

DATE OF ISSUE : 2009. 08. 25

SPECIFICATION

MODEL : SPHWHTS6D30B

[Rank : $V_F(S1, S2)$, CIE($P0, Q0, R0, S0, T0, U0, V0, W0$),
 $\Phi_V(V1, W1, X1, Y1, Z1)$]

HIGH POWER LED - SUNNIX6

CUSTOMER		
CHECKED	CHECKED	APPROVED
Preliminary		

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

SAMSUNG LED CO.,LTD.
314, MAETAN3- DONG, YEONGTONG- GU,
SUWON- SI, GYUNGGI- DO, KOREA, 443- 743

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1. Product Outline

1) Features

- Plastic Molded Lead Frame Type : 8.0 mm, 8.0 mm, 3.9 mm
- Built In 9 LED Chips
- Beam View Angle($\Delta\theta$) : 120 °
- Lead(Pb) Free Product : RoHS Compliant

2) Applications

- General Illumination
- Down Lighting
- Decorative Lighting

2. Absolute Maximum Rating

- Operation Forward Current 250 mA
- Peak Pulsed Forward Current 350 mA
(Duty 1/10 and Pulse Width 10 msec)
- Reverse Voltage 16.5 V
- 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) 120 °C

3. Characteristics

1) Electrical properties ($T_a = 25$ °C)

Parameter	Symbol	Condition	Rank	Min.	Typ.	Max.	Unit	
Reverse Voltage	V_R	$I_F = 5$ mA	-	12.0	-	16.5	V	
Forward Voltage	V_F	$I_F = 250$ mA	S0	S1	8.9	-	10.0	V
				S2	10.0	-	11.0	

2) Luminous Flux ($T_a = 25$ °C)

Rank	Symbol	Condition	Min.	Typ.	Max.	Unit	
V5	V1	Φ_V	$I_F = 250$ mA	150	-	170	lm
	W1			170	-	190	
	X1			190	-	210	
	Y1			210	-	230	
	Z1			230	-	250	

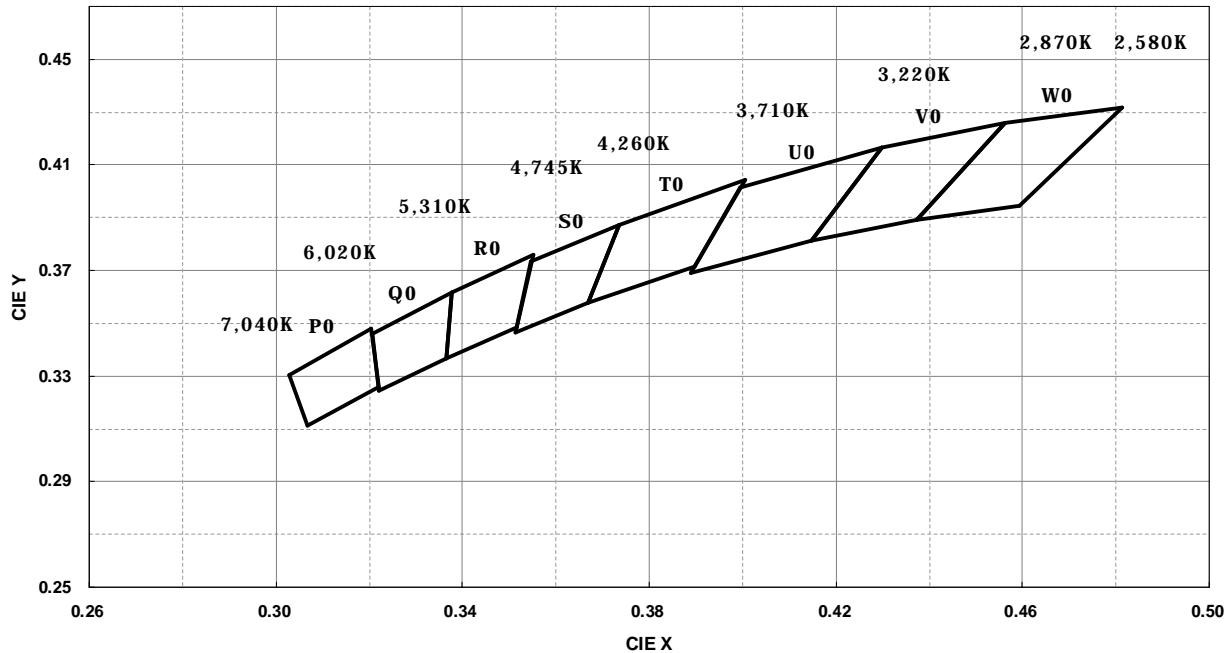
3) Chromaticity Coordinates ($T_a = 25\text{ }^\circ\text{C}$)

Rank	CCT(K)	Condition	CCx				CCy				
P8	P0	7040~6020	$I_F = 250\text{ mA}$	0.3205	0.3028	0.3068	0.3221	0.3481	0.3304	0.3113	0.3261
	Q0	6020~5310		0.3376	0.3207	0.3222	0.3366	0.3616	0.3462	0.3243	0.3369
	R0	5310~4745		0.3551	0.3376	0.3366	0.3515	0.376	0.3616	0.3369	0.3487
	S0	4745~4260		0.3736	0.3548	0.3512	0.367	0.3874	0.3736	0.3465	0.3578
	T0	4260~3710		0.4006	0.3736	0.367	0.3898	0.4044	0.3874	0.3578	0.3716
	U0	3710~3220		0.4299	0.3996	0.3889	0.4147	0.4165	0.4015	0.369	0.3814
	V0	3220~2870		0.4562	0.4299	0.4147	0.4373	0.426	0.4165	0.3814	0.3893
	W0	2870~2580		0.4813	0.4562	0.4373	0.4593	0.4319	0.426	0.3893	0.3944

- ※ Tolerance : $V_F : \pm 0.1$, $\Phi_V : \pm 10\%$, CCx CCy : ± 0.02
- ※ Color Rendering Index (Ra) : Typ.75 (CIE: P0,Q0,R0,S0,T0)
- ※ Color Rendering Index (Ra) : Typ.80 (CIE: U0,V0,W0)

4. Chromaticity Diagram

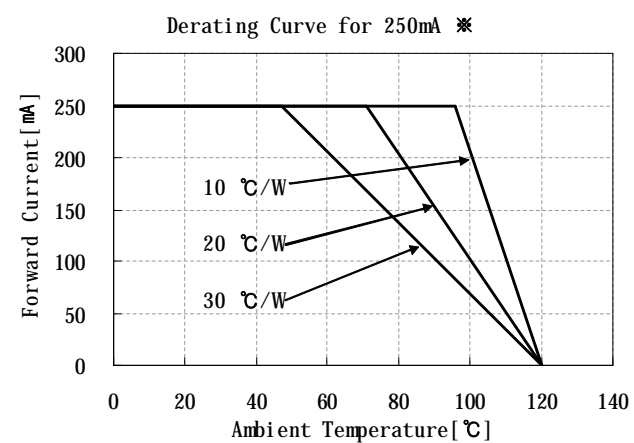
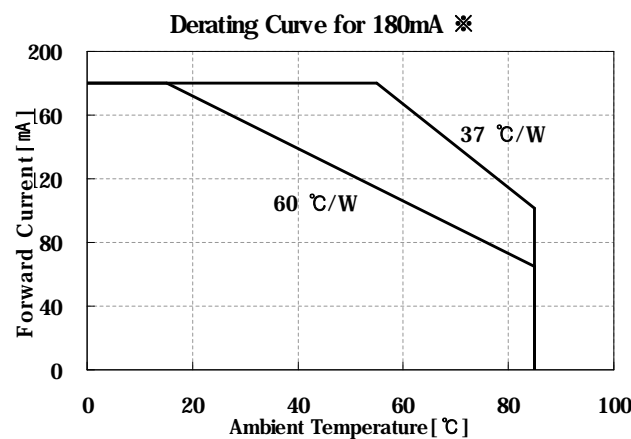
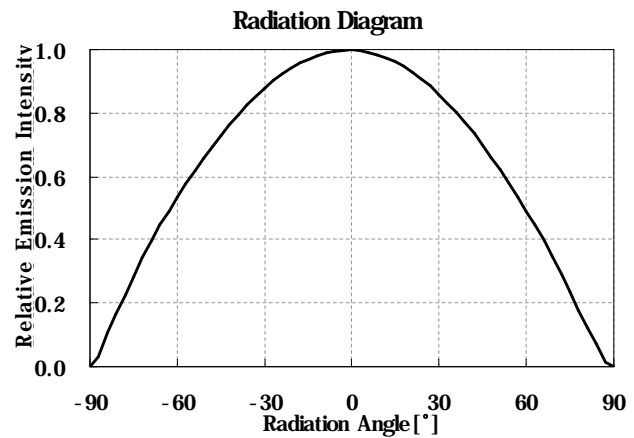
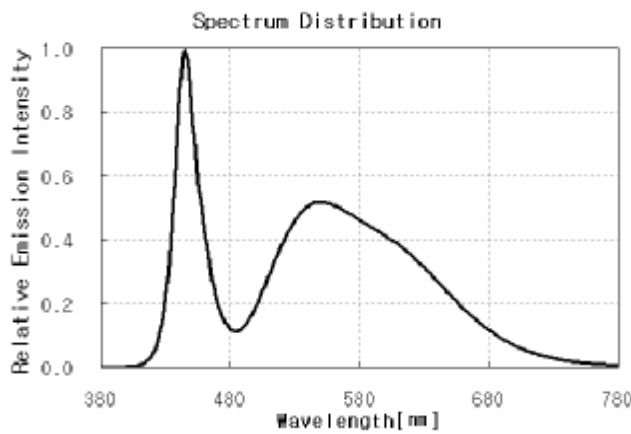
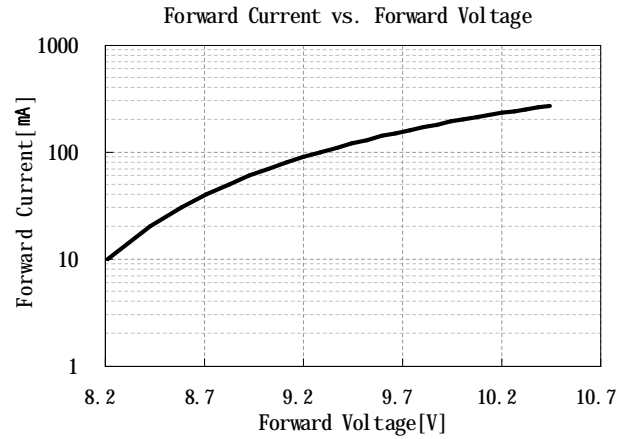
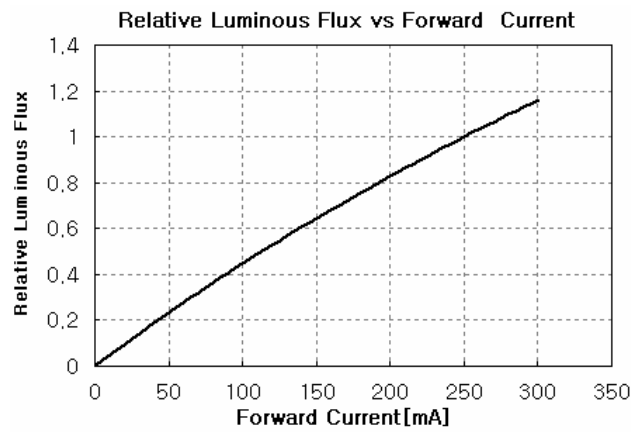
CIE Diagram



Approved Rank

Symbol	V_F	CIE	Φ_V
Rank	S1, S2	P0, Q0, R0, S0, T0, U0, V0, W0	V1, W1, X1, Y1, Z1

5. Typical Characteristic Graphs



※ Thermal Resistance Test Conditions

- Junction to ambient thermal resistance
- JEDEC Standard JESD 51-2,3

JESD 51-2 : Integrated Circuits Thermal Test Method Environmental Conditions

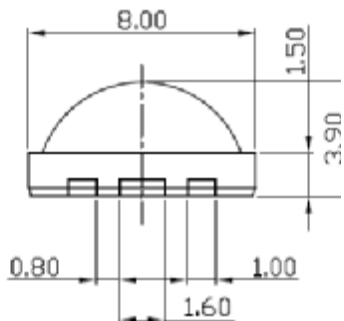
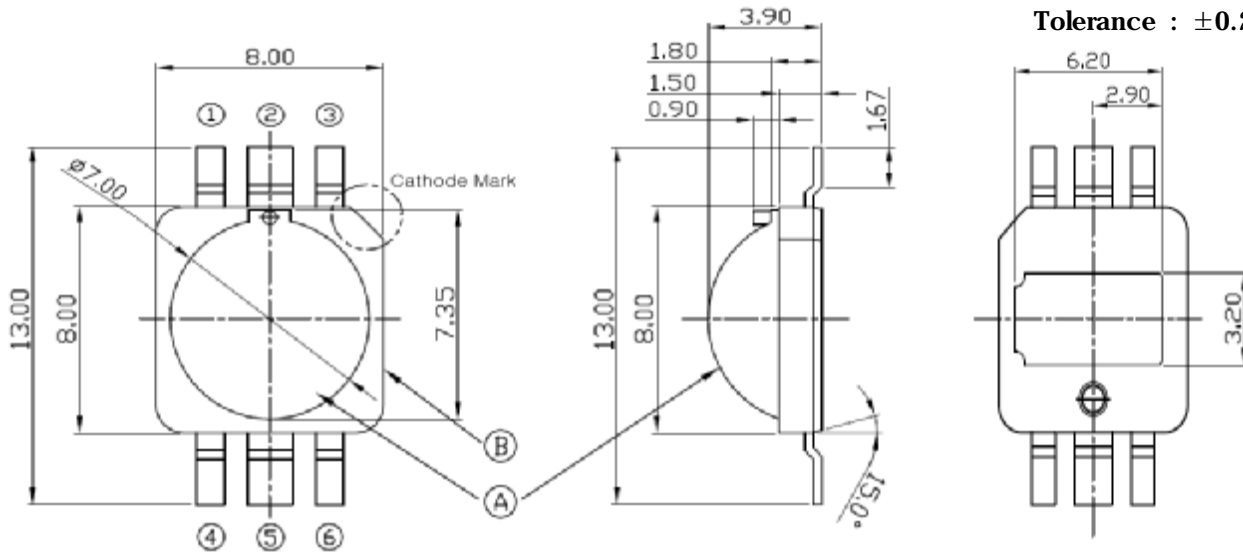
- Natural Convection (Still Air)

JESD 51-3 : Low Effective Thermal Conductivity Test Board for Leaded Surface Mount Package

6. Outline Drawing and Dimension

Unit : mm

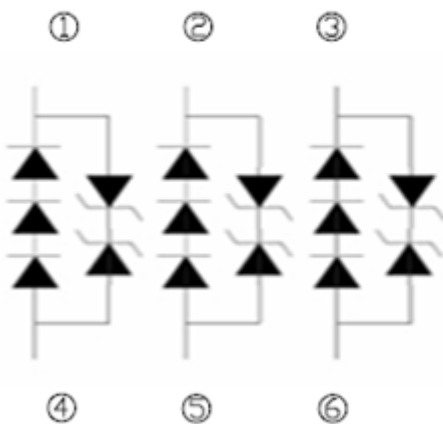
Tolerance : ± 0.2



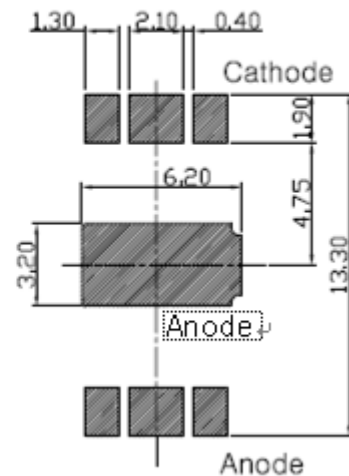
Pick and Place

1. Do not place pressure on the encapsulating resin ("A")
2. The maximum compressing force is 15N on the polymer ("B")

Circuit



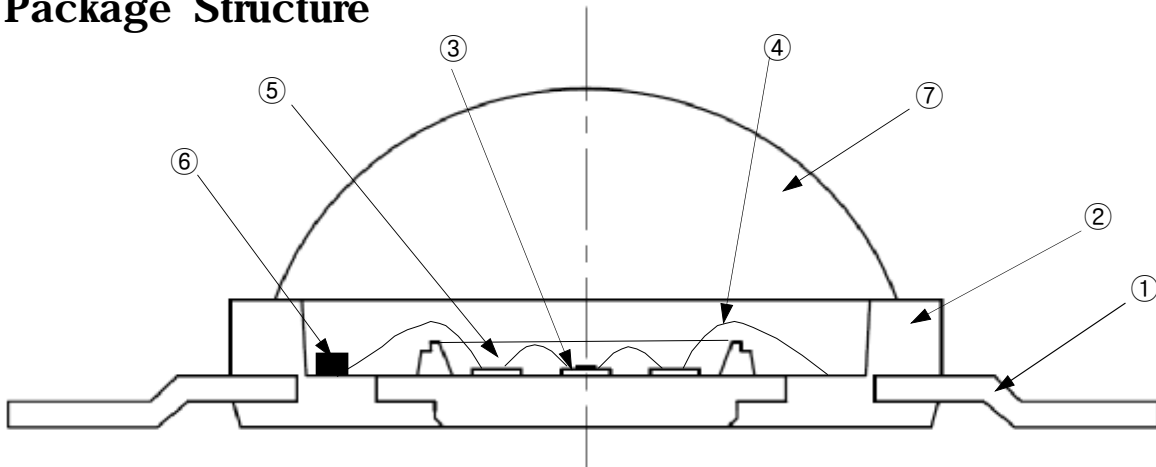
Solder Pattern for Surface Mount



Remarks

Make sure that the heat sink is electrically connected to the Anode.
Heat sink is to be soldered, If not, use the heat conductive adhesive.

7. Package Structure

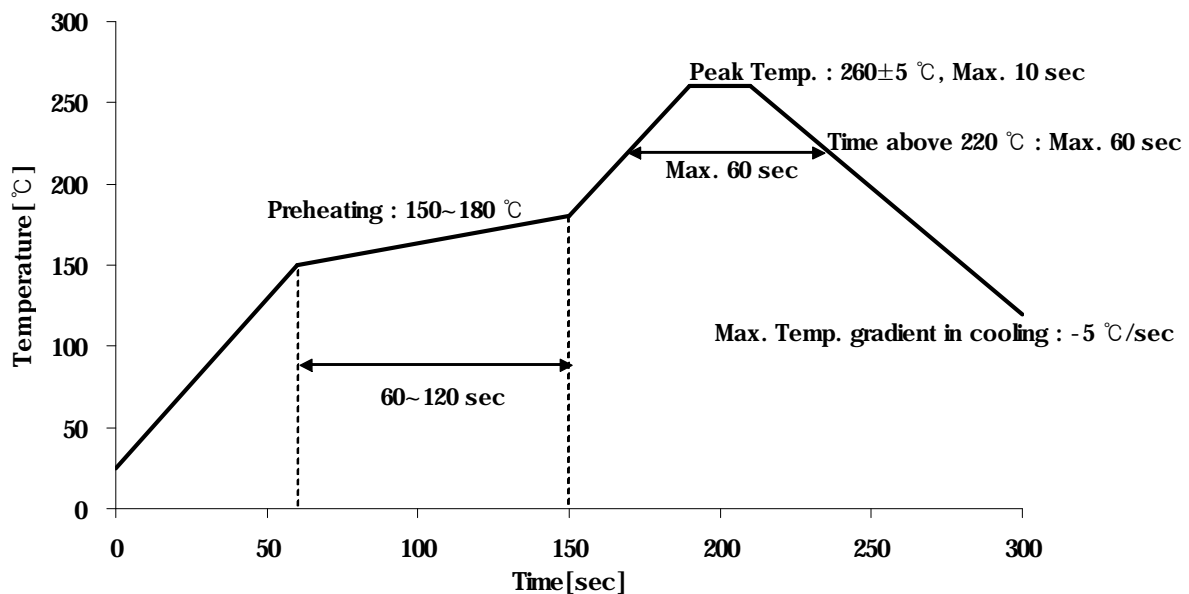


No	Component	Material
①	Frame	Copper frame(Silver plated)
②	Package	Heat-resistant polymer
③	LED chip	GaN/Al ₂ O ₃
④	Wire	Gold wire
⑤	Encapsulant	Silicone + Phosphor
⑥	Zener diode	Si
⑦	Lens	Silicone

8. Solder Conditions

1) Reflow Conditions (Pb-Free)

Reflow Frequency : 2 time max.

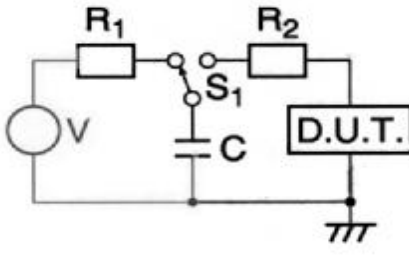


2) For Manual Soldering

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

9. 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, 60 % 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 180 mA	100 cycles
Reflow (Pb- Free)	Peak 260±5 °C for 10 sec	3 times
ESD(HBM)	 <p style="text-align: center;">$R_1 : 10 \text{ M}\Omega$, $R_2 : 1.5 \text{ k}\Omega$, $C : 100 \text{ pF}$</p>	3 times (± 5 kV)

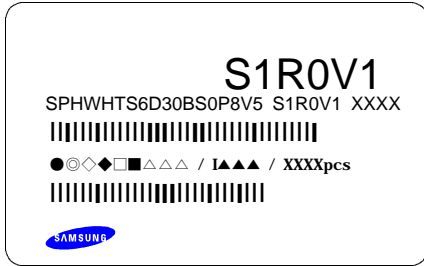
※ Max. DC current is depending on maximum current derating curve.

2) Criteria for Judging the Damage

Item	Symbol	Test Condition	Limit	
			Min	Max
Forward Voltage	V_F	$I_F = 250 \text{ mA}$	-	U.S.L.*1.2
Luminous Flux	Φ_V	$I_F = 250 \text{ mA}$	L.S.L.*0.5	-
Reverse Voltage	V_R	$I_R = 5 \text{ mA}$	-	U.S.L.*2.0

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

11. Label Structure



Rank Code

/S1/ : VF Rank (refer to page 3)

/R0/ : Chromaticity Coordinate Rank, CIE (refer to page 4)

/V1/ : Luminous Flux (refer to page 3)

12. Lot Number

The Lot number is composed of the following characters

●◎◇◆□■△△△ / I▲▲▲ / 1000PCS

● : Production Site (S:SAMSUNG LED, G:Gosin China, L:SOLLEDS)

◎ : 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)

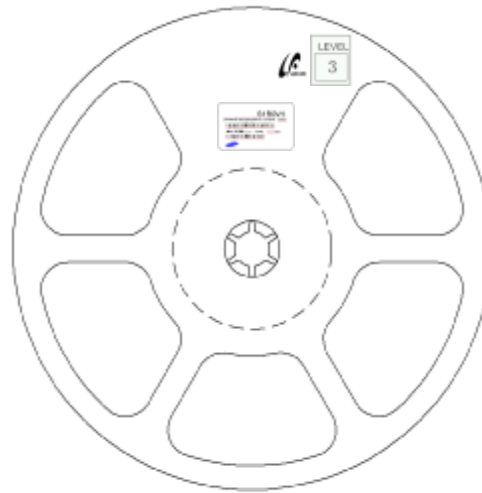
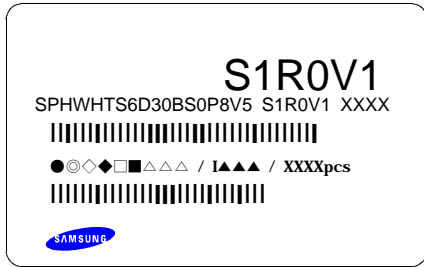
■ : Day (1 ~ 9, A, B ~ V)

△ : SAMSUNG LED Product Number (1 ~ 999)

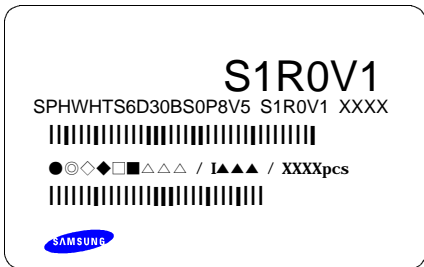
▲ : Reel Number (1 ~ 999)

13. Reel Packing Structure

1) Reel



2) Aluminum Bag



Humidity Indicator Card



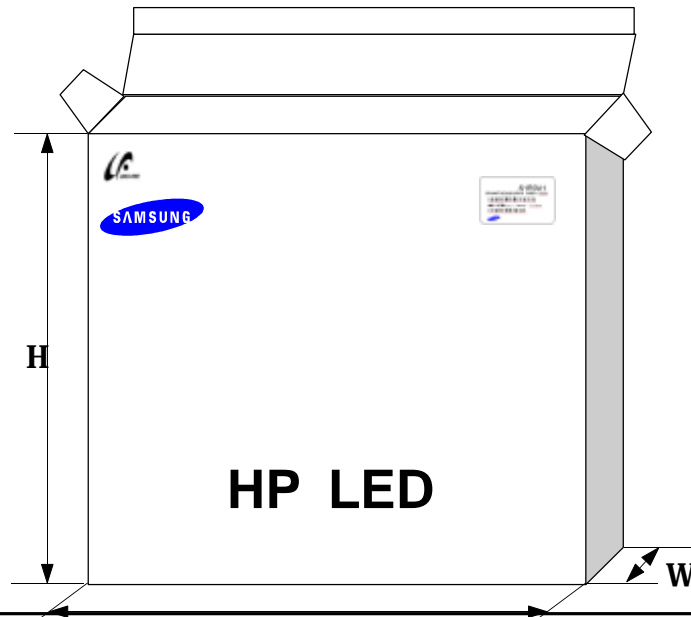
Silica gel



3) Inner Box

Material : Paper(SW3B(B))

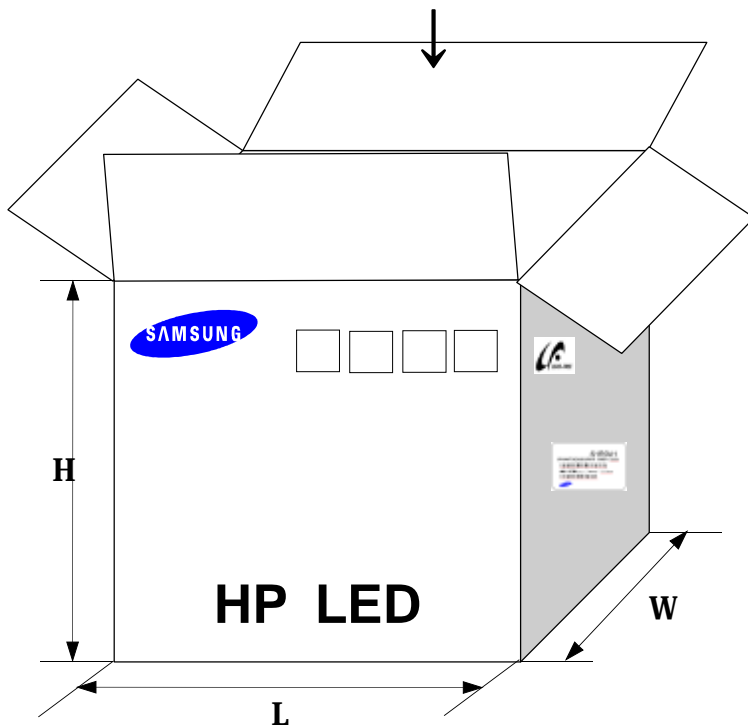
TYPE	SIZE(mm)		
	L	W	H
13inch	335	45	335



4) Carton Box

Material : Paper(SW3B(B))

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



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°C, 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 72 hours (3days) 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 is >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. 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.

14. Precaution for Use (취급상 주의사항)

- 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.

과전류 방지를 위해 전압의 미세한 이동에 의해 야기되는 전류의 순간 변화를 방지하기 위해 저항 등의 설치를 권장함.

- 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.

제품은 물, 오일, 유기물과 같은 액체 타입에서의 사용은 제한되며, 세정이 필요할 시에는 IPA 사용을 권장함.

- 3) When the LEDs illuminate, operating current should be decided after considering the ambient maximum temperature.

LED의 발광 시, 동작 전류는 주변 최고온도를 고려하여 결정되어야 함.

- 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 SEMCO, they should be packed by a sealed container with nitrogen gas injected. (Shelf life of sealed bags : 12 months, temp. 0~40°C, 20~70%RH)

LED의 보관은 청정한 환경에서 보존되어야 하며, 만약 삼성전기로부터 공급받는 후 3개월 또는 그 이상 보관이 필요하다면 질소 가스를 동봉한 보존용기에 보관되어야 함. (보존 bag의 수명 : 12 개월, 보존 온도 0~40°C, 습도 20~70%RH)

- 5) After storage bag is open, device subjected to soldering, solder reflow, or other high temperature processes must be:

보존 Bag이 개봉된 후에, 납땀이나 reflow등의 높은 온도에 노출되는 제품은 다음의 사항에 부합되어야 함.

- a. Mounted within 168 hours (7days) at an assembly line with a condition of no more than 30°C/60%RH,

- a. 제품은 30°C/60%RH보다 같거나 낮은 조립조건에서 168시간(7일) 이내에 조립되어야 함.

- b. Stored at <10% RH.

- b. 10% 이하의 상대습도에서 보관되어야 함.

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

사용하지 않은 제품은 방습팩에 넣어 개봉 부위를 달아서 다시 포장한 후, 건조한

장소에서 보관할 것을 권장함

- 7) Devices require baking before mounting, if humidity card reading is >60% at $23\pm 5^{\circ}\text{C}$.**

만약 습도표시카드의 수치가 $23\pm 5^{\circ}\text{C}$ 에서 60% 이상이라면, 제품 실장 전에 **baking**하여야 함.

- 8) Devices must be baked for 24hours at $65\pm 5^{\circ}\text{C}$, if baking is required.**

만약 **baking**이 필요하다면, 제품은 $65\pm 5^{\circ}\text{C}$ 에서 24시간 정도 **baking** 되어야 함.

- 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.**

LED는 정전기 및 서지에 민감한 제품이므로, **LED** 제품을 다룰 시에는 정전기 방지장갑이나 손목밴드를 사용하기를 권장함.

If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices.

만약 절대 허용치를 초과하는 전압이 **LED**에 가해지면, **LED** 소자는 파괴되거나 손상될 수 있음.

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.

손상된 제품은 누설전류의 증가, **Turn on** 전압의 저하, 저 전류에서의 점등불량 등의 이상 거동을 보일 수 있음.

15. Hazard Substance Analysis



Test Report No. F690501/LF-CTSAYAA09-20356R1

Issued Date: July 17, 2009

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To: SAMSUNG LED CO.,LTD.
314, Maetan-dong
Yeongtong-gu
Suwon-city
GYEONGGI-DO
Korea

The following merchandise was submitted and identified by the client as :

Product Name : LED

SGS File No. : AYAA09-20356R1

Received Date : July 14, 2009

Test Performing Date : July 15, 2009

Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results

Test Results : For further details, please refer to following page(s)

Comments : By the applicant's specific request, the sampling and testing was performed only for the part indicated in the photo without disassembly. The client has confirmed that the described item No.s/part No.s are the same with the sample submitted.

Pluto Kim
Cindy Park
Jinee Song/ Testing Person

SGS Testing Korea Co. Ltd.

Jeff Jang / Chemical Lab Mgr

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Test Report No. F690501/LF-CTSAYAA09-20356R1

Issued Date: July 17, 2009

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Sample No. : AYAA09-20356R1.001

Sample Description : LED

Item No./Part No. : SPHWHTS6D30B

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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