Technical Data Sheet

SEOUL SEMICONDUCTOR

Specification
STW0B12BH

Rev. 01

May. 2012

www.seoulsemicon.com

SSC-QP-7-07-24 (Rev.00)

Technical Data Sheet

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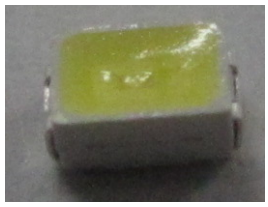
1. Description



TOP VIEW LED is designed for high current operation and high flux output applications.
Furthermore, its thermal management characteristic is better than other LED solutions by package SMD design and good thermal emission material.
According to these advantages, it enables to apply various lighting applications and design solution, automotive lighting etc.

Features

- White & Warm colored SMT package.
- Pb-free Reflow Soldering Application
- Suitable for all SMT assembly methods ; Suitable for all soldering methods
- RoHS Compliant

Applications

- Interior lighting
- General lighting
- Indoor and out door displays
- Architectural / Decorative lighting

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2. Absolute maximum ratings [1]

Parameter	Symbol	Value	Unit
Power Dissipation[*1]	P_d	111	mW
Forward Current	I_F	30	mA
Peak Forward Current	I_{FM} [2]	90	mA
Operating Temperature	T_{opr}	-40 ~ +85	℃
Storage Temperature	T_{stg}	-40 ~ +100	℃
Junction Temperature	T_j	125	℃

[1] Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.
[2] *IFM* was measured at $T_W \leq$ 1msec of pulse width and D ≤ 1/10 of duty ratio.

3. Electro-Optical characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	I_F=20mA	2.7	3.2	3.6	V
Reverse Current	I_R	V_F=5V	-	-	10	μA
Luminous Intensity[1]	I_v	I_F=20mA	2,200	-	2,800	mcd
Color Temperature	CCT	I_F=20mA	2,850	-	7,000	K
Viewing Angle [2]	$2\Theta_{1/2}$	I_F=20mA	-	115	-	deg.
Color Rendering Index*	Ra	I_F=20mA	70		-	-
Thermal resistance [3]	Rth JS	I_F =20mA	-	76	-	°C / W

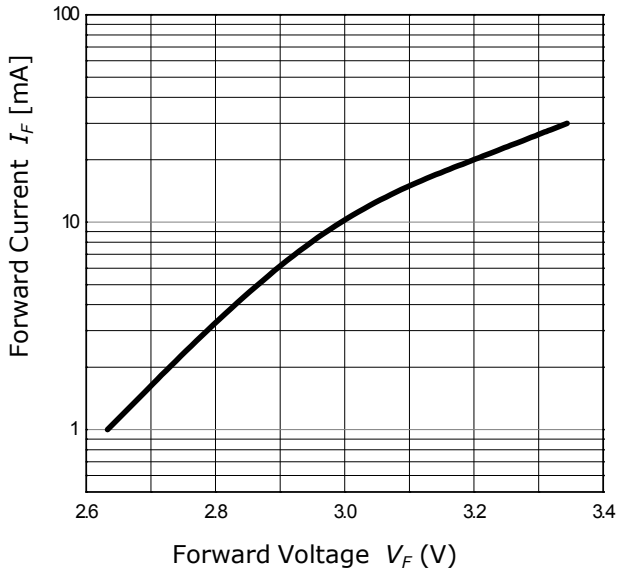
[1] The luminous intensity IV was measured at the peak of the spatial pattern which may not be aligned with the mechanical axis of the LED package.
[2] $2\Theta_{1/2}$ is the off-axis where the luminous intensity is 1/2 of the peak intensity.
[3] Thermal resistance: R_{th}JS (Junction / solder)

* Tolerance : V_F :±0.05V, I_V :±10%, ΦV:±10%, Ra :±3, x,y :±0.01

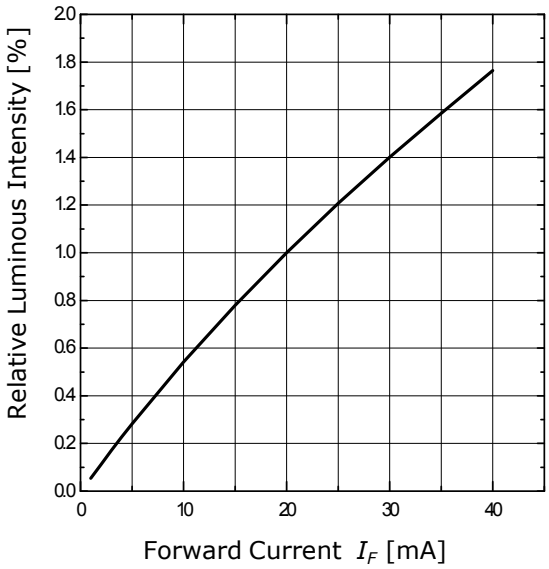
[Note] All measurements were made under the standardized environment of SSC.

4. Characteristic Graph

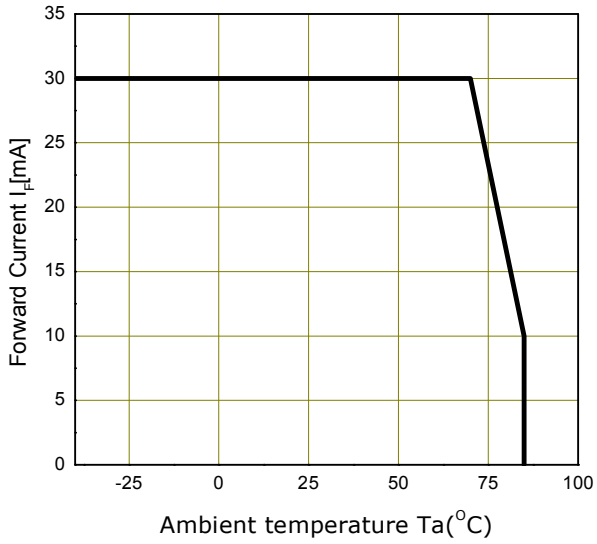
Forward Current vs.
Forward Voltage



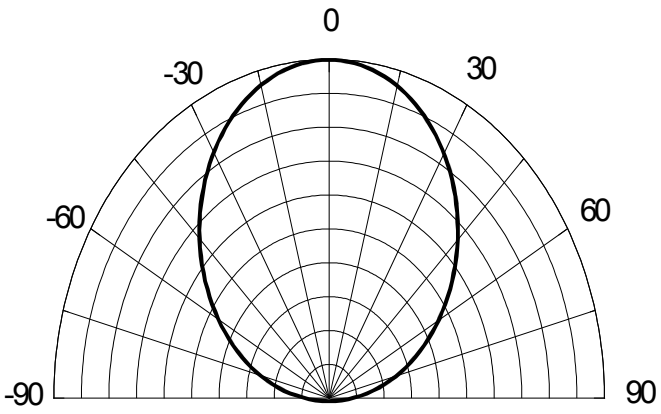
Relative Luminous Intensity vs.
Forward Current



Forward Current vs.
Ambient Temperature

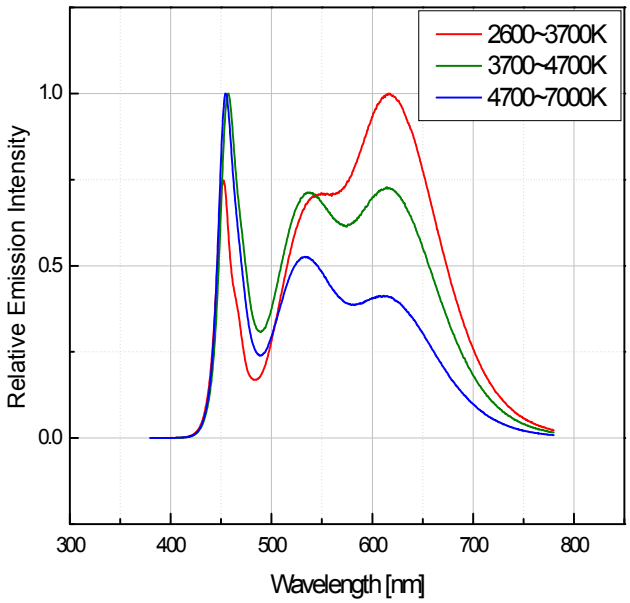


Radiation Diagram



4. Characteristic Graph

Spectrum



5. Reliability Test

(1) TEST ITEMS AND RESULTS

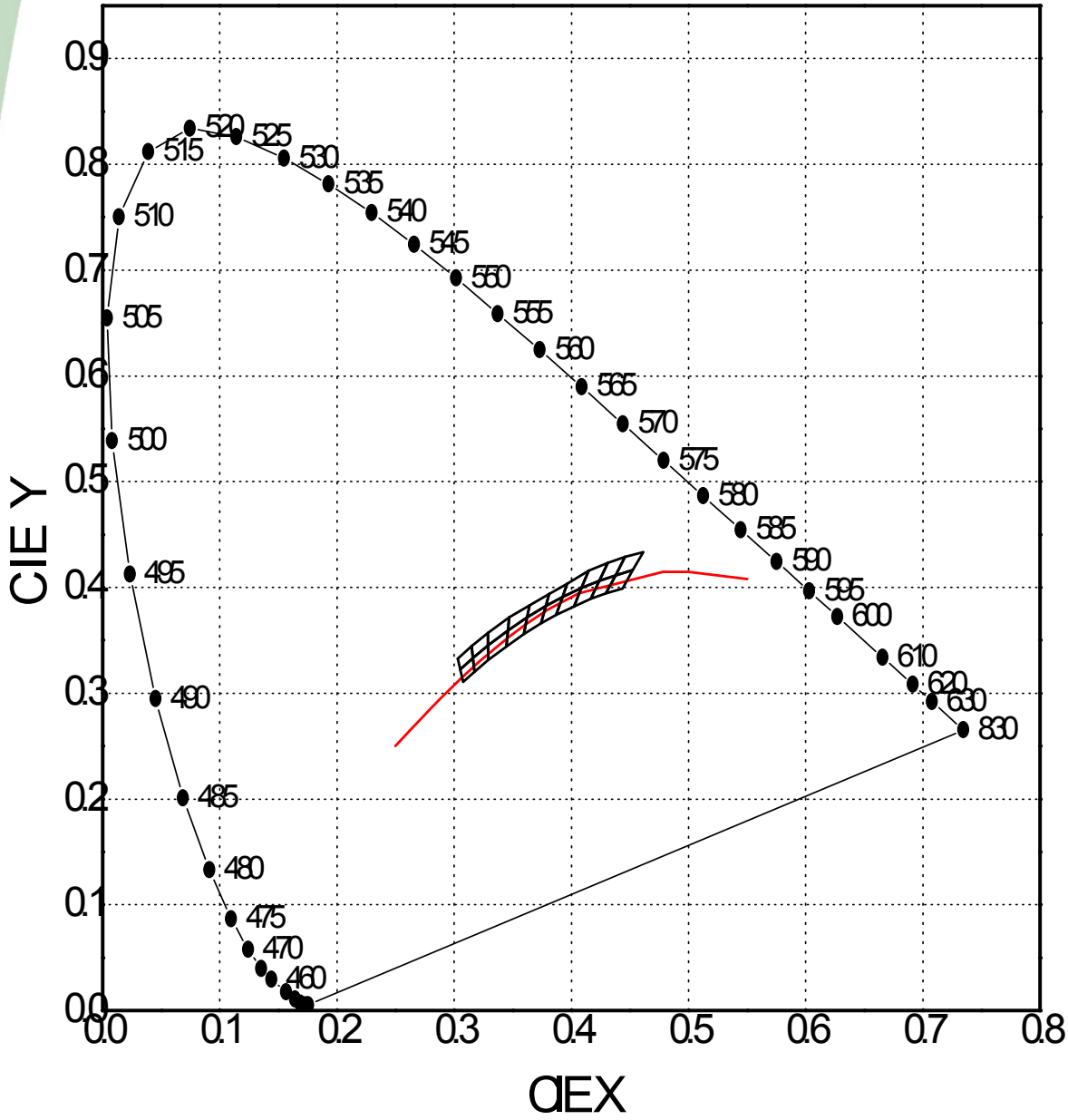
Item	Reference	Test Conditions	Duration / Cycle	Number of Damaged
Thermal Shock	EIAJ ED-4701	T_a =-40°C(30min) ~ 100°C(30min)	100 Cycle	0/22
High Temperature Storage	EIAJ ED-4701	T_a =100°C	1000 Hours	0/22
High Temp. High Humidity Storage	EIAJ ED-4701	T_a =60°C, RH=90%	1000 Hours	0/22
Low Temperature Storage	EIAJ ED-4701	T_a =-40°C	1000 Hours	0/22
Operating Endurance Test	Internal Reference	T_a =25°C, I_F =20mA	1000 Hours	0/22
High Temperature High Humidity Life Test	Internal Reference	T_a =60°C, RH=90%, I_F =20mA	500 Hours	0/22
High Temperature Life Test	Internal Reference	T_a =85°C, I_F =20mA	500 Hours	0/22
Low Temperature Life Test	Internal Reference	T_a =-40°C, I_F =20mA	1000 Hours	0/22

(2) Criteria for Judging the Damage

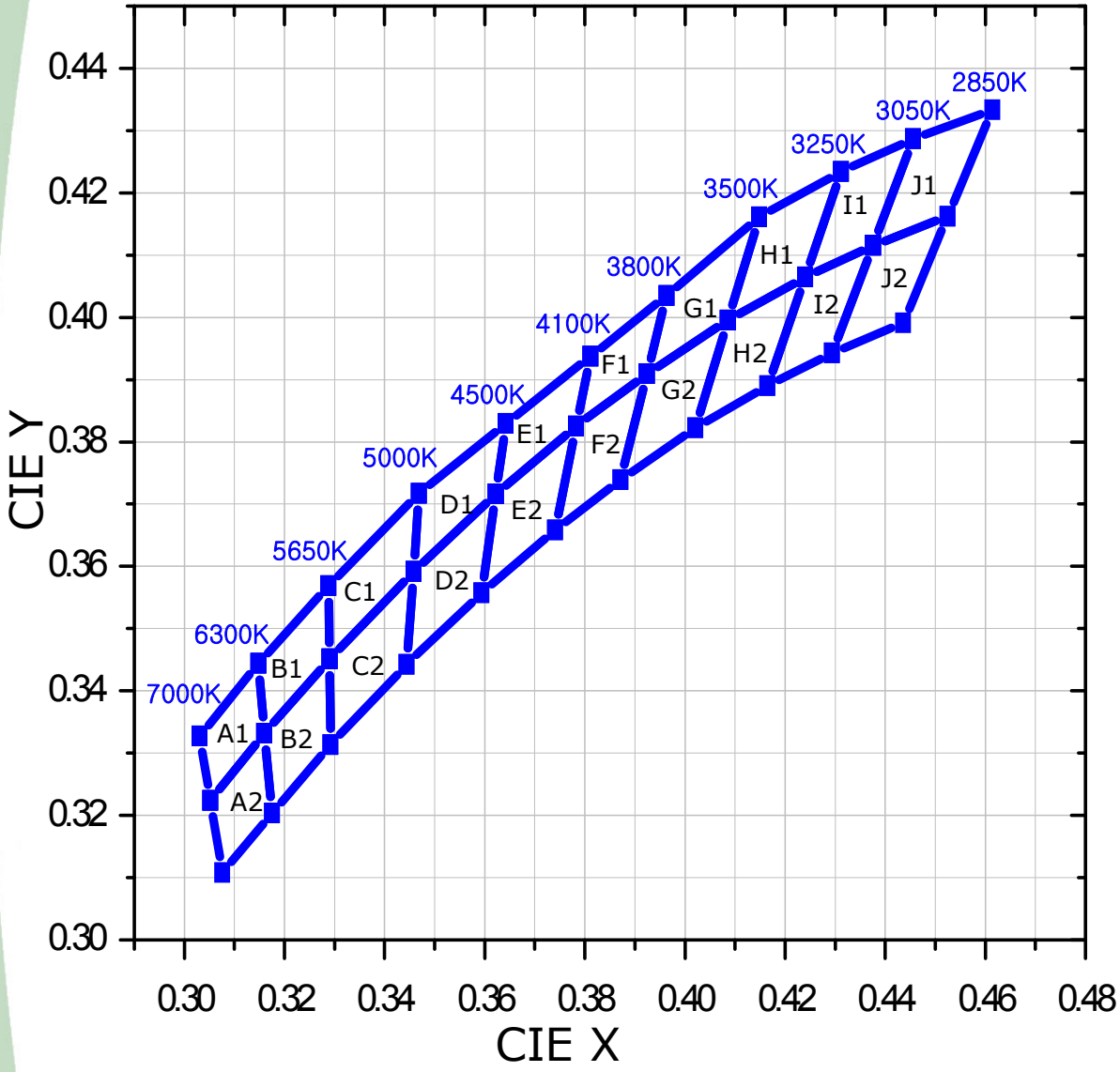
Item	Symbol	Condition	Criteria for Judgment	
			MIN	MAX
Forward Voltage	V_F	I_F =20mA	-	USL*1 × 1.2
Luminous Intensity	I_V	I_F =20mA	LSL*2 × 0.5	-

Note : *1 USL : Upper Standard Level *2 LSL : Lower Standard Level
** These test items are jugged by the criteria of Luminous Intensity Condition 2.

6. Color & Binning



6. Color & Binning



6. Color & Binning

● COLOR RANK

<IF=20mA, Ta=25℃>

7000~6300K				6300~5650K			
A1		A2		B1		B2	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3031	0.3327	0.3052	0.3224	0.3148	0.3444	0.316	0.3332
0.3148	0.3444	0.316	0.3332	0.3288	0.3569	0.329	0.3451
0.316	0.3332	0.3175	0.3204	0.329	0.3451	0.3292	0.3313
0.3052	0.3224	0.3076	0.3108	0.316	0.3332	0.3175	0.3204
5650~5000K				**5000~4500K**			
C1		C2		D1		D2	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3288	0.3569	0.329	0.3451	0.3469	0.3717	0.3458	0.3592
0.3469	0.3717	0.3458	0.3592	0.3642	0.3829	0.3622	0.3716
0.3458	0.3592	0.3444	0.3442	0.3622	0.3716	0.3594	0.3557
0.329	0.3451	0.3292	0.3313	0.3458	0.3592	0.3444	0.3442
4500~4100K				**4100~3800K**			
E1		E2		F1		F2	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3642	0.3829	0.3622	0.3716	0.3811	0.3937	0.3783	0.3825
0.3811	0.3937	0.3783	0.3825	0.3963	0.4035	0.3924	0.3909
0.3783	0.3825	0.3741	0.3658	0.3924	0.3909	0.3871	0.3739
0.3622	0.3716	0.3594	0.3557	0.3783	0.3825	0.3741	0.3658
3800~3500K				**3500~3250K**			
G1		G2		H1		H2	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3963	0.4035	0.3924	0.3909	0.4148	0.4161	0.4086	0.3995
0.4148	0.4161	0.4086	0.3995	0.4312	0.4234	0.424	0.4065
0.4086	0.3995	0.4021	0.3822	0.424	0.4065	0.4165	0.389
0.3924	0.3909	0.3871	0.3739	0.4086	0.3995	0.4021	0.3822
3250~3050K				**3050~2850K**			
I1		I2		J1		J2	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4312	0.4234	0.424	0.4065	0.4456	0.4287	0.4376	0.4116
0.4456	0.4287	0.4376	0.4116	0.4614	0.4333	0.4525	0.4162
0.4376	0.4116	0.4294	0.3943	0.4525	0.4162	0.4436	0.3991
0.424	0.4065	0.4165	0.389	0.4376	0.4116	0.4294	0.3943

7. Bin Code Description

Bin Code		
Luminous Intensity	CIE	Forward Voltage
A4	A1	Z1

Luminous Intensity (mcd) @ I_F = 20mA		
Bin Code	Min.	Max.
A5	2,200	2,400
A6	2,400	2,600
A7	2,600	2,800

Color Rank @ I_F = 20mA
A1 ~ J2

Average for Total Forward Voltage [V] @ I_F = 20mA		
RANK	Min.	Max.
X1	2.7	2.8
X2	2.8	2.9
Y	2.9	3.0
Z1	3.0	3.1
Z2	3.1	3.2
Z3	3.2	3.3
A1	3.3	3.4
A2	3.4	3.5
A3	3.5	3.6

[Note] All measurements were made under the standardized environment of SSC.
In order to ensure availability, single color rank will not be orderable.

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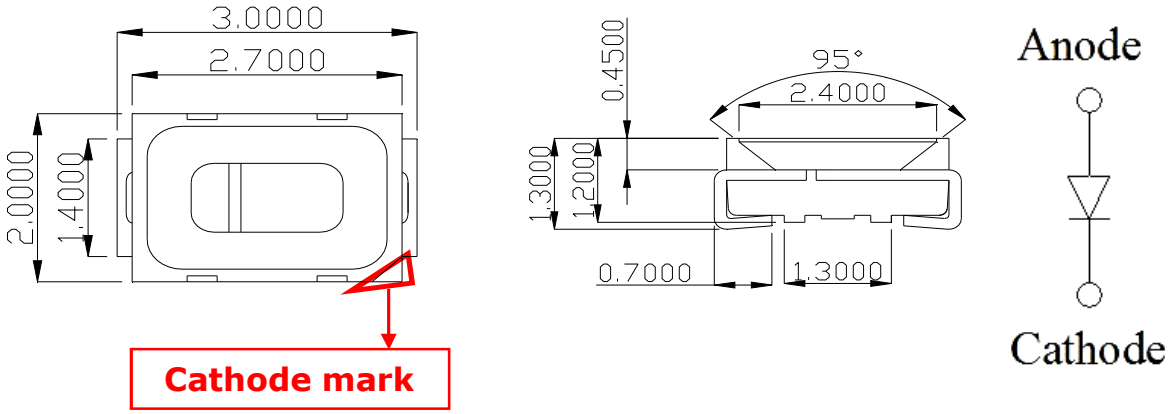
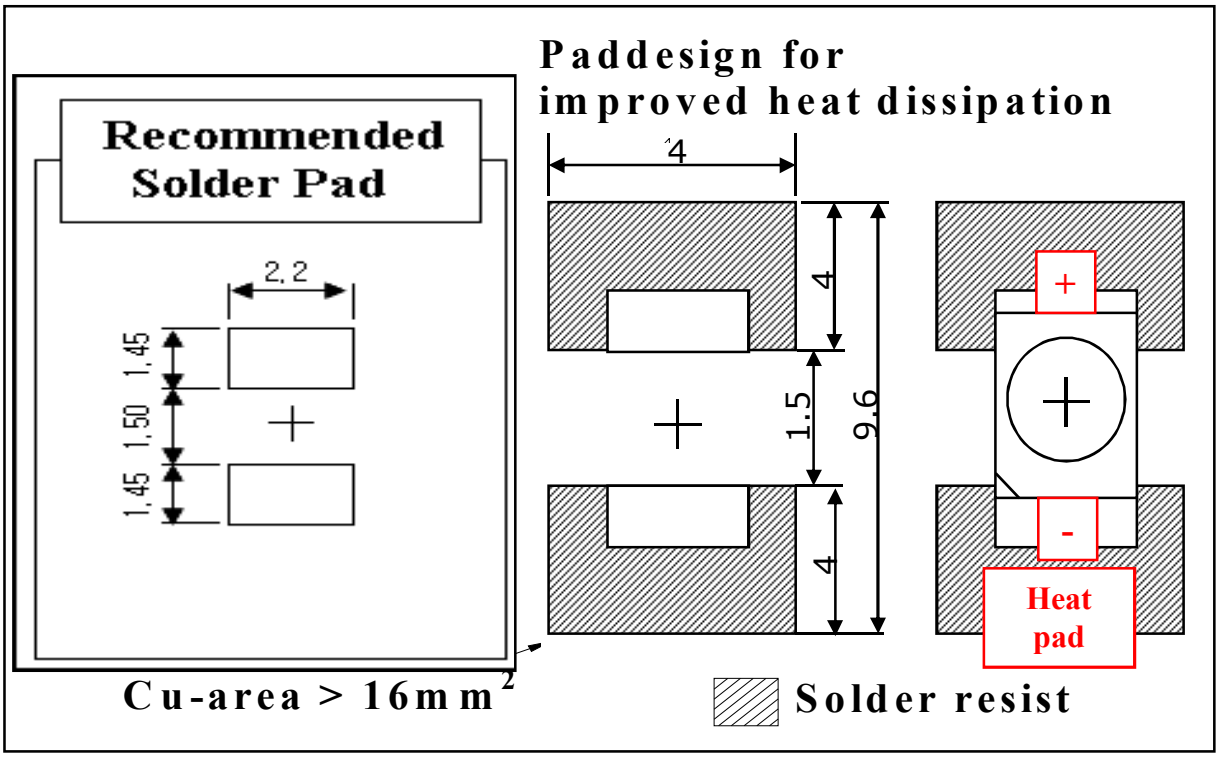
8. Outline Dimension

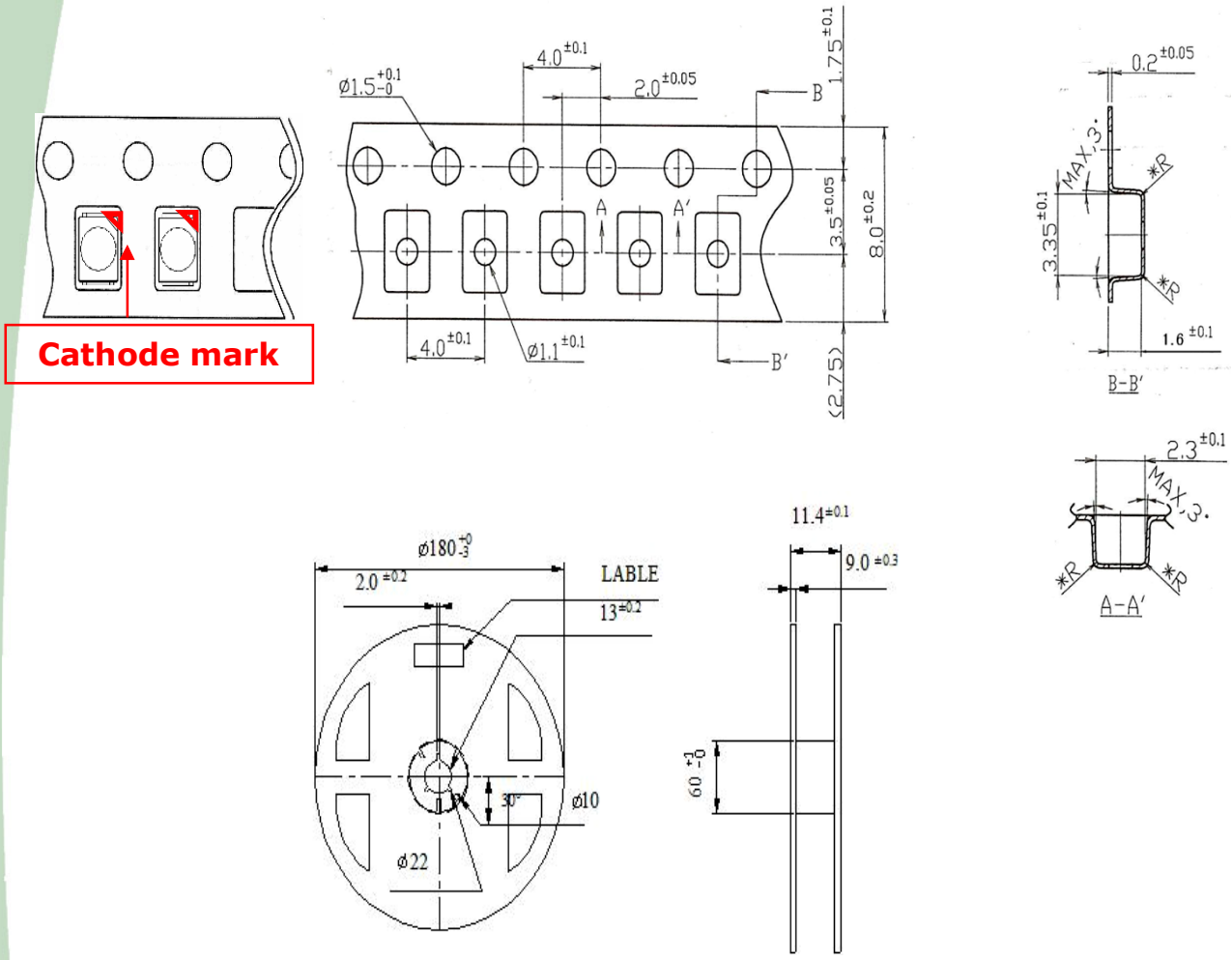




9. Material

item	Chip	Package	Encapsulate	Electrodes
Material	InGaN/ Sapphire	Heat-Resistant Polymer	Silicone Resin + Phosphor	Ag Plating Copper Alloy

10. Packing

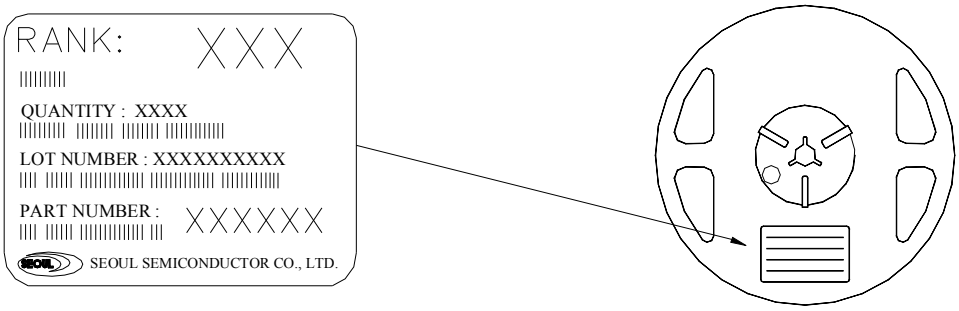


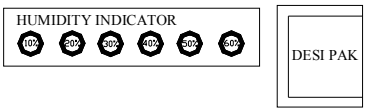
(Tolerance: ±0.2, Unit: mm)

(1) Quantity : 2500pcs/Reel
(2) Cumulative Tolerance : Cumulative Tolerance/10 pitches to be ±0.2mm
(3) 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
(4) Package : P/N, Manufacturing data Code No. and quantity to be indicated on a damp proof Package

SEOUL SEMICONDUCTOR

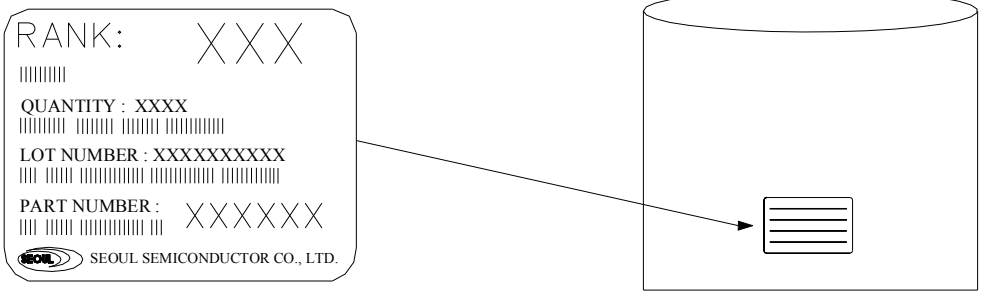
Reel





DESI PAK

Aluminum Vinyl Bag

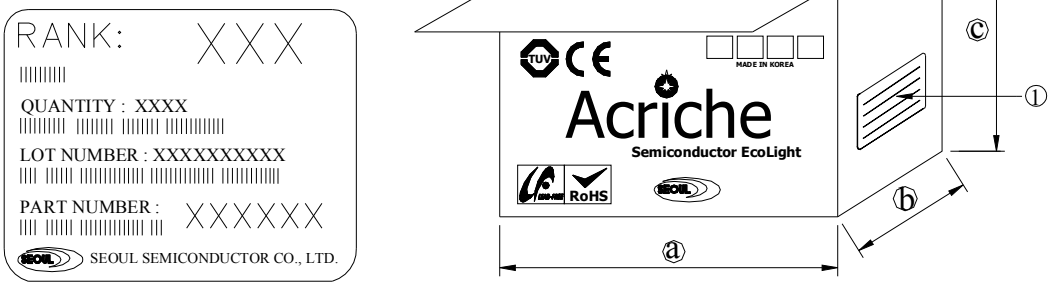


Outer Box Structure

Material : Paper(SW3B(B))

TYPE	SIZE (mm)		
	ⓐ	ⓑ	ⓒ
7inch	245	220	102
	245	220	142

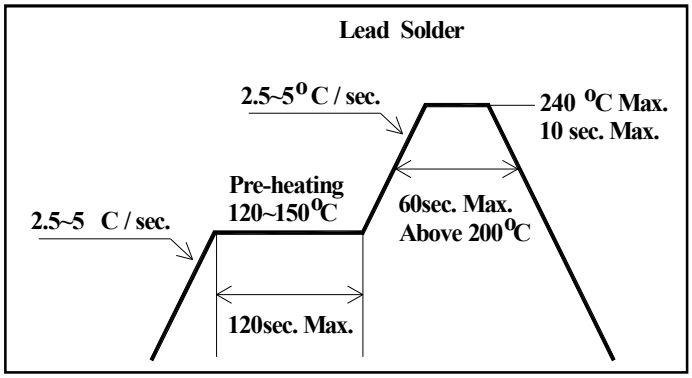
① SIDE



11. Soldering

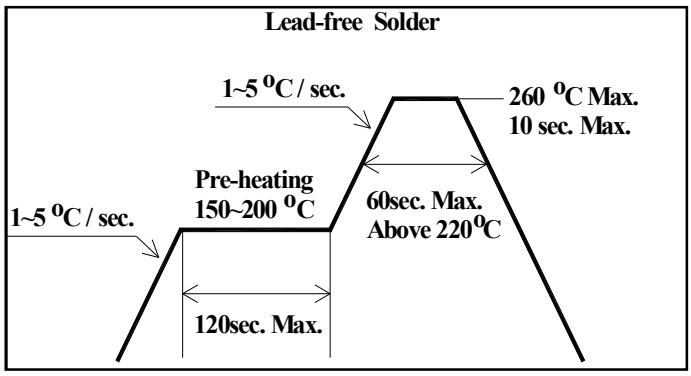
(1) Lead Solder

Lead Solder	
Pre-heat	120~150℃
Pre-heat time	120 sec. Max.
Peak-Temperature	240℃ Max.
Soldering time Condition	10 sec. Max.



(2) Lead-Free Solder

Lead Free Solder	
Pre-heat	150~200℃
Pre-heat time	120 sec. Max.
Peak-Temperature	260℃ Max.
Soldering time Condition	10 sec. Max.



(3) Hand Soldering conditions
Do not exceed 4 seconds at maximum 315ºC under soldering iron.

(4) The encapsulated material of the LEDs is silicone.
Precautions should be taken to avoid the strong pressure on the encapsulated part.
So when using the chip mounter, the picking up nozzle that does not affect the silicone resign should be used.

(5) It is recommended that the customer use the nitrogen reflow method.

(6) Repairing should not be done after the LEDs have been soldered.

(7) Reflow soldering should not be done more than two times.
In the case of more than 24 hours passed soldering after first, LEDs will be damaged.

12. Precaution for use

(1) Storage

In order to avoid the absorption of moisture, it is recommended to store in a dry box (or a desicator) with a desiccant. Otherwise, to store them in the following environment is recommended.
Temperature : 5ºC ~30ºC Humidity : maximum 70%RH

(2) Attention after open.

LED is correspond to SMD, when LED be soldered dip, interfacial separation may affect the light transmission efficiency, causing the light intensity to drop.
Attention in followed; Keeping of a fraction
Temperature : 5 ~ 40ºC Humidity : less than 30%

(3) In the case of more than 4 week passed after opening or change color of indicator on desiccant, components shall be dried 10-12hr. at 60±5ºC.

(4) Silver plating might be tarnished in the environment that contains corrosive gases and materials. Also any product that has tarnished lead might be decreased the solder-ability and optical-electrical properties compare to normal ones.
Please do not expose the product in the corrosive environment during the storage.

(5) Any mechanical force or any excess vibration shall not be accepted to apply during cooling process to normal temperature after soldering.

(6) Quick cooling shall be avoided.

(7) Components shall not be mounted on warped direction of PCB.

(8) Anti radioactive ray design is not considered for the products.

(9) This device should not be used in any type of fluid such as water, oil, organic solvent etc. When washing is required, IPA should be used.

(10) When the LEDs are illuminating, operating current should be decided after considering the ambient maximum temperature.

(11) The LEDs must be soldered within seven days after opening the moisture-proof packing.

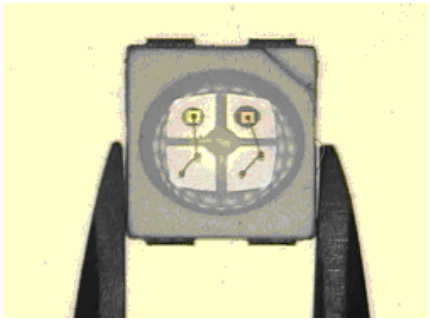
(12) Repack unused products with anti-moisture packing, fold to close any opening and then store in a dry place.

(13) The appearance and specifications of the product may be modified for improvement without notice.

13. Handling of Silicone Resin LEDs

(1) During processing, mechanical stress on the surface should be minimized as much as possible. Sharp objects of all types should not be used to pierce the sealing compound.

(2) In general, LEDs should only be handled from the side. By the way, this also applies to LEDs without a silicone sealant, since the surface can also become scratched.



(3) When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevented.
This is assured by choosing a pick and place nozzle which is larger than the LED's reflector area.

(4) Silicone differs from materials conventionally used for the manufacturing of LEDs. These conditions must be considered during the handling of such devices. Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust.
As mentioned previously, the increased sensitivity to dust requires 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.

(5) SSC 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.