High Power LED S-Series

0.7W Amber

SPHAMTS2N100

Features

- Package : Lead frame package
- Dimension : 2.30 mm x 2.30 mm
- Chip Technology : Flip Chip
- ESD : 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM)
- Qualifications : AEC-Q102 Qualified with RV-level 0

SAMSUNG

Table of Contents

1. Characteristics

a) Typical Characteristics

[T_s = 25 ºC][1]

Item	Symbol	Value	Unit.
Luminous Flux (**I_F** = 200 mA)	Φ_V	Typ. 60	lm
Forward Voltage (**I_F** = 200 mA)	V_F	Typ. 2.9	V
Viewing Angle	Φ	Typ. 120	º
Reverse Current	I_R	Not designed for reverse operation	
Real Thermal Resistance (Junction to Solder point)	$R_{th\_J\text{-}S\ (Real)}$	8 12	K/W
Electrical Thermal Resistance (Junction to Solder point)	$R_{th\_J\text{-}S\ (Elec.)}$	Typ. 6.2 Max. 9.3	K/W
Radian Surface	A	0.81	mm²

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] (Ts:25℃) [3]	**I_F**	300	mA
Minimum Forward current[2] (Ts:25℃) [3]	**I_F**	50	mA
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 ms

[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	A	M	T	S	2	N	1	0	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 (AM for automotive amber color)
6	LED PKG version (T for initial version)
7 8	Product configuration and type (S2 for automotive 2323 PKG type)
9	Lens configuration (N for no lens)
10	Max power (Internal code)
11,12	Specific property (00 for default)
13 14	Forward voltage property
15 16	CIE coordination property
17 18	Luminous flux property

a) Luminous Flux Bins [5] (I_F = 200 ㎃, T_S= 25ºC)

Symbol	Flux Bin Code	Flux Range (lm)	
		Min	Max
Φ_V	C2	48	56
	D2	56	64
	E2	64	72

b) Voltage Bins (I_F = 200 ㎃, T_S = 25 ºC)

Symbol	Voltage Bin Code	Voltage Range (V)	
		Min	Max
V_F	1D	2.75	3.00
	1E	3.00	3.25
	1H	3.25	3.40

Note:

[5] Luminous flux measuring equipment : CAS140CT

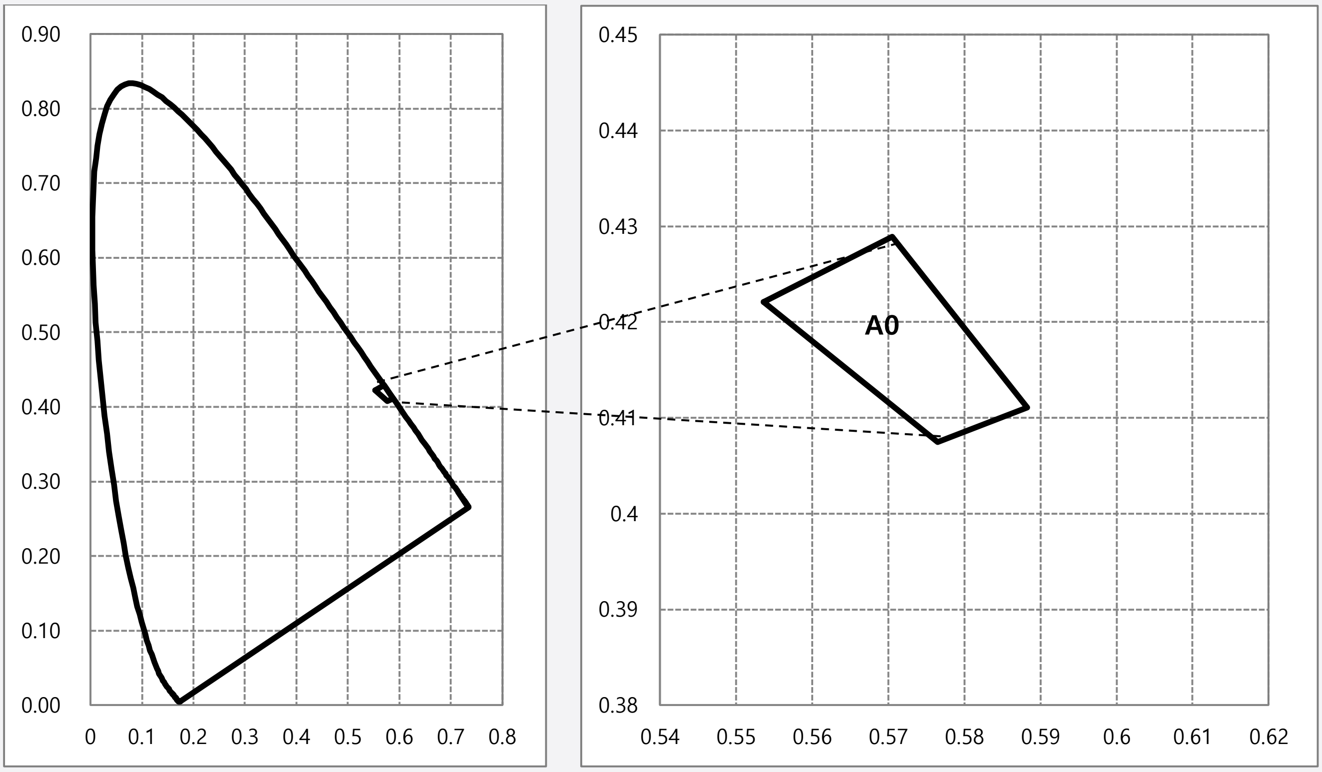
Φ_V and V_F tolerances are ±7% and ±0.1 V respectively.

c) Color Bin [6](I$_F$ = 200 ㎃)

Symbol	Color Bin Code	Cx				Cy			
Cx, Cy	A0	0.5536	0.5765	0.5883	0.5705	0.4221	0.4075	0.4111	0.4289

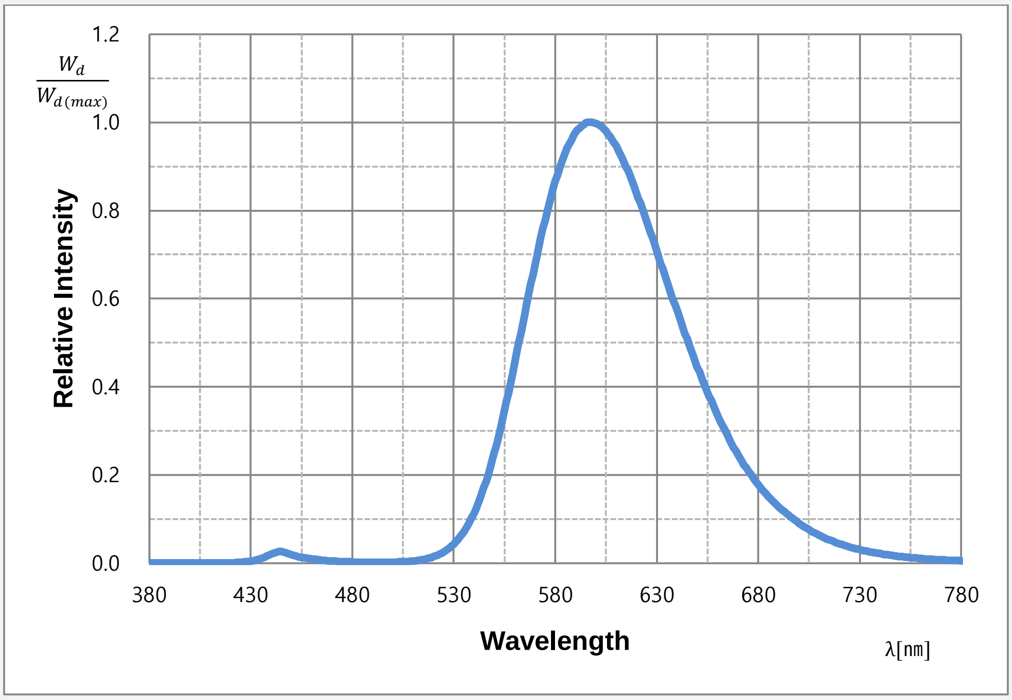
Note

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

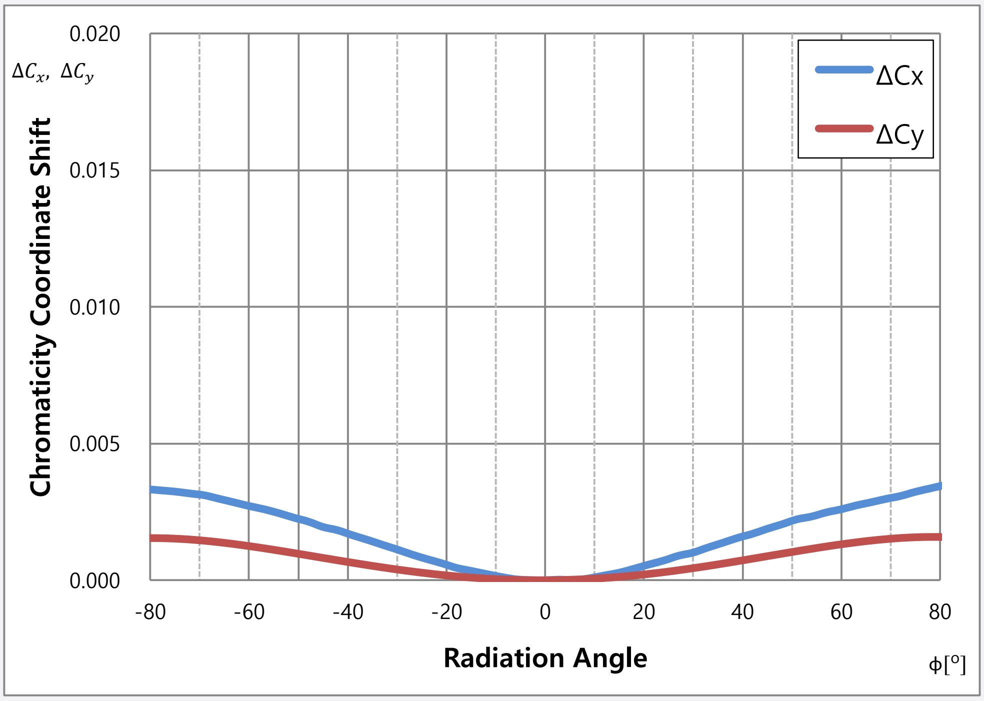


3. Typical Characteristics Graphs

a) Spectrum Distribution (I_F = 200 ㎃, T_S = 25 ºC)



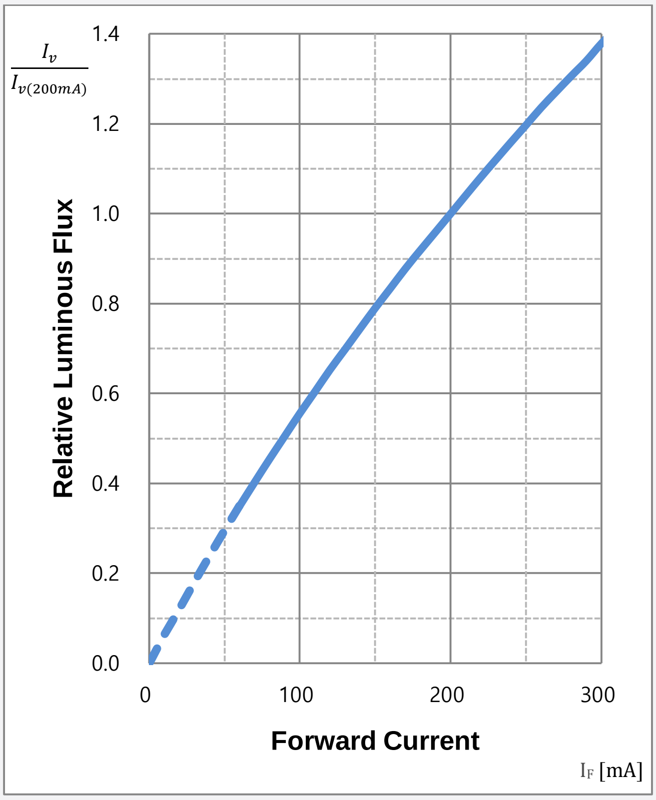
b) Typical Chromaticity Coordinate Shift vs Radiation Angle (I_F = 200 ㎃, T_S = 25 ºC) [7]

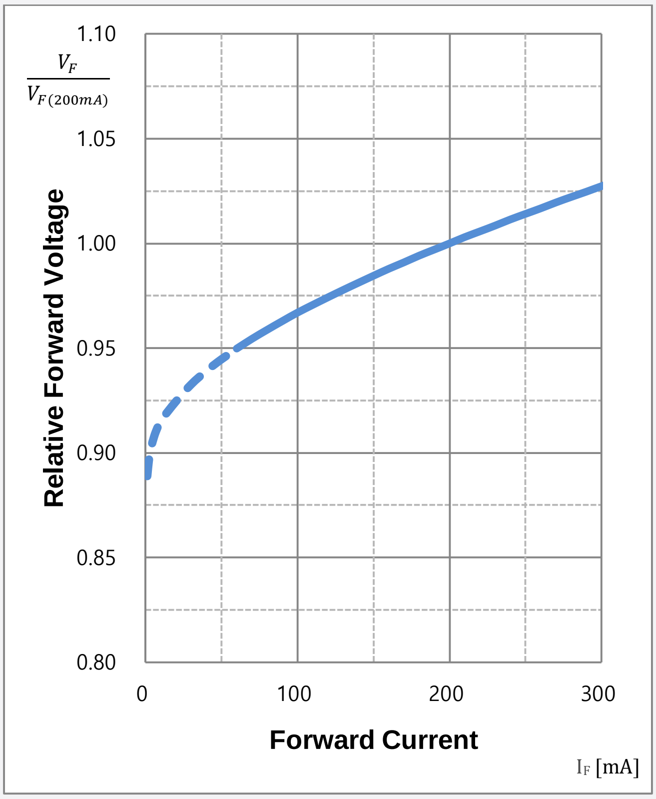


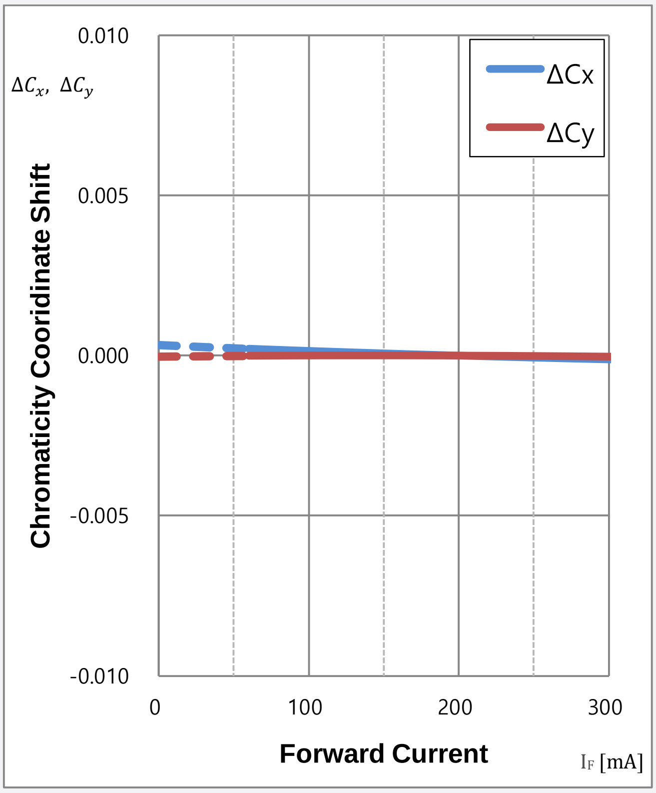
Note:

[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]



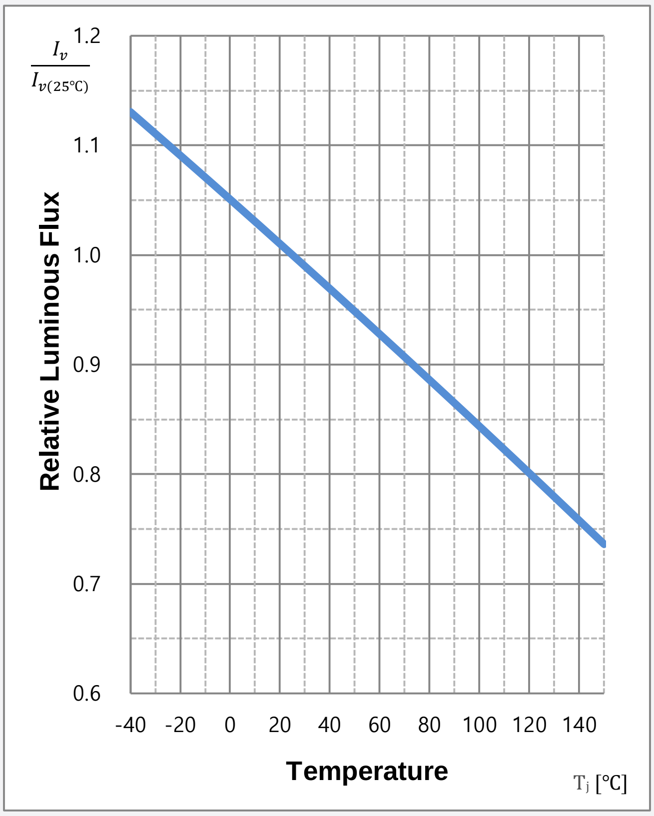


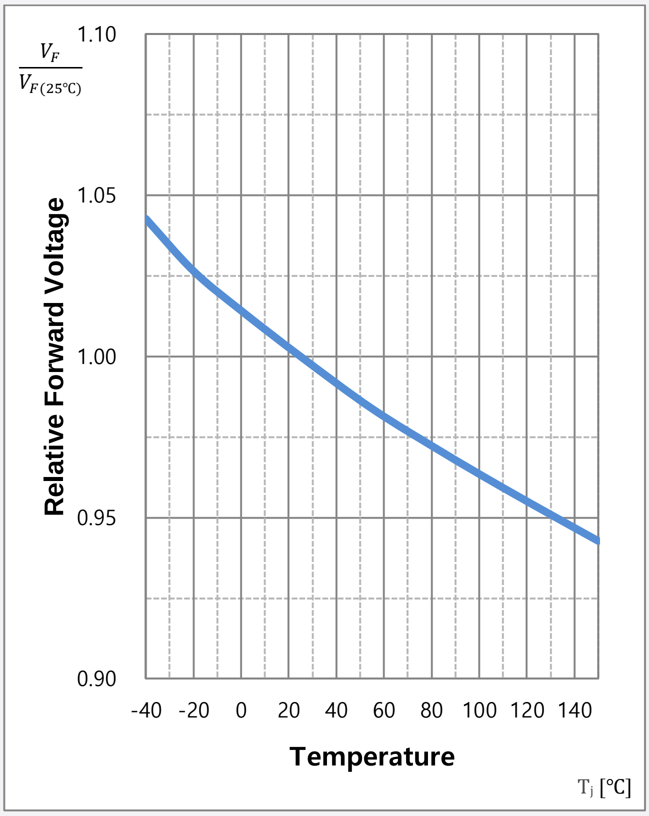


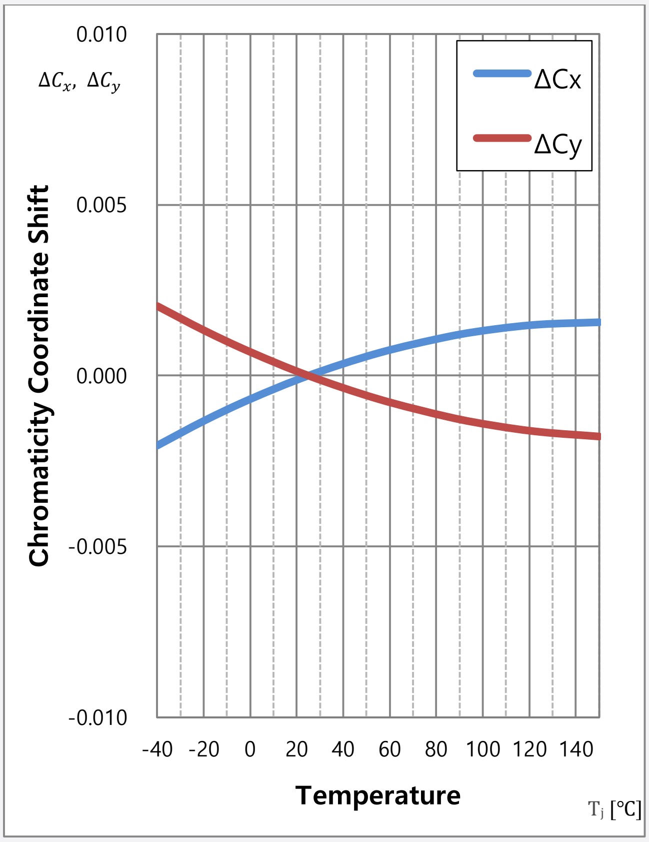
Note:

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

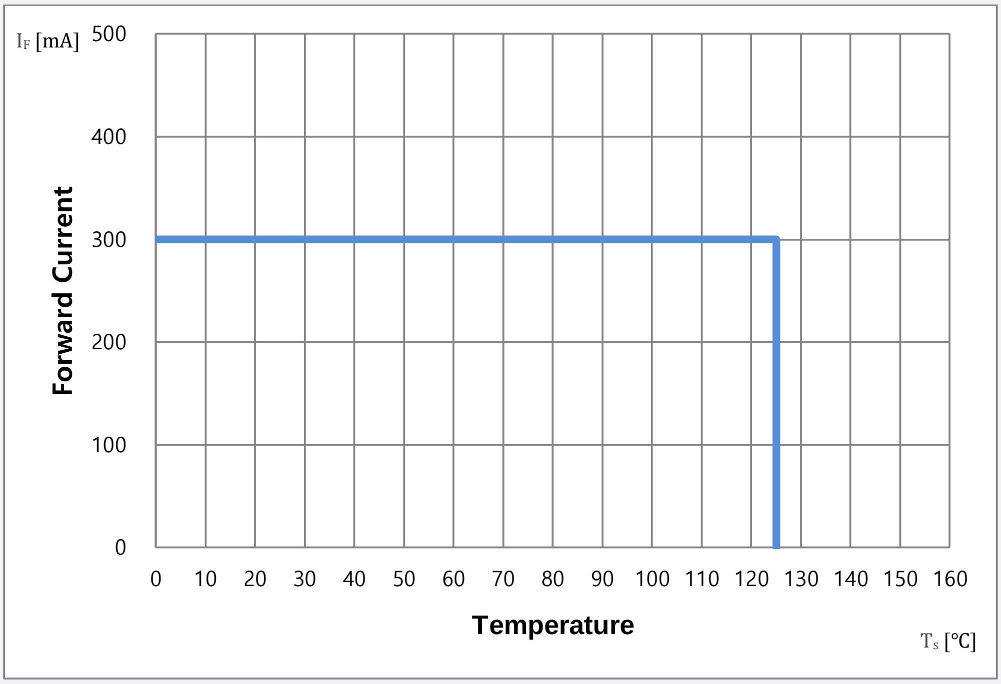
d) Temperature Characteristics (I_F = 200 mA)







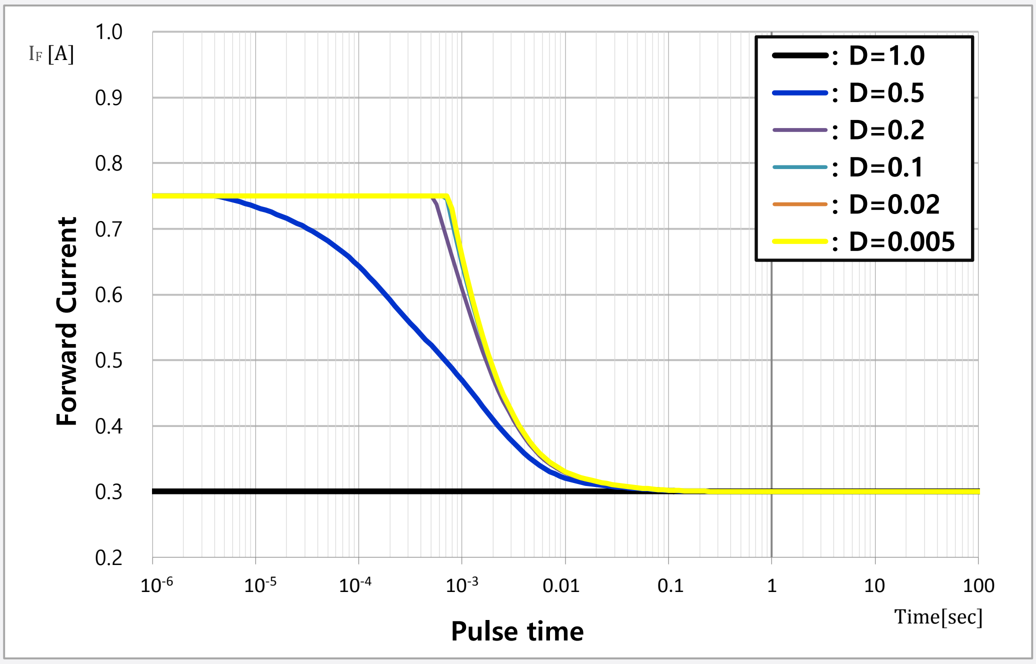
e) Derating Curve [9]



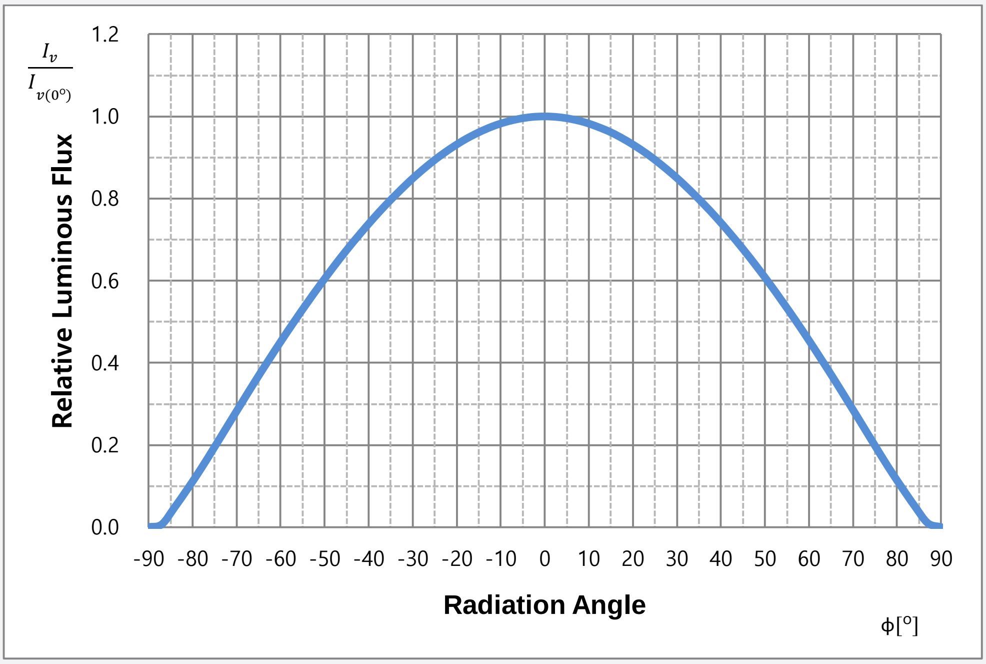
Note:

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

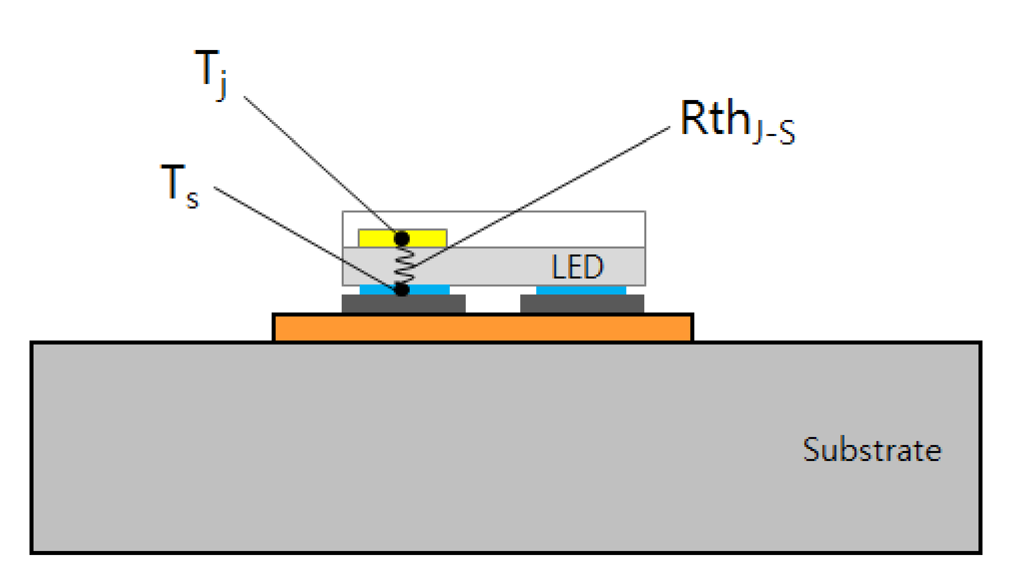
f) Permissible Pulse Handling Capability ($I_F = f(t_p)$; D: Duty cycle, T_S = 125 ºC)



g) **Beam Angle Characteristics (I_F = 200 ㎃, T_S = 25 ºC)**



4. Soldering Temperature Location

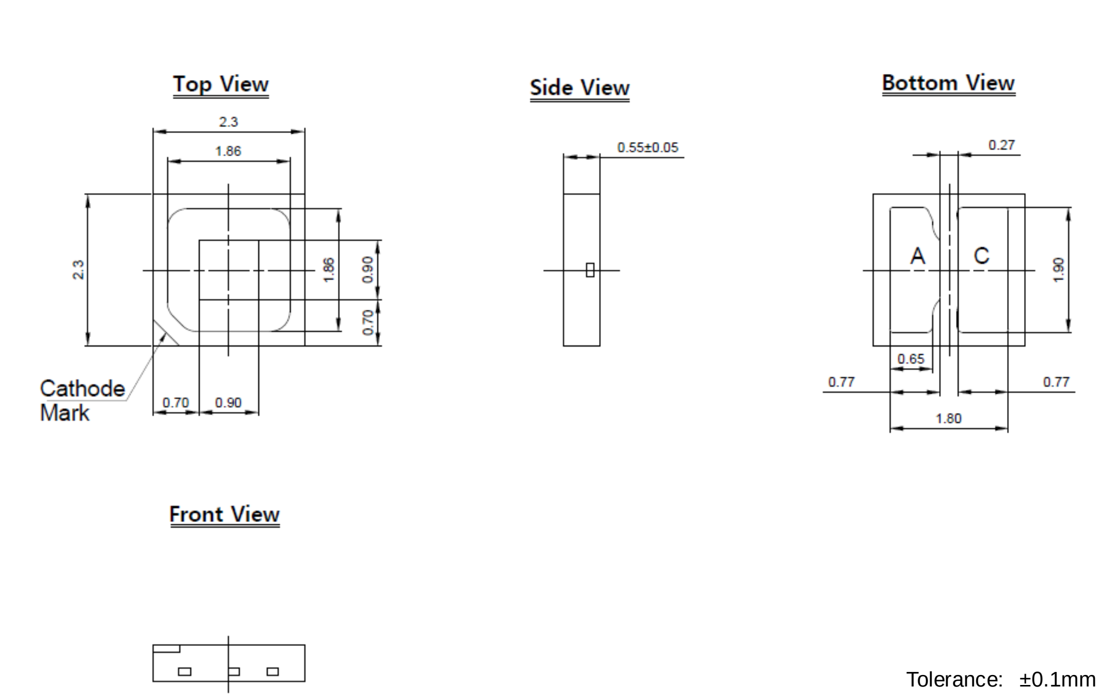


T_j : Temperature of Junction

T_s : Temperature of Solder Pad

$Rth_{j\text{-}s}$: Thermal Resistance from Junction to Solder Pad

5. Mechanical Dimension



Note:

Approximate weight : 10.5mg.

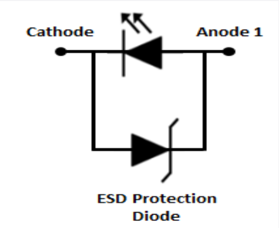
Unit: mm

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

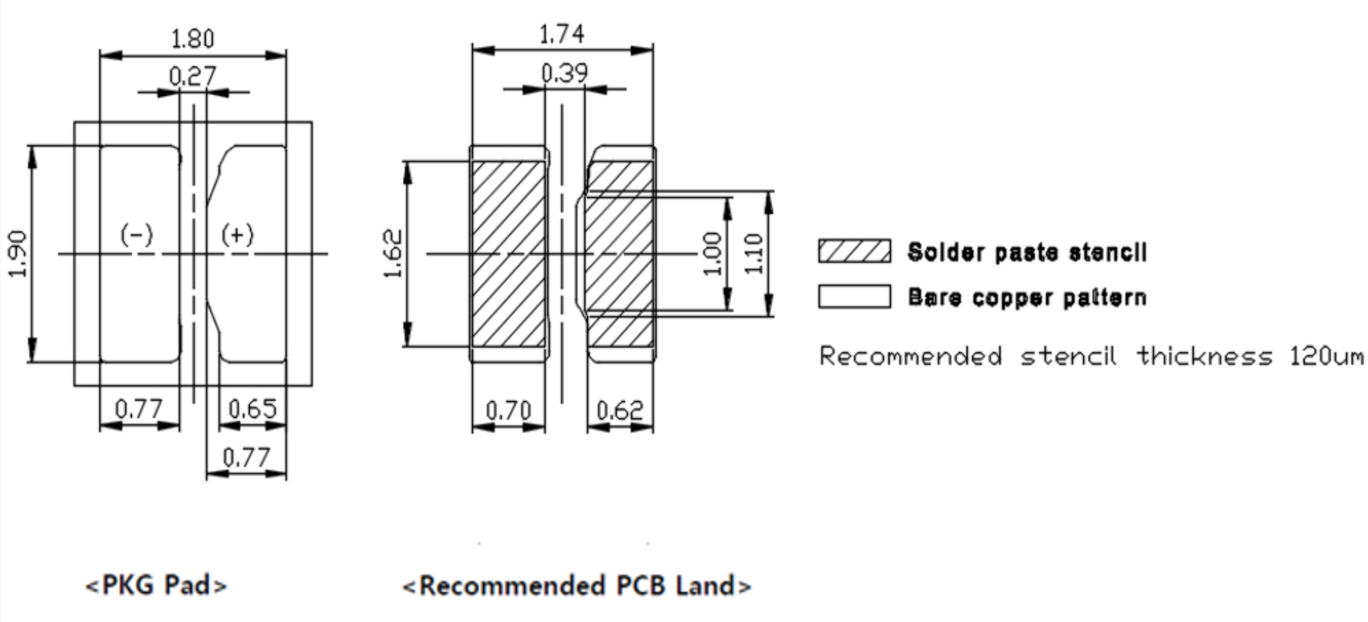


c) Material Information

Description	Material
Substrate	SMC Cu Lead Frame
LED Die	GaN
Phosphor	Silicone
Zener Diode	Silicon
Wire	Au
Resin Mold	Silicone

6. Soldering Conditions

a) Pad Configuration & Solder Pad Layout

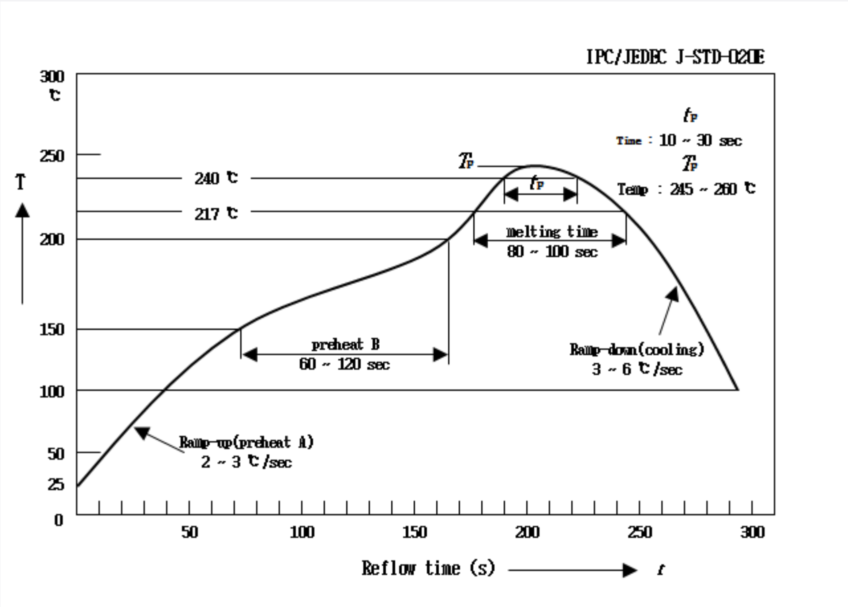


Notes:

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

b) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.



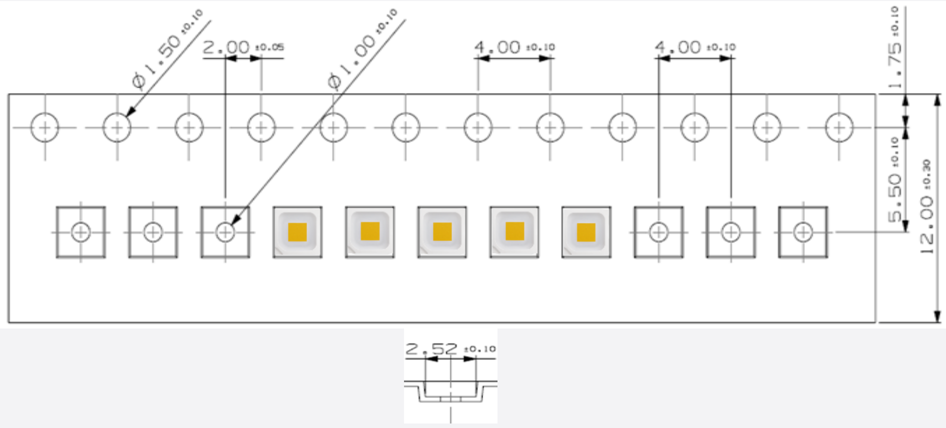
c) Manual Soldering Conditions

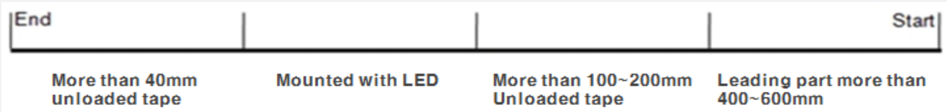
Not more than 5 seconds @ max. 300 ºC, under soldering iron.(one time only)

7. Tape & Reel

a) Taping Dimension

User feed direction →

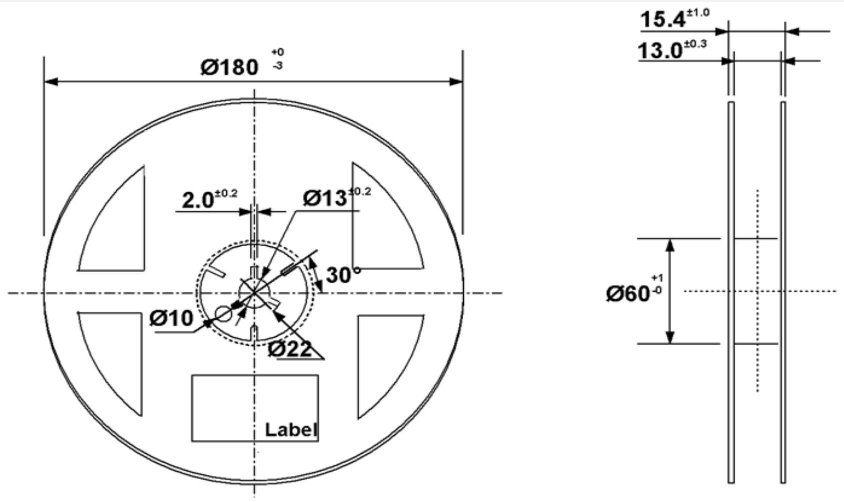




Notes:

Unit: ㎜, LED taping quantity: 3,000EA / Reel

b) Reel Dimension

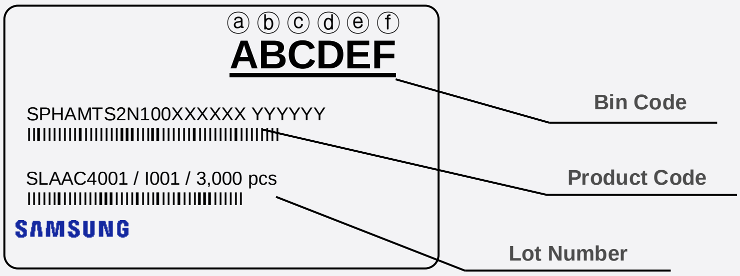


Notes:

㎜, Tolerance : ±0.20 ㎜

8. Label Structure

a) Label Structure



Note: Denoted bin code and product code above is only an example (see description on page 5,6)

Bin Code:

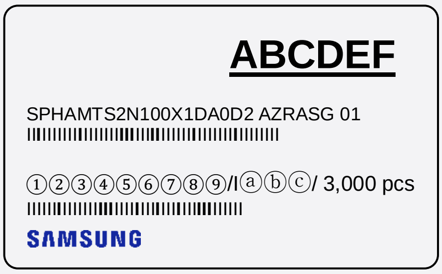
ⓐⓑ: Forward Voltage bin (refer to page 5)

ⓒⓓ: Chromaticity bin (refer to page 6)

ⓔⓕ: Luminous Flux bin (refer to page 5)

b) Lot Number

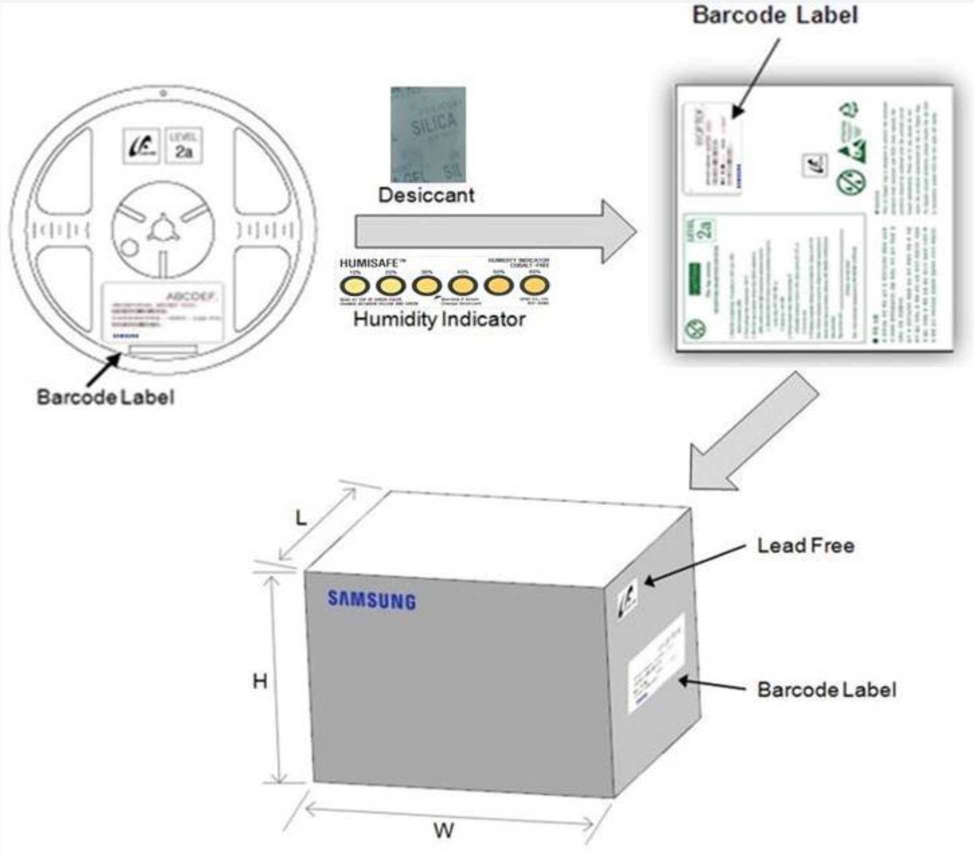
The lot number is composed of the following characters:



①②③②③④⑤⑥⑦⑧⑨ / Iⓐⓑⓒ / 3,000 pcs		
①②	:	Production site
③	:	Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)
④	:	Year (G: 2022, H: 2023, I: 2024…)
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. Handling and Use Precautions

1) For over-current protection, we recommend the use of resistors to prevent sudden current surges caused by slight shifts in voltage.

2) LEDs should not be contacted to any type of fluid (i.e. water, oil, organic solvent, etc.). If cleaning is required, only use isopropyl alcohol.

3) The maximum ambient temperature must be considered in order for the maximum temperature ratings not to be exceeded.

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. ~40℃, ~90% RH)

5) After storage bag is open, LED 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℃ / 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) LEDs require baking before mounting, if humidity card reading is >60% at 23±5℃.

8) If baking is required, LEDs must be baked for 1 day at 60±5℃.

9) LEDs are sensitive to electrostatic discharge and surges. Applying any voltage exceeding the absolute maximum rating of the LED can cause permanent damage to the device. Damaged LEDs may have some unusual characteristics such as increased leakage current, lower turn-on voltage or may light abnormally at low current. When handling LEDs, using grounding wrist-bands or anti-static gloves is recommended.

10) VOCs (volatile organic compounds) present in adhesives, flux, hardeners or organic additives, etc. that are used in luminaires may lead to discoloration of the LED when exposed to heat or light. Note that VOCs can permeate silicone bags. This phenomenon can significantly affect light output from the luminaire. To avoid this issue, please carefully evaluate materials used in your process and/or luminaire to be free of VOCs.

11. Company Information

Samsung Electronics LED BUSINESS

1, Samsung-ro Giheung-gu
Yongin-si, Gyeonggi-do 17113 Korea

http://www.samsung.com/led

Sales Contact

leedw007@samsung.com

jh0932.yang@samsung.com

US

Samsung Semiconductor, Inc.
11800 Amber park Drive #225 Alpharetta, GA 30004 USA
Tel : +1 678 892 7385

Europe

Samsung Semiconductor Europe GmbH,
Einsteinstrasse 174, 81677 Munich, Germany
Tel : +49 6196 66 3902

Japan

Samsung Japan Corporation
10F, Shinagawa Grand Central Tower 2-16-4, Kounan, Minato-ku, Tokyo 108-8240, Japan
Tel : +81 3 6369 6267

China(Shenzhen)

Samsung Electronics Co., Ltd.
25F/26F, SCC building A, No.88, Haide Yi Road, Nanshan District, 518026, Shenzhen China
Tel : +86 21 2325 3551

China(Shanghai)

Samsung Electronics Co., Ltd.
Building B, No 1065 Zhongshan RD(W), Changning District, Shanghai, China
Tel : +86 21 2325 3504

India

Samsung Electronics
Suite #006 Ground Floor, Copia Corporate Suites, Jasola, New Delhi 110025, India, Delhi, IND
Tel : +91 9600003320

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.

Samsung Electronics Co., Ltd.
1, Samsung-ro
Giheung-gu
Yongin-si, Gyeonggi-do, 17113
KOREA

www.samsung.com/led