



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: TU

产品型号 Product P/N: 35B

客 户 Client name:

客户料号 Client P/N:

版 本 号 Version No.: Y00

日 期 Sending Date: 2025.03.25

客户承认栏 Client Approval	
核准 Approval	确认 Audit

制定 Confirmation: 审核 Approval:

工厂地址:江西省南昌市高新区艾溪湖北路 699 号

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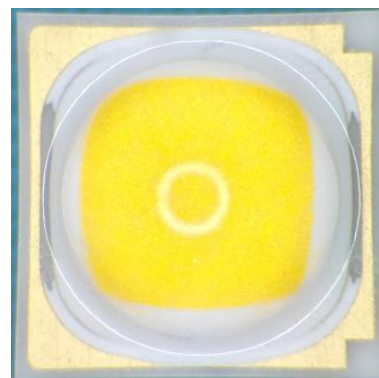
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1、特点 Features

- ◆ 陶瓷封装, 高亮度, 高光效
Ceramic Substrate package , High brightness ,High efficiency
- ◆ 尺寸: 3.50mm*3.50mm
Size: 3.50mm*3.50mm
- ◆ 根据 ANSI 标准分档
According to the ANSI standard colour gamut
- ◆ 350mA@85°C分档
Binned at 350mA@85°C
- ◆ 适于 SMT 贴片
Compatible with SMT
- ◆ 发光角度: 120°
Viewing Angle: 120°
- ◆ 亮度典型值: Typ.185lm @5700K @Tj85°C
Luminous Flux: Typ.185lm @5700K @ Tj 85°C
- ◆ 光效典型值: Typ.190lm/W @5700K @ Tj 85°C
Luminous efficacy: Typ.190lm/W @5700K @ Tj 85°C
- ◆ 包装: 最大 1000 颗/卷
Package: Max: 1000pcs /reel



2、应用 Applications

建筑照明	Architectural
工业照明	Industrial
商业照明	Commercial
室内外照明	Indoor and outdoor area



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 Forward Current	I_F	1500	mA
工作温度 Operating Temperature	T_{opr}	-40~105	°C
存储温度 Storage Temperature	T_{stg}	-40~120	°C
ESD Classification(HBM)	-	±8	kV
结温 Junction Temperature	T_j	150	°C

b) 光电参数 Electro-Optical Characteristics (IF=350mA,@ Tj 85°C)

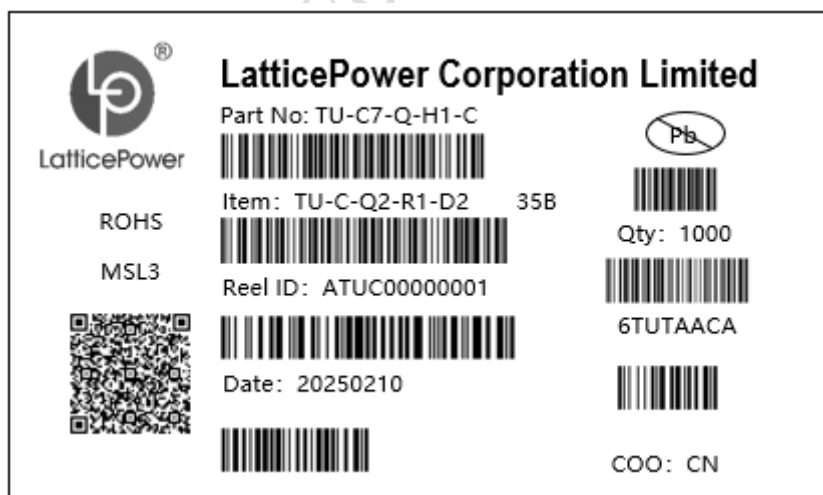
项目 Item	符号 Symbol	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
光通量 Luminous Flux	Φ	Refer to Flux Rank Distribution			Lm
正向电压 Forward Voltage	VF	2.5	2.8	3.0	V
热阻 Thermal Resistance	----	----	4.0	----	°C/W
发光角度 Viewing Angle	2θ1/2	----	120	----	°

4、产品代码 Product Order Code

TU - C7 - Q - H1 - C
 ① ② ③ ④ ⑤

- ① 产品型号 Product Type
- ② 显色指数 Ra level
- ③ 色温 CCT
- ④ 亮度 Luminous
- ⑤ 电压 Forward Voltage

a) 出货标签(例) Shipping label (e.g.)





b) Part No.信息 Part No. Information

Digit	PKG Information	Cod e	Specification				
1	Product	TU	TU				
2	CRI	C7	C	min70			
		75	D	min75			
		C8	E	min80			
		C9	G	min90			
3	CCT(K)	P	6500	C、 E	P1、 P2、 P3、 P4		
		Q	5700	C、 E	Q1、 Q2、 Q3、 Q4		
		R	5000	C、 E、 G	R1、 R2、 R3、 R4		
		T	4000	C、 E、 G	T1、 T2、 T3、 T4、 T5、 T6、 T7、 T8、 T9、 TA、 TB、 TC、 TD、 TE、 TF、 TG		
		U	3500	C、 E、 G	U1、 U2、 U3、 U4、 U5、 U6、 U7、 U8、 U9、 UA、 UB、 UC、 UD、 UE、 UF、 UG		
		V	3000	C、 E、 G	V1、 V2、 V3、 V4、 V5、 V6、 V7、 V8、 V9、 VA、 VB、 VC、 VD、 VE、 VF、 VG		
		W	2700	C、 E、 G	W1、 W2、 W3、 W4、 W5、 W6、 W7、 W8、 W9、 WA、 WB、 WC、 WD、 WE、 WF、 WG		
		Y	2200	C、 E	Y1、 Y2、 Y3、 Y4、 Y5、 Y6、 Y7、 Y8、 Y9、 YA、 YB、 YC、 YD、 YE、 YF、 YG		
		P	6500	C、 E	MAC5 (P1→PR,P2→PS, P3→PT, P4→PU)		
		Q	5700	C、 E	MAC5 (Q1→QR,Q2→QS, Q3→QT, Q4→QU)		
		R	5000	C、 E、 G	MAC5 (R1→RR,R2→RS, R3→RT, R4→RU)		
		T	4000	C、 E、 G	MAC3 (T1→TW,T2→TX , T3→TY , T4→TZ)		
		U	3500	C、 E、 G	MAC3 (U1→UW,U2→UX , U3→UY , U4→UZ)		
		V	3000	C、 E、 G	MAC3 (V1→VW,V2→VX , V3→VY , V4→VZ)		
		W	2700	C、 E、 G	MAC3 (W1→WW,W2→WX , W3→WY , W4→WZ)		
		Y	2200	C、 E	MAC3 (Y1→YW,Y2→YX , Y3→YY , Y4→YZ)		
4	LVminoVs (lm)	D1	100-120	G1,H1	G1	100	110
					H1	110	120
		E1	120-140	J1,K1	J1	120	130
					K1	130	140
		F1	140-160	M1,N1	M1	140	150
					N1	150	160
		G1	160-180	P1,Q1	P1	160	170
					Q1	170	180
		H1	180-200	R1,S1	R1	180	190
					S1	190	200

5	Forward Voltage(V)	C	2.5-3.	D2	2.5	2.8	
				F2	2.8	3	

c) 亮度分档 LVminoVs fIVx Binning (IF=350mA,@ Tj 85℃)

Bin	symbol	Min.	Max.	Vnit
G1	IV	100	110	Im
H1	IV	110	120	
J1	IV	120	130	
K1	IV	130	140	
M1	IV	140	150	
N1	IV	150	160	
P1	IV	160	170	
Q1	IV	170	180	
R1	IV	180	190	
S1	IV	190	200	

备注 Notes :

✧ 光通量测量误差范围±7%

LVminoVs fIVx measVrement tolerance: ±7%

d) 电压分档 Forward Voltage Binning (IF=350mA,@ Tj 85℃)

Bin	symbol	Min.	Max.	Vnit
D2	VF	2.5	2.8	V
F2	VF	2.8	3	

备注 Notes :

✧ 电压测量误差范围±0.1V

Tolerance is ±0.1V on voltage measVrements

e) 显指分档 Ra GroVps

Bin	symbol	Min.	Max.	R9
C	CRI	70	75	/
D	CRI	75	80	/
E	CRI	80	90	Min.0
G	CRI	90	100	Min.50

备注 Notes :

✧ 显指测量误差范围 ± 2 Tolerance is ± 2 on CRI measurements

f) 亮度分布 FIVx Rank Distribution (IF =350mA,@ Tj 85℃)

CRI 70

■ 供货等级 Available Rank

CCT	CIE	CRI	FIVx Rank									
6500	P	70	G1	H1	J1	K1	M1	N1	P1	Q1	R1	S1
5700	Q	70	G1	H1	J1	K1	M1	N1	P1	Q1	R1	S1
5000	R	70	G1	H1	J1	K1	M1	N1	P1	Q1	R1	S1
4000	T	70	G1	H1	J1	K1	M1	N1	P1	Q1	R1	S1
3500	V	70	G1	H1	J1	K1	M1	N1	P1	Q1	R1	S1
3000	V	70	G1	H1	J1	K1	M1	N1	P1	Q1	R1	S1
2700	W	70	G1	H1	J1	K1	M1	N1	P1	Q1	R1	S1
2200	Y	70	G1	H1	J1	K1	M1	N1	P1	Q1	R1	S1

CRI 80

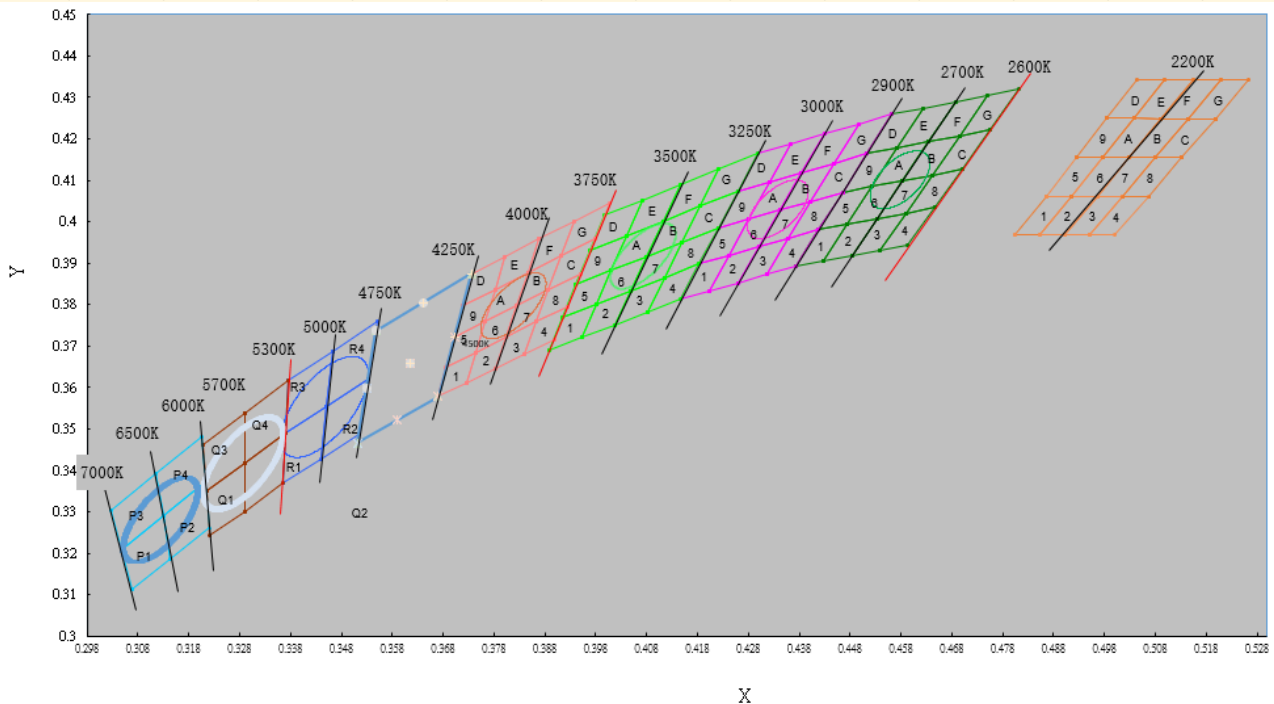
CCT	CIE	CRI	FIVx Rank									
6500	P	80	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
5700	Q	80	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
5000	R	80	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
4000	T	80	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
3500	U	80	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
3000	V	80	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
2700	W	80	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
2200	Y	80	G1	H1	J1	K1	M1	N1	P1	Q1	R1	

CRI 90

CCT	CIE	CRI	FIVx Rank									
5000	R	90	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
4000	T	90	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
3500	U	90	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
3000	V	90	G1	H1	J1	K1	M1	N1	P1	Q1	R1	
2700	W	90	G1	H1	J1	K1	M1	N1	P1	Q1	R1	

5、色区分档规则 Color Bin Regulations

a) 色区图 CIE Chromaticity Diagram



b) ANSI Bin 定义 ANSI Color bin definitions

色区	X1	Y1	X2	Y2	X3	Y3	X4	Y4
W1	0.4373	0.3893	0.4418	0.3981	0.4475	0.3994	0.4428	0.3906
W2	0.4428	0.3906	0.4475	0.3994	0.4532	0.4008	0.4483	0.3919
W3	0.4483	0.3919	0.4532	0.4008	0.4589	0.4021	0.4538	0.3931
W4	0.4538	0.3931	0.4589	0.4021	0.4646	0.4034	0.4593	0.3944
W5	0.4418	0.3981	0.4465	0.4071	0.4523	0.4085	0.4475	0.3994
W6	0.4475	0.3994	0.4523	0.4085	0.4582	0.4099	0.4532	0.4008
W7	0.4532	0.4008	0.4582	0.4099	0.4641	0.4112	0.4589	0.4021
W8	0.4589	0.4021	0.4641	0.4112	0.4700	0.4126	0.4646	0.4034
W9	0.4465	0.4071	0.4513	0.4164	0.4573	0.4178	0.4523	0.4085
WA	0.4523	0.4085	0.4573	0.4178	0.4634	0.4193	0.4582	0.4099
WB	0.4582	0.4099	0.4634	0.4193	0.4695	0.4207	0.4641	0.4112
WC	0.4641	0.4112	0.4695	0.4207	0.4756	0.4221	0.4700	0.4126
WD	0.4513	0.4164	0.4562	0.4260	0.4624	0.4274	0.4573	0.4178
WE	0.4573	0.4178	0.4624	0.4274	0.4687	0.4289	0.4634	0.4193
WF	0.4634	0.4193	0.4687	0.4289	0.4750	0.4304	0.4695	0.4207
WG	0.4695	0.4207	0.4750	0.4304	0.4813	0.4319	0.4756	0.4221
V1	0.4147	0.3814	0.4183	0.3898	0.4242	0.3919	0.4203	0.3833



V2	0.4203	0.3833	0.4242	0.3919	0.4300	0.3939	0.4259	0.3853
V3	0.4259	0.3853	0.4300	0.3939	0.4359	0.3960	0.4316	0.3873
V4	0.4316	0.3873	0.4359	0.3960	0.4418	0.3981	0.4373	0.3893
V5	0.4183	0.3898	0.4221	0.3984	0.4281	0.4006	0.4242	0.3919
V6	0.4242	0.3919	0.4281	0.4006	0.4342	0.4028	0.43	0.3939
V7	0.4300	0.3939	0.4342	0.4028	0.4403	0.4049	0.4359	0.3960
V8	0.4359	0.3960	0.4403	0.4049	0.4465	0.4071	0.4418	0.3981
V9	0.4221	0.3984	0.4259	0.4073	0.4322	0.4096	0.4281	0.4006
VA	0.4281	0.4006	0.4322	0.4096	0.4385	0.4119	0.4342	0.4028
VB	0.4342	0.4028	0.4385	0.4119	0.4449	0.4141	0.4403	0.4049
VC	0.4403	0.4049	0.4449	0.4141	0.4513	0.4164	0.4465	0.4071
VD	0.4259	0.4073	0.4299	0.4165	0.4364	0.4188	0.4322	0.4096
VE	0.4322	0.4096	0.4364	0.4188	0.4430	0.4212	0.4385	0.4119
VF	0.4385	0.4119	0.4430	0.4212	0.4496	0.4236	0.4449	0.4141
VG	0.4449	0.4141	0.4496	0.4236	0.4562	0.4260	0.4513	0.4164
U1	0.3889	0.3690	0.3915	0.3768	0.3981	0.3800	0.3953	0.3720
U2	0.3953	0.3720	0.3981	0.3800	0.4048	0.3832	0.4017	0.3751
U3	0.4017	0.3751	0.4048	0.3832	0.4116	0.3865	0.4082	0.3782
U4	0.4082	0.3782	0.4116	0.3865	0.4183	0.3898	0.4147	0.3814
U5	0.3915	0.3768	0.3941	0.3848	0.4010	0.3882	0.3981	0.3800
U6	0.3981	0.3800	0.4010	0.3882	0.4080	0.3916	0.4048	0.3832
U7	0.4048	0.3832	0.4080	0.3916	0.4150	0.3950	0.4116	0.3865
U8	0.4116	0.3865	0.4150	0.3950	0.4221	0.3984	0.4183	0.3898
U9	0.3941	0.3848	0.3968	0.3930	0.4040	0.3966	0.4010	0.3882
UA	0.4010	0.3882	0.4040	0.3966	0.4113	0.4001	0.4080	0.3916
UB	0.4080	0.3916	0.4113	0.4001	0.4186	0.4037	0.4150	0.3950
UC	0.4150	0.3950	0.4186	0.4037	0.4259	0.4073	0.4221	0.3984
UD	0.3968	0.3930	0.3996	0.4015	0.4071	0.4052	0.4040	0.3966
UE	0.4040	0.3966	0.4071	0.4052	0.4146	0.4089	0.4113	0.4001
UF	0.4113	0.4001	0.4146	0.4089	0.4222	0.4127	0.4186	0.4037
UG	0.4186	0.4037	0.4222	0.4127	0.4299	0.4165	0.4259	0.4073
T1	0.3670	0.3578	0.3726	0.3612	0.3744	0.3685	0.3686	0.3649
T2	0.3726	0.3612	0.3783	0.3646	0.3804	0.3721	0.3744	0.3685
T3	0.3783	0.3646	0.3840	0.3681	0.3863	0.3758	0.3804	0.3721
T4	0.3840	0.3681	0.3898	0.3716	0.3924	0.3794	0.3863	0.3758
T5	0.3686	0.3649	0.3744	0.3685	0.3763	0.3760	0.3702	0.3722
T6	0.3744	0.3685	0.3804	0.3721	0.3825	0.3798	0.3763	0.3760
T7	0.3804	0.3721	0.3863	0.3758	0.3887	0.3836	0.3825	0.3798
T8	0.3863	0.3758	0.3924	0.3794	0.3950	0.3875	0.3887	0.3836
T9	0.3702	0.3722	0.3763	0.3760	0.3782	0.3837	0.3719	0.3797
TA	0.3763	0.3760	0.3825	0.3798	0.3847	0.3877	0.3782	0.3837
TB	0.3825	0.3798	0.3887	0.3836	0.3912	0.3917	0.3847	0.3877



TC	0.3887	0.3837	0.3950	0.3875	0.3978	0.3958	0.3912	0.3917
TD	0.3719	0.3797	0.3782	0.3837	0.3802	0.3916	0.3736	0.3874
TE	0.3782	0.3837	0.3847	0.3877	0.3869	0.3958	0.3802	0.3916
TF	0.3847	0.3877	0.3912	0.3917	0.3937	0.4001	0.3869	0.3958
TG	0.3912	0.3917	0.3978	0.3958	0.4006	0.4044	0.3937	0.4001
R1	0.3371	0.3490	0.3451	0.3554	0.3440	0.3427	0.3366	0.3369
R2	0.3451	0.3554	0.3533	0.3620	0.3515	0.3487	0.3440	0.3427
R3	0.3376	0.3616	0.3463	0.3687	0.3451	0.3554	0.3371	0.3490
R4	0.3463	0.3687	0.3551	0.3760	0.3533	0.3620	0.3451	0.3554
Q1	0.3215	0.3350	0.3290	0.3417	0.3290	0.3300	0.3222	0.3243
Q2	0.3290	0.3417	0.3371	0.3490	0.3366	0.3369	0.3290	0.3300
Q3	0.3207	0.3462	0.3290	0.3538	0.3290	0.3417	0.3215	0.3350
Q4	0.3290	0.3538	0.3376	0.3616	0.3371	0.3490	0.3290	0.3417
P1	0.3068	0.3113	0.3144	0.3186	0.3130	0.3290	0.3048	0.3207
P2	0.3144	0.3186	0.3221	0.3261	0.3213	0.3373	0.3130	0.3290
P3	0.3048	0.3207	0.3130	0.3290	0.3115	0.3391	0.3028	0.3304
P4	0.3130	0.3290	0.3213	0.3373	0.3205	0.3481	0.3115	0.3391
Y1	0.4805	0.3968	0.4854	0.3968	0.4915	0.4062	0.4865	0.4062
Y2	0.4854	0.3968	0.4903	0.3969	0.4966	0.4062	0.4915	0.4062
Y3	0.4903	0.3969	0.4952	0.3969	0.5016	0.4062	0.4966	0.4062
Y4	0.4952	0.3969	0.5000	0.3969	0.5066	0.4062	0.5016	0.4062
Y5	0.4865	0.4062	0.4915	0.4062	0.4976	0.4156	0.4925	0.4156
Y6	0.4915	0.4062	0.4966	0.4062	0.5028	0.4156	0.4976	0.4156
Y7	0.4966	0.4062	0.5016	0.4062	0.5080	0.4156	0.5028	0.4156
Y8	0.5016	0.4062	0.5066	0.4062	0.5132	0.4156	0.5080	0.4156
Y9	0.4925	0.4156	0.4976	0.4156	0.5038	0.4250	0.4984	0.4250
YA	0.4976	0.4156	0.5028	0.4156	0.5091	0.4249	0.5038	0.4250
YB	0.5028	0.4156	0.5080	0.4156	0.5145	0.4249	0.5091	0.4249
YC	0.5080	0.4156	0.5132	0.4156	0.5198	0.4249	0.5145	0.4249
YD	0.4984	0.4250	0.5038	0.4250	0.5099	0.4344	0.5044	0.4344
YE	0.5038	0.4250	0.5091	0.4249	0.5154	0.4343	0.5099	0.4344
YF	0.5091	0.4249	0.5145	0.4249	0.5209	0.4342	0.5154	0.4343
YG	0.5145	0.4249	0.5198	0.4249	0.5264	0.4342	0.5209	0.4342

椭圆色区块

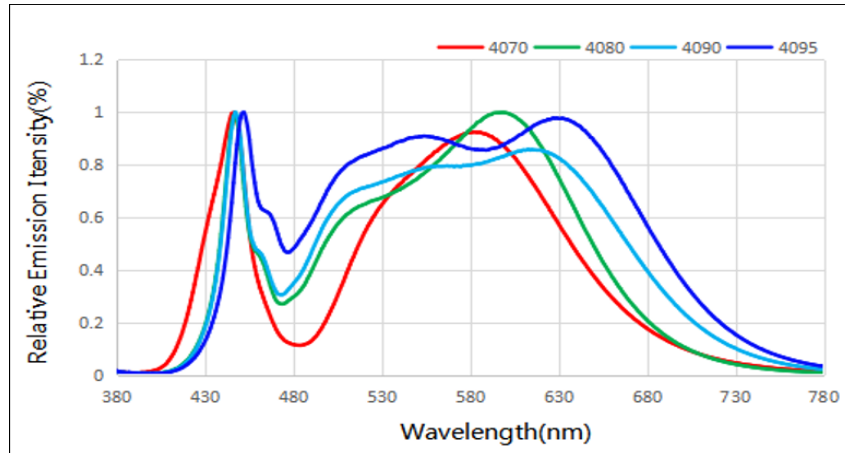
CCT	X	Y	a	b	θ	CCT (K)	类型
6500K	0.3123	0.3282	0.0116	0.0048	58.57	6500	MAC5
5700K	0.3287	0.3417	0.0125	0.0053	59.1	5700	MAC5
5000K	0.3447	0.3553	0.0137	0.0059	59.62	5000	MAC5
4000K	0.3818	0.3797	0.0094	0.004	53.72	4000	MAC3
3500K	0.4073	0.3917	0.0093	0.0041	54	3500	MAC3
3000K	0.4338	0.4030	0.0083	0.0041	53.22	3000	MAC3
2700K	0.4578	0.4101	0.0081	0.0042	53.7	2700	MAC3
2200K	0.5018	0.4153	0.0072	0.004	53.45	2200	MAC3

备注 Notes :

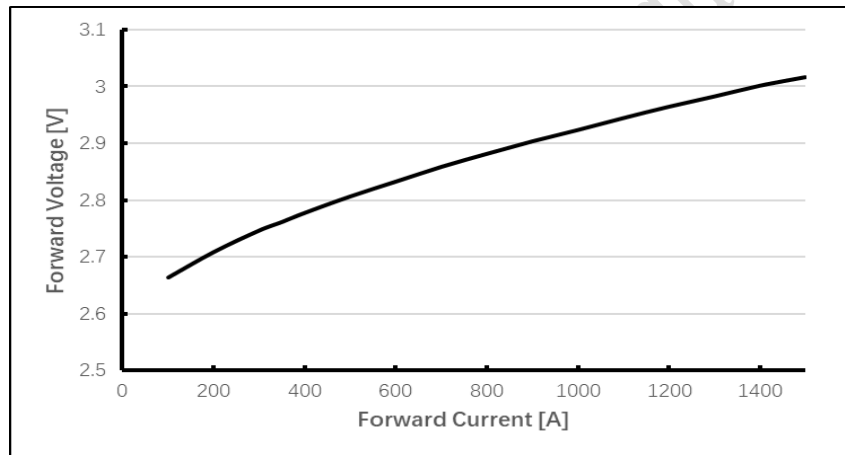
- ✧ 色度坐标 (x, y) 来自 CIE1931 色度图
The chromaticity coordinates(x,y)is derived from the CIE 1931 chromaticity diagram
- ✧ 测试分选设备用于光通量 (lm) 和 CIE1931 色度坐标 (x, y) 测试。
Testing&Sorting Machine is for the IVminoVs fIVx(lm) and the CIE1931 chromaticity coordinates(x,y) testing.
- ✧ 色度坐标 (x, y) 存在±0.006 公差。
The chromaticity coordinates(x,y) gVarantee shoVld be added ±0.006 tolerance.

6、光电特性图 The Photoelectric Characteristics Graph

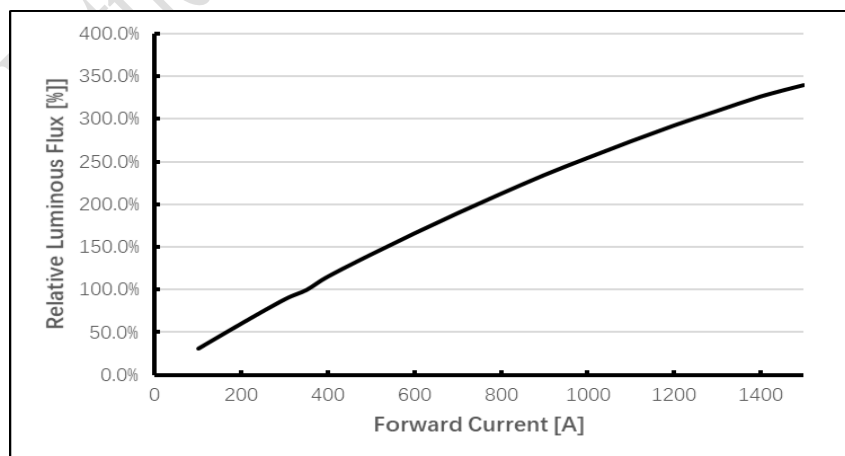
a)、光谱图 Color SpectrVm, $T_j = 25^\circ\text{C}$



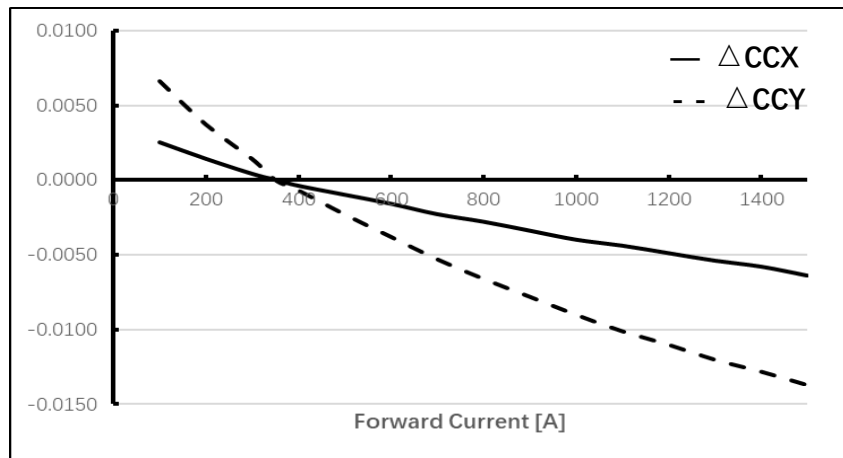
b)、Forward Voltage vs. Forward CVrrent, $T_j = 25^\circ\text{C}$



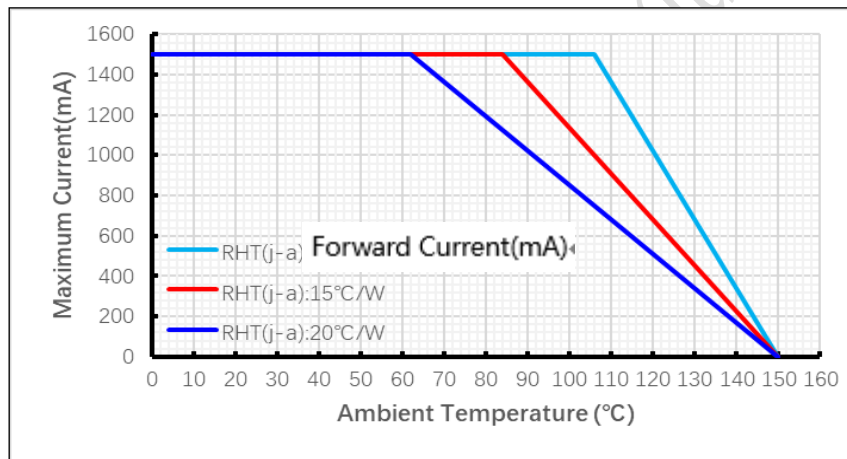
c)、Forward CVrrent vs. Relative LVminoVs FLVx, $T_j = 25^\circ\text{C}$



d) 、 Forward CVrrent vs. ΔCCX ΔCCY , $T_j = 25^\circ\text{C}$



e) 、 MaximVm Forward CVrrent vs. Ambient TemperatVre, $T_j(\text{max.}) = 150^\circ\text{C}$



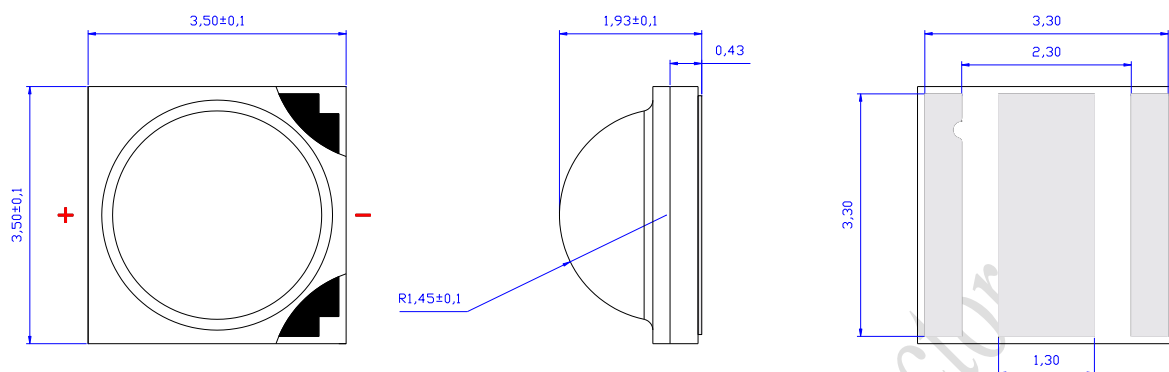
◇ 备注 Notes:

最大正向电流由 LED 结和环境之间的热阻决定。最终产品的设计方式应最大限度地减少从焊点到环境的热阻，以优化灯的寿命和光学特性。

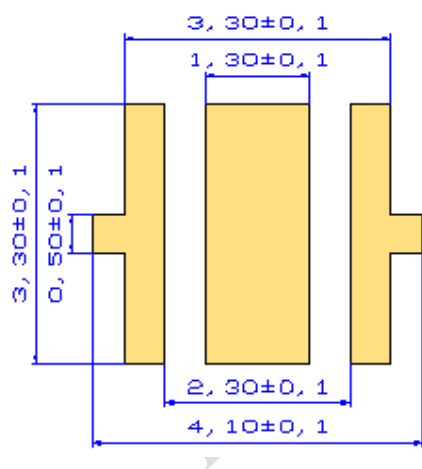
The maximVm forward cVrrent is determined by the thermal resistance between the LED jVnction and ambient. It is crVcial for the end prodVct to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics

7、产品及钢网尺寸 ProdVct and PCB Pad Dimensions

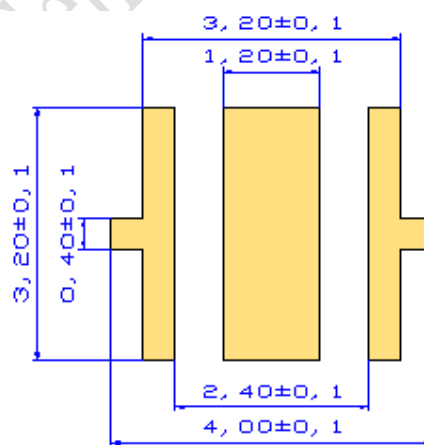
ProdVct Dimensions:



PCB Pad Dimensions:



建议 PCB 焊盘

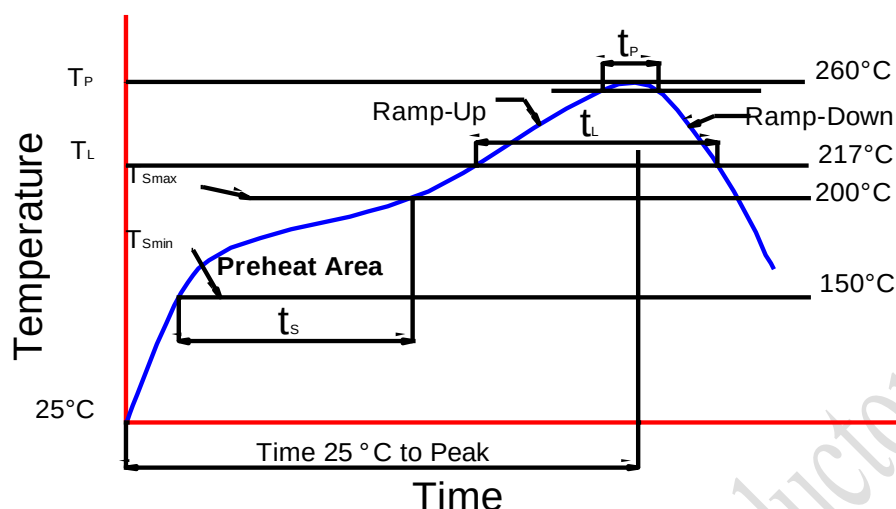


建议钢网

备注 Notes:

- ◇ 所有尺寸均以 mm 为单位
All dimensions are in millimeters
- ◇ 尺寸公差: ±0.1mm
Dimension tolerance: ± 0.1mm

8、回流焊特性 Reflow Soldering Characteristics

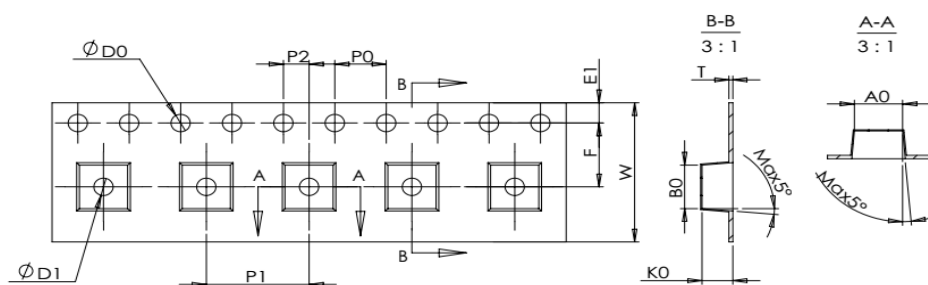


根据 EDEC-J-STD-020D 内容，参考以下内容。

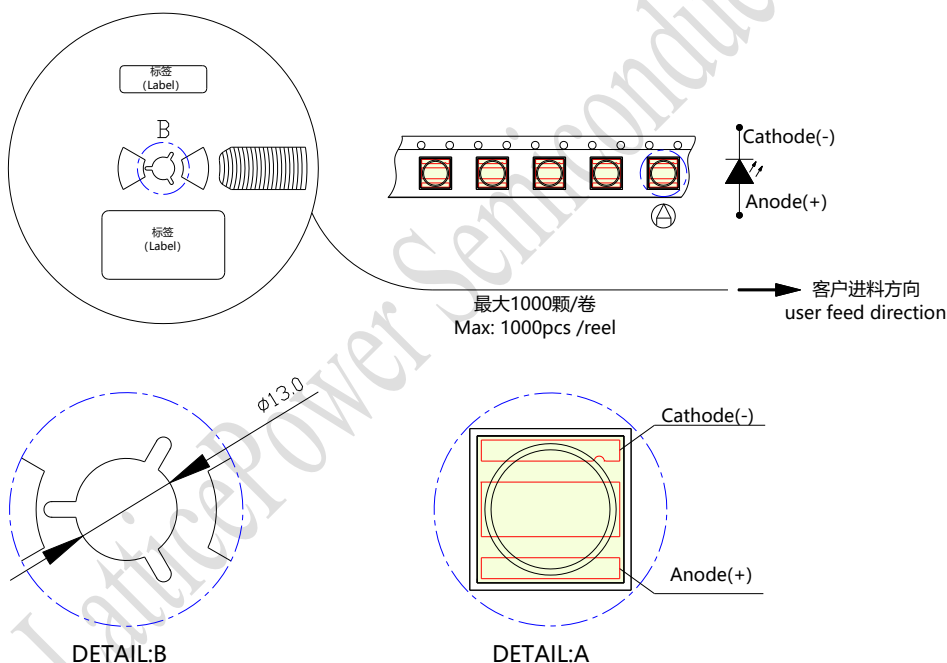
Compatible with the JEDEC-J-STD-020D, Using the parameters listed below.

特制参数 Profile Feature	无铅焊料 Lead-Free Solder
平均上升速率 (Tsmax 至 Tp) Average Ramp-Up Rate (Tsmax to Tp)	3 °C/sec max.
预热: 温度最小值 (Tsmin) Preheat: Temperature Min (Tsmin)	150
预热: 最高温度 (Tsmax) Preheat: Temperature Max (Tsmax)	200
预热: 时间 (tsmin 到 tsmax) Preheat: Time (tsmin to tsmax)	60-180 secs
回流温度 (Tl) Time Maintained Above: Temperature (Tl)	217°C
回流时间 (tl) Time Maintained Above: Time (tl)	60-150 secs
峰值/分类温度 (Tp) Peak/Classification Temperature (Tp)	255±5°C
实际峰值温度 (tp) 在 5°C 以内的时间 Time Within 5°C of Actual Peak Temperature (tp)	20~40 secs
降低速率 Ramp-Down Rate	5°C/sec max.

9、卷轴 Reel Dimensions



Item	spec
W	12.00±0.30
P1	8.00±0.10
E1	1.75±0.10
F	5.50±0.10
D0	1.50±0.10/0
D1	1.50±0.10/0
P0	4.00±0.10
P010	40.00±0.20
P2	2.00±0.10
A0	3.72±0.10
B0	3.72±0.10
K0	2.60±0.10
T	0.30±0.05
Unit:mm	



备注 Notes:

- ❖ 卷轴包装 1000pcs
Reel:1000pcs.
- ❖ 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 ContinVoVs 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 rewoVnd dVe to work interrVptions, no more than 10N shoVld 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 FailVre Criteria#	失效数/测试数 Vnits Failed/Tested
可焊性 (回流焊) Solderability(Reflow Soldering)	JEITA ED=4701 303 303A	$T_{sld}=255\pm 5^{\circ}\text{C}$, 5sec, Lead-free Solder(Sn-3.0Ag-0.5CV)	3times	#2	0/10
高低温循环 Temperature Cycle	JEITA ED=4701 100 105	-40°C (30min)~ 25°C (5min)~ 85°C (30min)~ 25°C (5min)	100cycles	#1	0/10
高温/低温储存 High/Low Temperature Storage	JEITA ED=4701 200 201/ JEITA ED=4701 200 202	$T_A=125^{\circ}\text{C}/T_A=-40^{\circ}\text{C}$	1000h	#1	0/10
冷热冲击 Thermal Shock	JESD22-A106	-40°C 15min fl < 3min 125°C 15min	1000Cycles	冷热冲击 Thermal Shock	0/10
高温老化 High Temperature Operating		$T_A=85^{\circ}\text{C}$, $I_F=1500\text{mA}$	1000h	#1	0/10
高温高湿老化 Temperature Humidity Operating		85°C , RH=85%, $I_F=1500\text{mA}$	1000h	#1	0/10

b) 失效判定 FailVre Criteria

判定 Criteria #	项目 Items	条件 Conditions	失效判定 FailVre Criteria
#1	正向电压 Forward Voltage (VF)	I_F	> 初始值 $\times 1.1$ 倍 > Initial value $\times 1.1$
	光通量 Luminous Flux (Φv)	I_F	< 初始值 $\times 0.7$ 倍 < Initial value $\times 0.7$
	反向电流 Reverse Current (IR)	$V_R=5\text{V}$	> 1VA > 1VA
	回流焊 Solderability	-	焊接面积 < 80% Less than 80% solder coverage

11、注意事项 CaVtions

a) 操作注意 Handling PrecaVtions



1) LED 上的压力会影响 led 的可靠性。应采取预防措施，以避免对 led 的强压力。在加热过程中不要对 led 施加压力。

PressVre on the LEDs will inflVence to the reliability of the LEDs. PrecaVtions shoVld be taken to avoid strong pressVre on the LEDs. Do not pVt stress on the LEDs dVring heating.

2) LED 焊接完毕后不应重新焊接。如果重新焊接不可避免，那么在修复之前和修复之后都要仔细检查 LED 的特性。

Re-soldering shoVld not be done after the LEDs have been soldered. If re-soldering is Vnavoidable, LED`s characteristics shoVld be carefVlly checked before and after sVch repair.

3) 不要将组装好的 pcb 堆在一起。由于 LED 的材料是软的，与 LED 组装的两个 PCB 之间的磨损可能会导致 LED 破坏性的故障。

Do not stack assembled PCBs together. Since materials of LEDs is soft, abrasion between two PCB assembled with LED might caVse catastrophic failVre of the LEDs.

4) 与标准的封装材料相比，硅胶通常更柔软，表面更容易吸引灰尘，如果不能保证最低程度的灰尘和灰尘颗粒，在部件焊接后，必须在表面使用合适的清洗液。

Compared to standard encapsVlants, silicone is generally softer, and the sVrface is more likely to attract dVst, In cases where a minimal level of dirt and dVst particles cannot be gVaranteed, a sVitable cleaning solVtion mVst be applied to the sVrface after the soldering of components.

5) 灯具材料中释放的挥发性有机化合物(VOCs)可以穿透 LED 的硅树脂封装，暴露在热量和光子能量下会变色。结果可能是灯具的光输出有重大损失。

VOCs (Volatile organic compoVnds) emitted from materials Vsed in the constrVction of fixTVres can penetrate silicone encapsVlants of LED and discolor when exposed to heat and photonic energy. The resVlt can be a significant loss of light oVtpVt from the fixTVre.

6) 安装 led 时，不要使用释放有机蒸汽的粘合剂。

Attaching LEDs, do not Vse adhesives that oVtgas organic vapor.。

7) LED 对 ESD (Electro-Static Discharge, ESD)敏感。以下是晶能半导体公司为减少这些影响而提出的一些建议。

LED is sensitive to Electro-Static Discharge (ESD). Below is a list of suggestions that LatticePower Semiconductor proposes to minimize these effects.

a. ESD(静电放电)

静电放电(ESD)定义为两个物体接触时释放出的静电。虽然大多数 ESD 事件被认为是无害的,但在许多工业环境中,在生产和存储期间,它可能是一个代价比较大的问题。ESD 对 LED 的损害可能导致产品显示出不同寻常的特性,例如:一反向泄漏电流的增加降低了开启电压

ESD (Electro Static Discharge)

Electrostatic discharge (ESD) is defined as the release of static electricity when two objects come into contact. While most ESD events are considered harmless, it can be an expensive problem in many industrial environments during production and storage. The damage from ESD to an LED may cause the product to demonstrate unusual characteristics such as: - Increase in reverse leakage current
lowered turn-on voltage.

-LED 在低电流时发射异常 Abnormal emissions from the LED at low current

以下建议可以帮助减少 ESD 发生的可能性。

The following recommendations are suggested to help minimize the potential for an ESD event.

一个或多个工作区域建议:

One or more work area suggestions:

-电离风扇设置 Ionizing fan setup

-导电材料制成的防静电台面/搁板垫 ESD table/shelf mat made of conductive materials

-防静电安全容器 ESD safe storage containers

一个或多个人员建议选择:

One or more personnel suggestion options:

-防静电腕带 Antistatic wrist-strap

-防静电材料鞋 Antistatic material shoes

-防静电衣服 Antistatic clothes

环境控制:

Environmental controls:

-湿度控制(干燥环境下防静电效果较差) Humidity control (ESD gets worse in a dry environment)

b) 清洗 Cleaning

1) 建议使用异丙醇进行清洗。如果使用其他溶剂, 必须保证这些溶剂不溶解包装或树脂。不建议使用超声波清洗。超声波清洗可能会对 LED 造成损坏。

We suggest 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.

c) 存储 Storage

➤ 不要将 LED 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 LED in damp places, Storage temperature between 5 °C and 30 °C, Relative humidity under 30%.

➤ 打开包装后使用注意事项 Use Precaution after Opening the Packaging

a) 开包后推荐条件 Recommend conditions after opening the package

- 密封/温度: 5~30°C 湿度: 小于 60%

- Sealing / Temperature : 5 ~ 30°C Humidity : less than RH60%

b) 如果包装已打开超过 168H(MSL 3) 或湿度指示卡颜色发生变化, 应在 65±5°C 条件下干燥 10-24H

If the package has been opened more than 168 hours (MSL 3) or the color of the humidity indicator card changes, components should be dried for 10-24hr at 65±5°C