

# SPECIFICATION

MODEL : SPHWWTS8N105EBW0H3



Approved rank :  $V_F$  (E5, K7),  
CIE (W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB,  
WC, WD, WE, WF, WG),  
 $\Phi_v$  (H1, M1)

## Sunnix8 WHITE LED W0 RANK

CUSTOMER		
CHECKED	CHECKED	APPROVED

SAMSUNG LED			
DRAWN	CHECKED(Sales)	CHECKED(Qual)	APPROVED

**SAMSUNG LED CO.,LTD.**

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# 1. Product Outline

## 1) Features

- Plastic Molded Lead Frame Type : 6.0 mm(L), 7.0 mm(W), 1.2 mm(T)
- Beam View Angle( $\Delta\theta$ )\* : 120 °
- High Power / Brightness Chip & Long Time Reliability

## 2) Applications

- General Lighting, Indoor Illumination, Refrigerator lighting etc.

※ View Angle describes the spatial intensity distribution and is the difference between the angles corresponding to 50% of the maximum intensity.

# 2. Absolute Maximum Rating

- Operation Forward Current<sup>(1)</sup> ..... 700 mA
- Peak Pulsed Forward Current ..... 800 mA  
(Duty 1/10 and Pulse Width 10 msec)
- Reverse Current<sup>(2)</sup> ..... 20 mA
- Thermal Resistance ( $R_{th\ j-s}$ ) .....  $\cong$  5 °C/W
- Operating Temperature Range ( $T_{OPR}$ ) ..... -40 °C ~ 85 °C
- Storage Temperature Range ( $T_{STG}$ ) ..... -40 °C ~ 110 °C
- LED Junction Temperature ( $T_j$ ) ..... 125 °C

(1) Refer to derating curve in the page 6.

(2) Does not operate in the reverse direction.

# 3. Characteristics

## 1) Electrical properties ( $T_a = 25\text{ °C}$ )

Parameter	Symbol	Condition	Rank	Min.	Typ.	Max.	Unit
Reverse Voltage	$V_R$	$I_R = 10\text{ mA}$	-	0.5	0.8	2.0	V
Forward Voltage	$V_F$	$I_F = 350\text{ mA}$	EB	E5	2.90	3.15	
				K7	3.15	3.50	

## 2) Color Rendering Index ( $T_a = 25\text{ °C}$ )

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Color Rendering	$R_a$	$I_F = 350\text{ mA}$	80	83	-	-

### 3) Chromaticity Coordinates ( $T_a = 25 \text{ }^\circ\text{C}$ )

Item	Condition	Rank	x				y				
Chromaticity Coordinate (*)	$I_F=350\text{mA}$	W0	W1	0.4373	0.4428	0.4475	0.4418	0.3893	0.3906	0.3994	0.3981
			W2	0.4428	0.4483	0.4532	0.4475	0.3906	0.3919	0.4008	0.3994
			W3	0.4483	0.4538	0.4589	0.4532	0.3919	0.3931	0.4021	0.4008
			W4	0.4538	0.4593	0.4646	0.4589	0.3931	0.3944	0.4034	0.4021
			W5	0.4418	0.4475	0.4523	0.4465	0.3981	0.3994	0.4085	0.4071
			W6	0.4475	0.4532	0.4582	0.4523	0.3994	0.4008	0.4099	0.4085
			W7	0.4532	0.4589	0.4641	0.4582	0.4008	0.4021	0.4112	0.4099
			W8	0.4589	0.4646	0.47	0.4641	0.4021	0.4034	0.4126	0.4112
			W9	0.4465	0.4523	0.4573	0.4513	0.4071	0.4085	0.4178	0.4164
			WA	0.4523	0.4582	0.4634	0.4573	0.4085	0.4099	0.4193	0.4178
			WB	0.4582	0.4641	0.4695	0.4634	0.4099	0.4112	0.4207	0.4193
			WC	0.4641	0.47	0.4756	0.4695	0.4112	0.4126	0.4221	0.4207
			WD	0.4513	0.4573	0.4624	0.4562	0.4164	0.4178	0.4274	0.426
			WE	0.4573	0.4634	0.4687	0.4624	0.4178	0.4193	0.4289	0.4272
			WF	0.4634	0.4695	0.475	0.4687	0.4193	0.4207	0.4304	0.4289
WG	0.4695	0.4756	0.4813	0.475	0.4207	0.4221	0.4319	0.4304			

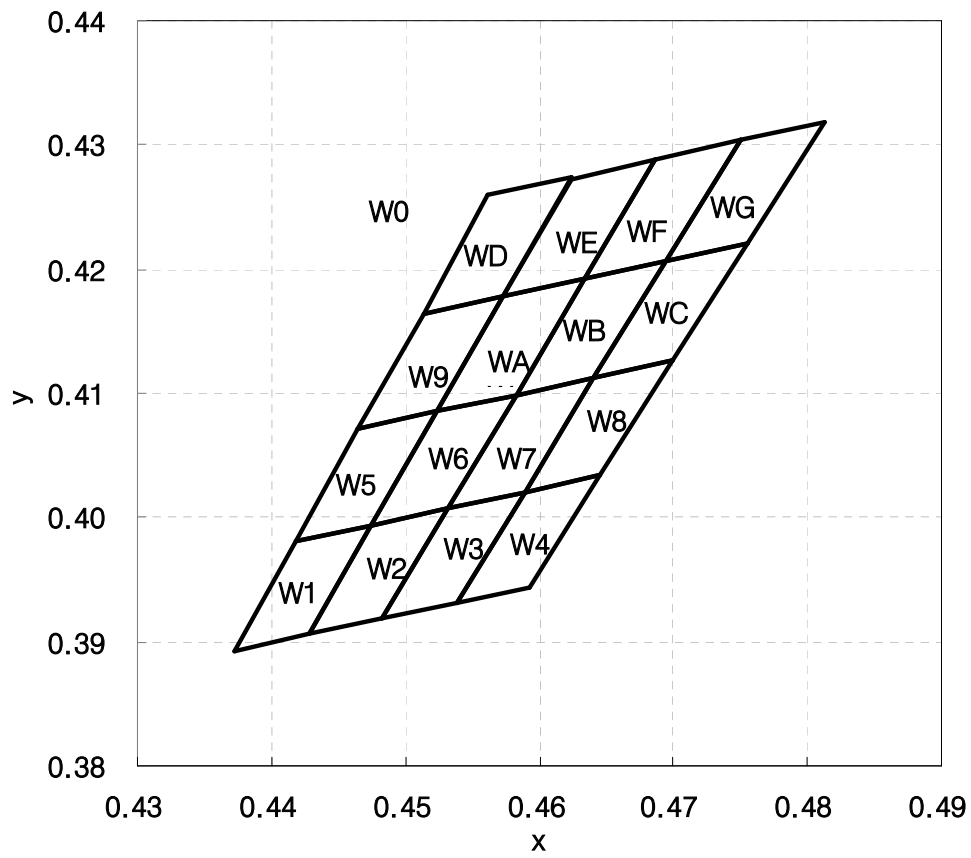
### 4) Luminous Flux ( $T_a = 25 \text{ }^\circ\text{C}$ )

Parameter	Symbol	Condition	Rank	Min.	Typ.	Max.	Unit
Luminous Flux	$\Phi_V$	$I_F = 350 \text{ mA}$	H3	H1	90	105	lm
				M1	105	-	

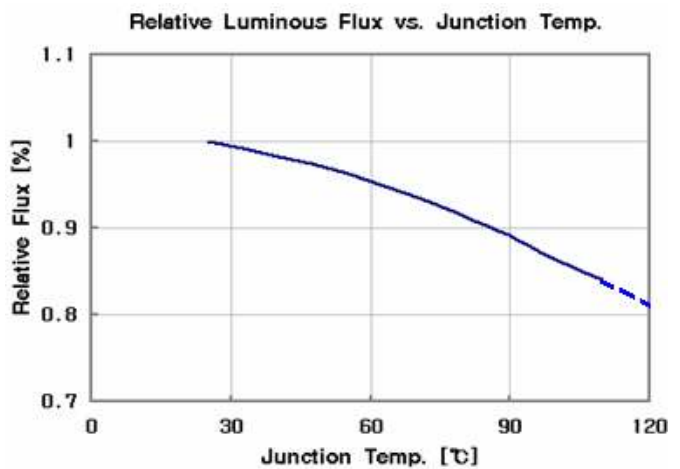
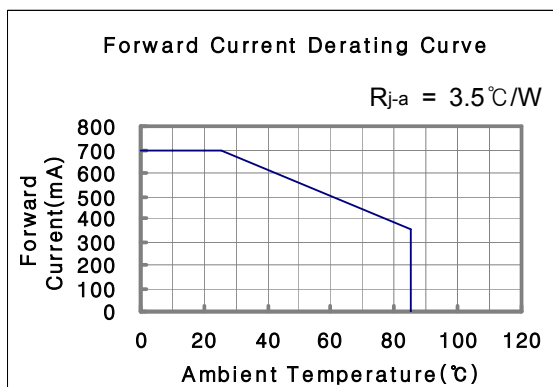
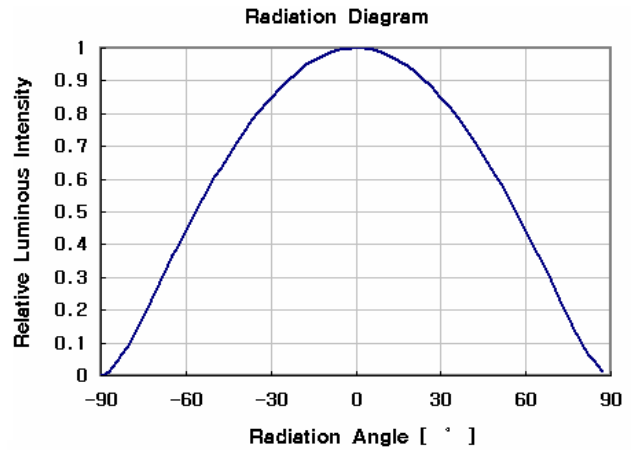
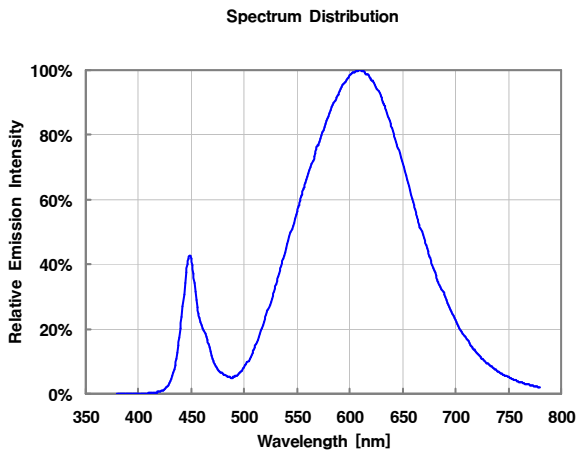
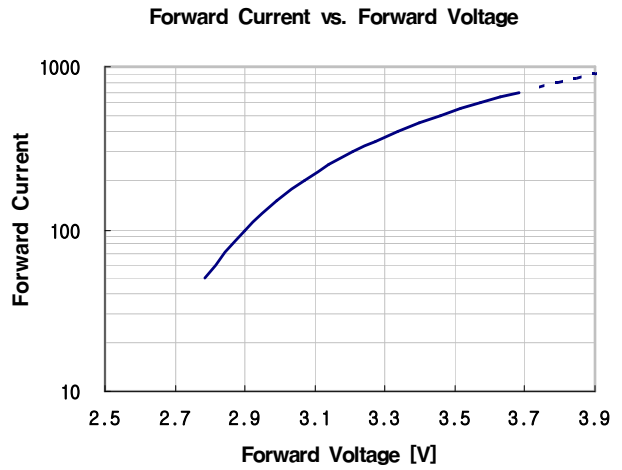
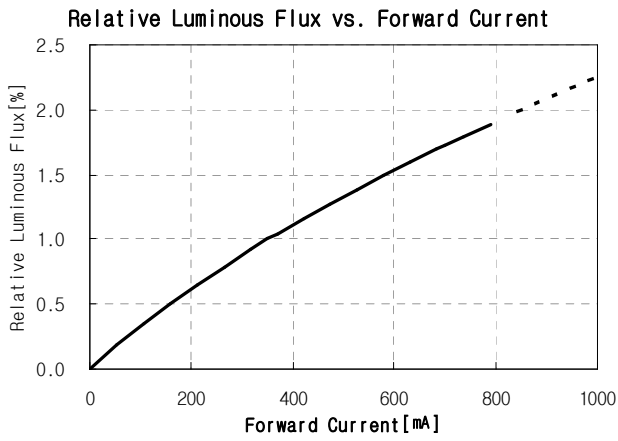
※ Tolerance :  $V_F : \pm 0.1$ ,  $\Phi_V : \pm 7 \%$ ,  $CCx \text{ } CCy : \pm 0.02$ ,  $R_a : \pm 5.0$

※ Luminous Intensity measuring equipment : CAS140CT

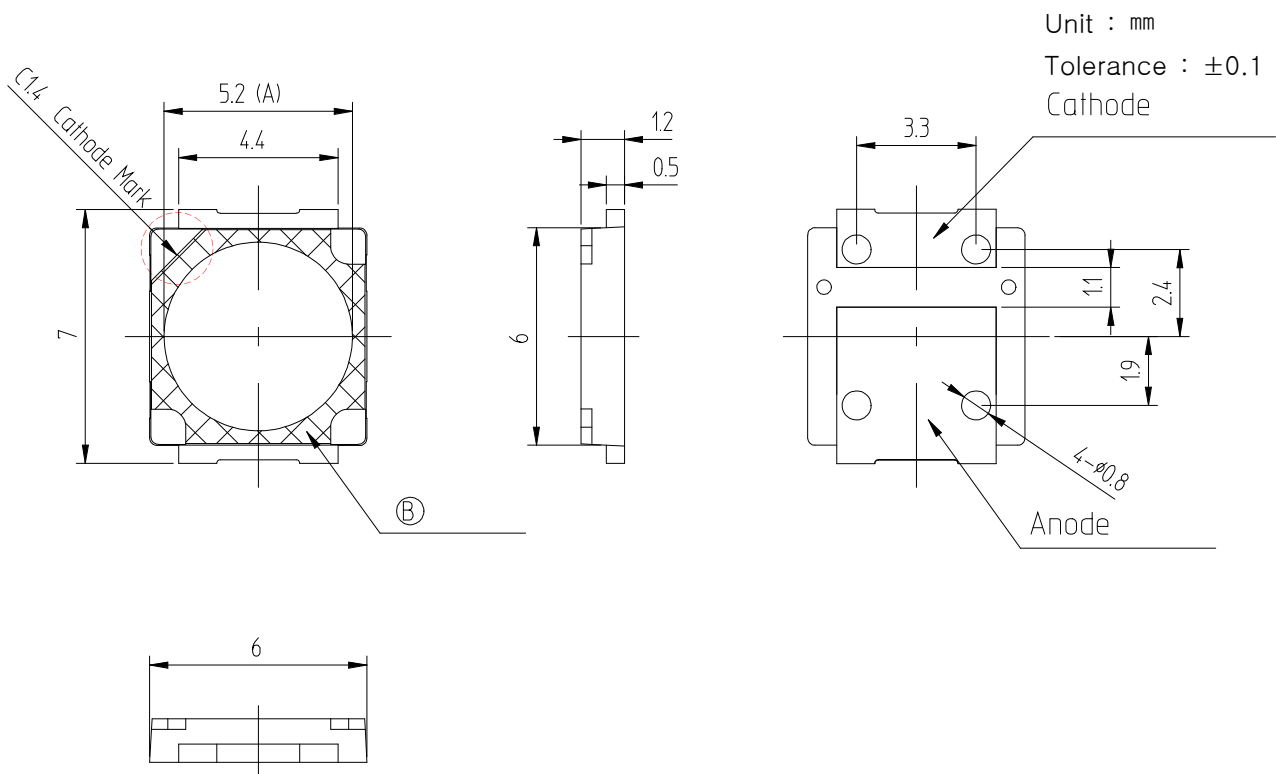
## 4. Chromaticity Diagram



# 5. Typical Characteristic Graphs



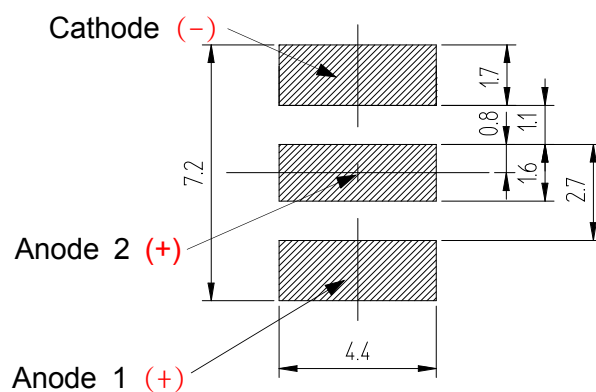
## 6. Outline Drawing and Dimension



### Pick and Place

1. Do not place pressure on the encapsulating resin ("A")  
It is recommended to use a pick&place nozzle with inside diameter at 5.2mm
2. The maximum compressing force is 15N on the polymer ("B")

### Solder Pattern for Surface Mount



\* This LED has built-in ESD protection device(s) connected in parallel to LED chip(s).

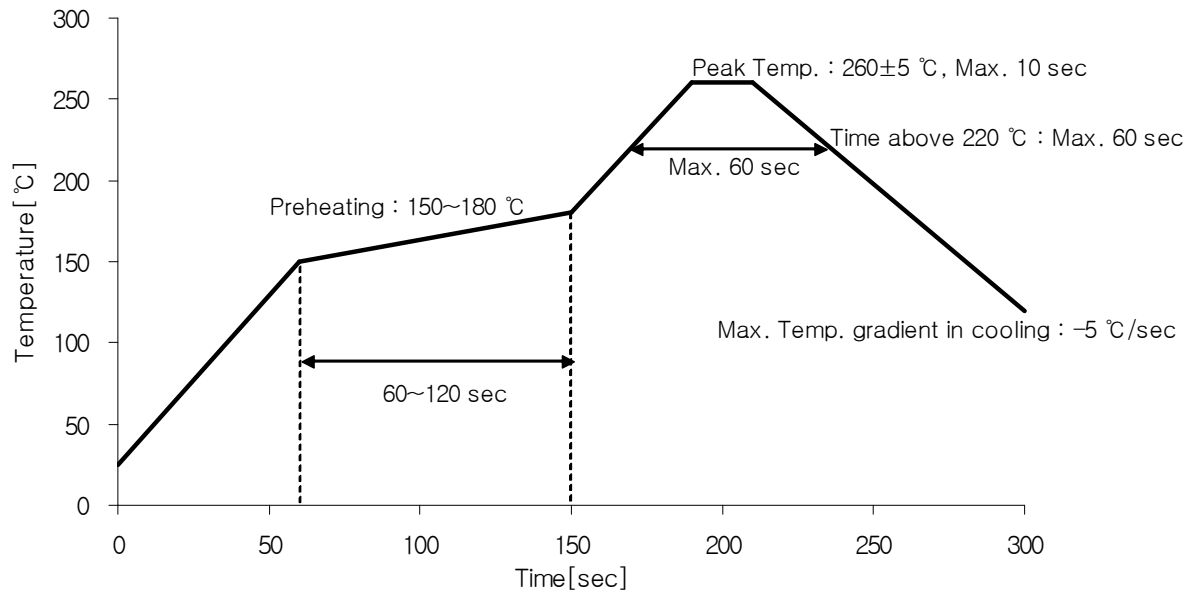
### Remarks

- Make sure that Anode 2 is electrically connected to the Anode 1.  
Anode 2 is to be soldered, If not, use the heat conductive adhesive.

## 7. Solder Conditions

### 1) Reflow Conditions (Pb-Free)

Reflow Frequency : 2 time max.



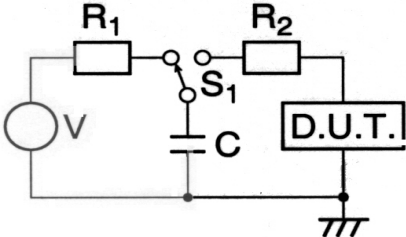
### 2) For Manual Soldering

Not more than 5 seconds @Max. 300 °C, under soldering iron.



## 8. Reliability Test Items and Conditions

### 1) Test Items

Test Items	Test Conditions	Test Hours/Cycles
Room Temperature life test	25 °C, $I_F = \text{Max DC}^*$	1,000 h
High Temperature humidity life test	85 °C, 85 % RH, $I_F = \text{Max DC}^*$	1,000 h
High Temperature life test	85 °C, $I_F = \text{Max DC}^*$	1,000 h
Low Temperature life test	-40 °C, $I_F = \text{Max DC}^*$	1,000 h
High Temperature Storage	110 °C	1,000 h
Low Temperature Storage	-40 °C	1,000 h
Thermal Shock	-40 / 120 °C, each 30 min	200 cycles
Temperature humidity Cycle On/Off test	-40 / 85 °C, each 20 min, 100 min transfer Power On/off each 5 min, DC 350 mA	100 cycles
Reflow (Pb-Free)	Peak 260±5 °C for 10 sec	3 times
ESD(HBM)	 <p>R1 : 10 MΩ , R2 : 1.5 kΩ , C : 100 pF</p>	3 times (± 5 kV)

\* Max. DC current is depending on maximum current derating curve.

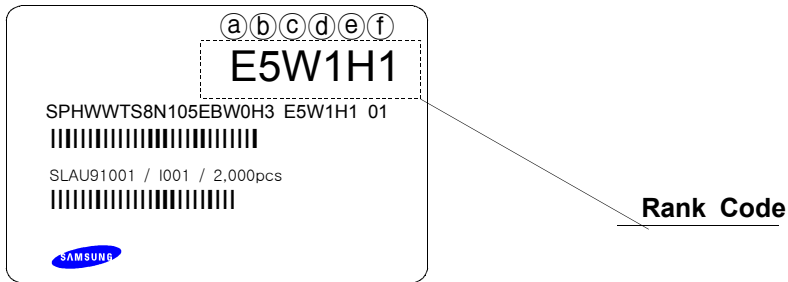
### 2) Criteria for Judging the Damage

Item	Symbol	Test Condition	Limit	
			Min	Max
Forward Voltage	$V_F$	$I_F = 350 \text{ mA}$	-	U.S.L.*1.1
Luminous Flux	$\Phi_V$	$I_F = 350 \text{ mA}$	L.S.L.*0.7	-

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



## 10. Label Structure

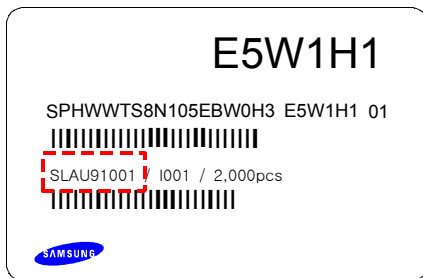


### Rank Code

- Ⓐ Ⓑ : VF Rank (refer to page 3)
- Ⓒ Ⓓ : Chromaticity Coordinate Rank, CIE (refer to page 4)
- Ⓔ Ⓕ : Luminous Flux (refer to page 4)

## 11. Lot Number

The Lot number is composed of the following characters

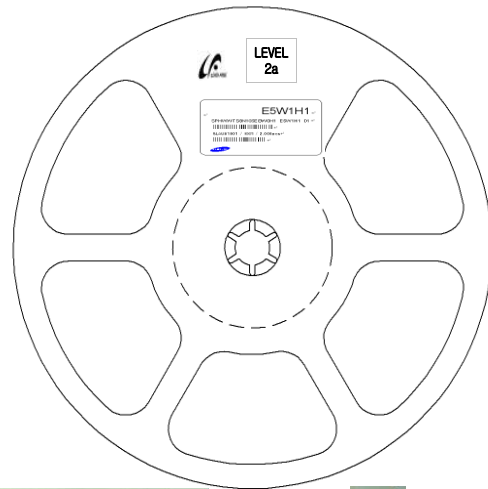
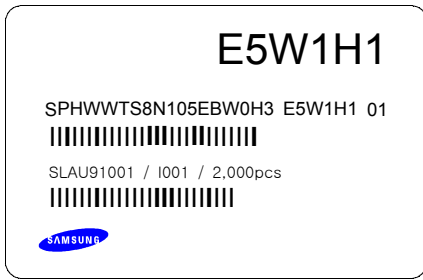


● ◎ ◇ ◆ □ ■ △ △ △ / | ▲ ▲ ▲ / 2000PCS

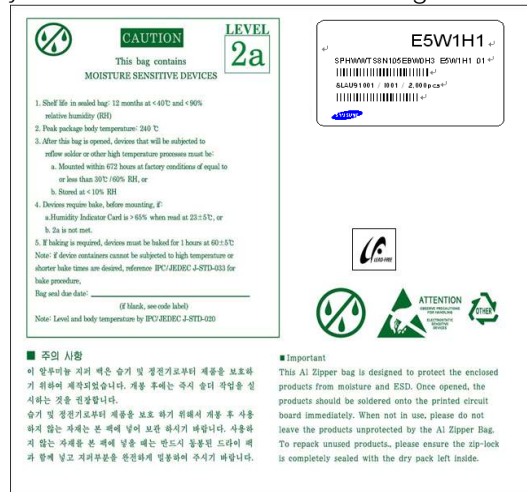
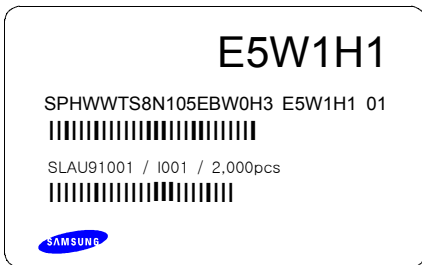
- : Production Site (S:SAMSUNG LED, G:Gosin China)
- ◎ : L (LED)
- ◇ : Product State (A:Normality, B:Bulk, C:First Production, R:Reproduction, S:Sample)
- ◆ : Year (S:2008, T:2009, U:2010...)
- : Month (1 ~ 9, A, B)
- : Day (1 ~ 9, A, B ~ V)
- △ : SAMSUNG LED Product Number (1 ~ 999)
- ▲ : Reel Number (1 ~ 999)

## 12. Reel Packing Structure

### 1) Reel



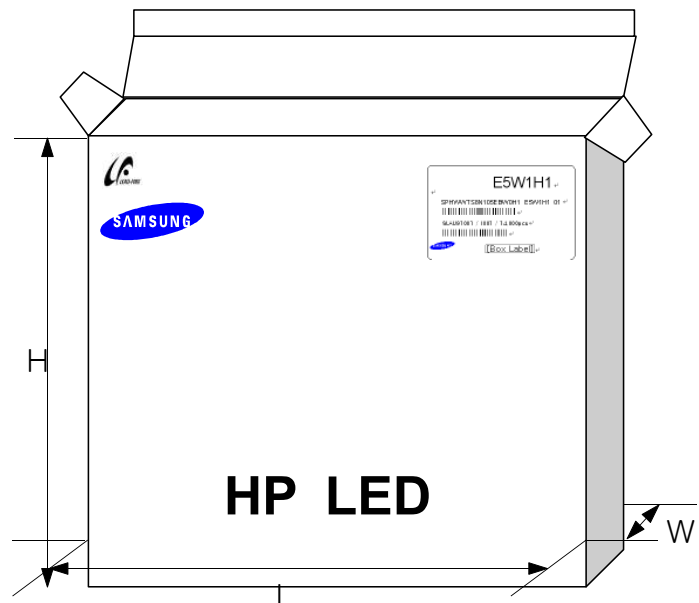
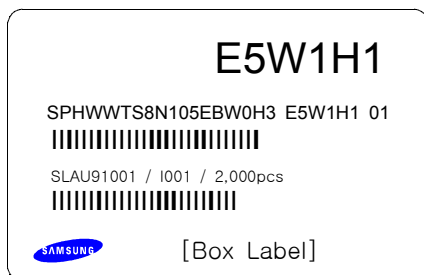
### 2) Aluminum Bag



### 3) Inner Box

Material : Paper(SW3B(B))

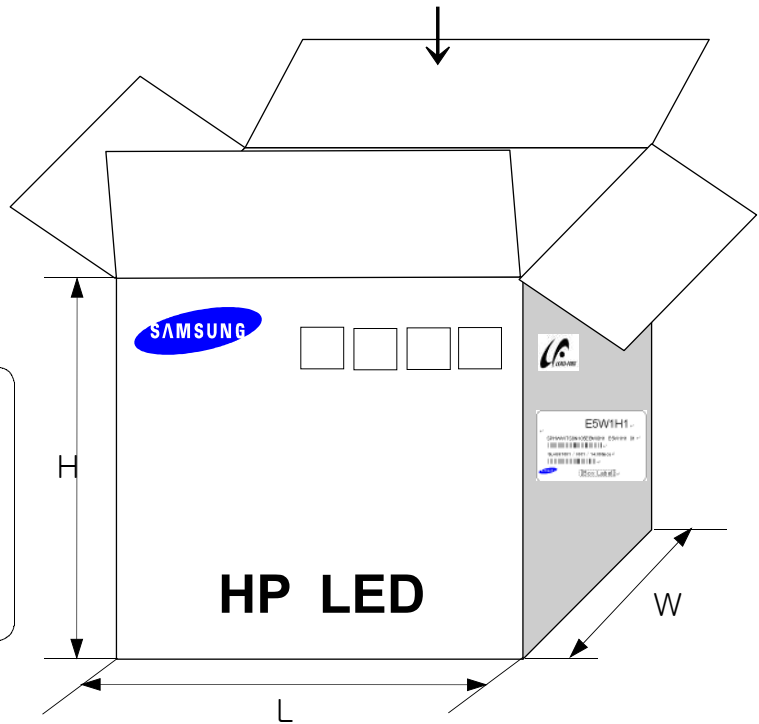
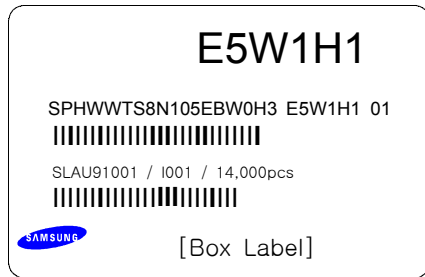
TYPE	SIZE(mm)		
	L	W	H
13inch	335	45	335




#### 4) Carton Box

Material : Paper(SW3B(B))

TYPE	SIZE(mm)		
	L	W	H
13inch	350	350	350



# 13. Aluminum Vinyl 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

**E5W1H1**

SPHWWMTS8N105EBW0H3 E5W1H1 01



SLAU91001 / 1001 / 2,000 pcs



**주의 사항**

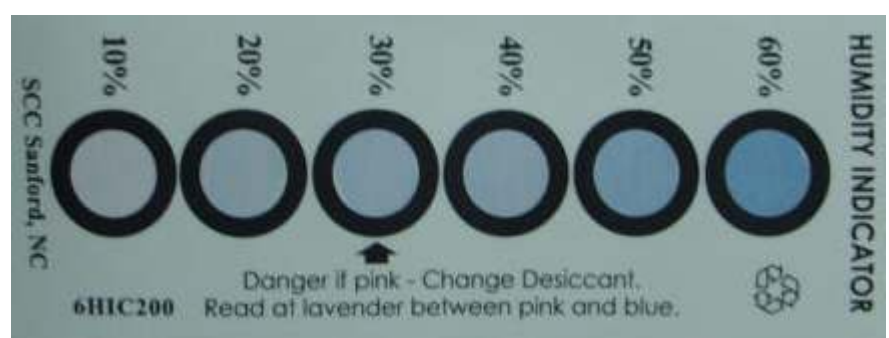
이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

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 Vinyl Bag



## 14. Precaution for Use

- 1) For over-current-proof function, customers are recommended to apply resistors to prevent sudden change of the current caused by slight shift of the voltage.
- 2) This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When washing is required, IPA is recommended to use.
- 3) When the LEDs illuminate, operating current should be decided after considering the ambient maximum 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 by a sealed container with nitrogen gas injected. (Shelf life of sealed bags : 12 months, temp. 0~40℃, 20~70%RH)
- 5) After storage bag is open, device subjected to soldering, solder reflow, or other high temperature processes must be:
  - a. Mounted within 168 hours (7days) at an assembly line with a condition of no more than 30℃/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 is >60% at 23±5℃.
- 8) Devices must be baked for 24hours at 65±5℃, if baking is required.
- 9) The LEDs are sensitive to the static electricity and surge. 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 leak current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.

- 10) When handling LED with tweezers, the LED Should only be held by the polymer body, not by the encapsulant or LENS.
- 11) The use of appropriate nozzle for the LED recommended. For the recommended nozzle size, refer to the figure at the below.  
Inner diameter of nozzle  $\geq \Phi 6.1\text{mm}$
- 12) Do not stack assembled PCBs together. Since silicone is a soft material, abrasion between two PCB assembled with silicone encapsulated LED might cause catastrophic failure of the LEDs due to damage to encapsulant and wire and LED detachment.







Test Report No. F690501/LF-CTSAYAA10-41879

Issued Date: December 22, 2010

Page 2 of 5

Sample No. : AYAA10-41879.001  
 Sample Description : LED PKG  
 Item No./Part No. : Sunnix8 PKG(White)

**Heavy Metals**

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, ICP	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, ICP	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, ICP	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.

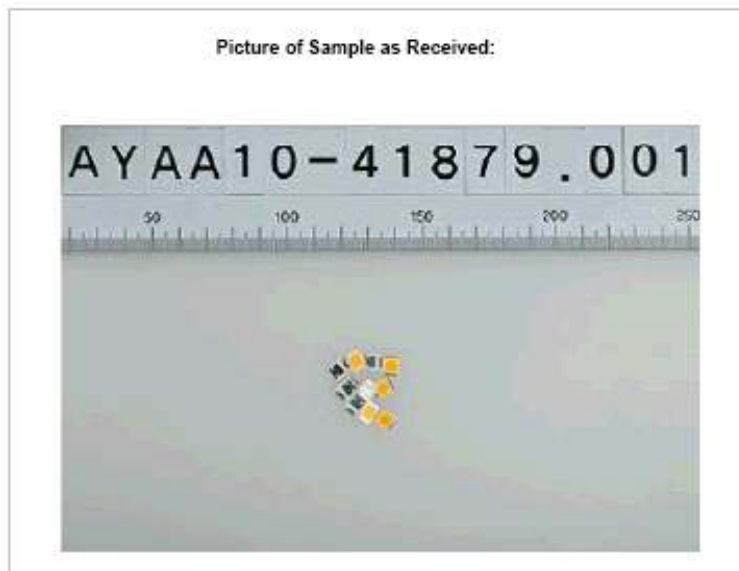
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 Unless otherwise stated, this report is valid only for the sample(s) listed and such samples are reserved for 10 days only.

**Sample No.** : AYAA10-41879.001  
**Sample Description** : LED PKG  
**Item No./Part No.** : Sunnix8 PKG(White)

**Halogen Contents**

Test Items	Unit	Test Method	MDL	Results
Bromine(Br)	mg/kg	BS EN 14582:2007 , IC	30	N.D.
Chlorine(Cl)	mg/kg	BS EN 14582:2007 , IC	30	N.D.

Picture of Sample as Received:



- 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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