

# 江西省晶能半导体有限公司

JiangXi LatticePower Semiconductor Corporation

## 产 品 规 格 书 Specification

产品名称 **Product Name:** LYA

产品型号 **Product P/N:** YA

客 户 **Client name:** \_\_\_\_\_

客户料号 **Client P/N:** \_\_\_\_\_

版 本 号 **Version No.:** Y02

日 期 **Sending Date:** 2021.05

| 客户承认栏<br>Client Approval |             |
|--------------------------|-------------|
| 核准<br>Approval           | 确认<br>Audit |
|                          |             |

制定 **Confirmation:** \_\_\_\_\_ 审核 **Approval:** \_\_\_\_\_

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## 1、特点 Features

- ◆ PLCC 封装，高亮度，高可靠性，主要用于汽车应用  
PLCC package ,High brightness ,High efficiency ,It is mainly used in automobile applications
- ◆ 尺寸：3.5mm\*2.8mm\*1.85mm  
Size: 3.5mm\*2.8mm\*1.85mm
- ◆ 通过无铅认证  
RoHS compliant
- ◆ MSL 等级 2a  
MSL 2a
- ◆ 通过 AEC-Q102  
AEC-Q102
- ◆ 适于 SMT 贴片  
Compatible with SMT
- ◆ 发光角度：120°  
Viewing Angle: 120°
- ◆ 包装：最大 2000 颗/卷  
Package: Max: 2000pcs /reel
- ◆ 建议额定使用电流为 50mA  
Recommended current 50mA



## 2、应用 Applications

汽车内外部照明

Interior and exterior lighting for automotive

### 3、性能 Performance

#### a) 极限参数 Maximum Ratings

| 参数<br>Parameter                                  | 符号<br>Symbol                                 | 数值<br>Rating | 单位<br>Unit |
|--------------------------------------------------|----------------------------------------------|--------------|------------|
| 最小正向电流<br>Min DC Forward Current                 | $I_F$                                        | 10           | mA         |
| 最大正向电流<br>Max DC Forward Current                 | $I_F$                                        | 70           | mA         |
| 功率<br>Power Dissipation                          | P                                            | 0.2          | W          |
| 峰值正向电流<br>Peak Forward Current                   | $I_{FP}$                                     | 100          | mA         |
| 最大反向电压<br>Maximum Reverse Current                | 不可施加反向电压<br>Do not apply for reverse current |              |            |
| 结温 (DC 模式)<br>LED Junction Temperature (DC mode) | $T_j$                                        | 125          | ℃          |
| 工作温度<br>Operating Temperature Range              | $T_{opr}$                                    | -40~100      | ℃          |
| 存储温度<br>Storage Temperature                      | $T_{stg}$                                    | -40~100      | ℃          |
| ESD (人体模式)<br>ESD Human Body Mode                | ----                                         | 2000         | V          |

备注 Notes :

✧ 绝对最大额定值环境温度  $T_a=25^{\circ}\text{C}$

Absolute Maximum Ratings at  $T_a=25^{\circ}\text{C}$

✧  $I_{FP}$  脉冲时间 $\leq 10\text{ms}$ , 宽度 $\leq 10\%$

$I_{FP}$  Conditions with pulse width  $\leq 10\text{ms}$  and duty cycle $\leq 10\%$

**b) 光电参数 Electro-Optical Characteristics (T solder pad =25 °C, I<sub>F</sub> =50mA)**

| 项目<br>Item                                                               | 符号<br>Symbol            | 最小值<br>Min. | 典型值<br>Typ. | 最大值<br>Max. | 单位<br>Unit |
|--------------------------------------------------------------------------|-------------------------|-------------|-------------|-------------|------------|
| 光通量<br>Luminous Flux                                                     | Φ                       | 6.4         | 10          | 15.8        | Lm         |
| 正向电压<br>Forward Voltage                                                  | V <sub>F</sub>          | 1.9         | 2.3         | 2.65        | V          |
| 主波长<br>Dominant wavelength                                               | WLD                     | 583         | 589         | 595         | nm         |
| 反向电流<br>Reverse Current (V <sub>R</sub> =25V)                            | I <sub>R</sub>          | --          | --          | 5           | uA         |
| 实际热阻 PN/焊点<br>Real Thermal Resistance<br>(Junction to Solder point)      | R <sub>thJS real</sub>  |             | 118         | 135         | °C/W       |
| 电热阻 PN/焊点<br>Electrical Thermal Resistance<br>(Junction to Solder point) | R <sub>thJS elec.</sub> |             | 80          | 95          | °C/W       |
| 发光角度<br>Viewing Angle                                                    | 2θ <sub>1/2</sub>       |             | 120         |             | °          |

备注 Notes :

✧ 光通量测量误差范围±6%

Luminous flux measurement tolerance: ±6%

✧ 光电参数测试是瞬态时间为 20ms

Electric and optical data is tested at 20 ms pulse condition

c) 亮度分布特性 **Luminous Flux Characteristics** (T solder pad = 25 ℃, I<sub>F</sub> =50mA)

| Product | WLD     | Luminous Code | Luminous Flux |      | Order Code (e. g.) |
|---------|---------|---------------|---------------|------|--------------------|
|         |         |               | min           | max  |                    |
| YA      | 583~586 | B2            | 6.4           | 8    | YA-Y1-B3-FG3       |
|         |         | B3            | 8             | 10   |                    |
|         |         | B4            | 10            | 12.5 |                    |
|         | 586~589 | B2            | 6.4           | 8    | YA-Y2-B3-FG3       |
|         |         | B3            | 8             | 10   |                    |
|         |         | B4            | 10            | 12.5 |                    |
|         | 589~592 | B2            | 6.4           | 8    | YA-Y5-B3-FG3       |
|         |         | B3            | 8             | 10   |                    |
|         |         | B4            | 10            | 12.5 |                    |
|         | 592~595 | B2            | 6.4           | 8    | YA-Y6-B3-FG3       |
|         |         | B3            | 8             | 10   |                    |
|         |         | B4            | 10            | 12.5 |                    |

#### 4、产品代码 Product Order Code

YA      -      Y5      -      B3      -      FG3  
①                      ②                      ③                      ④

- ① 产品型号      Product Type (YA:LYA)
- ② 主波长      Dominant wavelenght
- ③ 亮度等级      Brightness Level
- ④ 电压等级      VF Level

出货标签(例) Shipping label (e.g.)



**LatticePower (JiangXi) Corporation**

Item: YA-Y5-B3-FG3      LYA



Reel ID: AYAA00000001



Qty: 2000

6YAXAAAA



Date:2021-05-10

## 5、分档规则 Bin Regulations (T<sub>solder pad</sub> = 25 °C, I<sub>F</sub> = 50mA)

### a) 主波长分档 Dominant wavelength Groups

| Group Code | Min. | Max. |
|------------|------|------|
| Y1         | 583  | 586  |
| Y2         | 586  | 589  |
| Y5         | 589  | 592  |
| Y6         | 592  | 595  |

### b) 亮度分档 Luminous Flux Groups

| Group Code | Min. | Max. |
|------------|------|------|
| B2         | 6.4  | 8    |
| B3         | 8    | 10   |
| B4         | 10   | 12.5 |
| B5         | 12.5 | 15.8 |

### c) 电压分档 Voltage Groups

| Group Code | Range    |
|------------|----------|
| FG1        | 1.9~2.05 |
| FG2        | 2.05~2.2 |
| FG3        | 2.2~2.35 |
| FG4        | 2.35~2.5 |
| FG5        | 2.5~2.65 |

备注 Notes :

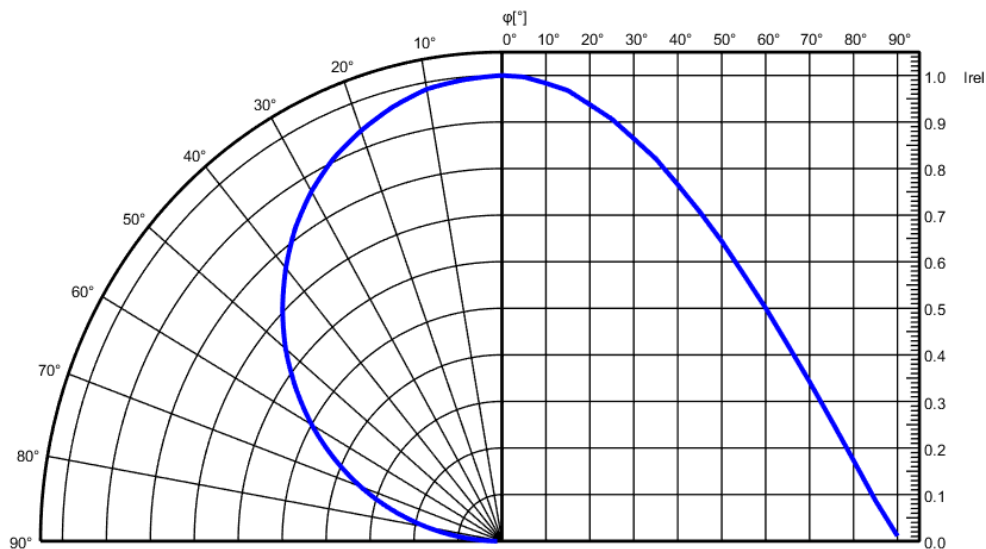
- ✧ 亮度测试存在±6%的公差  
It maintains a tolerance of ±6% on luminous flux measurements.
- ✧ 电压测试误差±0.1V  
Forward voltage(VF) ±0.1V



## 6、光电特性图 The Photoelectric Characteristics Graph

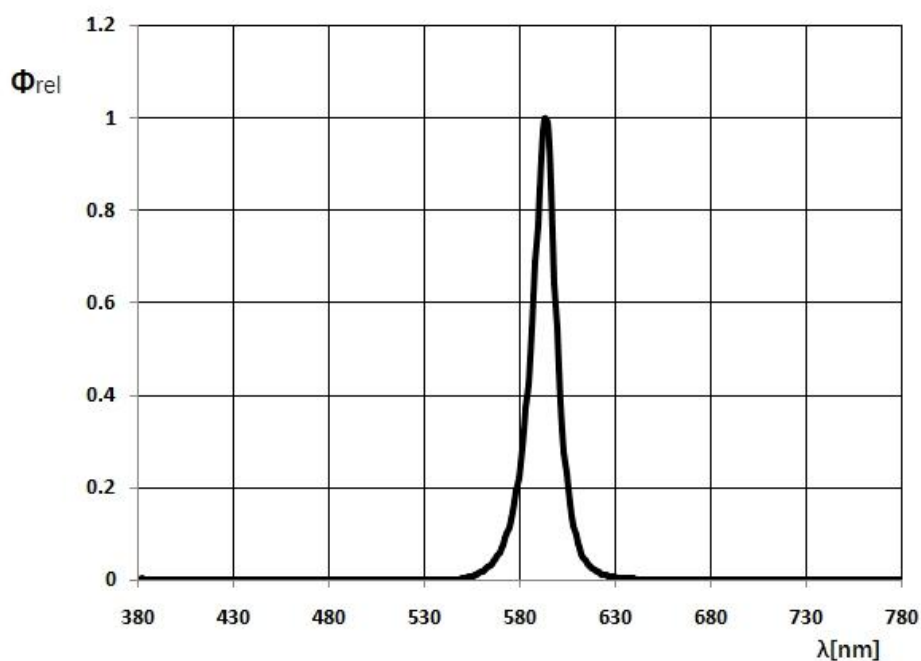
**Fig 1. 辐射特性 / Radiation Characteristics**

IF=50mA; TS = 25°C



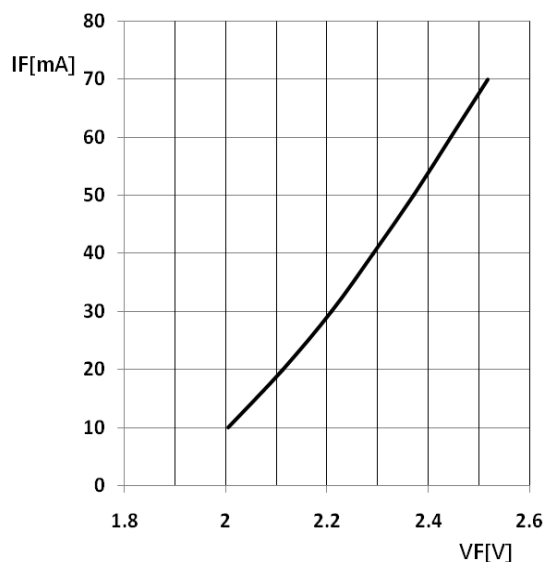
**Fig 2. 相对发光光谱/ Relative Spectral Power Distribution vs. Wavelength**

$\Phi_{rel}=f(\lambda)$ ; IF=50mA; TS = 25°C



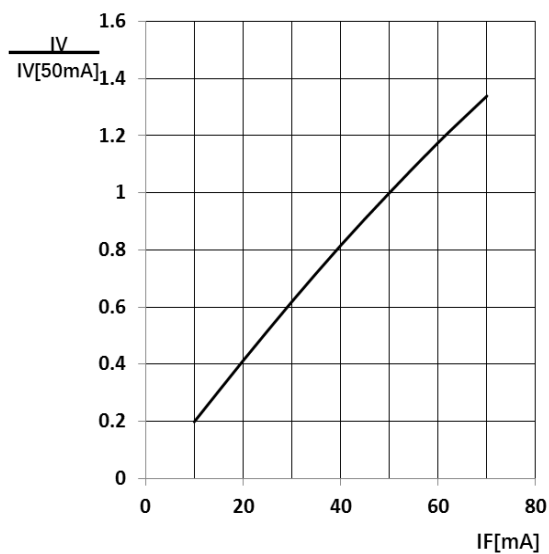
**Fig 3. 正向电流/Forward Voltage**

$I_F = f(V_F)$ ;  $T_S = 25^\circ\text{C}$



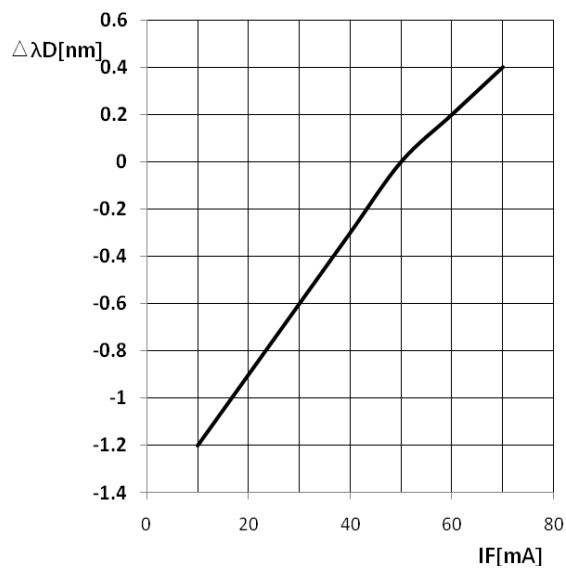
**Fig 4. 相对发光强度/Relative Luminous Intensity**

$I_v / I_v(50 \text{ mA}) = f(I_F)$ ;  $T_S = 25^\circ\text{C}$



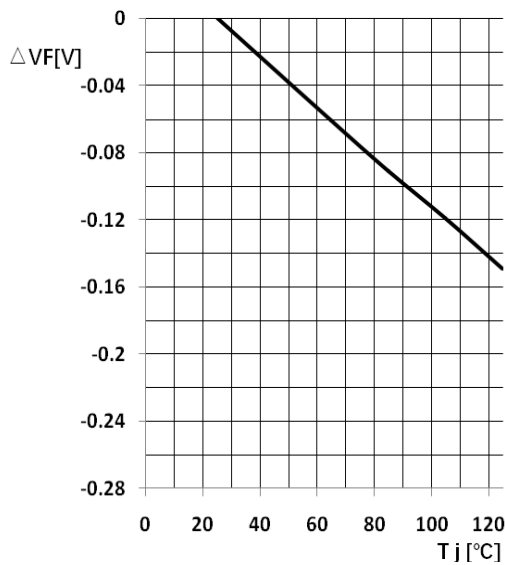
**Fig 5. 波长偏移/ Shift in Wavelength**

$\Delta\lambda_D = f(I_F)$ ;  $T_S = 25^\circ\text{C}$



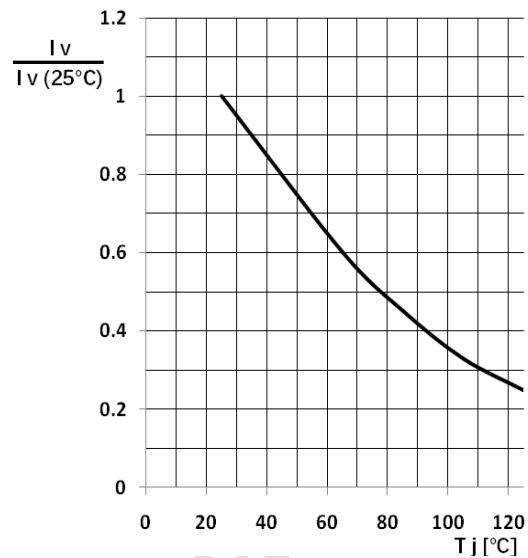
**Fig 6. 正向电压/Forward Voltage**

$$\Delta VF = VF - VF(25^\circ\text{C}) = f(T_j); IF = 50\text{mA}$$



**Fig 7. 相对发光强度 Relative Luminous Flux**

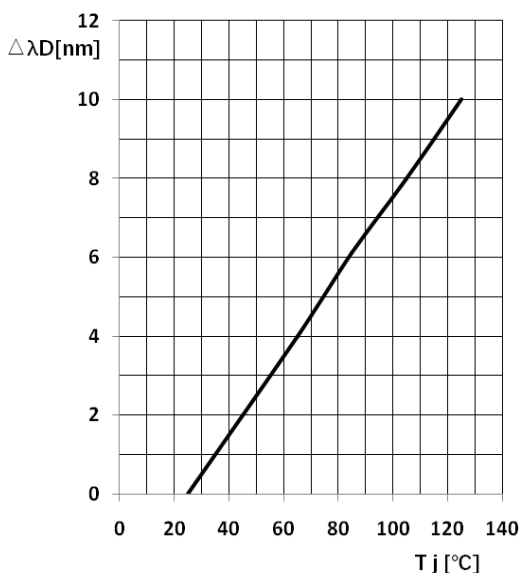
$$I_v / I_v(25^\circ\text{C}) = f(T_j); IF = 50\text{mA}$$



**Fig 8. 波长偏移/**

**Shift in Wavelength**

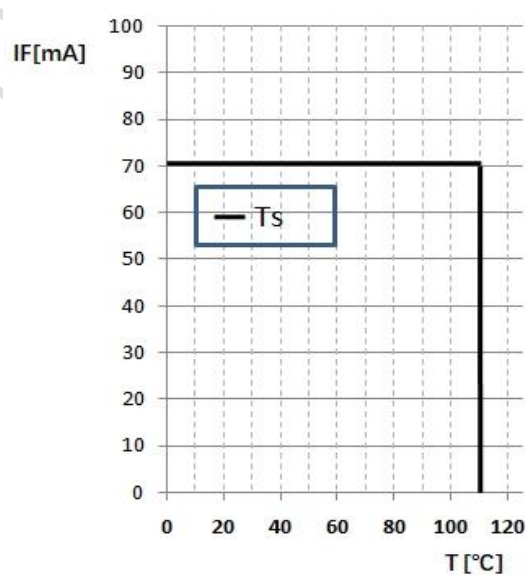
$$\Delta \lambda_D = \lambda_D - \lambda_D(25^\circ\text{C}) = f(IF); T_S = 25^\circ\text{C}$$



**Fig 9. 最大正向电流/**

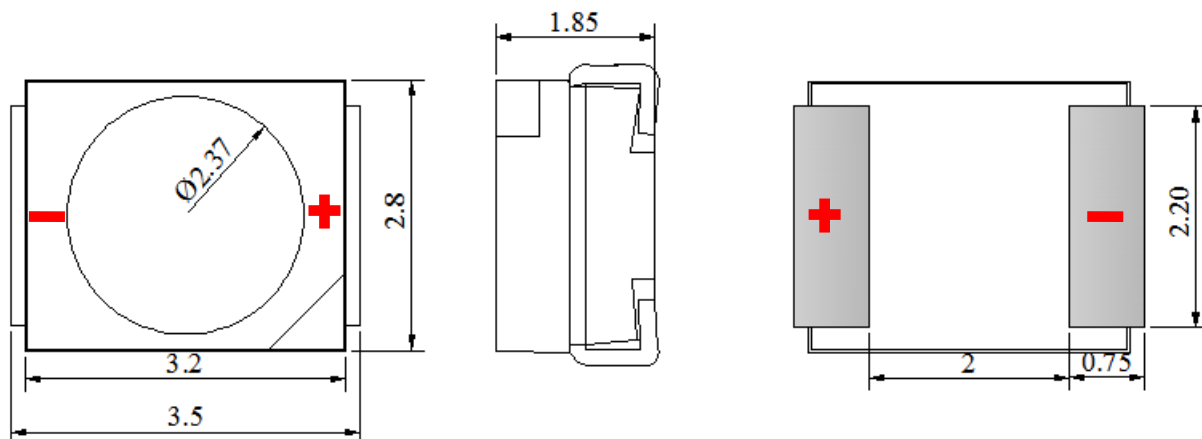
**Max. Permissible Forward Current**

$$IF = f(T)$$



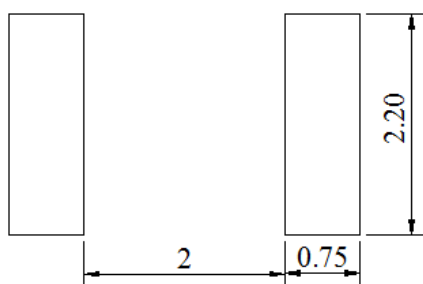
## 7、产品及钢网尺寸 Product and PCB Pad Dimensions

### a) 产品尺寸 Product Dimensions:



### b) 推荐焊盘尺寸/

#### PCB Pad Dimensions



### c) 材料信息/

#### Material Information

| 项目<br>Item                              | 描述<br>Description             |
|-----------------------------------------|-------------------------------|
| 支架<br>Lead Frame                        | PLCC                          |
| 电极材料<br>Electrodes Materials            | 银电极<br>Ag-plated Copper Alloy |
| 芯片<br>LED Die                           | 铝镓铟磷<br>AlGaInP               |
| Wire                                    | Au                            |
| 封装树脂材料<br>Encapsulating Resin Materials | 硅胶<br>Silicone                |

备注 Notes:

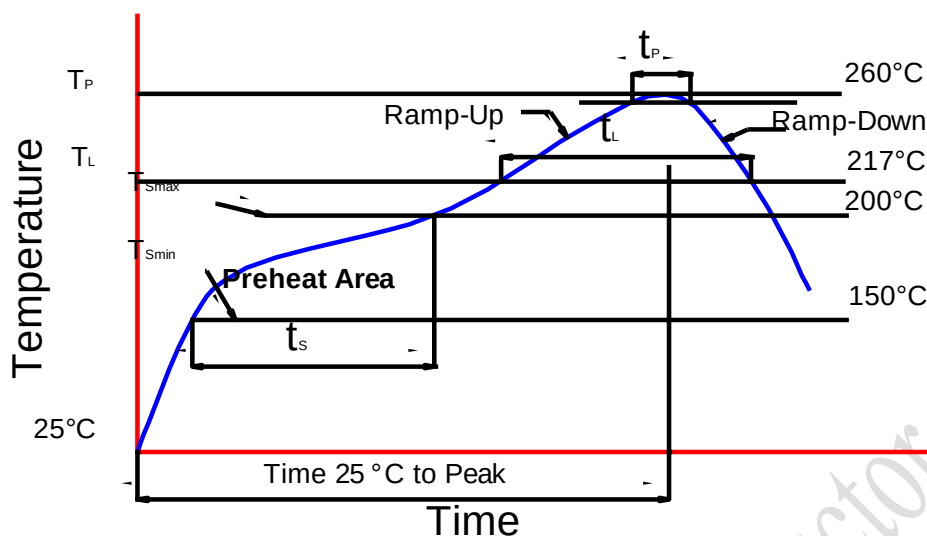
◇ 所有尺寸均以 mm 为单位

All dimensions are in millimeters

◇ 尺寸未按照公差±0.1mm 标记的，按照图纸标记

Size is not marked in accordance with tolerance ±0.1mm and dimension tolerances in accordance with drawings

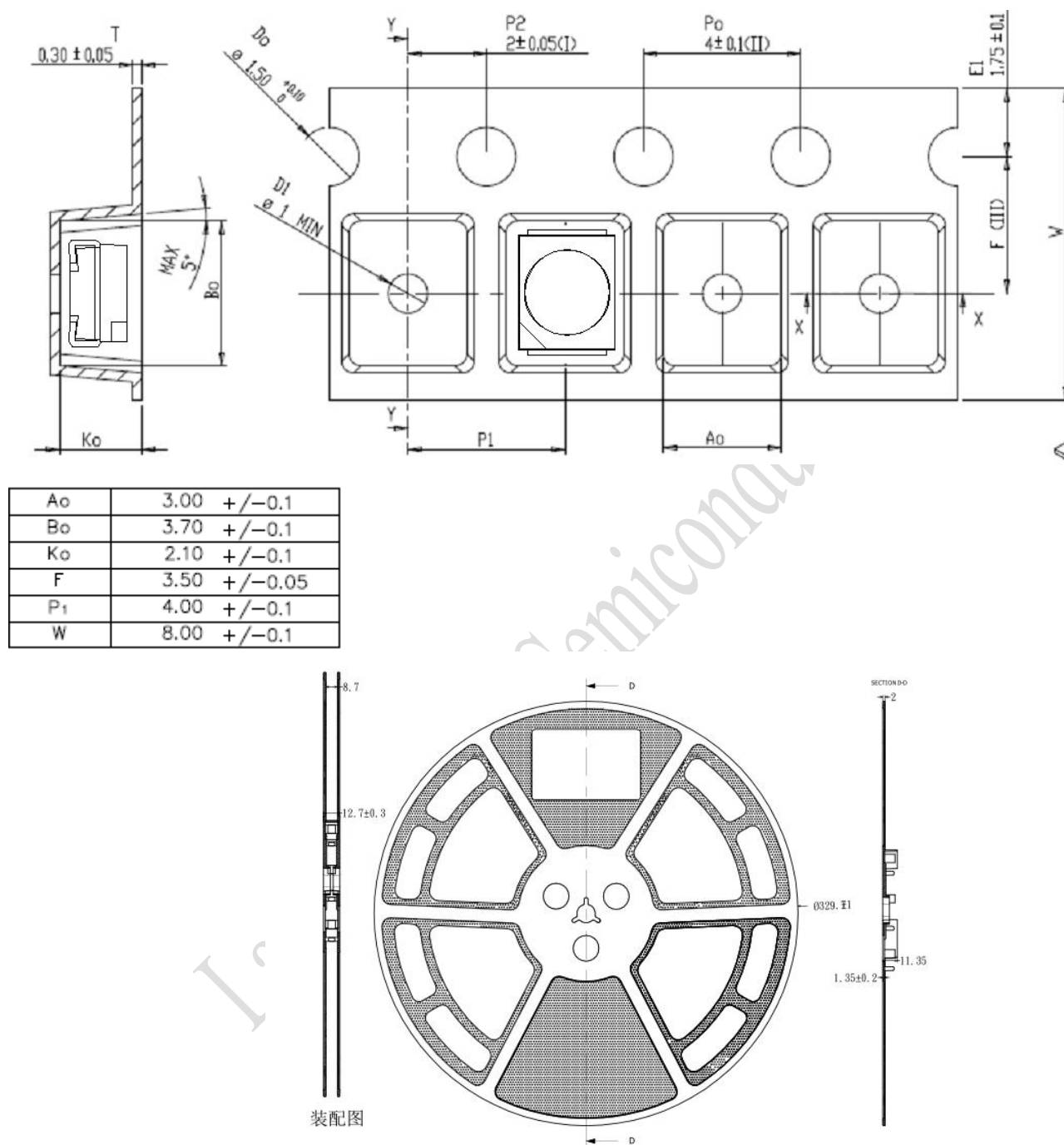
## 8、回流焊特性 Reflow Soldering Characteristics



根据 EDEC-J-STD-020E 内容，参考以下内容。  
Compatible with the JEDEC-J-STD-020E, using the parameters listed below.

| 特制参数 Profile Feature                                                                                        | 无铅焊料 Lead-Free Solder |
|-------------------------------------------------------------------------------------------------------------|-----------------------|
| 平均上升速率 (T <sub>smax</sub> 至 T <sub>p</sub> )<br>Average Ramp-Up Rate (T <sub>smax</sub> to T <sub>p</sub> ) | 3 °C/sec max.         |
| 预热: 温度最小值 (T <sub>smin</sub> )<br>Preheat: Temperature Min (T <sub>smin</sub> )                             | 150                   |
| 预热: 最高温度 (T <sub>smax</sub> )<br>Preheat: Temperature Max (T <sub>smax</sub> )                              | 200                   |
| 预热: 时间 (t <sub>smin</sub> 到 t <sub>smax</sub> )<br>Preheat: Time (t <sub>smin</sub> to t <sub>smax</sub> )  | 60-180 secs           |
| 回流温度 (T <sub>L</sub> )<br>Time Maintained Above: Temperature (T <sub>L</sub> )                              | 217°C                 |
| 回流时间 (t <sub>L</sub> )<br>Time Maintained Above: Time (t <sub>L</sub> )                                     | 60-150 secs           |
| 峰值/分类温度 (T <sub>p</sub> )<br>Peak/Classification Temperature (T <sub>p</sub> )                              | 255 ± 5°C             |
| 实际峰值温度 (t <sub>p</sub> ) 在 5°C 以内的时间<br>Time Within 5°C of Actual Peak Temperature (t <sub>p</sub> )        | 20~40 secs            |
| 降低速率<br>Ramp-Down Rate                                                                                      | 4°C/sec max.          |

## 9、卷轴 Reel Dimensions



备注 Notes:

- ◇ 卷轴包装 2000pcs  
Reel:2000pcs.
- ◇ 卷轴包装方法符合 IJSC0806 (连续胶带上的电子元件包装)  
The tape packing method complies with IJSC0806(Packing of Electronic Components on Continuous Tapes).
- ◇ 当卷轴由于工作中断而重绕时, 载带上压力不应超过 10N, 否则 LED 可能会粘在盖带上  
When the tape is rewound due to work interruptions, no more than 10N should be applied to the embossed carrier tape.  
The LEDs may stick to the cover tape.

## 10、可靠性 Reliability

### a) 测试和结果 Tests and Results

| 测试项目<br>Test Item                                 | 标准<br>Reference Standard | 测试条件<br>Test Conditions                                                                                                      | 测试周期<br>Test Duration            | 失效标准<br>Failure Criteria# |
|---------------------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------|
| 外观检测<br>External Visual                           | JESD22 B-101             | Visual Inspection                                                                                                            | /                                | #1                        |
| 破坏性物理分析<br>D.P.A                                  | AEC-Q102                 | Random Sample HSTRB,HAST,TC                                                                                                  | /                                | #1                        |
| 振动<br>Vibration                                   | JESD22 B-103             | 0.06 inch displacement,20 to 100 Hz,50 g 100 Hz to 2kHz,                                                                     | 4times                           | #1                        |
| 静电测试<br>ESD                                       | JESD22 A-114             | Human-body mode,<br>R = 1.5 k $\Omega$ , C = 100pF                                                                           | 3 times<br>Negative/<br>Positive | #1                        |
| 机械冲击<br>Mechanical Shock                          | JESD22 B-104             | 1500 g's for 0.5 ms,<br>5 blows, 3 orientations                                                                              | 3times                           | #1                        |
| 常温测试<br>Life Teat                                 | JESD22 A-108             | 25 $^{\circ}$ C, 1000 hours @70mA                                                                                            | 1000hrs                          | #1                        |
| 温度循环<br>Temperature Cycling                       | JESD22 A-104             | Tc = -40 $^{\circ}$ C ~100 $^{\circ}$ C, 30 min. dwell,5 min transfer, 1000 cycles                                           | 1000hrs                          | #1                        |
| 温度循环 2<br>Power Temperature Cycle                 | JESD22 A-105             | Ta = -40 $^{\circ}$ C~ 105 $^{\circ}$ C, If = 70mA,<br>20 min dwell / 20 min transition (1 hour cycle), 2 min ON / 2 min OFF | 1000hrs                          | #1                        |
| 高温高湿测试<br>High Humidity High Temp. Operating Life | JESD22 A-101             | 85 $^{\circ}$ C/85% RH, @ 70mA                                                                                               | 1000hrs                          | #1                        |
| 高温老化<br>High Temperature Operating Life           | JESD22 A-108C            | Ts = 100 $^{\circ}$ C, If = 70mA                                                                                             | 1000hrs                          | #1                        |
| 低温老化<br>Low Temperature Operating Life            | JESD22 A-108C            | Ta = -40 $^{\circ}$ C, If = 70mA                                                                                             | 1000hrs                          | #1                        |
| 低温储存<br>Low Temperature Storage Life              | JESD22 A-119             | Ta = -40 $^{\circ}$ C, non-operating                                                                                         | 1000hrs                          | #1                        |
| 低温储存<br>Hight Temperature Storage Life            | JESD22 A-103B            | Ta = 100 $^{\circ}$ C, non-operating                                                                                         | 1000hrs                          | #1                        |
| 冷热冲击<br>Thermal Shock                             | JESD22 A-104             | -40 $^{\circ}$ C ~ 125 $^{\circ}$ C, 1000 cycles                                                                             | 1000cycles                       | #1                        |

## b) 失效标准 Failure Criteria

| Criteria # | Items                      | Conditions | Failure Criteria                                                              |
|------------|----------------------------|------------|-------------------------------------------------------------------------------|
| #1         | Forward Voltage ( $V_F$ )  | $I_F$      | $> \text{Initial value} \times 1.1$ or<br>$< \text{Initial value} \times 0.9$ |
|            | Luminous Flux ( $\Phi_v$ ) | $I_F$      | $< \text{Initial value} \times 0.7$                                           |
| #2         | Solderability              | -          | Less than 90% solder coverage                                                 |



## 11、注意事项 Cautions

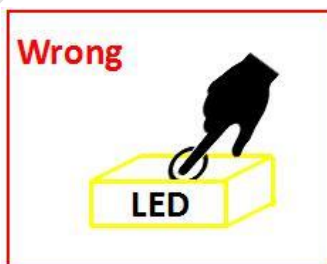
### a) 存储 Storage

- 不要将芯片放在潮湿的地方，存放温度在 5℃~30℃ 之间，相对湿度在 30% 以下。  
Do not place the chips in damp places, Storage temperature between 5 °C and 30 °C, Relative humidity under 30%.
- 开包后建议在 24 小时内过完回流焊，车间条件 ≤30℃/60%RH。  
After opening the package, it is recommended to finish the reflow within 24 hours. The workshop conditions are ≤30℃/60%RH
- 如果受潮，需将贴片卷盘放入 60℃ 烤箱烘烤 24 小时；打开后，LED 灯可重新密封在原始真空袋中。  
If it is wet, the patch reel should be baked in a 60 °C oven for 24 hours; after opening, the LED light can be resealed in the original vacuum bag.
- 不要接触任何未知的液体，特别是丙酮。  
Don't touch any unknown liquid, In particular, acetone.
- 防止静电死亡，手动操作需要戴橡胶手套并佩戴静电环。  
Prevent electrostatic killed, Manual operation is required to wear rubber gloves and wear electrostatic ring.

### b) 清洗 Cleaning

- 通常，LED 不建议对部件进行湿式清洁处理，因为封装不是密封的。  
In general, LED does not recommend a wet cleaning process for component as the package is not hermetically sealed.
- 由于采用开放式设计，所有类型的清洁液都可能渗透到封装中，导致 LED 退化或完全失效。  
Due to the open design, all kind of cleaning liquids can infiltrate the package and cause a degradation or a complete failure of the LED.

### c) 操作注意 Handling Precautions



- 在处理过程中，还应注意确保组件顶面没有压力。  
During the handling, care should be taken as well to ensure no pressure on the top surface of component.
- 应避免使用所有类型的尖锐物体（例如镊子，指甲等），以防止对硅树脂造成压力，因为这会导致部件损坏。  
All types of sharp objects(e.g. forceps, fingernail, etc) should be avoided in order to prevent stress to the silicone, since this can lead to damage of the component.

## 12、文件履历表 Document Resume

| 序号 | 变更日期       | 变更人 | 版本  | 变更内容                                             |
|----|------------|-----|-----|--------------------------------------------------|
| 01 | 2020.11.23 | 袁丁  | Y00 | 1.新制定;                                           |
| 02 | 2021.01.28 | 袁丁  | Y01 | 1.亮度相关代号变更, 由 M2/M3/M4/M5 变更为 B2/B3/B4/B5, 数值不变; |
| 03 | 2021.05.25 | 李雄斌 | Y02 | 1.变更波长代号;                                        |
|    |            |     |     |                                                  |
|    |            |     |     |                                                  |
|    |            |     |     |                                                  |
|    |            |     |     |                                                  |
|    |            |     |     |                                                  |
|    |            |     |     |                                                  |
|    |            |     |     |                                                  |
|    |            |     |     |                                                  |