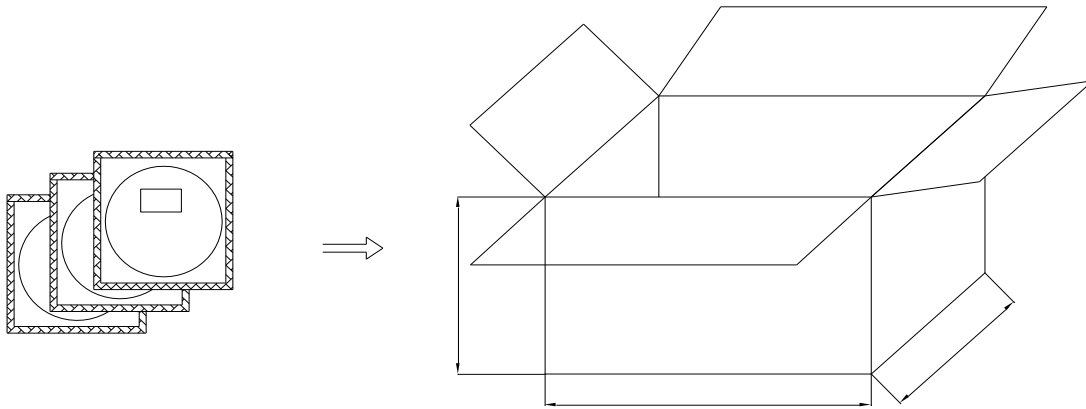


Fig.2-5 Cardboard 装箱

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

Table 2-3 Test Items 测试项目

| Test Items<br>项目                          | Ref.Standard<br>参考标准     | Test Condition<br>测试条件                       | Time<br>时间 | Quantity<br>数量 | Ac/Re<br>接收/拒收 |
|---|--------------------------|--|------------|----------------|----------------|
| Resistance to Soldering Heat<br>耐焊接热      | JESD22-B106              | Temp:260°Cmax<br>T=10 sec                    | 3times     | 22pcs.         | 0/1            |
| Thermal Shock<br>冷热冲击                     | JEITAED-4701<br>300 307  | -40°C 15min<br>10s<br>100°C 15min            | 500cycle   | 22pcs.         | 0/1            |
| High Temperature Storage<br>高温保存          | JEITAED-4701<br>200 201  | Temp:100°C                                   | 1000hrs.   | 22pcs.         | 0/1            |
| Low Temperature Storage<br>低温保存           | JEITA ED-4701<br>200 202 | Temp:-40°C                                   | 1000hrs.   | 22pcs.         | 0/1            |
| Room Temperature Operating Life<br>常温寿命测试 | JESD22-A108              | T <sub>A</sub> =25°C<br>I <sub>F</sub> =20mA | 1000hrs.   | 22pcs.         | 0/1            |

|  |                          |   |          |        |     |
|--|--------------------------|---|----------|--------|-----|
| High Temperature High Humidity Life Test<br>高温高湿寿命测试 | JESD22-A101              | 85°C/ 85%RH<br>I <sub>F</sub> =10mA         | 500hrs.  | 22pcs. | 0/1 |
| Temperature Humidity Storage<br>高温高湿储存               | JEITA ED-4701<br>100 103 | T <sub>A</sub> =85°C<br>R <sub>H</sub> =85% | 1000hrs. | 22pcs. | 0/1 |
| Low Temperature Life Test<br>低温寿命                    | JESD22-A108D             | T <sub>A</sub> =-40°C, I <sub>F</sub> =20mA | 1000hrs. | 22pcs. | 0/1 |

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

Table 2-4 Criteria 判定标准

| Test Items<br>项目                     | Symbol<br>符号   | Test Condition<br>测试条件 | Criteria For Judgement<br>判定标准  |
|--------------------------------------|----------------|------------------------|---|
| Forward Voltage<br>正向电压              | V <sub>F</sub> | I <sub>F</sub> =20mA   | Initial Data ±10%<br>初始值 ±10%   |
| Reverse Current<br>反向电流              | I <sub>R</sub> | V <sub>R</sub> = 5V    | %   |
| Luminous Intensity<br>光强             | I <sub>v</sub> | I <sub>F</sub> =20mA   | Average I <sub>v</sub> degradation rate<br>平均 I <sub>v</sub> 衰减 ≤30%              |
| Resistance to Soldering Heat<br>耐焊接热 | /              | /                      | No internal cracks, no material between stripped, no dead light<br>材料无内部裂痕、剥离、无死灯 |

Notes 备注:

1. The Reliability tests are based on Refond existing test platform. 可靠性测试基于瑞丰现有的测试标准。
- 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,



Table 3-1 Reflow Soldering Instructions

|   |                      |
|---|----------------------|
| Average temperature rise speed平均升温速度 (T <sub>max</sub> 至T <sub>P</sub> )  | Max 4 °C/ s 最高4 °C/秒 |
| 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> )  | 60s-120s 60 - 120秒   |
| Time limited to maintain high temperature: the temperature<br>限时维持高温: 温度 (T <sub>L</sub> )                            | 217 °C               |
| Time limited to maintain high temperature: The Time<br>限时维持高温: 时间 (t <sub>L</sub> )                                   | Max 60s 最多60秒        |
| Peak /Classification of temperature: 峰值 / 分类温度 (T <sub>P</sub> )  | 250 °C               |
| Time limit classification of peak temperature time<br>限时峰值分类温度: 时间 (t <sub>p</sub> )                                  | Max 10s 最多10秒        |
| Hold time within 5 °C with the actual peak temperature (T <sub>P</sub> )<br>与实际峰值温度 (T <sub>P</sub> ) 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 T <sub>p</sub><br>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 one times.回流焊接最多只能进行一次.
- 2.It is recommended that use the middle temperature solder paste.推荐使用中温锡膏生产加工
- 3.Stress on the LEDES should be avoided during heating in soldering process.在回流焊接过程中,不要对 LED 施加任何压力.
- 4.After soldering ,do not deal with the product before its temperature drop down to room temperature.在焊接完成后,待产品温度下降到室温后,再进行其它处理.



### 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



## 4.Handling Precautions 产品使用注意事项

### 4.1 Handling Precautions

#### 4.1.1 Storage 贮存

(1) Moisture proof and anti-electrostatic package with moisture absorbent material is used, Packaged products have one year to save time.

本产使用密封防潮抗静电袋包装,并附有干燥剂,未开封的产品保存时间一年。

(2) Before opening the package, the product should be kept at 30°C or less and humidity less than 60%RH.

开封前,产品须存放在温度不高于30°C,湿度不高于60%RH的环境中。

(3) Seal anti-electrostatic bag humidity card should immediately check bag humidity indicator card in the open the bag after, Humidity is greater than or equal to 30%, Must be baked before use  
 密封防静电袋内的湿度卡应在打开袋子后立即查看袋内的湿度指示卡来确定,湿度显示大于或等于30%时,使用前须进行烘烤。

(4) After opening the package, the product should be soldered within 24 hours. If not, please store at 30°C or less and humidity less than 10%RH. It is recommended that the product be operated at the workshop condition of 30°C or less and humidity less than 60%RH.

开封后,产品必须24小时内使用完(建议工作环境温度不高于30°C,湿度不高于60%),如未使用完,余料须存放在温度不高于30°C,湿度不高于10%的环境中。

(5) If the moisture absorbent material has fade away or the LEDs have exceeded the storage time, baking treatment should be performed based on the following condition : 65±5°C for 24 hours.

对于尚未焊接的LED,如果吸湿剂或包装失效,或者产品没有符合以上有效存储条件,烘烤可以起到一定的性能恢复效果,烘烤条件:65±5°C,持续时间24H。

(6) Customer pre-treatment conditions before use: 客户使用前处理方式:

| Customer pre-treatment conditions before use 客户使用前处理方式 |  |   |   |
|--|--|---|---|
| Condition before use<br>使用前情况:                         | undamped Production<br>date: 2 months<br>未受潮,生产日期为<br>2个月内 | undamped Production<br>date: 2-6 months<br>未受潮,生产日期为<br>2-6个月 | undamped Production<br>date exceed 6 months<br>未受潮,生产日期为<br>6个月以上 |
| Pre-treatment  | Baked 65°C±5°C/12H   | Baked 65°C±5°C/24H  | Baked 65°C±5°C/48H  |

|       |                |                |                |
|-------|----------------|----------------|----------------|
| 处理方式: | 烘烤65°C±5°C/12H | 烘烤65°C±5°C/24H | 烘烤65°C±5°C/48H |
|-------|----------------|----------------|----------------|

#### 4.1.2 Static Electricity 静电

(1) The following procedures may decrease the possibility of ESD damage.

以下操作可降低静电破坏的可能性

(2) Minimize friction between the product and surroundings to avoid static buildup.

将产品和外界之间的摩擦减到最低以避免静电产生。

(3) All production machinery and test instruments must be electrically grounded.

所有的产品设备和测试仪器必须接地。

(4) Operators must wear anti-static bracelets.

操作人员必须配戴静电环。

(5) Wear anti-static suit when entering work areas with conductive machinery.

进入带电设备工作区域时需穿防静电服。

(6) All workstations that handle IC and ESD-sensitive components must maintain an electrostatic potential of 150V or less.

所有操作 IC 和 ESD 敏感器件元器件的工作台必须保持低于 150V 的静电保护。

#### 4.1.3 Reverse voltage protection 反压保护

In generally the reverse current of LED is very small, it can t effect using the component normally, but when it often suffered the reverse voltage which exceed the limits of the component than it will be damaged, the reverse current increases rapidly causing the string light display gray scale so when designing, please pay attention to control the reverse voltage we suggest the reverse voltage less than 10V.

通常 LED 的反向漏电流都会很小,不会影响正常使用. 如果长期遭受超过其所能承受的反向电压冲击时,LED 会损伤,反向漏电流会迅速变大,引起显示屏亮度下串光的发生. 在设计中,要注意控制反向电压,建议加在 LED 上的反向电压值不超过 10V.

#### 4.1.4 The safe temperature for LEDs working 温度保护

Luminous Intensity decreased radically, if LEDs worked in hot environment for a long time, they will be disabled easily. When LEDs are working in a closed



### Version History/修订历史

| Date日期     | Revisor修订者 | Version版本 | Verifier审核 | Remarks备注 |
|------------|------------|-----------|------------|-----------|
| 2023-04-10 |            | E0        |            |           |
| 2023-07-01 |            | E1        |            |           |
| 2023-07-15 |            | E2        |            |           |
|            |            |           |            |           |
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|            |            |           |            |           |
|            |            |           |            |           |



[www.refond.com](http://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，以中文为准。