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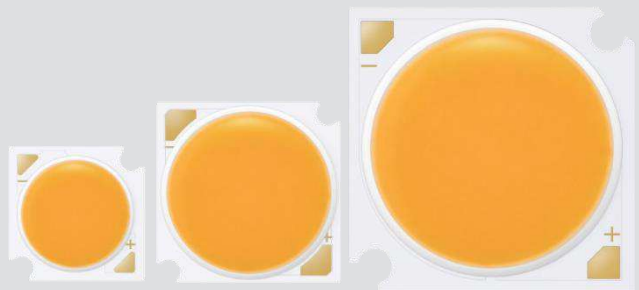
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High Voltage LED Series
Chip on Board

COB D-Gen.3



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
- Outdoor 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	-	115	°C	-
		LC003D	230 / 8.8		-
		LC006D	460 / 17.5		-
		LC009D	690 / 26.3		-
		LC013D	920 / 35.0		-
		LC016D	1150 / 43.8		-
Forward Current / Power Dissipation	I_F / P_D	LC019D	1380 / 52.6	mA / W	-
		LC026D	1840 / 70.1		-
		LC033D	2300 / 87.6		-
		LC040D	2760 / 105.1		-
		LC060D	2760 / 157.7		-
		LC080D	4140 / 236.5		-
ESD (HBM)	-	-	±2	kV	-
ESD (MM)	-	-	±0.5	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	31.0	34.0	37.0		
			1Z	46.8	51.0	55.2		
Color Rendering Index (R _a)	-	All model	3	70	-	-		
			5	80	-	-		
			7	90	-	-		
Beam Angle	°	-	-	115	-	-		
Nominal Power / Sorting Current	W / mA	LC003D	-	-	3.1 / 90	-		
		LC006D	-	-	6.1 / 180	-		
		LC009D	-	-	9.2 / 270	-		
		LC013D	-	-	12.2 / 360	-		
		LC016D	-	-	15.3 / 450	-		
		LC019D	-	-	18.4 / 540	-		
		LC026D	-	-	24.5 / 720	-		
		LC033D	-	-	30.6 / 900	-		
		LC040D	-	-	36.7 / 1080	-		
		LC060D	-	-	55.1 / 1080	-		
		LC080D	-	-	82.6 / 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 (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ $T_J = 85\text{ }^\circ\text{C}$ (lm)			
				Min.	Typ.	Max.	
LC003D	80	2700	D3	451	475	-	
		3000	D3	474	499	-	
		3500	D3	488	514	-	
		4000	D3	498	524	-	
		5000	D3	502	529	-	
		5700	D3	502	529	-	
		6500	D3	498	524	-	
	90	2700	D3	386	407	-	
		3000	D3	406	428	-	
		3500	D3	419	441	-	
		4000	D3	427	450	-	
		5000	D3	431	453	-	
		80	2700	D3	898	946	-
			3000	D3	944	994	-
3500	D3		972	1023	-		
4000	D3		991	1043	-		
5000	D3		1000	1052	-		
5700	D3		1000	1052	-		
6500	D3		991	1043	-		
LC006D	90	2700	D3	769	809	-	
		3000	D3	809	851	-	
		3500	D3	833	877	-	
		4000	D3	850	895	-	
		5000	D3	857	902	-	

Notes:

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

Model	CRI (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C (lm)		
				Min.	Typ.	Max.
LC009D	70	3000	D3	1515	1594	-
		4000	D3	1543	1624	-
		5000	D3	1571	1653	-
	80	2700	D3	1334	1405	-
		3000	D3	1402	1476	-
		3500	D3	1443	1519	-
		4000	D3	1472	1550	-
		5000	D3	1485	1563	-
		5700	D3	1485	1563	-
		6500	D3	1472	1550	-
	90	2700	D3	1142	1202	-
		3000	D3	1201	1264	-
		3500	D3	1237	1302	-
		4000	D3	1263	1329	-
		5000	D3	1273	1340	-
LC013D	70	3000	D3	1989	2094	-
		4000	D3	2026	2133	-
		5000	D3	2063	2171	-
	80	2700	D3	1753	1845	-
		3000	D3	1842	1939	-
		3500	D3	1896	1996	-
		4000	D3	1934	2036	-
		5000	D3	1950	2053	-
		5700	D3	1950	2053	-
		6500	D3	1934	2036	-
	90	2700	D3	1500	1579	-
		3000	D3	1578	1661	-
		3500	D3	1625	1710	-
		4000	D3	1658	1745	-
		5000	D3	1672	1760	-

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 (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C (lm)		
				Min.	Typ.	Max.
LC016D	70	3000	D3	2562	2697	-
		4000	D3	2609	2747	-
		5000	D3	2657	2797	-
	80	2700	D3	2257	2376	-
		3000	D3	2372	2497	-
		3500	D3	2442	2570	-
		4000	D3	2490	2622	-
		5000	D3	2511	2644	-
		5700	D3	2511	2644	-
		6500	D3	2490	2622	-
		2700	D3	1932	2033	-
		3000	D3	2032	2139	-
	90	3500	D3	2093	2203	-
		4000	D3	2136	2248	-
		5000	D3	2154	2267	-
70		3000	D3	3059	3220	-
		4000	D3	3116	3280	-
	5000	D3	3172	3339	-	
LC019D	80	2700	D3	2695	2837	-
		3000	D3	2833	2982	-
		3500	D3	2916	3069	-
		4000	D3	2974	3130	-
		5000	D3	2999	3157	-
	90	5700	D3	2999	3157	-
		6500	D3	2974	3130	-
		2700	D3	2307	2428	-
		3000	D3	2426	2554	-
		3500	D3	2499	2630	-
		4000	D3	2550	2684	-
		5000	D3	2572	2707	-

Notes:

- 3) 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 (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C (lm)			
				Min.	Typ.	Max.	
LC026D	70	3000	D3	4019	4230	-	
		4000	D3	4093	4308	-	
		5000	D3	4167	4387	-	
	80	2700	D3	3541	3727	-	
		3000	D3	3721	3917	-	
		3500	D3	3830	4032	-	
		4000	D3	3907	4112	-	
		5000	D3	3939	4147	-	
		5700	D3	3939	4147	-	
		6500	D3	3907	4112	-	
		90	2700	D3	3030	3190	-
			3000	D3	3187	3355	-
	3500		D3	3282	3455	-	
	LC033D	70	4000	D3	3350	3526	-
			5000	D3	3379	3556	-
3000			D3	4973	5235	-	
80		4000	D3	5065	5332	-	
		5000	D3	5157	5429	-	
		2700	D3	4382	4612	-	
		3000	D3	4605	4847	-	
		3500	D3	4740	4989	-	
		4000	D3	4834	5089	-	
		5000	D3	4875	5132	-	
		5700	D3	4875	5132	-	
		6500	D3	4834	5089	-	
90		2700	D3	3750	3947	-	
		3000	D3	3944	4152	-	
		3500	D3	4062	4276	-	
	4000	D3	4146	4364	-		
	5000	D3	4181	4401	-		

Notes:

- 4) 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 (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C (lm)		
				Min.	Typ.	Max.
LC040D	70	3000	D3	6118	6440	-
		4000	D3	6232	6560	-
		5000	D3	6345	6679	-
	80	2700	D3	5391	5675	-
		3000	D3	5665	5963	-
		3500	D3	5831	6138	-
		4000	D3	5948	6261	-
		5000	D3	5998	6313	-
		5700	D3	5998	6313	-
		6500	D3	5948	6261	-
	90	2700	D3	4614	4856	-
		3000	D3	4853	5108	-
		3500	D3	4997	5260	-
		4000	D3	5100	5369	-
		5000	D3	5144	5415	-
LC060D	70	3000	D3	9042	9518	-
		4000	D3	9209	9694	-
		5000	D3	9377	9870	-
	80	2700	D3	7967	8386	-
		3000	D3	8372	8813	-
		3500	D3	8617	9071	-
		4000	D3	8790	9253	-
		5000	D3	8864	9330	-
		5700	D3	8864	9330	-
		6500	D3	8790	9253	-
	90	2700	D3	6818	7177	-
		3000	D3	7172	7549	-
		3500	D3	7385	7774	-
		4000	D3	7537	7934	-
		5000	D3	7602	8002	-

Notes:

- 5) 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 (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C (lm)		
				Min.	Typ.	Max.
LC080D	70	3000	D3	13409	14115	-
		4000	D3	13657	14376	-
		5000	D3	13906	14637	-
	80	2700	D3	11815	12437	-
		3000	D3	12416	13069	-
		3500	D3	12779	13452	-
		4000	D3	13035	13721	-
		5000	D3	13144	13836	-
		5700	D3	13144	13836	-
		6500	D3	13035	13721	-
		2700	D3	10111	10643	-
	90	3000	D3	10635	11195	-
		3500	D3	10952	11529	-
		4000	D3	11178	11766	-
		5000	D3	11273	11867	-

Notes:

- 6) 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	A	H	D	N	G	2	5	Y	Z	W	3	D	3

Digit	PKG Information	Code	Specification
1 2 3	Samsung Package High Power	SPH	
4 5	Color	WH	White
6	Product Version	A	
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	3 5 7	Min. 70 (85°C) Min. 80 (85°C) Min. 90 (85°C)
13 14	Forward Voltage (V)	YZ 1Z	31.0~37.0 46.8~55.2
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)	D3	COB D-series Gen.3 level

a) Binning Structure

※ LCo₃D(I_F = 90 mA, T_J = 85 °C)

CRI(R _s) Min.	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)	
80	2700	SPHWAHDNA25YZW2D3	YZ	W2	D3	451 ~	
		SPHWAHDNA25YZW3D3		W3			
	3000	SPHWAHDNA25YZV2D3	YZ	V2	D3	474 ~	
		SPHWAHDNA25YZV3D3		V3			
	3500	SPHWAHDNA25YZU2D3	YZ	U2	D3	488 ~	
		SPHWAHDNA25YZU3D3		U3			
	4000	SPHWAHDNA25YZT2D3	YZ	T2	D3	498 ~	
		SPHWAHDNA25YZT3D3		T3			
	5000	SPHWAHDNA25YZR3D3	YZ	R3	D3	502 ~	
	5700	SPHWAHDNA25YZQ3D3	YZ	Q3	D3	502 ~	
	6500	SPHWAHDNA25YZP3D3	YZ	P3	D3	498 ~	
	90	2700	SPHWAHDNA27YZW2D3	YZ	W2	D3	386 ~
			SPHWAHDNA27YZW3D3		W3		
		3000	SPHWAHDNA27YZV2D3	YZ	V2	D3	406 ~
SPHWAHDNA27YZV3D3			V3				
3500		SPHWAHDNA27YZU2D3	YZ	U2	D3	419 ~	
		SPHWAHDNA27YZU3D3		U3			
4000		SPHWAHDNA27YZT2D3	YZ	T2	D3	427 ~	
		SPHWAHDNA27YZT3D3		T3			
5000		SPHWAHDNA27YZR3D3	YZ	R3	D3	431 ~	

※ LCoo6D(I_F = 180 mA, T_J = 85 °C)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)
80	2700	SPHWAHDNB25YZW2D3	YZ	W2	D3	898 ~
		SPHWAHDNB25YZW3D3		W3		
	3000	SPHWAHDNB25YZV2D3	YZ	V2	D3	944 ~
		SPHWAHDNB25YZV3D3		V3		
	3500	SPHWAHDNB25YZU2D3	YZ	U2	D3	972 ~
		SPHWAHDNB25YZU3D3		U3		
	4000	SPHWAHDNB25YZT2D3	YZ	T2	D3	991 ~
		SPHWAHDNB25YZT3D3		T3		
	5000	SPHWAHDNB25YZR3D3	YZ	R2	D3	1000 ~
	5700	SPHWAHDNB25YZQ3D3	YZ	Q2	D3	1000 ~
	6500	SPHWAHDNB25YZP3D3	YZ	P2	D3	991 ~
	90	2700	SPHWAHDNB27YZW2D3	YZ	W2	D3
SPHWAHDNB27YZW3D3			W3			
3000		SPHWAHDNB27YZV2D3	YZ	V2	D3	809 ~
		SPHWAHDNB27YZV3D3		V3		
3500		SPHWAHDNB27YZU2D3	YZ	U2	D3	833 ~
		SPHWAHDNB27YZU3D3		U3		
4000		SPHWAHDNB27YZT2D3	YZ	T2	D3	850 ~
		SPHWAHDNB27YZT3D3		T3		
5000		SPHWAHDNB27YZR3D3	YZ	R3	D3	857 ~

※ LCoogD(I_F = 270 mA, T_J = 85 °C)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)
70	3000	SPHWWAHDNC23YZV3D3	YZ	V3	D3	1515 ~
	4000	SPHWWAHDNC23YZT3D3	YZ	T3	D3	1543 ~
	5000	SPHWWAHDNC23YZR3D3	YZ	R3	D3	1571 ~
80	2700	SPHWWAHDNC25YZW2D3	YZ	W2	D3	1334 ~
		SPHWWAHDNC25YZW3D3		W3		
	3000	SPHWWAHDNC25YZV2D3	YZ	V2	D3	1402 ~
		SPHWWAHDNC25YZV3D3		V3		
	3500	SPHWWAHDNC25YZU2D3	YZ	U2	D3	1443 ~
		SPHWWAHDNC25YZU3D3		U3		
	4000	SPHWWAHDNC25YZT2D3	YZ	T2	D3	1472 ~
		SPHWWAHDNC25YZT3D3		T3		
	5000	SPHWWAHDNC25YZR3D3	YZ	R3	D3	1485 ~
	5700	SPHWWAHDNC25YZQ3D3	YZ	Q3	D3	1485 ~
	6500	SPHWWAHDNC25YZP3D3	YZ	P3	D3	1472 ~
	90	2700	SPHWWAHDNC27YZW2D3	YZ	W2	D3
SPHWWAHDNC27YZW3D3			W3			
3000		SPHWWAHDNC27YZV2D3	YZ	V2	D3	1201 ~
		SPHWWAHDNC27YZV3D3		V3		
3500		SPHWWAHDNC27YZU2D3	YZ	U2	D3	1237 ~
		SPHWWAHDNC27YZU3D3		U3		
4000		SPHWWAHDNC27YZT2D3	YZ	T2	D3	1263 ~
		SPHWWAHDNC27YZT3D3		T3		
5000		SPHWWAHDNC27YZR3D3	YZ	R3	D3	1273 ~

※ LCo13D(I_F = 360 mA, T_J = 85 °C)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)
70	3000	SPHWWAHDND23YZV3D3	YZ	V3	D3	1989 ~
	4000	SPHWWAHDND23YZT3D3	YZ	T3	D3	2026 ~
	5000	SPHWWAHDND23YZR3D3	YZ	R3	D3	2063 ~
80	2700	SPHWWAHDND25YZW2D3	YZ	W2	D3	1753 ~
		SPHWWAHDND25YZW3D3		W3		
	3000	SPHWWAHDND25YZV2D3	YZ	V2	D3	1842 ~
		SPHWWAHDND25YZV3D3		V3		
	3500	SPHWWAHDND25YZU2D3	YZ	U2	D3	1896 ~
		SPHWWAHDND25YZU3D3		U3		
	4000	SPHWWAHDND25YZT2D3	YZ	T2	D3	1934 ~
		SPHWWAHDND25YZT3D3		T3		
	5000	SPHWWAHDND25YZR3D3	YZ	R3	D3	1950 ~
	5700	SPHWWAHDND25YZQ3D3	YZ	Q3	D3	1950 ~
	6500	SPHWWAHDND25YZP3D3	YZ	P3	D3	1934 ~
	90	2700	SPHWWAHDND27YZW2D3	YZ	W2	D3
SPHWWAHDND27YZW3D3			W3			
3000		SPHWWAHDND27YZV2D3	YZ	V2	D3	1578 ~
		SPHWWAHDND27YZV3D3		V3		
3500		SPHWWAHDND27YZU2D3	YZ	U2	D3	1625 ~
		SPHWWAHDND27YZU3D3		U3		
4000		SPHWWAHDND27YZT2D3	YZ	T2	D3	1658 ~
		SPHWWAHDND27YZT3D3		T3		
5000		SPHWWAHDND27YZR3D3	YZ	R3	D3	1672 ~

※ LCo16D(I_F = 450 mA, T_J = 85 °C)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)
70	3000	SPHWWAHDNE23YZV3D3	YZ	V3	D3	2562 ~
	4000	SPHWWAHDNE23YZT3D3	YZ	T3	D3	2609 ~
	5000	SPHWWAHDNE23YZR3D3	YZ	R3	D3	2657 ~
80	2700	SPHWWAHDNE25YZW2D3	YZ	W2	D3	2257 ~
		SPHWWAHDNE25YZW3D3		W3		
	3000	SPHWWAHDNE25YZV2D3	YZ	V2	D3	2372 ~
		SPHWWAHDNE25YZV3D3		V3		
	3500	SPHWWAHDNE25YZU2D3	YZ	U2	D3	2442 ~
		SPHWWAHDNE25YZU3D3		U3		
	4000	SPHWWAHDNE25YZT2D3	YZ	T2	D3	2490 ~
		SPHWWAHDNE25YZT3D3		T3		
	5000	SPHWWAHDNE25YZR3D3	YZ	R3	D3	2511 ~
	5700	SPHWWAHDNE25YZQ3D3	YZ	Q3	D3	2511 ~
	6500	SPHWWAHDNE25YZP3D3	YZ	P3	D3	2490 ~
	90	2700	SPHWWAHDNE27YZW2D3	YZ	W2	D3
SPHWWAHDNE27YZW3D3			W3			
3000		SPHWWAHDNE27YZV2D3	YZ	V2	D3	2032 ~
		SPHWWAHDNE27YZV3D3		V3		
3500		SPHWWAHDNE27YZU2D3	YZ	U2	D3	2093 ~
		SPHWWAHDNE27YZU3D3		U3		
4000		SPHWWAHDNE27YZT2D3	YZ	T2	D3	2136 ~
		SPHWWAHDNE27YZT3D3		T3		
5000		SPHWWAHDNE27YZR3D3	YZ	R3	D3	2154 ~

※ LCo19D(I_F = 540 mA, T_J = 85 °C)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)	
70	3000	SPHWWAHDNF23YZV3D3	YZ	V3	D3	3059 ~	
	4000	SPHWWAHDNF23YZT3D3	YZ	T3	D3	3116 ~	
	5000	SPHWWAHDNF23YZR3D3	YZ	R3	D3	3172 ~	
80	2700	SPHWWAHDNF25YZW2D3	YZ	W2	D3	2695 ~	
		SPHWWAHDNF25YZW3D3		W3			
	3000	SPHWWAHDNF25YZV2D3	YZ	V2	D3	2833 ~	
		SPHWWAHDNF25YZV3D3		V3			
	3500	SPHWWAHDNF25YZU2D3	YZ	U2	D3	2916 ~	
		SPHWWAHDNF25YZU3D3		U3			
	4000	SPHWWAHDNF25YZT2D3	YZ	T2	D3	2974 ~	
		SPHWWAHDNF25YZT3D3		T3			
	5000	SPHWWAHDNF25YZR3D3	YZ	R3	D3	2999 ~	
	5700	SPHWWAHDNF25YZQ3D3	YZ	Q3	D3	2999 ~	
	6500	SPHWWAHDNF25YZP3D3	YZ	P3	D3	2974 ~	
	90	2700	SPHWWAHDNF27YZW2D3	YZ	W2	D3	2307 ~
			SPHWWAHDNF27YZW3D3		W3		
		3000	SPHWWAHDNF27YZV2D3	YZ	V2	D3	2426 ~
			SPHWWAHDNF27YZV3D3		V3		
3500		SPHWWAHDNF27YZU2D3	YZ	U2	D3	2499 ~	
		SPHWWAHDNF27YZU3D3		U3			
4000		SPHWWAHDNF27YZT2D3	YZ	T2	D3	2550 ~	
		SPHWWAHDNF27YZT3D3		T3			
5000		SPHWWAHDNF27YZR3D3	YZ	R3	D3	2572 ~	

※ LCo26D(I_F = 720 mA, T_J = 85 °C)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)	
70	3000	SPHWHAHNDNG23YZV3D3	YZ	V3	D3	4019 ~	
	4000	SPHWHAHNDNG23YZT3D3	YZ	T3	D3	4093 ~	
	5000	SPHWHAHNDNG23YZR3D3	YZ	R3	D3	4167 ~	
80	2700	SPHWHAHNDNG25YZW2D3	YZ	W2	D3	3541 ~	
		SPHWHAHNDNG25YZW3D3		W3			
	3000	SPHWHAHNDNG25YZV2D3	YZ	V2	D3	3721 ~	
		SPHWHAHNDNG25YZV3D3		V3			
	3500	SPHWHAHNDNG25YZU2D3	YZ	U2	D3	3830 ~	
		SPHWHAHNDNG25YZU3D3		U3			
	4000	SPHWHAHNDNG25YZT2D3	YZ	T2	D3	3907 ~	
		SPHWHAHNDNG25YZT3D3		T3			
	5000	SPHWHAHNDNG25YZR3D3	YZ	R3	D3	3939 ~	
	5700	SPHWHAHNDNG25YZQ3D3	YZ	Q3	D3	3939 ~	
	6500	SPHWHAHNDNG25YZP3D3	YZ	P3	D3	3907 ~	
	90	2700	SPHWHAHNDNG27YZW2D3	YZ	W2	D3	3030 ~
			SPHWHAHNDNG27YZW3D3		W3		
		3000	SPHWHAHNDNG27YZV2D3	YZ	V2	D3	3187 ~
			SPHWHAHNDNG27YZV3D3		V3		
3500		SPHWHAHNDNG27YZU2D3	YZ	U2	D3	3282 ~	
		SPHWHAHNDNG27YZU3D3		U3			
4000		SPHWHAHNDNG27YZT2D3	YZ	T2	D3	3350 ~	
		SPHWHAHNDNG27YZT3D3		T3			
5000		SPHWHAHNDNG27YZR3D3	YZ	R3	D3	3379 ~	

※ LCo₃D(I_F = 900 mA, T_J = 85 °C)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _F Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)
70	3000	SPHWAHDNH23YZV3D3	YZ	V3	D3	4973 ~
	4000	SPHWAHDNH23YZT3D3	YZ	T3	D3	5065 ~
	5000	SPHWAHDNH23YZR3D3	YZ	R3	D3	5157 ~
80	2700	SPHWAHDNH25YZW2D3	YZ	W2	D3	4382 ~
		SPHWAHDNH25YZW3D3		W3		
	3000	SPHWAHDNH25YZV2D3	YZ	V2	D3	4605 ~
		SPHWAHDNH25YZV3D3		V3		
	3500	SPHWAHDNH25YZU2D3	YZ	U2	D3	4740 ~
		SPHWAHDNH25YZU3D3		U3		
	4000	SPHWAHDNH25YZT2D3	YZ	T2	D3	4834 ~
		SPHWAHDNH25YZT3D3		T3		
	5000	SPHWAHDNH25YZR3D3	YZ	R3	D3	4875 ~
	5700	SPHWAHDNH25YZQ3D3	YZ	Q3	D3	4875 ~
	6500	SPHWAHDNH25YZP3D3	YZ	P3	D3	4834 ~
	90	2700	SPHWAHDNH27YZW2D3	YZ	W2	D3
SPHWAHDNH27YZW3D3			W3			
3000		SPHWAHDNH27YZV2D3	YZ	V2	D3	3944 ~
		SPHWAHDNH27YZV3D3		V3		
3500		SPHWAHDNH27YZU2D3	YZ	U2	D3	4062 ~
		SPHWAHDNH27YZU3D3		U3		
4000		SPHWAHDNH27YZT2D3	YZ	T2	D3	4146 ~
		SPHWAHDNH27YZT3D3		T3		
5000		SPHWAHDNH27YZR3D3	YZ	R3	D3	4181 ~

※ LCo₄oD(I_F = 1080 mA, T_J = 85 °C)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _r Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)	
70	3000	SPHWHAHDNK23YZV3D3	YZ	V3	D3	6118 ~	
	4000	SPHWHAHDNK23YZT3D3	YZ	T3	D3	6232 ~	
	5000	SPHWHAHDNK23YZR3D3	YZ	R3	D3	6345 ~	
80	2700	SPHWHAHDNK25YZW2D3	YZ	W2	D3	5391 ~	
		SPHWHAHDNK25YZW3D3		W3			
	3000	SPHWHAHDNK25YZV2D3	YZ	V2	D3	5665 ~	
		SPHWHAHDNK25YZV3D3		V3			
	3500	SPHWHAHDNK25YZU2D3	YZ	U2	D3	5831 ~	
		SPHWHAHDNK25YZU3D3		U3			
	4000	SPHWHAHDNK25YZT2D3	YZ	T2	D3	5948 ~	
		SPHWHAHDNK25YZT3D3		T3			
	5000	SPHWHAHDNK25YZR3D3	YZ	R3	D3	5998 ~	
	5700	SPHWHAHDNK25YZQ3D3	YZ	Q3	D3	5998 ~	
	6500	SPHWHAHDNK25YZP3D3	YZ	P3	D3	5948 ~	
	90	2700	SPHWHAHDNK27YZW2D3	YZ	W2	D3	4614 ~
			SPHWHAHDNK27YZW3D3		W3		
		3000	SPHWHAHDNK27YZV2D3	YZ	V2	D3	4853 ~
			SPHWHAHDNK27YZV3D3		V3		
		3500	SPHWHAHDNK27YZU2D3	YZ	U2	D3	4997 ~
			SPHWHAHDNK27YZU3D3		U3		
		4000	SPHWHAHDNK27YZT2D3	YZ	T2	D3	5100 ~
SPHWHAHDNK27YZT3D3			T3				
5000		SPHWHAHDNK27YZR3D3	YZ	R3	D3	5144 ~	

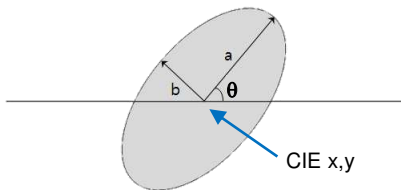
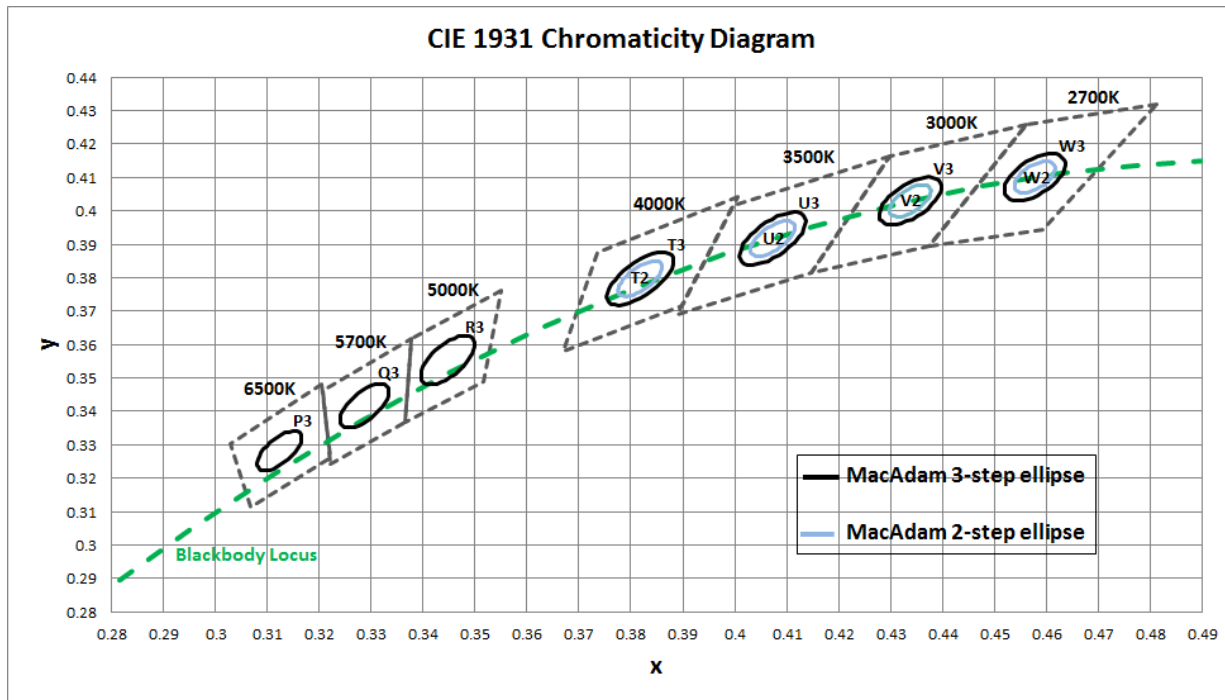
※ LCo6oD(I_F = 1080 mA, T_J = 85 °C)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _F Rank	Chrom. Bin	Flux Rank	Flux Range (Φ _v , lm)	
70	3000	SPHWWAHDNL231ZV3D3	1Z	V3	D3	9042 ~	
	4000	SPHWWAHDNL231ZT3D3	1Z	T3	D3	9209 ~	
	5000	SPHWWAHDNL231ZR3D3	1Z	R3	D3	9377 ~	
80	2700	SPHWWAHDNL251ZW2D3	1Z	W2	D3	7967 ~	
		SPHWWAHDNL251ZW3D3		W3			
	3000	SPHWWAHDNL251ZV2D3	1Z	V2	D3	8372 ~	
		SPHWWAHDNL251ZV3D3		V3			
	3500	SPHWWAHDNL251ZU2D3	1Z	U2	D3	8617 ~	
		SPHWWAHDNL251ZU3D3		U3			
	4000	SPHWWAHDNL251ZT2D3	1Z	T2	D3	8790 ~	
		SPHWWAHDNL251ZT3D3		T3			
	5000	SPHWWAHDNL251ZR3D3	1Z	R3	D3	8864 ~	
	5700	SPHWWAHDNL251ZQ3D3	1Z	Q3	D3	8864 ~	
	6500	SPHWWAHDNL251ZP3D3	1Z	P3	D3	8790 ~	
	90	2700	SPHWWAHDNL271ZW2D3	1Z	W2	D3	6818 ~
			SPHWWAHDNL271ZW3D3		W3		
		3000	SPHWWAHDNL271ZV2D3	1Z	V2	D3	7172 ~
			SPHWWAHDNL271ZV3D3		V3		
3500		SPHWWAHDNL271ZU2D3	1Z	U2	D3	7385 ~	
		SPHWWAHDNL271ZU3D3		U3			
4000		SPHWWAHDNL271ZT2D3	1Z	T2	D3	7537 ~	
		SPHWWAHDNL271ZT3D3		T3			
5000		SPHWWAHDNL271ZR3D3	1Z	R3	D3	7602 ~	

※ LCo8oD(I_F = 1620 mA, T_J = 85 °C)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _F Rank	Chrom. Bin	Flux Rank	Flux Range (Φ _v , lm)	
70	3000	SPHWWAHDNM231ZV3D3	1Z	V3	D3	13409 ~	
	4000	SPHWWAHDNM231ZT3D3	1Z	T3	D3	13657 ~	
	5000	SPHWWAHDNM231ZR3D3	1Z	R3	D3	13906 ~	
80	2700	SPHWWAHDNM251ZW2D3	1Z	W2	D3	11815 ~	
		SPHWWAHDNM251ZW3D3		W3			
	3000	SPHWWAHDNM251ZV2D3	1Z	V2	D3	12416 ~	
		SPHWWAHDNM251ZV3D3		V3			
	3500	SPHWWAHDNM251ZU2D3	1Z	U2	D3	12779 ~	
		SPHWWAHDNM251ZU3D3		U3			
	4000	SPHWWAHDNM251ZT2D3	1Z	T2	D3	13035 ~	
		SPHWWAHDNM251ZT3D3		T3			
	5000	SPHWWAHDNM251ZR3D3	1Z	R3	D3	13144 ~	
	5700	SPHWWAHDNM251ZQ3D3	1Z	Q3	D3	13144 ~	
	6500	SPHWWAHDNM251ZP3D3	1Z	P3	D3	13035 ~	
	90	2700	SPHWWAHDNM271ZW2D3	1Z	W2	D3	10111 ~
			SPHWWAHDNM271ZW3D3		W3		
		3000	SPHWWAHDNM271ZV2D3	1Z	V2	D3	10635 ~
			SPHWWAHDNM271ZV3D3		V3		
		3500	SPHWWAHDNM271ZU2D3	1Z	U2	D3	10952 ~
			SPHWWAHDNM271ZU3D3		U3		
		4000	SPHWWAHDNM271ZT2D3	1Z	T2	D3	11178 ~
SPHWWAHDNM271ZT3D3			T3				
5000		SPHWWAHDNM271ZR3D3	1Z	R3	D3	11273 ~	

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



MacAdam Ellipse (W2, W3)					
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 (V2, V3)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4338	0.403	53.22	0.0056	0.0027
3-step	0.4338	0.4030	53.22	0.0083	0.0041

MacAdam Ellipse (U2, U3)					
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 (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 (R3)					
Step	CIE x	CIE y	θ	a	b
3-step	0.3447	0.3553	59.62	0.0082	0.0035

MacAdam Ellipse (Q3)					
Step	CIE x	CIE y	θ	a	b
3-step	0.3287	0.3417	59.0950	0.0075	0.0032

MacAdam Ellipse (P3)					
Step	CIE x	CIE y	θ	a	b
3-step	0.3123	0.3282	58.5700	0.0067	0.0029

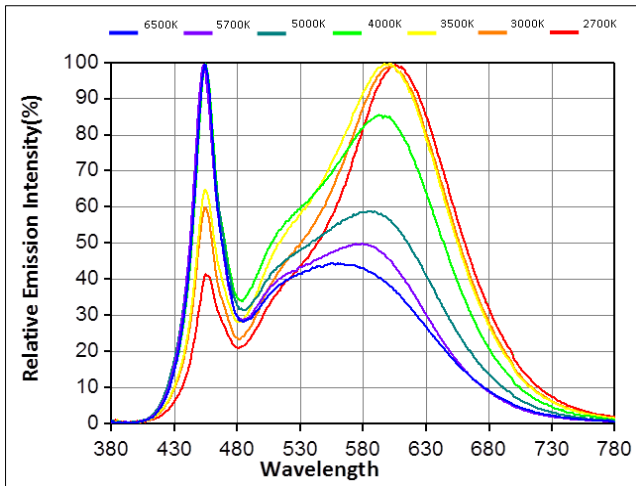
Note:

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

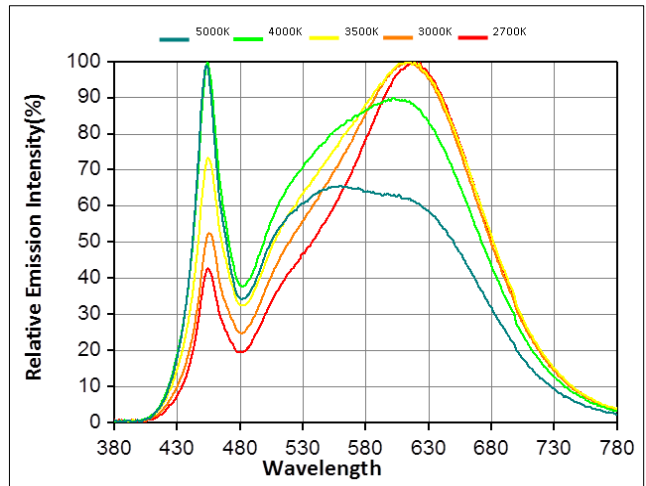
3. Typical Characteristics Graphs

a) Spectrum Distribution (I_f = Sorting Current, T_J = 85 °C)

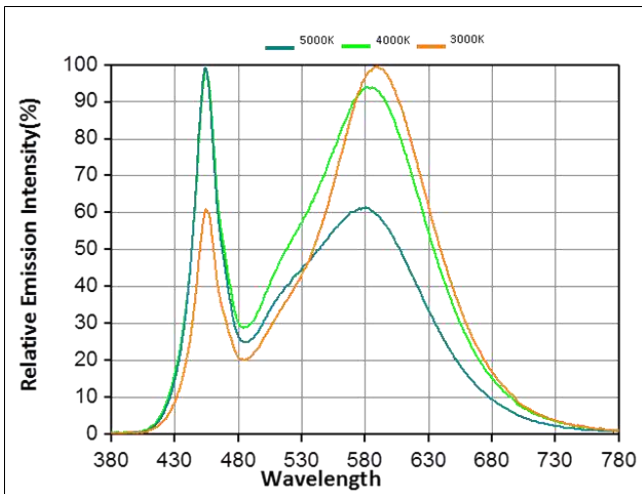
CRI Ra 80+



CRI Ra 90+

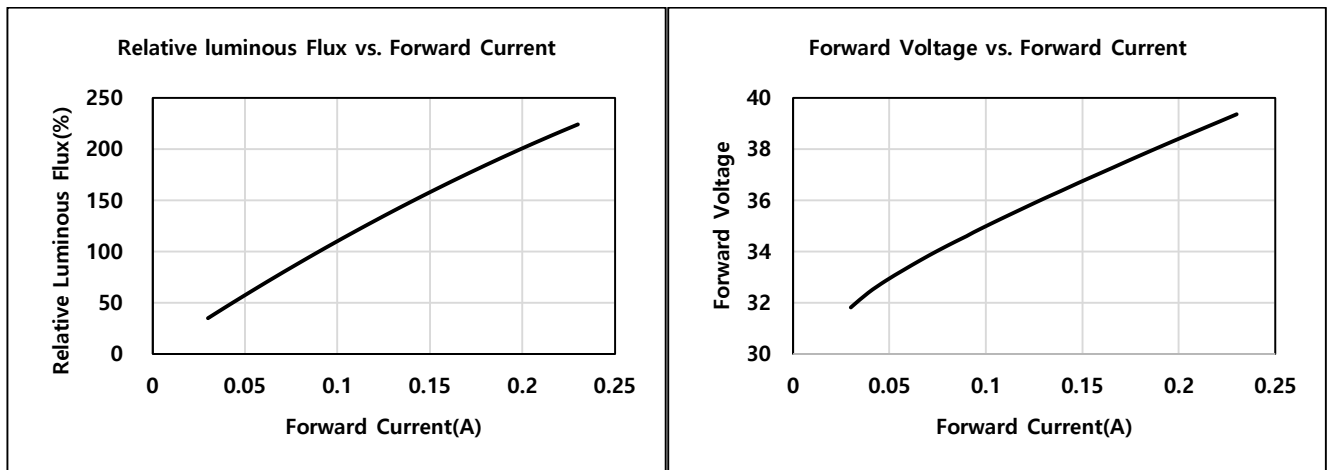


CRI Ra 70+

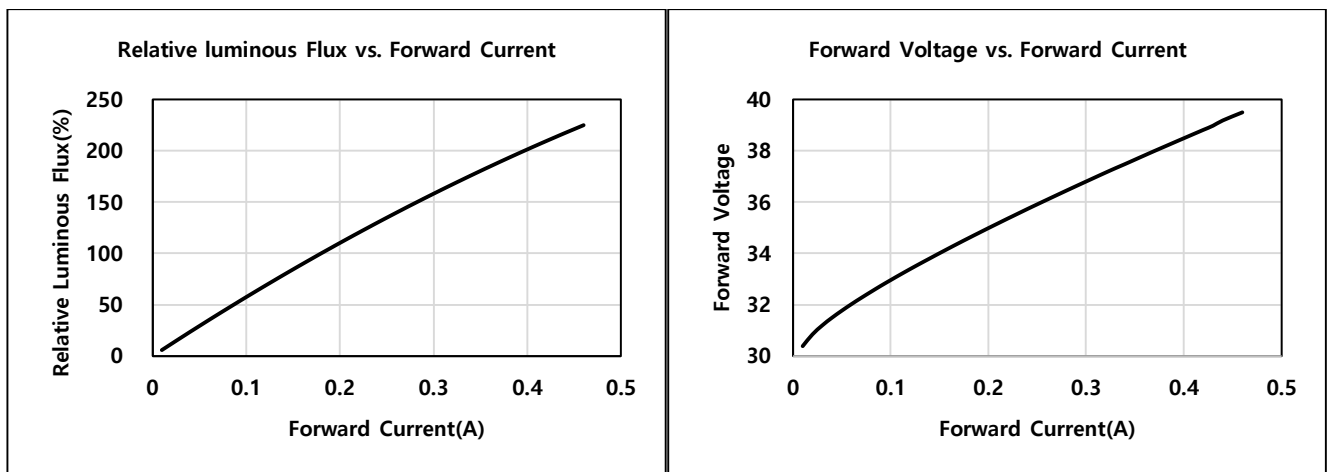


b) Forward Current Characteristics ($T_J = 85\text{ }^\circ\text{C}$)

1) LC003D



2) LC006D



3) LC009D

