佛山市国星光电股份有限公司

FOSHAN NATIONSTAR OPTOELECTRONICS CO., LTD

SPECIFICATION

Customer		Product	0805 CHIP LED
Customer No.		Type	FC-2012XXX

APPROVED SIGNATURES			

ISO14001 环境管理体系认证

ISO9001 质量管理体系认证

Research & Development Center		
APPROVE	CHECK	DRAW
Release Date：2009-12-21		

FC-2012X X X Chip Light Emitting Diode

Technical Data Sheet

This product is generally used as indicator and luminary for electronic equipment such as dashboard and signal Led board. And it also be widely used for indoor and outdoor decorative lighting.

Features:

Color	Material
Red	Red-AlGaInP
Orange	Orange -AlGaInP
Yellow	Yellow -AlGaInP
Yellow Green	Yellow Green -AlGaInP
Green	Green-InGaN
Blue	Blue-InGaN
White	Blue-InGaN

- Wide Viewing Angle
- Reflow Solderable
- High Luminous Intensity and Low Power Dissipation
- Good Reliability and Long Life
- Complied With RoHS Directive

Electrical Characteristics

✧ Absolute Maximum Ratings (Temperature=25°C):

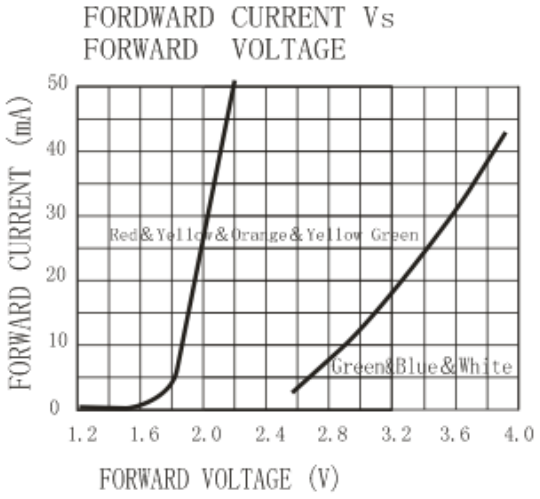
Parameter	Symbol	Rating	Unit
Forward Current	I_F	25 Max.	mA
Pulse Forward Current*	I_{FP}	100 Max.	mA
Reverse Voltage	V_R	5 Max.	V
Operating Temperature	T_{OPR}	-30 ~ +85	℃
Storage Temperature	Tstg	-40 ~ +100	℃

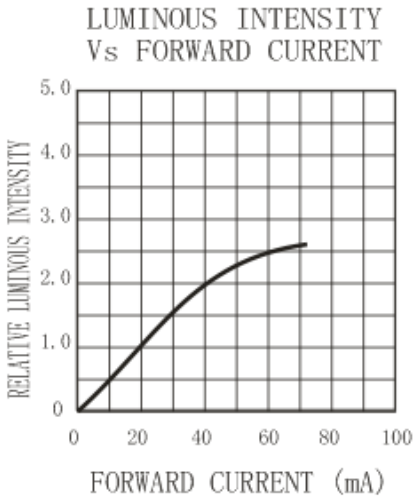
* Note: Pulse width≤0.1ms, Duty≤1/10*

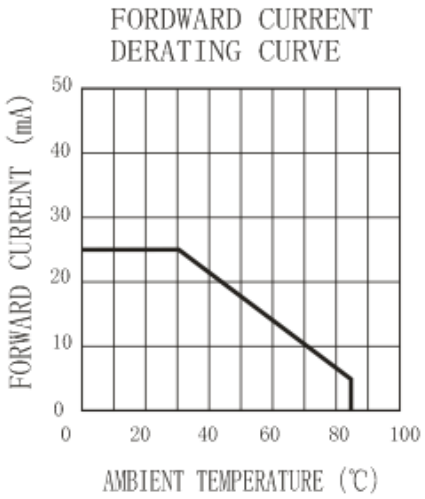
✧ Electro-Optical Characteristics (Temperature=25°C):

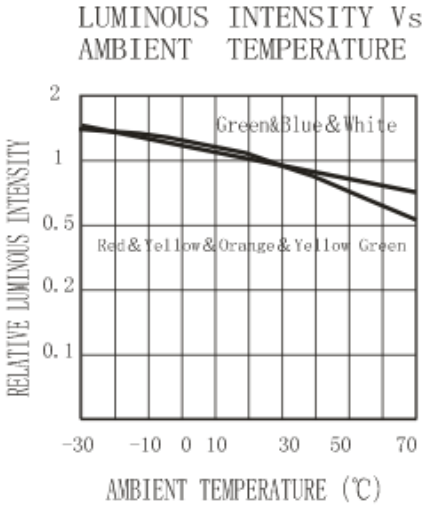
Part Number	EMITTED COLOR	Lens Color	Dominant Wavelength (nm)	IV(If=20mA) mcd		Vf (v) Typ.	View Angle 2Θ1/2
				Min.	Typ.		
FC-2012SXK-620D08	Super Red	Water Clear	620	50	80	2.0	130
FC-2012HRK-625L			625	120	170		
FC-2012YOXK-600H08	Super Orange		604	100	150	2.0	130
FC-2012YXK-585F08	Super Yellow		588	60	80	2.0	130
FC-2012HYK-589I			589	150	200		
FC-2012GHK-570A08	Yellowish Green		570	20	30	2.0	130
FC-2012GEK-572E			572	30	50		
FC-2012UGK-520D	Super Green		520	300	400	3.2	130
FC-2012BXK-465D	Super Blue		465	50	80	3.2	130
FC-2012BK-470D			470	60	100		
FC-2012WBY-460G	Super White	Yellow diffused	X:0.29 Y:0.28	400	600	3.2	130

Typical Characteristics Curves

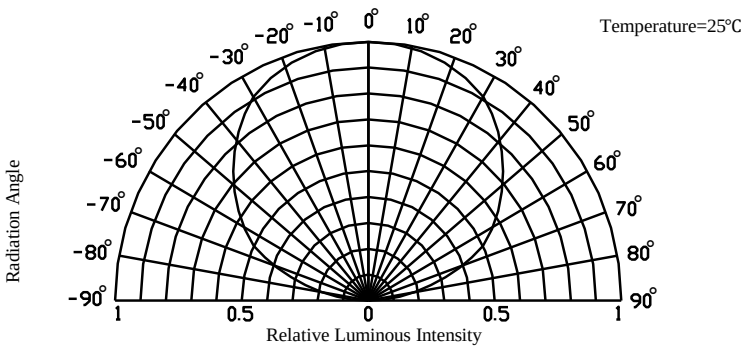








Radiation Diagram



Reliability Test Items And Conditions

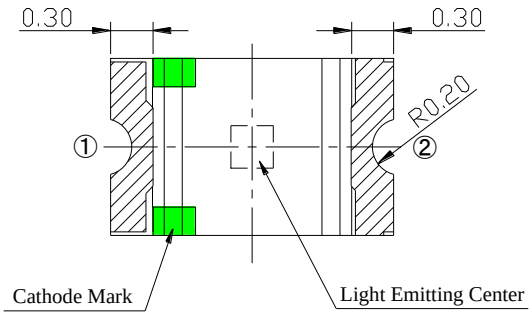
Test Items	Test Conditions	Quantity	Judging Criteria
Solderability	Solder Temperature：300℃ Solder Duration：（3.5±0.5）sec.	15	Solderable Area Over 95%
Thermal Shock Followed by High Temperature And High Humidity Cyclic	-40℃ ⇢ 10 min. 5 Cycles ↓↑ Shift (2~3) min. 100℃ ⇢ 10 min. ↓ 25℃~55℃ （90%~95%）RH 2 Cycles for 48 hrs., Recover for 2 hrs.	11	C=0 & I**
Resistance For Soldering Heat	Reflow Soldering	15	C=0 & I**
DC Operating Life	1000 hrs. Forward Current：25mA	22	C=0 & I*
High Temperature Storage	100℃⇢ 1000 hrs.	15	C=0 & I*
High Temperature And High Humidity Cyclic	25℃~55℃ （90%~95%）RH 6 Cycles for 144 hrs., Recover for 2 hrs.	11	C=0 & I*

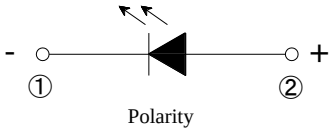
***1 Criteria For Judging Damage**

Items	Symbol	Test Conditions	Criteria For Judging Damage I*	Criteria For Judging Damage I**
Forward Voltage	V_F	I_F=20mA	≥USL×1.2	≥USL
Reverse Current	I_R	V_R=5V	≥USL×2.0	≥USL
Luminous Intensity	I_V	I_F=20mA	≤LSL×0.5	≤LSL

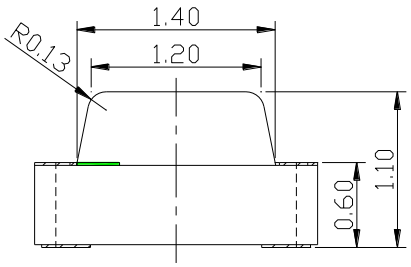
***** USL: Upper Standard Level, LSL: Lower Standard Level *****

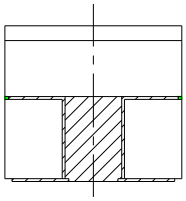
Outline Dimensions

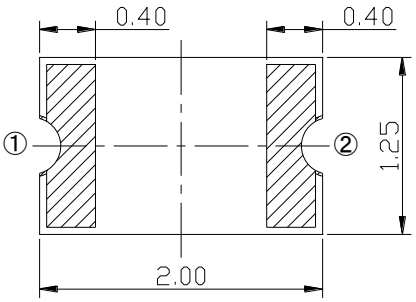


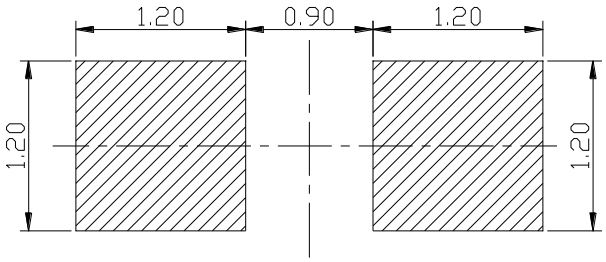


Polarity

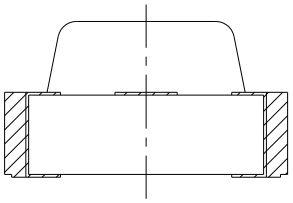








Recommended Soldering Pad



Section View

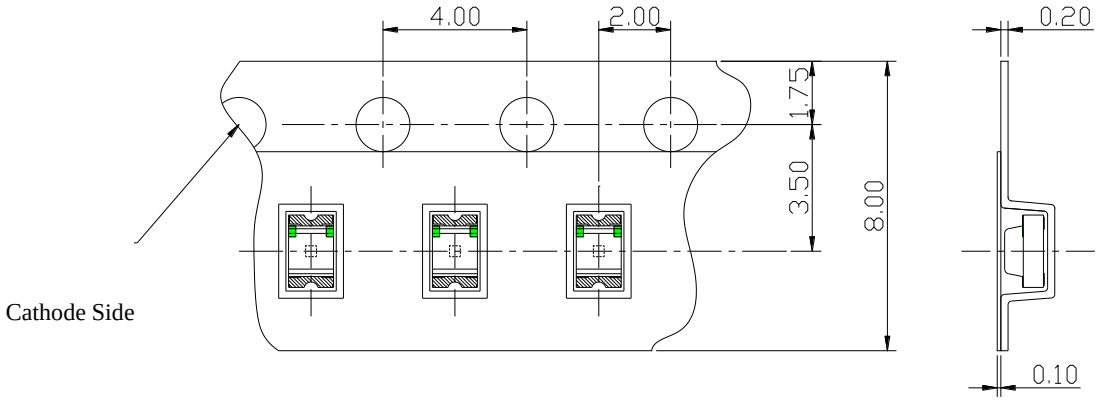
Cuprum Area:

Solder Resist:

The Tolerances Unless Mentioned is ± 0. 1mm, Unit= mm

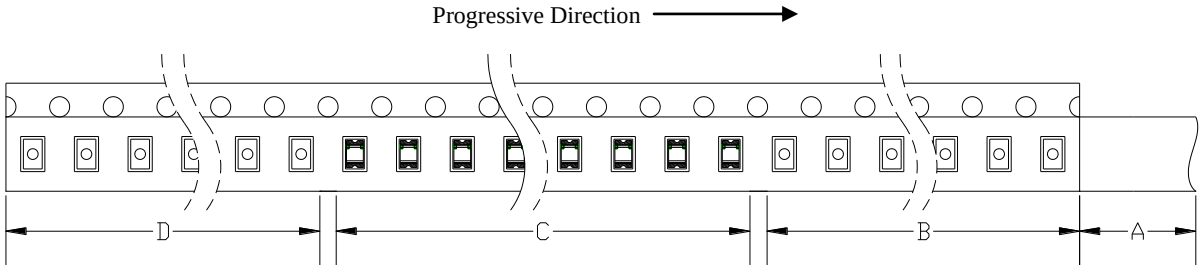
Packaging (1)

✧ **Carrier Tape**



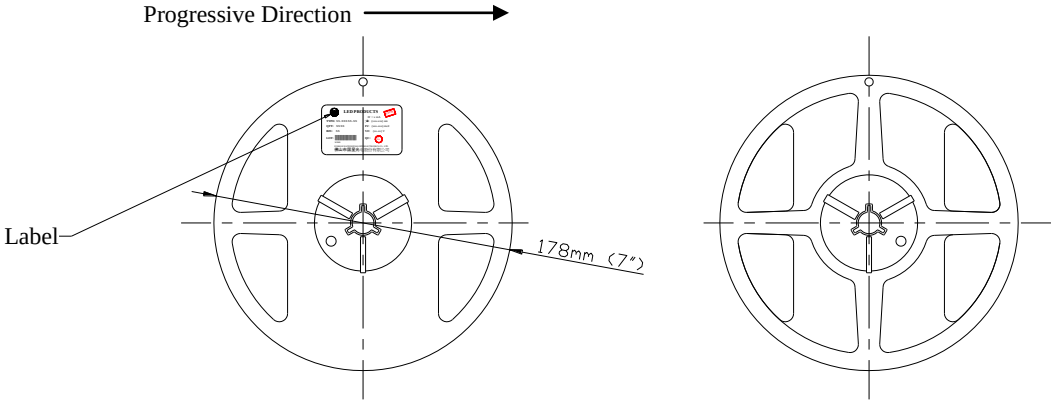
All dimensions in mm, tolerances unless mentioned is ±0.1 mm.

✧ **Details Of Carrier Tape**



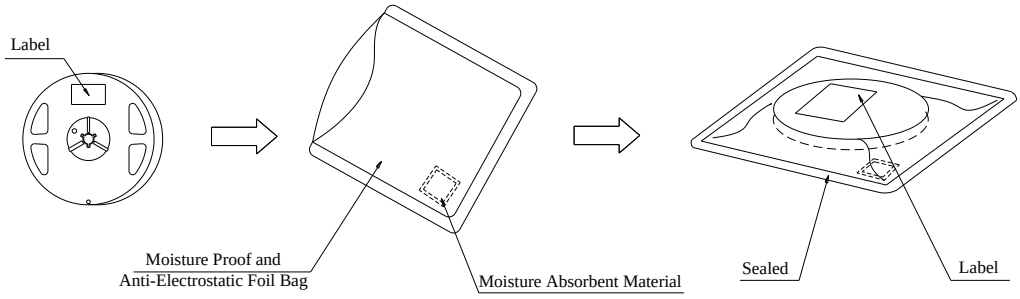
A: Top Cover Tape, 300mm; B: Leader, Empty, 200mm; C:3000 Lamps Loaded; D: Trailer, Empty, 200mm.

✧ **Reel Dimension**

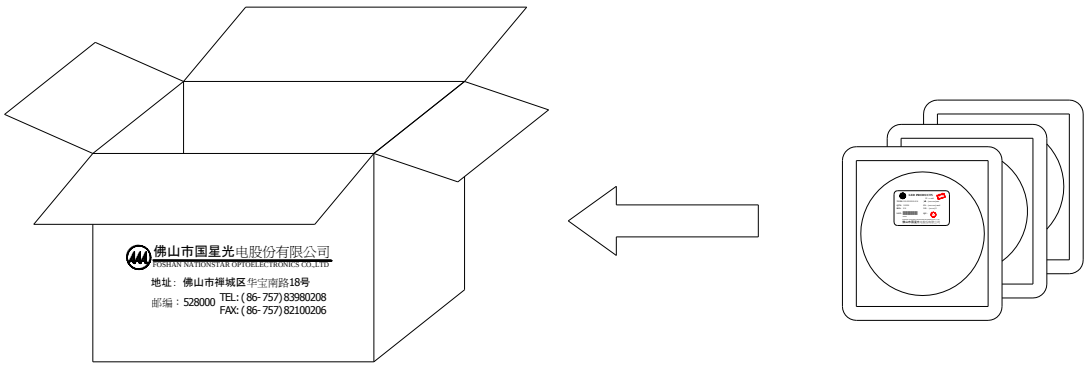


Packaging (2)

✧ Moisture Proof and Anti-Electrostatic Foil Bag



✧ Cardboard Box



✧ Label Explanation

QTY：Quantity

BIN：Rank

LOT：Lot Number

λd：Wavelength Range or (Xx-x)

IV：Luminous Intensity Range

VF：Forward Voltage Range

IF：Testing Current

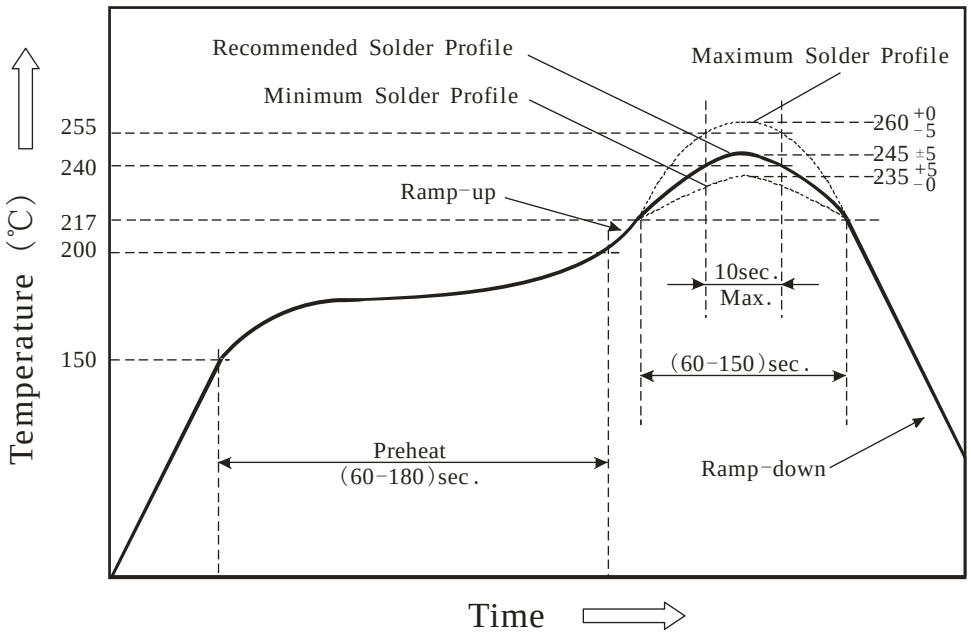
Guideline for Soldering

1. Hand Soldering

A soldering iron of less than 20W is recommended to be used in Hand Soldering. Please keep the temperature of the soldering iron under 300℃ while soldering. Each terminal of the LED is to go for less than 3 second and for one time only.

Be careful because the damage of the product is often started at the time of the hand soldering.

2. Reflow Soldering: Use the conditions shown in the under Profile of Pb-Free Reflow Soldering.



- Reflow soldering should not be done more than two times.
- Stress on the LEDs should be avoided during heating in soldering process.
- After soldering, do not deal with the product before its temperature drop down to room temperature.

3. Cleaning

It is recommended that alcohol be used as a solvent for cleaning after soldering. Cleaning is to go under 30℃ for 3 minutes or 50℃ for 30 seconds. When using other solvents, it should be confirmed beforehand whether the solvents will dissolve the package and the resin or not.

Ultrasonic cleaning is also an effective way for cleaning. But the influence of Ultrasonic cleaning on LED depends on factors such as ultrasonic power. Generally, the ultrasonic power should not be higher than 300W. Before cleaning, a pre-test should be done to confirm whether any damage to LEDs will occur.

Note: This general guideline may not apply to all PCB designs and configurations of all soldering equipment. The technique in practice is influenced by many factors, it should be specialized base on the PCB designs and configurations of the soldering equipment.

Precautions (1)

1. Storage

• Moisture proof and anti-electrostatic package with moisture absorbent material is used, to keep moisture to a minimum.

• Before opening the package, the product should be kept at 30℃ or less and humidity less than 60% RH, and be used within a year.

• After opening the package, the product should be stored at 30℃ or less and humidity less than 10%RH, and be soldered within 24 hours (1 days). It is recommended that the product be operated at the workshop condition of 30℃ or less and humidity less than 60%RH.

• If the moisture absorbent material has fade away or the LEDs have exceeded the storage time, baking treatment should be performed based on the following condition: (80±5)℃ for 24 hours.

2. Static Electricity

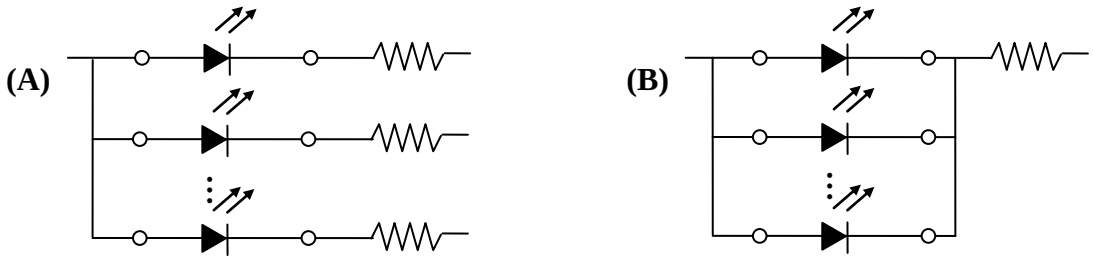
Static electricity or surge voltage damages the LEDs. Damaged LEDs will show some unusual characteristics such as the forward voltage becomes lower, or the LEDs do not light at the low current., even not light.

All devices, equipment and machinery must be properly grounded. At the same time, it is recommended that wrist bands or anti-electrostatic gloves, anti-electrostatic containers be used when dealing with the LEDs.

3. Design Consideration

In designing a circuit, the current through each LED must not 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.

It is recommended to use Circuit A which regulates the current flowing through each LED rather than Circuit B. When driving LEDs with a constant voltage in Circuit B, the current through the LEDs may vary due to the variation in Forward Voltage (V_F) of the LEDs. In the worst case, some LED may be subjected to stresses in excess of the Absolute Maximum Rating.



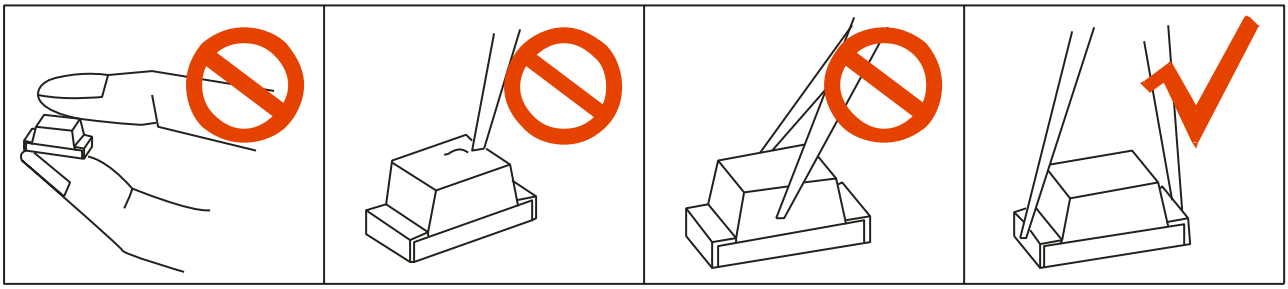
Preferable　　Non-Preferable

Thermal Design is paramount importance because heat generation may result in the Characteristics decline, such as brightness decreased, Color changed and so on. Please consider the heat generation of the LEDs when making the system design.

Precautions (2)

4. Others

When handling the product, touching the encapsulant with bare hands will not only contaminate its surface, but also affect on its optical characteristics. Excessive force to the encapsulant might result in catastrophic failure of the LEDs due to die breakage or wire deformation. For this reason, please do not put excessive stress on LEDs, especially when the LEDs are heated such as during Reflow Soldering.



The epoxy resin of encapsulant is fragile, so please avoid scratch or friction over the epoxy resin surface. While handling the product with tweezers, do not hold by the epoxy resin, be careful.

5. Safety Advice For Human Eyes

Viewing direct to the light emitting center of the LEDs, especially those of great Luminous Intensity, will cause great hazard to human eyes. Please be careful.

Appendix

IV(mcd) BINS:

Detailed Bracket					
IV(mcd)	**IV(mcd)**	**IV(mcd)**	**IV(mcd)**	**IV(mcd)**	**IV(mcd)**
5-6	13-16	36-45	100-120	270-330	750-900
7-7	16-20	45-55	120-150	330-400	900-1200
7-9	20-24	55-65	150-180	400-500	
9-11	24-30	65-80	180-220	500-600	
11-13	30-36	80-100	220-270	600-750	

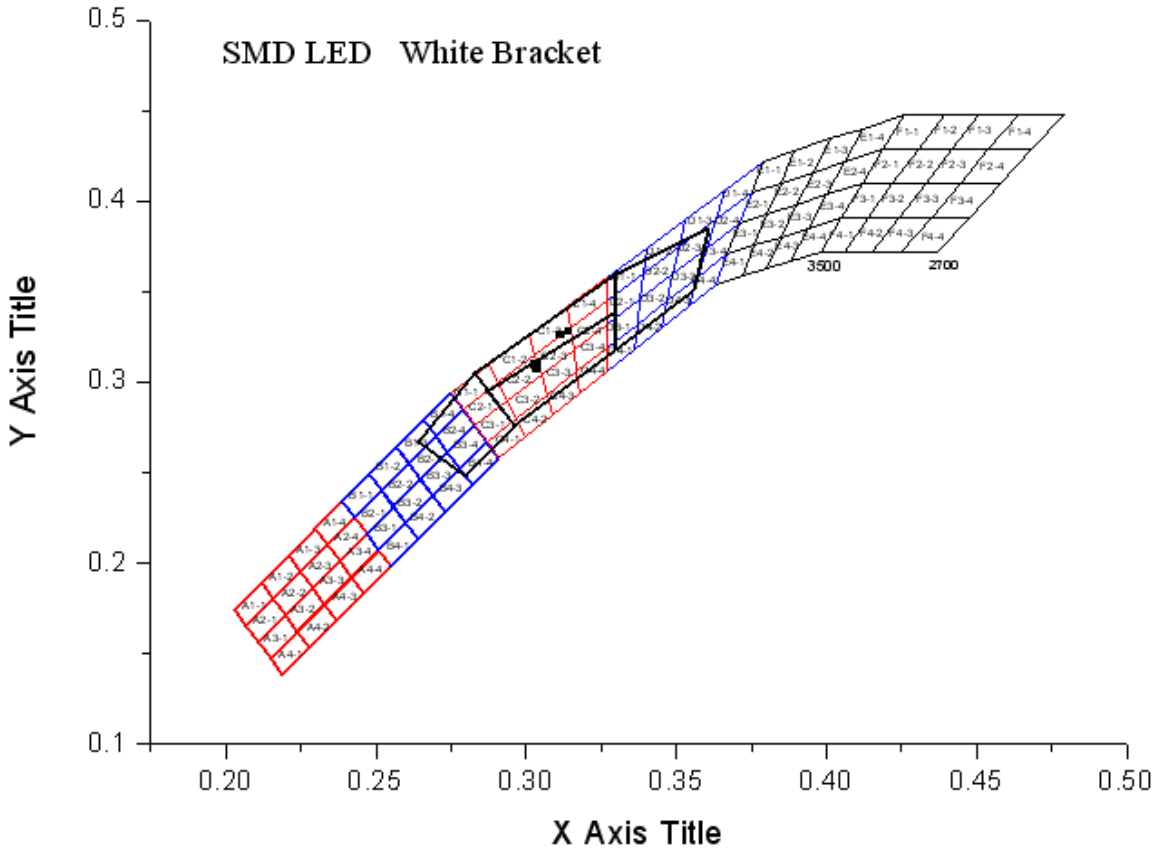
VF(V) BINS:

Detailed Bracket					
VF(V)	**VF(V)**	**VF(V)**	**VF(V)**	**VF(V)**	**VF(V)**
1.6-1.7	2.0-2.1	2.4-2.5	2.8-2.9	3.2-3.3	3.6-3.7
1.7-1.8	2.1-2.2	2.5-2.6	2.9-3.0	3.3-3.4	3.7-3.8
1.8-1.9	2.2-2.3	2.6-2.7	3.0-3.1	3.4-3.5	3.8-3.9
1.9-2.0	2.3-2.4	2.7-2.8	3.1-3.2	3.5-3.6	3.9-4.0

λ_D (nm) BINS

	λ_D(nm)		**λ_D(nm)**	
Blue	463-466	**Green**	515-517.5	527.5-530
	466-469		517.5-520	530-532.5
	469-472		520-522.5	532.5-535
	472-475		522.5-525	
Yellow Green	568-570		525-527.5	
	570-572	**Yellow**	580-582.5	590-592.5
	572-574		582.5-585	592.5-595
	574-576		585-587.5	
Orange	598~601		587.5-590	
	601~604	**Red**	620~640	
	604~607			
	607~610			

White (X,Y) BINS:



		Bottom	Left	Top	Right			Bottom	Left	Top	Right
A 区 X:0.229 Y:0.186	X	0.219	0.203	0.239	0.255	B 区 X:0.265 Y:0.246	X	0.255	0.239	0.275	0.291
	Y	0.138	0.174	0.234	0.198		Y	0.198	0.234	0.294	0.258
C 区 X:0.305 Y:0.304	X	0.291	0.275	0.327	0.327	D 区 X:0.349 Y:0.36	X	0.327	0.327	0.379	0.363
	Y	0.258	0.294	0.358	0.306		Y	0.306	0.358	0.422	0.354
E 区 X:0.39 Y:0.398	X	0.363	0.379	0.426	0.398	F 区 X:0.433 Y:0.41	X	0.398	0.426	0.479	0.437
	Y	0.354	0.422	0.448	0.372		Y	0.372	0.448	0.448	0.372
When the Label is printed Please give clear indication of color coordinate area（**as：A1-2**）											

Notes：Measurement Condition：I_F=20mA