



HLPTSMD021 是一款高灵敏度的光敏传感器，贴片式外型封装，体积小巧，高可靠性，既节能又环保，应用领域广，可取代传统 CDS 使用，也可以用于产品对射及反射使用。

HLPTSMD021-2 infrared LED is a high sensitivity of the photosensitive sensor, SMD package, small size, high reliability, energy saving and environmental protection, wide application field, it can replace the traditional CDS use, can also be used for product use on the radio and reflection.

特性 Features

- 感光峰值波长 850nm Peak wavelength $\lambda_p=850\text{nm}$
- 符合 RoHS RoHS compliant
- 高可靠性 High reliability
- 低功耗 Low Power Consumption

应用 Applications

- 替代传统 CDS 光敏电阻 Instead of conventional CDS photosensitive resistors
- 适用于各类光控照明产品：如小夜灯等 Suitable for all kinds of light products: such as night lamp etc.
- 自动调节背景光：如 LCD、手机、照像机、电脑摄像头等 As LCD, phone, camera, computer camera etc.
- 控制各类光控影控玩具 Control all kinds of light controlled picture control toys
- 各类光控红外检测测试设备等 All kinds of light controlled infrared inspection and testing equipment

量身订制 Tailor made

- 品种齐全,生产周期短,小批量库存备货 Variety complete, production cycle is short, small batch inventory stocking
- 可按要求提供不同外型,角度，方便安装于产品的任何位置 Can be provided in different shapes, angles, easy to install in any position of the product
- 可按需求提供最佳的规格，以便让产品效果更好，更具市场竞争力 The best specifications can be provided in order to make the product better and more Competitive

光学特性 Optical Characteristics (Ta=25°C)

参数 Parameter	符号 Symbol	测试条件 Test Condition	最小 Min	典型 Typ	最大 Max	单位 Unit
感光峰值波长 Photosensitive peak wavelength	λ_p	\	--	850	--	nm
感光波宽范围 Sensitivity wave width	λ	\	400	--	1100	nm
集电极—发射极电压 Collector-emitter Breakdown Voltage	Bvceo	IC=100 μ A Ee=0mW/cm ²	30	--	--	V
发射极—集电极电压 Emitter-Collector Breakdown Voltage	Bveco	IE=10 μ A Ee=0mW/cm ²	5	--	--	V
集电极发射极饱和电压 Collector-Emitter saturation voltage	Vce (sat)	IC=2mA Ee=1mW/cm ²	--	--	0.4	V
光电流 Photo-current	IL(1)	VCE=5V Ev=10Lux	2	4	6	μ A
	IL(2)	VCE=5V Ev=30Lux	6	12	18	μ A
	IL(3)	VCE=5V Ev=100Lux	20	40	60	μ A
暗电流 dark current	Iceo	VCE=5V Ev=0Lux	--	--	0.2	μ A
开启时间 Opening time	tr	VCE=5V IC=1mA	15			us
关闭时间 Closing time	tf	RL=1000 Ω	15			us

极限参数 Absolute Maximum Ratings at (Ta=25°C)

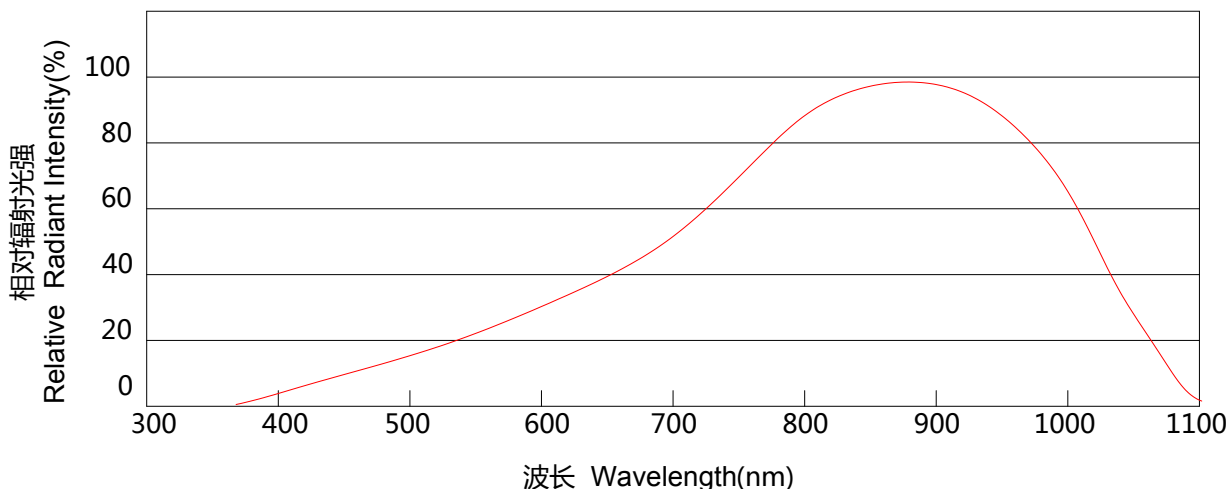
电气特性	Electrical characteristics	符号	Symbol	额定值	Rated Value	单位	Unit
集电极—发射极电压 Collector-emitter Breakdown Voltage		V _{CEO}		30		V	
发射极—集电极电压 Emitter-Collector Breakdown Voltage		V _{ECO}		5		V	
功耗		PC		70		mW	
工作温度		Topr		-30--+85		°C	
储存温度		Tstg		-40--+100		°C	

可靠性试验 Reliability Test

测试项目	Test Parameter	参考标准	Reference Criterion	测试条件	Test Condition	时间	Time	样品数	Quantity	Ac/Re
耐焊接热	Resistance to Soldering Heat	JESD22-B106		260°C±5°C		10 sec		22PCS		0/1
冷热循环	Temperature	JESD22-A104		+100°C(15min) 5min -10°C(15min)		50 cycles		22PCS		0/1
冷热冲击	Thermal Shock	JESD22-A104		+105°C(30min) 5min -45°C(30min)		50 cycles		22PCS		0/1
高温贮存	High Temperature storage	JESD22-A103		+100°C		1000H		22PCS		0/1
低温贮存	Low Temperature storage	JESD22-A119		-40°C		1000H		22PCS		0/1
寿命测试	Temperature Operating Life	JESD22-A108		V _{CE} =5V		1000H		22PCS		0/1
高温高湿 High Temperature High Humidity		JESD22-A101		85°C/85%		1000H		22PCS		0/1

光电特性曲线 Typical electro-optical characteristics Curves

感光特性曲线 Photographic property Curve



相对灵敏度
The relative sensitivity

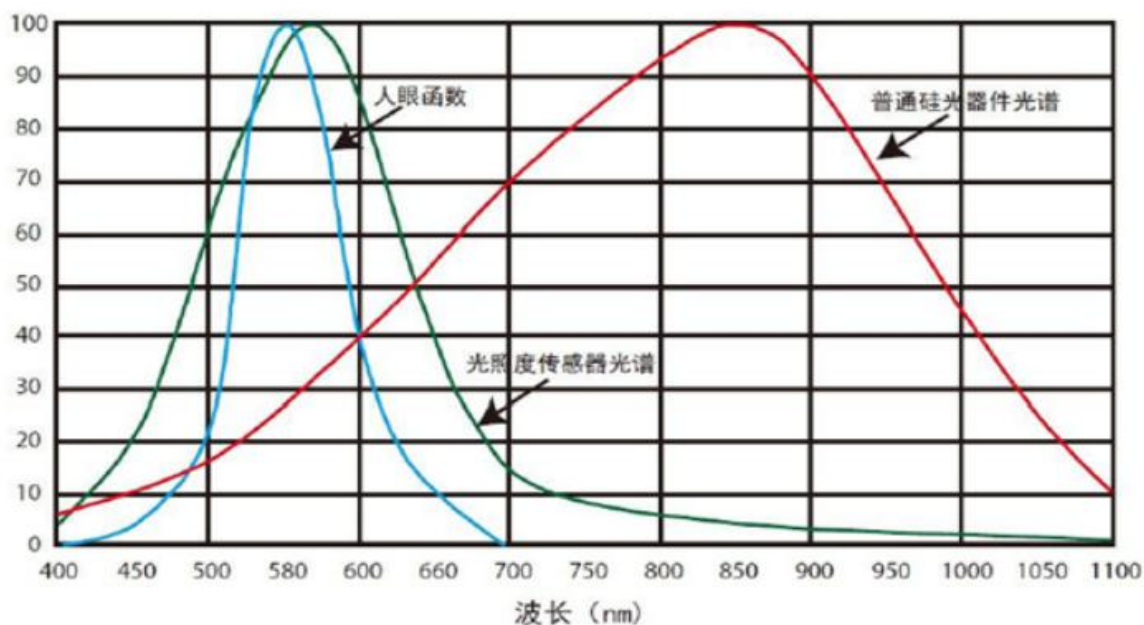


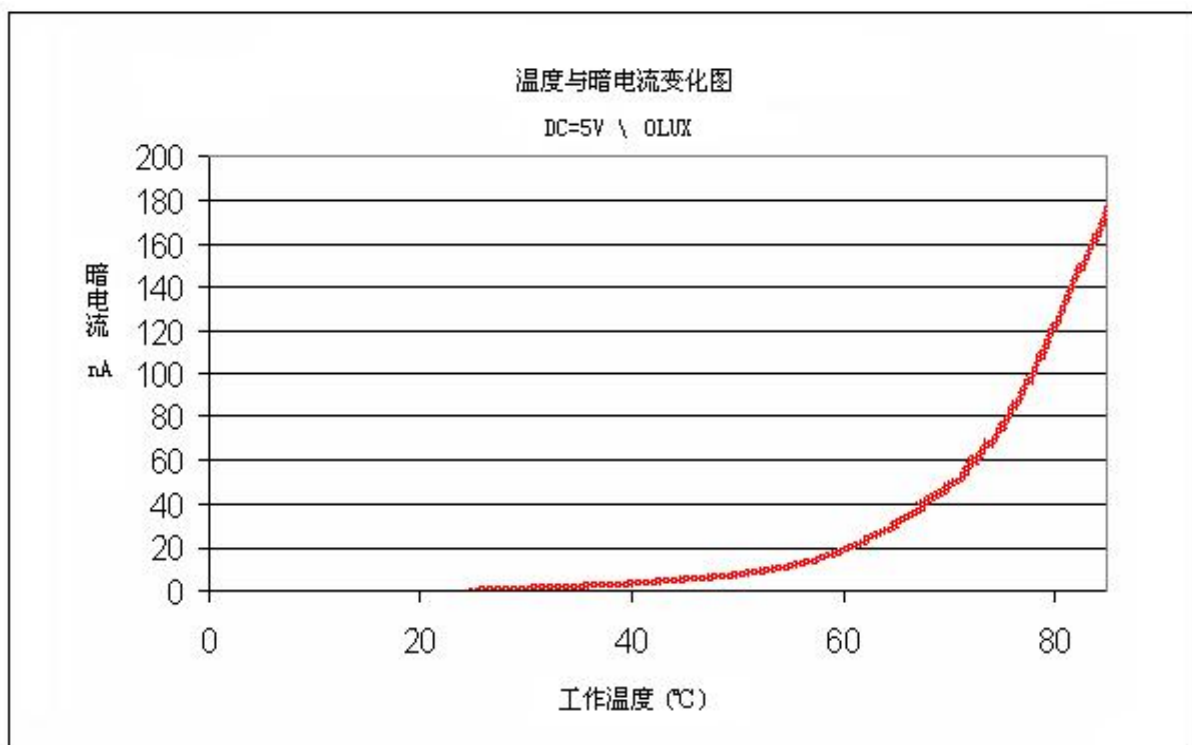
图 1-1

Photoreceptor curve

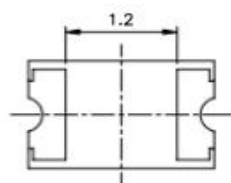
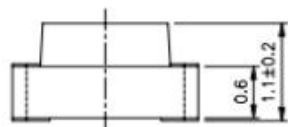
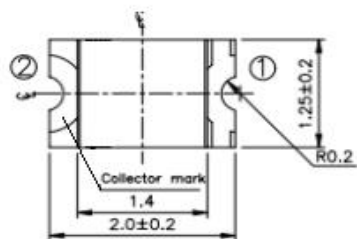
光敏传感器

Visible light sensor curve

Environment temperature VS Dark



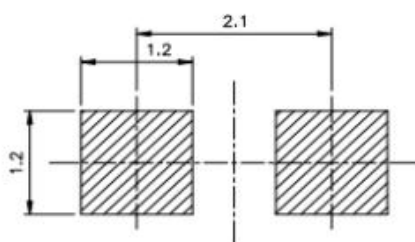
产品外型尺寸 Package outline dimensions



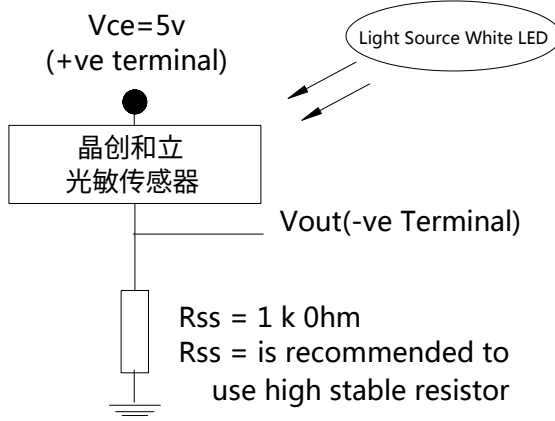
① Emitter
② Collector



For reflow soldering (Propose)



一般应用示意图

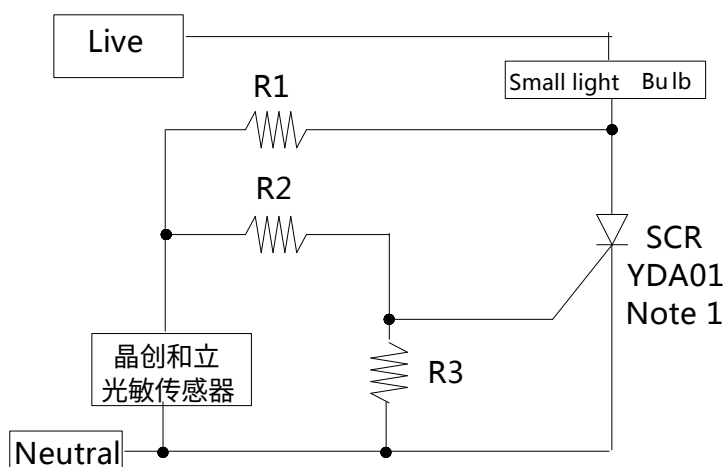


备注：所有尺寸单位均为 mm，如无特殊说明误差范围为±0.15mm

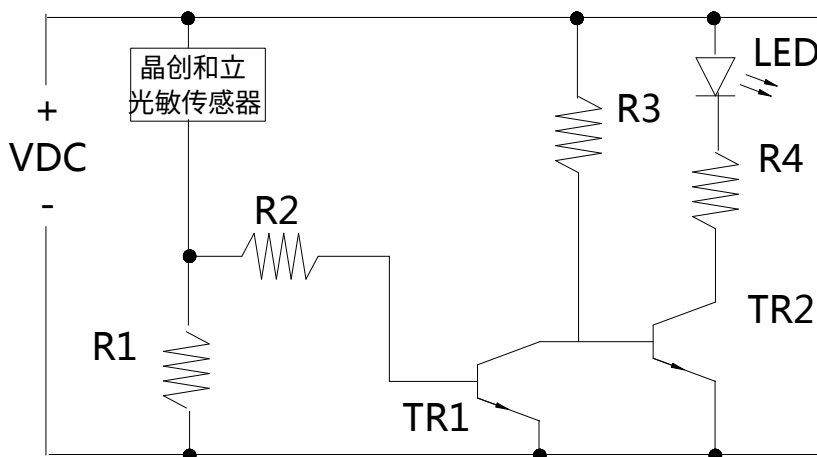
Note: All dimensions in mm, tolerance is ±0.15mm unless otherwise noted

LED通用驱动电路

该电路需要一个敏感的可控硅。灯泡的电流是由敏感的可控硅开关空置。当光量超过阈值时，该VC与VE引脚之间的电流转移了可控硅的栅极电流。光切换阈值可通过选择R2和R3不同的值进行调整。

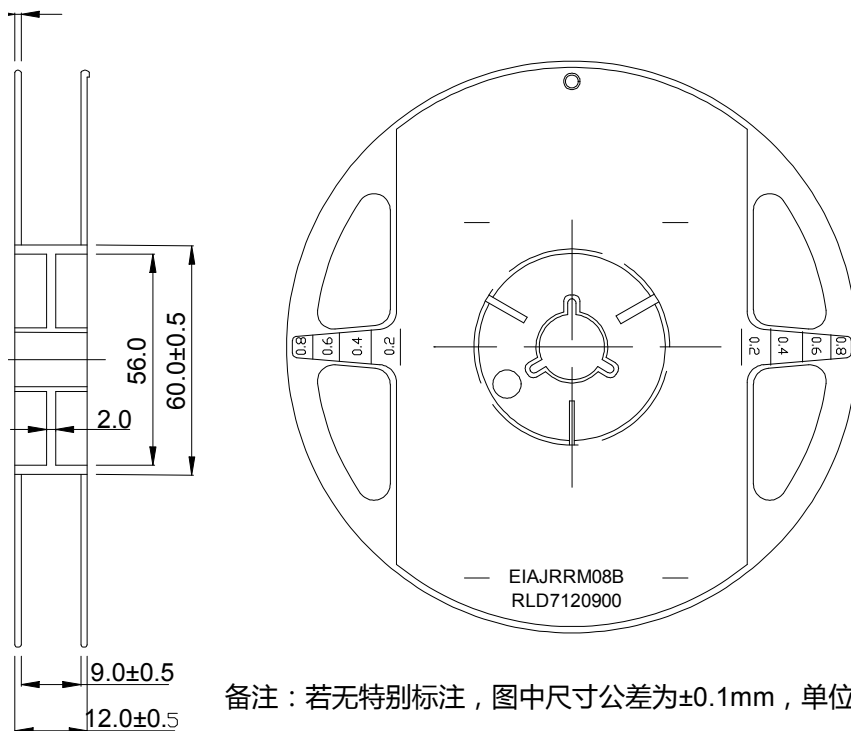


当光照低于光照阈值时，TR1三极管关闭，TR2三极管导通，LED导通。当环境光照大于光照阈值时，TR1降低的电流并使TR2截止，LED不导通。



包装规格 Packing Specification

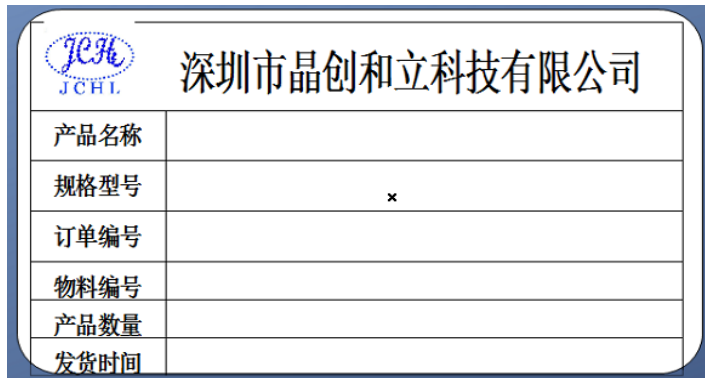
■ 卷轴尺寸 Reel Dimensions



备注：若无特别标注，图中尺寸公差为 $\pm 0.1\text{mm}$ ，单位=mm

Note : Tolerance s unless mentioned $\pm 0.01\text{mm}$. Unit=mm

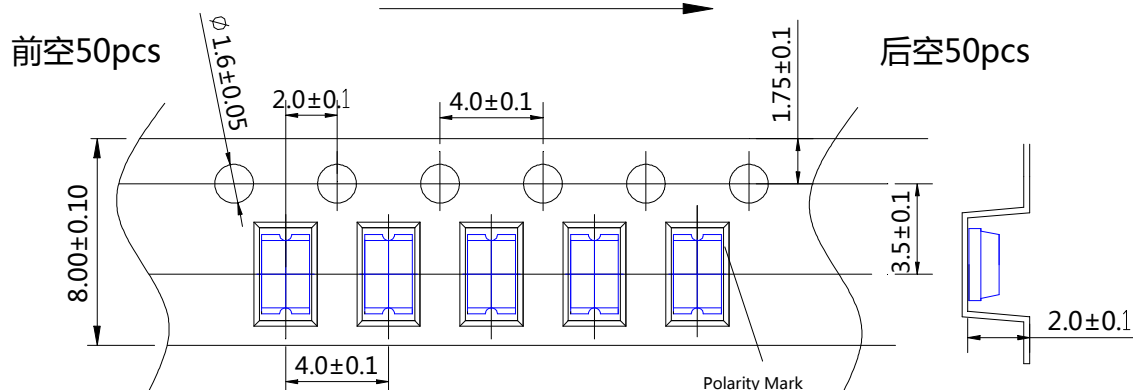
■ 外箱标签



■ 卷盘规格 Carrier Tape

编带 3000pcs/卷 Quantity 3000 pcs Per Reel

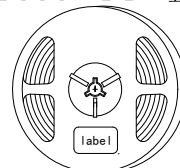
Progressive direction 用 使 方向



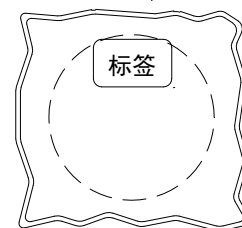
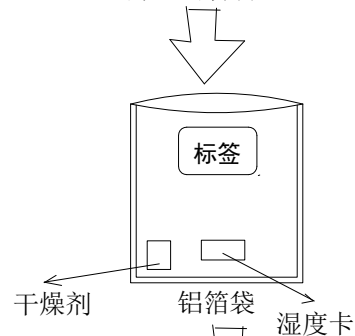
■ 包装步骤

Moisture Resistant Packing Process

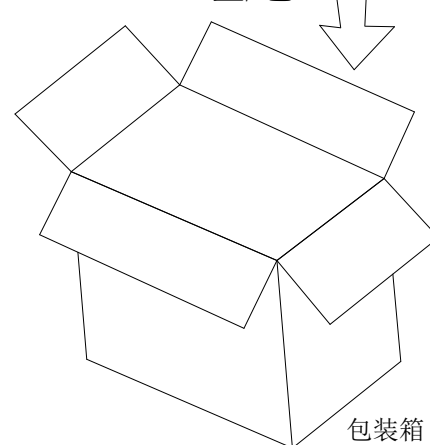
3000PCS/盘



卷好盘的材料



1盘/包



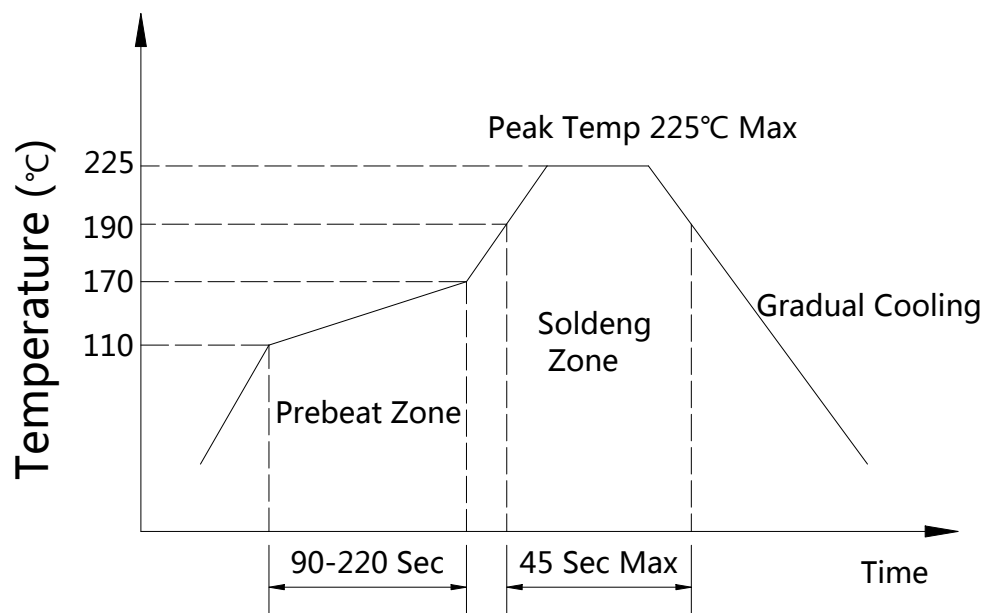
回流焊 Reflow

■ 回流焊接：

推荐使用以下无铅回流焊接温度图进行

Roflow Soldering:

Use the conditions shown in the under Figure of PB-Free Reflow Soldering.



■ 回流焊接 Reflow Soldering

- 回流焊次数不可以超过两次，两次回流焊时间间隔如果超过 24 小时，LED 可能由于吸湿而损坏。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.
- 当焊接时，不要在材料受热时用力压胶体表面。When soldering, do not put stress on the LEDs during heating.

■ 烙铁焊接 Soldering Iron

- 如使用手工焊接，建议使用小于 25 瓦的电烙铁，烙铁温度必须空置在 300°C 以下，焊接时间需控制在 3 秒钟以内，且每个点只能焊接一次。If manual soldering is used, the use of a soldering iron of less than 25W is recommended, and the temperature of the iron must be kept below 300°C, with soldering time within 2 seconds.
- 当焊接时，不要在材料受热时用力压胶体表面。When soldering, do not put stress on the LEDs during heating
- 手工焊接只可焊接一次。The hand solder should be done only one time
- 器件外部温度在 40°C 以下时，才可以对其进行处理。避免高温时操作对 LED 造成损伤。Handling of the SMD LED should be done when the package has been cooled down to below 40°C or less. This is to prevent LED failures due to thermal-mechanical stress during handing.

■ 清洗 Cleaning

- 在焊接后推荐使用酒精进行清洗，在温度不高于 30°C 的条件下持续 3 分钟，不高于 50°C 的条件下持续 30 秒。使用其他类似溶剂清洗前，请先确认使用的溶剂不会对 LED 的封装和环氧树脂部分造成损伤。It is recommended that alcohol be used as a solvent for cleaning after soldering. Cleaning is to go under 30°C for 3 minutes or 50°C for 30 seconds. When using other solvents, it should be confirmed beforehand whether the solvents will dissolve the package and the resin or not.

■ 修补 Repairing

- LED 回流焊后不应该修复，当修复是不可避免时，必须使用双头烙铁，但必须事先确认此种方式会不会损坏 LED 本身的特性。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 the characteristics of LEDs will or will not be damaged by repairing.

注意：此一般指导原则并不适用于所有 PCB 设计和焊接设备的配置。具体工艺收到诸多因素的影响，请根据特定的 PCB 设计和焊接设备来确定焊接方案。Note: This general guideline may not apply to all PCB designs and configurations of all soldering equipment. The technique in practice is influenced by many factors, it should be specialized base on the PCB designs and configurations of the soldering equipment.