

# **SL-T1516RGBA-L160**

## **DATA SHEET**

SPEC. NO. : SZ21091201  
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REV. : A/0

Approved By:

Checked By:

Prepared By:

## 产品及特性 Products and features

型号 Model	发光材料 Emitting light	发光颜色 Emitting Light	胶体颜色 Lens Color
SL-T1516RGBA-L160	R:AlGaInP; G/B:InGaN	RGB	雾状哑光 Fog Matte

### 特点 Features

- 高亮技术 High lighting technology
- 发光角度为 110° Viewing Angle: 110 Degree
- 低功耗 Low power consumption
- 防潮级别: 3 级 Moisture levels: level 3
- 无铅 lead-free
- 符合 RoHS 规范 Meet RoHS Certification
- 五面刷墨 All round brush black
- 金线焊接 Gold wire bonding
- 内包脚, 表面哑光 Insourcing feet, surface matte

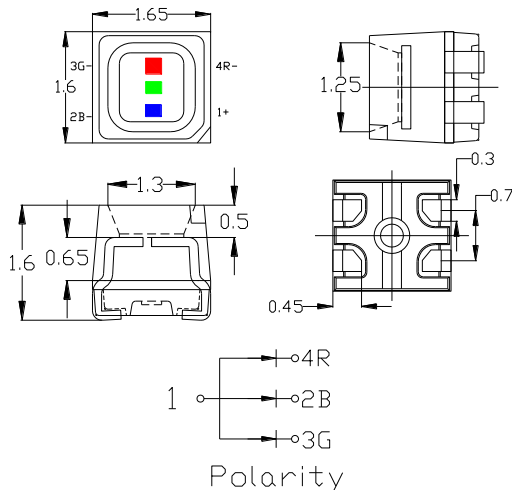


### 用途 Applications

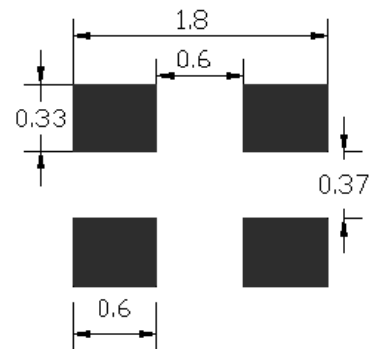
户内外全彩显示屏 P2.5-P3.2 Outdoor/Indoor full-color screen P2.5-P3.2

\*1注: 防水级别是指产品在贴上电路板后用防水树脂或有机硅做好防水处理之后的防水能力。  
This is tested after assembling the products on a PCB and isolating the electrical paths by silicone.

## 外观图 Mechanical Dimensions



### 推荐的焊盘规格 Recommended Solder pad Design



1. 所有尺寸单位为mm, 未注明公差为±0.05mm.

The units in the graphs above are in millimeter (mm), Does not indicate the tolerance of + / - 0.05 mm.

2. 规格书若有变动, 恕不另行通知, 此规格书以中英文方式书写, 若有冲突以中文版本为准。

The information in this paper is subject to change without notice. This specification in English and Chinese writing, if there is a conflict the Chinese version shall prevail.

## 性能参数 Performance Parameters

### (1) 极限参数 Absolute ratings ( $T_a=25^{\circ}\text{C}$ )

参数 Parameter	符号 Symbol	额定值 Limits			单位 Unit
		红 Red	绿 Green	蓝 Blue	
正向电流 Forward Current	$I_F$	25	20	10	mA
正向脉冲电流 Pulse Forward Current <sup>*1</sup>	$I_{FP}$	70	60	60	mA
工作温度 Operation Temperature	$T_{amb}$	-40 ~ 85			$^{\circ}\text{C}$
贮存温度 Storage Temperature	$T_{stg}$	-40 ~ 100			$^{\circ}\text{C}$
焊接温度 Soldering Temperature	$T_{sld}$	245 0 -5			$^{\circ}\text{C}$
反向电压 Reverse Voltage	$V_R$	10			V
功耗 Power Dissipation	$P_D$	75	88	88	mW
结温 Junction Temperature	$T_j$	+110	+110	+110	$^{\circ}\text{C}$
锡焊后 1 芯片周围导热温度 <sup>*2</sup> Junction/Ambient	$R_{th JS}$	280	300	300	$^{\circ}\text{C/W}$
锡焊后 3 芯片周围导热温度 <sup>*2</sup> Junction/Solder Point	$R_{th JS}$	450	480	480	$^{\circ}\text{C/W}$

\*注<sup>1</sup> 脉冲时间  $\leq 0.1\text{msec}$  占空比  $\leq 1/10$  ;

\*1 pulse time 0.1 msec of empty or less than 1/10 or less;

### (2) 光电参数 Electrical/Optical Characteristics ( $T_a=25^{\circ}\text{C}$ )

参数 Parameter	颜色 Color	测试条件 Testing conditions	符号 Symbol	单位 Unit	最小值 Min	典型值 Typ	最大值 Max
亮度 Luminous Intensity	红 Red	$I_F = 15\text{mA}$	$I_{LEDV}$	mcd	—	450	—
	绿 Green	$I_F = 8\text{mA}$			—	720	—
	蓝 Blue	$I_F = 5\text{mA}$			—	100	—
半光强角度 50% Power Angle			$2\theta_{\frac{1}{2}}$	deg	—	110	—
主波长 Dominant Wavelength	红 Red	$I_F = 15\text{mA}$	$\lambda_d$	nm	615	—	625
	绿 Green	$I_F = 8\text{mA}$			515	—	535
	蓝 Blue	$I_F = 5\text{mA}$			460	—	475
正向电压 Forward Voltage	红 Red	$I_F = 15\text{mA}$	$V_F$	V	1.8	—	2.5
	绿 Green	$I_F = 8\text{mA}$			2.5	—	3.3
	蓝 Blue	$I_F = 5\text{mA}$			2.5	—	3.3
反向电流 Reverse Current	红 Red	$V_R = 20\text{V}$	$I_R$	$\mu\text{A}$	—	—	0.1
	绿蓝 Green Blue	$V_R = 10\text{V}$			—	—	0.5

\*注1: 本规格书成品参数测试以莱特光电“LED620”设备为标准。

This specification product parameter test with LIGHT "LED620 equipment" as the standard.

\*注2: 产品级别设定为: 亮度=1:1.30±0.02, 波长为R=5nm, G/B=4nm, 具体要求以客户协商为准。

Set the product level as: brightness = 1:1.30±0.02, wavelength for R = 5 nm, G/B = 4 nm. Specific requirements will be subject to customer consultation.

\*注3: 以上所示正向电压允许误差±0.1V, 亮度允许误差±10%, 主波长允许误差±1nm, 半光强角度允许误差±10°。

The above shown in forward voltage allowed error of plus or minus 0.1 V, brightness allowed error of plus or minus 10%, the main wavelength allowed error of plus or minus 1 nm, half intensity angle allowed error of plus or minus 10°.

## 特性曲线图 Characteristic Curves

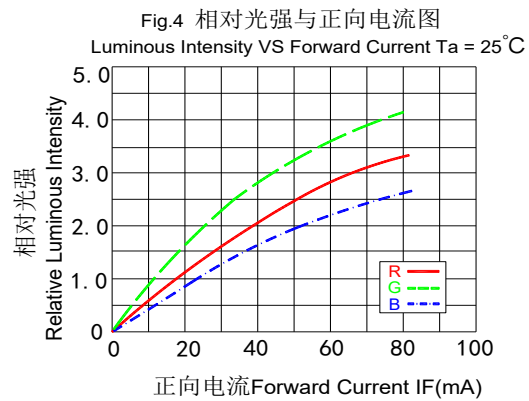
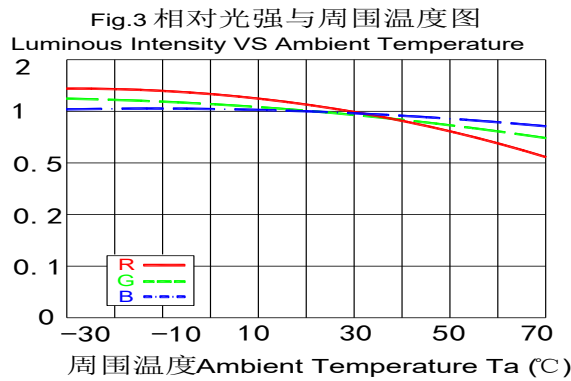
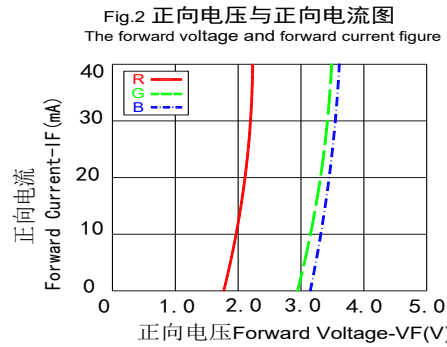
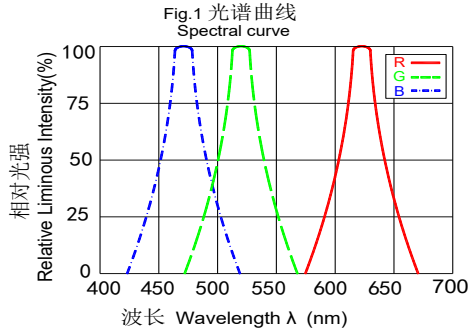


Fig.5 正向电流与温度图  
Forward current and temperature

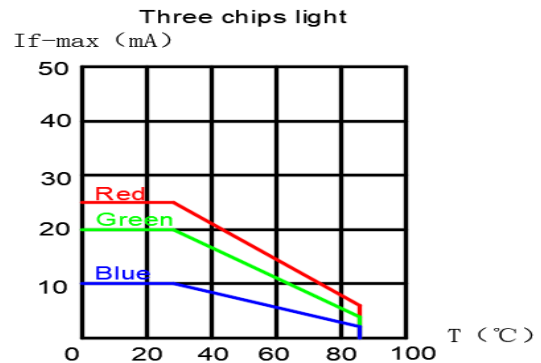
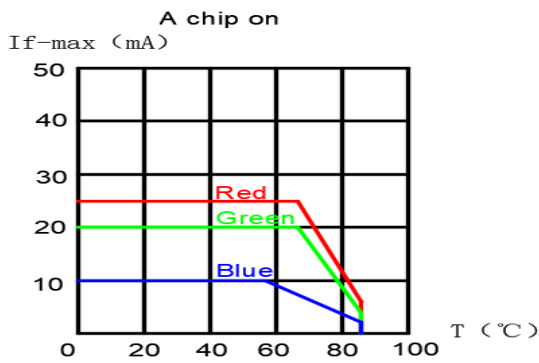
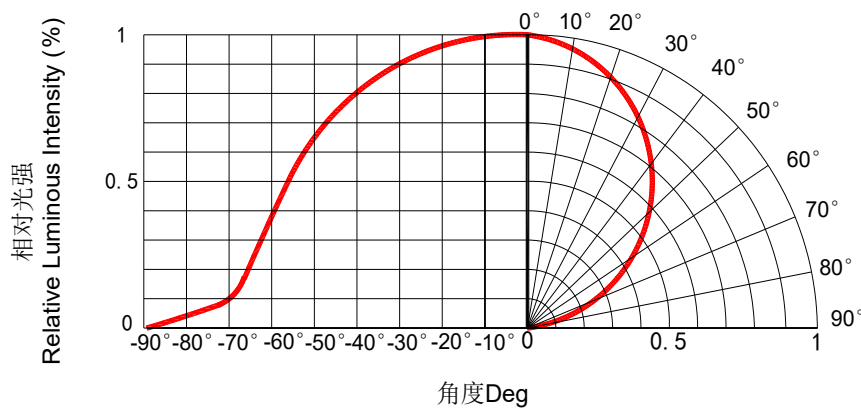


Fig.6 光强分布特性曲线  
The intensity distribution curve



## 可靠性试验 Reliability Tests

### (1) 产品可靠性条件 Reliability Test Conditions

No.	项目 Items	参考标准 Reference	测试条件 Test Condition	测试 Test Hours/ Cycles	试验数量 Quantity	判据 Criterion
1	回流焊 Soldering	GB/T 4937, II, 2. 2&2. 3	Tsol*: 245 0-5 °C	10 sec	22 pcs	0/22
2	冷热冲击 Thermal Shock	MIL-STD-202G	130°C ~ -40°C 30min 30min	250Cycles	22 pcs	0/22
3	寿命测试 Operation Life	JESD22-A108D	Ta = 25°C If = 20mA	1000Hrs	22 pcs	0/22
4	高温存储 High Temp Storage	JEITA ED-4701 200 201	Temp: 100°C	1000Hrs	22 pcs	0/22
5	低温存储 Low Temp Storage	JEITA ED-4701 200 202	Temp: -40°C	1000Hrs	22 pcs	0/22
6	高温高湿 High Temperature & Humidity	JEITA ED-4701 100 103	Temp: 85°C RH: 85%	1000Hrs	22 pcs	0/22

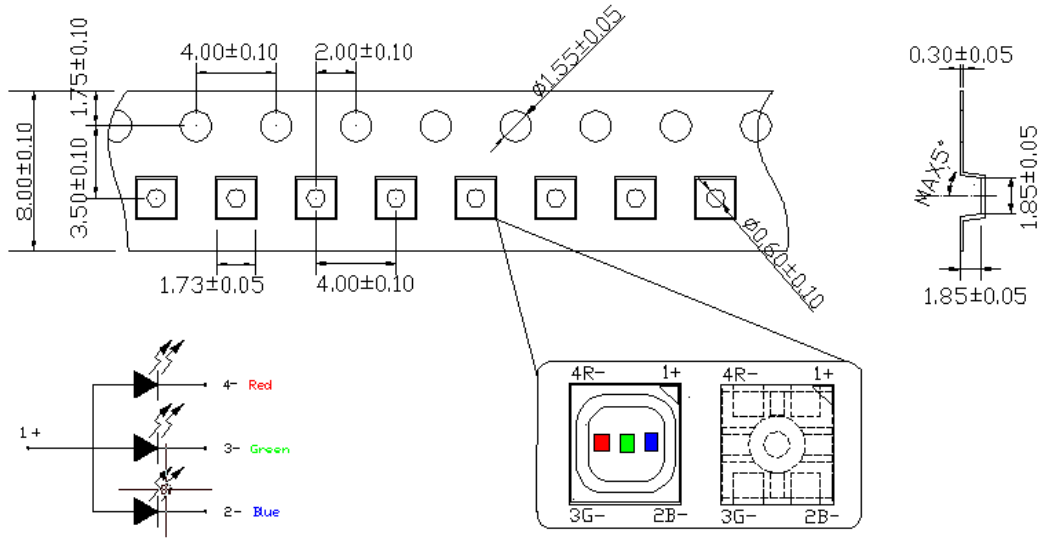
\*注1: Tsol为回流焊时锡液的温度; Temp为实验温度  
Tsol for reflow soldering tin fluid temperature; Temp for experimental temperature

### (2) 可靠性失效判定标准 The reliability failure criterion

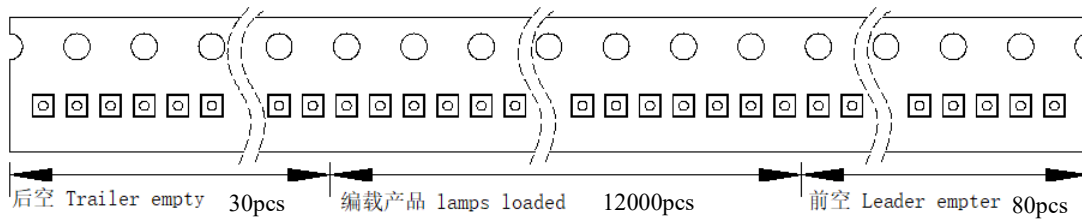
项目 Items	符号 Symbol	测试条件 Test condition	判断标准 Failure Criteria
正向电压 Forward Voltage	VF	IF = (R) 15mA	初始值± 10% The initial value plus or minus 10%
		IF = (G) 8mA	
		IF = (B) 5mA	
反向电流 Reverse Current	IR	VR = 20V	IR ≤ 0.1μA
		VR = 10V	IR ≤ 0.5μA
亮度 Luminous Intensity	ILEDV	IF = (R) 15mA	平均 ILEDV 衰减 ≤ 30%，单个 ILEDV 衰减 ≤ 50% Average ILEDV attenuation 30% or less, a single ILEDV attenuation 50% or less
		IF = (G) 8mA	
		IF = (B) 5mA	
回流焊 Soldering			材料无内部裂痕、无材料间爆裂、剥离、无死灯 Material without internal cracks, no material between stripped no deaded light

## 包装 Packaging

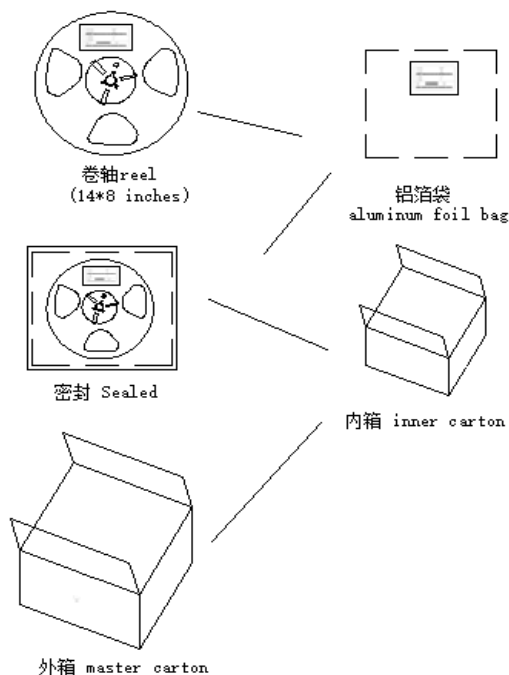
### (1) 载带规格 Carrier Tape Specifications



### (2) 载带细节 Details Of Carrier Tape



### (3) 包装方式 Package Method



#### 标签格式 Label Mode

<b>LIGHT</b>	深圳莱特光电股份有限公司 Light Electronics CO., LTD.	
TYPE NO. :	_____	
QUANTITY :	_____	
BIN :	_____	
DATE CODE :	_____	
REMARKS :	_____	

#### 包装详情 Details Of Package

- 每卷 12kpcs
- Each reel 12Kpcs
- 每袋 2 卷 (24kpcs)
- 2 reel for each bag (24kpcs)
- 内箱 16 卷 (192kpcs)
- 16 reels for inner carton (192kpcs)
- 外箱两内箱 32 卷 (384kpcs)
- 32 reels for per inner carton to one master carton (384Kpcs)

## 焊接指导 Soldering Operation Instructions

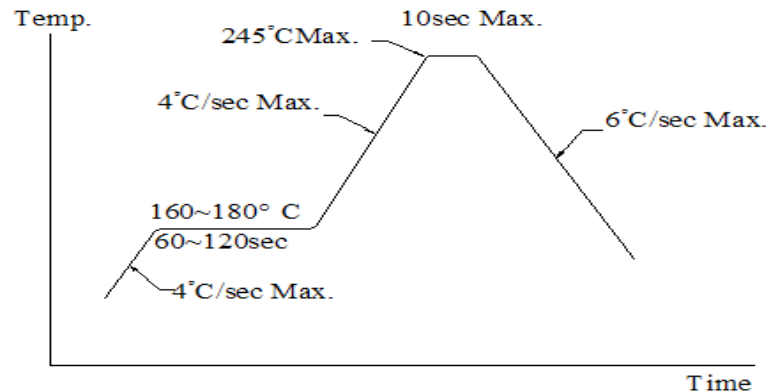
### (1) 使用烙铁人手焊接 The use of iron hand soldering

- 低密度产品焊接时推荐使用功率低于25W的烙铁或热风枪，焊接时烙铁的温度必须保持在315°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。当第一次没有焊接好时，必须停10s后才可以焊接，第二次焊接还是没有焊接好时，必须更换新SMD灯。

A soldering iron or heat Gun of less than 25W is recommended to be used in hand soldering of low density products. Please Keep the temperature under 315°C while soldering . Each terminal of the LED is to go for less 3 second and for one time only. If it failed first time, 10secs cooling is necessary and then continue soldering, failed second time, must replace a new SMD LED.

- 焊接时烙铁头不要触到SMD LED胶体部份。  
Do not contact the resin of SMD LED with the tip of soldering iron.
- 焊接时不要有任何机械压力施加在产品胶体顶部。  
No mechanical stress should be exerted on the resin of SMD LED during soldering.
- 焊接完产品后，只有当产品温度降到40°C以下时才可以进行后续的处理，这是为了防止产品由于后续工作的机械的热压力而失效。  
Post work after soldering should be done when the package has been cooled down to below 40°C or less. This is to prevent the SMD LED failures due to thermal-mechanical stress during holding.
- 人手焊接过程中的不慎操作易引起LED产品的损坏，应当小心谨慎。  
Be careful because the damage of the product is often started at the time of the hand soldering.

### (2) 回流焊温度/时间 The Temperature Profile for SMD1516 is shown below



\*注1: 当焊接完成后，修焊接是不被推荐的。如实在不能避免，则修焊必须事先被验收合格以免由于修焊而被破坏SMD LED灯体；维修焊接时，请注意必须控制时间（参照使用烙铁人手焊接项）。

Modification is not recommended on SMD LED after soldering. If cannot be avoided, it must be pre-qualified to avoid damaging SMD LED; Please control the soldering time (refer to **Manual soldering by soldering iron**).

注2: 回流焊最多只能进行一次；使用无铅回流焊时实际温度最大245°C。

Reflow soldering should not be done more than one time. When using lead-free reflow soldering temperature to 245 °C.

注3: 在回流焊接近升温过程中，请不要对LED施加任何压力。

Don't put any physical stress while heating.

注4: 在焊接完成后，待产品温度下降到室温之后，再进行其它处理。

Don't do anything before the product cooling down to ambient temperature.

### (3) 清洗 Cleaning

在焊接后推荐使用异丙醇来清洗，在温度不高于30℃的条件下持续3分钟，不高于50℃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。

基本上不建议使用超声波来进行清洗。若必须使用时，超音波的输出率以及电路板放置的位置也会对LED造成不同的影响，请在使用前确认没有异常。

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 Epoxy resin or not.

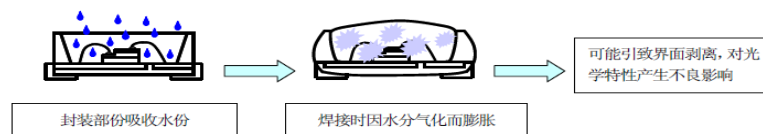
Basically using ultrasonic cleaning is not recommended. If you must use the output rate of ultrasound and the position of the circuit board placed also had different effects on the LED, please confirm no exception before use.

\*注：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。具体工艺受到诸多因素的影响，请根据特定的PCB设计和焊接设备来确定焊接方案。

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.

## 使用注意事项 Using Considerations

### (1) LED贮存 Storage



1. 本产品使用密封防潮防静电袋包装，并附有干燥剂，未开封的产品有 2 个月的保存时间；当存储时间超过规定的 3 个月时需重新烘烤。

This product use sealed moisture-proof anti-static bags and with desiccant. The max storage period before opening the package is 2 month. When the storage time has reached 2 month, baking treatment should be performed.

2. 开封前，产品须存放在温度不高于 30℃，湿度不高于 60%RH 的环境中。

Before opening the package, the product must be stored at temperature less than 30°C and humidity less than 60%.

3. 开封后，产品应放入烤箱保存 65°C±5°C，产品应在 24 小时内用完，否则，应该以原包装的样式保存在防潮柜中。建议工作环境温度不高于 30℃，湿度不高于 60%RH 的环境中，建议客户在 1 个月的时间内用完（从包装日期起）。

After opening the package, Products should be stored in the oven 65°C ± 5°C, the LEDs should be used within 24 hours. Otherwise, it should be stored in moisture. Suggest the products should be stored at temperature less than 30°C and humidity less than 60%. Suggest the products should be used within 1 month (from the date of packaging).

4. 我们建议打开包装超过 24 小时的在使用前应先烘烤，烘烤条件是：65°C±5°C，48 小时；如打开包装超过 36 小时以上，请加长烘烤时间；如打开包装超过 60 小时以上，请勿使用，返回我司处理。

If the LEDs be kept over 24 hours, baking is required before mounting. Baking condition as below: 65°C + / - 5°C for 48 hours. Open the package than 48 hours please extend baking time; Open the package than 60 hours please do not use and return to our company.

5. 使用前，请确认包装是否有破袋，若有破袋，请勿使用，返回我司处理。

Before use, please make sure that if the packing broken, if you have torn bags, please do not use and return to our company.

6. 使用前，请确认元件是否在储存时间内，若在 2 个月到 3 个月以内，使用前请先除湿，烘烤条件是：65°C±5°C，48 小时；小批量试用 OK 无异常后，再批量使用，超过（包括）3 个月的元件请勿使用，返回我司处理。

Before use, please confirm whether the element in the storage time, if between two months and three months, please dehumidification firstly before use, Baking condition as below: 65°C + / - 5°C for 48 hours. small batch trial OK without exception, batch use again, do not use the element more than three months and return to our company.



## (2) ESD (静电的防范) ESD(Electrostatic Discharge)

1. 静电和电涌会导致产品特性发生改变，例如正向电压降低等，如果情况严重甚至会损毁产品。所以在使用时必须采取有效的防静电措施。

Excessive ESD and surge voltage could change the property of LEDs. The LEDs will show some unusual characteristics such as lower forward voltage. And sometimes the LEDs will be damaged. So we must take some effective measures to prevent electrostatic.

2. 所有相关的设备和机器都应该正确接地，同时必须采取其它防止静电和电涌的措施。  
All related equipment and machines should be properly grounded, at the same time must take other measures to prevent static and transient.
3. 使用防静电手环，防静电垫子，防静电工作服、工作鞋、手套，防静电容器，都是有效的防止静电和电涌的措施。  
Use anti-static bracelet, anti-static MATS, anti-static overalls, work shoes, gloves, anti-static container, are effective measures to prevent static and transient.

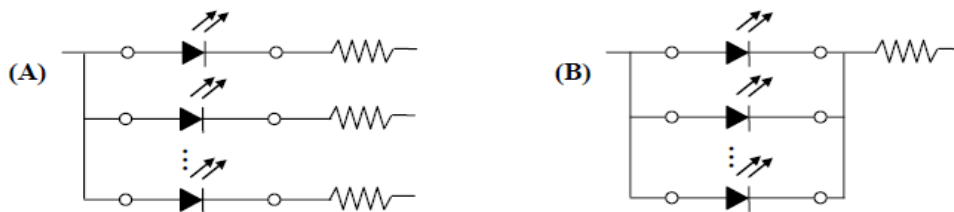
## (3) 设计建议 Design suggestions

1. 设计电路时，通过LED的电流不能超过规定的最大值，同时，还需使用保护电阻，否则，微小的电压变化将会引起较大的电流变化，可能导致产品损毁。

In designing a circuit, the current through each LED must not exceed the absolute maximum rating specified for each LED. In the meanwhile, resistors for protection should be applied, otherwise slight voltage shift will cause big current change, burn out may happen.

2. 建议使用以下(A)电路，[该电路能够很好的调节通过每个 LED 的电流](#)；[不推荐使用](#)(B)电路，该电路在持续的电压驱动下，LED 的正向电压 (VF) 发生变化，电流会随之而发生变化，可能使某些 LED 承受高于规定的电流值。

It is recommended to use the following (A) circuit, The circuit can very good adjust current through each LED; Not recommended (B) circuit, the circuit is under constant voltage driver, LED the forward voltage (VF) change, the current will subsequently and change, may make some LED to withstand higher than stipulated by the current value.



3. LED 的特性容易因为自身的发热和环境的温度的改变而发生改变。[温度的升高会降低 LED 的发光效率、影响发光颜色等，所以在设计时应充分考虑散热的问题。](#)

The characteristics of LEDs easily because of their heat and environmental temperature change and change, A rise in temperature will reduce the LED luminous efficiency and affect the emitting light colors, so should be given due consideration in the design of the cooling problem.

## (4) 反压保护 Reverse voltage protection

通常 LED 的反向漏电流都很小，不会影响正常使用。如果 LED 长期遭受超过其所能承受的反向电压冲击时，LED 会被损伤，反向漏电流会迅速变大，引起显示屏零灰度下串光的发生。在设计中，要注意控制反向电压，建议加在 LED 上的反向电压值不超过 10V。

LED reverse leakage current is very small, usually does not affect the normal use. If LED long suffering more than they can withstand impact reverse voltage, the LED will be damage, reverse leakage flows rapidly, causing a zero grayscale string under the light. In the design, attention should be paid to control reverse voltage, Suggestions on the LED of reverse voltage values are not more than 10 v.

## (5) 温度保护 The safe temperature for LEDs working

LED 在高温条件下，衰减会加速，本身应力也会增大，若长期处于高温环境下，极易出现失效。对于高密度排列使用的情况，建议在使用过程中灯面温度不超过 55℃，灯脚温度不超过 75℃。

LED under the condition of high temperature, the attenuation will accelerate, stress will also increase in itself, if long-term under high temperature environment, appear easily. Used for high density arrangement, it is recommended to use in the process of light surface temperature is not more than 55 °C, the light foot temperature does not exceed 75 °C.

(6) 其它事项 Others

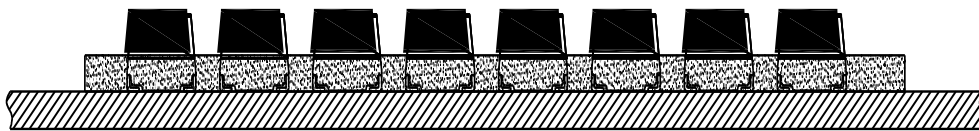
1. 直接用手拿取产品不但会污染封装树脂表面，也可能由于静电等因素导致产品性能的改变。过度的压力也可能直接影响封装内部的管芯和金线，因此请勿对产品施加过度压力，特别当产品处于高温状态下，例如在回流焊接过程中。LED的环氧树脂封装部分相当脆弱，请勿用坚硬、尖锐的物体刮、擦封装树脂部分。在用镊子夹取的时候也应当小心注意。

Directly with the hand take products not only may pollute the encapsulating resin surface, may also be due to factors such as electrostatic leads to a change in product performance. Undue pressure may also directly affect the sealed tube core and gold wire, so please do not put too much pressure for products, especially when the product is in high temperature condition, such as in the reflow soldering process. LED part epoxy resin encapsulation is quite fragile, do not use hard and sharp objects, wipe en capsulation resin part. When to use tweezers clip should also be careful.

2. 请使用不低于标准电流的百分之十驱动LED产品以确保其稳定性。  
Please use no less than ten percent of the standard current to drive the LED products in order to ensure its stability.
3. LED于室外使用时，请进行足够的防水，防湿以及盐害等防护。  
LED outdoor use, please be sure to adequate waterproof, moisture proof and salt injury protection.
4. 在海洋运输或存储过程中，货柜往往会经历海洋高湿气候及较大的昼夜温差变化。白天密封在货柜内的富含水气的高温空气，在夜间由于温度降低水气达到超饱和，集装箱内的水蒸气就会凝结成水珠，造成“集装箱雨”现象，这种液态的水会对货柜箱内货物或货物的外包装产生严重的影响。因此，在LED进行海上运输时内外包装一定要使用干燥的材料，并根据航程中的温度变化、航程的长短等因素放置适量的干燥剂以吸收潮气。

LED in the process of sea transport or storage, container tend to experience the ocean humidity climate, large temperature difference between day and night change. Sealing during the day in the high temperature air of moisture-laden air inside the container, due to the temperature at night to reduce moisture to super saturation, a container of water vapor will condense into water droplets, "the container rain" phenomenon, this kind of liquid water on the container the goods in the cabinet or serious impact on the outer packing of the goods. Therefore, both inside and outside the LED to maritime transport packaging must use dry material, and according to the range of temperature change and the length of the voyage to place the right amount of desiccant to absorb the moisture.

5. 产品用于室外LED显示屏的时候需封装防水保护胶。  
Products for outdoor LED display are encapsulated waterproof protection glue.



## (7) LED模组、显示屏使用注意事项 The LED module, display use advice

1. LED模组、显示屏产品，在出货前请告知客户注意产品的使用环境，避免使用过程中出现较恶劣环境、雨淋等不良情况引起产品不良。特别对用于租赁品产品的客户，请一定做好产品防潮处理。如确实有产生淋雨的情况，请一定要做好后期的相关除湿处理，方式如持续将屏在低灰度（80-150）情况下点亮除湿至少48小时以上，或将模组烘烤后，再在存储箱内放入抽湿盒等措施。

The LED module, display products, please inform the customer pay attention to the using of the products before shipment environment, avoid in the process of using a bad environment, as well as the rain caused bad products. Especially for leasing products used for the customer, please must be moisture proof processing products. If there are generated in the rain, please be sure to do a good job in the late of dehumidification process, ways, such as continuous will screen under the condition of low gray (80-150), light dehumidification at least 48 hours, after baking, or module in storage box into the wet box again.

2. 注意做好模组、显示屏的防潮保护，当出现回潮天气时，在使用完后请告知客户先将显示屏累加开上两个小时以去除水分，确保表面干燥后在安排密封保存。

Pay attention to the moisture protection module, display, when the moisture regain of weather, after use, please inform customer first will display accumulation on two hours to remove moisture, ensure sealed surface after drying in the arrangements.

3. 显示屏在不用或储存时，请存储于内部干燥、完好的密封箱，同时放入适量不少于 500g 以上的干燥剂吸湿防潮，然后进行密封，并定期检查存储箱内干燥剂失效及存储环境是否存在回潮等情况。

Display without or store, please stored in the internal fully dry, seal box, at the same time in the right amount of not less than 500 g or more desiccant moisture absorption moisture, and then to carry on the seal, and regularly check storage failure and storage environment whether there is a resurgence in the desiccant, and so on and so forth.

4. 电子类产品建议经常开启使用。对于长时间存储后未使用的显示屏或模组，重新取出使用时，建议先将在低灰度（80-100）左右进行点亮 8-12H，再转低灰度 150 左右进行点亮 8-12H，避免瞬间高温时灯珠内部因有水分或受潮出现膨胀、引起死灯等品质异常。

Electronic product advice often use. To display or after long time storage module, to remove, when using advice in the first low gray (80-100) for light 8 to 12 h, then turn to low gray around 150 for light 8 to 12 h, avoid instantaneous heat lamp bead inside because there is water or be affected with damp be affected with damp inflation, cause death light qualities such as abnormal.