

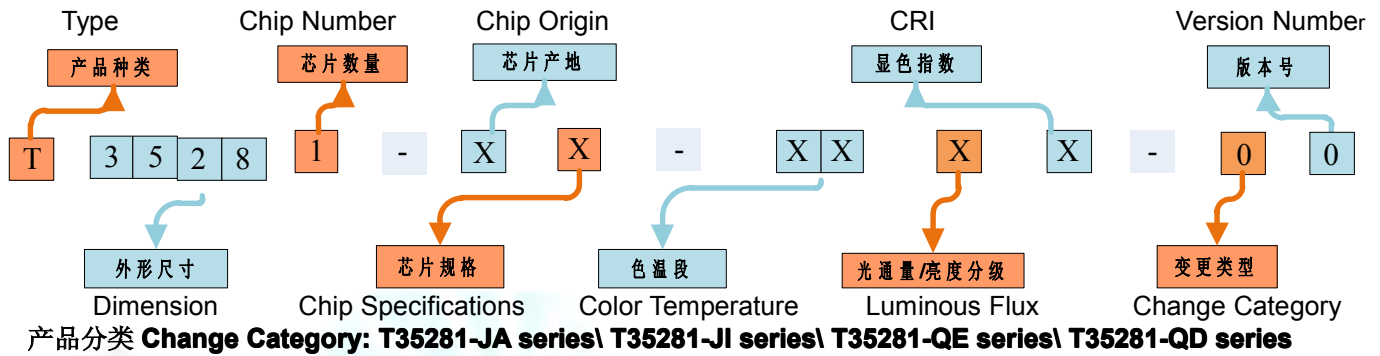
# SMD 3528 Series Data Sheet

## ● 特性 Features

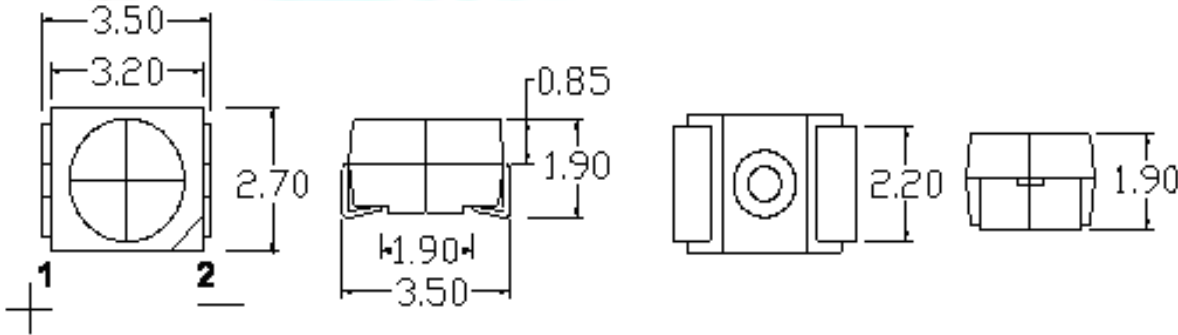
高光效  
高可靠性  
角度 120°  
适合所有 SMT 组装及焊接工艺  
符合 RoHS 指令要求

**Super high efficiency**  
**High reliability performance**  
**Viewing angle 120°**  
**Suitable for all SMT assembly and solder process**  
**Complied with RoHS directive**

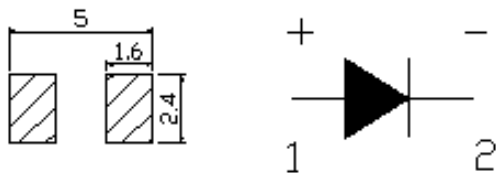
## ● 产品编码解说 Product Definition Code



## ● 封装尺寸 Dimension



图中所有尺寸均以毫米为单位  
All dimensions are in millimeter  
若无特别标注, 图中尺寸公差为±0.1mm  
Tolerance is ±0.1mm unless otherwise noted



焊盘尺寸  
**Recommend padlayout**



● 极限参数 (温度=25℃) Absolute maximum ratings at Ta=25℃

项目 Item	符号 Symbol	极限参数 Absolute Maximum Rating	单位 Unit
正向电流 Forward Current	If	25	mA
正向脉冲电流 Pulse Forward Current	Ifp	150	mA
反向电压 Reverse Voltage	V <sub>R</sub>	5	V
功耗 Power Dissipation	P <sub>D</sub>	90	mW
操作温度 Operating Temperature	T <sub>opr</sub>	-30~85	℃
储存温度 Storage Temperature	T <sub>stg</sub>	-40~100	℃
结点温度 Junction Temperature	T <sub>j</sub>	110	℃
过锡温度 Solder Temperature	T <sub>s</sub>	260	℃

Notes: Ifp conditions with pulse width ≤10ms and duty cycle ≤10%

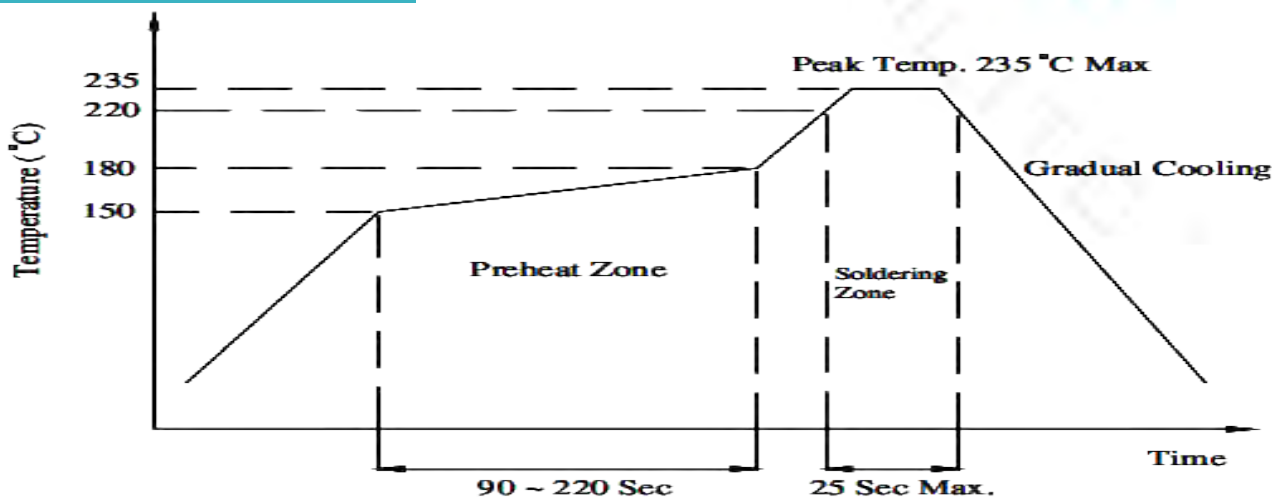
● 光电参数 (温度=25℃) Optical-Electrical Characteristics at Ta=25℃

参数名称 Parameter	符号 Symbol	数值 Value			单位 Unit	测试条件 Testcondition
		Min.	Typ.	Max.		
正向电压 Forward Voltage	V <sub>F</sub>	2.8	3.2	3.6	V	If=20mA
光通量 Luminous Flux	Φ	6	8	9	LM	If=20mA
色温 Color Temperature	CCT	1900	6000/4000/3000	100000	K	If=20mA
显色指数 Color Rndering Index	CRI	50	70/75/80	90	---	If=20mA
反向电流 Reverse Current	I <sub>R</sub>	---	---	10	uA	V <sub>R</sub> =5V
全视角 Viewing angle	2θ1/2	---	120	---	Deg	If=20mA
抗静电 Antistatic ability	ESD 模式	HBM(人体模式)			-4000V	
		MM(机器模式)			-3000V	

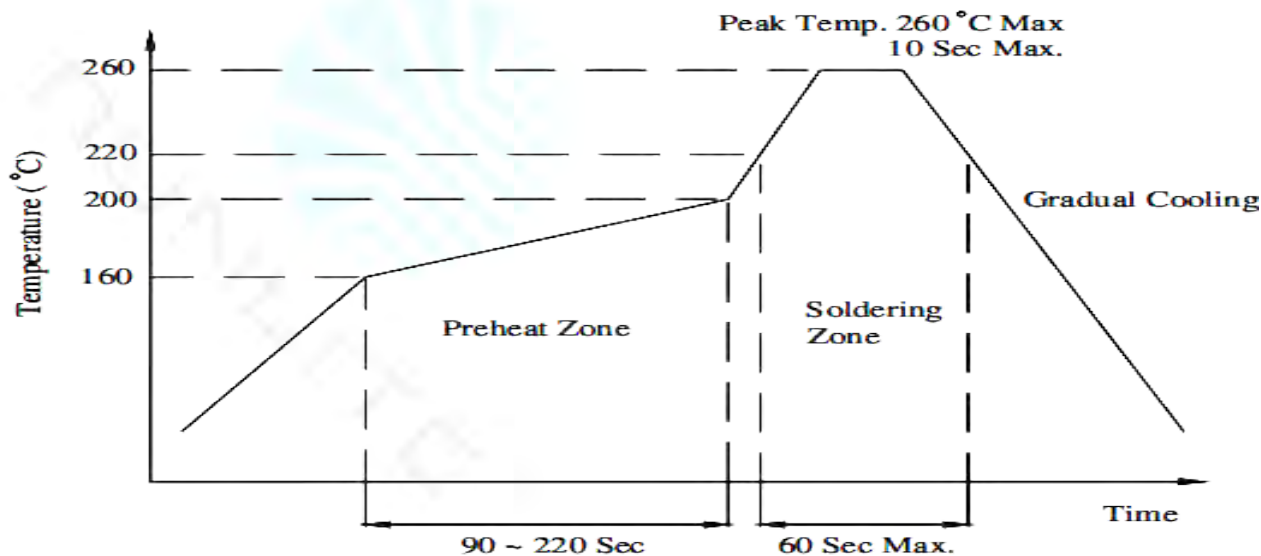
Notes: 光通量 (LM) ±10%    Luminous Flux (LM) ±10%  
 正向电压(VF) ±0.1    Forward Voltage (VF) ±0.1V  
 色坐标 (X,Y) ±0.01    Wavelength (X,Y) ±0.01 (CCT±5%)  
 显色指数 (CRI) ±2    Color Rndering Index (CRI) ±2  
 全视角 (2θ1/2) ±5    Viewing angle (2θ1/2) ±5

## ● 回流焊接曲线图 IR reflow soldering Profile

### 有铅焊接 Lead solder



### 无铅焊接 Lead Free solder



- 注意:
1. 我们建议的回流焊温度为  $240^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ，最高的焊接温度要控制在  $260^{\circ}\text{C}$  以内。
  2. 当产品在处在高温状态中时不要对其硅胶施加压力。
  3. 回流焊的次数应小于两次。

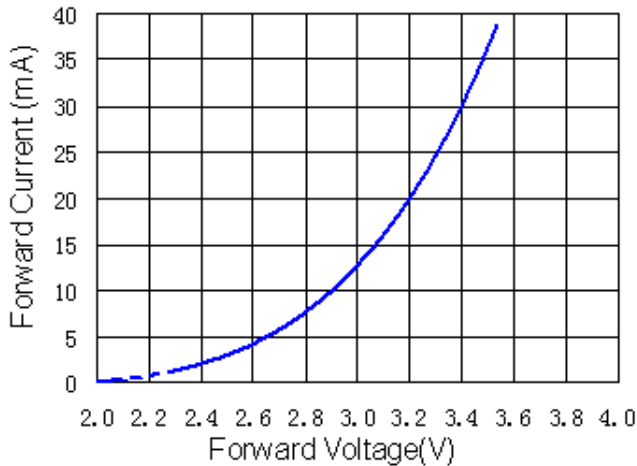
#### NOTES:

1. We recommend the reflow temperature  $240^{\circ}\text{C} \pm 5^{\circ}\text{C}$ . the maximum soldering temperature should be limited to  $260^{\circ}$
2. Don't cause stress to the silicone resin while it is exposed to high temperature.
3. Number of reflow process shall be 1 time.

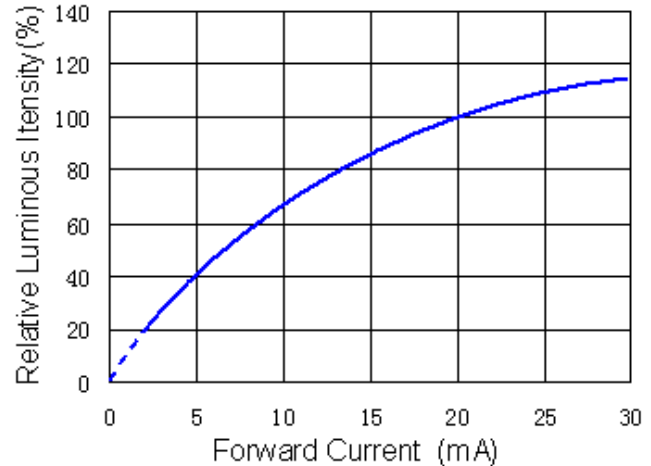
● 典型光电特性曲线 **Typical Optical-Electrical Characteristics curves**

环境参数 **Environment Parameter:** 温度 **Temperature=25℃**, 湿度 **Humidity=45%**

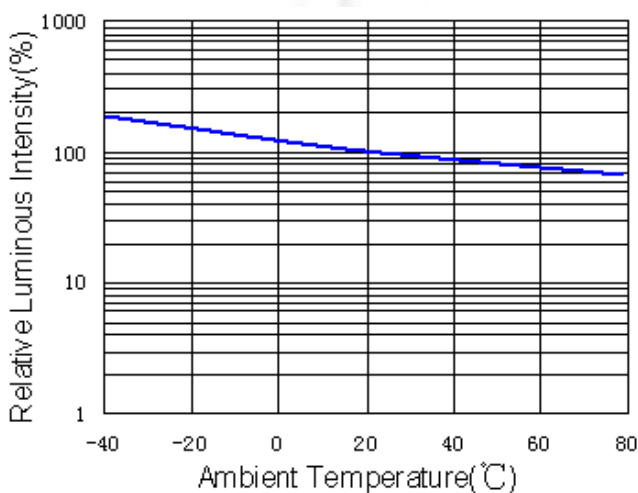
电压与电流关系曲线图  
**Forward Current VS Forward Volatage**



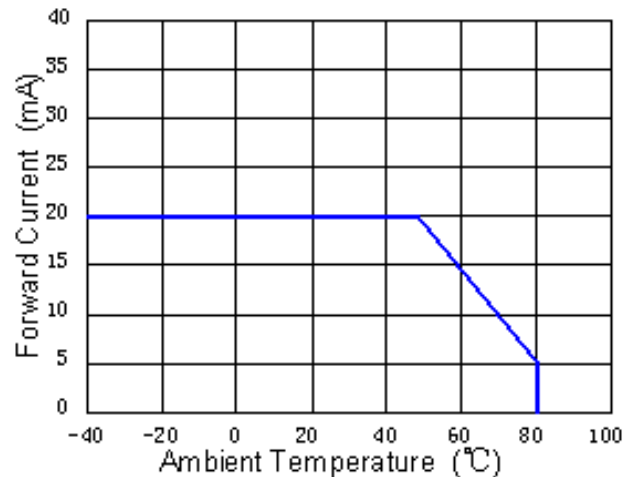
亮度与电流关系曲线图  
**Relative Flux VS Forward Current**



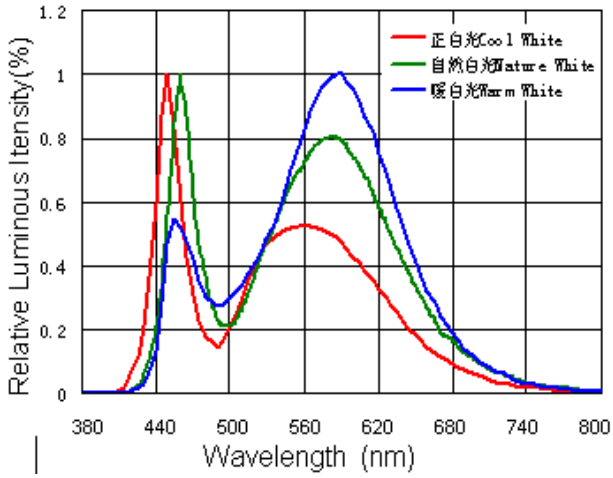
亮度与温度关系曲线图  
**Relative Flux VS Ambient Temperature**



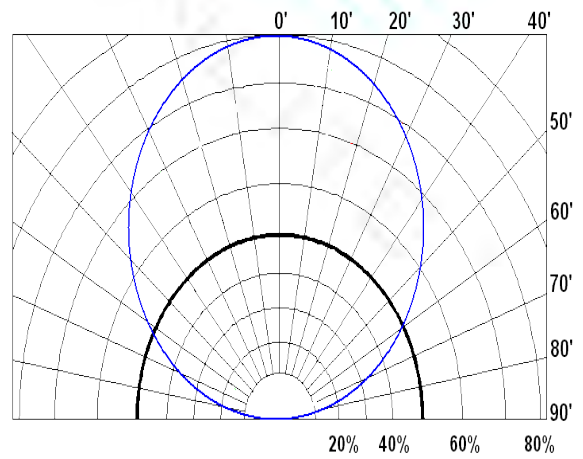
电流与温度关系曲线图  
**Forward Curent VS Ambient Temperature**



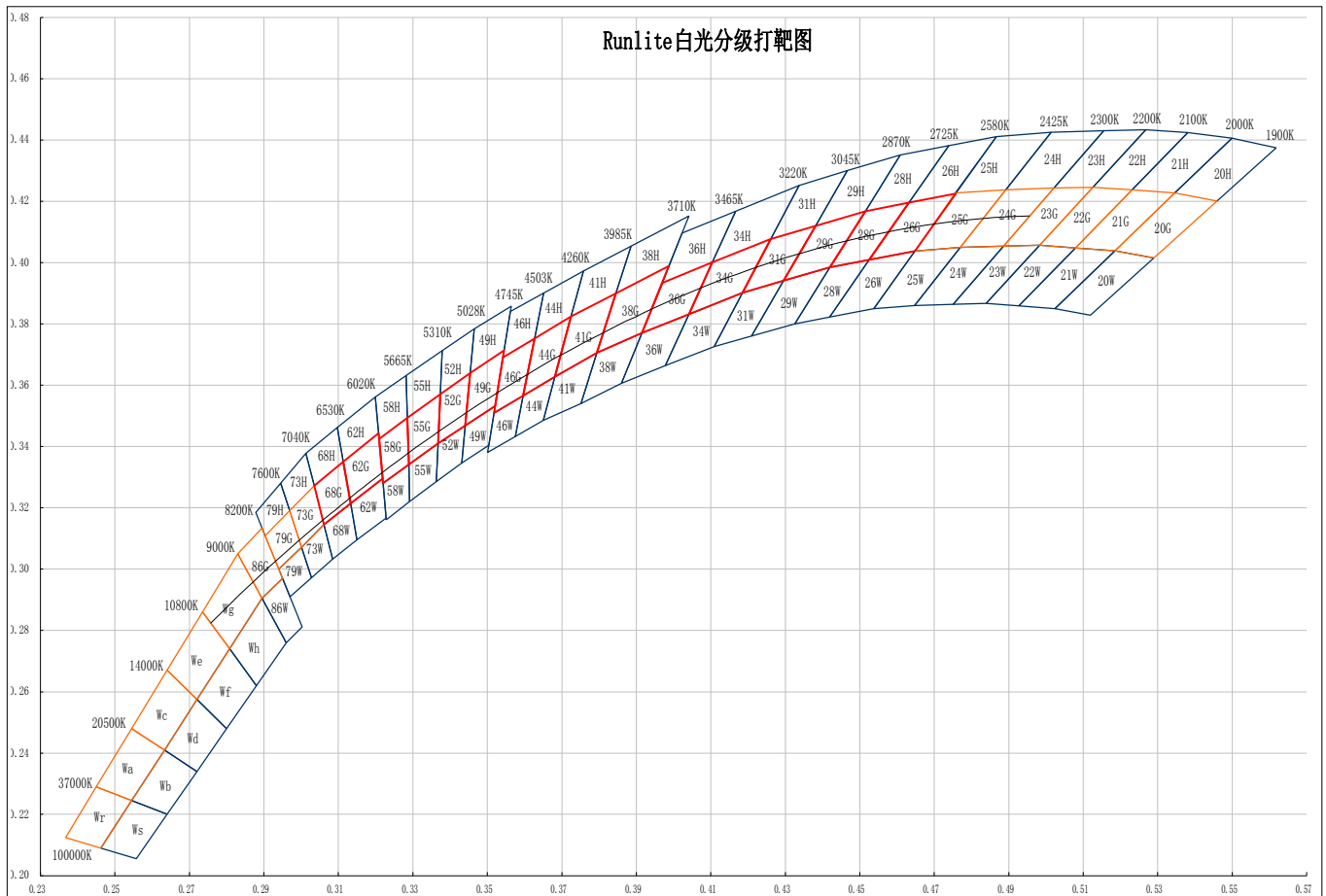
光谱特性图  
Relative Spectral Distribution



发光角度图 (极坐标)  
Typical Spectral Distribution



Runlite白光分级打靶图



分光打靶图 Chromaticity range & Color lineup



● 分光等级 Range of bins

电压分级 Range of Voltage
VF (V)
2.8~2.9
2.9~3.0
3.0~3.1
3.1~3.2
3.2~3.3
3.3~3.4
3.4~3.5
3.5~3.6

白光 COOL White		自然白 Neutral White		暖白 Warm White	
CCT (K)	BIN	CCT (K)	BIN	CCT (K)	BIN
4745~5028	49H	3710~3985	38H	1900~2000	20H
	49G		38G		20G
	49W		38W		20W
5028~5310	52H	3985~4260	41H	2000~2100	21H
	52G		41G		21G
	52W		41W		21W
5310~5665	55H	4260~4503	44H	2100~2200	22H
	55G		44G		22G
	55W		44W		22W
5665~6020	58H	4503~4745	46H	2200~2300	23H
	58G		46G		23G
	58W		46W		23W
6020~6530	62H			2300~2425	24H
	62G				24G
	62W				24W
6530~7040	68H			2425~2580	25H
	68G				25G
	68W				25W
7040~7600	73H			2580~2725	26H
	73G				26G
	73W				26W
7600~8200	79H			2725~2870	28H
	79G				28G
	79W				28W
8200~9000	86G			2870~3045	29H
	86W				29G
9000~10800	Wg			3045~3220	29W
	Wh				31H
10800~14000	We			3220~3465	31G
	Wf				31W
14000~20500	Wc			3465~3710	34H
	Wd				34G
20500~37000	Wa			34W	
	Wb			36H	
37000~100000	Wr			36G	
	Ws			36W	

● 信赖性测试项目及标准 Test items and results of reliability

测试项目 Test Item	测试条件 Test Conditions	持续周期 Duration/Cycle	破坏数量 Number of amage	参考 Reference
温度循环 Temperature	-40℃ 30min ↑↓25℃(2min) 100℃ 30min	循环 100 次 100 times	0/100	JEITA ED-4701300 303
冷热冲击 Thermal Shock	-40℃ 30min ↑↓ 5sec 100℃ 30min	循环 100 次 100 times	0/100	JEITA ED-4701200 303
高温储存 High Temperature Storage	Ta=100℃	1000 小时 1000 hours	0/100	EIAJED-4701200 201
高温高湿 Humidity Heat Storage	Ta=85℃ RH=85%	1000 小时 1000 hours	0/100	EIAJED-4701100 103
低温储存 Low Temperatue Storage	Ta=-40℃	1000 小时 1000 hours	0/100	EIAJED-4701200 202
常温老化 Room Temperatue Test	Ta=25℃ IF=20mA	1000 小时 1000 hours	0/100	Tested with Runlite standard
高温高湿老化 High Humidity Heat Test	60℃ RH=90% IF=20mA	1000 小时 1000 hours	0/100	Tested with Runlite standard
低温老化 Low Temperature Test	Ta=-40℃ IF=20mA	1000 小时 1000 hours	0/100	Tested with Runlite standard
静电放电人体模式 ESD(HBM)	-4KV at 1.5KΩ; 100pF	3 次 3 times	0/100	MIL-STD-883D

● 失效判断标准 Criteria for judging the Damage

项目 Item	符号 Symbol	条件 Condition	失效判断标准 Criteria for Judgement	
			下限 MIN	上限 MAX
顺向电压 Forward Voltage	VF	IF=20mA		USL×1.1
反向电流 Reverse Current	IR	VR=5V		10uA
光通量 Luminous Intensity	Φ	IF=20mA	LSL×0.7	

备注[Note]:

\*1 USL:标准上限值

\*2 LSL:标准下限值

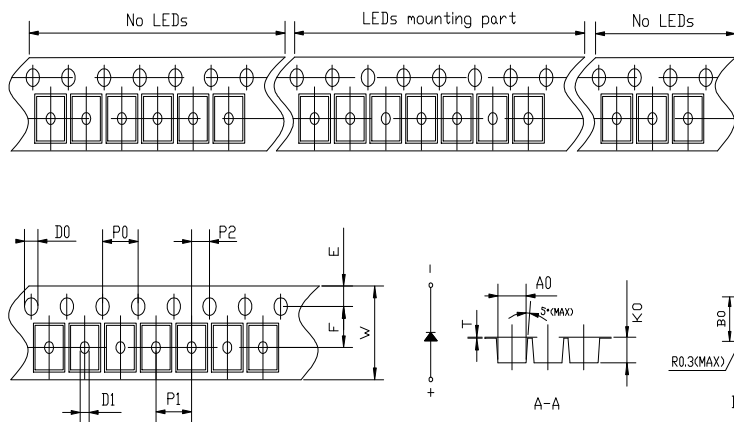
Uper Specification Level

Lower Specification Level

## ● 包装规格 Packaging

### 1. 料带尺寸 (单位:mm)

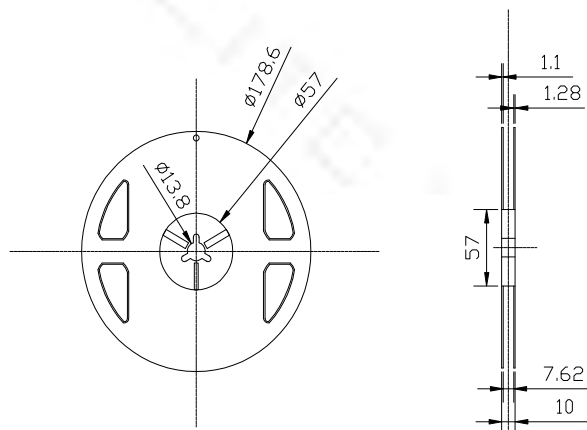
#### Dimensions of Tape (Unit:mm)



symbol	A0	B0	K0	P0	P1	P2	model	unit
spec	3.15±0.10	3.80±0.10	2.10±0.10	4.00±0.10	4.00±0.10	2.00±0.10		
symbol	W	T	E	F	D0	D1	3528	mm
spec	8.00±0.10	0.235±0.05	1.75±0.10	3.50±0.10	1.50 <sup>+0.10</sup> <sub>-0.00</sub>	1.00 <sup>+0.10</sup> <sub>-0.00</sub>		

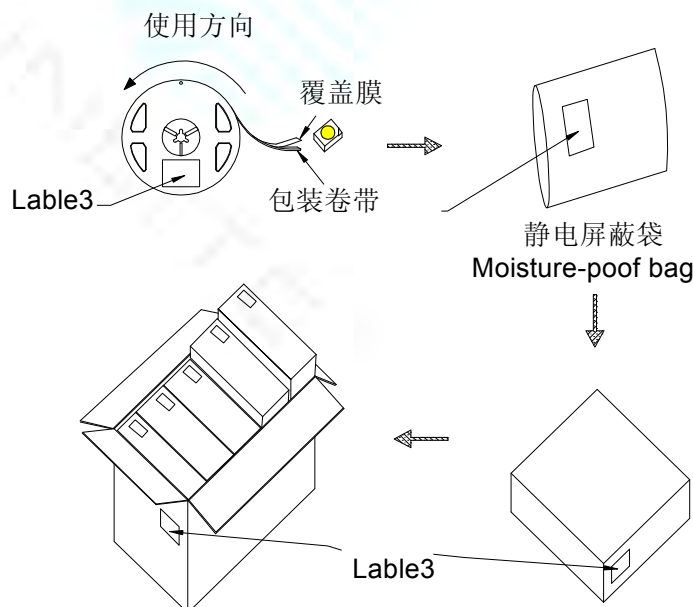
### 2. 卷盘尺寸 (单位: mm)

#### Dimensions of Reel (Unit:mm)



### 3. 装箱尺寸图 (单位: mm)

#### Package Dimension (Unit:mm)



每个外箱装5个内箱  
外箱尺寸=425\*245\*273mm  
Outside box  
Maximums for inside  
boxes

每盒5袋  
内箱尺寸: 247\*230\*75mm  
Inside box Maximums seven reels



## SMD 型 LED 使用说明书

感谢您使用深圳市源磊科技有限公司的系列 LED 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 LED, 在实际应用领域其可靠性与整体系统设计水平、作业方式、使用条件均相关。本使用说明不可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!

Thanks for using relevant LED products of Shenzhen Runlite Technology Co.,Ltd., in order to enhance your understanding of the characteristics of our products, as far as possible to reduce or avoid unnecessary damage to the product due to human factors, and make it can better service your production. we give corresponding instructions, According to the characteristic in the process of standard use. At the same time, even if the same specifications LED, in the practical application field its reliability are related to overall system design level, mode of operation and conditions of use. This Instructions can't cover all questions may encounter during customer use process, We sincerely apologize for any inconvenience this may cause.

### 1、产品申明:

使用本产品之前, 请贵司务必预先进行测试, 以便确认是否适合使用目的。产品介绍的用途并不保证不抵触任何专利, 有关 LED 产品的进出口法律责任应由客户担负, 请预先查清每一国家或地区的有关规定。产品可能会因性能提高或规格参数改变等缘故, 恕不经预告更改。我们要求量产前签订正式的产品规格书。

### 1、Declaring:

In order to confirm if it is right for the purpose, Pretest is necessary before use the product. This product presentation does not guarantee not contravene any patent. Relate to imports and exports LED product Legal liability should be responsible by customer, so please verify relevant provision about the LED product in your Target market. we may change specifications from time to time in the interest of product development, without prior notification or public announcement. An agreement of formal product specifications is required prior to mass production.

### 2、物料确认:

投料的 LED BIN 等级是否吻合, 如 VF、CIE BIN、亮度等是否属同一等级, 同一等级的应在一起使用。若不是同一等级的 LED 应用在同一物件上, 应先评估其适用性, (若不同 VF 或 CIE BIN 投在一起可能会发生亮度上或颜色上的差异)

### 2、Before use:

We suggest that the same parameters products should be used together, such as BIN coordinate, VF and luminous flux etc.

### 3、包装储存:

3.1、开包装前避免湿气进入 LED 内部, 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 5-30℃, 湿度不超过 50%。

#### 3.2、开包装后的预防措施

LED 是表面贴装件, 当 LED 进行焊接时, 可能会发生 LED 内部分离, 其发光效率受到影响而导致亮度下降或发光颜色变异。

以下是需注意的事项:

a、开包装后应尽快完成焊接 (24 小时内)。

b、余料请密封或放置在 5 ~ 40℃、湿度不超过 30% 的环境中。

c、如果开包装超过 1 周或湿度指示卡变色 (由蓝色变为粉红色) 并超出 30% 安全值, LED 应进行 60±5℃/24 小时的干燥除湿处理。

3.3、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。请避免环境温湿度的骤变, 尤其是高湿环境下易产生水汽凝结。

### 3、Package and Storage:

3.1、To avoid the moisture penetration, we recommend storing SMD LEDs in a dry box(or desiccator) with a desiccant. The recommended storage conditions are Temperature 5 to 30degrees Centigrade. Humidity 50% maximum.

#### 3.2、Precaution after opening packaging

However LED is correspond SMD, when LED be soldered dip, interfacial separation may affect the light transmission efficiency, causing the light intensity to drop.

Attention in followed.

a. Soldering should be done right after opening the package(within 24Hrs).

b. Keeping of a fraction

- Sealing Temperature : 5 ~ 40℃ Humidity : less than 30%

c. If the package has been opened more than 1week or the humidity indicator color change from blue to pink (over 30%), components should be dried for 24hrs at 60±5℃

### 4、热沉:

4.1、LED 应用终端产品应考虑散热设计, LED 功率温升系数由 LED 在线路板中的排布密度、热阻、和环境温度来决定。设计时 LED 产生的热量不超过其最大极限值 (参考 LED Tj 结温), 和其他电子元器件一样, 有必要考虑避开发热元件的设计。

4.2、LED 发光工作时, 请考虑其工作电流应该由其最大工作结温决定。

### 4、Heat Generation

4.1、Thermal design of the end product is of paramount importance. Please consider the heat generation of the LED when making the system design. The coefficient of temperature increase per input electric power is affected by the thermal resistance of the circuit board and density of LED placement on the board, as well as other components. It is necessary to avoid intense heat generation and operate within the maximum ratings given in this specification.

4.2、The operating current should be decided after considering the ambient maximum temperature of LEDs.

### 5、焊接条件:

5.1、产品是否适合回流焊制程请参考对应产品的规格书。源磊不对浸润式的焊接方式进行质保。

5.2、回流焊接温度及时间请参照对应产品规格书。LED 不宜进行两次或两次以上的回流焊接。

5.3、不建议将 LED 贴装在弯曲的线路板上。焊接时避免快速冷却, 在 LED 焊接冷却过程中避免任何形式的机械力或过度的震动, 焊接后, 不要弯曲线路板。

5.4、完成焊接的 LED 不宜进行返修作业。如不可避免, 采用双头烙铁, 但事先应确认返修是否会对 LED 的特性产生破坏。

### 5、Recommended soldering

5.1、Please refer to LED specification corresponded whether the product is adaptable to reflow process. Runlite cannot make guarantee on the

- LEDs after they have been assembled using the dip soldering method.
- 5.2、Reflow soldering should not be done more than two times.
  - 5.3、Components should not be mounted on warped direction of PCB. Please avoid rapid cooling after soldering. Any mechanical force or any excess vibration shall not be accepted to apply during cooling process to normal temp after soldering. After soldering, do not warp the PCB.
  - 5.4、Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron is suggested. It should be confirmed before hand whether the characteristics of the LEDs will not be damaged by repairing.
- 6、静电防护:  
LED 是静电敏感电子元件, 应采取各种措施避免静电, 诸如在使用过程中戴静电手环或防静电手套。所有的装置、设备仪器应适当的接地。建议在贴装 LED 时预防机器设备的浪, 建议对组装后的 LED 产品进行测试检查 LED 是否受到静电的破坏, 白光或蓝光 LED 确认方法为 (参考): 1mA 或 2.5V/单颗芯片不能点亮或同等条件下亮度较其他 LED 明显偏暗为缺陷品。
- 6、Handling of static electricity :  
These products are sensitive to static electricity charge. Please take measures to prevent any static electricity being produced such as the wearing of a wristband or anti-static gloves when handling this product. All devices, equipment and machinery must be properly grounded. It is recommended that precautions be taken against surge voltage to the equipment. When inspecting the final products in which LEDs were assembled, it is recommended to check whether the assembled LEDs are damaged by static electricity or not. It is easy to find static-damaged LEDs by a light-on test @1mA/ a dice (reference)
- 7、清洁清洗:  
建议使用异丙醇来清洁 LED, 如果要采用其他溶剂清洁, 一定要确保此溶剂不会对环氧、有机硅、硅胶、支架镀银层等产生影响。不建议使用超声波清洗以免对 LED 造成损伤。若不可避免, 清洗前请先进行预测试, 以确认是否对 LED 造成不良影响或潜在性隐患。
- 7、Cleanning:  
Runlite suggests using isopropyl alcohol for cleaning. In case other solvents are used, it must be assured that these solvents do not dissolve the package or resin. Ultrasonic cleaning is not recommended. Ultrasonic cleaning may cause damage to the LED. If have to do that, please pre-test the new method, it will avoid for leding exterior and color fail potentially.
- 8、其他注意事项:
- 8.1、白光 LED 是由蓝光芯片和特种荧光粉组合。因此, LED 的发光颜色会随着工作电流的变化而变化, 使用前应考虑此因素是否能达到预期效果。
  - 8.2、产品的应用可不用考虑防辐射的设计。
  - 8.3、砷化镓应用在某些发射管上, 这类产品在废弃处理过程中禁止碎化或燃烧以免引起危害。由此类产品在废弃处理过程产生的气体或液体, 吸入或饮用亦是危险的。
  - 8.4、LED 长时间暴露在阳光或偶尔暴露在紫外线下可能导致胶体或透镜黄变。
  - 8.5、为保证 LED 光电性能, 请保持 LED 发光区域表面清洁, 避免手指印或其它异物覆盖。
  - 8.6、不建议在 LED 的硅胶表面覆盖其他与之不兼容的脂类物质。
  - 8.7、鉴于吸嘴的形式, 除了要避免作用在硅胶表面的机械外力, 对 SMT 贴装制程基本无限制。
  - 8.8、请留意避免 LED 在组装时与其他组件发生干涉现象。
  - 8.9、在设计电路时应预防开关过程中产生逆向电压或过大电流对 LED 的瞬间冲击。
  - 8.10、LED 支架为镀银支架, 银易与硫元素发生硫化现象, 导致 LED 外观及光色发生变异。生产及使用环境应避免或远离硫元素。
  - 8.11、使用过程中避免镊子等锋利工具触碰硅胶胶体部分。
  - 8.12、产品符合 RoHs 指令, 产品意图主要应用在通用电气设备 (如办公自动设备、通讯设备、视听设备、家用电器、测量工具等) 特别是通用照明。一旦应用在高可靠度或由于故障失效而直接影响人身安全等领域产品上 (航空产品、医疗设备、自动控制系统等), 请事先联系我们的销售代表。
- 8、Other caution:
- 8.1、The White LEDs are devices which are materialized by combining Blue LEDs and special phosphors. Consequently, the color of the LEDs is changed a little by an operating current. Care should be taken after due consideration when using LEDs
  - 8.2、Anti radioactive ray design is not considered for the products listed here in.
  - 8.3、Gallium arsenide is used in some of the products listed in this publication. These products are dangerous if they are burned or shredded in the process of disposal. It is also dangerous to drink the liquid or inhale the gas generated by such products when chemically disposed.
  - 8.4、Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.
  - 8.5、LED electrode and lead frame are comprised of a silver plated copper alloy. The silver surface may be affected by environments which contain corrosive gases and so on. Please avoid conditions which may cause the LED to corrode, tarnish or discolor. This corrosion or discoloration might lower solderability or might affect on optical characteristics.
  - 8.6、Please do not recommend to cover the silicone resin of the LEDs with other resin (epoxy, urethane, etc)
  - 8.7、When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevent.
  - 8.8、Please be aware that this product should not come into contact with other parts in assembled status.
  - 8.9、Please design a circuit that prevents any reverse voltage (excess current) from being applied to this product instantaneously when the circuit is ON or OFF.
  - 8.10、LED electrode and lead frame are comprised of a silver plated copper alloy. It is easy to chemical reaction with sulfur. It will be results in LED exterior and color have been changed. So during produce process and storage condition should avoid or far away for the sulfur materials.
  - 8.11、Avoid touching silicone resin parts especially by sharp tools such as Pincette(Tweezers)
  - 8.12、This product complies with RoHs directives. This product is intended for the application in general electronic devices (such as office automation equipment, communication devices, audio-video equipment, home electrical appliances, measurement hardware and others), especially in general lighting. In cases where this product is used for the applications that requires high reliability or could directly affect human life or health due to failure or malfunction (aerospace hardware, medical equipment, atomic control equipment and others), please consult with our sales representatives beforehand. Our warranty does not cover situations where this product undergoes secondary fabrication such as changes in shape.