



# Specification

## THBTGFR5210-CE

SSC		CUSTOMER
Drawn	Approval	Approval

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# THBTGFR5210-CE

## THBTGFR5210-CE

### Description

- Small size suitable for compact appliances.
- 3-chip in one Package
- Surface-mounted chip LED device.
- Pb-free and RoHS complaint component.
- Tape and Reel packing.
- All Color are available
- Increases the life time of battery.



### Features

- 3.0 (W) X 1.35 (D) X 1.0 (T) mm
- Dominant Wavelength :
  - Red: 625 nm
  - Green:530 nm
  - Blue: 472nm

### Applications

- Cellular phone's keypad lightning
- Other decoration lighting
- Information Boards
- Lighting for Small Size Device.

## 1. Absolute maximum ratings

(Ta=25°C)

Parameter	Symbol	Value			Unit
		Red	Green	Blue	
Power Dissipation	$P_d$	60	90	90	mW
Forward Current	$I_F$	25*2/15*3			mA
Peak Forward Current	$I_{FM}^{*1}$	100	100	100	mA
Reverse Voltage	$V_R$	5			V
Operation Temperature	$T_{opr.}$	-40 ~ 100			°C
Storage Temperature	$T_{stg.}$	-40 ~ 100			°C

\*1  $I_{FM}$  conditions: Pulse width  $T_w \leq 0.1ms$  and Duty ratio  $\leq 1/10$ .

\*2 1-chip ON

\*3 3-chip ON

## 2. Electro-Optical Characteristics

(Ta=25°C)

Parameter	color	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	Red	$V_F$	$I_F=10mA$	1.8	1.9	2.3	V
	Green		$I_F=10mA$	2.7	3.0	3.5	
	Blue		$I_F=10mA$	2.7	2.9	3.3	
	Red	$V_{Fm}$	$I_F=1\mu A$	1.3	-	1.8	
	Green		$I_F=1\mu A$	1.8	-	2.7	
	Blue		$I_F=1\mu A$	1.8	-	2.7	
Reverse Current	Red	$I_R$	$V_R=5V$	-	-	10	$\mu A$
Luminous Intensity*2	Red	$I_v$	$I_F=10mA$	120	170	200	mcd
	Green		$I_F=10mA$	230	300	380	
	Blue		$I_F=10mA$	50	80	140	
Wavelength	Red	$\lambda_d$	$I_F=10mA$	615	625	635	nm
	Green		$I_F=10mA$	520	530	540	
	Blue		$I_F=10mA$	465	472	477	
Spectral Bandwidth	Red	$\Delta\lambda$	$I_F=10mA$	-	20	-	nm
	Green		$I_F=10mA$	-	35	-	
	Blue		$I_F=10mA$	-	25	-	
Viewing Angle*3	R,G,B	$2\theta_{1/2}$	$I_F=10mA$	-	150	-	°

◆ Zener Diode의 전기적 특성

항목	조건	Min	Typ	Max	Unit
$V_F$	$I_F=10mA$	-	-	1.6	V
$I_R$	$V_R=5V$	-	-	1.0	$\mu A$

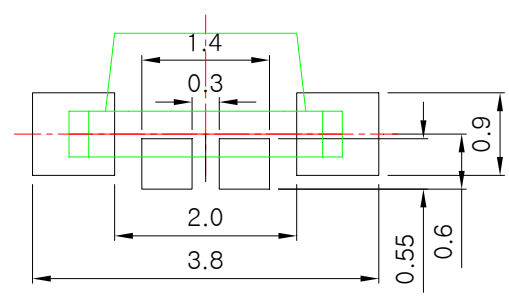
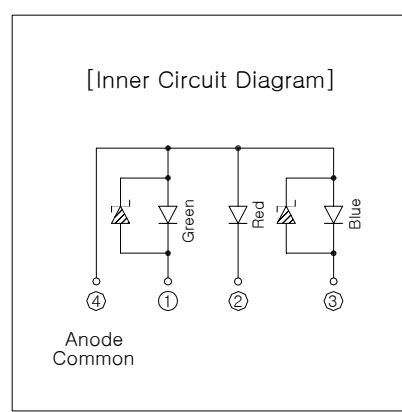
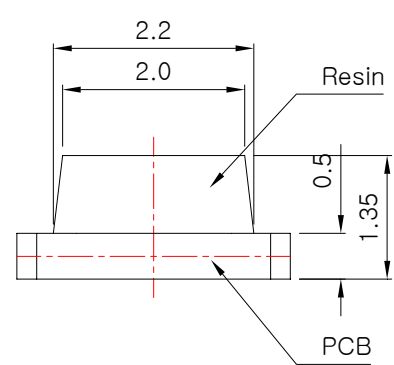
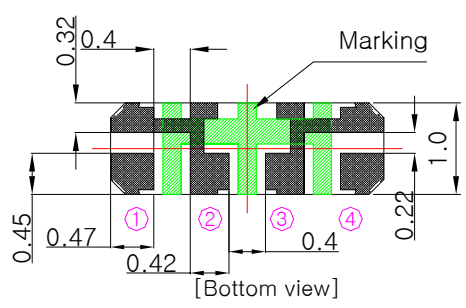
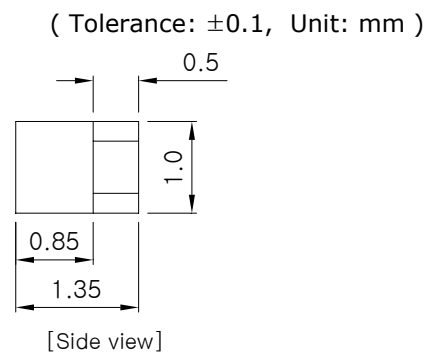
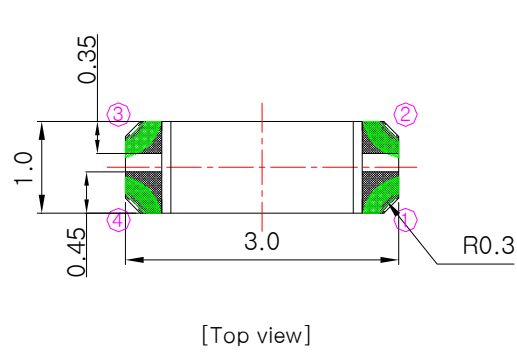
\*2 The luminous intensity IV is measured at the peak of the spatial pattern which may not be aligned with the mechanical axis of the LED package.

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

[Note] All products confirm to the listed minimum and maximum specifications for electric and optical characteristics, when operated at 20mA within the maximum ratings shown above. All measurements were made under the standardized environment of SSC.

(Tolerance :  $I_v \pm 10\%$ ,  $\lambda_D \pm 2\text{ nm}$ ,  $V_F \pm 0.1\text{ V}$ )

### 3.Outline Dimension



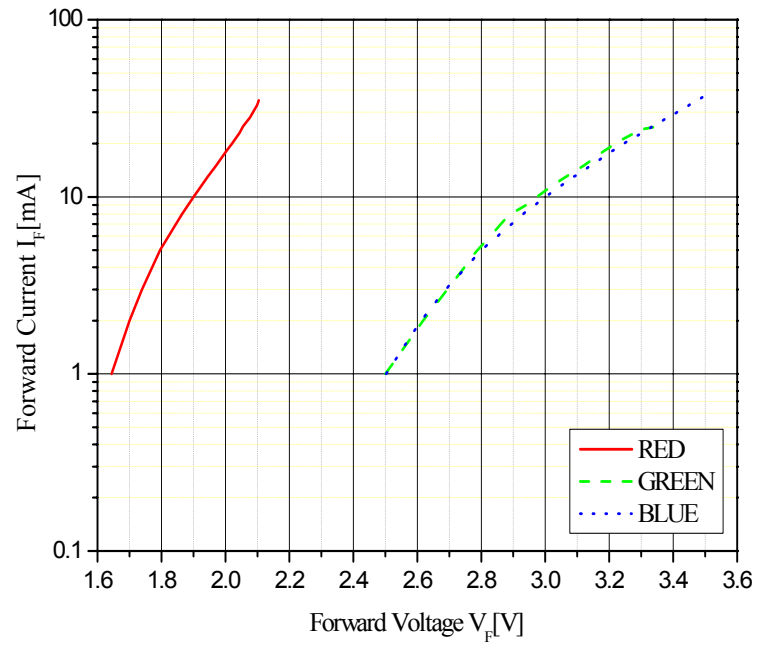
**\* MATERIALS**

PARTS	MATERIALS
Package	BT_Resin
Encapsulating Resin	Epoxy
Electrodes	Au Plating Copper Alloy

### 4. Electro-Optical characteristic Diagram

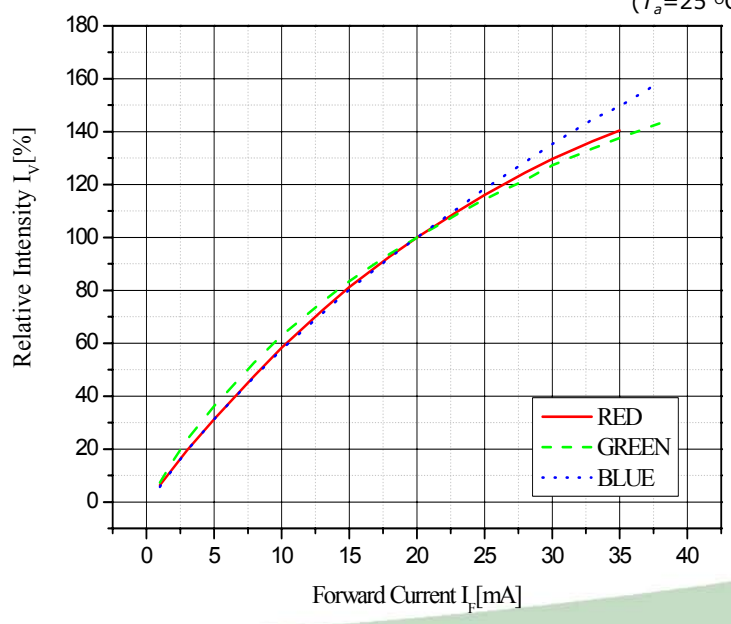
Forward Current vs. Forward Voltage (per die)

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

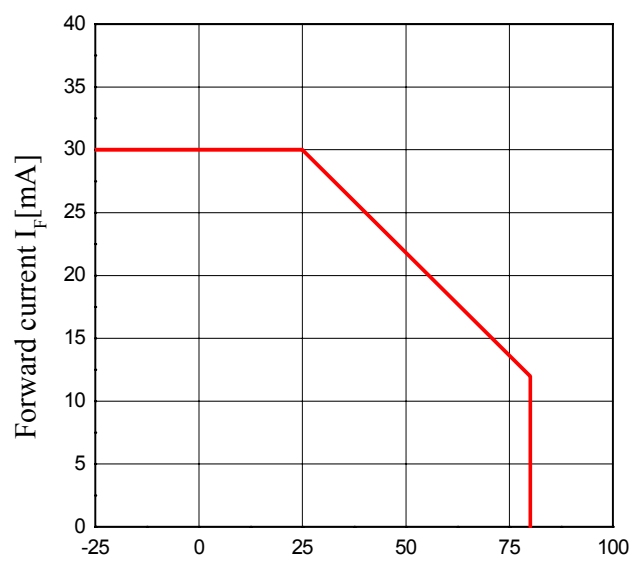


Relative Luminous Intensity vs Forward Current

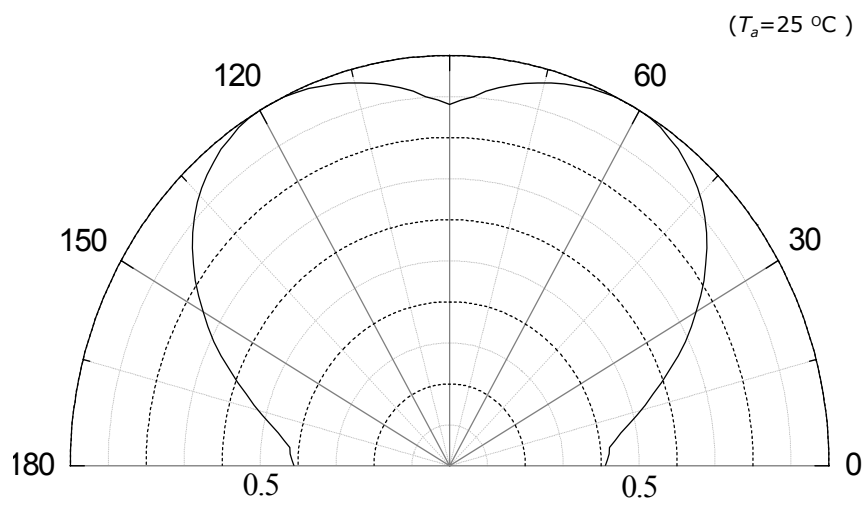
( $T_a=25\text{ }^\circ\text{C}$ )



Ambient Temperature vs. Allowable Forward Current (per die)



Radiation Diagram





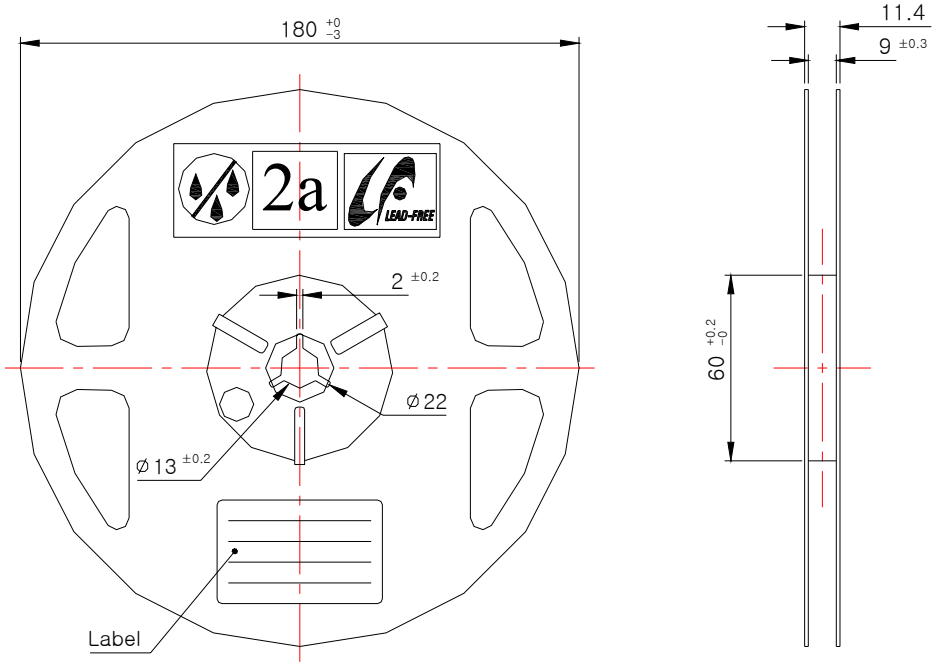
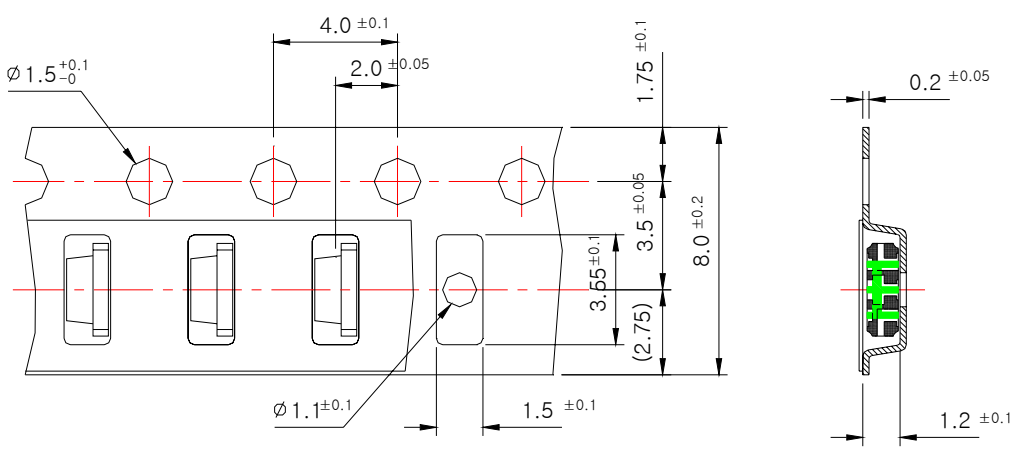
## 5. Rank Division

V <sub>F</sub> [V] (I <sub>F</sub> =10mA)			λ[nm] (I <sub>F</sub> =10mA)			I <sub>V</sub> [mcd] (I <sub>F</sub> =10mA)			RANK
RED	GREEN	BLUE	RED	GREEN	BLUE	RED	GREEN	BLUE	
1.80~2.00	2.70~2.90	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	01
					472~477	120~200	230~380	50~140	02
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	03
					472~477	120~200	230~380	50~140	04
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	05
					472~477	120~200	230~380	50~140	06
	2.90~3.10	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	07
					472~477	120~200	230~380	50~140	08
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	09
					472~477	120~200	230~380	50~140	10
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	11
					472~477	120~200	230~380	50~140	12
	3.10~3.30	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	13
					472~477	120~200	230~380	50~140	14
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	15
					472~477	120~200	230~380	50~140	16
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	17
					472~477	120~200	230~380	50~140	18
	3.30~3.5	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	19
					472~477	120~200	230~380	50~140	20
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	21
					472~477	120~200	230~380	50~140	22
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	23
					472~477	120~200	230~380	50~140	24

2.0~2.20	2.70~2.90	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	25
					472~477	120~200	230~380	50~140	26
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	27
					472~477	120~200	230~380	50~140	28
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	29
					472~477	120~200	230~380	50~140	30
	2.90~3.10	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	31
					472~477	120~200	230~380	50~140	32
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	33
					472~477	120~200	230~380	50~140	34
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	35
					472~477	120~200	230~380	50~140	36
	3.10~3.30	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	37
					472~477	120~200	230~380	50~140	38
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	39
					472~477	120~200	230~380	50~140	40
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	41
					472~477	120~200	230~380	50~140	42
	3.30~3.5	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	43
					472~477	120~200	230~380	50~140	44
2.90~3.10		615~635	520~540	465~472	120~200	230~380	50~140	45	
				472~477	120~200	230~380	50~140	46	
3.10~3.30		615~635	520~540	465~472	120~200	230~380	50~140	47	
				472~477	120~200	230~380	50~140	48	
2.2~2.40	2.70~2.90	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	49
					472~477	120~200	230~380	50~140	50
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	51
					472~477	120~200	230~380	50~140	52
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	53
					472~477	120~200	230~380	50~140	54

	2.90~3.10	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	55
					472~477	120~200	230~380	50~140	56
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	57
					472~477	120~200	230~380	50~140	58
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	59
					472~477	120~200	230~380	50~140	60
	3.10~3.30	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	61
					472~477	120~200	230~380	50~140	62
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	63
					472~477	120~200	230~380	50~140	64
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	65
					472~477	120~200	230~380	50~140	66
	3.30~3.5	2.70~2.90	615~635	520~540	465~472	120~200	230~380	50~140	67
					472~477	120~200	230~380	50~140	68
		2.90~3.10	615~635	520~540	465~472	120~200	230~380	50~140	69
					472~477	120~200	230~380	50~140	70
		3.10~3.30	615~635	520~540	465~472	120~200	230~380	50~140	71
					472~477	120~200	230~380	50~140	72

### 6. Packing

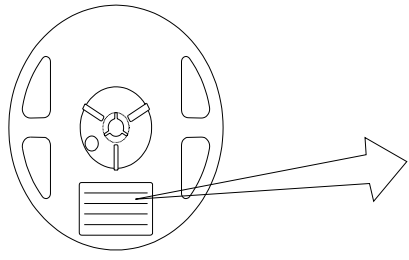


Tolerance:  $\pm 0.2$ , Unit: mm

- (1) Quantity: 3,000 pcs./Reel
- (2) Cumulative Tolerance: Cumulative Tolerance/10 pitches to be  $\pm 0.2$  mm
- (3) Adhesion Strength of Cover Tape: Adhesion strength to be 0.1-0.7 N when the over tape is turned off from the carrier tape at  $10^\circ$  angle to be the carrier tape.
- (4) Package: P/N, Manufacturing data Code No. and quantity to be indicated on a damp proof Package.

● Reel Packing Structure

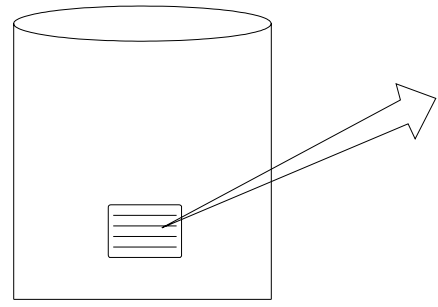
Reel



P/N : ##### ##
   
 제품명 : SSC-THBTGFR5210-CE
   
  
 Lot No #####
   
  
 수량 : 3000



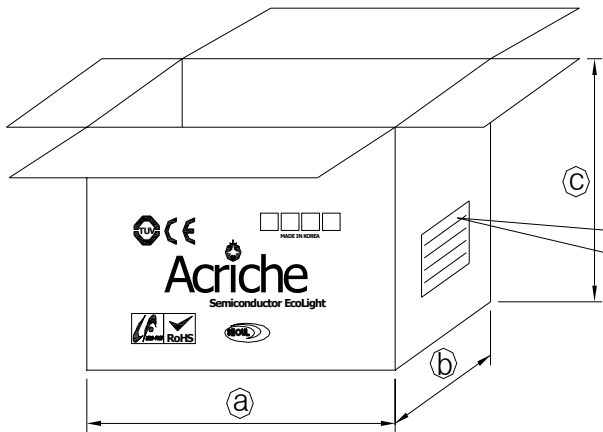
Aluminum Vinyl Bag



P/N : ##### ##
   
 제품명 : SSC-THBTGFR5210-CE
   
  
 Lot No #####
   
  
 수량 : 3000



Outer Box



\*Material : Paper (SW3B(B))

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

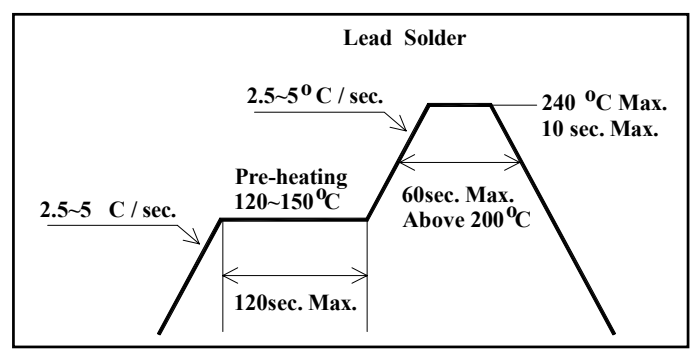
CHIP LED
   
 PART : SSC-THBTGFR5210-CE
   
 CODE : \_\_\_\_\_
   
 Q'YT : 30,000EA
   
 LOT NO : \_\_\_\_\_
   
 DATE : \_\_\_\_\_
   

 SEOUL SEMICONDUCTOR CO.,LTD

## 7. Soldering

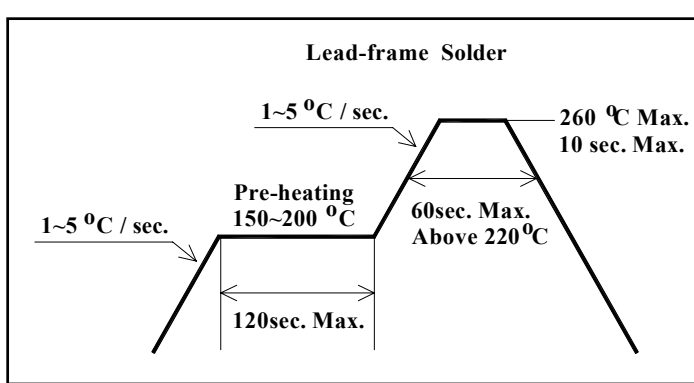
### (1) Lead Solder

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



### (2) Lead-Free Solder

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



### (3) Hand Soldering conditions

Do not exceed 3 seconds at maximum 280°C 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 resin should be used.

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

## 8. 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 65%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;

a. After opened and mounted the soldering shall be quickly.

b. Keeping of a fraction

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

(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) LEDs must be stored to maintain a clean atmosphere. If the LEDs are stored for 3 months or more after being shipped from SSC, a sealed container with a nitrogen atmosphere should be used for storage.

(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.