

*Customer:

SPECIFICATION

Preliminary

ITEM	Top View LED
MODEL	SSC-SFT821N-BS

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1. Features

- Pb-free Reflow Soldering application
- RoHS Compliant
- Package : white 4-Lead package (upper surface color : black)
- Suitable for all SMT assembly methods
- ESD-withstand voltage : up to 2 kV (MIL-STD-883D)
- Encapsulating Resin : soft silicone resin and diffused (Milky color)
- High Reliability (silicone resin)

2. Application

- LDM
- Indoor and outdoor displays
- LCD Backlights etc.
- R G B – displays
- Automotive
- Signage and Channel letter
- Indicator

3. Absolute Maximum Ratings ^{*1}

($T_a=25^{\circ}\text{C}$)

Parameter	Symbol	Value			Unit
		Red	Green	Blue	
Forward Current	I_F	30	30	30	mA
Forward Peak Surge Current ^{*2}	I_{FM}	100	100	100	mA
Reverse Voltage (per die)	V_R	5			V
Power Dissipation	P_d	81 ^{*3}	120 ^{*3}	114 ^{*3}	mW
		263 ^{*4}			
Operating Temperature	T_{opr}	-40 ~ +100			°C
Storage Temperature	T_{stg}	-40 ~ +100			°C

*1 Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.

*2 I_{FM} was measured at T_w 1msec of pulse width and D 1/10 of duty ratio.

*3 The value for one LED device.(Single color)

*4 The value for total power dissipation when two and more devices are lit simultaneously.

4. Electro-Optical Characteristics

($T_a=25^{\circ}\text{C}$)

Parameter		Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	Red	V_F	$I_F=20\text{mA}$	1.8	2.1	2.3	V
	Green		$I_F=20\text{mA}$	3.0	3.2	3.5-	
	Blue		$I_F=20\text{mA}$	3.0	3.2	3.5-	
Reverse Current	Red	I_R	$V_R=10\text{V}$ (per die)	-	-	1	μA
	Green			-	-	1	
	Blue			-	-	1	
Luminance Intensity ^{*1}	Red	I_V	$I_F=20\text{mA}$ (per chip)	-	700	1100	mcd
	Green			-	1200	1600	
	Blue			-	400	560	
Peak Wavelength	Red	λ_p	$I_F=20\text{mA}$	-	632	-	nm
	Green		$I_F=20\text{mA}$	-	518	-	
	Blue		$I_F=20\text{mA}$	-	453	-	
Dominant Wavelength	Red	λ_d	$I_F=20\text{mA}$	620	623	625	nm
	Green		$I_F=20\text{mA}$	520	527	535	
	Blue		$I_F=20\text{mA}$	455	460	465	
Spectral Bandwidth	Red	$\Delta\lambda$	$I_F=20\text{mA}$	-	14	-	nm
	Green		$I_F=20\text{mA}$	-	33	-	
	Blue		$I_F=20\text{mA}$	-	23	-	
Viewing Angle ^{*3}	R, G, B	$2\theta_{1/2}$	$I_F=20\text{mA}$ (per die)	-	120	-	deg.

*1 The luminous intensity I_V was measured at the peak of the spatial pattern which may not be aligned with the mechanical axis of the LED package.
Luminous Intensity Measurement allowance is $\pm 10\%$

*2 Please refer to CIE 1931 chromaticity diagram

*3 $2\theta_{1/2}$ is the off-axis where the luminous intensity is 1/2 of the peak intensity.

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

5. Rank of SFT821N-BS

1) Rank Name

X ₁	X ₂	X ₃	X ₄
Total Iv	Green Color	Blue Color	White Color

2) Test Condition

Parameter	Symbol	Value			Unit
		R	G	B	
Forward Current	I _f	20	20	20	mA
Reverse Voltage	V _r	10	10	10	V

3) Luminous Intensity [Iv]

R		G		B		Rank Name	Total Iv		Unit
MIN	MAX	MIN	MAX	MIN	MAX		MIN	MAX	
460	1100	800	1600	200	560	N	1460	1900	mcd
						O	1900	2500	
						P	2500	2880	

4) Forward Voltage [V_f]

R		G		B		Unit
MIN	MAX	MIN	MAX	MIN	MAX	
1.8	2.3	3.0	3.5	3.0	3.5	V

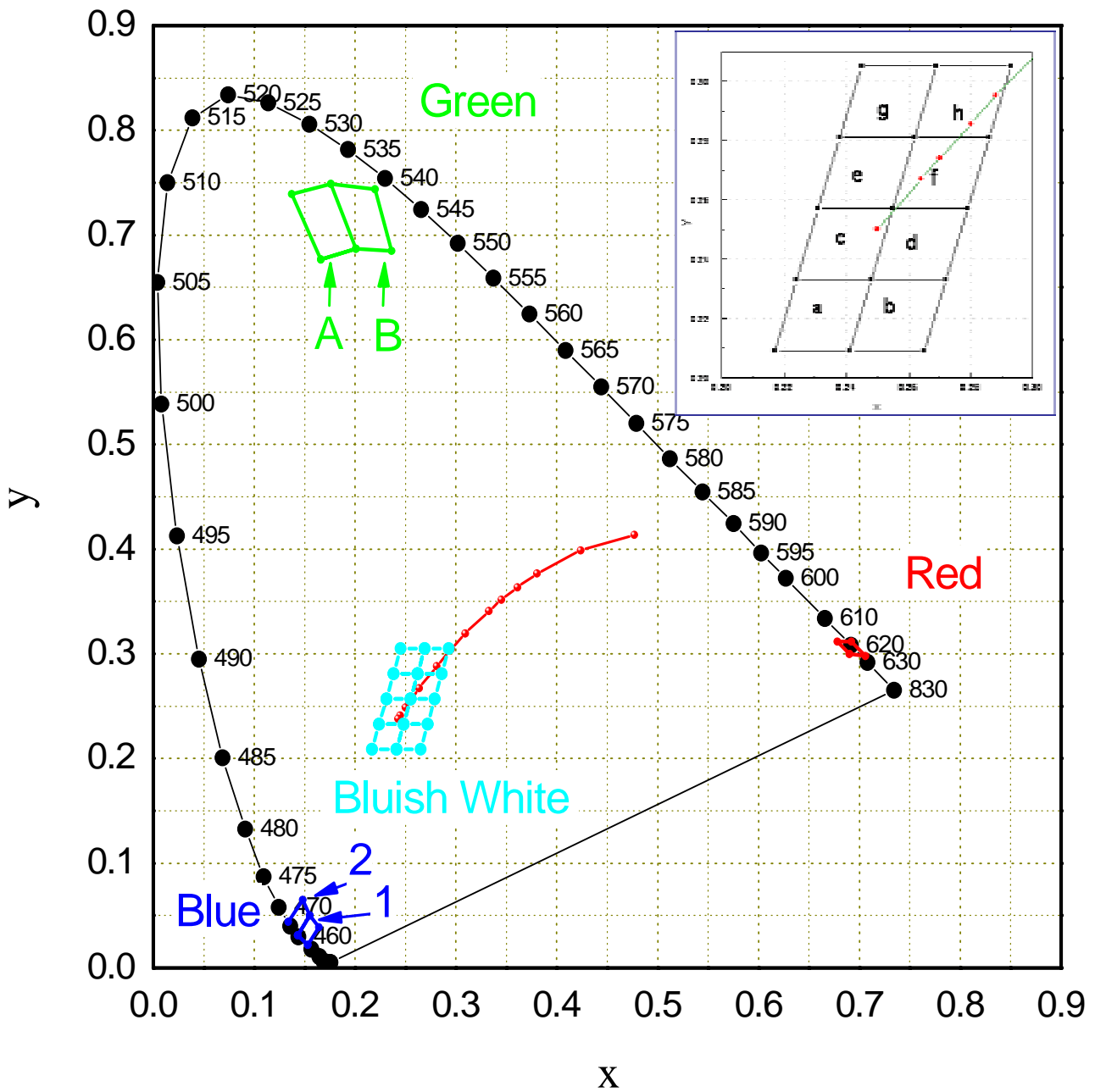
5) Reverse Current [I_r]

R		G		B		Unit
MIN	MAX	MIN	MAX	MIN	MAX	
-	1	-	1	-	1	uA

6. Rank of Color

1) RGB Balance

Red		Green : A		Green : B		Blue : 1		Blue : 2	
x	y	x	y	x	y	x	y	x	y
0.690	0.300	0.166	0.677	0.201	0.687	0.153	0.022	0.143	0.031
0.706	0.298	0.201	0.687	0.236	0.685	0.164	0.039	0.155	0.050
0.692	0.312	0.176	0.749	0.220	0.744	0.155	0.050	0.148	0.065
0.678	0.312	0.137	0.739	0.176	0.749	0.143	0.031	0.134	0.044



2) White Balance

◆ Target of Color : Bluish White (Cool White)

- Color Coordinates (typ.): x 0.255 , y 0.257

- I_p Condition = 12mA for Red / 20mA for Green / 12mA for Blue

- 1 Bin, Cell Size = x 0.025 , y 0.031

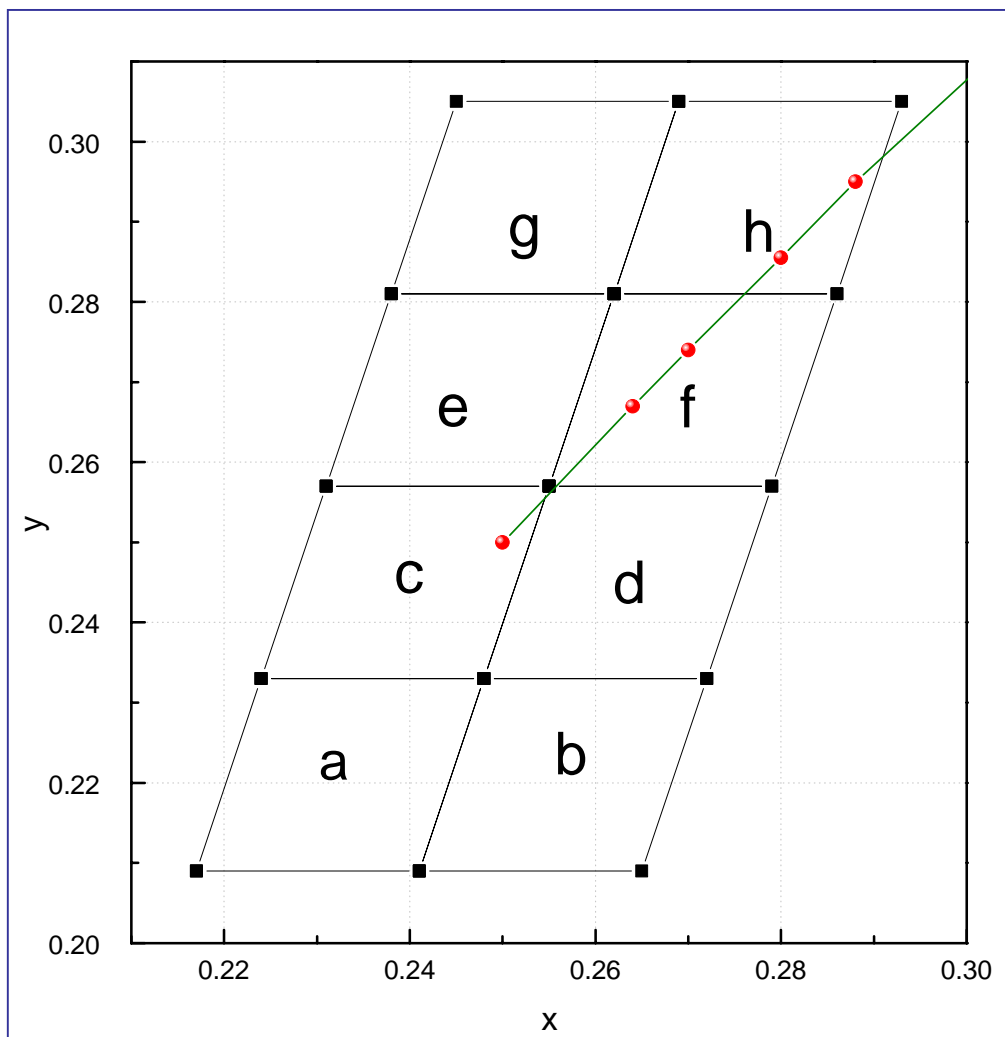
- 9 Bin, Total Cell Size = x 0.052 , y 0.112

- Color Rank : a, b, c, d, e, f, g, h (8 BIN)

a		b		c		d		e	
x	y	x	y	x	y	x	y	x	y
0.217	0.209	0.241	0.209	0.224	0.233	0.248	0.233	0.231	0.257
0.241	0.209	0.265	0.209	0.248	0.233	0.272	0.233	0.255	0.257
0.248	0.233	0.272	0.233	0.255	0.257	0.279	0.257	0.262	0.281
0.224	0.233	0.248	0.233	0.231	0.257	0.255	0.257	0.238	0.281

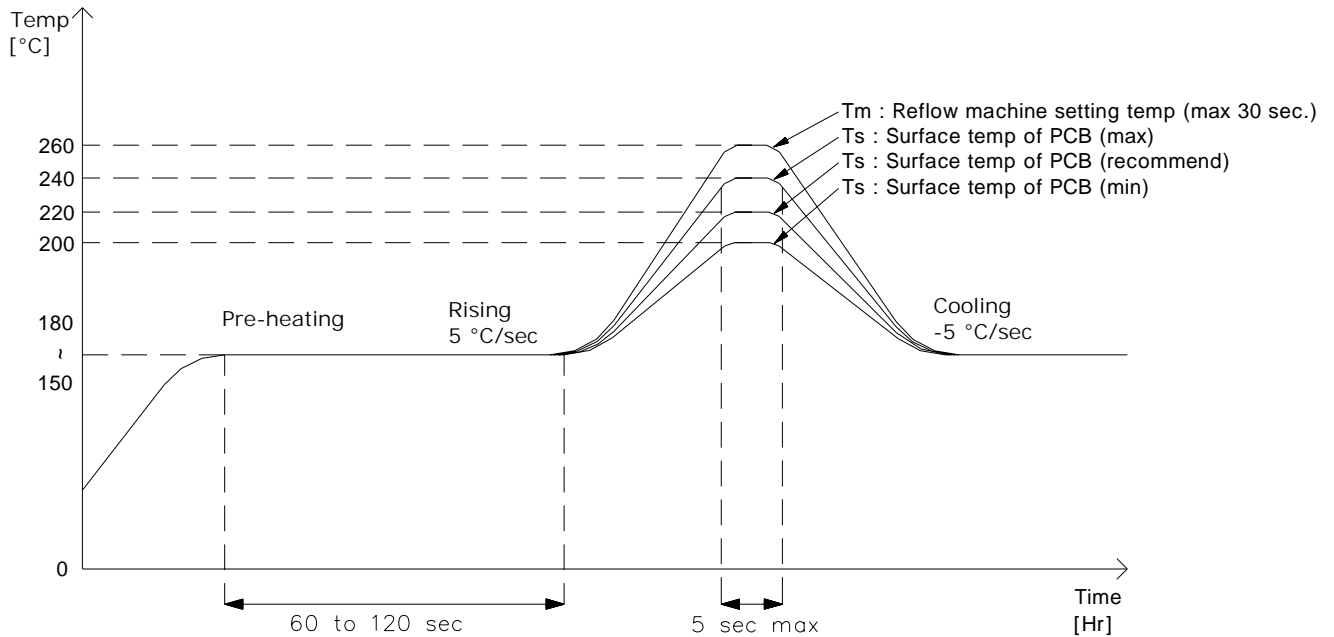
f		g		h	
x	y	x	y	x	y
0.255	0.257	0.238	0.281	0.262	0.281
0.279	0.257	0.262	0.281	0.286	0.281
0.286	0.281	0.269	0.305	0.293	0.305
0.262	0.281	0.245	0.305	0.269	0.305

● Measurement Uncertainty of the Color Coordinates : ± 0.01



7. Soldering Profile

(1) Reflow Soldering Conditions / Profile (Lead Free Solder)



(2) Hand Soldering conditions

Do not exceed 4 seconds at maximum 315°C under soldering iron.

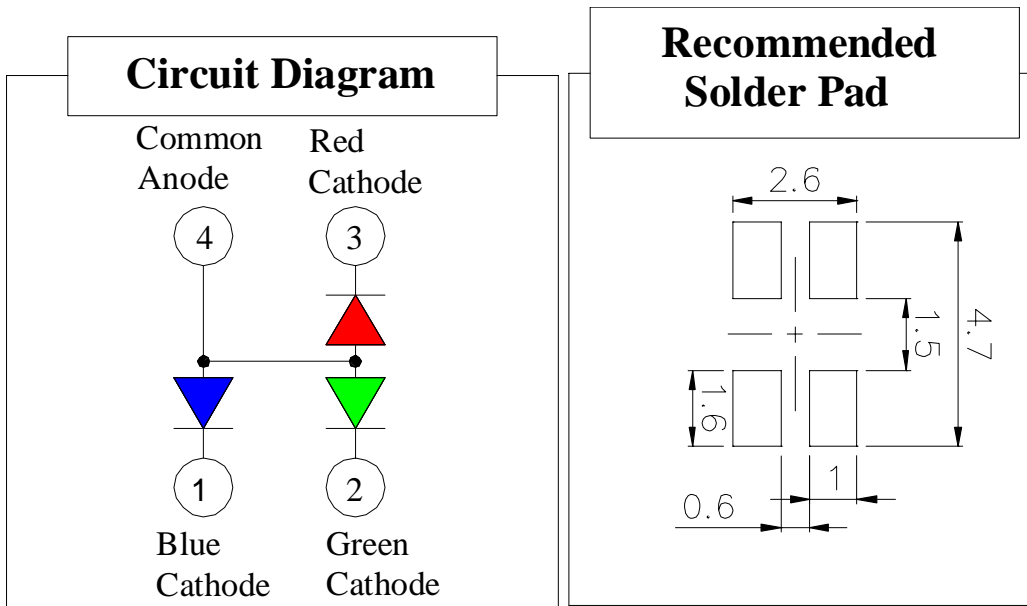
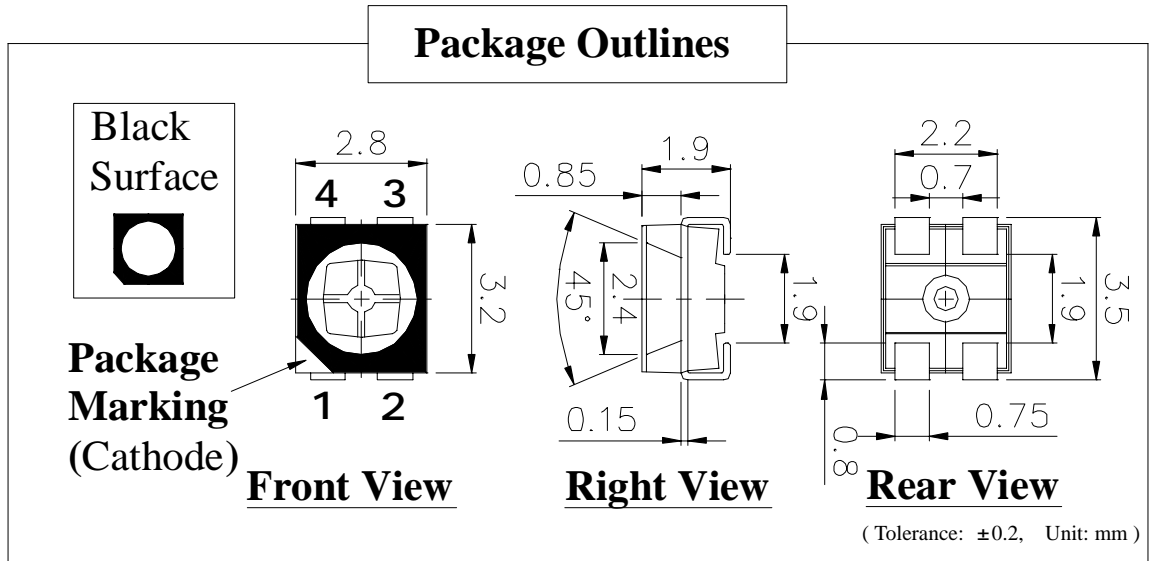
(3) The encapsulated material of the LEDs is silicone.

Precautions should be taken to avoid the strong pressure on the encapsulated part.

So when using the chip moulder, the picking up nozzle that does not affect the silicone resin should be used.

Note : In case that the soldered products are reused in soldering process, we don't guarantee the products.

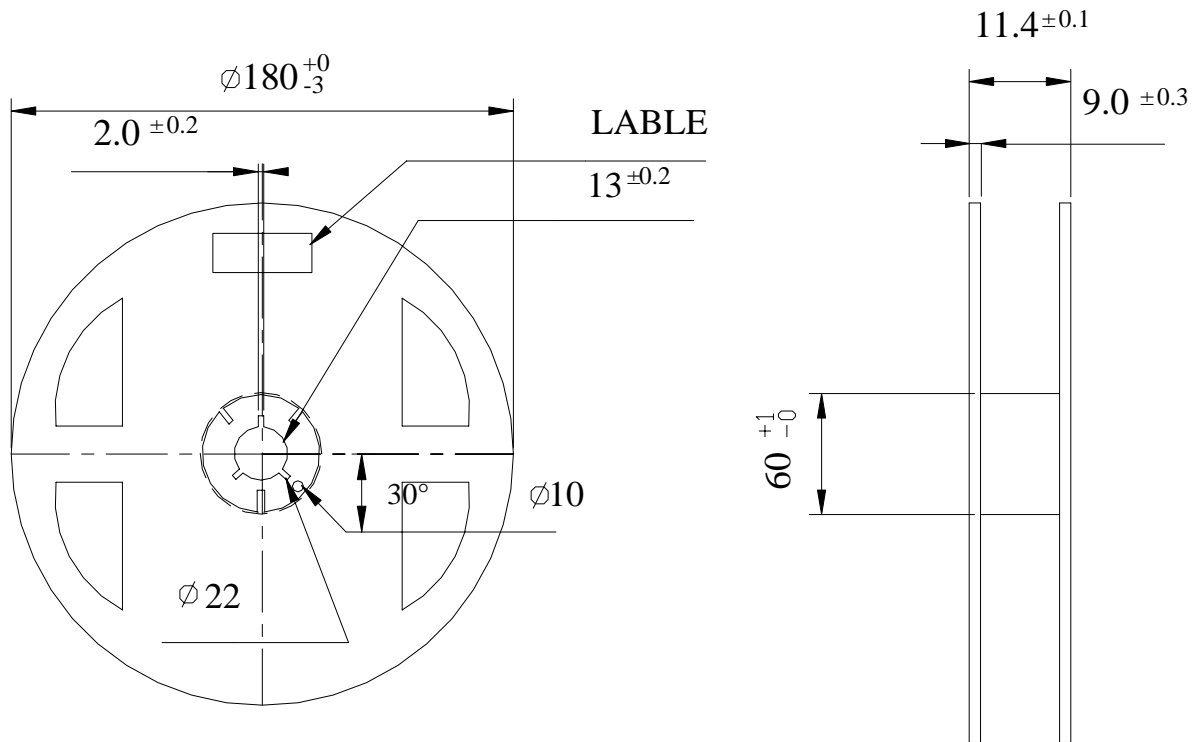
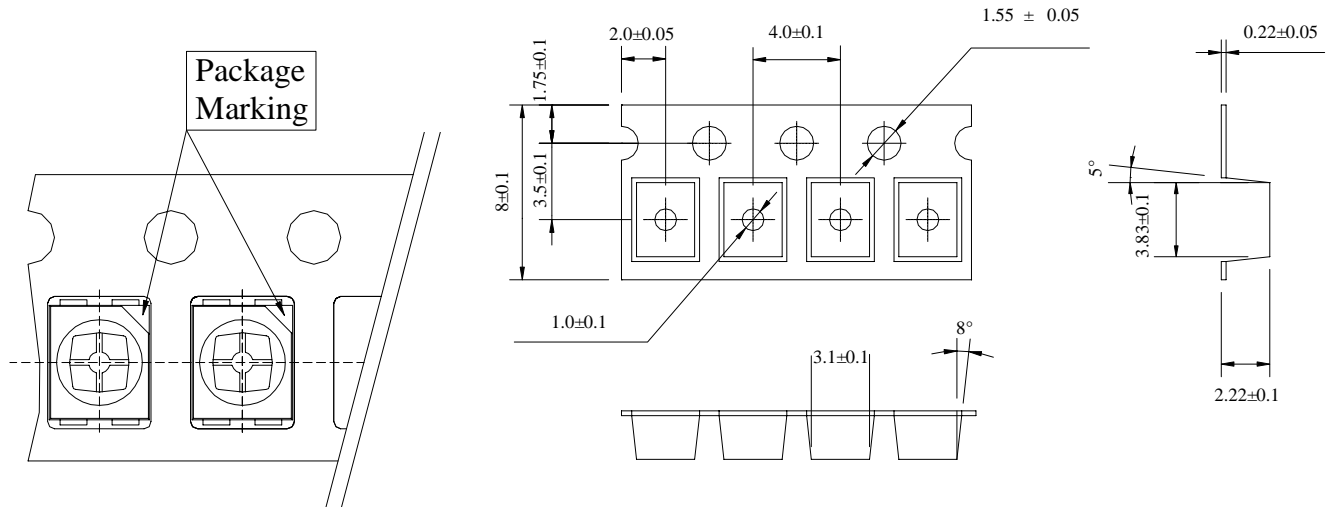
8. Outline Dimension And Material



* MATERIALS

PARTS	MATERIALS
Package	Heat-Resistant Polymer
Package upper surface color	Black
Encapsulating Resin	Soft Silicone Resin (Diffused)
Electrodes	Ag Plating Copper Alloy

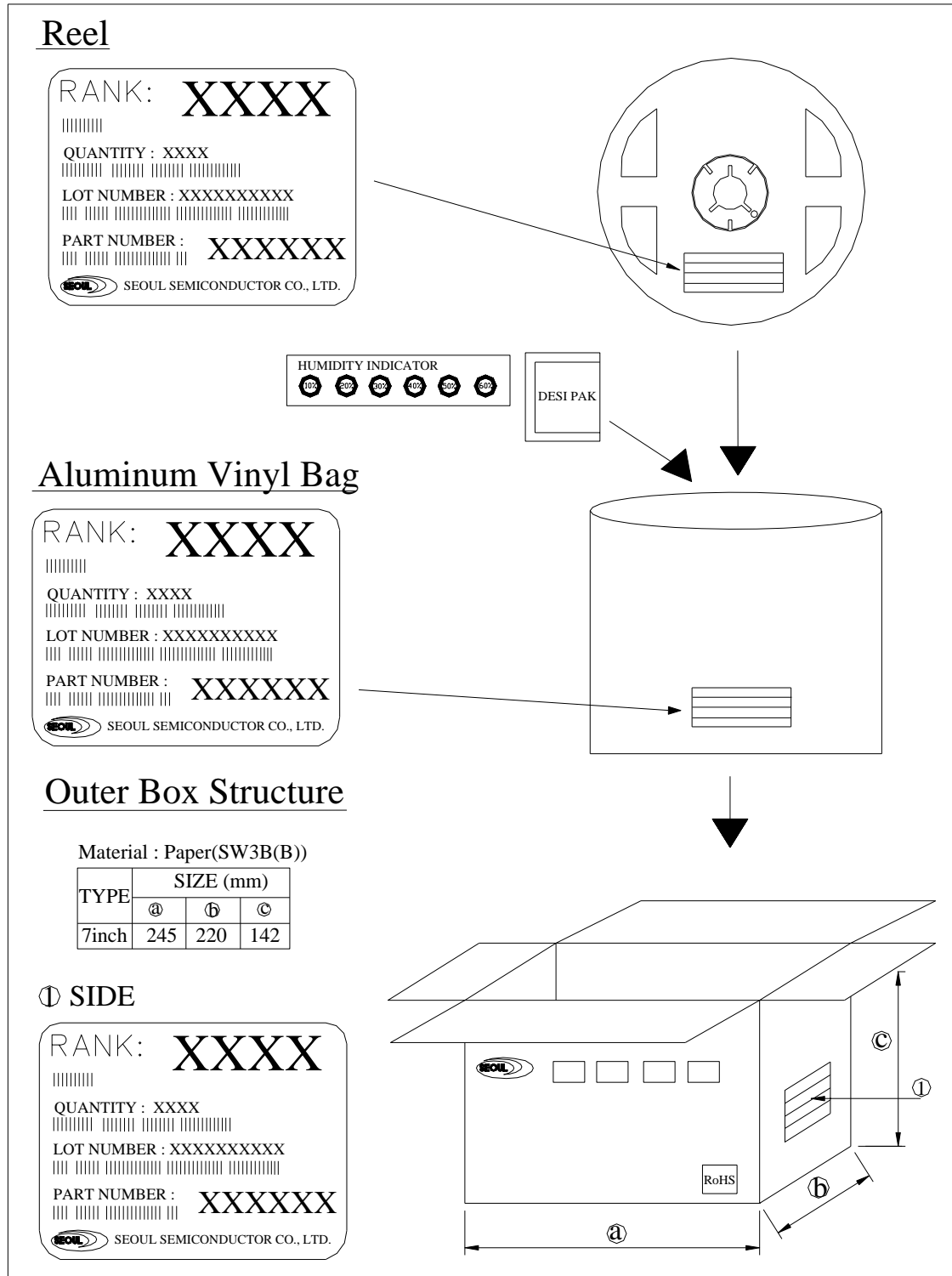
9. Packing



(Tolerance: ± 0.2 , Unit: mm)

- (1) Quantity : 2000 pcs/Reel
- (2) Cumulative Tolerance : Cumulative Tolerance/10 pitches to be ± 0.2 mm
- (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

10. Reel Packing Structure



11. Lot Number

The lot number is composed of the following characters;

SFT # ~ #
SFT **First Part Name**
 Year (6 for 2006, 7 for 2007, 8 for 2008)
 Month (01 for Jan., 02 for Feb., 11 for Nov., 12 for Dec.)
 Day (01, 02, 03, 04, 28, 29, 30, 31.)
~# **The number of the internal quality control**

RANK: **XXX**

|||||

QUANTITY : 700

||||| ||||| ||||| |||||

LOT NUMBER : SFT70426 01 512

|||| |||| ||||| ||||| ||||| ||||| ||||| |||||

PART NUMBER : SFT821N-BS

|||| |||| ||||| ||||| ||||

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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 desiccator) with a desiccant. Otherwise, to store them in the following environment is recommended.

Temperature : 5°C ~30°C 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 ~ 40°C Humidity : less than 10%

(3) In the case of more than 1 week passed after opening or change color of indicator on desiccant, components shall be dried 10-12hr. at 60±5°C.

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

(5) Quick cooling shall be avoided.

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

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

(8) 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.

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

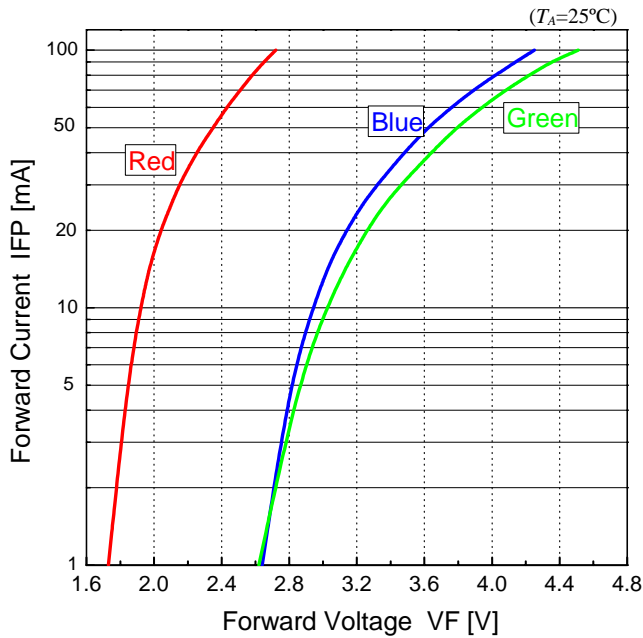
(10) The LEDs must be soldered within seven days after opening the moisture-proof packing.

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

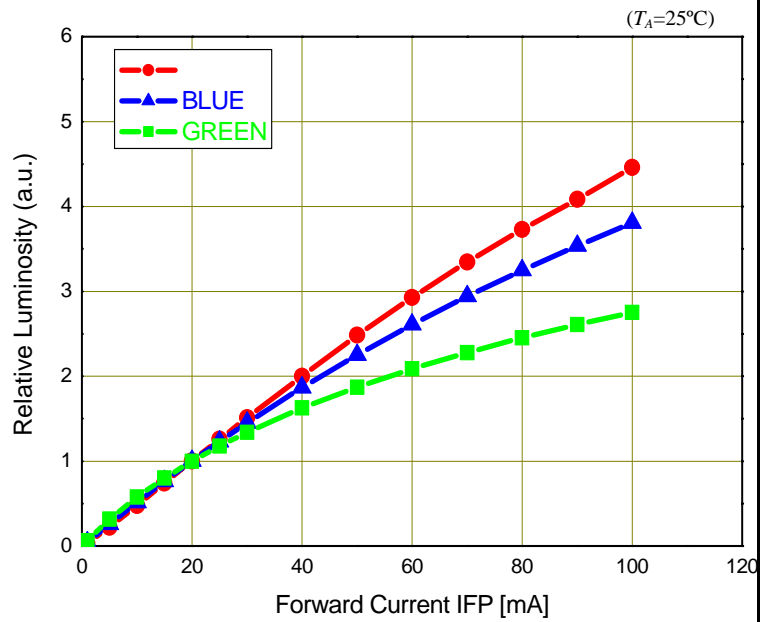
(12) The appearance and specifications of the product may be modified for improvement without notice.

13. Characteristic Diagram

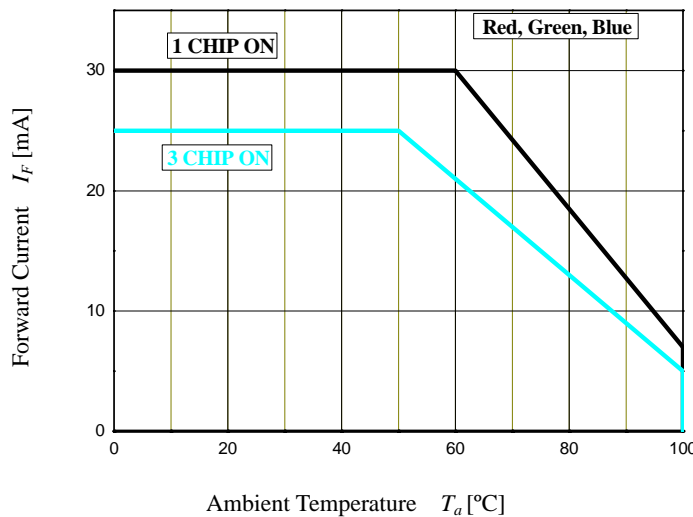
Forward Current vs. Forward Voltage



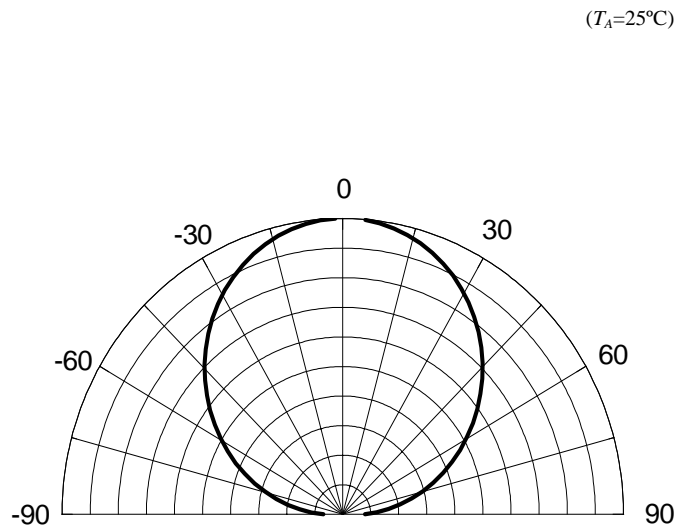
Relative Luminous Intensity vs. Forward Current



Forward Current Derating Curve



Radiation Diagram

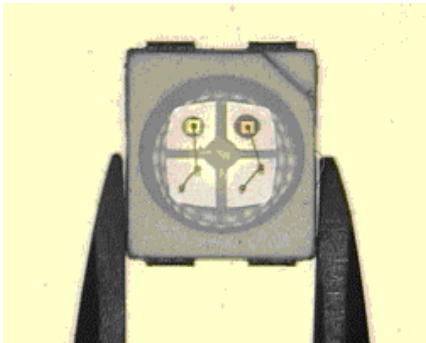


14. Handling of Silicone Resin LEDs

(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.