



洲光源  
CHAULIGHT

# 产品规格书 SPECIFICATION

客户名称: \_\_\_\_\_  
Customer Name  
产品类型: 反射式光电开关  
Product Name  
产品型号: ZOS-R2016B-08D-Z4  
Part No.

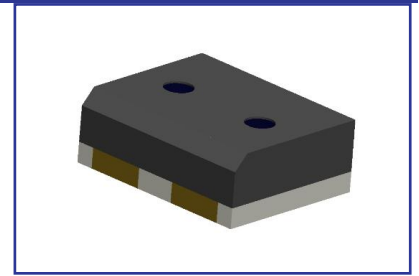
|                                                   |            |                                           |            |                                            |  |
|---------------------------------------------------|------------|-------------------------------------------|------------|--------------------------------------------|--|
| <input type="checkbox"/> 技术参考 Technical Reference |            | <input type="checkbox"/> 样品 Sample        |            | <input type="checkbox"/> 量产供货 Mass Product |  |
| 客户审核 (加盖公章)<br>Client approval (Stamp)            |            | 洲光源审核<br>Chaulight approval               |            |                                            |  |
| 核准 Approval                                       | 确认 Checked | 核准 Approval                               | 确认 Checked | 制作 Edited                                  |  |
|                                                   |            | 刘峰斌                                       | 郝三强        | 王乐                                         |  |
| <input type="checkbox"/> 接收 Qualified             |            | <input type="checkbox"/> 不接收 Disqualified |            | 日期 Date: 2022.03.21                        |  |

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ZOS-R2016B-08D-Z4 由激光发射二极管和硅光晶体管组成，它们并排封装在黑色热塑性外壳中的汇聚光轴上。光电晶体管只接收来自 IR 的辐射。这是正常情况。但当物体在中间时，光电晶体管不能接收辐射。有关更多组件信息，请参阅 IR 和 PT。

The ZOS-R2016B-08D-Z4 Composed of laser emitting diodes and silicon transistors, encased side-by-side on converging optical axis in a black thermoplastic housing. The phototransistor receives radiation from the IR only. This is the normal situation. But when an object is in between, phototransistor could not receives the radiation. For additional component information, please refer to IR and PT.



### 特性 Feature

- 可靠性高、辐射强度高、低电压驱动  
High reliability、High radiant intensity、Low forward voltage、
- 感应速度快、感光度强  
Fast response time、High photo sensitivity
- 截止感应波长 940nm  
Cut-off visible wavelength  $\lambda_p=940\text{nm}$
- 无铅材料、Rosh 认证  
Pb.Free、RoHS compliant version

### 应用 Application

- 蓝牙耳机、非接触开关  
TWS、Non-contact Switching
- 智能电子产品  
Intelligent Electronic Products

## 最大额定值 Absolute Maximum Ratings

测试项目 Parameter (Ta=25℃)

|                                   |                  |          |     |     |     |
|-----------------------------------|------------------|----------|-----|-----|-----|
| Optical Output Power              | P <sub>OP</sub>  | 5        | 6   | —   | mW  |
| Threshold Current                 | I <sub>th</sub>  | —        | 1   | 2   | mA  |
| Operating Current                 | I <sub>op</sub>  | —        | 7   | —   | mA  |
| Differential resistance           | R <sub>s</sub>   | —        | 60  | 80  |     |
| Operating Voltage                 | V <sub>op</sub>  | 1.8      | 2.1 | 2.4 | V   |
| Slope Efficiency                  | $\eta_s$         | 0.8      | 1   | —   | W/A |
| Power Conversion Efficiency       | PCE              | 38       | 41  | —   | %   |
| Wavelength                        | $\lambda_{peak}$ | 930      | 940 | 950 | nm  |
| Spectral Width (RMS)              | $\Delta\lambda$  | —        | 1   | 2.5 | nm  |
| Beam Full Divergence (D86)        | $\phi$           | 16       | 20  | 24  | °   |
| ESD tolerance, human body model   | ESD              | 260      |     |     | V   |
| Optical Output Power              | P <sub>OP</sub>  | 5        | 6   | —   | mW  |
| 工作温度 Operating Temperature        | T <sub>opr</sub> | -25~+85  |     | °C  |     |
| 储存温度 Storage Temperature          | T <sub>stg</sub> | -40~+100 |     | °C  |     |
| 焊接温度 Lead Soldering Temperature*3 | T <sub>sol</sub> | 260      |     | °C  |     |

\*1、在 25 摄氏度的环境中测试 below 25 Free Air Temperature

\*2、脉宽少于等于 100us, 占空比 1% Pulse width  $\leq 100\mu s$ , Duty cycle= 1%

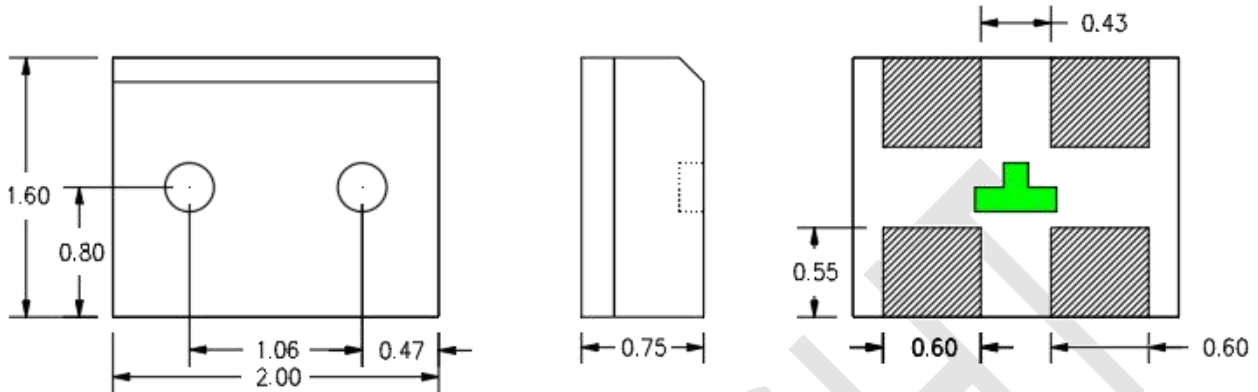
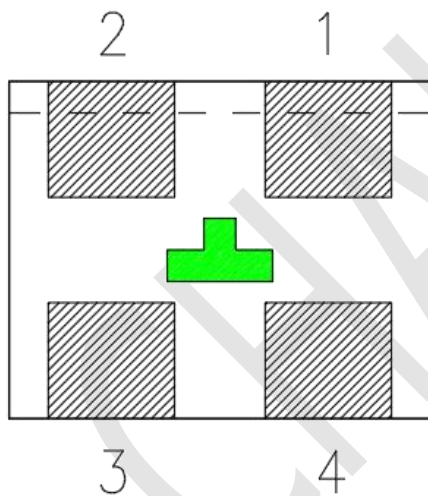
\*3、离胶体 2mm 以上焊接 5s 内 2mm form body for 5 seconds

光电特性 Electro-Optical Characteristics

| 电性参数（温度=25℃）<br>Paramete（Ta=25℃）    |                                        | 符号<br>Symbol         | 条件<br>Condition                                | 最小值<br>Min. | 典型值<br>Typ. | 最大值<br>Max. | 单位<br>Units |
|-------------------------------------|----------------------------------------|----------------------|------------------------------------------------|-------------|-------------|-------------|-------------|
| 输入端<br>Input                        | 正向电压 Forward Voltage                   | V <sub>F</sub>       | I <sub>F</sub> =20mA                           | --          | 1.2         | 1.5         | V           |
|                                     |                                        |                      | IF=100mA*2                                     | --          | 1.4         | 1.85        |             |
|                                     |                                        |                      | IF=1A *2                                       | --          | 2.6         | 4.0         |             |
|                                     | 峰值波长 Peak Wavelength                   | λ <sub>p</sub>       | I <sub>F</sub> =20mA                           | --          | 940         | --          | nm          |
|                                     | 反向电流 Reverse Current                   | I <sub>R</sub>       | V <sub>R</sub> =5V                             | --          | --          | 10          | μA          |
| 输出端<br>Output                       | 暗电流 Dark Current                       | I <sub>CEO</sub>     | Ee=0mW/cm <sup>2</sup><br>V <sub>CE</sub> =20V | --          | --          | 30          | uA          |
|                                     | 集电极-发射极的工作电压<br>C-E Saturation Voltage | V <sub>CE(SAT)</sub> | I <sub>C</sub> =2mA<br>Ee=1mW/cm <sup>2</sup>  | --          | --          | 0.4         | mW/sr       |
| 转换特性<br>Transfer<br>Characteristics | 上升时间 Rise Time                         | t <sub>r</sub>       | V <sub>CE</sub> =5V<br>I <sub>C</sub> =1mA     | --          | 15          | --          | μS          |
|                                     | 下降时间 Fall Time                         | t <sub>f</sub>       | R <sub>L</sub> =1000Ω                          | --          | 15          | --          |             |
|                                     | 光电流 Collector Current                  | I <sub>C(ON)</sub>   | IF=10mA<br>V <sub>CE</sub> =5V                 | 0.18        | 1           | --          | mA          |

\*2  
、脉宽少于等于 100us， 占空比 1% Pulse width ≤100μs,Duty cycle= 1%

## 产品尺寸 Package Dimension

Tolerance:  $\pm 0.02\text{mm}$ .

1:LD-  
2:VCC  
3:VOUT  
4:LD+

## 备注 Notes:

--所有尺寸为毫米标识

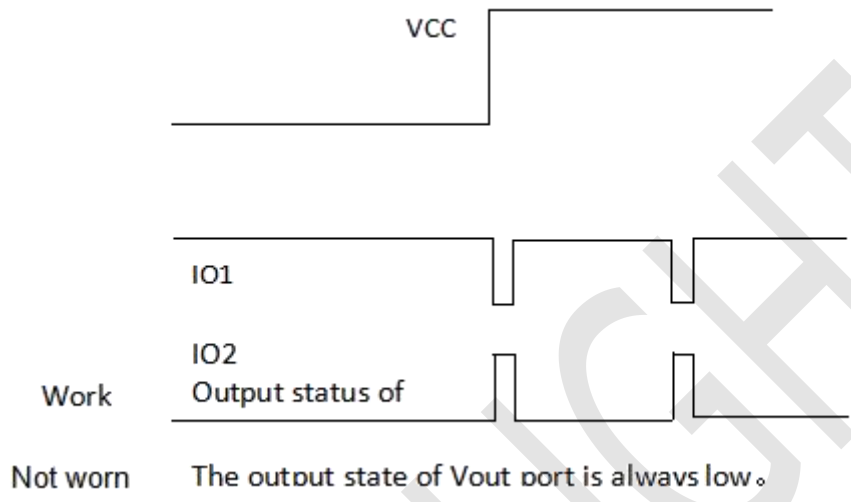
All dimensions are in millimeters

--未标识尺寸正负公差为 0.3mm

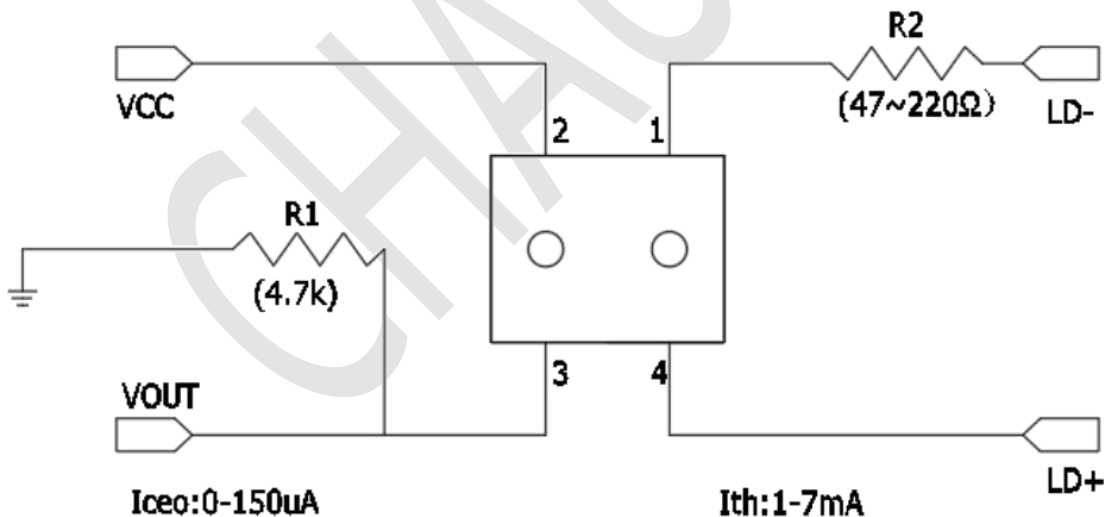
Tolerances unless dimensions  $\pm 0.3\text{mm}$

## 应用程序电路的工作顺序 Working sequence of application circuit

For example, 250us is used to work for 50ms (the average current is 30uA), and the timing is adjusted according to the actual application. Standby current 180nA



### Typical application circuit:

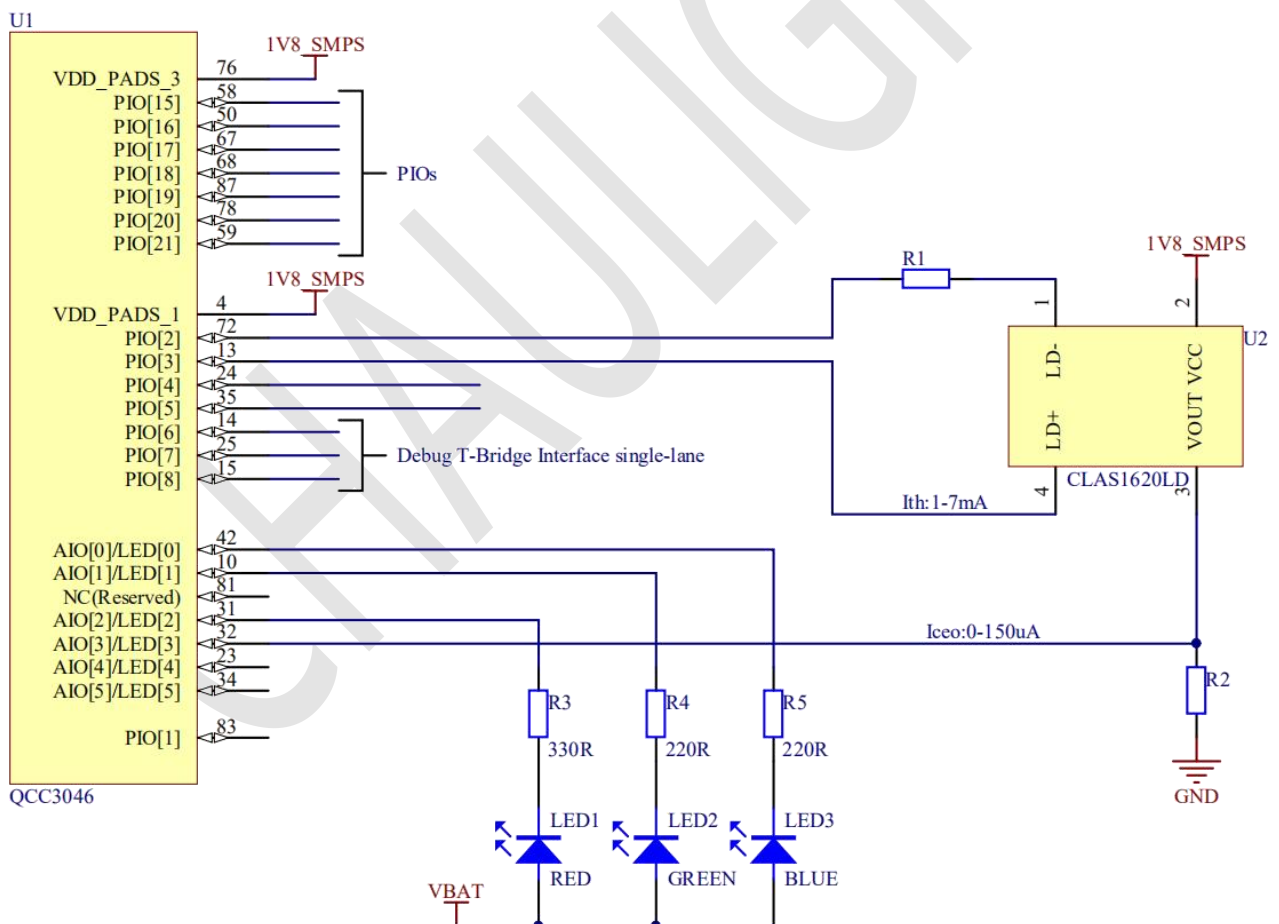


In this paper, the total system control circuit based on SoC Qualcomm QCC3046 was designed. (For reference only, please refer to the actual design)

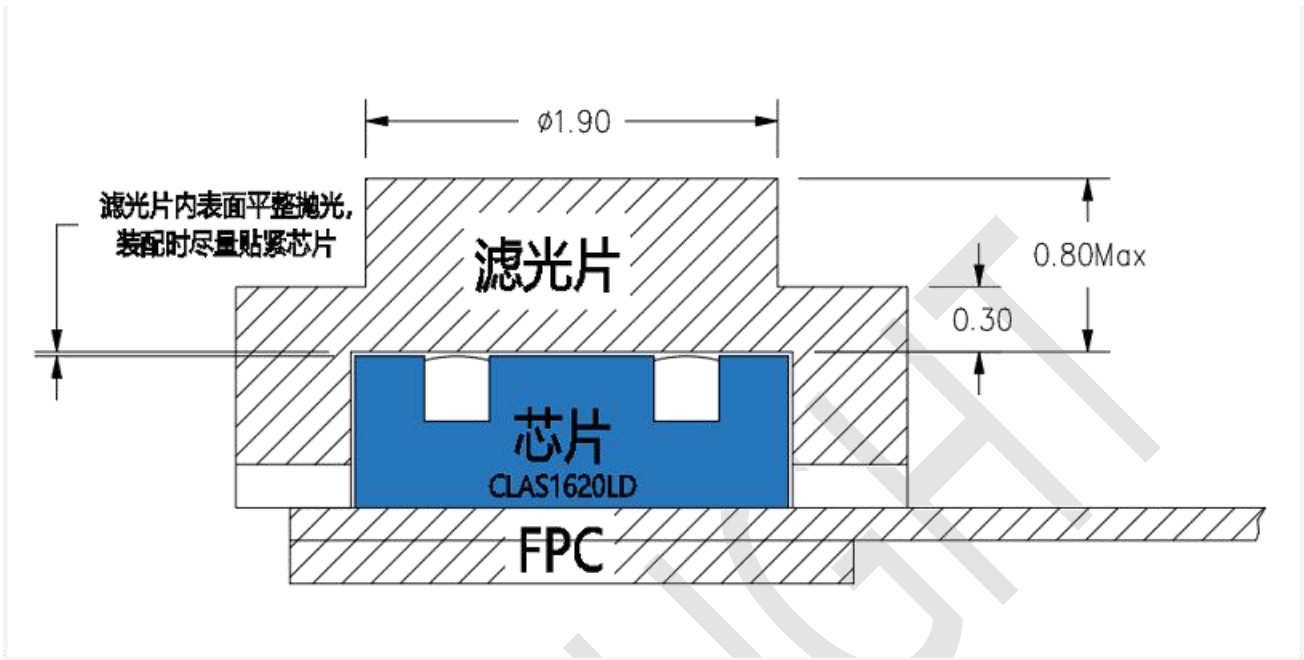
Resistance design reference value

| Resistance | Sensing distance | Comment                                                                                                                                  |
|------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 47Ω        | ≈6mm             | The smaller the resistance value, the greater the induction distance.<br>The greater the resistance, the smaller the induction distance. |
| 67Ω        | ≈5mm             |                                                                                                                                          |
| 87Ω        | ≈4mm             |                                                                                                                                          |
| 120Ω       | ≈3mm             |                                                                                                                                          |

## Typical application circuit:

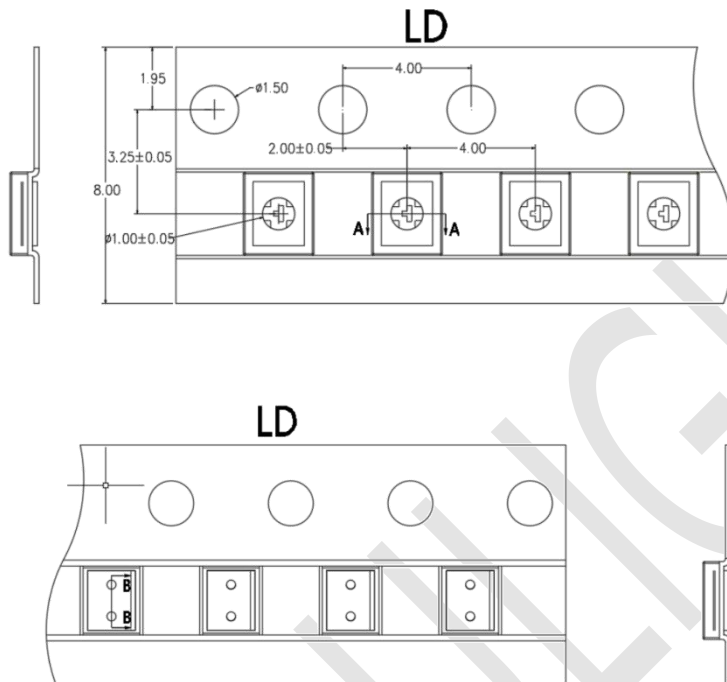


Structural design reference:

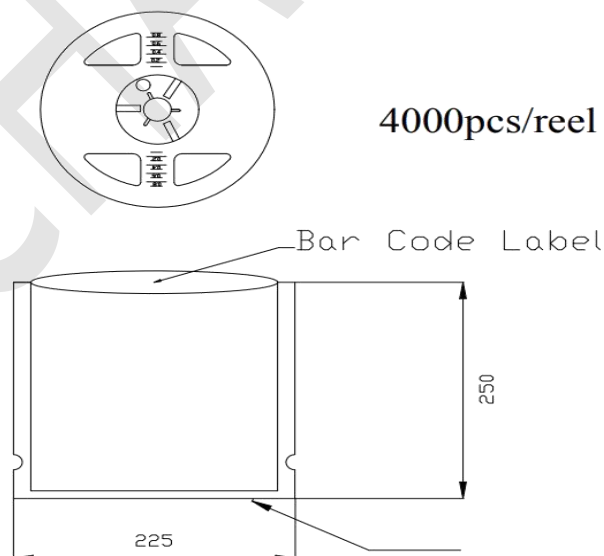


| NO. | Name                 | Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Comment |
|-----|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1   | FPC                  | Connect sensor to PCBA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |
| 2   | Photoelectric sensor | It is used to detect the non-electric quantity which directly causes the change of light quantity, such as light intensity, illumination, radiation temperature measurement, gas composition analysis, etc. Can also be other non-electric charges, such as part diameter, surface roughness, strain, displacement, vibration, etc., that can be converted into changes in the amount of light. Speed, acceleration, as well as the shape of the object, the recognition of the working state. Photoelectric sensor with non-contact, fast response. Therefore, it has been widely used in industrial automation devices and robots. |         |
| 3   | Filter               | Used to filter light beyond the wavelength of 940nm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |

## ●Tapping and packaging specifications (Units: mm)



## ●Package Method:(Units: mm)

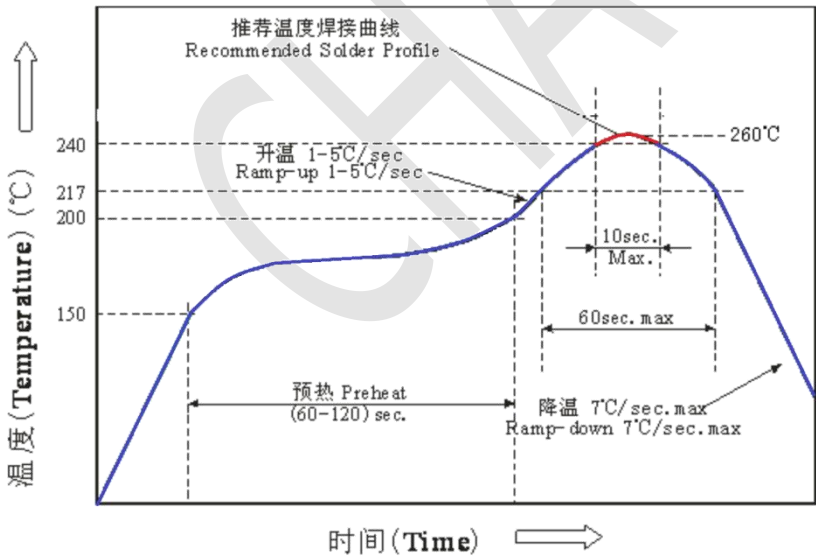


| Parameter                                                 | Reference         | Device         |
|-----------------------------------------------------------|-------------------|----------------|
| Average temperature gradient in preheating                |                   | 2.5°C/sec      |
| Soak time                                                 | $t_{\text{soak}}$ | 2 to 3 minutes |
| Time above 217°C ( $T_1$ )                                | $t_1$             | Max 60 sec     |
| Time above 230°C ( $T_2$ )                                | $t_2$             | Max 50 sec     |
| Time above $T_{\text{peak}} - 10^\circ\text{C}$ ( $T_3$ ) | $t_3$             | Max 10 sec     |
| Peak temperature in reflow                                | $T_{\text{peak}}$ | 260°C          |
| Temperature gradient in cooling                           |                   | Max -5°C/sec   |

--焊接 Soldering

- 1、胶体不可侵入锡槽内.Epoxy non-invasive tin tank.
  - 2、加热过程中不能对引脚施加压力。Pin pressure can not be applied during heating.
  - 3、推荐焊接条件 260°C <5s 或 340°C <3s Recommended welding conditions 260°C <5 s or 340°C <3 s.
- 注：建议客户尽量使用较低的温度和较短的时间进行焊接；在符合以上推荐回流曲线条件下的死灯上 限为 500PPM. Note:Customers are advised to use lower temperature and shorter time for welding as far as possible; the upper limit of dead lamp under the condition of PPM. above recommended reflux curve is 500.
- 4、建议客户在经波峰焊后加装风扇，以利散热，需等 LED 冷却后（最 好为室温后）,再进行下一工序 加工。 Customers are advised to install fan after wave peak welding to facilitate heat dissipation, need to wait for LED cooling (preferably after room temperature) before the next process processing.

推荐回流焊曲线 Recommended Reflow Welding Curves



## ► 注意事项 Note

### --其他 Other

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## ► 更改记录表 Engineering Change Notice-Record

| 版本<br>Edition | 更改日期<br>Date | 主要更改内容<br>Main Content | 拟 制<br>Prepared | 确 认<br>Checked |
|---------------|--------------|------------------------|-----------------|----------------|
| 1.0           | 2022-3-21    | 新产品发布 New Production   | 王乐              | 郝三强            |
|               |              |                        |                 |                |
|               |              |                        |                 |                |
|               |              |                        |                 |                |