深圳雷曼光电科技股份有限公司
Ledman Optoelectronic Co., Ltd.

SPECIFICATION

R G B series

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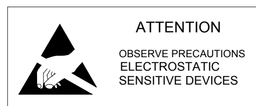

Custom Approved Signatures 客户确认签章	Approved 确认	Checked 审核	Prepared 制定

As we are making continuous efforts to improve the performance of LED, Specifications are subject to change without notice.
我们一直致力于 LED 产品性能的提升，因此造成的规格变更，将不做说明.

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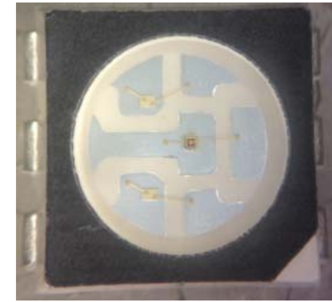
Ledman RGB SERIES



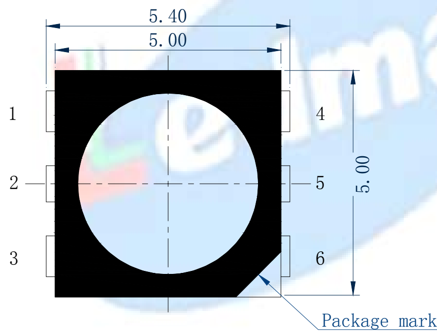
1. Features & Description 特性说明

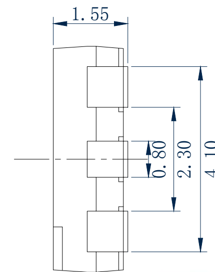
- ✧ 5.0×5.0×1.5mm Top SMD
- ✧ Colloid Color ：Water Transparent 胶体颜色：透明
- ✧ Emission Color：Full Color 发光颜色:全彩
- ✧ Viewing Angle：120° 视角度: 120°
- ✧ Surface Color：Black Coated Surface 表面色：表面刷墨
- ✧ RoHS Compliant 符合 RoHS 指令要求

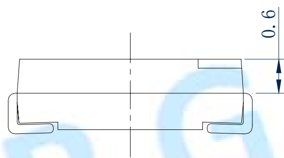
2. Application 应用领域

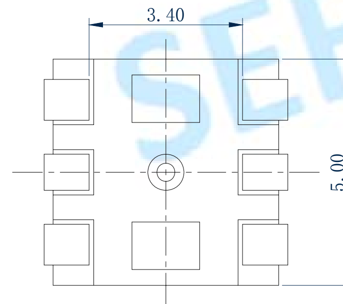
- ✧ Indoor displays 室内显示屏
- ✧ Backlights 背光
- ✧ Coupling into light guides 接合器指示灯
- ✧ R G B full color displays 红绿蓝全彩屏

3. Outline Drawing 外观尺寸

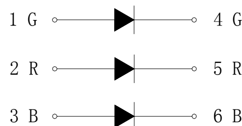


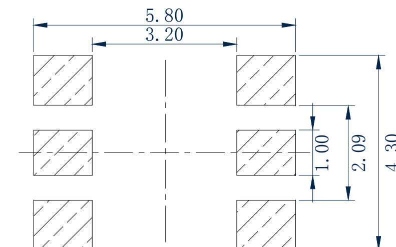






Recommended solder pad
推荐焊盘尺寸





Note:
All dimensions for reference only, dimensions are in mm tolerance is ±0.1mm unless otherwise noted.
所有的标示尺寸仅供参考，除了有特别标注外，尺寸公差为±0.1 毫米.

4. Absolute Maximum Ratings 极限规格 (Ta = 25°C)

Items 项目	Symbol 符号	Absolute Maximum Rating 极限规格			Unit 单位
		R	G	B	
DC Forward Current 正向电流	I_F	30	30	30	mA
Peak Forward Current * 正向峰值电流	I_{FP}	200	100	100	mA
Reverse Voltage 反向电压	V_R	5	5	5	V
Power Dissipation 消耗功率	P_D	120	110	110	mW
Operation Temperature 工作温度	T_{op}	-20 ~ + 75			°C
Storage Temperature 储存温度	T_{sgt}	-30 ~ + 80			°C
ESD 抗静电能力	---	1.5 KV			HBM

* Pulse width≤0.1msec, duty≤1/10.
脉冲宽度 ≤0.1msec, 占空比 ≤1/10

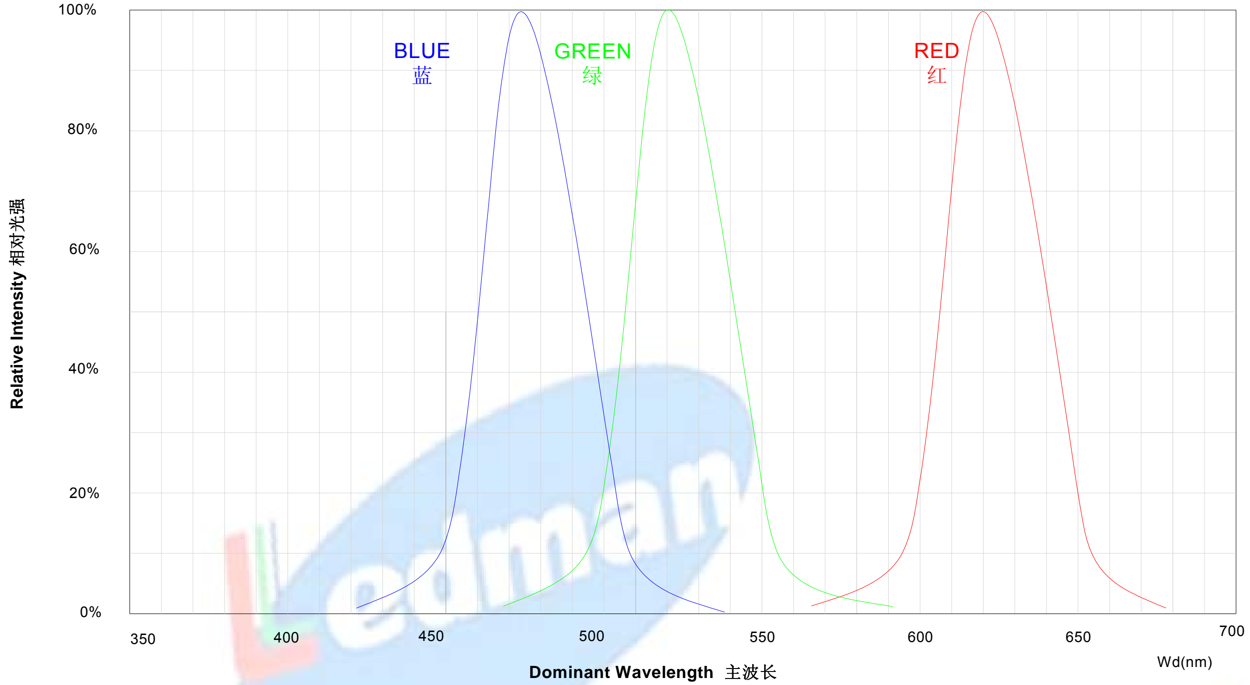
5. Characteristics 主要光电参数

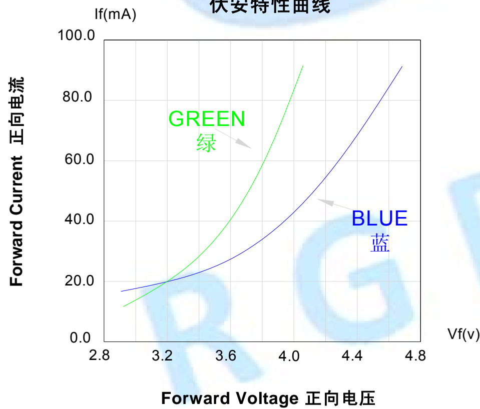
Items 项目	Symbol 符号	Condition 条件	Values 数值			Unit 单位
			R	G	B	
Wavelength at peak emission 峰值波长	λ_{peak}	I_F = 20mA	625	525	470	nm
Dominant wavelength 主波长	λ_{dom}	I_F = 20mA	620～630	520～530	465～475	nm
Forward voltage 正向电压	V_F（Typ）	I_F = 20mA	2.0	3.2	3.2	V
	V_F（Max）		2.4	3.6	3.6	
Luminous Intensity 发光强度	I_V（Typ）	I_F = 20mA	680	1500	340	mcd
		I_F = 15mA	---	---	---	
Reverse current (Max) 反向电流	I_R	V_R = 5V	10	10	10	μA
50% Power Angle 视角度	2θ½	I_F = 20mA	120	120	120	Deg.

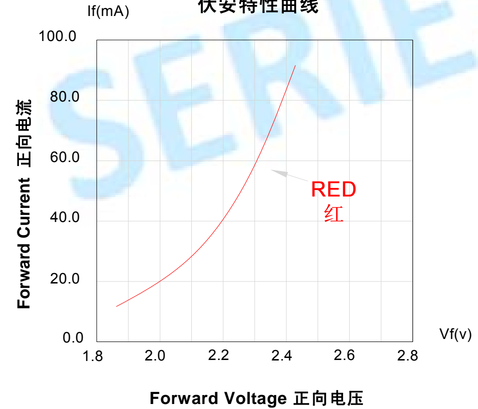
Note 注:

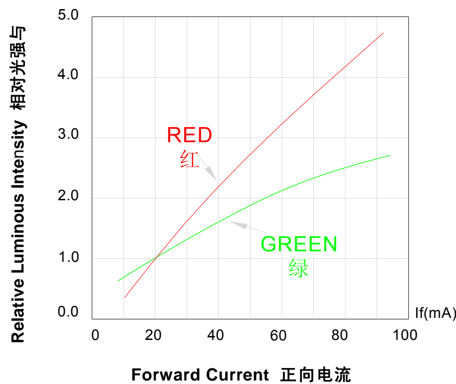
Tolerance 公差 ：V_F±0.05V, Φ_V±10%,λ_{dom}±1nm.

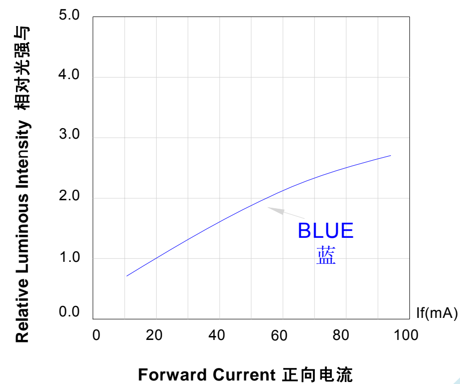
6. Typical Optical-Electronic Characteristic Curves 典型光电特征曲线图



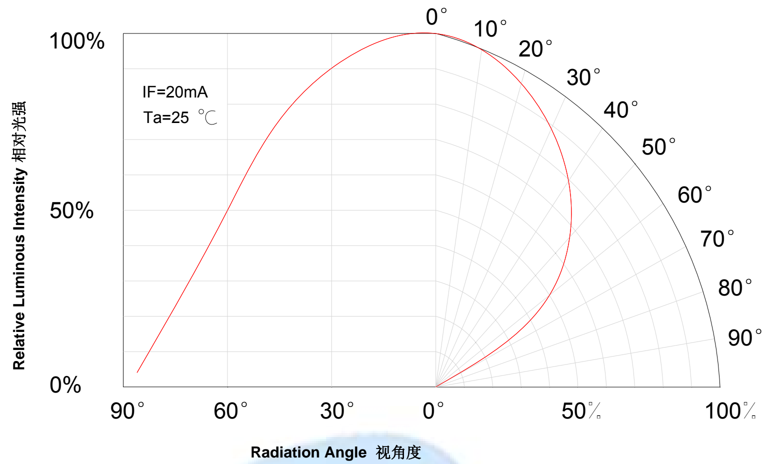




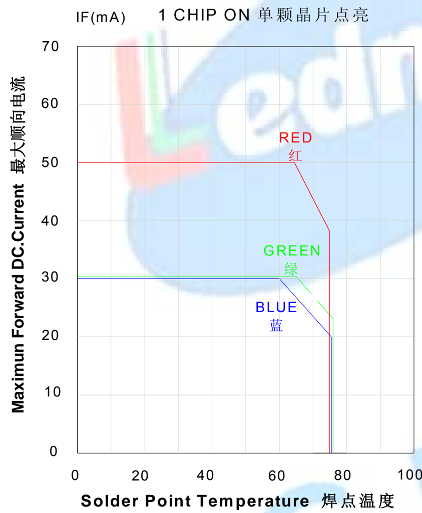


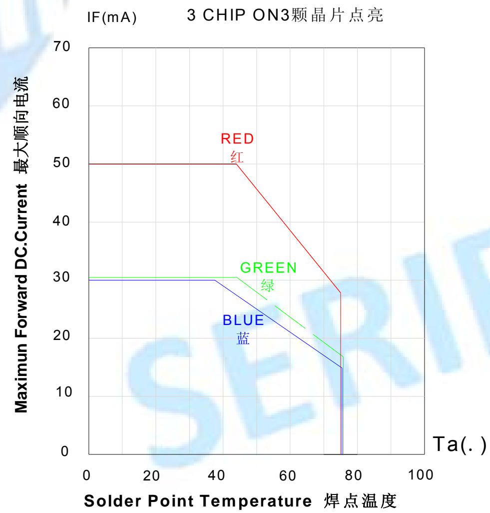


Relative Luminous Intensity vs.Radiation Angle
光强分布与角度

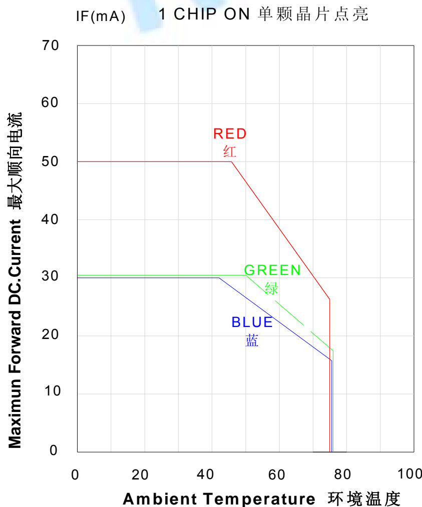


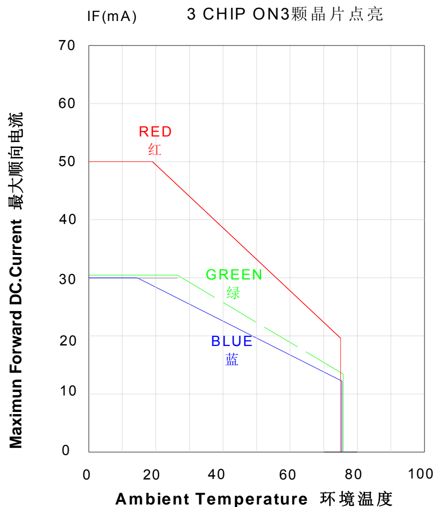
Maximun Forward DC.Currentvs.Solder Point Temperature
最大顺向电流与焊点温度关系曲线





Maximun Forward DC.Currentvs.Ambient Temperature
最大顺向电流与环境温度关系曲线





CIE1931 GRAPH

Note„注:

The color coordinates of the mixed light can be expected within the area of the color triangle marked a).The achromatic point (x=0.3300, y=0.3300) is marked“+”.

在三角区域 a 内可进行混光，标示 “+” 处为标准白光（X 0. 3300, Y 0. 3300）.

7. Application Notes 应用注意事项

✧ The purpose of this document is to provide a clear understanding to the customers and users, on the ways how to use our SMD lamps appropriately.
本文件主要向顾客及用户介绍怎样更好的使用我司的 SMD LED 产品.

✧ Generally, SMD can be used the same way as other general purpose semiconductors. When using Ledman's SMD LED, the following precautions must be taken to protect the SMD.
一般来说, SMD LED 跟一般的半导体元件用法相同，当使用雷曼光电的 SMD LED 产品，请遵从以下的使用方法，从而保护 SMD LED 产品.

7.1 Cleaning 清洁

✧ Don't use unspecified chemical liquids to clean the SMD LED; the chemical could harm the SMD LED.
严禁用任何方式清洗 SMD LED, 清洗可能会损坏 SMD LED. .

✧ This device should not be used in any type of fluid such as water, oil, organic solvent, etc.
严禁与任何形式的液体接触或清洗, 如油、水、有机物等, 使用过程中尽量避免沾污.

7.2 Moisture Proof Packing 防潮包装

✧ In order to prevent moisture absorption into the SMD LED during the transportation and storage, SMD LED is packed in a moisture barrier bag. Desiccants and a humidity indicator are packed together with SMD LED as the secondary protection. The indication of humidity indicator card provides the information of humidity within SMD packing.
为避免 SMD LED 产品在运输及储存中吸湿， 已使用防潮的铝包装袋包装 SMD LED 产品，并在包装袋内放置干燥剂及湿度指示卡. 干燥剂主要控制包装袋内的湿度，湿度指示卡主要监控包装袋内湿度.

7.3 Storage 储存条件

✧ Shelf life in original sealed bag at storage condition of <40ºC and <70%RH is 6 months. Baking is required whenever shelf life is expired.
包装袋密封后在温度 <40℃, 湿度 <70%的环境下可储存 6 个月. 当超过保质期时, 需要重新烘烤.

7.4 Precaution for Use 使用注意事项

✧ Before opening the packaging, Please check whether bag leak air or not. If there is leakage, please return to factory baking before using.
在开包装前, 请先检查包装袋是否有漏气现象, 如有漏气, 请返回厂家重新烘烤后再使用.

✧ If humidity card reading is＞30%, please return to factory baking before using.
若发现湿度指示卡读值超过 30%, 请返回厂家重新烘烤后再使用.

✧ After bag opening, the SMD LED must be stored under the condition < 30ºC and < 60%RH. Under this condition, SMD LED must be used (subject to reflow) within 12 hours after bag opening, and re-baking is required when exceeding 12 hours.
开封后请在以下条件使用：温度 ＜ 30℃ 湿度 ＜ 60%, 不得超过 12 小时. 若超出 12 小时, 必须重新烘烤后才能使用.

✧ All the remained LED must be dehumidified and vacuum-packed, and put the desiccant and humidity card inside the package again.
未使用完的 LED，应除湿后真空包装，并重新放入干燥剂及湿度指示卡.

✧ LED can´t be used under the high temperature,high humidity,containing sulfurand corrosive environments.
LED 禁止于高温、高湿、含硫或带腐蚀性等恶劣环境下使用.

✧ To protect your eyes, please don't watch the product directly when the LEDs lighten.
请不要直视点亮的 LED，以免伤害眼睛.

7.5 Baking 烘烤条件

✧ For baking, place the SMD LED in oven at temperature 70ºC±5ºC and relative humidity ≤10%RH, for 24 hours.
产品在烤箱内温度为 70℃±5℃ ，湿度≤10%， 烘烤时间为：24 小时

✧ Take out the material from packaging bag for re-bake. Do not open the door of oven frequently during the baking process.
烘烤时去除铝包装袋，烘烤过程中不能打开烤箱.

7.6 How to choose the pickup nozzle 如何选择吸嘴

✧ During SMT, please choose the pickup nozzle that has larger outer diameter than the lighting area of lens, in case that improper position of pickup nozzle will damage the gold wire inside the LED. Different collets fit for different products
在贴片过程，请选用直径大于 LED 发光区域的吸嘴，防止不合适的吸嘴损坏 LED 内部的金线；不同的 LED 选用不同吸嘴.

7.7 Soldering 焊接

Manual soldering by soldering iron 手工焊接作业

✧ The use of a constant-temperature soldering iron is recommended and the temperature of the iron must be kept at below 315ºC, with soldering time within 3 seconds.
使用恒温烙铁焊接,烙铁温度必须保持低于 315℃，焊接时间不能超过 3 秒.

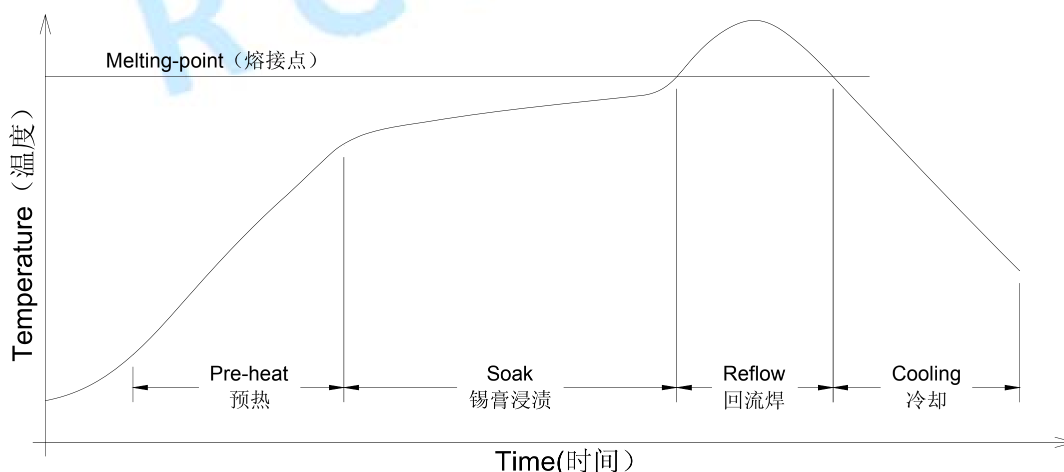
✧ The epoxy resin and PPA should not be in contact with tip of soldering iron.
烙铁不能接触到胶体和 PPA 等塑胶材料.

✧ No mechanical stress should be exerted on the resin portion of SMD LED during soldering.
在焊接过程中不要用硬物按压产品的胶体部分.

✧ Handling of the SMD LED should be done when the package has been cooled down to below 40ºC or less. This is to prevent the SMD LED failures due to thermal-mechanical stress during handling.
焊接完成后，必须让产品温度低于 40℃才可进行下一工序作业，严禁强制降温，以防产品损伤.

Reflow Soldering 回流焊接

✧ The temperature (Top surface of SMD LED) profile is as below:
过回流焊的温度曲线



Solder = Sn63-Pb37 焊接剂 = 有铅锡	Solder = Lead-free 焊接剂= 无铅锡
Average ramp-up rate = 4ºC/s max. 升温速率 = 4ºC/秒 最大	Average ramp-up rate = 4ºC/s max 升温速率= 4ºC/秒 最大
Preheat temperature = 100ºC ~150ºC 预热温度 = 100ºC ~150ºC	Preheat temperature = 150ºC ~200ºC 预热温度= 150ºC ~200ºC
Preheat time = 100s max. 预热时间 = 100s 最大	Preheat time = 100s max. 预热时间 = 100s 最大
Ramp-down rate = 3ºC/s max. 降温速率 = 3ºC/s 最大	Ramp-down rate = 3ºC/s max. 降温速率= 3ºC/s 最大
Peak temperature = 230ºC max. 峰值温度 = 230ºC 最大	Peak temperature = 250ºC max. 峰值温度= 250ºC 最大
Time within 5ºC of actual Peak Temperature = 10s max. 在峰值温度±5ºC 时间不能超过 10 秒	Time within 5ºC of actual Peak Temperature = 10s max. 在峰值温度±5ºC 时间不能超过 10 秒
Duration above 183ºC is 80s max. 温度高于 183ºC 的持续时间不可超过 80 秒	Duration above 217ºC is 80s max. 温度高于 217ºC 的持续时间不可超过 80 秒

7.8 Soldering Note 焊接注意事项

✧ Modification is not recommended on the SMD LED after soldering. If modification cannot be avoided, the modifications must be pre-qualified to avoid damaging the SMD LED.
一般回流焊后无需返修，如果必须返修，必须保证在不伤害 SMD LED 的前提下进行.

✧ Reflow soldering should not be done more than one time.
LED 只能过一次回流焊，不可分多次进行.

✧ No stress should be exerted on the package during soldering.
在焊接过程中不可对产品施加外力.

✧ Handling of the SMD LED should be done when the package has been cooled down to below 40ºC or less. This is to prevent the SMD LED failures due to thermal-mechanical stress during handling.
焊接完成后，必须让产品温度低于 40℃才可进行下一工序作业，严禁强制降温，以防产品损伤.

✧ After soldering, PCBs stacked is prohibited. To prevent the SMD LED from being damaged, it should be placed in a special material cassette fixture, and no touching between the PCBs.
焊接完成后，PCB 禁止堆放，应使用专用料盒式夹具，PCB 之间无接触，防止产品受损坏

7.9 Electrostatic Discharge 静电放电

✧ Electrostatic discharge (ESD) may damage the SMD LED.
静电放电(ESD)会损害 SMD LED.

✧ Precautions such as ESD wrist strap, ESD shoe strap or antistatic gloves must be worn whenever handling of the SMD LED.
在使用 SMD LED 时，必须佩戴防静电环、穿防静电鞋及佩戴防静电手套.

✧ All devices, equipment and machinery must be properly grounded.
所有的设备必须接地.

7.10 Overcurrent 过流保护

✧ Heat management of the SMD LED must be taken into consideration during the design stage of SMD LED application. The current should be de-rated appropriately by referring to the de-rating curve attached on each

product specification.
在电路设计时应慎重考虑 SMD 产品的散热处理，电流应该适当的降低，具体请参照每款产品的规格书电流-温度对应曲线图.

✧ During the process of using the LED, customers should input current limiting resistor in the circuit by using a cross-flow drive to prevent the damage of the LED due to dramatic increase in current caused by fluctuations in voltage.
使用过程中，应使用恒流驱动或在电路中加入限流电阻，防止因电压的波动造成电流剧增损坏 LED.

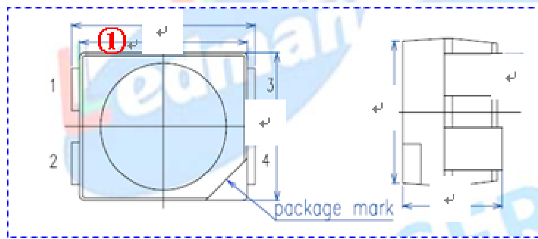
✧ Make sure the drive current and reverse voltage is not over absolute maximum current, or it will damage the LED.
必须确保 LED 的驱动电流及反向电压不超出规格值，以免损坏 LED.

✧ It is important to eliminate the possibility of surge current during circuitry design.
设计驱动电路时，必须避免浪涌电流的产生.

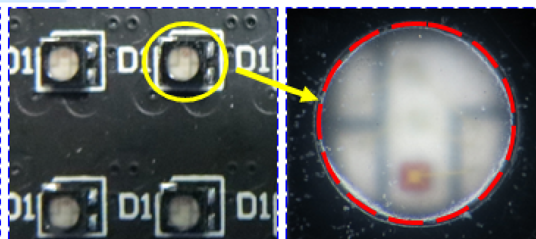
✧ The power output end of AC voltage should not exceed 5.5V.
电源输出端对地交流电压不应超出 5.5V.

7.11 The silicone series packaging glue application notes 硅胶系外封胶应用注意事项

✧ Silicone series SMD LED product using silica gel encapsulation, compared with the traditional Epoxy Encapsulating Compounds withexcellentreliability. But the silicone is a soft colloid, and reflector cavity cup depth of SMD is shallow.In the application process is easy to crush the colloid, damage internal state line.
SMD LED 硅胶系列产品其外封胶采用硅胶封装，相对于传统的环氧外封胶，具有更优良的可靠性. 但硅胶是软性胶体，并且 SMD 的反射腔杯较浅，在应用过程中易压伤胶体，损伤内部邦线.



例：硅胶系 SMD 产品外形尺寸结构图（规格书）



例：硅胶系 SMD 产品外形，软性胶面。（实物图）

Silicone series SMD product size structure diagram (specification)Silicone series SMD product shape, soft rubber surface (the physical map)

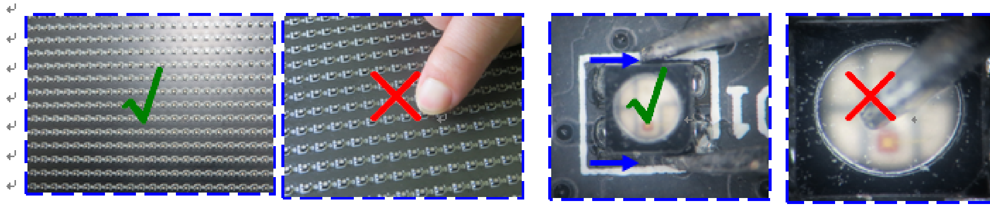
✧ Selection of SMT machinesuction nozzle diameter size, please according to the reflection cavity diameter size product structure graph search on the product model specification (tagging①).Selection of the suction nozzle is slightly larger size, avoid suction nozzle is too small to silica gel pressure injury.
SMT 贴片机吸嘴尺寸直径的选用，请根据产品型号查找规格书上产品结构图的反射腔直径尺寸（标注①处），选用稍大尺寸的吸嘴，避免吸嘴过小对硅胶压伤.

✧ Parameter adjustment of SMT paste belt machine suction nozzle height, try to avoid direct pressure vacuum adsorption to silica surface.
SMT 贴带机吸嘴高度的参数调试，尽量避免真空吸附时直接压到硅胶面.

✧ After reflow, PCB plate semi-finished storage requires the use of fixation, whole journey to avoid hitting plate, stacked, crushed silica gel.
回流焊后，PCB 板半成品的存放需使用固定架放置，全程避免撞板、堆叠，压伤硅胶.

✧ In the process of the operation of attention for the operator to the propaganda is prohibited to use tweezers or other sharp objects touch the lamp bead silica gel surface, both sides take manual soldering lamp use tweezers clamping SMD pin free inspection and operation, prevent human crushed silica gel.
作业过程中注意对操作员进行宣导严禁使用镊子或其它尖锐物品碰触灯珠硅胶面，手工焊锡取灯时用镊子夹住 SMD 无引脚的两侧，防止检验和作业时人为压伤硅胶.

✧ Correct: the prohibition of extrusion beads surface. Error: extrusion surface with finger.
Correct:Tweezers side clamping SMD. Error:The forceps tip touches the silica gel surface



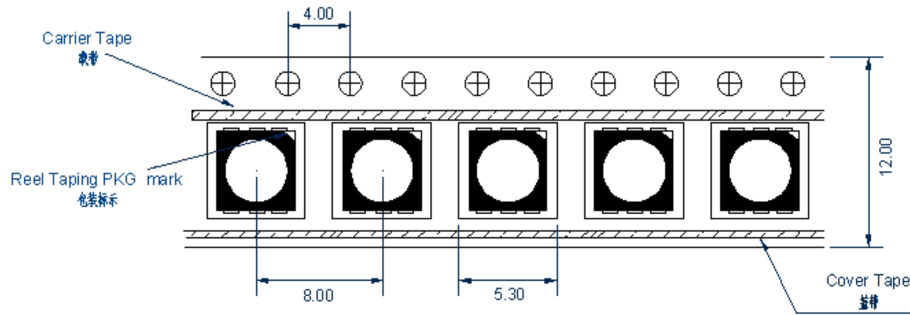
正确：禁止挤压灯面　　错误：手指挤压灯面　　正确：摄子侧体夹灯　　错误：摄子尖碰到硅胶面

✧ Application must pay attention to protection and treatment in the production process of sulfur, and the selection of the quality assurance of the PCB board, solder paste, and other supporting materials (sulfur). Surface mounting, to prevent and reduce the influence of process of sulfur, take some measures: regular cleaning reflow oven, note the reflow oven chain lubrication of high temperature oil sulfur and former SMT PCB plate surface cleaning, after the SMT PCB board and components of clean, LED components and modules to the same sulfur the materials are put together, the space environment to clean and ventilated storage.

应用端须注意生产过程中硫的防护处理，并选用有质量保证的 PCB 板材和锡膏、及其它配套辅料（不含硫）. 表面贴装时，为预防和降低制程中硫的影响，可注意采取一些措施：定期清洁回流焊炉，注意回流焊炉链条润滑高温油的含硫、SMT 前 PCB 板的表面清洁、SMT 后 PCB 板和元器件的清洁、LED 元件和模组不要同含硫的物料放在一起，存放的空间环境要清洁通风.

8. Packaging Specifications 包装规格

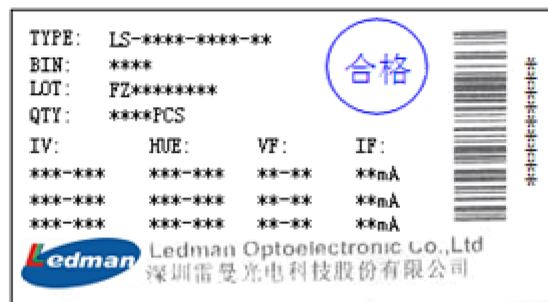
8.1 Taping Dimension 贴带



Note 注 : The quantity/reel to be Max1001 pcs.
每卷数量最多 1001 颗材料.

8.2 Label 标签

TYPE：产品型号
BIN：箱号
LOT：批号
QTY：数量
IV：光强
HUE：波长等级
VF：正向电压
IF：测试电流



8.3 Packaging 包装

Reel
卷轴

Label
标签

Humidity Indicator
湿度指示卡

Desiccant
干燥剂

Label
标签

Polyethylene Bag
铝箔袋

A Carton
A 纸箱

B Carton
B 纸箱

Label
标签

Label
标签

Ledman
RGB SERIES

Notes 注**:**

1) 10 Reel per A carton.
   A 纸箱装 10 卷材料.
2) 20 Reel per B carton.
   B 纸箱装 20 卷材料