



伟鸿泰科技（深圳）有限公司

VIHONTEK TECHNOLOGY (SHENZHEN) CO., LTD

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产品规格书



产品型号: PPA5050RGB-202060-H04J1W-00

产品描述: SMD 5050 RGB

送样日期: 2018-9-1

文件编号: RD-G-201809001

版本号: A/01



客户审核			伟鸿泰		
核准	确认	制作	核准	确认	制作
			胡志强	胡志强	汪娟
接受 <input type="checkbox"/>	不接受 <input type="checkbox"/>		日期: 2018-9-1		



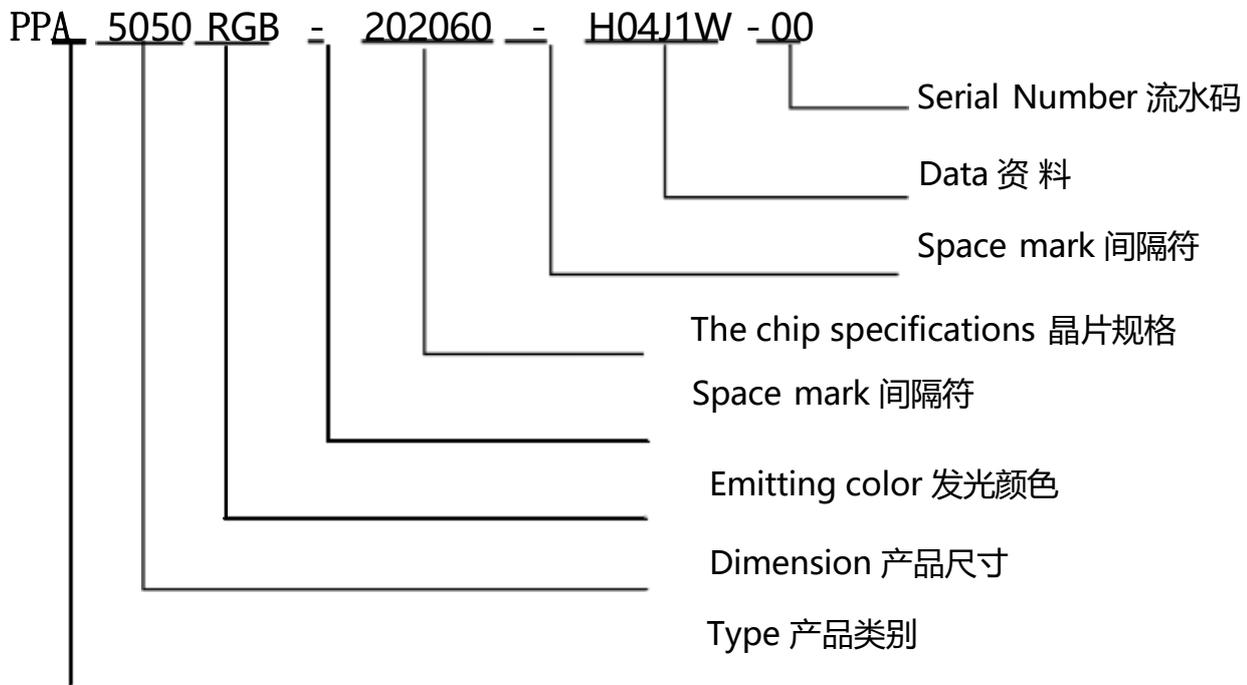
1. 产品特点 Product Features:

- PLCC-2 Package 垂直型表面贴封装
- Extremely wide viewing angle 发光角度广
- Suitable for all SMT assembly and solder process
适用于所有的SMT 组装和焊接工艺
- Available on tape and reel 适用于载带及卷盘
- Package: 1000pcs/reel 包装: 1000 颗/卷
- Positive polarity products , the gap is negative
正极性产品 , 缺口是负极

2. 主要应用领域:

- LED Strip 灯条
- Indoor display 室内显示

3. 产品编码解说:





5. 极限参数 (温度=25℃) Absolute Maximum Ratings (Ta=25℃)

项目 Item	符号 Symbol	极限参数 Absolute Maximum Rating		单位 Unit
正向电流 Forward Current	I _F	20 (单芯)		mA
反向电压 Reverse Voltage	V _R	5		V
功耗 Power Dissipation	P _D	R	46	mW
		G	64	
		B	64	
操作温度 Operating Temperature	T _{opr}	-40~85		℃
储存温度 Storage Temperature	T _{stg}	-40~100		℃
结点温度 Junction Temperature	T _j	110		℃
引脚温度 Pin Temperature	T _p	70		℃
抗静电 Antistatic ability	ESD	HBM(人体模式) 2000V		
过锡温度 Soldering Temperature	T _{sol}	Reflow Soldering: 260℃/10 sec. Hand Soldering: 350℃/3 sec.		

6. RGB 芯片光电特性参数 (温度=25℃) Electro-Optical Characteristics (Ta=25℃)

颜色	正向电压 Forward Voltage	激发波长 (nm)	发光强度 (mcd)	光通量 (LM)
R	1.9-2.3	620-630	480-900	1.5-3.0
G	2.9-3.3	520-530	1000-1500	4.5-6.5
B	2.9-3.3	460-470	100-500	1.0-2.0

参数名称 Parameter	符号 Symbol	数值 Value			单位 Unit	测试条件 Test condition
		Min.	Typ.	Max.		
反向电流 Reverse Current	I _R	---	---	10	uA	V _R =5V
全视角 Viewing angle	2θ1/2	---	120	---	Deg	I _f =20mA

Note: 备注

1. 2θ1/2 is the angle from optical centrline where the luminous intensity is 1/2 the optical Centerline value

2θ1/2 是半值角，指光强是光学中心线光强的 1/2 处到光学中心线的角度

2. The above luminous flux measurement allowance tolerance is ±8% 光通量的测试允许公差为 ±8%

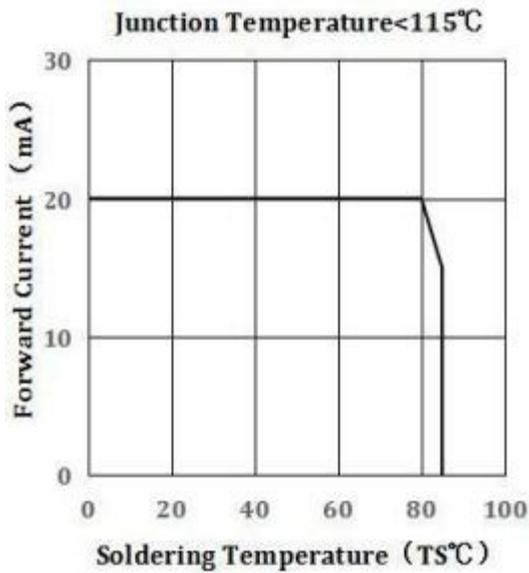
3. The above forward voltage measurement allowance tolerance is ±0.1V 所示电压测量误差 ±0.1V

4. The above dominant wavelength measurement allowance tolerance is ±1 所示波长测量误差 ±1nm

7. Typical optical characteristics curves 典型光学特性曲线

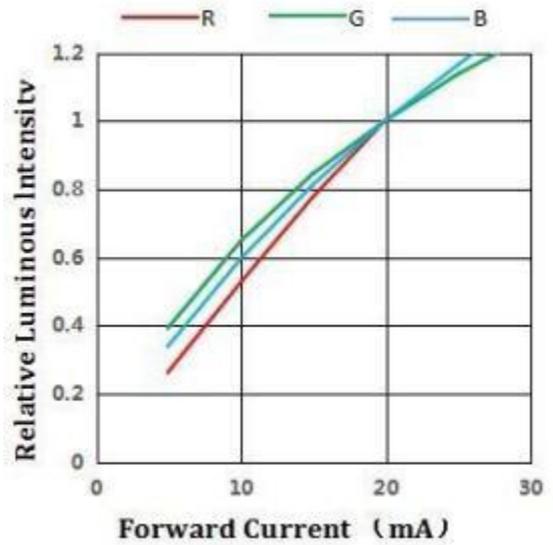
Soldering Temperature VS.Forward Current

焊盘温度与正向电流特性曲线



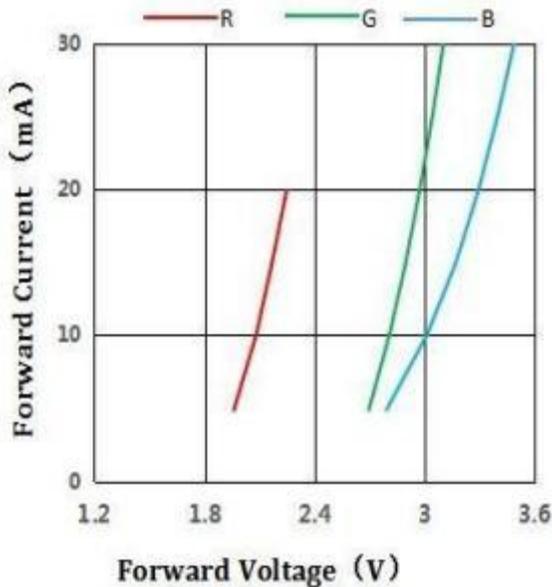
Forward Current VS.Relative Intensity

正向电流与相对光强特性曲线



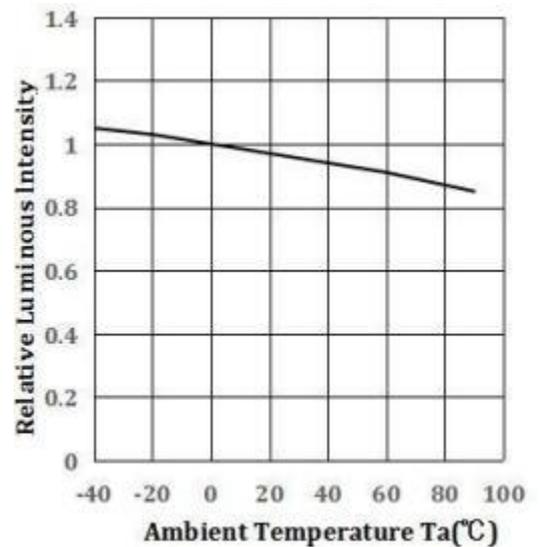
Forward Voltage VS. Forward Current

正向电压与正向电流特性曲线



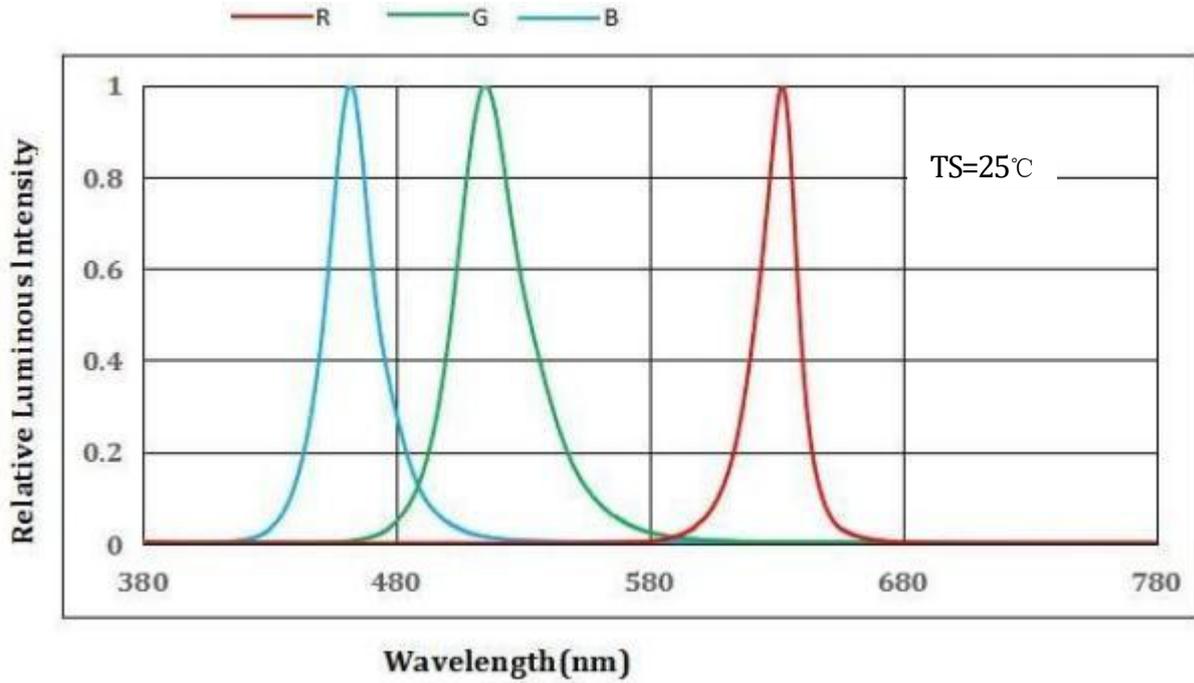
Ambient Temperature VS. Relative Intensity

环境温度与相对光强特性曲线

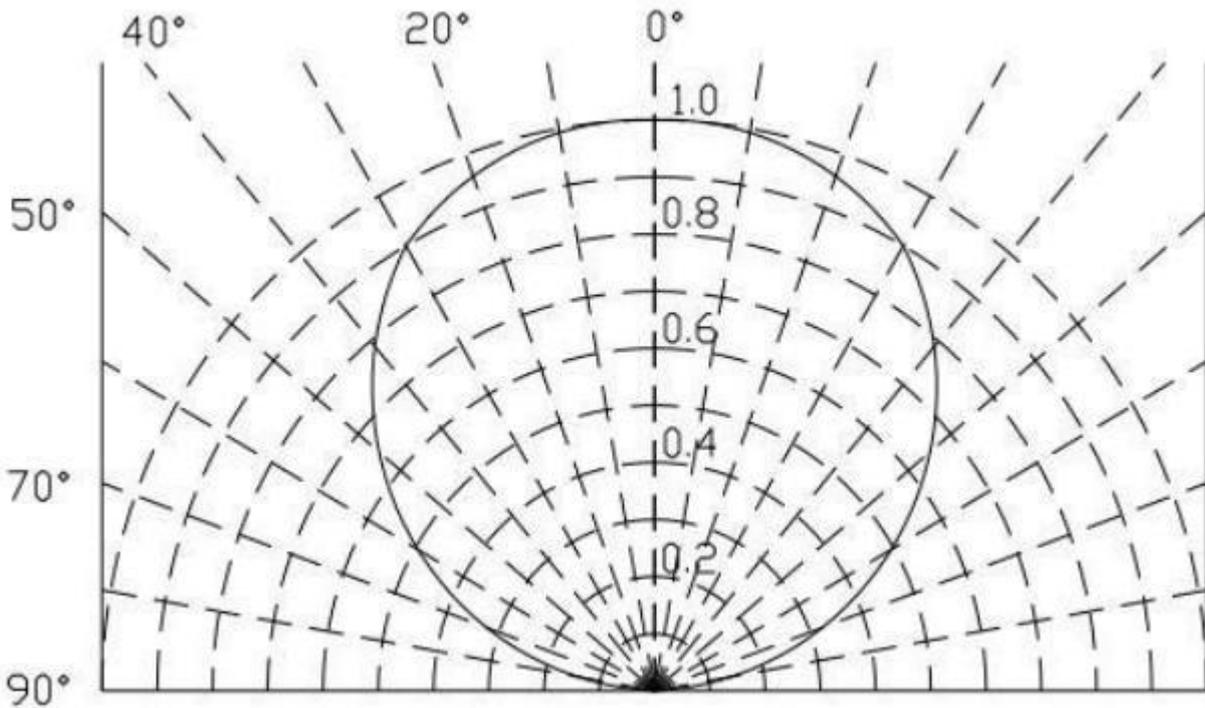


Relative spectral emission

相对光谱分布特性曲线



辐射角度曲线





8. Reliability Test Items and Conditions 信赖性测试项目条件

The reliability of products shall be satisfied with items listed below.

Confidence level: 90%

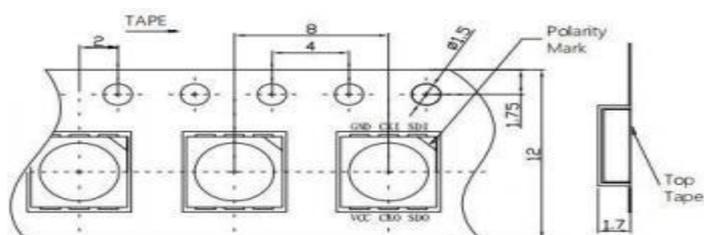
LTPD: 10%

Test Item 测试项目	Test Conditions 测试条件	Duration/Cycle 持续周期	Quantity 数量	Ac/Re 接收/拒收
Thermal Shock 冷热冲击	-40°C 20min ↑↓ 5sec 100°C 20min	300 times 循环 300 次	22PCS	0/1
Low Temperature Storage 低温储存	Ta=-40°C	1000 hours 1000 小时	22PCS	0/1
High Temperature Storage 高温储存	Ta=100°C	1000 hours 1000 小时	22PCS	0/1
Room Temperature Test 常温通电	Ta=25°C IF=20mA	1000 hours 1000 小时	22PCS	0/1
High Temperature Test 高温通电	Ta=85°C IF=20mA	1000 hours 1000 小时	22PCS	0/1
			22PCS	0/1
Humidity Heat Test 高温高湿通电	Ta=85°C RH=85% IF=20mA	500 hours 500 小时	22PCS	0/1

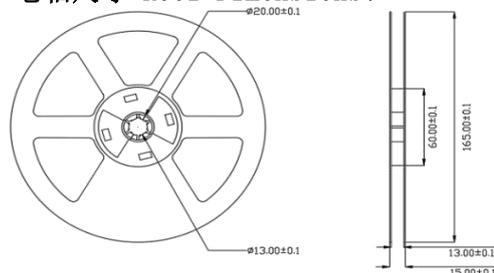
9. 包装规格:

载带规格 Carrier Tape Dimensions:

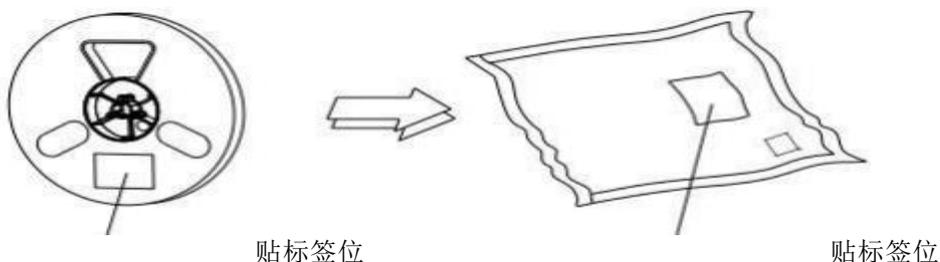
(单位: mm)



卷轴尺寸 Reel Dimensions:



防潮带包装 Moisture Resistant Packing:



注: 标注公差为±0.1mm, 单位: mm

标签模板:

伟鸿泰科技（深圳）有限公司

VIHONTEK TECHNOLOGY (SHENZHEN) CO., LTD

Part NO:				
芯片	λ d/TC(nm/K)	Vf(V)	Iv(mcd/lm)	Date
R				
G				BIN
B				
IF		物料编号		
LOTON		QTY		

注意事项: 使用前将灯珠除湿 24H/70°C, 灯珠支架缺口为 (正极或者负极)。注明: SMD5050 系列包装标准 1000PCS/包, 特别要求除外。

Dehumidify LED chips for 24 hours at 70°C before use. The notch on the LED chip bracket indicates the polarity (positive or negative). Note: SMD5050 series packaging standard is 1000PCS/pack, unless otherwise specified.



SMD 型LEDs使用注意事项 Precautions for Using SMD-Type LEDs

感谢您使用伟鸿泰科技（深圳）有限公司的一系列LEDs产品，为增进您对我司产品特性的了解，也为方便您快速掌握产品的基本操作，为尽量减少或避免因人为等因素造成不必要的产品损坏，使其能够更好的为您的生产服务，特针对使用过程中的一些规范使用作相应说明，同时即使是同一规格LEDs，在实际应用领域其可靠性与设计水平，作业方式，使用条件均相关，本使用说明不能涵盖客户使用过程中可能碰到的所有问题，由此带来的不便，敬请谅解！

Thank you for using the LEDs product series from Vihontek Technology (Shenzhen) Co., Ltd. To enhance your understanding of our product features and facilitate quick mastery of basic operations, we provide the following guidelines for proper usage to minimize or prevent unnecessary damage caused by human factors, ensuring optimal performance for your production needs. Please note that even for LEDs of the same specification, reliability, design quality, operating methods, and usage conditions all influence performance in actual applications. This manual cannot cover every possible scenario encountered during customer use. We appreciate your understanding for any inconvenience this may cause.

1. 通常LEDs也象其它的电子元件一样有着相同的使用方法，为一让客户更好地使用伟鸿泰科技的LEDs产品，请参看下面的LEDs保护预防措施。Generally, LEDs are used in the same manner as other electronic components. To help customers better utilize Vihontek Technology's LEDs products, please refer to the following LEDs protection precautions.

2. 运输及储存 Transportation and Storage

SMD LEDs 采用防潮防静电铝箔袋包装，运输过程中避免挤压或刺穿包装袋，并做好必要的防静电防护措施，产品生产前，发现漏气及破损，请停止直接使用，并做必要的低温除湿后使用，产品在换料，贴装，成品出货，安装过程中，应注意防止外力碰撞挤压 LEDs，造成外力损伤 LEDs 灯珠失效。

SMD LEDs are packaged in moisture-proof and anti-static aluminum foil bags. During transportation, avoid crushing or puncturing the packaging bags and implement necessary anti-static protection measures. If leakage or damage is detected prior to production, discontinue direct use and perform necessary low-temperature dehumidification before use. During material handling, placement, finished product shipment, and installation, take care to prevent external impacts or compression of the LEDs, which may cause physical damage and LEDs chip failure.

如生产前，已发现铝箔袋，拆封，破损，漏气请及时退回原厂重新除湿检测，绝不能上线使用。

If aluminum foil bags are found to be opened, damaged, or leaking air prior to production, promptly return them to the original manufacturer for re-dehumidification and testing. Under no circumstances should they be used on the production line.

3. 包装储存 Packaging and Storage:

SMD LEDs属于湿敏元件，将LEDs包装在铝箔袋中是为了避免LEDs在运输和储存时吸收湿气，在包装袋中放有干燥剂，以吸收湿气，如果LEDs吸收了湿气，在LEDs过回流焊时，湿气就会膨胀，使胶体与支架脱离，或损害键合金丝，造成产品失效，由于这个原因，真空防湿包装是为了使包装袋内避免有湿气，此款产品防潮等级为 LEVEL5a。

表一：IPC/JEDEC J-STD-020 规定的材料防潮等级（MSL）定义。

SMD LEDs are moisture-sensitive components. Packaging LEDs in aluminum foil bags prevents them from absorbing moisture during transportation and storage. Desiccants are included in the packaging to absorb any moisture present. If LEDs absorb moisture, moisture expands during reflow soldering, causing the die to separate from the substrate or damaging the bonding wires, resulting in product failure. For this reason, vacuum moisture-proof packaging is used to prevent moisture ingress into the pouch. This product has a moisture sensitivity level of LEVEL 5a. Table 1: Material Sensitivity Level (MSL) Definitions per IPC/JEDEC J-STD-020.

防潮等级	包装拆封后车间寿命	
	时间	条件
LEVEL1	无限制	≦30°C/85 % RH
LEVEL2	1 年	≦30°C/60 % RH
LEVEL2a	4 周	≦30°C/60 % RH
LEVEL3	168 小时	≦30°C/60 % RH
LEVEL4	72 小时	≦30°C/60 % RH
LEVEL5	48 小时	≦30°C/60 % RH
LEVEL5a	24 小时	≦30°C/60 % RH
LEVEL6	取出即用	≦30°C/60 % RH

3.1 真空包装的储存：建议 SMD 系列 LED 存放在内置干燥剂的干燥柜中，储存环境为温度 20°C–30°C，湿度为：60% 以下，储存时间不超过三个月。Vacuum-Packed Storage: It is recommended that SMD series LEDs be stored in a desiccant cabinet with built-in desiccant. Storage conditions should be maintained at a temperature of 20° C to 30° C and humidity below 60%. Storage duration should not exceed three months.

3.2 拆开包装后的储存和使用 Storage and Use After Unpacking:

a. 拆包装前应检查包装有效期和确保无漏气。Before opening the packaging, check the expiration date and ensure there are no leaks.

b. 真空铝袋拆包后暴露的环境车间寿命：在≦30°C/60%RH 条件内，在线使用时间不超过 48 小时 (Level 5)，5050 和色光系列建议不超过 12 小时。如不符合上述环境要求，建议拆包作业时间不超过 2 小时。Environmental shelf life after opening vacuum aluminum bags: Under conditions ≦30° C/60% RH, the online usage time should not exceed 48 hours (Level 5). For the 5050 series, usage is recommended not to exceed 12 hours. If the above environmental requirements are not met, the recommended time for opening the package should not exceed 2 hours.

c. 开包后的余料在≦30°C/60%RH 车间环境内，应在 12H 内完成密封，并按照 3.1 条件储存。After opening the package, any remaining material must be resealed within 12 hours under workshop conditions of ≦30° C/60% RH and stored according to the conditions specified in Section 3.1.

3.3 LED 器件暴露在空气中 24 小时内，且环境符合 3.1、3.2 要求，则 LED 器件可以在进行低温烘烤除湿再使用。LED devices exposed to air for 24 hours in an environment meeting the requirements of 3.1 and 3.2 may undergo low-temperature baking to remove moisture before reuse.

3.4 LED 器件暴露在空气中 大于 24 小时（或环境不符合 3.1、3.2 要求），则 LED 器件需进行高温烘烤除湿再使用。If LED devices are exposed to air for more than 24 hours (or if the environment does not meet the requirements of sections 3.1 and 3.2), the LED devices must undergo high-temperature baking to remove moisture before use.

3.5 未拆开真空包装内的 LED 器件，且包装完好（未进行二次封口），90 天以内的可以直接使用，但在 90 –180 天的 LED 器件需进行低温除湿再使用。LED devices that remain unopened in their vacuum packaging and are in undamaged condition (without secondary sealing) can be used directly within 90 days. However, LED devices stored between 90 and 180 days must undergo low-temperature dehumidification before use.

3.6 未拆开真空包装内的 LED 器件，且包装完好（未进行二次封口），但已超过180天LED器件需进行高温除湿再使用。LED devices that remain unopened in their vacuum packaging and are in intact condition (without secondary sealing) but have exceeded 180 days must undergo high-temperature dehumidification before use.

3.7 LED 是表面贴装件，如 LED 受潮后，在回流焊高温条件下，可能会发生 LED 支架和封装胶剥离，其发光效率受到影响而导致亮度下降或发光颜色变异。LEDs are surface-mount components. If an LED becomes damp, exposure to the high temperatures of reflow soldering may cause the LED base and encapsulation resin to separate. This can impair luminous efficiency, resulting in reduced brightness or color variation.

3.8 LED电极和支架是由镀银的铜合金组成，外表银层易受到腐蚀性气体影响，请避免接触腐蚀的环境造成LED变色、以免产生 LED 的焊接性变差或者影响光电性能。请避免环境湿度的骤变，尤其是高湿环境下易产生水汽凝结。



The LED electrodes and mounts are composed of silver-plated copper alloy. The silver coating on the surface is susceptible to corrosive gases. Avoid exposure to corrosive environments to prevent LED discoloration, which may impair solderability or affect photovoltaic performance. Avoid sudden changes in ambient temperature and humidity, particularly in high-humidity conditions where moisture condensation is likely to occur.

4. 产品除湿 Product Dehumidification:

4.1 低温除湿办法 Low-Temperature Dehumidification Methods:

4.1.1 拆开真空包装，从真空包装中取出整盘LED器件。Open the vacuum packaging and remove the entire tray of LEDs components from the vacuum packaging.

4.1.2 在原始卷盘上，进行烘烤，平铺方式避免卷盘变形。Bake on the original baking sheet, arranging items flat to prevent warping.

4.1.3 将整盘 LED器件放置在 70°C烤箱中，烘烤 24 小时(注意：不能在高于 70°C温度下烘烤整盘 LED 器件，LED 卷盘 70°C以上容易造成变形)。Place the entire LED reel in a 70° C oven and bake for 24 hours. (Note: Do not bake the entire LED reel at temperatures exceeding 70° C, as temperatures above 70° C may cause deformation of the LED reel.)

4.1.4 烘烤完成后，才能使用 LED 器件进行正常作业。After baking is complete, the LED device can be used for normal operation.

4.1.5 建议彩色光产品全部低温除湿在使用效果更好。It is recommended that all colored light products undergo low-temperature dehumidification for optimal performance.

4.2 高温除湿办法：（建议把货物返回我公司进行高温除湿）High-Temperature Dehumidification Method: (We recommend returning the goods to our company for high-temperature dehumidification.)

4.2.1 按 BIN 等级区分后拆开卷带，将LEDs器件至于不锈钢盘内平铺，平铺厚度不得大于 2CM。After sorting by BIN grade, unroll the tape and place the LEDs components flat on the stainless steel tray. The layered thickness must not exceed 2 cm.

4.2.2 高温烘烤温度 80°C/2H, 120°C/2H, 150°C/6H, 然后在烤箱内自然降温半小时开始编带，4H内必须编带完成（等待期间LEDs器件应置于干燥柜内，建议干燥柜湿度控制在 30%RH 以内）。High-temperature baking temperatures: 80° C/2 hours, 120° C/2 hours, 150° C/6 hours. Allow the oven to cool naturally for 30 minutes before beginning tape winding. Tape winding must be completed within 4 hours (during the waiting period, LEDs should be stored in a drying cabinet; recommended humidity control within 30% RH).

4.2.3 编带完成后需要 70°C/6H 除湿，再进行真空包装。After tape assembly, dehumidify at 70° C for 6 hours before vacuum packaging.

4.3 已完成装配的LED元件进行防潮管控。Moisture control measures are implemented for assembled LED components.

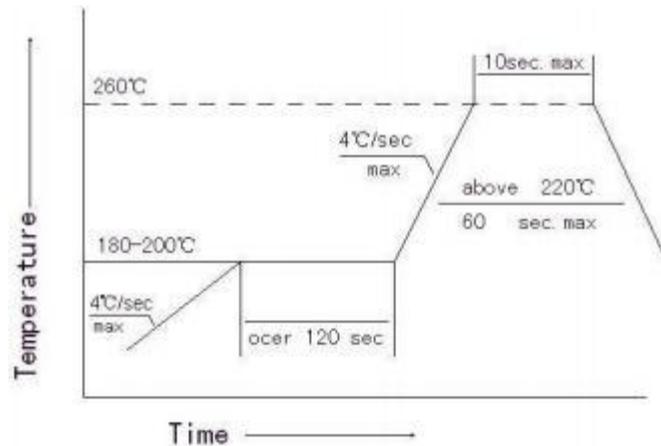
4.3.1对需要进行二次 SMT 工艺或高温的产品，在完成一次焊接后将会进行二次焊接前，亦应做好必要的防潮处理，暴露在（ $\leq 30^{\circ}\text{C}/60\%RH$ ）条件下，最长不能超过 2H,若二次高温生产相隔时间较长，则一次焊接后的材料必需进行必要的除湿工作（在 $70^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 的烤箱中烘烤不少于 12 小时），然后抽真空密封保存，或者先将产品储存在干燥箱恒温恒湿箱内，二次高温生产前，再做进行除湿工作（在 $70^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 的烤箱中烘烤不少于 12 小时），以确保产品在过高温工艺前不受潮，低湿烘烤条件： $70^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 烘烤不小于 12 小时 高温烘烤条件： $130^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 烘烤5 小时，回流焊正常作业累计不超过 3 次。For products requiring secondary SMT processes or high-temperature operations, necessary moisture protection measures must be implemented after initial soldering and before secondary soldering. Exposure to conditions $\leq 30^{\circ}\text{C}/60\%RH$ must not exceed 2 hours. If the interval between primary and secondary high-temperature production is prolonged, materials after primary soldering must undergo mandatory dehumidification (baked in an oven at $70^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for no less than 12 hours), followed by vacuum sealing for storage. Alternatively, products may be stored in a constant temperature and humidity chamber. Prior to secondary high-temperature processing, dehumidification must be performed again (baking in an oven at $70^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for no less than 12 hours) to ensure products remain moisture-free before high-temperature processing. Low-humidity baking conditions: Bake at $70^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for no less than 12 hours High-temperature baking conditions: Bake at $130^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 5 hours; cumulative reflow soldering operations shall not exceed 3 times.

4.3.2对挤出工艺或者高温防护处理的产品，建议产品做防护工艺前，做好必要的除湿工作，在 $130^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 的烤箱中烘烤 5 小时，以剔除产品在检测，老化，运输过程中暴露在空气中吸收的湿气，以避免产品在做防护处理后，包在材料表面的湿气会慢慢侵入材料，造成产品失效. For products undergoing extrusion processes or high-temperature protective treatments, it is recommended to perform necessary dehumidification prior to protective processing. Bake the product in an oven at $130^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 5 hours to remove moisture absorbed during testing, aging, or transportation. This prevents moisture trapped on the material surface after protective treatment from gradually penetrating the material, which could cause product failure.

5. 焊接 Welding:

5.1 回流焊：经伟鸿泰科技采用下面所列参数检测证明，表面贴装型 LED 符合 JEDEC J-STD-020C 标准。作为一般指导原则，伟鸿泰科技建议客户遵循所用焊锡膏制造商推荐使用的焊接温度曲线。Reflow Soldering: Vihontek Technology has verified through testing with the parameters listed below that surface-mount LEDs comply with the JEDEC J-STD-020C standard. As a general guideline, Vihontek Technology recommends that customers follow the soldering temperature profile recommended by the manufacturer of the solder paste used.

请注意此一般指导原则可能并不适用于所有 PCB 设计和回流焊设备的配置. Please note that this general guideline may not apply to all PCB designs and reflow soldering equipment configurations.

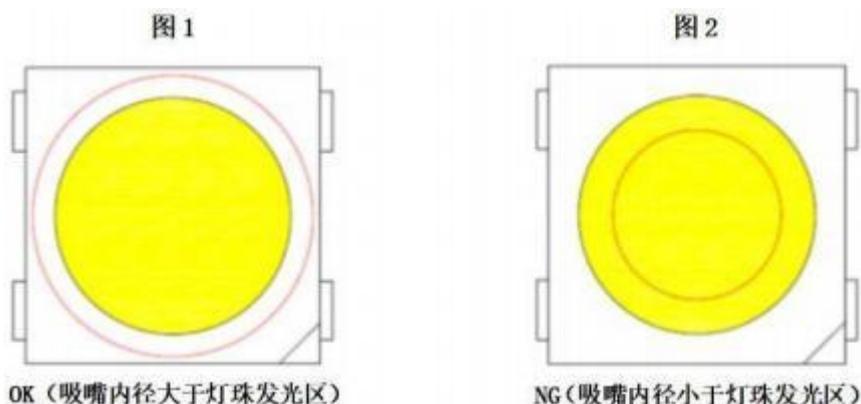


温度曲线特点	含铅焊料	无铅焊料
平均升温速度 (Ts max 至 Tp)	最高 3°C/秒	最高 3°C/秒
预热: 最低温度 (Ts min)	100°C	150°C
预热: 最高温度 (Ts max)	150°C	200°C
预热: 时间 (ts min 至 ts max)	60-120 秒	60-180 秒
维持高温温度的时间: 温度 (TL)	183 °C	217 °C
维持高温温度的时间: 时间 (t L)	60-150 秒	60-150 秒
峰值/分类温度 (T P)	215 °C	240 °C
在实际峰值温度 (tp)5°C 内的时间	<10 秒	<10 秒
降温速度	最高 6°C/秒	最高 6°C/秒
25 °C 升至峰值温度所需时间	最多 6 分钟	最多 6 分

5.2 手工焊接: 建议使用功率不超过 60W 的电烙铁, 控制电烙铁温度不超过 350°C, 每次焊接时电烙铁在支架引脚上停留不超过 3 秒, 如需要反复焊接时, 间隔停留时间不少于 3 秒, 避免长时间高温对 LED 造成损伤, 焊接过程中, 请勿触摸或挤压 LED 灯珠的表面, 避免对 LED 内部造成损伤, 同时请注意避免电烙铁对 LED 表面胶体及 PPA 的烫伤及其它损伤。Manual Soldering: Use a soldering iron with a power rating not exceeding 60W. Maintain the soldering iron temperature below 350° C. Limit each soldering contact to no more than 3 seconds on the bracket pins. If repeated soldering is necessary, allow at least 3 seconds between each soldering point to prevent prolonged high-temperature damage to the LED. During soldering, avoid touching or squeezing the surface of the LED chip to prevent internal damage. Additionally, take care to prevent the soldering iron from scorching or otherwise damaging the surface adhesive or PPA coating on the LED.

注: 所有温度是指在封装本体上表面测得的温度, 当焊接时, 不要在材料受热时用力压胶体表面. All temperatures refer to those measured on the upper surface of the package body. When soldering, do not apply force to the surface of the gel while the material is heated.

6. SMT 吸嘴要求: (红色圆圈指吸嘴内径如图 1、图 2) SMT Nozzle Requirements: (Red circles indicate nozzle inner diameter as shown in Figures 1 and 2)



为防止气压泄露，SMD 吸咀外径不可以超过 LED 尺寸，吸咀内径尺寸应尽可能大，吸咀顶端材质建议采用柔软材料以防在吸取期间刮伤或损毁 LED 胶体表面，元件的尺寸必须在取放机里准确。

To prevent air pressure leakage, the outer diameter of the SMD pick-up nozzle must not exceed the LED dimensions. The inner diameter of the nozzle should be as large as possible. The nozzle tip material should be made of soft material to prevent scratching or damaging the LED encapsulation surface during pick-up. Component dimensions must be accurately maintained within the pick-and-place machine.

7. 材料取拿方式：用镊子夹取材料，不可按压胶体或尖锐物体碰刺胶体，材料不可堆叠放置。Material handling procedure: Use tweezers to pick up materials. Do not press on the gel or allow sharp objects to puncture it. Materials must not be stacked.



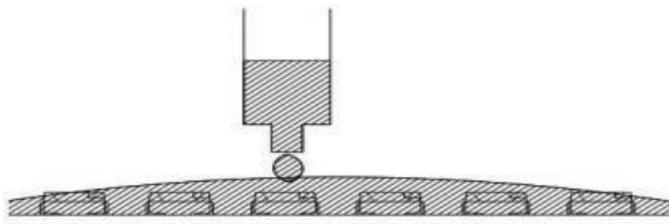
不可将产品堆积在一起，它可能会损坏内部电路，



不可用在PH<7 的酸性场所



8. 当我们需要使用外封胶涂抹 LED 产品时，应确保外封胶与 LED 封装胶水相匹配，因为大多数 LED 的封装胶水为硅胶及环氧胶，它有较强的氧化性和较强的吸湿性，必须防止外封材质进入 LED 内部以造成 LED 的损伤，单一的溴元素含量要求小于 900PPM，单氯元素含量要求小于 900PPM，在涂抹 LED 产品时要求外封胶溴元素与氯元素总含量必须小于 1500PPM。When applying encapsulation material to LED products, ensure compatibility with the LED encapsulation adhesive. Since most LED encapsulation adhesives are silicone or epoxy-based, exhibiting strong oxidizing properties and high hygroscopicity, prevent encapsulation material from entering the LED interior to avoid damage. The bromine content must be less than 900 ppm, and the monochlorine element content must be less than 900 ppm. When applying to LED products, the total bromine and chlorine content in the encapsulation compound must be less than 1500 ppm.





9. 热量设计要求 Thermal Design Requirements:

对于 LED 产品，散热方面的设计是很重要的，在设计产品时请考虑 LED 所产生的热量，PCB 板的热阻，LED 排布的密度，以及输入的电功率都会使温度增加。For LEDs products, thermal management design is critical. When designing products, consider the heat generated by LEDs, the thermal resistance of the PCB board, the density of LED placement, and the input electrical power—all of which contribute to increased temperatures.

为避免出现过多热量的产生，须保证 LED 运行时要在产品规格书中所要求的最大规格范围之内，在设定 LED 的驱动功率时，应考虑到最高的环境温度。产品最高工作温度不易超过 50°C （即 $\leq 50^{\circ}\text{C}$ ，指灯珠脚位 GND 处的工作温度）。To prevent excessive heat generation, ensure the LED operates within the maximum specifications outlined in the product datasheet. When setting the LED drive power, account for the highest ambient temperature. The maximum operating temperature should not exceed 50°C (i. e., $\leq 50^{\circ}\text{C}$, referring to the operating temperature at the GND pin of the LED package).

10. 防静电及电涌防护 Anti-static and Surge Protection:

静电和电涌会伤害到 LED 产品，因此，必须做好相应的防护措施，为保护好 LED 产品，无论什么时间与场合，只要接触到 LED 时，需要穿带防静电手环，及防静电手套，所有的设备和仪器设备均须接地，建议每一种产品在出货前检验时，都应有相关电性测试，以挑选出因静电而产生的不良品，在电路设计时，应考虑消除电涌对 LED 危害的可能性。

Static electricity and electrical surges can damage LED products. Therefore, appropriate protective measures must be implemented. To safeguard LED products, whenever handling them—regardless of time or location—wear an anti-static wrist strap and anti-static gloves. All equipment and instruments must be grounded. It is recommended that each product undergo relevant electrical testing during pre-shipment inspection to identify defects caused by static electricity. Circuit design should incorporate measures to eliminate the potential harm of electrical surges to LEDs.

11. 特别申明 Special Notice:

1. 如果超出规格书以外而进行使用时，出任何问题我司将不承担责任。Our company shall not be held liable for any issues arising from use beyond the specifications outlined in the technical documentation.
2. LED 可以发出很强的足以伤害到眼睛的光，要注意预防，不可过长时间用肉眼直视 LED 的灯光。LED lights can emit intense light that may cause eye damage. Take precautions and avoid staring directly at the light for extended periods.
3. 在大量使用之前，应与我司相关人员交流，了解更详细的规格要求。Before large-scale use, please consult with our relevant personnel to understand more detailed specification requirements.