

## 高智慧科技 LED 规格书

### SPECIFICATION FOR VANTEX LED LAMP

产品型号:

MODEL No : VA35281WC32BBF38A

制作日期: 2011 年 8 月 15 日

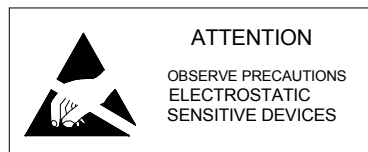
DOC. No : 15Aug2011

产品描述:

Product Description:

3528 正白 SMT-LED

3.5 x 2.8 x 1.9mm SMT-LED in Normal White  
Color



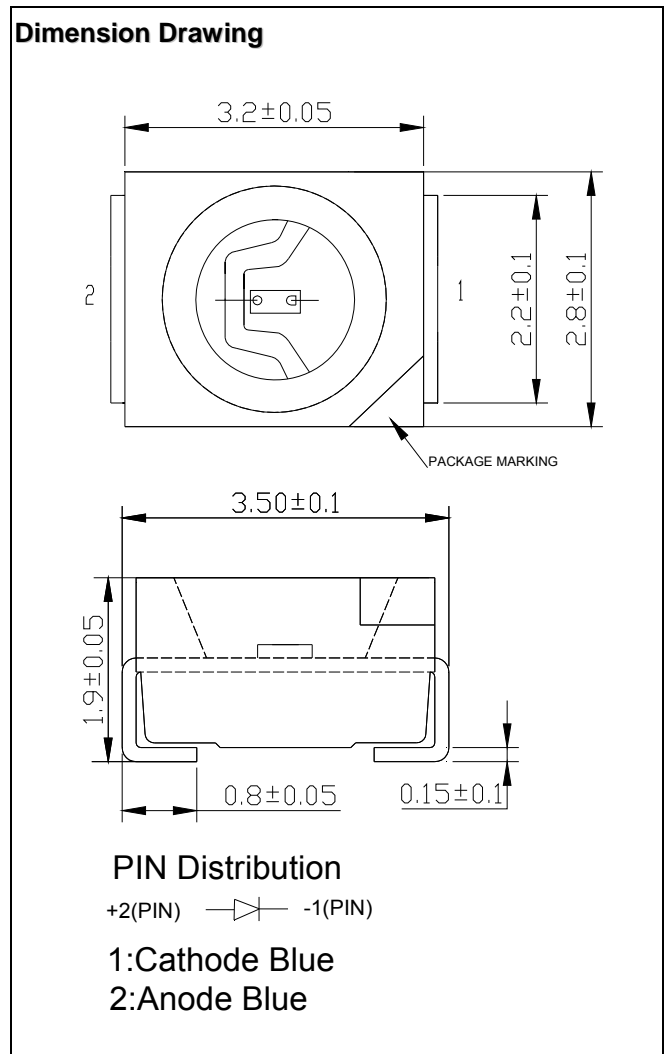
**Applications:(应用)**

- Indicators (指示灯)
- Illumination (照明)
- LED Back Lights (背光源)
- Energy Saving Lamp (节能灯)
- Automobile's Applications (汽车行业应用)

**Absolute Maximum Ratings at Ta = 25°C**

(在 25°C环境下最大绝对额定值)

Items (项目)	Symbol (符号)	Absolute maximum Rating (最大绝对额定值)	Unit (单位)
Forward Current (正向电流)	I <sub>F</sub>	25	mA
Peak Forward Current (正向峰值电流)	I <sub>FP</sub>	3x25	mA
Reverse Voltage (反向电压)	V <sub>R</sub>	5	V
Power Dissipation (功率消耗)	P <sub>D</sub>	90	mW
Operation (工作温度)	T <sub>opr</sub>	-40 ~ + 100	°C
Storage Temperature (储存温度)	T <sub>stg</sub>	-40 ~ + 100	°C
Junction temperature (结温)	T <sub>j</sub>	120	°C
Soldering temperature (焊接温度)	T <sub>sol</sub>	260	°C
Manual soldering time at 260°C(max) (260°C 手工焊接时间)	---	5	sec



**Notes:**

1. Proper current rating must be observed to maintain junction temperature below the maximum at all time.  
(额定电流值要维持在最大结温温度以下.)
2. IFM condition: 0.1 ms pulse width, Duty Cycle=0.25.  
(电流条件: 脉宽: 0.1ms, 周期: 0.25.)
3. All above test condition: Mounted on PC Board FR 4(pad size>=16mm<sup>2</sup>)  
(以上测试条件: 安装在 FR4-PC 板上, 面积不能小于 16 平方毫米.)
4. LED lamps are not designed to be driven in reverse bias.  
(LED 不能设计反偏驱动.)

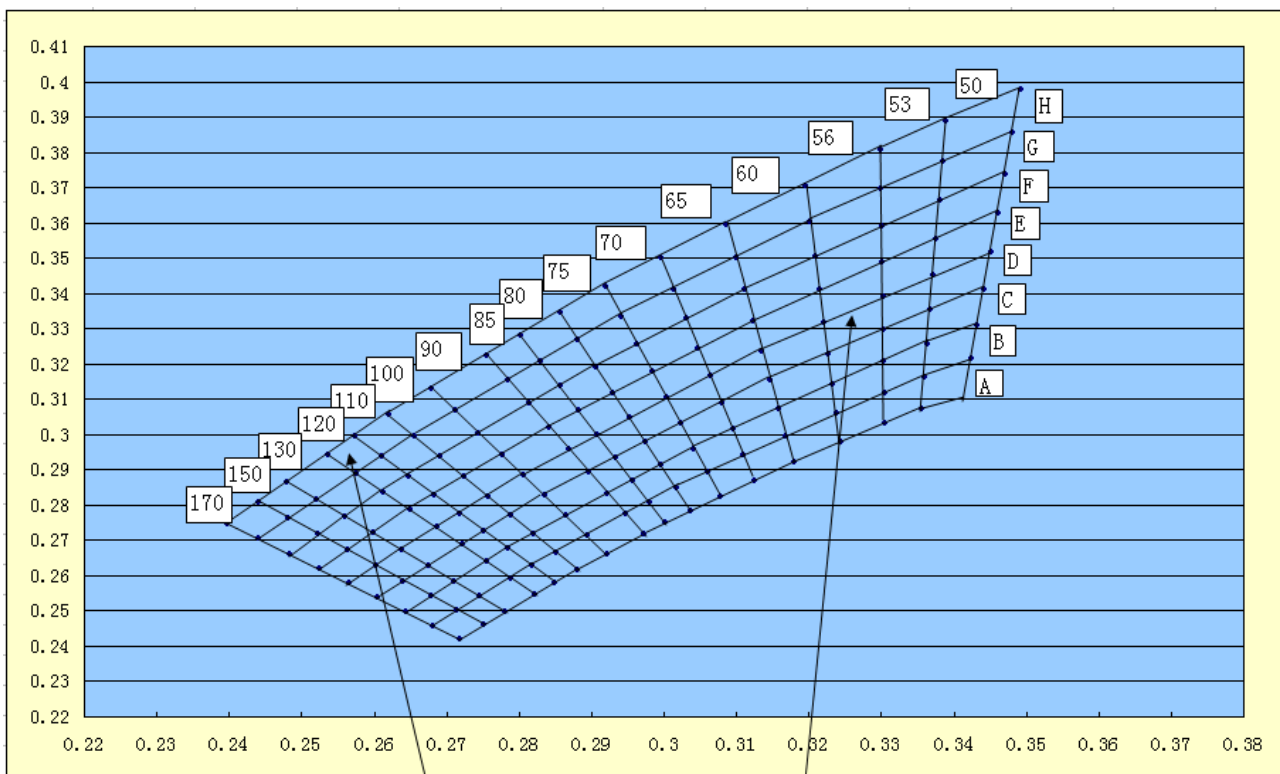
**Typical Electrical & Optical Characteristics ( Ta = 25°C)** (在 25°C 环境下光电强特性)

Items (项目)	Symbol (符号)	Condition (条件)	Min (最小值)	Typ (典型值)	Max (最大值)	Unit (单位)
Forward Voltage (正向电压)	$V_F$	$I_F = 20\text{mA}$	3.0	3.2	3.6	V
Reverse Current (反向漏电流)	$I_R$	$V_R = 5\text{V}$	---	---	5	$\mu\text{A}$
Luminous Intensity (光强)	$I_v$	$I_F = 20\text{mA}$	700	2200	2600	mcd
Luminous Flux (光通量)	$\Phi_v$	$I_F = 20\text{mA}$	2.0	7.2	8.0	lm
Chromaticity Coordinates (色坐标)	x	$I_F = 20\text{mA}$	---	0.333	---	---
	y	$I_F = 20\text{mA}$	---	0.356	---	---
Color Temperature (色温)	$T_c$	$I_F = 20\text{mA}$	5000	6000	8000	K
Power (Avg) (功率消耗)	P	$I_F = 20\text{mA}$	---	0.064	---	mw
Color rendering index (显色指数)	Ra	$I_F = 20\text{mA}$	72	73	75	---
50% Power Angle (发光角度)	$2\theta_{\frac{1}{2}}$	$I_F = 20\text{mA}$	---	120	---	deg

**Notes:**

- 1) Tolerance of measurement of the Color Coordinates is  $\pm 0.01$ . (色坐标精度 $\pm 0.01$ .)
- 2) Tolerance of measurement of  $V_f$  is  $\pm 0.05$ . (电压精度 $\pm 0.05$ .)
- 3) Luminous Flux is measured with the accuracy of  $\pm 10\%$ . (光通量测量精度 $\pm 10\%$ .)

**CIE Chromaticity Diagram (色区图)**



Example 120H:CCT 12000-13000K, XY→H      56D:CCT 5600-6000K, XY→D

**Graphs (曲线图)**

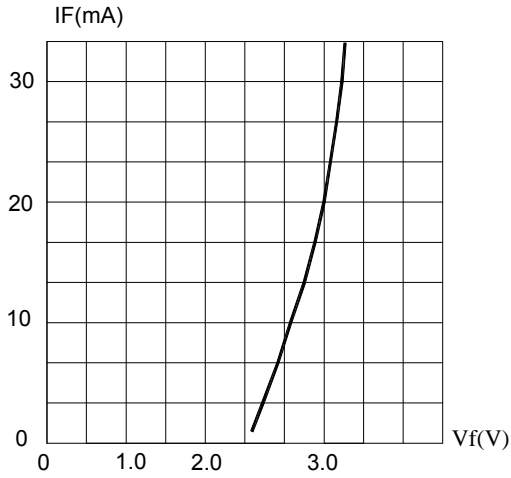


FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE.  
(正向电流与正向电压的曲线图)

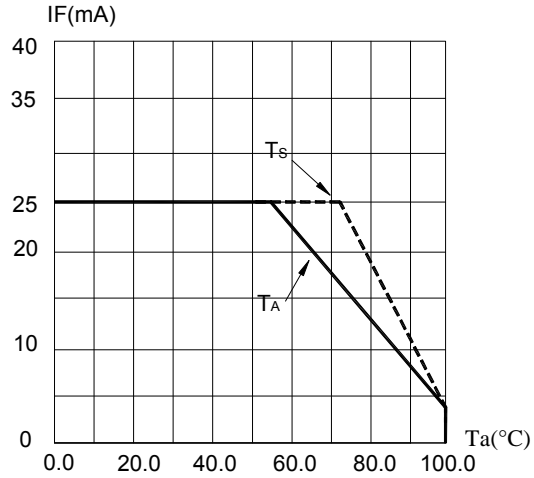


FIG.2 MAXIMUM FORWARD DC CURRENT VS AMBIENT TEMPERATURE( $T_{jmax}=120\text{ }^{\circ}\text{C}$ )  
 $T_A$  temp. ambient;  $T_S$  temp. solder point.  
(最大正向电流与环境温度关系曲线图)

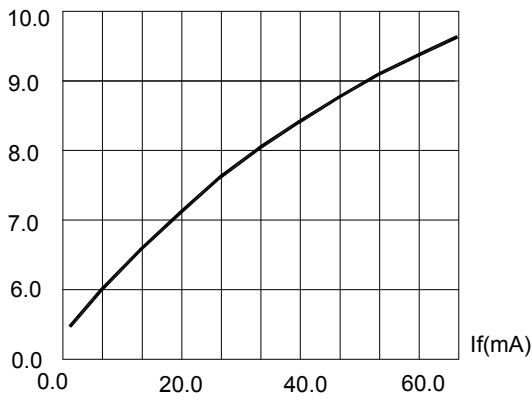


FIG.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT  
(正向电流与光通量的曲线图)

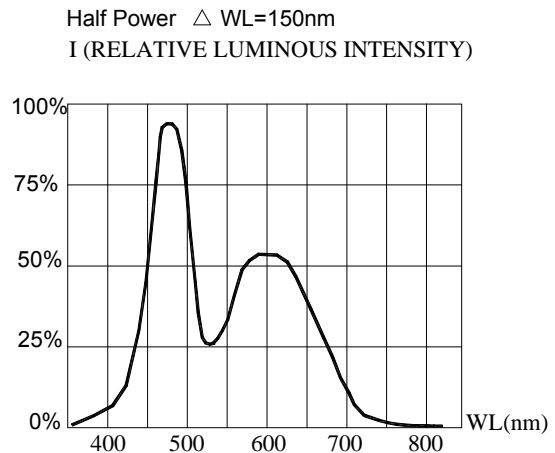


FIG.4 RELATIVE LUMINOUS INTENSITY VS. WAVELENGTH.  
(光谱曲线图)

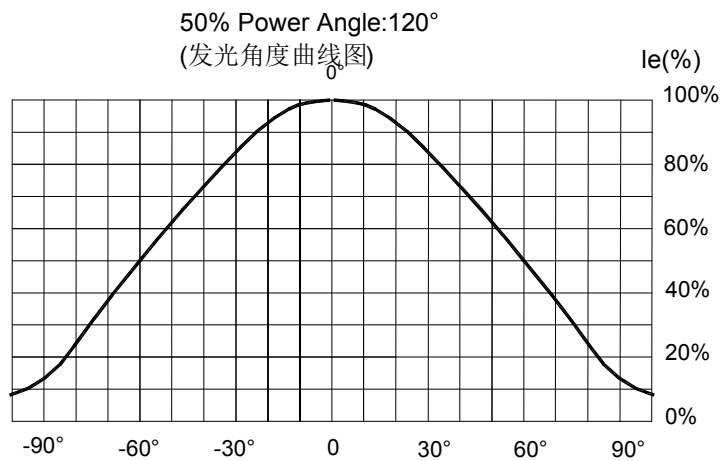
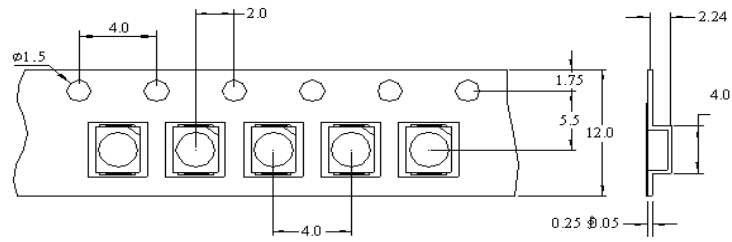


FIG.5 FAR FIELD PATTERN

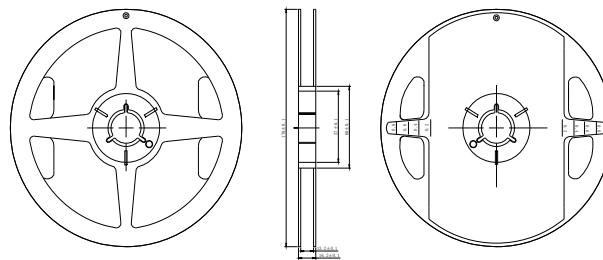
MODEL No :	VA35281WC32BBF38A
Edition No.	A0

### Packaging (包装)

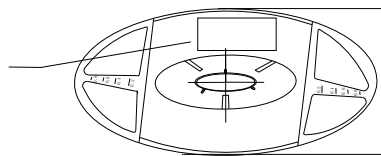
#### Dimensions for Tape (编带规格)



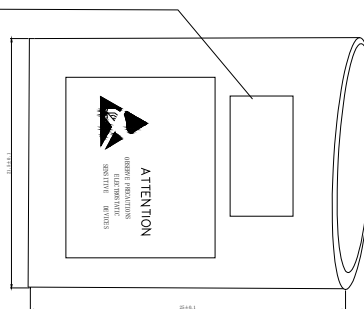
### Packing (包装)



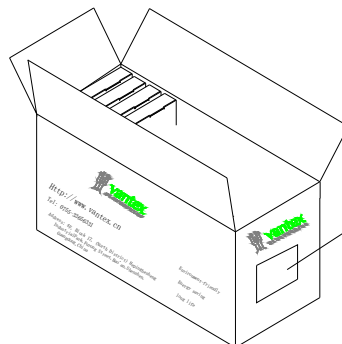
Reel, quantity: 2,000 pcs



Bag, quantity: 2,000 pcs



Box, quantity: 30 Bag



### Notes:

- All dimensions are in mm, tolerance is  $\pm 2.0\text{mm}$  unless otherwise noted.  
(所有的尺寸都是毫米为单位, 公差 $\pm 2.0\text{mm}$ , 特殊尺寸做特殊标识.)
- Specifications are not subject to change without notice.  
(没有通知前说明书不能随意改动.)

## Reliability Testing for SMD (可靠性测试)

Type (类型)	Test Item (测试项目)	REF. Standard (检测标准)	Test condition (测试条件)	Times (次数)	Sample count (样品数量)
Environments Sequence (环境检测)	Temperature Cycle (温度循环)	JESD22-A104-A	-40℃~25℃~100℃~25℃ 30min,5min,30min,5min	100 cycles	100
	Thermal shock (冷热冲击)	JESD22-A106	-40℃~100℃ 30min,30min	100 cycles	100
	Temperature Storage (温度存储)	JIS C 7021 (1977)B-11	Ta=60℃ RH=90%	1000Hrs	100
Operation Sequence (性能检测)	Life test (寿命测试)	JESD22-A108-A	Ta=25℃ If: B=20mA	1000Hrs	100
	High humidity Heat life test (高温高湿寿命测试)	JESD22-A101	Ta =85℃ RH=85% If: B=15mA	1000Hrs	100
Destructive Sequence (破坏性检测)	Resistance to soldering Heat (高温焊接)	JESD22-A113	IR soldering 245℃/10sec	10Sec	20
ESD Test (抗静电测试)	ESD TEST	AEC(Q101-002)	Human body model 2000v	--	10
Physical Sequent (抗振性检测)	Physical Sequence	MIL-STD-883 Method 2007	20G min ,20 to 2000Hz 4 cycles,4min.Each,X,Y,Z	--	50

## Application notes (申请注意事项)

The purpose of this document is to provide a clear understanding to the customers and users, on the ways how to use our LED lamps appropriately. (该文件的目的是为了让客户和使用者更加清楚怎样使用我们 LED 产品.)

### Description

Generally, LED can be used the same way as other general-purpose semiconductors. When using VANTEX'S Lamps, the following precautions must be taken to protect the LED.(LED 都有共同的特性, 使用我们的 LED 产品也要做到以下保护措施.)

### 1. Cleaning (清洁)

- ✧ Don't use unspecified chemical liquids to clean the SMT-LED; the chemical could harm the SMT-LED. When washing is necessary, please immerse the SMT-LED in alcohol at normal room temperature for less than 1 minute and dry at normal room temperature for 15 minutes before use. (不要使用未经许可的化学清洗液清洗 LED, 化学品会损害 LED, 若必须清洗时, 请在室温下使用标准认证的酒精清洗, 清洗时间不能超过 1 分钟, 使用前在干燥的房间内放置 15 分钟.)
- ✧ The influence of ultrasonic cleaning on the SMT-LED depending on factors such as ultrasonic power and the way SMT-LED are mounted. Ultrasonic cleaning shall be pre-qualified to ensure this will not cause damage to the SMT-LED. (超声波震动清洗对 LED 是有损害的, 所以使用超声波清洗后要对产品再次确认对产品是没有损害的.)

## 2. Moisture Proof Packing (防潮)

- ✧ In order to prevent moisture absorption into SMT-LED during the transportation and storage, SMT-LED is packed in a moisture barrier bag. Desiccants and a humidity indicator are packed together with SMT-LED as the secondary protection. The indication of humidity indicator card provides the information of humidity within SMD packing. (为了防止 LED 在运输和储存的过程中受潮, 所以把 LED 包装在一个抽真空的铝箔袋里, 在铝箔袋里放一个干燥剂和一个湿度卡作为进一步防护,)

## 3. Storage (储存)

- ✧ Shelf life in original sealed bag at storage condition of  $<40^{\circ}\text{C}$  and  $<90\%RH$  is 6 months. Baking is required whenever shelf life is expired. (在温度低于  $40^{\circ}\text{C}$  和湿度低于  $90\%$  的环境下质保期是 6 个月, 质保期过后必须烘烤后使用.)
- ✧ After bag opening, the SMT-LED must be stored under the condition  $<30^{\circ}\text{C}$  and  $<60\%RH$ . Under this condition, SMT-LED must be used (subject to reflow) within 8 hours after bag opening, and re-baking is required when exceeding 12 hours. (打开包装袋后, LED 必须在温度低于  $30^{\circ}\text{C}$ 、湿度低于  $60\%$  的条件下保存, 打开包装袋的 LED 灯必须在 8 小时内使用完成, 未使用完的 LED 灯必须从新标准条件烘烤 12 小时后在使用.)
- ✧ For baking, place SMT-LED in oven at temperature  $80\pm 5^{\circ}\text{C}$  and relative humidity  $\leq 10\%RH$ , for 12 hours. (LED 除湿条件是烤箱温度  $80\pm 5^{\circ}\text{C}$ 、湿度低于  $10\%$ , 除湿时间 12 小时.)

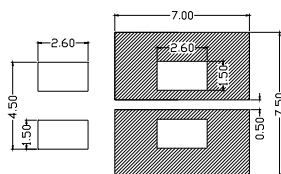
## 4. Soldering (焊接)

### . Manual soldering by soldering iron (手工烙铁焊接)

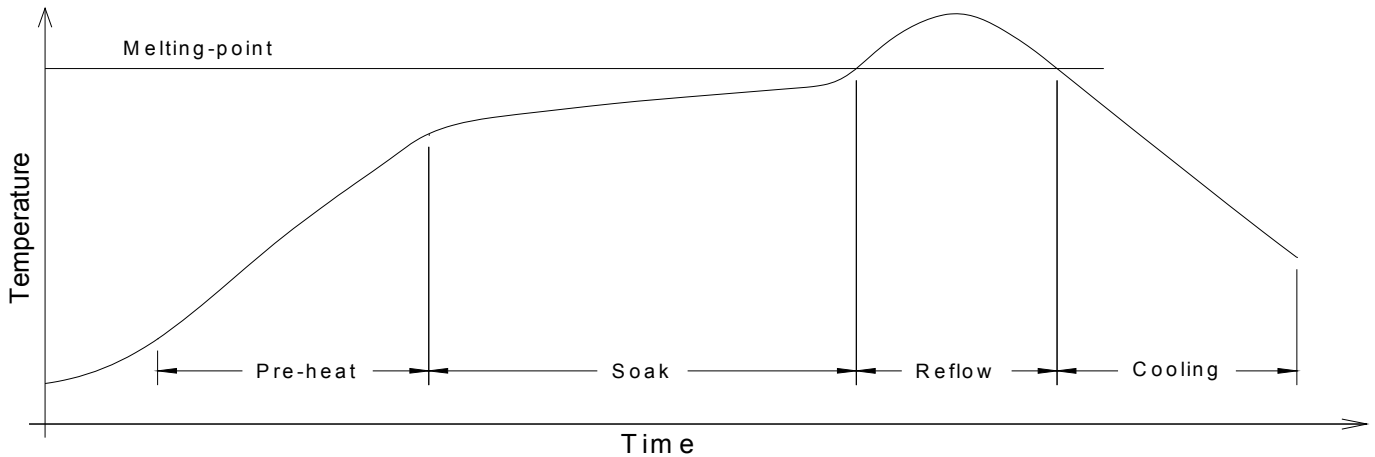
- ✧ The use of a soldering iron of less than 25W is recommended and the temperature of the iron must be kept at below  $315^{\circ}\text{C}$ , with soldering time within 2 seconds. (建议使用低于 25 瓦以下的烙铁, 烙铁温度低于  $315^{\circ}\text{C}$ , 焊接时间控制在 2 秒以内.)
- ✧ The silicone sealant of SMT-LED should not be in contact with tip of soldering iron. (烙铁头上的松香类杂物不要接触到 LED 表面的硅胶.)
- ✧ No mechanical stress should be exerted on the resin portion of SMT-LED during soldering. (LED 焊接过程中不能有外物挤压 LED 表面硅胶.)
- ✧ Handling of SMT-LED should be done when the package has been cooled down to below  $40^{\circ}\text{C}$  or less. This is to prevent the SMT-LED failures due to thermal-mechanical stress during handling. (为了防止高温下 LED 受机械压力的破坏, 所以 LED 必须冷却温度低于  $40^{\circ}\text{C}$  以下才能进行包装,)

### . Reflow Soldering (回流焊)

- ✧ Recommended solder pad design for heat dissipation (Unit: mm) (为了更好的散热, 建议根据以下焊接图设计具体产品.)



- ✧ The temperature (Top surface of SMT-LED) profile is as below: (以下是 LED 回流焊焊接温度曲线图.)



Solder = Sn63-Pb37 (有铅锡膏焊接)	Solder =Low Lead-free (无铅锡膏焊接)
Average ramp-up rate = 4°C/s max. (温度上升斜率最大是 4 °C/s)	Average ramp-up rate = 3°C/s max. (温度上升斜率最大是 3 °C/s)
Preheat temperature = 100°C ~150°C (预热温度)	Preheat temperature = 130°C ~170°C (预热温度)
Preheat time = 100s max. (预热最长时间)	Preheat time = 120s max. (预热最长时间)
Ramp-down rate = 6°C/s max. (上升斜率最大是 6 °C/s)	Ramp-down rate = 6°C/s max. (上升斜率最大是 6 °C/s)
Peak temperature = 220°C max. (峰值温度最大是 220 °C)	Peak temperature = 240°C max. (峰值温度最大是 240 °C)
Time within 5°C of actual Peak Temperature = 10s max. (峰值温度精度±5°C, 时间最长 10 秒.)	Time within 3°C of actual Peak Temperature = 25s max. (峰值温度精度±3°C, 时间最长 25 秒.)
Duration above 180°C is 80s max. (180 °C 以上时间是最长 80 秒.)	Duration above 200°C is 40s max. (200 °C 以上时间是最长 40 秒.)

- ✧ Modification is not recommended on SMT-LED after soldering. If modification cannot be avoided, the modifications must be pre-qualified to avoid damaging SMT-LED. (请参考以上焊接参数, 若必须改变焊接参数, 必须确保修改后不损害 LED 寿命.)
- ✧ Reflow soldering should not be done more than one time. (不能多次过回流焊.)
- ✧ No stress should be exerted on the package during soldering. (焊接过程中不能有外物挤压 LED.)
- ✧ PCB should not be wrapped after soldering; this is to allow natural cooling of the PCB board and SMT-LED. (过回流焊后 PCB 板不能立即包装, 必须等到冷却后才能包装.)

## 5. Electrostatic Discharge and Surge current (静电和浪涌电流)

- ✧ Electrostatic discharge (ESD) or surge current (EOS) may damage SMT-LED. (静电和浪涌电流都会对 LED 造成损害.)
- ✧ Precautions such as ESD wrist strap, ESD shoe strap or antistatic gloves must be worn whenever handling of SMT-LED.  
(使用 LED 的时候, 必须穿防静电衣服、静电鞋、戴有线静电环预防静电损坏 LED)
- ✧ All devices, equipment and machinery must be properly grounded. (使用的设备和工具必须接好地线消除静电.)
- ✧ It is recommended to perform electrical test to screen out ESD failures at final inspection. (要对 LED 进行最后 ESD 失效性检测.)
- ✧ It is important to eliminate the possibility of surge current during circuitry design. (电路必须设计浪涌电流保护电路.)

## 6. Heat Management (温度控制)

- ✧ Heat management of SMT-LED must be taken into consideration during the design stage of SMT-LED application. The current should be de-rated appropriately by referring to the de-rating curve attached on each product specification.  
(LED 使用设计期间必须考虑热量的散热情况, 驱动电流的大小需参考说明书上的数值选择合适的电流.)