



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: CHIP LED

产品型号 Product Type: PD4437C-L01-1T

客 户 Client name: _____

客户料号 Client P/N: _____

版 本 号 Version No.: Y02

日 期 Sending Date: 2022.07.04

客户承认栏 Client Approval	
核准 Approval	确认 Audit

制定 Confirmation: _____ 审核 Approval: _____

工厂地址:江西省南昌市高新区艾溪湖北路 699 号

Address: No.699 Aixihu North Road, Nanchang, Jiangxi Province, China

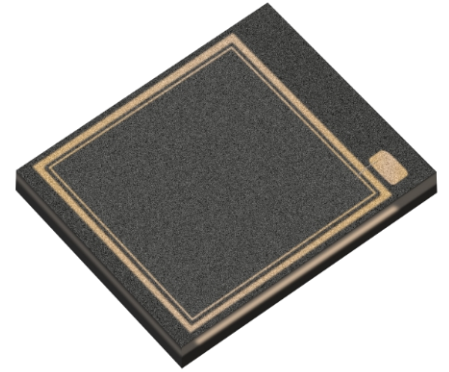
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1、特点 Features

- ◆ 快速响应时间
Fast response time
- ◆ 小轮廓尺寸以及仅为 0.55mm+/-0.1mm 厚薄封装
Small outline dimensions and thin package was only 0.55mm+/-0.1mm
- ◆ 特别适用于 400~1100nm 的应用
Especially suitable for applications from 400 nm to 1100 nm
- ◆ 适用于回流焊
Suitable for reflow soldering
- ◆ 无铅
Pd free
- ◆ 符合 RoHS 标准
RoHS compliant
- ◆ IPC / JEDEC J-STD-020C: MSL-3



2、描述 Description

- ◆ PD4437C-L01-1T 是一种高速、高灵敏度的 PIN 光电二极管
PD4437C-L01-1T is a high speed and high sensitive PIN photodiode

3、应用 Applications

- ◆ 医用传感器
Medical Sensor
- ◆ 红外应用系统
Infrared applied system

4、性能 Performance

a) 极限参数 Maximum Ratings (Ta =25 °C, unless specified otherwise)

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
反向电压 Reverse Voltage	V _R	32	V
工作温度 Operating Temperature Range	T _{opr}	-40~85	°C
存储温度 Storage Temperature	T _{stg}	-40~85	°C
ESD (人体模式) ESD Human Body Mode	HBM	2000	V

b) 光电参数 Electro-Optical Characteristics (Ta =25 °C, unless specified otherwise)

项目 Item	符号 Symbol	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit	条件 Condition
灵敏度的光谱范围 Spectral range of sensitivity	$\lambda_{0.1}$	400	----	1100	nm	----
峰值灵敏度的波长 Wavelength Of Peak Sensitivity	λ_p	----	940	----	nm	----
反向光电流 Reverse Light Current	I_L	29	32	----	μA	Ee=1mW/cm ² VR=1V λ_p =525nm
	I_L	34	39	----	μA	Ee=1mW/cm ² VR=1V λ_p =660nm
	I_L	38	42	----	μA	Ee=1mW/cm ² VR=1V λ_p =940nm
暗电流 Dark Current	I_D	----	1	10	nA	Ee=0mW/cm ² VR=10V
顺向电压 Forward Voltage	V_F	0.5	----	1.4	V	Ee=0mW/cm ² IF=10mA
视角 Viewing Angle	2 θ 1/2		120		°	VR=1V
反向崩溃电压 Reverse Breakdown Voltage	V_{BR}	32			V	Ee=0mW/cm ² IR=0.1mA
总电容 Total Capacitance	C_t	----	----	80	pF	VR=1V f=1MHZ, Ee=0mW/cm ²
		----	----	200	pF	VR=0V f=1KHZ, Ee=0mW/cm ²

5、光电特性图 The Photoelectric Characteristics Graph

Fig 1. 定向特性 / Directional Characteristics

$S(\text{rel}) = f(\theta)$; $T_a = 25^\circ\text{C}$

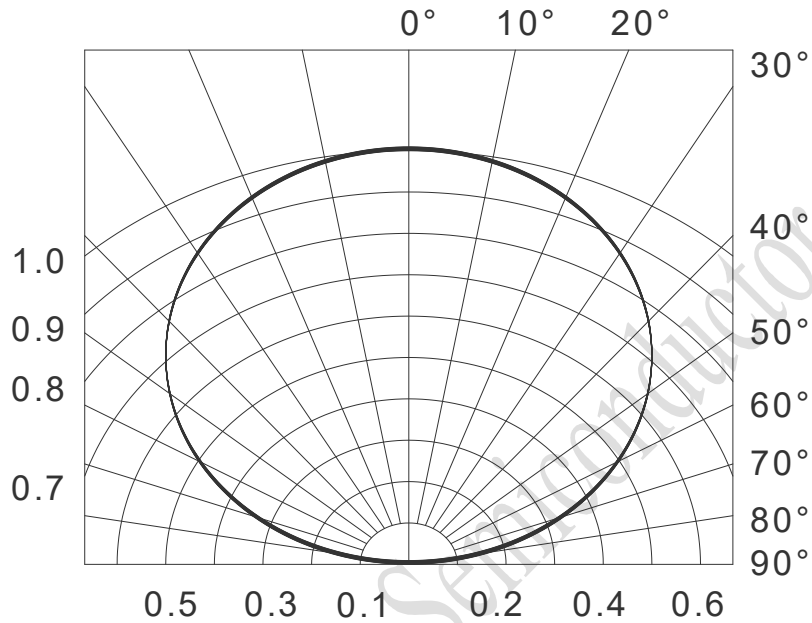


Fig 2. 相对光谱灵敏度 / Spectral Sensitivity

$S(\text{rel}) = f(\lambda)$; $T_a = 25^\circ\text{C}$

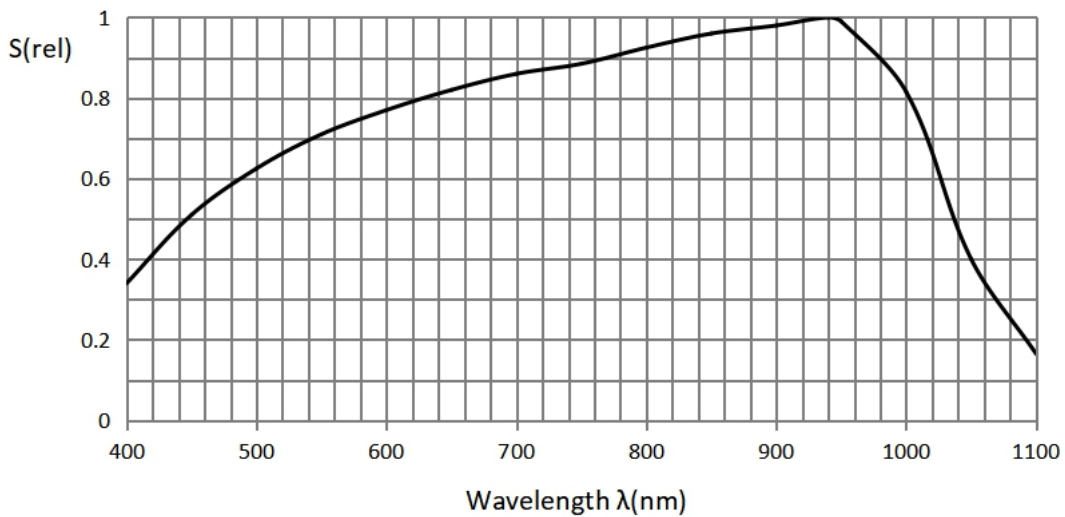


Fig 3. 光电流/Light Current

$$I_L = f(E_e), \lambda_p = 940\text{nm}, V_R = 1\text{V}$$

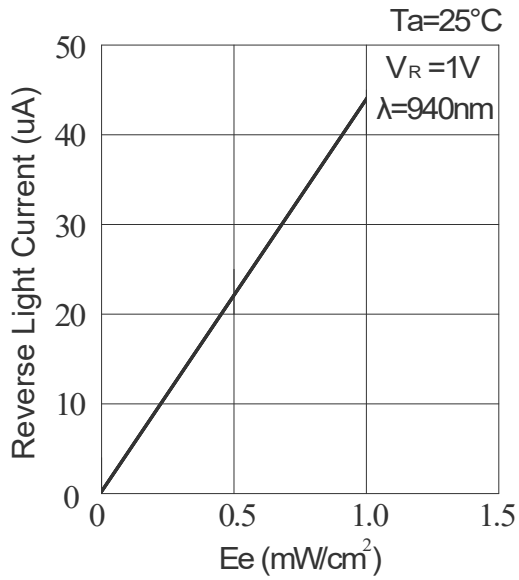


Fig 4. 暗电流/Dark Current

$$I_D = f(V_R); E_e = 0$$

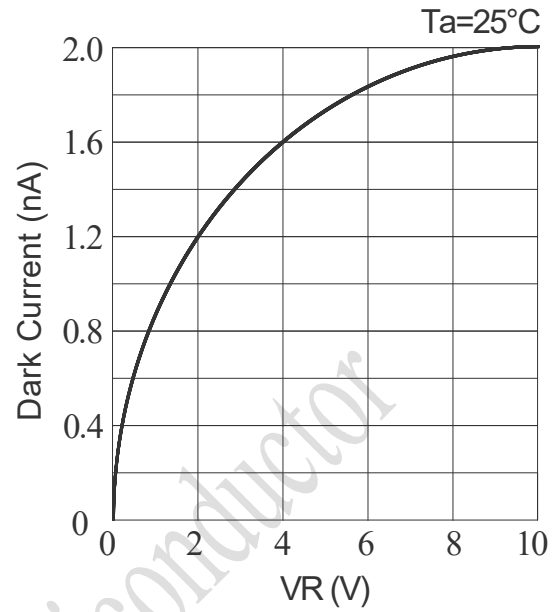
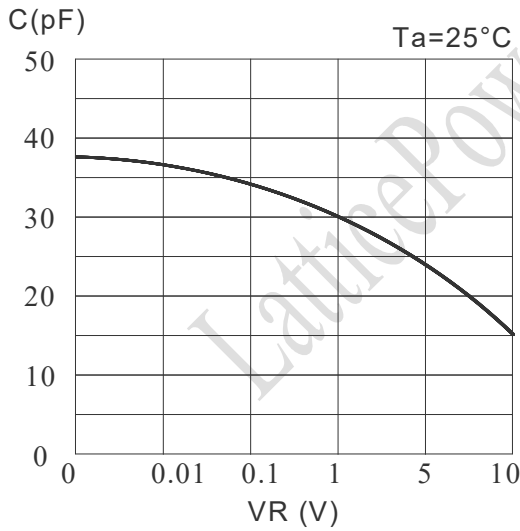
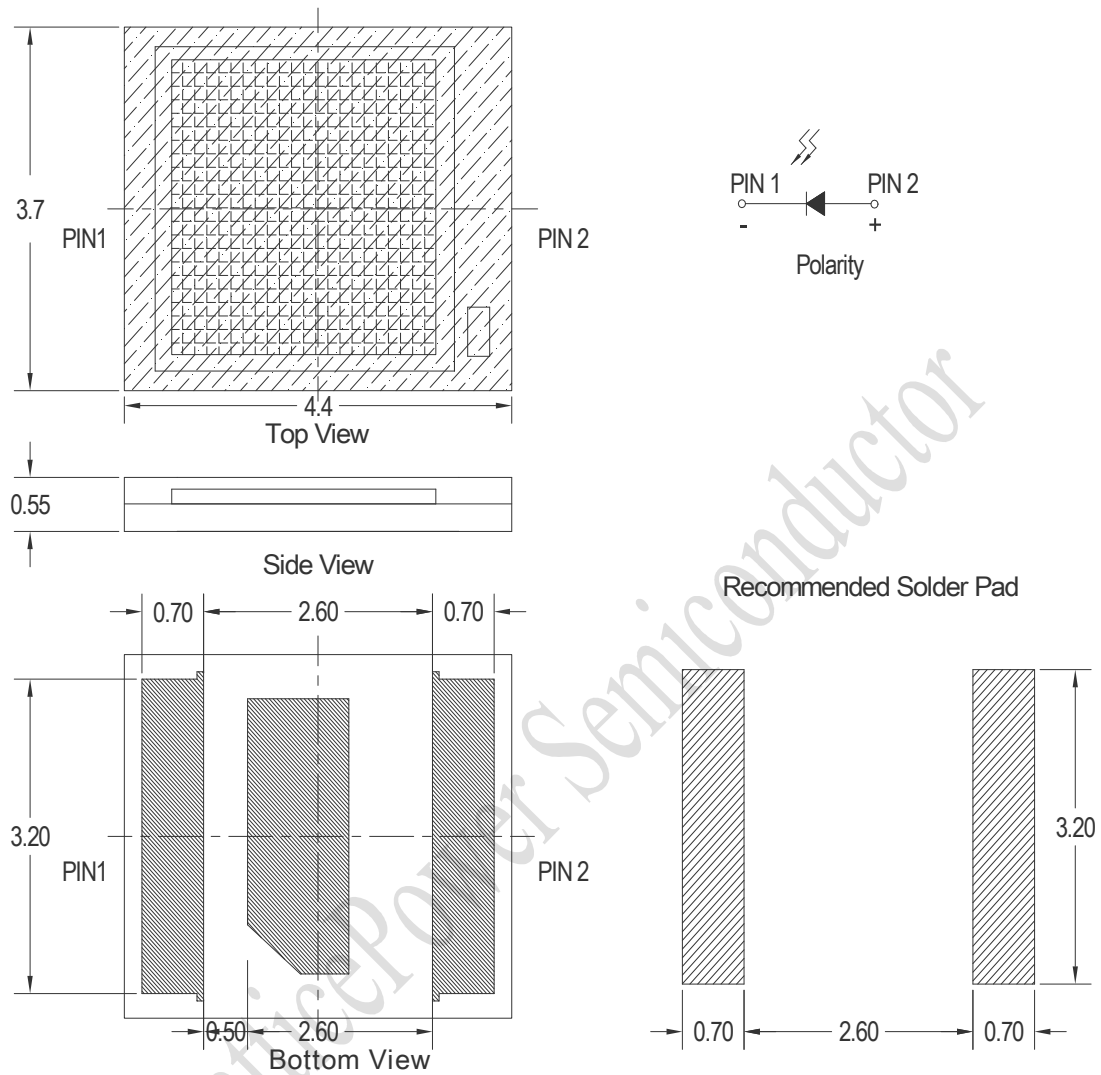


Fig 5. 电容/Capacitance

$$C_t = f(V_R), f = 1\text{MHz}, E_e = 0\text{mW/cm}^2$$



6、产品尺寸 Product Dimensions



备注 Notes:

◇ 所有尺寸均以 mm 为单位。

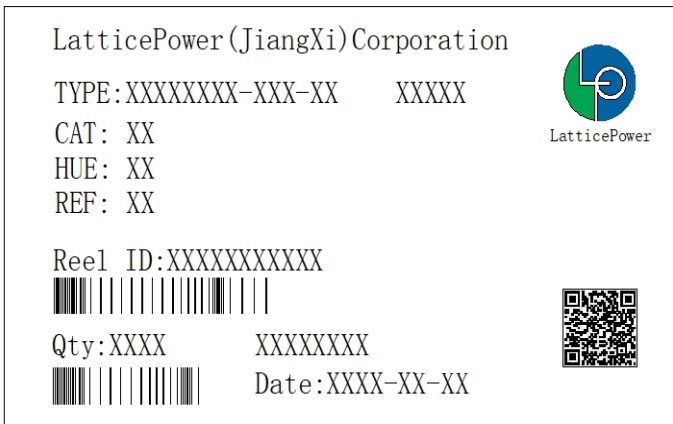
All dimensions are in millimeters.

◇ 尺寸未按照公差 $\pm 0.1\text{mm}$ 标记的，按照图纸标记。

Size is not marked in accordance with tolerance $\pm 0.1\text{mm}$ and dimension tolerances in accordance with drawings.

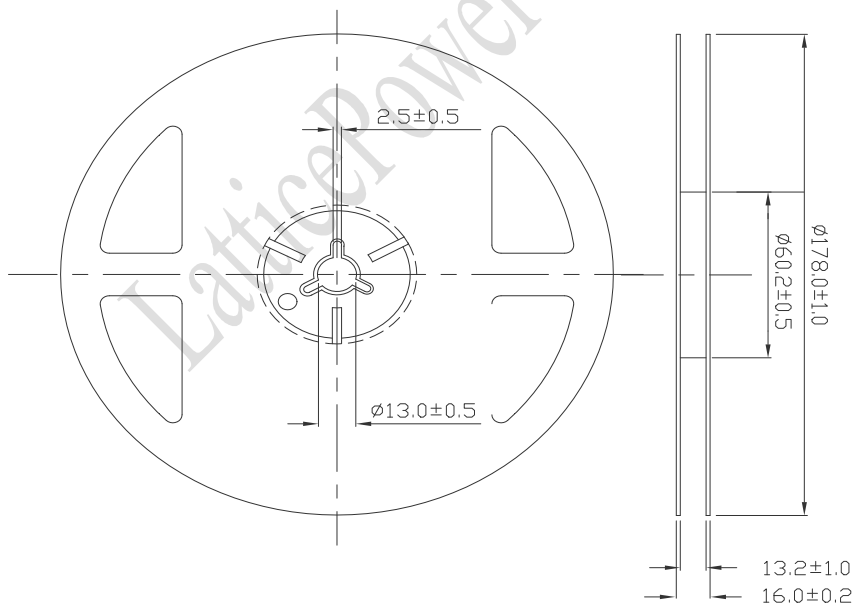
7、防潮包装材料 Moisture Resistant Packing Materials

a) 标签说明 Label Explanation

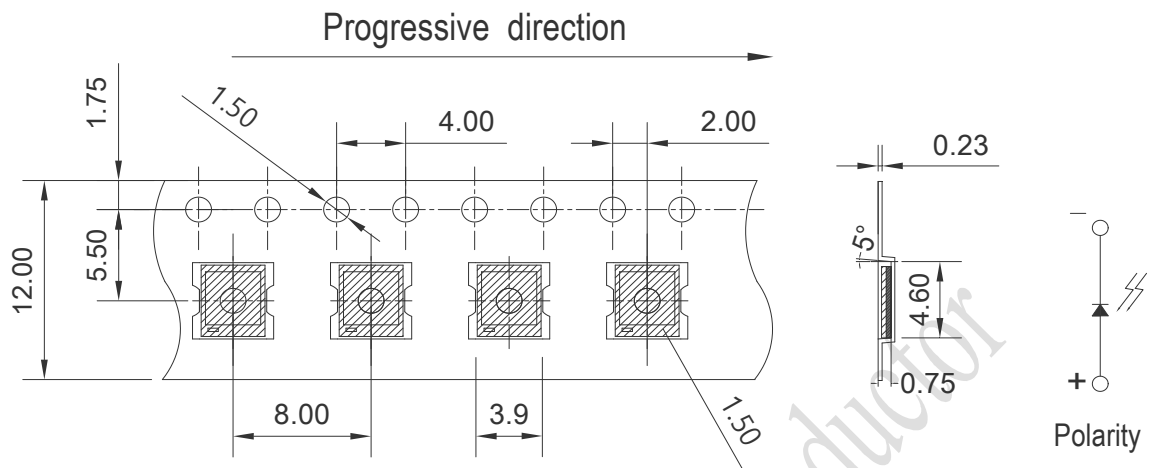


- TYPE: Product Type
- CAT: Rank
- HUE: Peak Wavelength
- REF: Reference
- Reel ID.: Reference
- QTY: Packing Quantity

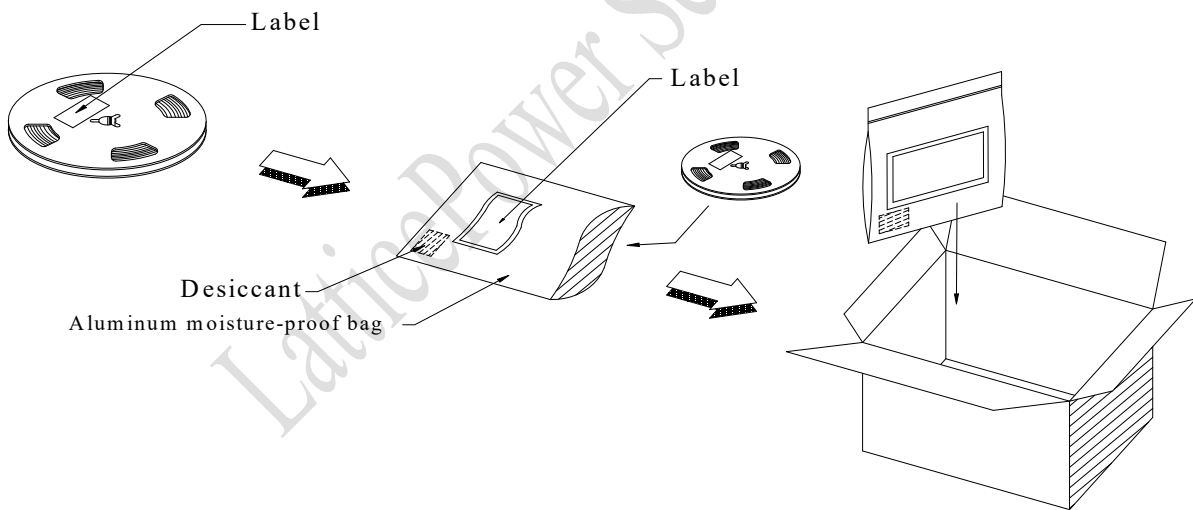
b) 卷轴尺寸 Reel Dimensions



c) 包装数量规格 Packing Quantity Specification



d) 防潮包装工艺 Moisture Resistant Packing Process



备注 Notes:

- ◇ 未标注的公差均为 $\pm 0.1\text{mm}$ ，单位为 mm。 Tolerance unless mentioned is $\pm 0.1\text{mm}$, Unit = mm.
- ◇ 卷轴包装 1500pcs。 Reel: 1500pcs.
- ◇ 当包装与标签有特殊要求时,以客户需求为准。

When there are special requirements for packaging and labeling, customer demand prevails.

- ◇ 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。

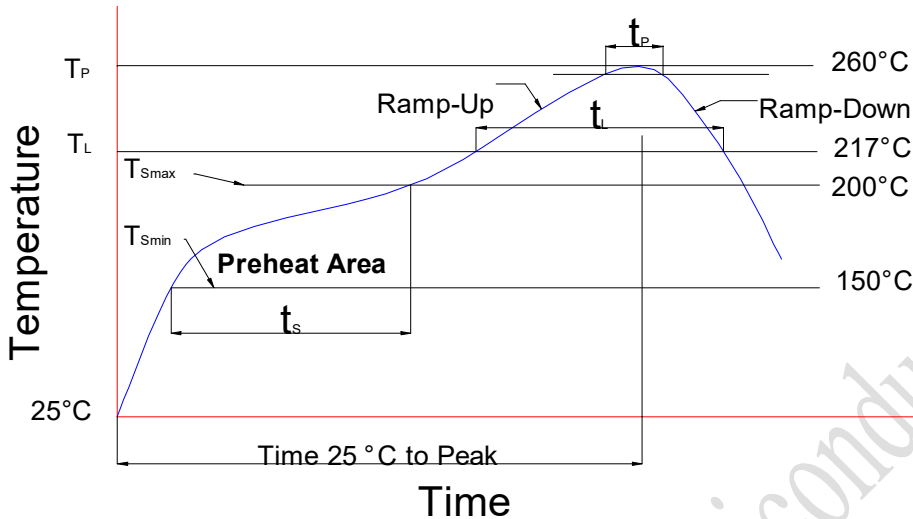
When the tape is rewound due to work interruptions, no more than 10N should be applied to the embossed carrier tape. The LEDs may stick to the cover tape.

8、焊接条件 Soldering Condition

a) 回流焊 Reflow soldering

➤ 无铅回流焊温度曲线。

Pb-free solder temperature profile.



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 _{Smax} 至 T _P) Average Ramp-Up Rate (T _{Smax} to T _P)	3 °C/sec max.
预热: 温度最小值 (T _{Smin}) Preheat: Temperature Min (T _{Smin})	150
预热: 最高温度 (T _{Smax}) Preheat: Temperature Max (T _{Smax})	200
预热: 时间 (t _{Smin} 到 t _{Smax}) Preheat: Time (t _{Smin} to t _{Smax})	60-180 secs
回流温度 (T _L) Time Maintained Above: Temperature (T _L)	217°C
回流时间 (t _L) Time Maintained Above: Time (t _L)	60-150 secs
峰值/分类温度 (T _P) Peak/Classification Temperature (T _P)	255 ± 5°C
实际峰值温度 (t _p) 在 5°C 以内的时间 Time Within 5°C of Actual Peak Temperature (t _p)	30 secs max.
降低速率 Ramp-Down Rate	4°C/sec max.

- 回流焊不应做两次以上。
Reflow soldering should not be done more than two times.
- 在焊接升温过程中,不要挤压光电二极管。
When soldering, do not put stress on the Photodiode during heating.
- 在焊接后,不要使电路板翘曲。
After soldering, do not warp the circuit board.

b) 手工焊接 Hand Soldering

- 推荐使用功率低于 20W 的烙铁,焊接时烙铁的温度必须保持在 350°C 以下,且每个电极只能进行一次焊接,每次焊接的持续时间不得超过 3 秒。
If manual soldering is necessary used, the power of less than 20W is recommended. The temperature of the iron must be kept at below 350° C, with soldering time within 3 seconds and each electrode can be only soldered at one time

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9、可靠性 Reliability

a) 测试和结果 Tests and Results

测试项目 Test Item	标准 Reference Standard	测试条件 Test Conditions	测试周期 Test Duration
回流焊 Solderability(Reflow Soldering)	JEITA ED-4701 300 302	Tsld=255±5°C,5sec,Lead-free Solder	3 times
高低温循环 Temperature Cycle	JEITA ED-4701 100 105	-40°C(30min)~85°C(30min)	300cycles
冷热冲击 Thermal Shock	MIL-STD-202G-107G- A	-40°C(15min)~85°C(15min)/ Transfer time <20sec	300cycles
低温存储 Low Temperature Storage	JEITA ED-4701 100 202	T _A =-40°C	1000H
高温存储 High Temperature Storage	JEITA ED-4701 100 201	T _A =85°C	1000H
高温高湿寿命 Temperature Humidity Operating Life	JEITA ED-4701 100 103 JESD22-A108	T _a =85°C, RH=85%, V _R =5V	1000H
室温寿命 Room Temperature Life	JESD22-A108	T _a =25°C, V _R =5V	1000H
静电放电测试 Electrostatic Discharge Test	JESD22-A114	Human body model : 2000 V	

b) 失效标准 Failure Criteria

Criteria #	Items	Conditions	Failure Criteria
#1	Forward Voltage (V _F)	I _F	> Initial value×1.1 or < Initial value×0.9
	Reverse Light Current (I _L)	V _R	< Initial value×0.8
#2	Solderability	-	Less than 90% solder coverage

10、注意事项 Cautions

a) 存储 Storage

- 开封前，产品需存放在温度不高于 30℃,湿度不高于 60%RH 的环境中,应在一年内用完。
All the products should be stored in the environment of temperature<30℃ and humidity<60% RH before opening the package,should be used within a year.
- 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.
- 如果吸湿剂或包装失效，或者光电二极管已超出存放时间,应使用如下条件进行烘烤。
烘烤处理: 60±5℃,至少 25 小时以上。
If the moisture absorbent material has faded away or the Photodiode have exceeded the storage time, baking treatment should be performed using the following conditions.
Baking treatment : 60±5℃ for Min. 24 hours.
- 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，光电二极管不建议被湿式清洁处理，因为封装不是密封的。
In general, The Photodiode 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，导致光电二极管退化或完全失效。
Due to the open design, all kind of cleaning liquids can infiltrate the package and cause a degradation or a complete failure of the Photodiode.

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），以防止对环氧树脂造成压力，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 epoxy, since this can lead to damage of the component.

11、文件履历表 Document Resume

序号	变更日期	变更人	版本	变更内容
01	2020.12.9	丁焕	Y00	研发新制定初版
02	2021.11.18	丁焕	Y01	微调产品尺寸图面以及增加 1KHZ 条件下电容规格
03	2022.07.04	丁焕	Y02	修改卷轴包装数量