

DATE OF ISSUE : 2007. 08. 06

SPECIFICATION

MODEL : SLSRGBW815TSNSWS

[Approved Rank : $V_F(S)$, CIE(A3, A4, C1, C2, C3, C4), $I_V(S)$]

RGBW LED

CUSTOMER :

SAMSUNG ELECTRO-MECHANICS CO., LTD.

314. MAETAN3-DONG, YEONGTONG-KU,
SUWON-SI, GYUNGKI-DO, KOREA, 442-743

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1. Product Outline

1) Feature

- . Lead Frame Type LED Package (5.2 * 6.0 * t 1.3mm)
- . Beam Angle ($\Delta\theta$: 120 °)
- . AlGaInP, GaN/Al₂O₃ Chip & Long Time Reliability

2) Applications

- . Indoor, Outdoor Display and etc.

2. Absolute Maximum Rating

Item	Symbol	Absolute Maximum Rating			Unit
		Red	Green	Blue	
Forward Current	I _F	30	30	30	mA
Pulse Forward Current	I _{FP}	100	100	100	mA
Reverse Voltage	V _r	10	—	—	V
Reverse Current	I _R	—	85	85	mA
Operating Temperature	T _{opr}	-30 ~ 85			°C
Storage Temperature Range	T _{stg}	-40 ~ 100			°C

-. I_{FP} Conditions : Duty 1/10 Pulse Width 10msec

3. Characteristics

Electrical properties

(Ta : 25°C)

Item	Symbol	Condition	Rank	Color	Min.	Typ.	Max.	Unit
Forward Voltage (*)	V _F	I _F = 20 mA	S	Red	1.8	2.1	2.6	V
				Green	2.9	3.2	3.7	
				Blue	2.9	3.2	3.6	
Reverse Current	I _R	V _R = 5V	—	R	—	—	100	μA
Reverse Voltage	V _r	I _R = 10mA	—	G, B	0.6	—	2.0	V

Dominant Wavelength

(Ta : 25°C)

Item	Symbol	Condition	Rank	Color			Unit
				Red	Green	Blue	
Dominant Wavelength (*)	λ _D	I _F = 20 mA	—	618 ~ 628	520 ~ 540	458 ~ 475	nm

Chromaticity Coordinate

(Ta : 25°C)

Item	Condition	Rank		x				y			
Chromaticity Coordinate	IF=60mA (R, G, B IF=20mA)	W	A3	0.220	0.250	0.250	0.220	0.275	0.280	0.245	0.240
			A4	0.250	0.280	0.280	0.250	0.280	0.285	0.250	0.245
			C1	0.220	0.250	0.250	0.220	0.240	0.245	0.210	0.205
			C2	0.250	0.280	0.280	0.250	0.245	0.250	0.215	0.210
			C3	0.220	0.250	0.250	0.220	0.205	0.210	0.175	0.170
			C4	0.250	0.280	0.280	0.250	0.210	0.215	0.180	0.175

Luminous Intensity

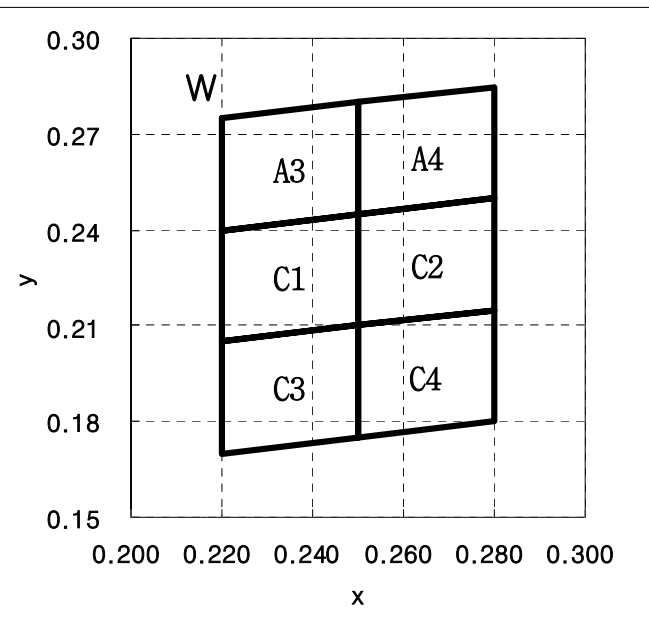
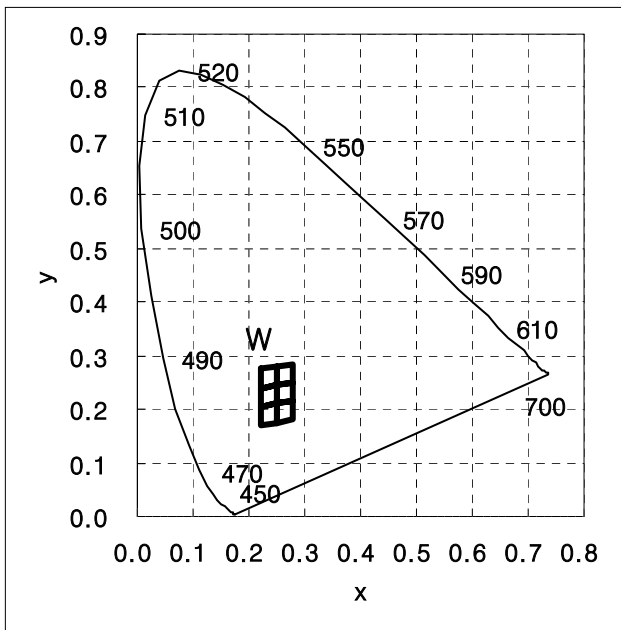
(Ta : 25°C)

Item	Symbol	Condition	Rank	Color	min.	typ.	MAX.	Unit
Luminous Intensity (*)	I_v	$I_F = 20 \text{ mA}$	S	Red	450	600	—	mcd
				Green	1200	1400	—	
				Blue	200	400	—	
		$I_F = 60 \text{ mA}$ (R,G,B $I_F = 20 \text{ mA}$)		—	1850	2400	—	

* Tolerance : V_F ; $\pm 0.1V$, λ_D ; $\pm 2nm$, x,y ; ± 0.02 , I_v ; $\pm 10\%$

* Luminous intensity measuring equipment : CAS140 B

4. Chromaticity Diagram



* $W = A3 + A4 + C1 + C2 + C3 + C4$

※ Approved Rank

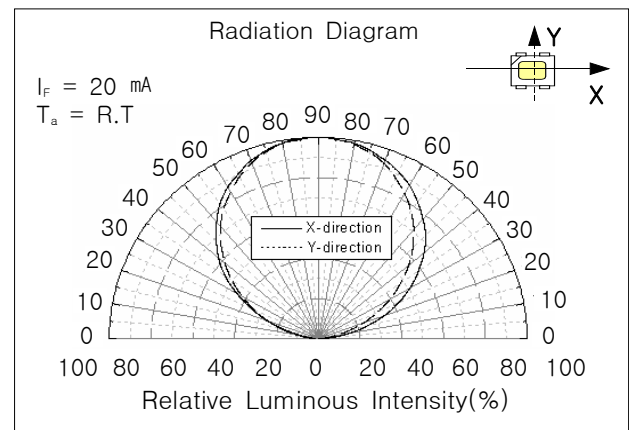
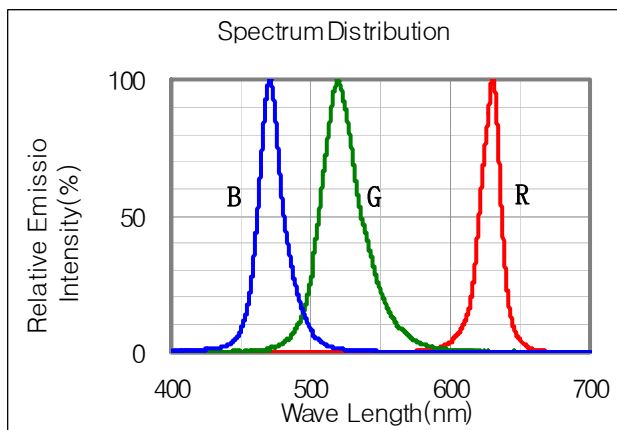
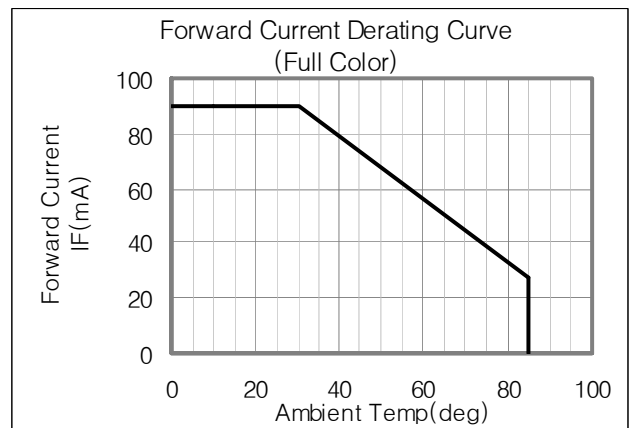
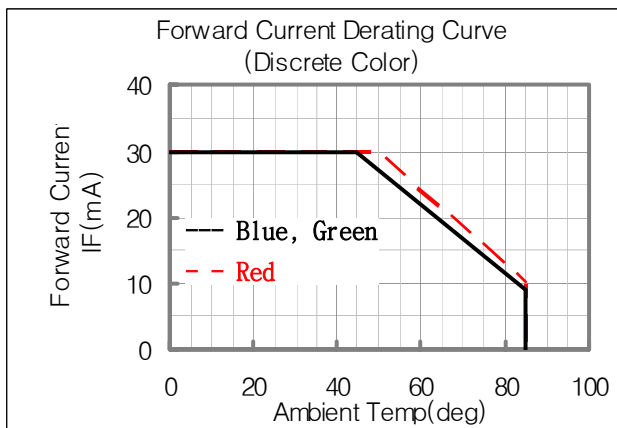
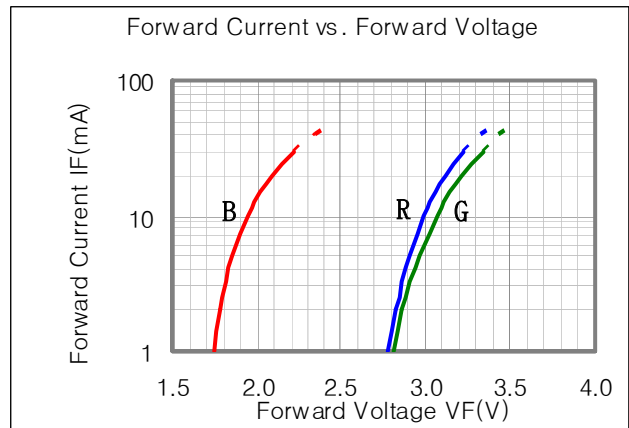
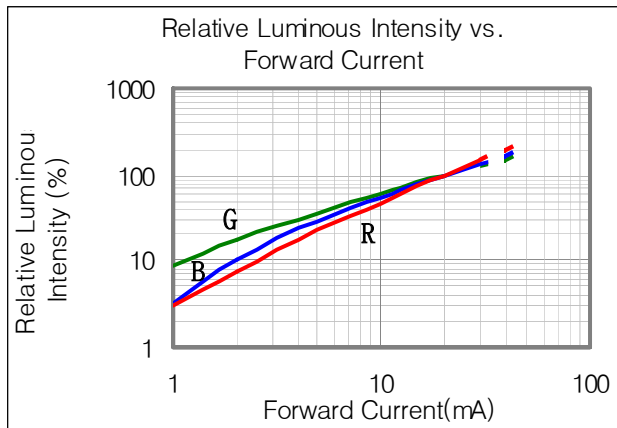
V_F	CIE	I_v
S	A3, A4 C1, C2, C3, C4	S

* Each reel contains only one of the A3, A4, C1, C2, C3 or C4, a segment (1/6) of the CIE rank.

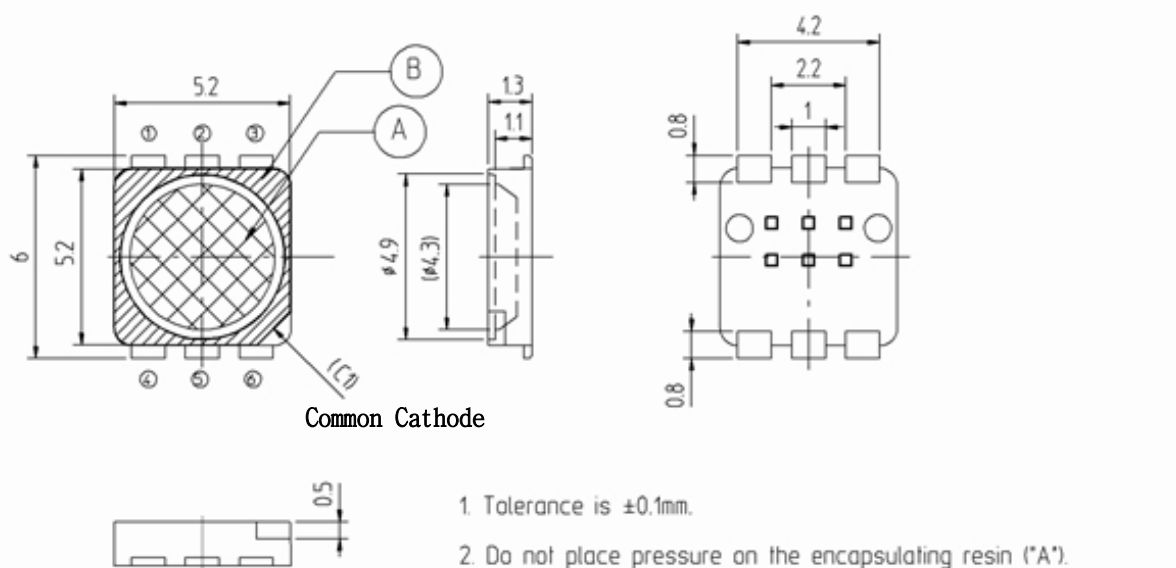
5. Typical Characteristics Graph

* These graphs show typical values.

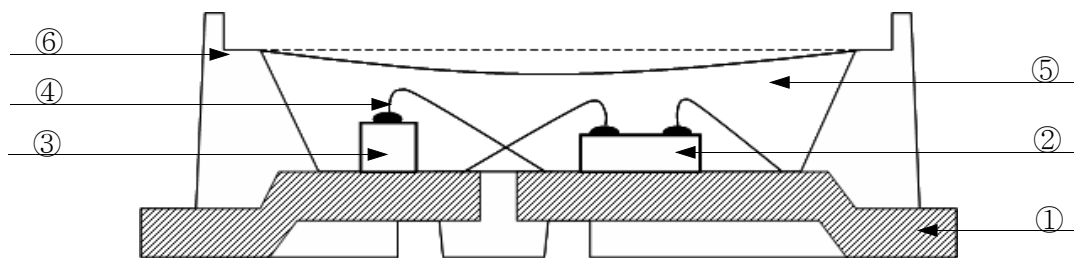
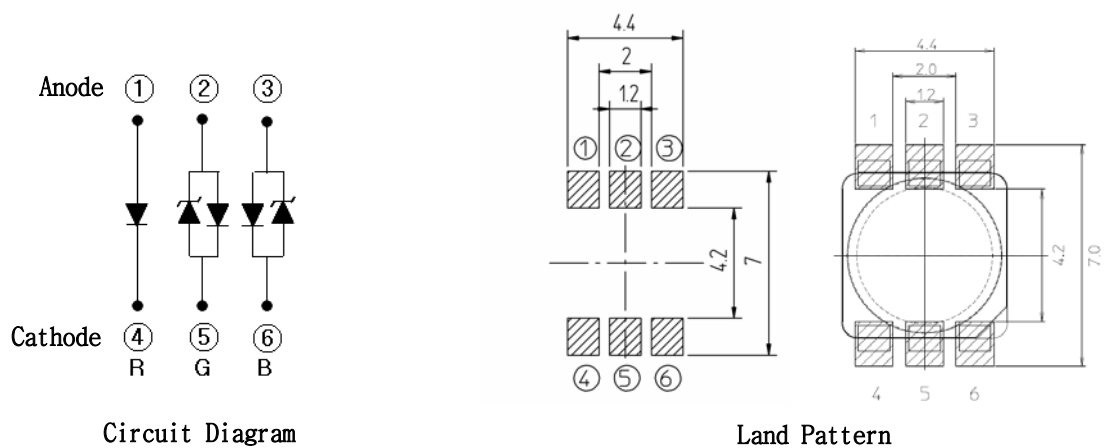
(T_a : 25°C)



6. LED Package Outline Dimensions



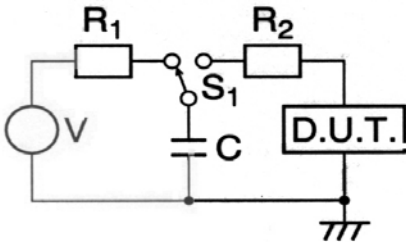
1. Tolerance is $\pm 0.1\text{mm}$.
2. Do not place pressure on the encapsulating resin (*A*).
3. The maximum compressing force is 15N on the polymer (*B*).



NUMBER	ITEM	MATERIAL
①	FRAME	Copper Frame(Silver Plated)
②	LED CHIP	AlGaInP, GaN/Al ₂ O ₃
③	Zener Diode	Si
④	WIRE	Gold Wire
⑤	RESIN	Resin
⑥	PACKAGE	Heat-resistant Polymer

7. Reliability Test Items and Conditions

1) Test Items and Results

Test Item	Test Conditions	Test Hours/Cycles	Sample No
Room Temperature life test	25°C±3°C, Red;DC30 mA, Green;DC30 mA, Blue;DC30 mA	500 h	50
High Temperature humidity life test	60°C±3°C, 95%±2%RH, Red;DC18 mA, Green;DC18 mA, Blue;DC18 mA	500 h	50
High Temperature life test	85°C±3°C, Red;DC9 mA, Green;DC9 mA, Blue;DC9 mA	500 h	50
Low Temperature life test	-30°C±3°C, Red;DC30 mA, Green;DC30 mA, Blue;DC30 mA	500 h	50
Thermal Shock	-40°C ~ 100°C 0.5 h 0.5 h	100 cycles	22
High Temperature Storage	Ta=100°C±3°C	500 h	22
Low Temperature Storage	Ta=-40°C±3°C	500 h	22
High Temperature humidity Storage	60°C±3°C, 95%±2%RH	500 h	50
Temperature humidity Cycle	25°C ~ 65°C ~ -10°C 24hrs/1cycle, 95%RH	10 cycles	22
Reflow Soldeing (Pb-Free)	Peak 260±5°C for 10sec, 220°C over time 60sec max	3 times	22
ESD(HBM)	 -R1:10MΩ , R2:1.5KΩ , C:100pF	5 times	5
On/Off test	50°C±3°C, 95%±2%RH, On/2sec, Off/2sec Red;DC30 mA, Green;DC30 mA, Blue;DC30 mA	120h	50

2) Criteria for Judging the Damage

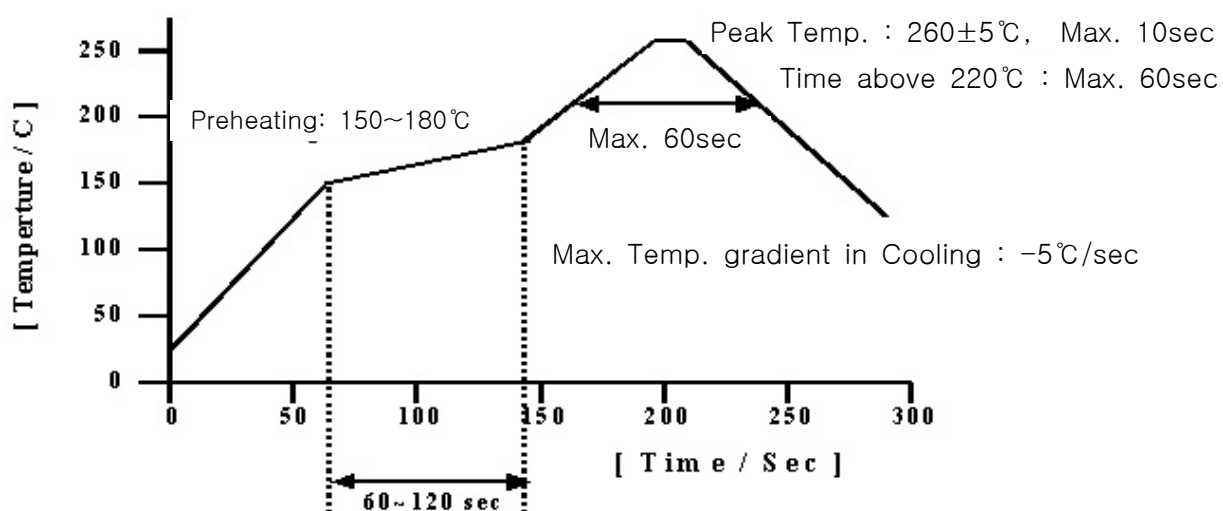
Item	Symbol	Test Condition	Limit	
			Min	Max
Forward Voltage	V_F	$I_F=20\text{ mA}$	—	U.S.L.*1.1
Luminous Intensity	IV	$I_F=20\text{ mA}$	L.S.L.*0.5	—

* USL : Upper Standard Level LSL : Lower Standard Level

8. Solder Conditions

1) Reflow Conditions (Pb Free)

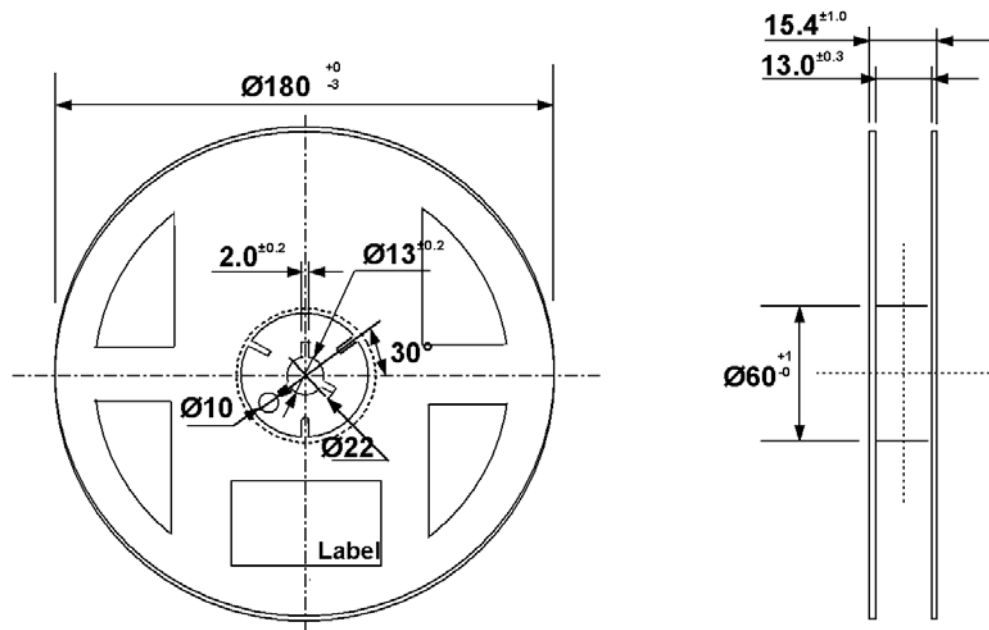
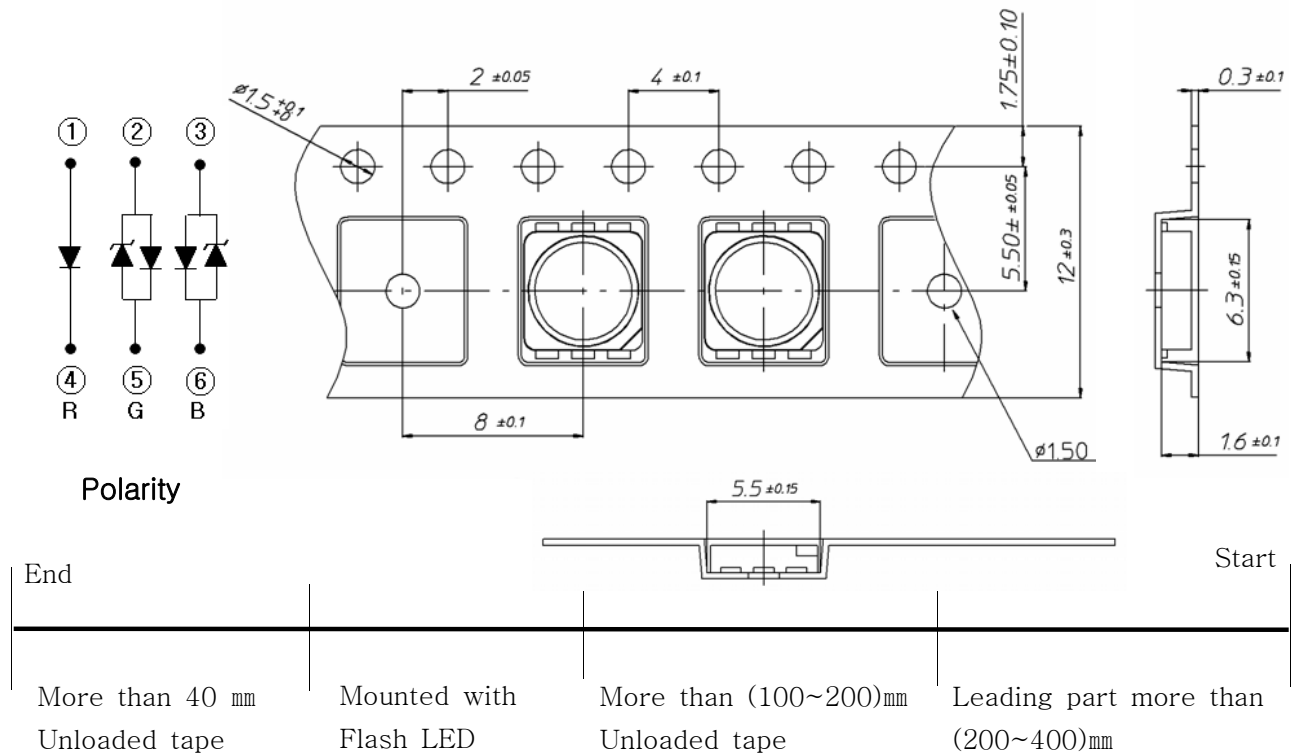
Reflow Frequency : 2 times max.



2) For Manual Soldering

Not more than 5 seconds @MAX 300°C , under soldering iron.(one time only)

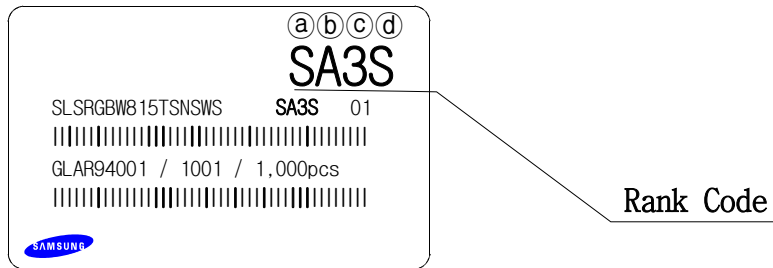
9. Taping Dimension



Tolerance ± 0.2 , Unit:mm

- (1) Quantity : The quantity/reel to be 1000pcs.
- (2) Cumulative Tolerance : Cumulative tolerance/10 pitches to be ± 0.2 mm
- (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°C 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



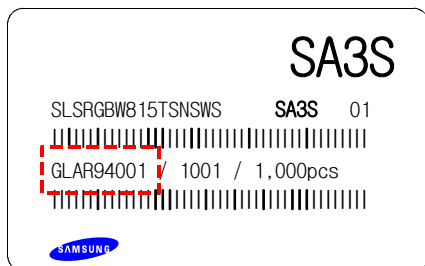
N.B) Denoted rank is the only example.

Rank Code

- Ⓐ : Forward Voltage(V_F) Rank (refer to page. 3)
- ⒷⒸ : Chromaticity Coordinate Rank (refer to page. 4)
- Ⓓ : Luminous Intensity(I_v) Rank (refer to page. 4)

11. Lot Number

The Lot number is composed of the following characters

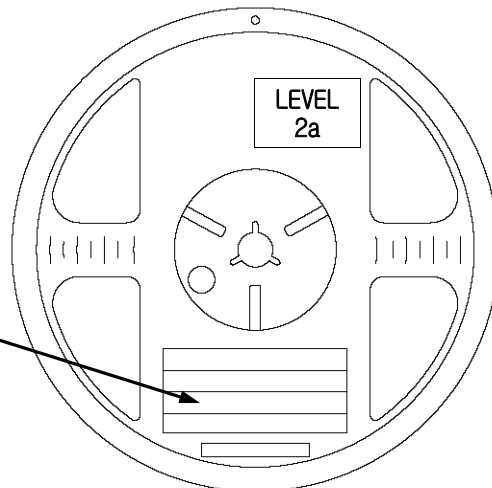
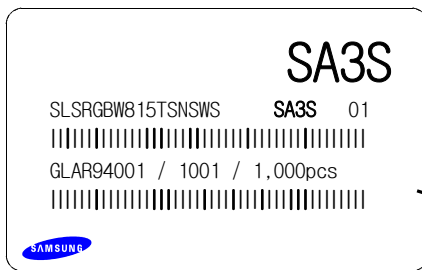


●◎◇◆□■△△△ / ▲▲▲ / 1000PCS

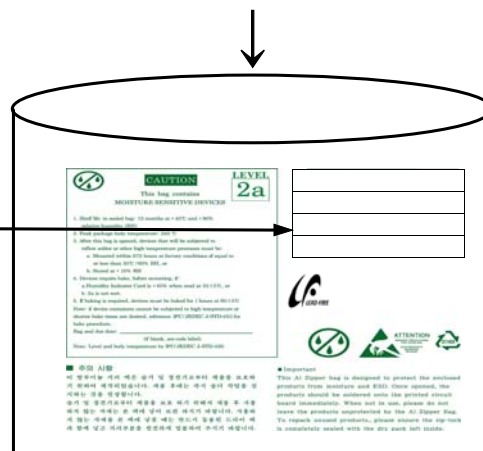
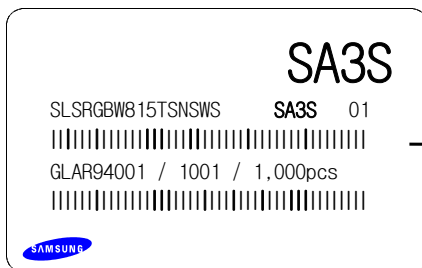
- : Production Site (S:SEMCO, G:Gosin China)
- ◎ : L (LED)
- ◇ : Product State (A:Normality, B: Bulk, C:First Production, R:reproduction, S:Sample)
- ◆ : Year (Q:2006, R:2007, S:2008...)
- : Month (1 ~ 9, A, B)
- : Day (1 ~ 9, A, B ~ V)
- △ : SEMCO. Product number (1 ~ 999)
- ▲ : Reel Number (1 ~ 999)

12. Reel Packing Structure

Reel



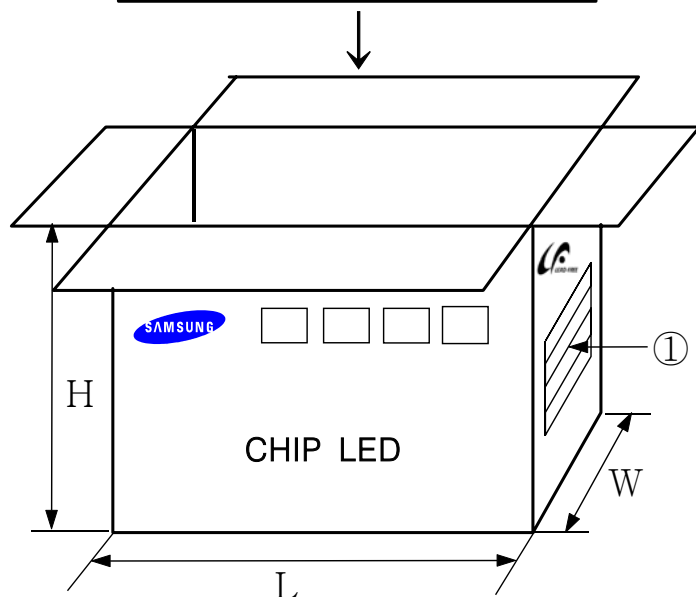
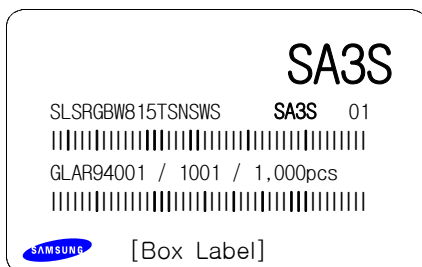
Aluminum Vinyl Bag



Material : Paper(SW3B(B))

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

① SIDE



13. Aluminum Vinyl Bag



CAUTION

This bag contains
MOISTURE SENSITIVE DEVICES

LEVEL

2a

1. Shelf life in sealed bag: 12 months at $<40^{\circ}\text{C}$ and $<90\%$ 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 $<10\%$ RH
4. Devices require bake, before mounting, if:
 - a. Humidity Indicator Card is $>65\%$ when read at $23\pm5^{\circ}\text{C}$, or
 - b. 2a is not met.
5. If baking is required, devices must be baked for 1 hours at $60\pm5^{\circ}\text{C}$

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

SA3S

SLSRGBW815TSNSWS SA3S 01

|||||

GLAR94001 / 1001 / 1,000pcs

|||||





■ 주의 사항

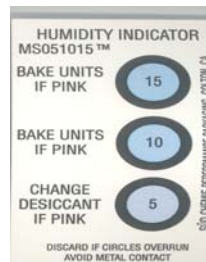
이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

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.
電圧の少しの**変更**により引き起こされる突然の電流**変更**を防ぐために過電流防止機能の抵抗器を適用する ように**勧め**します。
- 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.
本製品は、水、油、有機的な**溶剤**などの任意のタイプの流体の中で使用しないで下さい。
洗浄が要求される場合、IPAを使用して下さい。
- 3) When the LEDs illuminate, operating current should be decided after considering the ambient maximum temperature.
LED**発光**の時、動作電流はLED**周囲**の**温度条件**により使用電流を決めてください。
- 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℃, 20~70%RH)
本製品は**清潔な大気**を維持する環境で保存して下さい。
LEDが送られた後に3か月以上保存される場合、窒素**雰囲気**を備えた密封したコンテナ装置に保管して下さい。(0~40℃以下、20~70%のRH以下とし12か月以内)
- 5) After storage bag is open, device subjected to soldering, solder reflow, or other high temperature processes must be:
 - a. Mounted within 168 hours (7 days) at an assembly line with a condition of no more than 30℃/60%RH,
 - b. Stored at <10% RH開封後、Reflowハンダあるいは他の**高温プロセス**にさらされる場合は、
 - a. 工場**条件**30℃以下、60%RH以下の**条件**で168時間（7日）**以内**にマウントを完了して下さい。
 - b. また10%のRHで保存して下さい。
- 6) Repack unused Products with anti-moisture packing, fold to close any opening and then store in a dry place.
未使用のLEDが**残**った場合は、乾燥剤（シリカゲル）入り乾燥容器などで保管して下さい。
なお**当社防湿袋**に**戻**し、再封印することを**推奨**します。

- 7) Devices require baking before mounting, if humidity card reading is $>65\%$ at $23\pm5^{\circ}\text{C}$.

以下の場合、マウントする前にbakeすることをお勧めします。

$23\pm5^{\circ}\text{C}$ での湿度カードの表紙が65%以上の時

- 8) Devices must be baked for 24hours at $65\pm5^{\circ}\text{C}$, if baking is required.
Bakingが要求される場合、 $65\pm5^{\circ}\text{C}$ で24時間Bakeすることをお勧めします。

- 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.

本製品は静電気やサージ電圧に敏感で、素子の損傷や信頼性低下を起こすことがあります。本LEDの取り扱いに際しては、手首バンドまたは静電気防止グローブ等の静電気対策を十分行って下さい。

LEDに最大定格電圧値を超過される場合、LEDの損害を引き起こし、破壊する可能性があります。

損傷したLEDには、漏洩電流が著しく大きくなり、順方向の立ち上がり電圧が低下したり低電流で発光しなくなる等の異常が現れます。

15. Hazard Substance Analysis



Test Report No. F690501/LF-CTSAYA07-08113

Date: April 03, 2007

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To: **SAMSUNG ELECTRO-MECHANICS CO., LTD.**
314, Maetan3-dong
Yeongtong-gu
Suwon-city
GYEONGGI-DO 442-373
Korea

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

Product Name : 5252 Full Color LED

SGS File No. : AYA07-08113

Received Date : March 28, 2007

Test Performing Date : March 29, 2007

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)

Pluto Kim
Monet Jeong
Jully Oh
Jerry Jung
/Testing Person

SGS Testing Korea Co. Ltd.

Jeff Jang / Chemical Lab Mgr

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**Test Report No. F890501/LF-GTSAYA07-08113**

Date: April 03, 2007

Page 2 of 3

Sample No. : AYA07-08113.001

Sample Description : S2S2 Full Color LED

Item No./Part No. : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3050B(1995), US EPA 6010B(1995), ICP	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3050B(1995), US EPA 6010B(1995), ICP	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1995), US EPA 6010B(1995), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1995), US EPA 7195A(1992), UV	1	N.D.

Flame Retardant-PPBBs/PPBEs

Test Items	Unit	Test Method	MDL	Results
Monobromodiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromodiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromodiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromodiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromodiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromodiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromodiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromodiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromodiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromodiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Monobromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.

NOTE: (1) N.D. = Not detected.(<MDL)
(2) ppm = mg/kg
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) ** = Qualitative analysis (No Unit)
(6) Negative = Undetectable / Positive = Detectable

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Picture of Sample as Received:

Sample Color :

White



*** End ***

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