THE DATASHEET OF

SPHCW1HDNC25YHRTB3

High Power LED Series
Chip on Board

LC026B - Gen3

High efficacy COB LED package, well-suited for use in spotlight applications

Features & Benefits

- Chip on Board (COB) solution makes it easy to design in
- Simple assembly reduces manufacturing cost
- Low thermal resistance
- InGaN/GaN MQW LED with long time reliability
- Completed 6,000 hours of LM-80 Testing

Applications

- Spotlight / Downlight
- LED Retrofit Bulbs
- Outdoor Illumination

Table of Contents

1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +105	ºC	-
Storage Temperature	T_{stg}	-40 ~ +120	ºC	-
LED Junction Temperature	T_j	150	ºC	-
Case Temperature	Tc	105	ºC	*Note
Forward Current	I_F	1300	mA	-
Power Dissipation	P_D	48.1	W	-
ESD (HBM)	-	±2	kV	-
ESD (MM)	-	±0.5	kV	-

b) Electro-optical Characteristics (I_F = 720 mA, T_c = 25 ºC)

Item	Unit	Rank	Min.	Typ.	Max.
Forward Voltage (V_F)	V	YH	32.5	35.5	38.5
Color Rendering Index (R_a)	-	5	80	-	-
		7	90	-	-
Thermal Resistance (junction to chip point)	ºC/W		-	0.9	-
Beam Angle	º		-	115	-
Nominal Power	W			25.6	
Eye Protection	º	Risk 1	-		-

Notes:

1) The COB is tested in pulsed condition at rated test current (10 ms pulse width) and rated temperature ($T_j = T_c = T_a$ = 25 °C)
2) Samsung maintains measurement tolerance of: forward voltage = ±5 %, CRI = ±1
3) Refer to the derating curve, '3. Typical Characteristics Graph' designed within the range.

c) Luminous Flux Characteristics (I_F = 720 mA)

CRI (R_a) Min.	Nominal CCT (K)	Flux Rank	Flux Bin	Sorting[1] @ T_c = 25 °C (lm)		Calculated Flux[2] @ T_c = 85 °C (lm)	
				Min.	Max.	Min.	Max.
80	2700	B3	33	3760	3970	3422	3613
			34	3970	4276	3613	3891
	3000	B3	32	3770	3990	3431	3631
			33	3990	4306	3631	3918
	3500	B3	32	3880	4100	3531	3731
			33	4100	4408	3731	4011
	4000	B3	32	4000	4230	3640	3849
			33	4230	4550	3849	4141
	5000	B3	36	4050	4280	3686	3895
			37	4280	4600	3895	4186
	5700	B3	36	4050	4280	3686	3895
			37	4280	4600	3895	4186
90	2700	B3	24	2815	3050	2562	2776
			25	3050	3380	2776	3076
			26	3380	3685	3076	3353
	3000	B3	24	2870	3110	2612	2830
			25	3110	3440	2830	3130
			26	3440	3746	3130	3409
	3500	B3	24	2955	3200	2689	2912
			25	3200	3530	2912	3212
			26	3530	3848	3212	3502
	4000	B3	24	3035	3285	2762	2989
			25	3285	3615	2989	3290
			26	3615	3940	2989	3585

Notes:

1) The COB is tested in pulsed condition at rated test current (10 ms pulse width) and rated temperature ($T_j = T_c = T_a$ = 25 °C)
2) Calculated flux values are for reference only
3) Samsung maintains measurement tolerance of: luminous flux = ±7 %, CRI = ±1

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	C	W	1	H	D	N	C	2	5	Y	H	R	T	B	3

Digit	PKG Information	Code	Specification
1 2 3	Samsung Package High Power	SPH	
4 5	Color	WW	Warm White (T/U/V/W Ranks)
		CW	Cool White (Q/R Ranks)
6	Product Version	1	
7 8	Form Factor	HD	COB
9	Lens Type	N	No lens
10	Internal Code	C	LC026
11	Chip Type	2	
12	CRI & Sorting Temperature	5	Min. 80 25 °C
		7	Min. 90
13 14	Forward Voltage (V)	YH	32.5~38.5
15	CCT (K)	W	2700 K Bin Code: WA,WB (MacAdam Ellipse)
		V	3000 K VA, VB (MacAdam Ellipse) VW, VX, VY, VZ (ANSI bin)
		U	3500 K UA, UB (MacAdam Ellipse)
		T	4000 K TA, TB (MacAdam Ellipse) TW, TX, TY, TZ (ANSI bin)
		R	5000 K RA (MacAdam Ellipse) RW, RX, RY, RZ (ANSI bin)
		Q	5700 K QW, QX, QY, QZ (ANSI bin)
16	MacAdam / ANSI	2	MacAdam 2-step
		3	MacAdam 3-step
		T	ANSI bin
17 18	Luminous Flux	B3	Bin Code: 32, 33, 34, 36, 37 (80 CRI)
			24, 25, 26 (90 CRI)

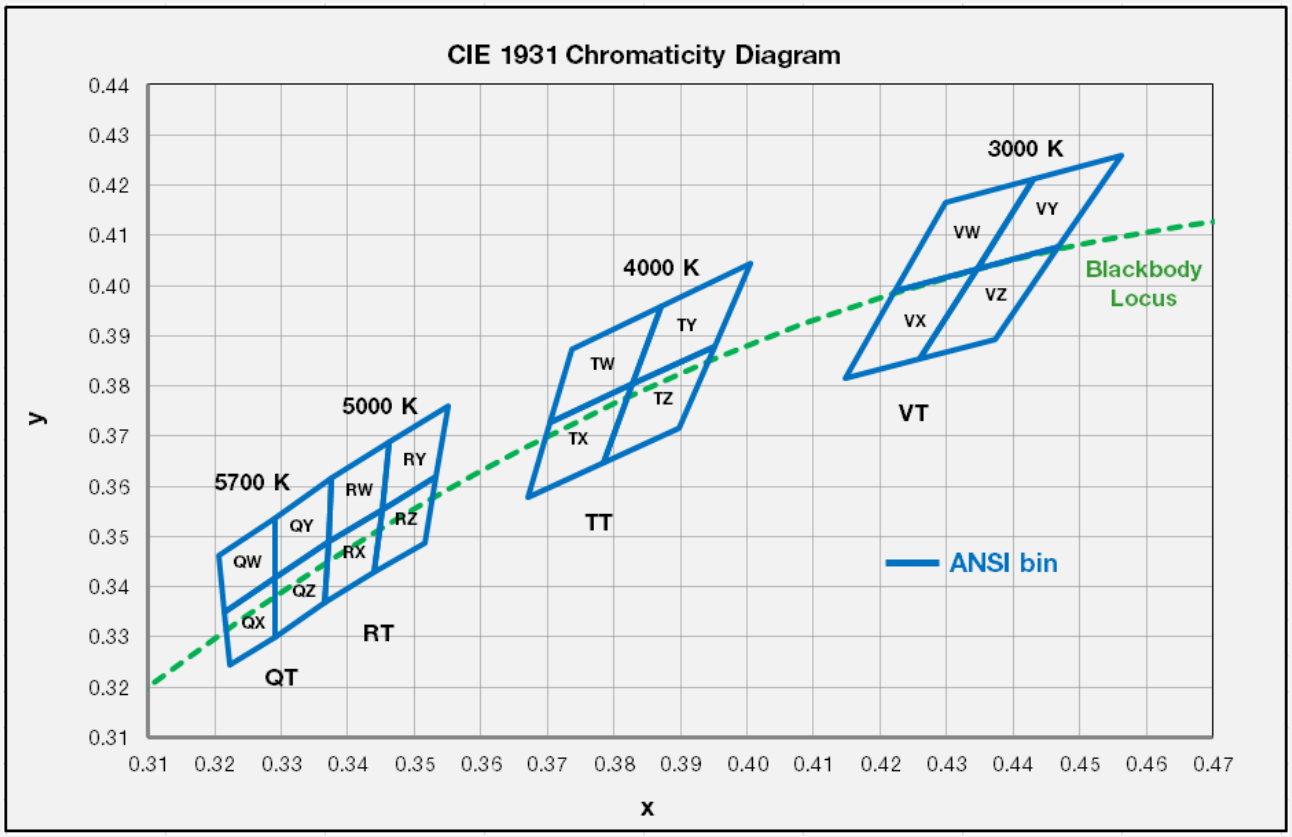
a) Binning Structure (I_F = 720 mA, T_C = 25 ºC)

CRI (R_a) Min.	Nominal CCT (K)	Product Code	V_F Rank	Color Rank	Chrom. Bin	Flux Rank	Flux Bin	Flux Range (Φ_v, lm)
80	2700	SPHWW1HDNC25YHW2B3	YH	W2	WB	B3	33	3760 ~ 3970
							34	3970 ~ 4276
		SPHWW1HDNC25YHW3B3	YH	W3	WA, WB	B3	33	3760 ~ 3970
							34	3970 ~ 4276
	3000	SPHWW1HDNC25YHV2B3	YH	V2	VB	B3	32	3770 ~ 3990
							33	3990 ~ 4306
		SPHWW1HDNC25YHV3B3	YH	V3	VA, VB	B3	32	3770 ~ 3990
							33	3990 ~ 4306
	3500	SPHWW1HDNC25YHU2B3	YH	U2	UB	B3	32	3880 ~ 4100
							33	4100 ~ 4408
		SPHWW1HDNC25YHU3B3	YH	U3	UA, UB	B3	32	3880 ~ 4100
							33	4100 ~ 4408
	4000	SPHWW1HDNC25YHT2B3	YH	T2	TB	B3	32	4000 ~ 4230
							33	4230 ~ 4550
		SPHWW1HDNC25YHT3B3	YH	T3	TA, TB	B3	32	4000 ~ 4230
							33	4230 ~ 4550
	5000	SPHCW1HDNC25YHR3B3	YH	R3	RA	B3	36	4050 ~ 4280
							37	4280 ~ 4600
		SPHCW1HDNC25YHRTB3	YH	RT	RW, RX, RY, RZ	B3	36	4050 ~ 4280
							37	4280 ~ 4600
	5700	SPHCW1HDNC25YHQTB3	YH	QT	QW, QX QY, QZ	B3	36	4050 ~ 4280
							37	4280 ~ 4600

a) Binning Structure (I_F = 720 mA, T_C = 25 ºC)

CRI (R_a) Min.	Nominal CCT (K)	Product Code	V_F Rank	Color Rank	Chrom. Bin	Flux Rank	Flux Bin	Flux Range (Φ_v, lm)
90	2700	SPHWW1HDNC27YHW2B3	YH	W2	WB	B3	24	2815 ~ 3050
							25	3050 ~ 3380
							26	3380 ~ 3685
		SPHWW1HDNC27YHW3B3	YH	W3	WA, WB	B3	24	2815 ~ 3050
							25	3050 ~ 3380
							26	3380 ~ 3685
	3000	SPHWW1HDNC27YHV2B3	YH	V2	VB	B3	24	2870 ~ 3110
							25	3110 ~ 3440
							26	3440 ~ 3746
		SPHWW1HDNC27YHV3B3	YH	V3	VA, VB	B3	24	2870 ~ 3110
							25	3110 ~ 3440
							26	3440 ~ 3746
	3500	SPHWW1HDNC27YHU2B3	YH	U2	UB	B3	24	2955 ~ 3200
							25	3200 ~ 3530
							26	3530 ~ 3848
		SPHWW1HDNC27YHU3B3	YH	U3	UA, UB	B3	24	2955 ~ 3200
							25	3200 ~ 3530
							26	3530 ~ 3848
	4000	SPHWW1HDNC27YHT2B3	YH	T2	TB	B3	24	3035 ~ 3285
							25	3285 ~ 3615
							26	3615 ~ 3940
		SPHWW1HDNC27YHT3B3	YH	T3	TA, TB	B3	24	3035 ~ 3285
							25	3285 ~ 3615
							26	3615 ~ 3940

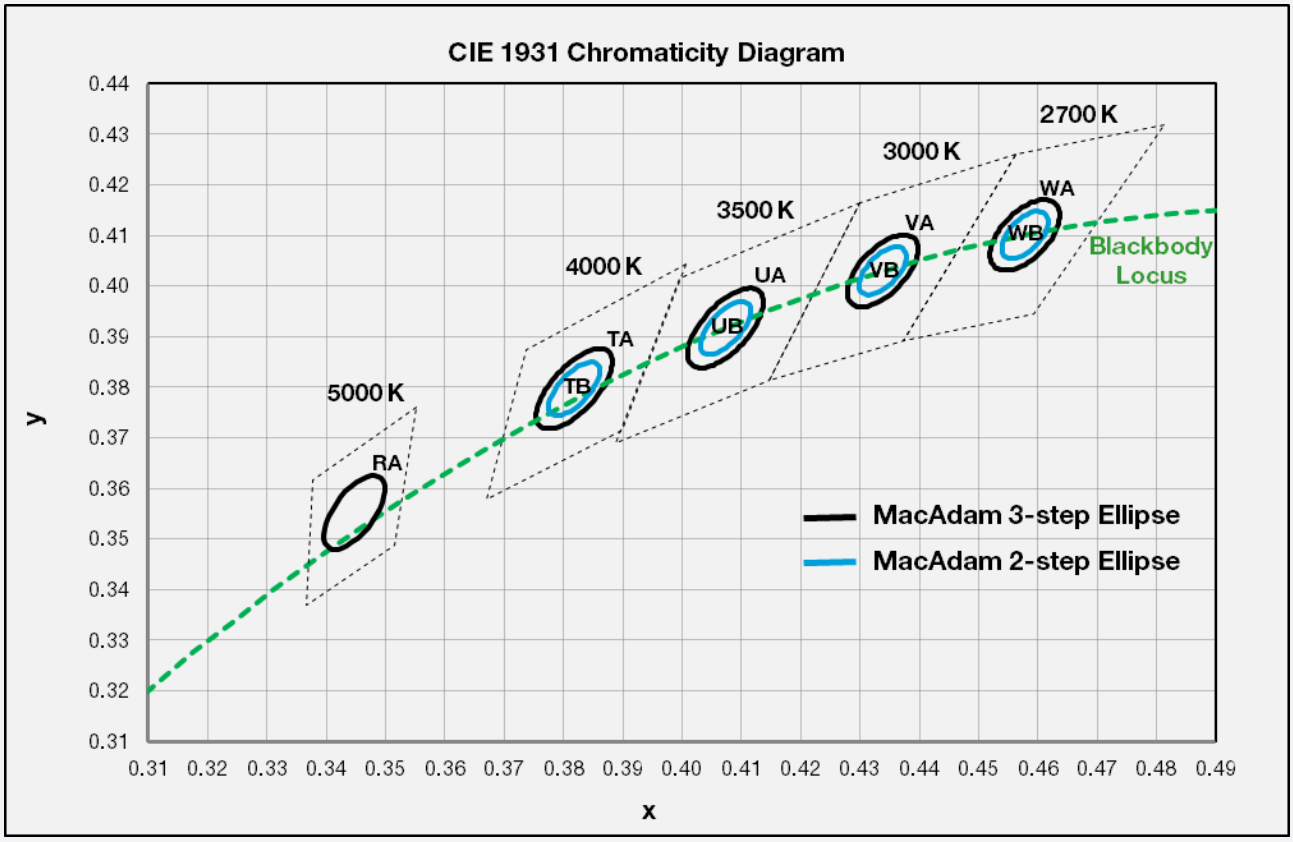
b) Chromaticity Region & Coordinates (I_F = 720 mA, T_c = 25 °C)

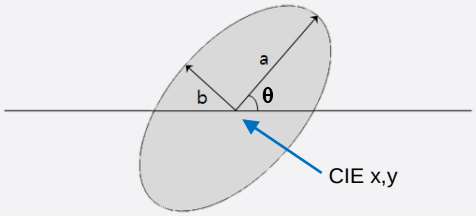


Region	CIE x	CIE y	Region	CIE x	CIE y
V rank (3000 K)					
VW	0.4223	0.3990	VY	0.4345	0.4033
	0.4345	0.4033		0.4468	0.4077
	0.4431	0.4213		0.4562	0.4260
	0.4299	0.4165		0.4431	0.4213
VX	0.4223	0.3990	VZ	0.4260	0.3854
	0.4147	0.3814		0.4373	0.3893
	0.4260	0.3854		0.4468	0.4077
	0.4345	0.4033		0.4345	0.4033
R rank (5000 K)					
RW	0.3376	0.3616	RY	0.3463	0.3687
	0.3463	0.3687		0.3551	0.3760
	0.3451	0.3554		0.3533	0.3620
	0.3371	0.3490		0.3451	0.3554
RX	0.3371	0.3490	RZ	0.3451	0.3554
	0.3451	0.3554		0.3533	0.3620
	0.3440	0.3428		0.3515	0.3487
	0.3366	0.3369		0.3440	0.3428

Region	CIE x	CIE y	Region	CIE x	CIE y
T rank (4000 K)					
TW	0.3736	0.3874	TY	0.3871	0.3959
	0.3871	0.3959		0.4006	0.4044
	0.3828	0.3803		0.3952	0.3880
	0.3703	0.3726		0.3828	0.3803
TX	0.3703	0.3726	TZ	0.3828	0.3803
	0.3828	0.3803		0.3952	0.3880
	0.3784	0.3647		0.3898	0.3716
	0.3670	0.3578		0.3784	0.3647
Q rank (5700 K)					
QW	0.3207	0.3462	QY	0.3290	0.3538
	0.3290	0.3538		0.3376	0.3616
	0.3290	0.3417		0.3371	0.3490
	0.3215	0.3350		0.3290	0.3417
QX	0.3215	0.3350	QZ	0.3290	0.3417
	0.3290	0.3417		0.3371	0.3490
	0.3290	0.3300		0.3366	0.3369
	0.3222	0.3243		0.3290	0.3300

b) Chromaticity Region & Coordinates (I_F = 720 mA, T_c = 25 °C)





MacAdam Ellipse (WA, WB)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4578	0.4101	53.70	0.0054	0.0028
3-step	0.4578	0.4101	53.70	0.0081	0.0042

MacAdam Ellipse (VA, VB)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4338	0.4030	53.22	0.0056	0.0027
3-step	0.4338	0.4030	53.22	0.0083	0.0041

MacAdam Ellipse (UA, UB)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4073	0.3917	54.00	0.0062	0.0028
3-step	0.4073	0.3917	54.00	0.0093	0.0041

MacAdam Ellipse (TA, TB)					
Step	CIE x	CIE y	θ	a	b
2-step	0.3818	0.3797	53.72	0.0063	0.0027
3-step	0.3818	0.3797	53.72	0.0094	0.0040

MacAdam Ellipse (RA)					
Step	CIE x	CIE y	θ	a	b
3-step	0.3447	0.3553	59.62	0.0082	0.0035

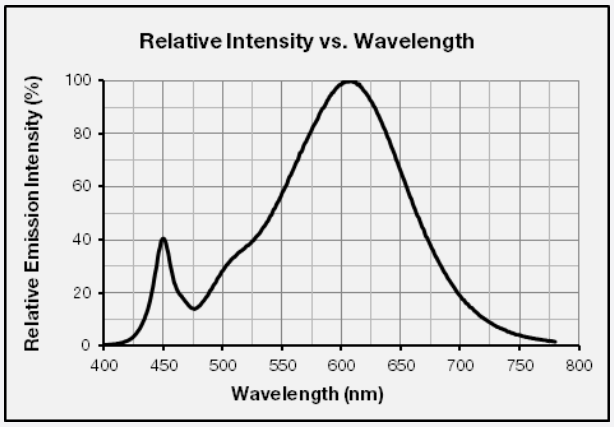
Note:

Samsung maintains measurement tolerance of: Cx, Cy = ±0.005

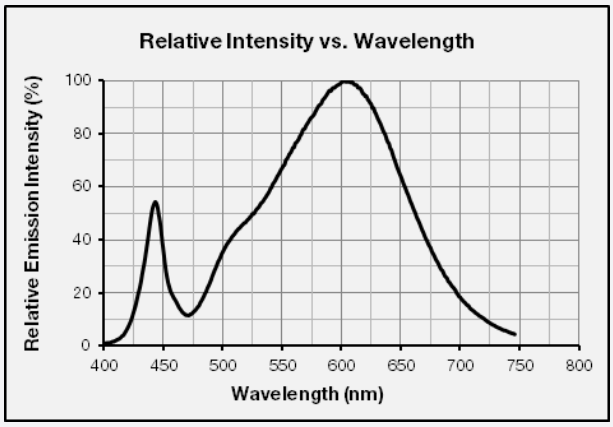
3. Typical Characteristics Graphs

a) Spectrum Distribution (I_F = 720 mA, T_c = 25 ºC)

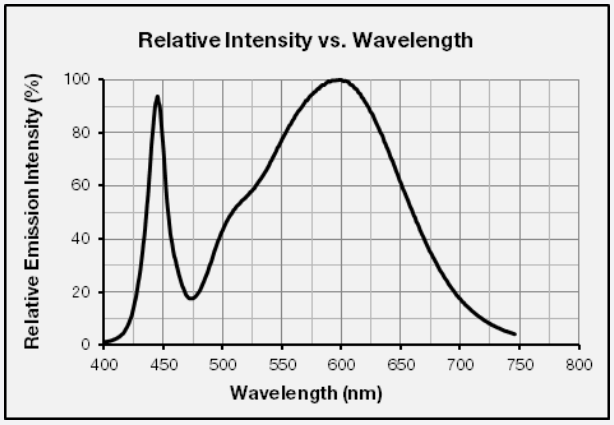
CCT: 2700 K



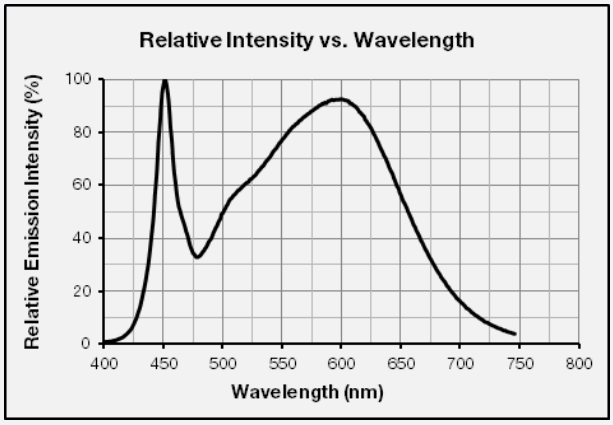
CCT: 3000 K



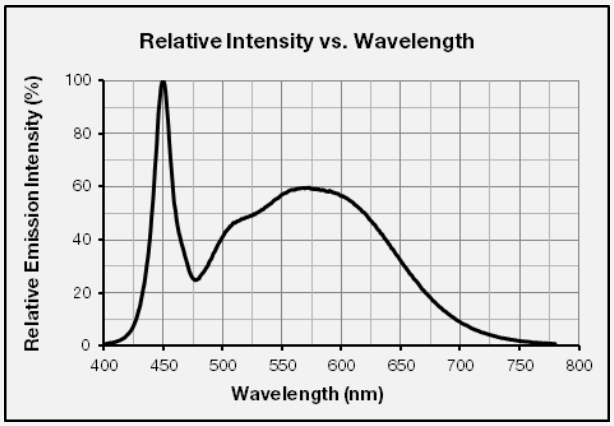
CCT: 3500 K



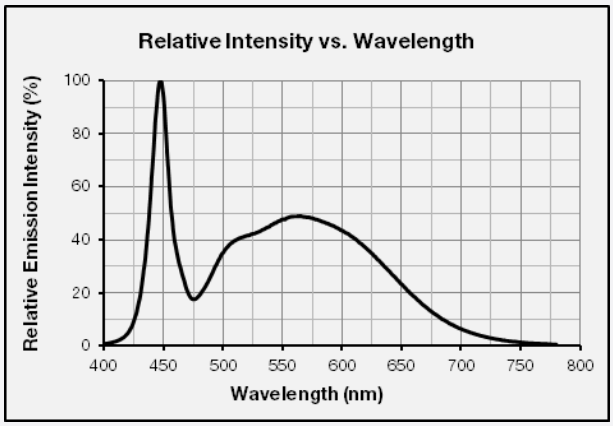
CCT: 4000 K



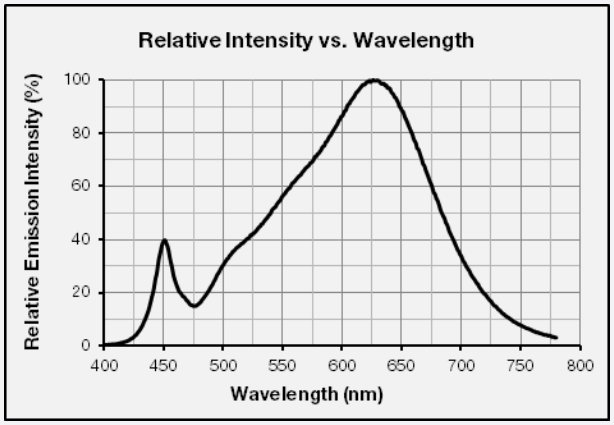
CCT: 5000 K



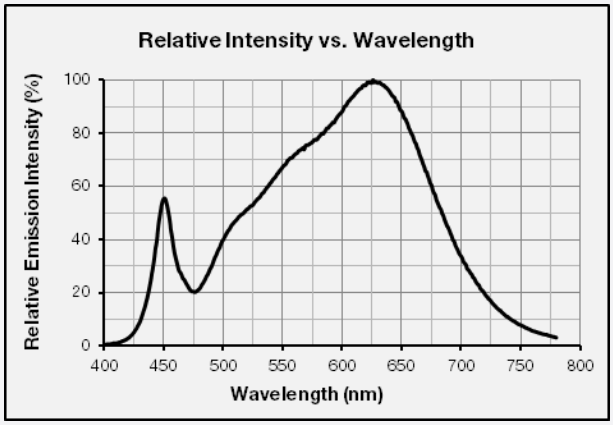
CCT: 5700 K



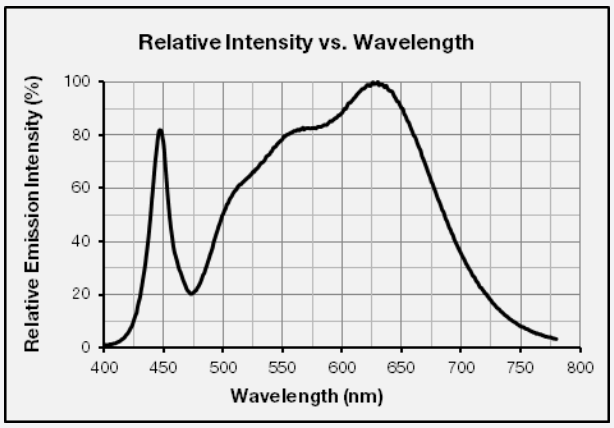
CCT: 2700 K (90 CRI)



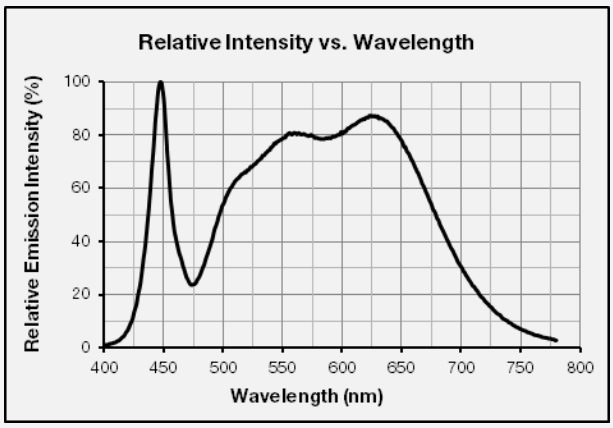
CCT: 3000 K (90 CRI)



CCT: 3500 K (90 CRI)

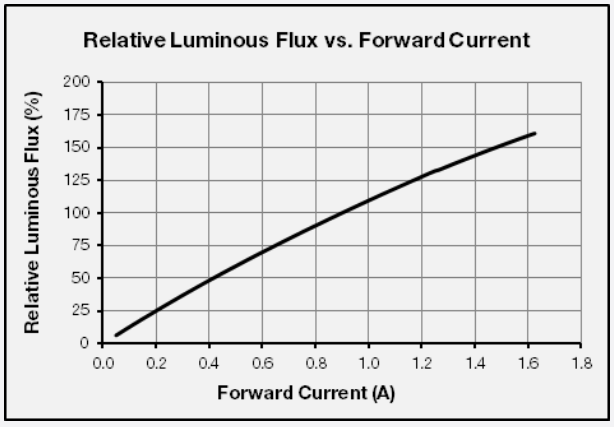


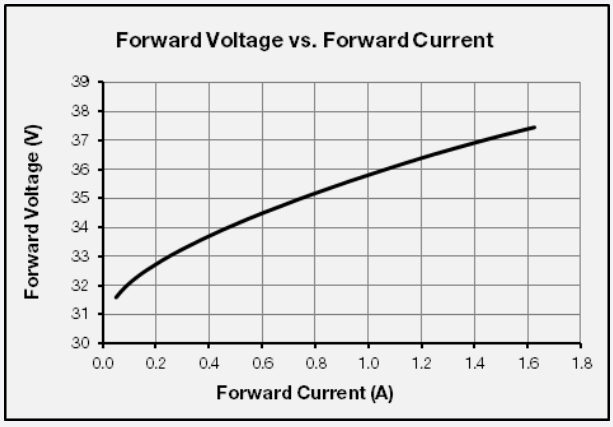
CCT: 4000 K (90 CRI)



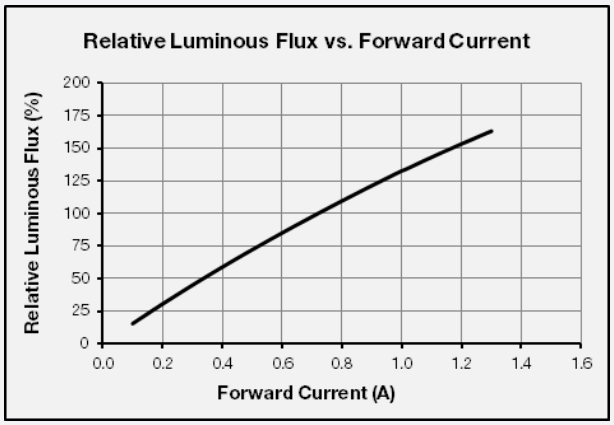
b) Forward Current Characteristics (T_c = 25 °C)

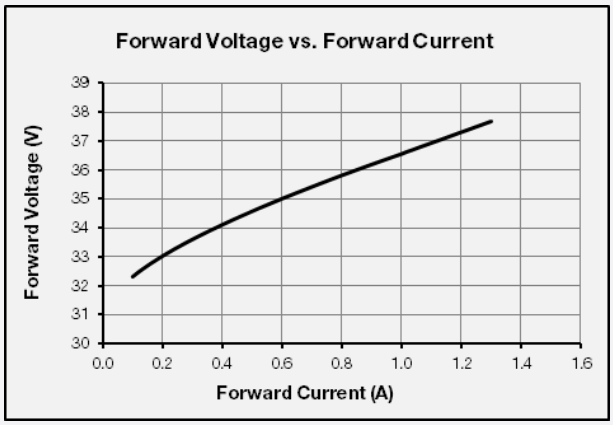
80 CRI





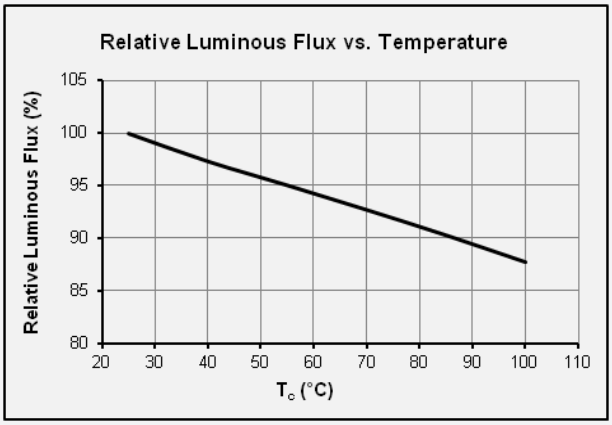
90 CRI

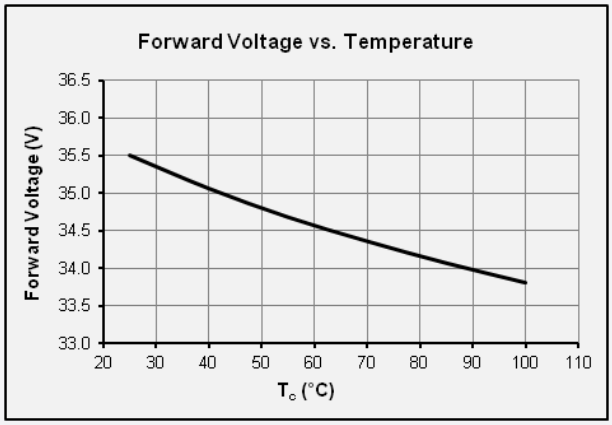




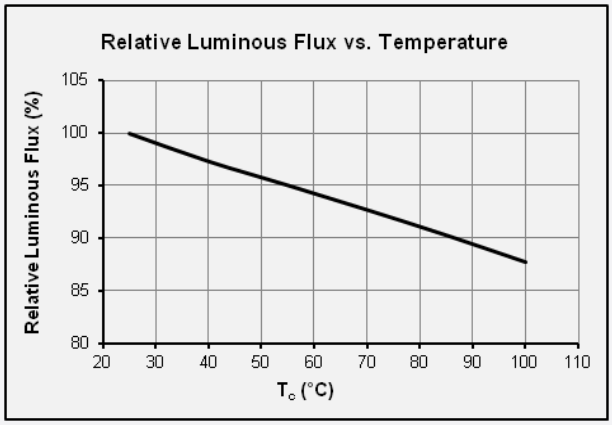
c) Temperature Characteristics (I_F = 720 mA)

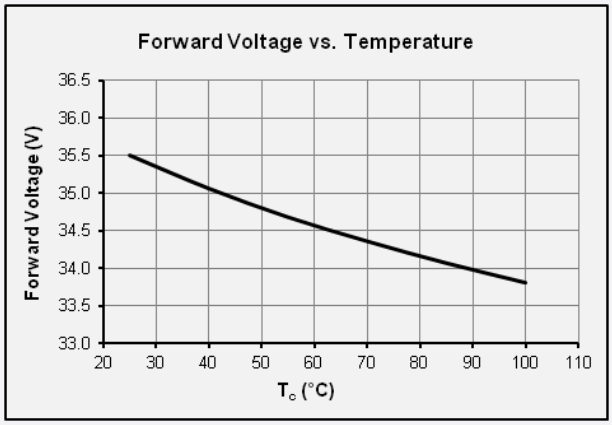
80 CRI





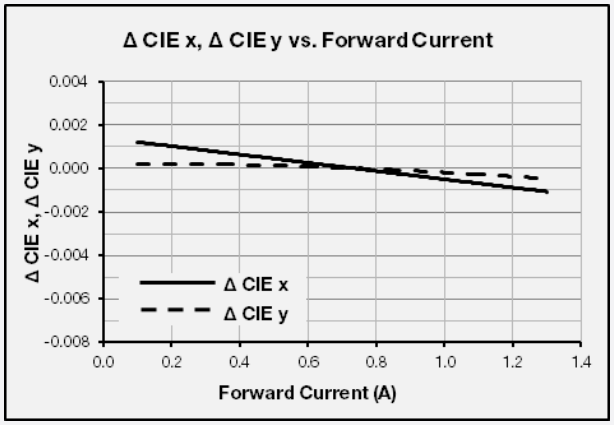
90 CRI

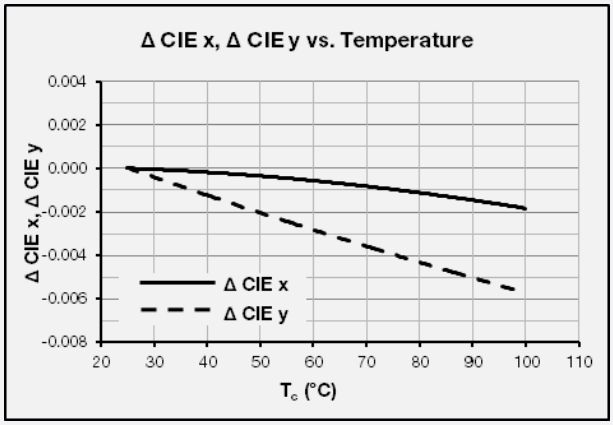




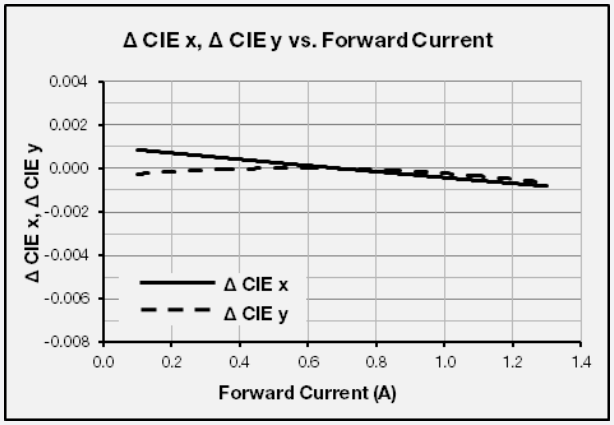
d) Color Shift Characteristics T_c = 25 ºC I_F = 720 mA

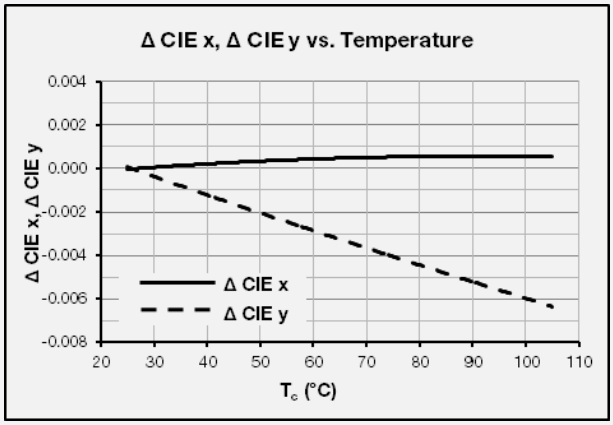
80 CRI



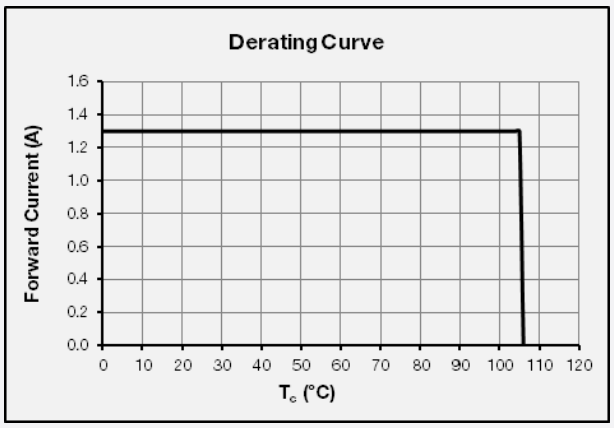


90 CRI



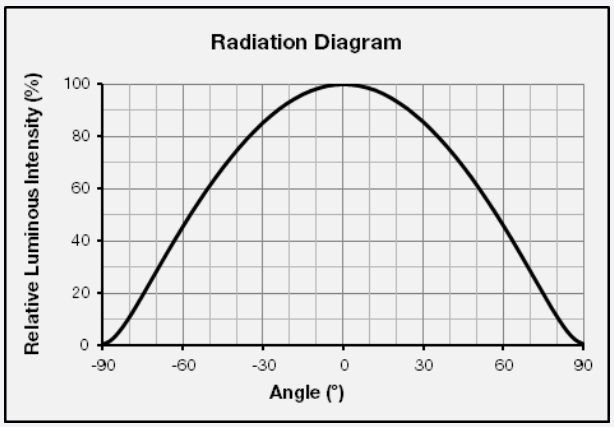


e) Derating Curve

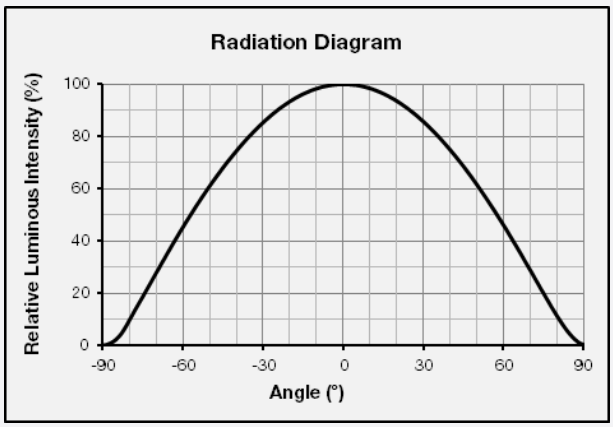


f) Beam Angle Characteristics (I_F = 720 mA, T_c = 25 °C)

80 CRI

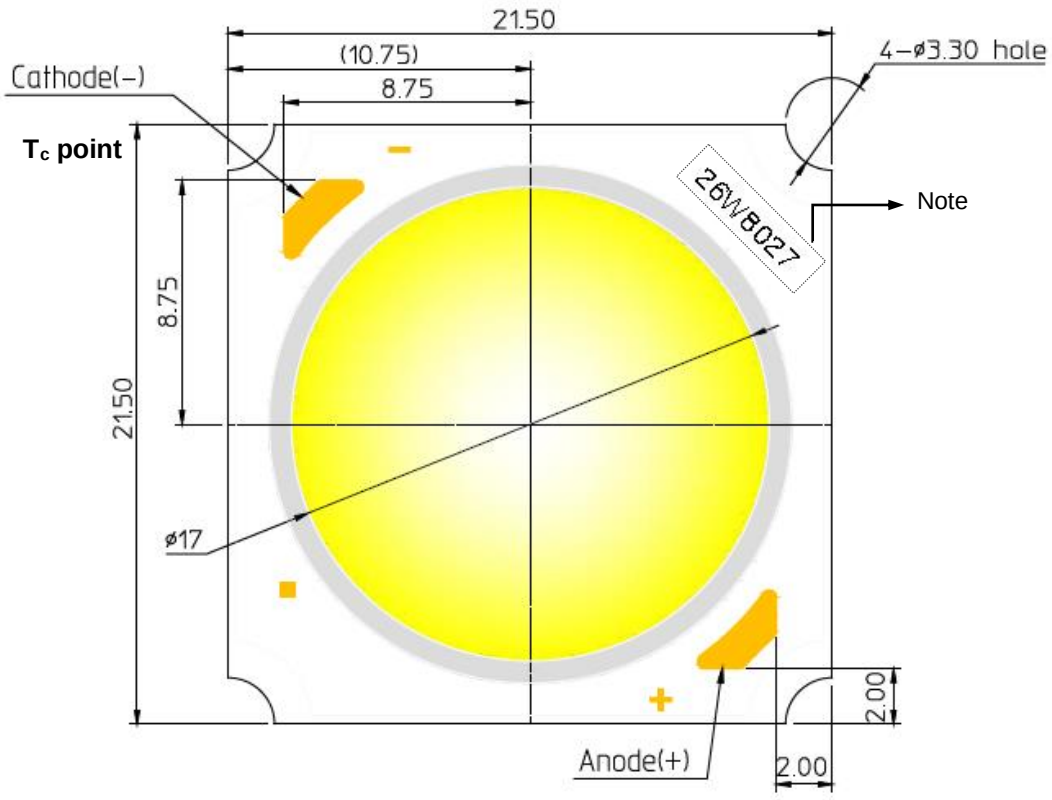


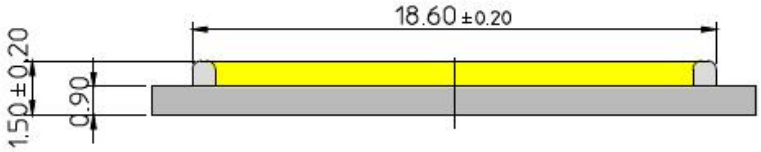
90 CRI



4. Outline Drawing & Dimension

1. Unit: mm
2. Tolerance: ± 0.15 mm





1. Unit: mm
2. Tolerance: ± 0.2 mm

Item	Dimension	Tolerance	Unit
Length	21.50	±0.15	mm
Width	21.50	±0.15	mm
Height	1.50	±0.20	mm
Light Emitting Surface (LES) Diameter	17	±0.15	mm

Note: Denoted product information above is only an example
(26W8027 : 26W, CRI80+, 2700K)

5. Reliability Test Items & Conditions

a) Test Items

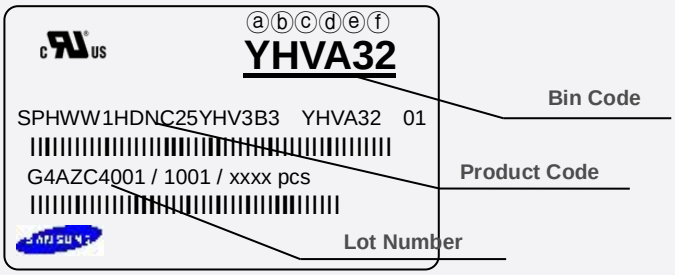
Test Item	Test Condition	Test Hour / Cycle
Room Temperature Life Test	25 ºC, I_F = max	1000 h
High Temperature Humidity Life Test	85 ºC, 85 % RH, DC Derating, I_F = max	1000 h
High Temperature Life Test	105 ºC, DC Derating, I_F = max	1000 h
Low Temperature Life Test	-40 ºC, DC 1300 mA	1000 h
High Temperature Storage	120 ºC	1000 h
Low Temperature Storage	-40 ºC	1000 h
Thermal Shock	-45 ºC / 15 min ↔ 125 ºC / 15 min temperature change in 5 min	200 cycles
Temperature Cycle On/Off Test	-40 ºC / 85 ºC each 20 min, 100 min transfer power on/off each 5 min, DC 900 mA	100 cycles
Temperature Humidity Storage Test	-10 ºC ↔ 25 ºC, 95 % RH ↔ 85 ºC, 95 % RH (24 h / cycle)	100 cycles
ESD (HBM)	R_1: 10 MΩ R_2: 1.5 kΩ C: 100 pF V: ±2 kV	5 times
ESD (MM)	R_1: 10 MΩ R_2: 0 kΩ C: 200 pF V: ±0.5 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	1500 g, 0.5 ms each of the 6 surfaces (3 axis x 2 sides)	5 times
Salt Spray Test	35 ºC, 5 % salt water 8 h spray, 16 h dwell	2 cycles

b) Criteria for Judging the Damage

Item	Symbol	Test Condition (T_c = 25 ºC)	Limit	
			Min.	Max.
Forward Voltage	V_F	I_F = 720 mA	L.S.L. * 0.9	U.S.L. * 1.1
Luminous Flux	Φ_v	I_F = 720 mA	L.S.L * 0.7	U.S.L * 1.3

6. Label Structure

a) Label Structure



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

Bin Code:

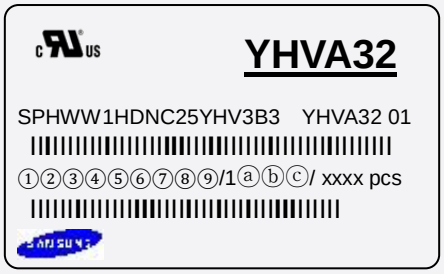
ⓐⓑ: Forward Voltage bin (refer to page 11)

ⓒⓓ: Chromaticity bin (refer to page 9-10)

ⓔⓕ: Luminous Flux bin (refer to page 6)

b) Lot Number

The lot number is composed of the following characters:



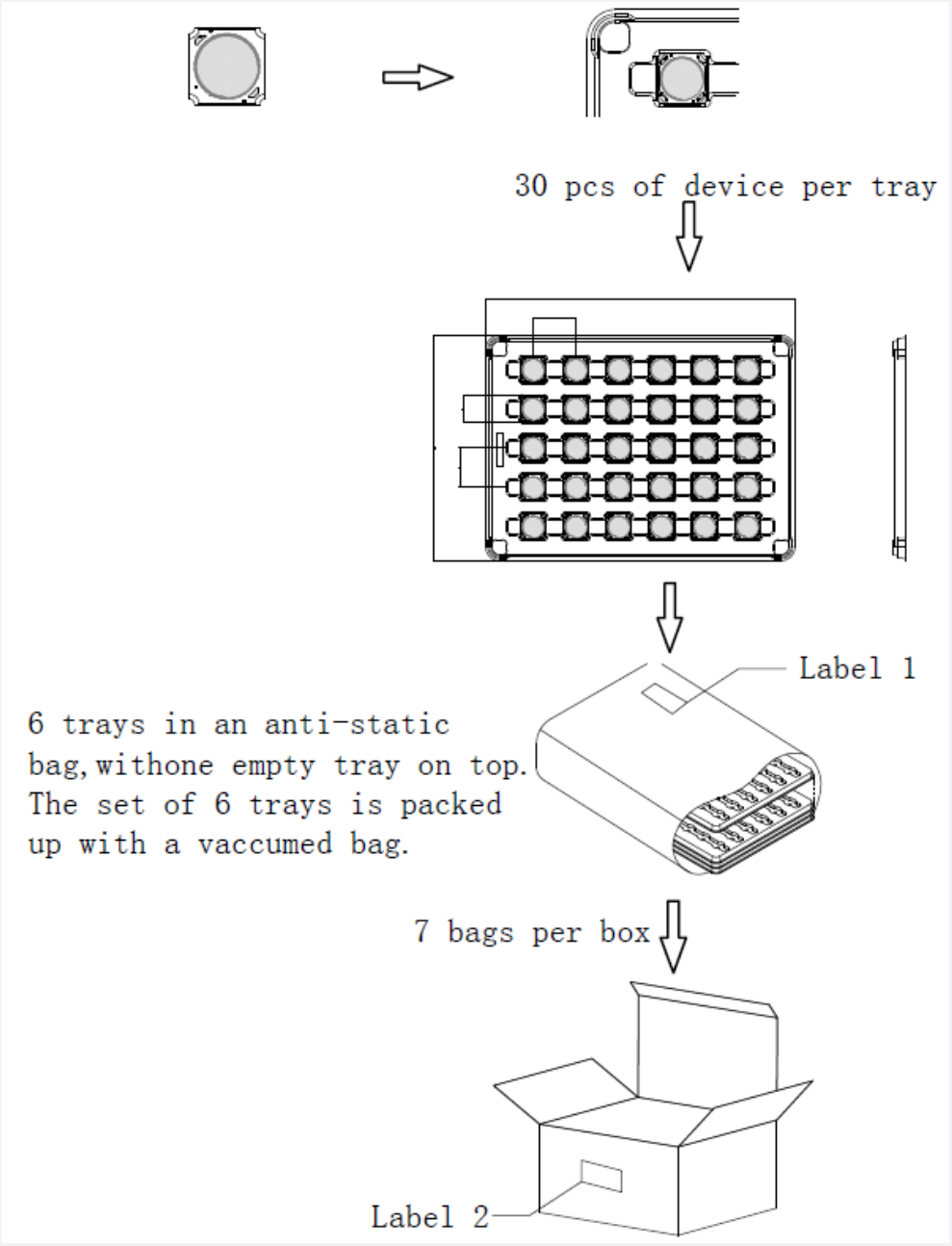
① ③④⑤⑥⑦⑧⑨ / 1ⓐⓑⓒ / xxxx pcs

①	:	Production site (S: Giheung, Korea, G: Tianjin, China)
②	:	4 (LED)
③	:	Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)
④	:	Year (Z: 2015, A: 2016, B: 2017…)
⑤	:	Month (1~9, A, B, C)
⑥⑦⑧⑨	:	Day (1~9, A, B~V)
ⓐⓑⓒ	:	Product serial number (001 ~ 999)

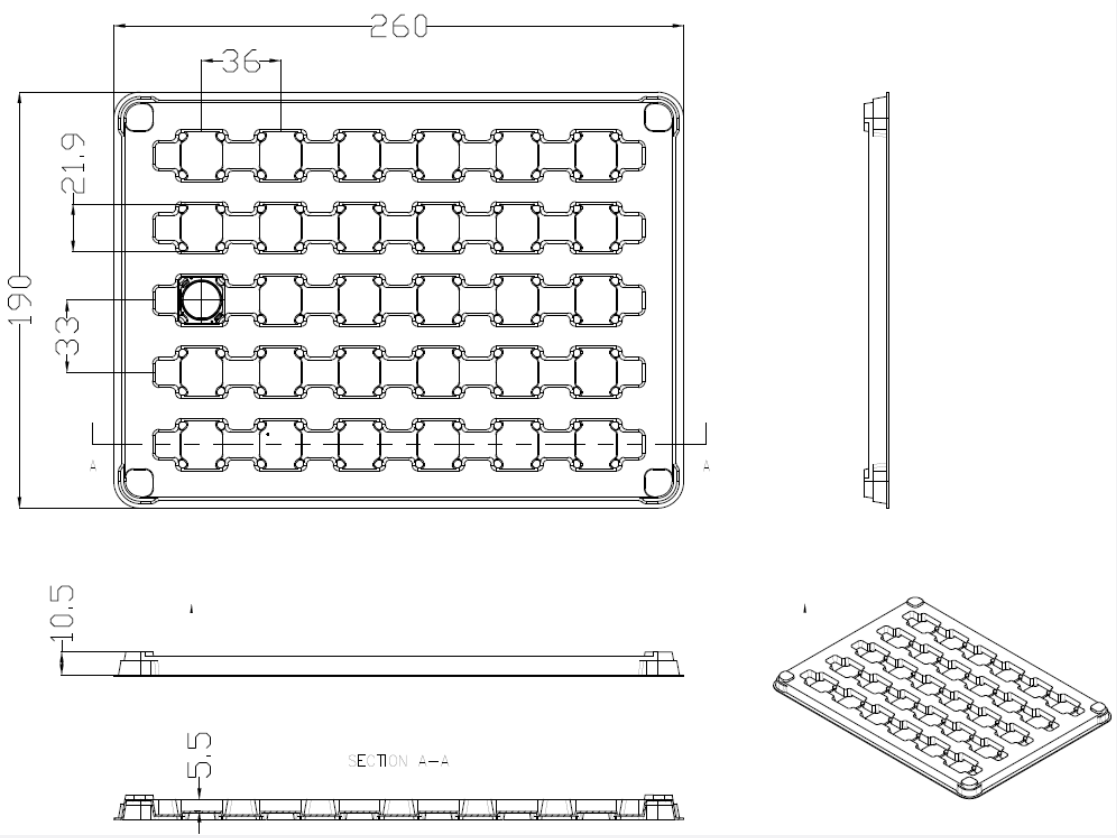
7. Packing Structure

Packing material	Max. quantity in pcs of COB	Dimension (mm)			
		Length	Width	Height	Tolerance
Tray	.30	260	190	11.5	1.0
Anti-static Bag	150 (6 trays)	387	350	-	10
Box	1,050 (7 anti-static bag)	270	200	255	10

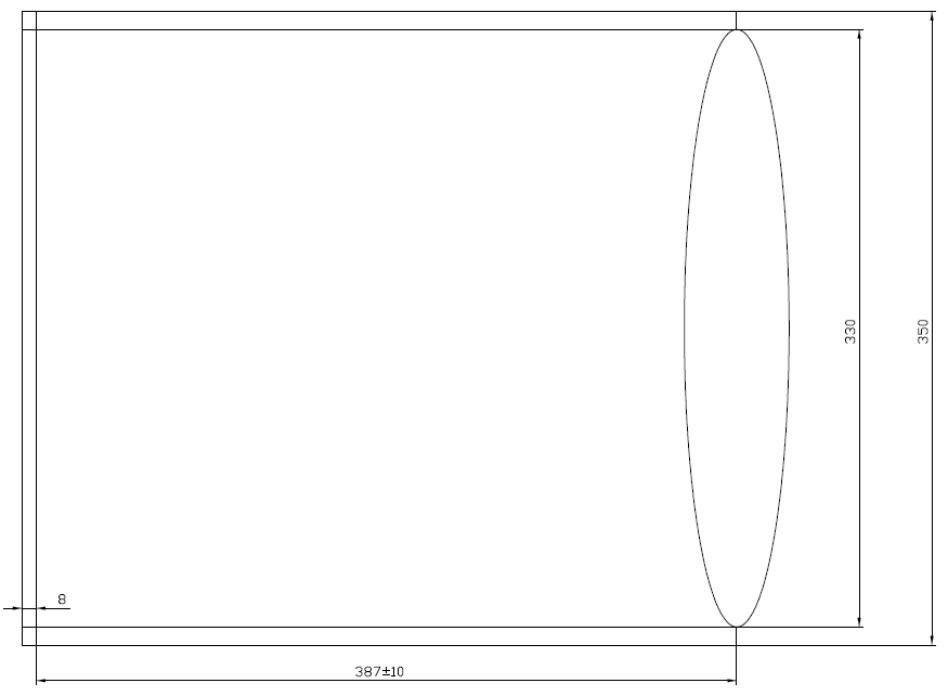
a) Packing Structure



d) Tray

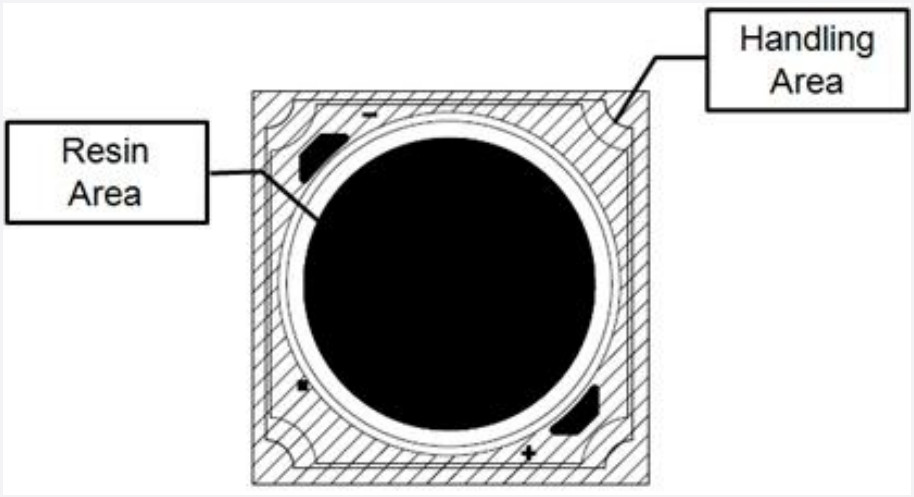


C) Anti-static Bag



8. Precautions in Handling & Use

1) 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.
2) LEDs must be stored in a clean environment. If the LEDs are to be stored for three months or more after being shipped from Samsung, they should be packed with a nitrogen-filled container (shelf life of sealed bags is 12 months at temperature 0~40 ºC, 0~90 % RH).
3) 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 ºC / 60 % RH, or
   b. Stored at <10 % RH
4) Repack unused products with anti-moisture packing, fold to close any opening and then store in a dry place.
5) Devices require baking before mounting, if humidity card reading is >60 % at 23 ± 5 ºC.
6) Devices must be baked for 1 hour at 60 ± 5 ºC, if baking is required.
7) 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.
8) In case of driving the LC026B around the extremely low current level, chips might exhibit different brightness due to the variation in I-V characteristics of each one. This is normal and does not adversely affect the performance of product.
9) 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.
10) The resin area is very sensitive, please do not handle, press, touch, rub, clean, or pick by with tweezers on it. Instead, please pick at the handling area as indicated below.



Legal and additional information.

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