

江西省晶能半导体有限公司
Jiangxi LatticePower Semiconductor Corporation

产 品 规 格 书
Specification

产品名称 Product Name:	LWB
产品型号 Product P/N:	AT
客 户 Client Name:	
客户料号 Client P/N:	
版 本 号 Version No.:	A06
日 期 Sending Date:	2025.04

工厂地址:江西省南昌市高新区艾溪湖北路 699 号

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1、特点 Features

- ◆ PLCC 封装，高亮度，高可靠性，主要用于汽车应用
PLCC package, high brightness, high reliability, it is mainly used in automotive applications
- ◆ 尺寸：3.5mm*2.8mm*1.8mm
Size: 3.5mm*2.8mm*1.8mm
- ◆ 颜色：根据 CIE 1931（白光）分档
Color: according to CIE 1931 (white)
- ◆ 通过 RoHS 认证
RoHS compliant
- ◆ MSL 等级 2a
MSL 2a
- ◆ 通过 AEC-Q102
AEC-Q102 qualified
- ◆ 适于 SMT 贴片
Compatible with SMT
- ◆ 发光角度：120°
Viewing angle: 120°
- ◆ 包装：最大 2000 颗/卷
Package: max 2000pcs /reel



2、应用 Applications

汽车内外部照明

Interior and exterior lighting for automotive



3、性能 Performance

a) 极限参数 Maximum Ratings

项目 Item	符号 Symbol	参数 Rating	单位 Unit
最大正向电流 Max DC Forward Current	I_F	70	mA
电功率 Electrical Power	P	0.2	W
峰值正向电流 Peak Forward Current	I_{FP}	100	mA
最大反向电压 Maximum Reverse Voltage	不可施加反向电压 Do not apply for reverse voltage		
结温 (DC 模式) LED Junction Temperature (DC mode)	T_j	125	°C
工作温度 Operating Temperature Range	T_{opr}	-40~115	°C
存储温度 Storage Temperature Range	T_{stg}	-40~115	°C
ESD (人体模式) ESD (Human Body Mode)	----	8000	V

备注 Notes :

✧ 环境温度 $T_a=25^{\circ}\text{C}$

Ratings at $T_a=25^{\circ}\text{C}$

✧ I_{FP} 脉冲时间 $\leq 10\text{ms}$, 占空比 $\leq 10\%$

I_{FP} Conditions with pulse $\leq 10\text{ms}$ and duty cycle $\leq 10\%$

b) 光电参数 Electro-Optical Characteristics (T solder pad =25 °C, I_F =50mA)

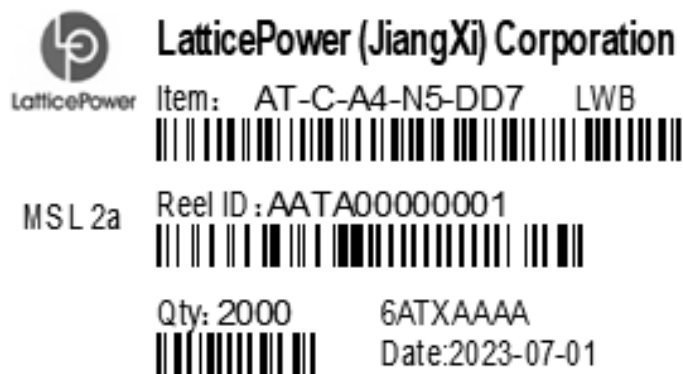
项目 Item	符号 Symbol	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
光通量 Luminous Flux	Φ	12.5	20	32.5	Lm
正向电压 Forward Voltage	V _F	2.75	3.0	3.50	V
色坐标 Color Coordinate	X	--	0.33	--	
	Y	--	0.33	--	
显指 Ra	Ra (6000K)	70			
	Ra (4500K)	60			
反向电流 Reverse Current (V _R =5V)	I _R	--	--	1	uA
实际热阻 PN/焊点 Real Thermal Resistance (Junction to Solder Point)	R _{thJS real}		145	172	°C/W
电热阻 PN/焊点 Electrical Thermal Resistance (Junction to Solder Point)	R _{thJS elec}		80	95	°C/W
发光角度 Viewing Angle	2θ		120		°
光电转换效率 Efficiency	η		47		%

4、产品代码 Product Order Code

AT - C - A4 - B5 - DD7
 ① ② ③ ④ ⑤

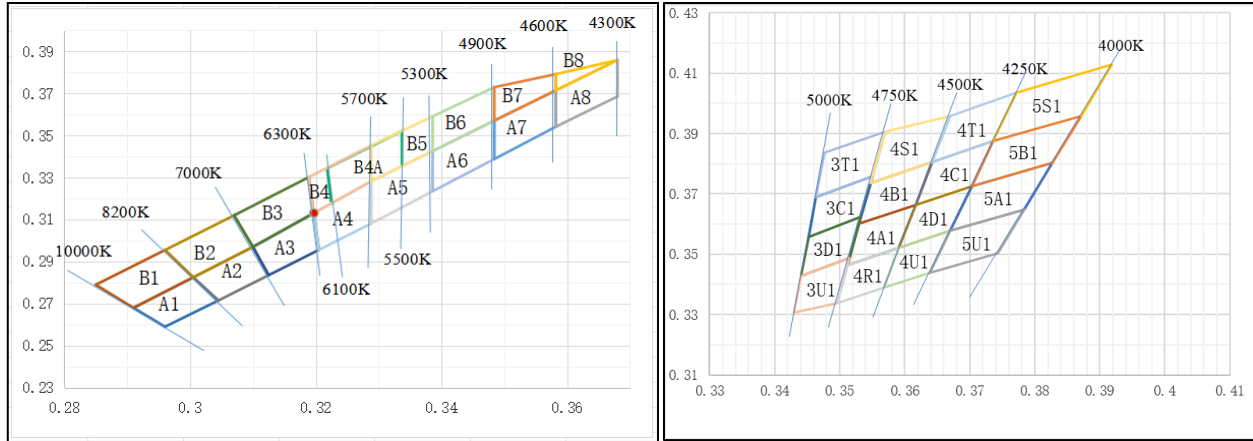
- ① 产品型号 Product Type (AT:LWB)
- ② 显色指数 Ra Level
- ③ 色温区块 Color Bin
- ④ 亮度等级 Brightness Level
- ⑤ 电压等级 VF Level

出货标签(例) Shipping label (e.g.)



5、分档规则 Bin Regulations

a) 色度区域 Chromaticity Regions (T solder pad = 25°C, I_F = 50 mA)



Color Chromaticity Groups

Color Bin	x	y	Color Bin	x	y
A1 8200K~10000K	0.296	0.259	B1 8200K~10000K	0.291	0.268
	0.291	0.268		0.285	0.279
	0.3005	0.2825		0.296	0.2955
	0.3045	0.2715		0.3005	0.2825
A2 7000K~8200K	0.3045	0.2715	B2 7000K~8200K	0.3005	0.2825
	0.3005	0.2825		0.296	0.2955
	0.31	0.297		0.307	0.312
	0.3125	0.28355		0.31	0.297
A3 6300K~7000K	0.31	0.297	B3 6300K~7000K	0.307	0.312
	0.3197	0.3131		0.3189	0.3302
	0.3205	0.2956		0.3197	0.3131
	0.3125	0.28355		0.31	0.297
A4 5700K~6300K	0.3197	0.3131	B4 5700K~6300K	0.3189	0.3302
	0.3288	0.3282		0.3288	0.3452
	0.3288	0.3081		0.3288	0.3282
	0.3205	0.2956		0.3197	0.3131

A5 5300K~5700K	0.3288	0.3081		B5 5300K~5700K	0.3288	0.3282
	0.3288	0.3282			0.3288	0.3453
	0.3386	0.3426			0.3386	0.3591
	0.3386	0.3235			0.3386	0.3426
A6 4900K~5300K	0.3386	0.3235		B6 4900K~5300K	0.3386	0.3426
	0.3386	0.3426			0.3386	0.3591
	0.3484	0.3571			0.3484	0.373
	0.3484	0.3388			0.3484	0.3571
A7 4600K~4900K	0.3484	0.3388		B7 4600K~4900K	0.3484	0.3571
	0.3484	0.3571			0.3484	0.373
	0.3582	0.3715			0.3582	0.3792
	0.3582	0.3542			0.3582	0.3715
A8 4300K~4600K	0.3582	0.3542		B8 4300K~4600K	0.3582	0.3715
	0.3582	0.3715			0.3582	0.3792
	0.368	0.3859			0.368	0.3859
	0.368	0.3686				
B4A 5500K~6100K	0.3225	0.3175				
	0.3218	0.3344				
	0.3337	0.3522				
	0.3337	0.3354				
3T1 4750K~5000K	0.35510	0.37600		3C1 4750K~5000K	0.34520	0.35580
	0.35704	0.39065			0.35329	0.36235
	0.34767	0.38374			0.35510	0.37600
	0.34635	0.36880			0.34635	0.36880
3D1 4750K~5000K	0.34405	0.34280		3U1 4750K~5000K	0.34954	0.33392
	0.35149	0.34869			0.35149	0.34869
	0.35329	0.36235			0.34405	0.34280
	0.34520	0.35580			0.34298	0.33077
4S1 4500K~4750K	0.36419	0.38049		4A1 4500K~4750K	0.35910	0.35215
	0.36693	0.39577			0.36165	0.36632
	0.35704	0.39065			0.35299	0.36004
	0.35478	0.37359			0.35120	0.34650

4B1 4500K~4750K	0.36165	0.36632	4R1 4500K~4750K	0.35672	0.33892
	0.36419	0.38049		0.35910	0.35215
	0.35478	0.37359		0.35120	0.34650
	0.35299	0.36004		0.34954	0.33392
4T1 4250K~4500K	0.37360	0.38740	4C1 4250K~4500K	0.37030	0.37260
	0.37718	0.40346		0.37360	0.38740
	0.36693	0.39577		0.36419	0.38049
	0.36419	0.38049		0.36165	0.36632
4D1 4250K~4500K	0.36700	0.35780	4U1 4250K~4500K	0.36391	0.34394
	0.37030	0.37260		0.36700	0.35780
	0.36165	0.36632		0.35910	0.35215
	0.35910	0.35215		0.35672	0.33892
5R1 4000K~4250K	0.37433	0.35022	5A1 4000K~4250K	0.37837	0.36468
	0.37837	0.36468		0.38274	0.38029
	0.36700	0.35780		0.37030	0.37260
	0.36391	0.34394		0.36700	0.35780
5B1 4000K~4250K	0.38274	0.38029	5S1 4000K~4250K	0.38710	0.39590
	0.38710	0.39590		0.39184	0.41285
	0.37360	0.38740		0.37718	0.40346
	0.37030	0.37260		0.37360	0.38740

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±0.006 公差。

The chromaticity coordinates(x,y) guarantee should be added ±0.006 tolerance.

b) 亮度分档 Luminous Flux Groups (T solder pad = 25°C, I_F =50 mA)

Group Code	Min	Max
B5	12.5	15.8
B6	15.8	20
M7	20	25.4
M8	25.4	32.5

c) 电压分档 Voltage Groups (T solder pad = 25°C, I_F =50 mA)

Group Code	Min	Max
DD6	2.75	3.00
DD7	3.00	3.25
DD8	3.25	3.50

d) 显指分档 Ra Groups (T solder pad = 25°C, I_F =50 mA)

Group Code	Min	Max
C	70	100
B	60	100

备注 Notes :

- ✧ 亮度测试存在±6%的公差
It maintains a tolerance of ±6% on luminous flux measurements.
- ✧ 电压测试误差±0.1V
ForATrd voltage(VF) ± 0.1V

6、光电特性图 The Photoelectric Characteristics Graph

Fig 1. 辐射特性 Radiation Characteristics

IF=50mA; TS = 25°C

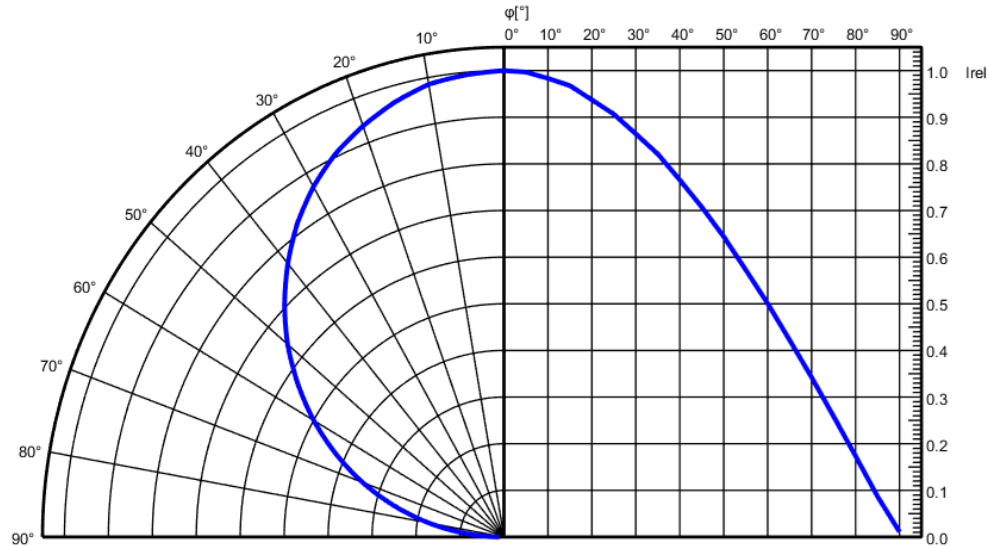


Fig 2. 相对发光光谱 Relative Spectral Distribution vs. Wavelength

$\Phi_{rel}=f(\lambda)$; IF=50mA; TS = 25°C

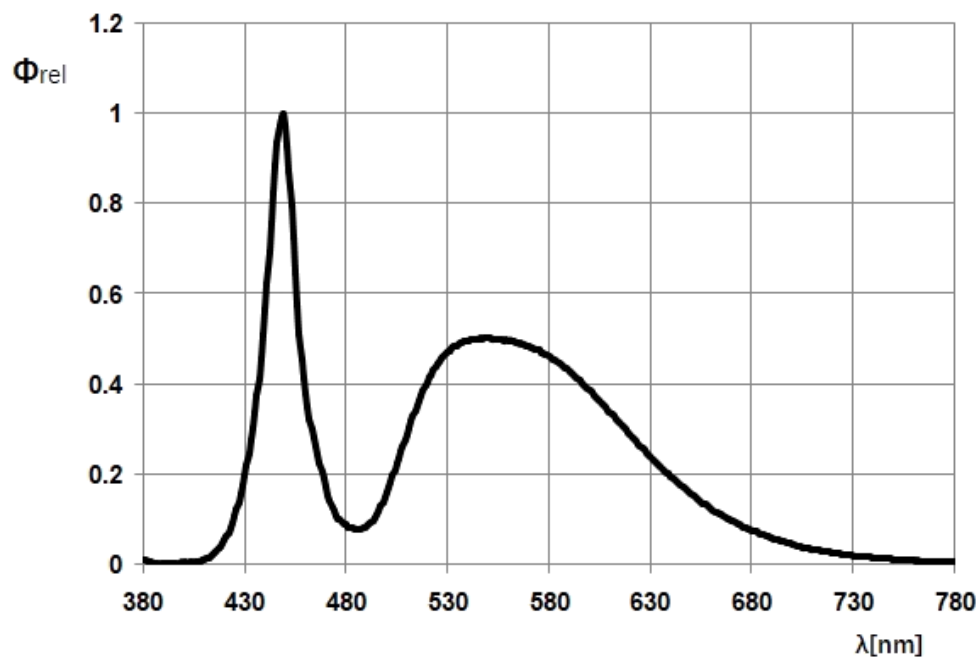


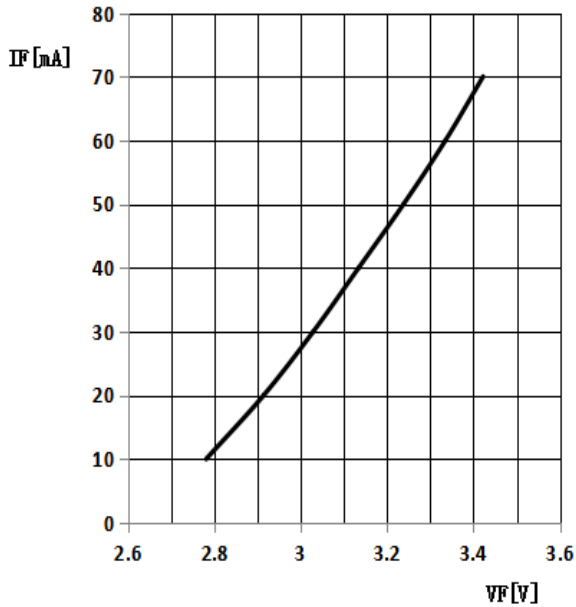
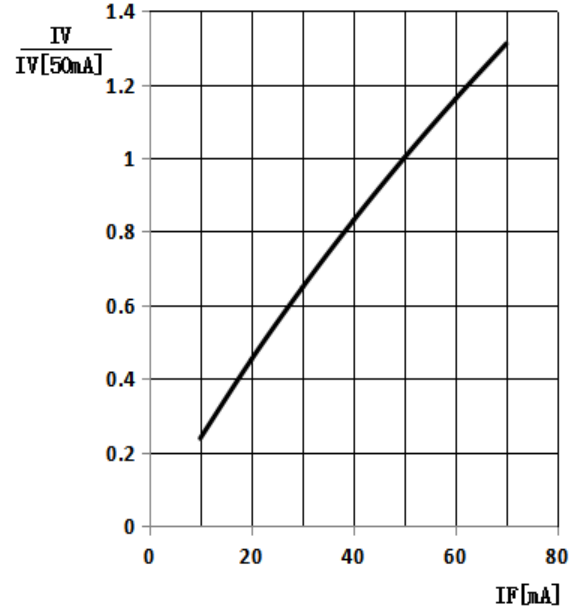
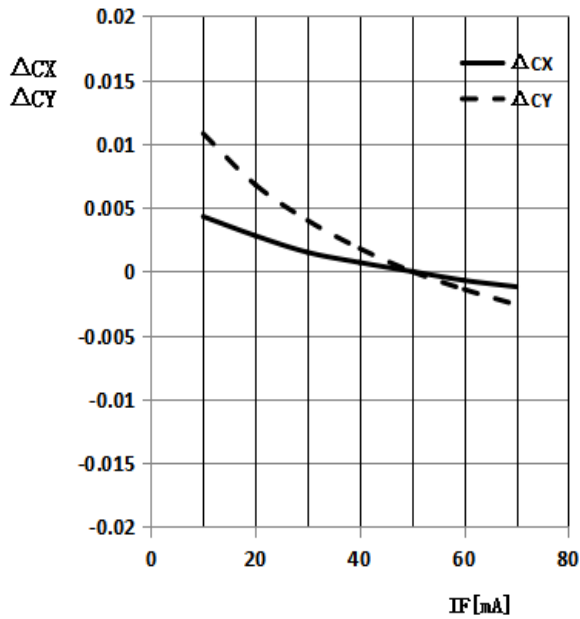
Fig 3. 正向电压 Forward Voltage
 $I_F = f(V_F); TS = 25^\circ C$

Fig 4. 相对发光强度 Relative Luminous Flux
 $I_v / I_v(50mA) = f(I_F); TS = 25^\circ C$

Fig 5. 色坐标偏移 Chromaticity Coordinate Shift
 $\Delta C_x, \Delta C_y = f(I_F); TS = 25^\circ C$


Fig 6. 正向电压 Forward Voltage

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 50\text{mA}$$

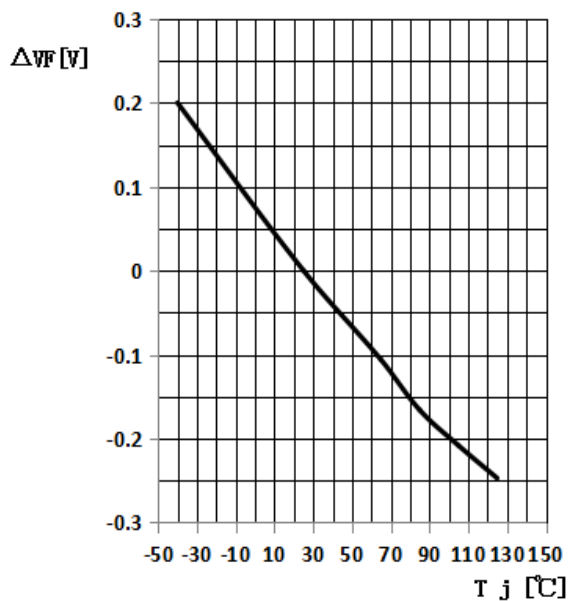


Fig 7. 相对发光强度 Relative Luminous Flux

$$I_v / I_v(25^\circ\text{C}) = f(T_j); I_F = 50\text{mA}$$

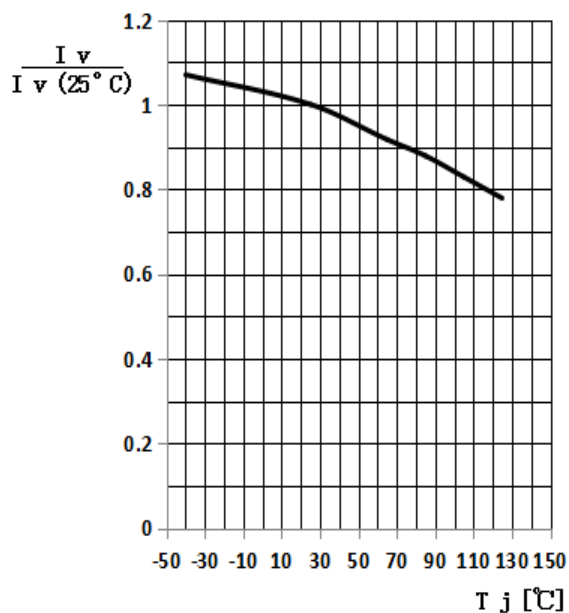


Fig 8. 色坐标偏移

Chromaticity Coordinate Shift

$$\Delta C_x, \Delta C_y = f(I_F); T_S = 25^\circ\text{C}$$

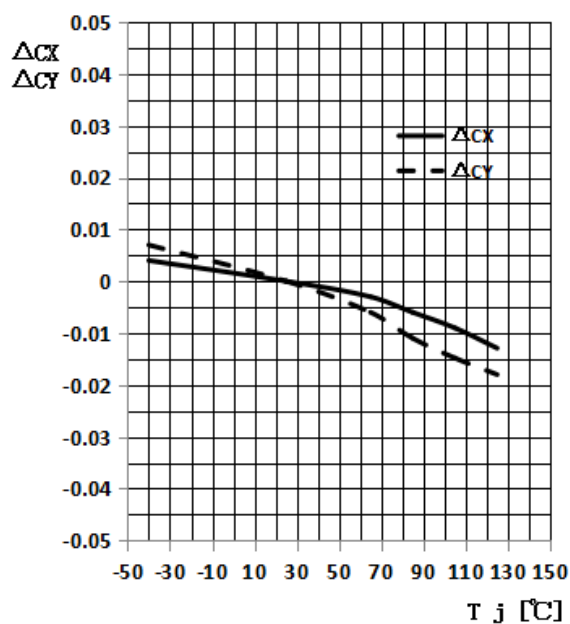
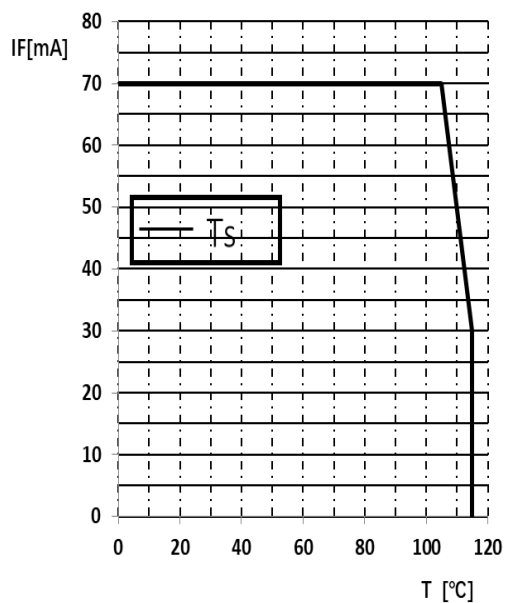


Fig 9. 最大正向电流

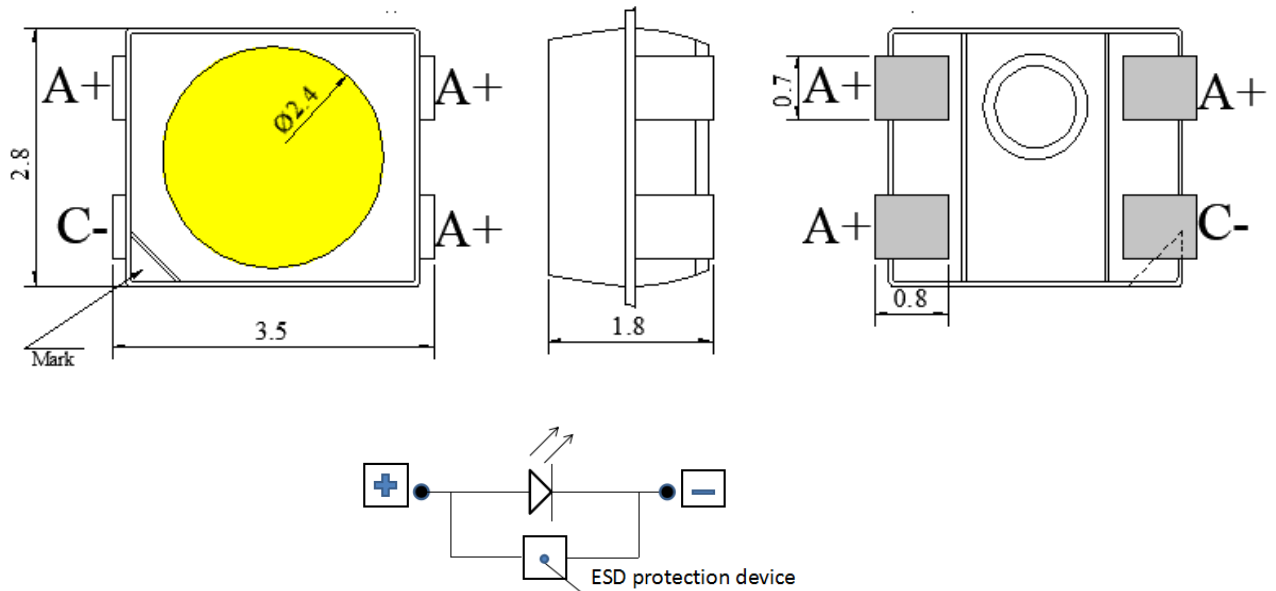
Max. Permissible Forward Current

$$I_F = f(T)$$

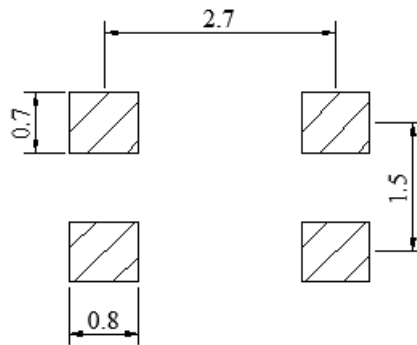


7、产品及焊盘尺寸 Product and Soldering Pattern Dimensions

a) 产品尺寸 Product Dimensions:



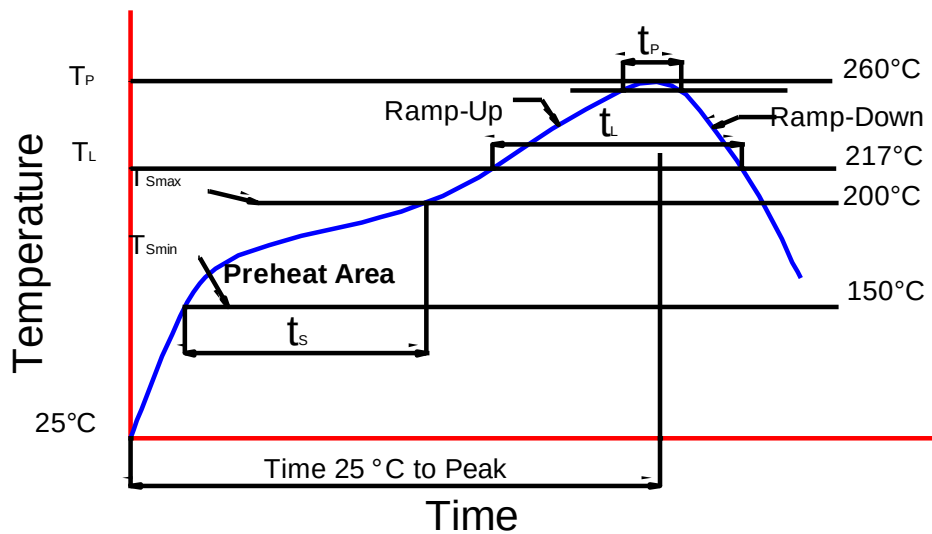
b) 焊盘尺寸 Soldering Pattern Dimensions



备注 Notes:

- ✧ 所有尺寸均以 mm 为单位
All dimensions are in millimeters
- ✧ 尺寸公差 $\pm 0.1\text{mm}$
Dimension tolerance $\pm 0.1\text{mm}$
- ✧ 灯珠近似重量: 28.5mg
Approximate weight: 28.5mg

8、回流焊曲线 Reflow Soldering Profile

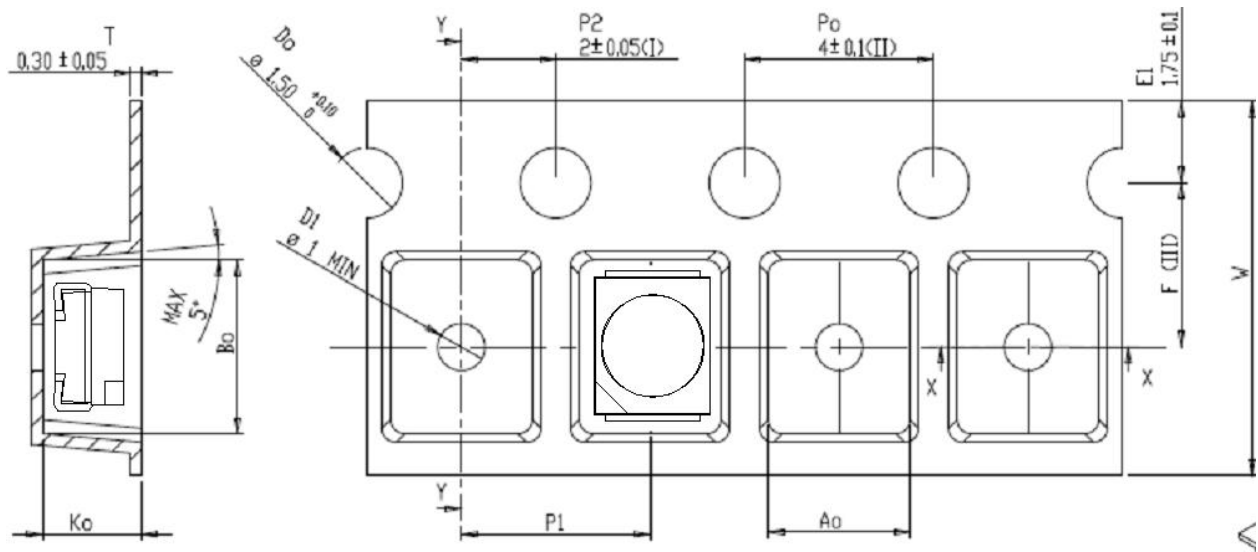


根据 JEDEC-J-STD-020E, 参考以下参数:

Compatible with the JEDEC-J-STD-020E, refer to the parameters as 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°C
预热: 最高温度 (T_{smax}) Preheat: Temperature Max (T_{smax})	200°C
预热: 时间 (t_{smin} 到 t_{smax}) Preheat: Time (t_{smin} to t_{smax})	60-180 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)	20~40 secs
降低速率 Ramp-Down Rate	4°C/sec max.

9、载带及卷轴 Tape and Reel



Ao	3.00 +/−0.1
Bo	3.70 +/−0.1
Ko	2.10 +/−0.1
F	3.50 +/−0.05
P1	4.00 +/−0.1
W	8.00 +/−0.1

备注 Notes:

✧ 卷轴包装数量: 2000pcs

Units per Reel: 2000pcs

✧ 卷轴包装方法符合 JIS C 0806 (连续胶带上的电子元件包装)

The tape packing method complies with JISC0806 (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

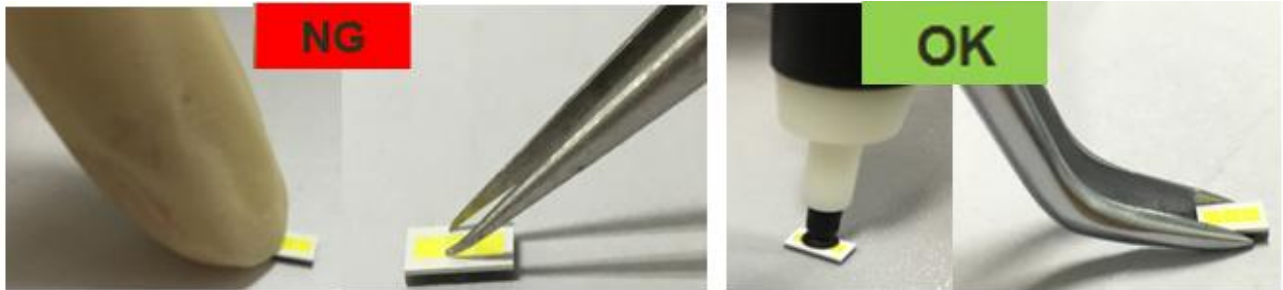
When the tape is rewound due to work interruptions, no more than 10N should be applied to the embossed carrier tape. The LEDs may stick to the cover tape.

10、注意事项 Cautions

a) 存储 Storage

- 即使未开封，也不要将产品放在潮湿的地方。建议存放温度在 5℃~30℃之间，相对湿度在 30% 以下。
Even if unopened, do not store the product in a high humidity place. The recommended storage temperature is between 5°C and 30°C, and the relative humidity should be below 30%.
- 打开包装后建议在 24 小时内过完回流焊，车间条件≤30℃/60%RH。
It is recommended to finish the reflow soldering process within 24 hours after opening the package. The workshop conditions should be ≤30°C/60%RH.
- 本产品为 MSL 2a，如果开封后未能在期限内完成组装，再次使用前需将贴片卷盘放入 60℃烤箱烘烤 24 小时后才能确保安全使用。建议使用后的余料可重新密封在原始真空袋中。
This product is MSL 2a. If the assembly is not completed within the specified time after opening, to ensure the quality, the tape and reel should be baked in a 60°C oven for 24 hours before reuse. It is recommended to reseat any unused material in the original vacuum bag.
- 不要接触任何未知的液体，特别是丙酮。
Do not come into contact with any unknown liquids, especially acetone.
- 防止静电损伤，手动操作需要在静电防护环境下，同时作业员需佩戴静电环。
To prevent electrostatic damage, manual operations should be performed in an electrostatic-protected environment, and operators should wear anti-static rings.

b) 操作注意 Handling Precautions



- 在处理过程中，应注意确保组件顶面不会受到压力或碰撞。
During the handling process, it is crucial to ensure that the top surface of the component is not subjected to any pressure or impact.
- 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。
The use of all types of sharp objects, such as tweezers and fingernails, should be avoided to prevent applying pressure to the silicone resin, as this can lead to component damage.

11、文件履历表 Document Resume

序号	变更日期	变更人	版本	变更内容
01	2021.04.19	李雄斌	Y00	1.新制定;
02	2021.05.25	李雄斌	Y01	1.新增产品电路图;
03	2021.11.16	李雄斌	A01	1.标签新增“MSL 2a”标识;
04	2023.07.01	袁丁	A02	1.标签抬头调整;
05	2024.03.09	李俊杰	A03	1.更新工作温度及图 Fig9; 2.更新最小正向电流; 3.新增 LED 质量信息
06	2024.09.06	曾海强	A04	1.添加 B4A 色区
07	2025.04.10	曾海强	A05	1.添加 4500K 相关色区 2. 更新规格书格式 3. 添加显指卡控规则
08	2025.04.22	曾海强	A06	1. 更新降额曲线, 删除 TJ 标识 2. 产品尺寸图标识 3. 修改 4500K 色区代码