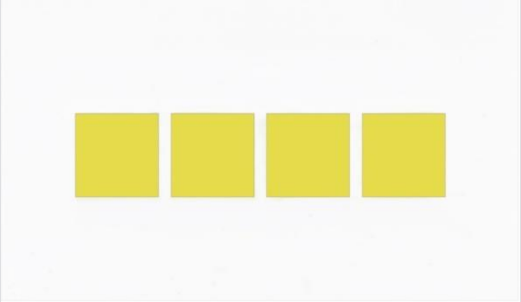
High Power LED I-Series

12W White

SPHWHTB6NAA0



Features

- Package : Lead frame package
- Dimension : 6.23 mm x 3.60 mm
- Chip Technology : Thin GaN
- ESD : 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM)
- Qualifications : AEC-Q102 Qualified with RV-level 1

SAMSUNG

Table of Contents

1. Characteristics

a) Typical Characteristics

[T_S = 25 ºC][1]

Item	Symbol	Value	Unit.
Chromaticity Coordinate	Cx Cy	0.33 0.35	
Luminous Flux (I_F = 1,000 ㎃)	Φ_V	Typ. 1,540	lm
Forward Voltage (I_F = 1,000 ㎃)	V_F	Typ. 12.0	V
Viewing Angle	Φ	Typ. 120	º
Reverse Current	I_R	Not designed for reverse operation	
Real Thermal Resistance (Junction to Solder point)	$R_{th\_J\text{-}S\ (Real)}$	Typ. 0.9 Max. 1.2	K/W
Electrical Thermal Resistance (Junction to Solder point)	$R_{th\_J\text{-}S\ (Elec.)}$	Typ. 0.7 Max. 0.9	K/W
Radian Surface	A	4.50	㎟

Note:

[1] The measurement condition means that temperature dependence is excluded by applying pulse current for typically 25ms

b) Absolute Maximum Rating

Item	Symbol	Rating	Unit
Ambient / Operating Temperature	T_a	-40 ~ +125	ºC
Storage Temperature	T_{stg}	-40 ~ +125	ºC
LED Junction Temperature	T_j	150	ºC
Maximum Forward current[2] (T_S:25℃) [3]	I_F	1,500	㎃
Minimum Forward current[2] (T_S:25℃) [3]	I_F	50	㎃
Maximum Reverse current		Do not apply for reverse current	
ESD Sensitivity[4]	-	±8 for HBM	kV

Note:

[2] Driving the product at forward current (IF) below Min. IF or above Max. IF may result in unpredictable behavior of the product.

[3] The measurement condition means that temperature dependence is excluded by applying pulse current for typically 25 ㎳.

[4] It is included the device to protect the product from ESD.

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	T	B	6	N	A	A	0	A	B	C	D	E	F

Digit	PKG Information
1 2	Company name and Samsung LED PKG (SP for Samsung PKG)
3	Power variant (H for automotive high power)
4 5	Color variant (WH for automotive white color)
6	LED PKG version (T for initial version)
7 8	Product configuration and type (B6 for Automotive Individual 6236 PKG type)
9	Lens configuration (N for no lens)
10	Typical power (Internal code)
11	Special internal code (A for Automotive version)
12	Specific property (0 for default)
13 14	Forward voltage property
15 16	CIE coordination property
17 18	Luminous flux property

a) Luminous Flux Bins [5] (I_F = 1,000 ㎃, T_S= 25ºC)

Symbol	Flux Bin Code	Flux Range (lm)	
		Min	Max
Φ_V	2K	1247	1370
	3K	1306	1435
	4K	1370	1505
	5K	1435	1576
	6K	1505	1654

b) Voltage Bins (I_F = 1,000 ㎃, T_S = 25 ºC)

Symbol	Voltage Bin Code	Voltage Range (V)	
		Min	Max
V_F	4C	10.9	11.9
	4D	11.9	12.9

Note:

[5] Luminous flux measuring equipment : CAS140CT

Φ_V and V_F tolerances are ±7% and ±0.1V, respectively.

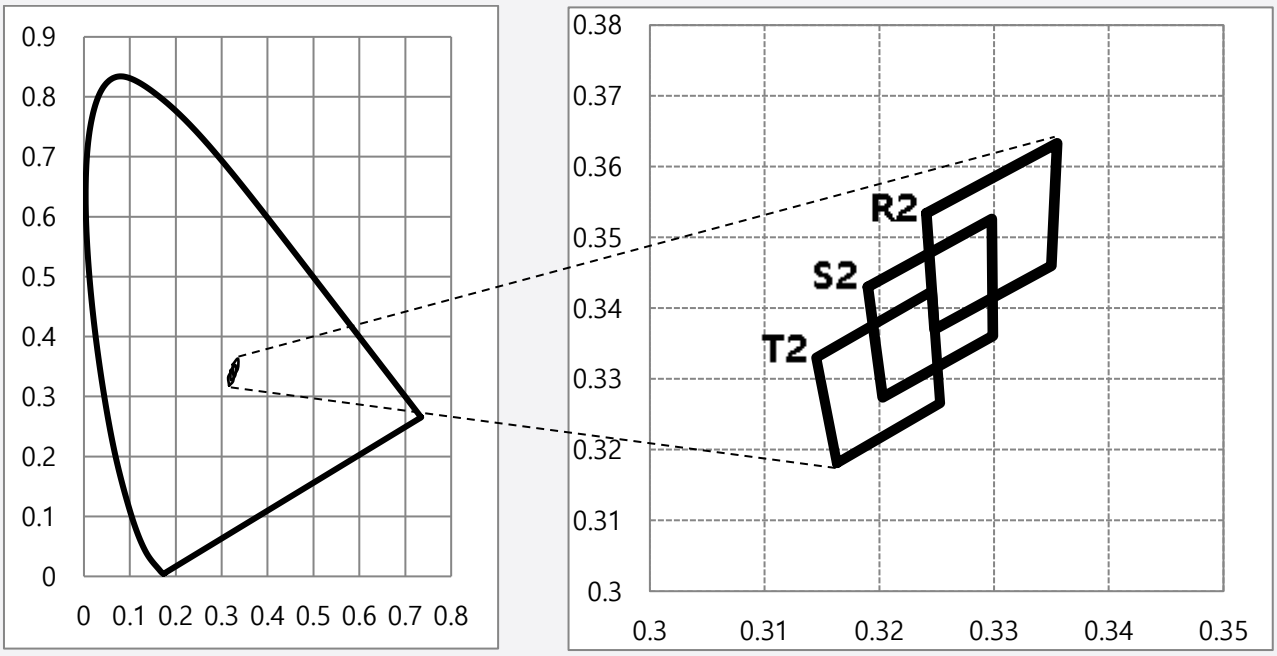
c) Color Bin [6](I_F = 1,000 mA)

Symbol	Color Bin Code	Cx				Cy			
Cx, Cy	R2	0.3241	0.3248	0.3350	0.3355	0.3534	0.3370	0.3460	0.3633
	S2	0.3190	0.3203	0.3299	0.3298	0.3430	0.3274	0.3361	0.3526
	T2	0.3163	0.3145	0.3246	0.3253	0.3181	0.3330	0.3424	0.3266

Note

[6] Luminous flux measuring equipment : CAS140CT

Chromaticity coordinates : Cx, Cy according to CIE 1931. Cx and Cy tolerances are ±0.005, respectively.

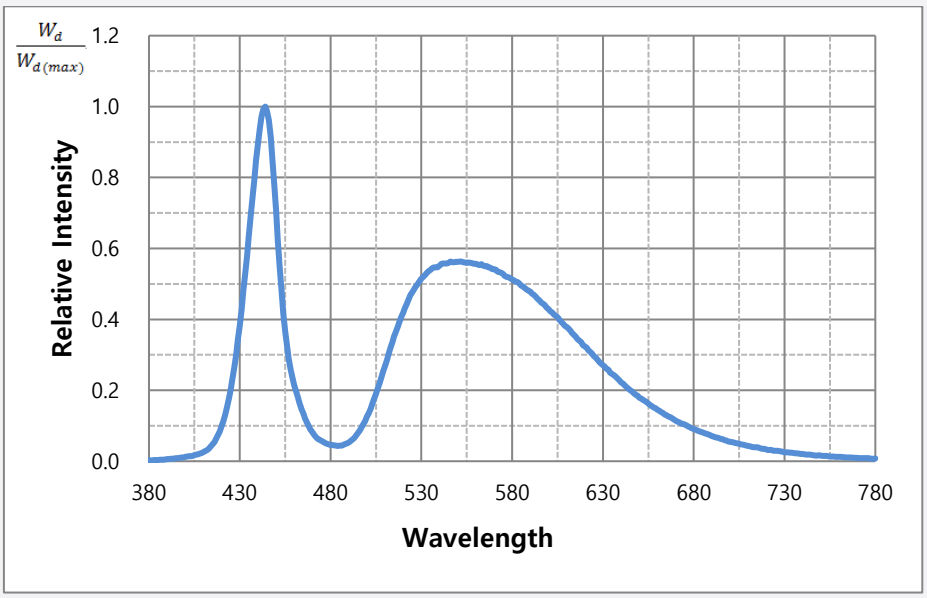


d) Luminous Flux Bins according to Color Bin (I_F = 1,000 mA, T_S = 25 ºC)

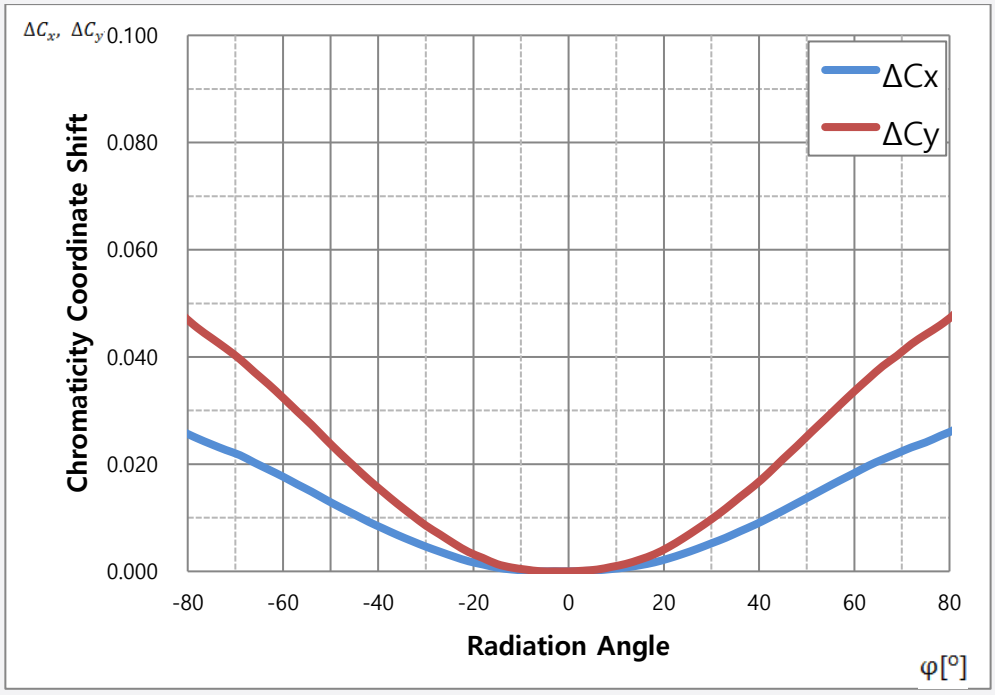
Symbol	Flux Bin Code	2K		3K		4K		5K		6K	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
		1247	1370	1306	1435	1370	1505	1435	1576	1505	1654
Φ_V	R2			O		O		O		O	
	S2	O		O		O		O			
	T2	O		O		O					

3. Typical Characteristics Graphs

a) Spectrum Distribution (I_F = 1,000 ㎃, T_S= 25 ºC)



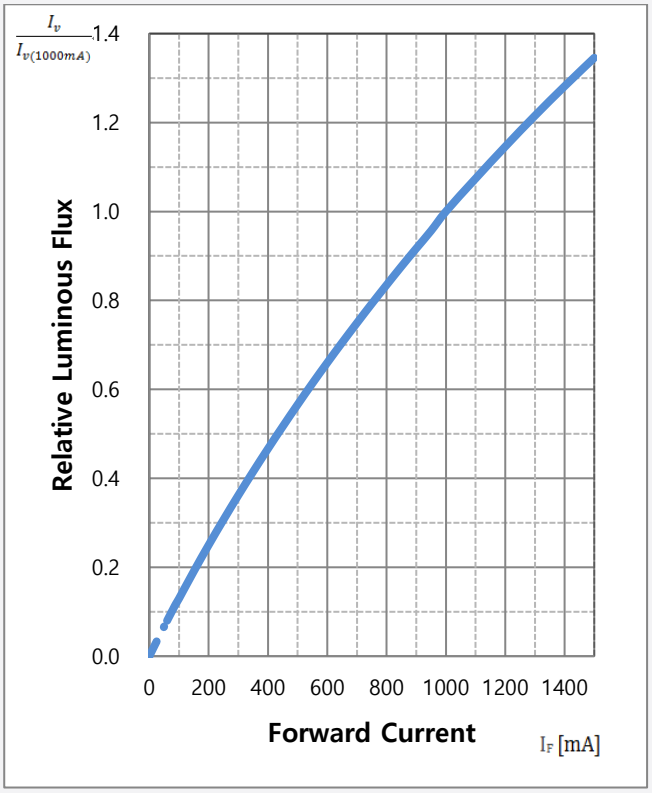
b) Typical Chromaticity Coordinate Shift vs Radiation Angle (I_F = 1,000 ㎃, T_S = 25 ºC) [7]

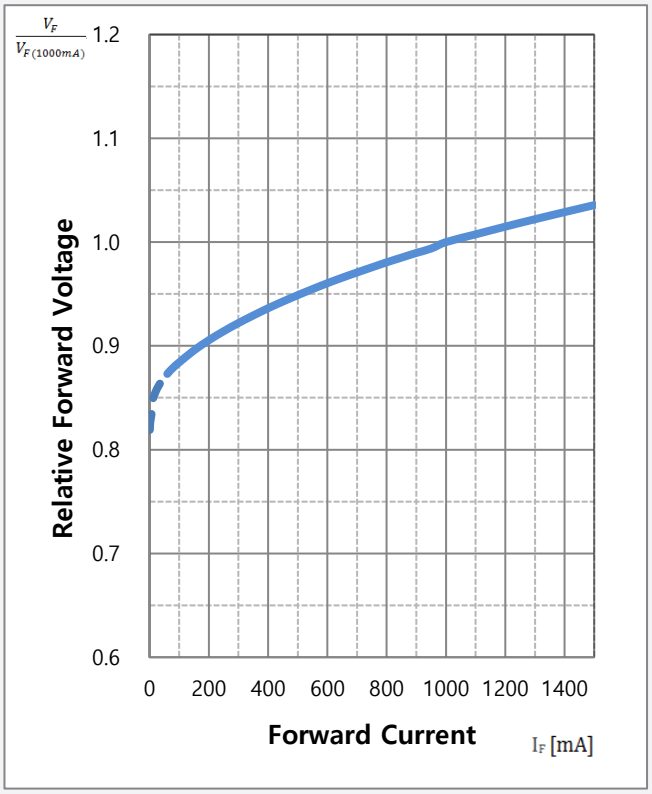


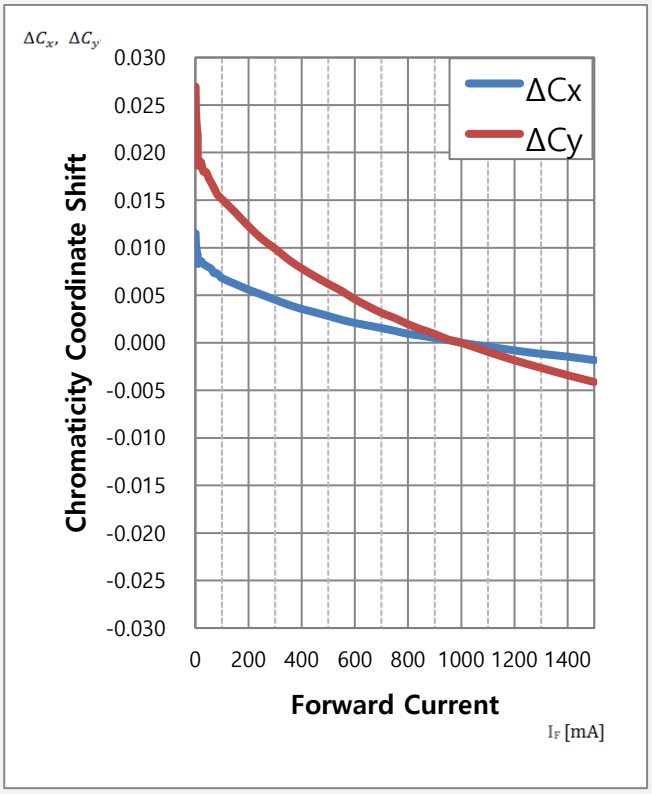
Note:

[7] The measurement condition means that temperature dependence is excluded by applying pulse current for typically 25 ㎳.

c) Forward Current Characteristics (T_S = 25 ºC) [8]



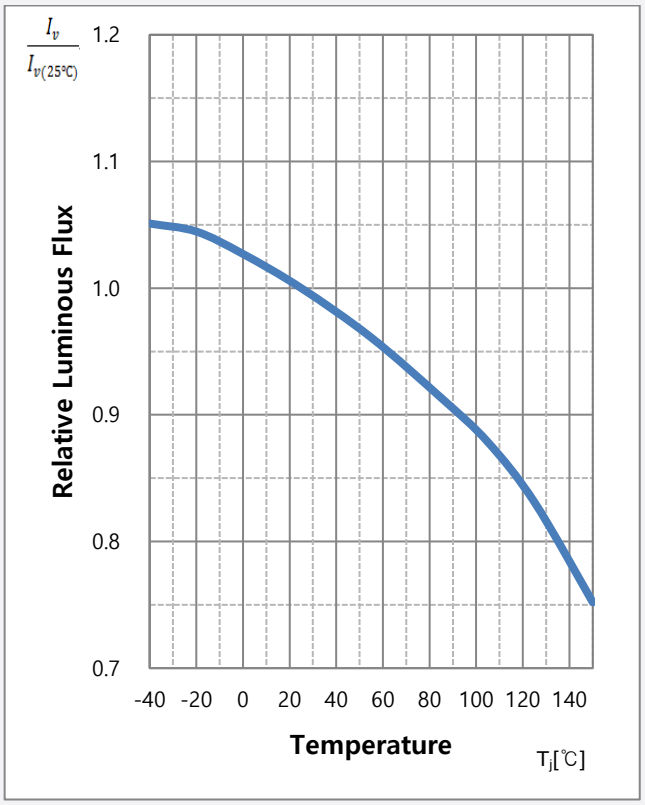


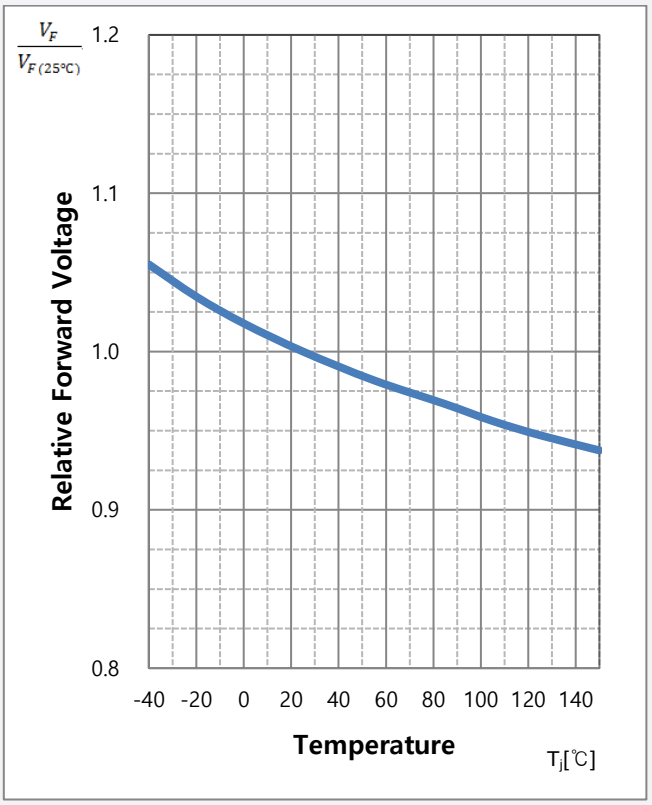


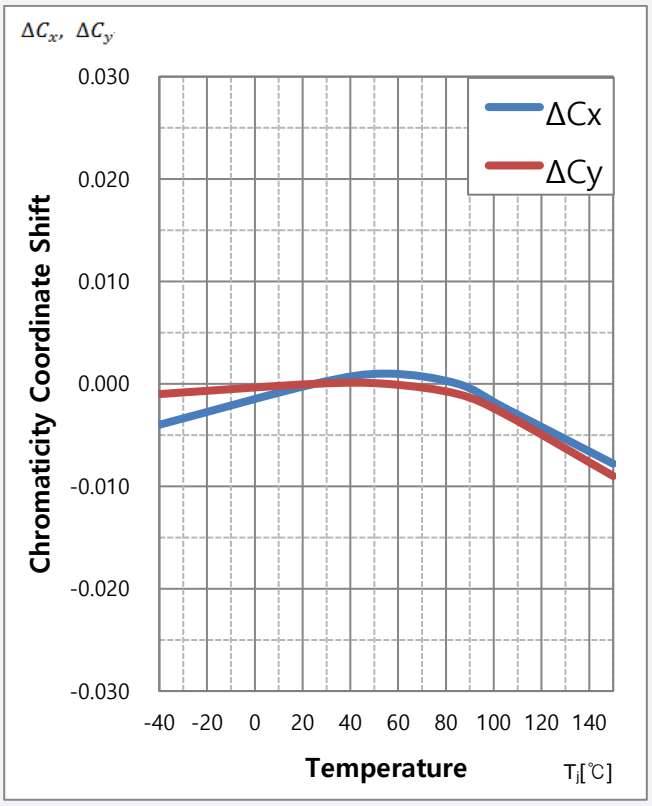
Note:

[8] The measurement condition means that temperature dependence is excluded by applying pulse current for typically 25 ms.

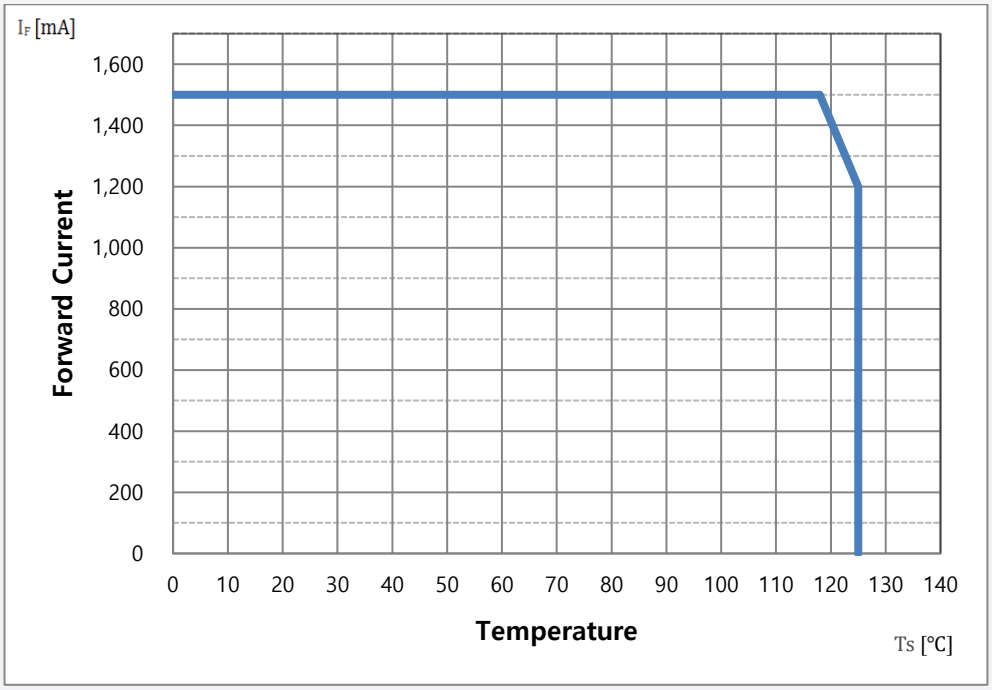
d) Temperature Characteristics (I_F = 1,000 ㎃)







e) Derating Curve [9]

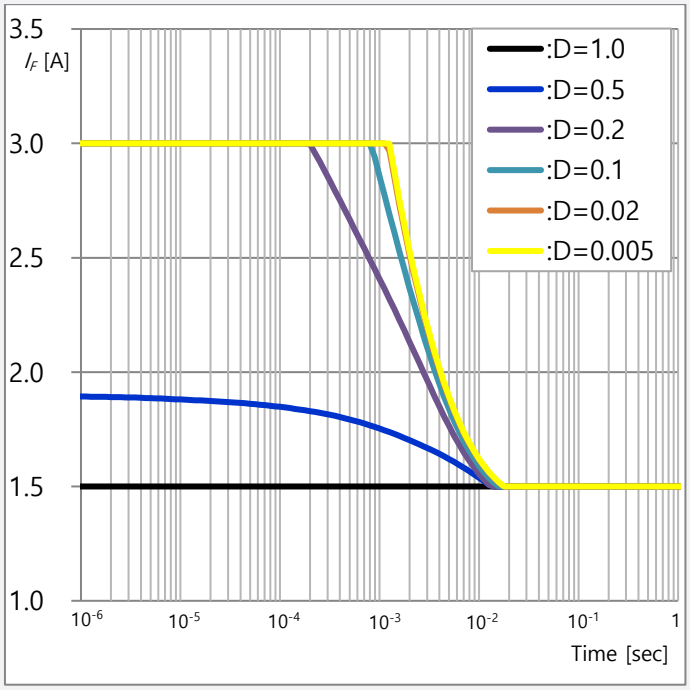


Note:

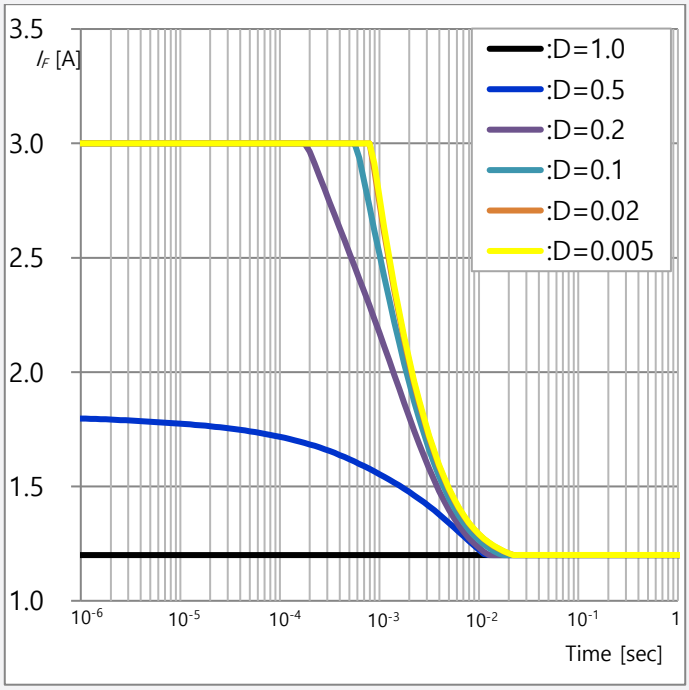
[9] The measurement condition means that temperature dependence is excluded by applying pulse current for typically 25 ㎳.

f) Permissible Pulse Handling Capacity ($I_F = f(t_P)$; D: Duty cycle)

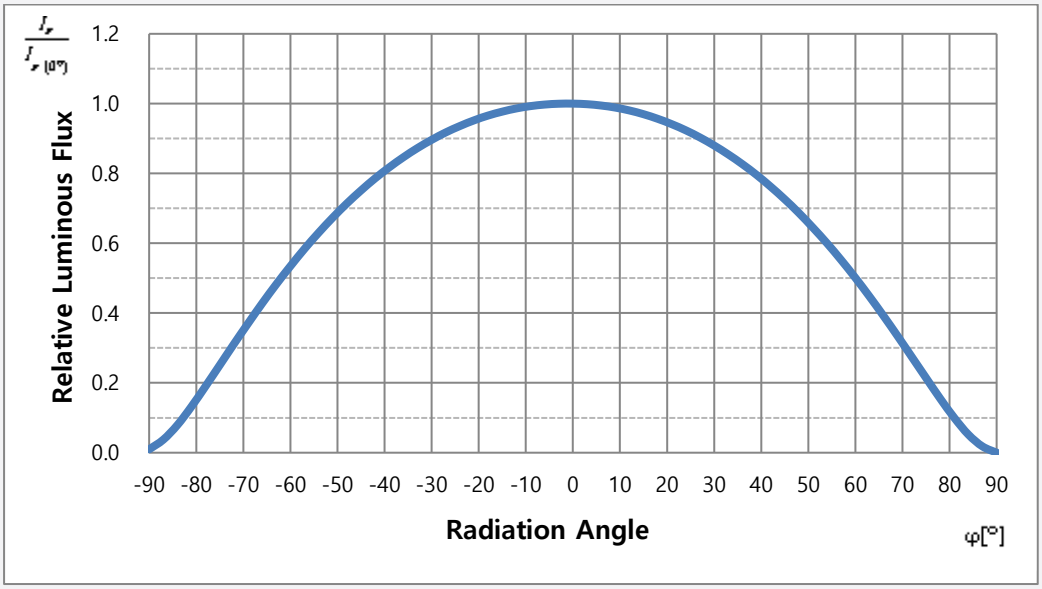
T_S = 0 ~ 118 ºC



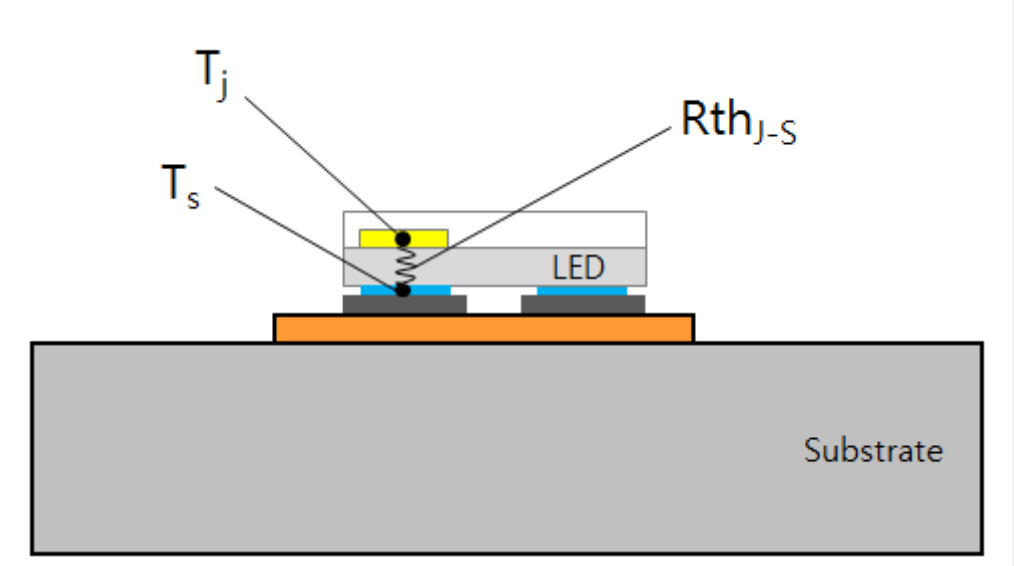
T_S = 118 ~ 125 ºC



g) Beam Angle Characteristics (I_F = 1,000 ㎃, T_S = 25 ºC)



4. Soldering Temperature Location

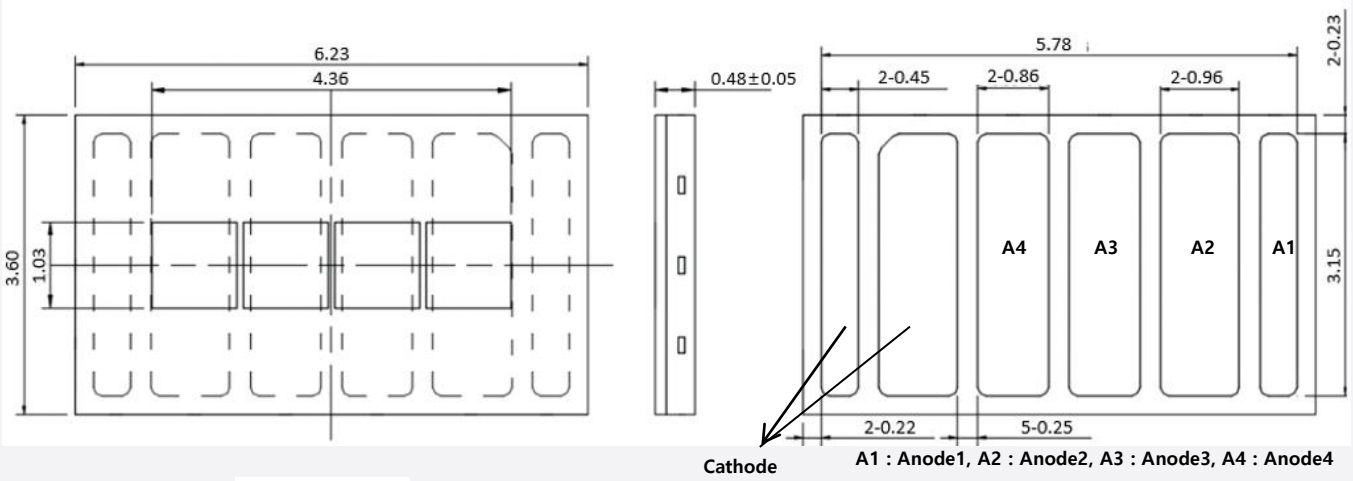


T_j : Temperature of Junction

T_S : Temperature of Solder Pad

R_{thj-s} : Thermal Resistance from Junction to Solder Pad

5. Mechanical Dimension



[Top view] [Side view] [Bottom view]

Notes:

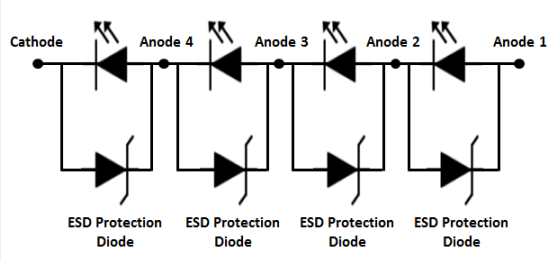
Unit: mm, Tolerance: ±0.1mm. Approximate Weight : 0.042g

a) Pick and Place

Do not place pressure on the resin molded part

It is recommended to use a pick & place nozzle CNT 3X5, etc.

b) Electric Schematic Diagram

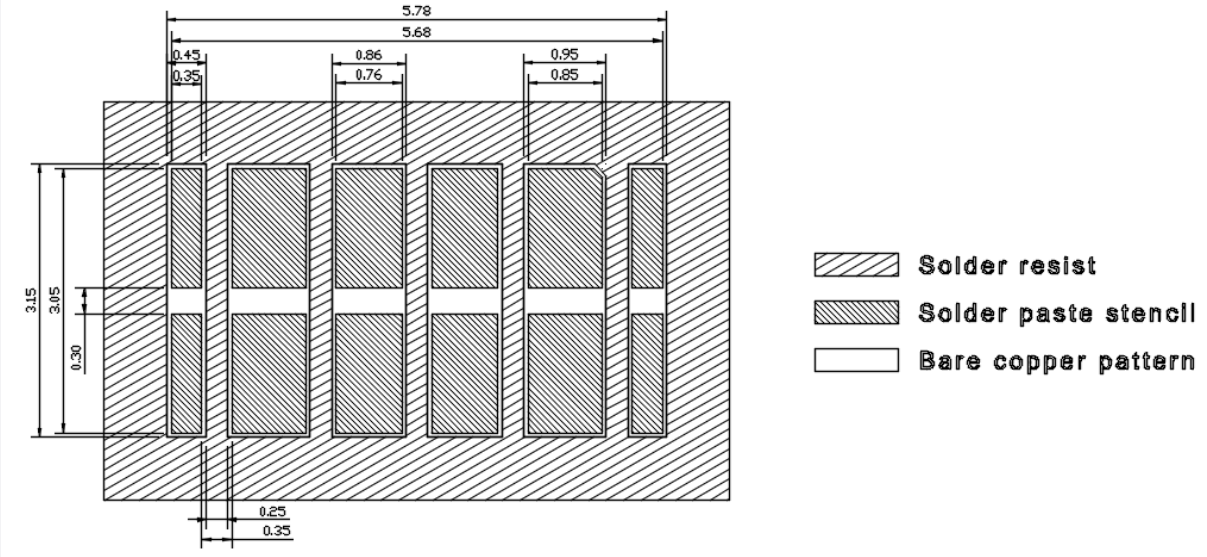


c) Material Information

Description	Material
Substrate	EMC Lead Frame
LED Die	Thin GaN
Phosphor	Glass with Phosphor
Zener Diode	Silicon
Wire	Au
Resin Mold	Silicone

6. Soldering Conditions

a) Pad Configuration & Solder Pad Layout

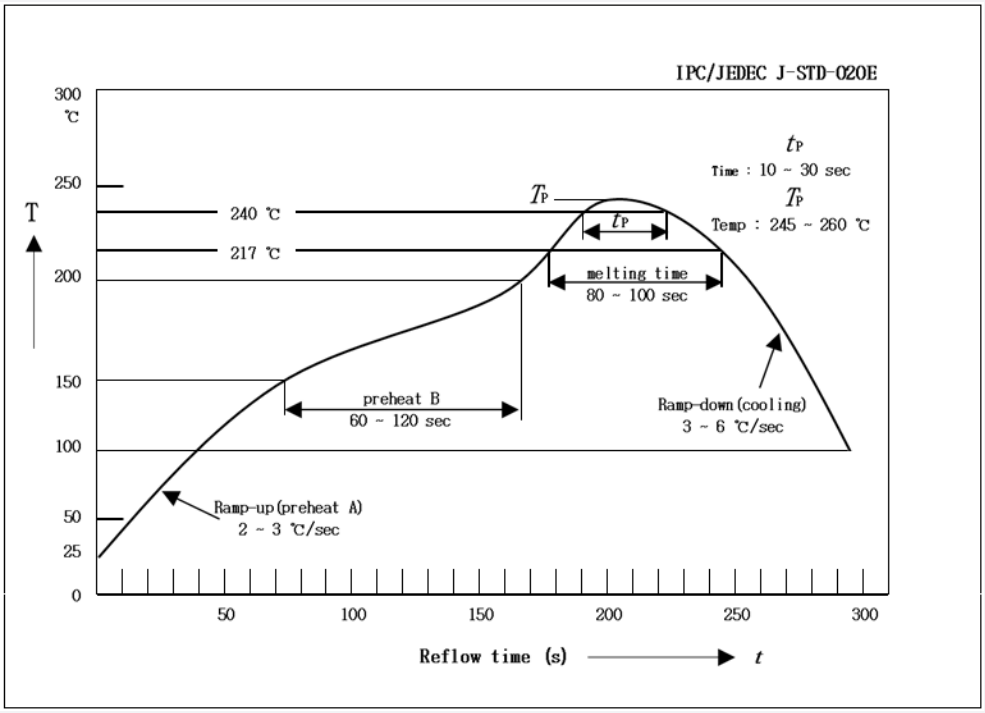


Notes:

Unit: ㎜, Tolerance : ±0.10 ㎜, recommended stencil thickness 120 ㎛

b) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.



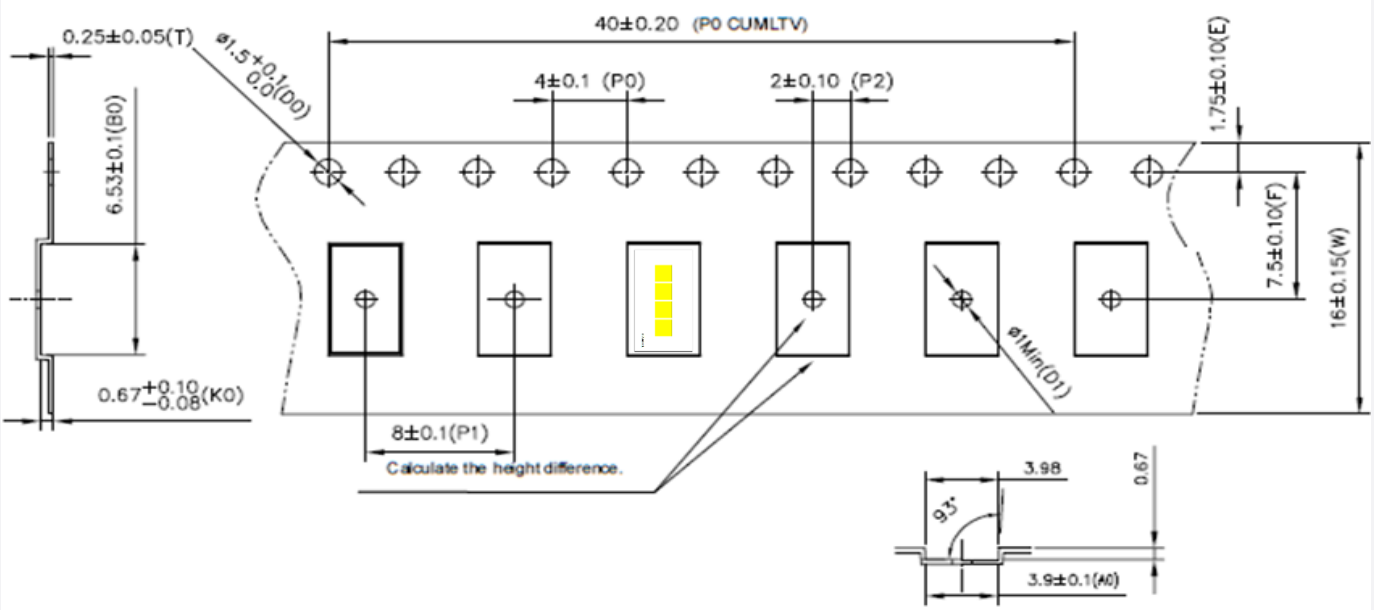
c) Manual Soldering Conditions

Not more than 5 seconds @ max. 300 ºC, under soldering iron.(one time only)

7. Tape & Reel

a) Taping Dimension

User feed direction →



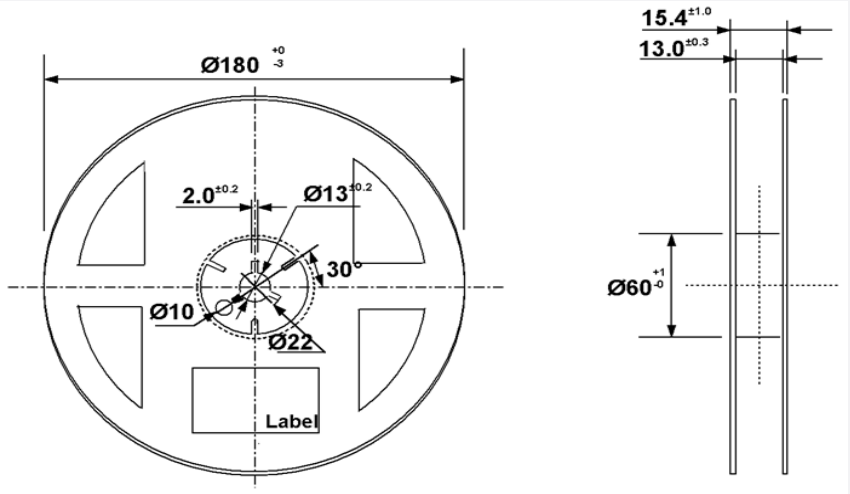
※ Package placement condition in a reel tape

Empty pocket(Min. 100ea)	LED mounting part	Empty pocket(Min. 100ea)

Notes:

Unit: ㎜, LED taping quantity : 1,000EA / Reel

b) Reel Dimension

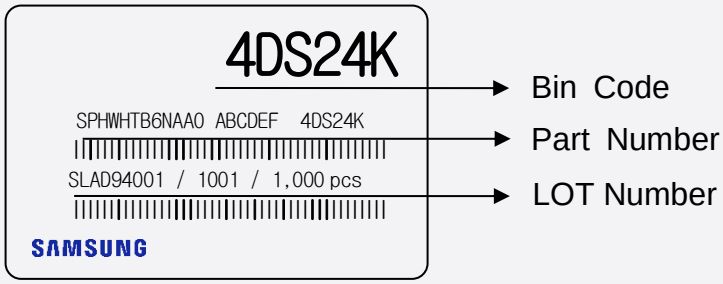


Notes:

Unit: mm, Tolerance : ±0.20 ㎜

8. Label Structure

a) Product Labeling Information



N.B) Denoted rank is the only example

b) Bin Code Structure

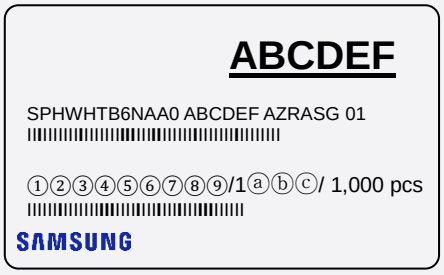
AB: Forward Voltage (V_F) Bin (refer to page. 5)

CD: Color bin (C_x, C_y) (refer to page. 6)

EF: Luminous Flux (I_V) Bin (refer to page. 5)

c) Lot Number Structure

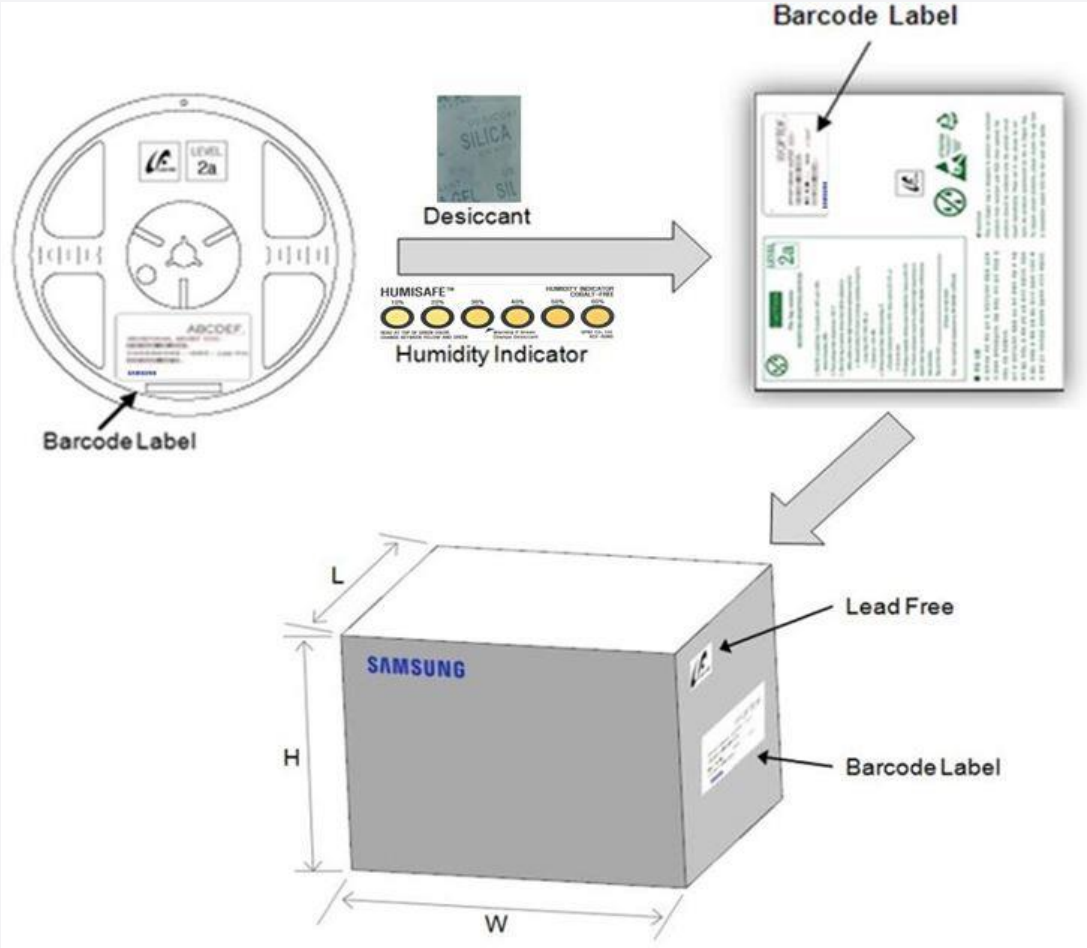
The lot number is composed of the following characters:



①②③③②③④⑤⑥⑦⑧⑨ / 1ⓐⓑⓒ / 1,000 pcs	
①②	: Production site (SL: Kiheung, Korea)
③	: Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)
④	: Year (C: 2018, D: 2019, E: 2020…)
⑤	: Month (1~9, A, B, C)
⑥	: Day (1~9, A, B~V)
⑦⑧⑨	: Serial number (001 ~ 999)
ⓐⓑⓒ	: Product serial number (001 ~ 999)

9. Packing Structure

a) Packing Process



Dimension of Transportation Box in ㎜

Width	Length	Height
220	245	182

10. Precautions in Handling & Use

1) Absolute maximum ratings are set to prevent LED products from breaking due to extreme stress (temperature, current, voltage, etc.). Usage conditions must never go above the ratings, nor do any of two of the factors reach the rating level simultaneously.
2) Please avoid touch or pressure on resin molded part in the products. To handle the products directly, it is recommended to use nonmetallic tweezers.
3) 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.
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 ELECTRONICS, they should be packed by a sealed container with nitrogen gas injected.
5) After bag is opened, device subjected to soldering, solder reflow, or other high temperature processes must be:
   a. Mounted within 672hours at an assembly line with a condition of no more than 30℃/60% RH,
   b. Stored at < 10% RH.
6) Repack unused products using anti-moisture packing, fold to close any openings and store in a dry place with <10% RH.
7) Devices require baking before mounting, if humidity card reading is >60% at 23±℃.
8) Devices must be baked for 1 day at 60±5℃, 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.
10) Prepare an ESD protective area by placing conductive mattress ($10^6\Omega$) and ionizer to remove any static electricity.
11) VOCs (volatile organic compounds) may be occurred by adhesives, flux, hardener or organic additives which are used in luminaires (fixture) and LED silicone bags are permeable to it. It may lead a discoloration when LED expose to heat or light. This phenomenon can give a significant loss of light emitted (output) from the luminaires (fixtures). In order to prevent these problems, we recommend you to know the physical properties for the materials used in luminaires, it requires selecting carefully.

11. Company Information

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Legal and additional information.

About Samsung Electronics Co., Ltd.

Samsung inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, digital appliances, network systems, and memory, system LSI, foundry and LED solutions. For the latest news, please visit the Samsung Newsroom at news.samsung.com.

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