

## Middle Power LED PLCC Series

# 0.2W White SPMWHT3215A3



### Features & Benefits

- Package : Au Plated 2 pad design package with silicone resin
- Dimension : 3.2 mm x 2.8 mm
- Technology : Epi-up
- Color Coordinate Group : Appropriate to ECE
- Chip Configuration : 1 chip
- ESD Voltage : Up to 2 kV acc. to ISO 10605-contact
- Viewing Angle: 120°
- Qualifications: The product qualification test based on the guidelines of AEC-Q101-REV-C.

SAMSUNG

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## 1. Characteristics

### a) Typical Characteristics

[T<sub>j</sub> = 25 °C] <sup>[1]</sup>

Item	Symbol	Value	Unit.
Luminous Flux (I <sub>F</sub> = 50 mA)	cd	Typ. 3.5	cd
Forward Voltage (I <sub>F</sub> = 50 mA)	V <sub>F</sub>	Typ. 3.1	V
Viewing Angle	φ	Typ. 120	Deg
Reverse Current	I <sub>R</sub>	10	μA
Real Thermal Resistance (Junction to Solder point)	R <sub>th_J-S (Real)</sub>	Typ. 68	K/W
		Max. 79	
Electrical Thermal Resistance (Junction to Solder point)	R <sub>th_J-S (Elec.)</sub>	Typ. 60	K/W
		Max. 70	
Radian Surface	A	4.52	mm <sup>2</sup>

**Note:**

[1] Measurement condition: LED (T<sub>j</sub>) = Ambient temperature (T<sub>a</sub>), by applying pulse current for under 25ms.

### b) Absolute Maximum Rating

Item	Symbol	Rating	Unit
Ambient / Operating Temperature	T <sub>a</sub>	-40 ~ +110	°C
Storage Temperature	T <sub>stg</sub>	-40 ~ +110	°C
LED Junction Temperature	T <sub>j</sub>	125	°C
Maximum Forward current <sup>[2]</sup> (T <sub>j</sub> : 25°C) <sup>[3]</sup>	I <sub>F</sub>	70	mA
Minimum Forward current <sup>[2]</sup> (T <sub>j</sub> : 25°C) <sup>[3]</sup>	I <sub>F</sub>	10	mA
Maximum Reverse current		Do not apply for reverse current	
ESD Sensitivity <sup>[4]</sup>	-	±2 HBM	kV

**Note:**

[2] Unpredictable performance may be resulted by driving the product at below Min. I<sub>F</sub> or above Max. I<sub>F</sub>. But there will be no damage to the product.

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

[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	M	W	H	T	3	2	3	5	A	3	A	B	C	D	E	F

Digit	PKG Information
1 2	company name and Samsung LED PKG (SP for Samsung PKG)
3	power variant (M for automotive middle power)
4 5	color variant (WH for automotive white color)
6	LED PKG version (T for initial version)
7 8 9	product configuration and type (323 for automotive 3228 PKG Au plate type)
10	Max power (5 for 50mA)
11	specific property (A for Automotive)
12	CRI Variant (3 for CRI Min. 70)
13 14	forward voltage property
15 16	CIE coordination property
17 18	luminous flux property

**a) Luminous Intensity Bins <sup>[5]</sup> ( $I_F = 50 \text{ mA}$ ,  $T_j = 25 \text{ }^\circ\text{C}$ )**

Symbol	Bin Code	Intensity Range (cd)		Flux Range (lm)	
		Min	Max	Min	Max
$\Phi$	A2	3.0	4.0	9.0	12.0
	A3	4.0	5.0	12.0	15.0

**b) Voltage Bins <sup>[5]</sup> ( $I_F = 50 \text{ mA}$ ,  $T_j = 25 \text{ }^\circ\text{C}$ )**

Symbol	Bin Code	Voltage Range (V)	
		Min	Max
$V_F$	C1	2.7	3.0
	C2	3.0	3.3
	C3	3.3	3.6

**Note:**

[5] Luminous intensity measuring equipment: CAS140CT

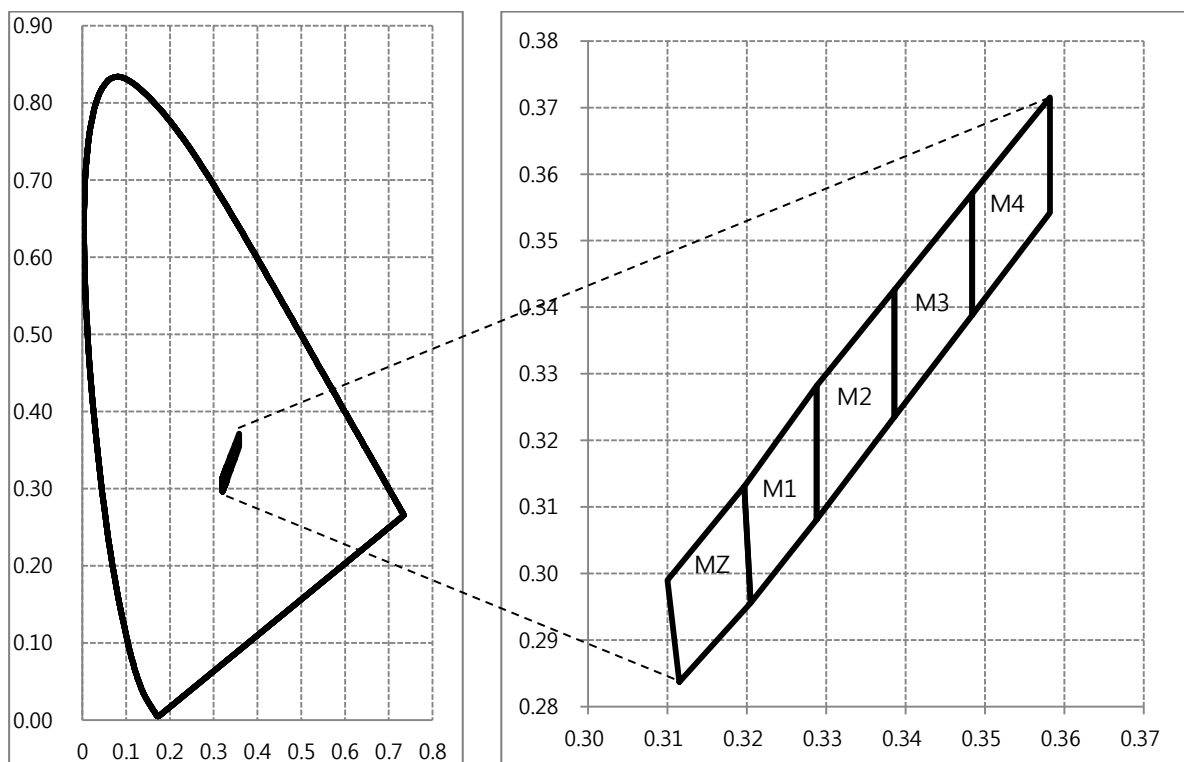
$\Phi_V$  and  $V_F$  tolerances are  $\pm 7\%$  and  $\pm 0.1 \text{ V}$ , respectively.

**c) Color Bins<sup>[6]</sup> ( $I_F = 50$  mA)**

Symbol	Bin Code	$C_x$				$C_y$			
$C_x, C_y$	MZ	0.3115	0.3205	0.3197	0.3100	0.2837	0.2956	0.3131	0.2990
	M1	0.3205	0.3197	0.3288	0.3288	0.2956	0.3131	0.3282	0.3081
	M2	0.3288	0.3288	0.3386	0.3386	0.3081	0.3282	0.3426	0.3235
	M3	0.3386	0.3386	0.3484	0.3484	0.3235	0.3426	0.3571	0.3388
	M4	0.3484	0.3484	0.3582	0.3582	0.3388	0.3571	0.3715	0.3542

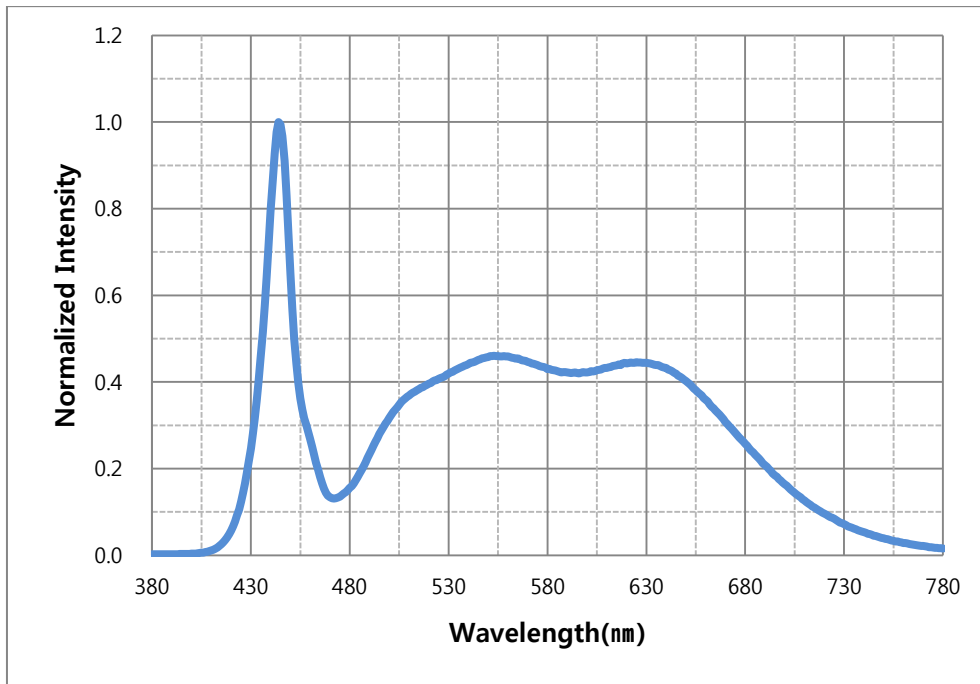
**Note**

[6] Chromaticity coordinates:  $C_x, C_y$  according to CIE 1931.  $C_x$  and  $C_y$  tolerances are  $\pm 0.005$ , respectively.

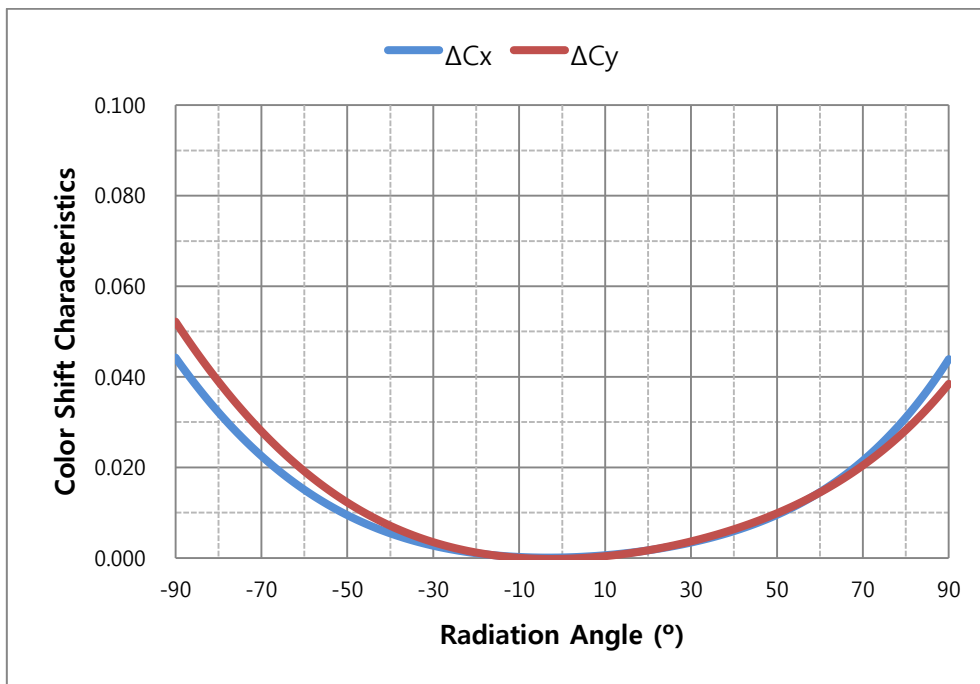


### 3. Typical Characteristics Graphs

a) Spectrum Distribution ( $I_F = 50 \text{ mA}$ ,  $T_s = 25^\circ\text{C}$ )<sup>[7]</sup>



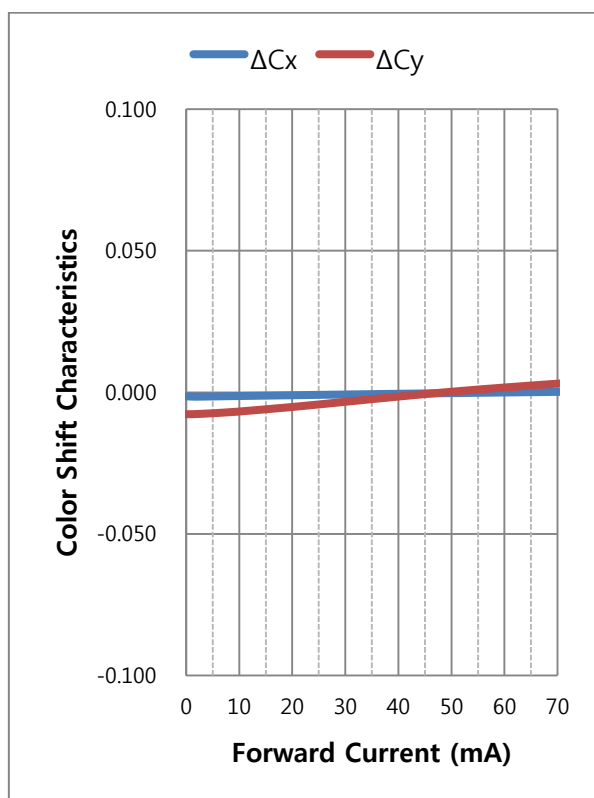
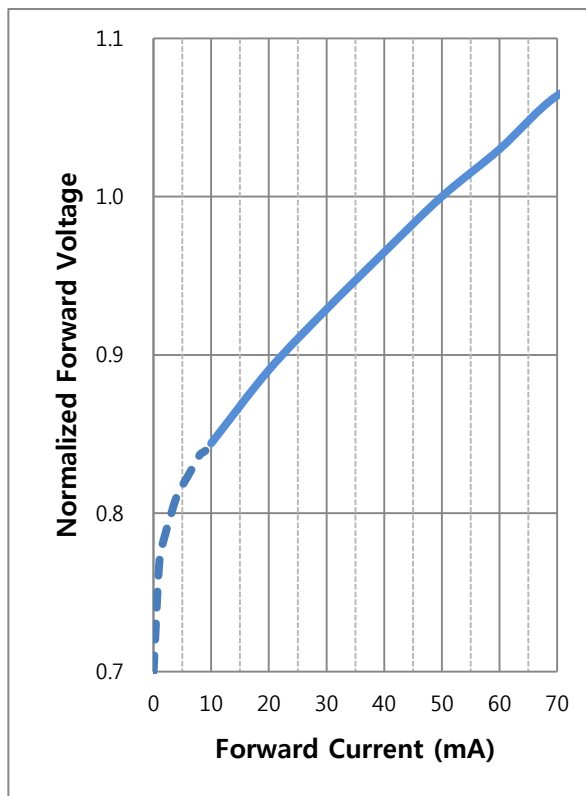
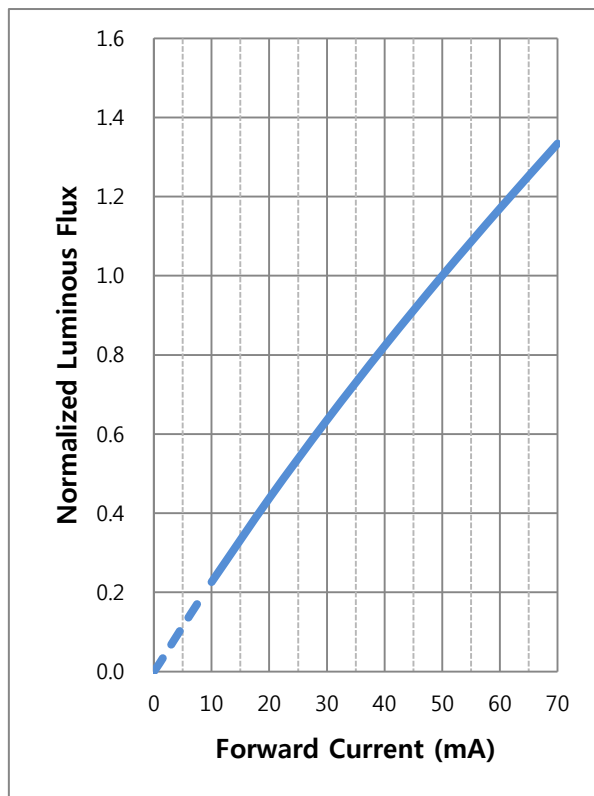
b) Typical Chromaticity Coordinate Shift vs Radiation Angle ( $I_F = 50 \text{ mA}$ ,  $T_s = 25^\circ\text{C}$ )<sup>[7]</sup>



Note:

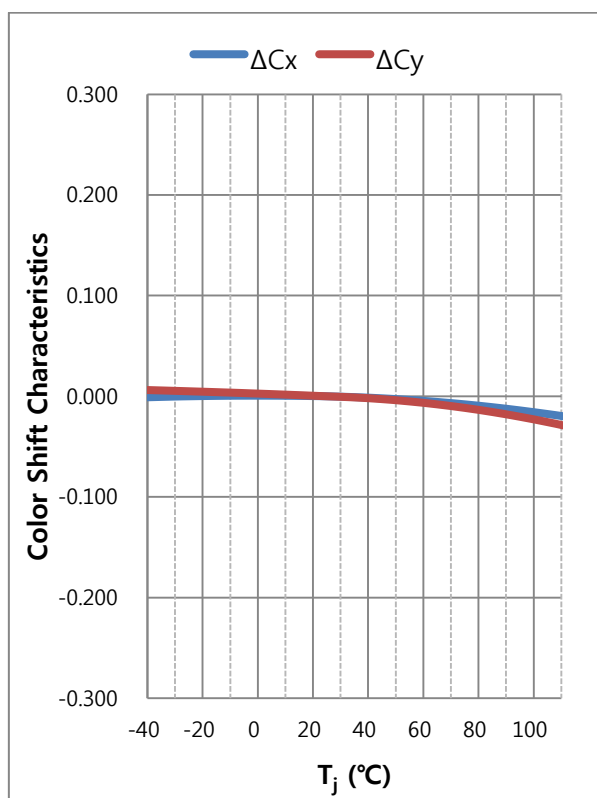
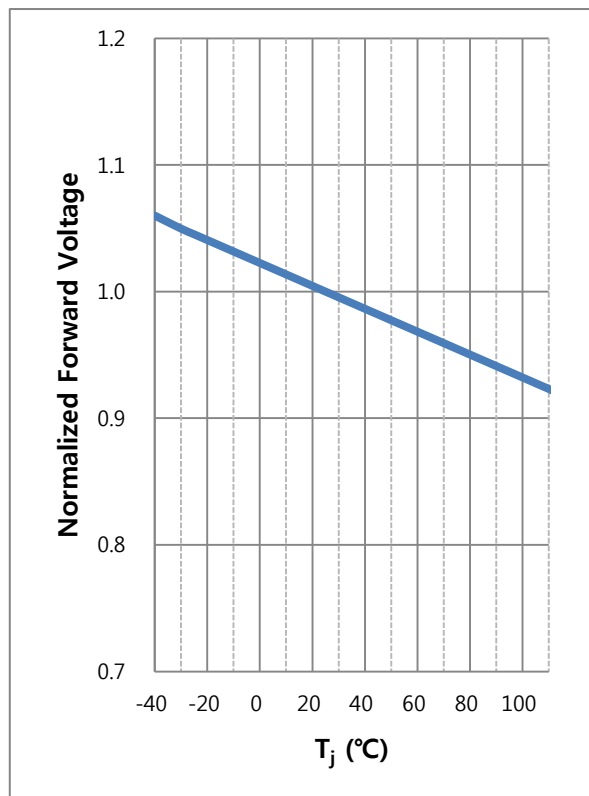
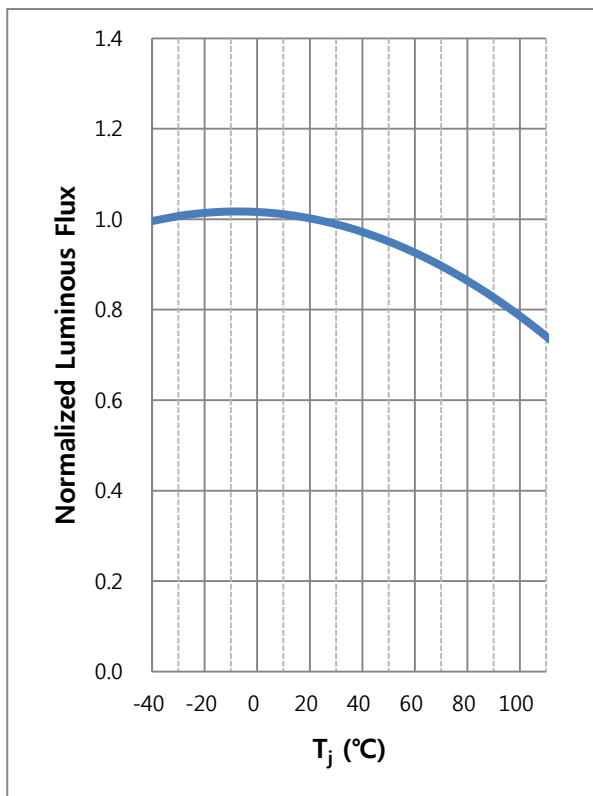
[7] The measurement condition means that temperature dependence is excluded by applying pulse current for under 25ms.

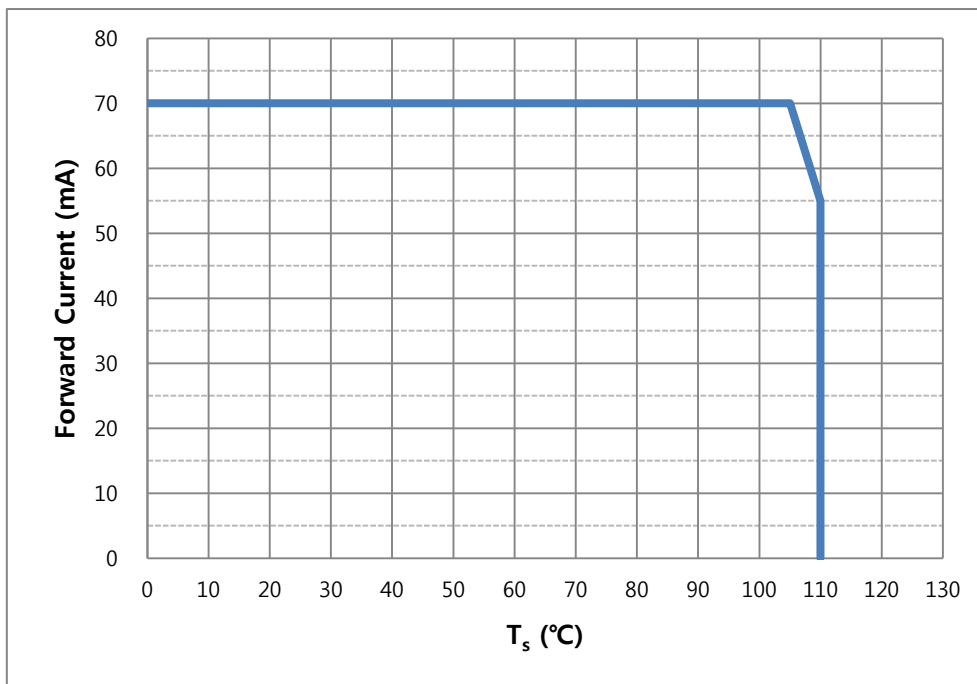
c) Forward Current Characteristics ( $T_s = 25\text{ }^{\circ}\text{C}$ )<sup>[8]</sup>



Note:

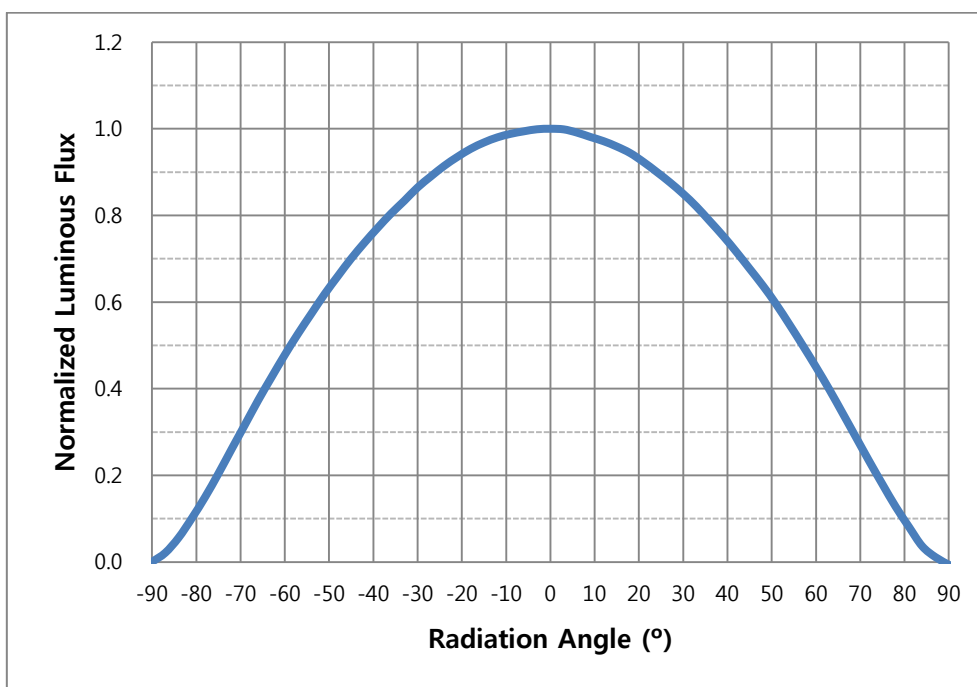
[8] The measurement condition means that temperature dependence is excluded by applying pulse current for under 25ms.

**d) Temperature Characteristics ( $I_F = 50$  mA)**

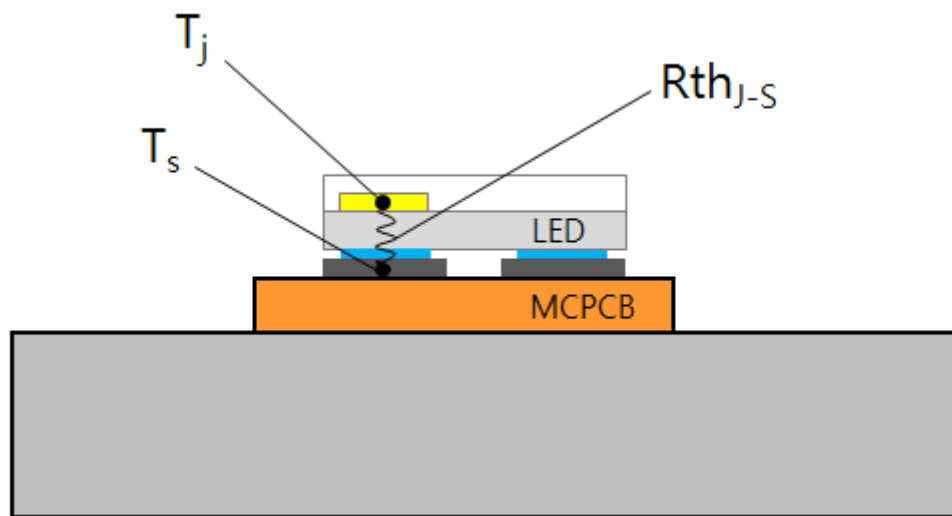
**e) Derating Curve<sup>[9]</sup>**

**Note:**

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

**f) Beam Angle Characteristics ( $I_F = 50$  mA,  $T_s = 25$  °C)**

#### 4. Soldering Temperature Location

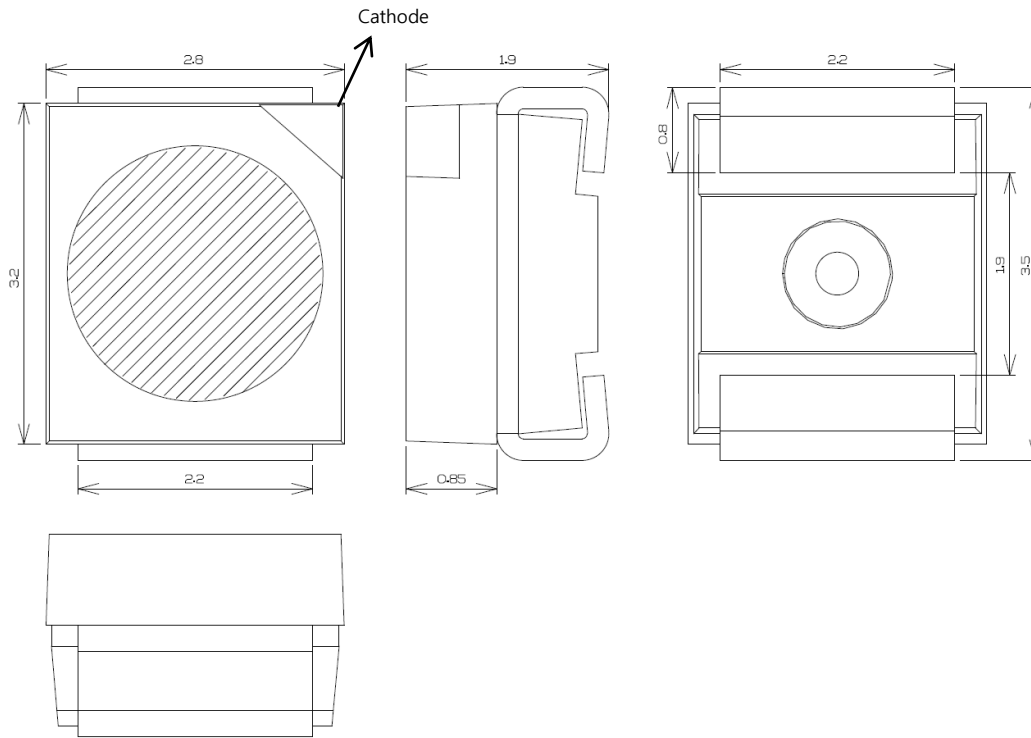


$T_j$ : Temperature of Junction

$T_s$ : Temperature of Solder Pad

$R_{th_{J-S}}$ : Thermal Resistance from Junction to Solder Pad

## 5. Mechanical Dimension



**Note:**

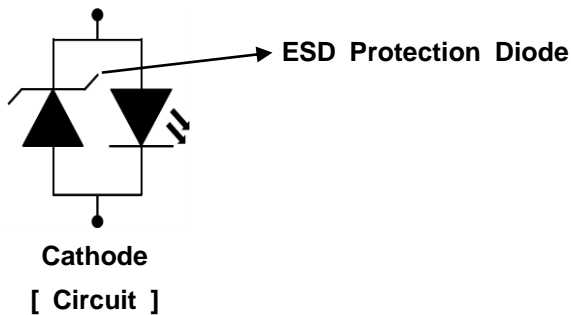
Unit: mm, Tolerance:  $\pm 0.1\text{mm}$

### a) Pick and Place

Do not place pressure on the resin lens (hatch area).

The maximum compressing force is 15N in the polymer.

### b) Electric Schematic Diagram

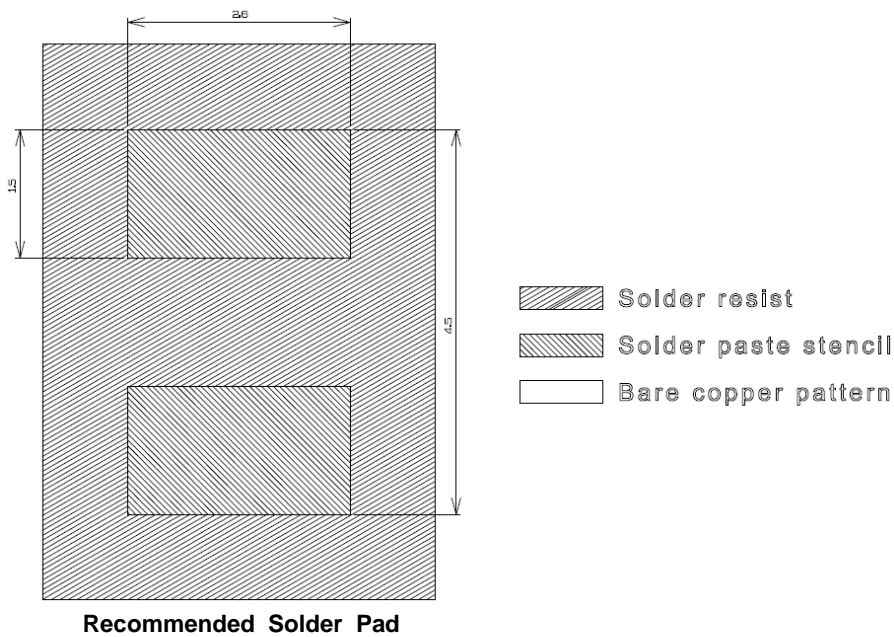


### c) Material Information

Description	Material
Lead flame	PLCC
LED Die	Epi-up
Wire	Au
Resin Mold	Silicon

## 6. Soldering Conditions

### a) Pad Configuration & Solder Pad Layout

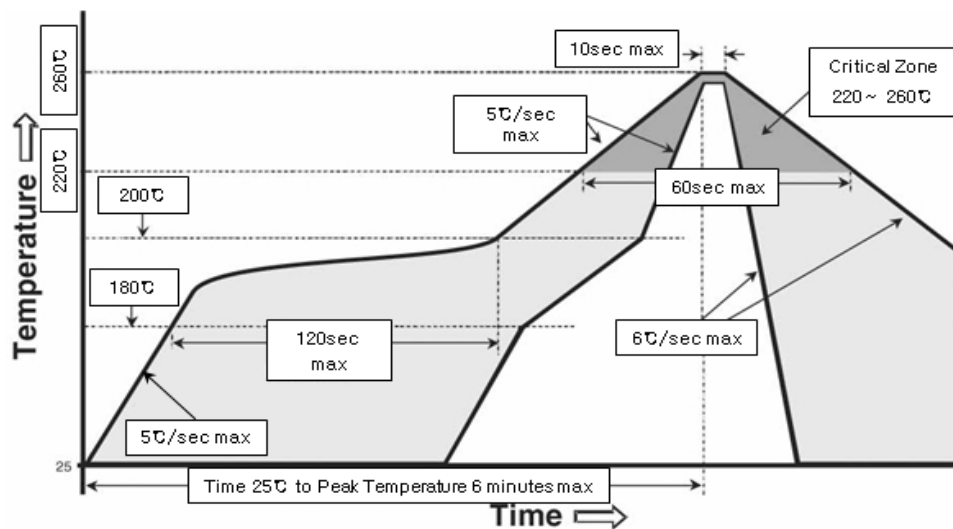


#### Notes:

Unit: mm, Tolerance:  $\pm 0.1$ mm

### b) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.

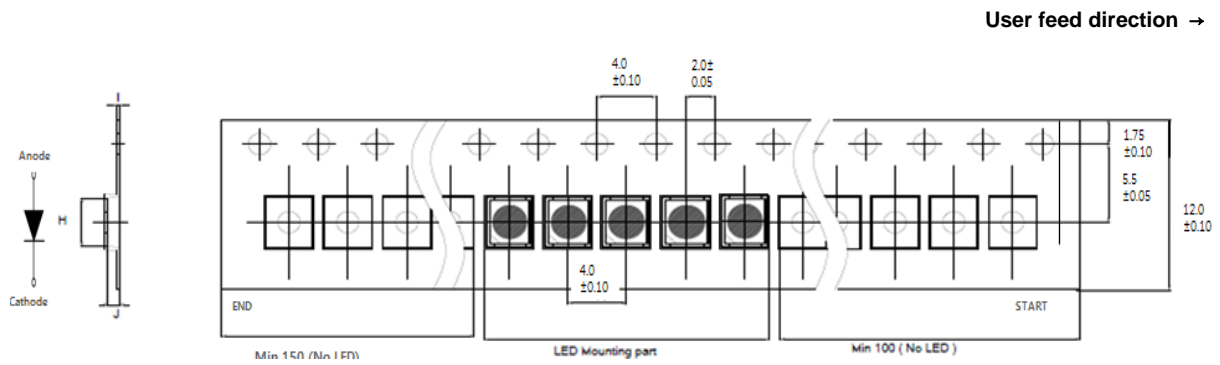


### c) Manual Soldering Conditions

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

## 7. Tape & Reel

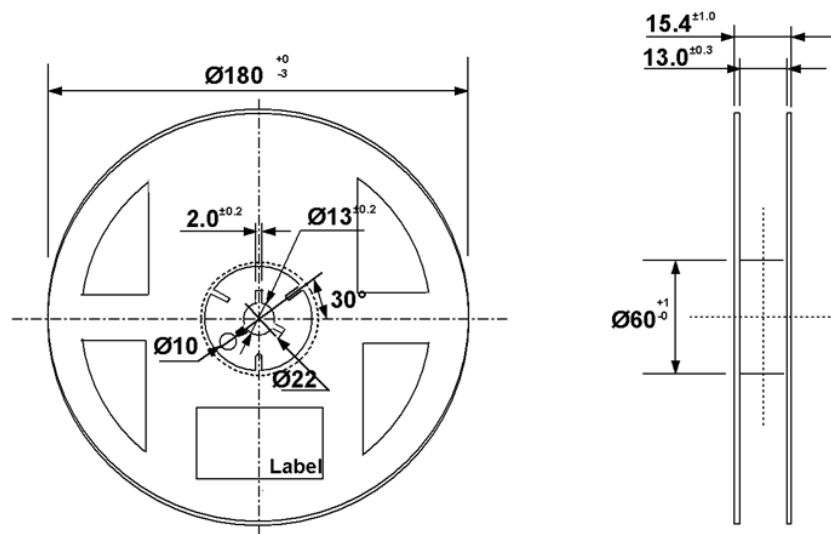
### a) Taping Dimension



**Note:**

Unit: mm, LED taping quantity: 2,000EA / Reel

### b) Reel Dimension

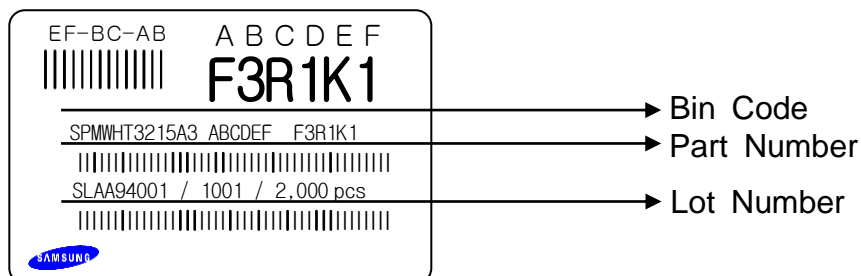


**Notes:**

Unit: mm, Tolerance:  $\pm 0.2\text{mm}$

## 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)

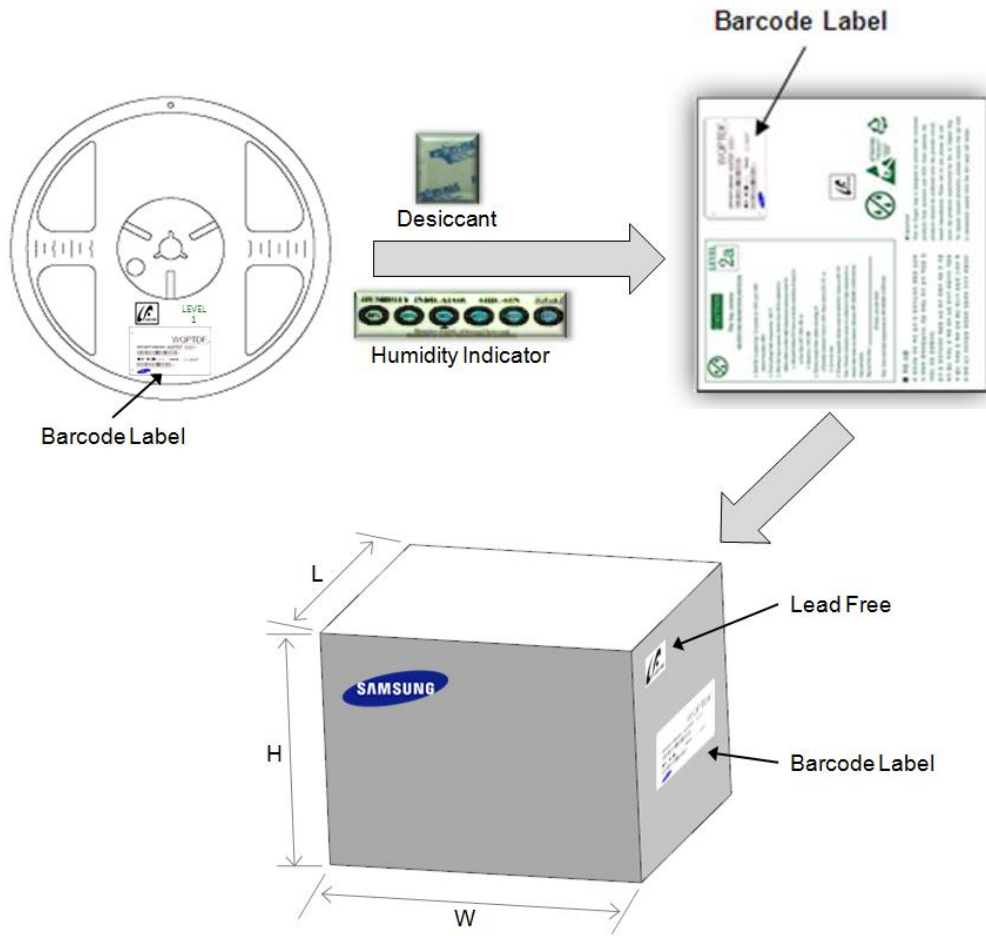
### c) Lot Number Structure

The lot number is composed of the following characters:

No.	Information
1	Production Site : S:SAMSUNG LED, G:GOSIN CHINA
2	LED
3	Product State A :Normality, B :Bulk, C :First Production, R :Reproduction, S :Sample
4	Year : Y:2014, Z:2015, A:2016, B:2017, C:2018 ...
5	Month : 1 ~ 9, A, B
6	Day : 1 ~ 9, A, B ~ V
789	Product number : 1 ~ 999
abc	Reel Number : 1 ~ 999

## 9. Packing Structure

### a) Packing Process



Dimension of Transportation Box in mm

Width	Length	Height
220	245	182

## 10. Precautions in Handling & 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 Electronics, they should be packed by a sealed container with nitrogen gas injected.  
(Shelf life of sealed bags: 12 months, temp.  $\sim 40^{\circ}\text{C}$ ,  $\sim 90\%$  RH)
- 5) After storage bag is open, 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  $30^{\circ}\text{C}/60\%$  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  $23\pm 5^{\circ}\text{C}$ .
- 8) Devices must be baked for 1 day at  $60\pm 5^{\circ}\text{C}$ , 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.
- 10) 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) Risk of Sulfurization (or Tarnishing)  
The lead frame from Samsung Electronics is a plated package and it may change to black(or dark colored) when it is exposed to Ag (a), Sulfur (S), Chlorine (Cl) or other halogen compound. It requires attention.  
Sulfide (Sulfurization) of the lead frame may cause a change of degradation intensity, chromaticity coordinates and it may cause open circuit in extreme cases. It requires attention.  
Sulfide (Sulfurization) of the lead frame may cause of storage and using with oxidizing substances together. Therefore, LED is not recommend to use and store with the below list.  
: Rubber, Plain paper, lead solder cream etc.

## 11. Company Information



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