

晶能光电股份有限公司
LatticePower Corporation Limited

产 品 规 格 书
Specification

产品名称 Product Name: Chip Scale Package

产品型号 Product P/N: CSP1616-1c

客 户 Client name: _____

客户料号 Client P/N: _____

版 本 号 Version No.: A00

日 期 Sending Date: 2024.02.08

客户承认栏 Client Approval	
核准 Approval	确认 Audit

制定 Confirmation: _____ 审核 Approval: _____

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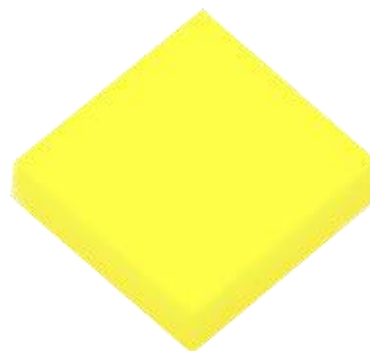
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1、特点 Features

- ◆ 小尺寸封装，高亮度，高光效
Small footprint package , High brightness ,High efficiency
- ◆ 尺寸：1.60*1.60*0.35mm，5 面发光
Size: 1.60*1.60*0.35mm, Five-sided emitter
- ◆ 根据客户标准分档
According to the Customer standard colour gamut
- ◆ 适于 SMT 贴片
Compatible with SMT
- ◆ 发光角度：136°
Viewing Angle: 136°
- ◆ 包装：最大 5000 颗/卷
Package: Max: 5000pcs /reel



2、应用 Applications

背光

Back Light



3、性能 Performance

a) 绝对最大额定值 Absolute Maximum Ratings

参数 Parameter	符号 Symbol	最大参数值 Maximum Rating	单位 Unit
电流(Ta=25°C) DC (Video Mode) Forward Current	I _F	1500	mA
功率 Power Dissipation	P	4.8	W
脉冲电流(Ta=25°C) Pulsed(Flash Mode) Forward Current	I _{FP}	1700	mA
结温 (DC 模式) LED Junction Temperature (DC mode)	T _j	135	°C
反向电压 Reverse Voltage	V _R	5	V
反向电流 (V _R =5V) Reverse Current	I _R	0.5	μA
工作温度 Operating Temperature Range	T _{opr}	-40~85	°C
存储温度 Storage Temperature	T _{stg}	-40~100	°C
ESD (人体模式) ESD Human Body Mode	----	2000	V

备注 Notes :

✧ 绝对最大额定值环境温度 Ta=25°C

Absolute Maximum Ratings at Ta=25°C

✧ I_{FP} 脉冲时间≤10ms, 宽度≤10%

I_{FP} Conditions with pulse width ≤10ms and duty cycle≤10%

b) 光电参数

Electro-Optical Characteristics (Ta =25 °C, If =700mA)

项目 Item	符号 Symbol	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
光通量 Luminous Flux	Φ	230	-	320	Lm
正向电压 Forward Voltage	VF	2.8	3.0	3.2	V
低电流正向电压 Forward Voltage at Low Current	VF ₁	2.0(@1uA)	-	-	V
颜色坐标 Color Coordinate	CIE	-	-	-	X,Y
峰值波长 Peak wavelength	WP	441	-	450	Nm
热阻 Thermal Resistance	----	----	10.5	----	°C/W
发光角度 Viewing Angle	201/2	----	136	----	°
结温 LED Junction Temperature	T _j	----	135	----	°C

备注 Notes :

✧ 光通量测量误差范围±7%

Luminous flux measurement tolerance: ±7%

✧ 光电参数测试是瞬态时间为 20ms

Electric and optical data is tested at 20 ms pulse condition

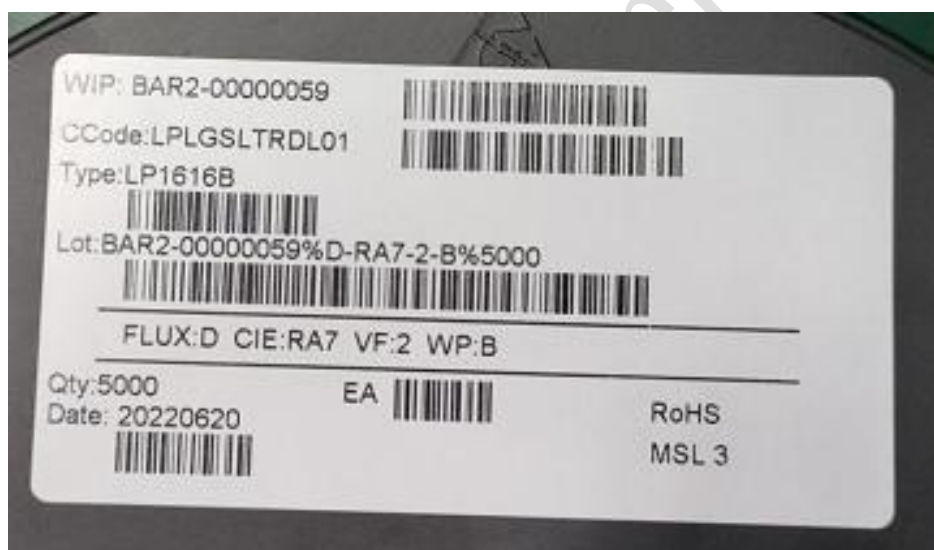
4. 产品代码 Product Order Code

E - RC11 - 2 - B

① ② ③ ④

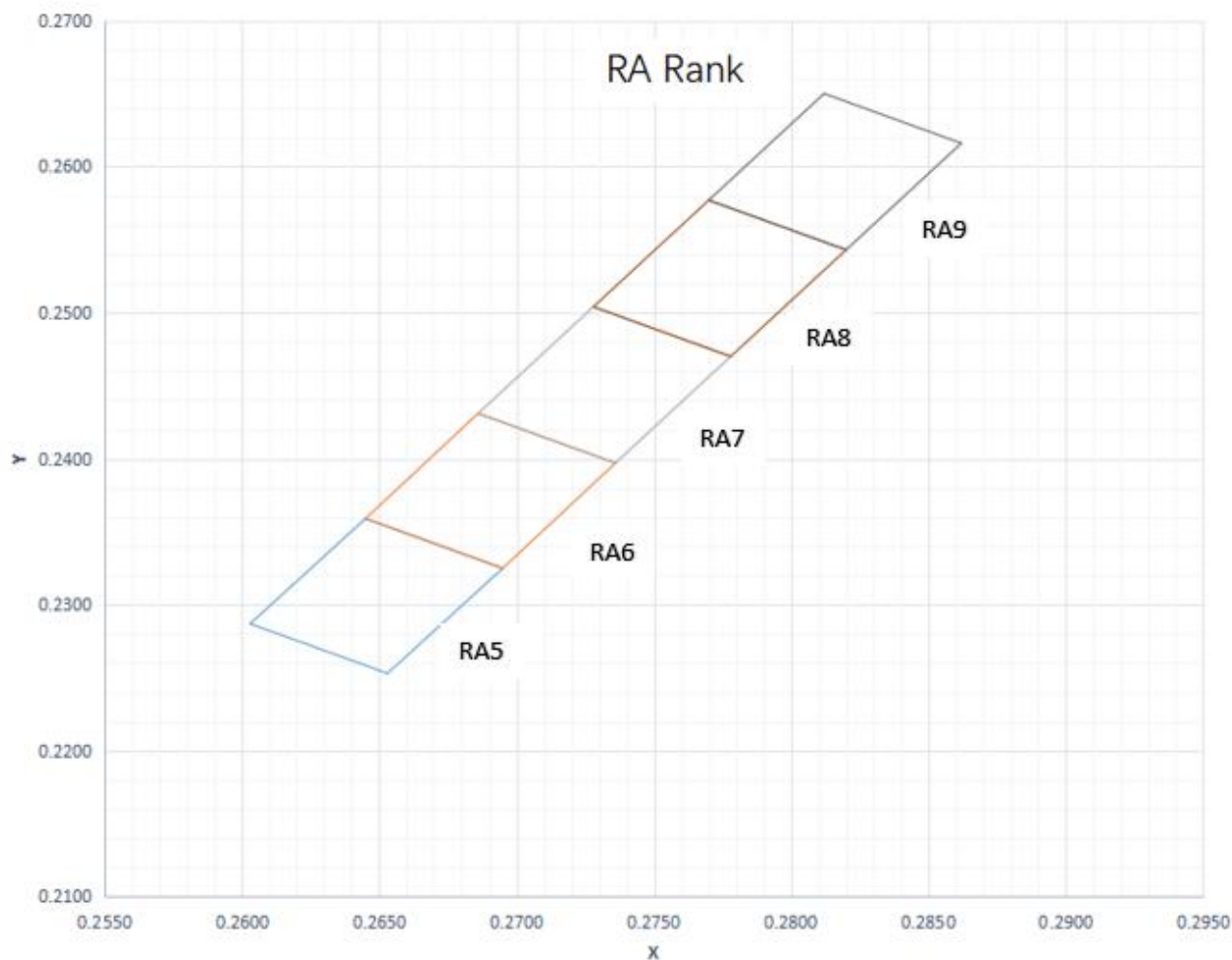
- ① 亮度等级 Luminous Flux Rank
- ② 颜色坐标 Color Coordinate
- ③ 电压等级 VF Rank
- ④ 峰值波长 Peak Wavelength

出货标签(例) Shipping label (e.g.)

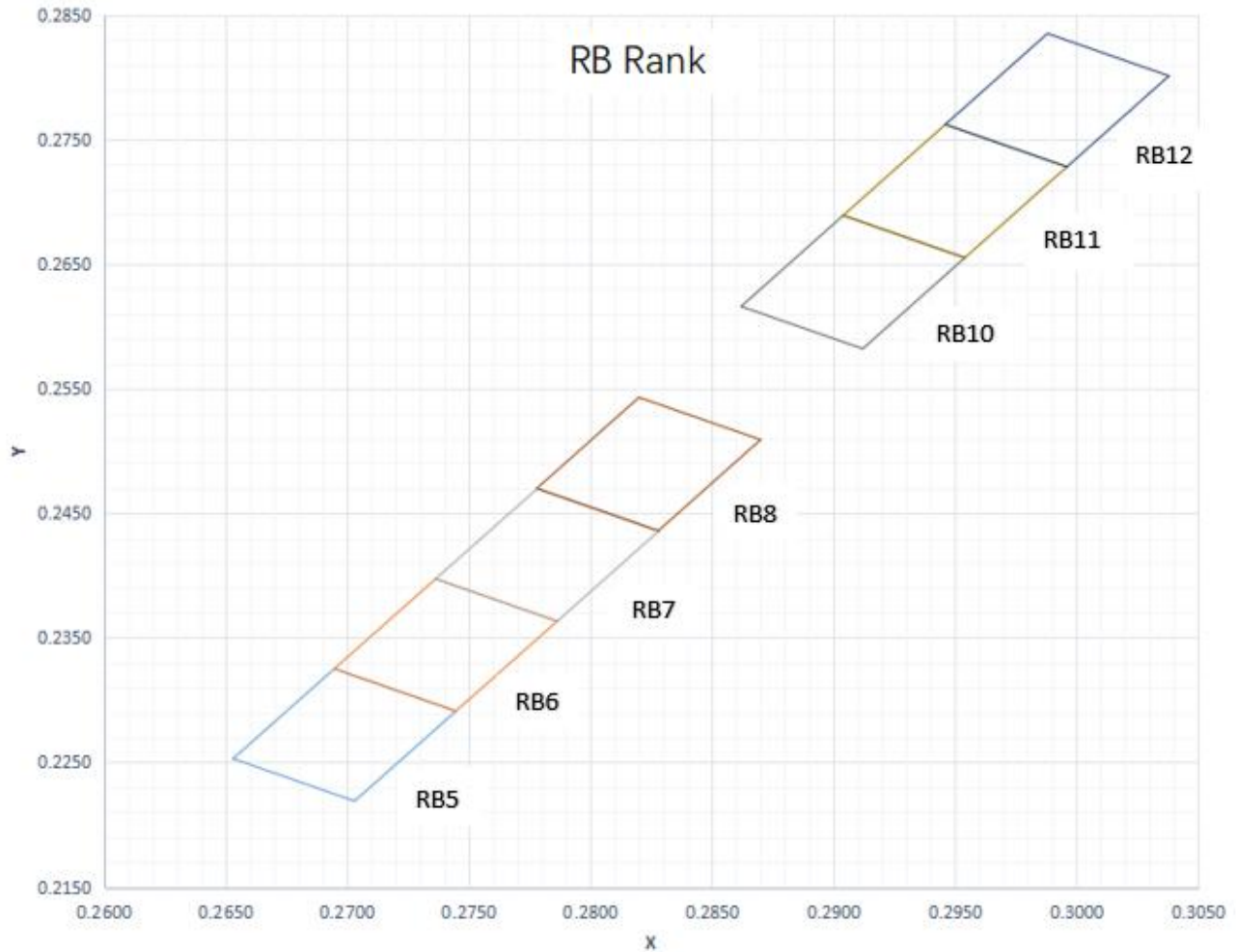


5. 分档规则 Bin Regulations

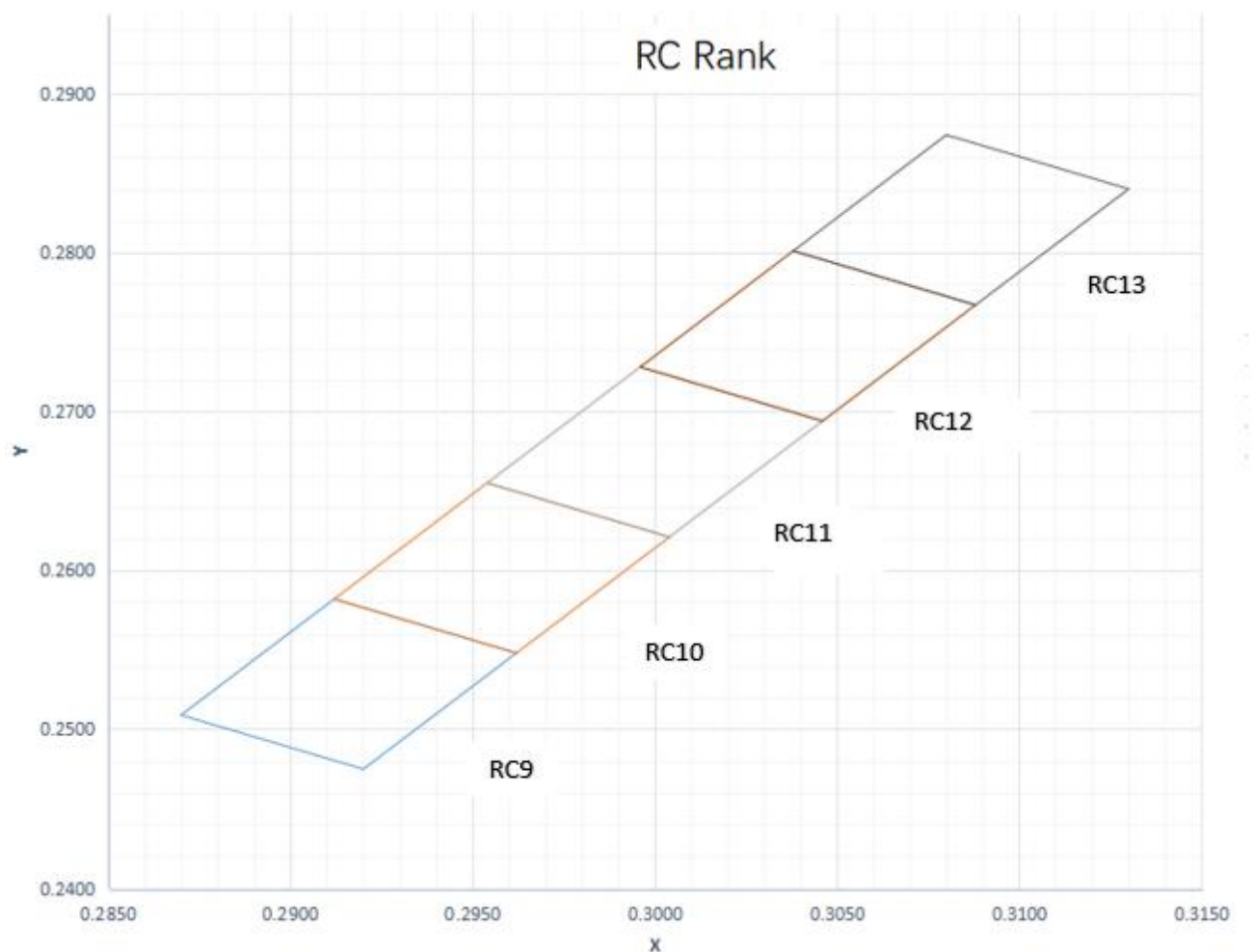
a) 色区图分档 Chromaticity Diagram Bin Table($T_a=25^{\circ}\text{C}$, $I_F=700\text{mA}$)



Rank	CIE_X	CIE_Y	Rank	CIE_X	CIE_Y	Rank	CIE_X	CIE_Y
RA5	0.2695	0.2325	RA6	0.2736	0.2397	RA7	0.2778	0.2470
	0.2653	0.2253		0.2695	0.2325		0.2736	0.2397
	0.2603	0.2287		0.2645	0.2359		0.2686	0.2431
	0.2645	0.2359		0.2686	0.2431		0.2728	0.2504
	0.2695	0.2325		0.2736	0.2397		0.2778	0.2470
RA8	0.2820	0.2543	RA9	0.2862	0.2616			
	0.2778	0.2470		0.2820	0.2543			
	0.2728	0.2504		0.2770	0.2577			
	0.2770	0.2577		0.2812	0.2650			
	0.2820	0.2543		0.2862	0.2616			



Rank	CIE_X	CIE_Y	Rank	CIE_X	CIE_Y	Rank	CIE_X	CIE_Y
RB5	0.2745	0.2291	RB6	0.2786	0.2363	RB7	0.2828	0.2436
	0.2703	0.2219		0.2745	0.2291		0.2786	0.2363
	0.2653	0.2253		0.2695	0.2325		0.2736	0.2397
	0.2695	0.2325		0.2736	0.2397		0.2778	0.2470
	0.2745	0.2291		0.2786	0.2363		0.2828	0.2436
RB8	0.2870	0.2509	RB11	0.2996	0.2728	RB12	0.3038	0.2801
	0.2828	0.2436		0.2954	0.2655		0.2996	0.2728
	0.2778	0.2470		0.2904	0.2689		0.2946	0.2762
	0.2820	0.2543		0.2946	0.2762		0.2988	0.2835
	0.2870	0.2509		0.2996	0.2728		0.3038	0.2801
RB10	0.2954	0.2655	RB12	0.2996	0.2728	RB12	0.3038	0.2801
	0.2912	0.2582		0.2954	0.2655		0.2996	0.2728
	0.2862	0.2616		0.2904	0.2689		0.2946	0.2762
	0.2904	0.2689		0.2946	0.2762		0.2988	0.2835
	0.2954	0.2655		0.2996	0.2728		0.3038	0.2801



Rank	CIE_X	CIE_Y	Rank	CIE_X	CIE_Y	Rank	CIE_X	CIE_Y
RC9	0.2962	0.2548	RC10	0.3004	0.2621	RC11	0.3046	0.2694
	0.2920	0.2475		0.2962	0.2548		0.3004	0.2621
	0.2870	0.2509		0.2912	0.2582		0.2954	0.2655
	0.2912	0.2582		0.2954	0.2655		0.2996	0.2728
	0.2962	0.2548		0.3004	0.2621		0.3046	0.2694
RC12	0.3088	0.2767	RC13	0.3130	0.2840			
	0.3046	0.2694		0.3088	0.2767			
	0.2996	0.2728		0.3038	0.2801			
	0.3038	0.2801		0.3080	0.2874			
	0.3088	0.2767		0.3130	0.2840			

备注 Notes :

✧ 色度坐标 (x, y) 来自 CIE1931 色度图

The chromaticity coordinates(x,y)is derived from the CIE 1931 chromaticity diagram

✧ PT86 测试设备用于光通量 (lm) 和 CIE1931 色度坐标 (x, y) 测试。

PT86 is for the luminous flux(lm) and the CIE1931 chromaticity coordinates(x,y) testing.

✧ 色度坐标 (x, y) 存在±0.005 公差。

The chromaticity coordinates(x,y) guarantee should be added ±0.005 tolerance.

b) 亮度分档 Luminous Flux BIN Table (Ta = 25°C, IF = 700 mA)

CIE Rank RA5~RA9

BIN code	最小值 Min.	最大值 Max.	单位 Unit
Z	230	240	Lm
A	240	250	
B	250	260	
C	260	270	
D	270	280	
E	280	290	
F	290	300	

CIE Rank RB5~RB8

BIN code	最小值 Min.	最大值 Max.	单位 Unit
Z	230	240	Lm
A	240	250	
B	250	260	
C	260	270	
D	270	280	
E	280	290	
F	290	300	

CIE Rank RB10~RB12

BIN code	最小值 Min.	最大值 Max.	单位 Unit
B	250	260	Lm
C	260	270	

D	270	280
E	280	290
F	290	300
G	300	310
H	310	320

CIE Rank RC9~RC13

BIN code	最小值 Min.	最大值 Max.	单位 Unit
D	265	280	Lm
E	280	290	
F	290	300	
G	300	310	
H	310	320	

c) 电压分档 Voltage BIN Table (Ta= 25°C, I_F =700 mA)

BIN code	最小值 Min.	最大值 Max.	单位 Unit
1	2.8	3.0	V
2	3.0	3.2	

d) 峰值波长分档 Wavelength BIN Table (Ta= 25°C, I_F =700 mA)

BIN code	最小值 Min.	最大值 Max.	单位 Unit
B	441	447	nm
C	447	450	

备注 Notes :

- ✧ 亮度测试存在±7%的公差
It maintains a tolerance of ±7% on luminous flux measurements.
- ✧ 电压测试存在±0.1V 的公差

It maintains a tolerance of $\pm 0.1V$ on VF measurements

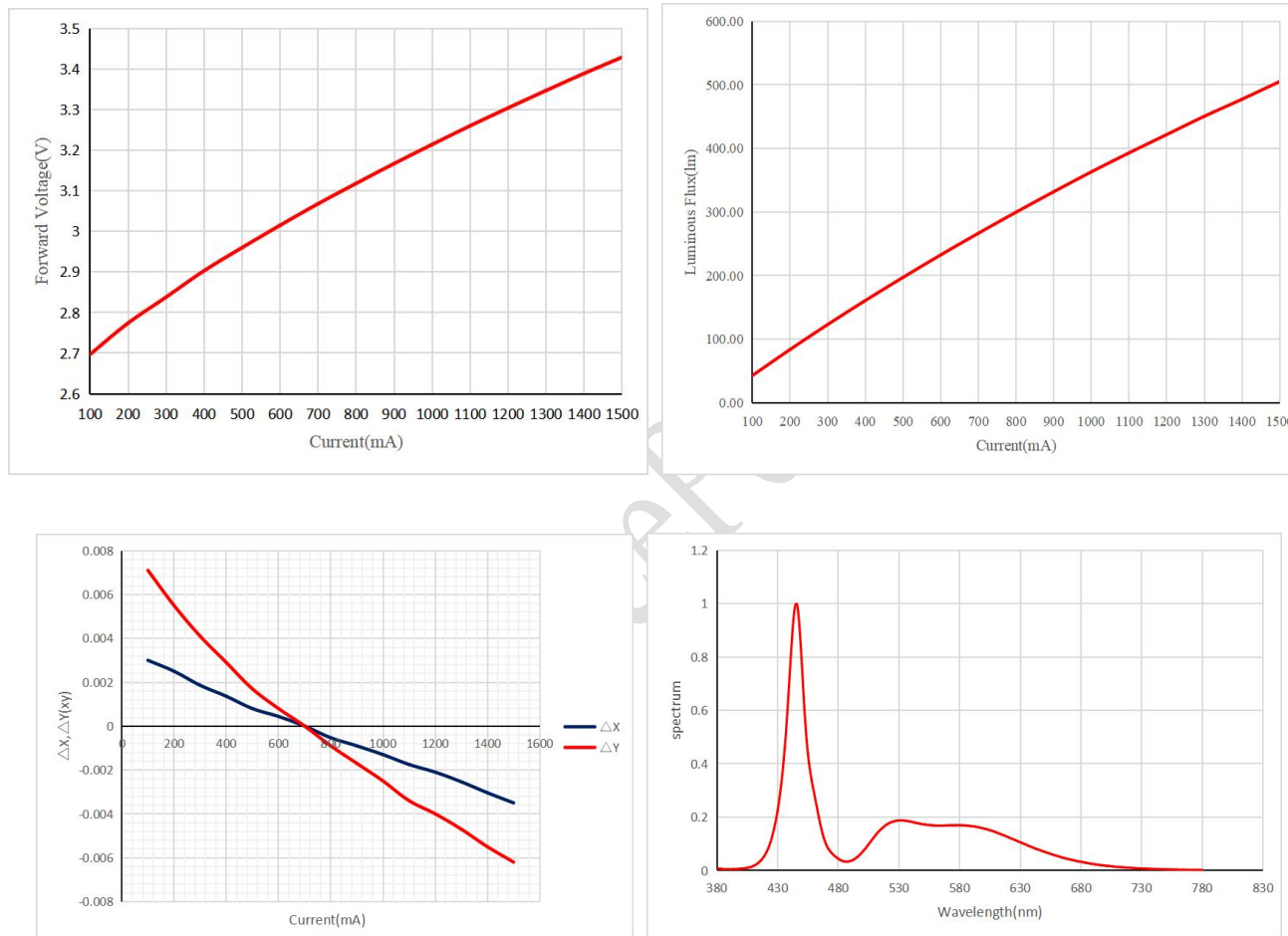
✧ 峰值波长测试存在 $\pm 1.0nm$ 的公差

It maintains a tolerance of $\pm 1.0nm$ on measurements

6、光电特性图

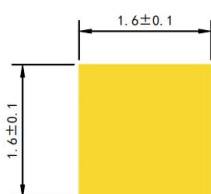
The Photoelectric Characteristics Graph ($T_a = 25^\circ C$)

CIE RB6 Rank

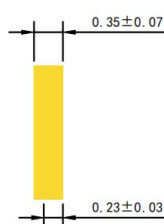


7 产品尺寸和结构 Product Dimensions and Structure

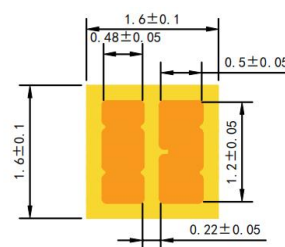
Product Dimensions:



Top View



Side View



Bottom

Package Structure:

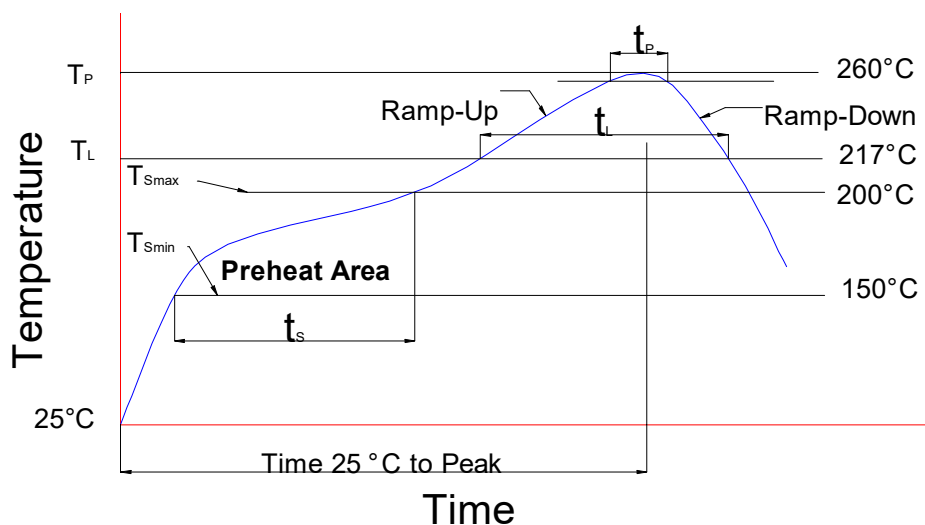


No.	Item	Material
①	Phosphor film	Silicone+Phosphor
②	Chip	GaN on Sapphire, Flip Chip

备注 Notes:

- ◇ 所有尺寸均以 um 为单位
All dimensions are in millimeters
- ◇ 尺寸未按照公差 $\pm 50\mu\text{m}$ 标记的，按照图纸标记
Size is not marked in accordance with tolerance $\pm 50\mu\text{m}$ and dimension tolerances in accordance with drawings

8、回流焊特性 Reflow Soldering Characteristics

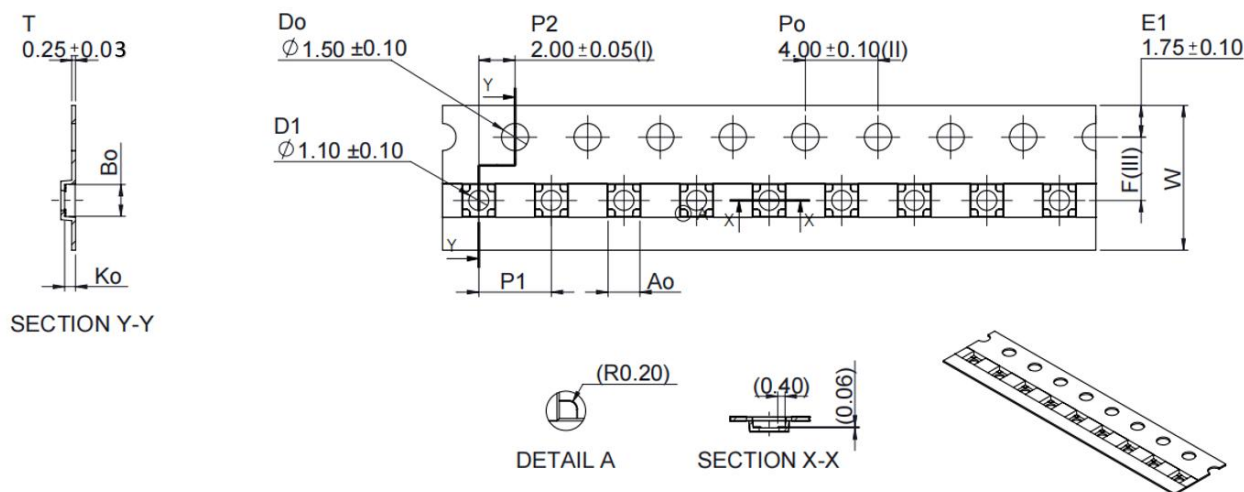


根据 EDEC-J-STD-020D 内容，参考以下内容。

Compatible with the JEDEC-J-STD-020D, using the parameters listed below.

特制参数 Profile Feature	无铅焊料 Lead-Free Solder
平均上升速率 (T_{Smax} 至 T_p) Average Ramp-Up Rate (T_{Smax} to T_p)	3 °C/sec max.
预热: 温度最小值 (T_{Smin}) Preheat: Temperature Min (T_{Smin})	150
预热: 最高温度 (T_{Smax}) Preheat: Temperature Max (T_{Smax})	200
预热: 时间 (t_{Smin} 到 t_{Smax}) Preheat: Time (t_{Smin} to t_{Smax})	60-120 secs
回流温度 (T_L) Time Maintained Above: Temperature (T_L)	217°C
回流时间 (t_L) Time Maintained Above: Time (t_L)	60-150 secs
峰值/分类温度 (T_p) Peak/Classification Temperature (T_p)	255±5°C
实际峰值温度 (t_p) 在 5°C 以内的时间 Time Within 5°C of Actual Peak Temperature (t_p)	5 secs
降低速率 Ramp-Down Rate	4°C/sec max.

9、载带 Tape Dimensions



Ao	1.76 +/- 0.05
Bo	1.76 +/- 0.05
Ko	0.60 +/- 0.05
F	3.50 +/- 0.05
P1	4.00 +/- 0.10
W	8.00 +/- 0.10

备注 Notes:

- ✧ 卷轴包装最大 5000pcs
Reel: max 5000pcs.
- ✧ 卷轴包装方法符合 IJSC0806 (连续胶带上的电子元件包装)
The tape packing method complies with IJSC0806(Packing of Electronic Components on Continuous Tapes).
- ✧ 当卷轴由于工作中断而重绕时, 载带上压力不应超过 10N, 否则 LED 可能会粘在盖带上
When the tape is rewound due to work interruptions, no more than 10N should be applied to the embossed carrier tape.
The LEDs may stick to the cover tape.

10、可靠性 Reliability

a) 测试和结果 Tests and Results

测试项目 Test Item	参考标准 Reference Standard	测试条件 Test Conditions	测试周期 Test Duration	失效标准 Failure Criteria#
可焊性（回流焊） Solderability (Reflow Soldering)	JESD22-B102	$T_{sld}=255\pm5^{\circ}\text{C}$, 5sec, Lead-free Solder(Sn-3.0Ag-0.5Cu)	3times	#2
高低温循环 Temperature Cycle	JESD22-A105	$I_F=1200\text{mA}$, $-40^{\circ}\text{C}(30\text{min})\sim 25^{\circ}\text{C}(5\text{min})$ $\sim 80^{\circ}\text{C}(30\text{min})\sim 25^{\circ}\text{C}(5\text{min})$	200cycles	#1
高温/低温储存 High/Low Temperature Storage	JESD22-A119	$T_A=125^{\circ}\text{C}/T_A=-40^{\circ}\text{C}$	1000h	#1
高温老化 High Temperature Operating	JESD22-A108	$T_A=85^{\circ}\text{C}$, $I_F=1200\text{mA}$	1000h	#1
高温高湿老化 Temperature Humidity Operating	JESD22- A101	85°C , RH=85%, on 2s/off 5s $I_F=1200\text{mA}$	10,000cycles	#1
高温高湿老化 Temperature Humidity Operating	JESD22- A101	50°C , RH=90%, $I_F=1200\text{mA}$	1000h	#1
振动 Vibration	JESD22-B103	200m/s^2 , 100~20000~100Hz, 4cycles, 4min, each X,Y,Z	3times	#1

b) 失效判定 Failure Criteria

判定 Criteria #	项目 Items	条件 Conditions	失效判定 Failure Criteria
#1	正向电压 Forward Voltage (V_F)	I_F	> 初始值×1.1 倍 > Initial value×1.1
	光通量 Luminous Flux (Φ_v)	I_F	< 初始值×0.9 倍 < Initial value×0.9
	反向电流 Reverse Current (I_R)	$V_R=5V$	> 1uA > 1uA
#2	回流焊 Solderability	-	焊接面积<80% Less than 80% solder coverage

11、注意事项 Cautions

a) 存储 Storage

- 不要将芯片放在潮湿的地方，存放温度在 5°C~30°C之间，相对湿度在 30%以下。
Do not place the chips in damp places, Storage temperature between 5 °C and 30 °C, Relative humidity under 30%.
- 开包后建议在 24 小时内过完回流焊，车间条件≤30°C/60%RH。
After opening the package, it is recommended to finish the reflow within 24 hours. The workshop conditions are ≤30°C/60%RH
- 如果受潮，需将贴片卷盘放入 60°C烤箱烘烤 24 小时；打开后，LED 灯可重新密封在原始真空袋中。
If it is wet, the patch reel should be baked in a 60 ° C oven for 24 hours; after opening, the LED light can be resealed in the original vacuum bag.
- 不要接触任何未知的液体，特别是丙酮。
Don't touch any unknown liquid, In particular, acetone.
- 防止静电死亡，手动操作需要戴橡胶手套并佩戴静电环。
Prevent electrostatic killed, Manual operation is required to wear rubber gloves and wear electrostatic ring.

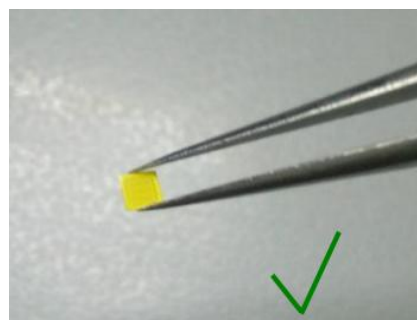
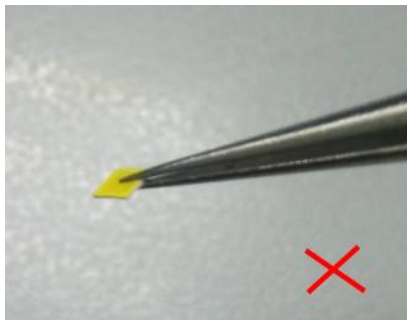
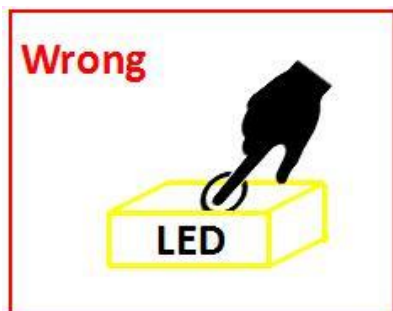
b) 清洗 Cleaning

- 通常，LED 不建议对部件进行湿式清洁处理，因为封装不是密封的。
In general, LED does not recommend a wet cleaning process for component as the package is not hermetically sealed.
- 由于采用开放式设计，所有类型的清洁液都可能渗透到封装中，导致 LED 退化或完全失效。
Due to the open design, all kind of cleaning liquids can infiltrate the package and cause a degradation or a complete failure of the LED.

c) 推荐吸嘴 Recommend Nozzle Dimensions

- 建议使用聚四氟乙烯等材料作为喷嘴，锐化钢材料拾取工具不建议使用
Recommend using Teflon material for the nozzle, sharpen steel material pick up tools are refused.

d) 操作注意 Handling Precautions



- 在处理过程中，还应注意确保组件顶面没有压力
During the handling, care should be taken as well to ensure no pressure on the top surface of component.
- 应避免使用所有类型的尖锐物体（例如镊子，指甲等），以防止对硅树脂造成压力，因为这会导致部件损坏。
All types of sharp objects(e.g. forceps, fingernail, etc) should be avoided in order to prevent stress to the silicone, since this can lead to damage of the component.