深圳东裕光大电子有限公司
广州市东裕光电科技有限公司

产品规格书
SPECIFICATION

客户名称 CUSTOMER	
产品名称 PRODUCTION	贴片 SMD
产品型号 MODEL	DY-S352818/RGBC/6812-TR2
版本号 VERSION NO	A1.0

地址(Add)：深圳市光明区凤凰街道光明大道 481 号乐府广场 1B 栋 1609-1611 室

厂址(Add)：广东省广州市番禺区石基镇海涌路 3 号 10 号厂房 2 楼

电话(Tel)：0755-88367730　020-39294688

传真(Fax)：020-39966833

网址(Net)：www.tonyuled.cn　www.tonyuled.com

客户确认 CUSTOMER CONFIRMATION	**审　核 CHECKED BY**	**编　制 PREPARED BY**
	汪建新	陈少龙

DY-S352818/RGBC/6812-TR2

产品描述 Descriptions

- 是一个集控制电路与发光电路于一体的智能外控 LED 光源。其外型与一个 3528LED 灯珠相同，每个元件即为一个像素点。像素点内部包含了智能数字接口数据锁存信号整形放大驱动电路，电源稳压电路，内置恒流电路，高精度 RC 振荡器有效保证了像素点光的颜色高度一致。
- 数据协议采用单线归零码的通讯方式，像素点在上电复位以后，DIN 端接受从控制器传输过来的数据，首先送过来的 24bit 数据被第一个像素点提取后，送到像素点内部的数据锁存器，剩余的数据经过内部整形处理电路整形放大后通过 DO 端口开始转发输出给下一个级联的像素点，每经过一个像素点的传输，信号减少 24bit。像素点采用自动整形转发技术，使得该像素点的级联个数不受信号传送的限制，仅仅受限信号传输速度要求。
- LED 具有低电压驱动，环保节能，亮度高，散射角度大，一致性好，超低功率，超长寿命等优点。将控制电路集成于 LED 上面，电路变得更加简单，体积小，安装更加简便。
- 湿敏等级：5a；静电ESD：2KV。

产品特性 Features

- 灰度调节电路（256 级灰度可调）。
- 当刷新速率 30 帧/秒时，低速模式级联数不小于 512 点，高速模式不小于 1024 点。
- 数据发送速度可达 800Kbps。
- 光的颜色高度一致，性价比高。
- 单线数据传输，可无限级联。
- 控制电路与 RGB 芯片集成在一个 3528 封装的元器件中，构成一个完整的外控像素点。
- 内置信号整形电路，任何一个像素点收到信号后经过波形整形再输出，保证线路波形畸变不会累加。
- 内置上电复位和掉电复位电路。控制电路与 RGB 芯片集成在一个 3528 封装的元器件中，构成一个完整的外控像素点。
- 内置信号整形电路，任何一个像素点收到信号后经过波形整形再输出，保证线路波形畸变不会累加。
- 串行级联接口，能通过一根信号线完成数据的接收与解码。

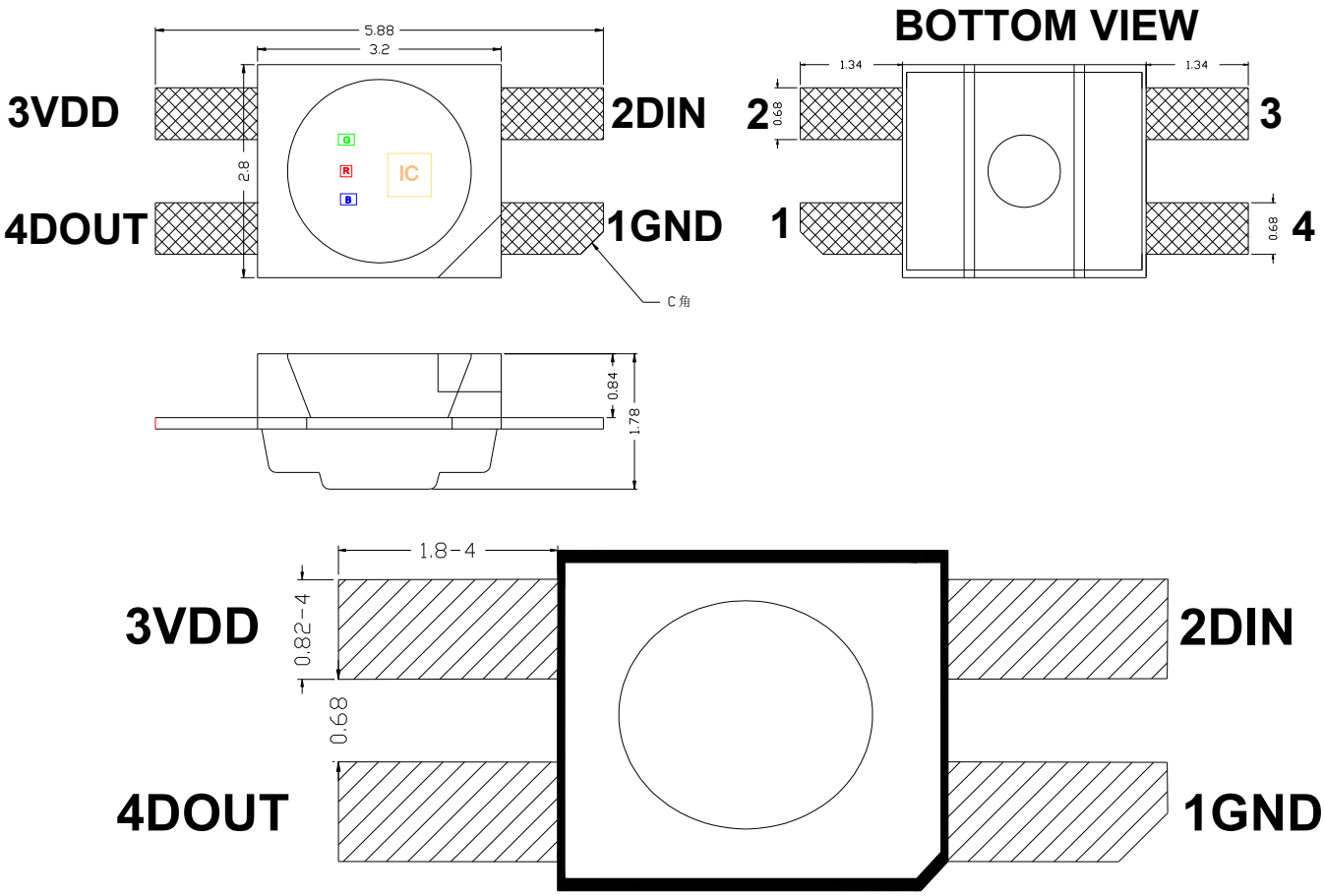
产品应用 Applications

- LED 全彩发光字灯串，LED 全彩模组，LED 幻彩软硬灯条，LED 护栏管，LED 外观/情景照明。
- LED 点光源，LED 像素屏，LED 异形屏，各种电子产品,电器设备跑马灯。

包装方式 Packing Quantity Specification

- 编带 2000 个/卷。

一、外形尺寸及建议焊盘尺寸 Package Profile & Soldering PAD Suggested



注：所有尺寸均为毫米，除非另有说明，公差为±0.1。

Notes: All dimensions are in mm, tolerance is ±0.1 unless otherwise noted.

引脚功能说明		
符号	管脚名	功能描述
DOUT	数据输出	控制数据信号输出
GND	地	电源接地和信号接地
VDD	电源	供电管脚
DIN	数据输入	控制数据信号输入

备注：承认书之编号和型号可用于查询，客户如有需要，请提供相应的编号和型号。

Remark：P/N & Model in samples approval sheet can be used to inquire，please provide corresponding P/N & model if customer need.

二、光电参数 Electro-Optical Characteristics

（环境温度 Ambient temperature：25℃，环境湿度 Humidity：RH60%）

1 RGB Electro-Optical Characteristics

颜色 Colour	12mA	
	波长（nm） Wavelength（nm）	亮度（mcd） Brightness（mcd）
红色（RED）	620-625	200-385
绿色（GREEN）	515-525	815-1275
蓝色（BLUE）	460-470	120-240

注：亮度误差±10%，波长误差±1.0nm

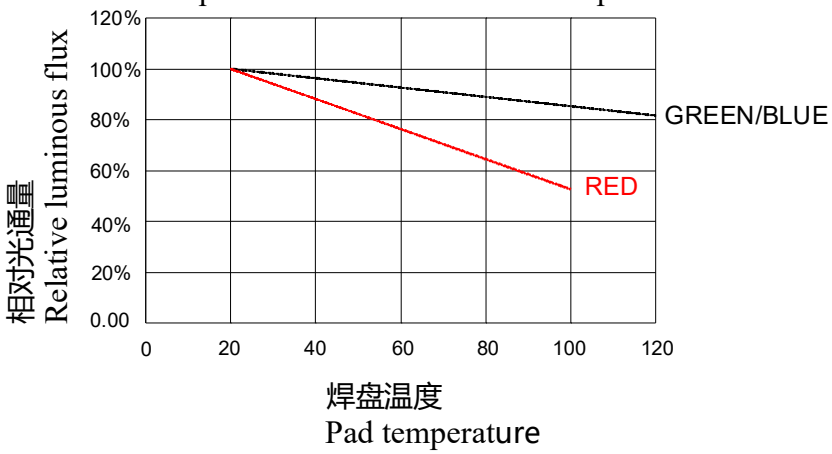
Note:Luminous Intensity: ±10%Iv, Dominant Wavelength: ±1.0nm

2. IC Electro-Optical Characteristics（TA=-20 至+70℃，VDD=4.5 至 5.5V，VSS=0V）

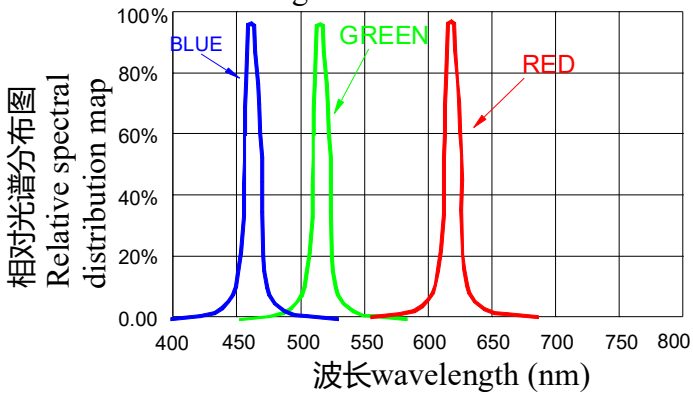
参数 Parameter	符号 Symbol	最小 Minimum	典型 Typical	最大 Maximum	单位 Unit	测试条件 Test conditions
工作电压 Chip input voltage	V_{DD}	3.7	5.0	5.5	V	---
信号输入翻转阀值 Signal input flip threshold	V_{IH}	2.8	---	---	V	+VDD=5.0V
	V_{IL}	---	---	1.8	V	
B/G/R输出驱动电流 B/G/R output drive current	I_{DOUT}	10	12	14.5	mA	V_{DS}=1V
PWM频率 PWM frequency	F_{PWM}	---	1.0	---	KHz	---
静态功耗 Static power consumption	I_{DD}	---	0.6	---	mA	---
数据传输速率 Transfer rate	F_{DIN}	---	800	---	Kbps	

三、典型光电特性曲线图 Typical Photoelectricity Characteristic Curve Chart

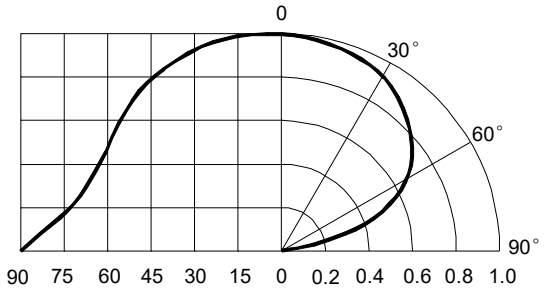
焊盘温度与光通量输出的相对关系
The relative relationship between pad temperature and luminous flux output



波长特性
Wavelength characteristics



典型的辐射方向图 120°
Typical radiation pattern 120 °



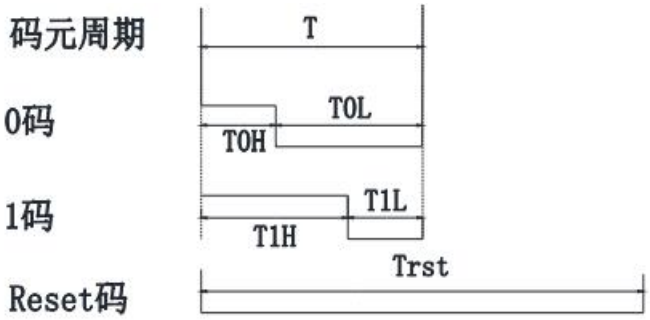
四、极限参数 Absolute Maximum Rating

（环境温度 Ambient temperature：25℃，环境湿度 Humidity：RH60%）

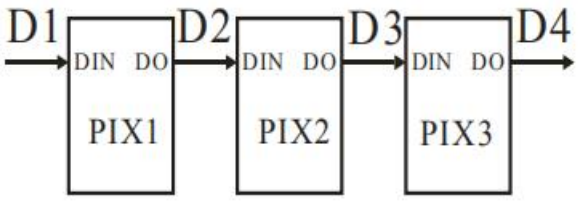
项目 Item	符号 Symbol	数值 Value			单位 Unit	备注 Remark
		Red	Green	Blue		
正向电流 Forward Current	IF	20	20	20	mA	---
正向峰值电流 Peck forward current	IFP	70	100	100	mA	---
耗散功率 Power Dissipation	Pd	50	70	70	mW	---
反向耐压 Reverse Voltage	VR	5			V	---
工作环境温度 Operation Temperature	Tamb	-40 至+85℃				---
贮藏温度 Storage Temperature	Tstg	-40 至+85℃				---
焊接温度 Soldering Temperature	Tsol	260℃				
注：脉冲占空比不大于 1%，宽度不大于 100us **Notes:** IFP Conditions-Pulse Width≤100μs and Duty≤1%						

五、时序波形图 Time Series Waveform

输入码型（环境温度 Ambient temperature：25℃）



连接方式：



六、建议数据传输时间 Suggested data transmission time

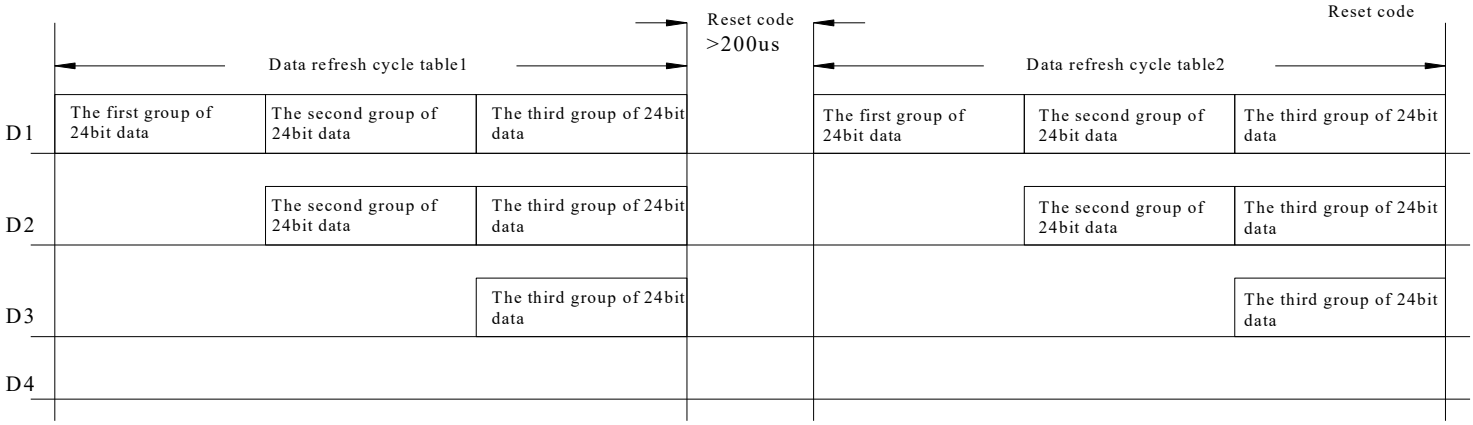
时序表名称 Timeline name		Min.	实际值 Actual value	Max.	单位 Unit
T	码元周期 Symbol period	1.20	--	--	μs
T0H	0码， 高电平时间 0 code, high-level time	0.20	0.30	0.40	μs
T0L	0码， 低电平时间 0 code, low-level time	0.80	--	--	μs
T1H	1码， 高电平时间 1 code, high-level time	0.60	0.67	1.00	μs
T1L	1码， 低电平时间 1 code, low-level time	0.20	--	--	μs
Reset	Reset码，低电平时间 Reset code, low-level time	>200	--	--	μs

1. 协议采用单极性归零码，每个码元必须有低电平，本协议的每个码元起始为高电平，高电平时间宽度决定“0”码或“1”码。
The protocol adopts unipolar zeroing code, and each symbol must have a low level. Each symbol in this protocol starts with a high level, and the duration of the high level determines the "0" or "1" code.

2. 书写程序时，码元周期最低要求为1.2μs。
When writing a program, the minimum required code period is 1.2 μ s.

3. “0”码、 “1”码的高电平时间需按照上表的规定范围， “0”码、 “1”码的低电平时间要求小于20μs。
The high-level time of "0" and "1" codes should be within the specified range in the table above, and the low-level time of "0" and "1" codes should be less than 20 μ s.

七、数据传输方式 Data transmission method (Ta=25℃)



注Note： 其中D1为MCU端发送的数据，D2、D3、D4为级联电路自动整形转发的数据。

Among them, D1 is the data sent by the MCU end, and D2, D3, and D4 are the data automatically shaped and forwarded by the cascaded circuit.

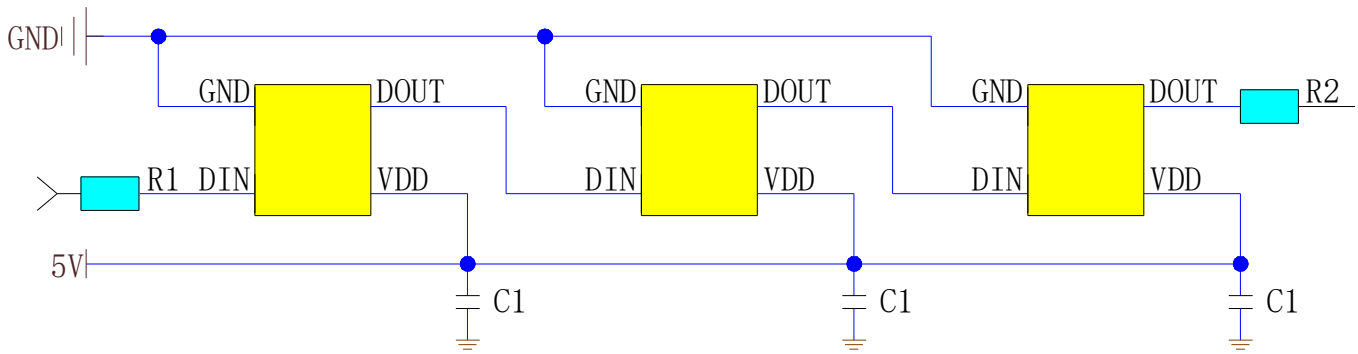
八. 24bit 数据结构 24 bit data structure (Ta=25℃)

G7	G6	G5	G4	G3	G2	G1	G0	R7	R6	R5	R4
R3	R2	R1	R0	B7	B6	B5	B4	B3	B2	B1	B0

注：高位先发，按照 GRB 的顺序发送数据(G7 → G6 →……..W0)

High bit first send, send data in GRB order (G7 → G6 →.... B0)

九、应用电路原理图 Principles of Applied Circuits



在实际应用电路中，为防止产品在测试时带电插拔产生的瞬间高压损伤IC内部信号输入输出引脚，应在信号输入及输出端串接保护电阻。此外，为了使各IC芯片间更稳定工作，各灯珠间的退偶电容则必不可少；

In practical application circuits, to prevent instantaneous high voltage damage to the internal signal input and output pins of the IC caused by live plugging and unplugging during testing, protective resistors should be connected in series at the signal input and output terminals. In addition, in order to ensure more stable operation between IC chips, the decoupling capacitance between each LED is essential;

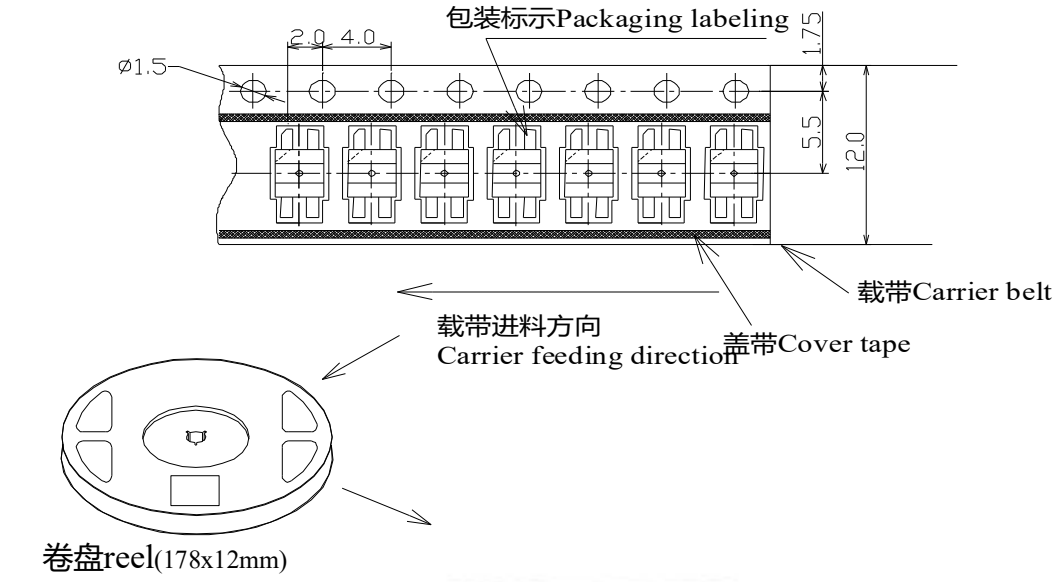
应用一：用于软灯条或硬灯条的，灯珠间传输距离短的，建议在信号输入输出端各串接保护电阻，即R1、R2约500欧；

Application 1: For soft or hard light strips with short transmission distance between lamp beads, it is recommended to connect protective resistors in series at the signal input and output terminals, R1, R2, about 500 ohms;

应用二：用于模组或一般异形产品，灯珠间传输距离长，因线材及传输距离不同，在信号两端串接的保护电阻会略有不同；以实际使用情况定.

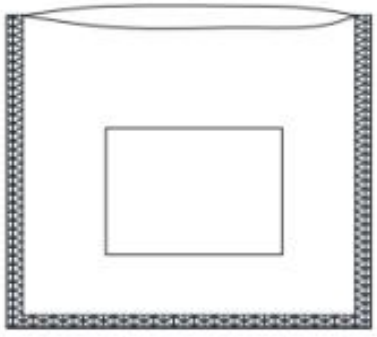
Application 2: Used for modules or general shaped products. The transmission distance between lamp beads is long. Due to different wire materials and transmission distances, the protective resistance of the signal line connected in series at both ends will be slightly different; Based on actual usage.

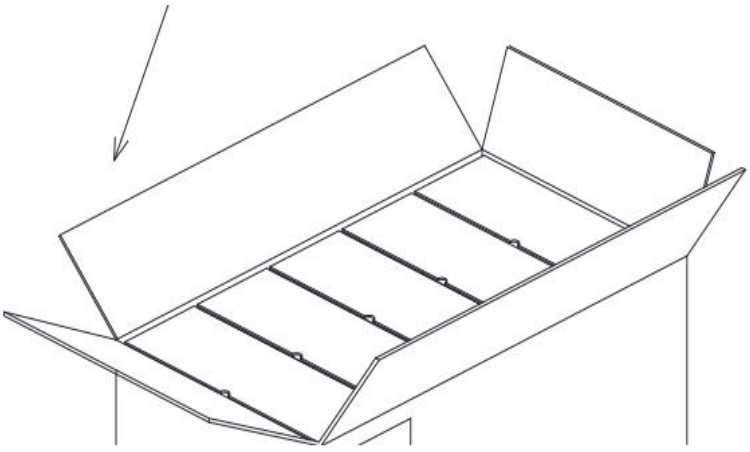
十、包装载带与圆盘尺寸 Package Carrier And Disk Dimensions



卷盘reel(178x12mm)

(每卷最多装2000个灯珠)
(Each roll can hold up to 2000 lamp beads)





注：所有尺寸均为毫米，除非另有说明，公差为±0.1。

Notes: All dimensions are in mm, tolerance is ±0.1 unless otherwise noted.

表面贴装LED采用卷盘包装，LED在用普通或防静电袋包装后再装在纸箱中. 纸箱用于保护运输途中LED不受机械冲击，纸箱不防水，因此请注意防潮防水。

Surface mounted LEDs are packaged in rolls, and the LEDs are packaged in regular or anti-static bags before being packed in cardboard boxes The cardboard box is used to protect the LED from mechanical impact during transportation. The cardboard box is not waterproof, so please pay attention to moisture-proof and waterproof.

十一、可靠性实验项目 Reliability Test Project

项目 Item	测试标准 Test criterion	测试条件 Test condition	测试时间 Test time	判定标准 Decision criteria	数量 Qty.	失效数量 Fail Qty.
常温寿命测试 Normal Temperature Oper-ating Life	JESD22-A108D	25℃ 1500mA 1008H	168H/1008H	VF≤1.1VF（初始）光通量维持率≥90%	22	0
冷热冲击测试 Temperature Cycle	JEITA ED-4701 100 103 JEITA ED-4701 300 301 MIL-STD-202G	-40℃--100℃ 30min/1min/30min 500cycle	10cy/500Cycles	无死灯 、无外观不良	22	0
高温存储 High temperature store	JIS7021:B10 MIL-STD-202:210A MIL-STD-750:2031	Ta=85℃±5℃	1000Hrs	无死灯 、无外观不良	22	0
低温存储 Low temperature store	JIS7021:B12	Ta= -35℃±5℃	1000Hrs	无死灯 、无外观不良	22	0
耐焊接热 Resistance to Soldering Heat	JEITA ED-4701 300 301	Temp:260℃max T=10 sec	3times	无死灯 、无外观不良	22	0
湿热循环 Temperature And Humidity Cyclic	JEITA ED-4701 200 203	-10℃～65℃，0%～90%RH 24hrs	10 cycles	无死灯 、无外观不良	22	0
高温高湿储存 High Temperature High Humidity Storage	JEITA ED-4701 100 103	Ta=60℃，RH=90%	1000Hrs	无死灯 、无外观不良	22	0

十二、失效判定标准 Criteria For Judging Damage

项目 Project	符号 Symbol	测试条件 Test conditions	判断标准Judgment criteria	
			最小值 Minimum value	最大值 Maximum value
发光强度 Intensity	IV	DC=5V,规格典型电流 DC=5V, Typical current specification	初始数据X0.7 Initial data X0.7	---
耐焊接热 Resistance to Soldering Heat	---	DC=5V,规格典型电流 DC=5V, Typical current specification	无死灯或明显损坏 No dead lights or obvious damage	

十三、注意事项 Note

1、焊接 Welding

（1）SMD LED 灌封胶较软，外力易损坏发光面及塑料壳，焊接时要轻拿轻放。

SMD LED is soft and easy to damage the luminous surface and plastic shell by external force It should be handled lightly when welding.

（2）建议使用易洗型的助焊剂，依照回流曲线条件回流焊接，回流次数最多两次，确保 LED 发光面干净，异物会影响发光颜色。

It is recommended to use soldering flux with tin wash type, reflow soldering according to the condition of reflux curve, reflow twice at most, ensure the LED luminous surface is clean, foreign matter will affect the luminous color.

（3）**使用手工烙铁焊接**，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 360℃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。

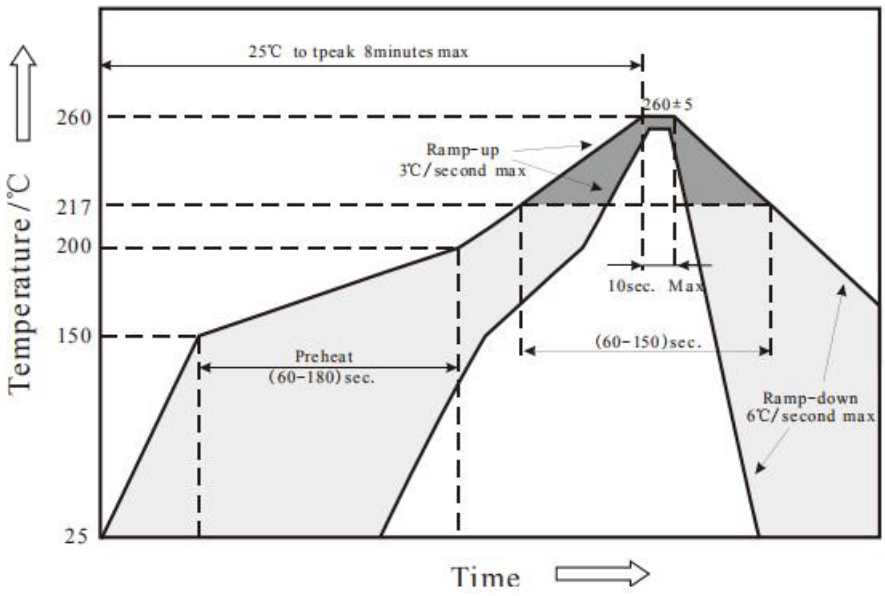
人手焊接过程中的不慎操作易引起 LED 产品的损坏，应当小心谨慎。

A soldering iron of less than 20W is recommended to be used in Hand Soldering. Please keep the temperature of the soldering iron under 360℃ while soldering. Each terminal of the LED is to go for less than 3 second and for one time only.

Be careful because the damage of the product is often started at the time of the hand soldering.

（4）**回流焊接：**推荐使用以下无铅回流焊接温度图进行。

Reflow Soldering: Use the conditions shown in the under Figure of Pb-Free Reflow Soldering



（5）回流焊不能超过两次,回流焊最高温度建议 260℃。

Reflow soldering should not be done more than two times.The reflow temperature we recommend is 260℃

（6）焊接过程中，严禁在高温情况下碰触胶体；焊接后禁止对胶体施加外力，禁止弯折 PCB，避免元件受到撞击。

During the soldering process, do not touch the lens at high temperature，After soldering, any mechanical force on the lens or any excessive vibration shall not be accepted to apply, also the circuit board shall not be bent as well.

（7）在焊接完成后，待产品温度下降到室温之后，再进行其他处理。

After soldering, do not deal with the product before its temperature drop down to room temperature

（8）请不要将不同 BIN 级的 LED 使用于同一个产品上，否则可能会导致产品的严重色差。

Please do not use different BIN LED on the same product, otherwise it may cause serious color difference.

2、防静电措施 ESD countermeasure

（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。

Static electricity or surge voltage damages the LEDs. Damaged LEDs will show some unusual characteristics such as the forward voltage becomes lower, or the LEDs can not be lighted up. In view of the above, we should do some anti-static precautions when using the SMD LED

（2）所有相关的设备和机器都应该正确接地，同时必须采取其他防止静电和电涌的措施。

All devices, equipments and machineries must be properly grounded, at the same time we should take measures to prevent anti-static and voltage surge.

（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。

It is also recommended that anti-electrostatic wrist bands, pads, uniforms, gloves or containers can be used when dealing with the LEDs

3、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， 例如，反向漏电流会迅速变大等。这样会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。

In general, the reverse current of LED is very small, which won't affect the normal use of components. But when it is often suffered the reverse voltage which exceeds the limit of the component then it will be damaged. Such as the reverse current increase rapidly. And it will cause the string light when the screen is black. So please pay attention to controlling the reverse voltage which less than 10V is recommended.

4、清洗 Cleaning

在焊接后推荐使用酒精（无水乙醇）进行清洗，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。

It is recommended that alcohol（Anhydrous ethanol）be used as a solvent for cleaning after soldering. Cleaning is to go under 30℃ for 3 minutes or 50℃ for 30 seconds. When using other solvents, it should be confirmed beforehand whether the solvents will dissolve the package and the resin or not.

5、灌封 Enbedment

（1）挥发性物质会渗透到 LED 内部，在通电产生光子及热的条件下，会导致 LED 变色，进而造成严重光衰，严禁使用任何对 LED 器件的性能或者可靠性有害的物质或材料，针对特定的用途和使用环境，建议对所有的物质和材料进行相容性的测试。在贴装 LED 时候，不要使用能产生有机挥发性气体的粘结剂。

Volatile substances to leach into the LED inside, photons in electricity and heat conditions, will lead to the LED color, thus causing serious droop, it is forbidden to use any of the LED device performance or reliability of harmful substances or materials, for a specific purpose and use of the environment, advice on all the material and the material compatibility test.When attaching LED, do not use adhesive that can produce volatile organic gas.

（2）使用正常灌封胶时,建议先以少量试验，常温点亮 168 小时，确定没有问题再作业。

It is recommended to light up for 168 hours at room temperature for a small amount of test before using normal

filling and sealing glue.

6、存储时间 Storage time

为避免受潮的影响，我司建议产品在未开包装前储存条件为 5-30°C，相对湿度小于 60%；已开包装的 LED 光源请在 24H 内使用安装完毕，如未用完之产品，请进行除湿并抽真空后密封保存。开封超过一周或湿度卡发生变化时，请务必进行除湿，除湿条件：60°C±5°C，12H；产品密封保存有效使用期为一年。

To avoid moisture, we recommend storage conditions for the unopened LED +5 ~ +30 °C, relative hu-midity <60%. LED should be used within 24 Hrs. of opening the package. Please make sure to dehumid-ify and vacuum pack the remaining/ unused LED. Dehumidifying condition: +60 ° C ± 5 ° C, 12 Hrs. Effective age for the sealed led is one year.

7、使用注意事项 Precautions

（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。

When handling the product, touching the encapsulation with bare hands will not only contaminate its surface,but also have an effect on its optical characteristics. Excessive force to the encapsulation might result in catastrophic failure of the LEDs due to die breakage or wire deformation. For this reason, please do not put excessive stress on LEDs, especially when the LEDs are heated such as during Reflow Soldering.

（3）产品在进行 PCB 布线设计时，针对软性板材、及 0.5T 以下板材，焊盘走向应与 PCB 延展方向保持垂直状态，以减少 PCB 板弯折时产生之应力作用在 LED 引脚，造成 LED 产品因应力作用拉伸产生失效隐患；

In PCB wiring design, for soft plates and plates below 0.5T, the direction of the pads should be kept perpendicular to the direction of PCB extension, so as to reduce the effect of the bending stress of the PCB on the LED pins, resulting in the potential failure of LEDS products due to stress stretching

（4）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。

The epoxy resin of encapsulation is fragile, so please avoid scratch or friction over the epoxy resin surface.While handling the product with tweezers, do not hold by the epoxy resin, be careful.

8、其他 Others

（1）依规格要求，本公司保留调整产品材料组合的权利。

TONYU reserves the rights on the adjustment of product material mix for the specification.

（2）如果超出规格书以外而进行使用时，出任何问题我们都将不承担责任 。

We will not be responsible for any problem if it is used beyond the specification.

（3）在使用产品之前，应与我们交流，了解更详细的规格要求。

Before using the product, you should communicate with us for more detailed specifications.