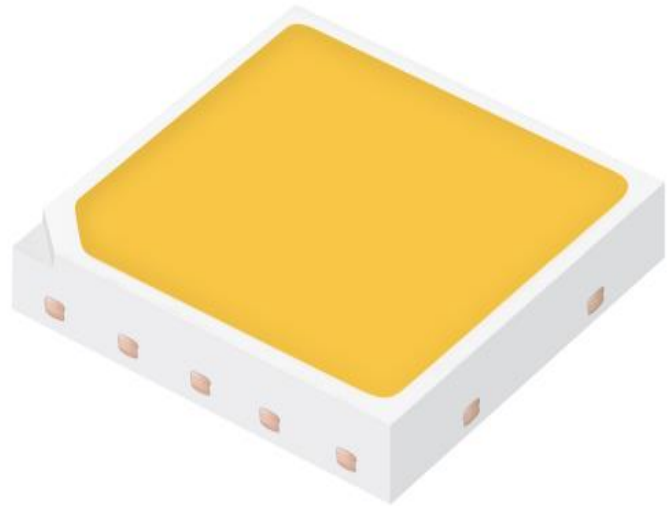


High Power LED Series

LH502HD

Horticulture



Features & Benefits

- Operates at a maximum current of up to 1000mA
- Uniform light distribution under any beam angle
- Strengthened Anti sulfurization
- Color binning @ 85°C



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1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Operating Temperature	T_{opr}	-40 ~ +105	°C	
Storage Temperature	T_{stg}	-40 ~ +100	°C	-
LED Junction Temperature	T_j	125	°C	-
Forward Current	I_F	1000	mA	-
Peak Pulse Forward Current	I_{FP}	1250	mA	Duty cycle ≤ 1/10, pulse width 10ms
Soldering Temperature		260 <10	°C	-
Electrostatic Discharge Withstand Voltage(HBM)	ESD(HBM)	±8 (Class 3B)	kV	-

b) Electro-optical Characteristics ($I_F = 350 \text{ mA}$, $T_j = 25^\circ\text{C}$)

Item	Unit	Rank	Min.	Typ.	Max.
Forward Voltage (V_F)	V	YB	5.60	-	6.00
PPF	$\mu\text{mol/s}$	3000K	4.75	-	5.35
		4000K	4.90	-	5.50
		5000K	5.05	-	5.65
		5000K	5.05	-	5.65
		6500K	5.05	-	5.65
Thermal Resistance (junction to chip point)	°C/W		-	3	-
Beam Angle	°			120	

Notes:

Samsung maintains measurement tolerance of: PPF = $\pm 7\%$, forward voltage = $\pm 0.1 \text{ V}$

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	2	L	5	N	6	H	0	Y	B	T	5	A	3

Digit	PKG Information	Code	Specification	
1 2 3	Samsung Package High Power	SPH	High Power PKG	
4 5	Color	WH	White	
6	Product Version	2	2nd Version	
7 8	Form Factor	L5	5050 size	
9	Lens Type	N	No lens	
10	Model	6	5050 Series	
11	Internal Code	H	Horticulture	
12	CRI	0		
13 14	Forward Voltage (V)	YB	Bin code	A0 5.6 – 5.8 A1 5.8 – 6.0
15	CCT (K)	V	3000K	
		T	4000K	
		R	5000K	
		P	6500K	
16	MacAdam Step	3	MacAdam 3-Step	
		5	MacAdam 5-Step	
17 18	Luminous Flux (lm)	A3		

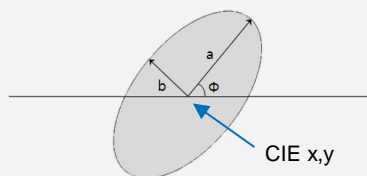
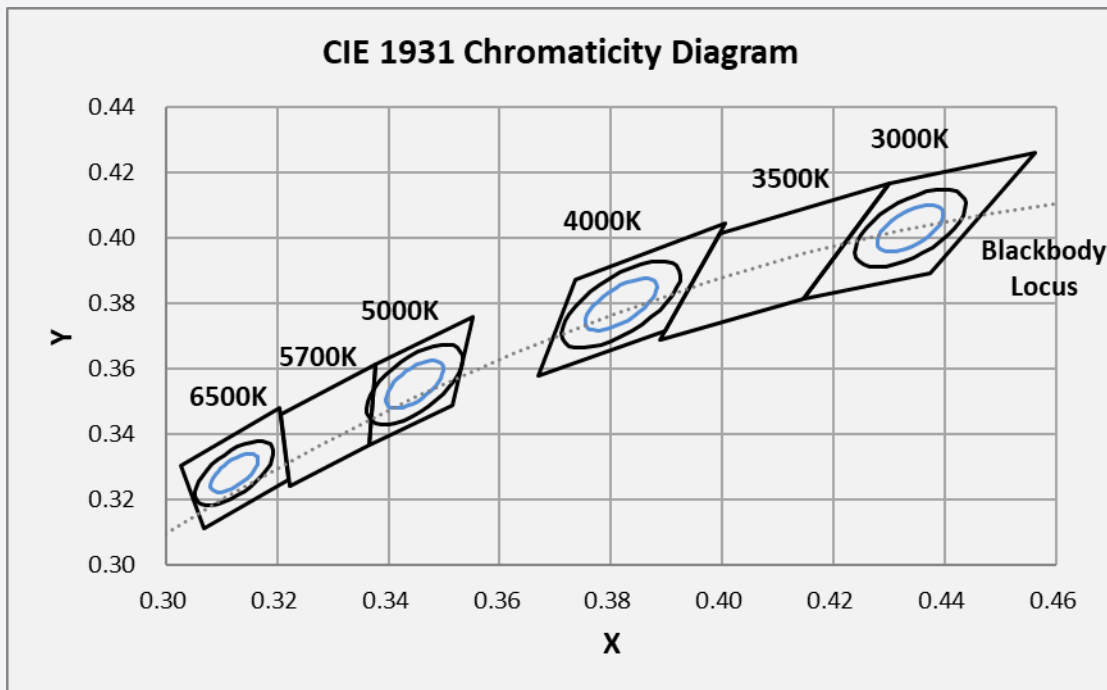
a) PPF Rank ($I_f = 350 \text{ mA}$, $T_j = 25^\circ\text{C}$)

Nominal CCT(K)	Product Code	VF Rank	Chrom Rank (Bins)	PPF		PPF Range (PPF, $\mu\text{mol/s}$)
				Rank	Bins	
3000	SPHWH2L5N6H0YBV3A3	YB	T3, T5	A3	48	4.75-5.05
	SPHWH2L5N6H0YBV5A3				51	5.05-5.35
4000	SPHWH2L5N6H0YBT3A3	YB	T3, T5	A3	49	4.90-5.20
	SPHWH2L5N6H0YBT5A3				52	5.20-5.50
5000	SPHWH2L5N6H0YBR3A3	YB	T3, T5	A3	51	5.05-5.35
	SPHWH2L5N6H0YBR5A3				54	5.35-5.65
6500	SPHWH2L5N6H0YBP3A3	YB	T3, T5	A3	51	5.05-5.35
	SPHWH2L5N6H0YBP5A3				54	5.35-5.65

b) Voltage Bins ($I_f = 350 \text{ mA}$, $T_j = 25^\circ\text{C}$)

Nominal CCT (K)	CRI (R _a) Min.	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
-	-	-	YB	A0	5.6 – 5.8
				A1	5.8 - 6.0

c) Chromaticity Region & Coordinates ($I_F = 350 \text{ mA}$, $T_j = 85^\circ\text{C}$)

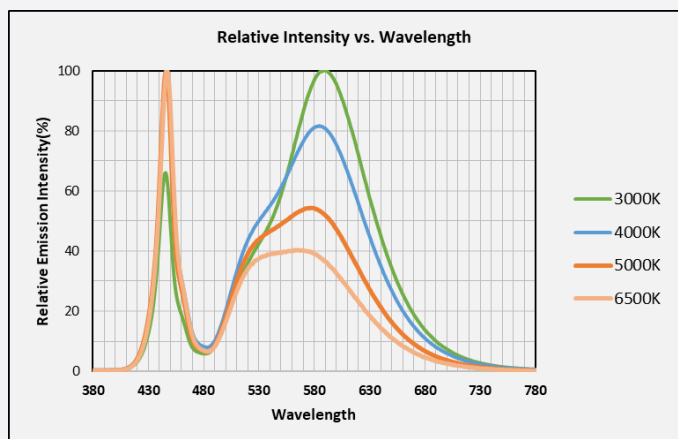


CCT	Rank	CIE x	CIE y	Φ	A	b
3000K	V3	0.4338	0.4030	53.2	0.0083	0.0041
	V5				0.0138	0.0068
4000K	T3	0.3818	0.3797	53.7	0.0094	0.0040
	T5				0.0157	0.0067
5000K	R3	0.3447	0.3553	59.6	0.0082	0.0035
	R5				0.0137	0.0058
6500K	P3	0.3123	0.3282	58.6	0.0067	0.0029
	P5				0.0112	0.0048

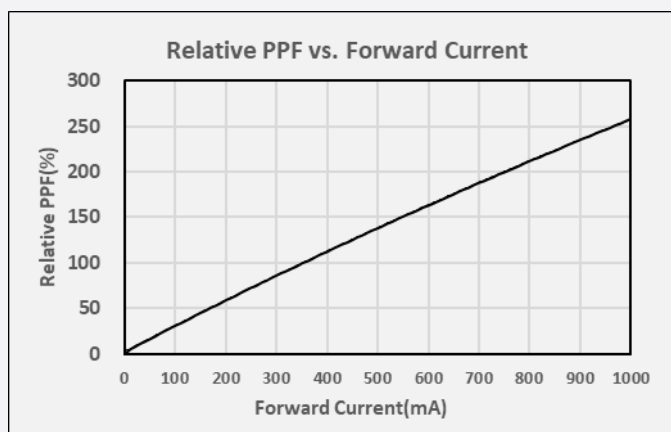
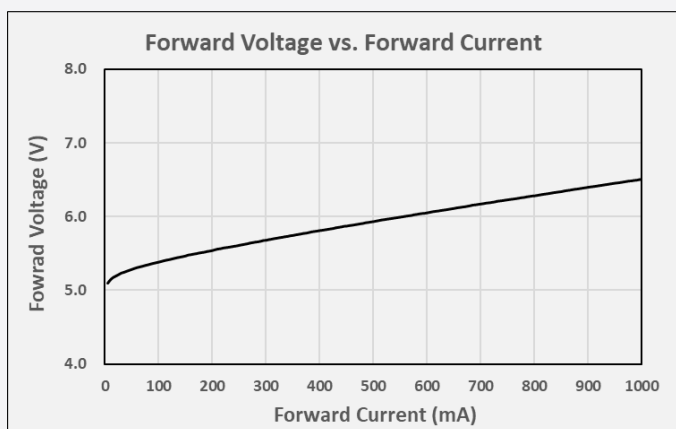
Note : Samsung maintains measurement tolerance of: $C_x, C_y = \pm 0.005$

3. Typical Characteristic Graphs

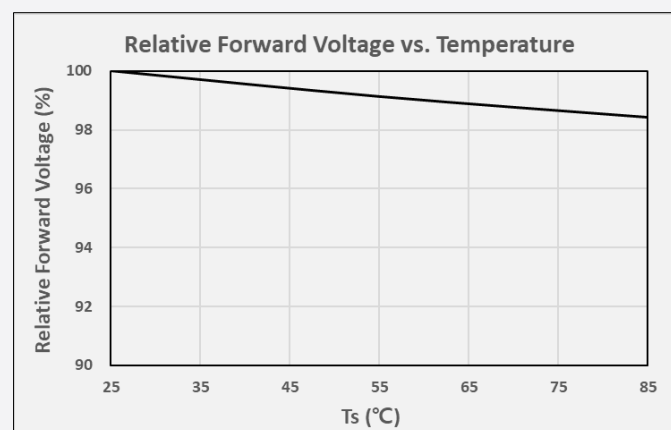
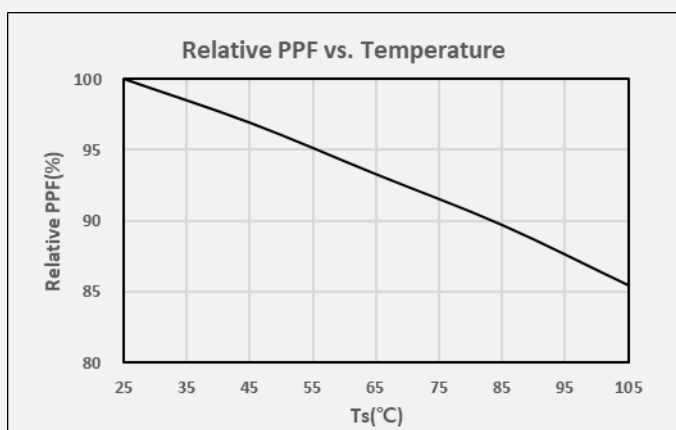
a) Spectral Distribution ($I_F = 350 \text{ mA}$, $T_j = 25^\circ\text{C}$)



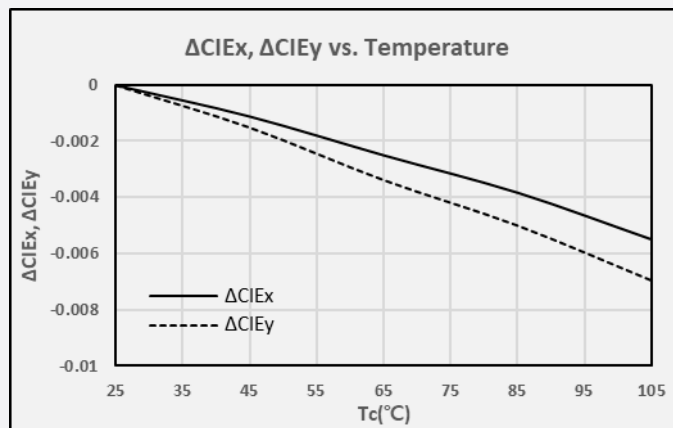
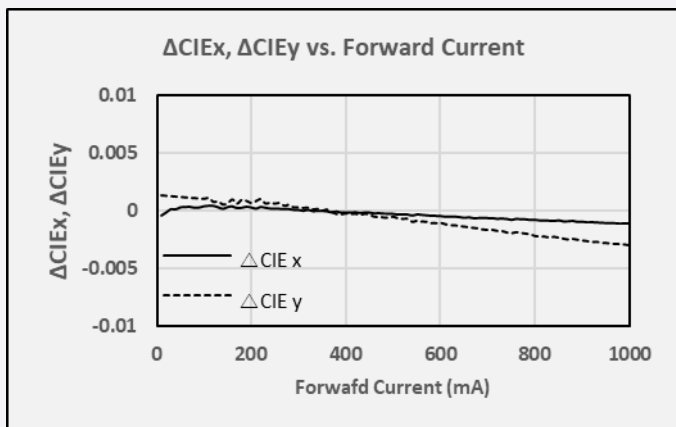
b) Forward Current Characteristics ($T_j = 25^\circ\text{C}$)



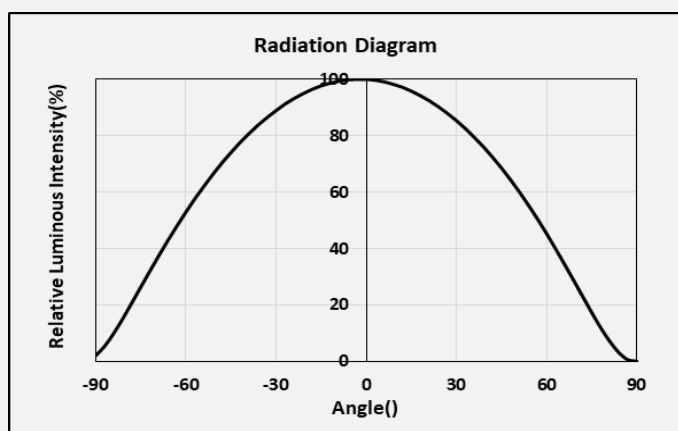
c) Temperature Characteristics ($I_F = 350 \text{ mA}$)



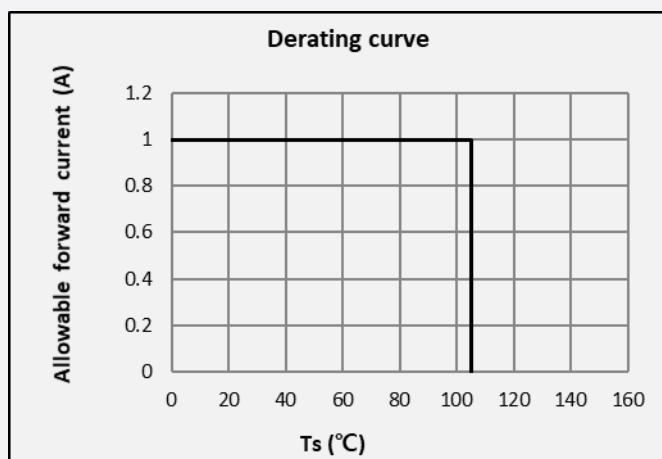
d) Color Shift Characteristics ($I_F = 350 \text{ mA}$, $T_J = 25^\circ\text{C}$)



e) Beam Angle Characteristics ($I_F = 350 \text{ mA}$, $T_J = 25^\circ\text{C}$)



f) Derating Curve



g) Luminous Flux Characteristics¹⁾ (CCT = 5000K)

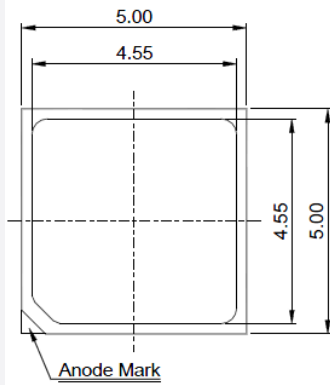
CRI (R _a) Min.	Nominal CCT (K)	I _F	Typ. @ T _J = 25 °C		
			V _F	PPF	PPE
-	5000K	100mA	5.37 V	1.59	2.96
		180mA	5.51 V	3.13	2.84
		350mA	5.70 V	5.36	2.69
		640mA	6.02 V	9.52	2.47
		800mA	6.19 V	11.67	2.36
		1000mA	6.40 V	14.25	2.23

Notes:

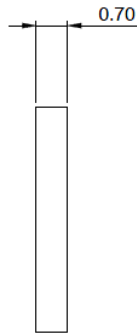
- 1) Reference Only

4. Outline Drawing & Dimension

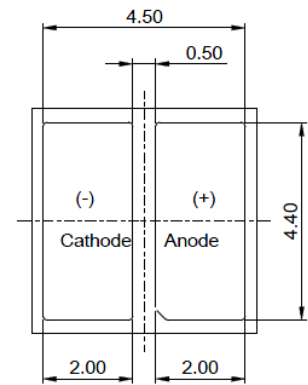
a) Mechanical Dimensions



[Top View]



[Side View]

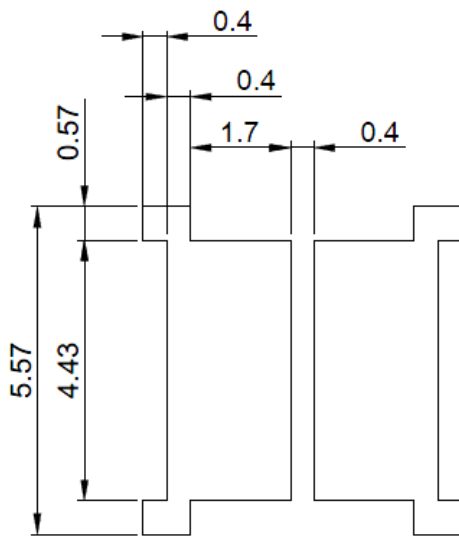


[Bottom View]

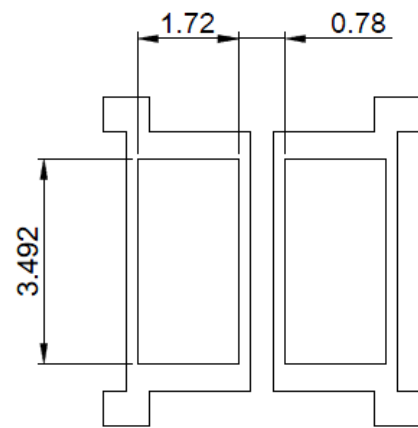
Notes:

- 1) Mark for the Anode
- 2) Unit : mm
- 3) Tolerance : $\pm 0.1\text{mm}$

b) Recommended Solder Pad



Recommended Solder Pad



Recommended Stencil Opening

5. Reliability Test Items & Conditions

a) Test Items

Test Item	Test Condition	Test Hour / Cycle
High Temperature Operating Life Test	85°C, 640mA	1000 h
Wet High Temperature Operating Life Test	85°C, 85 % RH, DC 640mA	1000 h
Temperature Cycling	-45°C / 15min ~ 125°C / 15min Temperature change within 5min	500 cycles
ESD (HBM)	R1: 10 MΩ R2: 1.5 kΩ C: 100 pF V: ±8 kV	5 times
Vibration Test	20~ 80 Hz (displacement: 0.06 inch, max. 20 g) 80 ~ 2 kHz (max. 20 g) min. frequency ↔ max. frequency 4 min transfer	4 times
Mechanical Shock Test	1500g, 0.5 ms each of the 6 surfaces (3 axis x 2 sides)	5 times

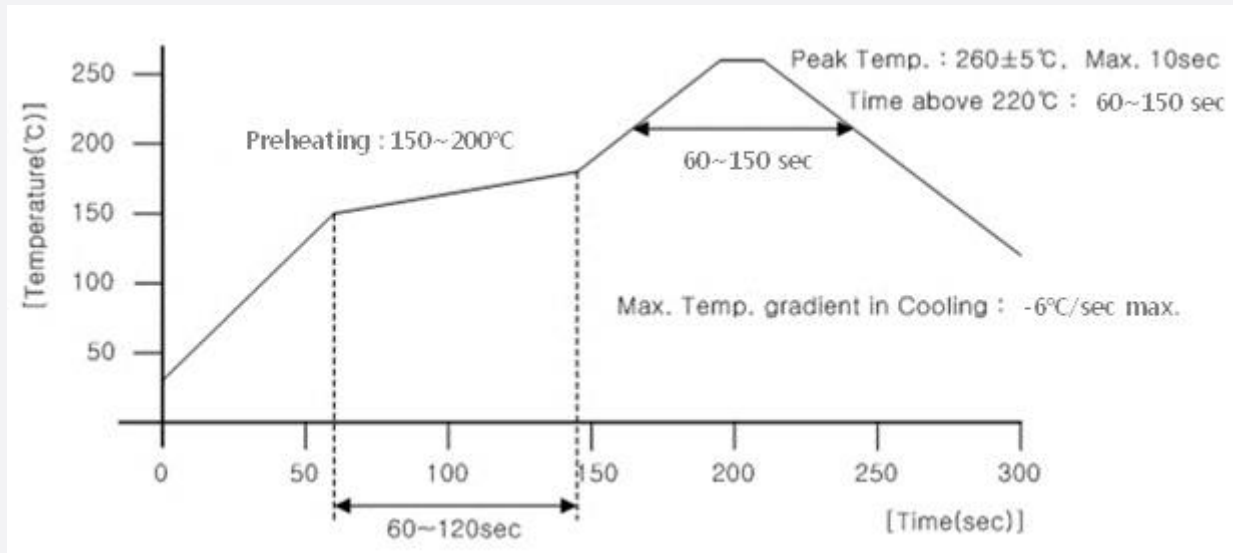
b) Criteria for Judging the Damage

Item	Symbol	Test Condition (T _c = 25°C)	Limit	
			Min.	Max.
Forward Voltage	V _F	I _F = Sorting Current	L.S.L. * 0.9	U.S.L. * 1.1
PPF	μmol/s	I _F = Sorting Current	L.S.L. * 0.7	U.S.L. * 1.3

6. Soldering Conditions

a) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.



b) Manual Soldering Conditions

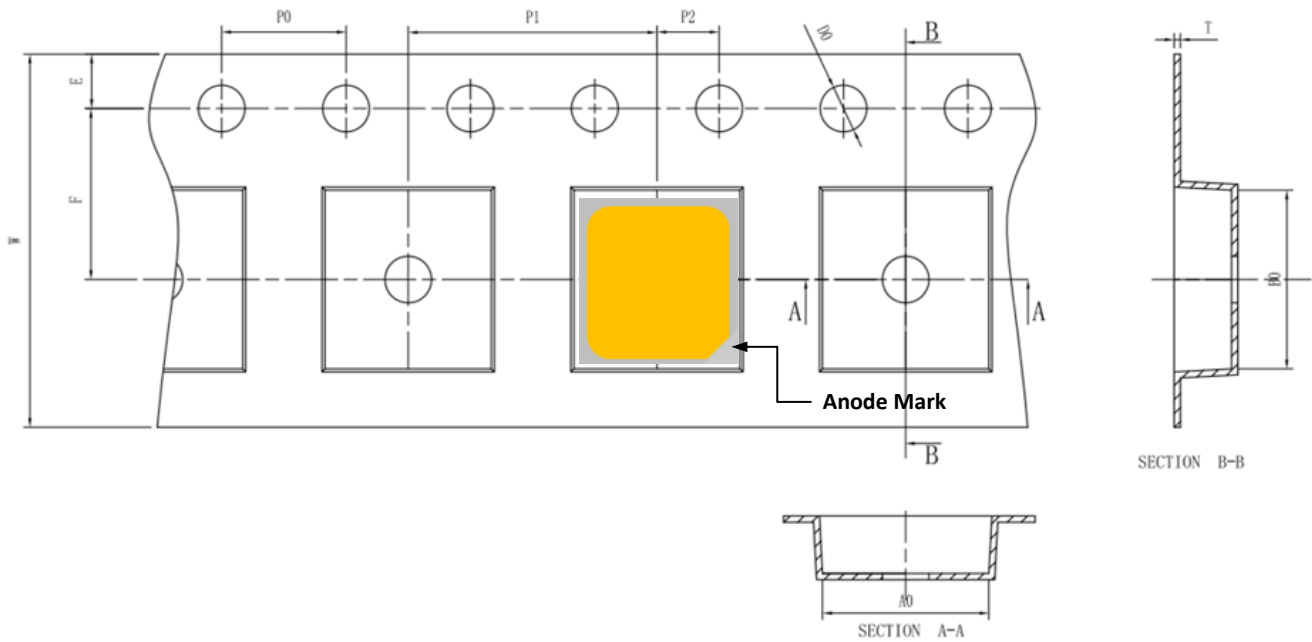
Not more than 5 seconds @ max. 300°C, under soldering iron.

7. Tape & Reel

a) Taping Dimension

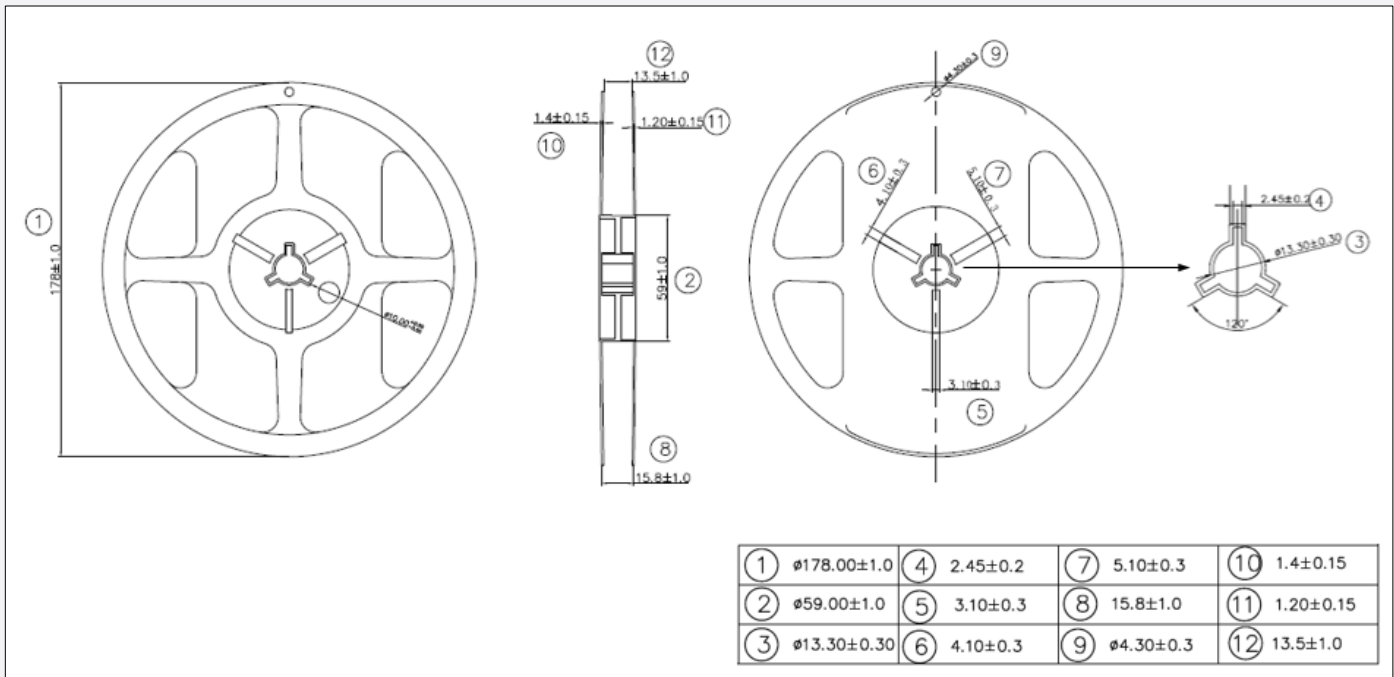
(unit: mm)

ITEM	W	A0	B0	K0	E	F	D0	D1	P0	P1	P2	T	LENGTH	PCS/REEL
5.35	+0.10 -0.10	+0.05 -0.05	+0.05 -0.05	+0.05 -0.05	+0.10 -0.10	+0.10 -0.10	+0.10 -0.00	+0.10 -0.00	+0.10 0.00	+0.10 -0.10	+0.10 -0.10	+0.05 -0.05	m	PCS



b) Reel Dimension (max 2,000 pcs)

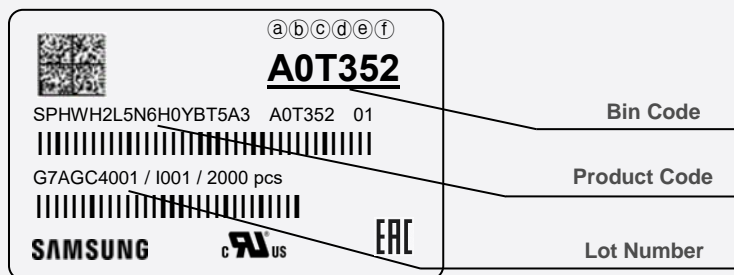
(unit: mm)

**Notes:**

- 1) Quantity: The quantity/reel is 2000 pcs
- 2) All dimensions are millimeters.
- 3) Packaging : P/N, Manufacturing data code no. and quantity are indicated on the aluminum packing bag.

8. Label Structure

a) Label Structure



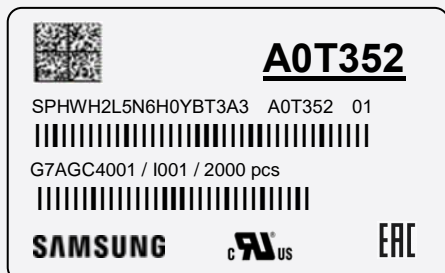
Note: Denoted bin code and product code above is only an example (see description on page 4)

Bin Code:

- ⒶⓅ: Forward Voltage bin (refer to page 6)
- ⒸⓁ: Chromaticity bin (refer to page 7)
- ⓔⓕ: PPF bin (refer to page 5)

b) Lot Number

The lot number is composed of the following characters:



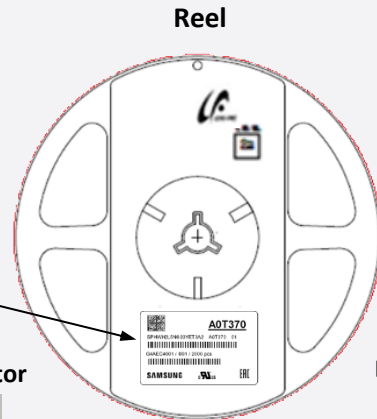
①②③④⑤⑥⑦⑧⑨ / IⒶⒷⒸ / xxxx pcs

- ①② : Production site (G7 : Guangzhou ,China)
- ③ : Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)
- ④ : Year (G:2022, H:2023 ...)
- 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

Reel



Humidity indicator

Desiccant



Aluminum Vinyl Packing Bag

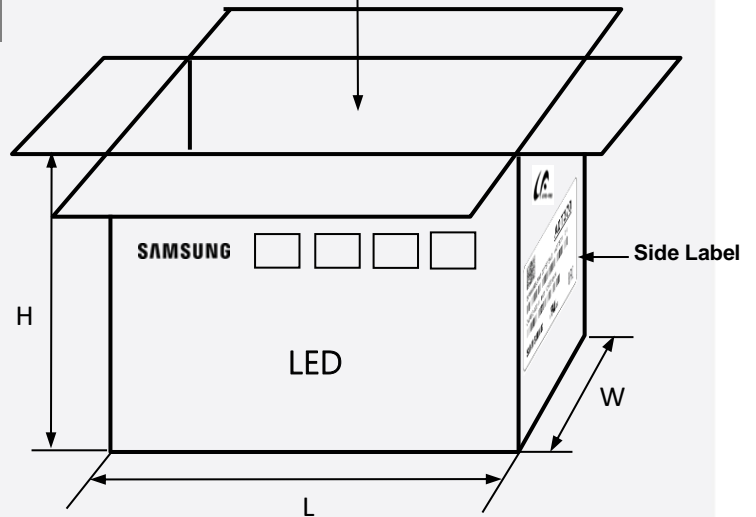


Outer Box

Material: Paper (SW3B(B))

Type	Size (mm)			Note
	L	W	H	
7 inch S	245 ± 5	220 ± 5	86 ± 5	Up to 5 reels
7 inch L	245 ± 5	220 ± 5	182 ± 5	Up to 10 reels

Side Label



Paper(SW3B(B))

b) Aluminum Vinyl Packing Bag



CAUTION

This bag contains
MOISTURE SENSITIVE DEVICES

LEVEL

2a



A0T352

SPHWH2L5N6H0YBT3A3 A0T352 01
 |||
 G7AGC4001 / I001 / 2000 pcs
 |||

SAMSUNG  

1. Shelf life in sealed bag: 12 months at < 40°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 > 60% when read at 23±5°C, or
 - b. 2a is not met.
5. If baking is required, devices must be baked for 10 ~ 24 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.

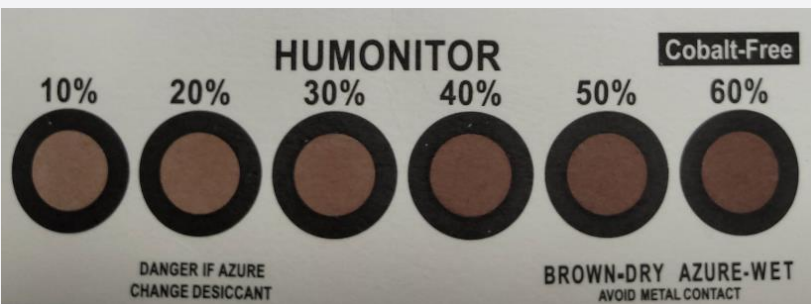
습기 및 정전기로부터 제품을 보호 하기 위해서 개봉 후 사용하지 않는 자재는 본 팩에 넣어 보관 하시기 바랍니다. 사용하지 않는 자재를 본 팩에 넣을 때는 반드시 동봉된 드라이 팩과 함께 넣고 지퍼부분을 완전하게 밀봉하여 주시기 바랍니다.

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.

c) Silica Gel & Humidity Indicator Card inside Aluminum Vinyl Bag

(This image is for reference only. Silicagel and humidity indicator shapes may be different.)



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. 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.
- 11) Risk of sulfurization (or tarnishing)

The LED from Samsung Electronics Co., Ltd. uses a silver-plated lead frame and its surface color may change to black (or dark colored) when it is exposed to sulfur (S), chlorine (Cl) or other halogen compound. Sulfurization of lead frame may cause intensity degradation, change of chromaticity coordinates and, in extreme cases, open circuit. It requires caution. Due to possible sulfurization of lead frame, LED should not be used and stored together with oxidizing substances made of materials such as: rubber, plain paper, lead solder cream, etc.

Legal and additional information.

[About Samsung Electronics Co., Ltd.](#)

Samsung Electronics Co., Ltd. inspires the world and shapes the future with transformative ideas and technologies, redefining the worlds of TVs, smartphones, wearable devices, tablets, cameras, digital appliances, printers, medical equipment, network systems and semiconductors.

We are also leading in the Internet of Things space through, among others, our Digital Health and Smart Home initiatives. We employ 307,000 people across 84 countries. To discover more, please visit our official website at www.samsung.com and our official blog at global.samsungtomorrow.com.

"Samsung provides limited warranty for its LED products, the full text of which is available at <https://www.samsung.com/led/lighting/warranty>."

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KOREA

www.samsungled.com

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