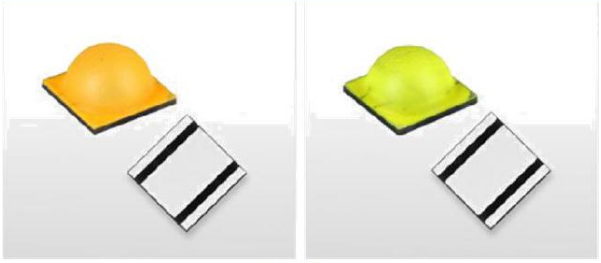
RUI SHUO 锐硕光电

. One of the best Lm/W, Lm/$ in High-Power LED （高光效、高性价比）
. HIGH-POWER CERAMIC PACKAGING LED – 5050 4W SERIES （ LED-5050 4W 系列 ）

T15***41A-**AA(COOL, NEUTRAL, WARM)



Product Brief（产品简介）

FEATURES AND BENEFITS（特性优点）

. HIGH LUMEN OUTPUT AND EFFICACY（高流明和高光效）
. DESIGNED FOR HIGH CURRENT OPERATION（高电流使用）
. LOW THERMAL RESISTANCE（低热阻）
. COOL WHITE EFFICACY OF UP TO 105 LM/W (@ 25℃, 700MA)（冷白光效可达 105LM/W)
. WIDE CCT RANGE 2600~7000K（色温范围：2600~7000K)
. HIGH COLOR QUALITY WITH CRI MIN. 70（RA≥70）
. PB-FREE REFLOW SOLDERING APPLICATION（适用无铅回流焊）

KEY APPLICATIONS（应用）

- INDOOR LIGHTING（室内照明）
- OUTDOOR LIGHTING（户外照明）
- AUTOMOTIVE（汽车应用）
- ARCHITECTURAL LIGHTING（建筑照明）
- INDUSTRIAL LIGHTING (HIGH/LOW BAY)（工业照明）
- HOME APPLIANCE（家用电器）

Table 1. Product Selection Table（产品目录）

Model No. 型号	Color 颜色	CCT （色温） Min.(最小值）	Typ.（典型值）	Max.（最大值）
T1565*11A-**AA	Cool White（冷白）	6020K	6530K	7040K
T1561*41A-**AA	Cool White （冷白）	5700K	6100K	6500K
T1557*41A-**AA	Cool White（冷白）	5310K	5665K	6020K
T1550*41A-**AA	Neutral White （正白）	4745K	5028K	5311K
T1540*41A-**AA	Neutral White （正白）	3710K	3985K	4260K
T1530*41A-**AA	Warm White （暖白）	2870K	3045K	3220K
T1527*41A-**AA	Warm White（暖白）	2580K	2725K	2870K

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Performance Characteristics （特性参数）

Table 2. Electro Optical Characteristics（光电特性）, IF = 350mA , Ta = 25℃, RH60%

Color Temperature 色温	Color Rendering 显指	Typical Luminous Flux 光通量典型(350mA)
	Min 最小值	Typ. （典型值）
2725±145K	80	400
3045±175K	80	415
3985±275K	80	430
5028±283K	70	460
5665±355K	70	475
6100±400K	70	479
6530±510K	70	446

- Tolerance of measurements of the Luminous Flux is ±7%(LM 测试误差±7%）.
- Ra measurement tolerance is ±2（Ra 测试误差±2）.
- Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram （CCT 参考 CIE 1931 色度图）.
- The lumen table is only for reference（LM 参数供参考）.
- Ta = 25℃, RH60% （温度：25 ℃，湿度：60%）.

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Performance Characteristics （特性参数）

Table 3. Electro Optical Characteristics（光电特性）, IF = 350mA , Ta = 25℃, RH60%

Item 参数	Symbol 符号	Value 数值			Unit 单位	Test Condition 测试条件
		Min 最小值	Typ 典型值	Max 最大值		
Forward Voltage 正向电压	VF	11.0	12	13	V	IF=350mA
Reverse Current 反向电流	IR	-	-	10	μA	VR=5V
View Angle 发光角度	2θ1/2	-	145	150	°	IF=350mA
Thermal Resistance 热阻	(Rth $_{j\text{-}sp}$)	-	1.3	-	℃/W	IF=350mA
Electrostatic Discharge 抗静电	ESD	1000	-	-	V	-

- Tolerance : VF :±0.1V（VF 测试误差±0.1V）.
- 2Θ1/2 is the off-axis where the luminous intensity is 1/2 of the peak intensity（2Θ1/2 即为发光强度为峰值强度 1/2 的角度）.
- Thermal resistance : RthJS (Junction / solder) 热阻值 (结点至焊点) .
- Ta = 25℃, RH60% （温度：25 ℃，湿度：60%）.

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Performance Characteristics（特性参数）

Table 4. Absolute Maximum Ratings（最大额定参数）, Ta = 25℃, RH60%

Item 参数名称	Symbol 符号	Absolute Maximum Ratings 最大额定参数	Unit 单位
Forward Current 正向电流	IF	700	mA
Pulse Forward Current 正向脉冲电流	IFP	1000	mA
Power Dissipation 功率损耗	PD	9100	mW
Reverse Voltage 反向电压	VR	5	V
Operating Temperature 操作温度	Topr	-40～+100	℃
Storage Temperature 储存温度	Tstg	-40～+100	℃
Junction Temperature 结温	Tj	125	℃
Soldering Temperature 回流温度	Tsld	230℃ or 260℃ for 10sec	

• IFP condition with Pulse: Width≤100μs Duty cycle≤1/10

• LED's properties might be different from suggested values like above and below tables if operation condition will be exceeded our parameter range. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.

• 正向脉冲电流条件:脉冲宽度≤100μs，占空比≤1/10

• 操作条件若超出最大额定参数，可能会对 LED 造成不可预期伤害。

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Relative Spectral Distribution（光谱分布）

Fig 1. Color Spectrum（光谱图）, Ta = 25℃, RH60%

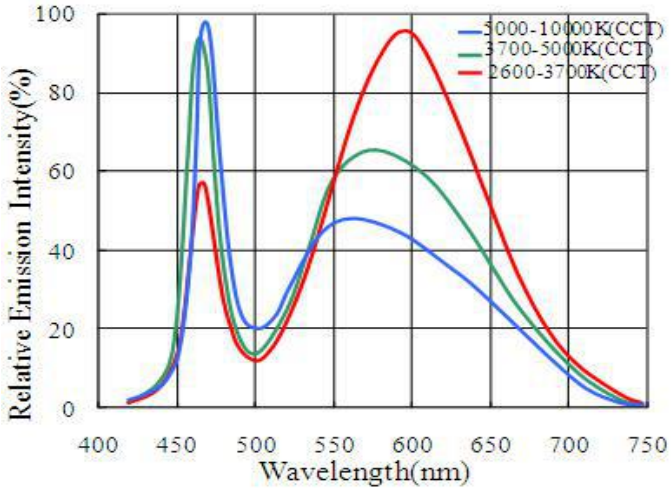
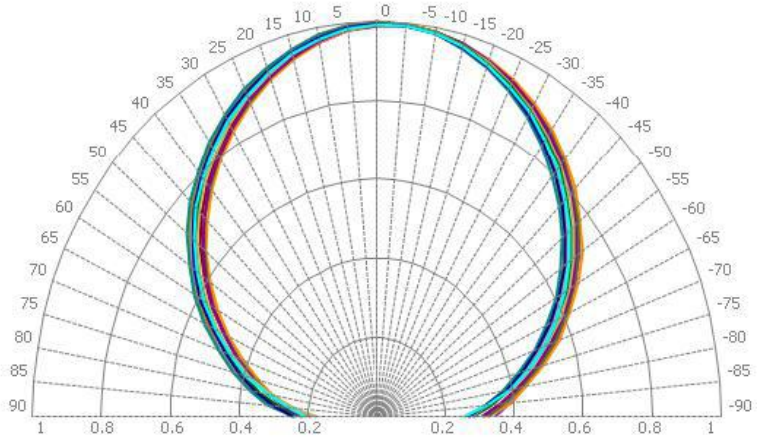


Fig 2. Viewing Angle Distribution （发光角度）, Ta = 25℃, RH60%

IF = 350mA



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Forward Current Characteristics（IV 特性曲线）

Fig 3. IF--- Relative Luminous flux， , Ta = 25℃
（亮度与电流关系，温度=25 ℃ ）

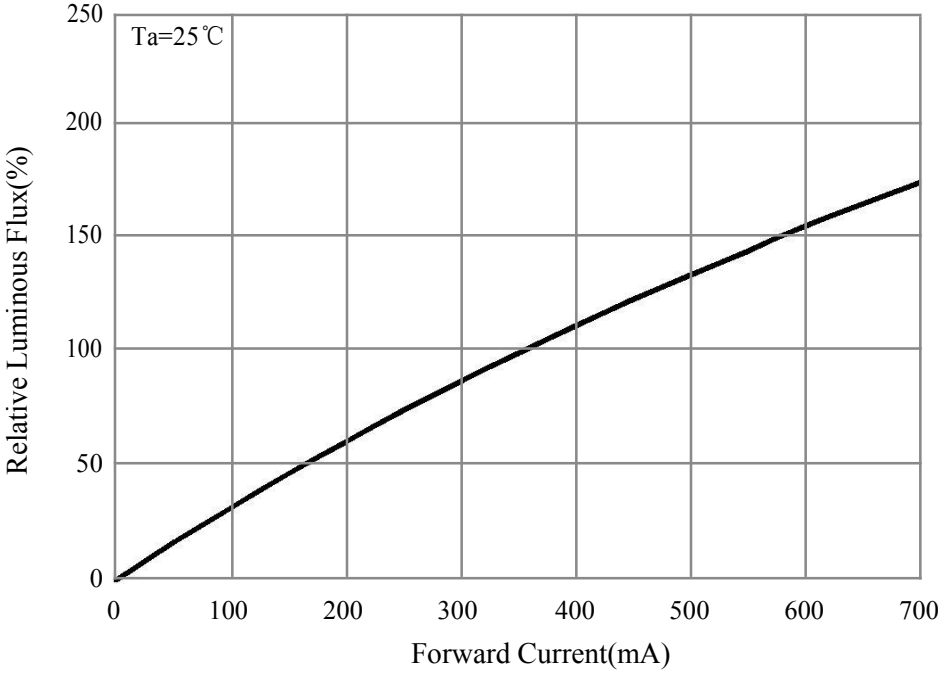
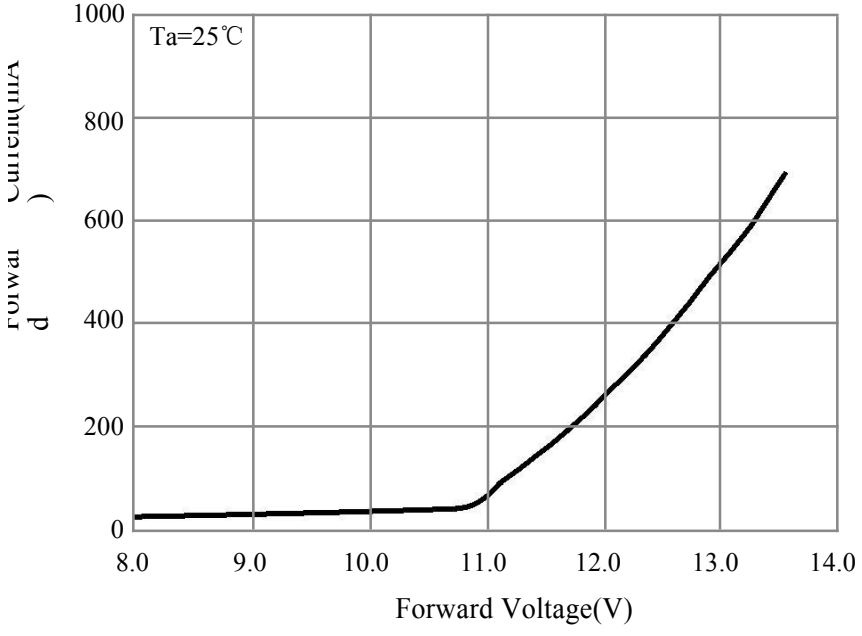


Fig 4. Forward Voltage vs. Forward Current , Ta = 25℃
（电压与电流关系，温度=25℃ ）



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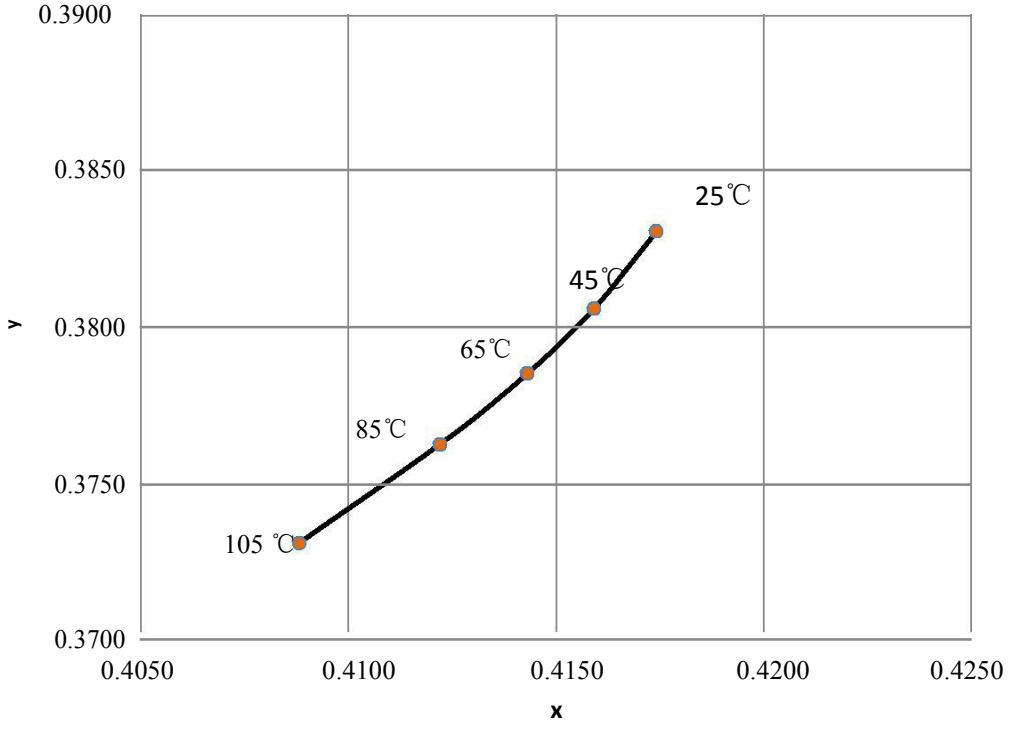
Ta vs. CIE x, y Shift （温度漂移曲线）

Fig 5. Ta vs. CIE x, y Shift （温度与 CIE x, y 关系）



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Iv & Vf VS Temperature Characteristics（亮度与电压 vs 温度关系）

Fig 6. Ta—Relative Luminous flux（温度与亮度关系）

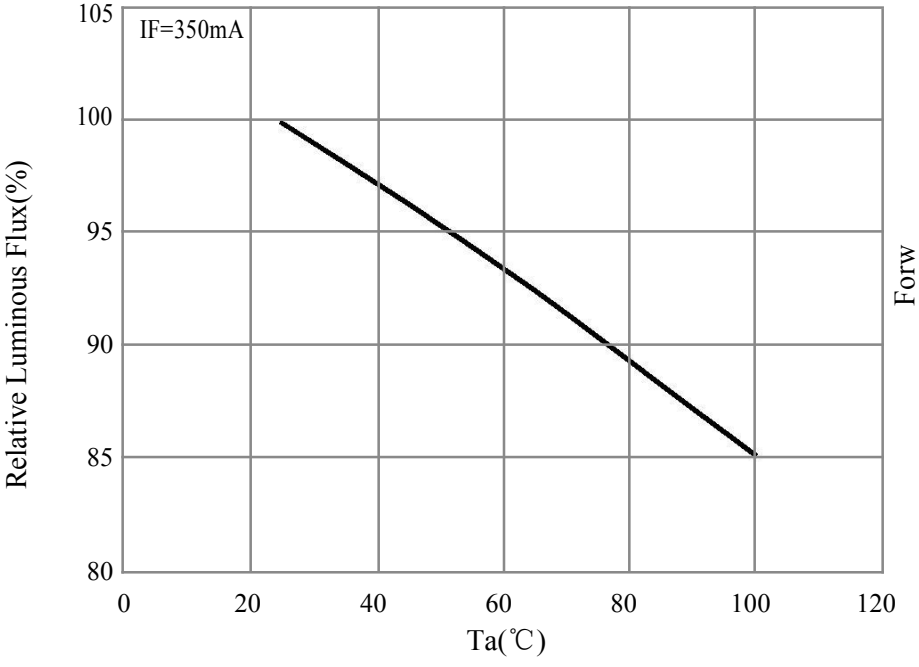
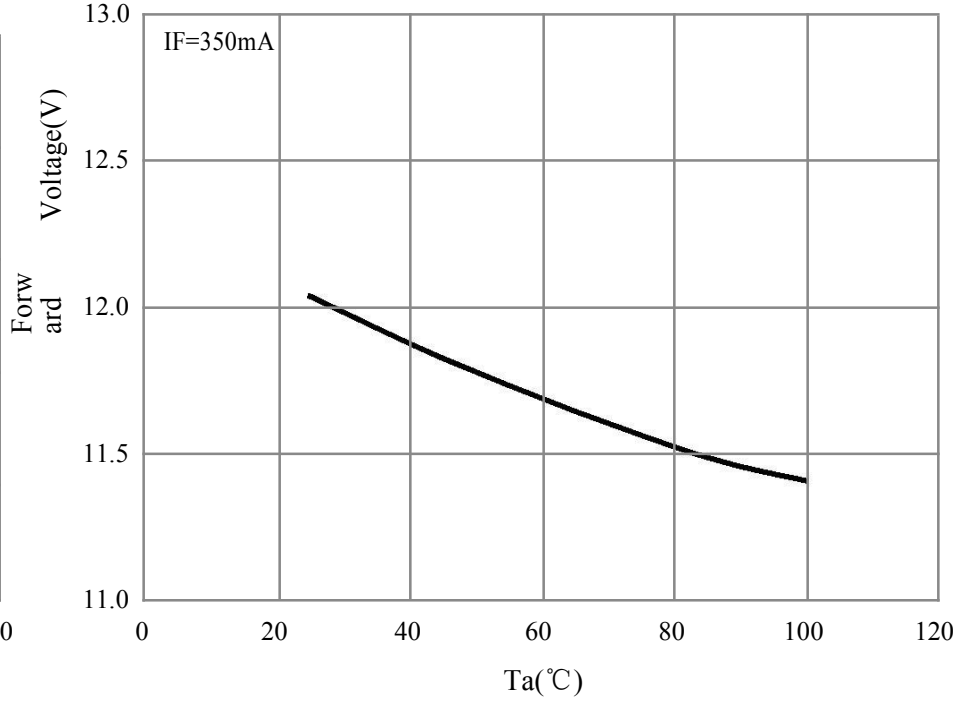


Fig 7. Ta—Forward Voltage（温度与电压关系）



- The temperature range in the curve is not the operating temperature range
- You can check the operating temperature range in fourth pages.

- 以上曲线温度范围不代表产品使用温度范围
- 使用温度范围以第四页规范为准。

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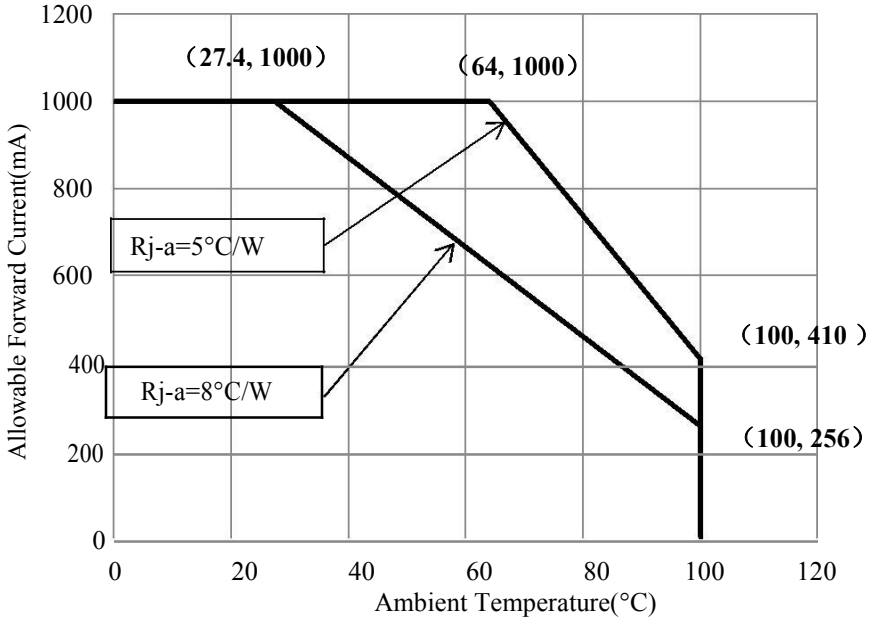
Ambient Temperature Characteristics（电流温度关系特性）

Fig 8, Maximum Forward Current vs. Ambient Temperature（最大正向电流 vs 环境温度）



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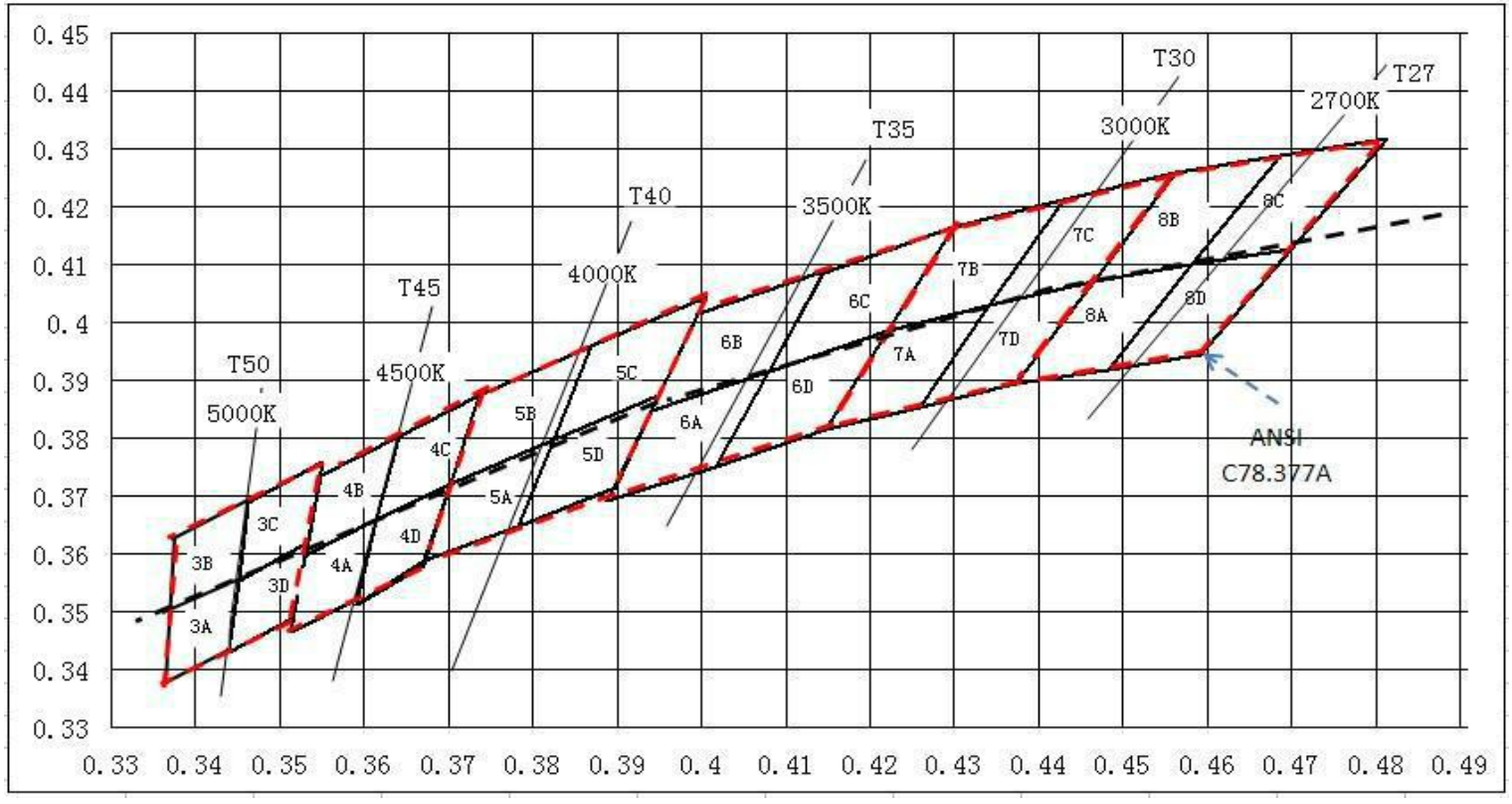
Color Bin Structure（分色方式）

Fig 9, CIE Chromaticity Diagram（CIE 色区图）, IF = 350mA, Ta = 25℃



•All measurements were made under the standardized environment of Ruishuo LED.
• In order to ensure availability, single color rank will not be orderable.
•所有测量都在锐硕标准环境下进行.
•为了确保可用性，单一颜色的排名不会订购.

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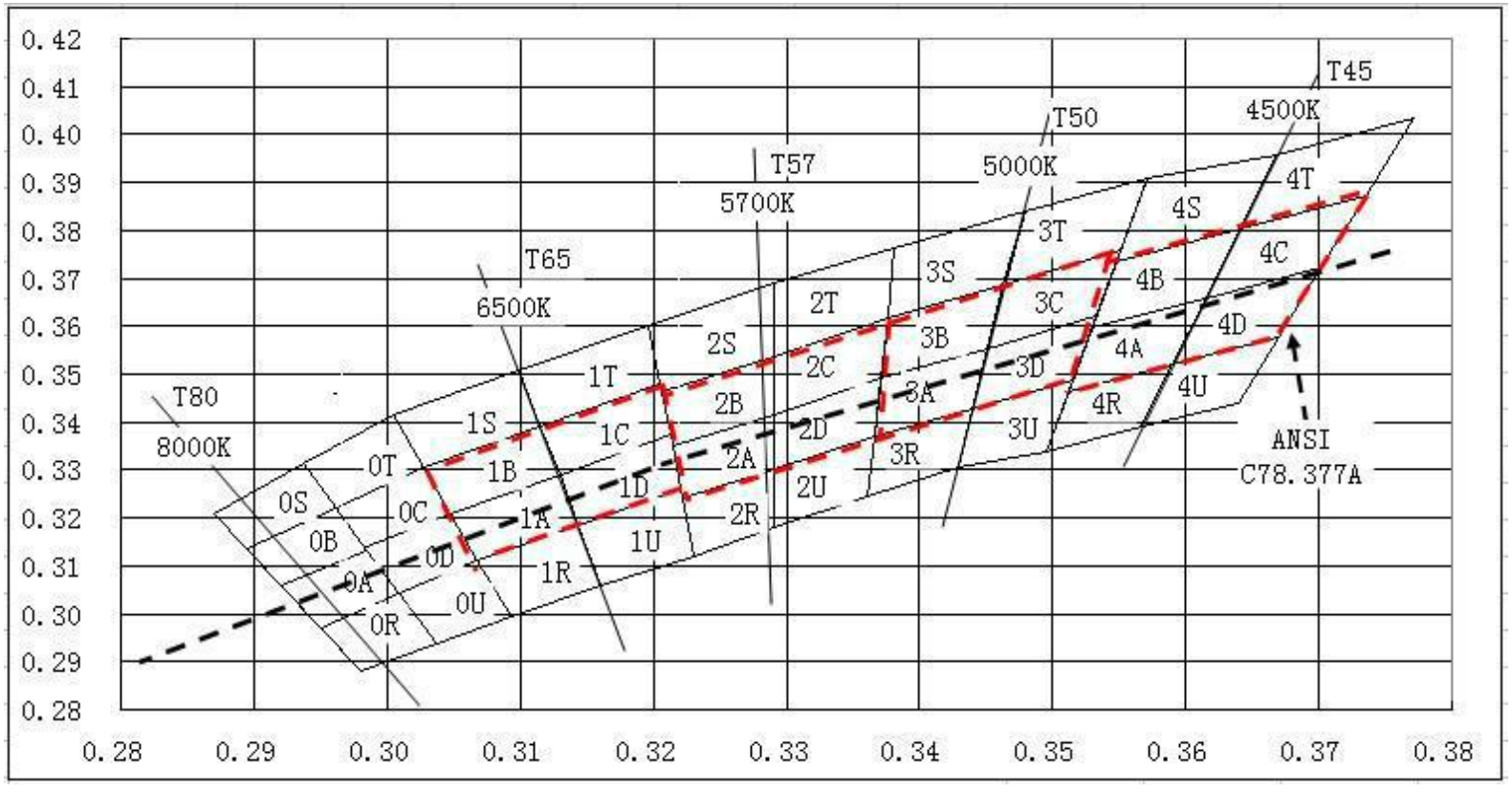
Color Bin Structure（分色方式）

Fig 10, CIE Chromaticity Diagram（CIE 色区图）, IF = 350mA, Ta = 25℃



•All measurements were made under the standardized environment of Ruishuo LED.
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Color Bin Structure（分色方式）

Table 5. Color coordinate(色区坐标） , IF = 350mA , Ta = 25℃, RH60%

Region	X	Y	Region	X	Y	Region	X	Y
3A	0.3371	0.3490	5A	0.3670	0.3578	7A	0.4147	0.3814
	0.3451	0.3554		0.3702	0.3722		0.4221	0.3984
	0.3440	0.3428		0.3825	0.3798		0.4342	0.4028
	0.3366	0.3369		0.3783	0.3646		0.4259	0.3853
3B	0.3376	0.3616	5B	0.3702	0.3722	7B	0.4221	0.3984
	0.3463	0.3687		0.3736	0.3874		0.4299	0.4165
	0.3451	0.3554		0.3869	0.3958		0.4430	0.4212
	0.3371	0.3490		0.3825	0.3798		0.4342	0.4028
3C	0.3463	0.3687	5C	0.3825	0.3798	7C	0.4342	0.4028
	0.3551	0.3760		0.3869	0.3958		0.4430	0.4212
	0.3533	0.362		0.4006	0.4044		0.4562	0.4260
	0.3451	0.3554		0.3950	0.3875		0.4465	0.4071
3D	0.3451	0.3554	5D	0.3783	0.3646	7D	0.4259	0.3853
	0.3533	0.3620		0.3825	0.3798		0.4342	0.4028
	0.3515	0.3487		0.3950	0.3875		0.4465	0.4071
	0.3440	0.3428		0.3898	0.3716		0.4373	0.3893

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Color Bin Structure（分色方式）

Table 5. Color coordinate(色区坐标） , IF = 350mA , Ta = 25℃, RH60%

4A	0. 3512	0. 3465	6A	0. 3889	0. 369	8A	0. 4373	0. 3893
	0. 3529	0. 3597		0. 3941	0. 3848		0. 4465	0. 4071
	0. 3615	0. 3659		0. 4080	0. 3916		0. 4582	0. 4099
	0. 3590	0. 3521		0. 4017	0. 3751		0. 4483	0. 3919
4B	0. 3529	0. 3597	6B	0. 3941	0. 3848	8B	0. 4465	0. 4071
	0. 3548	0. 3736		0. 3996	0. 4015		0. 4562	0. 4260
	0. 3641	0. 3804		0. 4146	0. 4084		0. 4687	0. 4289
	0. 3615	0. 3659		0. 4080	0. 3916		0. 4582	0. 4099
4C	0. 3615	0. 3659	6C	0. 4080	0. 3916	8C	0. 4582	0. 4099
	0. 3641	0. 3804		0. 4146	0. 4089		0. 4687	0. 4289
	0. 3736	0. 3874		0. 4299	0. 4165		0. 4813	0. 4319
	0. 3702	0. 3722		0. 4221	0. 3984		0. 4700	0. 4126
4D	0. 359	0. 3521	6D	0. 4017	0. 3751	8D	0. 4483	0. 3919
	0. 3615	0. 3659		0. 4080	0. 3916		0. 4582	0. 4099
	0. 3702	0. 3722		0. 4221	0. 3989		0. 4700	0. 4126
	0. 3670	0. 3578		0. 4147	0. 3814		0. 4593	0. 3944

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Color Bin Structure（分色方式）

Table 5. Color coordinate(色区坐标） , IF = 350mA , Ta = 25℃, RH60%

Region	X	Y	Region	X	Y	Region	X	Y	Region	x	y
0A	0. 2950	0. 2970	0B	0. 292	0. 3060	0C	0. 2984	0. 3133	0D	0. 2984	0. 3133
	0. 2920	0. 3060		0. 2895	0. 3135		0. 2962	0. 3220		0. 3048	0. 3207
	0. 2984	0. 3133		0. 2962	0. 3220		0. 3028	0. 3304		0. 3068	0. 3113
	0. 3009	0. 3042		0. 2984	0. 3133		0. 3048	0. 3207		0. 3009	0. 3042
0R	0. 2980	0. 2880	0S	0. 2895	0. 3135	0T	0. 2962	0. 322	0U	0. 3037	0. 2937
	0. 2950	0. 2970		0. 287	0. 3210		0. 2937	0. 3312		0. 3009	0. 3042
	0. 3009	0. 3042		0. 2937	0. 3312		0. 3005	0. 3415		0. 3068	0. 3113
	0. 3037	0. 2937		0. 2962	0. 322		0. 3028	0. 3304		0. 3093	0. 2993
1A	0. 3048	0. 3207	1B	0. 3028	0. 3304	1C	0. 3115	0. 3391	1D	0. 3130	0. 3290
	0. 3130	0. 3290		0. 3115	0. 3391		0. 3205	0. 3481		0. 3213	0. 3373
	0. 3144	0. 3186		0. 3130	0. 329		0. 3213	0. 3373		0. 3221	0. 3261
	0. 3068	0. 3113		0. 3048	0. 3207		0. 3130	0. 3290		0. 3144	0. 3186
1R	0. 3068	0. 3113	1S	0. 3005	0. 3415	1T	0. 3099	0. 3509	1U	0. 3144	0. 3186
	0. 3144	0. 3186		0. 3099	0. 3509		0. 3196	0. 3602		0. 3221	0. 3261
	0. 3161	0. 3059		0. 3115	0. 3391		0. 3205	0. 3481		0. 3231	0. 3120
	0. 3093	0. 2993		0. 3028	0. 3304		0. 3115	0. 3391		0. 3161	0. 3059
2A	0. 3215	0. 3350	2B	0. 3207	0. 3462	2C	0. 3290	0. 3538	2D	0. 3290	0. 3417
	0. 3290	0. 3417		0. 329	0. 3538		0. 3376	0. 3616		0. 3371	0. 3490
	0. 3290	0. 3300		0. 329	0. 3417		0. 3371	0. 3490		0. 3366	0. 3369
	0. 3222	0. 3243		0. 3215	0. 335		0. 3290	0. 3417		0. 3290	0. 3300
2R	0. 3222	0. 3243	2S	0. 3196	0. 3602	2T	0. 3290	0. 3690	2U	0. 3290	0. 3300
	0. 3290	0. 3300		0. 3290	0. 3690		0. 3381	0. 3762		0. 3366	0. 3369
	0. 3290	0. 3180		0. 3290	0. 3538		0. 3376	0. 3616		0. 3361	0. 3245
	0. 3231	0. 3120		0. 3207	0. 3462		0. 3290	0. 3538		0. 3290	0. 3180

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Color Bin Structure（分色方式）

Table 5. Color coordinate(色区坐标） , IF = 350mA , Ta = 25℃, RH60%

3A	0. 3371	0. 3490	3B	0. 3376	0. 3616	3C	0. 3463	0. 3687	3D	0. 3451	0. 3554
	0. 3451	0. 3554		0. 3463	0. 3687		0. 3551	0. 3760		0. 3533	0. 3620
	0. 3440	0. 3427		0. 3451	0. 3554		0. 3533	0. 3620		0. 3515	0. 3487
	0. 3366	0. 3369		0. 3371	0. 349		0. 3451	0. 3554		0. 3440	0. 3427
3R	0. 3366	0. 3369	3S	0. 3381	0. 3762	3T	0. 3480	0. 3840	3U	0. 3440	0. 3428
	0. 3440	0. 3428		0. 348	0. 3840		0. 3571	0. 3907		0. 3515	0. 3487
	0. 3429	0. 3307		0. 3463	0. 3687		0. 3551	0. 3760		0. 3495	0. 3339
	0. 3361	0. 3245		0. 3376	0. 3616		0. 3463	0. 3687		0. 3429	0. 3307
4A	0. 3530	0. 3597	4B	0. 3548	0. 3736	4C	0. 3641	0. 3804	4D	0. 3615	0. 3659
	0. 3615	0. 3659		0. 3641	0. 3804		0. 3736	0. 3874		0. 3702	0. 3722
	0. 3590	0. 3521		0. 3615	0. 3659		0. 3702	0. 3722		0. 3670	0. 3578
	0. 3512	0. 3465		0. 353	0. 3597		0. 3615	0. 3659		0. 3590	0. 3521
4R	0. 3512	0. 3465	4S	0. 3571	0. 3907	4T	0. 3668	0. 3957	4U	0. 3590	0. 3521
	0. 3590	0. 3521		0. 3668	0. 3957		0. 3771	0. 4034		0. 3670	0. 3578
	0. 3567	0. 3389		0. 3641	0. 3804		0. 3736	0. 3874		0. 3640	0. 3440
	0. 3495	0. 3339		0. 3548	0. 3736		0. 3641	0. 3804		0. 3567	0. 3389

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Luminous Flux Bin Structure(分光方式）

Table 6. Luminous Flux Ranks（光通量分档）, IF = 350mA , Ta = 25℃, RH60%

Color Temperature 色温	Color Rendering 显指		Luminous Flux 光通量（IF=350mA）		
	Min 最小值	Typ 典型值	Code 代码	Min 最小值	Max 最大值
2725±145K	80	82	2Y	370	400
			2Z	400	440
			3A	440	480
3045±175K	80	82	2Y	370	400
			2Z	400	440
			3A	440	480
3985±275K	80	81	2Z	400	440
			3A	440	480
			3B	480	520
5028±283K	70	71	2Z	400	440
			3A	440	480
			3B	480	520
5665±355K	70	71	2Z	400	440
			3A	440	480
			3B	480	520
6100±400K	70	71	2Z	400	440
			3A	440	480
			3B	480	520
6530±510K	70	71	2Z	400	440
			3A	440	480
			3B	480	520

- Tolerance of measurements of the Luminous Flux is ±7%（光通量的测量误差：±7%）。
- Ra measurement tolerance is ±2.（Ra 测量误差：±2）。
- Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram（相关色温来源于 CIE 1931 色度图）.
- Ta = 25℃, RH60% （温度：25 ℃，湿度：60%）.

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Forward Voltage Bin Structure（分压方式）

Table 7. Forward Voltage Ranks (正向电压分档） , IF = 350mA , Ta = 25℃, RH60%

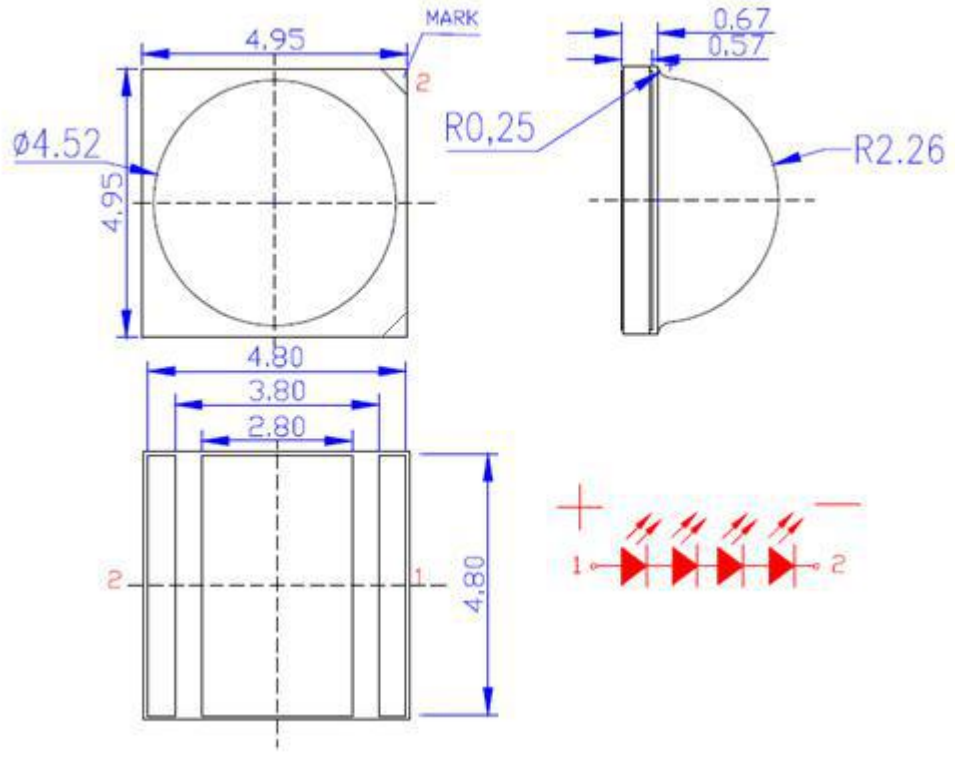
Code 代码	Min 最小值	Max 最大值	Unit 单位
C	11	12	V
D	12	13	V
E	13	14	V

- Tolerance of measurements of the Forward Voltage is ±0.1V (正向电压的测量误差：±0.1V).
- Ta = 25℃, RH60% （温度：25 ℃，湿度：60%）.

锐硕光电

Mechanical Dimensions （产品尺寸）

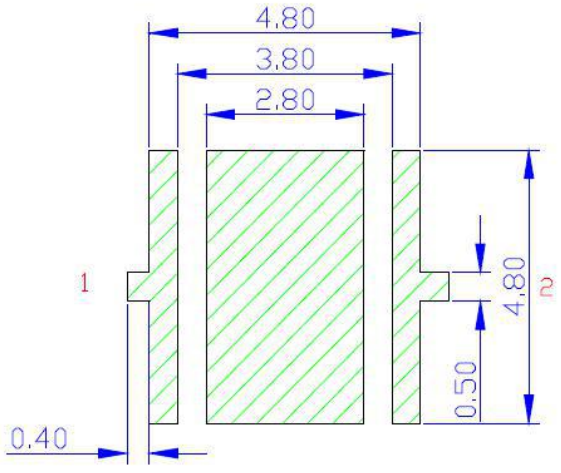
Mechanical Dimensions（产品尺寸）



- All dimensions are in millimeters（图中所有尺寸均以毫米为单位）.
- Scale : 1:1 (比例： 1:1）.
- Undefined tolerance is ±0.2mm（尺寸公差:±0.2 毫米).

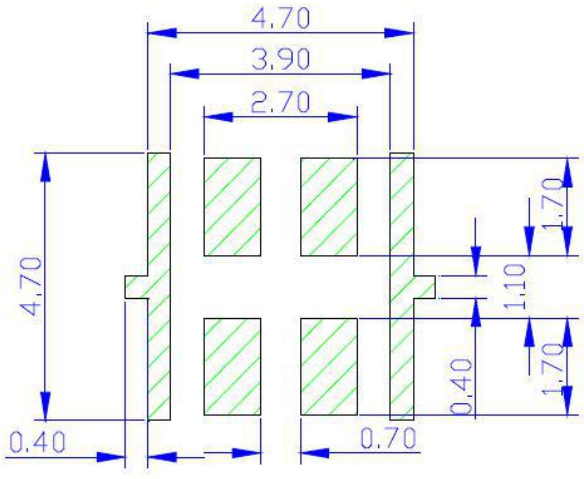
锐硕光电

Recommended Solder Pad(焊盘设计）



焊盘图

Recommended solder pad
建议焊盘



钢网图

Recommended stencil opening
建议钢网

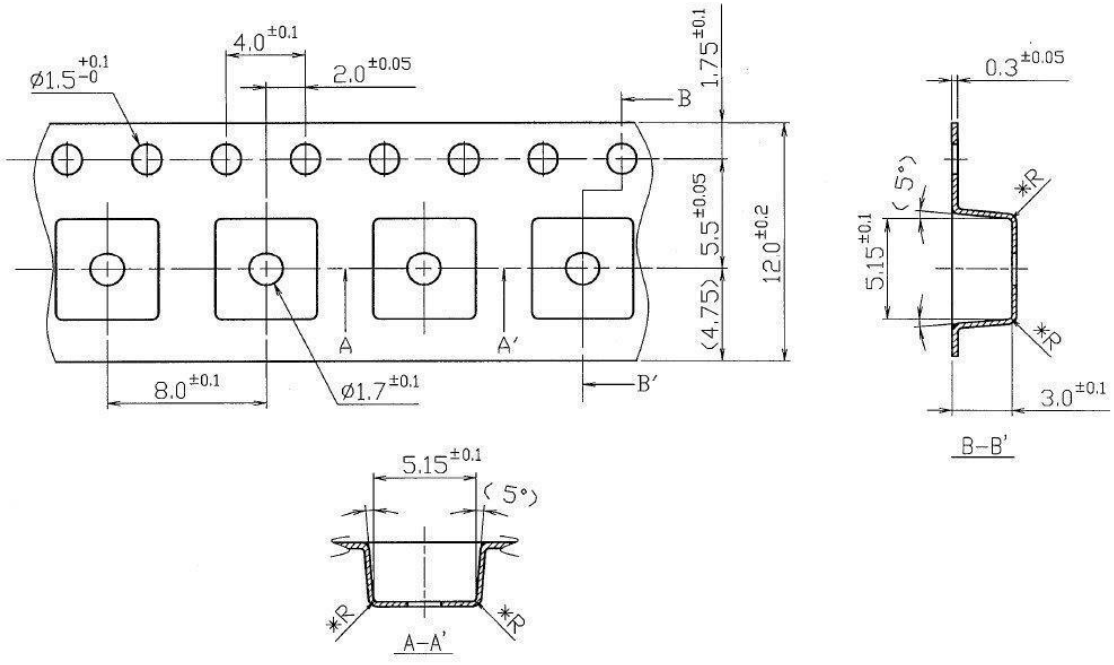
- All dimensions are in millimeters.
- Scale : 1:1
- This drawing without tolerances are for reference only
- Undefined tolerance: ±0.10mm.

- 图中所有尺寸均以毫米为单位.
- 比例：1:1 .
- 图纸仅供参考.
- 若无特殊标注，图中公差尺寸为±0.10mm.

锐硕光电

Packaging Information（包装信息）

Reel Packaging（卷带包装）



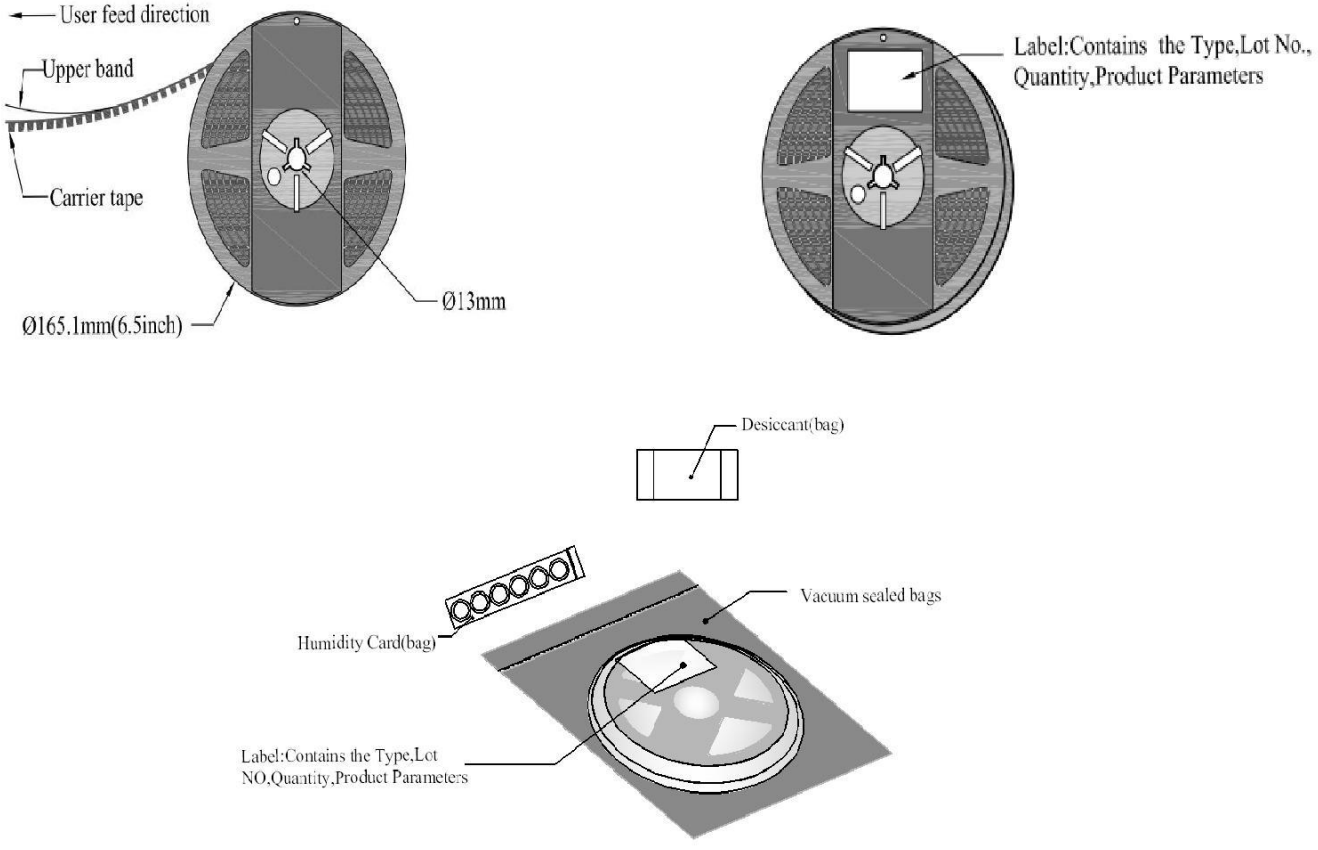
- Quantity : Max 500pcs/Reel
- Cumulative Tolerance : Cumulative Tolerance/10 pitches to be ±0.25mm
- Adhesion Strength of Cover Tape Adhesion strength to be 0.1-0.7N when the cover tape is turned off from the carrier tape at the angle of 10˚ to the carrier tape.
- Package : P/N, Manufacturing data Code No. and Quantity to be indicated on a damp proof Package.

- 数量: 最多 500pcs/卷
- 10 pitches 累积公差 :±0.2mm
- 上带剥离强度为 0.1-0.7N（上带与载带成 10°角剥离）
- 包装信息包含料号, 生产日期及数量等

锐硕光电

Packaging Information（包装信息）

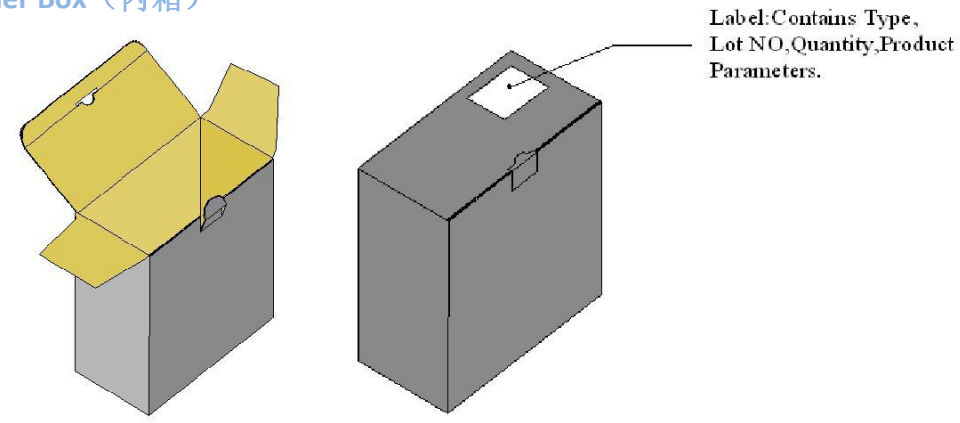
Reel Packaging（卷带包装）



锐硕光电 RUI SHUO

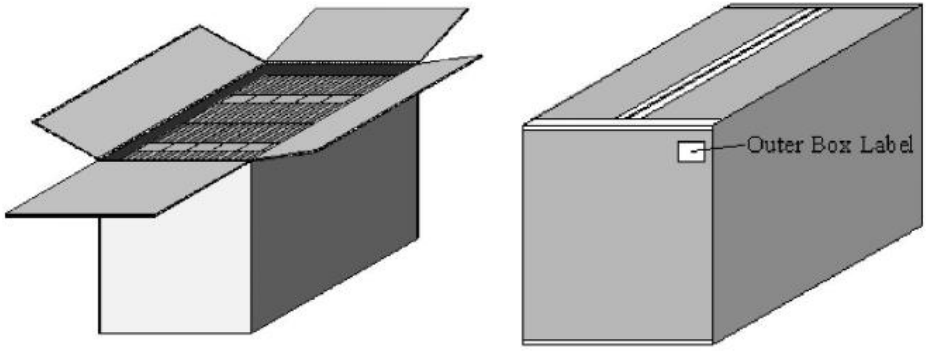
Packaging Information（包装信息）

Inner Box（内箱）



* Capacity 5 or 10 reels per box（内箱容量：5 或 10 卷）

Outer Box（外箱）



Label （标签）

* Capacity 30 or 60 reels per box（外箱容量：30 或 60 卷）

锐硕光电 RUI SHUO

Product Nomenclature (命名原则)

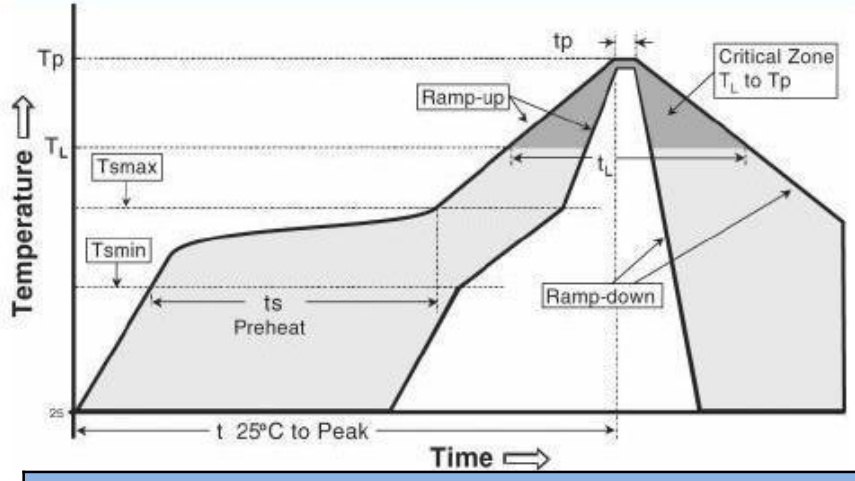
Table 8. Part Numbering System(命名原则）：T □□ □□ ____ □ □ □ □ —□□ □□ ____ ____

X1 X2 X3 X4 X5 X6 X7 X8

Item Number Code 序号代码	Description 描述	Content 内容
X1	Type code 产品代码	34:3020; 3A:K285; 3B:3014; 3C:3030; 5A:5050N; 32: 3528; 19: Ceramic 3535; 15: Ceramic 5050; 12: Ceramic 9292; 20: 2016.
X2	CCT code 色温代码	2725±145K: 27 3045±175K: 30 3985±275K: 40 5028±283K: 50 5665±355K: 57 6100±400K:61 6530±510K: 65
X3	Color Rendering 显指	Ra70：7；Ra80：8；Ra90：9
X4	No. of serial chip 晶片串联数量	1-Z.
X5	No. of parallel chip 晶片并联数量	1-Z.
X6	Component code 补充吗	A-Z
X7	Internal code1 内部码 1	\
X8	Internal code2 内部码 2	\

锐硕光电

Reflow Soldering Characteristics(建议回流焊方式）



Reflow soldering	
Temperature Min (Tsmin) Temperature Max (Tsmax) Time(ts)from (Tsmin to Tsmax)	150°C 200°C 60-180 seconds.
Ramp-up rate (TL to Tp)	3°C/seconds max.
Liquidous temperature(TL) Time(tL) maintained above TL	217°C 60-150 seconds
Peak package body temperature(Tp)	260°C max
Time (tp) within 5°C of the specified classification temperature(Tc).	20-40 seconds max
Ramp-down rate (Tp to TL)	6°C/second max
Time 25°C to peak temperature	8 min max

RUI SHUO 锐硕光电

Pre-caution for use (注意事项）

Caution

1. Reflow soldering is recommended not to be done more than two times. In the case of more than 24 hours passed soldering after first, LEDs will be damaged.
2. Repairs should not be done after the LEDs have been soldered. When repair is unavoidable, suitable tools must be used.
3. Die slug is to be soldered.
4. When soldering, do not put stress on the LEDs during heating.
5. After soldering, do not warp the circuit board.

Notes on Ruishuo EMC Series soldering:

1. Recommend to use reflow machine.
2. Recommend to use heating plate soldering.
3. Manual soldering is not recommended.

Notes on reflow process:

1. To confirm whether the actual temperature curve in the reflow soldering conditions comply with recommended conditions. LEDs are guaranteed for one time reflow.
2. During reflow process do not apply force on LED active area.
3. After reflow process, PCB board should be cooled down before packing or storage.

锐硕光电
RUI SHUO

Pre-caution for use (注意事项）

注意：

1. 回流焊建议不要超过两次.
2. LED 焊接后不建议重工。当重工不可避免时,必须使用合适的工具.
3. 不可虚焊.
4. 焊接加热过程中,请勿施加压力于 LED 表面 .
5. 焊接后,请勿弯曲电路板.

焊接注意事项：

1. 建议使用回流焊机器。
2. 建议使用加热板焊接。
3. 不建议手动焊接。

回流焊注意事项：

1. 确保实际温度曲线与回流焊接条件相符合。
2. 在回流过程中，请勿施加压力于 LED 表面 。
3. 回流后,PCB 板在包装或存储前需冷却至常温。

Revision record 修订记录				
DOC.NO 文件编号	Version 版本	Page 页数	Content of change 变更内容	Date 日期
SZRSPSA-016	B03	23	新版发行	2018/5/11
SZRSPSA-016	B03	23	产品特性曲线修改	2018/5/22
SZRSPSA-016	B03	23	针对部分输入错误修改	2018/6/2
SZRSPSA-016	B03	23	修改产品使用电流及其测试数据	2018/8/26
SZRSPSA-016	B03	/	修改最大电流，已经更新全色温段 LM	2019/9/25
SZRSPSA-016	B03	16	修改对应色温的 LM 分档	2019/10/12