SPECIFICATION
产品规格书

REFOND P/N 产品型号

RF-A13D-W***0*12-P7

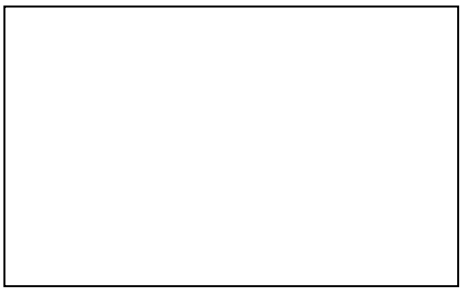
□R&D 研发

■Mass Product 量产供货

Contents 目录

1. Description 产品介绍

1.1General Description 产品描述



The white light of this light emitting diode is formed by mixing light from a blue light chip.，Size：13.5mmX13.5mmX1.7mm。

这种 LED 的白光是由蓝光芯片激发荧光粉后，混光形成，产品尺寸：13.5mmX13.5mmX1.7mm。

1.2Features 产品特征

►COB Package. COB封装

►High power density.高功率密度

►Integrated packaging module, no SMT.集成封装模块，免SMT

► Aluminum substrate package，low thermal resistance 铝基板封装，热阻低

►RoHS compliant.RoHS 认证

1.3 Application 产品应用

►Commercial lighting.商业照明

►Indoor lighting.室内照明

►Supermarket lighting.超市照明

►General use.一般应用

1.4 Package Dimension 封装尺寸

Fig.1-1 Top view 正面视图

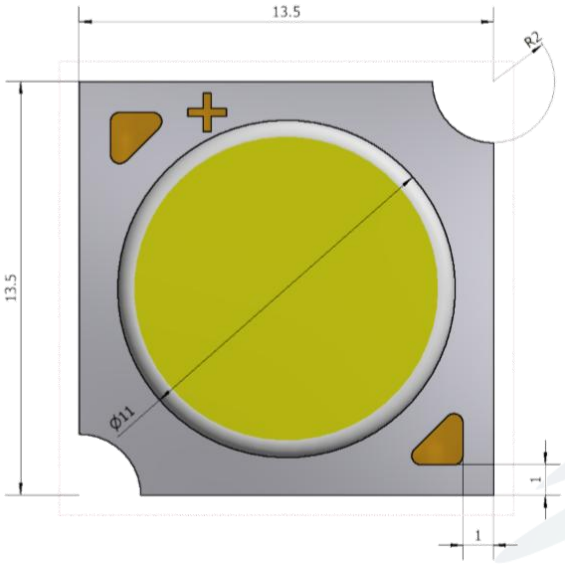
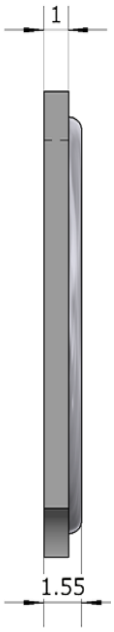
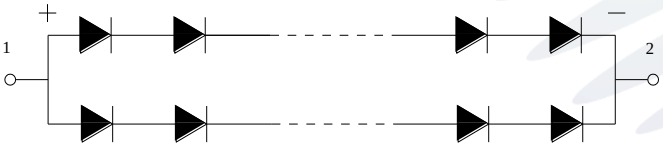
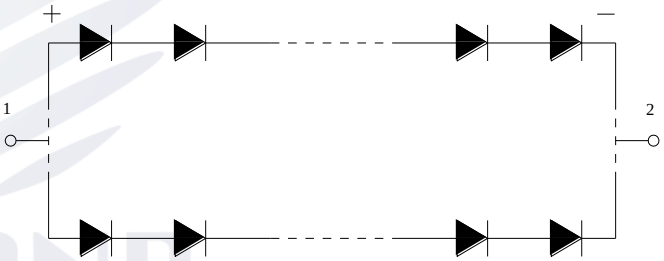


Fig.1-2Side view 侧面视图





RF-A13D-W***0212-P7：12S2P



RF-A13D-W***0312-P7:12S3P
RF-A13D-W***0512-P7:12S5P

Fig.1-3Polarity 极性

Notes 备注：

1. All dimensions units are millimeters. 所有尺寸标注单位为毫米
2. All dimensions tolerances are ±0.5mm unless otherwise noted.除特别标注外，所有尺寸公差为±0.5 毫米

1.5 Product Parameters 产品参数

Table 1-1 Electrical / Optical Characteristics at Tc=25°C 电性与光学特性

Item 项目	Symbol 符号	Test Condition 测试条件	Value			Unit 单位
			Min. （最小值）	Typ （典型值）	Max. （最大值）	
RF-A13D-W***0212-P7 Forward Voltage （正向电压）	V_F	I_F=200mA	32	36	40	V
RF-A13D-W***0312-P7 Forward Voltage （正向电压）	V_F	I_F=350mA	32	36	40	V
RF-A13D-W***0512-P7 Forward Voltage （正向电压）	V_F	I_F=550mA	32	36	40	V
Reverse Current （漏电流）	I_R	V_R=60V	---	---	60	uA
RF-A13D-W2SS0212-P7 (2700K) Luminous Flux （光通量）	Φ	I_F=200mA	900	1050	1200	lm
RF-A13D-W3SS0212-P7 (3000K) Luminous Flux （光通量）	Φ	I_F=200mA	900	1050	1200	lm
RF-A13D-W3KS0212-P7 (3500K) Luminous Flux （光通量）	Φ	I_F=200mA	1000	1150	1300	lm
RF-A13D-W4SS0212-P7 (4000K) Luminous Flux （光通量）	Φ	I_F=200mA	1000	1150	1300	lm
RF-A13D-W5SS0212-P7 (5000K) Luminous Flux （光通量）	Φ	I_F=200mA	1000	1150	1300	lm
RF-A13D-W7SS0212-P7 (6500K) Luminous Flux （光通量）	Φ	I_F=200mA	1000	1150	1300	lm

RF-A13D-W2ST0212-P7 (2700K) Luminous Flux （光通量）	Φ	I_F=200mA	800	950	1100	lm
RF-A13D-W3ST0212-P7 (3000K) Luminous Flux （光通量）	Φ	I_F=200mA	800	950	1100	lm
RF-A13D-W3KT0212-P7 (3500K) Luminous Flux （光通量）	Φ	I_F=200mA	900	1050	1200	lm
RF-A13D-W4ST0212-P7 (4000K) Luminous Flux （光通量）	Φ	I_F=200mA	900	1050	1200	lm
RF-A13D-W5ST0212-P7 (5000K) Luminous Flux （光通量）	Φ	I_F=200mA	900	1050	1200	lm
RF-A13D-W7ST0212-P7 (6500K) Luminous Flux （光通量）	Φ	I_F=200mA	900	1050	1200	lm
RF-A13D-W2SV0212-P7 (2700K) Luminous Flux （光通量）	Φ	I_F=200mA	700	850	1000	lm
RF-A13D-W3SV0212-P7 (3000K) Luminous Flux （光通量）	Φ	I_F=200mA	700	850	1000	lm
RF-A13D-W3KV0212-P7 (3500K) Luminous Flux （光通量）	Φ	I_F=200mA	800	950	1100	lm
RF-A13D-W4SV0212-P7 (4000K) Luminous Flux （光通量）	Φ	I_F=200mA	800	950	1100	lm
RF-A13D-W5SV0212-P7 (5000K) Luminous Flux （光通量）	Φ	I_F=200mA	800	950	1100	lm

RF-A13D-W7SV0212-P7 (6500K) Luminous Flux （光通量）	Φ	I_F=200mA	800	950	1100	lm
RF-A13D-W2SS0312-P7 (2700K) Luminous Flux （光通量）	Φ	I_F=350mA	1700	1900	2100	lm
RF-A13D-W3SS0312-P7 (3000K) Luminous Flux （光通量）	Φ	I_F=350mA	1700	1900	2100	lm
RF-A13D-W3KS0312-P7 (3500K) Luminous Flux （光通量）	Φ	I_F=350mA	1800	2000	2200	lm
RF-A13D-W4SS0312-P7 (4000K) Luminous Flux （光通量）	Φ	I_F=350mA	1800	2000	2200	lm
RF-A13D-W5SS0312-P7 (5000K) Luminous Flux （光通量）	Φ	I_F=350mA	1800	2000	2200	lm
RF-A13D-W7SS0312-P7 (6500K) Luminous Flux （光通量）	Φ	I_F=350mA	1800	2000	2200	lm
RF-A13D-W2ST0312-P7 (2700K) Luminous Flux （光通量）	Φ	I_F=350mA	1500	1700	1900	lm
RF-A13D-W3ST0312-P7 (3000K) Luminous Flux （光通量）	Φ	I_F=350mA	1500	1700	1900	lm
RF-A13D-W3KT0312-P7 (3500K) Luminous Flux （光通量）	Φ	I_F=350mA	1600	1800	2000	lm
RF-A13D-W4ST0312-P7 (4000K) Luminous Flux （光通量）	Φ	I_F=350mA	1600	1800	2000	lm

RF-A13D-W5ST0312-P7 (5000K) Luminous Flux （光通量）	Φ	I_F=350mA	1600	1800	2000	lm
RF-A13D-W7ST0312-P7 (6500K) Luminous Flux （光通量）	Φ	I_F=350mA	1600	1800	2000	lm
RF-A13D-W2SV0312-P7 (2700K) Luminous Flux （光通量）	Φ	I_F=350mA	1300	1500	1700	lm
RF-A13D-W3SV0312-P7 (3000K) Luminous Flux （光通量）	Φ	I_F=350mA	1300	1500	1700	lm
RF-A13D-W3KV0312-P7 (3500K) Luminous Flux （光通量）	Φ	I_F=350mA	1400	1600	1800	lm
RF-A13D-W4SV0312-P7 (4000K) Luminous Flux （光通量）	Φ	I_F=350mA	1400	1600	1800	lm
RF-A13D-W5SV0312-P7 (5000K) Luminous Flux （光通量）	Φ	I_F=350mA	1400	1600	1800	lm
RF-A13D-W7SV0312-P7 (6500K) Luminous Flux （光通量）	Φ	I_F=350mA	1400	1600	1800	lm
RF-A13D-W2SS0512-P7 (2700K) Luminous Flux （光通量）	Φ	I_F=550mA	2500	2800	3100	lm
RF-A13D-W3SS0512-P7 (3000K) Luminous Flux （光通量）	Φ	I_F=550mA	2500	2800	3100	lm
RF-A13D-W3KS0512-P7 (3500K) Luminous Flux （光通量）	Φ	I_F=550mA	2650	2950	3250	lm

RF-A13D-W4SS0512-P7 (4000K) Luminous Flux （光通量）	Φ	I_F=550mA	2650	2950	3250	lm
RF-A13D-W5SS0512-P7 (5000K) Luminous Flux （光通量）	Φ	I_F=550mA	2650	2950	3250	lm
RF-A13D-W7SS0512-P7 (6500K) Luminous Flux （光通量）	Φ	I_F=550mA	2650	2950	3250	lm
RF-A13D-W2ST0512-P7 (2700K) Luminous Flux （光通量）	Φ	I_F=550mA	2200	2500	2800	lm
RF-A13D-W3ST0512-P7 (3000K) Luminous Flux （光通量）	Φ	I_F=550mA	2200	2500	2800	lm
RF-A13D-W3KT0512-P7 (3500K) Luminous Flux （光通量）	Φ	I_F=550mA	2350	2650	2950	lm
RF-A13D-W4ST0512-P7 (4000K) Luminous Flux （光通量）	Φ	I_F=550mA	2350	2650	2950	lm
RF-A13D-W5ST0512-P7 (5000K) Luminous Flux （光通量）	Φ	I_F=550mA	2350	2650	2950	lm
RF-A13D-W7ST0512-P7 (6500K) Luminous Flux （光通量）	Φ	I_F=550mA	2350	2650	2950	lm
RF-A13D-W2SV0512-P7 (2700K) Luminous Flux （光通量）	Φ	I_F=550mA	1950	2250	2550	lm
RF-A13D-W3SV0512-P7 (3000K) Luminous Flux （光通量）	Φ	I_F=550mA	1950	2250	2550	lm

RF-A13D-W3KV0512-P7 (3500K) Luminous Flux （光通量）	Φ	I_F=550mA	2100	2400	2700	lm
RF-A13D-W4SV0512-P7 (4000K) Luminous Flux （光通量）	Φ	I_F=550mA	2100	2400	2700	lm
RF-A13D-W5SV0512-P7 (5000K) Luminous Flux （光通量）	Φ	I_F=550mA	2100	2400	2700	lm
RF-A13D-W7SV0512-P7 (6500K) Luminous Flux （光通量）	Φ	I_F=550mA	2100	2400	2700	lm
RF-A13D-W2SE0512-P7 (2700K) Luminous Flux （光通量）	Φ	I_F=550mA	1750	2050	2350	lm
RF-A13D-W3SE0512-P7 (3000K) Luminous Flux （光通量）	Φ	I_F=550mA	1750	2050	2350	lm
RF-A13D-W3KE0512-P7 (3500K) Luminous Flux （光通量）	Φ	I_F=550mA	1900	2200	2500	lm
RF-A13D-W4SE0512-P7 (4000K) Luminous Flux （光通量）	Φ	I_F=550mA	1900	2200	2500	lm
RF-A13D-W5SE0512-P7 (5000K) Luminous Flux （光通量）	Φ	I_F=550mA	1900	2200	2500	lm
RF-A13D-W***0212-P7 RF-A13D-W***0312-P7 RF-A13D-W***0512-P7 Viewing Angle （发光角度）	2θ1/2	I_F=200mA / I_F=350mA / I_F=550mA	---	---	120	deg
RF-A13D-W**S0212-P7 RF-A13D-W**S0312-P7 RF-A13D-W**S0512-P7 Color Rendering Index （显色指数）	C_{RI}	I_F=200mA / I_F=350mA / I_F=550mA	70	72	---	/

RF-A13D-W**T0212-P7 RF-A13D-W**T0312-P7 RF-A13D-W**T0512-P7 Color Rendering Index （显色指数）	C_{RI}	I_F=200mA / I_F=350mA / I_F=550mA	80	82	---	/
RF-A13D-W**V0212-P7 RF-A13D-W**V0312-P7 RF-A13D-W**V0512-P7 Color Rendering Index （显色指数）	C_{RI}	I_F=200mA / I_F=350mA / I_F=550mA	90	92	---	/
RF-A13D-W**E0512-P7 Color Rendering Index （显色指数）	C_{RI}	I_F=550mA	95	96.5	---	/

Table 1-2 Absolute Maximum Ratings at Tc=25°C 绝对最大值

Parameter（参数）	Symbol（符号）	Rating（值）	Units（单位）
RF-A13D-W***0212-P7 Power Dissipation （功耗）	P_D	16.0	W
RF-A13D-W***0312-P7 Power Dissipation （功耗）	P_D	24.0	W
RF-A13D-W***0512-P7 Power Dissipation （功耗）	P_D	40.0	W
RF-A13D-W***0212-P7 Forward Current （正向电流）	I_F	400	mA
RF-A13D-W***0312-P7 Forward Current （正向电流）	I_F	600	mA
RF-A13D-W***0512-P7 Forward Current （正向电流）	I_F	1000	mA
RF-A13D-W***0212-P7 Peak Forward Current （峰值电流）	I_F	440	mA
RF-A13D-W***0312-P7 Peak Forward Current （峰值电流）	I_F	660	mA
RF-A13D-W***0512-P7 Peak Forward Current （峰值电流）	I_F	1100	mA

Reverse Voltage （反向电压）	V_R	60	V
Electrostatic Discharge (HBM)（静电）	E_{SD}	2000	V
Operating Temperature （操作温度）	T_{OPR}	-40 ~ +85	℃
Storage Temperature （储存温度）	T_{OPR}	-40 ~ +85	℃
Junction Temperature （结温）	T_J	115	℃

Notes 备注：

1. 1.1/10 Duty cycle, pulse width 10ms.脉宽10ms,周期1/10.

2. The above forward voltage measurement allowance tolerance is± 0.3V.以上所示电压测量误差±0.3V.

3. The above color coordinates measurement allowance tolerance is 0.005. 以上所示坐标测量误差 0.005.

4. The above luminous intensity measurement allowance tolerance ±10%.上述发光强度的测试允许公差为±10%.

5. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product. 使用功率不能超过规定的最大值。

6. All measurements were made under the standardized environment of Refond. 所有测试都是基于瑞丰现有的标准测试平台。

7.When the LEDs are in operation the maximum current should be decided after measuring the package temperature，junction temperature should not exceed the maximum rate. LED 使用的最大电流需要根据散热条件确定，结温不能超过最大值。

8. ESD yield is over 90% at 1000V ESD (HBM). ESD protection during products handing is needed. 90%的LED通过人体模式ESD1000V 测试，在操作时请注意静电防护。

9.Tj refers to the highest temperature chip PN junction temperature in COB, which is usually the chip PN junction temperature in the luminescence center. Tj 是指COB中温度最高的芯片PN结温，通常为发光中心的芯片PN结温。

1.6 Bin Range Of Luminous Flux and The Chromaticity Diagram (IF=200/350/550mA)流明与色区分 BIN 范围(IF=200/350/550mA)

Table 1-3

	V_F（V）	Φ（lm）	SDCM
RF-A13D-W2SS0212-P7(2700K)		900-1050-1200	2S-3
RF-A13D-W2ST0212-P7(2700K)		800-950-1100	
RF-A13D-W2SV0212-P7(2700K)		700-850-1000	
RF-A13D-W3SS0212-P7(3000K)		900-1050-1200	3S-3
RF-A13D-W3ST0212-P7(3000K)		800-950-1100	
RF-A13D-W3SV0212-P7(3000K)		700-850-1000	
RF-A13D-W3KS0212-P7(3500K)		1000-1150-1300	3K-3
RF-A13D-W3KT0212-P7(3500K)		900-1050-1200	
RF-A13D-W3KV0212-P7(3500K)		800-950-1100	
RF-A13D-W4SS0212-P7(4000K)		1000-1150-1300	4S-3
RF-A13D-W4ST0212-P7(4000K)		900-1050-1200	
RF-A13D-W4SV0212-P7(4000K)		800-950-1100	
RF-A13D-W5SS0212-P7(5000K)		1000-1150-1300	5S-3
RF-A13D-W5ST0212-P7(5000K)		900-1050-1200	
RF-A13D-W5SV0212-P7(5000K)		800-950-1100	
RF-A13D-W7SS0212-P7(6500K)		1000-1150-1300	7S-3
RF-A13D-W7ST0212-P7(6500K)		900-1050-1200	
RF-A13D-W7SV0212-P7(6500K)		800-950-1100	
RF-A13D-W2SS0312-P7(2700K)		1700-1900-2100	2S-3
RF-A13D-W2ST0312-P7(2700K)		1500-1700-1900	
RF-A13D-W2SV0312-P7(2700K)	32-40	1300-1500-1700	
RF-A13D-W3SS0312-P7(3000K)		1700-1900-2100	3S-3
RF-A13D-W3ST0312-P7(3000K)		1500-1700-1900	
RF-A13D-W3SV0312-P7(3000K)		1300-1500-1700	
RF-A13D-W3KS0312-P7(3500K)		1800-2000-2200	3K-3
RF-A13D-W3KT0312-P7(3500K)		1600-1800-2000	
RF-A13D-W3KV0312-P7(3500K)		1400-1600-1800	
RF-A13D-W4SS0312-P7(4000K)		1800-2000-2200	4S-3
RF-A13D-W4ST0312-P7(4000K)		1600-1800-2000	
RF-A13D-W4SV0312-P7(4000K)		1400-1600-1800	
RF-A13D-W5SS0312-P7(5000K)		1800-2000-2200	5S-3
RF-A13D-W5ST0312-P7(5000K)		1600-1800-2000	
RF-A13D-W5SV0312-P7(5000K)		1400-1600-1800	
RF-A13D-W7SS0312-P7(6500K)		1800-2000-2200	7S-3
RF-A13D-W7ST0312-P7(6500K)		1600-1800-2000	
RF-A13D-W7SV0312-P7(6500K)		1400-1600-1800	
RF-A13D-W2SS0512-P7(2700K)		2500-2800-3100	2S-3
RF-A13D-W2ST0512-P7(2700K)		2200-2500-2800	
RF-A13D-W2SV0512-P7(2700K)		1950-2250-2550	
RF-A13D-W2SE0512-P7(2700K)		1750-2050-2350	
RF-A13D-W3SS0512-P7(3000K)		2500-2800-3100	3S-3

RF-A13D-W3ST0512-P7(3000K)		2200-2500-2800	
RF-A13D-W3SV0512-P7(3000K)		1950-2250-2550	
RF-A13D-W3SE0512-P7(3000K)		1750-2050-2350	
RF-A13D-W3KS0512-P7(3500K)		2650-2950-3250	3K-3
RF-A13D-W3KT0512-P7(3500K)		2350-2650-2950	
RF-A13D-W3KV0512-P7(3500K)		2100-2400-2700	
RF-A13D-W3KE0512-P7(3500K)		1900-2200-2500	
RF-A13D-W4SS0512-P7(4000K)		2650-2950-3250	4S-3
RF-A13D-W4ST0512-P7(4000K)		2350-2650-2950	
RF-A13D-W4SV0512-P7(4000K)		2100-2400-2700	
RF-A13D-W4SE0512-P7(4000K)		1900-2200-2500	
RF-A13D-W5SS0512-P7(5000K)		2650-2950-3250	5S-3
RF-A13D-W5ST0512-P7(5000K)		2350-2650-2950	
RF-A13D-W5SV0512-P7(5000K)		2100-2400-2700	
RF-A13D-W5SE0512-P7(5000K)		1900-2200-2500	
RF-A13D-W7SS0512-P7(6500K)		2650-2950-3250	7S-3
RF-A13D-W7ST0512-P7(6500K)		2350-2650-2950	
RF-A13D-W7SV0512-P7(6500K)		2100-2400-2700	

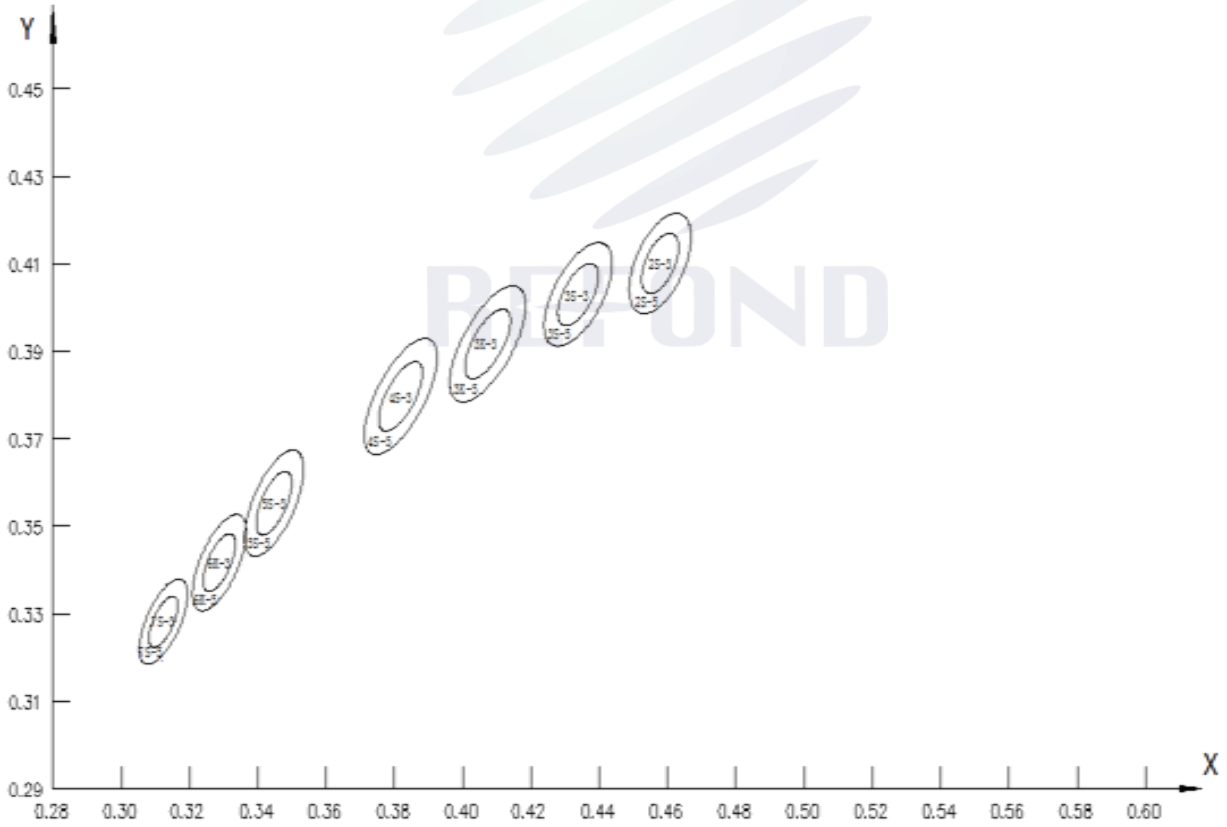


Fig 1-4 The C.I.E Chromaticity Diagram CIE色度图

Table 1-4

色温	中心点		θ
2700K	0.4578	0.4101	57.28
	色区代码	3-step	
		a	b
	2S-3	0.007733	0.004011
	色区代码	5-step	
		a	b
	2S-5	0.012889	0.006685
	色区代码	7-step	
		a	b
	2S-7	0.0180446	0.009359

色温	中心点		θ
3000K	0.4338	0.4030	53.16
	色区代码	3-step	
		a	b
	3S-3	0.008346	0.004098
	色区代码	5-step	
		a	b
	3S-5	0.01391	0.006831
	色区代码	7-step	
		a	b
	3S-7	0.019474	0.009563

色温	中心点		θ
3500K	0.4073	0.3917	52.96
	色区代码	3-step	
		a	b
	3K-3	0.009271	0.004139
	色区代码	5-step	
		a	b
	3K-5	0.015452	0.006899
	色区代码	7-step	
		a	b
	3K-7	0.021633	0.009659

色温	中心点		θ
4000K	0.3818	0.3797	54
	色区代码	3-step	
		a	b
	4S-3	0.009386	0.004035
	色区代码	5-step	
		a	b
	4S-5	0.015644	0.006725
	色区代码	7-step	
		a	b
	4S-7	0.0219016	0.009415

色温	中心点		θ
5000K	0.3447	0.3553	59.62
	色区代码	3-step	
		a	b
	5S-3	0.008200	0.003600
	色区代码	5-step	
		a	b
	5S-5	0.0109200	0.004800
	色区代码	7-step	
		a	b
	5S-7	0.017107	0.007262

色温	中心点		θ
6500K	0.3123	0.3282	58.38
	色区代码	3-step	
		a	b
	7S-3	0.006617	0.002855
	色区代码	5-step	
		a	b
	7S-5	0.011029	0.004758
	色区代码	7-step	
		a	b
	7S-7	0.01544	0.006662

1.7 Typical optical characteristics curves 典型光学特性曲线

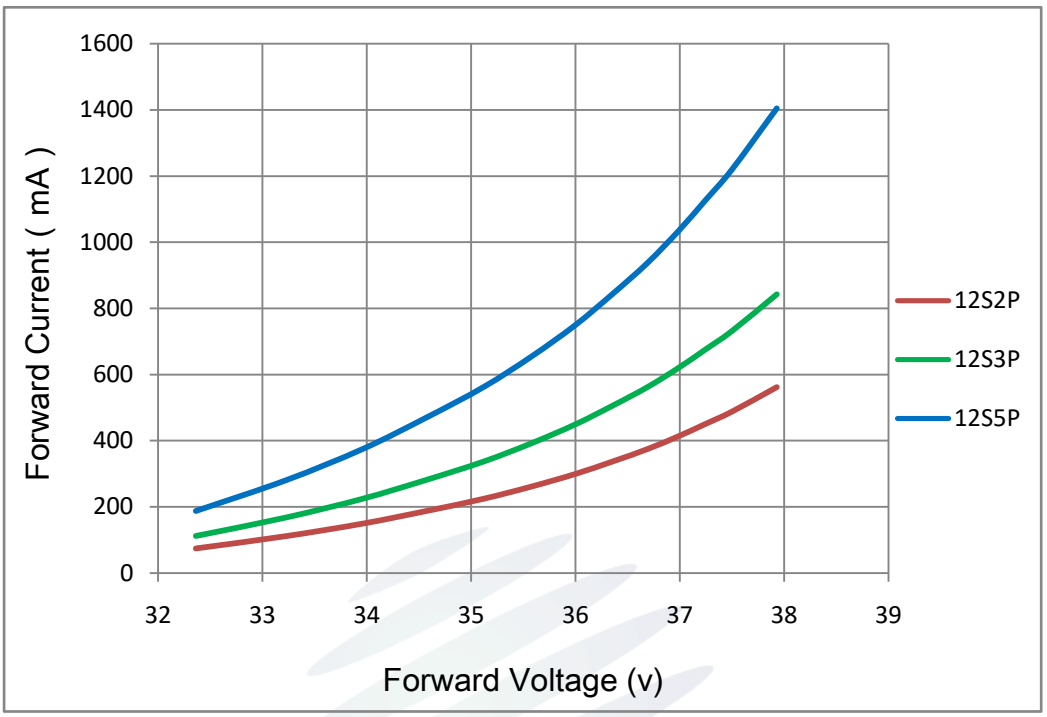


Fig 1-7 Forward Voltage Vs Forward Current.伏安特性曲线

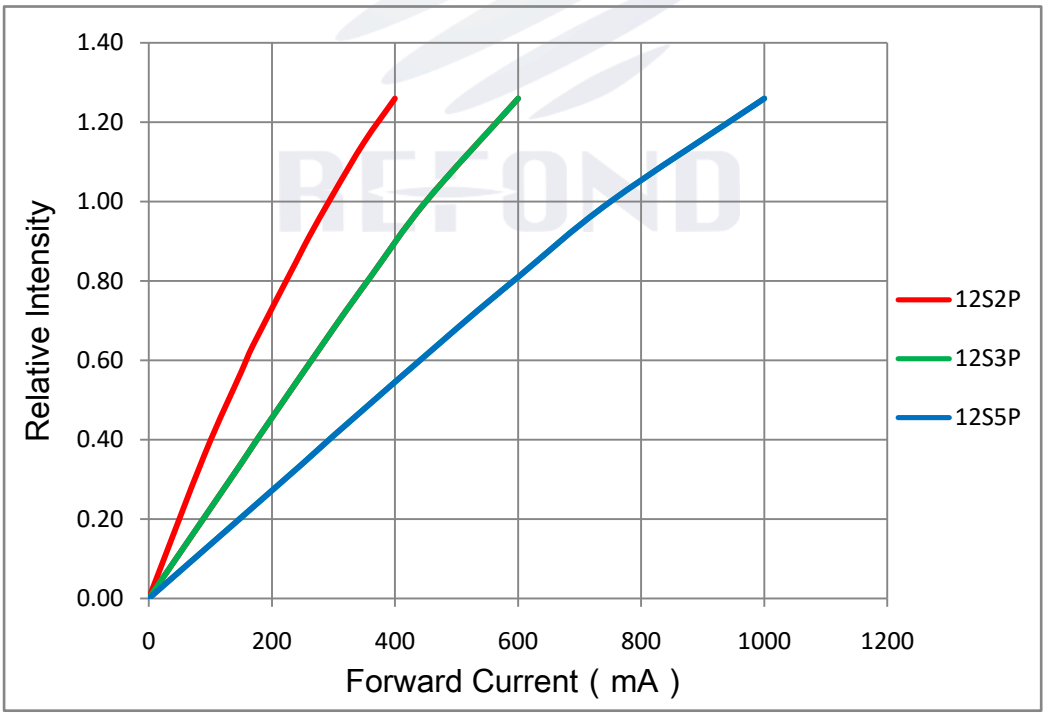


Fig 1-8 Forward Current Vs Relative Intensity.正向电流与相对光强特性曲线

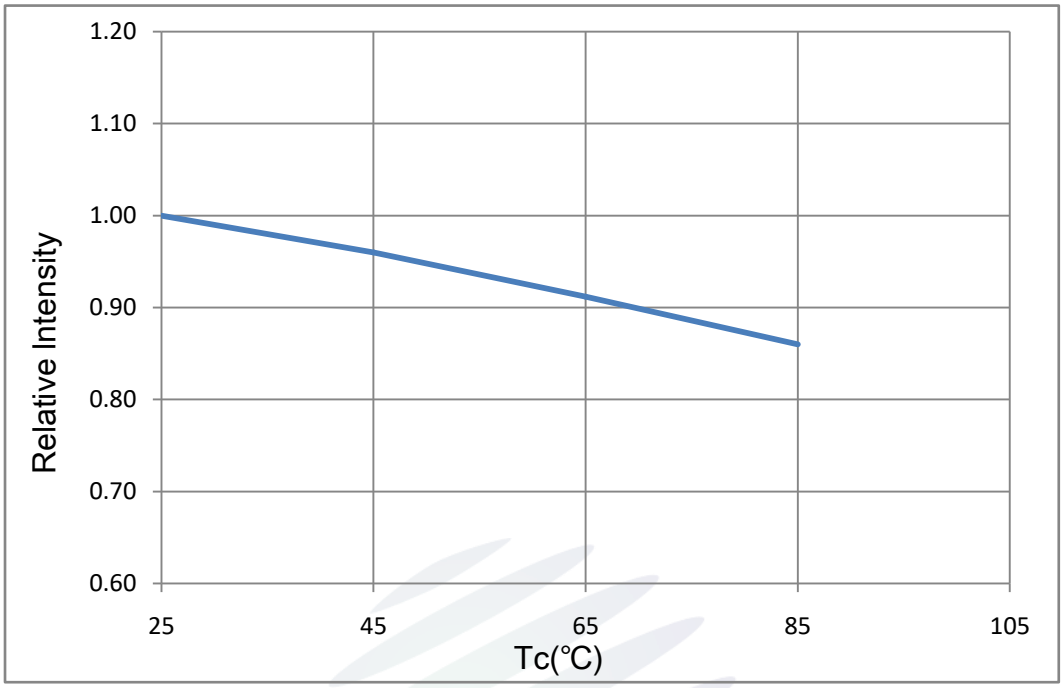


Fig 1-9 Case Temperature Vs Relative Intensity Tc.测试点温度与相对光强特性曲线

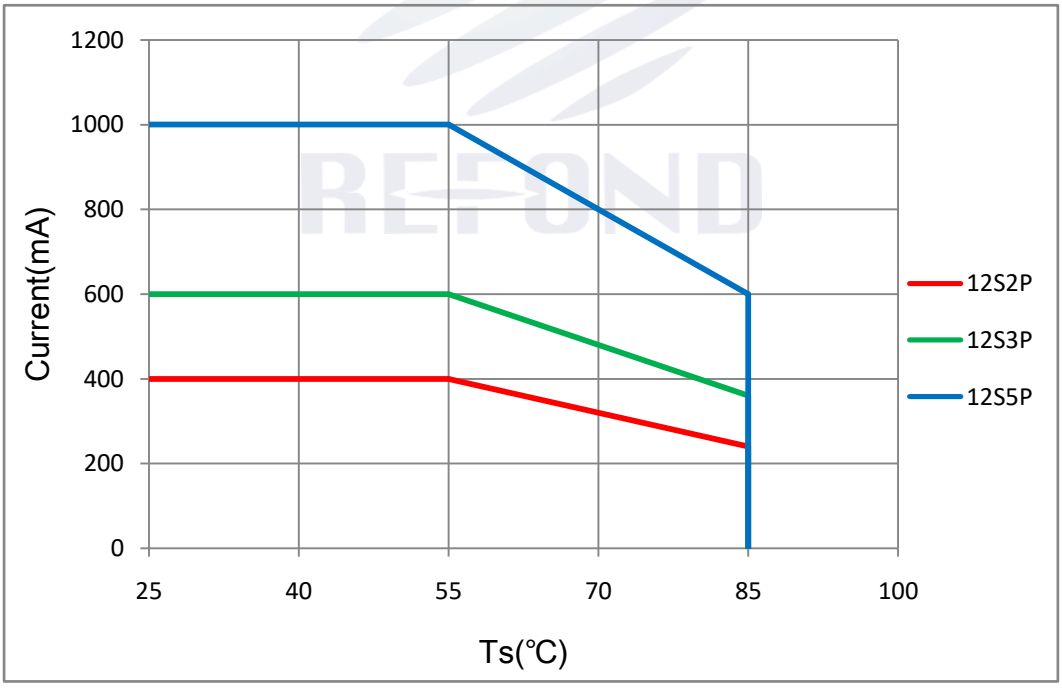


Fig 1-10 Case Temperature Vs Forward Current Tc.测试点温度与正向电流特性曲线

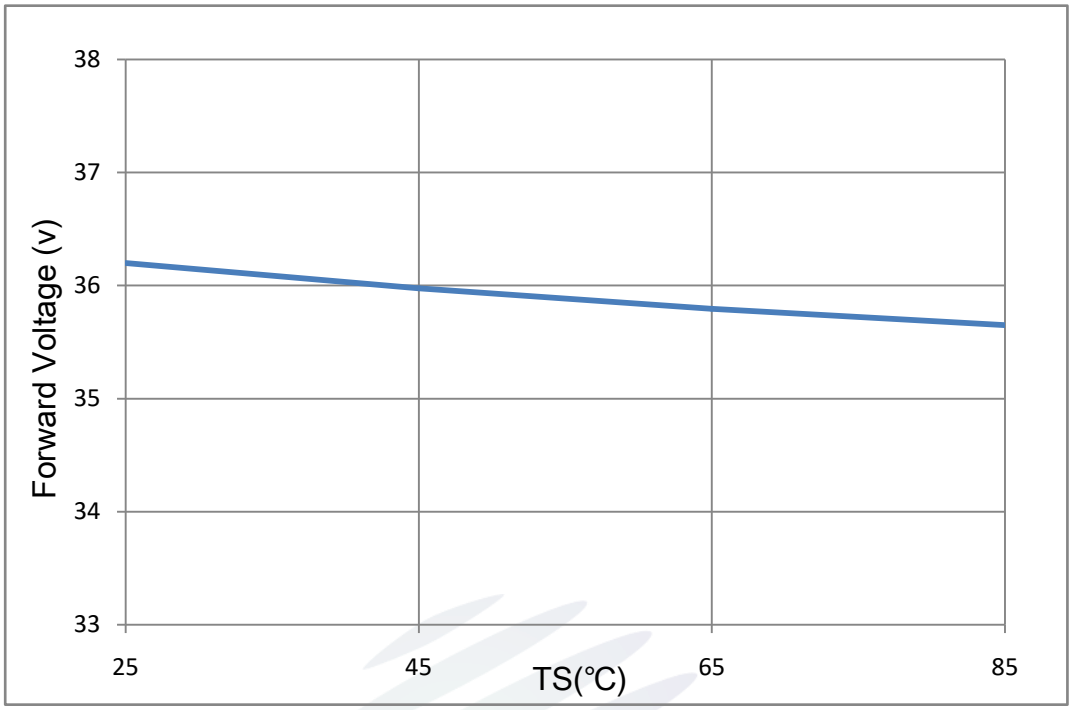


Fig 1-11 Forward Voltage Vs Case Temperature.电压与Ts测试点温度特性曲线

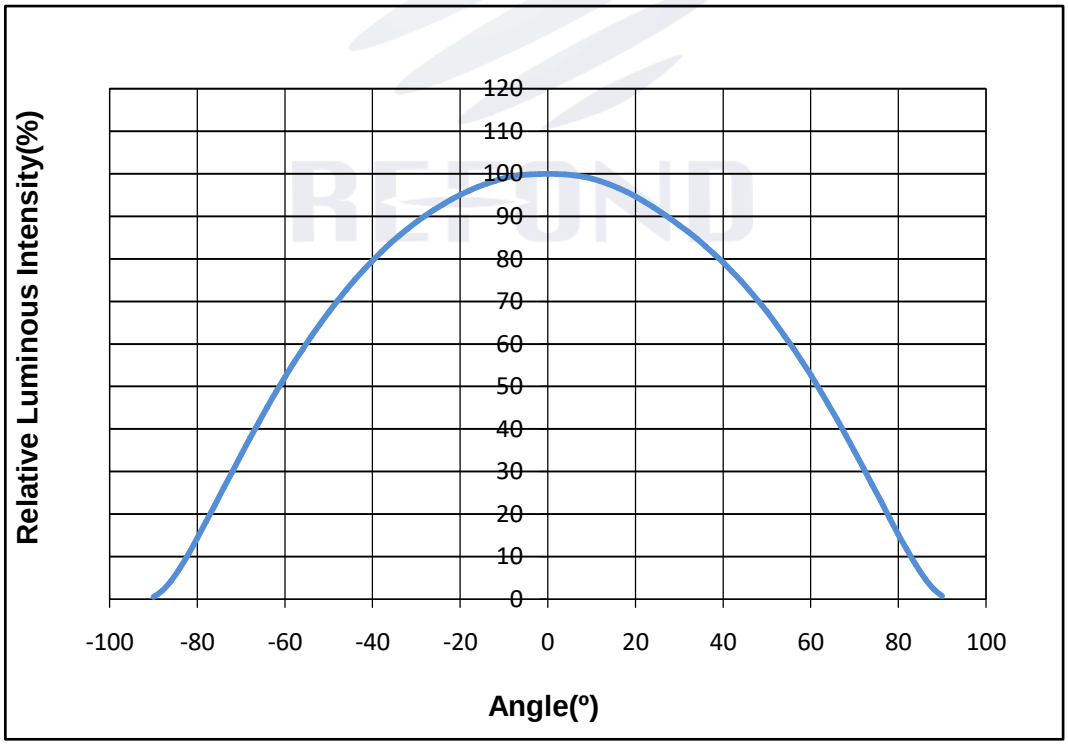


Fig 1-12 Radiation diagram 辐射特性曲线

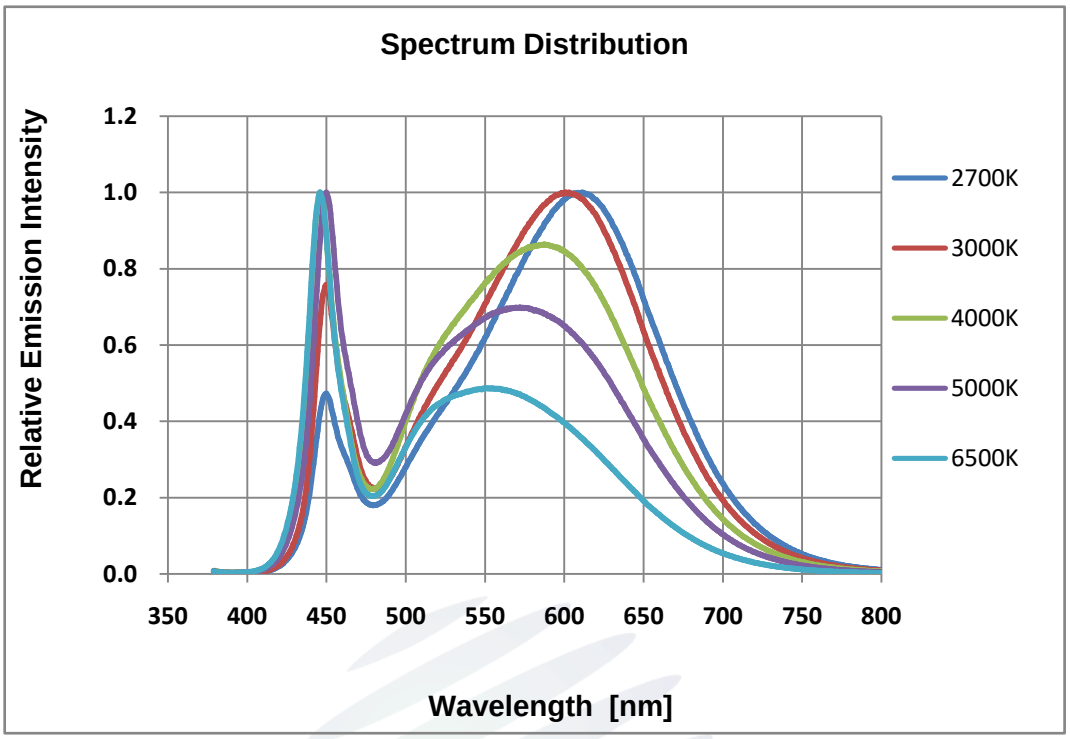


Fig 1-13Spectrum Distribution 光谱分布特性曲线

2. Packaging 产品包装

2.1 Packaging Specification 包装规格

Package:162 pcs/box.包装每盒 162 pcs。

2.1.1 Suction box Dimension 吸塑盒尺寸

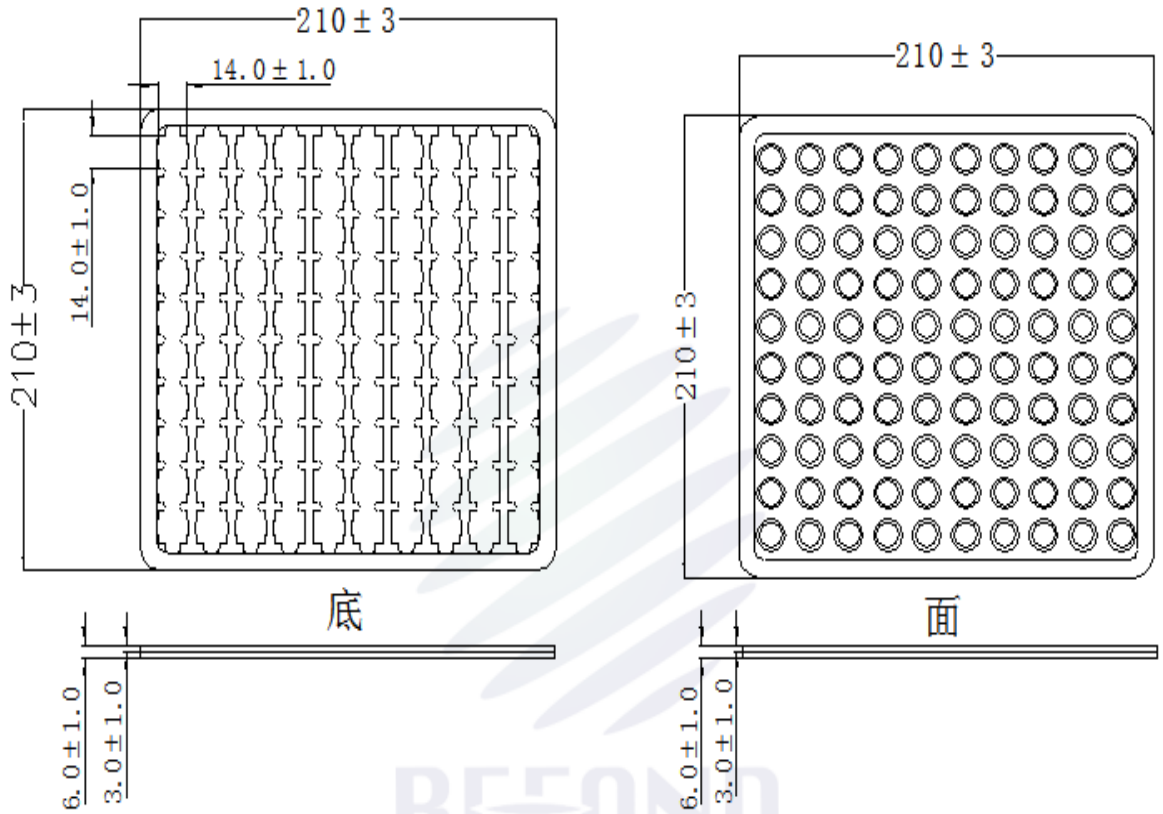


Fig.2-1 Suction box Dimension 吸塑盒尺寸

Notes 备注:

The tolerances unless mentioned ±0.1mm. Unit : mm 注：未注公差为±0.1毫米，尺寸单位：毫米。

2.1.3Label Form Specification 标签规格

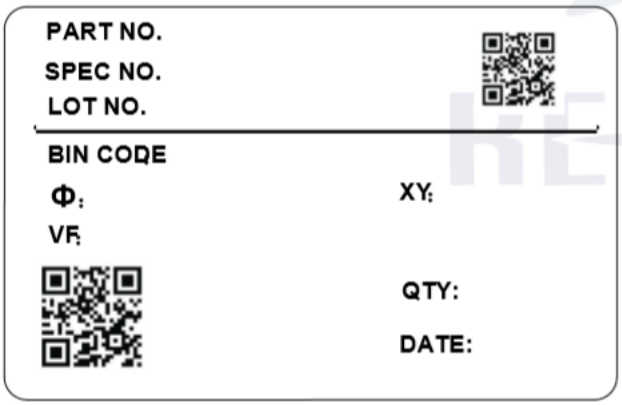


Fig 2-3 Label Form 标签模板

Table 2-2 Label Parameter 标签参数

PART NO.	Part Number 品名
SPEC NO.	Spec Number 规格
LOT NO.	Lot Number 批次号
BIN CODE	Bin Code 参数代码
Φ	Luminous flux 光通量
XY	Chromaticity Bin 色区
V_F	Forward Voltage 正向电压
QTY	Packing Quantity 数量
DATE	Made Date 生产日期

2.2 Moisture Resistant Packing 防潮包装

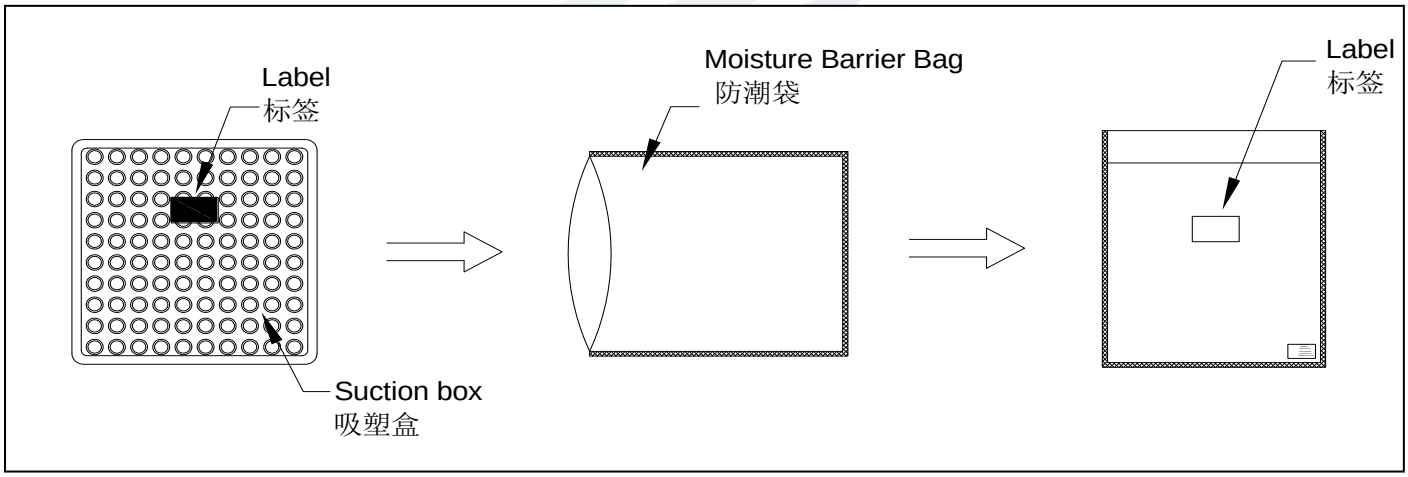


Fig.2-3Moisture Resistant Packing 防潮包装

2.3 Cardboard Box 包装纸箱

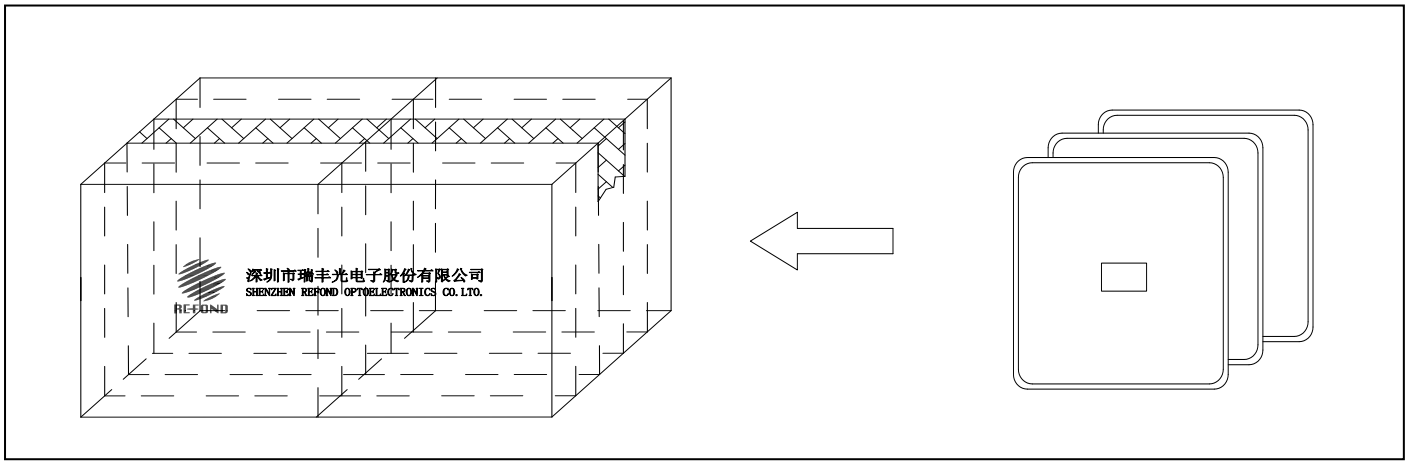


Fig.2-4Cardboard Box 包装纸箱

2.4 Reliability Test Items And Conditions 信赖性测试项目及条件

Table 2-3 Reliability Test Items And Conditions 信赖性测试项目及条件

TestItems 项目	Ref.Standard 参考标准	Test Condition 测试条件	Time 时间	Quantity 数量	Ac/Re 接收/拒收
Thermal Shock 冷热冲击	JESD22-A106	-40℃ 15min ↑↓10sec 100℃ 15min	100 cycle	10pcs	0/1
High Temperature Storage 高温保存	JESD22-A103	Temp:100℃	1000hrs	10pcs	0/1
Low Temperature Storage 低温保存	JESD22-A119	Temp:-40℃	1000hrs	10pcs	0/1
Life Test 常温老化	JESD22-A108	T_C=65℃ T_a=25℃ RF-A13D-W***0212-P7 (I_F=300mA) RF-A13D-W***0312-P7 (I_F=450mA) RF-A13D-W***0512-P7 (I_F=750mA)	1000hrs	10pcs	0/1
High Temperature High Humidity Life Test 高温高湿老化	JESD22-A101	60℃/ 90%R_H T_C=85℃ RF-A13D-W***0212-P7 (I_F=300mA) RF-A13D-W***0312-P7 (I_F=450mA) RF-A13D-W***0512-P7 (I_F=750mA)	1000hrs	10pcs	0/1
Temperature Humidity Storage 高温高湿储存	JEITA ED-4701 100 103	T_a=85℃ R_H=85%	1000hrs	10pcs	0/1

2.5 Criteria For Judging Damage 失效判定标准

Table 2-4 Criteria For Judging Damage 失效判定标准

Test Items 项目	Symbol 符号	Test Condition 测试条件	Criteria For Judgement 判定标准	
			Min. 最小	Max. 最大
Forward Voltage 正向电压	V_F	RF-A13D-W***0212-P7 (I_F=300mA) RF-A13D-W***0312-P7 (I_F=450mA) RF-A13D-W***0512-P7 (I_F=750mA)	-	U.S.L*)x1.1
High Temperature High Humidity Life Test 高温高湿老化	/	RF-A13D-W***0212-P7 (I_F=300mA) RF-A13D-W***0312-P7 (I_F=450mA) RF-A13D-W***0512-P7 (I_F=750mA)	No open circuit, shortcircuit or Flicke 无开路,短路，闪变	
Luminous Flux 光通量	Φ	RF-A13D-W***0212-P7 (I_F=300mA) RF-A13D-W***0312-P7 (I_F=450mA) RF-A13D-W***0512-P7 (I_F=750mA)	L.S.L*)x0.7	-

Notes 备注:

1.U.S.L: Upper standard level 规格上限 L.S.L: Lower standard level 规格下限

2.The Reliability tests are based on Refond existing test platform. 信赖性测试基于瑞丰现有的测试平台。

3.The technical information shown in the data sheets are limited to the typical characteristics and circuit examples of the referenced products. It does not constitute the warranting of industrial property nor the granting of any license. 以上技术数据仅为产品的典型值，只作为参考，不作为任何应用条件及应用方式的保证。

3. Soldering Instructions 焊接说明

焊接温度	300 °C	最高温度	350 °C
焊接时间	3 秒	最长时间	最多5 秒

(1) The hand solder should be done only one time.手工焊接只可焊接一次.

(2) When soldering , do not put stress on the COBs'silicone.当焊接时，不要压 COB 硅胶体表面.

(3) When soldering , put COB on the Surface of a poor conductor of heat.当焊接时，将 COB 放在热的不良导体表面.

(4) Don't remove the protective film on the silicone until soldering end.焊接结束前不得撕掉硅胶的保护层。

3.1.1 SolderingIron 烙铁焊接

(1) When hand soldering, keep the temperature of iron below less 350℃ less than 5 seconds.当手工焊接时，烙铁的温度必须小于350℃，时间不可超过5秒。

(2) The tip of the iron tip is the blade.建议使用刀型烙铁焊接。

3.1.2 Repairing修补

Repair should not be done after the COBs have been soldered. When repairing is unavoidable,a double-head soldering iron should be used (as below figure). It should be confirmed in advance whether the characteristics of COBs will or will not be damaged by repairing. When COBs are repairing ,don't use soldering iron scrape pad of COBs.

COB回流焊后不应该修复，当必须修复时，必须使用双头烙铁，而且事先应确认此种方式会不会损坏COB本身的特性。修复时不得使用烙铁刮COB焊盘。

3.1.3 Cautions 注意事项

(1)The encapsulated material of the LEDs is silicone. Therefore the LEDs have a soft surface on the top of package. The pressure to the top surface will be influence to the reliability of the LEDs. Precautions should be taken to avoid the strong pressure on the encapsulated part. So when usethe picking up nozzle, the pressure on the silicone resin should be proper. LED封装胶为硅胶，表面较软，用力按压胶体表面会影响LED可靠性，因此应有预防措施避免在按压器件，当使用吸嘴时，胶体表面的压力应是恰当的。

(2) Components should not be mounted on warped (non coplanar) portion of PCB. After soldering, do not warp the circuit board.LED 灯珠不要焊接在弯曲的 PCB 板上，焊接之后，也不要弯折线路板。

(3) Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering. Do not rapidly cool device after soldering.回流焊之后冷却过程中，不要对材料实加外力，也不要有震动，回流焊后，不要采用激剧冷却的方式。

4. Handling Precautions 产品使用注意事项

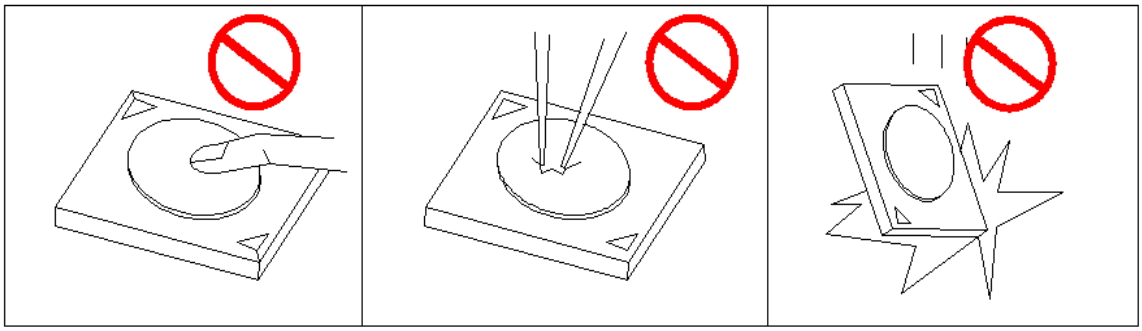
4.1 Handling Precautions 产品使用注意事项

(1) LED operating environment and sulfur element composition cannot be over 100PPM in the LEDmating usage material. This is provided for informational purposes only and is not a warranty or endorsement.LED 工作环境及与 LED 适配的材料中硫元素及化合物成份不可超过 100PPM.这只是一个建议，不作任何品质担保。

(2) In order to prevent ex-ternal material from getting into the inside of LED, which may cause the malfunction of LED, the single content of Bromine element is required to be less than 900PPM,the single content of Chlorine elementis required to be less than 900PPM,the total content of Bromine element and Chlorine element in the external materials of the application products is required to be less than 1500PPM. This is provided for informational purposes only and is not a warranty or endorsement.为了防止外界物质进入 LED 内部以造成 LED 的损伤，所处环境及所用套件等等，单一的溴元素含量要求小于 900PPM，单一氯元素含量要求小于 900PPM，溴元素与氯元素总含量必须小于 1500PPM. 这只是一个建议，不作任何品质担保。

(3) VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsulants of LEDs and discolor when exposed to heat and photonic energy. The result can be a significant loss of light output from the fixture. Knowledge of the properties of the materials selected to be used in the construction of fixtures can help prevent these issues. Refond advises against theuse of any chemicals or materials that have been found or are suspected to have an adverse affect on device performance or reliability. To verifycompatibility, Refond recommends that all chemicals and materials be tested in the specific application and environment for which they are intended tobe used. Attaching LEDs, do not use adhesives that outgas organic vapor. 应用套件中的挥发性物质会渗透到 LED 内部，在通电产生光子及热的条件下，会导致 LED 变色，进而造成严重光衰，提前了解套件材料能够避免产生这些问题。瑞丰反对使用任何对 LED 器件的性能或者可靠性有害的物质或材料，不管这些材料是已经证实了的还是仅仅怀疑有害。针对特定的用途和使用环境，瑞丰建议对所有的物质和材料进行相容性的测试。在贴装 LED 时候，不要使用能产生有机挥发性气体的粘结剂。

(4) Handle the component along the side surface by using forceps or appropriate tools; do not directlytouch or Handle the silicone lens surface, it may damage the internal circuitry.通过使用适当的工具从材料侧面夹取，不可直接用手或尖锐金属压胶体表面，它可能会损坏内部电路。



(5) In designing a circuit,the current through each LED must be exceed the absolute maximum rating specified for each LED.In the meanwhile,resistors for protection should be applied,otherwise slight voltage shift will cause big current change,burn out may happen. The driving circuit must be designed to allow forward voltage only when it is ON or OFF.If the reverse voltage is applied to LED, migration can be generated resulting in LED damage. 设计电路时，通过 LED 的电流不能超过规定的最大值，同时，还需使用保护电阻，否则，微小的电压变化将会引起较大电流变化，可能导致产品损毁。电路设计必须保证只有在开启或者关闭的时候出现正向电压的变化，不要施加反压，否则会损坏 LED。

(6) Thermal Design is paramount importance because heat generation may result in the Characteristics decline,such as brightness decreased,Color change and so on.Please consider the heat generation of the LEDs when making the system design.LED 容易因为自身的发热和环境的温度改变而改变，温度升高会降低 LED 发光效率，影响发光颜色，所以在设计时应充分考虑散热问题。

(7) Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust，requiring special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after the soldering of components. Refond suggests 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. 与其他封装胶相比，硅胶通常较软，表面易吸附脏物，应用时应特别注意，当对产品洁净度要求较高时，回流焊以后需要采用恰当的清洗方式，我们推荐用异丙醇作清洗剂，如需要用到其他清洗剂，必须保证不会破坏封装体，超声清洗可能会对 LED 带来损害，不推荐这种清洗方式。

(8) To avoid the moisture penetration, we recommend store in a dry box with a desiccant. The recommended storage temperature range is 5℃ to 30℃ and a maximum humidity of RH50%.为了避免湿气进入，产品应该保存在干燥的地方，同时需要使用干燥剂， 推荐的储存温度是 5℃到 30℃，最大湿度不能超过 50%。

(9)Similar to most Solid state devices; LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS). 像其他的半导体电子器件一样，LED 对静电过流击穿非常敏感，需要做好防护。

(10) Other points for attention, please refer to our relevant information.其它注意事项请参照瑞丰相关资料。

Version History/修订历史

Date日期	Revisor修订者	Version版本	Verifier审核	Remarks备注
2022-9-22	刘明	E0	姚胜坚	初版发行

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www.refond.com

Declare 申明

This specification is written both in English and in Chinese and the latter is formal.

产品规格书以中英文方式书写，若有冲突以中文版本为准。