DATE OF ISSUE : 2011. 02.14

SPECIFICATION

MODEL : SPHWHTS6D335

[Rank : V_F(S1, S2), CIE(P4, Q4, R4, S4, T4, U4, V4, W4), Φ_V(W1, X1, Y1, Z1)]

HIGH POWER LED - SUNNIX6G

CUSTOMER :		
CHECKED	CHECKED	APPROVED

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

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

Contents

1. Product Outline

1) Features

- Plastic Molded Lead Frame Type : 8.0 ㎜, 8.0 ㎜, 3.9 ㎜
- Built In 6 LED Chips
- Beam View Angle(△θ) : 120 °
- Lead(Pb) Free Product : RoHS Compliant

2) Applications

- General Illumination
- Down Lighting
- Decorative Lighting

2. Absolute Maximum Rating

- Operation Forward Current ····· 250 ㎃
- Peak Pulsed Forward Current ····· 350 ㎃
  (Duty 1/10 and Pulse Width 10 msec)
- Reverse Voltage ····· 16.5 V
- Thermal Resistance ($R_{th\ J\text{-}S}$) ····· ≒ 5 ℃/W
- Operating Temperature Range (T_{OPR}) ····· -40 ℃ ~ 85 ℃
- Storage Temperature Range (T_{STG}) ····· -40 ℃ ~ 110 ℃
- LED Junction Temperature (T_J) ····· 120 ℃

3. Characteristics

1) Electrical properties (T_a = 25 ℃)

Parameter	Symbol	Condition	Rank		Min.	Typ.	Max.	Unit
Reverse Voltage	V_R	I_R = 5 ㎃	-		12.0	-	16.5	V
Forward Voltage	V_F	I_F = 250 ㎃	S0	S1	8.9	-	9.7	V
				S2	9.7	-	10.5	

2) Luminous Flux (T_a = 25 ℃)

Rank		Symbol	Condition	Min.	Typ.	Max.	Unit
W4	W1	Φ_V	I_F = 250 ㎃	170	-	190	lm
	X1			190	-	210	
	Y1			210	-	230	
	Z1			230	-	250	

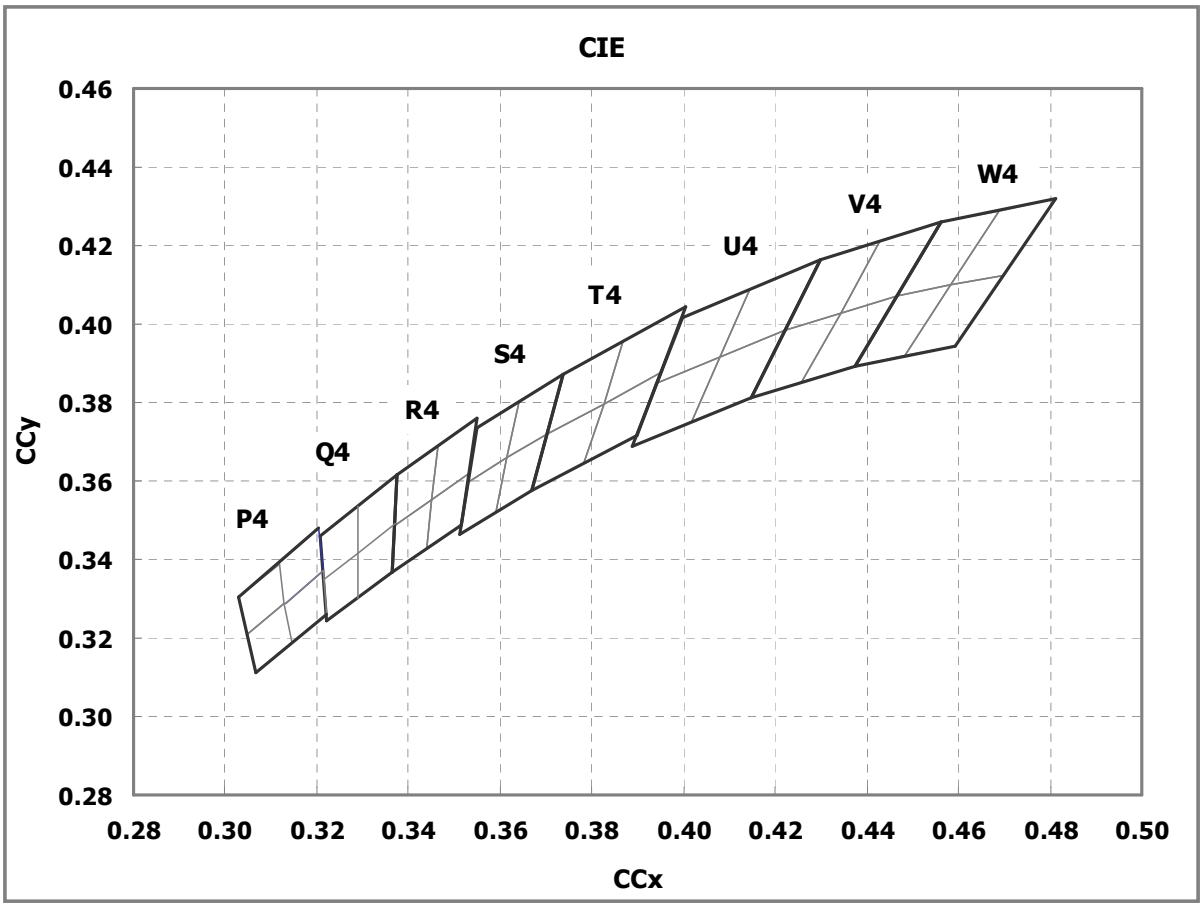
3) Chromaticity Coordinates (T_a = 25 ℃)

Rank		CCT(K)	Condition	CCx				CCy			
P4	PW	6,020~7,040	IF = 250 mA	0.3028	0.3117	0.3130	0.3048	0.3304	0.3390	0.3290	0.3209
	PX			0.3048	0.3130	0.3145	0.3068	0.3209	0.3290	0.3187	0.3113
	PY			0.3117	0.3205	0.3213	0.3131	0.3393	0.3481	0.3371	0.3290
	PZ			0.3131	0.3213	0.3221	0.3145	0.3290	0.3371	0.3261	0.3187
Q4	QW	5,310~6,020	IF = 250 mA	0.3207	0.3290	0.3290	0.3215	0.3467	0.3538	0.3417	0.3350
	QX			0.3215	0.3290	0.3290	0.3222	0.3350	0.3417	0.3300	0.3243
	QY			0.3290	0.3376	0.3371	0.3290	0.3538	0.3616	0.3490	0.3417
	QZ			0.3290	0.3371	0.3366	0.3290	0.3417	0.3490	0.3369	0.3300
R4	RW	4,745~5,310	IF = 250 mA	0.3376	0.3463	0.3451	0.3371	0.3616	0.3687	0.3554	0.3490
	RX			0.3371	0.3451	0.3440	0.3366	0.3490	0.3554	0.3428	0.3369
	RY			0.3463	0.3551	0.3533	0.3451	0.3687	0.3760	0.3620	0.3554
	RZ			0.3451	0.3533	0.3515	0.3440	0.3554	0.3620	0.3487	0.3428
S4	SW	4,260~4,745	IF = 250 mA	0.3529	0.3548	0.3641	0.3615	0.3597	0.3736	0.3804	0.3659
	SX			0.3512	0.3529	0.3615	0.3590	0.3465	0.3597	0.3659	0.3521
	SY			0.3615	0.3641	0.3736	0.3702	0.3659	0.3804	0.3874	0.3722
	SZ			0.3590	0.3615	0.3702	0.3670	0.3521	0.3659	0.3722	0.3578
T4	TW	3,710~4,260	IF = 250 mA	0.3702	0.3736	0.3869	0.3825	0.3722	0.3874	0.3958	0.3798
	TX			0.3670	0.3702	0.3825	0.3783	0.3578	0.3722	0.3798	0.3646
	TY			0.3825	0.3869	0.4006	0.3950	0.3798	0.3958	0.4044	0.3875
	TZ			0.3783	0.3825	0.3950	0.3898	0.3646	0.3798	0.3875	0.3716
U4	UW	3,220~3,710	IF = 250 mA	0.3941	0.3996	0.4146	0.4080	0.3848	0.4015	0.4089	0.3916
	UX			0.3889	0.3941	0.4080	0.4017	0.3690	0.3848	0.3916	0.3751
	UY			0.4080	0.4146	0.4299	0.4221	0.3916	0.4089	0.4165	0.3984
	UZ			0.4017	0.4080	0.4221	0.4147	0.3751	0.3916	0.3984	0.3814
V4	VW	2,870~3,220	IF = 250 mA	0.4221	0.4299	0.4430	0.4342	0.3984	0.4165	0.4212	0.4028
	VX			0.4147	0.4221	0.4342	0.4259	0.3814	0.3984	0.4028	0.3853
	VY			0.4342	0.4430	0.4562	0.4465	0.4028	0.4212	0.4260	0.4071
	VZ			0.4259	0.4342	0.4465	0.4373	0.3853	0.4028	0.4071	0.3893
W4	WW	2,580~2,870	IF = 250 mA	0.4465	0.4562	0.4687	0.4582	0.4071	0.4260	0.4289	0.4099
	WX			0.4373	0.4465	0.4582	0.4483	0.3893	0.4071	0.4099	0.3919
	WY			0.4582	0.4687	0.4813	0.4700	0.4099	0.4289	0.4319	0.4126
	WZ			0.4483	0.4582	0.4700	0.4593	0.3919	0.4099	0.4126	0.3944

※ Tolerance : V_F : ±0.1, Φ_V : ±10 %, CCx CCy : ±0.02

※ Color Rendering Index (Ra) : Typ.82

4. Chromaticity Diagram



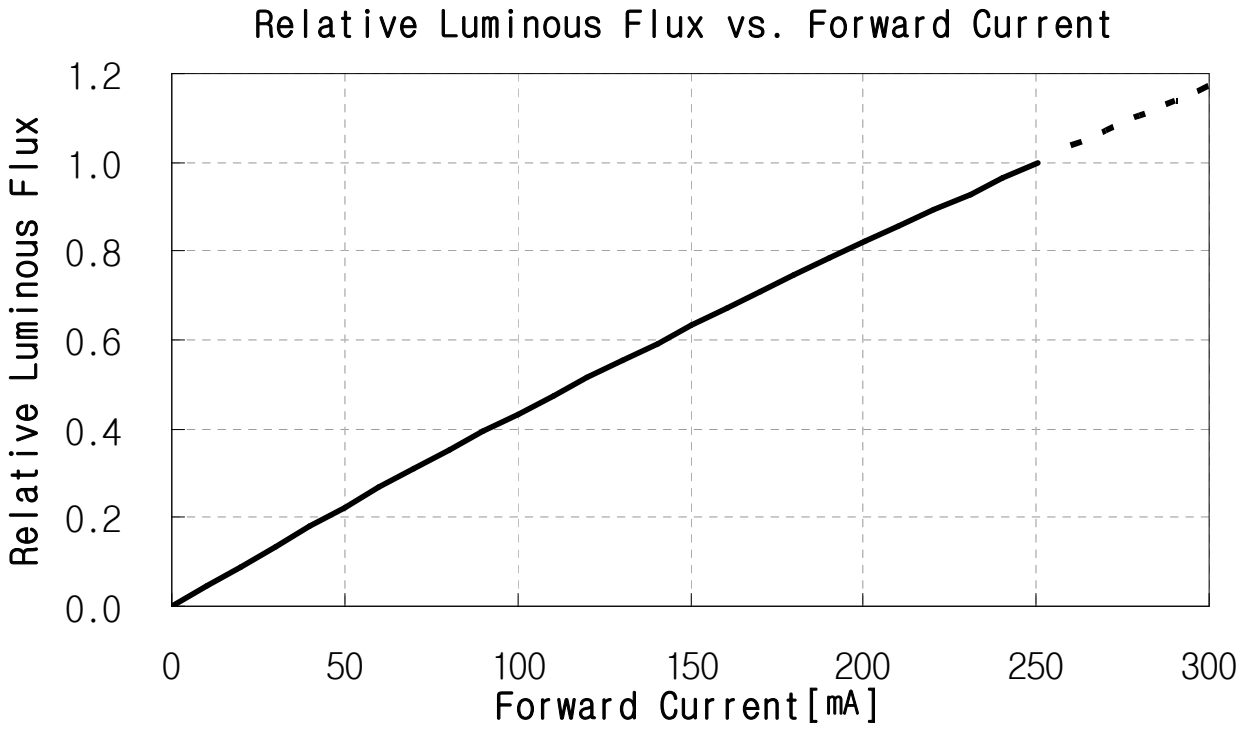
※ Correspondence Table of CIE - Luminious Flux Rank

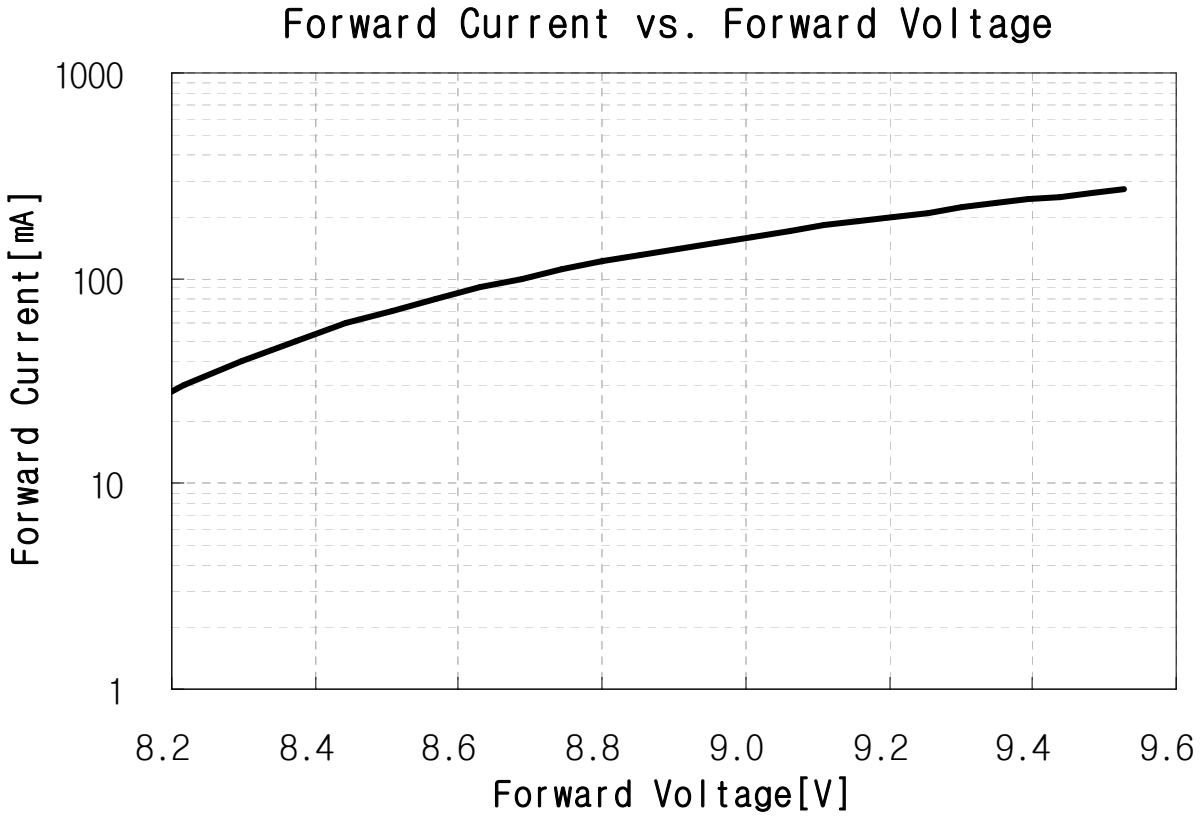
CIE Rank	Luminious Rank			
	W1	X1	Y1	Z1
P4				
Q4				
R4				
S4				
T4				
U4				
V4				
W4				

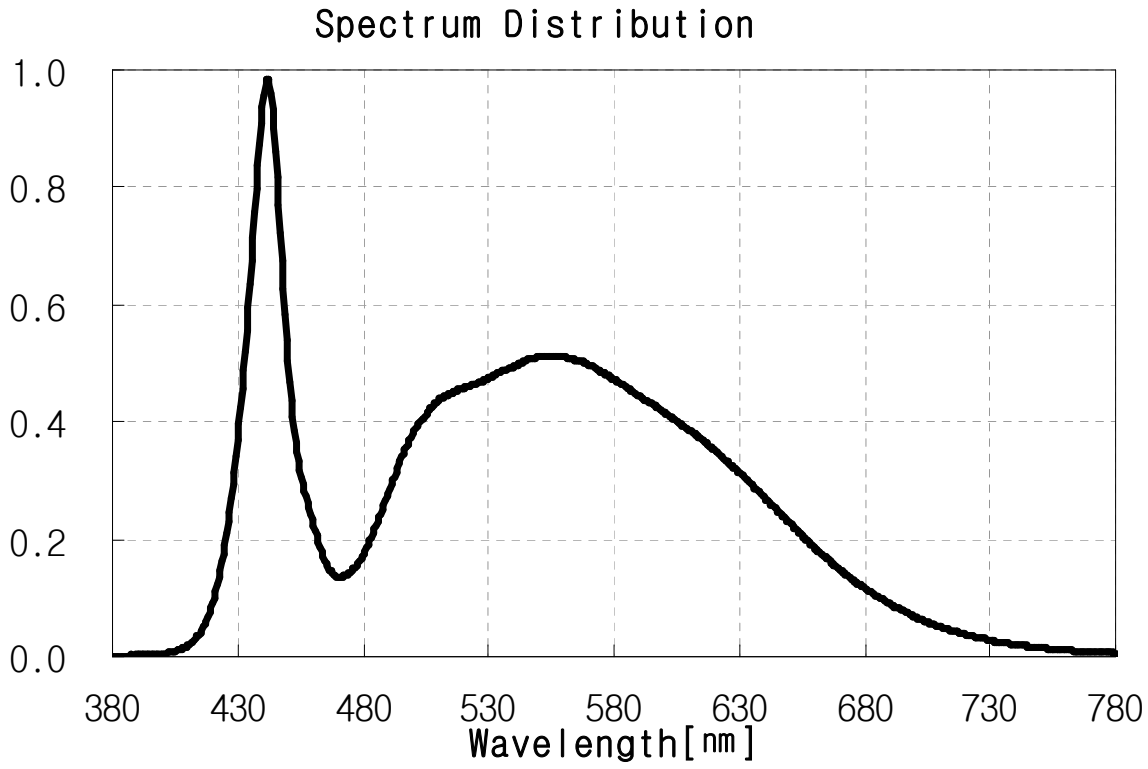
Approved Rank

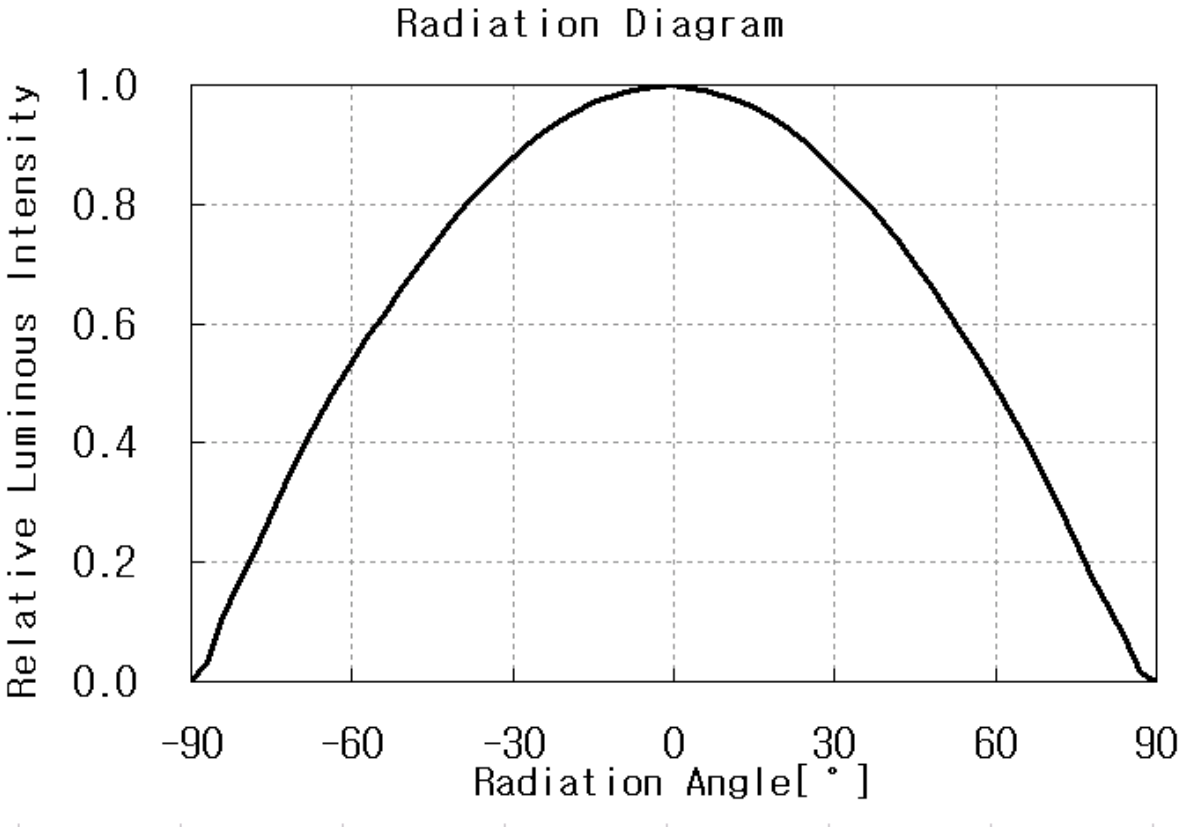
Symbol	V_F	CIE	Φ_V
Rank	S1, S2	P4, Q4, R4, S4, T4, U4, V4, W4	W1, X1, Y1, Z1

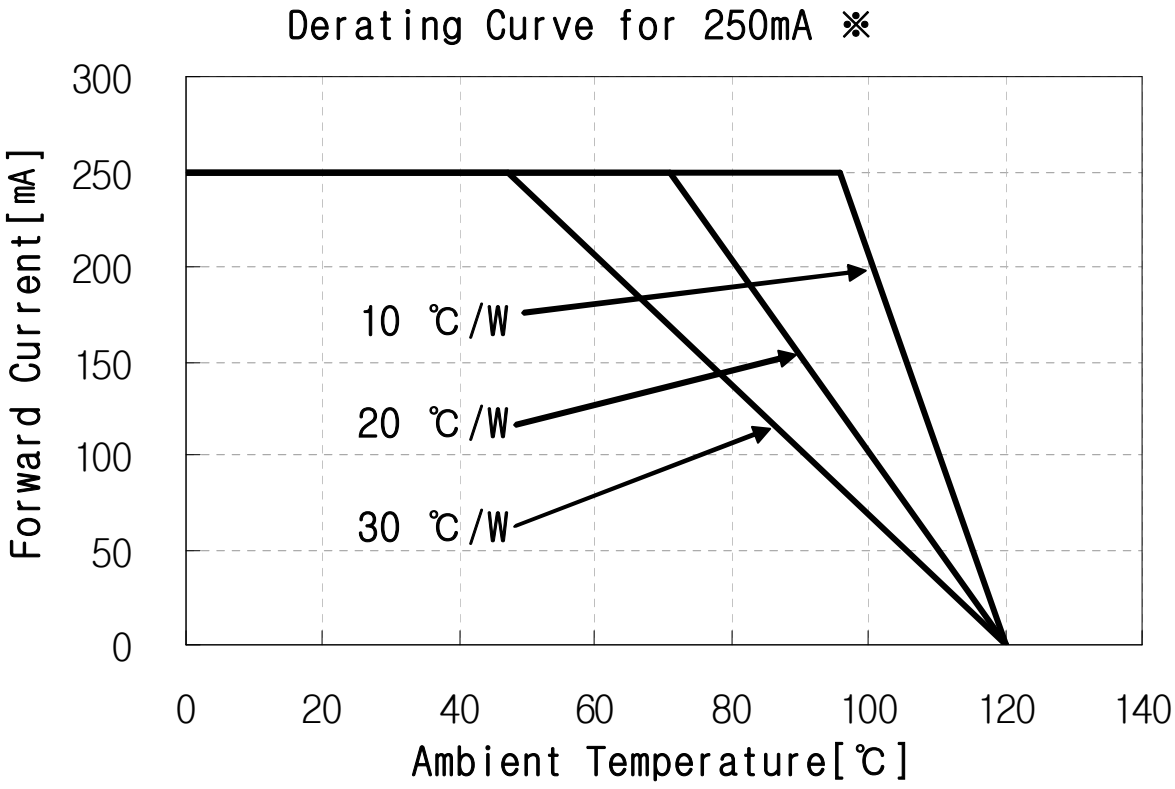
5. Typical Characteristic Graphs

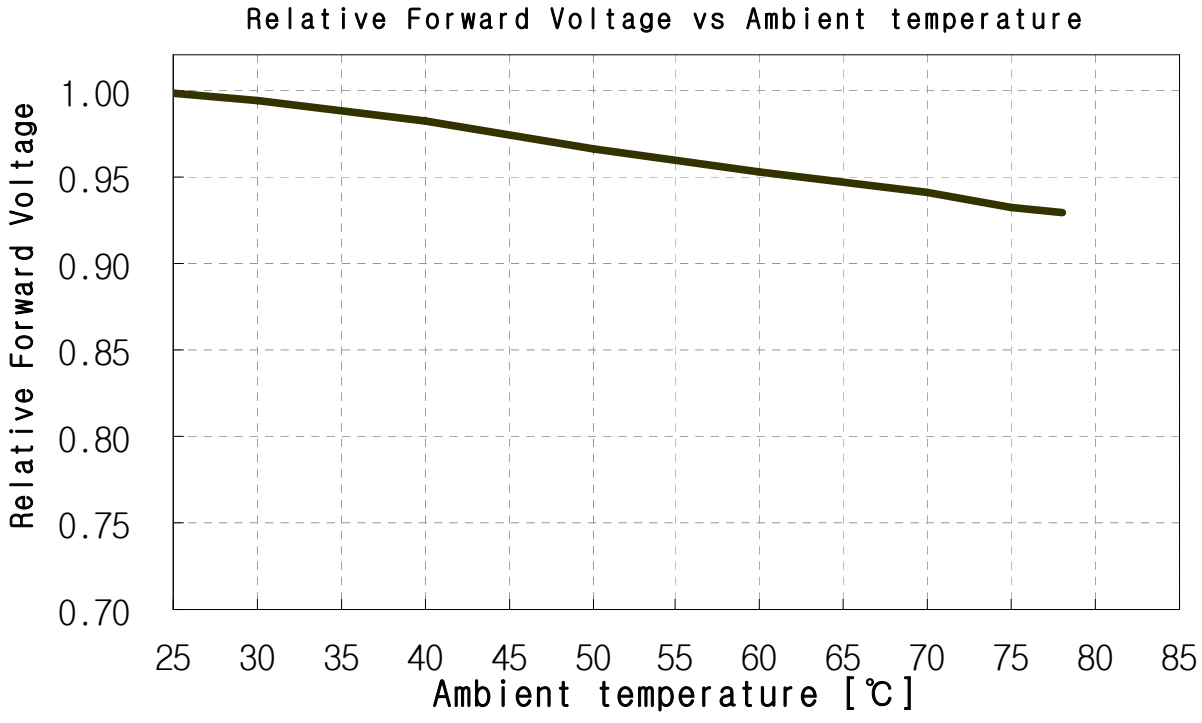





Spectrum Distribution
1.0
0.8
0.6
0.4
0.2
0.0
380
430
480
530
580
630
680
730
780
Wavelength[nm]

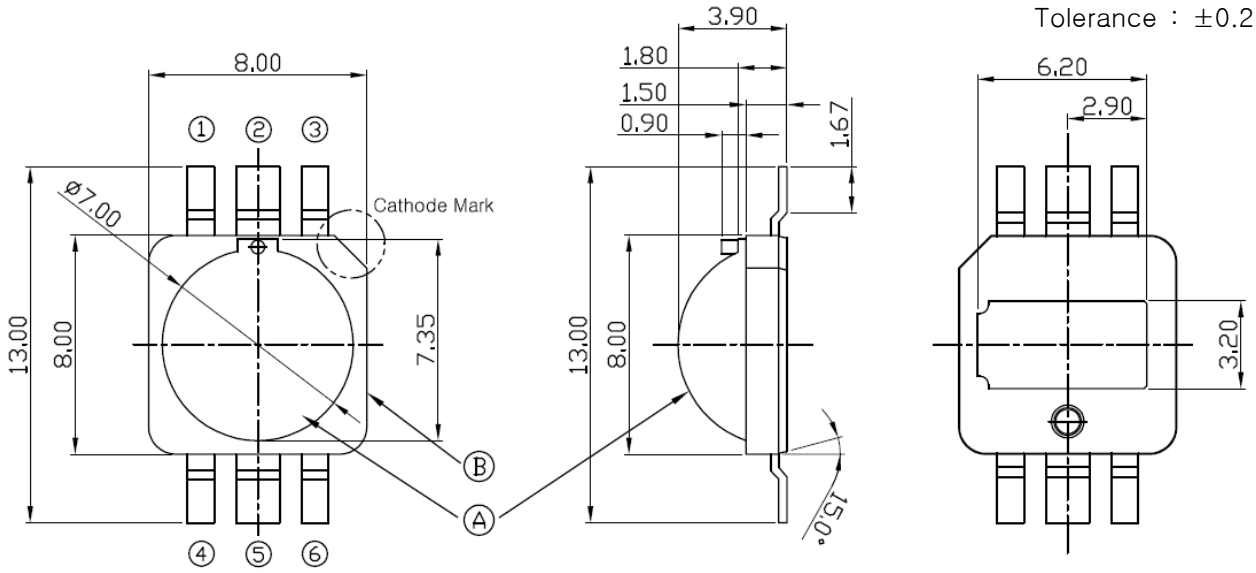

Radiation Diagram
Relative Luminous Intensity
1.0
0.8
0.6
0.4
0.2
0.0
-90
-60
-30
0
30
60
90
Radiation Angle[°]

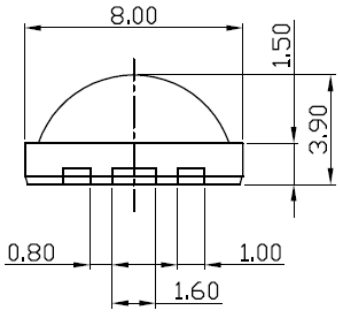

Derating Curve for 250mA ※
Forward Current[mA]
300
250
200
150
100
50
0
10 ℃/W
20 ℃/W
30 ℃/W
0
20
40
60
80
100
120
140
Ambient Temperature[℃]


Relative Forward Voltage vs Ambient temperature
Relative Forward Voltage
1.00
0.95
0.90
0.85
0.80
0.75
0.70
25
30
35
40
45
50
55
60
65
70
75
80
85
Ambient temperature [℃]

6. Outline Drawing and Dimension

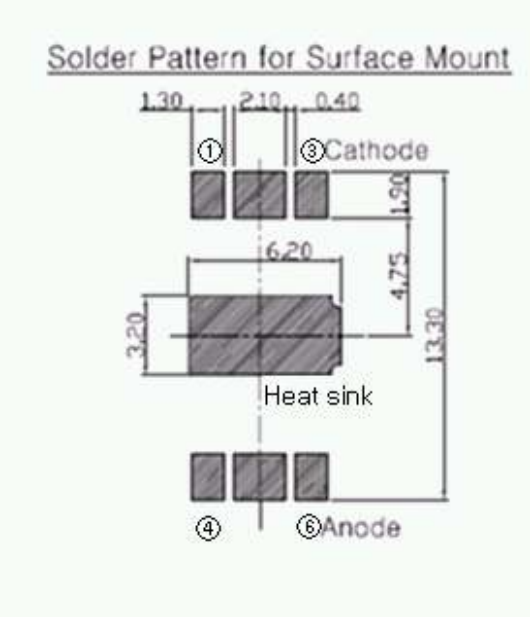
Unit : mm
Tolerance : ±0.2





Pick and Place

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



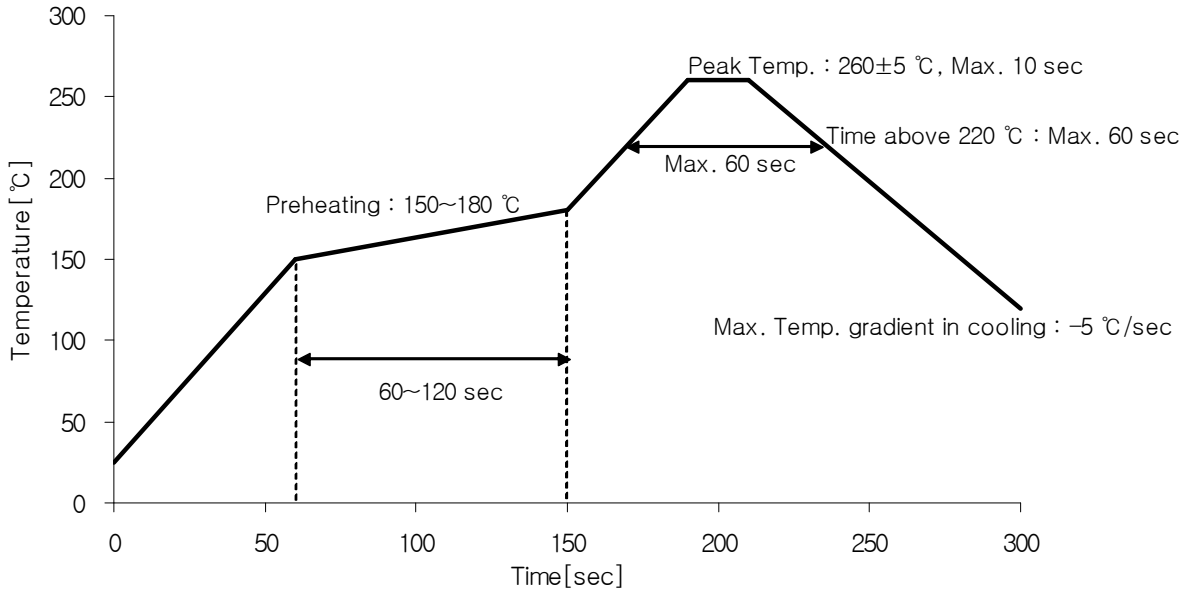
Remarks

* Heat sink is to be soldered, If not, use the heat conductive adhesive.
* This LED has built-in ESD protection device(s) connected in parallel to LED chip(s).

7. Solder Conditions

1) Reflow Conditions (Pb-Free)

Reflow Frequency : 2 time max.

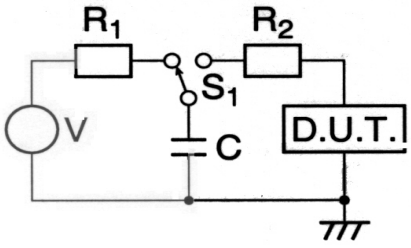


2) For Manual Soldering

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

8. Reliability Test Items and Conditions

1) Test Items

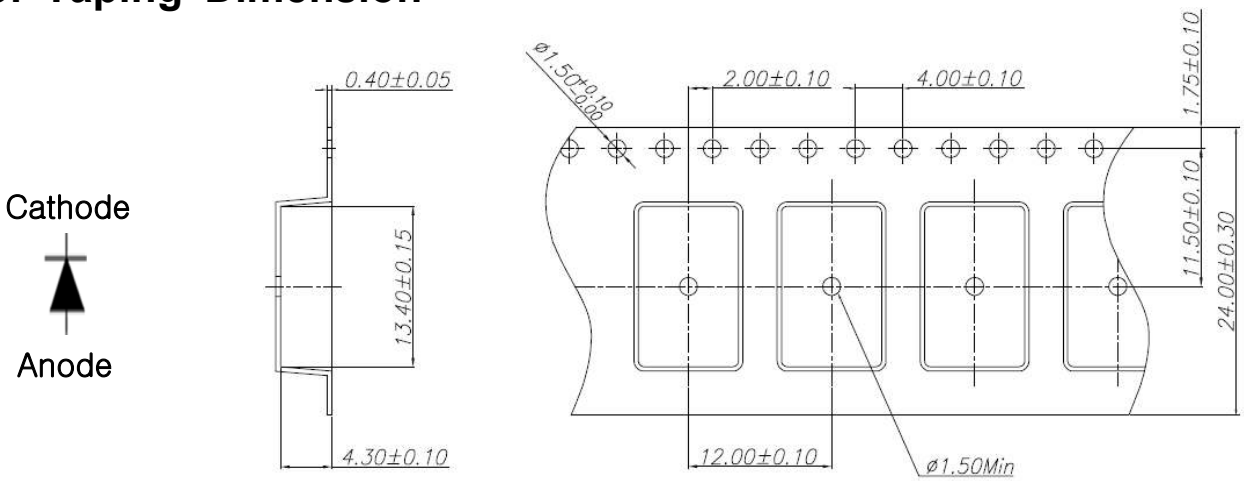
Test Items	Test Conditions	Test Hours/Cycles
Room Temperature life test	25 ℃, I_F = Max DC※	1,000 h
High Temperature humidity life test	85 ℃, 85 % RH, I_F = Max DC※	1,000 h
High Temperature life test	85 ℃, I_F = Max DC※	1,000 h
Low Temperature life test	-40 ℃, I_F = Max DC※	1,000 h
High Temperature Storage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

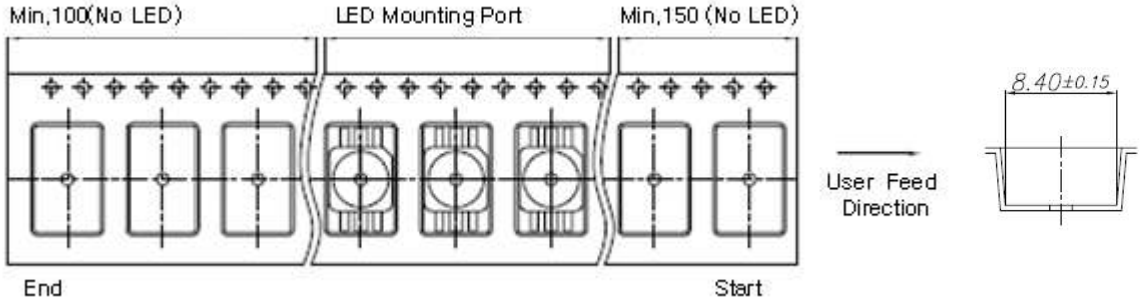
2) Criteria for Judging the Damage

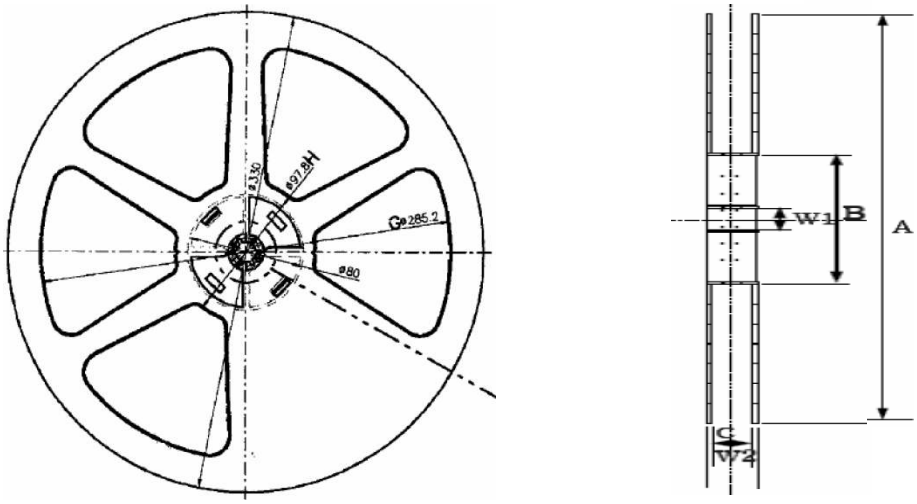
Item	Symbol	Test Condition	Limit	
			Min	Max
Forward Voltage	V_F	IF = 250 mA	-	U.S.L.*1.1
Luminous Flux	Φ_V	IF = 250 mA	L.S.L.*0.3	-
Reverse Voltage	V_R	IR = 5 mA	-	U.S.L.*2.0

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

9. Taping Dimension







Symbol	A	B	C	W1	W2
Dimension(㎜)	330 ± 1	80 ± 1	25 ± 0.5	13 ± 0.3	29.5 ± 1

(1) Quantity : 1,000 Pcs / 13" Reel.

(2) Cumulative Tolerance : Cumulative Tolerance/10 pitches is less than ±0.2 ㎜

(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

10. Label Structure

Rank Code

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

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

/Y1/ : Luminous Flux (refer to page 3)

11. Lot Number

The Lot number is composed of the following characters

●◎◇◆□■△△△ / I▲▲▲ / xxxx PCS

● : 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 (T:2009, U:2010, V:2011...)

□ : Month (1 ~ 9, A, B)

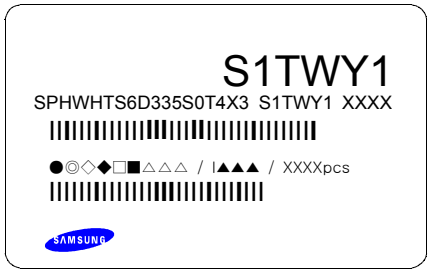
■ : Day (1 ~ 9, A, B ~ V)

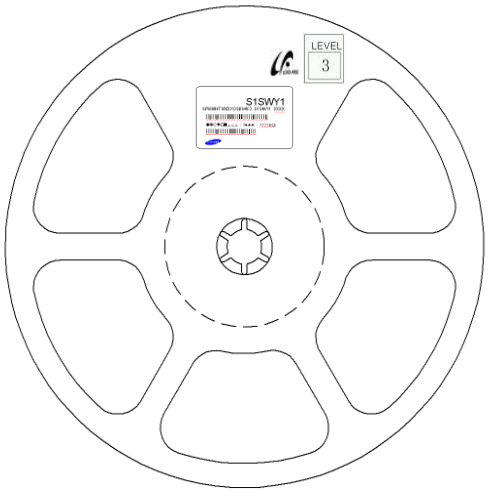
△ : SAMSUNG LED Product Number (1 ~ 999)

▲ : Reel Number (1 ~ 999)

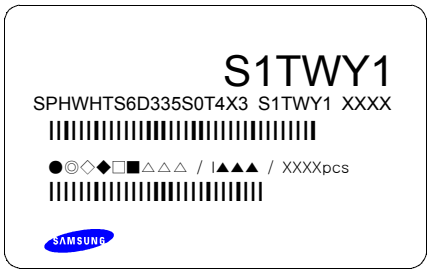
12. Reel Packing Structure

1) Reel





2) Aluminum Bag



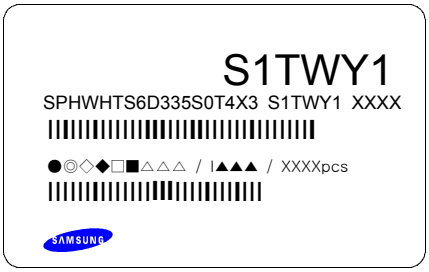
Humidity Indicator Card

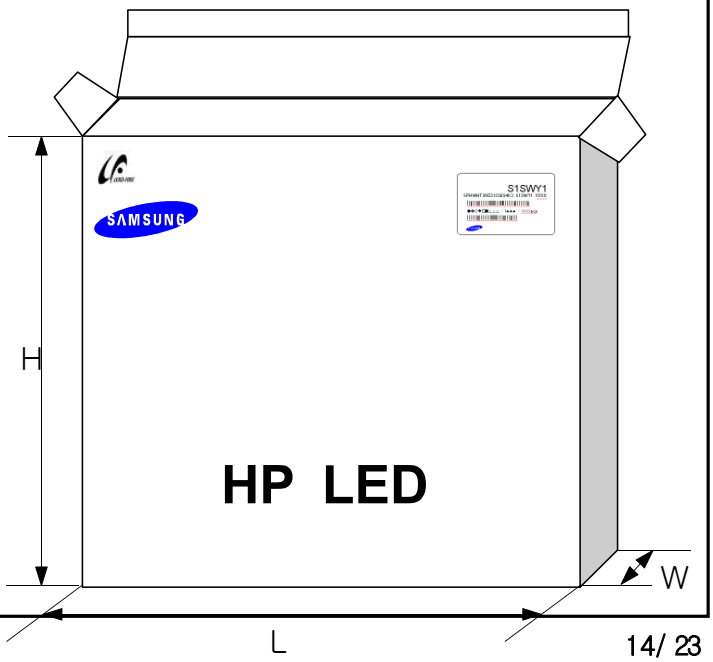
Silica gel

3) Inner Box

Material : Paper(SW3B(B))

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

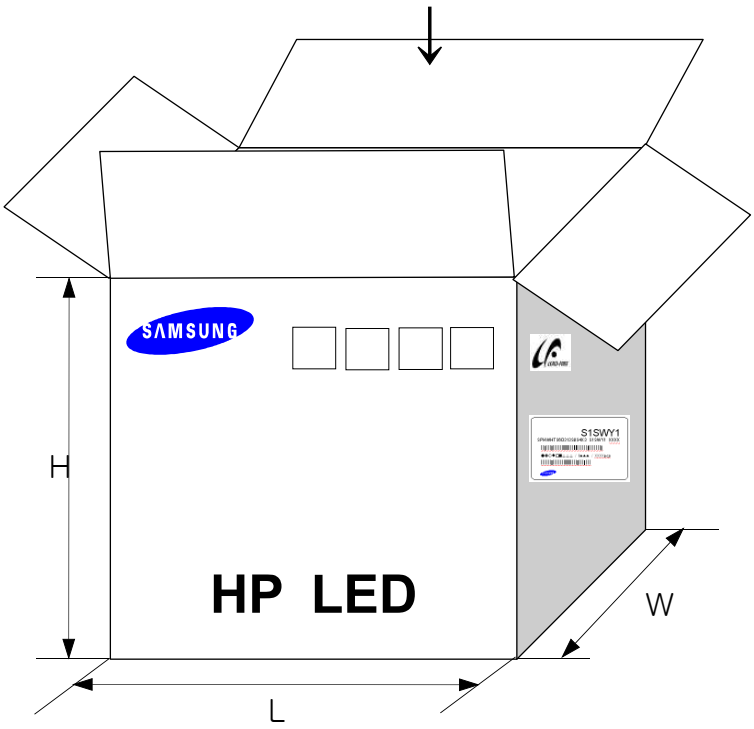




4) Carton Box

Material : Paper(SW3B(B))

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



13. 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 72 hours (3days) 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.

14. Hazard Substance Analysis

SGS

Test Report No. F690501/LF-CTSAYAA11-02853 Issued Date: January 27, 2011 Page 1 of 6

To: **SAMSUNG LED CO., LTD.**
314,Maetan-dong
Yeongtong-gu
Suwon-city
GYEONGGI-DO 443-743
Korea

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

SGS File No.	: AYAA11-02853
Product Name	: LED
Item No./Part No.	: Sunnix6G
Received Date	: Jan 21, 2011
Test Period	: Jan 24, 2011 to Jan 27, 2011
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.

SGS Testing Korea Co. Ltd.

Timothy Jeon
Jinhee Kim
Cindy Park
Jerry Jung/ Testing Person

Jeff Jang / Chemical Lab Mgr

SGS Testing Korea Co.,Ltd.
322, The O valley, 555-9, Hogye-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea 431-080
t +82 (0)31 4808 000 f +82 (0)31 4808 089 http://www.sgslab.co.kr ,www.kr.sgs.com/greenlab

SGS

Test Report No. F690501/LF-CTSAYAA11-02853 Issued Date: January 27, 2011 Page 2 of 6

Sample No. : AYAA11-02853.001

Sample Description : LED

Item No./Part No. : Sunnix6G

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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Sample No. : AYAA11-02853.001
Sample Description : LED
Item No./Part No. : Sunnix6G

Halogen Contents

Test Items	Unit	Test Method	MDL	Results
Fluorine(F)	mg/kg	BS EN 14582:2007 , IC	30	105
Bromine(Br)	mg/kg	BS EN 14582:2007 , IC	30	N.D.
Chlorine(Cl)	mg/kg	BS EN 14582:2007 , IC	30	N.D.
Iodine(I)	mg/kg	BS EN 14582:2007 , IC	50	N.D.

Other(s)

Test Items	Unit	Test Method	MDL	Results
PFOS(Perfluorooctane Sulfonates-Acid/Metal Salt/Amide)	mg/kg	US EPA 3540C/3550C, LC/MS	1	N.D.

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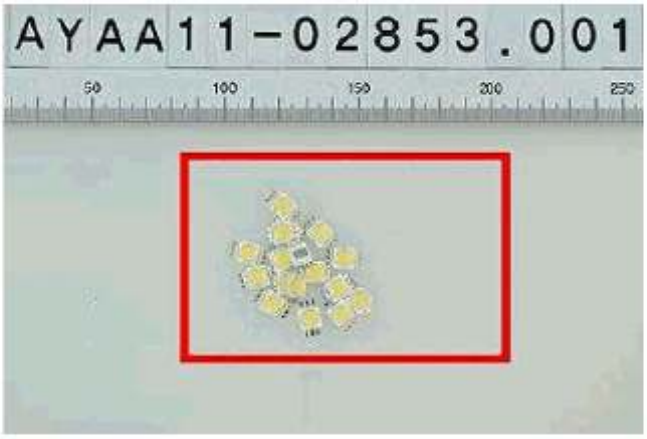
Picture of Sample as Received:



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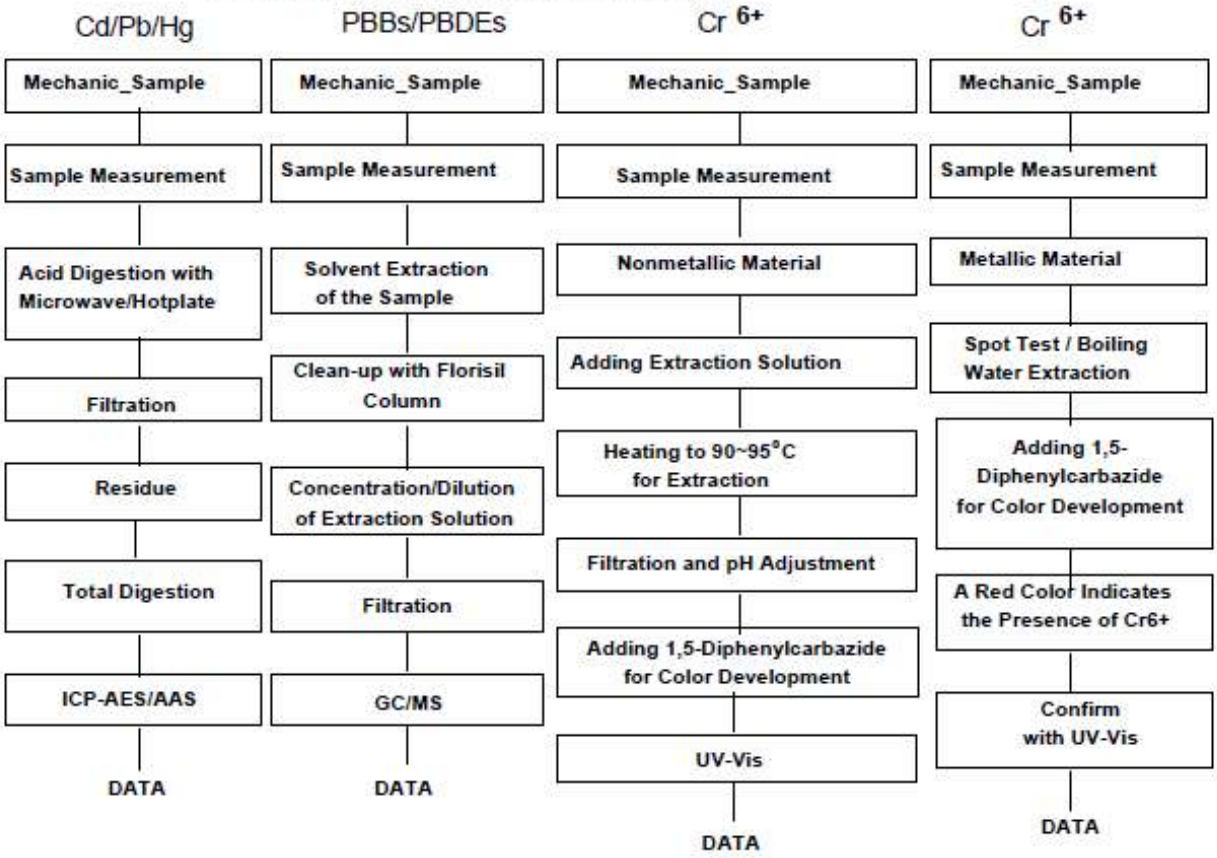
Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr^{6+}/PBBs&PBDEs Testing



The samples were dissolved totally by pre-conditioning method according to above flow chart for Cd,Pb,Hg.

Section Chief : Gilsae Yi

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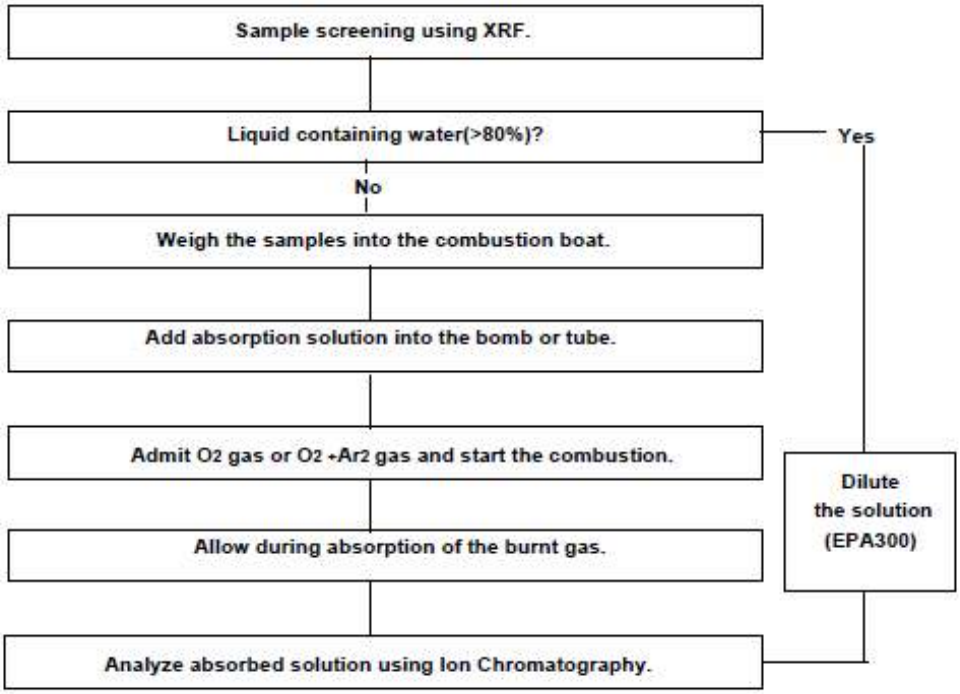
Flow Chart for Halogen Test



*** End ***

NOTE: (1) N.D. = Not detected.(<MDL)
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
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Revision History
(Model : SPHWHTS6D333)

Date	Revision History	Author	
		Drawn	Approved
2011.02.14	Initial Edition	S.B.Hong	Y.H.Song