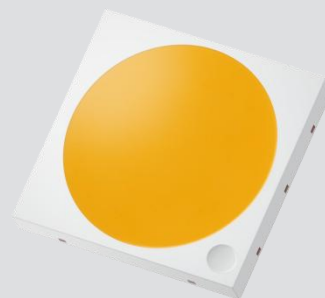


High Power LED Series

LH508A



High efficacy and lumen makes
the LH508A suitable use in a broad range of applications

Features & Benefits

- Operates at a maximum current of up to 0.24 A
- Uniform light distribution under any beam angle
- CIE Hot binning @ 85 °C



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1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Operating Temperature	T_{opr}	-40 ~ +85	°C	
Storage Temperature	T_{stg}	-40 ~ +85	°C	-
LED Junction Temperature	T_j	125	°C	-
Forward Current	I_F	240	mA	-
Peak Pulse Forward Current	I_{FP}	300	mA	Duty cycle ≤ 1/10, pulse width 100µm
Soldering Temperature		260 <10	°C s	-

b) Electro-optical Characteristics($I_F = 160$ mA, $T_j = 25$ °C)

Item	Unit	Rank	Min.	Typ.	Max.
Forward Voltage (V_F)	V	-	23.5	24.5	26.5
		3	70	-	-
Color Rendering Index (R_a)	-	5	80		
		7	90		
Thermal Resistance (junction to chip point)	°C/W		-	1.9	-
Beam Angle	°		-	116	-
Nominal Power	W			3.9	
ESD (HBM)	kV			±4	

Notes:

- 1) Samsung maintains measurement tolerance of: luminous flux = ±7 %, forward voltage = ±0.1 V
- 2) Characteristics @ 25 °C are for reference only

c) Luminous Flux Characteristics (I_F = 160 mA)

CRI (R _a) Min.	Nominal CCT (K)	Flux Rank	Flux Bin	Flux @ T _J = 25 °C (lm)		
				Min.	Typ.	Max.
70	3000K	-	-	521	572	-
	4000K	-	-	558	610	-
	5000K	-	-	558	610	-
	5700K	-	-	558	610	-
80	2700K	-	-	459	504	-
	3000K	-	-	473	520	-
	4000K	-	-	521	550	-
	5000K	-	-	521	550	-
90	2700K	-	-	402	429	-
	3000K	-	-	416	444	-
	4000K	-	-	443	473	-

Notes:

- 1) The COB is tested in pulsed operating condition at rated test current (10 ms pulse width) and rated temperature (T_J = T_C = 25 °C).
- 2) Samsung maintains measurement tolerance of: Luminous flux = ±7 %, CRI = ±1

2. Product Code Information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	P	H	W	H	1	L	5	N	4	0	3	X	E	W	3	A	1

Digit	PKG Information	Code	Specification
1 2 3	Samsung Package High Power	SPH	
4 5	Color	WH	White
6	Product Version	1	
7 8	Form Factor	L5	5050 size
9	Lens Type	N	No lens
10	Wattage or Model	4	LH508A
11	Internal Code	0	
12	CRI & Sorting Temperature	3	Min. 70 (25°C)
		5	Min. 80 (25°C)
		7	Min. 90 (25°C)
13 14	Forward Voltage (V)	XE	23.5~26.5V
15	CCT (K)	W	2700K
		V	3000K
		U	3500K
		T	4000K
		R	5000K
		Q	5700K
		P	6500K
16	MacAdam Step	3	MacAdam 3-step
17 18	Luminous Flux	A1	A1 level

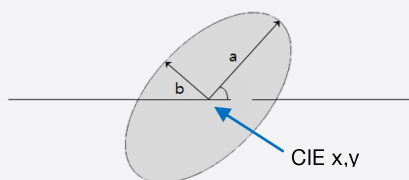
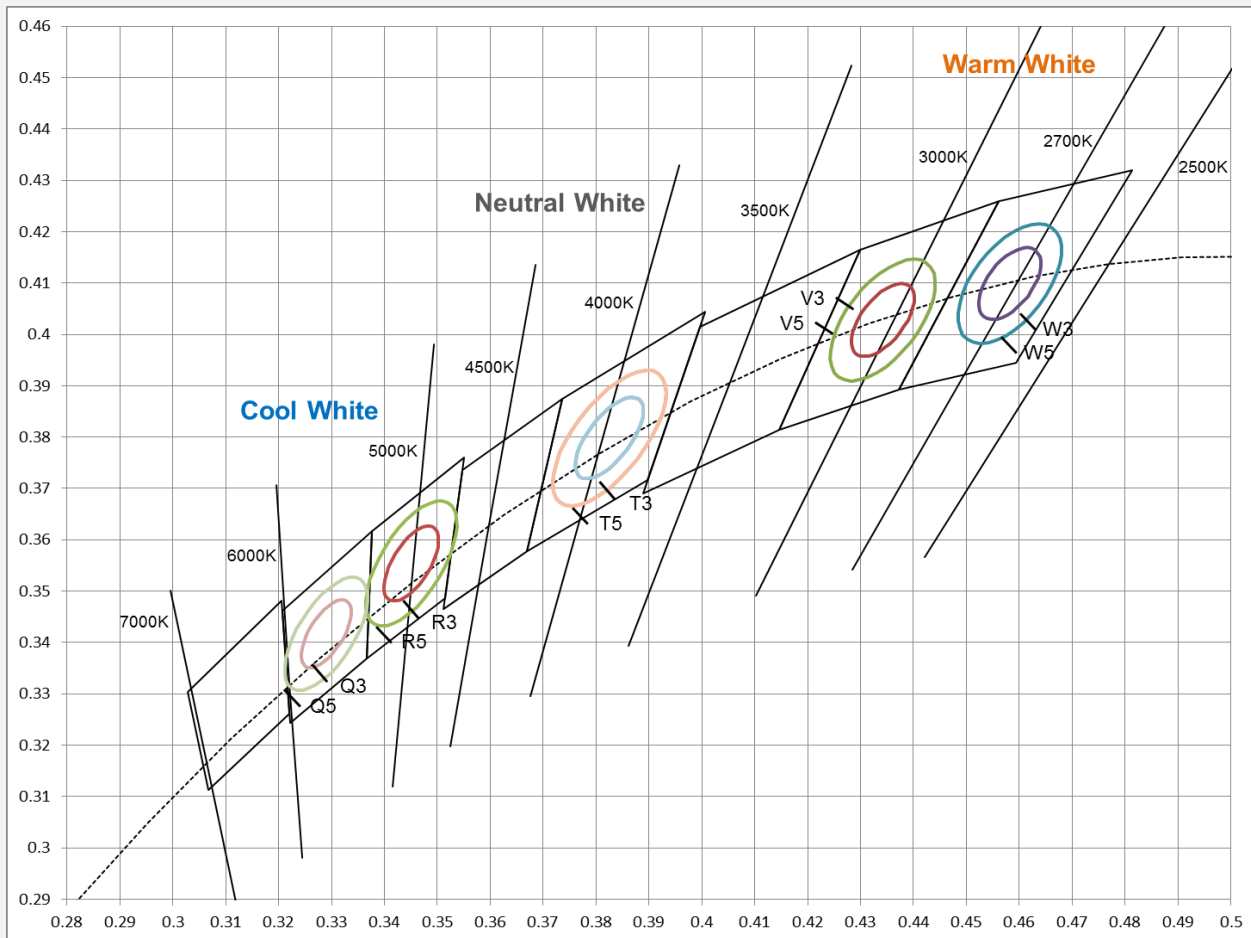
a) Binning Structure ($I_F = 160 \text{ mA}$)

CRI (R_a) Min.	Nominal CCT (K)	Product Code	V_F Rank ($T_J=25^\circ\text{C}$)	Chrom. Bin ($T_J=85^\circ\text{C}$)	Flux Rank	Flux Range (Φ_v, lm) ($T_J=25^\circ\text{C}$)
90	2700	SPHWH1L5N407XEW3A1	XE	W3	A1	402 ~
		SPHWH1L5N407XEW5A1		W5		
	3000	SPHWH1L5N407XEV3A1	XE	V3	A1	416 ~
		SPHWH1L5N407XEV5A1		V5		
	4000	SPHWH1L5N407XET3A1	XE	T3	A1	443 ~
		SPHWH1L5N407XET5A1		T5		
80	2700	SPHWH1L5N405XEW3A1	XE	W3	A1	459 ~
		SPHWH1L5N405XEW5A1		W5		
	3000	SPHWH1L5N405XEV3A1	XE	V3	A1	473 ~
		SPHWH1L5N405XEV5A1		V5		
	4000	SPHWH1L5N405XET3A1	XE	T3	A1	521 ~
		SPHWH1L5N405XET5A1		T5		
70	5000	SPHWH1L5N405XER3A1	XE	R3	A1	521 ~
		SPHWH1L5N405XER5A1		R5		
	3000	SPHWH1L5N403XEV3A1	XE	V3	A1	521 ~
		SPHWH1L5N403XEV5A1		V5		
	4000	SPHWH1L5N403XET3A1	XE	T3	A1	558 ~
		SPHWH1L5N403XET5A1		T5		
	5000	SPHWH1L5N403XER3A1	XE	R3	A1	558 ~
		SPHWH1L5N403XER5A1		R5		
	5700	SPHWH1L5N403XEQ3A1	XE	Q3	A1	558 ~
		SPHWH1L5N403XEQ5A1		Q5		

b) Voltage Bins ($I_F = 160 \text{ mA}$, $T_j = 25 \text{ }^\circ\text{C}$)

Nominal CCT (K)	CRI (R _a) Min.	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
-	-	-	XE	D1	23.5 ~ 24.5
				E1	24.5 ~ 25.5
				F1	25.5 ~ 26.5

c) Chromaticity Region & Coordinates ($I_F = 160 \text{ mA}$, $T_J = 85^\circ\text{C}$)

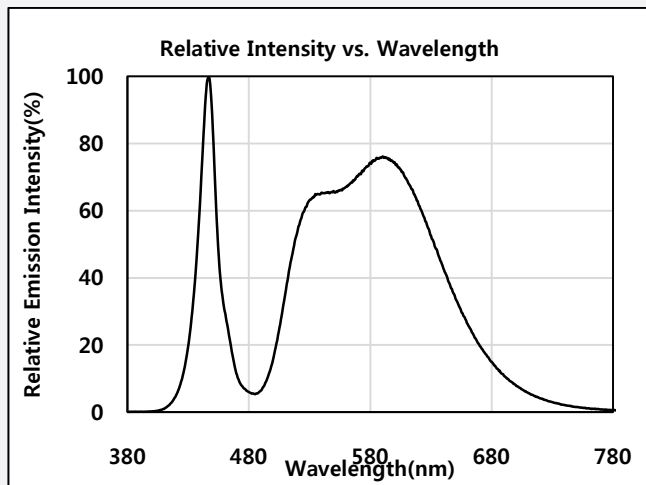


CCT	Rank	CIE x	CIE y	q	a	b
2700K	W3	0.4578	0.4101	53.7	0.0081	0.0042
	W5	0.4578	0.4101	53.7	0.0135	0.0070
3000K	V3	0.4338	0.4030	53.2	0.0083	0.0041
	V5	0.4338	0.4030	53.2	0.0138	0.0068
4000K	T3	0.3818	0.3797	53.7	0.0094	0.0040
	T5	0.3818	0.3797	53.7	0.0157	0.0067
5000K	R3	0.3447	0.3553	59.6	0.0082	0.0035
	R5	0.3447	0.3553	59.6	0.0137	0.0058
5700K	Q3	0.3287	0.3417	59.1	0.0075	0.0032
	Q5	0.3287	0.3417	59.1	0.0125	0.0053

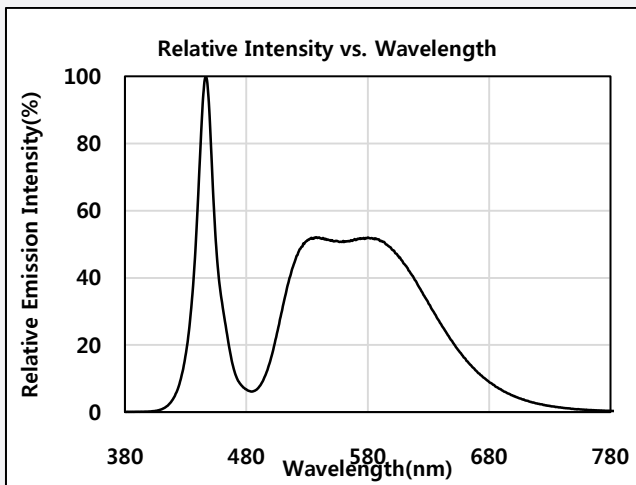
3. Typical Characteristic Graphs

a) Spectrum Distribution ($I_f = 160 \text{ mA}$, $T_J = 25^\circ\text{C}$)

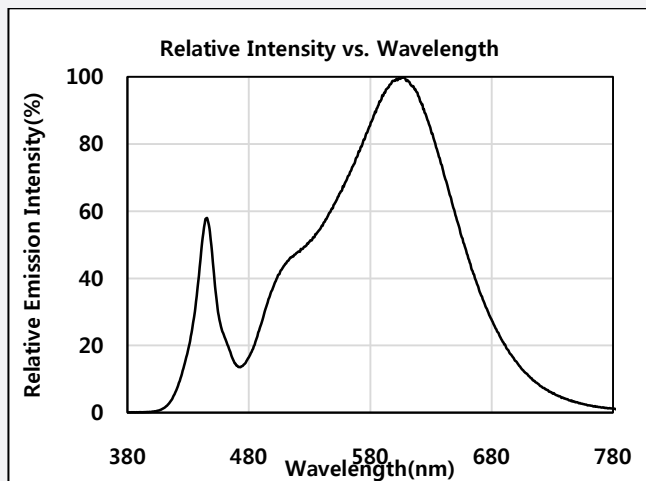
CCT : 4000K (70 CRI)



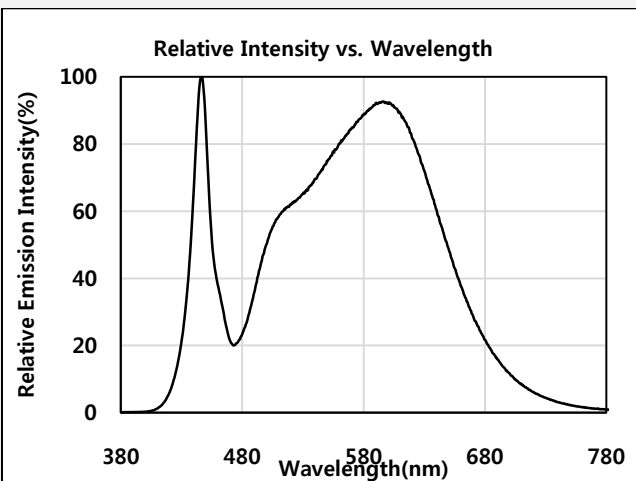
CCT : 5000K (70 CRI)



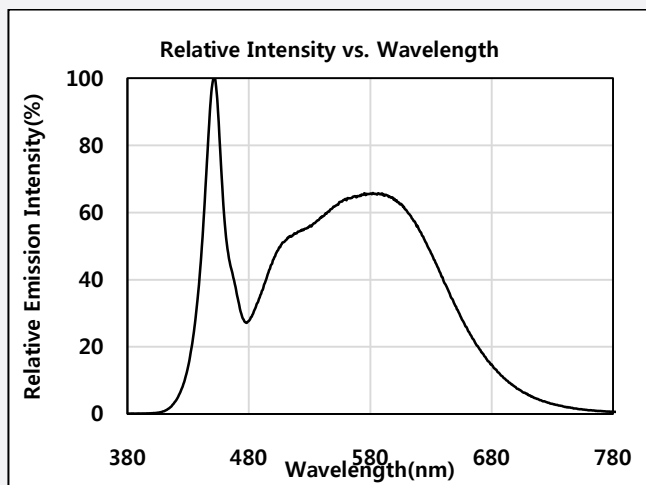
CCT : 3000K (80 CRI)



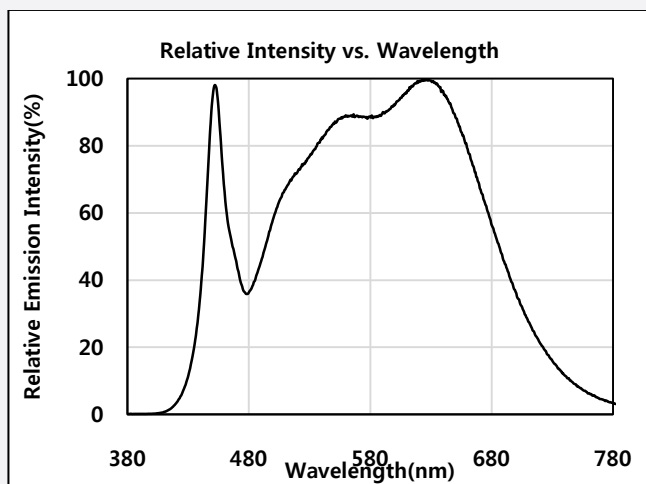
CCT : 4000K (80 CRI)



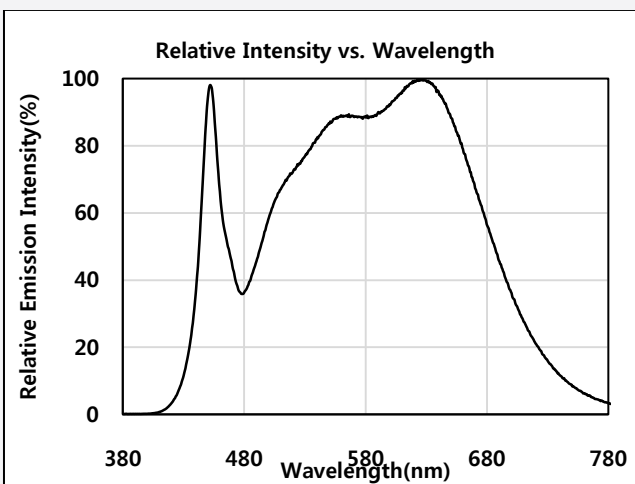
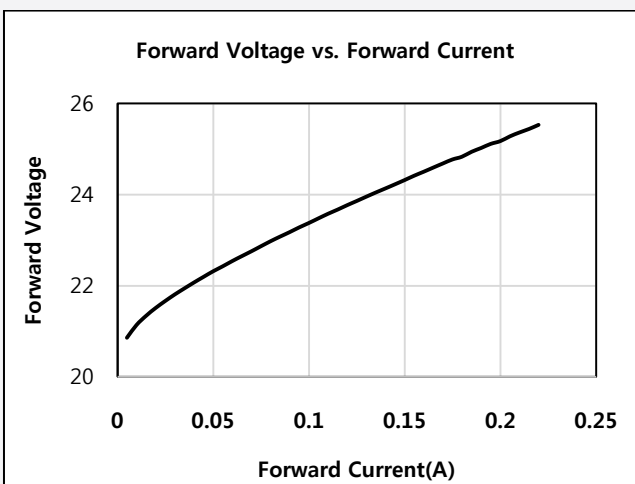
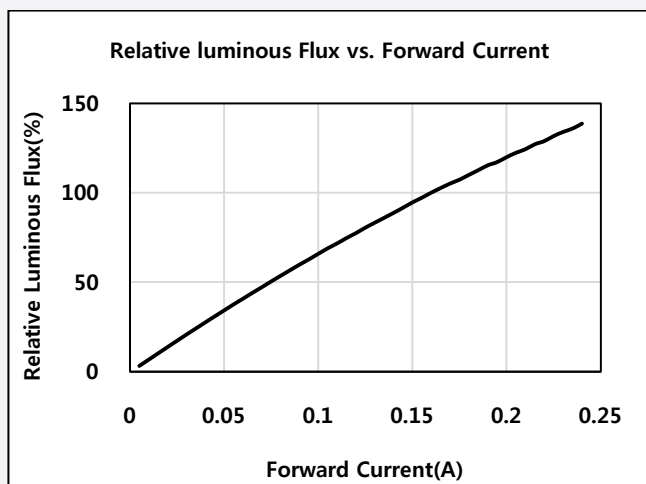
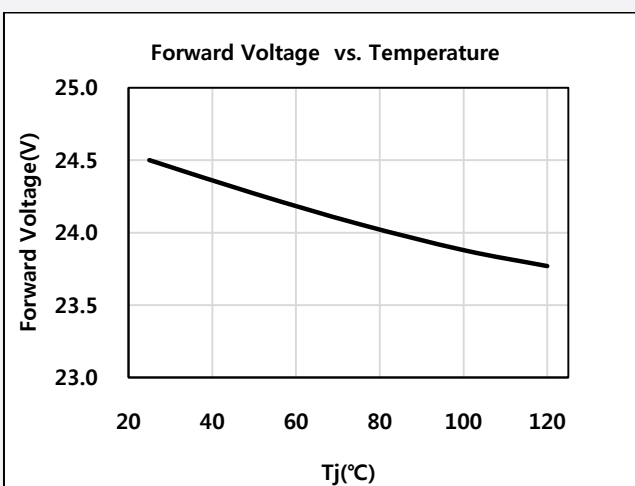
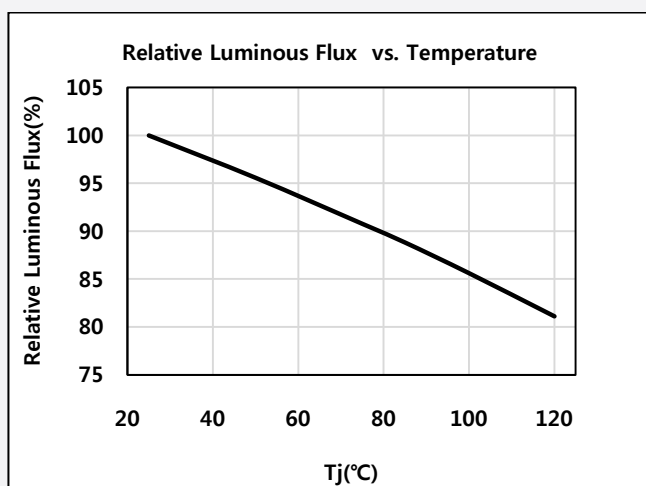
CCT : 5000K (80 CRI)



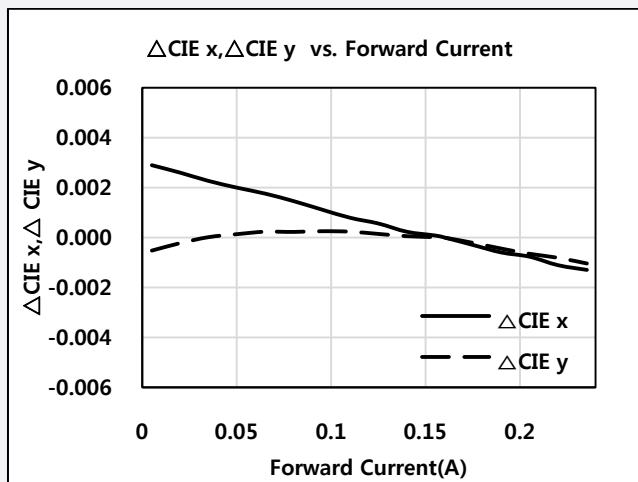
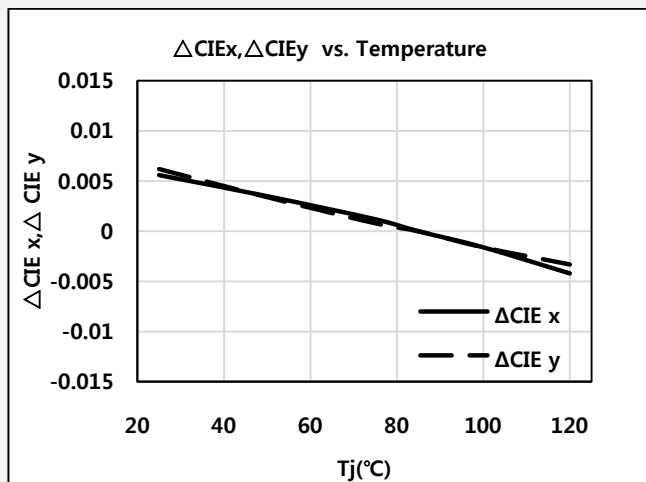
CCT : 3000K (90 CRI)



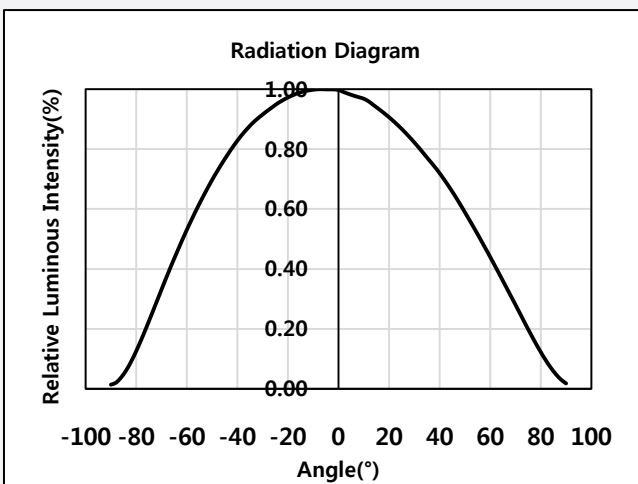
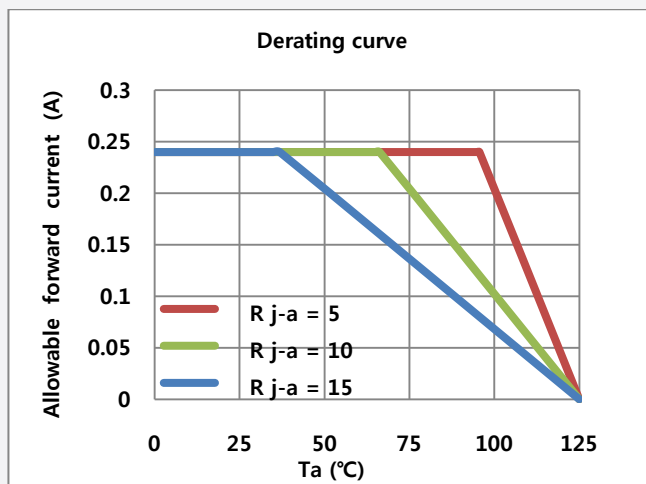
CCT : 4000K (90 CRI)

b) Forward Current Characteristics ($T_J = 25^\circ\text{C}$)c) Temperature Characteristics ($I_F = 160\text{ mA}$)

d) Color Shift Characteristics ($I_F = 160 \text{ mA}$, $T_J = 25^\circ\text{C}$)

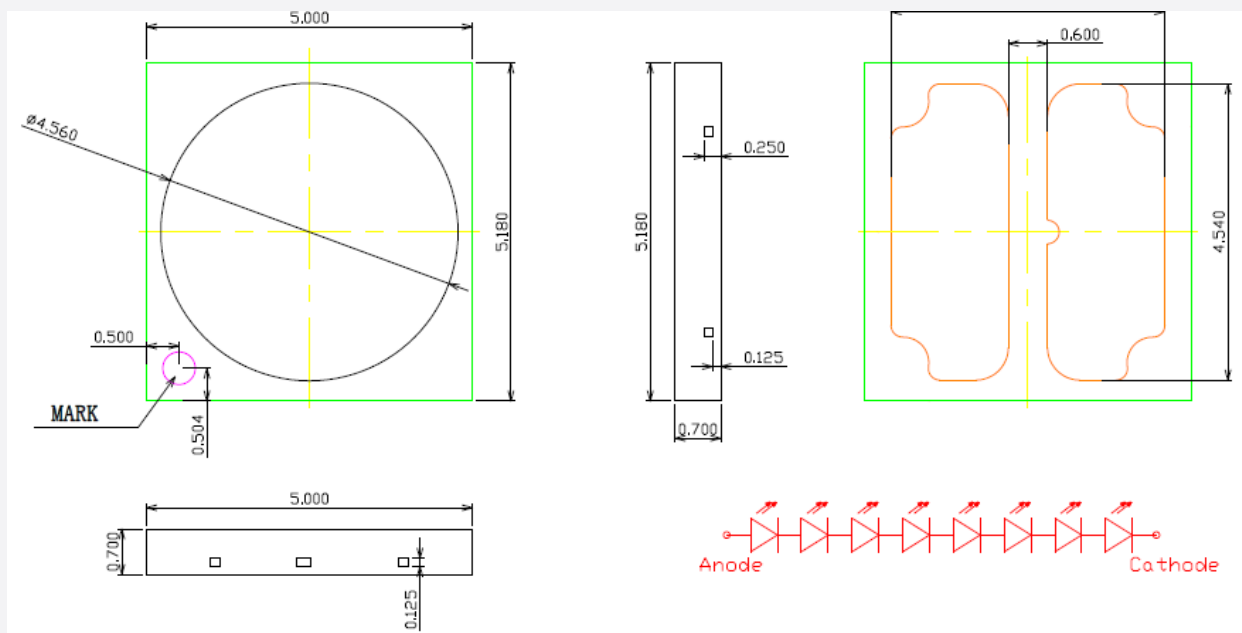


e) Derating Curve and Beam Angle Characteristics ($I_F = 160 \text{ mA}$, $T_J = 25^\circ\text{C}$)



4. Outline Drawing & Dimension

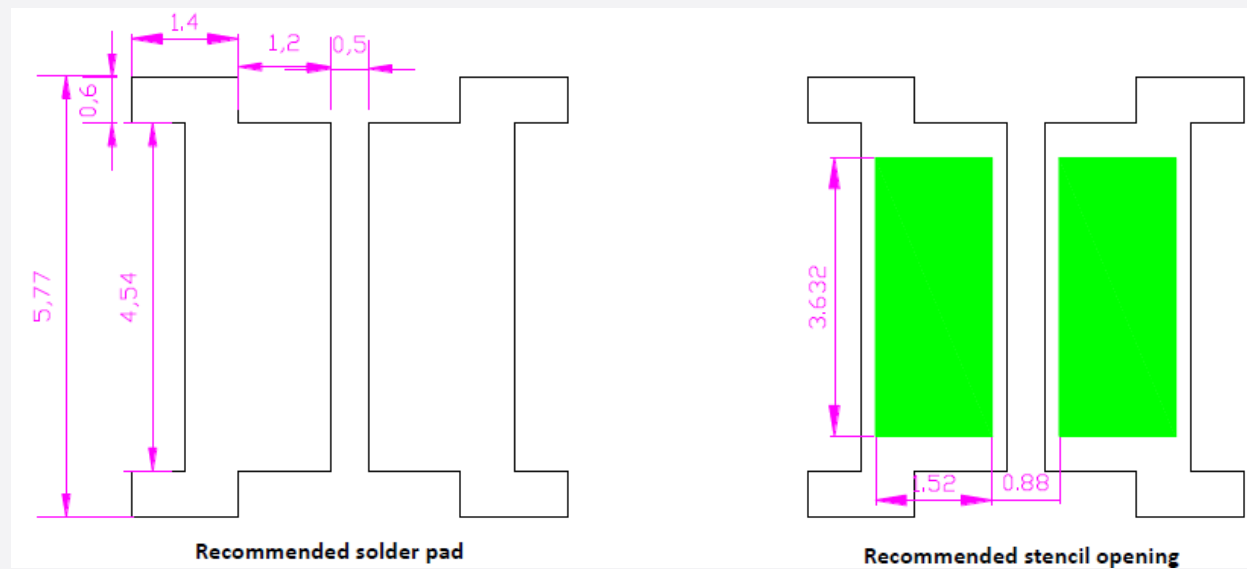
a) Mechanical Dimensions



Notes:

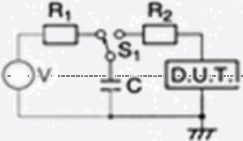
- 1) Mark for the Anode

b) Recommended Solder Pad



5. Reliability Test Items & Conditions

a) Test Items

Test Item	Test Condition	Test Hour / Cycle	Sample Size
Room Temperature Life Test	25 °C, DC 240 mA	1000 h	22
High Temperature Life Test	85 °C, DC 240 mA	1000 h	22
High Temperature Humidity Life Test	85 °C, 85 % RH, DC 240 mA	1000 h	22
Low Temperature Life Test	-40 °C, DC 240 mA	1000 h	22
Powered Temperature Cycle Test	-45 °C / 20 min ↔ 85 °C / 20 min, sweep 100 min cycle on/off: each 5 min, DC 240 mA	100 cycles	22
Thermal Cycle	-45 °C / 15 min ↔ 125 °C / 15 min → Hot plate 180 °C	500 cycles	100
High Temperature Storage	120 °C	1000 h	11
Low Temperature Storage	-40 °C	1000 h	11
ESD (HBM)	 R_1: 10 MΩ R_2: 1.5 kΩ C: 100 pF V: ± 4 kV	5 times	30
ESD (MM)	R_1: 10 MΩ R_2: 0 C: 200 pF V: ± 0.4 kV	5 times	30
Vibration Test	20~2000~20 Hz, 200 m/s ² , sweep 4 min X, Y, Z 3 direction, each 1 cycle	4 cycles	11
Mechanical Shock Test	1500 g, 0.5 ms 3 shocks each X-Y-Z axis	5 cycles	11

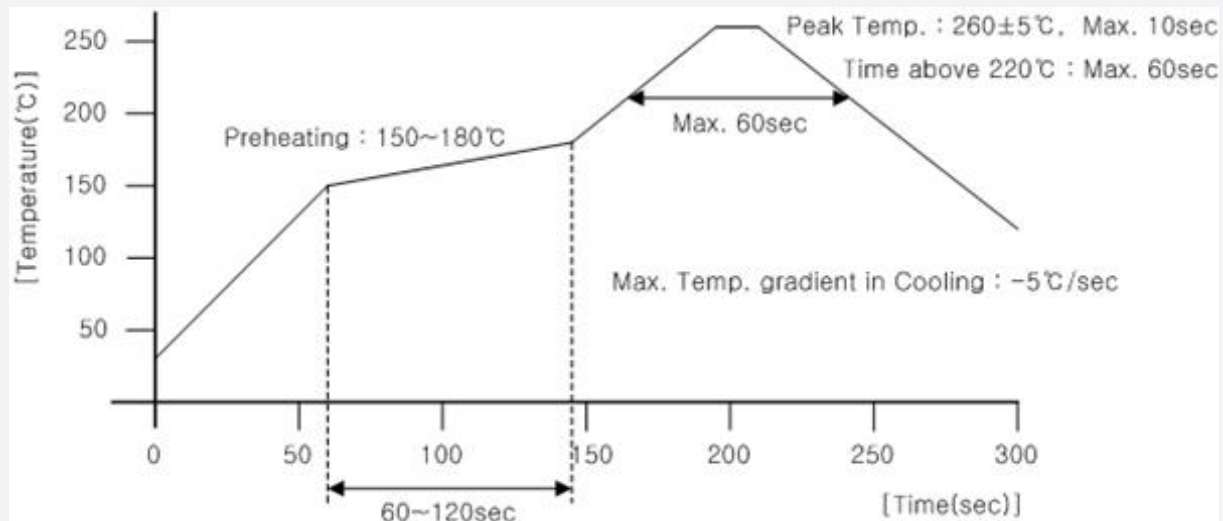
b) Criteria for Judging the Damage

Item	Symbol	Test Condition ($T_s = 25^\circ\text{C}$)	Limit	
			Min	Max
Forward Voltage	V_F	$I_F = 160$ mA	Init. Value * 0.9	Init. Value * 1.1
Luminous Flux	Φ_v	$I_F = 160$ mA	Init. Value * 0.7	Init. Value * 1.1

6. Soldering Conditions

a) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.



b) Manual Soldering Conditions

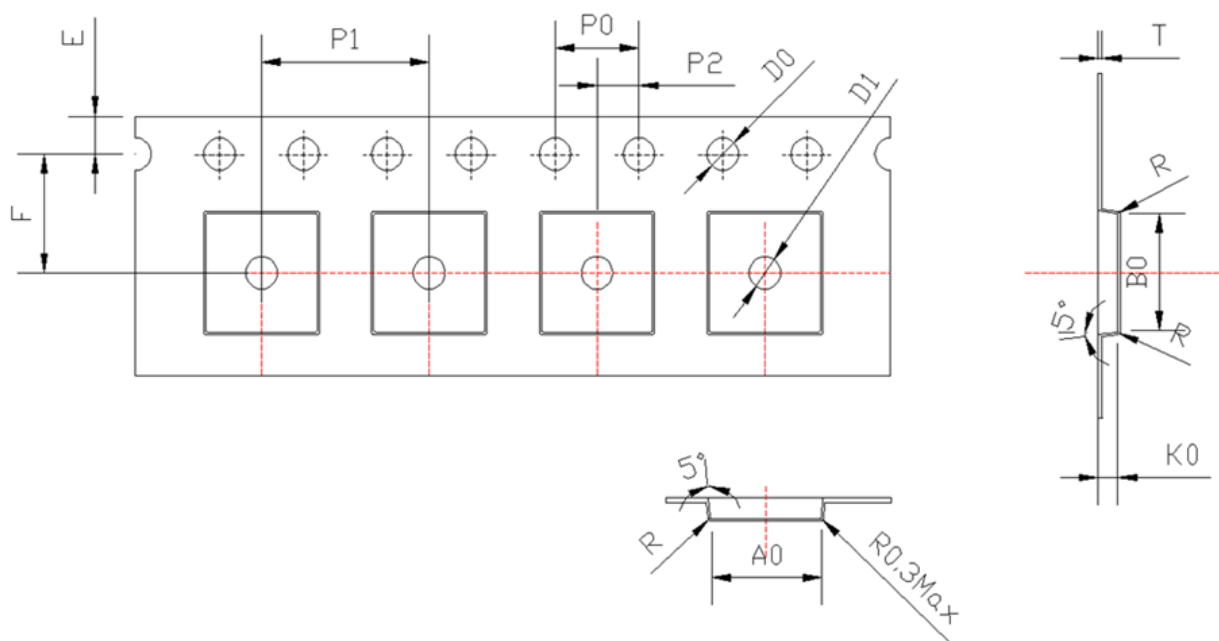
Not more than 5 seconds @ max. 300 °C, under soldering iron.

7. Tape & Reel

a) Taping Dimension

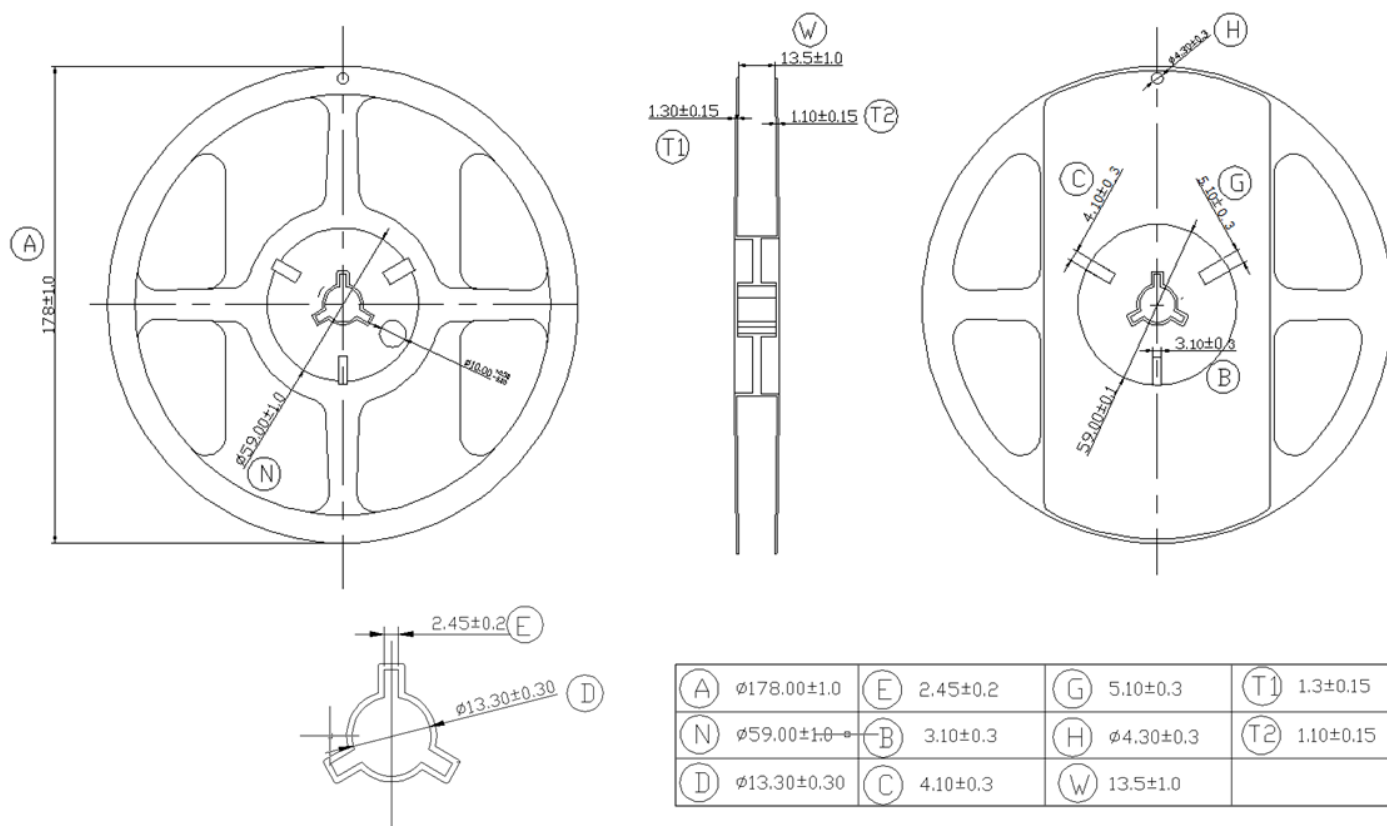
(unit: mm)

symbol	AO	BO	KO	PO	P1	P2	Length
Spec	5.20±0.10	5.40±0.10	0.95±0.10	4.00±0.10	8.0±0.10	2.0±0.10	1010M/R
symbol	W	T	E	F	DO	D1	
Spec	12.0±0.2	0.20±0.05	1.75±0.10	5.50±0.05	1.50+0.1/-0	1.50±0.10	



b) Reel Dimension (max 2,000 pcs)

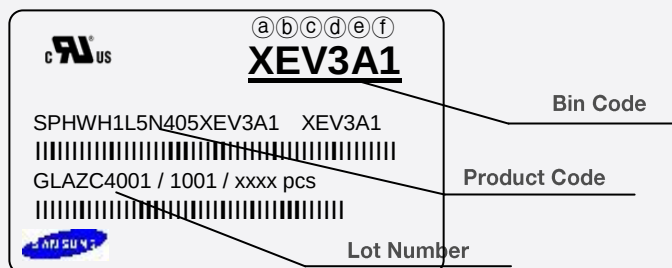
(unit: mm)

**Notes:**

- 1) Quantity: The quantity/reel is 2000 pcs
- 2) All dimensions are millimeters (tolerance : $\pm 0.2\text{mm}$)
- 3) Packaging: P/N, Manufacturing data code no. and quantity are indicated on the aluminum packing bag.

8. Label Structure

a) Label Structure



Note: Denoted bin code and product code above is only an example (see description on page 5)

Bin Code:

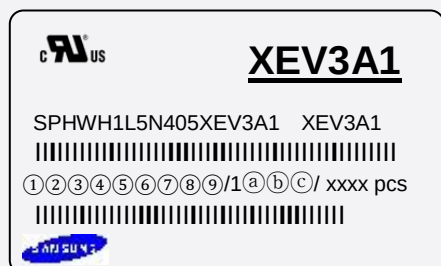
ⒶⒷ: Forward Voltage bin (refer to page 7)

ⒸⒹ: Chromaticity bin (refer to page 8)

ⒺⒻ: Luminous Flux bin (refer to page 6)

b) Lot Number

The lot number is composed of the following characters:



① ③④⑤⑥⑦⑧⑨ / 1ⒶⒷⒸ / xxxx pcs

① : Production site (S: Giheung, Korea, G: Tianjin, China)

② : L (LED)

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

④ : Year (Z: 2015, A: 2016, B: 2017...)

⑤ : Month (1~9, A, B, C)

⑥ : Day (1~9, A, B~V)

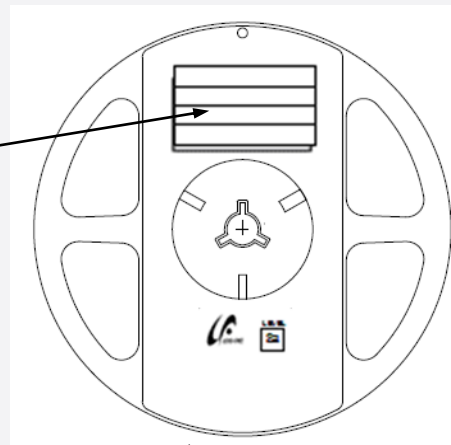
⑦⑧⑨ : Samsung Electronics Product serial number (001 ~ 999)

ⒶⒷⒸ : Reel number(001 ~ 999)

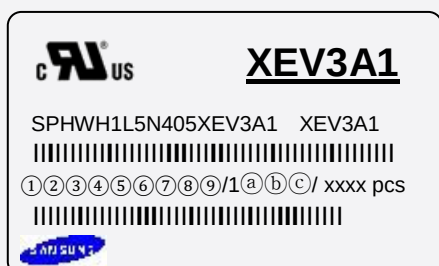
9. Packing Structure

a) Packing Process (The quantity of PKG on the Reel to be Max 2,000 pcs)

Reel



Aluminum Vinyl Packing Bag

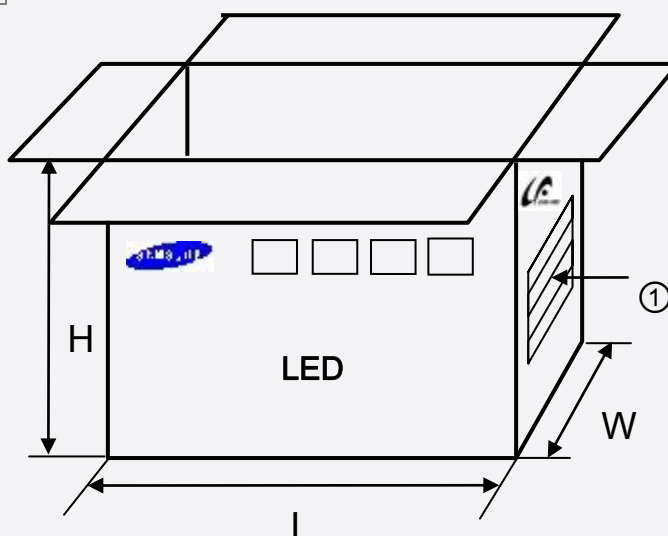
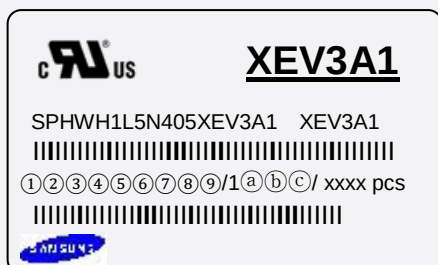


Inner Box

Material: Paper (SW3B(B))

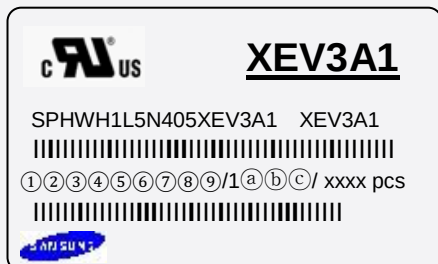
Type	Size (mm)			Note
	L	W	H	
7 inch L	225 ± 5	65 ± 5	240 ± 5	Up to 2 reels

① Side Label

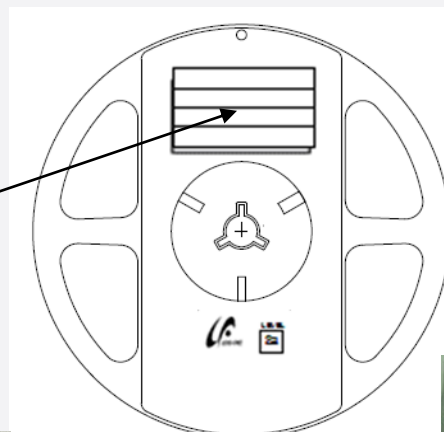
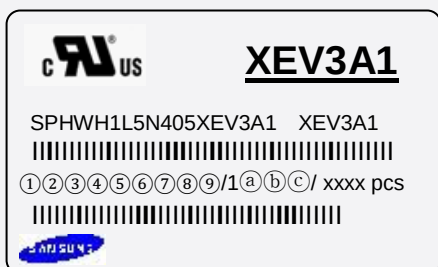


b) Packing Process (The quantity of PKG on the Reel to be Max 2,000 pcs)

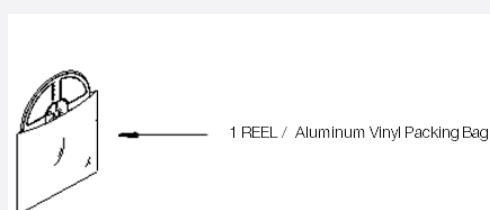
Reel



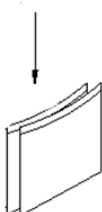
Aluminum Vinyl Packing Bag



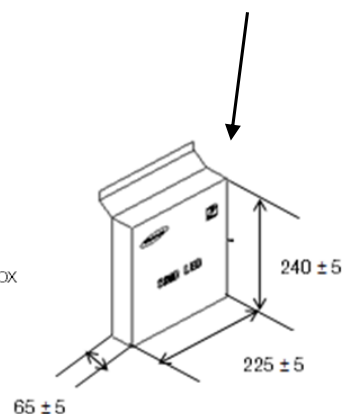
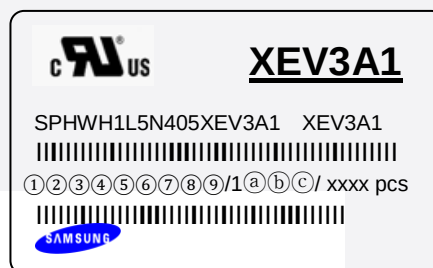
Inner Box



1 REEL / Aluminum Vinyl Packing Bag



2 REEL / INNER BOX



INNER BOX

c) Aluminum Vinyl Packing Bag



CAUTION

This bag contains
MOISTURE SENSITIVE DEVICES

LEVEL
2a

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 solder 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 >60% when read at 23±5℃, or
 - b. 2a is not met.
5. If baking is required, devices must be baked for 10 ~ 24 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

 **XEV3A1**
 SPHWH1L5N405XEV3A1 XEV3A1
 123456789/1a(b)(c)/xxxx pcs







ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
SENSITIVE
DEVICES



■ 주의 사항

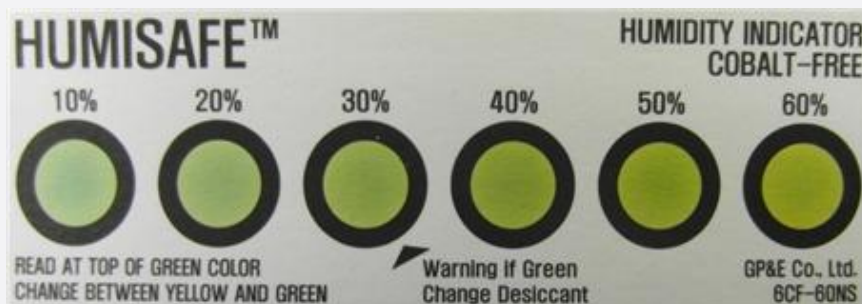
이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

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.

d) Humidity Indicator Card inside Aluminum Vinyl Bag



10. Precautions in Handling & Use

- 1) For over-current protection, users are recommended to apply resistors connected in series with the LEDs to mitigate sudden change of the forward current caused by shift of forward voltage.
- 2) This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When cleaning is required, IPA is recommended as the cleaning agent. Some solvent-based cleaning agent may damage the silicone resins used in the device.
- 3) When the device is in operation, the forward current should be carefully determined considering the maximum ambient temperature and corresponding junction temperature.
- 4) LEDs must be stored in a clean environment. If the LEDs are to be stored for three months or more after being shipped from Samsung, they should be packed with a nitrogen-filled container (shelf life of sealed bags is 12 months at temperature 0~40 °C, 0~90 % RH).
- 5) After storage bag is opened, device subjected to soldering, solder reflow, or other high temperature processes must be:
 - a. Mounted within 672 hours (28 days) at an assembly line with a condition of no more than 30 °C / 60 % RH, or
 - b. Stored at <10 % RH
- 6) Repack unused devices 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 1 hour at 60 ± 5 °C, if baking is required.
- 9) The LEDs are sensitive to the static electricity and surge current. 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 leakage current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.
- 10) VOCs (Volatile Organic Compounds) can be generated from adhesives, flux, hardener or organic additives used in luminaires (fixtures). Transparent LED silicone encapsulant is permeable to those chemicals and they may lead to a discoloration of encapsulant when they exposed to heat or light. This phenomenon can cause a significant loss of light emitted (output) from the luminaires. In order to prevent these problems, we recommend users to know the physical properties of materials used in luminaires and they must be carefully selected.

Legal and additional information.

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