

Data Sheet

AH665B_W

Part Number : SPHWH2A6NB00WYRAUD



Introduction

Part number : SPHWH2A6NB00WYRAUD

Automotive head lamp lighting source



Features

- Package : Silicone covered ceramic substrate
- Dimension : 6.6 mm x 2.0 mm
- Luminous flux: Typ. 1,800 lm @1,400 mA
- Color coordinates group : Appropriate to ECE
- Chip configuration : 5 chip array (1x5)
- Viewing angle : 120°

Applications

- Automotive head lamp : Low/High beam
- Fog lamp
- DRL lamp
- Motorcycle head lamp

Environmental compliance

Samsung is compliant to the restrictions of hazardous substances in electronic equipment, namely, the RoHS, ELV, ISO14001 and REACH directives.

Samsung will not intentionally supplement the restricted materials to the head lamp LED product : Cd, Pb, Hg, PBBs, PBDEs and Cr⁶⁺



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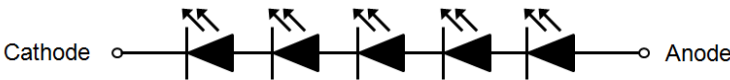
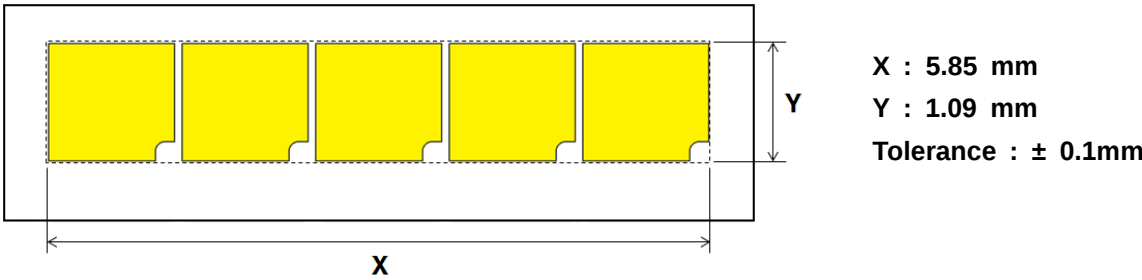
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Product overview

• Luminous flux

Part number	Color of emission	Luminous flux	Form factor
SPHWH2A6NB00WYRAUD	White	Typ. 1,800 lm	1 x 5

• Optical source configuration and electric schematic diagram



Part number description

The part number designation is explained as follows :

SP H WH 2 A6 N B 0 0 WY RA UD
AB C DE F GH I J K L MN OP QR

Where:

- AB** - designates company name and package (SP for Samsung LED Package)
- C** - designates package details (H for high power package)
- DE** - designates color (WH for white)
- F** - designates version of product (2 for second version up)
- GH** - designates type of package (A6 for Automotive 6.6x2.0 mm²)
- I** - designates type of lens (N for no lens type)
- J** - designates maximum power (B for 20~30 W)
- K** - designates special internal code (0 for default)
- L** - designates CRI (0 for default)
- MN** - designates forward voltage (WY for 15~20 V)
- OP** - designates CIE Coordination (RA for R1 and S1 bin)
- QR** - designates luminous flux (UD for 1750~2000 lm)

Characteristics

• Typical characteristics

[T_j = 25 °C]^[1]

Parameter	Symbol	Value	Unit
Luminous flux (I _F = 1,400 mA)	lm	Typ. 1,800	lm
Forward voltage (I _F = 1,400 mA)	V _F	Typ. 17.5	V
Viewing angle	φ	120	Degree
Reverse current	I _R	Not designed for reverse operation	mA
Thermal resistance (Junction to solder point)	(Typ.) R _{th_J-S} (Max.) R _{th_J-S}	1.8 2.1	K/W K/W
Radiant surface	A	6.38	mm ²

• Luminous flux bin^[2]

[T_j = 25 °C]^[1]

Symbol	Condition	Bin code	Min.	Typ.	Max.	Unit
Φ _V	I _F = 1,400 mA	UB	1,750		1,850	lm
		VB	1,850		2,000	

• Forward voltage bin^[2]

[T_j = 25 °C]^[1]

Symbol	Condition	Bin code	Min.	Typ.	Max.	Unit
V _F	I _F = 1,400 mA	WY	15.0	17.5	20.0	V

* Notes

[1] Measurement condition : LED(T_j) = Ambient temperature(T_a), by applying pulse current for under 35 msec.

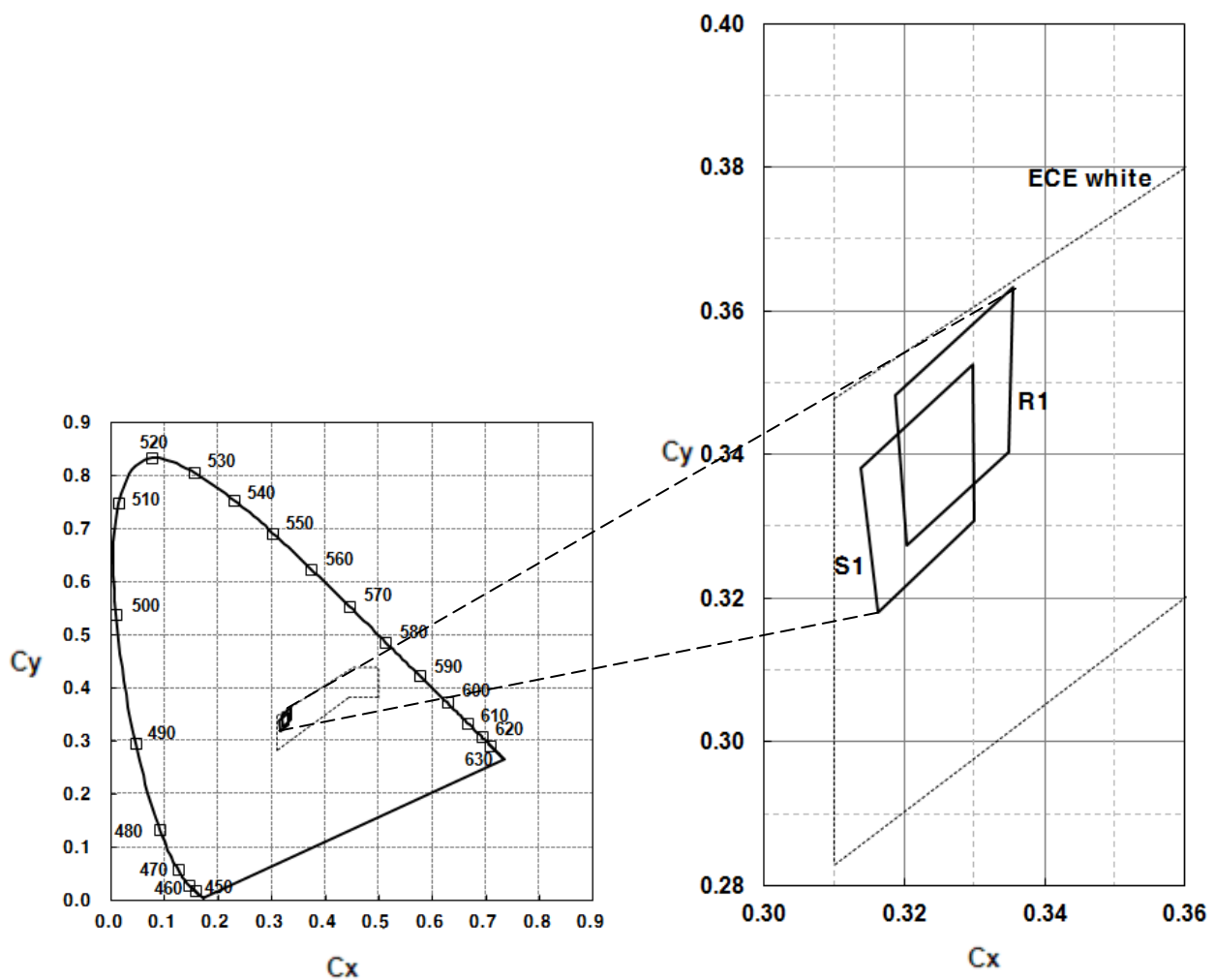
[2] Luminous flux measuring equipment : CAS140CT

Φ_V and V_F tolerances are ±10 % and ±5 %, respectively.

- Color coordinates bin^[3]

Symbol	Condition	Bin code	Cx				Cy			
Cx, Cy	$I_F =$ 1,400 mA	R1	0.3186	0.3203	0.3349	0.3355	0.3484	0.3274	0.3404	0.3633
		S1	0.3138	0.3163	0.3300	0.3298	0.3381	0.3181	0.3308	0.3526

- Color bin definition



* Notes

[3] Luminous flux measuring equipment : CAS140CT

Color coordinates : Cx, Cy according to CIE 1931.

Color bin : R1 and S1 according to IEC/PAS 62707-1

Cx and Cy tolerances are ± 0.01 , respectively.

Absolute maximum ratings

Parameter	Symbol	Value	Unit
Operating temperature range	$T_{Op.}$	-40 ~ +125	°C
Storage temperature range	$T_{Stg.}$	-40 ~ +125	°C
Junction temperature	$T_{j \text{ Max.}}$	+150	°C
Maximum forward current ^[4] ($T_a : 25 \text{ }^{\circ}\text{C}$) ^[5]	I_F	1,600	mA
Minimum forward current ^[4] ($T_a : 25 \text{ }^{\circ}\text{C}$) ^[5]	I_F	100	mA
Reverse voltage ($T_a : 25 \text{ }^{\circ}\text{C}$) ^[5]	V_R	Not designed for reverse operation	V
Maximum peaked current ^[6] ($T_a : 25 \text{ }^{\circ}\text{C}$) ^[5]	I_P	1,800 for $\leq 10 \text{ msec}$	mA
ESD sensitivity ^[7]	-	-8.0 ~ +8.0 for HBM	kV

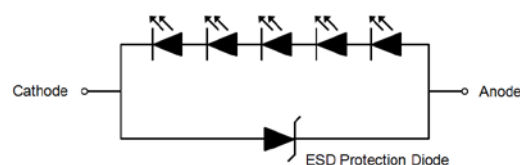
* Notes

[4] Unpredictable performance may be resulted by driving the product at below Min. I_F or above Max. I_F .

[5] The measurement condition means that temperature dependence is excluded by applying pulse current for under 35 msec.

[6] Duty 1/10 pulse with 10 msec.

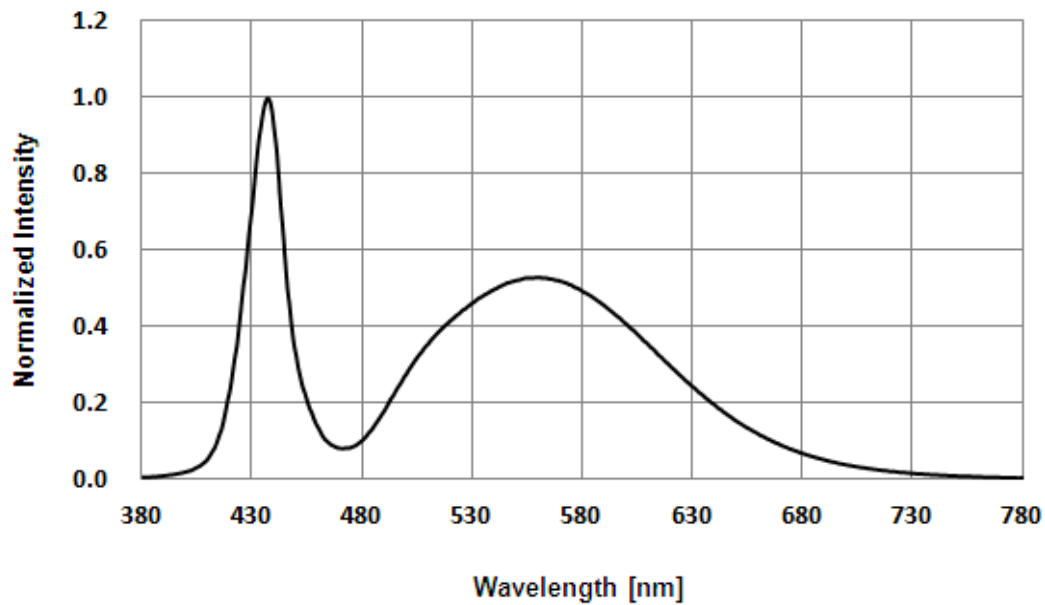
[7] The ESD test has to apply with ESD protection diode having protection voltage of minimum 36V on a metal PCB. It is strongly recommended that the LED product should be used with Zener diode mentioned for the ESD qualification.



Typical characteristic graphs

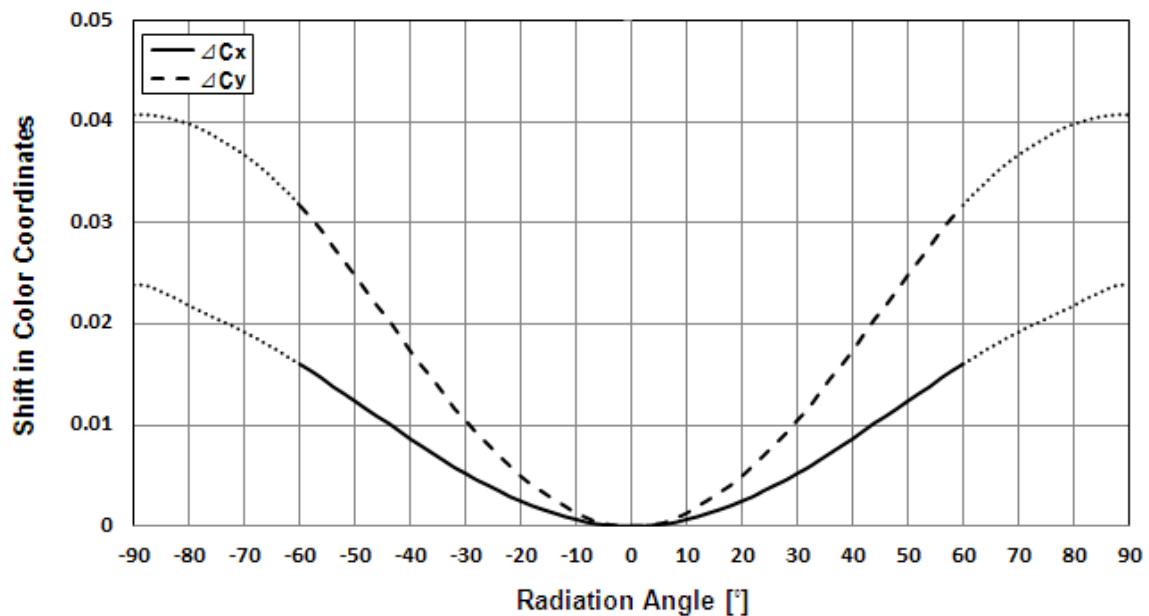
- Typical spectrum

$I_F = 1,400 \text{ mA}$, $T_a = 25 \text{ }^\circ\text{C}^{[8]}$



- Typical color vs. radiation angle

$I_F = 1,400 \text{ mA}$, $T_a = 25 \text{ }^\circ\text{C}^{[8]}$

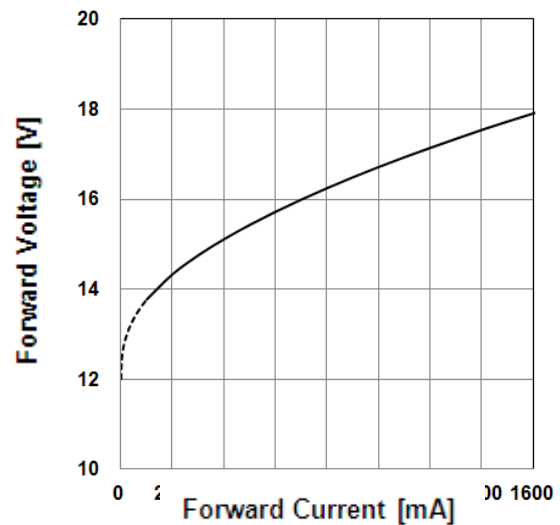
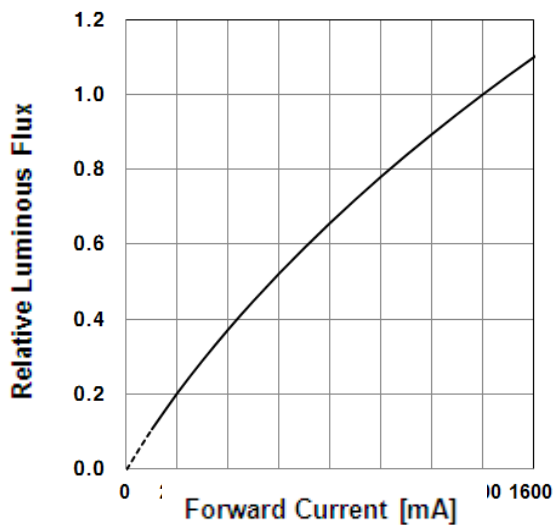


* Notes

[8] The measurement condition means that temperature dependence is excluded by applying pulse current for under 35 msec.

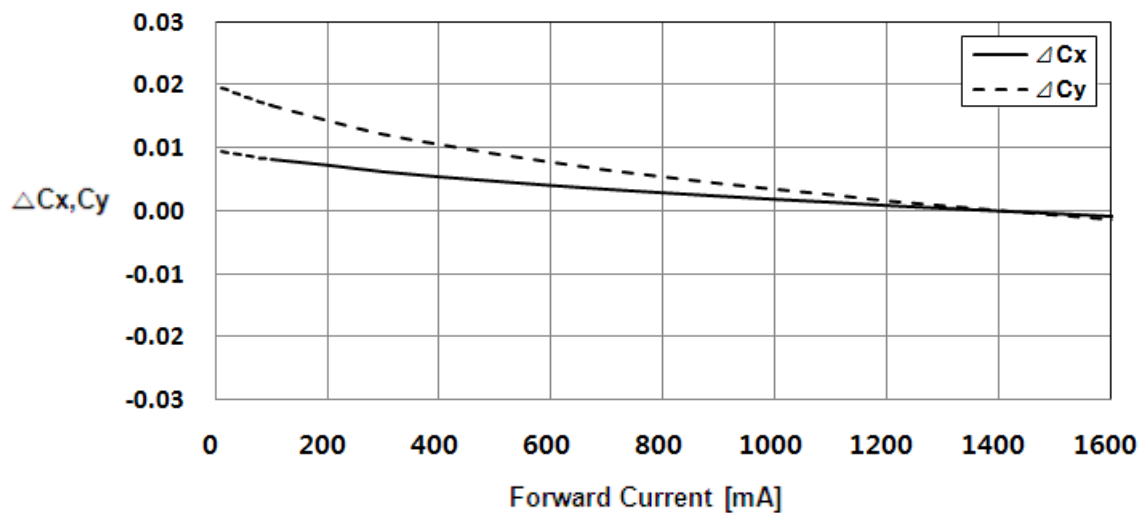
- Relative luminous flux & forward voltage vs. forward current^[9]

$T_a = 25\text{ }^{\circ}\text{C}$



- Color coordinates shift vs. forward current^[9]

$T_a = 25\text{ }^{\circ}\text{C}$

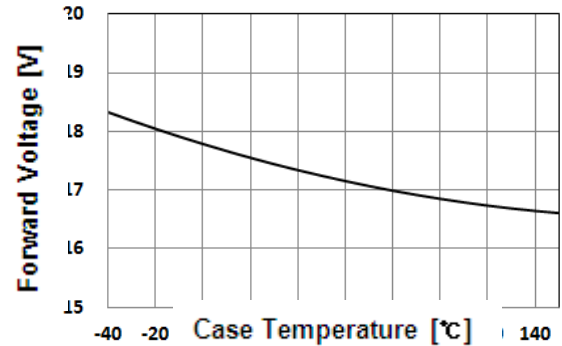
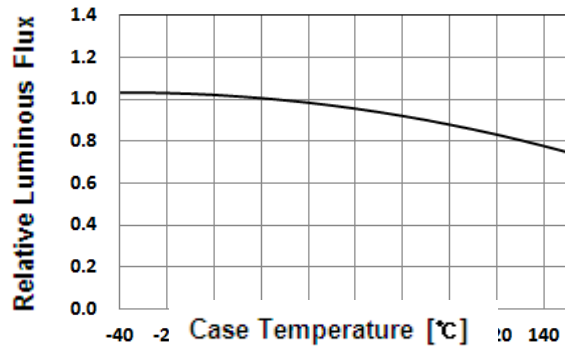


* Notes

[9] The measurement condition means that temperature dependence is excluded by applying pulse current for under 35 msec.

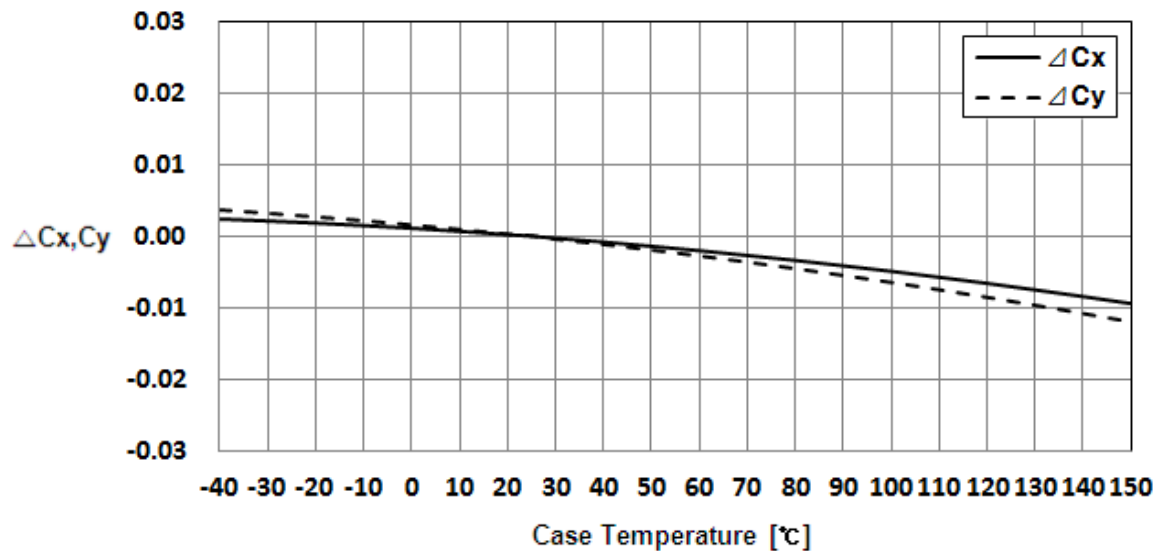
- Luminous flux & forward voltage vs. temperature^[10]

$$I_F = 1,400 \text{ mA}$$



- Color coordinates shift vs. temperature^[10]

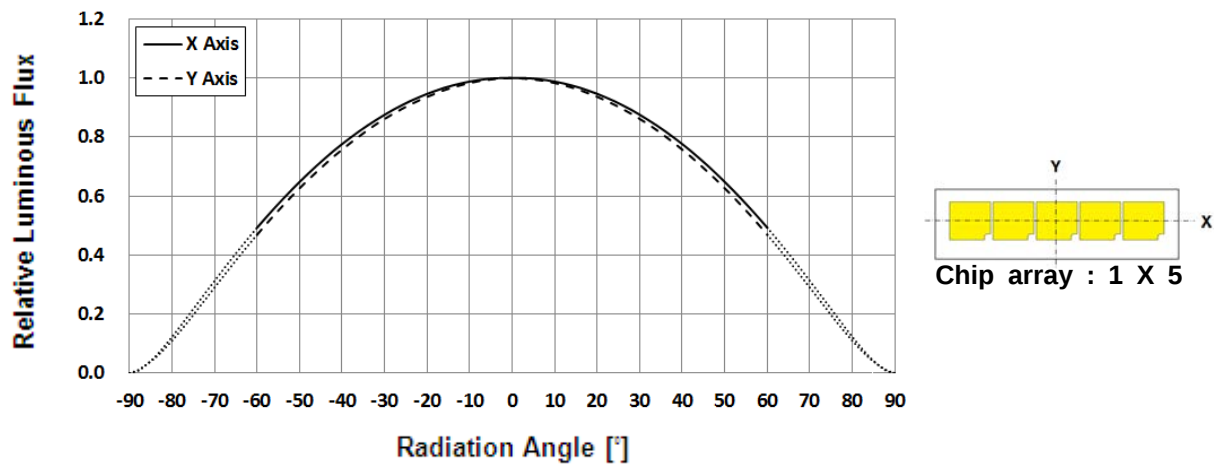
$$I_F = 1,400 \text{ mA}$$



* Notes

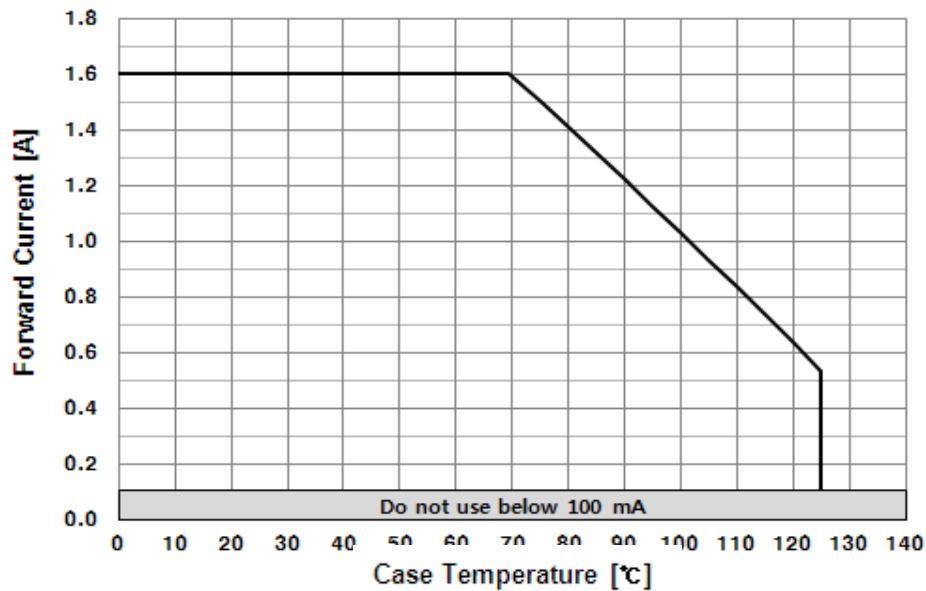
[10] The measurement condition means that temperature dependence is excluded by applying pulse current for under 35 msec.

- Typical radiant pattern



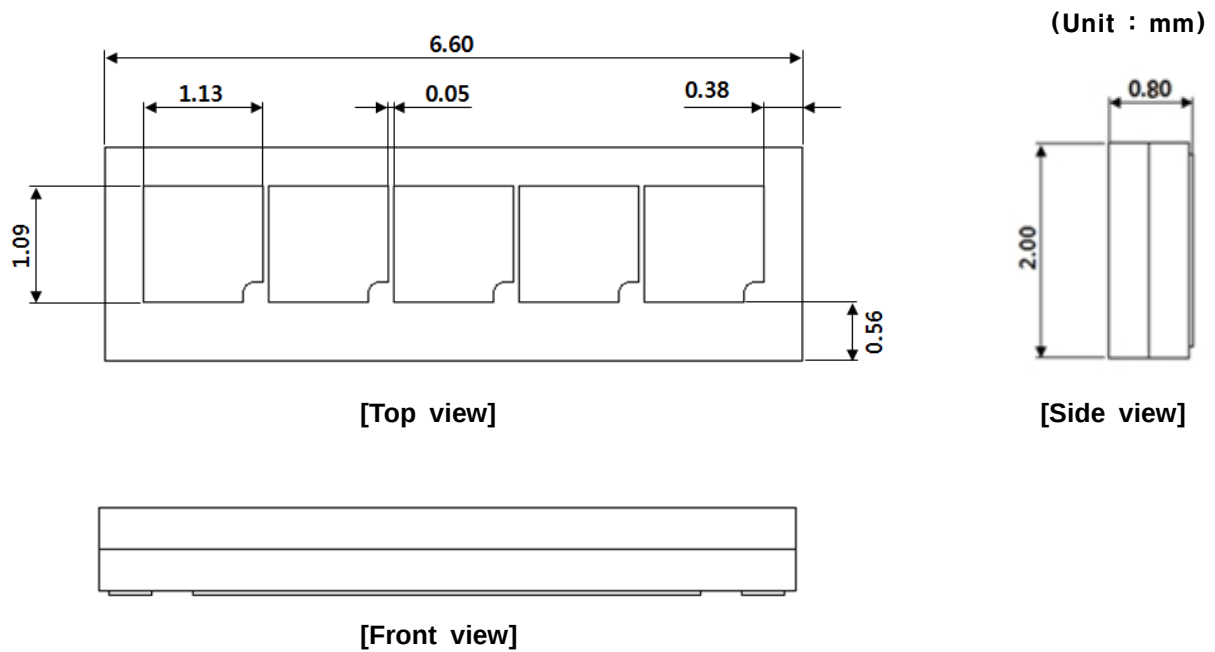
- Permissible forward current^[11]

$$I_F = f(T_C), R_{th \text{ Real Max.}}$$

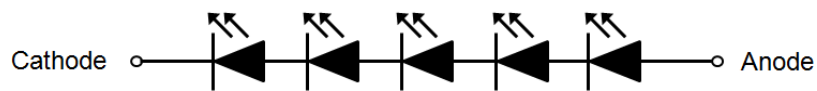


* Notes

[11] The measurement condition means that temperature dependence is excluded by applying pulse current for under 35 msec.

Mechanical dimension^[12]

- Electric schematic diagram



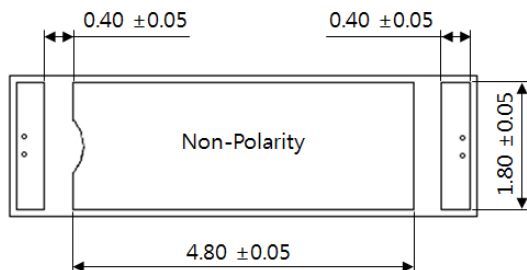
* Notes

[12] Tolerance unless otherwise specified is ± 0.1 mm.

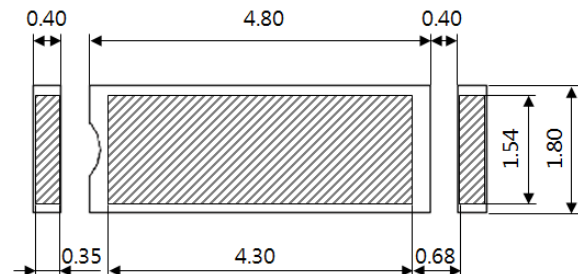
Soldering conditions

- Pad configuration & solder pad layout^[13]

(Unit : mm)



[Pad configuration]



[Recommended solder pad & stencil]

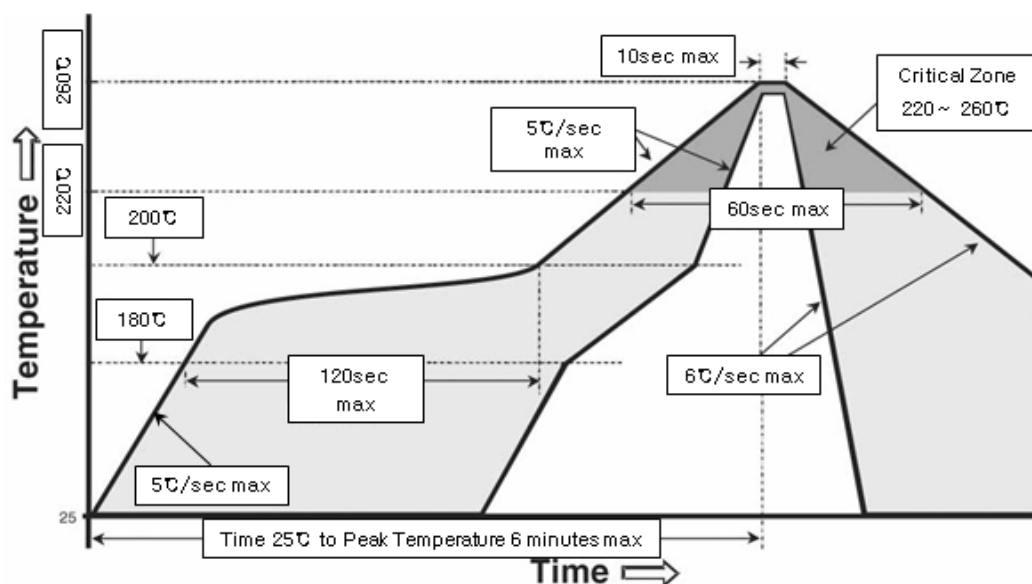
□ Solder pad ▨ Stencil

* Notes

[13] Tolerance unless otherwise specified is ± 0.1 mm.

- Reflow soldering condition (Pb free)

Reflow frequency : 2 times max.

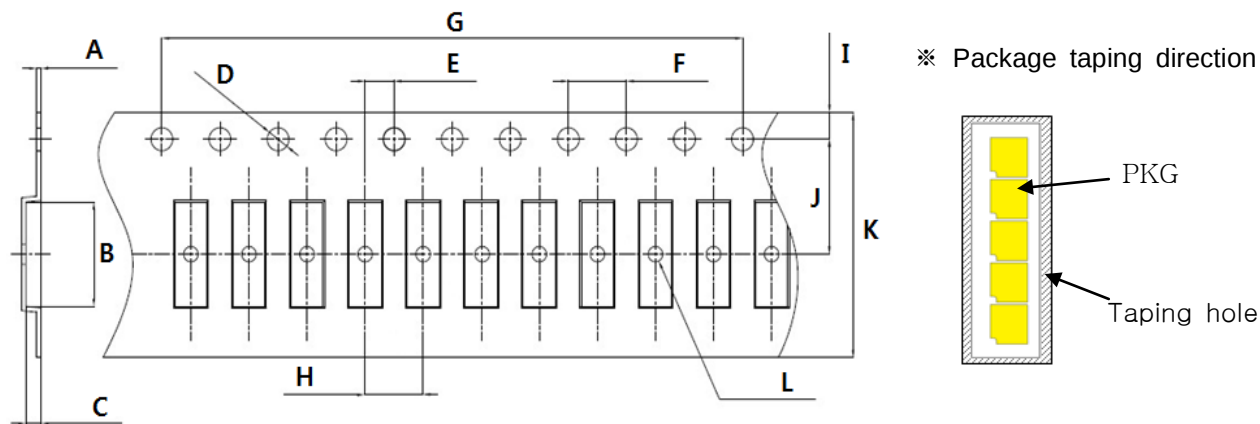


- Manual soldering condition

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

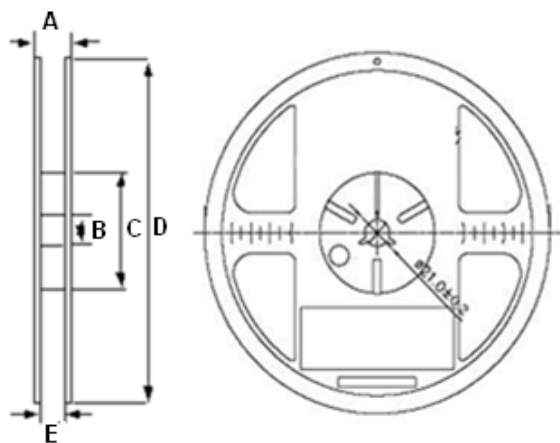
Packing information

• Tape and reel



[Unit : mm]

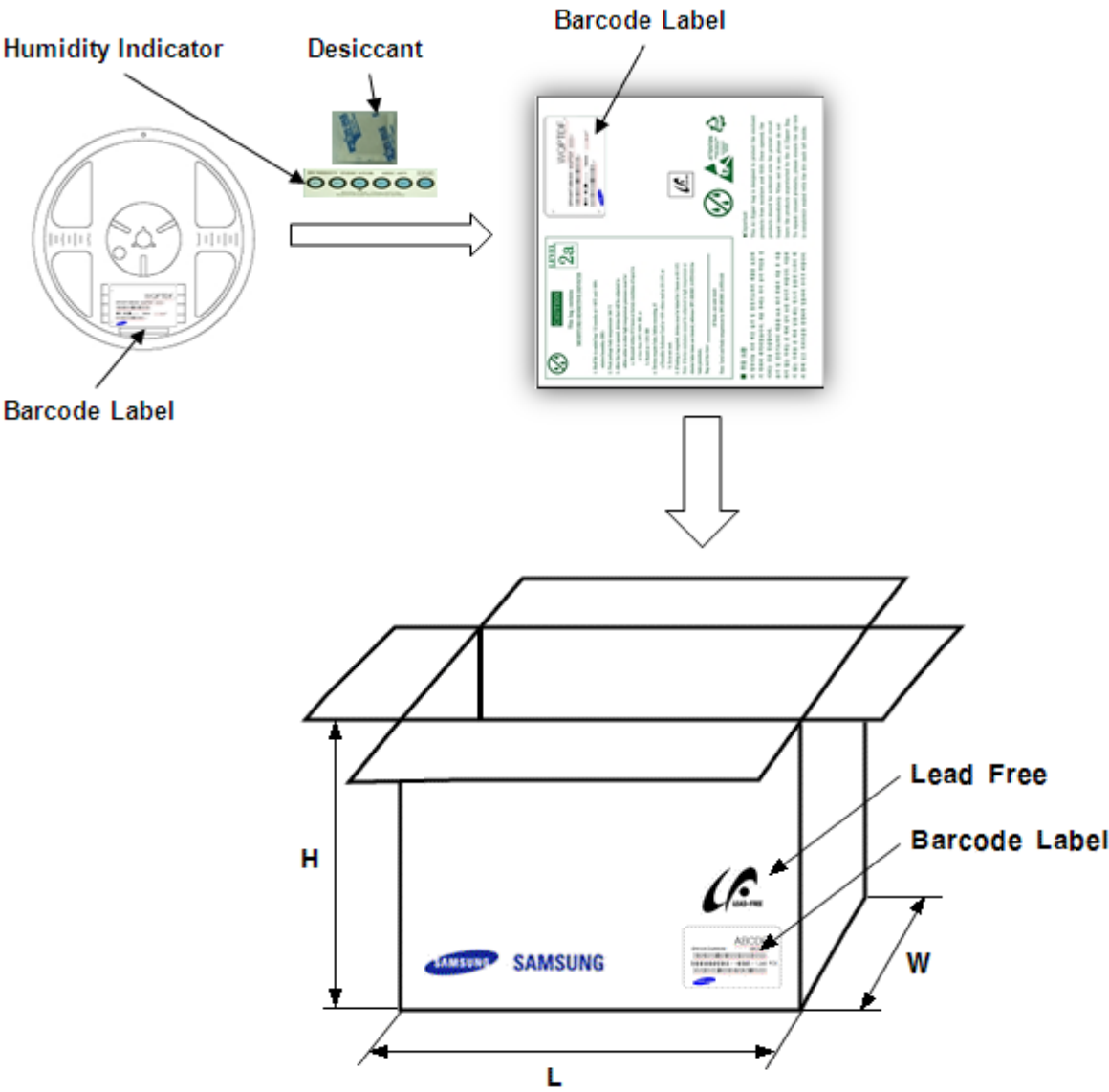
Symbol	A	B	C	D	E	F	G	H	I	J	K	L
Spec.	0.30 ±0.05	6.82 ±0.10	1.04 ±0.10	Φ1.50 +0.10	2.00 ±0.10	4.00 ±0.10	40.00 ±0.20	4.00 ±0.10	1.75 ±0.10	7.50 ±0.10	16.00 ±0.30	Φ1.00 ±0.20



(Unit : mm)

Symbol	A	B	C	D	E
Spec.	Ø330.0 ±1.0	80.0 ±1.0	13.0 ±0.5	13.0 ±0.3	17.5 ±1.0

• Packing process

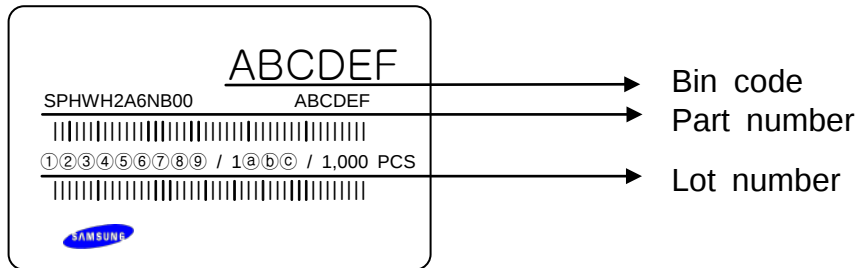


(Unit : mm)

Width	Length	Height	Remark
225	250	190	-

Product labeling information

• Label information



1. Bin code

- AB : Forward voltage(V_F) bin
- CD : Color coordinates(C_x , C_y) bin
- EF : Luminous flux(Φ_v) bin

2. Lot number

①②③④⑤⑥⑦⑧⑨ / 1a⑥c / 1,000 pcs

- ① : Production site (S : Samsung Korea, G : Tianjin China)
- ② : L (LED)
- ③ : Product state (A : Normality, B : Bulk, C : First production,
R : Reproduction, S : Sample)
- ④ : Year (X : 2013, Y : 2014, Z : 2015...)
- ⑤ : Month (1 ~ 9, A, B, C)
- ⑥ : Day (1 ~ 9, A, B ~ V)
- ⑦⑧⑨ : Samsung LED product number (1 ~ 999)
- a⑥c : Reel number (1 ~ 999)

Reliability test conditions

For detailed Information
please contact your Samsung sales partner

Precaution

- 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 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 strongly recommended to use non metallic tweezers and grip the ceramic part.
- 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, 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 672 hours at an assembly line with a condition of no more than 30 °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) 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.
- 8) Prepare a ESD protective area by placing conductive mattress ($10^6\Omega$) and ionizer to remove any static electricity.
- 9) VOCs (volatile organic compounds) may be occurred by adhesives, flux, hardener or organic additives which is 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 to select carefully.



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The following merchandise was submitted and identified by the client as :

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Jeff Jang / Chemical Lab Mgr

[illegible]

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Revision history

[illegible]

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