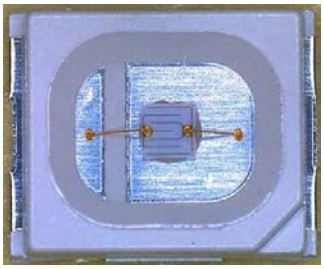
台宙晶體科技股份有限公司

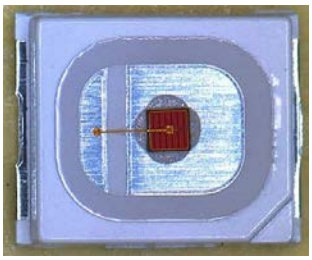
Top Crystal Technology Inc.,

Power Light Source

Introduction：

TMSB-BFX (R,G,B)is one the highest flux LEDs in the world. Due to the special design of chip and package, the TMSB-BFX (R,G,B) is designed by particular package for high power LED.





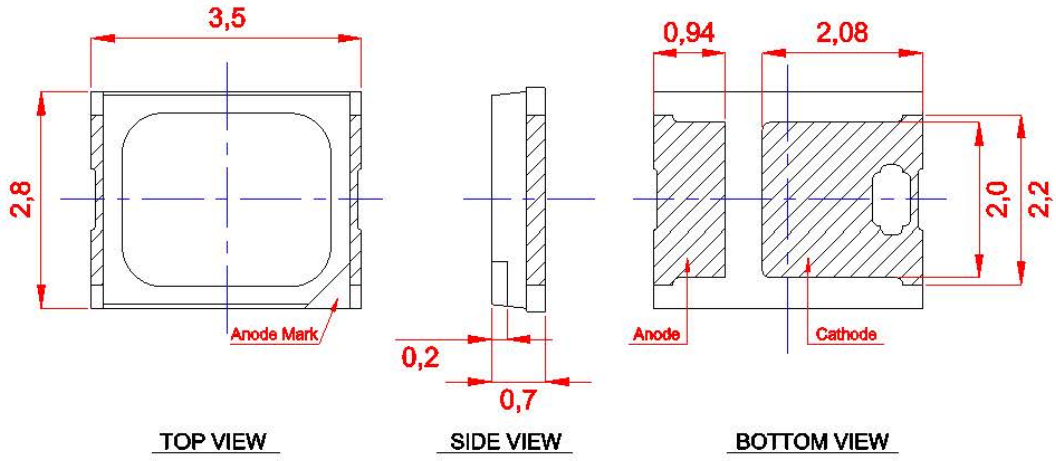
Feature：

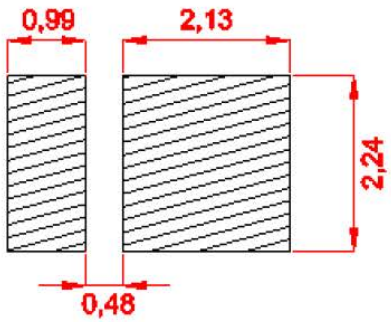
- Long operating life
- Energy efficiency
- Low thermal resistance
- Compact design
- Instant light
- Fully dimmable
- No UV
- Superior ESD protection
- ROHS compatibility

Typical Applications:

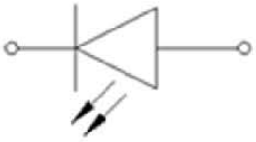
- Reading lights
- Portable light
- Orientation
- Entertainment
- Garden
- Security light
- Ceiling light
- Architectural lighting
- General lighting
- Jewel display illumination

Package Dimensions





Recommended Solder Pad



Circuit Diagram

Notes：

1. Drawings are not to scale.
2. All dimensions are in millimeter.
3. General tolerance is ±0.2mm.
4. The polarity of slug at bottom is anode.
5. It is important that the slug can't contact aluminum surface, it is strongly recommended that there should coat a uniform electrically isolated heat dissipation film on the surface.
6. It is strongly recommended that the temperature of lead be not higher than 70℃.

Absolute Maximum Ratings

Parameter		Conditions
DC Forward Current	1W	350mA
	3W	500 mA
Peak Pulse Current (mA)	1W	700 mA
	3W	1000 mA
LED Junction Temperature (℃)		110℃
Operating Temperature (℃)		-30~100
Storage Temperature (℃)		-40~120
Soldering Temperature		Manual 240℃(max) 5 seconds
Reverse Voltage		Not design to be driven in reverse bias

Notes：

1. Proper current derating must be observed to maintain junction temperature below the maximum at all time.
2. Allowable reflow cycles are 3 times for each LED

Optical Characteristics (Tj=25℃)

Color	Dominant Wavelength λd		Viewing Angle Degree
	Min.	Max.	$2\theta_{1/2}$
Royal Blue	450nm	460nm	125
Blue	455nm	475nm	125
Cyan	495nm	505nm	125
Green	515nm	535nm	125
Amber	585nm	597.5nm	120
Red	615nm	630nm	120
Crimson[3]	650nm	670nm	120

Notes :

1. CCT (Wavelength) ±5% tester tolerance.
2. Wavelength is measured with an accuracy of ±0.5nm.
3. Peak Wavelength λp

Flux Characteristics (Tj=25℃)

Color	Forward current	Part Number	Minimum Luminous Flux(lm)	Typical Luminous Flux(lm)	Maximum Luminous Flux(lm)
Royal Blue	150mA	TMSB-BFYX	80mW	120mW	--
Blue	150mA	TMSB-BFBX	3Lm	4Lm	--
Cyan	150mA	TMSB-BFCX	70Lm	25Lm	
Green	150mA	TMSB-BFGX	20Lm	30Lm	--
Amber	150mA	TMSB-BFAX	15Lm	20Lm	--
Red	150mA	TMSB-BFRX	15Lm	20Lm	--
Crimson	150mA	TMSB-BFPX	70mW	100mW	

Electrical Characteristics (Tj=25℃)

			Forward Voltage V_F(V)		
Color	Forward current	Part Number	Min.	Typ.	Max.
Royal Blue	150mA	TMSB-BFYX	2.9	3.2	3.6
Blue	150mA	TMSB-BFBX	2.9	3.2	3.6
Green	150mA	TMSB-BFGX	2.9	3.4	3.8
Amber	150mA	TMSB-BFAX	1.8	2.2	2.8
Red	150mA	TMSB-BFRX	1.8	2.2	2.8
Crimson	150mA	TMSB-BFPX	1.8	2.2	2.8

Notes:

1. V_F ±0.1V tester tolerance.

RELIABILITY ITEMS and SPECTIONS

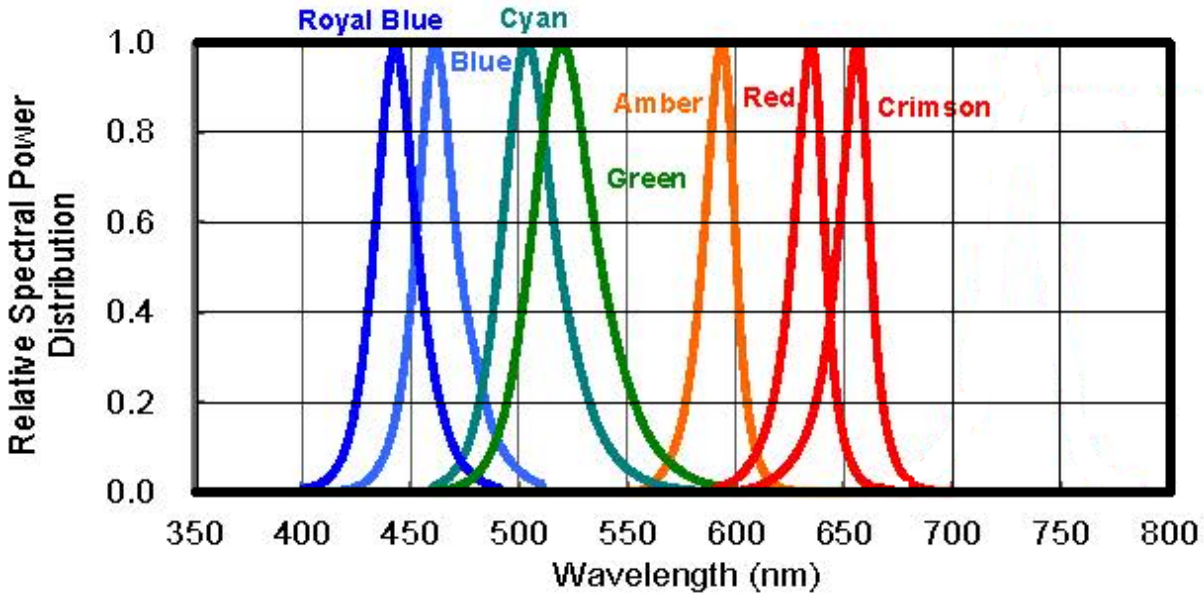
No	Test Item	Test Conditions	Remark
1	Room Temperature Operating Life	25℃	1000 hrs
2	High Temperature Storage	Temperature：110℃	1000 hrs
3	Thermal shock	-40°C to 120°C, 20 min. dwell, <20 sec. transfer	200 cycles
4	High Temperature，High Humidity Storage	85°C/85%RH	1000 hrs
5	Low Temperature Storage	- 40℃	1000 hrs
6	Solderability	Tp = 260°C for 5 sec	3 times
7	Drop test	120 cm height，fall freely onto stainless board	3 times
8	Temperature Cycle (TMCL)	-40°C to 120°C, 30 min. dwell, <5 min. transfer	200 cycles

Failure Criteria：

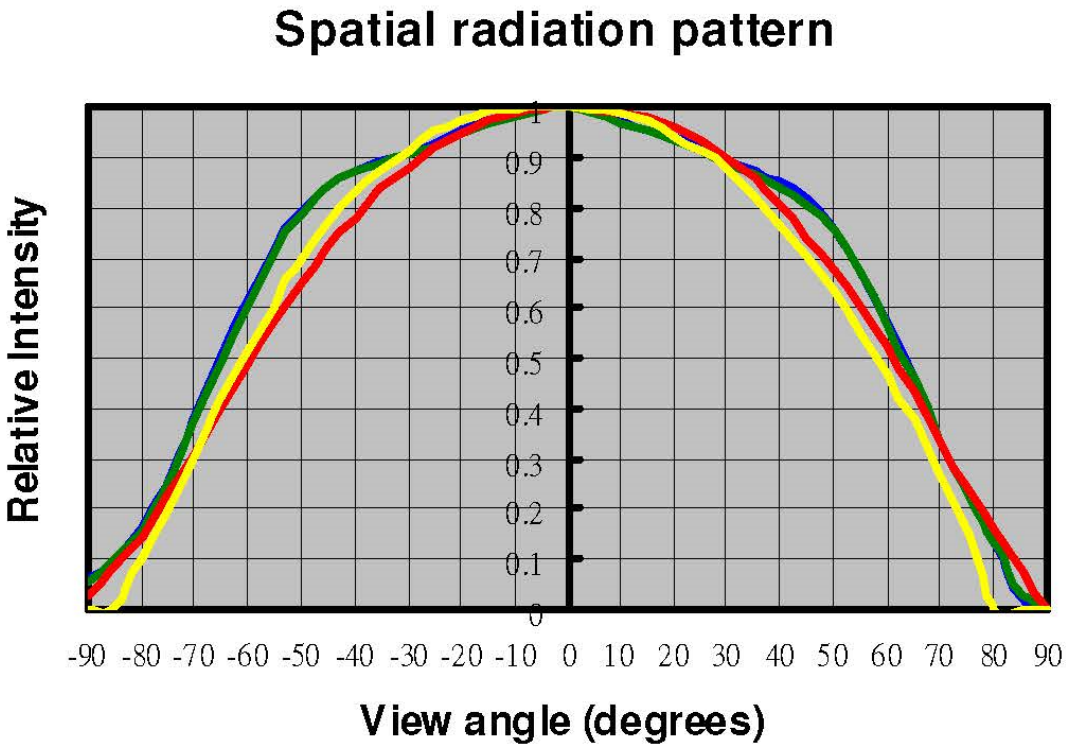
1. Forward Voltage (VF) ≧ Initial Level x 1.1
2. Luminous Flux or Radiometric Power (ΦV) ≦ Initial Level x 0.7
3. Reverse Current (IR) ≧ 10μA
4. Resistance to Soldering Heat：No deaqd lamps or visual damage.

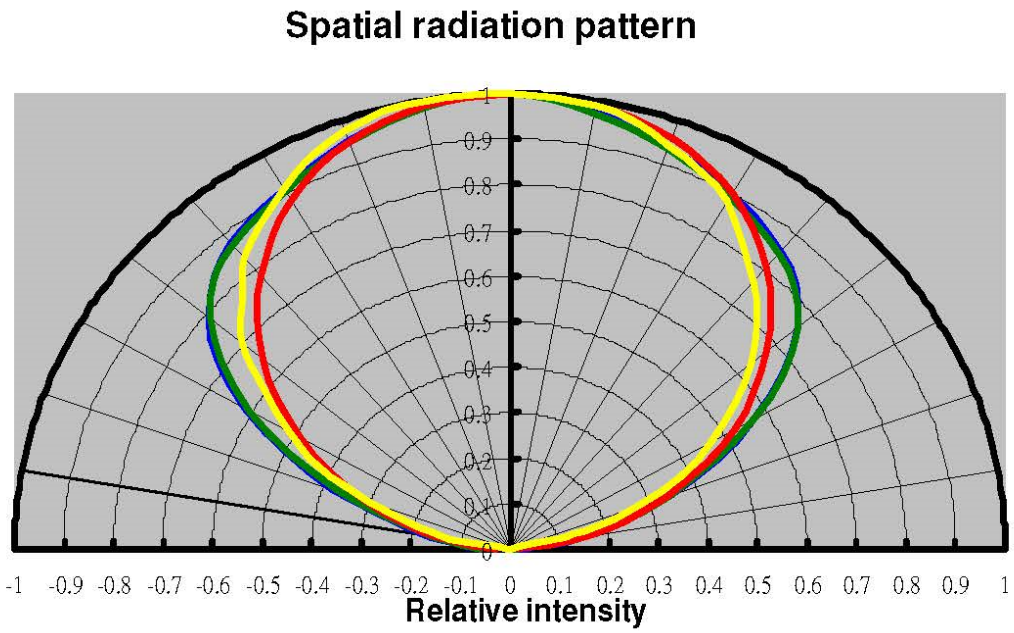
Wavelength Spectrum, Ta=25 ℃

Royal Blue、Blue、Cyan、Green、Amber、Red、Crimson

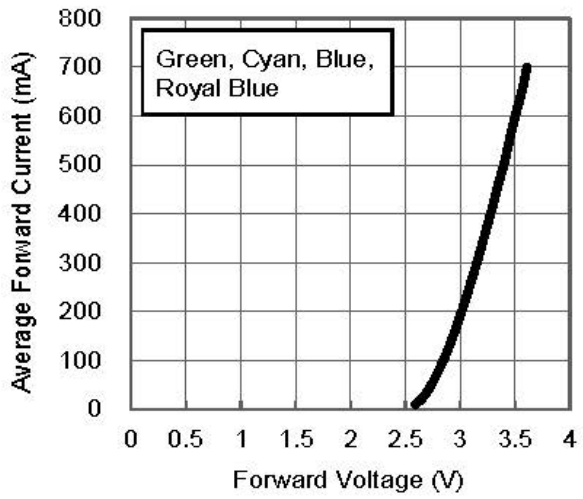


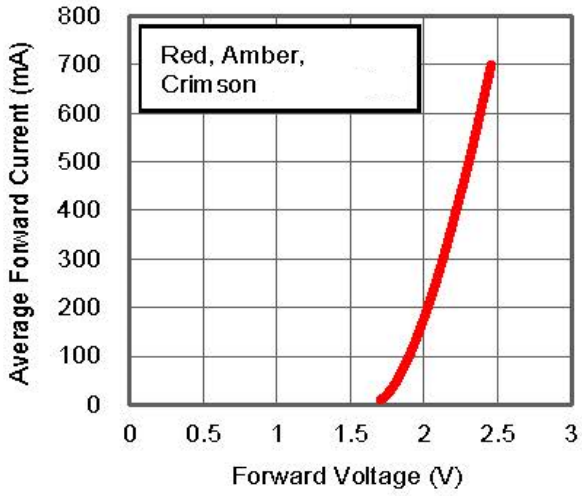
Typical Spatial Radiation Pattern



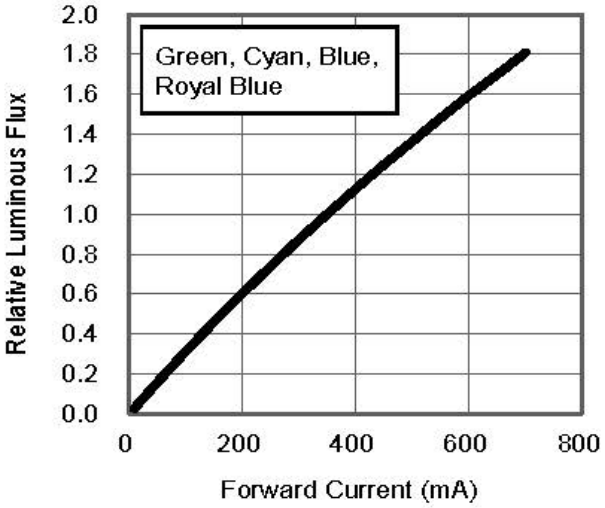


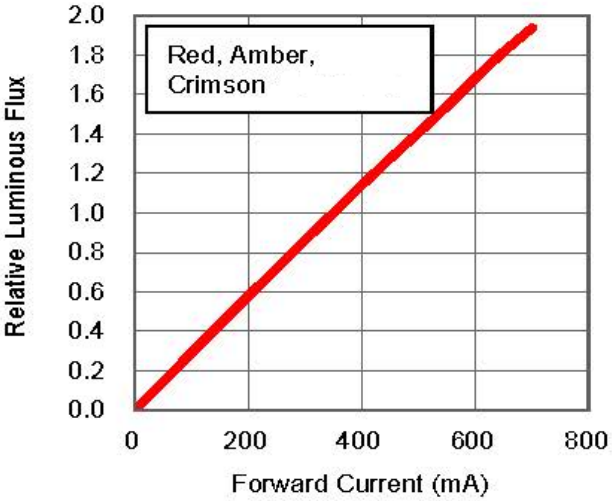
Forward current vs. Forward Voltage Characteristics



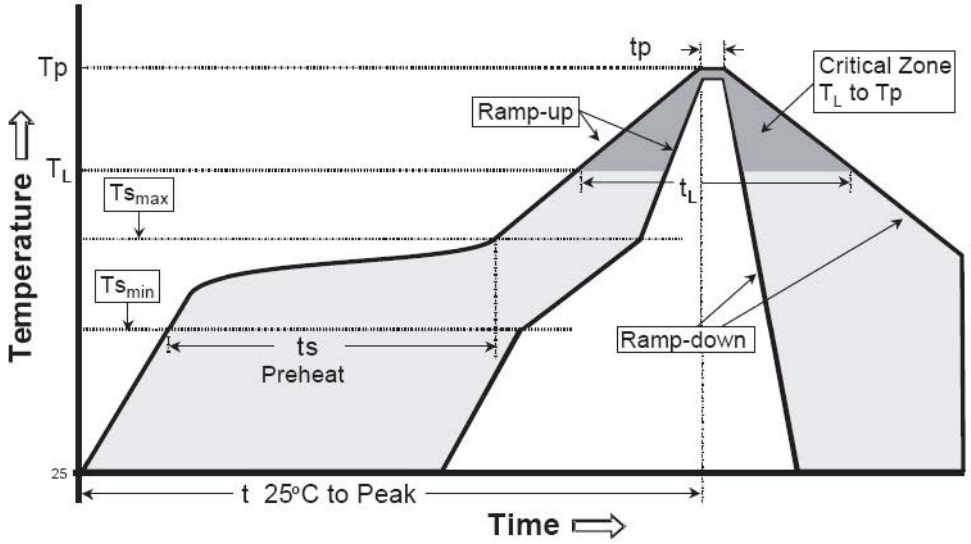


Relative intensity vs. Forward Current





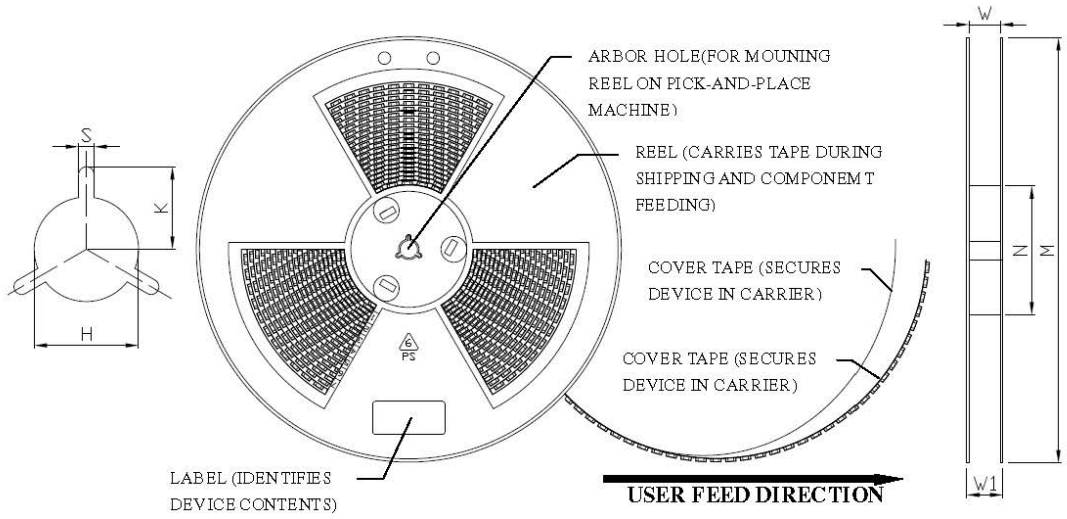
Recommended Soldering Profile



Profile Feature	Typical parameters
Average Ramp-Up Rate (Ts_{max} to Tp)	3 ℃/second max.
Preheat Temperature Min (Ts_{min})	150 ℃
Preheat Temperature Max (Ts_{max})	200 ℃
Time (Ts_{min} to Ts_{max})	60-180 seconds
Time maintained above Temperature (TL)	217 ℃
Time maintained above Time (TL)	60-150 seconds
Peak/Classification Temperature (Tp)	240 ℃
Time within 5 ℃ of Actual Peak Temperature (Tp)	5 seconds
Ramp-Down Rate	6 ℃/second max.
Time 25 ℃ to Peak Temperature	8 minutes max.

- All temperatures refer to topside of the package, measured on the package body surface.
- Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.
- Reflow soldering should not be done more than three times.
- When soldering, do not put stress on the LEDs during heating.
- After soldering, do not warp the circuit board.

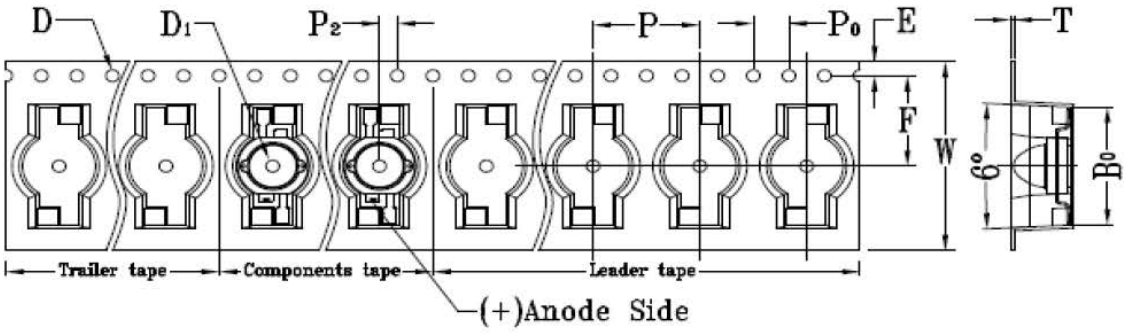
Tape and Reel Packaging Specifications



Unit：mm

M	N	W	W1	H	K	S
Φ330.0	Φ99.5	24.4	29	Φ13.5	10.75	2.5
±1.0	±1.0	±1.0	±1.0	±0.5	±0.5	±0.5

Carrier tape dimensions



Unit：mm

W	P	E	F	P_2	D	D_1	P_0	A_0	B_0	K_0	T
24.0	12.0	1.75	11.5	2.0	1.5	1.5	4.0	8.2	15.0	6.7	0.4
±0.3	±0.1	±0.1	±0.1	±0.1	±0.1	±0.25	±0.1	±0.1	±0.1	±0.1	±0.05

Notice

1. In order to avoid absorption of moisture, it is recommended that the products are stored in the dry box (or desiccators) with a desiccants. Alternatively the following environment is recommended: Storage temperature : 5°C~30°C Humidity:60% HR max.
2. If the storage conditions are of high humidity the product should be dried before use. Recommended drying conditions: 12 hours at 60°C±5°C.
3. Any mechanical force or any excess vibration should be avoid during the cooling process after soldering.
4. Reflow rapidly cooling should be avoided.
5. Components should not be mounted on distorted Printed Circuit Boards.
6. Devices should not contact with any types of fluid, such as water , oil , organic solvents…. etc.
7. The maximum ambient temperature should be taken into consideration when determining the operating current.
8. Devices should be soldered within 7 days after opening the moisture-proof packing.
9. Repack unused product in anti-moisture packing, fold to close any opening and store in a dry place.
10. The appearance and specifications of devices may be modified for improvement without notice.
11. ESD Precautions Static Electricity and surge damages LEDs. It is recommended that wrist bands or anti-electrostatic gloves be used when handing the LEDs . All devices, equipment and machinery should be properly grounded.
12. This product must be driven by constant power supplier.