SPECIFICATIONS FOR SMALITE

斯迈得规格书

SL-SPE2I-730NA-11FRNW series

SPE2 3535 陶瓷红外系列

Customer 客户确认	Approved 批准	Checked 审核	Prepared 编制

深圳市斯迈得半导体有限公司
地址：广东省深圳市宝安区石岩街道松白路中运泰科技工业厂区厂房 6 栋 8、9 楼

电话: (86 755) 29625658
(86 755) 33581166
传真: (86 755) 271512580

Shenzhen Smalite Semiconductor Co., Ltd
8-9/F, 6th Block, Zhongyuntai Hi-Tech Industrial zone, Songbai Road, Shiyan Office, Bao'an District, Shenzhen
Tel: (86 755) 29625658
(86 755) 33581166
Fax: (86 755) 271512580

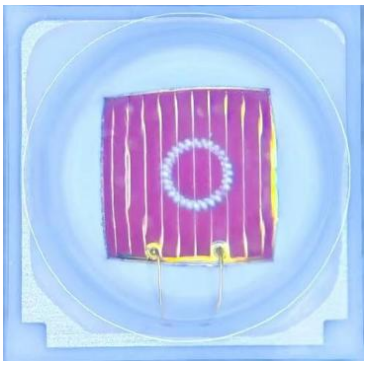
目录

Descriptions 说明

* Industry-standard footprint 行业标准封装
* High lumen and directional light output 高亮度定向光输出
* High reliability 高可靠性
* Lead free product 不含铅，环保
* RoHS compliant 通过 RoHS 认证

Product appearance

产品外观



极性辨识详见第 9 页

Feature 特点

* Ceramic substrate package 陶瓷基板封装
* Size(mm):3.5*3.5*2.3 尺寸（mm）：3.5*3.5*2.3
* Wide Viewing Angle: 120º 宽发光角度：120º
* Electrically neutral thermal path 热电分离
* Pb-free Reflow solderable 无铅回流焊焊接

Applications 产品应用

* Plant factory 植物工厂
* Tissue culture 组织培养
* Landscape lighting 景观照明等
* General use 其他适合的应用

Product Coding Rules 产品编码规则

AB-CDEFG-HIJKL-MNOPST

AB	CDEF	G	HIJ	K	L	MN	O	P	S	T
SL	产品型号	颜色	色区	显色指数	基板信息	串并方式	电流	芯片电压	特殊要求-1	特殊要求-2
Smalite	Part Series	Color	Color area	CRI	Baseboard information	Series and parallel mode	Current	Chip voltage	Other Special -one	Other Special -two

Absolute Maximum Ratings(Ta=25℃) 最大限定参数(Ta=25℃)

Parameter 项目名称	Symbol 符号	Value 规格	Unit 单位
Power dissipation 消耗功率	P_d	1500	mW
Forward current 正向电流	I_F	700	mA
Reverse voltage 反向电压	V_R	5	V
Operating temperature range 工作温度范围	T_{op}	-35 ~+100	℃
Storage temperature range 储存温度范围	T_{stg}	-35 ~+85	℃
Junction temperature 结温	T_j	125	℃
Electrostatic Discharge 抗静电能力	ESD	2000	V

Electro-optical Characteristics(Ta=25℃) 主要光电参数(Ta=25℃)

Parameter 项目名称	Symbol 符号	Min	Typ	Max	Unit	Test Condition 测试条件
Reverse Current 漏电流	IR	--	--	1	uA	VR=5V
Forward voltage 正向电压	V_F	1.8	1.95	2.0	V	IF=350mA
		1.9	2.2	2.3	V	IF=700mA
Peak Wavelength 峰值波长	λp	725	--	737	nm	IF=350/700 mA
Spectrum Radiation Bandwidth（半波宽）	FWHM	--	36	--	nm	IF=350/700 mA
Total radiant flux 辐射功率	Φe	410	445	480	mW	IF =350mA
		760	820	880	mW	IF=700mA
PhotosyntheticPhoton Flux 光合光子通量	PPF	2.3	2.44	2.6	umol/S	IF =350mA
		4.0	4.57	4.9	umol/S	IF =700mA
Viewing Angle 发光角度	$2\theta_{1/2}$	--	120	--	Deg	IF=350/700 mA
Thermal Resistance 热阻	Rth	--	4.2	--	℃/W	V_R=5V

NOTES 注释：

* The measurement of forward voltage maintains a tolerance of ± 0.05V, Tolerance of measurement of Total radiant flux/Photosynthetic Photon Flux :±5%.

*正向电压测量误差±0.05V，辐射功率/光合光子通量±5%。

* wavelength measurement allowance tolerance is ±1nm.

*波长测量误差为 ± 1nm。

* Rth j-sp is the thermal resistance from LED junction to solder point on MCPCB with electrical power.

* Rth j-sp 是通电时从 PN 结到铝基板焊点的热阻。

* The product is not designed to be used under reverse current or voltage, it is recommended to be used under forward current and voltage.

*本产品非设计于逆向电流(压)下使用，建议应于正向电流(压)下使用。

Major output distribution 主要产出分布

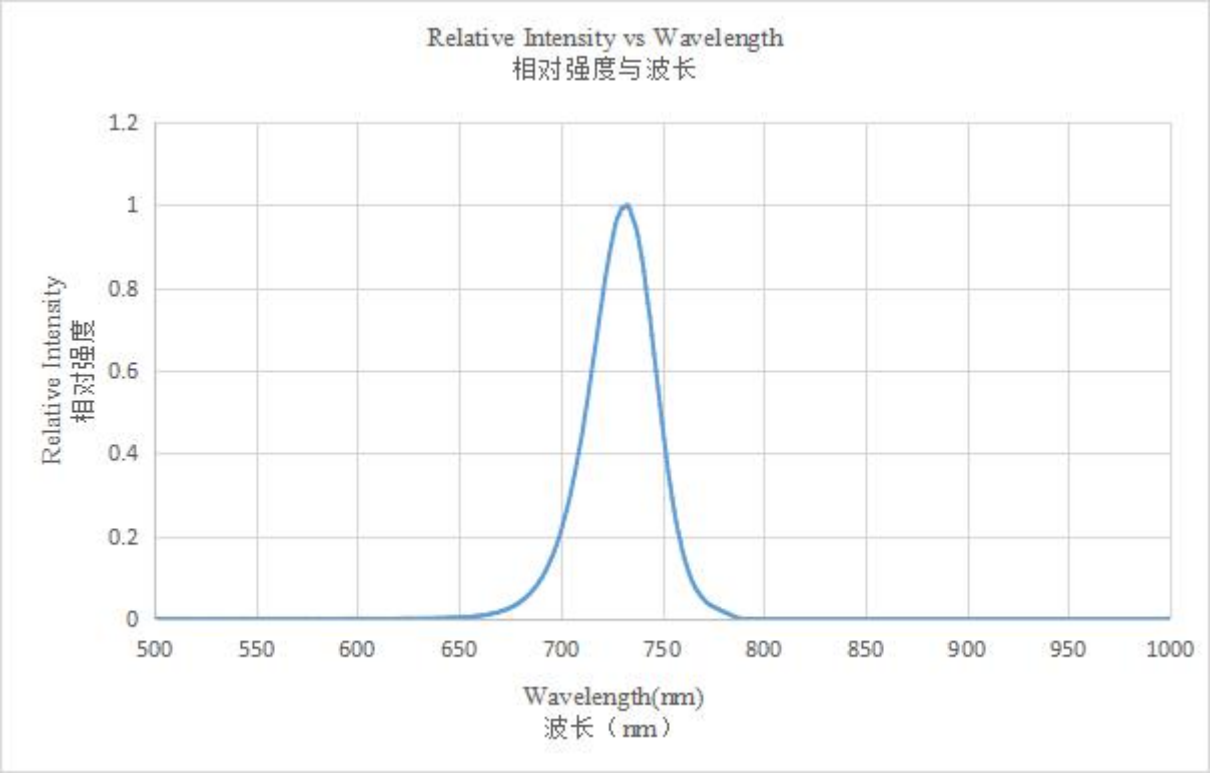
I）IF=350mA (Ta=25℃)

Group	VF(min) (V)	VF(max) (V)	Total radiant flux(min) (mW)	Total radiant flux(max) (mW)	PPF(min) (umol/S)	PPF(max) (umol/S)	PPE(typ) (μmol/s/W)
V1E1	1.8	1.9	410	430	2.3	2.4	3.63
V1E2	1.8	1.9	430	450	2.4	2.5	3.78
V1E3	1.8	1.9	450	480	2.5	2.6	3.94
V2E1	1.9	2.0	410	430	2.3	2.4	3.44
V2E2	1.9	2.0	430	450	2.4	2.5	3.59
V2E3	1.9	2.0	450	480	2.5	2.6	3.74

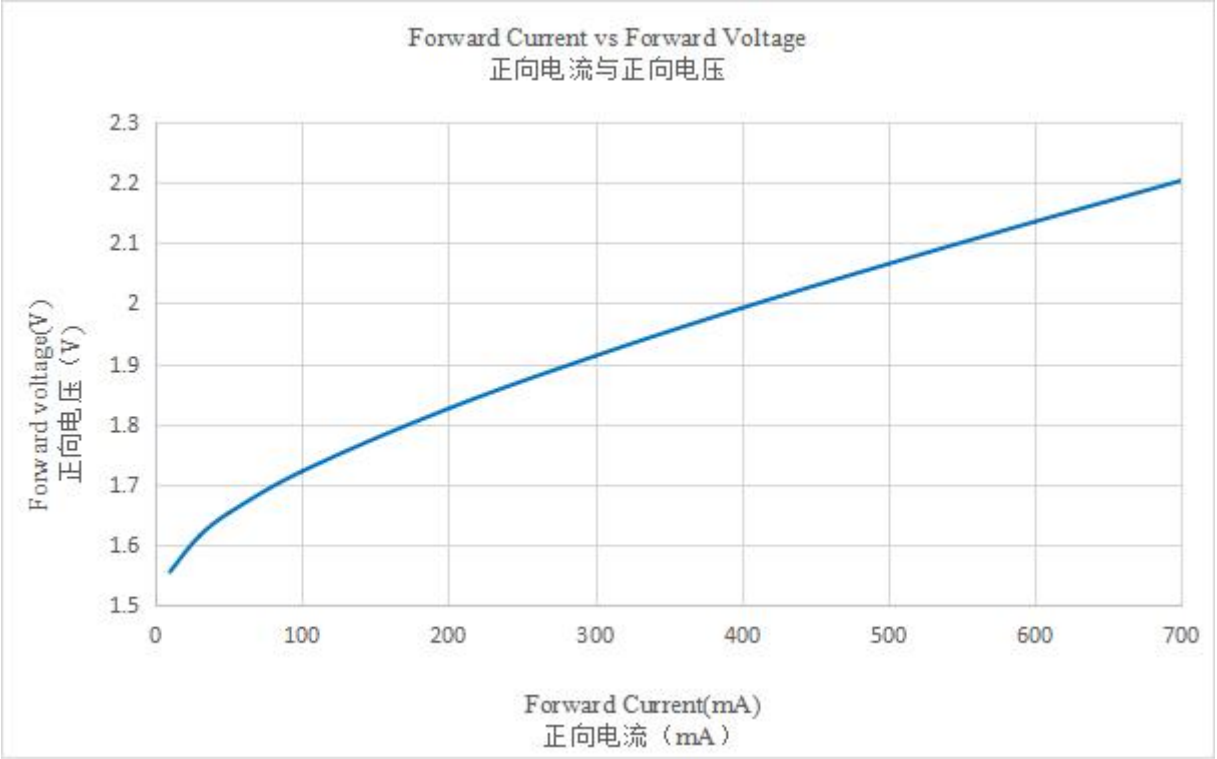
2）IF=700mA (Ta=25℃)

Group	VF(min) (V)	VF(max) (V)	Total radiant flux(min) (mW)	Total radiant flux(max) (mW)	PPF(min) (umol/S)	PPF(max) (umol/S)	PPE(typ) (μmol/s/W)
V1E1	1.9	2.1	760	800	4.0	4.3	2.96
V1E2	1.9	2.1	800	840	4.3	4.6	3.18
V1E3	1.9	2.1	840	880	4.6	4.9	3.39
V2E1	2.1	2.3	760	800	4.0	4.3	2.69
V2E2	2.1	2.3	800	840	4.3	4.6	2.89
V2E3	2.1	2.3	840	880	4.6	4.9	3.08

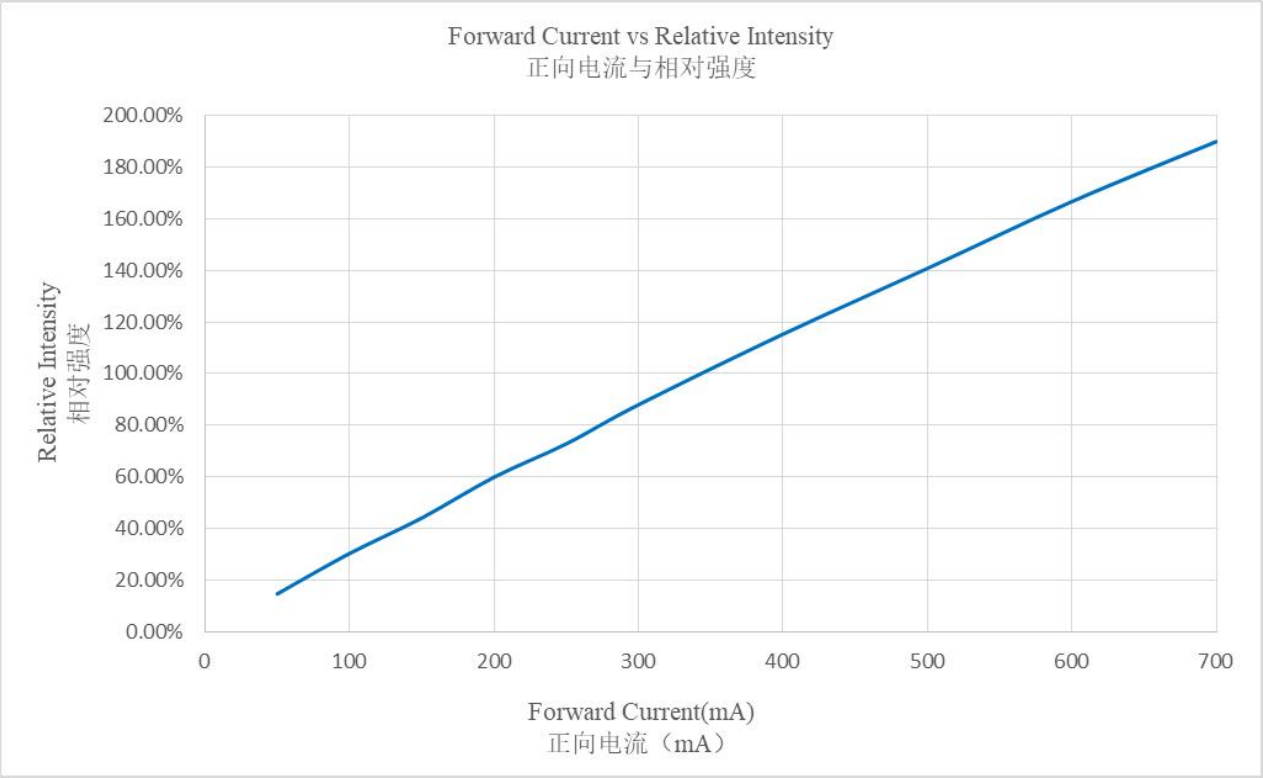
Typical optical characteristics curves 光电特性曲线



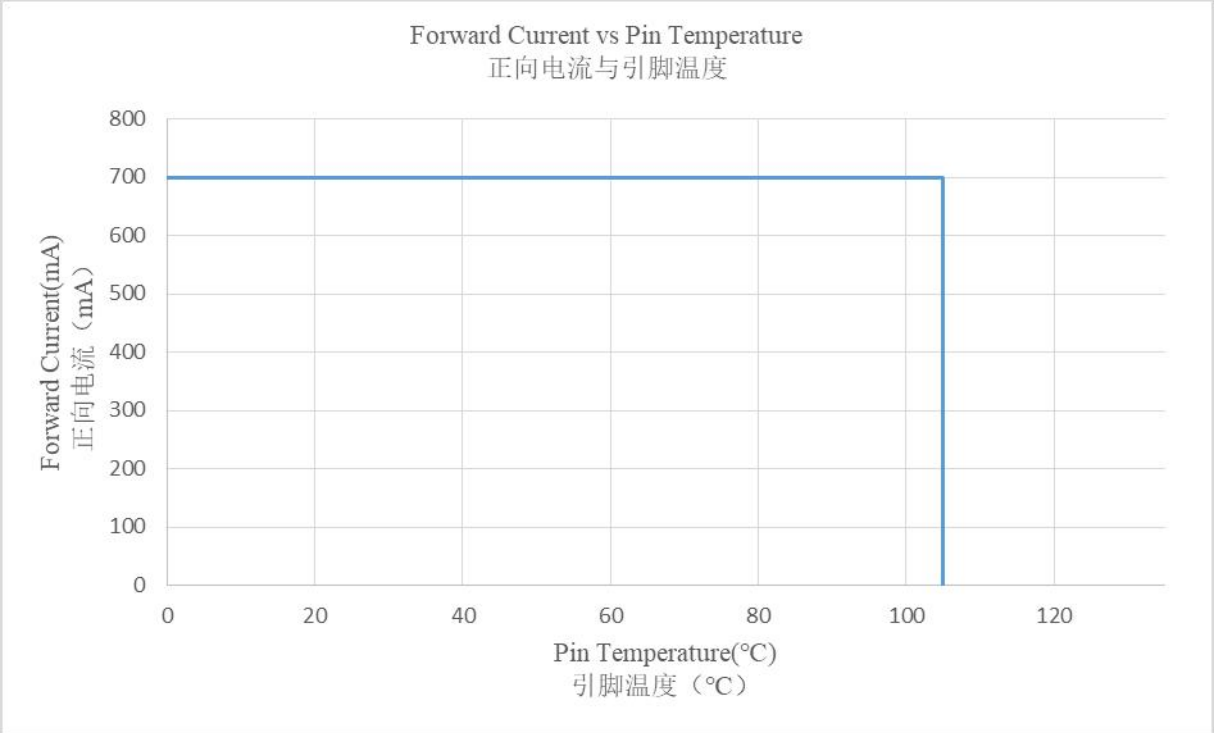
Forward Voltage vs Forward Current 伏安特性曲线



Relative Radiant Flux vs Forward Current 相对辐射通量与正向电流

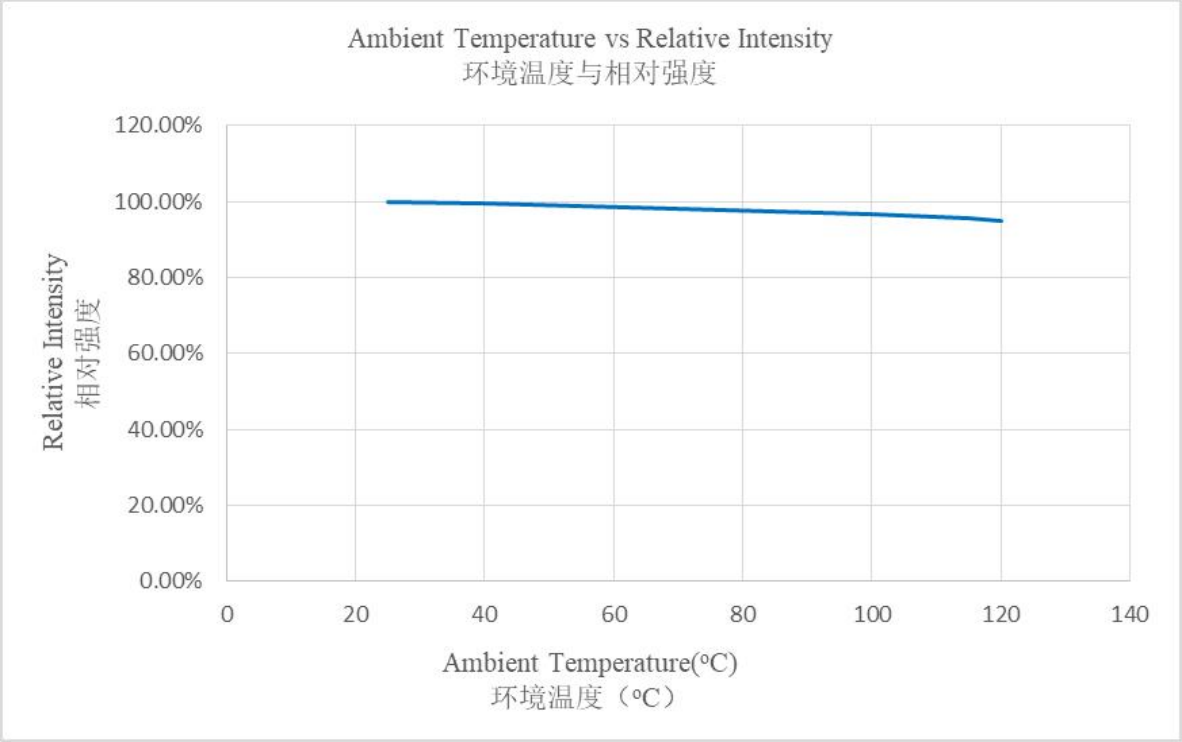


Ambient Temperature vs Forward Current 引脚温度与正向电流



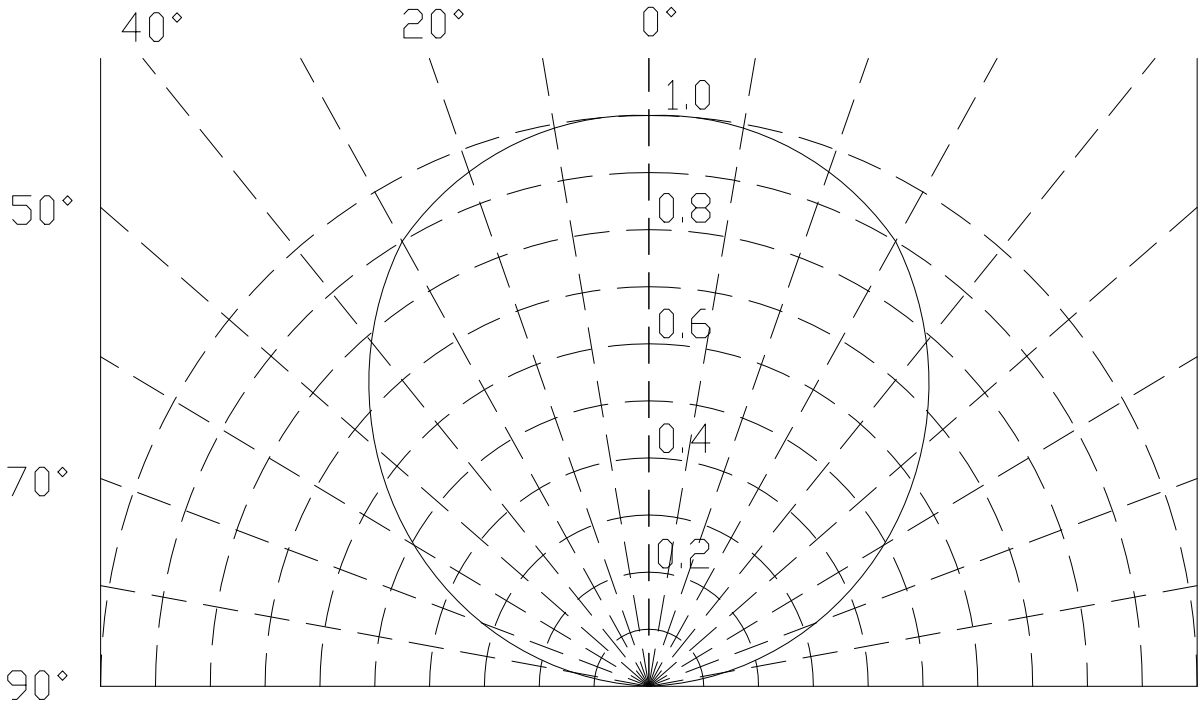
Relative Radiant Flux vs Junction Temperature

相对辐射通量与结温特性曲线

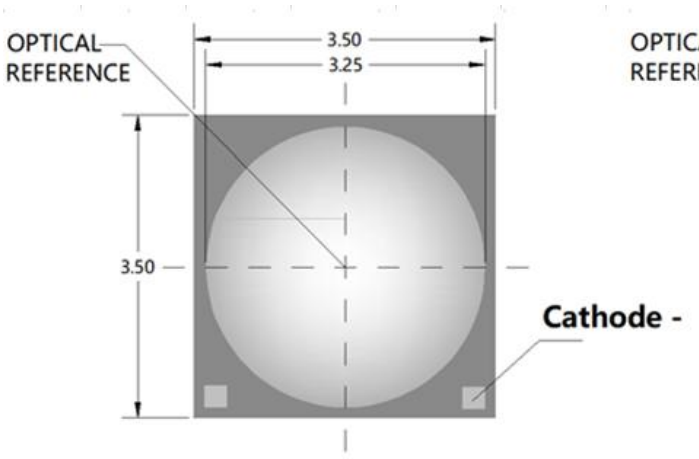


View Angle Distribution 空间角度分布

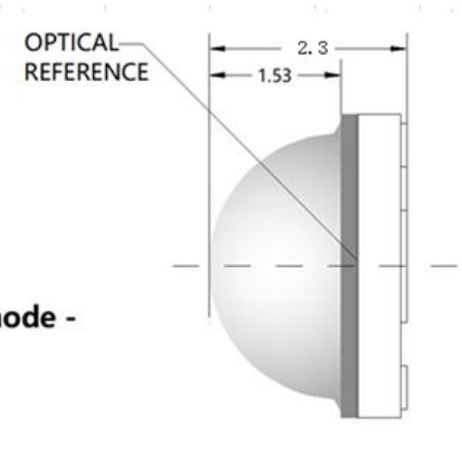
Curves of beam angle and relative brightness



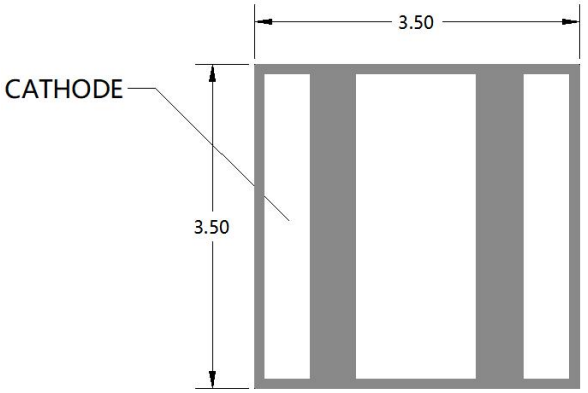
Mechanical Dimensions 外观尺寸



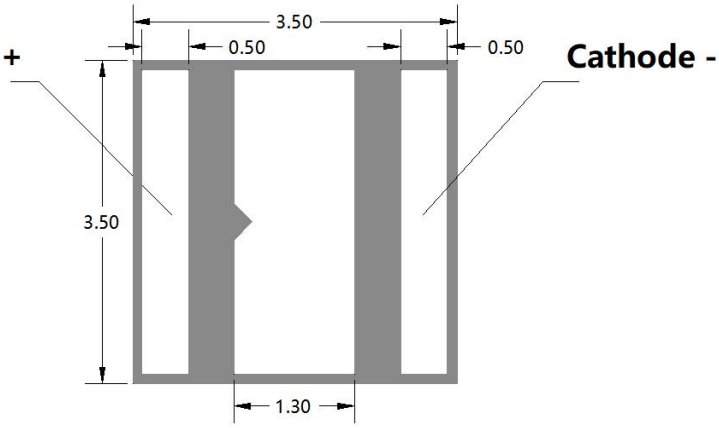
Top View



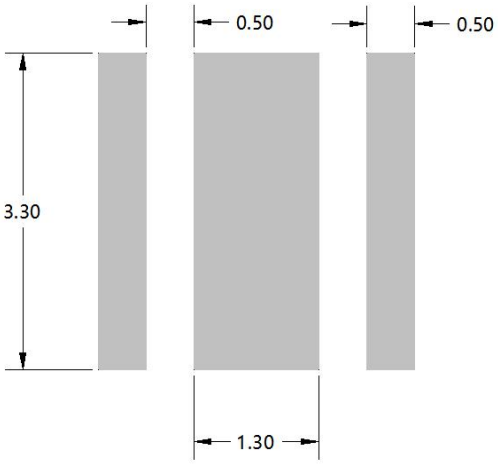
Side View



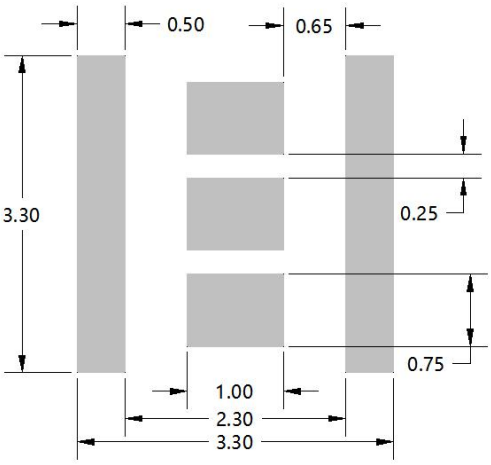
Bottom View



Alternate Bottom View



Recommended PCB Solder Pad

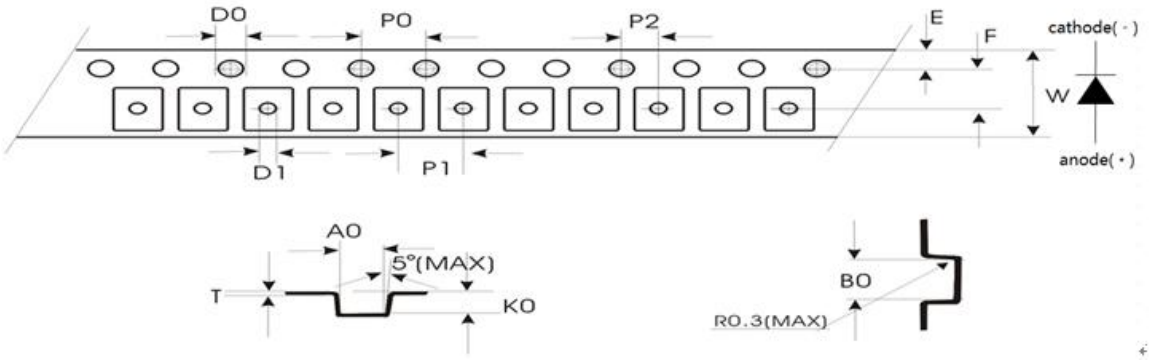


Recommended stencil Pattern
(Shaded Area Is Open)

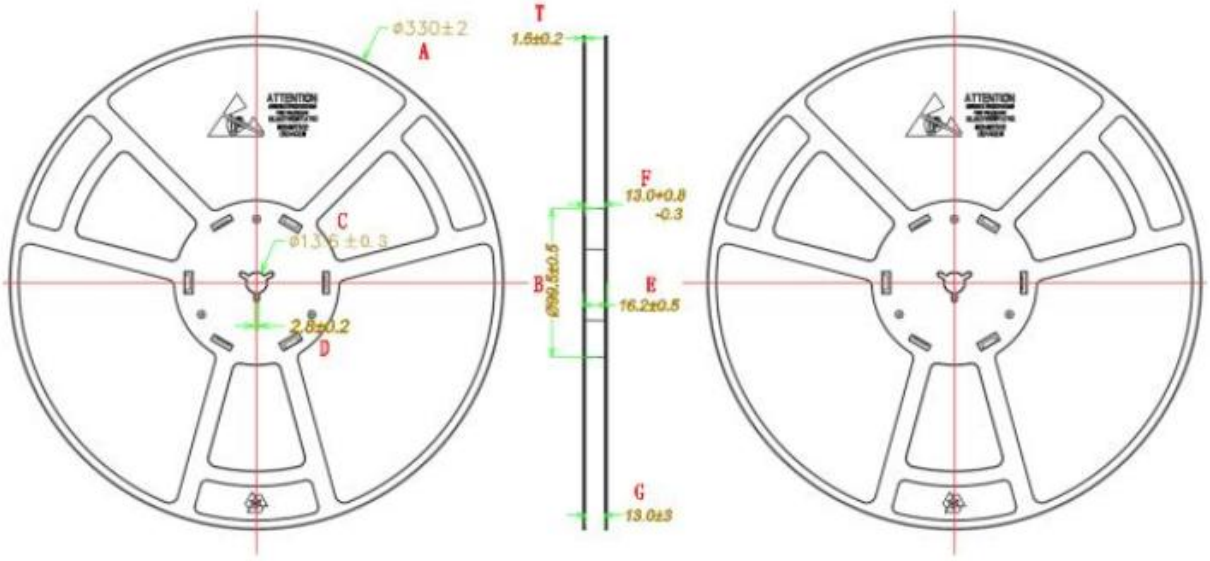
Packaging 包装

Dimensions of Tape 载带规格

A0	3.90±0.1	P0	4.00±0.1	T	0.30±0.03	D0	1.60±0.1	10P0	40.00±0.2
B0	3.90±0.1	P1	8.00±0.1	E	1.75±0.1	D1	1.60±0.1		
K0	2.60±0.1	P2	2.00±0.1	F	5.50±0.1	W	12.00±0.1		



Dimensions of Reel 卷盘规格



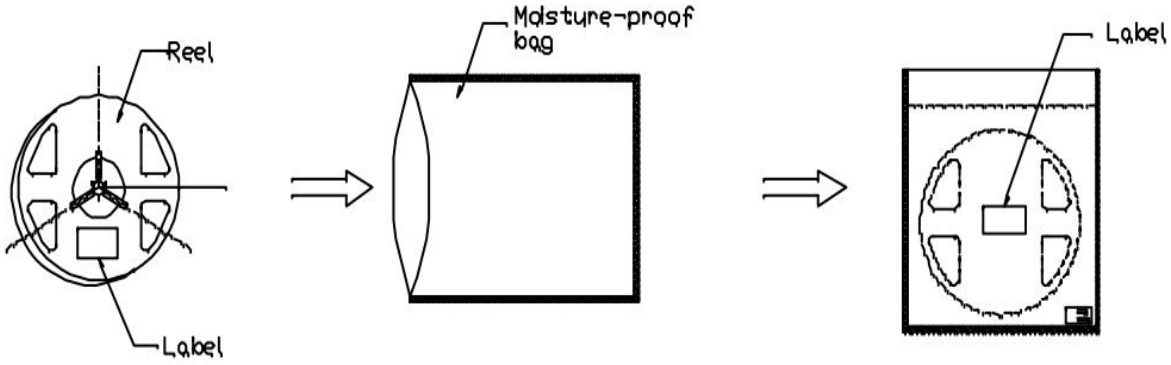
A±2	B±0.5	C±0.3	D±0.2	E±0.5	$F^{+0.8}_{-0.3}$	G±3	T±0.2
ø330	99.5	13.6	2.8	16.2	13.0	13.0	1.6

NOTES 注释：

*数量：3000pcs/卷

***Quantity: The quantity/reel is 3,000 pcs。**

Packaging specifications 包装规格



Label 标签

Part NO：产品型号 Product model

LOT NO：指令单号 Instruction number

Φe： 辐射功率 Total radiant flux

WLP：峰值波长 Peak Wavelength

FR：光合光子通量 Photosynthetic Photon Flux

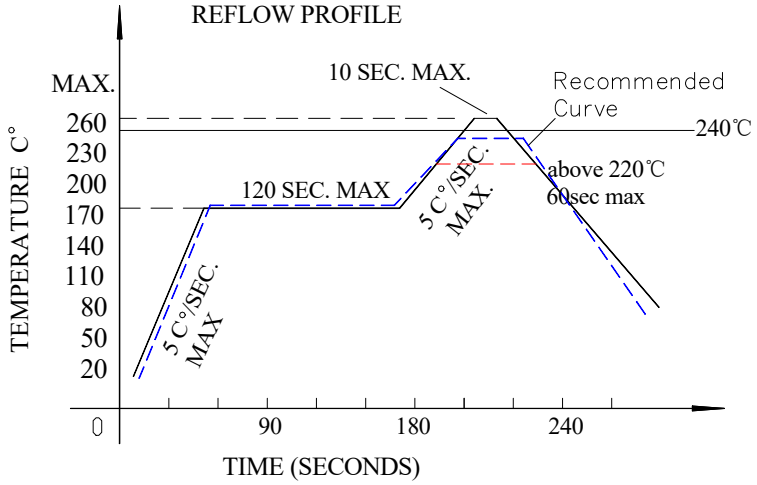
VF：正向电压 Forward Voltage

IF：电流 Electric current

QTY：数量 Quantity

Date：日期 Date

Requirements for Application and Reflow Soldering 应用及回流焊要求



Reflow soldering curve 回流焊曲线图

(Product is highest resistant to 260℃ reflow but suggested the highest temperature of 240℃ within)

（产品最高可耐260℃回流焊，但建议最高温度设为240℃）

■ Notes for reflow soldering 回流焊注意事项：

1. No more than twice for reflow soldering.
   注意回流焊不可超过两次。
2. To ensure the quality of our LEDs, we encapsulate them with silica gels. So please do not put pressure on the LEDs.
   为保证 LED 质量及可靠性我司采用硅胶封装，胶体表面较软，焊接加热过程中，不可施加压力在 LED 表面。
3. Please choose the right nozzle(try to learn from the plastic products parts) to avoid the damage to products due to the pressure.
   在吸嘴的选取上要选择吸嘴的大小和压力合适的吸嘴（尽量吸取产品的塑胶部分），以避免造成压力过大伤害产品。
4. Please put on the antistatic hand loop during the use. The worktable should be with antistatic finish. The equipments must be contacted with ground.
   LED 为静电敏感产品，使用时请佩带防静电手环，工作台做好防静电处理，机台设备等保证接地。

■ Handwork soldering 手工焊接：

1. During the soldering, the electronic soldering iron must be kept under the temperature of 300℃ and the soldering time must not be beyond 3 seconds. No touch between the electronic soldering iron and colloid.
   手工焊接时，要保持电烙铁温度在 300 摄氏度以下，并且焊接时间小于 3 秒，电烙铁不可接触胶体。
2. Handwork soldering is only allowed once. We won't take responsibility for more than that.
   手工焊接只可进行一次，重复焊接不保证产品是否完好。
3. Avoid using sharp objects to compress products Colloidal Part directly.
   避免使用尖锐的物体直接接触产品胶体部分。
4. Please put on the antistatic hand loop during the use. The worktable should be with antistatic finish. The equipments must be contacted with ground.

LED 为静电敏感产品，使用时请佩带防静电手环，工作台做好防静电处理，机台设备等保证接地。

Storage Conditions 储存条件

Before opening the package 打开包装袋前：

1. The LEDs can be preserved for 1 year in condition of temperature no more than 30℃ and humidity no more than 60%RH. Recommended for moisture-proof foil bag with desiccant packaging methods and stored in the constant temperature and humidity box. Can not reach the requirements under the environment of the guarantee as far as possible in six months after use.

   在温度不超过30℃及湿度不超过60%RH 条件下，LED 可以保存一年，建议采用带干燥剂的防潮铝箔袋的包装方式，存放在恒温恒湿箱中。达不到要求的环境下，尽量保证在6个月内使用完毕。

After opening the package打开包装后：

1.The LEDs should be run out with 12 hours in condition of temperature no more than 30℃ and humidity no more than 60%RH. The rest products should be pressurized in vacuum condition with desiccants. Stored for more than 7 days, next time also must be dehumidification, the dehumidification conditions is 70℃ with 12 hours.

   开封后，LED 在≤30℃,≤60%RH 相对湿度的条件下，12 小时内完成贴片作业，未用完的产品重新真空密封，并放置在一个密封容器中，同时必须使用干燥剂。存储超过7 天，下次使用时同样需要除湿操作，除湿条件为70℃ 12 小时。

2.The sealed storage products stock in the drying cabinet more for than one month, then must be dehumidified before used, and the dehumidified conditions is 70℃ 24 hours.

   密封的产品在干燥箱中存储超过1个月的，须经过深度除湿作业才能上线，除湿条件：70℃24小时。

3. If the product does not vacuum sealed packaging, and in the air for more than 40hours, this product must be removed from the tape of reel and put into the steel plate to dehumidify with 150℃ 2 hours, then could ensure the quality of the product after the soldering operation.

   如果产品没有真空包装密封保存，且在空气中放置超过40小时，此产品必须从载带中拆出，放入钢盘进行150℃2小时的除湿，之后进行回流焊作业才能保证产品品质。

Handling Conditions 操作事项

1. LED operating environment and sulfur element composition cannot be over 100PPM in the LED mating usage material. This is provided for informational purposes only and is not a warranty or endorsement.
   LED 工作环境及与 LED 适配的材料中硫元素及化合物成分不可超过 100PPM。这只是一个建议，不做任何品质担保。
2. In order to prevent ex- ternal material from getting into the inside of LED, which may cause the malfunction of LED, the single content of Bromine element is required to be less than 900PPM, the single content of Chlorine element is required to be less than 900PPM, the total content of Bromine element and Chlorine element in the external materials of the application products is required to be less than 1500PPM. This is provided for informational purposes only and is not a warranty or endorsement.
   为了防止外界物质进入 LED 内部以造成 LED 的损失，所处环境及所用套件等等，单一的溴元素含量要求小于 900PPM，单一氯元素含量要求小于 900PPM，溴元素与氯元素总含量必须小于 1500PPM。这只是一个建议，不作任何品质担保。
3. VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsulants of LEDs and discolor when exposed to heat and photonic energy. The result can be a significant loss of light output from the fixture. Knowledge of the properties of the materials selected to be used in the construction of fixtures can help prevent these issues. Smalite advises against the use of any chemicals or materials that have been found or are suspected to have an adverse effect on device performance or reliability. To verify compatibility, Smalite recommends that all chemicals and materials be tested in the specific application and environment for which they are intended to be used. Attaching LEDs, do not use adhesives that outgas organic vapor.
   应用套件中的挥发性物质会渗透到 LED 内部，在通电产生光和热的条件下，会导致 LED 变色，进而造成严重光衰，提前了解套件材料能够避免产生这些问题。斯迈得反对使用任何对 LED 器件的性能或者可靠性有害的物质或材料，不管这些材料是已经证实了的还是仅仅怀疑有害。针对特定的用途和使用环境，斯迈得建议对所有物质和材料进行相容性的测试。在贴装 LED 时，不要使用能产生有机挥发性气体的粘接剂。
4. Handle the component along the side surface by using forceps or appropriate tools; do not directly touch or Handle the silicone lens surface, it may damage the internal circuitry.
   通过使用适当的工具从材料侧面夹取，不可直接用手或尖锐金属压胶体表面，它可能会损坏内部电路。

5. In designing a circuit, the current through each LED cannot be 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. The driving circuit must be designed to allow forward voltage only when it is ON or OFF. If the reverse voltage is applied to LED, migration can be generated resulting in LED damage.
   设计电路时，通过 LED 的电流不能超过规定的最大值，同时，还需要使用保护电阻，否则，微小的电压变化将会引起较大电流变化，可能导致产品损毁。电路设计必须保证只有在开关或者关闭的时候出现正向电压的变化，不要施加反压，否则会损坏 LED。

6. Thermal Design is paramount importance because heat generation may result in the Characteristics decline, such as brightness

decreased, Color change and so on. Please consider the heat generation of the LEDs when making the system design.
LED 容易因为自身的发热和环境的温度改变而改变，温度升高会降低 LED 发光效率，影响发光颜色，所以在设计时应充分考虑散热问题。

7. Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust， requiring special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after the soldering of components. Smalite 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.
与其他封装胶相比，硅胶通常较软，表面易吸附脏污，应用时应特别注意，当对产品洁净度要求较高时，回流焊以后需要采用恰当的清洗方式，我们推荐用异丙醇作清洗剂，如需要用到其他清洗剂，必须保证不会破坏封装体，超声清洗可能会对 LED 带来损害，不推荐这种清洗方式。