

# SPECIFICATION

MODEL : SPMWHT5225N36AP0S0



Approved rank :  $V_F$ (AZ, A1, A2, A3, A4),  
CIE(P1, P2, P3, P4, P5, P6, P7),  
 $I_v$ (S0)

## 5630 WHITE LED P0 RANK

CUSTOMER :

CHECKED

APPROVED

### SAMSUNG LED

DRAWN	CHECKED		APPROVED
	Sales	Qual	

**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 ( : 120 °)
- . AlGaInP, GaN/Al<sub>2</sub>O<sub>3</sub> Chip & Long Time Reliability

## 2) Applications

- . Indoor, Outdoor Display and etc.

# 2. Absolute Maximum Rating

Parameter	Symbol	Rating	Condition
Operating temperature range	T <sub>op</sub>	-40 ~ +85	
Storage temperature range	T <sub>stg</sub>	-40 ~ +100	
Junction Temperature	T <sub>j</sub>	110	
Forward current	I <sub>F</sub>	160	
Peak Pulsed Forward Current	I <sub>FP</sub>	300	Duty 1/10 Pulse Width 10
Reverse Voltage	V <sub>R</sub>	0.7 ~ 1.2 V	I <sub>R</sub> = 5
Thermal resistance, Junction to PCB	R <sub>th, JS</sub>	< 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 <sub>F</sub>	I <sub>F</sub> = 50	6A	AZ	2.75	-	2.90	V
				A1	2.90	-	3.00	V
				A2	3.00	-	3.10	V
				A3	3.10	-	3.20	V
				A4	3.20	-	3.25	V
Reverse Voltage	V <sub>r</sub>	I <sub>F</sub> = 5	-	0.7	-	1.2	V	
Color Rendering	R <sub>a</sub>	I <sub>F</sub> = 50	3	70	-	-	-	

## Chromaticity Coordinate

( Ta : 25 )

Condition	Rank	x				y				
I <sub>F</sub> = 50	P0	P1	0.2954	0.3052	0.3088	0.2989	0.3084	0.3058	0.3123	0.3149
		P2	0.2989	0.3088	0.3122	0.3022	0.3149	0.3123	0.3185	0.3212
		P3	0.3022	0.3122	0.3157	0.3056	0.3212	0.3185	0.3248	0.3276
		P4	0.3056	0.3157	0.3192	0.3091	0.3276	0.3248	0.3313	0.3341
		P5	0.3091	0.3192	0.3229	0.3127	0.3341	0.3313	0.3379	0.3408
		P6	0.3127	0.3229	0.3266	0.3163	0.3408	0.3379	0.3447	0.3477
		P7	0.3163	0.3266	0.3301	0.3198	0.3477	0.3447	0.3511	0.3542

\* Tolerance : V<sub>F</sub>:±0.1 V, v<sub>v</sub>:±5 %, x,y:±0.01, , R<sub>a</sub> :±3.0

\* Luminous Intensity measuring equipment : CAS140CT

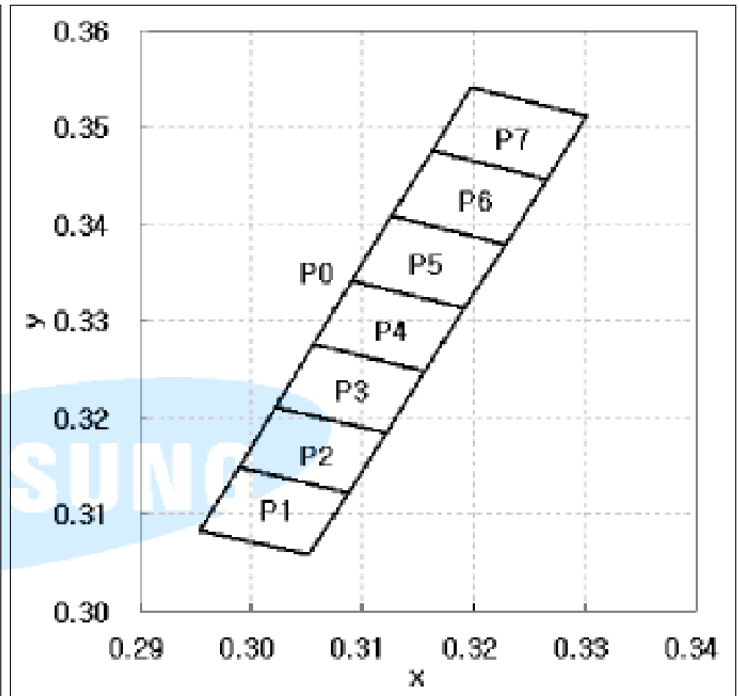
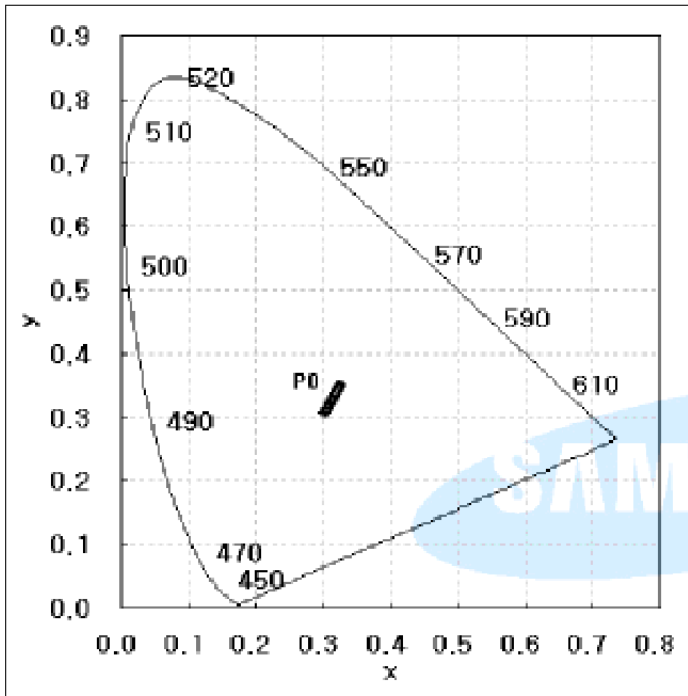
**Luminous Intensity / Luminous Flux**

( Ta : 25 )

Symbol	Conditions	Model Name	Rank	Min.	Typ.	Max.	Unit
$I_v$	$I_F = 50$	SPMWHT5225N36AP0S0	S0	5.2	6.0	6.8	cd
$\Phi_v$	$I_F = 50$	-	-	16.6	18.6	21.7	lm

\* Luminous Flux (  $\Phi_v$  ) : Only reference data.

**4. Chromaticity Diagram**



\*  $P0 = P1+P2+P3+P4+P5+P6+P7$

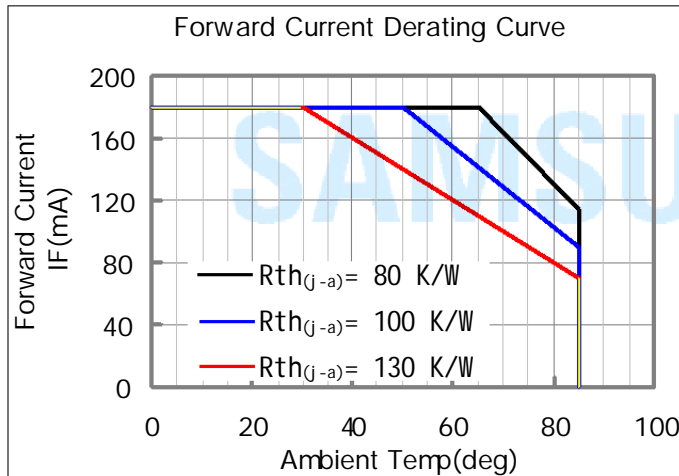
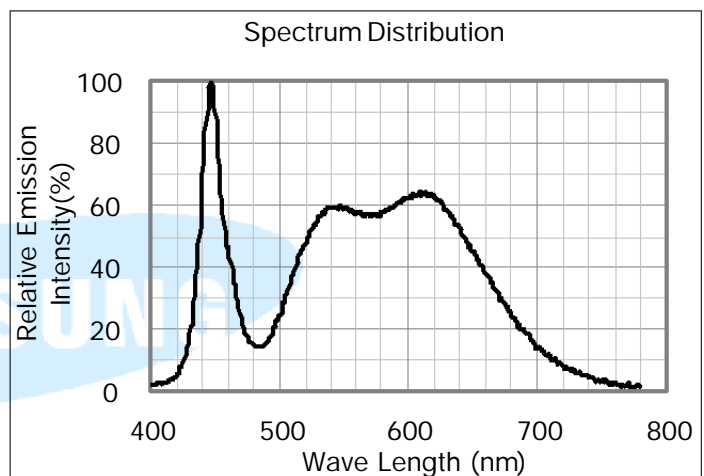
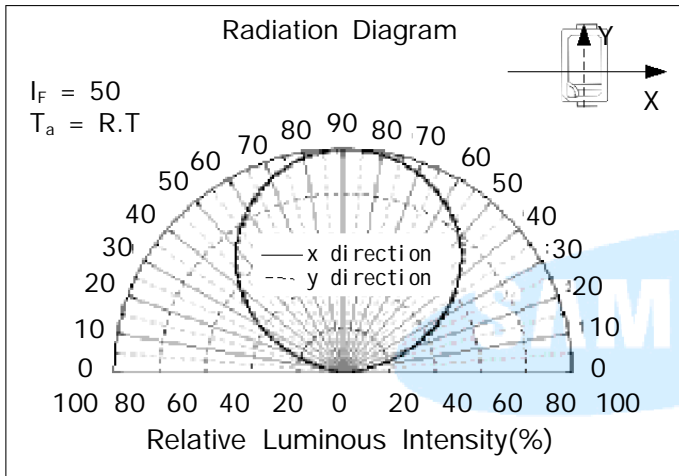
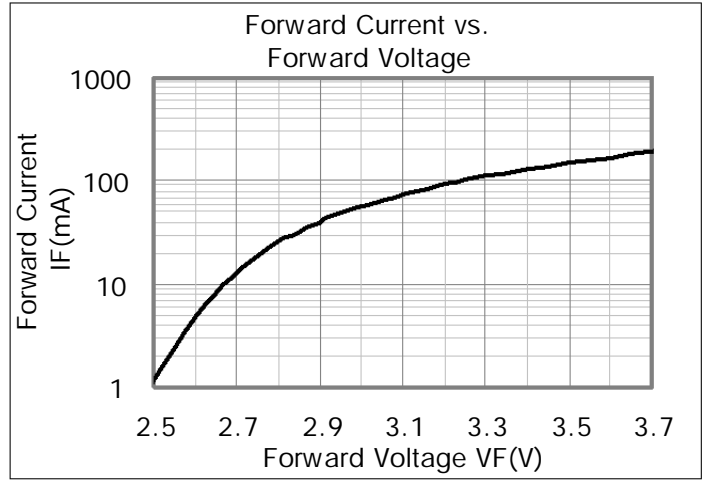
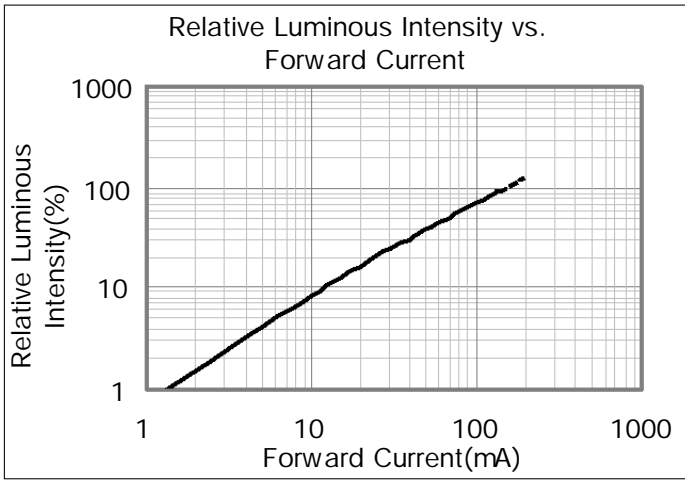
$V_F$	CIE	$I_v$
AZ, A1, A2, A3, A4	P1, P2, P3, P4, P5, P6, P7	S0

- \* Each reel contains only one of the AZ, A1, A2, A3 or A4 a segment (1/5) of the  $V_F$  rank.
- \* Each reel contains only one of the P1, P2, P3, P4, P5, P6 or P7 a segment (1/7) of the CIE rank.

# 5. Typical Characteristics Graph

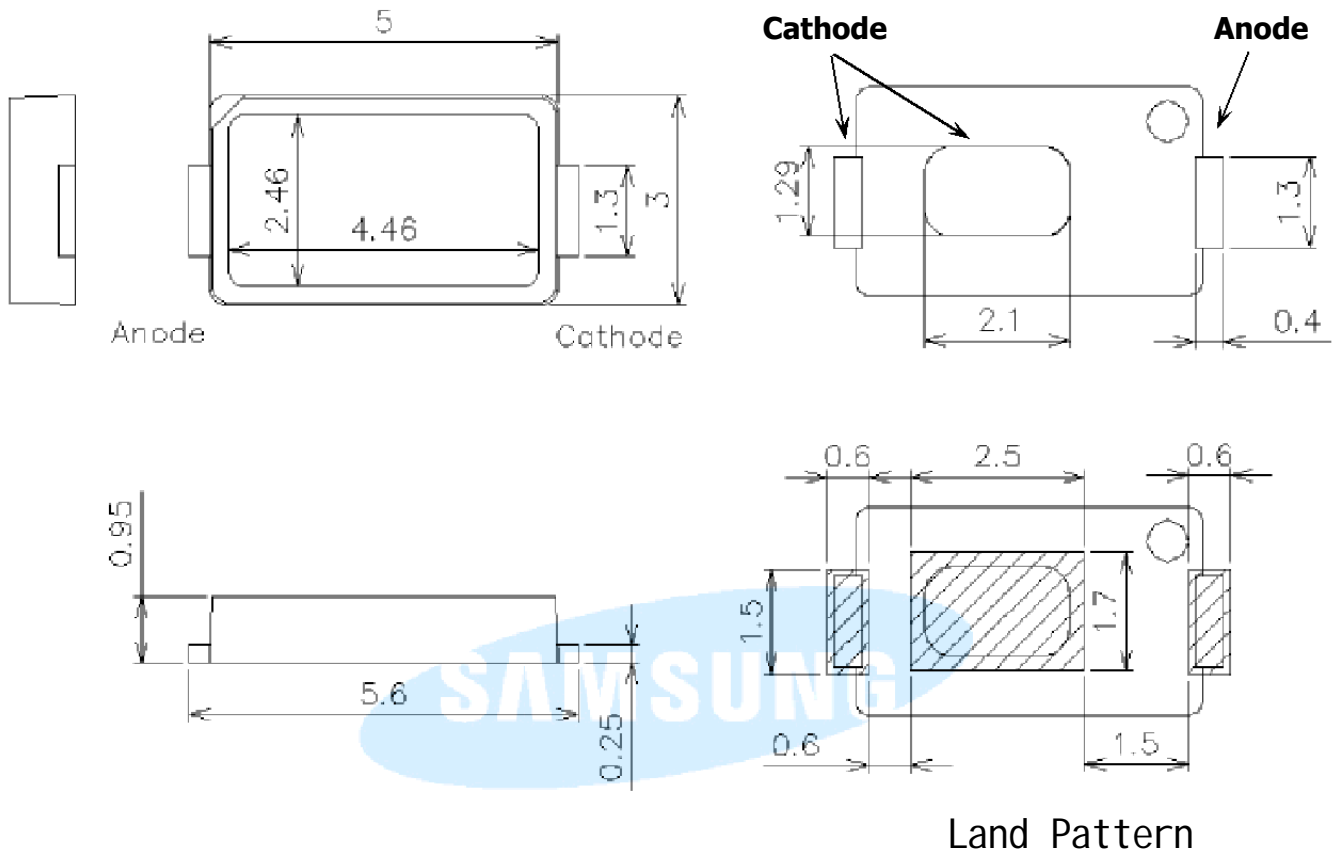
\* These graphs show typical values.

( Ta : 25 )



## 6. LED Package Outline Dimensions

unit: mm  
Tolerance: ± 0.1



\* 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 24h drying 60 , 60 %RH 120h 260 10sec 3 cycles	1 cycle	50	
Room Temperature life test	25 ±3 , DC150	1,000 hrs	50	
High Temperature life test	85 ±3 , DC120	1,000 hrs	50	
High Temperature humidity life test	60 ±3 , 95 %±2 %RH, DC150	1,000 hrs	50	
High Temperature humidity On/Off test	85 ±3 , 85%±2 %RH, DC150 DC150 , On/2 sec, Off/5 sec	100,000 cycles	50	
Low Temperature life test	-40 ±3 , DC150	1,000 hrs	50	
Temperature humidity Cycle	-10 ~ 25 ,95 %RH ~ 65 ,95 %RH DC150 , 24 hrs/ 1 cycle	10 cycles	50	
Thermal Shock	-40 ,0.5 hrs ~ 100 , 0.5 hrs 100 cycles Reflow 260 Hot plate 180	1 cycle	100	
Series	85 ±3 , 85%±2 %RH, 24h Reflow 260 , 3cycles -40 ,1 hr ~ 85 , 1 hr	1 cycle	30	
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/s <sup>2</sup> , Sweep 4 min, 48min, 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

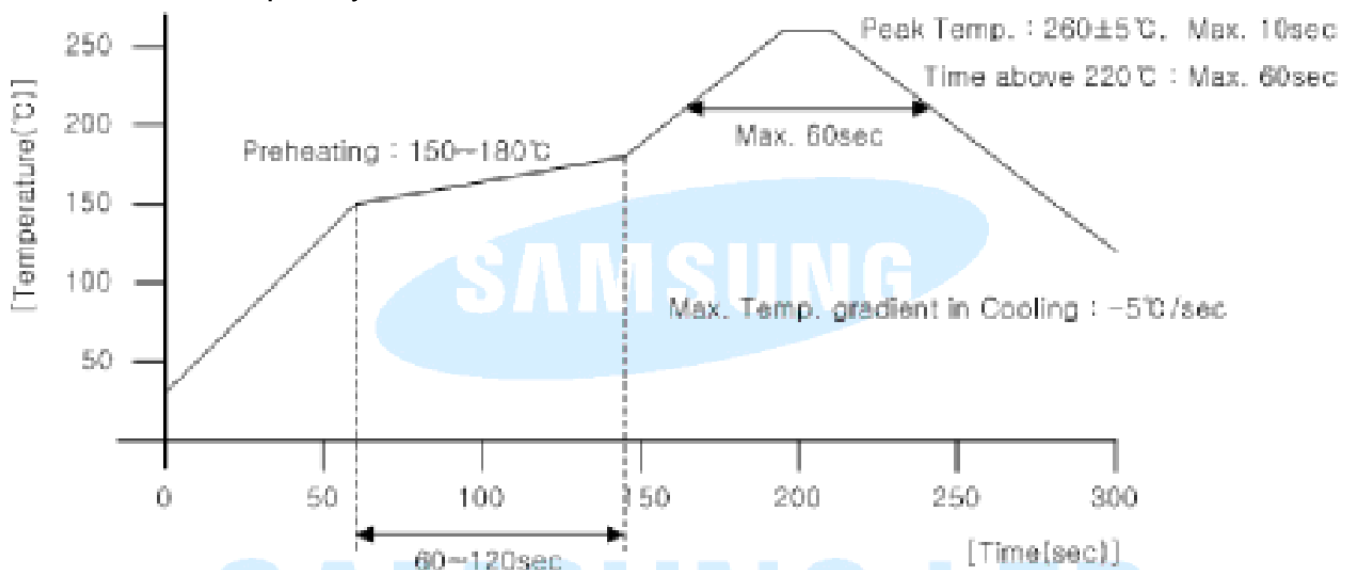
Item	Symbol	Test Condition	Limit	
			Min	Max
Forward Voltage	$V_F$	$I_F = 50$	Init. Value*0.9	Init. Value*1.1
Luminous Intensity	$I_V$	$I_F = 50$	Init. Value*0.8	Init. Value*1.2

\* USL : Upper Standard Level      LSL : Lower Standard Level

## 8. Solder Conditions

### 1) Reflow Conditions ( Pb Free )

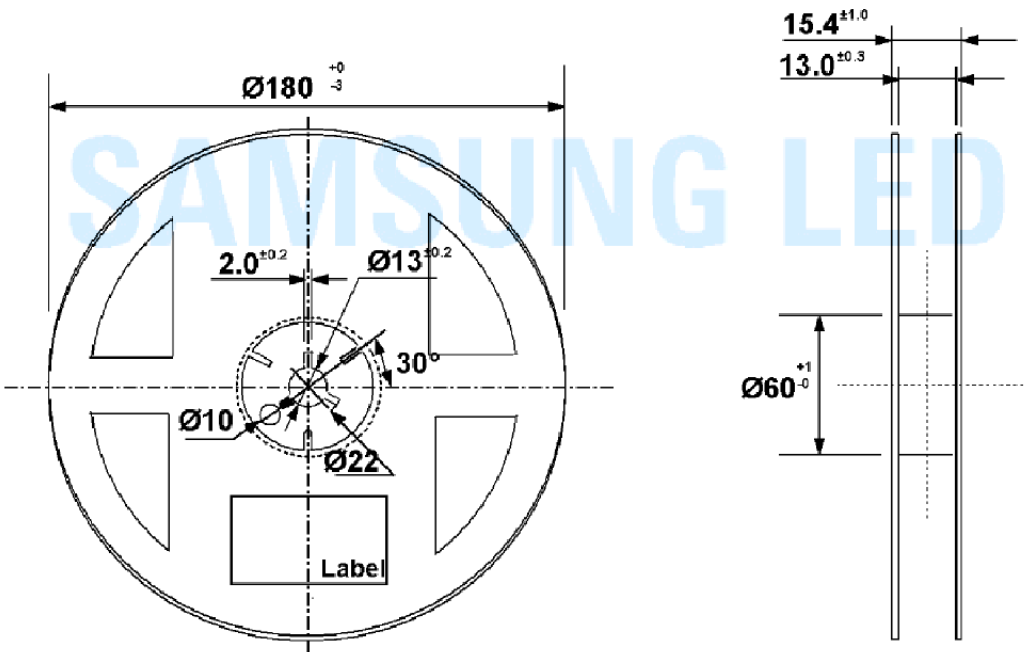
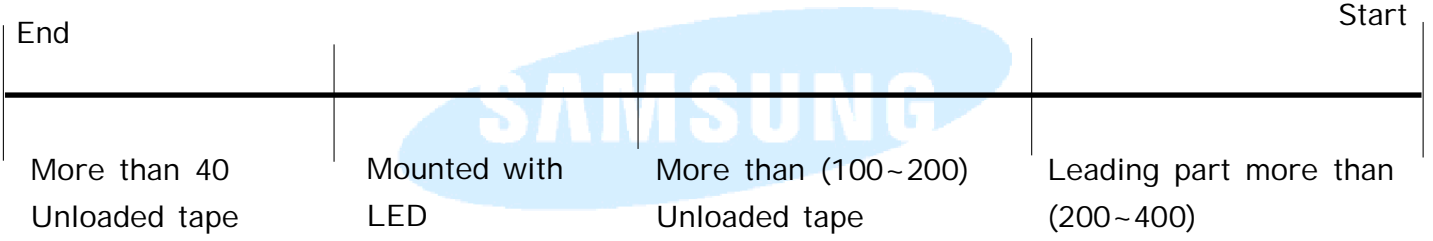
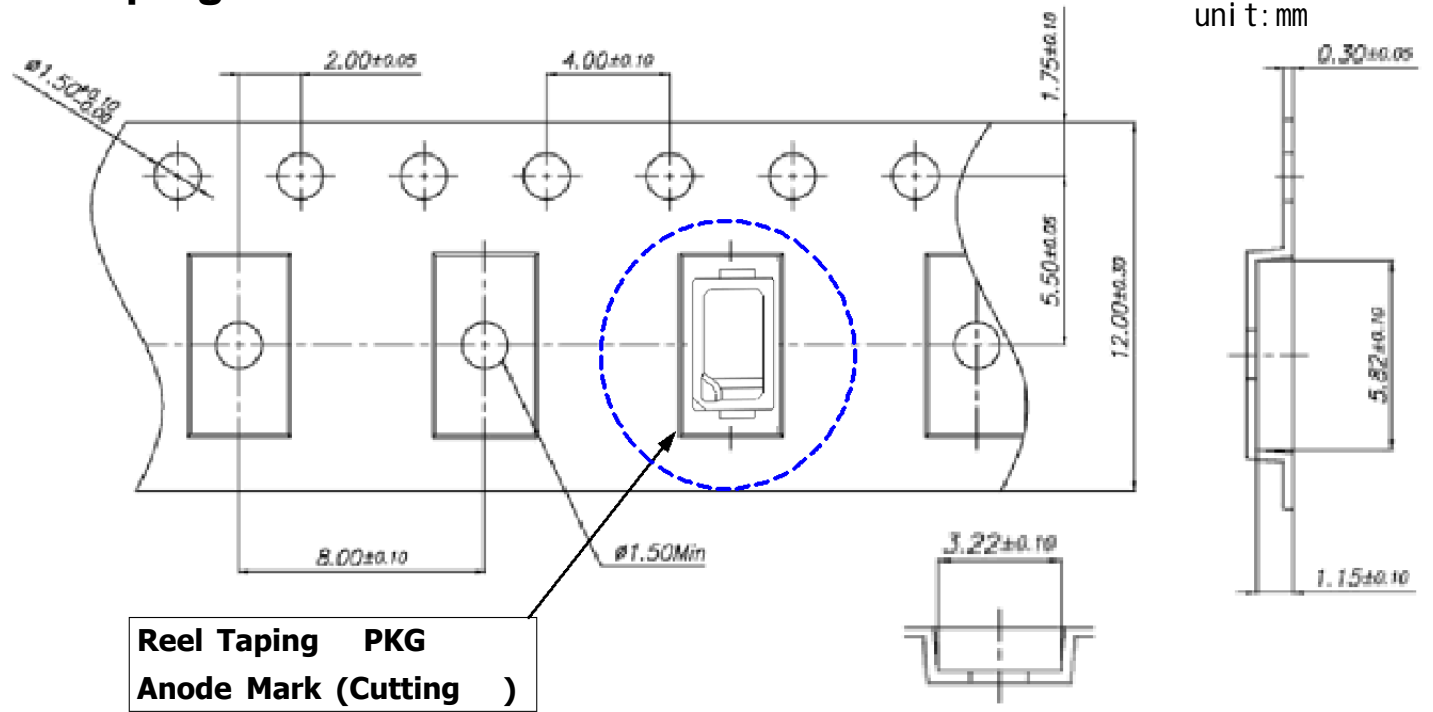
Reflow Frequency : 2 times max.



### 2) For Manual Soldering

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

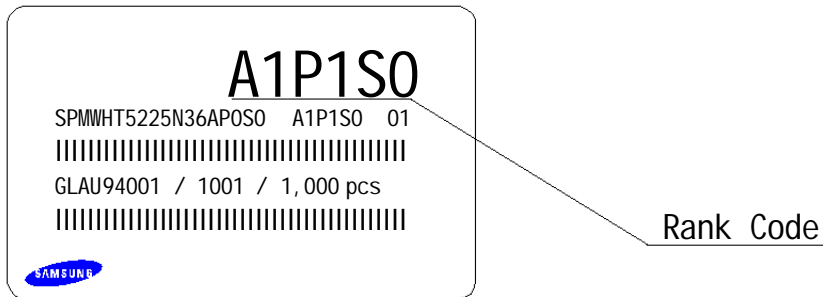
# 9. Taping Dimension



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



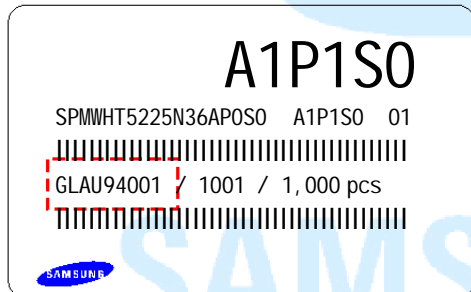
N.B) Denoted rank is the only example.

### Rank Code

- : Forward Voltage( $V_F$ ) Rank (refer to page. 3)
- : Chromaticity Coordinate Rank (refer to page. 3)
- : Luminous Intensity( $I_v$ ) Rank (refer to page. 4)

## 11. Lot Number

The Lot number is composed of the following characters



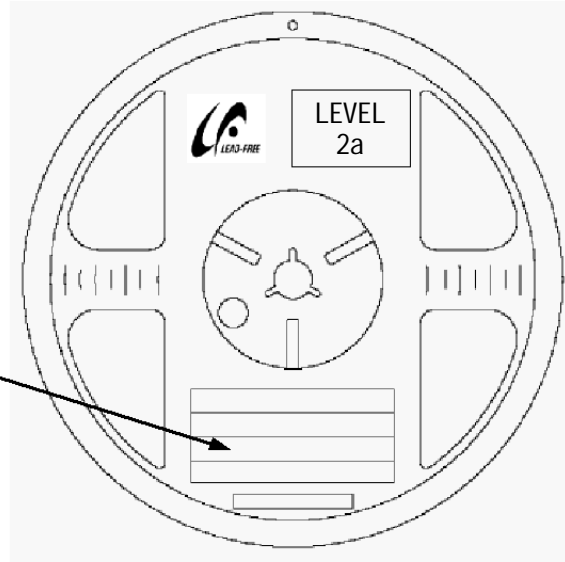
/ 1 / 1,000 PCS

- : Production Site (S:SAMSUNG LED, G:GOSIN CHINA)
- : L (LED)
- : Product State (A:Normality, B:Bulk, C:First Production, R:Reproduction, S:Sample)
- : Year (U:2010, V:2011, W:2012...)
- : 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

## Reel

**A1P1S0**  
 SPMWHT5225N36APOS0 A1P1S0 01  
 |||||  
 GLAU94001 / 1001 / 1,000 pcs  
 |||||



## Aluminum Vinyl Bag

**A1P1S0**  
 SPMWHT5225N36APOS0 A1P1S0 01  
 |||||  
 GLAU94001 / 1001 / 1,000 pcs  
 |||||

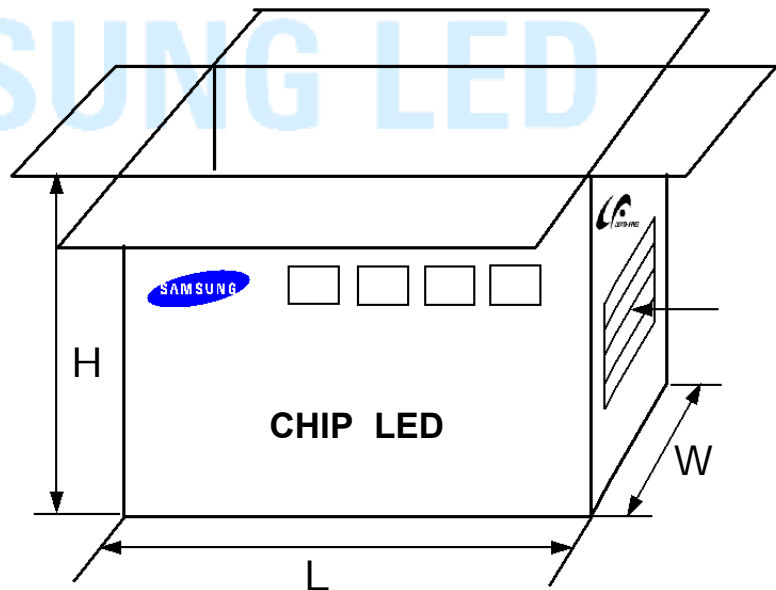


Material : Paper(SW3B(B))


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

SIDE

**A1P1S0**  
 SPMWHT5225N36APOS0 A1P1S0 01  
 |||||  
 GLAU94001 / 1001 / 10,000 pcs  
 |||||  
 [Box Label]



# 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: 240 °C
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 30°C / 60% RH, or
  - b. Stored at <math>< 10\%</math> RH
4. Devices require bake, before mounting, if:
  - a. Humidity Indicator Card is > 65% when read at   - b. 2a is not met.
5. If baking is required, devices must be baked for 1 hours at

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

**A1P1S0**

SPMWHT5225N36APOS0 A1P1S0 01

|||||

GLAU94001 / 1001 / 1,000 pcs

|||||





**주의 사항**

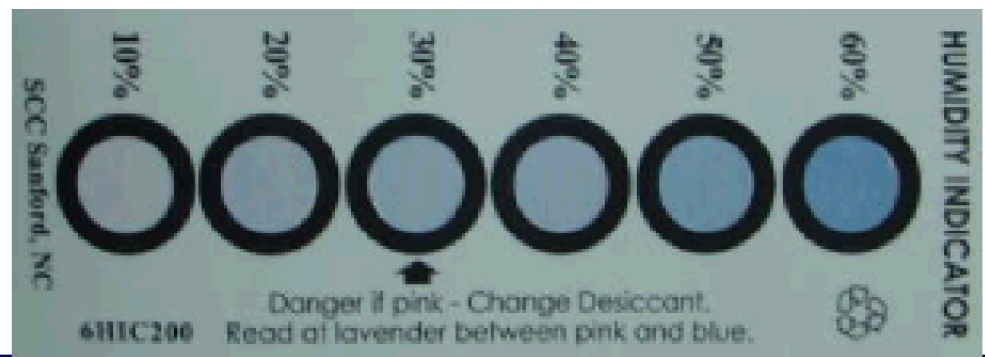
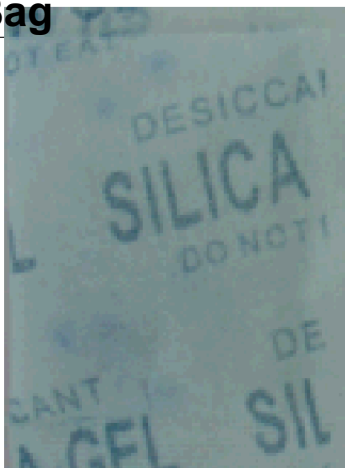
이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

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.

IPA

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

LED

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)

LED

LED

3

( bag : 12 , 0~40 , 20~70 %RH)

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

Bag , reflow

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

a. 30 /60 %RH 168 (7 )

b. Stored at <10 %RH.

b. 10 %

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  $23\pm 5$  .  
 baking  $23\pm 5$   $60\%$  ,
- 8) Devices must be baked for 24 hours at  $65\pm 5$  , if baking is required.  
 baking ,  $65\pm 5$  24 baking .
- 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.  
 LED , LED

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

LED , LED

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.

, Turn on ,

SAMSUNG LED

# 15. Hazard Substance Analysis



**Test Report No.** F690601/LF-CTSAYAA10-28284

**Issued Date:** August 17, 2010

Page 1 of 5

**To:** SAMSUNG LED CO.,LTD.  
 914,Maetan-dong  
 Yeongdeung-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. : 0030N2(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.

Timothy Jeon  
 Jinhee Kim  
 Cindy Park  
 Jerry Jung / Testing Person

SGS Testing Korea Co. Ltd.

Jeff Jang / Chemical Lab Mgr



The attached is issued by the Company stated in its Report Certificate of Testing result which, except as stated or otherwise of [www.sgs.com](http://www.sgs.com), is not subject to external review, and is for the use of the Client only and shall not be used for any other purpose. The Client is responsible for the accuracy of the information provided to the Company and for the use of the information and shall not be held liable for any loss or damage caused by the use of the information. The Client is also responsible for the accuracy of the information provided to the Company and for the use of the information. The Client is also responsible for the accuracy of the information provided to the Company and for the use of the information. The Client is also responsible for the accuracy of the information provided to the Company and for the use of the information.



**Test Report No. F69501/LF-CT8AYAA10-28284**

Issued Date: August 17, 2010

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Sample No. : AYAA10-28284.001  
 Sample Description : LED  
 Item No./Part No. : 5830N2(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 cm<sup>2</sup> sample surface area.

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Test Report No. F690501/LF-CT8AYAA10-28284

Issued Date: August 17, 2010

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Sample No. : AYAA10-28284.001  
 Sample Description : LED  
 Item No./Part No. : S830N2(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:



- 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 Cr(VI) coating  
 Positive = Presence of Cr(VI) 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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