DATE OF ISSUE : **2011. 04. 13**

SPECIFICATION

MODEL : SPMWHT5225D5WAV0S0

Approved rank : V_F(A1, A2, A3, A4, A5),
CIE(V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG),
I_V(S1, S2)

5630 CRI80 WHITE LED V0 RANK

CUSTOMER :	
CHECKED	APPROVED

SAMSUNG LED			
DRAWN	CHECKED		APPROVED
	SALES	QUALITY	

SAMSUNG LED CO., LTD.
314. MAETAN 3-DONG, YEONGTONG-GU,
SUWON-SI,GYEONGGI-DO,KOREA,443-743

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1. Product Outline

1) Feature

. Lead Frame Type LED Package (5.6 * 3.0 * t 0.95 mm)

. Beam Angle (△θ : 120 ˚)

. GaN/Al_2O_3 Chip & Long Time Reliability

2) Applications

. Indoor, Outdoor Display and etc.

2. Absolute Maximum Rating

Parameter	Symbol	Rating	Condition
Operating temperature range	T_{op}	–40 ~ +85℃	
Storage temperature range	T_{stg}	–40 ~ +100℃	
Junction Temperature	T_j	110℃	
Forward current	I_F	150 ㎃	
Peak Pulsed Forward Current	I_{FP}	300 ㎃	Duty 1/10 Pulse Width 10 ㎳
Reverse Voltage	V_R	0.7 ~ 1.2 V	IR = 5 ㎃
Thermal resistance, Junction to PCB	R_{th}, JS	< 40 K/W	
Assembly Process Temp.		260℃, < 10 sec	
ESD		5 kV	HBM

3. Characteristics

Electrical / Optical Characteristics

(Ta : 25 ℃)

Item	Symbol	Conditions	Rank		Min.	Typ.	Max.	Unit
Forward Voltage (*)	V_F	I_F = 50 ㎃	WA	A1	2.8	-	2.9	V
				A2	2.9	-	3.0	
				A3	3.0	-	3.1	
				A4	3.1	-	3.2	
				A5	3.2	-	3.3	
Reverse Voltage	V_r	I_F = 5 ㎃	-		0.7	-	1.2	V
Color Rendering	R_a	I_F = 50 ㎃	5		80	-	-	-

Luminous Intensity / Luminous Flux

(Ta : 25 ℃)

Symbol	Conditions	Model Name	Rank		Min.	Typ.	Max.	Unit
I_v	I_F = 50 ㎃	SPMWHT5225D5WAV0S0	S0	S1	4.99	-	5.76	cd
				S2	5.76	-	6.72	
Φ_v	I_F = 50 ㎃	SPMWHT5225D5WAV0S0	S0	S1	14.93	-	17.22	lm
				S2	17.22	-	20.09	

*** Luminous Flux (Φ_v) : Only reference data.**

Chromaticity Coordinate

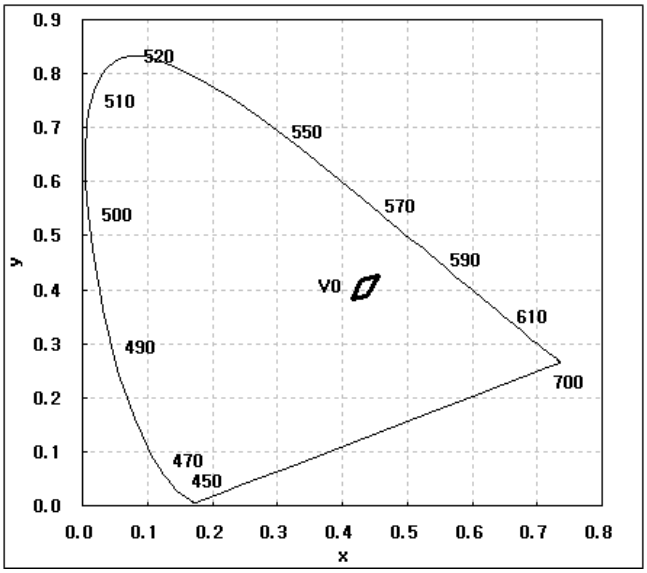
(Ta : 25℃)

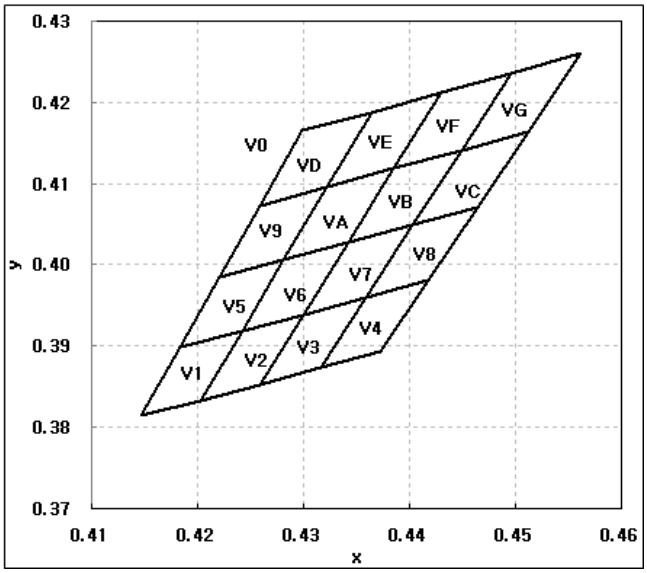
Condition	Rank		x				y			
I_F = 50 mA	V0	V1	0.4147	0.4203	0.4242	0.4183	0.3814	0.3833	0.3919	0.3898
		V2	0.4203	0.4259	0.4300	0.4242	0.3833	0.3853	0.3939	0.3919
		V3	0.4259	0.4316	0.4359	0.4300	0.3853	0.3873	0.3960	0.3939
		V4	0.4316	0.4373	0.4418	0.4359	0.3873	0.3893	0.3981	0.3960
		V5	0.4183	0.4242	0.4281	0.4221	0.3898	0.3919	0.4006	0.3984
		V6	0.4242	0.4300	0.4342	0.4281	0.3919	0.3939	0.4028	0.4006
		V7	0.4300	0.4359	0.4403	0.4342	0.3939	0.3960	0.4049	0.4028
		V8	0.4359	0.4418	0.4465	0.4403	0.3960	0.3981	0.4071	0.4049
		V9	0.4221	0.4281	0.4322	0.4259	0.3984	0.4006	0.4096	0.4073
		VA	0.4281	0.4342	0.4385	0.4322	0.4006	0.4028	0.4119	0.4096
		VB	0.4342	0.4403	0.4449	0.4385	0.4028	0.4049	0.4141	0.4119
		VC	0.4403	0.4465	0.4513	0.4449	0.4049	0.4071	0.4164	0.4141
		VD	0.4259	0.4322	0.4364	0.4299	0.4073	0.4096	0.4188	0.4165
		VE	0.4322	0.4385	0.4430	0.4364	0.4096	0.4119	0.4212	0.4188
		VF	0.4385	0.4449	0.4496	0.4430	0.4119	0.4141	0.4236	0.4212
		VG	0.4449	0.4513	0.4562	0.4496	0.4141	0.4164	0.4260	0.4236

* Tolerance : V_F:±0.1 V, I_v:±5 %, x,y:±0.01, R_a :±3.0

* Luminous Intensity measuring equipment : CAS140CT

4. Chromaticity Diagram





* V0 = V1+V2+V3+V4+V5+V6+V7+V8+V9+VA+VB+VC+VD+VE+VF

V_F	CIE	I_v
A1, A2, A3, A4, A5	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG	S1, S2

* Each reel contains only one of the A1, A2, A3, A4 or A5 a segment (1/5) of the V_F rank.

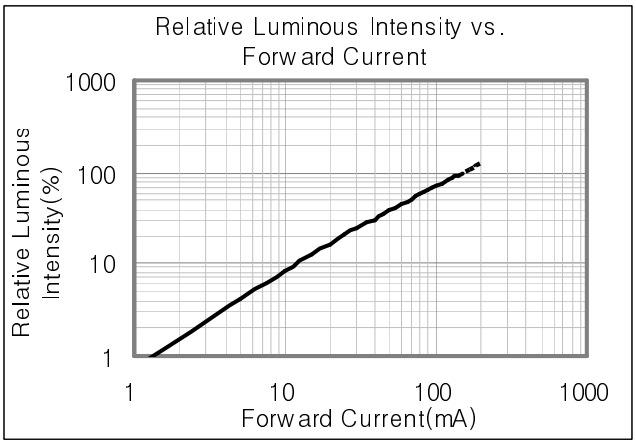
* Each V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF or VG a segment (1/16) of the CIE rank.

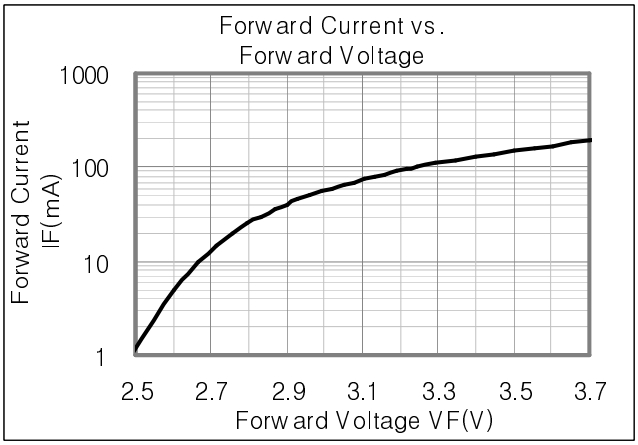
* Each reel contains only one of the S1 or S2 a segment (1/2) of the I_v rank.

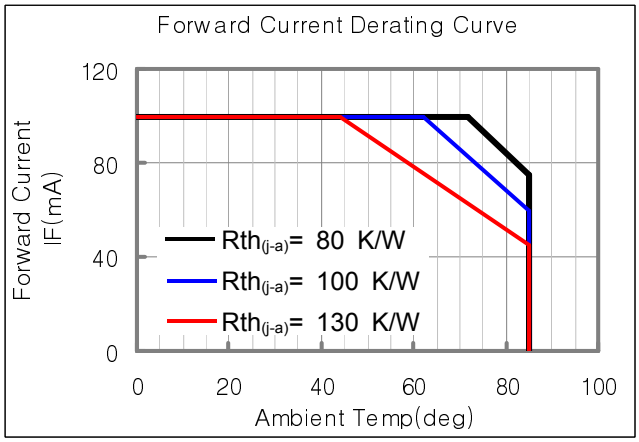
5. Typical Characteristics Graph

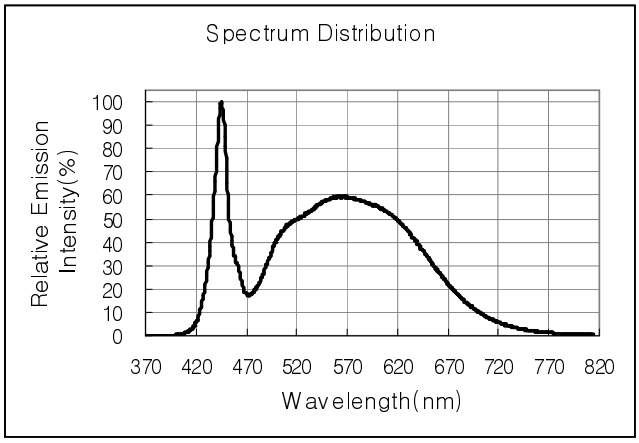
*** These graphs show typical values.**

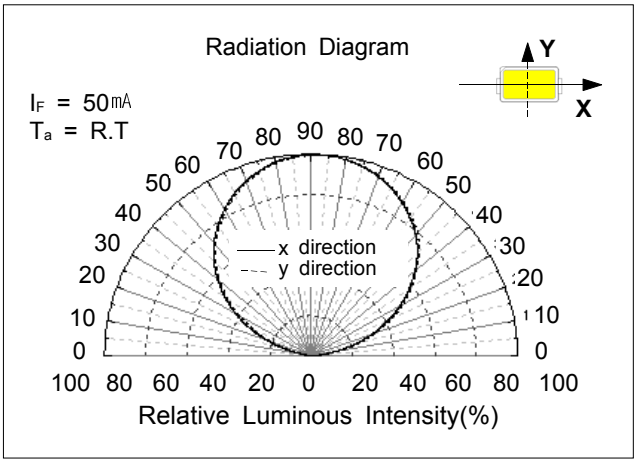
(Ta : 25℃)





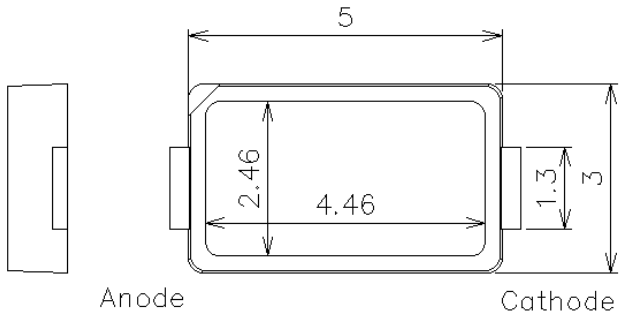


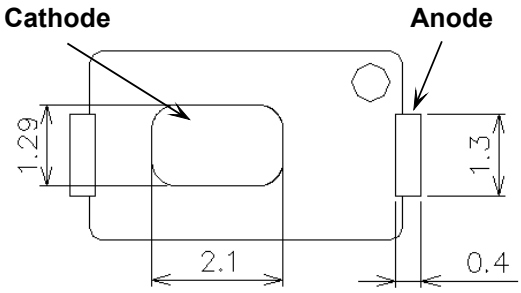


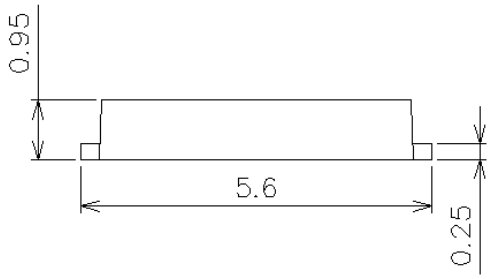


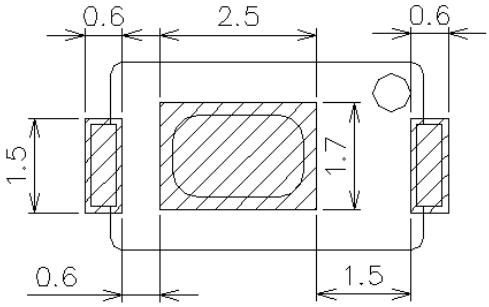
6. LED Package Outline Dimensions

unit:mm
Tolerance:±0.1







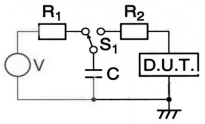


Land Pattern

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

7. Reliability Test Items and Conditions

1) Test Items

Test Item	Test Conditions		Test Hours/Cycles	Sample No
MSL Test	125 ℃ 24hrs drying → 60 ℃, 60 %RH 120hrs → 260 ℃ 10sec 3 cycles		1 cycle	50
Room Temperature life test	25 ℃±3 ℃, DC100 ㎃		1,000 hrs	50
High Temperature life test	85 ℃±3 ℃, DC75 ㎃		1,000 hrs	50
High Temperature humidity life test	60 ℃±3 ℃, 95 %±2 %RH, DC100 ㎃		1,000 hrs	50
High Temperature humidity On/Off test	85 ℃±3 ℃, 85 %±2 %RH, DC100 ㎃ DC100 ㎃, On/2 sec, Off/5 sec		100,000 cycles	50
Low Temperature life test	-40 ℃±3 ℃, DC100 ㎃		1,000 hrs	50
Temperature humidity Cycle	-10 ℃ ~ 25 ℃,95 %RH ~ 65 ℃,95 %RH DC100 ㎃, 24 hrs/1 cycle		10 cycles	50
Thermal Shock	-45 ℃/15 min ↔ 125 ℃/15 min, 150 Cycle => Reflow 260 ℃ → Hot plate 180 ℃		1 cycle	100
High Temperature Storage	Ta=100 ℃±3 ℃		1000 hrs	11
Low Temperature Storage	Ta=-40 ℃±3 ℃		1000 hrs	11
Temperature humidity Cycle	-10 ℃ ~ 25 ℃, 95 %RH ~ 65 ℃, 95 %RH 24 hrs/ 1 cycle		10 cycles	11
ESD(HBM)		R1:10 ㏁, R2:1.5 ㏀, C:100 ㎊, V = ±5 kV	5 times	5
ESD(MM)		-R1:10 ㏁, R2:0, C:200 ㎊, V = ±0.2 kV	5 times	5
Vibration Test	100~2000~100 Hz, 200 m/s², Sweep 4 min, 48 min, X, Y, Z 3 direction, each 1 cycle		4 cycles	11
Mechanical Shock Test	1500G, 0.5 ms, 3 shocks each X-Y-Z axis		5 cycles	11

2) Criteria for Judging the Damage

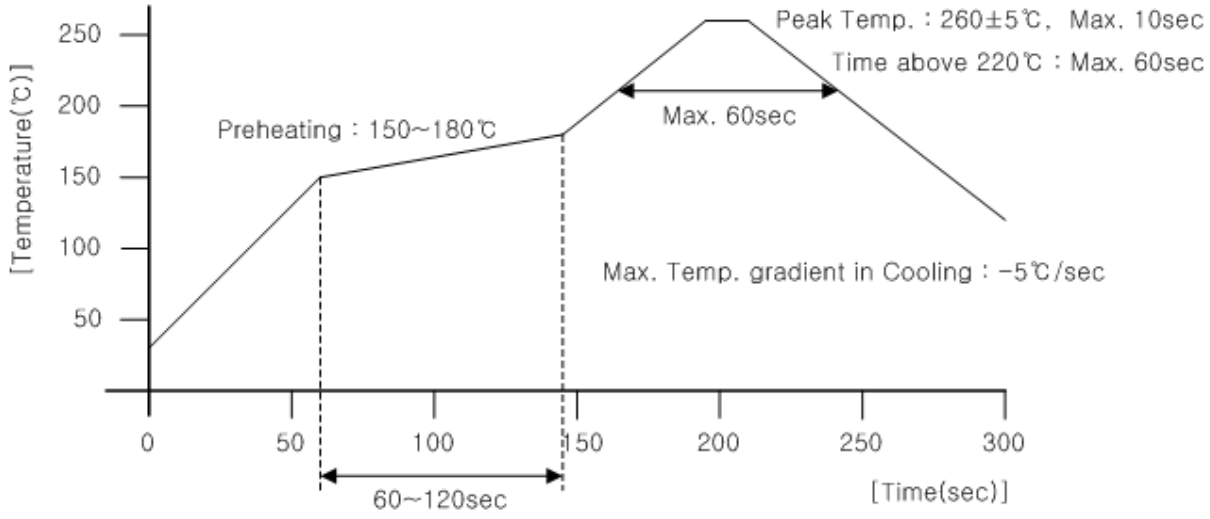
Item	Symbol	Test Condition	Limit	
			Min	Max
Forward Voltage	V_F	I_F = 50 ㎃	Init. Value*0.9	Init. Value*1.1
Luminous Intensity	I_V	I_F = 50 ㎃	Init. Value*0.8	Init. Value*1.2

* USL : Upper Standard Level LSL : Lower Standard Level

8. Solder Conditions

1) Reflow Conditions (Pb Free)

Reflow Frequency : 2 times max.

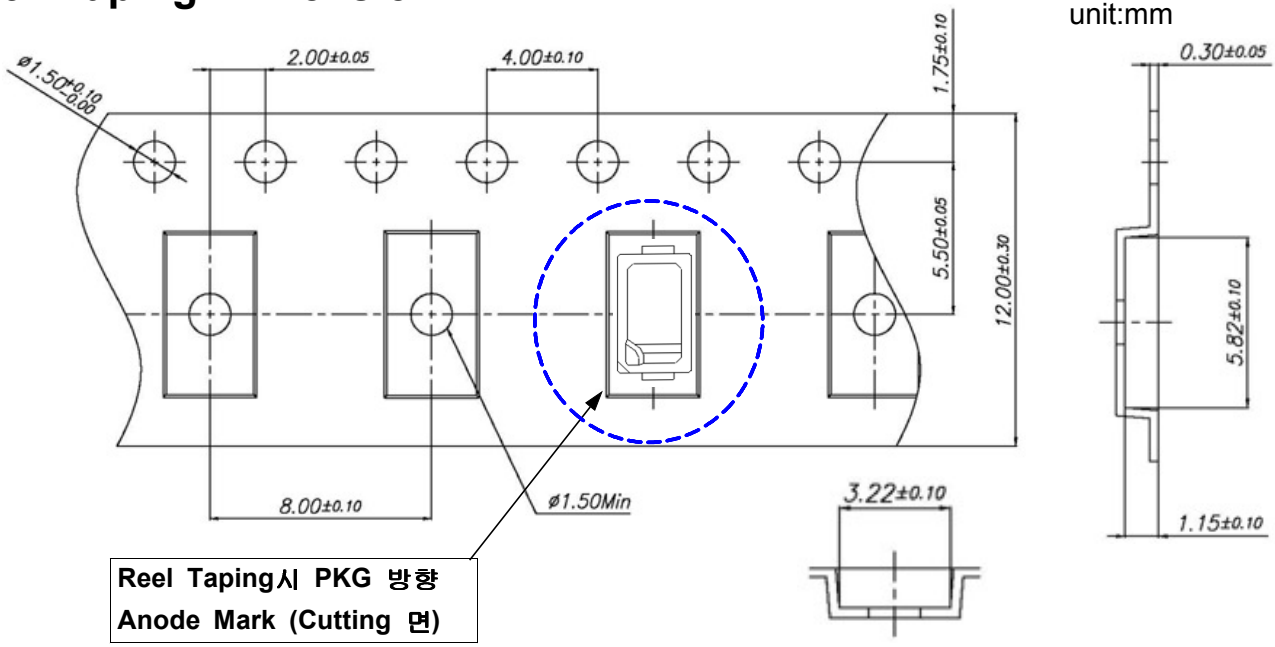


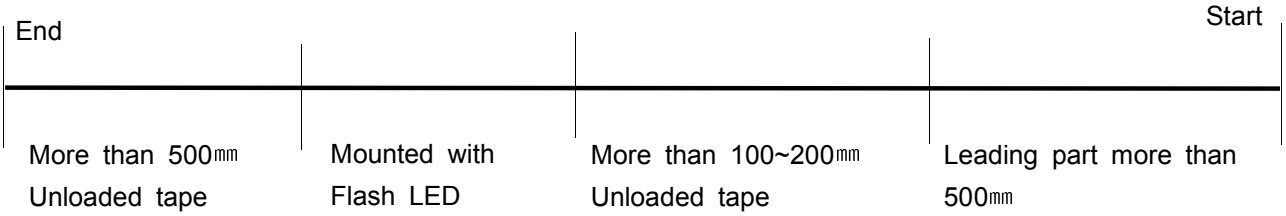
2) For Manual Soldering

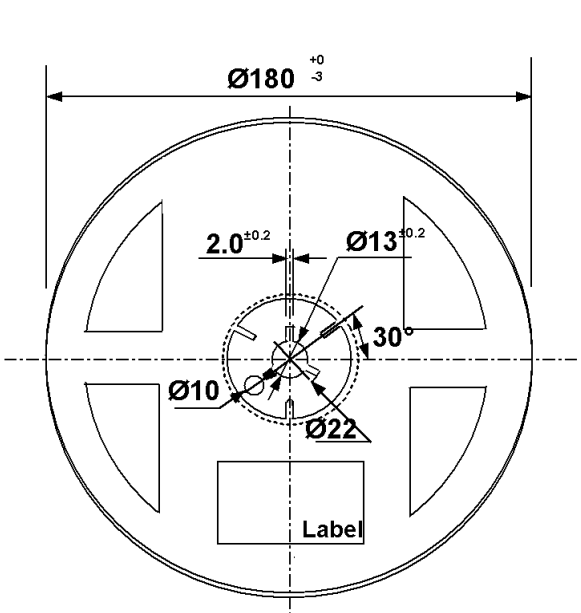
Not more than 5 seconds @MAX300 ℃, under soldering iron.

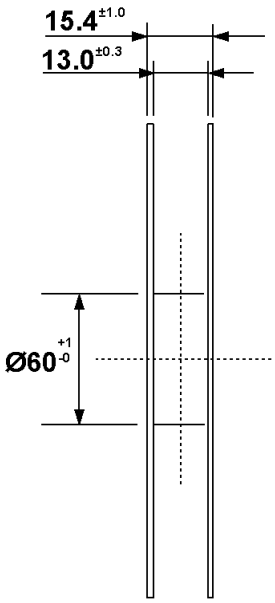
9. Taping Dimension

unit:mm









Tolerance ±0.2 , Unit:mm

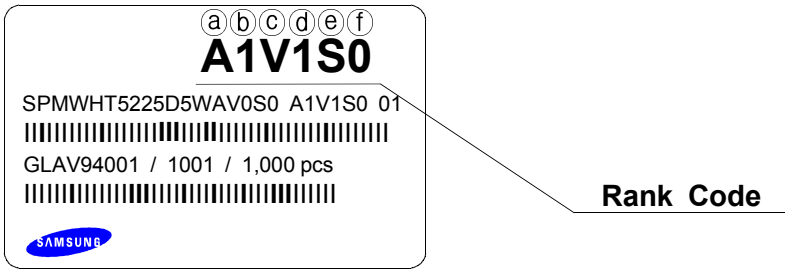
(1) Quantity : The quantity/Reel to be Max. 1,000 pcs, .

(2) Cumulative Tolerance : Cumulative tolerance/10 pitches to be ±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



N.B) Denoted rank is the only example.

Rank Code

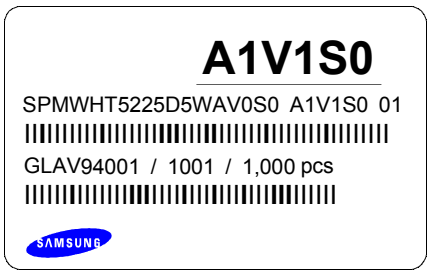
ⓐⓑ : Forward Voltage(V_F) Rank (refer to page. 3)

ⓒⓓ : Chromaticity Coordinate Rank (refer to page. 4)

ⓔⓕ : Luminous Intensity(cd) Rank (refer to page. 3)

11. Lot Number

The Lot number is composed of the following characters



①②③④⑤⑥⑦⑧⑨ / 1ⓐⓑⓒ / 1,000 PCS

① : Production Site (S:SAMSUNG LED, G:GOSIN CHINA)

② : L (LED)

③ : Product State (A:Normality, B:Bulk, C:First Production, R:Reproduction, S:Sample)

④ : Year (V:2011, W:2012, X:2013...)

⑤ : Month (1 ~ 9, A, B)

⑥ : Day (1 ~ 9, A, B ~ V)

⑦⑧⑨ : SAMSUNG LED Product number (1 ~ 999)

ⓐⓑⓒ : Reel Number (1 ~ 999)

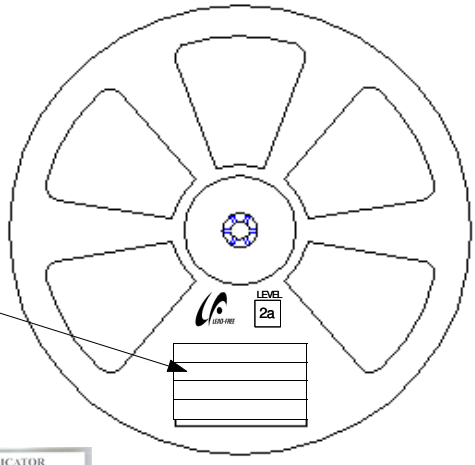
12. Reel Packing Structure

Reel

A1V1S0

SPMWHT5225D5WAV0S0 A1V1S0 01

GLAV94001 / 1001 / 1,000 pcs

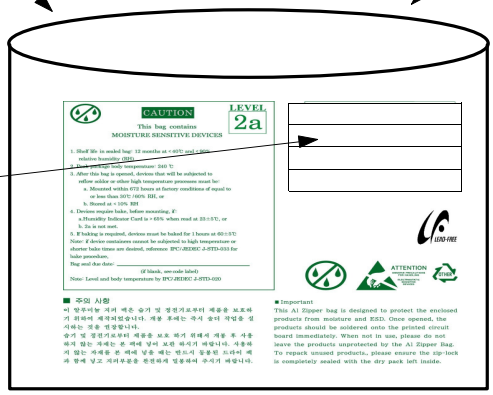


Aluminum Vinyl Bag

A1V1S0

SPMWHT5225D5WAV0S0 A1V1S0 01

GLAV94001 / 1001 / 1,000 pcs



Material : Paper(SW3B(B))

TYPE	SIZE(mm)		
	L	W	H
7inch	245	220	182

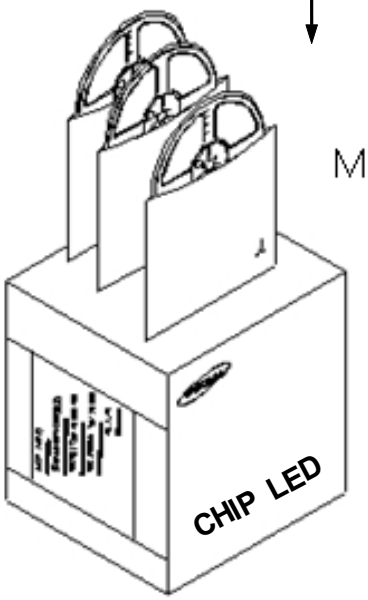
① SIDE

A1V1S0

SPMWHT5225D5WAV0S0 A1V1S0 01

GLAV94001 / 1001 / 10,000 pcs

[Box Label]



Max. 10,000 pcs

13. Aluminum Vinyl Bag

CAUTION

LEVEL 2a

This bag contains
MOISTURE SENSITIVE DEVICES

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

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

A1V1S0

SPMWHT5225D5WAV0S0 A1V1S0 01

GLAV94001 / 1001 / 1,000 pcs

LEAD-FREE

ATTENTION
OBSERVE PRECAUTIONS FOR HANDLING
ELECTROSTATIC SENSITIVE DEVICES

OTHER

■ 주의 사항

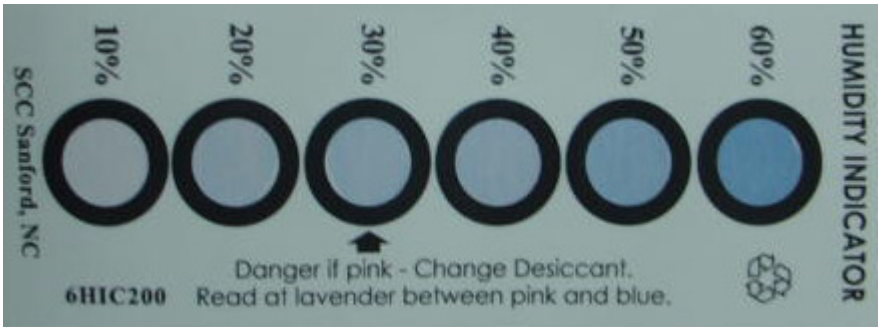
이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

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 (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 SLED, 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)
LED의 보관은 청정한 환경에서 보존되어져야 하며, 만약 삼성LED로부터 공급받는 후 3개월 또는 그 이상 보관이 필요하다면 질소 가스를 동봉한 보존용기에 보관되어야 함.
(보존 bag의 수명 : 12 개월, 보존 온도 0~40 ℃, 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, 납땜이나 reflow등의 높은 온도에 노출되는 제품은 다음의 사항에 부합되어야 함.
a. Mounted within 168 hours (7 days) at an assembly line with a condition of no more than 30 ℃/60 %RH,
a. 제품은 30 ℃/60 %RH보다 같거나 낮은 조립조건에서 168시간(7일)이내에 조립해야 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 닫아서 다시 포장한 후, 건조한 장소에서 보관할 것을 권장함.

7) Devices require baking before mounting, if humidity card reading is >60 % at 23±5 ℃.
만약 습도표시카드의 수치가 23±5 ℃에서 60 % 이상이라면, 제품 실장 전에 baking하여야 함.

8) Devices must be baked for 24 hours at 65±5 ℃, if baking is required.
만약 baking이 필요하다면, 제품은 65±5 ℃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 LED에 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

SGS

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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 :

SGS File No.	: AYAA10-28284
Product Name	: LED
Item No./Part No.	: 5630N2(A) PKG
Received Date	: Aug 12, 2010
Test Period	: Aug 13, 2010 to Aug 16, 2010
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

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Sample No. : AYAA10-28284.001

Sample Description : LED

Item No./Part No. : 5630N2(A) PKG

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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Test Report No. F690501/LF-CTSAYAA10-28284 Issued Date: August 17, 2010 Page 3 of 5

Sample No. : AYAA10-28284.001

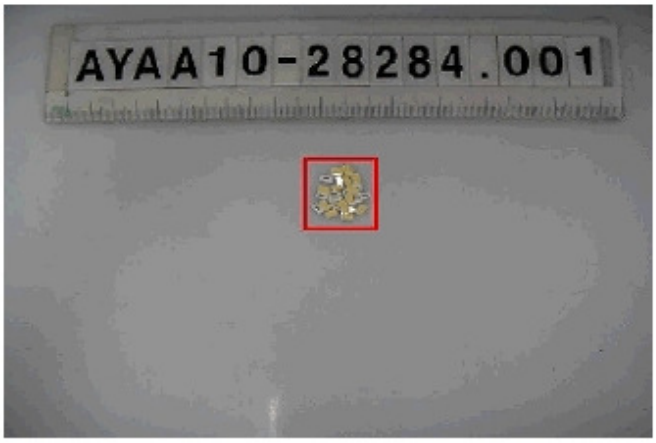
Sample Description : LED

Item No./Part No. : 5630N2(A) PKG

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:



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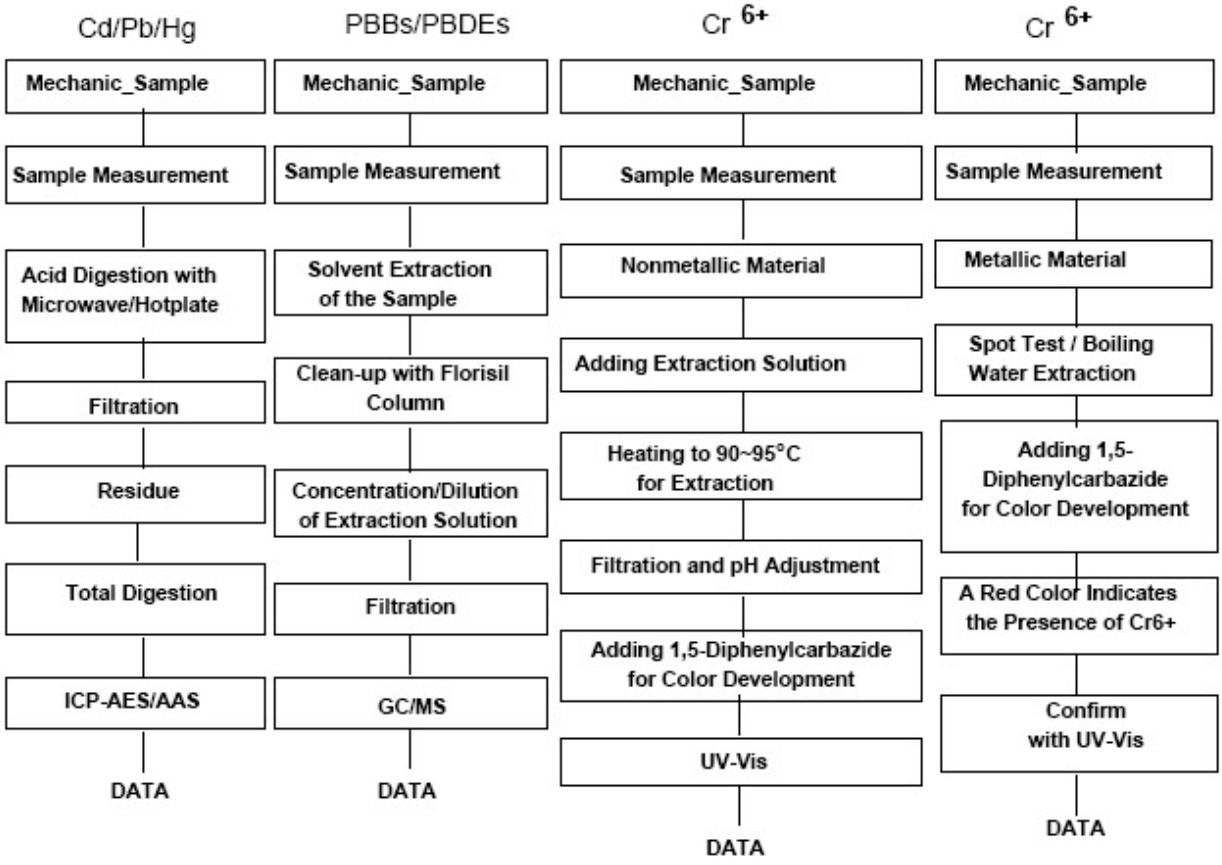
Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr^{6+}/PBBs&PBDEs Testing



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

Section Chief : Gilse Lee

NOTE:
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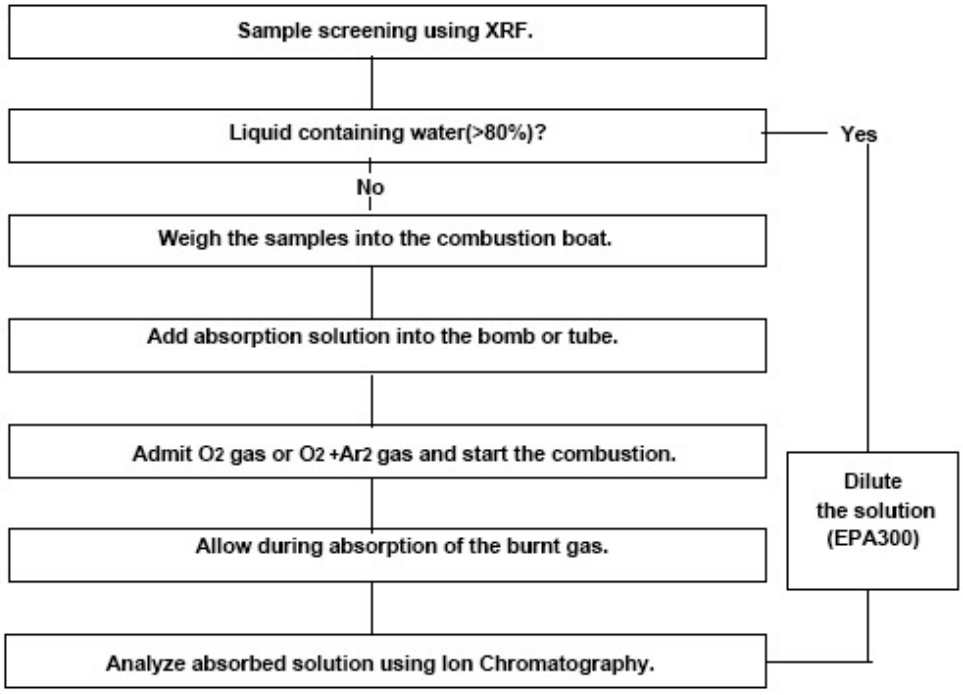
Flow Chart for Halogen Test



*** End ***

NOTE:
(1) N.D. = Not detected.(<MDL)
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) ** = Qualitative analysis (No Unit)
(6) * = Boiling-water-extraction:
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Revision History
(Model:SPMWHT5225D5WAV0S0)

Date	Revision History	Writer	
		Drawn	Approved
2011.04.13	New Version	T.J Kim	Y.H Song