

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:	LAWD-BD
产品型号 Product P/N:	MK
客 户 Client Name:	
客户料号 Client P/N:	
版 本 号 Version No.:	A02
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工厂地址:江西省南昌市高新区艾溪湖北路 699 号

Address: No.699 Aixihu North Road, Nanchang, Jiangxi Province, China

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1、特点 Features

- ◆ EMC 封装，高亮度，高可靠性，主要用于汽车应用
EMC package, high brightness, high reliability, it is mainly used in automotive applications
- ◆ 尺寸：3.70mm*3.50mm*0.75mm
Size: 3.70mm*3.50mm*0.75mm
- ◆ 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 1500 颗/卷
Package: max 1500pcs /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	200	mA
电功率 Electrical Power	P	0.5	W
峰值正向电流 Peak Forward Current	I_{FP}	400	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	150	°C
工作温度 Operating Temperature Range	T_{opr}	-40~125	°C
存储温度 Storage Temperature Range	T_{stg}	-40~125	°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 =140mA)

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（White）	40	55	70	Lm
	Φ（Amber）	30	43	60	
正向电压 Forward Voltage	VF	2.75	3.0	3.50	V
色坐标 Color Coordinate	X(White)	--	0.33	--	
	Y(White)		0.33		
	X(Amber)	0.577	--		
	Y(Amber)	0.418			
显指 Ra	Ra（white）	60		100	
反向电流 Reverse Current（VR=5V）	IR	--	--	1	uA
实际热阻 PN/焊点 Real Thermal Resistance (Junction to Solder Point)	RthJS real		35		°C/W
电热阻 PN/焊点 Electrical Thermal Resistance (Junction to Solder Point)	RthJS elec		22		°C/W
发光角度 Viewing Angle	2θ		120		°
光电转换效率 Efficiency	η		41		%

4、产品代码 Product Order Code

MK - CN - B45F - R11DR - DD7
 ① ② ③ ④ ⑤

- ① 产品型号 Product Type (MK:LAWD-BD)
- 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

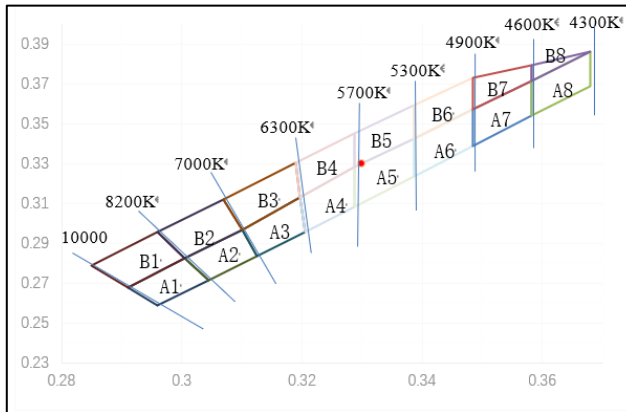
出货标签(例) Shipping label (e.g.)



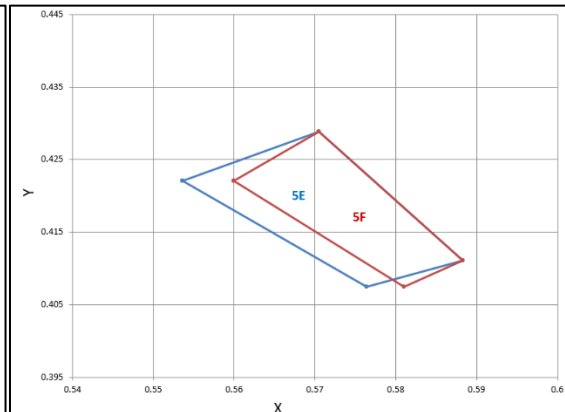
5、分档规则 Bin Regulations

a) 色度区域 Chromaticity Regions (T solder pad = 25°C, I_F =140mA)

White



Amber



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				
5E 1600K~1950K	0.5536	0.4221		5F 1600K~1950K	0.5600	0.4221
	0.5764	0.4075			0.5810	0.4075
	0.5883	0.4111			0.5883	0.4111
	0.5705	0.4289			0.5705	0.4289

b) 亮度分档 Luminous Flux Groups (T solder pad = 25°C, I_F =140mA)

white			amber		
Group Code	Min	Max	Group Code	Min	Max
R11	40	50	DR	30	40
R12	50	60	R11	40	50
C1	60	70	R12	50	60

c) 电压分档 Voltage Groups (T solder pad = 25°C, I_F =140mA)

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 =140mA)

white		
Group Code	Min	Max
B	60	100

amber		
Group Code	Min	Max
N	0	100

备注 Notes :

- ✧ 亮度测试存在±8%的公差
It maintains a tolerance of ±8% on luminous flux measurements.
- ✧ 电压测试误差±0.1V
Forward voltage(VF) ± 0.1V
- ✧ 色度坐标 (x, y) 存在±0.006 公差。
The chromaticity coordinates(x,y) guarantee should be added ±0.006 tolerance.

6、光电特性图 The Photoelectric Characteristics Graph

Fig 1. 辐射特性 Radiation Characteristics

IF=140mA; TS = 25°C

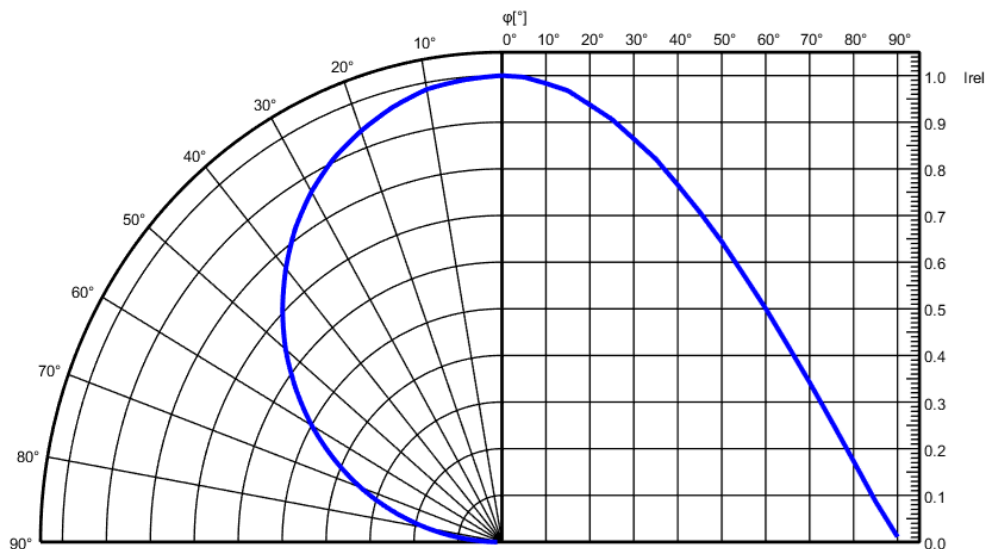


Fig 2. 相对发光光谱 Relative Spectral Distribution vs. Wavelength

$\Phi_{rel}=f(\lambda)$; IF=140mA; TS = 25°C

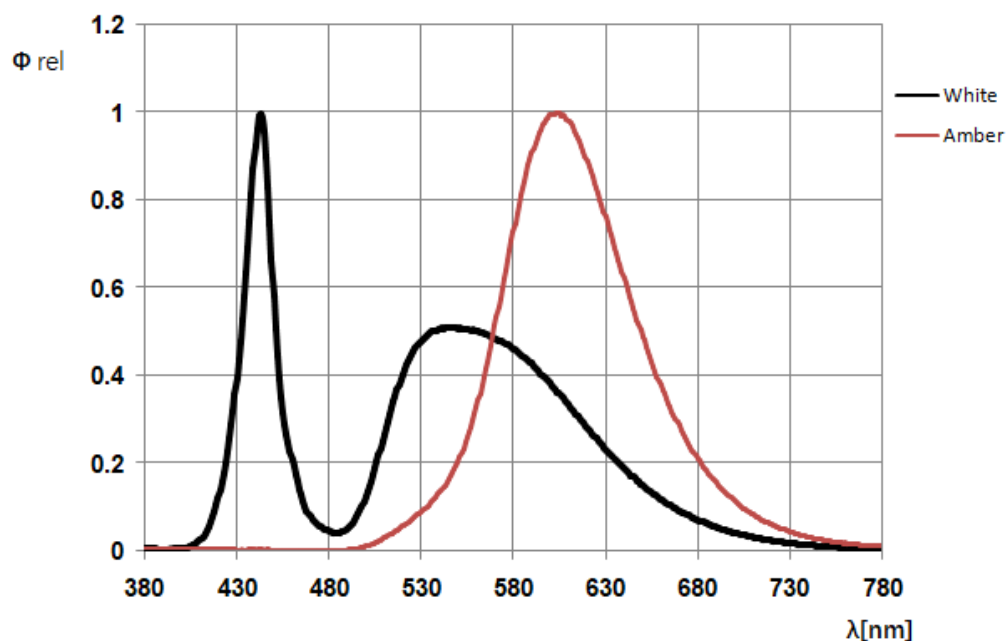


Fig 3. 正向电压 Forward Voltage

$I_F = f(V_F)$; $T_S = 25^\circ\text{C}$

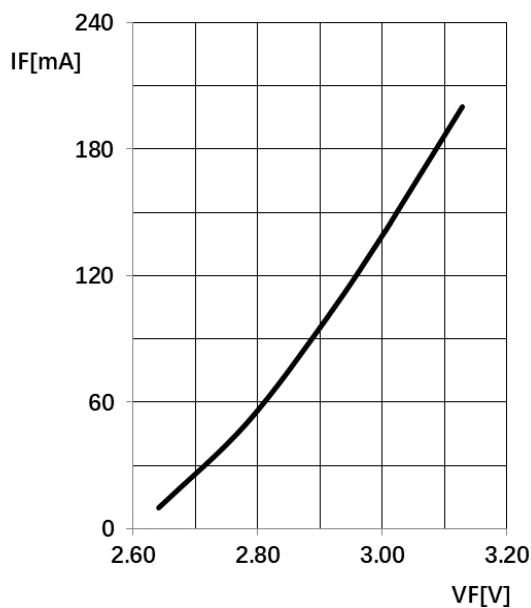


Fig 4. 相对发光强度 Relative Luminous Flux

$I_v / I_v(140\text{mA}) = f(I_F)$; $T_S = 25^\circ\text{C}$

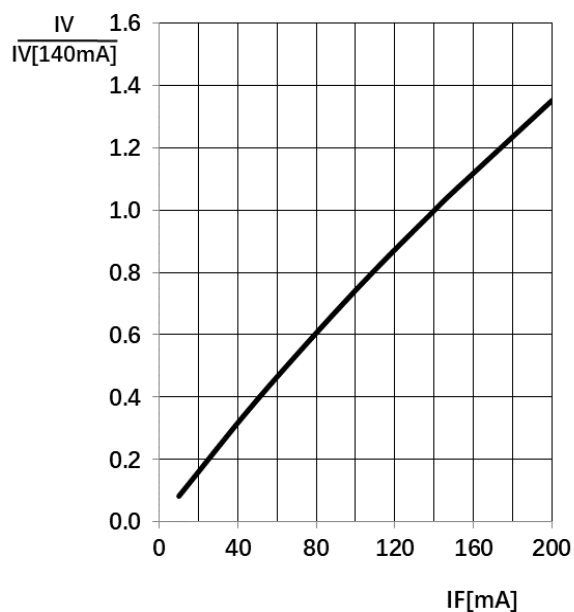


Fig 5. 色坐标偏移 Chromaticity Coordinate Shift

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

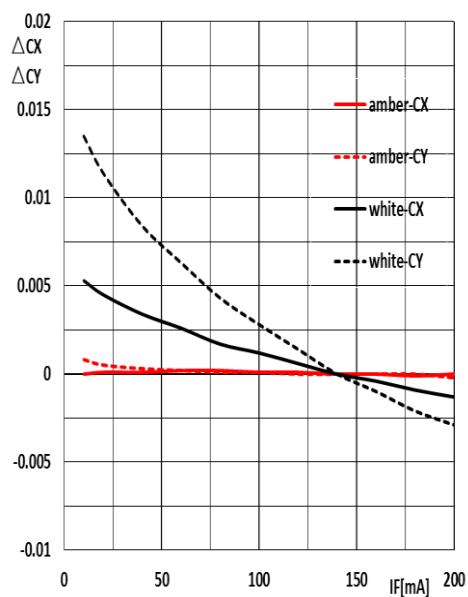


Fig 6. 正向电压 Forward Voltage

$$\Delta VF = VF - VF(25^\circ\text{C}) = f(T_j); IF = 140\text{mA}$$

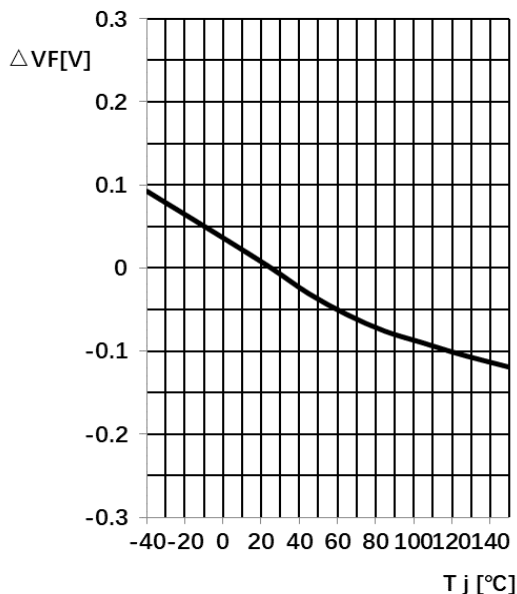


Fig 7. 相对发光强度 Relative Luminous Flux

$$I_v / I_v(25^\circ\text{C}) = f(T_j); IF = 140\text{mA}$$

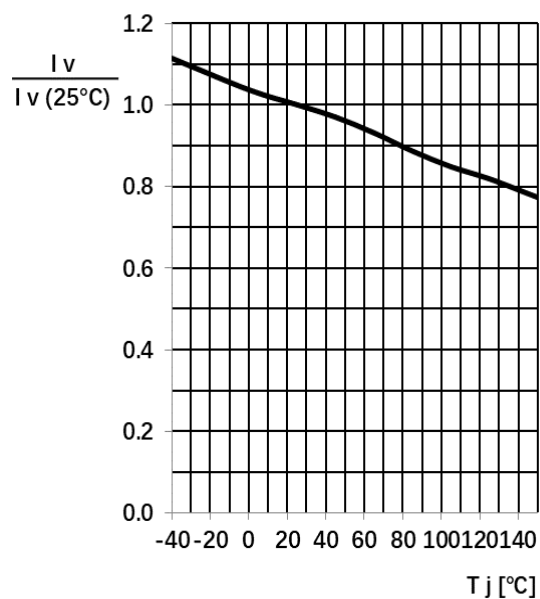


Fig 8. 色坐标偏移

Chromaticity Coordinate Shift

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

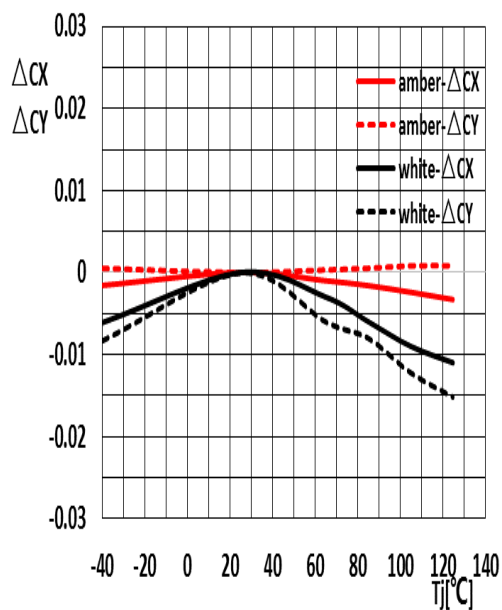
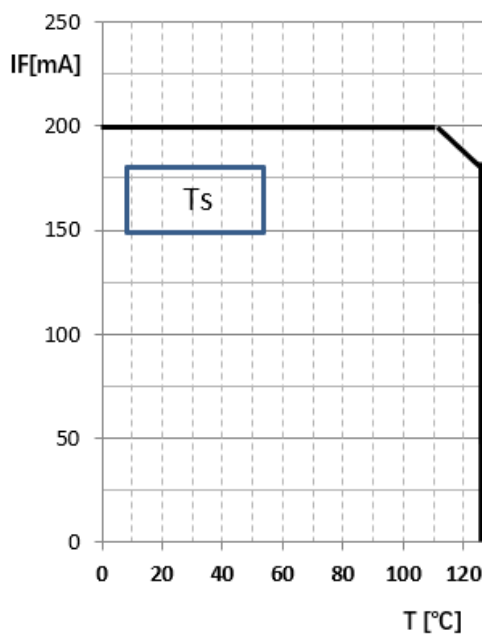


Fig 9. 最大正向电流

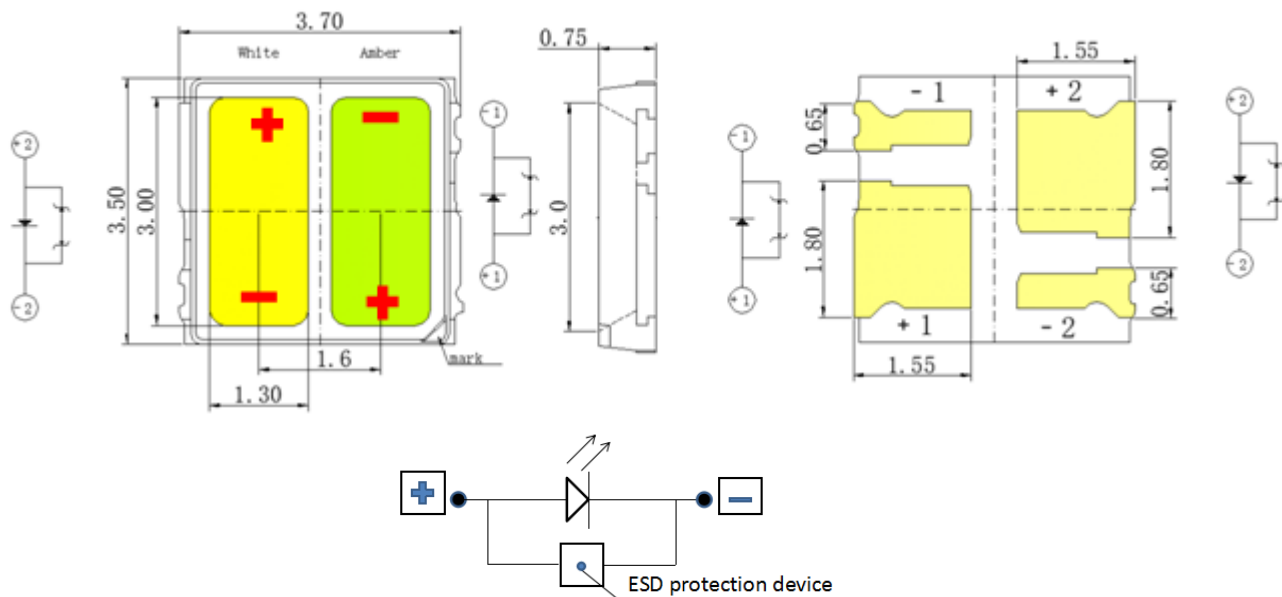
Max. Permissible Forward Current

$$IF = f(T)$$

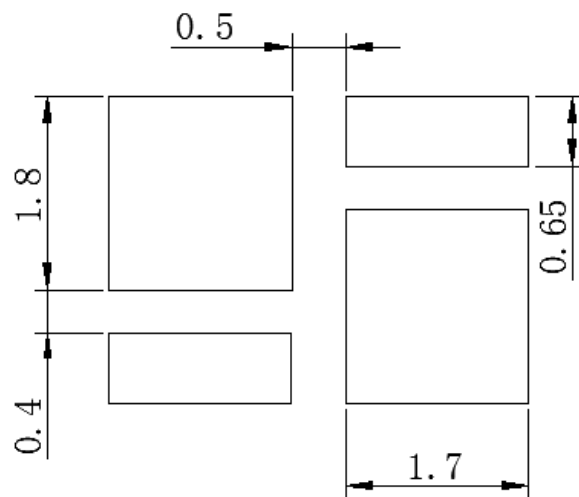


7、产品及焊盘尺寸 Product and Soldering Pattern Dimensions

a) 产品尺寸 Product Dimensions:



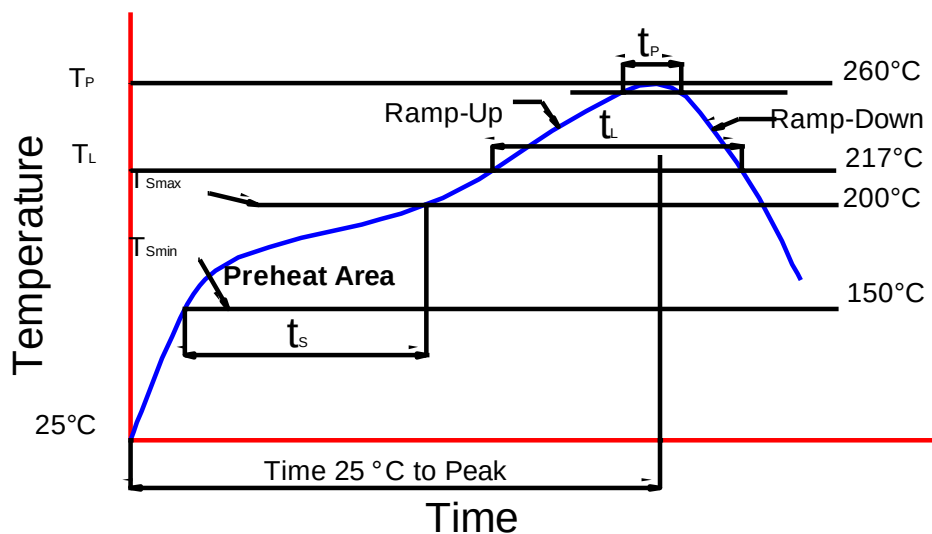
b) 焊盘尺寸 Soldering Pattern Dimensions



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: 28.9mg
Approximate weight: 28.9mg

8、回流焊曲线 Reflow Soldering Profile

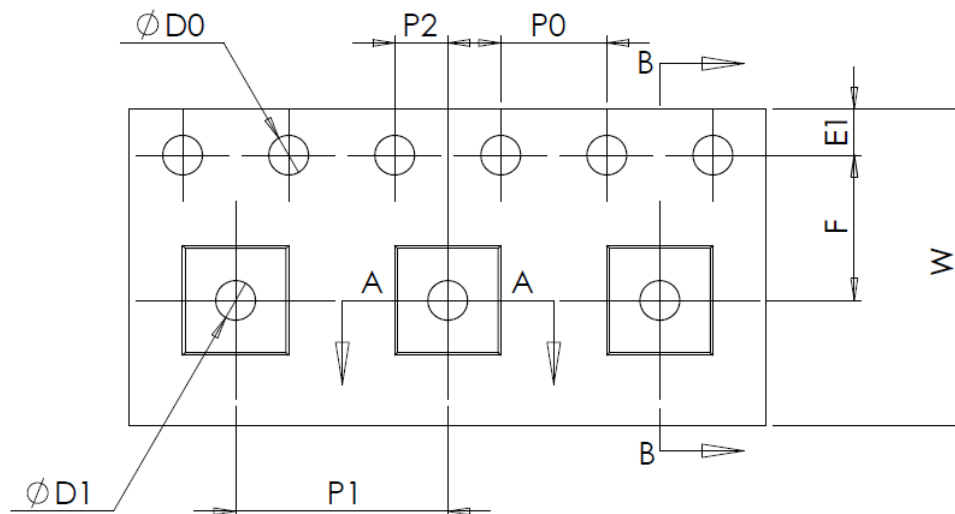


根据 JEDEC-J-STD-020E, 参考以下参数:

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



A0	3.8 ± 0.1
B0	3.95 ± 0.1
K0	1.20 ± 0.1
F	5.5 ± 0.05
P1	8 ± 0.1
W	$12 + 0.3 / -0.1$

备注 Notes:

✧ 卷轴包装数量: 1500pcs

Units per Reel: 1500pcs

✧ 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 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

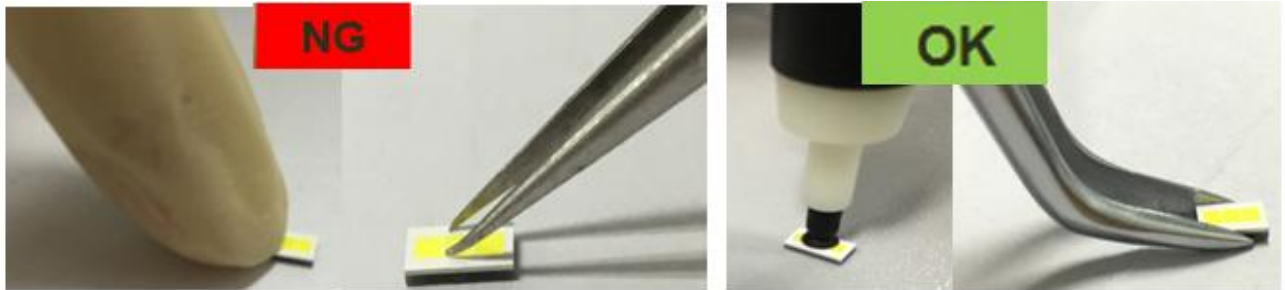
When the tape is rewound due to work interruptions, no more than 10N should be applied to the embossed carrier tape. The LEDs may stick to the cover tape.

10、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	2022.05.13	袁丁	Y00	1.新制定;
02	2023.02.07	袁丁	Y01	1.标签增加“MSL 2a”标识;
03	2024.03.09	李俊杰	A00	1.删除最小正向电流; 2.新增 5F 色区; 3.新增 LED 质量信息;
04	2024.06.10	曾海强	A01	1.更新标签级别信息;
05	2025.05.22	曾海强	A02	1.更新文档文字及格式; 2.更改显指为 60, 代码为 B 3.修改色区格式位置