

High Voltage LED Series
Chip on Board

COB D-series G4 S90



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

Applications

- Spotlight / Downlight
- LED Retrofit Bulbs
- Indoor Illumination

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1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Model	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-	-40 ~ +105	°C	-
Storage Temperature	T_{stg}	-	-40 ~ +120	°C	-
LED Junction Temperature	T_J	-	150	°C	-
Case Temperature	T_c	-	105	°C	-
		LC003D	230 / 8.4		-
		LC006D	460 / 16.8		-
		LC009D	690 / 25.3		-
		LC013D	920 / 33.7		-
		LC016D	1150 / 42.1		-
Forward Current / Power Dissipation	I_F / P_D	LC019D	1380 / 50.5	mA / W	-
		LC026D	1840 / 67.3		-
		LC033D	2300 / 84.2		-
		LC040D	2760 / 101.0		-
		LC060D	2760 / 153.2		-
		LC080D	4140 / 229.8		-
ESD (HBM)	-	-	±2	kV	-

b) Electro-optical Characteristics (I_F = Sorting Current, T_J = 85 °C)

Item	Unit	Model	Rank	Min.	Typ.	Max.		
Forward Voltage (V _F)	V	All model	YZ	30.6	33.6	36.6		
			1Z	45.5	50.5	55.5		
Color Rendering Index (R _a /R ₉)	-	All model	7	90 / 50	-	-		
Beam Angle	°	-	-	-	115	-		
Nominal Power / Sorting Current	W / mA	LC003D	-	-	3.0 / 90	-		
		LC006D	-	-	6.0 / 180	-		
		LC009D	-	-	9.1 / 270	-		
		LC013D	-	-	12.1 / 360	-		
		LC016D	-	-	15.1 / 450	-		
		LC019D	-	-	18.1 / 540	-		
		LC026D	-	-	24.2 / 720	-		
		LC033D	-	-	30.2 / 900	-		
		LC040D	-	-	36.3 / 1080	-		
		LC060D	-	-	54.5 / 1080	-		
		LC080D	-	-	81.8 / 1620	-		
		Thermal Resistance (Junction to chip case)	°C/W	LC003D	-	-	2.43	-
				LC006D	-	-	1.41	-
LC009D	-			-	0.94	-		
LC013D	-			-	0.81	-		
LC016D	-			-	0.64	-		
LC019D	-			-	0.57	-		
LC026D	-			-	0.45	-		
LC033D	-			-	0.38	-		
LC040D	-			-	0.30	-		
LC060D	-			-	0.23	-		
LC080D	-	-	0.15	-				

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 = 85 °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 ($I_F = \text{Sorting Current}$)

Model	CRI (R_a) Min.	Nominal CCT (K)	Flux Rank	Flux@ $T_J = 85\text{ °C}$ (lm)		
				Min.	Typ.	Max.
LC003D	90	2700	D4	454	483	-
		3000	D4	470	500	-
		3500	D4	481	512	-
		4000	D4	485	516	-
		5000	D4	492	524	-
LC006D	90	2700	D4	894	951	-
		3000	D4	941	1001	-
		3500	D4	948	1008	-
		4000	D4	950	1011	-
		5000	D4	964	1025	-
LC009D	90	2700	D4	1341	1426	-
		3000	D4	1385	1474	-
		3500	D4	1415	1505	-
		4000	D4	1427	1518	-
		5000	D4	1447	1539	-
LC013D	90	2700	D4	1769	1882	-
		3000	D4	1823	1939	-
		3500	D4	1857	1976	-
		4000	D4	1882	2002	-
		5000	D4	1911	2033	-

Notes:

- 1) The COB is tested in pulsed operating condition at rated test current (10 ms pulse width) and rated temperature ($T_J = T_C = 85\text{ °C}$).
- 2) Samsung maintains measurement tolerance of: Luminous flux = $\pm 7\%$, CRI = ± 1

Model	CRI (R _a) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C (lm)		
				Min.	Typ.	Max.
LC016D	90	2700	D4	2315	2462	-
		3000	D4	2358	2509	-
		3500	D4	2416	2570	-
		4000	D4	2463	2621	-
		5000	D4	2473	2631	-
LC019D	90	2700	D4	2758	2934	-
		3000	D4	2843	3024	-
		3500	D4	2898	3083	-
		4000	D4	2956	3145	-
		5000	D4	2976	3166	-
LC026D	90	2700	D4	3662	3896	-
		3000	D4	3776	4017	-
		3500	D4	3860	4106	-
		4000	D4	3886	4134	-
		5000	D4	3892	4141	-
LC033D	90	2700	D4	4470	4755	-
		3000	D4	4640	4936	-
		3500	D4	4739	5041	-
		4000	D4	4755	5058	-
		5000	D4	4775	5080	-

Notes:

- 2) The COB is tested in pulsed operating condition at rated test current (10 ms pulse width) and rated temperature (T_J = T_C = 85 °C).
- 2) Samsung maintains measurement tolerance of: Luminous flux = ±7 %, CRI = ±1

Model	CRI (R _a) Min.	Nominal	Flux	Flux@ T _J = 85 °C (lm)		
		CCT (K)	Rank	Min.	Typ.	Max.
LC040D	90	2700	D4	5447	5795	-
		3000	D4	5604	5961	-
		3500	D4	5772	6141	-
		4000	D4	5877	6252	-
		5000	D4	5914	6292	-
LC060D	90	2700	D4	7783	8279	-
		3000	D4	8203	8726	-
		3500	D4	8322	8853	-
		4000	D4	8528	9073	-
		5000	D4	8611	9161	-
LC080D	90	2700	D4	10911	11607	-
		3000	D4	11523	12258	-
		3500	D4	11690	12436	-
		4000	D4	12222	13002	-
		5000	D4	12341	13129	-

Notes:

- 1) The COB is tested in pulsed operating condition at rated test current (10 ms pulse width) and rated temperature (T_J = T_C = 85 °C).
- 2) 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	W	H	S	H	D	N	G	2	5	Y	Z	W	3	D	4

Digit	PKG Information	Code	Specification
1 2 3	Samsung Package High Power	SPH	
4 5	Color	WH	White
6	Product Version	S	S90
7 8	Form Factor	HD	COB
9	Lens Type	N	No lens
10	Wattage or Model	A B C D E F G H K L M	LC003D LC006D LC009D LC013D LC016D LC019D LC026D LC033D LC040D LC060D LC080D
11	Internal Code	2	
12	CRI & Sorting Temperature	7	Min. 90 (85°C)
13 14	Forward Voltage (V)	YZ 1Z	30.6~36.6 45.5~55.5 (60W, 80W)
15	CCT (K)	W V U T R Q P	2700K 3000K 3500K 4000K 5000K 5700K 6500K
16	MacAdam Step	2 3	MacAdam 2-step MacAdam 3-step
17 18	Luminous Flux (Lm)	D4	COB D-series Gen.4 level

a) Binning Structure (Sorting Current, $T_J = 85\text{ °C}$)

Model	CRI(R _a)	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)		
LC003D	90	2700	SPHWSHDNA27YZW2D4	YZ	W2	D4	454 ~		
			SPHWSHDNA27YZW3D4		W3				
		3000	SPHWSHDNA27YZV2D4	YZ	V2	D4	470 ~		
			SPHWSHDNA27YZV3D4		V3				
		3500	SPHWSHDNA27YZU2D4	YZ	U2	D4	481 ~		
			SPHWSHDNA27YZU3D4		U3				
		4000	SPHWSHDNA27YZT2D4	YZ	T2	D4	485 ~		
			SPHWSHDNA27YZT3D4		T3				
		5000	SPHWSHDNA27YZR2D4	YZ	R2	D4	492 ~		
			SPHWSHDNA27YZR3D4		R3				
		LC006D	90	2700	SPHWSHDNB27YZW2D4	YZ	W2	D4	894 ~
					SPHWSHDNB27YZW3D4		W3		
3000	SPHWSHDNB27YZV2D4			YZ	V2	D4	941 ~		
	SPHWSHDNB27YZV3D4				V3				
3500	SPHWSHDNB27YZU2D4			YZ	U2	D4	948 ~		
	SPHWSHDNB27YZU3D4				U3				
4000	SPHWSHDNB27YZT2D4			YZ	T2	D4	950 ~		
	SPHWSHDNB27YZT3D4				T3				
5000	SPHWSHDNB27YZR2D4			YZ	R2	D4	964 ~		
	SPHWSHDNB27YZR3D4				R3				

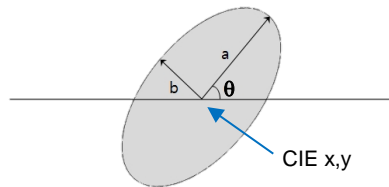
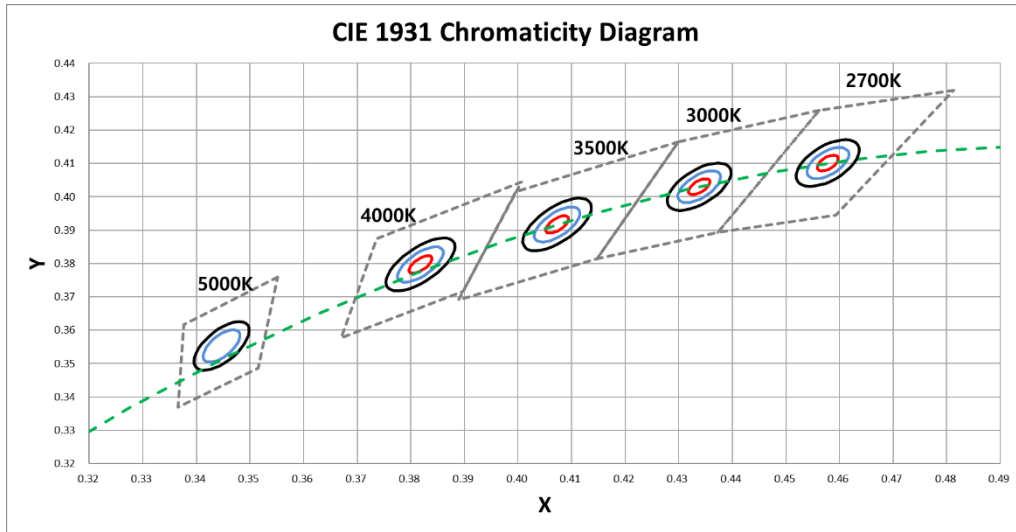
Model	CRI(R _a)	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)		
LC009D	90	2700	SPHWSHDNC27YZW2D4	YZ	W2	D4	1341 ~		
			SPHWSHDNC27YZW3D4		W3				
		3000	SPHWSHDNC27YZV2D4	YZ	V2	D4	1385 ~		
			SPHWSHDNC27YZV3D4		V3				
		3500	SPHWSHDNC27YZU2D4	YZ	U2	D4	1415 ~		
			SPHWSHDNC27YZU3D4		U3				
		4000	SPHWSHDNC27YZT2D4	YZ	T2	D4	1427 ~		
			SPHWSHDNC27YZT3D4		T3				
		5000	SPHWSHDNC27YZR2D4	YZ	R2	D4	1447 ~		
			SPHWSHDNC27YZR3D4		R3				
		LC013D	90	2700	SPHWSHDND27YZW2D4	YZ	W2	D4	1769 ~
					SPHWSHDND27YZW3D4		W3		
3000	SPHWSHDND27YZV2D4			YZ	V2	D4	1823 ~		
	SPHWSHDND27YZV3D4				V3				
3500	SPHWSHDND27YZU2D4			YZ	U2	D4	1857 ~		
	SPHWSHDND27YZU3D4				U3				
4000	SPHWSHDND27YZT2D4			YZ	T2	D4	1882 ~		
	SPHWSHDND27YZT3D4				T3				
5000	SPHWSHDND27YZR2D4			YZ	R2	D4	1911 ~		
	SPHWSHDND27YZR3D4				R3				

Model	CRI(R _a)	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)		
LC016D	90	2700	SPHWSHDNE27YZW2D4	YZ	W2	D4	2315 ~		
			SPHWSHDNE27YZW3D4		W3				
		3000	SPHWSHDNE27YZV2D4	YZ	V2	D4	2358 ~		
			SPHWSHDNE27YZV3D4		V3				
		3500	SPHWSHDNE27YZU2D4	YZ	U2	D4	2416 ~		
			SPHWSHDNE27YZU3D4		U3				
		4000	SPHWSHDNE27YZT2D4	YZ	T2	D4	2463 ~		
			SPHWSHDNE27YZT3D4		T3				
		5000	SPHWSHDNE27YZR2D4	YZ	R2	D4	2473 ~		
			SPHWSHDNE27YZR3D4		R3				
		LC019D	90	2700	SPHWSHDNF27YZW2D4	YZ	W2	D4	2758 ~
					SPHWSHDNF27YZW3D4		W3		
3000	SPHWSHDNF27YZV2D4			YZ	V2	D4	2843 ~		
	SPHWSHDNF27YZV3D4				V3				
3500	SPHWSHDNF27YZU2D4			YZ	U2	D4	2898 ~		
	SPHWSHDNF27YZU3D4				U3				
4000	SPHWSHDNF27YZT2D4			YZ	T2	D4	2956 ~		
	SPHWSHDNF27YZT3D4				T3				
5000	SPHWSHDNF27YZR2D4			YZ	R2	D4	2976 ~		
	SPHWSHDNF27YZR3D4				R3				

Model	CRI(R _a)	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)		
LC026D	90	2700	SPHWSHDNG27YZW2D4	YZ	W2	D4	3662 ~		
			SPHWSHDNG27YZW3D4		W3				
		3000	SPHWSHDNG27YZV2D4	YZ	V2	D4	3776 ~		
			SPHWSHDNG27YZV3D4		V3				
		3500	SPHWSHDNG27YZU2D4	YZ	U2	D4	3860 ~		
			SPHWSHDNG27YZU3D4		U3				
		4000	SPHWSHDNG27YZT2D4	YZ	T2	D4	3886 ~		
			SPHWSHDNG27YZT3D4		T3				
		5000	SPHWSHDNG27YZR2D4	YZ	R2	D4	3892 ~		
			SPHWSHDNG27YZR3D4		R3				
		LC033D	90	2700	SPHWSHDNH27YZW2D4	YZ	W2	D4	4470 ~
					SPHWSHDNH27YZW3D4		W3		
3000	SPHWSHDNH27YZV2D4			YZ	V2	D4	4640 ~		
	SPHWSHDNH27YZV3D4				V3				
3500	SPHWSHDNH27YZU2D4			YZ	U2	D4	4739 ~		
	SPHWSHDNH27YZU3D4				U3				
4000	SPHWSHDNH27YZT2D4			YZ	T2	D4	4755 ~		
	SPHWSHDNH27YZT3D4				T3				
5000	SPHWSHDNH27YZR2D4			YZ	R2	D4	4775 ~		
	SPHWSHDNH27YZR3D4				R3				

Model	CRI(R _a)	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)		
LC040D	90	2700	SPHWSHDNK27YZW2D4	YZ	W2	D4	5447 ~		
			SPHWSHDNK27YZW3D4		W3				
		3000	SPHWSHDNK27YZV2D4	YZ	V2	D4	5604 ~		
			SPHWSHDNK27YZV3D4		V3				
		3500	SPHWSHDNK27YZU2D4	YZ	U2	D4	5772 ~		
			SPHWSHDNK27YZU3D4		U3				
		4000	SPHWSHDNK27YZT2D4	YZ	T2	D4	5877 ~		
			SPHWSHDNK27YZT3D4		T3				
		5000	SPHWSHDNK27YZR2D4	YZ	R2	D4	5914 ~		
			SPHWSHDNK27YZR3D4		R3				
		LC060D	90	2700	SPHWSHDNL271ZW2D4	1Z	W2	D4	7783 ~
					SPHWSHDNL271ZW3D4		W3		
3000	SPHWSHDNL271ZV2D4			1Z	V2	D4	8203 ~		
	SPHWSHDNL271ZV3D4				V3				
3500	SPHWSHDNL271ZU2D4			1Z	U2	D4	8322 ~		
	SPHWSHDNL271ZU3D4				U3				
4000	SPHWSHDNL271ZT2D4			1Z	T2	D4	8528 ~		
	SPHWSHDNL271ZT3D4				T3				
5000	SPHWSHDNL271ZR2D4			1Z	R2	D4	8611 ~		
	SPHWSHDNL271ZR3D4				R3				
LC080D	90			2700	SPHWSHDNM271ZW2D4	1Z	W2	D4	10911 ~
					SPHWSHDNM271ZW3D4		W3		
		3000	SPHWSHDNM271ZV2D4	1Z	V2	D4	11523 ~		
			SPHWSHDNM271ZV3D4		V3				
		3500	SPHWSHDNM271ZU2D4	1Z	U2	D4	11690 ~		
			SPHWSHDNM271ZU3D4		U3				
		4000	SPHWSHDNM271ZT2D4	1Z	T2	D4	12222 ~		
			SPHWSHDNM271ZT3D4		T3				
		5000	SPHWSHDNM271ZR2D4	1Z	R2	D4	12341 ~		
			SPHWSHDNM271ZR3D4		R3				

b) Chromaticity Region & Coordinates (I_F = Sorting Current, T_J = 85 °C)



MacAdam Ellipse (W1, W2, W3)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4578	0.4101	53.7	0.0054	0.0028
3-step	0.4578	0.4101	53.7	0.0081	0.0042

MacAdam Ellipse (V1, V2, V3)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4338	0.4030	53.2	0.0056	0.0027
3-step	0.4338	0.4030	53.2	0.0083	0.0041

MacAdam Ellipse (U1, U2, U3)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4073	0.3917	54	0.0062	0.0028
3-step	0.4073	0.3917	54	0.0093	0.0041

MacAdam Ellipse (T1, T2, T3)					
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

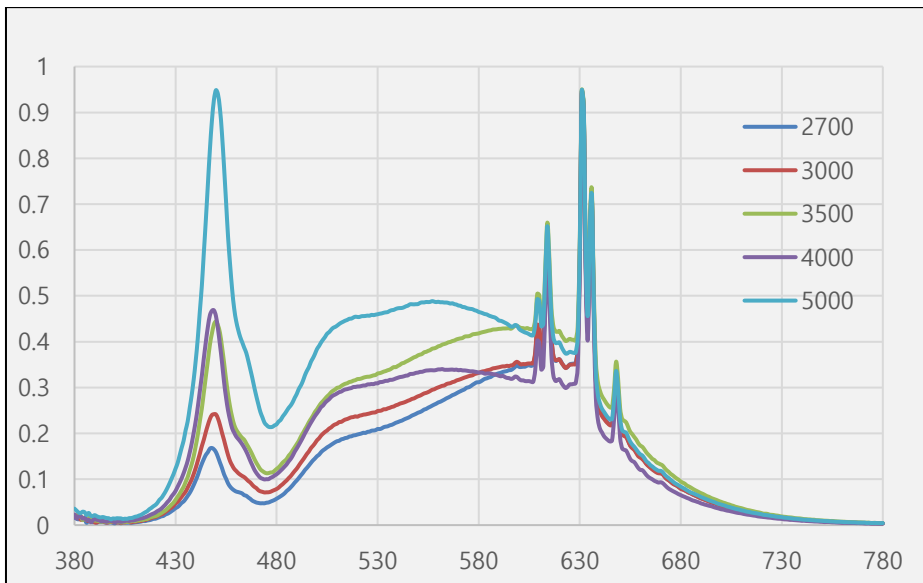
MacAdam Ellipse (R2, R3)					
Step	CIE x	CIE y	θ	a	b
2-step	0.3447	0.3553	59.62	0.0055	0.0024
3-step	0.3447	0.3553	59.62	0.0082	0.0035

Note:

Samsung maintains measurement tolerance of: $C_x, C_y = \pm 0.005$

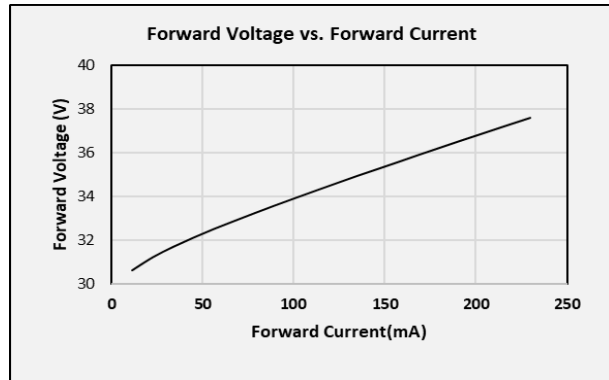
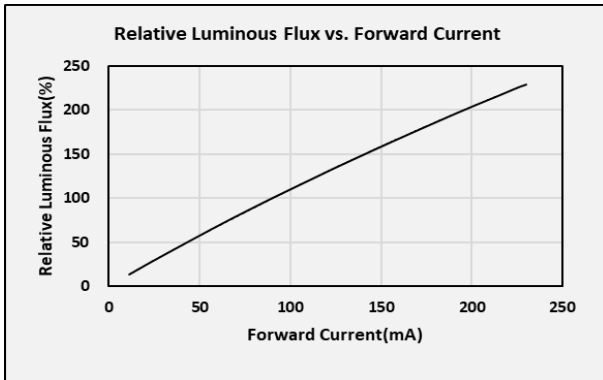
3. Typical Characteristics Graphs

a) Spectrum Distribution (I_f = Sorting Current)

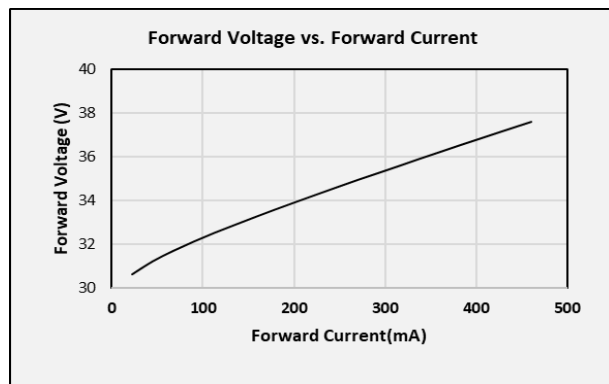
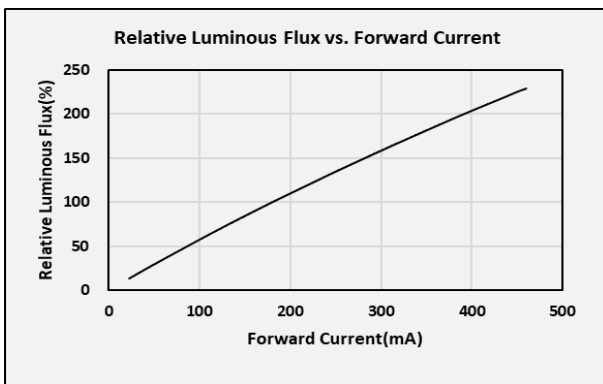


b) Forward Current Characteristics ($T_J = 85\text{ }^\circ\text{C}$)

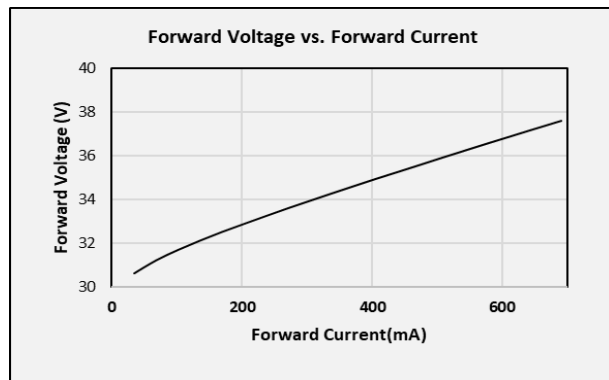
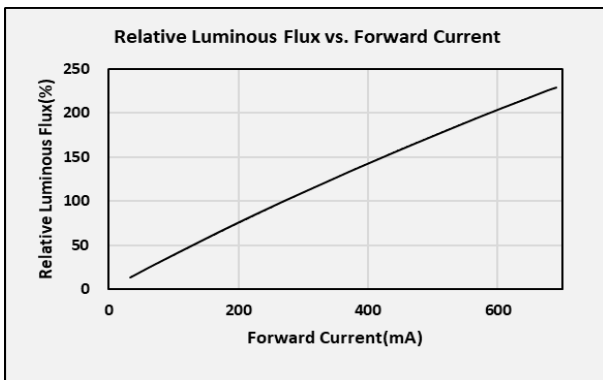
1) LC003D



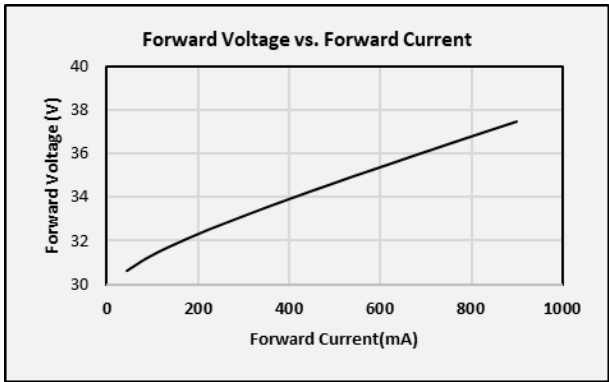
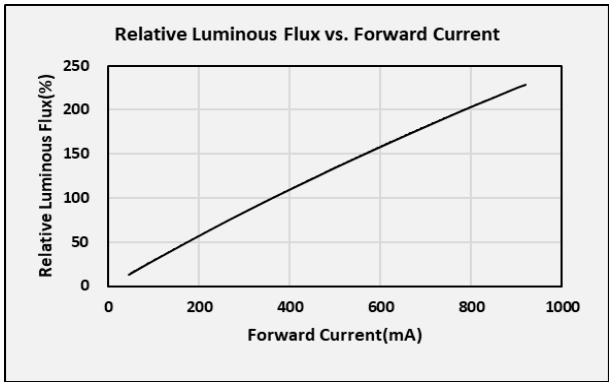
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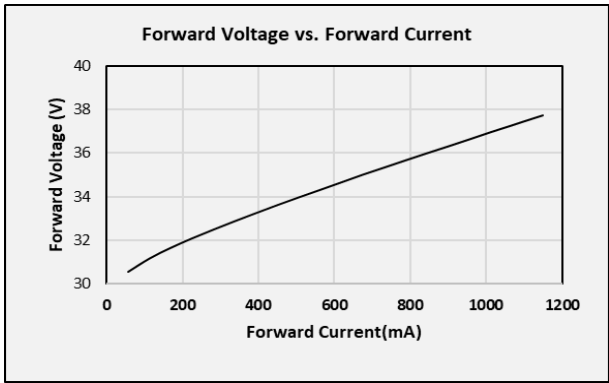
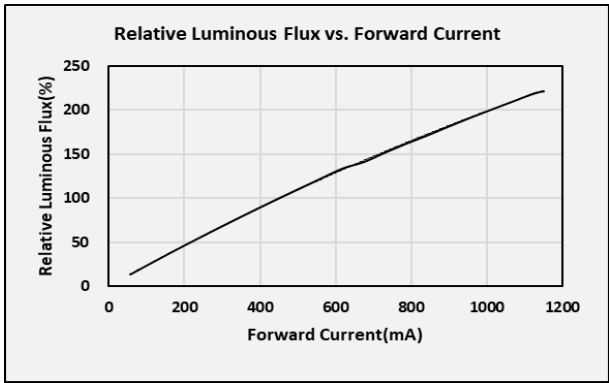
3) LC009D



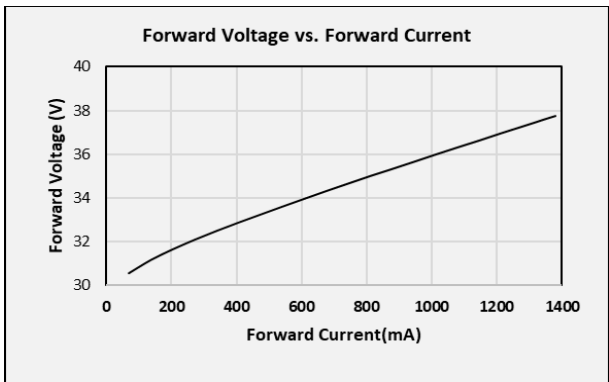
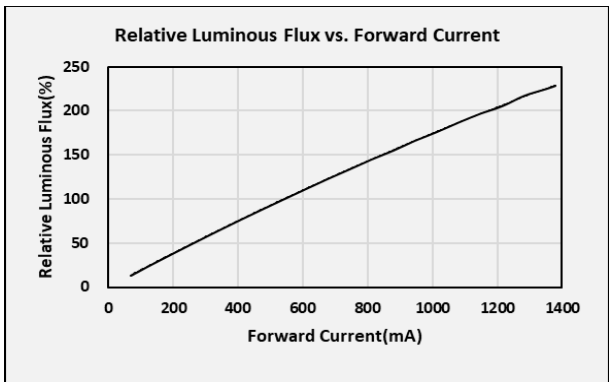
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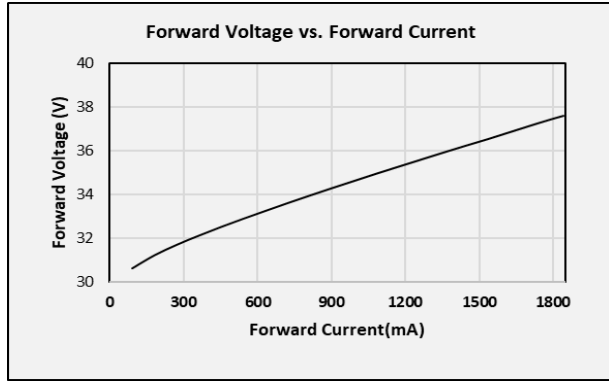
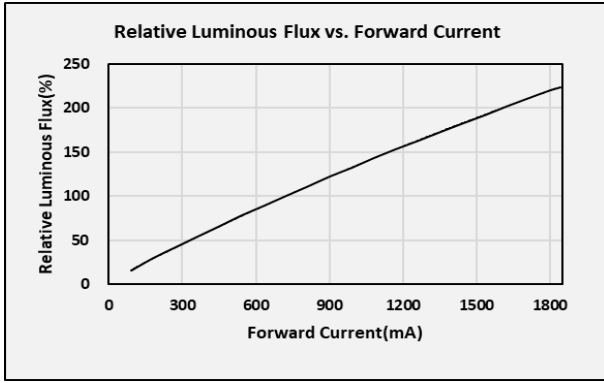
5) LC016D



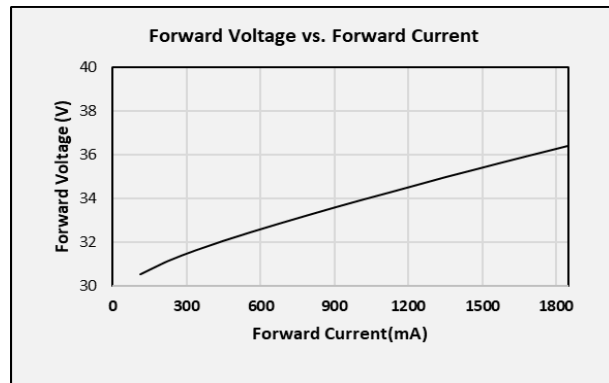
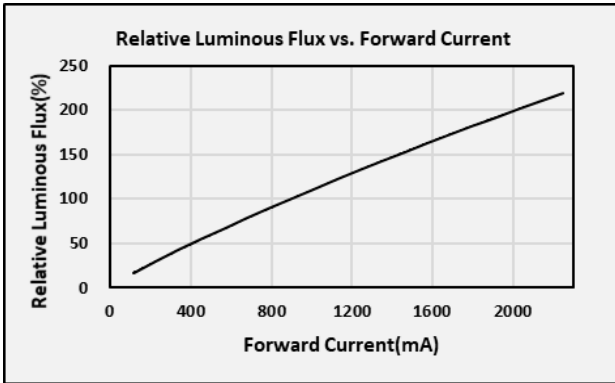
6) LC019D



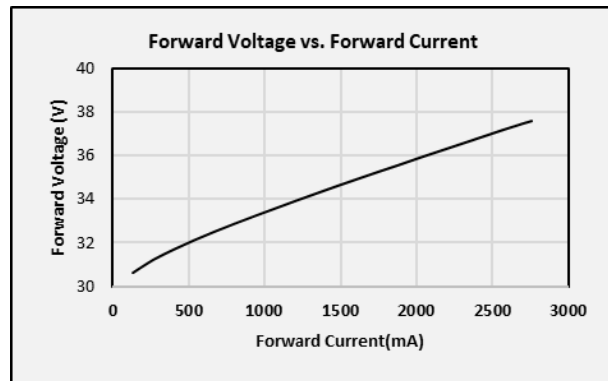
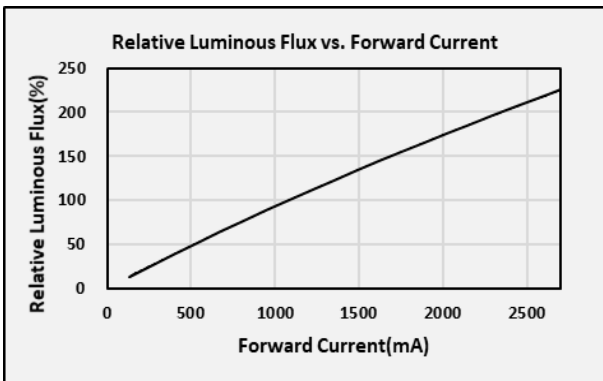
7) LC026D



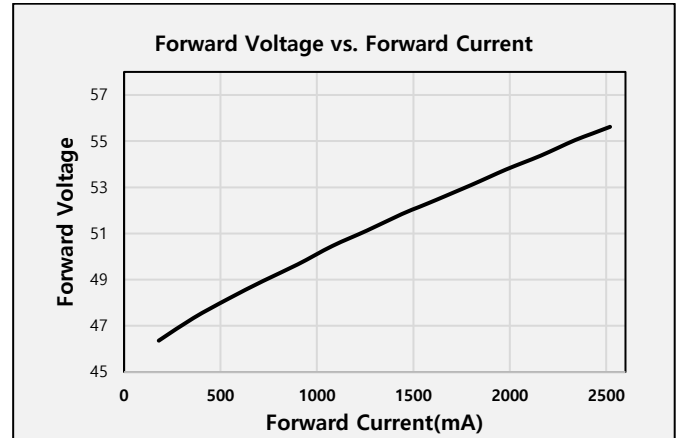
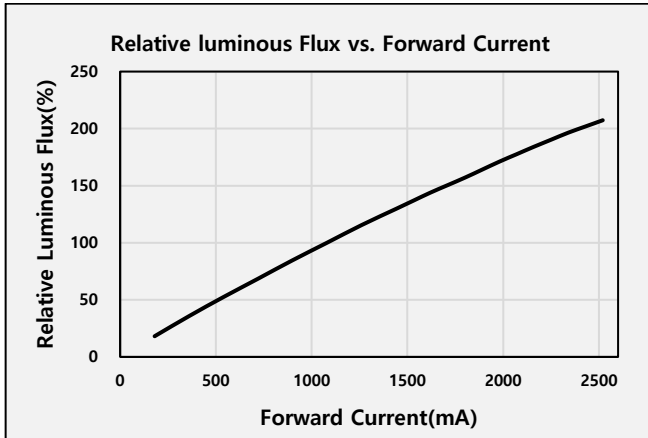
8) LC033D



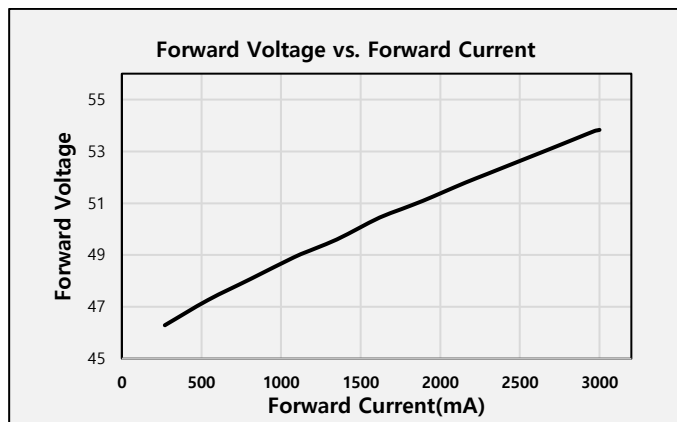
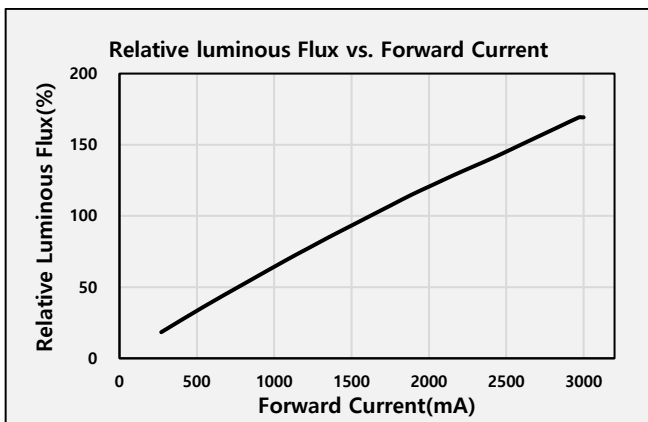
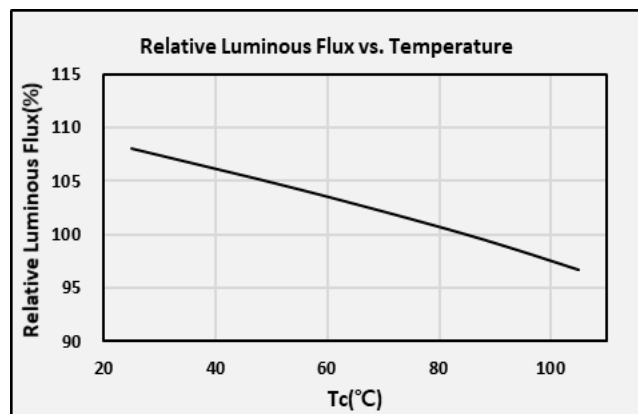
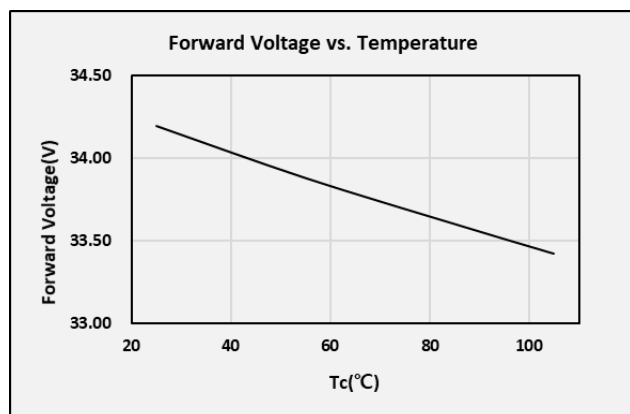
9) LC040D



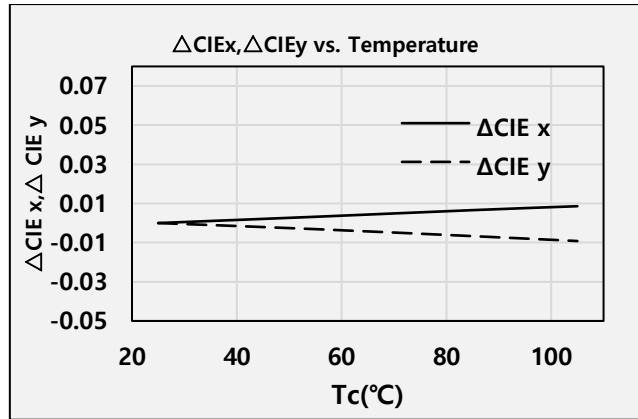
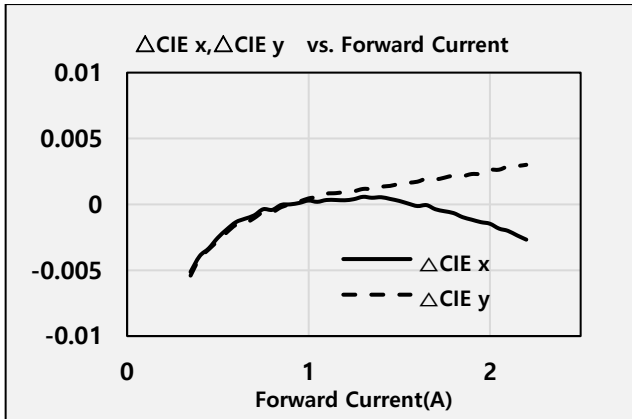
10) LC060D



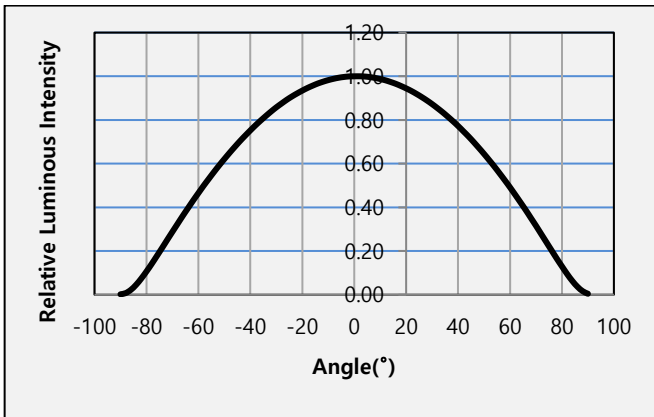
11) LC080D

c) Temperature Characteristics (I_f = Sorting Current)

d) Color Shift Characteristics ($T_J = 85\text{ }^\circ\text{C}$, $I_F = \text{Sorting Current}$, $\text{CRI} = 80+$)

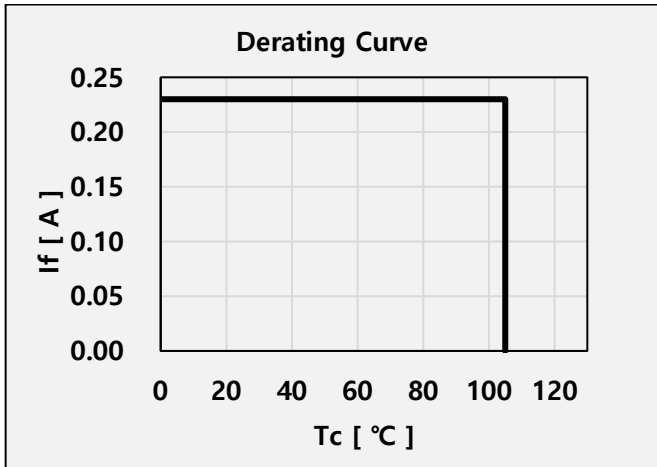


e) Beam Angle Characteristics ($I_F = \text{Sorting Current}$, $T_J = 85\text{ }^\circ\text{C}$)

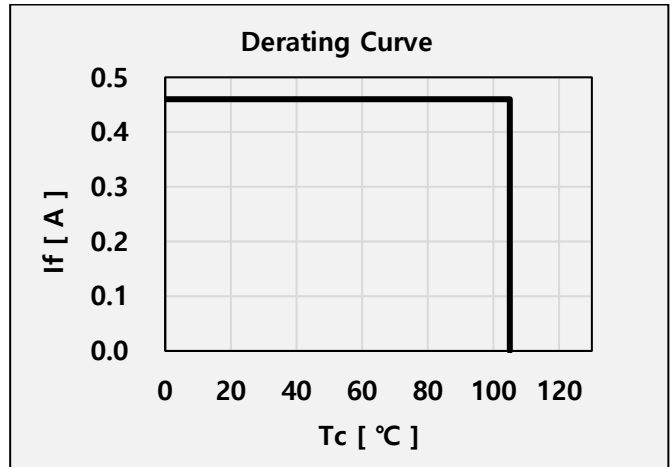


e) Derating Characteristics

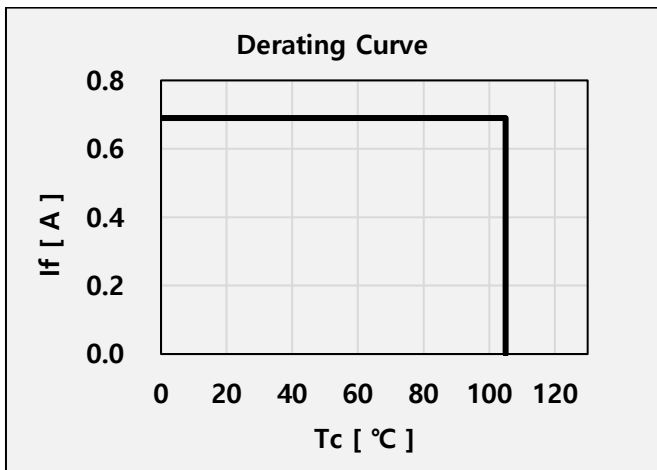
1) LC003D



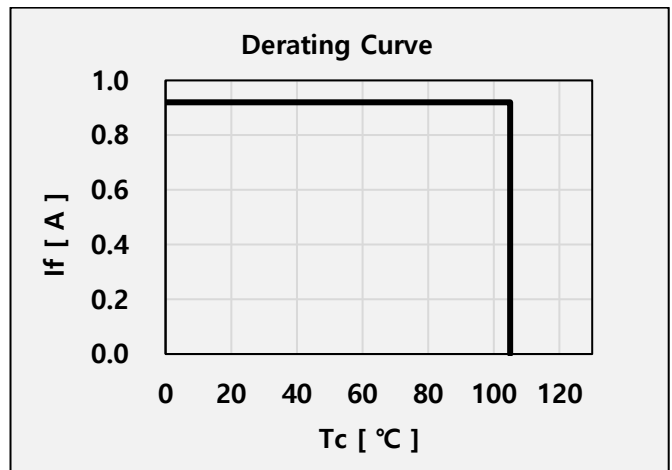
2) LC006D



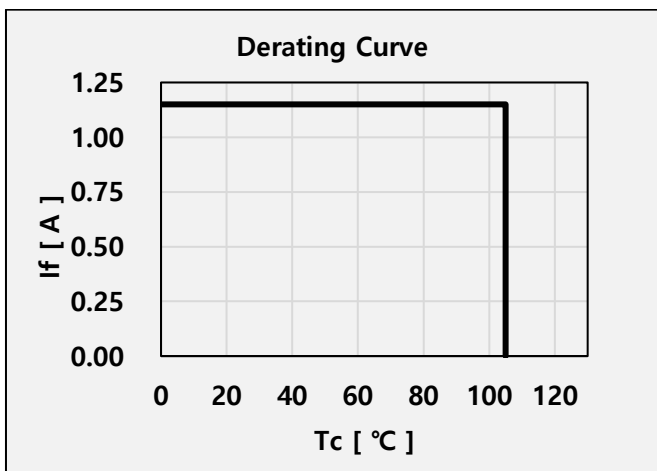
3) LC009D



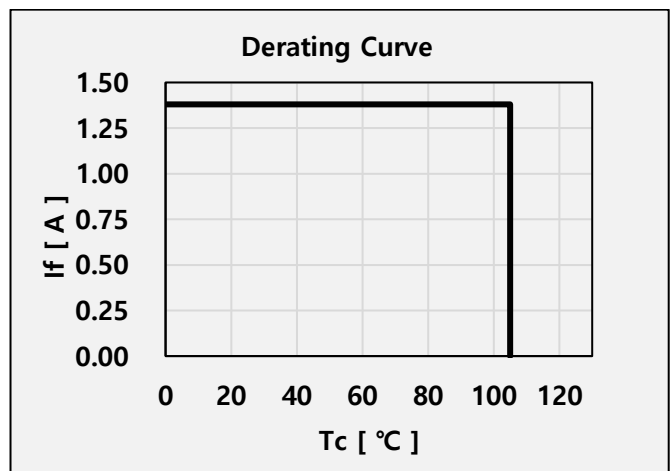
4) LC013D



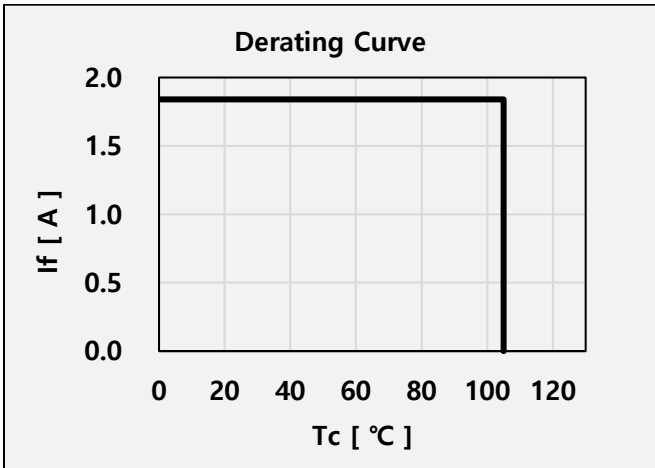
5) LC016D



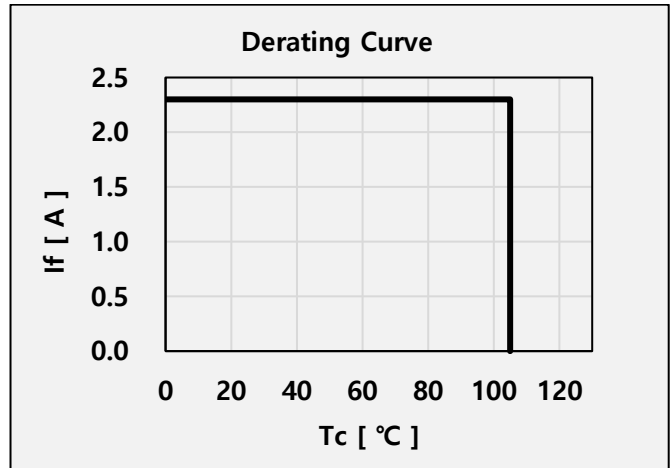
6) LC019D



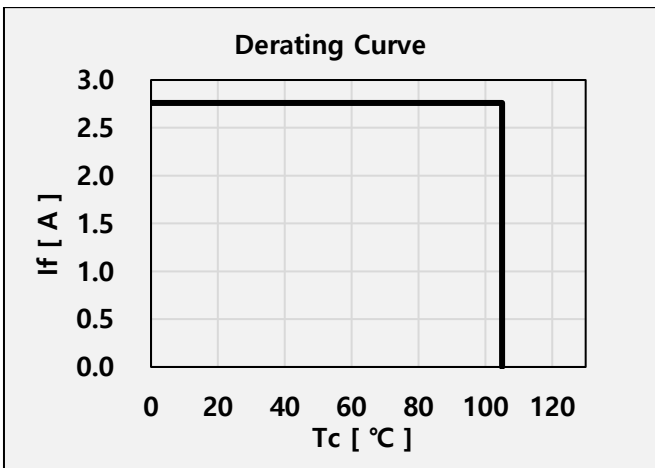
7) LC026D



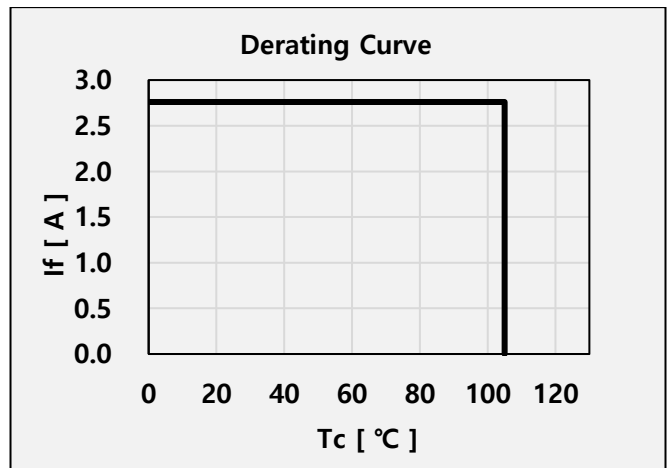
8) LC033D



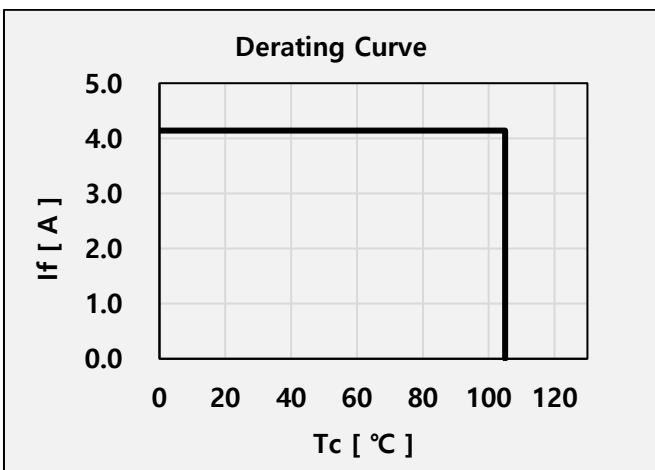
9) LC040D



10) LC060D

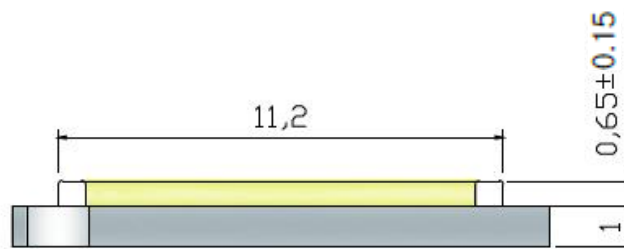
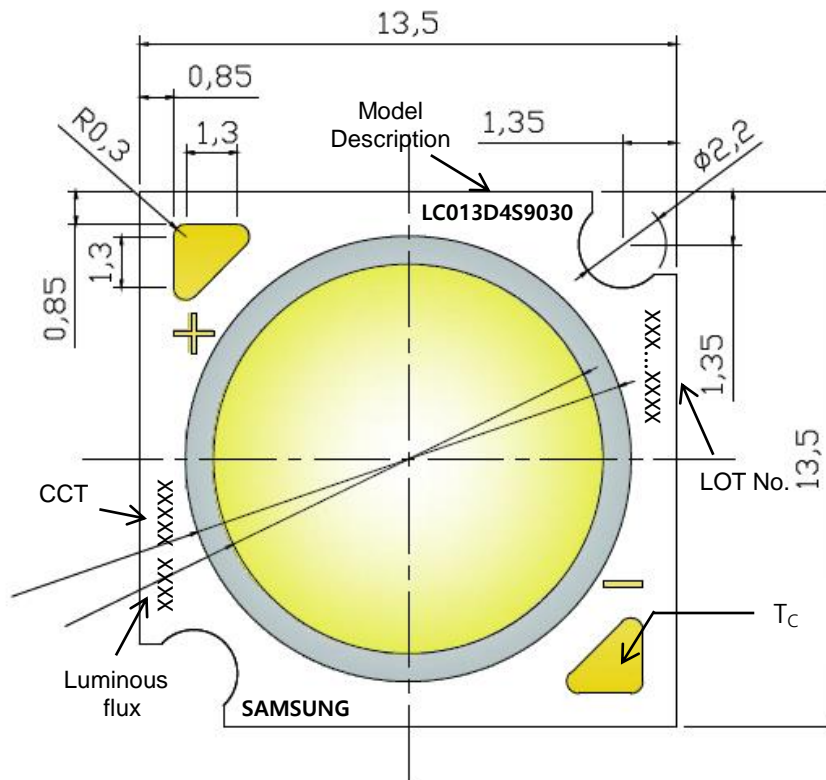


11) LC080D



4. Outline Drawing & Dimension

※ Model : LC003D, LC006D, LC009D, LC013D

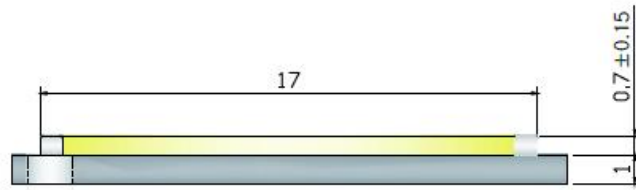
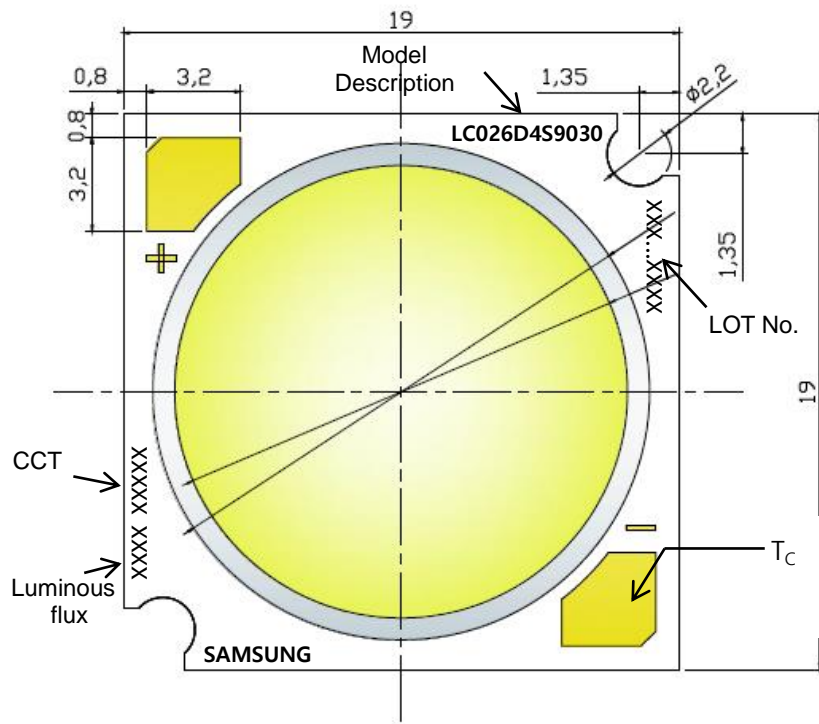


- 1. Unit: mm
- 2. Tolerance: ± 0.3 mm

Item	Dimension	Tolerance	Unit
Length	13.5	±0.15	mm
Width	13.5	±0.15	mm
Height	Dam	±0.15	mm
	Substrate	±0.10	mm
LES Diameter	Light Emitting Surface	±0.30	mm

Note: Denoted product information above is only an example
 (LC013D4S9030 : LC013D, Gen4, S90, 3000K)

※ Model : LC016D, LC019D, LC026D, LC033D

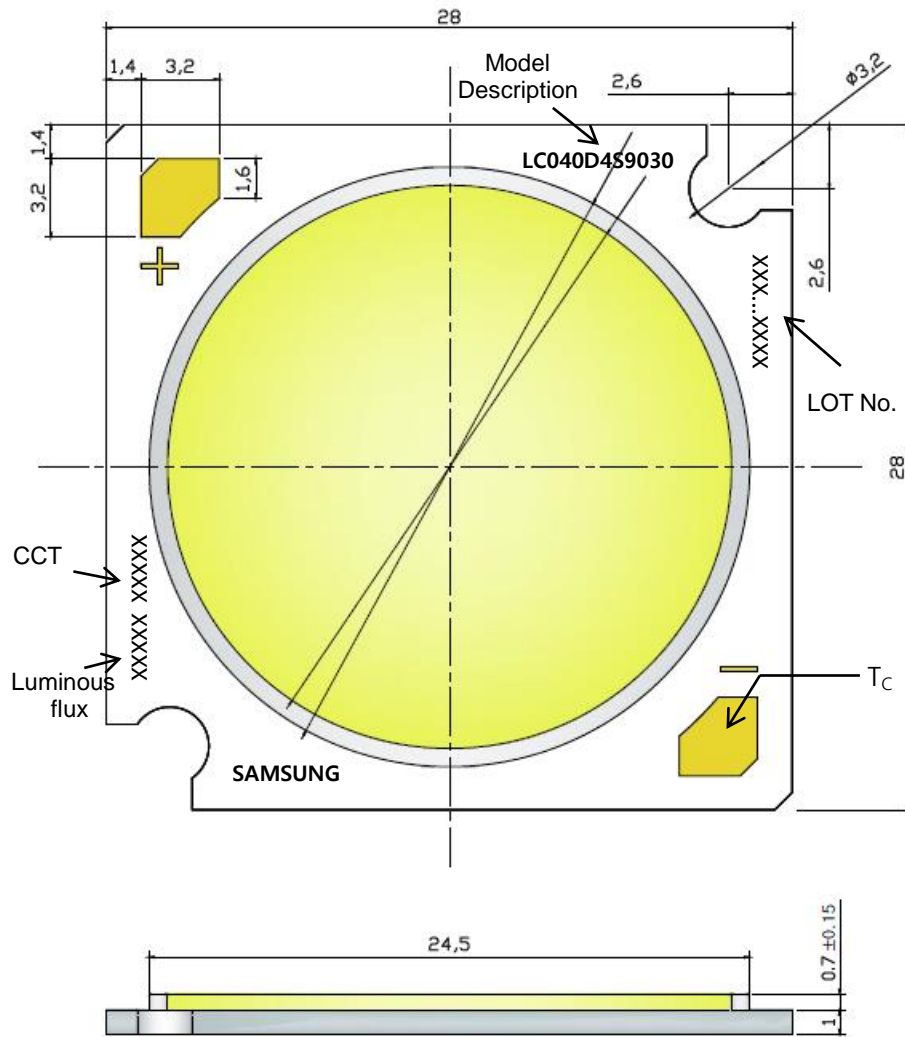


- 1. Unit: mm
- 2. Tolerance: ± 0.3 mm

Item	Dimension	Tolerance	Unit
Length	19.0	±0.15	mm
Width	19.0	±0.15	mm
Height	Dam	±0.15	mm
	Substrate	±0.10	mm
LES Diameter	Light Emitting Surface	±0.30	mm

Note: Denoted product information above is only an example
 (LC026D4S9030 : LC026D, Gen4, S90, 3000K)

※ Model : LC040D, LC060D, LC080D



- 1. Unit: mm
- 2. Tolerance: ± 0.3 mm

Item	Dimension	Tolerance	Unit
Length	28.0	± 0.15	mm
Width	28.0	± 0.15	mm
Height	Dam	± 0.15	mm
	Substrate	± 0.10	mm
LES Diameter	Light Emitting Surface	± 0.30	mm

Note: Denoted product information above is only an example
 (LC040D4S9030 : LC040D, Gen4, S90, 3000K)

5. Reliability Test Items & Conditions

a) Test Items

Test Item	Test Condition	Test Hour / Cycle
Wet High Temperature Operating Life Test (WHTOL)	60 °C, 90 % RH, DC Derating, I_F	1000 h
High Temperature Operating Life Test (HTOL)	85 °C, DC Derating, I_F	1000 h
Low Temperature Operating Life Test (LTOL)	-40 °C, DC, Derating I_F	1000 h
High Temperature Storage	105 °C	1000 h
Low Temperature Storage	-40 °C	1000 h
Wet High Temperature Storage Test	60°C, 90% RH	1000h
Temperature Cycling	-45 °C / 15min ~ 125 °C / 15min Temperature change within 5min	500 cycle
ESD (HBM)	R ₁ : 10 MΩ R ₂ : 1.5 kΩ C: 100 pF V: ±2 kV	5 times

b) Criteria for Judging the Damage

Item	Symbol	Test Condition ($T_c = 25\text{ °C}$)	Limit	
			Min.	Max.
Forward Voltage	V_F	$I_F = \text{Sorting Current}$	L.S.L. * 0.9	U.S.L. * 1.1
Luminous Flux	Φ_v	$I_F = \text{Sorting Current}$	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:

- ①②: Forward Voltage bin (refer to page 9)
- ③④: Chromaticity bin (refer to page 21)
- ⑤⑥: Luminous Flux bin (refer to page 5-8)

b) Lot Number

The lot number is composed of the following characters:



①②③④⑤⑥⑦⑧⑨ / I(a)(b)(c) / xxx pcs

- ① : Production site (G: China)
- ② : Product (4: LED)
- 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)

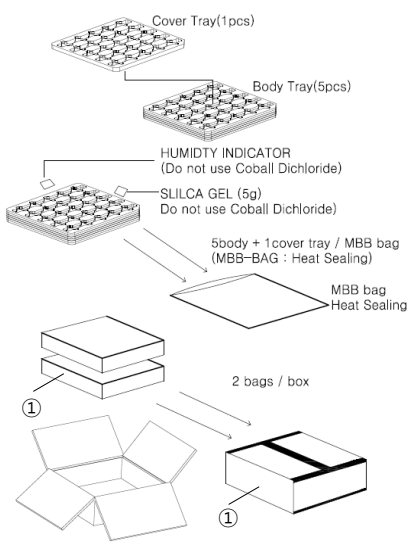
- ⑦⑧⑨ : Product serial number (001 ~ 999)
- a b c

7. Packing Structure

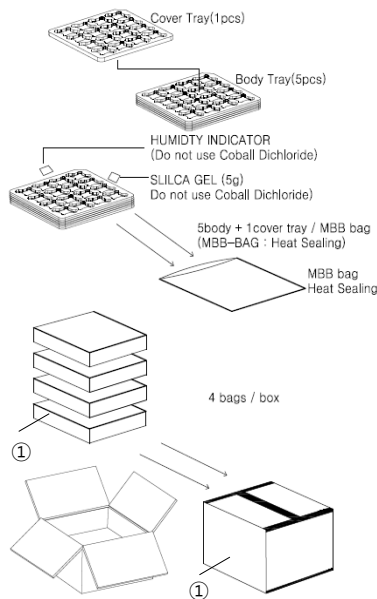
※ Model : L003D, LC006D, LC009D, LC013D

Packing material	Max. quantity in pcs of COB	Dimension(mm)			
		Length	Width	Height	Tolerance
Tray	50	200	200	8	1
Anti-Static Bag	250 (5 trays)	320	270	-	0.5
Outer Box (Small)	500 (2 bags)	225	225	65	5
Outer Box (Middle)	1000 (4 bags)	225	225	130	5

a) Packing Structure



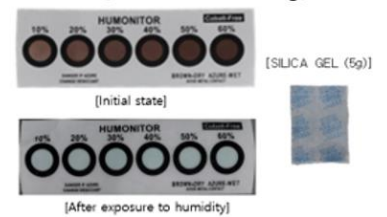
※ Small Box



※ Middle Box



[MBB BAG drawing]



① Side Label

LC013D S90 3000K
YZV3D4

SPHWHSHDND27YZV3D4 YZV3D4 01

 G4AZC4001 / I001 / xxx pcs

SAMSUNG

(1P) Supplier Part Number : SPHWHSHDND27YZV3D4

(33P) Bin Code / YZV3D4

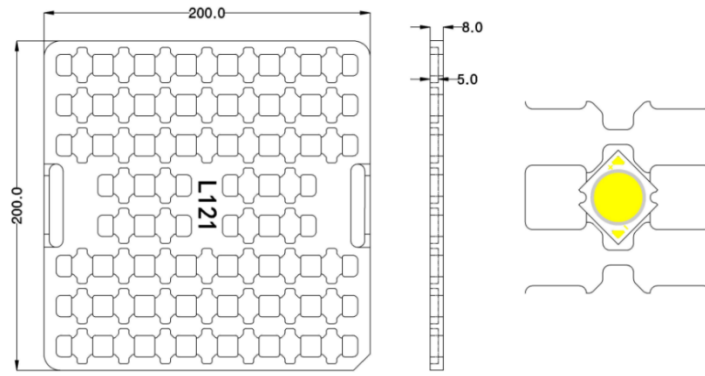
(1T) Lot Number / I001

(Q) Quantity : XXXX

(100) Data Code : 2109

(4L) Country of Origin : CN

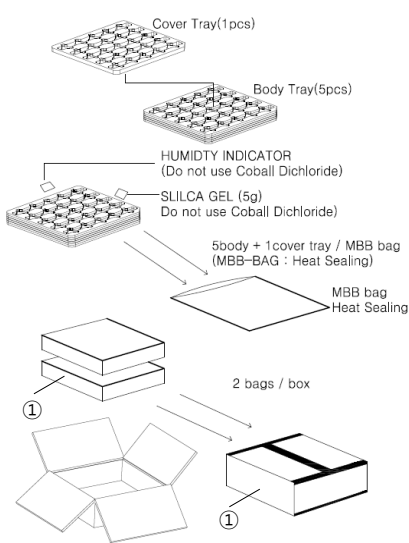
b) Tray



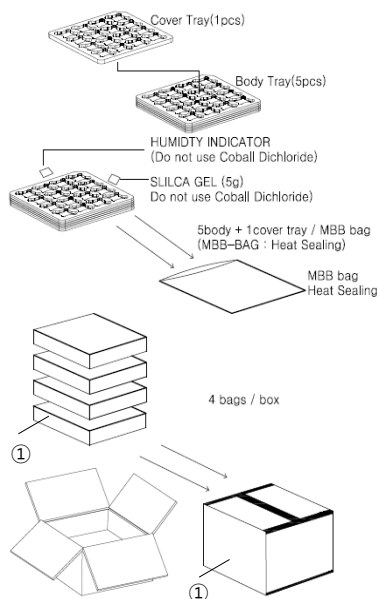
※ Model : LC016D, LC019D, LC026D, LC033D

Packing material	Max. quantity in pcs of COB	Dimension(mm)			
		Length	Width	Height	Tolerance
Tray	25	200	200	8	1
Anti-Static Bag	125 (5 trays)	320	270	-	+/- 0.5
Outer Box (Small)	250 (2 bags)	225	225	65	5
Outer Box (Middle)	500 (4 bags)	225	225	130	5

a) Packing Structure



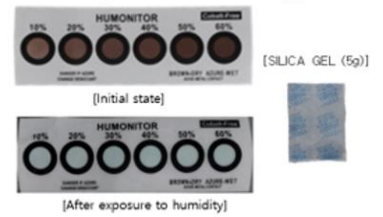
※ Small Box



※ Middle Box



[MBB BAG drawing]



[SILICA GEL (5g)]

[Initial state]

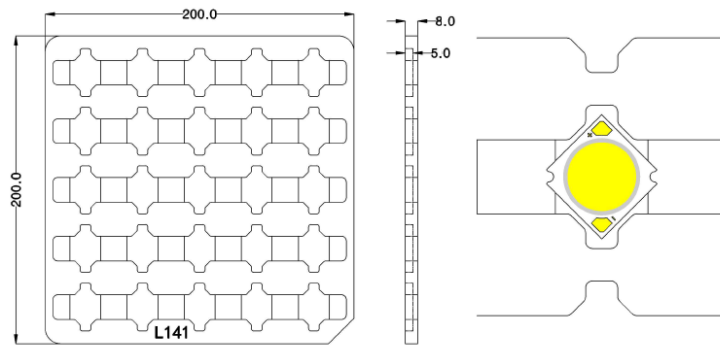
[After exposure to humidity]

① Side Label

LC026D S90 3000K
YZV3D4
 SPHWHSHDNG27YZV3D4 YZV3D4 01
 G4AZC4001 / I001 / xxx pcs
SAMSUNG

(1P) Supplier Part Number : SPHWHSHDNG27YZV3D4
 (Q) Quantity : XXX
 (33P) Bin Code / YZV3D4
 (100) Data Code : 2109
 (1T) Lot Number / I001
 (4L) Country of Origin : CN

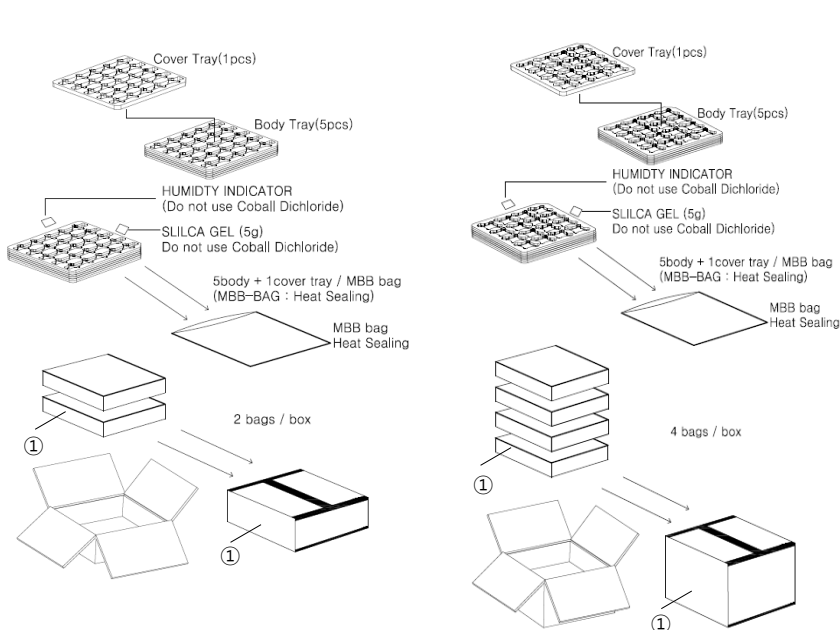
b) Tray



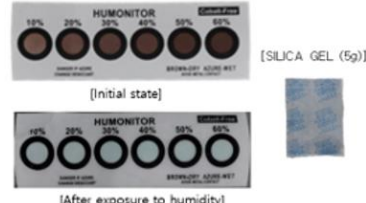
※ Model : LC040D, LC060D, LC080D

Packing material	Max. quantity in pcs of COB	Dimension(mm)			
		Length	Width	Height	Tolerance
Tray	16	200	200	8	1
Anti-Static Bag	80 (5 trays)	320	270	-	+/- 0.5
Outer Box (Small)	160 (2 bags)	225	225	65	5
Outer Box (Middle)	320 (4 bags)	225	225	130	5

a) Packing Structure



[MBB BAG drawing]



[SILICA GEL (5g)]

※ Small Box

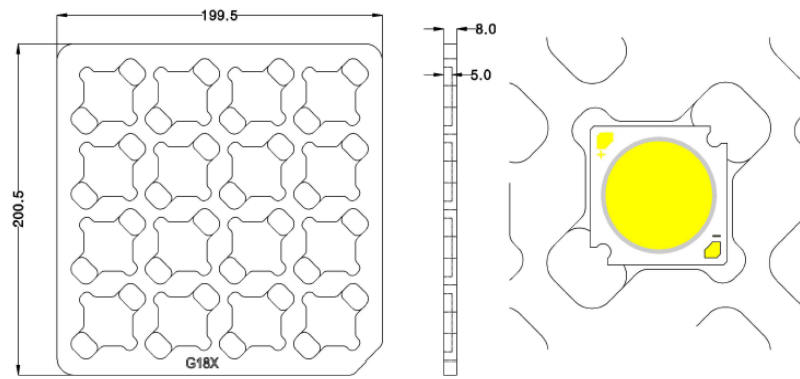
※ Middle Box

① Side Label

LC040D S90 3000K
YZV3D4
 SPHWSHDNK27YZV3D4 YZV3D4 01
 G4AZC4001 / 1001 / xxx pcs
SAMSUNG

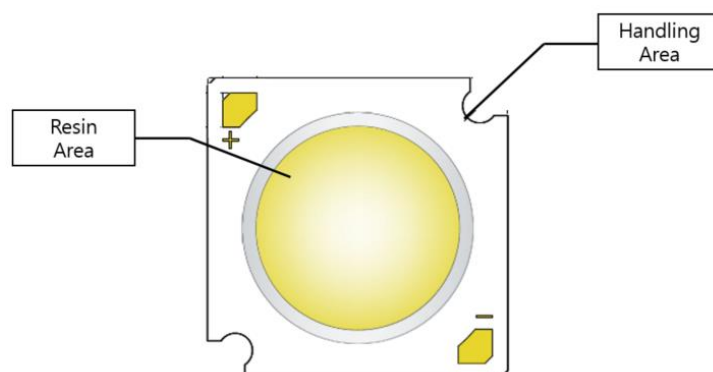
(1P) Supplier Part Number : SPHWSHDNK27YZV3D4
 (Q) Quantity : XXX
 (33P) Bin Code / YZV3D4
 (100) Data Code : 2109
 (1T) Lot Number / 1001
 (4L) Country of Origin : CN

b) Tray



8. Precautions in Handling & Use

- 1) This device should not be used in any type of fluid such as water, oil, organic solvent, etc. Some solvent-based cleaning agent may damage the silicone resins used in the device.
- 2) LEDs must be stored in a clean environment. Shelf life of sealed bags is 12 months at temperature 0~40 °C, 0~90 % RH.
- 3) After storage bag is opened, device subjected to soldering (wiring), 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 °C / 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 °C.
- 6) Devices must be baked for 1 hour at 60 ± 5 °C, 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) The thermal management is one of the most critical factors for the LED lighting system. Especially the LED junction temperature should not exceed the absolute maximum rating while operation of LED lighting system.
For more information, please refer to Application Note 'Mechanical & Thermal Guide for COB'.
- 9) In case of driving LEDs around the minimum current level (I_{f_min}), 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.
- 10) 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.
- 11) 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.
- 12) The LED from Samsung uses an Aluminum MCPCB with Ag thin layer and its surface color may change to black (or dark colored) when it is exposed to sulfur (S), chlorine (Cl) or other halogen compound. Sulfurization of Al-MCPCB may cause intensity degradation, change of chromaticity coordinates and, in extreme cases, open circuit. It requires caution. Due to possible sulfurization of Al-MCPCB, LED should not be used and stored together with oxidizing substances made of materials such as rubber, plain paper, lead solder cream, etc.
- 13) This product should be used in the field of commercial fixture and commercial lamp applications in general illumination that excludes sold into channels intended for incorporation in the consumer lamp products as well as sold for use in the field of use of display products.



Legal and additional information.

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Samsung provides limited warranty for its LED products, the full text of which is available at <https://www.samsung.com/led/support/warranties>.

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