

SPECIFICATION

MODEL : SPMRED5204

Approved rank : $V_F(S0)$, $\lambda_D(W1,W2)$, $I_V(S0)$

RED LED

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 (5.2 * 6.0 * t 1.3mm)
- . Beam Angle ($\Delta\theta$: 120°)
- . AlGaInP Chip & Long Time Reliability

2) Applications

- . Indoor, Outdoor Display and etc.

2. Absolute Maximum Rating

- 1). Operation Forward Current Per Chip..... 30 mA
 - 2). Peak Pulsed Forward Current Per Chip..... 100 mA
(Duty 1/10 Pulse Width 10msec)
 - 3). Reverse Voltage..... 10 V
 - 4). Operating Temperature Range (T_{opr}) -30°C ~ 85°C
 - 5). Storage Temperature Range (T_{stg}) -40°C ~ 100°C
- . I_{FP} Conditions : Duty 1/10 Pulse Width 10 ms

3. Characteristics

Electrical/ Optical Characteristics

(T_a : 25°C)

Item	Symbol	Conditions	Rank	Min.	Typ.	Max.	Unit
Forward Voltage (*)	V_F	$I_F = 40 \text{ mA}$	S0	1.7	-	2.6	V
Reverse Current	I_R	$V_R = 5 \text{ V}$	-	-	-	50	μA

Dominant Wavelength

(T_a : 25°C)

Item	Symbol	Condition	Rank	Model Name	Min.	Typ.	Max.	Unit	
Dominant Wavelength (*)	λ_D	$I_F = 40 \text{ mA}$	WW	W1	SPMRED5204N0S0W1S0	617		624.5	nm
				W2	SPMRED5204N0S0W2S0	624.5		632	

Luminous Intensity

(T_a : 25°C)

Item	Symbol	Condition	Rank	Min.	Typ.	Max.	Unit
Luminous Intensity (*)	I_v	$I_F = 40 \text{ mA}$	S0	600	-	-	mcd

- * Tolerance : V_F ; $\pm 0.1\text{V}$, λ_D ; $\pm 2\text{nm}$, I_v ; $\pm 10\%$
- * Luminous intensity measuring equipment : CAS140CT

※ Approved Rank

V_F	λ_D	I_v
S0	W1, W2	S0

* Each reel contains only one of the W1, W2 a segment (1/2) of the WW rank.

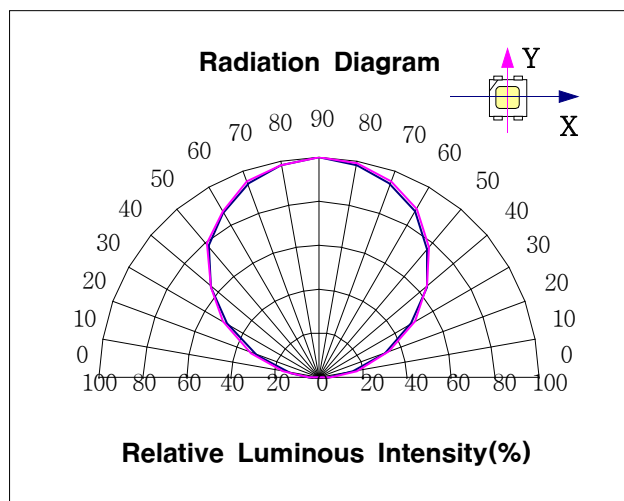
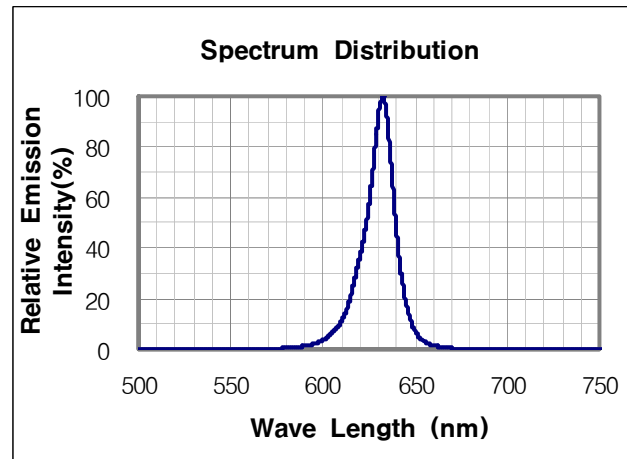
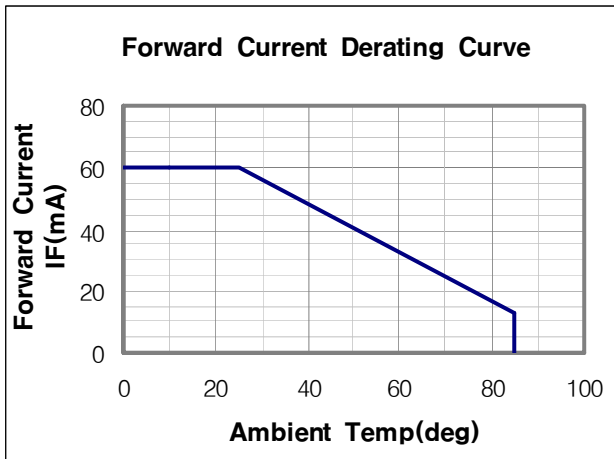
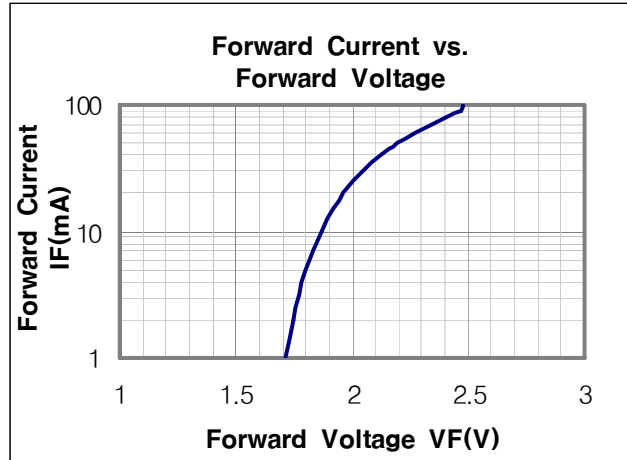
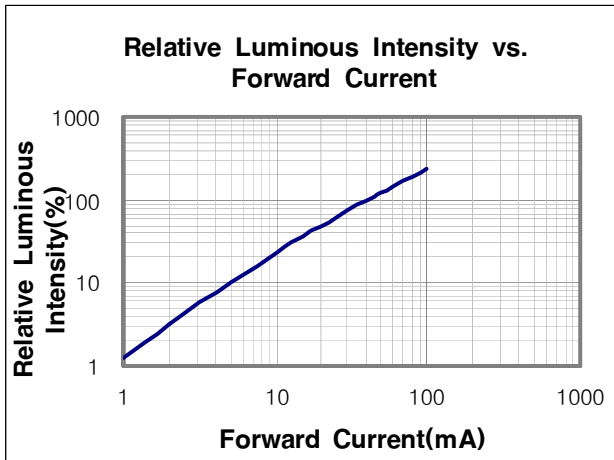
※ Special Approved Rank

V_F	λ_D	I_v
-	-	-

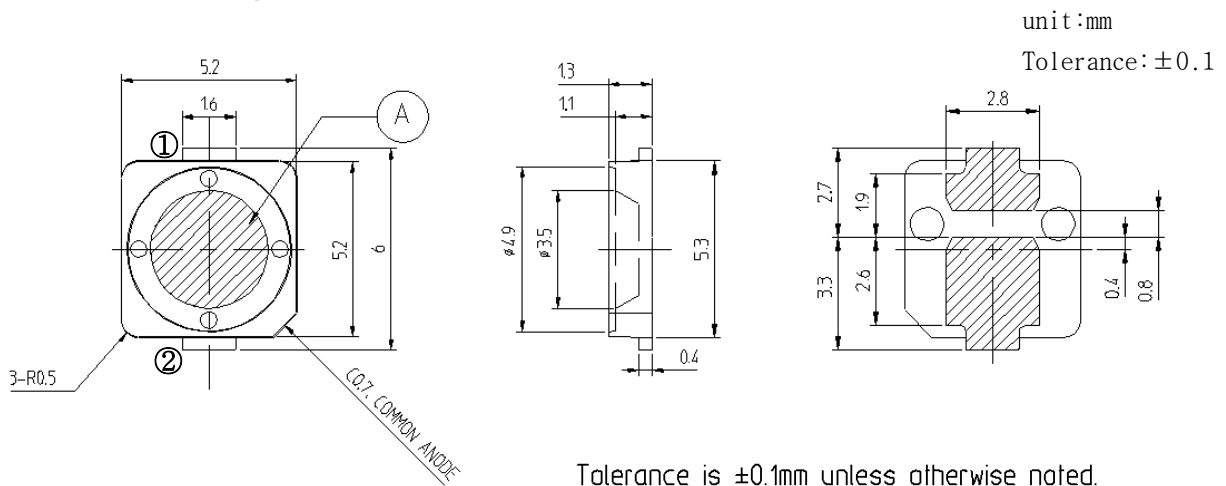
4. Typical Characteristics Graph

* These graphs show typical values.

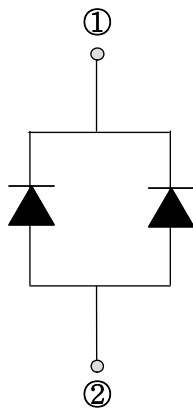
(Ta : 25°C)



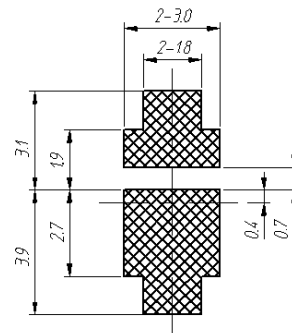
5. LED Package Outline Dimensions



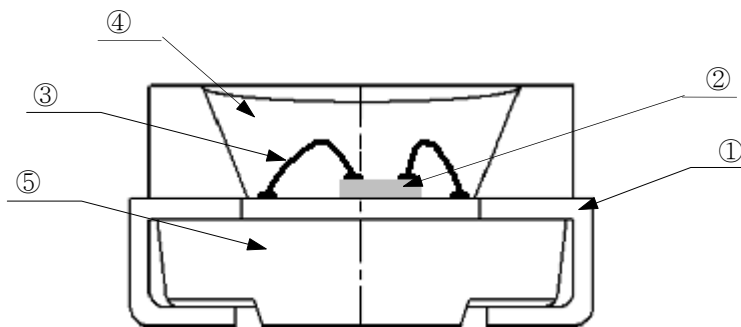
Tolerance is ±0.1mm unless otherwise noted.
The maximum compressing pressure is 15N.
Do not apply any damage on the phosphor ("A").



Circuit Diagram



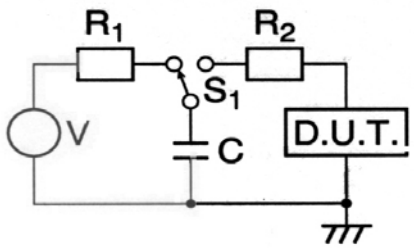
PCB PATTERN



NUMBER	ITEM	MATERIAL
①	FRAME	Copper Frame(Silver Plated)
②	LED CHIP	AlGaInP/AIn
③	WIRE	Gold Wire
④	RESIN	Resin
⑤	PACKAGE	Heat-resistant Polymer

6. Reliability Test Items and Conditions

1) Test Items

Test Item	Test Conditions	Test Hours/Cycles	Sample No
Room Temperature life test	25°C±3°C, DC60 mA	500 h	50
High Temperature humidity life test	60°C±3°C, 95%±2%RH, DC33 mA	500 h	50
High Temperature life test	85°C±3°C, DC12.5mA	500 h	50
Low Temperature life test	-30°C±3°C, DC60 mA	500 h	50
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	22
Thermal Shock	-40°C ~ 100°C 0.5 h 0.5 h	100 cycles	22
Temperature humidity Cycle	25°C ~ 65°C ~ -10°C 24hrs/1cycle, 95%RH	10 cycles	22
Reflow (Pb-Free)	Peak 260±5°C for 10sec	3 times	22
ESD(HBM)	 <p>-R1:10MΩ , R2:1.5KΩ , C:100pF</p>	5 times	5
On/Off test	50°C±3°C, 95%±2%RH, DC60 mA, On/2sec, Off/2sec	108000 cycles	50

2) Criteria for Judging the Damage

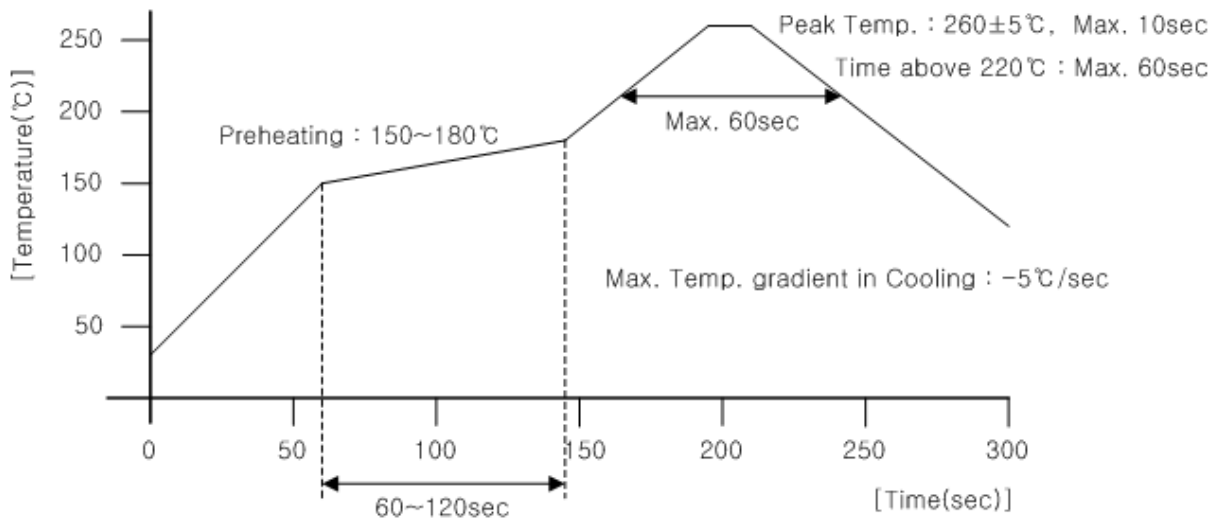
Item	Symbol	Test Condition	Limit	
			Min	Max
Forward Voltage	V _F	I _F = 40mA	-	U.S.L.*1.2
Luminous Intensity	I _V	I _F = 40mA	L.S.L.*0.5	-

* USL : Upper Standard Level LSL : Lower Standard Level

7. Solder Conditions

1) Reflow Conditions (Pb Free)

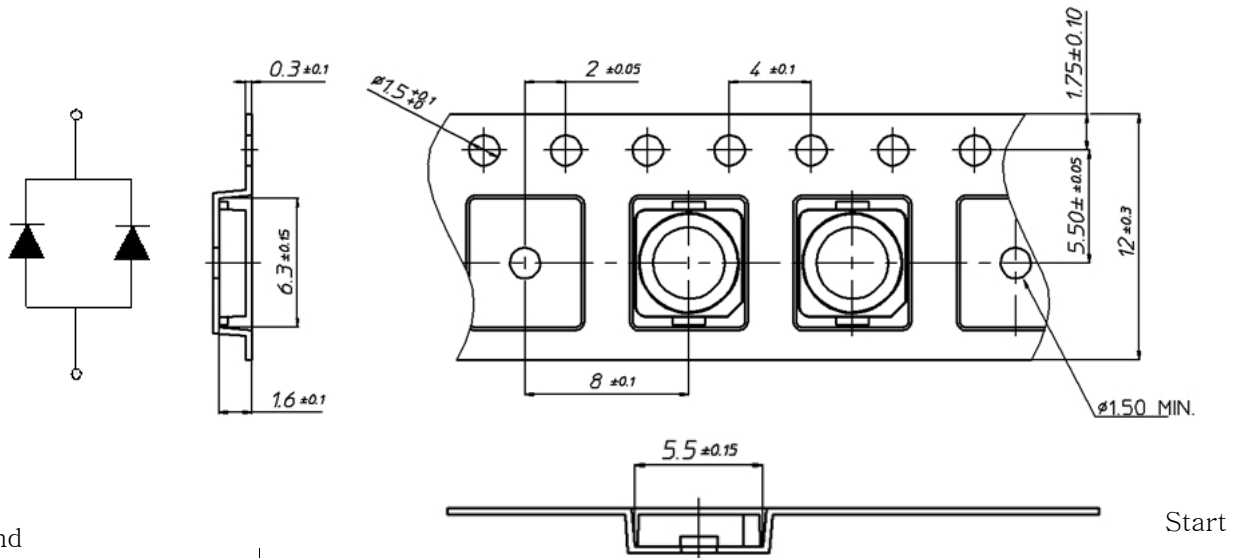
Reflow Frequency : 2 times max.



2) For Manual Soldering

Not more than 5 seconds @MAX300°C, under soldering iron.(one time only)

8. Taping Dimension

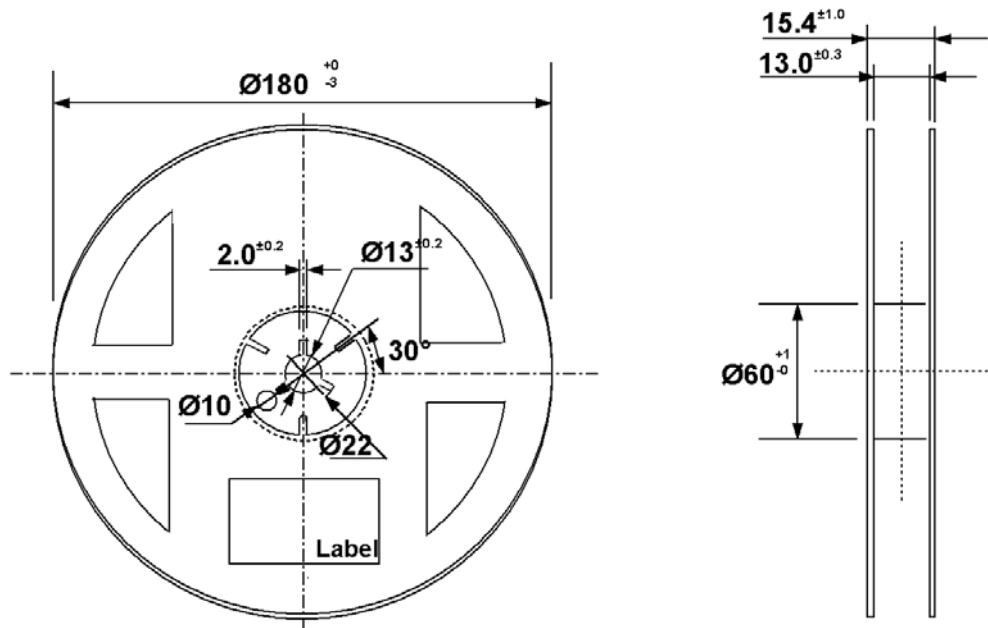


More than 40 mm
Unloaded tape

Mounted with
Flash LED

More than (100~200)mm
Unloaded tape

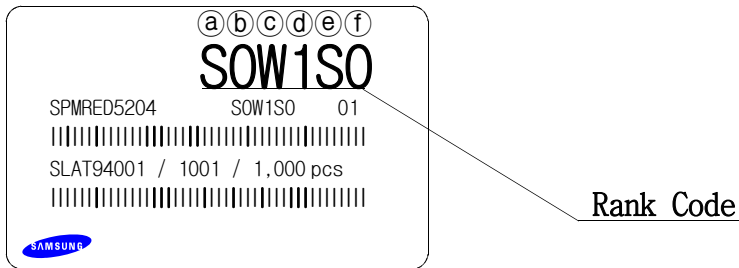
Leading part more than
(200~400)mm



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.

9. Label Structure



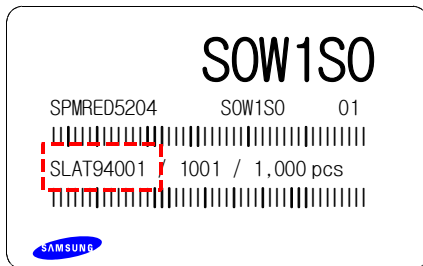
N.B) Denoted rank is the only example.

Rank Code

- ⒶⒷ : Forward Voltage(V_F) Rank (refer to page. 3)
- ⒸⒹ : Wavelength Rank(λ_D) (refer to page. 3)
- ⒺⒻ : Luminous Intensity(I_V) Rank (refer to page. 3)

10 Lot Number

The Lot number is composed of the following characters

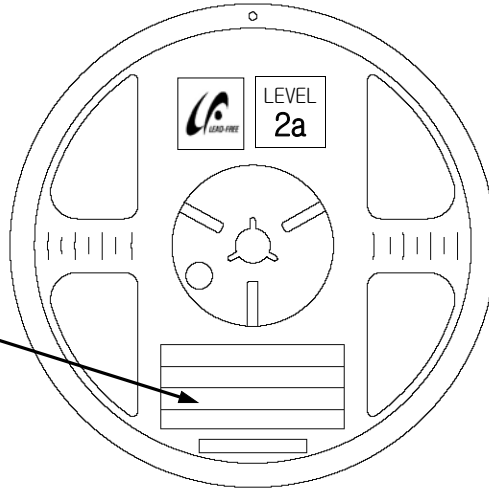
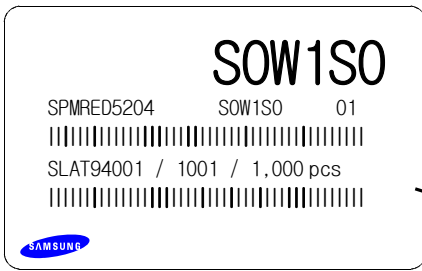


①②③④⑤⑥⑦⑧⑨ / 1ⒶⒷⒸ / 1,000 PCS

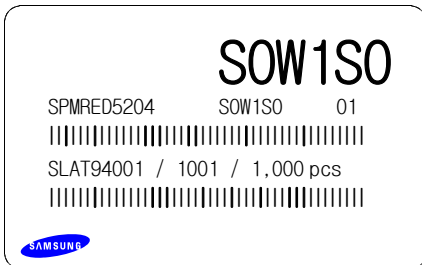
- ① : Production Site (S:SAMSUNG LED, G: GOSIN CHINA, I: Apro)
- ② : L (LED)
- ③ : Product State (A:Normality, B:Bulk, C:First Production, R:Reproduction, S:Sample)
- ④ : Year (T:2009, U:2010, V:2011...)
- ⑤ : Month (1 ~ 9, A, B)
- ⑥ : Day (1 ~ 9, A, B ~ V)
- ⑦⑧⑨ : SAMSUNG LED Product number (1 ~ 999)
- ⒶⒷⒸ : Reel Number (1 ~ 999)

11. Reel Packing Structure

Reel



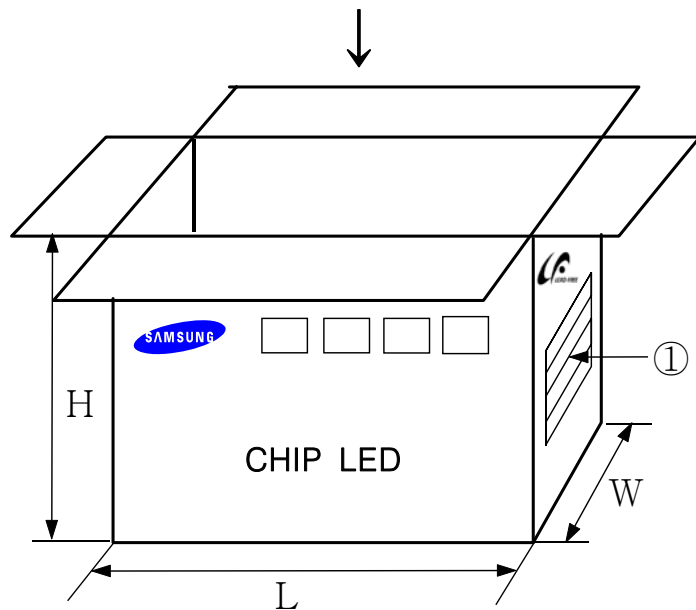
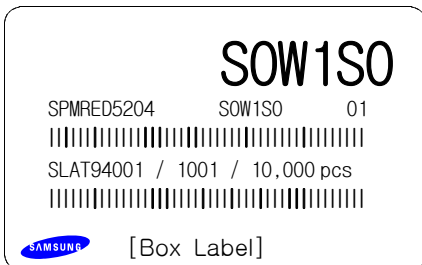
Aluminum Vinyl Bag




Material : Paper(SW3B(B))

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

① SIDE



12. Aluminum Vinyl Bag



CAUTION

This bag contains
MOISTURE SENSITIVE DEVICES

LEVEL
2a

SOW1SO

SPMRED5204 SOW1SO 01

|||||

SLAT94001 / 1001 / 1,000 pcs

|||||

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 23±5°C, or
 - b. 2a is not met.
5. If baking is required, devices must be baked for 1 hours at 60±5°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



■ 주의 사항

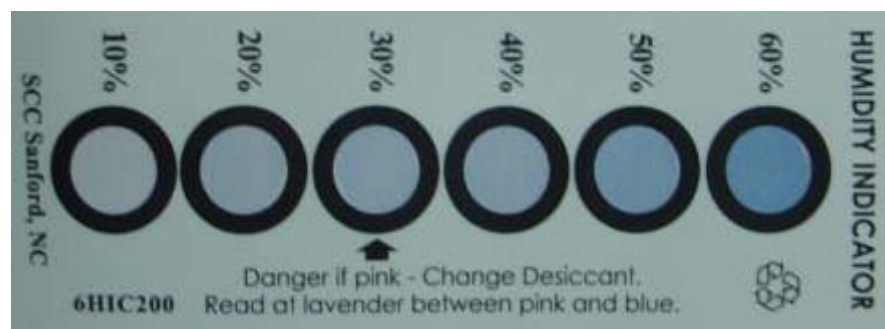
이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

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



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, 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 168 hours (7 days) 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. Hazard Substance Analysis


Test Report No. F690501/LF-CTSGP06-21332

Date: August 22, 2006

Page 1 of 3

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

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

Commodity : Flash LED 5252 Red
SGS File No. : GP06-21332
Received Date : August 14, 2006
Test Performing Date : August 15, 2006
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)

Jade Jang
 Monet Jeong
 Jully Oh
 Jerry Jung
 /Testing Person

SGS Testing Korea Co. Ltd.



Jeff Jang / Chemical Lab Mgr

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SGS Testing Korea Co., Ltd.

322, The D valley, 555-9, Hoge-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea 431-080

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1002-2, Hwasan-ri, Onsan-eub, Ulsan-gun, Ulsan, Korea 689-890 t +82 (0)52 239 6908-10 f +82 (0)52 239 6913


Test Report No. F690501/LF-CTSGP06-21332

Date: August 22, 2006

Page 2 of 3

Sample No. : GP06-21332.001

Sample Description : Flash LED 5252 Red

Style/Item No. : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996), ICP	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3050B(1996), US EPA 6010B(1996), ICP	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromobiphenyl	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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 1002-2, Hwasan-ri, Onsan-eub, Uiju-gun, Ulsan, Korea 689-890 t +82 (0)52 239 6908-10 f +82 (0)52 239 6913

Revision History
(Model : SPMRED5204)

Date	Revision History	Writer	
		Drawn	Approved
2009.07.01.	New Version	W.H. Jung	Y.C. Kim