

# **SPECIFICATION**

MODEL : SLFNCW1502CL

White Lens Flash LED

**SAMSUNG LED CO.,LTD.**  
314. Maetan 3-Dong, Yeongtong-gu,  
Suwon-si, Gyeonggi-do, Korea, 442-743

## 1. Product Outline

### 1) Features

- . Low profile Fresnel lens-integrated LED ( 5.2 x 4.5 x t 2.2mm )
- . Wide Beam Angle (  $\Delta\theta$  : 67°x65° ) for uniform illuminance
- . InGaN/GaN MQW LED with long-time reliability
- . Lead (Pb) free product – RoHS compliant

### 2) Applications

- . Flashlight for cameraphones & digital still cameras
- . Torchlight
- . Amusement equipment
- . Other applications



## 2. Absolute Maximum Rating

- 1) Torch Mode Operation Forward Current (  $T_a = 25^\circ\text{C}$  ) ..... 300 mA
- 2) Flash Mode Peak Pulsed Forward Current ..... 1200 mA  
(Pulse width  $t \leq 300\text{msec}$ , Duty ratio=0.06,  $T_a=25^\circ\text{C}$ )
- 3) Reverse Current ..... 85 mA
- 4) Thermal Resistance (  $R_{\text{th,j-s}}$  ) ..... 9 K/W
- 5) LED Junction Temperature (  $T_j$  ) ..... 125°C
- 6) Operating Temperature Range (  $T_{\text{opr}}$  ) ..... -40°C ~ 85°C
- 7) Storage Temperature Range (  $T_{\text{stg}}$  ) ..... -40°C ~ 100°C

## 3. Characteristics

### 1) Specifications

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

Item	Unit	Condition	Rank	Min	Typ	Max
Luminous Flux	lm	$I_F = 230 \text{ mA}$	S	20	35	50
Forward Voltage ( $V_F$ )	V	$I_F = 230 \text{ mA}$	S	2.8	3.2	3.6
Chromaticity Coordinates	x,y	$I_F = 230 \text{ mA}$	S	Refer to the CIE chromaticity coordinates in page 4		
Reverse Voltage ( $V_R$ )	V	$I_R = 10 \text{ mA}$		0.6	-	1.2
Size	mm	-		5.2 x 4.5 x 2.2		

#### Notes:

- \* Samsung LED uses the above specifications table as the final product test criteria.
- \* Samsung LED maintains a tester tolerance of  $\pm 10\%$  on flux measurements.
- \* Samsung LED maintains a tolerance of  $\pm 0.1\text{V}$  on forward voltage measurements.
- \* Samsung LED maintains a tester tolerance of  $\pm 0.02$  on CCx, CCy measurements.
- \* Samsung LED maintains a tester tolerance of  $\pm 10\%$  on low current voltage measurements.
- \* Samsung LED maintains a tolerance of  $\pm 0.15 \text{ mm}$  on device dimensions.

2) General characteristics

( T<sub>a</sub> : 25°C )

Item	Unit	Condition	Min	Typ	Max
Illuminance (at 1 meter)	lux	I <sub>F</sub> = 230 mA	20	35	50
		I <sub>F</sub> = 800 mA <sup>Ⓐ</sup>	70	95	120
		I <sub>F</sub> = 1000 mA <sup>Ⓑ</sup>	85	110	140
Luminous Intensity	cd	I <sub>F</sub> = 230 mA	20	35	50
		I <sub>F</sub> = 800 mA <sup>Ⓐ</sup>	70	95	120
		I <sub>F</sub> = 1000 mA <sup>Ⓑ</sup>	85	110	140
Luminous Flux	lm	I <sub>F</sub> = 230 mA	20	35	50
		I <sub>F</sub> = 800 mA <sup>Ⓐ</sup>	80	105	130
		I <sub>F</sub> = 1000 mA <sup>Ⓑ</sup>	95	120	150
Forward Voltage (V <sub>F</sub> )	V	I <sub>F</sub> = 230 mA	2.8	3.2	3.6
		I <sub>F</sub> = 800 mA <sup>Ⓐ</sup>	3.2	3.7	4.5
		I <sub>F</sub> = 1000 mA <sup>Ⓑ</sup>	3.4	3.9	4.7
CCT	°K	I <sub>F</sub> = 230 mA	4500	5700	7200
		I <sub>F</sub> = 800 mA <sup>Ⓐ</sup>	4520	5720	7220
		I <sub>F</sub> = 1000 mA <sup>Ⓑ</sup>	4530	5730	7230
Reverse Voltage (V <sub>R</sub> )	V	I <sub>R</sub> = 10 mA	0.6	-	1.2
Size	mm	-	5.2 x 4.5 x 2.2		

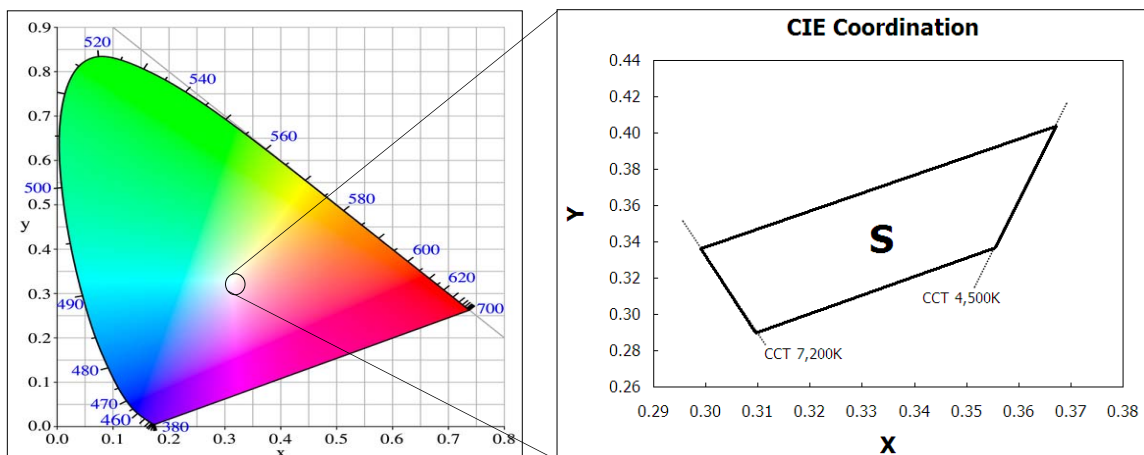
Notes:

\* The above data table is for design reference only.

Ⓐ Pulse mode operation: Pulse width ≤ 500ms, Duty ratio 0.1 for I<sub>F</sub> = 800mA

Ⓑ Pulse mode operation: Pulse width ≤ 400ms, Duty ratio 0.08 for I<sub>F</sub> = 1000mA

3) Chromaticity Diagram



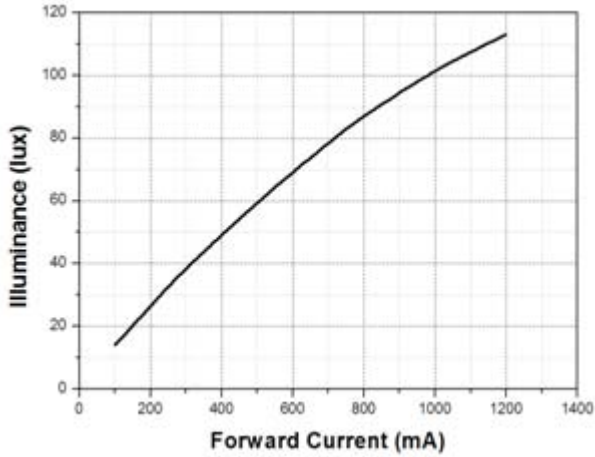
Item	Condition	Rank	x				y				
			0.3672	0.3555	0.3095	0.2990	0.4040	0.3370	0.2900	0.3360	
Chromaticity	I <sub>F</sub> = 230 mA	S									

## 4. Typical Characteristics Graph

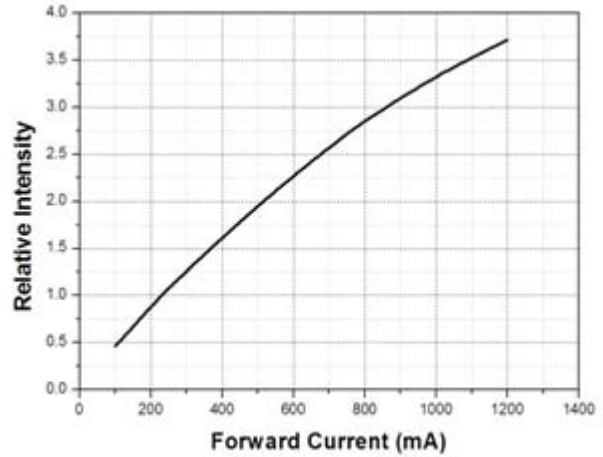
\* These graphs show typical values.

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

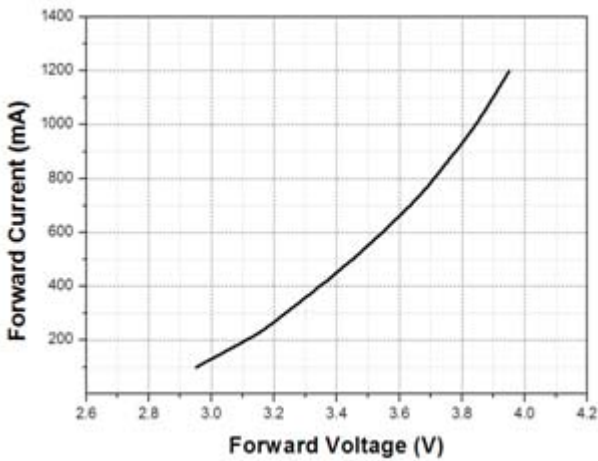
**Illuminance vs. Forward Current**



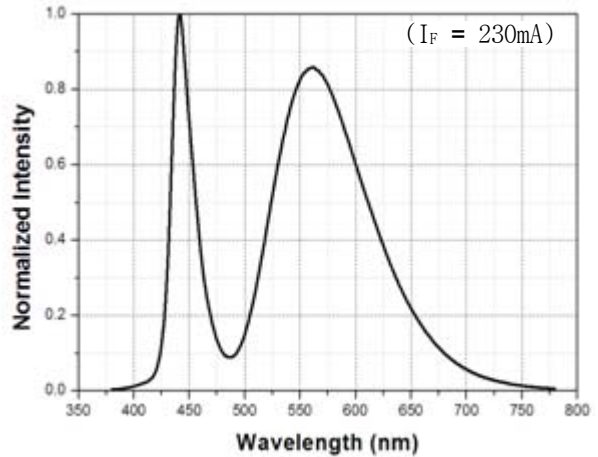
**Relative Intensity vs. Forward Current**



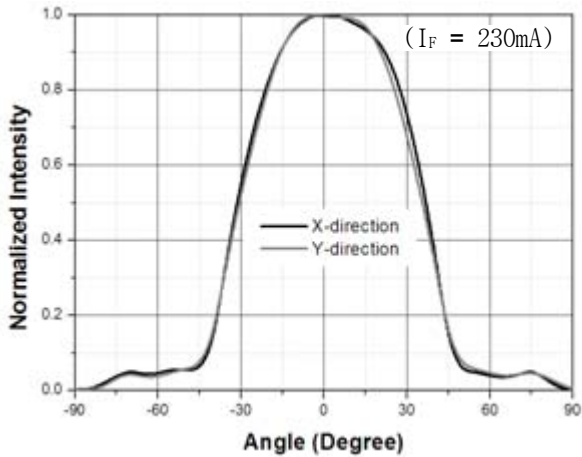
**Forward Current vs. Forward Voltage**



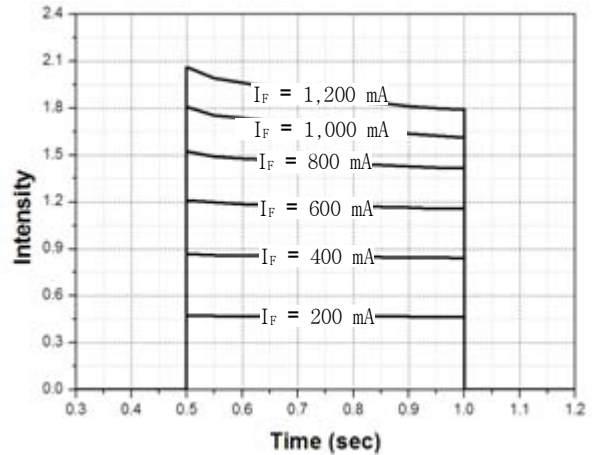
**Relative Spectral Emission**



**Radiation Pattern**



**Pulse Characteristics**

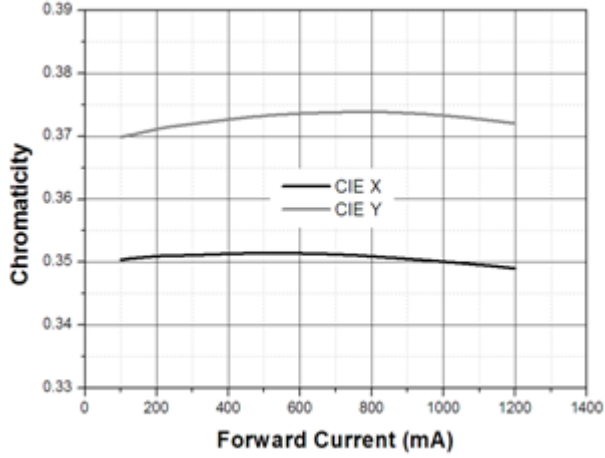


\* LED under test is SMT-soldered on a Samsung LED standard FR4 PCB

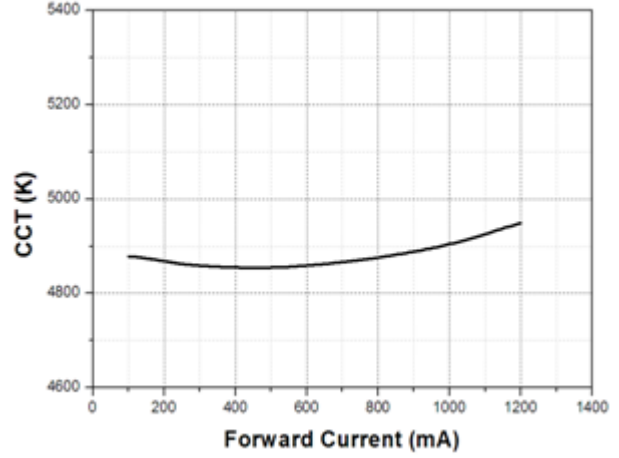
\* These graphs show typical values.

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

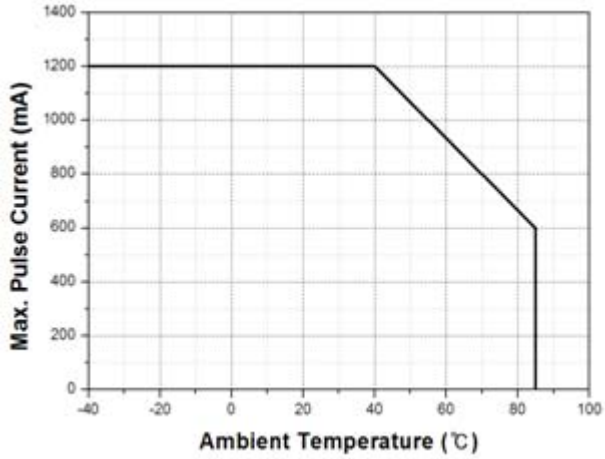
**Chromaticity vs. Forward Current**



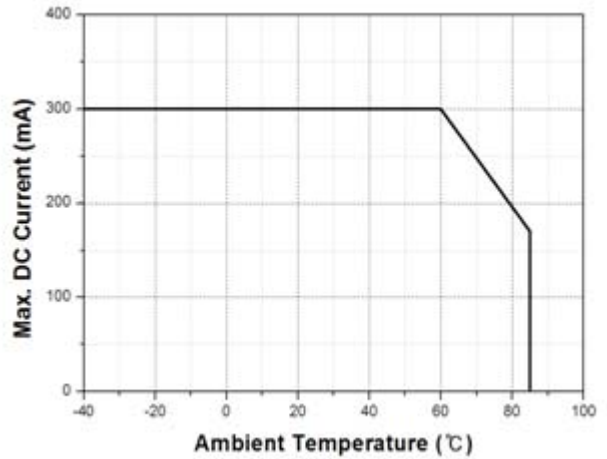
**CCT vs. Forward Current**



**Max. Pulse Rating**

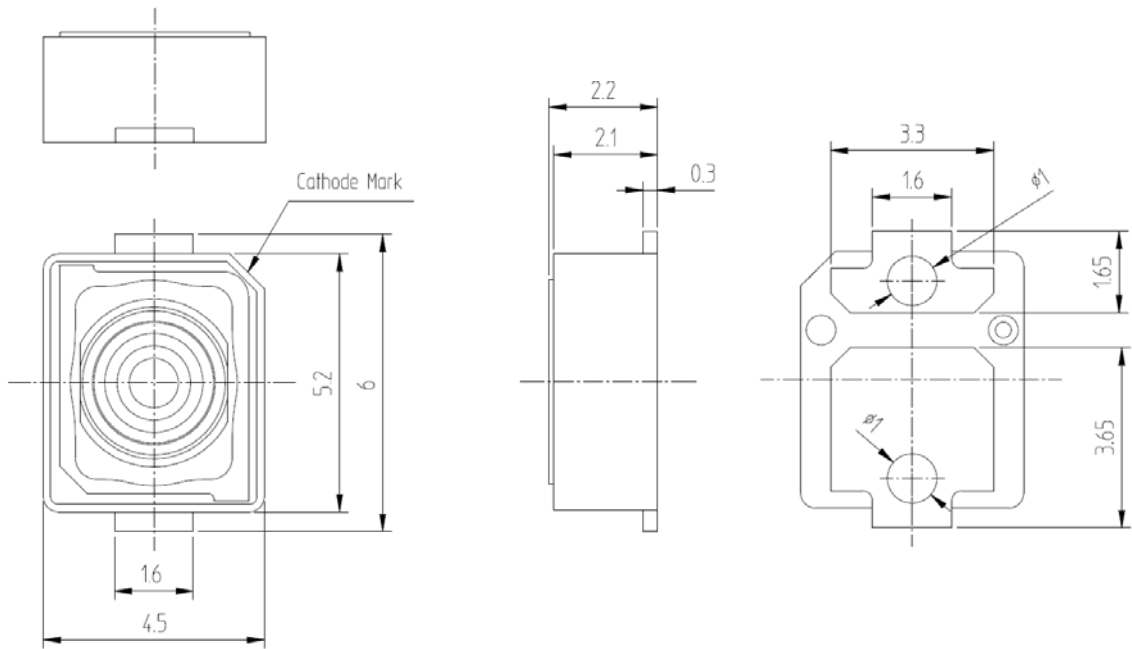


**Max. DC Rating**

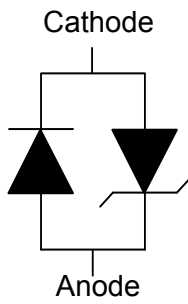


## 5. Outline Drawing & Dimension

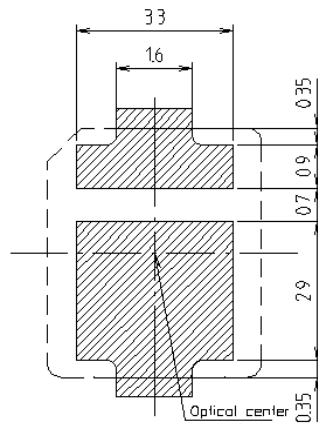
unit : mm  
Tolerance :  $\pm 0.15$



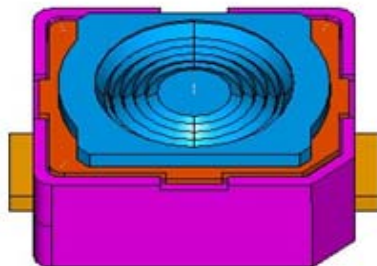
### Circuit



### Solder Pattern for Surface Mount

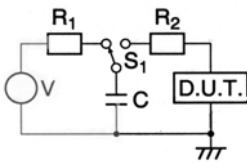


\* 2D, 3D CAD data are available upon request.



## 6. Reliability Test Items and Conditions

### 1) Test Items and Results

Test Item	Test Conditions	Test Hours/Cycles	No. of Samples
RTOL	25°C ± 3°C, DC 300 mA	168 h	22
WHTOL	85°C ± 3°C, 85% ± 2% RH, DC 170mA	168 h	60
HTOL	85°C ± 3°C, DC 170mA	168 h	22
LTOL	-40°C ± 3°C, DC 300mA	168 h	22
HTS	T <sub>a</sub> = 100°C ± 3°C	168 h	11
LTS	T <sub>a</sub> = -40°C ± 3°C	168 h	11
Thermal Shock	-40°C ↔ 100°C, each 30 min, 5 min Transfer	100 cycles	22
Temperature humidity Cycle	25°C ~ 65°C ~ -10°C 24hrs/1cycle, 95%RH, DC 300 mA	5 cycles	60
	25°C ~ 65°C ~ -10°C 24hrs/1cycle, 95%RH	5 cycles	60
On/Off Test	85°C ± 3°C, 85% ± 2% RH, IF = 600mA, On 0.3sec, Off 4.7sec	100k cycles	60
Series Test	85°C, 85% RH → Reflow[Pb free] → -40°C ↔ 85°C (24h) (3 times) (each 1h, 30cycles)	90 h	60
MSL 2a	120°C → 60°C, 95% RH → Reflow[Pb Free] (24h) (120hr) (3 times)	150 h	22
Vibration (sinewave) Test	100~2000~100 Hz, 20G, Sweep 1 min, X.Y.Z 3 direction	4 cycles	11
Drop Test	Random drop to steel, 120cm 12 times, 152cm 19times	31 times	11
ESD[HBM]	 <p>R1:10MΩ , R2:1.5KΩ , C:100pF</p>	3 times (± 5kV)	5

### 2) Criteria for Judging the Damage

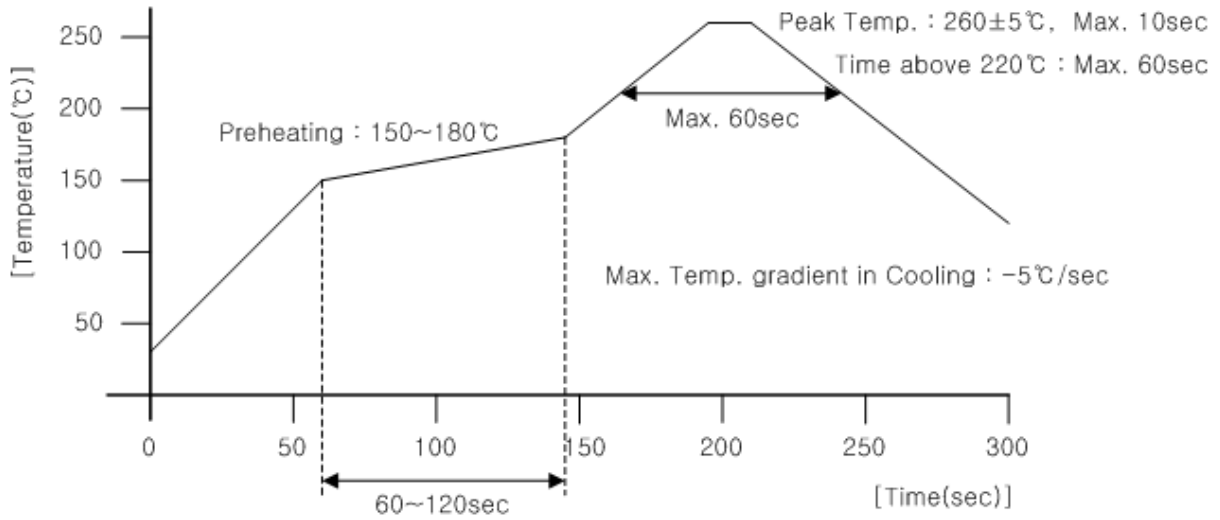
Item	Symbol	Test Condition [T <sub>a</sub> = 25°C]	Limit	
			Min.	Max.
Forward Voltage	V <sub>F</sub>	230 mA	L.S.L. × 0.9	U.S.L. × 1.1
Luminous Intensity	I <sub>v</sub>	230 mA	L.S.L. × 0.7	U.S.L. × 1.3

\* U.S.L. : Upper Standard Level    L.S.L. : Lower Standard Level

## 7. Solder Conditions

### 1) Reflow Conditions ( Pb Free )

Reflow Frequency : 2 times max.

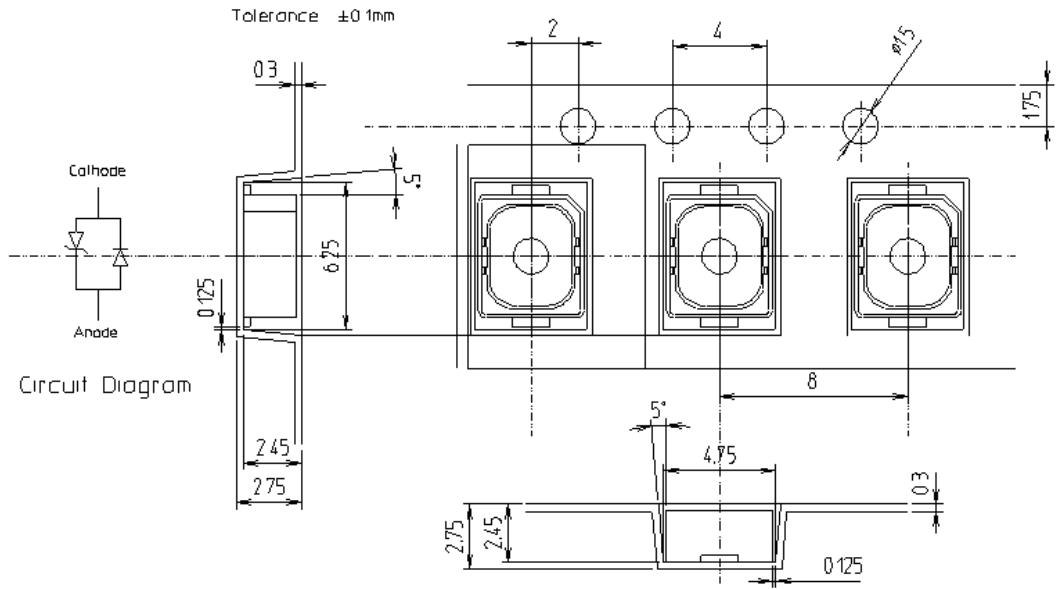


### 2) For Manual Soldering

Not more than 5 seconds @MAX300°C, under soldering iron.(one time only)



## 8. Taping Dimension



End

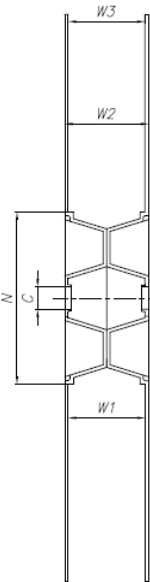
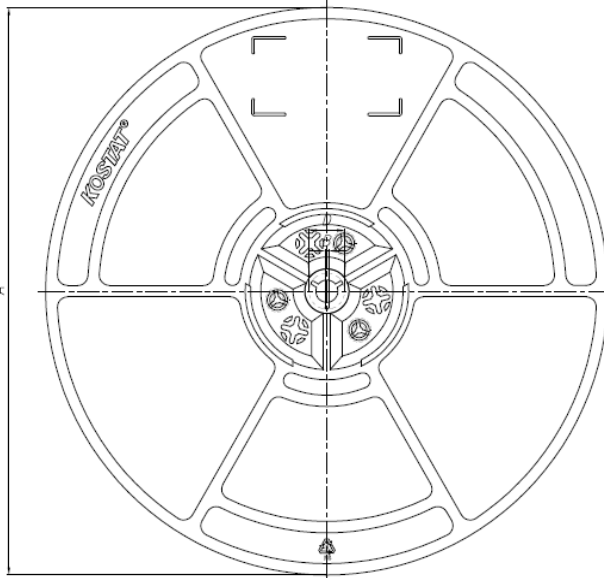
Start

More than 40 mm  
Unloaded tape

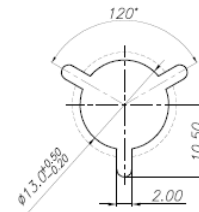
Mounted with  
Flash LED

More than (100~200)mm  
Unloaded tape

Leading part more than  
(200~400)mm

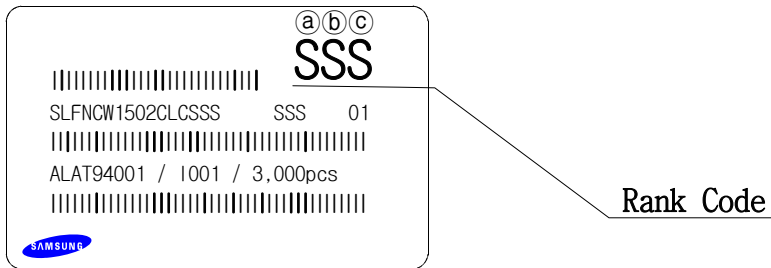


Size	12mm
A	3.30 $\begin{matrix} +2.0 \\ -2.0 \end{matrix}$
B	1.5min.
C	13.0 $\begin{matrix} +0.5 \\ -0.2 \end{matrix}$
D	20.2min.
N	100 $\begin{matrix} +3.0 \\ -0.0 \end{matrix}$
W1	12.4 $\begin{matrix} +3.0 \\ -0.0 \end{matrix}$
W2	16.4 $\begin{matrix} +2.0 \\ -2.0 \end{matrix}$
W3	13.65 $\begin{matrix} +1.75 \\ -0.75 \end{matrix}$



- (1) Quantity : The quantity/reel to be 3,000 pcs.
- (2) Cumulative Tolerance : Cumulative tolerance/10 pitches to be  $\pm 0.2$  mm
- (3) Adhesion Strength of Cover Tape : Adhesion strength to be 0.1-0.7N when the cover tape is turned off from the carrier tape at 10° angle to be the carrier tape.
- (4) Packaging : P/N, Manufacturing data code no. and quantity to be indicated on a damp proof package.

## 9. Label Structure



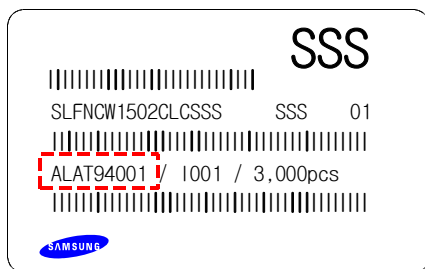
N.B) Denoted rank is the only example.

### Rank Code

- (a) : Forward Voltage ( $V_F$ ) Rank (refer to page. 3)
- (b) : Chromaticity Coordinate Rank (refer to page. 4)
- (c) : Luminous Flux ( $\Phi_V$ ) Rank (refer to page. 3)

## 10. Lot Number

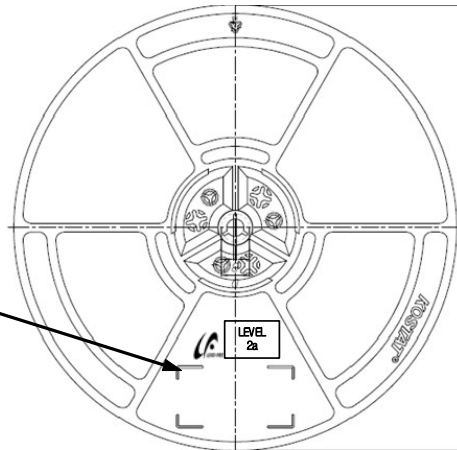
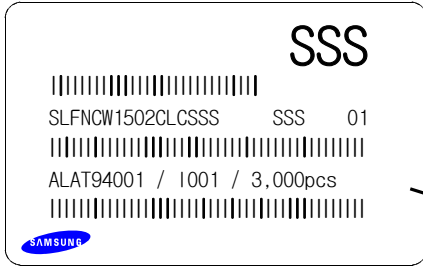
The Lot number is composed of the following characters



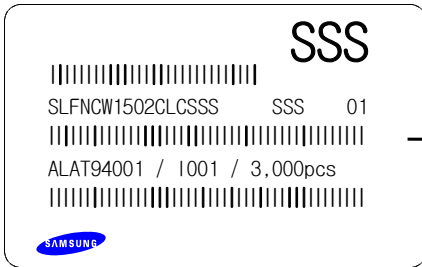
- ◎◇◆□■△△△ / |▲▲▲ / 3,000PCS
- : Production Site (S:SAMSUNG LED Suwon, G:Gosin China, A:Aprosystems)
- ◎ : L (LED)
- ◇ : Product State (A:Normality, B: Bulk, C:First Production, R:reproduction, S:Sample)
- ◆ : Year (S:2008, T:2009, U:2010, V:2011...)
- : Month (1 ~ 9, A~C)
- : Day (1 ~ 9, A, B ~ V)
- △ : SAMSUNG LED Product number (1 ~ 999)
- ▲ : Reel Number (1 ~ 999)

# 11. Reel Packing Structure

## Reel



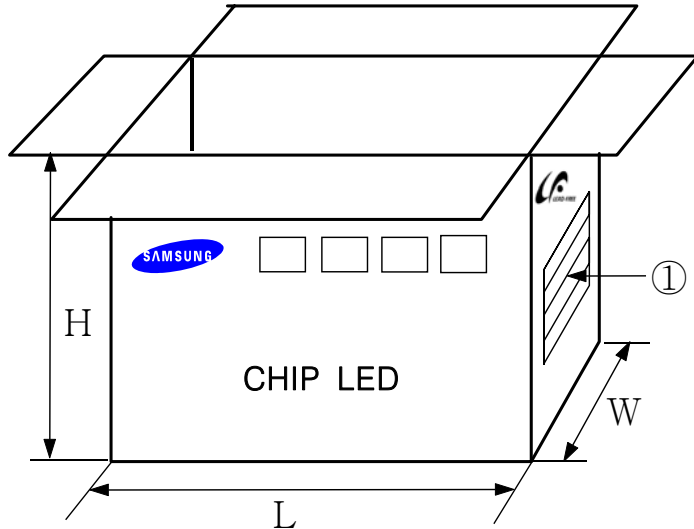
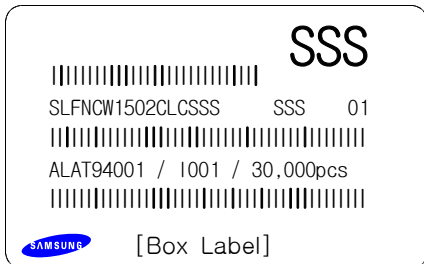
## Aluminum Bag




Material : Paper(SW3B(B))

TYPE	SIZE(mm)		
	(a)	(b)	(c)
13inch	335	335	335

### ① SIDE



## 12. Aluminum Packing Bag



**CAUTION**

This bag contains  
**MOISTURE SENSITIVE DEVICES**

**LEVEL**

**2a**

1. Shelf life in sealed bag: 12 months at <math>40^{\circ}\text{C}</math> and <math>90\%</math> relative humidity (RH)
2. Peak package body temperature: <math>240^{\circ}\text{C}</math>
3. After this bag is opened, devices that will be subjected to reflow solder or other high temperature processes must be:
  - a. Mounted within 672 hours at factory conditions of equal to or less than <math>30^{\circ}\text{C}</math> / <math>60\%</math> RH, or
  - b. Stored at <math>10\%</math> RH
4. Devices require bake, before mounting, if:
  - a. Humidity Indicator Card is > <math>65\%</math> when read at <math>23\pm 5^{\circ}\text{C}</math>, or
  - b. 2a is not met.
5. If baking is required, devices must be baked for 1 hours at <math>60\pm 5^{\circ}\text{C}</math>

Note: if device containers cannot be subjected to high temperature or shorter bake times are desired, reference IPC/JEDEC J-STD-033 for bake procedure,

Bag seal due date: \_\_\_\_\_  
(if blank, see code label)

Note: Level and body temperature by IPC/JEDEC J-STD-020

**SSS**

|||||

SLFNCW1502CLCSSS    SSS    01

|||||

ALAT94001 / 1001 / 3,000pcs

|||||

SAMSUNG



**주의 사항**

이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

습기 및 정전기로부터 제품을 보호 하기 위해서 개봉 후 사용하지 않는 자재는 본 팩에 넣어 보관 하시기 바랍니다. 사용하지 않는 자재를 본 팩에 넣을 때는 반드시 동봉된 드라이 팩과 함께 넣고 지퍼부분을 완전하게 밀봉하여 주시기 바랍니다.

**Important**

This Al Zipper bag is designed to protect the enclosed products from moisture and ESD. Once opened, the products should be soldered onto the printed circuit board immediately. When not in use, please do not leave the products unprotected by the Al Zipper Bag. To repack unused products., please ensure the zip-lock is completely sealed with the dry pack left inside.

### Silica gel & Humidity Indicator Card in Aluminum Bag



### 13. Precaution for use

- 1) For overcurrent-protection, customers are recommended to apply resistors connected in series with the LEDs to mitigate sudden change of the forward current caused by shift of the forward voltage.
- 2) This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When cleaning is required, IPA is recommended as cleaning agent. Solvent-based cleaning agent such as Zestron<sup>(R)</sup> may damage the silicone resins used in the device.
- 3) When the device is in operation, the forward current should be carefully determined considering the maximum ambient temperature and the corresponding junction temperature.
- 4) LEDs must be stored in a clean environment. If the LEDs are to be stored for 3 months or more after being shipped from Samsung LED, they should be packed with a nitrogen-filled container.  
(Shelf life of sealed bags: 12 months, temp. 0~40°C, 20~70%RH)
- 5) After storage bag is open, device subject to soldering, solder reflow, or other high temperature processes must be:
  - a. Mounted within 168 hours (7 days) at an assembly line with a condition of no more than 30°C/60%RH.
  - b. Stored at <10% RH.
- 6) Repack unused Products with anti-moisture packing, fold to close any opening and then store in a dry place.
- 7) Devices require baking before mounting, if humidity card reading reaches 60% at 23±5°C.
- 8) Devices must be baked for 24hours at 65±5°C, if baking is required.
- 9) The LEDs are sensitive to the static electricity and surge current. It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs.  
If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices.  
Damaged LEDs may show some unusual characteristics such as increase in leakage current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.

# 14. Hazard Substance Analysis



**Test Report No.** F690501/LF-CTSAYAA09-12064

**Issued Date:** April 29, 2009

**Sample No.** : AYAA09-12064.001

**Sample Description** : FLASH LED

**Item No./Part No.** : SLFNCW1502XL

### Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, ICP-OES	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, ICP-OES	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, ICP-OES	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008, UV-VIS	1	N.D.

### Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.

- NOTE: (1) N.D. = Not detected.(<MDL)  
 (2) mg/kg = ppm  
 (3) MDL = Method Detection Limit  
 (4) - = No regulation  
 (5) \*\* = Qualitative analysis (No Unit)  
 (6) \* = Boiling-water-extraction:  
 Negative = Absence of CrVI coating  
 Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

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Picture of Sample as Received:



\*\*\* End \*\*\*

- NOTE:
- (1) N.D. = Not detected.( $\leq$ MDL)
  - (2) mg/kg = ppm
  - (3) MDL = Method Detection Limit
  - (4) - = No regulation
  - (5) \*\* = Qualitative analysis (No Unit)
  - (6) \* = Boiling-water-extraction:
    - Negative = Absence of CrVI coating
    - Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm<sup>2</sup> sample surface area.

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