

High Voltage LED Series Chip on Board

COB D-Gen.4



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

SAMSUNG

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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	-
Forward Current / Power Dissipation	I _F / P _D	LC003D	230 / 8.4	mA / W	-
		LC006D	460 / 16.8		-
		LC009D	690 / 25.3		-
		LC013D	920 / 33.7		-
		LC016D	1150 / 42.1		-
		LC019D	1380 / 50.5		-
		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, $T_J = 85\text{ }^{\circ}\text{C}$)

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	3	70 / -50	-	-
			5	80 / 0	-	-
			7	90 / 50	-	-
Beam Angle	$^{\circ}$	-	-	-	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	-
		LC003D	-	-	2.43	-
		LC006D	-	-	1.41	-
Thermal Resistance (Junction to chip case)	$^{\circ}\text{C/W}$	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 ($T_J = T_C = T_a = 85\text{ }^{\circ}\text{C}$)
- 2) Samsung maintains measurement tolerance of: forward voltage = $\pm 5\%$, CRI = ± 1
- 3) Refer to the derating curve, '3. Typical Characteristics Graph' designed within the range.

c) Luminous Flux Characteristics (I_F = Sorting Current)

Model	CRI (R_a) Min.	Nominal CCT (K)	Flux Rank	Flux@ $T_J = 85^\circ\text{C}$ (lm)		
				Min.	Typ.	Max.
LC003D	80	2700	D4	468	498	-
		3000	D4	490	521	-
		3500	D4	501	534	-
		4000	D4	511	544	-
		5000	D4	517	549	-
		5700	D4	517	549	-
		6500	D4	508	540	-
	90	2700	D4	387	412	-
		3000	D4	416	443	-
		3500	D4	432	459	-
		4000	D4	445	474	-
		5000	D4	450	479	-
LC006D	80	2700	D4	923	981	-
		3000	D4	981	1043	-
		3500	D4	988	1051	-
		4000	D4	1008	1071	-
		5000	D4	1017	1081	-
		5700	D4	1017	1081	-
		6500	D4	1007	1071	-
	90	2700	D4	773	822	-
		3000	D4	833	886	-
		3500	D4	857	912	-
		4000	D4	876	933	-
		5000	D4	887	943	-

Notes:

- 1) The COB is tested in pulsed operating condition at rated test current (10 ms pulse width) and rated temperature ($T_J = T_C = 85^\circ\text{C}$).
- 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	D4	1562	1662	-
		4000	D4	1627	1731	-
		5000	D4	1605	1708	-
	80	2700	D4	1383	1471	-
		3000	D4	1444	1536	-
		3500	D4	1474	1568	-
		4000	D4	1511	1607	-
		5000	D4	1525	1623	-
		5700	D4	1525	1623	-
		6500	D4	1501	1597	-
	90	2700	D4	1143	1216	-
		3000	D4	1232	1310	-
		3500	D4	1268	1349	-
		4000	D4	1315	1399	-
		5000	D4	1329	1415	-
LC013D	70	2200	D4	1795	1910	-
		2700	D4	1923	2046	-
		3000	D4	2047	2177	-
		4000	D4	2125	2261	-
		5000	D4	2077	2210	-
		5700	D4	2106	2241	-
	80	2700	D4	1806	1922	-
		3000	D4	1899	2021	-
		3500	D4	1935	2059	-
		4000	D4	1973	2099	-
		5000	D4	1996	2123	-
		5700	D4	1993	2120	-
		6500	D4	1970	2095	-
	90	2700	D4	1502	1598	-
		3000	D4	1618	1722	-
		3500	D4	1668	1774	-
		4000	D4	1717	1827	-
		5000	D4	1755	1868	-

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

Model	CRI (R _a) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C (lm)		
				Min.	Typ.	Max.
LC016D	70	2200	D4	2384	2536	-
		2700	D4	2452	2609	-
		3000	D4	2670	2840	-
		4000	D4	2781	2959	-
		5000	D4	2744	2919	-
		5700	D4	2756	2932	-
	80	2700	D4	2364	2515	-
		3000	D4	2435	2590	-
		3500	D4	2494	2653	-
		4000	D4	2570	2734	-
		5000	D4	2608	2774	-
		5700	D4	2597	2763	-
	90	6500	D4	2566	2729	-
		2700	D4	1926	2049	-
		3000	D4	2066	2197	-
		3500	D4	2133	2270	-
		4000	D4	2236	2379	-
		5000	D4	2273	2418	-
LC019D	70	2200	D4	2856	3038	-
		2700	D4	3066	3262	-
		3000	D4	3197	3401	-
		4000	D4	3331	3543	-
		5000	D4	3287	3497	-
		5700	D4	3301	3512	-
	80	2700	D4	2832	3013	-
		3000	D4	2921	3107	-
		3500	D4	2977	3167	-
		4000	D4	3069	3265	-
		5000	D4	3123	3322	-
		5700	D4	3101	3299	-
	90	6500	D4	3072	3268	-
		2700	D4	2309	2456	-
		3000	D4	2490	2649	-
		3500	D4	2567	2730	-
		4000	D4	2671	2842	-
		5000	D4	2721	2895	-

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

Model	CRI (R _a) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C (lm)		
				Min.	Typ.	Max.
LC026D	70	2200	D4	3758	3998	-
		2700	D4	3970	4223	-
		3000	D4	4219	4488	-
		4000	D4	4354	4631	-
		5000	D4	4266	4538	-
		5700	D4	4345	4622	-
	80	2700	D4	3723	3961	-
		3000	D4	3917	4167	-
		3500	D4	3965	4218	-
		4000	D4	4035	4292	-
		5000	D4	4125	4388	-
		5700	D4	4085	4346	-
	90	6500	D4	4058	4317	-
		2700	D4	3077	3273	-
		3000	D4	3305	3516	-
		3500	D4	3391	3607	-
		4000	D4	3534	3760	-
		5000	D4	3604	3834	-
LC033D	70	2200	D4	4604	4897	-
		2700	D4	4944	5260	-
		3000	D4	5155	5484	-
		4000	D4	5371	5713	-
		5000	D4	5299	5637	-
		5700	D4	5323	5663	-
	80	2700	D4	4565	4857	-
		3000	D4	4812	5120	-
		3500	D4	4892	5204	-
		4000	D4	4987	5305	-
		5000	D4	5035	5356	-
		5700	D4	5035	5356	-
	90	6500	D4	4954	5270	-
		2700	D4	3821	4065	-
		3000	D4	4122	4385	-
		3500	D4	4244	4515	-
		4000	D4	4340	4617	-
		5000	D4	4388	4668	-

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

Model	CRI (R _a) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C (lm)		
				Min.	Typ.	Max.
LC040D	70	2200	D4	5693	6057	-
		2700	D4	5920	6298	-
		3000	D4	6260	6659	-
		4000	D4	6642	7066	-
		5000	D4	6519	6935	-
		5700	D4	6583	7004	-
	80	2700	D4	5646	6007	-
		3000	D4	5841	6214	-
		3500	D4	6049	6435	-
		4000	D4	6168	6562	-
		5000	D4	6177	6571	-
		5700	D4	6227	6625	-
	90	6500	D4	6126	6517	-
		2700	D4	4674	4972	-
		3000	D4	4951	5267	-
		3500	D4	5159	5488	-
		4000	D4	5332	5672	-
		5000	D4	5436	5782	-
LC060D	70	5700	D4	5318	5658	-
		2200	D4	8430	8969	-
		2700	D4	8794	9355	-
		3000	D4	9440	10042	-
		4000	D4	9835	10463	-
		5000	D4	9557	10167	-
	80	5700	D4	9747	10369	-
		2700	D4	8360	8893	-
		3000	D4	8810	9373	-
		3500	D4	8938	9509	-
		4000	D4	9133	9716	-
		5000	D4	9220	9809	-
	90	5700	D4	9220	9809	-
		6500	D4	9071	9650	-
		2700	D4	6912	7354	-
		3000	D4	7390	7861	-
		3500	D4	7649	8137	-
		4000	D4	7947	8454	-
		5000	D4	8034	8547	-
		5700	D4	7874	8377	-

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

Model	CRI (R _a) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C (lm)		
				Min.	Typ.	Max.
LC080D	70	2200	D4	12140	12915	-
		2700	D4	13232	14076	-
		3000	D4	13797	14677	-
		4000	D4	14374	15291	-
		5000	D4	14477	15401	-
		5700	D4	14245	15155	-
		2700	D4	12218	12998	-
	80	3000	D4	12904	13727	-
		3500	D4	13090	13926	-
		4000	D4	13348	14199	-
		5000	D4	13476	14336	-
		5700	D4	13476	14336	-
		6500	D4	13257	14104	-
	90	2700	D4	10173	10823	-
		3000	D4	10956	11656	-
		3500	D4	11280	12000	-
		4000	D4	11614	12356	-
		5000	D4	11743	12493	-
		5700	D4	11508	12243	-

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

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	4

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 LC003D B LC006D C LC009D D LC013D E LC016D F LC019D G LC026D H LC033D K LC040D L LC060D M LC080D	
11	Internal Code	2	
12	CRI & Sorting Temperature	3 Min. 70 (85°C) 5 Min. 80 (85°C) 7 Min. 90 (85°C)	
13 14	Forward Voltage (V)	YZ 30.6~36.6 1Z 45.5~55.5 (60W, 80W)	
15	CCT (K)	W 2700K V 3000K U 3500K T 4000K R 5000K Q 5700K P 6500K	
16	MacAdam Step	1 MacAdam 1-step 2 MacAdam 2-step 3 MacAdam 3-step	
17 18	Luminous Flux (Lm)	D4	COB D-series Gen.4 level

a) Binning Structure

※ LC003D(I_F = 90 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	SPHWAHDNA25YZW1D4	YZ	W1	D4	457 ~
		SPHWAHDNA25YZW2D4		W2		
	3000	SPHWAHDNA25YZV1D4	YZ	V1	D4	478 ~
		SPHWAHDNA25YZV2D4		V2		
	3500	SPHWAHDNA25YZU1D4	YZ	U1	D4	489 ~
		SPHWAHDNA25YZU2D4		U2		
	4000	SPHWAHDNA25YZT1D4	YZ	T1	D4	499 ~
		SPHWAHDNA25YZT2D4		T2		
	5000	SPHWAHDNA25YZR2D4	YZ	R2	D4	504 ~
		SPHWAHDNA25YZR3D4		R3		
	5700	SPHWAHDNA25YZQ2D4	YZ	Q2	D4	504 ~
		SPHWAHDNA25YZQ3D4		Q3		
	6500	SPHWAHDNA25YZP2D4	YZ	P2	D4	496 ~
		SPHWAHDNA25YZP3D4		P3		
90	2700	SPHWAHDNA27YZW1D4	YZ	W1	D4	378 ~
		SPHWAHDNA27YZW2D4		W2		
	3000	SPHWAHDNA27YZV1D4	YZ	V1	D4	406 ~
		SPHWAHDNA27YZV2D4		V2		
	3500	SPHWAHDNA27YZU1D4	YZ	U1	D4	421 ~
		SPHWAHDNA27YZU2D4		U2		
	4000	SPHWAHDNA27YZT1D4	YZ	T1	D4	434 ~
		SPHWAHDNA27YZT2D4		T2		
	5000	SPHWAHDNA27YZR2D4	YZ	R2	D4	439 ~
		SPHWAHDNA27YZR3D4		R3		

※ 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	SPHWAHDNB25YZW1D4	YZ	W1	D4	900 ~
		SPHWAHDNB25YZW2D4		W2		
	3000	SPHWAHDNB25YZV1D4	YZ	V1	D4	957 ~
		SPHWAHDNB25YZV2D4		V2		
	3500	SPHWAHDNB25YZU1D4	YZ	U1	D4	964 ~
		SPHWAHDNB25YZU2D4		U2		
	4000	SPHWAHDNB25YZT1D4	YZ	T1	D4	983 ~
		SPHWAHDNB25YZT2D4		T2		
	5000	SPHWAHDNB25YZR2D4	YZ	R2	D4	992 ~
		SPHWAHDNB25YZR3D4		R3		
	5700	SPHWAHDNB25YZQ2D4	YZ	Q2	D4	992 ~
		SPHWAHDNB25YZQ3D4		Q3		
	6500	SPHWAHDNB25YZP2D4	YZ	P2	D4	982 ~
		SPHWAHDNB25YZP3D4		P3		
90	2700	SPHWAHDNB27YZW1D4	YZ	W1	D4	754 ~
		SPHWAHDNB27YZW2D4		W2		
	3000	SPHWAHDNB27YZV1D4	YZ	V1	D4	813 ~
		SPHWAHDNB27YZV2D4		V2		
	3500	SPHWAHDNB27YZU1D4	YZ	U1	D4	836 ~
		SPHWAHDNB27YZU2D4		U2		
	4000	SPHWAHDNB27YZT1D4	YZ	T1	D4	855 ~

SPHWAHDNB27YZT2D4		T2	
SPHWAHDNB27YZR2D4		R2	
5000	YZ	D4	865 ~
SPHWAHDNB27YZR3D4		R3	

※ 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	SPHWHAHDC23YZV2D4	YZ	V2	D4	1524 ~
		SPHWHAHDC23YZV3D4		V3		
	4000	SPHWHAHDC23YZT2D4	YZ	T2	D4	1587 ~
		SPHWHAHDC23YZT3D4		T3		
	5000	SPHWHAHDC23YZR2D4	YZ	R2	D4	1566 ~
		SPHWHAHDC23YZR3D4		R3		
80	2700	SPHWHAHDC25YZW1D4	YZ	W1	D4	1349 ~
		SPHWHAHDC25YZW2D4		W2		
	3000	SPHWHAHDC25YZV1D4	YZ	V1	D4	1409 ~
		SPHWHAHDC25YZV2D4		V2		
	3500	SPHWHAHDC25YZU1D4	YZ	U1	D4	1438 ~
		SPHWHAHDC25YZU2D4		U2		
	4000	SPHWHAHDC25YZT1D4	YZ	T1	D4	1474 ~
		SPHWHAHDC25YZT2D4		T2		
	5000	SPHWHAHDC25YZR2D4	YZ	R2	D4	1488 ~
		SPHWHAHDC25YZR3D4		R3		
	5700	SPHWHAHDC25YZQ2D4	YZ	Q2	D4	1488 ~
		SPHWHAHDC25YZQ3D4		Q3		

90	6500	SPHWHAHDC25YZP2D4	YZ	P2	D4	1464 ~
		SPHWHAHDC25YZP3D4		P3		
	2700	SPHWHAHDC27YZW1D4	YZ	W1	D4	1115 ~
		SPHWHAHDC27YZW2D4		W2		
	3000	SPHWHAHDC27YZV1D4	YZ	V1	D4	1202 ~
		SPHWHAHDC27YZV2D4		V2		
	3500	SPHWHAHDC27YZU1D4	YZ	U1	D4	1237 ~
		SPHWHAHDC27YZU2D4		U2		
	4000	SPHWHAHDC27YZT1D4	YZ	T1	D4	1283 ~
		SPHWHAHDC27YZT2D4		T2		
	5000	SPHWHAHDC27YZR2D4	YZ	R2	D4	1297 ~
		SPHWHAHDC27YZR3D4		R3		

※ 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	2200	SPHWWAHDND23YZY2D4	YZ	Y2	D4	1777 ~
		SPHWWAHDND23YZY3D4		Y3		
	2700	SPHWWAHDND23YZW2D4	YZ	V2	D4	1876 ~
		SPHWWAHDND23YZW3D4		V3		
	3000	SPHWWAHDND23YZV2D4	YZ	V2	D4	1997 ~
		SPHWWAHDND23YZV3D4		V3		
	4000	SPHWWAHDND23YZT2D4	YZ	T2	D4	2073 ~
		SPHWWAHDND23YZT3D4		T3		
	5000	SPHWWAHDND23YZR2D4	YZ	R2	D4	2026 ~
		SPHWWAHDND23YZR3D4		R3		
	5700	SPHWWAHDND23YZQ2D4	YZ	Q2	D4	2055 ~
		SPHWWAHDND23YZQ3D4		Q3		
80	2700	SPHWWAHDND25YZW1D4	YZ	W1	D4	1762 ~
		SPHWWAHDND25YZW2D4		W2		
	3000	SPHWWAHDND25YZV1D4	YZ	V1	D4	1853 ~
		SPHWWAHDND25YZV2D4		V2		
	3500	SPHWWAHDND25YZU1D4	YZ	U1	D4	1888 ~
		SPHWWAHDND25YZU2D4		U2		
	4000	SPHWWAHDND25YZT1D4	YZ	T1	D4	1925 ~
		SPHWWAHDND25YZT2D4		T2		
	5000	SPHWWAHDND25YZR2D4	YZ	R2	D4	1947 ~
		SPHWWAHDND25YZR3D4		R3		
	5700	SPHWWAHDND25YZQ2D4	YZ	Q2	D4	1944 ~
		SPHWWAHDND25YZQ3D4		Q3		

90	6500	SPHWWAHDND25YZP2D4	YZ	P2	D4	1922 ~
		SPHWWAHDND25YZP3D4		P3		
	2700	SPHWWAHDND27YZW1D4	YZ	W1	D4	1465 ~
		SPHWWAHDND27YZW2D4		W2		
	3000	SPHWWAHDND27YZV1D4	YZ	V1	D4	1579 ~
		SPHWWAHDND27YZV2D4		V2		
	3500	SPHWWAHDND27YZU1D4	YZ	U1	D4	1627 ~
		SPHWWAHDND27YZU2D4		U2		
	4000	SPHWWAHDND27YZT1D4	YZ	T1	D4	1675 ~
		SPHWWAHDND27YZT2D4		T2		
	5000	SPHWWAHDND27YZR2D4	YZ	R2	D4	1712 ~
		SPHWWAHDND27YZR3D4		R3		

※ 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	2200	SPHWWAHDNE23YZY2D4	YZ	Y2	D4	2384 ~
		SPHWWAHDNE23YZY3D4		Y3		
	2700	SPHWWAHDNE23YZW2D4	YZ	Y2	D4	2452 ~
		SPHWWAHDNE23YZW3D4		Y3		
	3000	SPHWWAHDNE23YZV2D4	YZ	V2	D4	2670 ~
		SPHWWAHDNE23YZV3D4		V3		
	4000	SPHWWAHDNE23YZT2D4	YZ	T2	D4	2781 ~
		SPHWWAHDNE23YZT3D4		T3		
	5000	SPHWWAHDNE23YZR2D4	YZ	R2	D4	2744 ~
		SPHWWAHDNE23YZR3D4		R3		
	5700	SPHWWAHDNE23YZQ2D4	YZ	Q2	D4	2756 ~
		SPHWWAHDNE23YZQ3D4		Q3		
80	2700	SPHWWAHDNE25YZW1D4	YZ	W1	D4	2364 ~
		SPHWWAHDNE25YZW2D4		W2		
	3000	SPHWWAHDNE25YZV1D4	YZ	V1	D4	2435 ~
		SPHWWAHDNE25YZV2D4		V2		
	3500	SPHWWAHDNE25YZU1D4	YZ	U1	D4	2494 ~
		SPHWWAHDNE25YZU2D4		U2		
	4000	SPHWWAHDNE25YZT1D4	YZ	T1	D4	2570 ~
		SPHWWAHDNE25YZT2D4		T2		
	5000	SPHWWAHDNE25YZR2D4	YZ	R2	D4	2608 ~
		SPHWWAHDNE25YZR3D4		R3		
	5700	SPHWWAHDNE25YZQ2D4	YZ	Q2	D4	2597 ~
		SPHWWAHDNE25YZQ3D4		Q3		

90	6500	SPHWWAHDNE25YZP2D4	YZ	P2	D4	2566 ~
		SPHWWAHDNE25YZP3D4		P3		
	2700	SPHWWAHDNE27YZW1D4	YZ	W1	D4	1926 ~
		SPHWWAHDNE27YZW2D4		W2		
	3000	SPHWWAHDNE27YZV1D4	YZ	V1	D4	2066 ~
		SPHWWAHDNE27YZV2D4		V2		
	3500	SPHWWAHDNE27YZU1D4	YZ	U1	D4	2133 ~
		SPHWWAHDNE27YZU2D4		U2		
	4000	SPHWWAHDNE27YZT1D4	YZ	T1	D4	2236 ~
		SPHWWAHDNE27YZT2D4		T2		
	5000	SPHWWAHDNE27YZR2D4	YZ	R2	D4	2273 ~
		SPHWWAHDNE27YZR3D4		R3		

※ 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	2200	SPHWAHDNF23YZY2D4	YZ	Y2	D4	2856 ~
		SPHWAHDNF23YZY3D4		Y3		
	2700	SPHWAHDNF23YZW2D4	YZ	W2	D4	3066 ~
		SPHWAHDNF23YZW3D4		W3		
	3000	SPHWAHDNF23YZV2D4	YZ	V2	D4	3197 ~
		SPHWAHDNF23YZV3D4		V3		
	4000	SPHWAHDNF23YZT2D4	YZ	T2	D4	3331 ~
		SPHWAHDNF23YZT3D4		T3		
	5000	SPHWAHDNF23YZR2D4	YZ	R2	D4	3287 ~
		SPHWAHDNF23YZR3D4		R3		
	5700	SPHWAHDNF23YZQ2D4	YZ	Q2	D4	3301 ~
		SPHWAHDNF23YZQ3D4		Q3		
80	2700	SPHWAHDNF25YZW1D4	YZ	W1	D4	2832 ~
		SPHWAHDNF25YZW2D4		W2		
	3000	SPHWAHDNF25YZV1D4	YZ	V1	D4	2921 ~
		SPHWAHDNF25YZV2D4		V2		
	3500	SPHWAHDNF25YZU1D4	YZ	U1	D4	2977 ~
		SPHWAHDNF25YZU2D4		U2		
	4000	SPHWAHDNF25YZT1D4	YZ	T1	D4	3069 ~
		SPHWAHDNF25YZT2D4		T2		
	5000	SPHWAHDNF25YZR2D4	YZ	R2	D4	3123 ~
		SPHWAHDNF25YZR3D4		R3		
	5700	SPHWAHDNF25YZQ2D4	YZ	Q2	D4	3101 ~
		SPHWAHDNF25YZQ3D4		Q3		
	6500	SPHWAHDNF25YZP2D4	YZ	P2	D4	3072 ~
		SPHWAHDNF25YZP3D4		P3		

90	2700	SPHWWAHDNF27YZW1D4	YZ	W1	D4	2309 ~
		SPHWWAHDNF27YZW2D4		W2		
	3000	SPHWWAHDNF27YZV1D4	YZ	V1	D4	2490 ~
		SPHWWAHDNF27YZV2D4		V2		
	3500	SPHWWAHDNF27YZU1D4	YZ	U1	D4	2567 ~
		SPHWWAHDNF27YZU2D4		U2		
	4000	SPHWWAHDNF27YZT1D4	YZ	T1	D4	2671 ~
		SPHWWAHDNF27YZT2D4		T2		
	5000	SPHWWAHDNF27YZR2D4	YZ	R2	D4	2721 ~
		SPHWWAHDNF27YZR3D4		R3		

※ 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	2200	SPHWAHDNG23YZY2D4	YZ	Y2	D4	3758 ~
		SPHWAHDNG23YZY3D4		Y3		
	2700	SPHWAHDNG23YZW2D4	YZ	W2	D4	3970 ~
		SPHWAHDNG23YZW3D4		W3		
	3000	SPHWAHDNG23YZV2D4	YZ	V2	D4	4219 ~
		SPHWAHDNG23YZV3D4		V3		
	4000	SPHWAHDNG23Yzt2D4	YZ	T2	D4	4354 ~
		SPHWAHDNG23Yzt3D4		T3		
	5000	SPHWAHDNG23YzR2D4	YZ	R2	D4	4266 ~
		SPHWAHDNG23YzR3D4		R3		
	5700	SPHWAHDNG23YzQ2D4	YZ	Q2	D4	4345 ~
		SPHWAHDNG23YzQ3D4		Q3		
80	2700	SPHWAHDNG25YZW1D4	YZ	W1	D4	3723 ~
		SPHWAHDNG25YZW2D4		W2		
	3000	SPHWAHDNG25YZV1D4	YZ	V1	D4	3917 ~
		SPHWAHDNG25YZV2D4		V2		
	3500	SPHWAHDNG25YzU1D4	YZ	U1	D4	3965 ~
		SPHWAHDNG25YzU2D4		U2		
	4000	SPHWAHDNG25Yzt1D4	YZ	T1	D4	4035 ~
		SPHWAHDNG25Yzt2D4		T2		
	5000	SPHWAHDNG25YzR2D4	YZ	R2	D4	4125 ~
		SPHWAHDNG25YzR3D4		R3		
	5700	SPHWAHDNG25YzQ2D4	YZ	Q2	D4	4085 ~
		SPHWAHDNG25YzQ3D4		Q3		
	6500	SPHWAHDNG25YzP2D4	YZ	P2	D4	4058 ~
		SPHWAHDNG25YzP3D4		P3		

90	2700	SPHWHABDNG27YZW1D4	YZ	W1	D4	3077 ~
		SPHWHABDNG27YZW2D4		W2		
	3000	SPHWHABDNG27YZV1D4	YZ	V1	D4	3305 ~
		SPHWHABDNG27YZV2D4		V2		
	3500	SPHWHABDNG27YZU1D4	YZ	U1	D4	3391 ~
		SPHWHABDNG27YZU2D4		U2		
	4000	SPHWHABDNG27YZT1D4	YZ	T1	D4	3534 ~
		SPHWHABDNG27YZT2D4		T2		
	5000	SPHWHABDNG27YZR2D4	YZ	R2	D4	3604 ~
		SPHWHABDNG27YZR3D4		R3		

※ LCo33D(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	2200	SPHWAHDNH23YZY2D4	YZ	Y2	D4	4604 ~
		SPHWAHDNH23YZY3D4		Y3		
	2700	SPHWAHDNH23YZW2D4	YZ	W2	D4	4944 ~
		SPHWAHDNH23YZW3D4		W3		
	3000	SPHWAHDNH23YZV2D4	YZ	V2	D4	5155 ~
		SPHWAHDNH23YZV3D4		V3		
	4000	SPHWAHDNH23YZT2D4	YZ	T2	D4	5371 ~
		SPHWAHDNH23YZT3D4		T3		
	5000	SPHWAHDNH23YZR2D4	YZ	R2	D4	5299 ~
		SPHWAHDNH23YZR3D4		R3		
	5700	SPHWAHDNH23YZQ2D4	YZ	Q2	D4	5323 ~
		SPHWAHDNH23YZQ3D4		Q3		
80	2700	SPHWAHDNH25YZW1D4	YZ	W1	D4	4565 ~
		SPHWAHDNH25YZW2D4		W2		
	3000	SPHWAHDNH25YZV1D4	YZ	V1	D4	4812 ~
		SPHWAHDNH25YZV2D4		V2		
	3500	SPHWAHDNH25YZU1D4	YZ	U1	D4	4892 ~
		SPHWAHDNH25YZU2D4		U2		
	4000	SPHWAHDNH25YZT1D4	YZ	T1	D4	4987 ~
		SPHWAHDNH25YZT2D4		T2		
	5000	SPHWAHDNH25YZR2D4	YZ	R2	D4	5035 ~
		SPHWAHDNH25YZR3D4		R3		
	5700	SPHWAHDNH25YZQ2D4	YZ	Q2	D4	5035 ~
		SPHWAHDNH25YZQ3D4		Q3		
	6500	SPHWAHDNH25YZP2D4	YZ	P2	D4	4954 ~
		SPHWAHDNH25YZP3D4		P3		

90	2700	SPHWHAHDNH27YZW1D4	YZ	W1	D4	3821 ~
		SPHWHAHDNH27YZW2D4		W2		
	3000	SPHWHAHDNH27YZV1D4	YZ	V1	D4	4122 ~
		SPHWHAHDNH27YZV2D4		V2		
	3500	SPHWHAHDNH27YZU1D4	YZ	U1	D4	4244 ~
		SPHWHAHDNH27YZU2D4		U2		
	4000	SPHWHAHDNH27YZT1D4	YZ	T1	D4	4340 ~
		SPHWHAHDNH27YZT2D4		T2		
	5000	SPHWHAHDNH27YZR2D4	YZ	R2	D4	4388 ~
		SPHWHAHDNH27YZR3D4		R3		

※ LCo4oD(I_F = 1080 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	2200	SPHWAHDNK23YZY2D4	YZ	Y2	D4	5693 ~
		SPHWAHDNK23YZY3D4		Y3		
	2700	SPHWAHDNK23YZW2D4	YZ	W2	D4	5920 ~
		SPHWAHDNK23YZW3D4		W3		
	3000	SPHWAHDNK23YZV2D4	YZ	V2	D4	6260 ~
		SPHWAHDNK23YZV3D4		V3		
	4000	SPHWAHDNK23YZT2D4	YZ	T2	D4	6642 ~
		SPHWAHDNK23YZT3D4		T3		
	5000	SPHWAHDNK23YZR2D4	YZ	R2	D4	6519 ~
		SPHWAHDNK23YZR3D4		R3		
	5700	SPHWAHDNK23YZQ2D4	YZ	Q2	D4	6583 ~
		SPHWAHDNK23YZQ3D4		Q3		
80	2700	SPHWAHDNK25YZW1D4	YZ	W1	D4	5646 ~
		SPHWAHDNK25YZW2D4		W2		
	3000	SPHWAHDNK25YZV1D4	YZ	V1	D4	5841 ~
		SPHWAHDNK25YZV2D4		V2		
	3500	SPHWAHDNK25YZU1D4	YZ	U1	D4	6049 ~
		SPHWAHDNK25YZU2D4		U2		
	4000	SPHWAHDNK25YZT1D4	YZ	T1	D4	6168 ~
		SPHWAHDNK25YZT2D4		T2		
	5000	SPHWAHDNK25YZR2D4	YZ	R2	D4	6177 ~
		SPHWAHDNK25YZR3D4		R3		
	5700	SPHWAHDNK25YZQ2D4	YZ	Q2	D4	6227 ~
		SPHWAHDNK25YZQ3D4		Q3		
	6500	SPHWAHDNK25YZP2D4	YZ	P2	D4	6126 ~
		SPHWAHDNK25YZP3D4		P3		

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2700	SPHWAHDNK27YZW1D4	YZ	W1	D4	4674 ~
	SPHWAHDNK27YZW2D4		W2		
3000	SPHWAHDNK27YZV1D4	YZ	V1	D4	4951 ~
	SPHWAHDNK27YZV2D4		V2		
3500	SPHWAHDNK27YZU1D4	YZ	U1	D4	5159 ~
	SPHWAHDNK27YZU2D4		U2		
4000	SPHWAHDNK27YZT1D4	YZ	T1	D4	5332 ~
	SPHWAHDNK27YZT2D4		T2		
5000	SPHWAHDNK27YZR2D4	YZ	R2	D4	5436 ~
	SPHWAHDNK27YZR3D4		R3		
5700	SPHWAHDNK27YZQ2D4	YZ	Q2	D4	5318 ~
	SPHWAHDNK27YZQ3D4		Q3		

※ 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	2200	SPHWWAHDNL231ZY2D4	1Z	Y2	D4	8430 ~
		SPHWWAHDNL231ZY3D4		Y3		
	2700	SPHWWAHDNL231ZW2D4	1Z	W2	D4	8794 ~
		SPHWWAHDNL231ZW3D4		W3		
	3000	SPHWWAHDNL231ZV2D4	1Z	V2	D4	9440 ~
		SPHWWAHDNL231ZV3D4		V3		
	4000	SPHWWAHDNL231ZT2D4	1Z	T2	D4	9835 ~
		SPHWWAHDNL231ZT3D4		T3		
	5000	SPHWWAHDNL231ZR2D4	1Z	R2	D4	9557 ~
		SPHWWAHDNL231ZR3D4		R3		
	5700	SPHWWAHDNL231ZQ2D4	1Z	Q2	D4	9747 ~
		SPHWWAHDNL231ZQ3D4		Q3		
80	2700	SPHWWAHDNL251ZW1D4	1Z	W1	D4	8360 ~
		SPHWWAHDNL251ZW2D4		W2		
	3000	SPHWWAHDNL251ZV1D4	1Z	V1	D4	8810 ~
		SPHWWAHDNL251ZV2D4		V2		
	3500	SPHWWAHDNL251ZU1D4	1Z	U1	D4	8938 ~
		SPHWWAHDNL251ZU2D4		U2		
	4000	SPHWWAHDNL251ZT1D4	1Z	T1	D4	9133 ~
		SPHWWAHDNL251ZT2D4		T2		
	5000	SPHWWAHDNL251ZR2D4	1Z	R2	D4	9220 ~
		SPHWWAHDNL251ZR3D4		R3		
	5700	SPHWWAHDNL251ZQ2D4	1Z	Q2	D4	9220 ~
		SPHWWAHDNL251ZQ3D4		Q3		
	6500	SPHWWAHDNL251ZP2D4	1Z	P2	D4	9071 ~
		SPHWWAHDNL251ZP3D4		P3		

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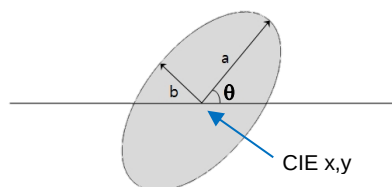
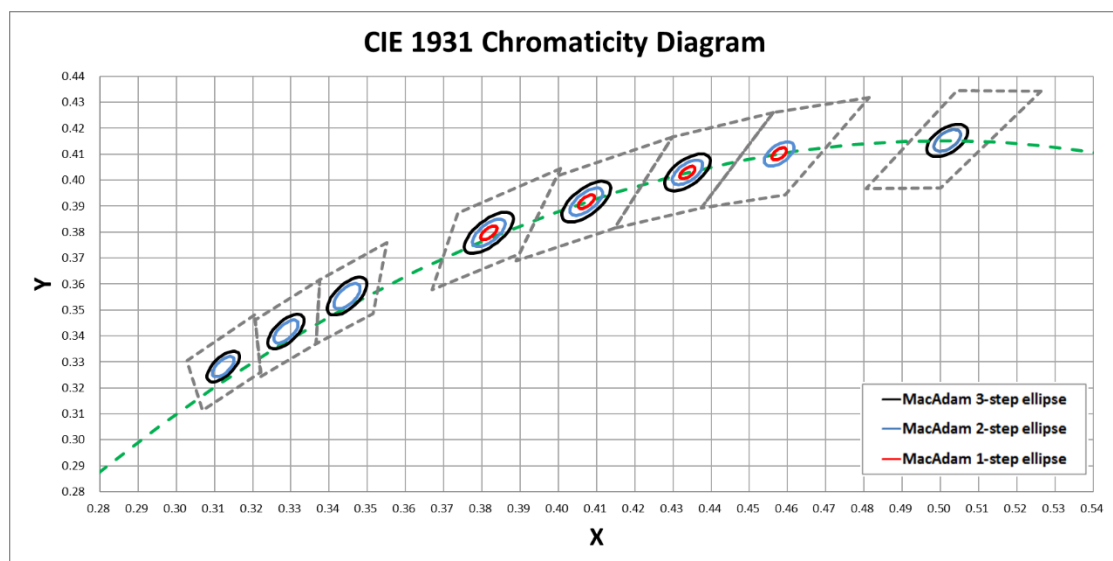
2700	SPHWWAHDNL271ZW1D4	1Z	W1	D4	6912 ~
	SPHWWAHDNL271ZW2D4		W2		
3000	SPHWWAHDNL271ZV1D4	1Z	V1	D4	7390 ~
	SPHWWAHDNL271ZV2D4		V2		
3500	SPHWWAHDNL271ZU1D4	1Z	U1	D4	7649 ~
	SPHWWAHDNL271ZU2D4		U2		
4000	SPHWWAHDNL271ZT1D4	1Z	T1	D4	7947 ~
	SPHWWAHDNL271ZT2D4		U2		
5000	SPHWWAHDNL271ZR2D4	1Z	R2	D4	8034 ~
	SPHWWAHDNL271ZR3D4		R3		
5700	SPHWWAHDNL271ZQ2D4	1Z	Q2	D4	7874 ~
	SPHWWAHDNL271ZQ3D4		Q3		

※ 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	2200	SPHWWAHDNM231ZY2D4	1Z	Y2	D4	12020 ~
		SPHWWAHDNM231ZY3D4		Y3		
	2700	SPHWWAHDNM231ZW2D4	1Z	W2	D4	12909 ~
		SPHWWAHDNM231ZW3D4		W3		
	3000	SPHWWAHDNM231ZV2D4	1Z	V2	D4	13460 ~
		SPHWWAHDNM231ZV3D4		V3		
	4000	SPHWWAHDNM231ZT2D4	1Z	T2	D4	14023 ~
		SPHWWAHDNM231ZT3D4		T3		
	5000	SPHWWAHDNM231ZR2D4	1Z	R2	D4	14124 ~
		SPHWWAHDNM231ZR3D4		R3		
	5700	SPHWWAHDNM231ZQ2D4	1Z	Q2	D4	13898 ~
		SPHWWAHDNM231ZQ3D4		Q3		
80	2700	SPHWWAHDNM251ZW1D4	1Z	W1	D4	11920 ~
		SPHWWAHDNM251ZW2D4		W2		
	3000	SPHWWAHDNM251ZV1D4	1Z	V1	D4	12589 ~
		SPHWWAHDNM251ZV2D4		V2		
	3500	SPHWWAHDNM251ZU1D4	1Z	U1	D4	12771 ~
		SPHWWAHDNM251ZU2D4		U2		
	4000	SPHWWAHDNM251ZT1D4	1Z	T1	D4	13022 ~
		SPHWWAHDNM251ZT2D4		T2		
	5000	SPHWWAHDNM251ZR2D4	1Z	R2	D4	13147 ~
		SPHWWAHDNM251ZR3D4		R3		
	5700	SPHWWAHDNM251ZQ2D4	1Z	Q2	D4	13147 ~
		SPHWWAHDNM251ZQ3D4		Q3		

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6500	SPHWWAHDNM251ZP2D4	1Z	P2	D4	12934 ~
	SPHWWAHDNM251ZP3D4		P3		
2700	SPHWWAHDNM271ZW1D4	1Z	W1	D4	9925~
	SPHWWAHDNM271ZW2D4		W2		
3000	SPHWWAHDNM271ZV1D4	1Z	V1	D4	10689 ~
	SPHWWAHDNM271ZV2D4		V2		
3500	SPHWWAHDNM271ZU1D4	1Z	U1	D4	11005 ~
	SPHWWAHDNM271ZU2D4		U2		
4000	SPHWWAHDNM271ZT1D4	1Z	T1	D4	11331 ~
	SPHWWAHDNM271ZT2D4		T2		
5000	SPHWWAHDNM271ZR2D4	1Z	R2	D4	11457 ~
	SPHWWAHDNM271ZR3D4		R3		
5700	SPHWWAHDNM271ZQ2D4	1Z	Q2	D4	11227 ~
	SPHWWAHDNM271ZQ3D4		Q3		

b) Chromaticity Region & Coordinates (I_F = Sorting Current, $T_J = 85^\circ\text{C}$)


MacAdam Ellipse (Y2, Y3)					
Step	CIE x	CIE y	θ	a	b
2-step	0.5018	0.4153	53.45	0.0048	0.0026
3-step	0.5018	0.4153	53.45	0.0072	0.004

MacAdam Ellipse (W1, W2)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4578	0.4101	53.7	0.0027	0.0014
3-step	0.4578	0.4101	53.7	0.0054	0.0028

MacAdam Ellipse (V1, V2, V3)					
Step	CIE x	CIE y	θ	a	b
1-step	0.4338	0.403	53.22	0.0028	0.0014
2-step	0.4338	0.403	53.22	0.0056	0.0027
3-step	0.4338	0.403	53.22	0.0083	0.0041

MacAdam Ellipse (U1, U2, U3)					
Step	CIE x	CIE y	θ	a	b
1-step	0.4073	0.3917	54	0.0031	0.0014
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
1-step	0.3818	0.3797	53.72	0.0031	0.0013
2-step	0.3818	0.3797	53.72	0.0063	0.0027
3-step	0.3818	0.3797	53.72	0.0094	0.004

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

MacAdam Ellipse (Q2, Q3)					
Step	CIE x	CIE y	θ	a	b
2-step	0.3287	0.3417	59.1	0.005	0.0021
3-step	0.3287	0.3417	59.1	0.0075	0.0032

MacAdam Ellipse (P2, P3)					
Step	CIE x	CIE y	θ	a	b
2-step	0.3123	0.3282	58.57	0.0045	0.0019
3-step	0.3123	0.3282	58.57	0.0067	0.0029

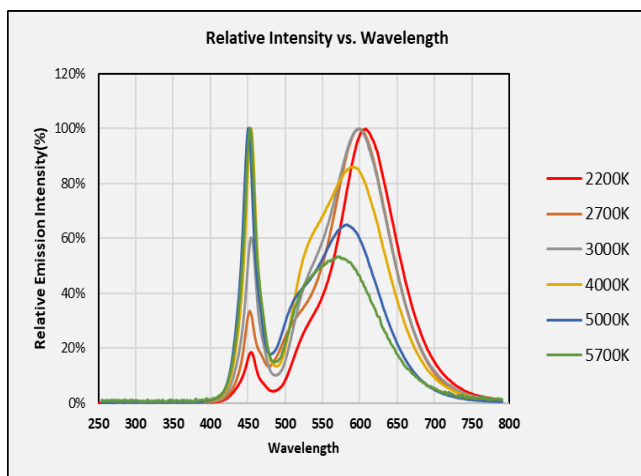
Note:

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

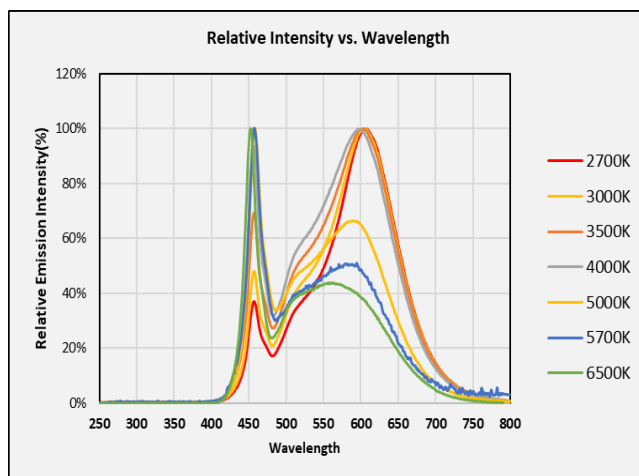
3. Typical Characteristics Graphs

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

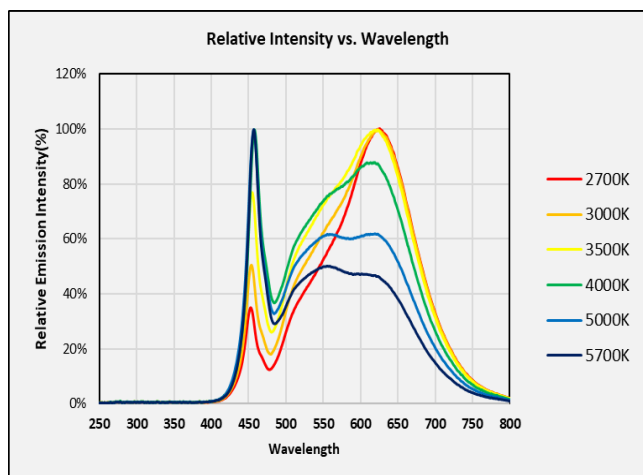
CRI Ra 70+



CRI Ra 80+

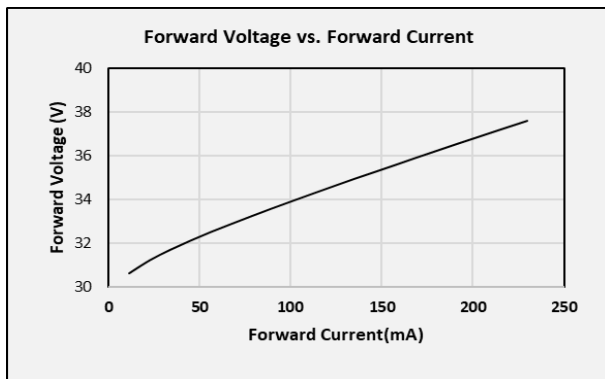
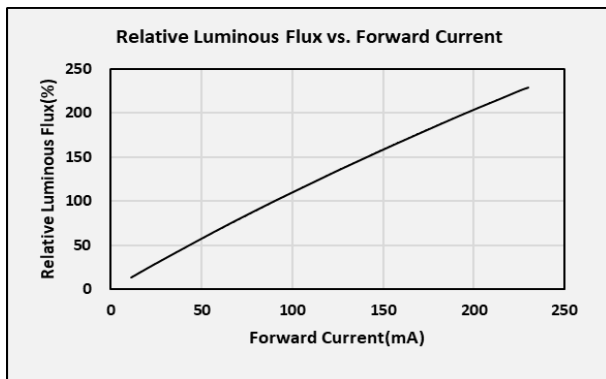


CRI Ra 90+

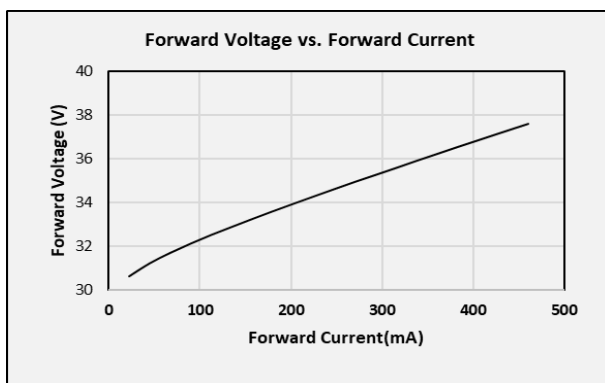
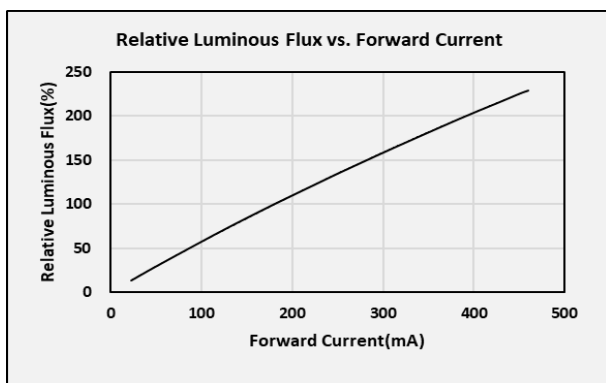


b) Forward Current Characteristics ($T_J = 85^\circ\text{C}$)

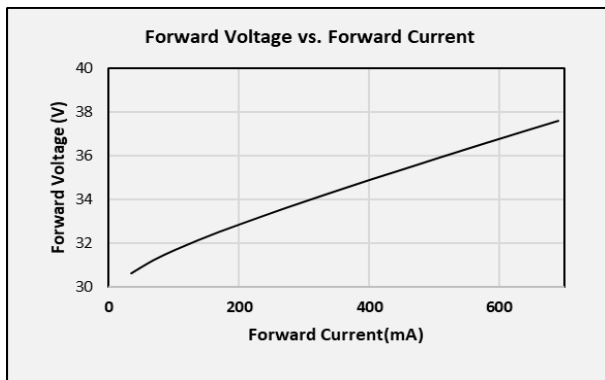
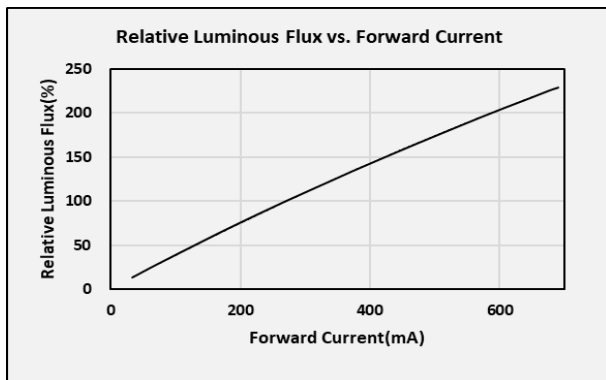
1) LC003D



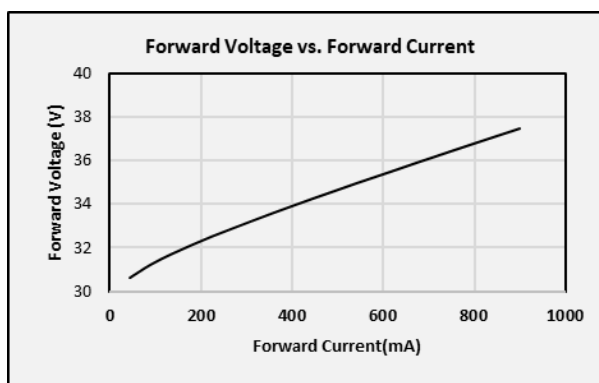
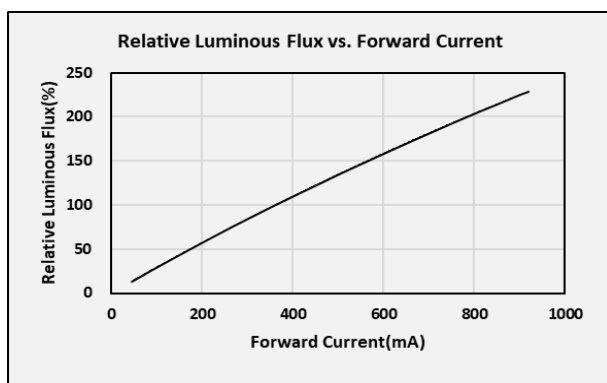
2) LC006D



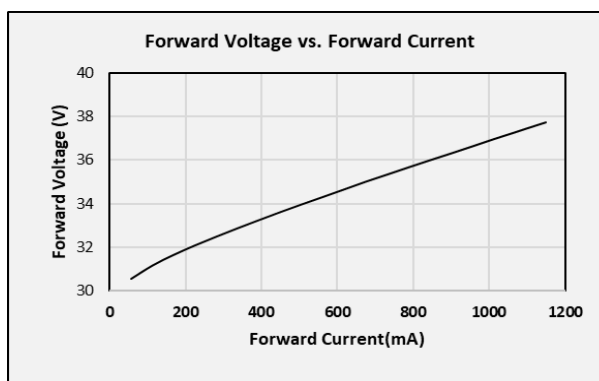
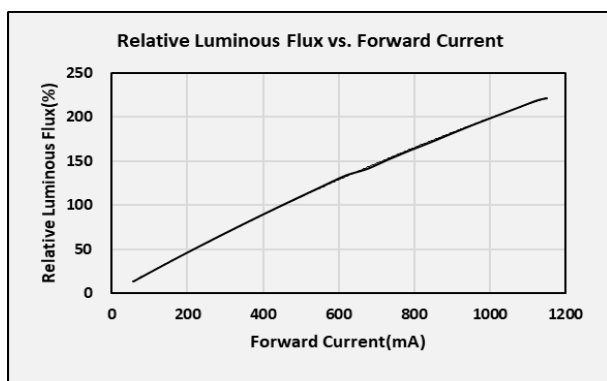
3) LC009D



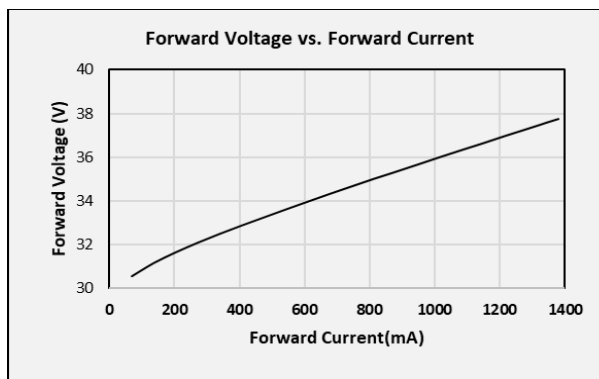
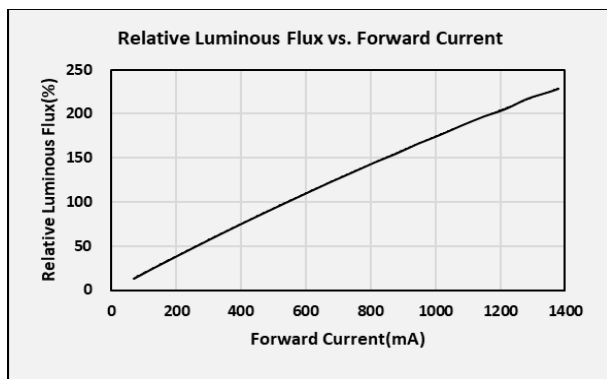
4) LC013D



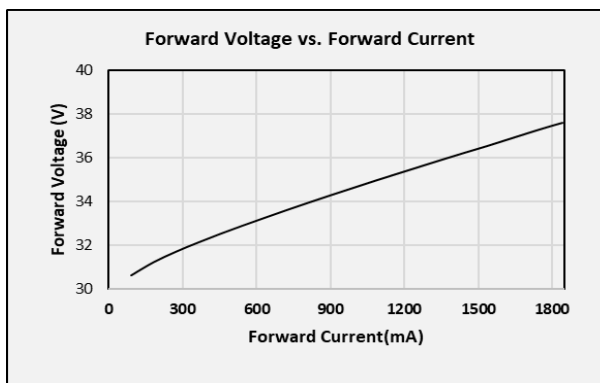
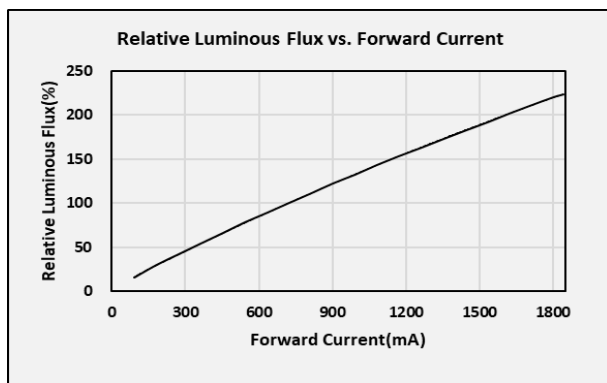
5) LC016D



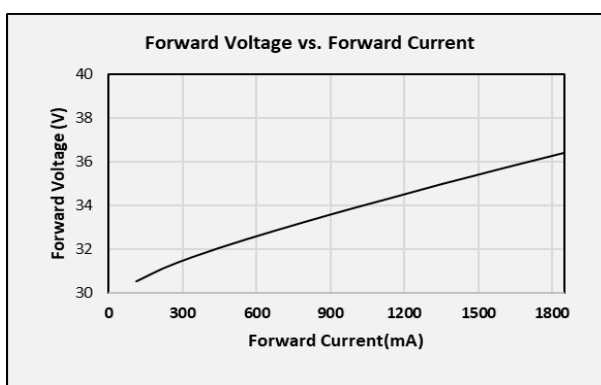
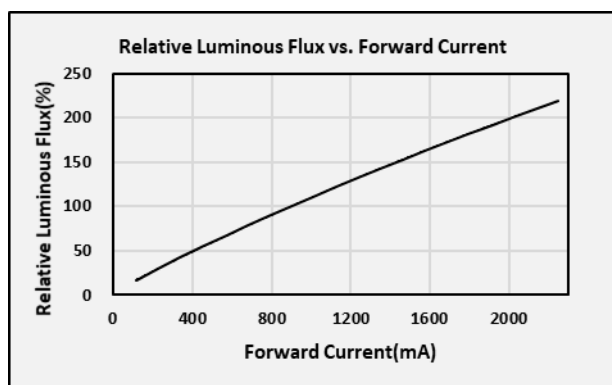
6) LC019D



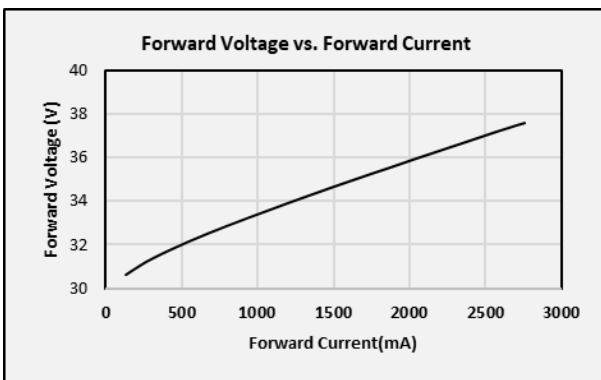
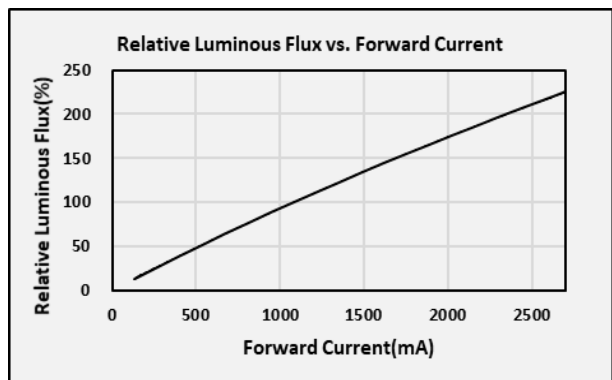
7) LC026D



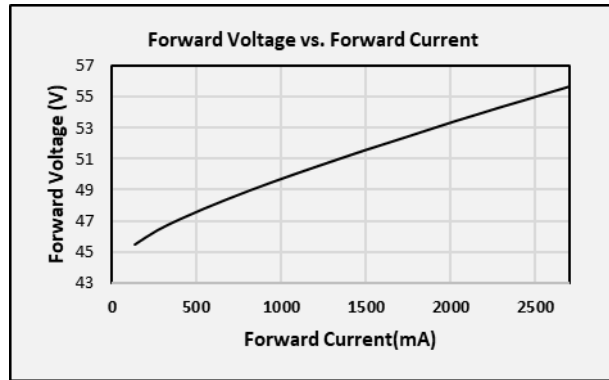
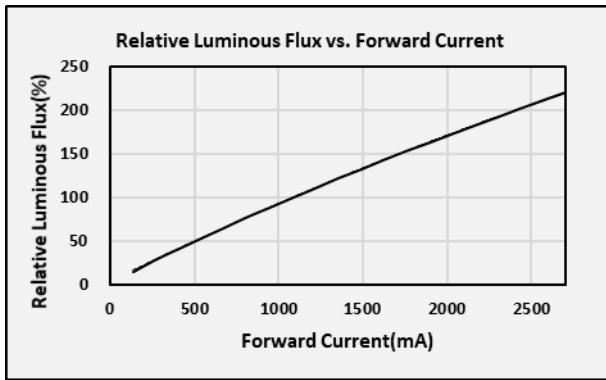
8) LC033D



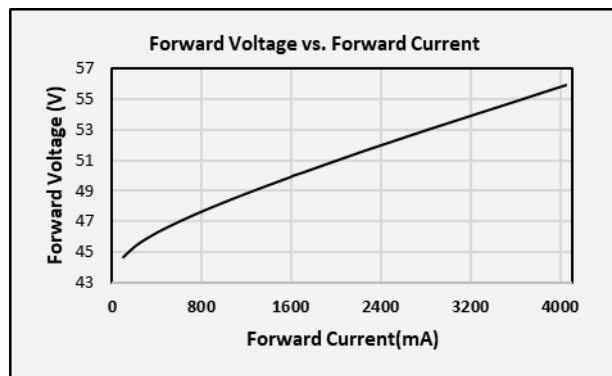
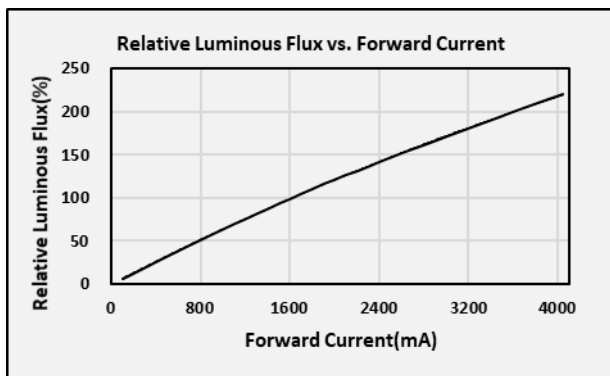
9) LC040D



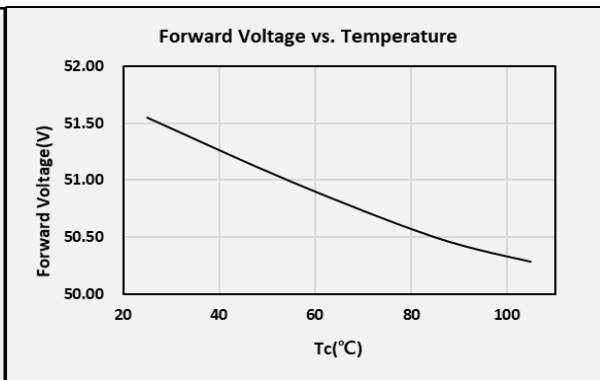
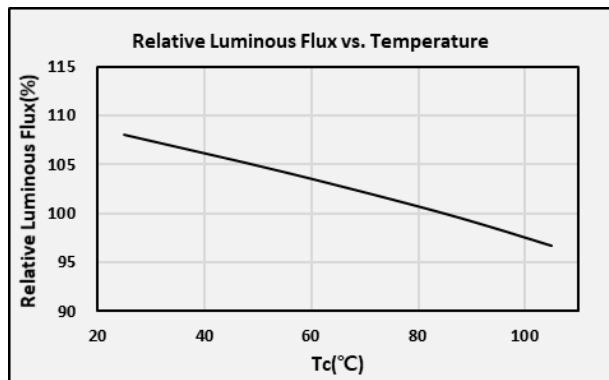
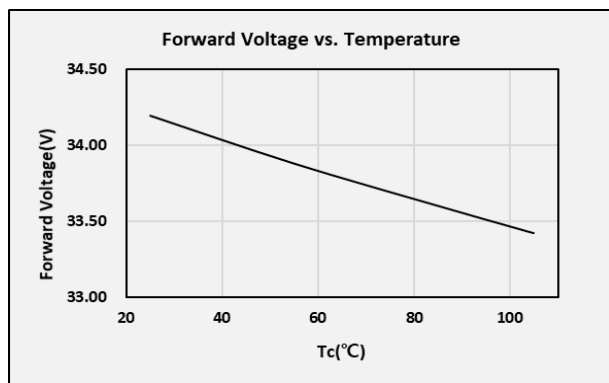
10) LC060D



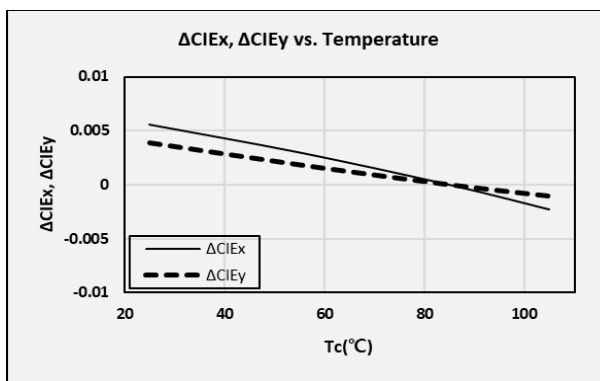
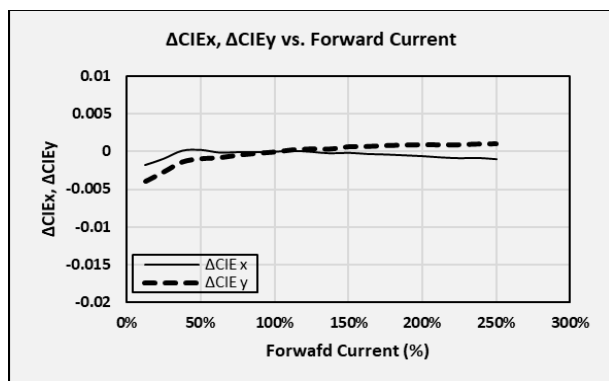
11) LC080D



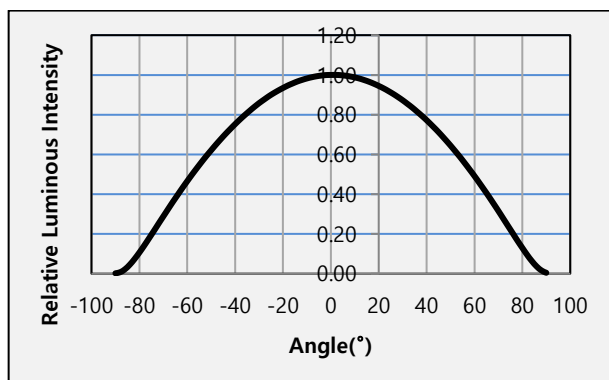
c) Temperature Characteristics (I_F = Sorting Current)



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

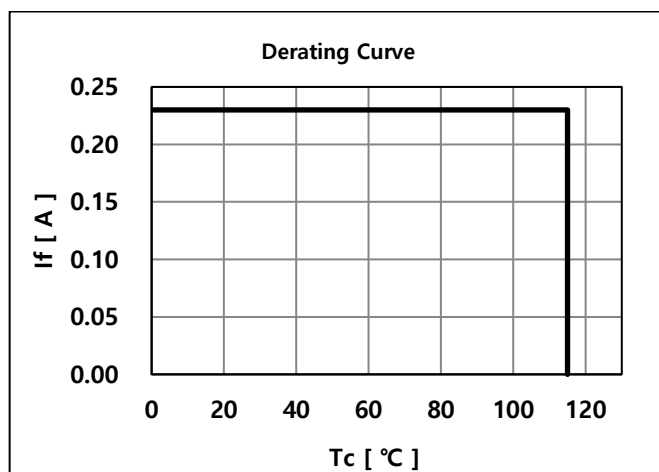


e) Beam Angle Characteristics (I_F = Sorting Current, $T_J = 85^{\circ}\text{C}$)

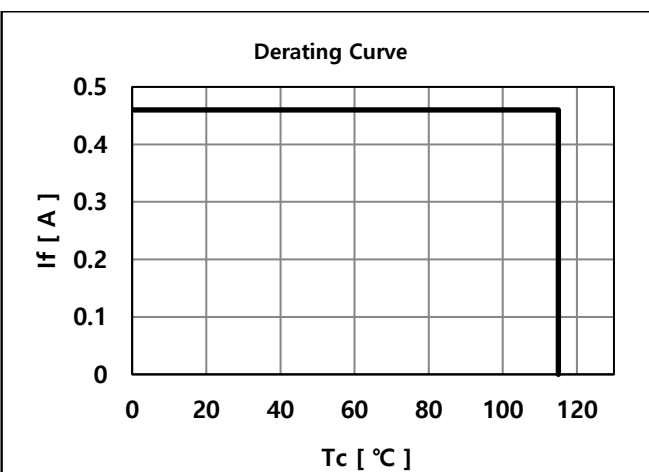


f) Derating Characteristics

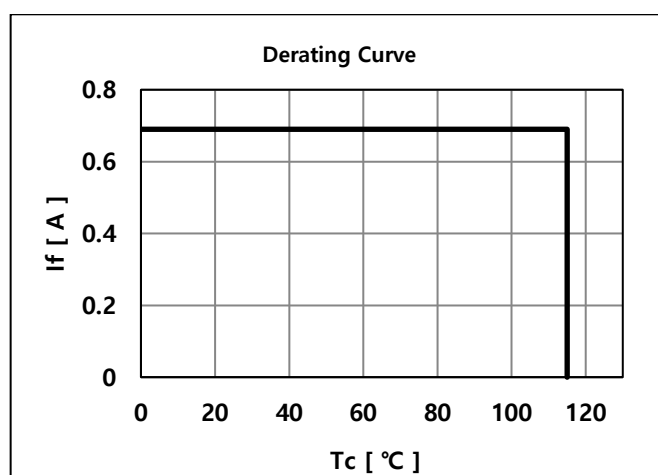
1) LC003D



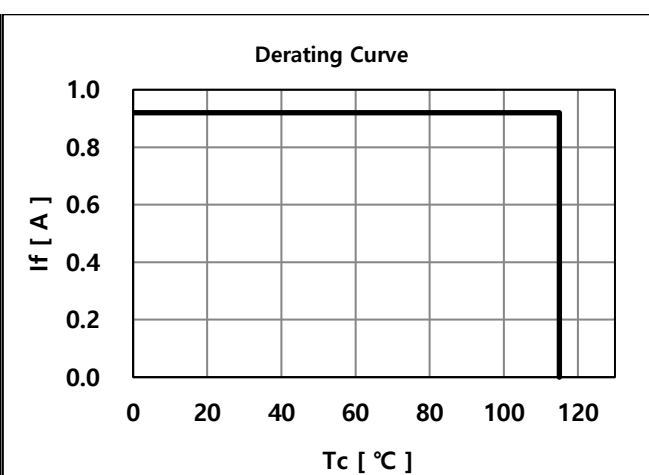
2) LC006D



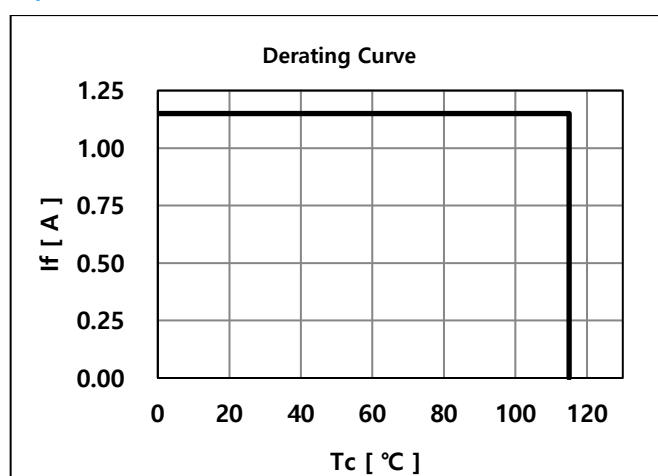
3) LC009D



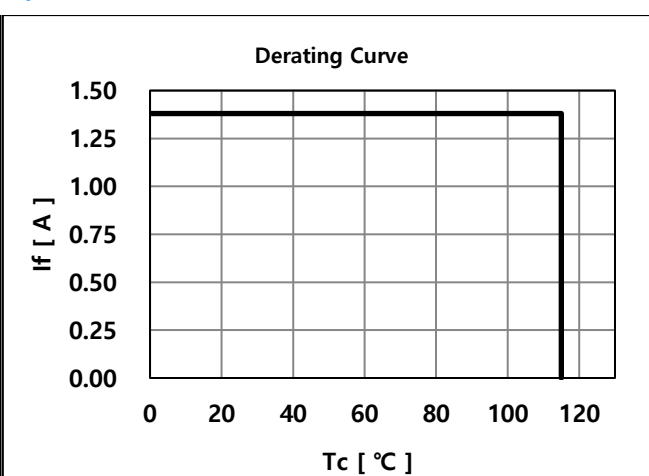
4) LC0013D



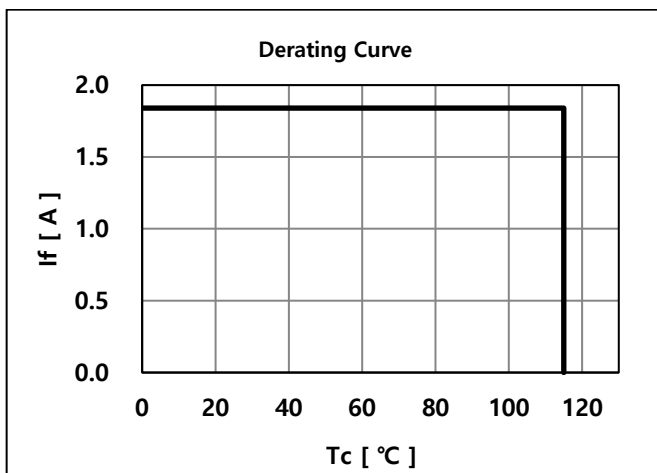
5) LC016D



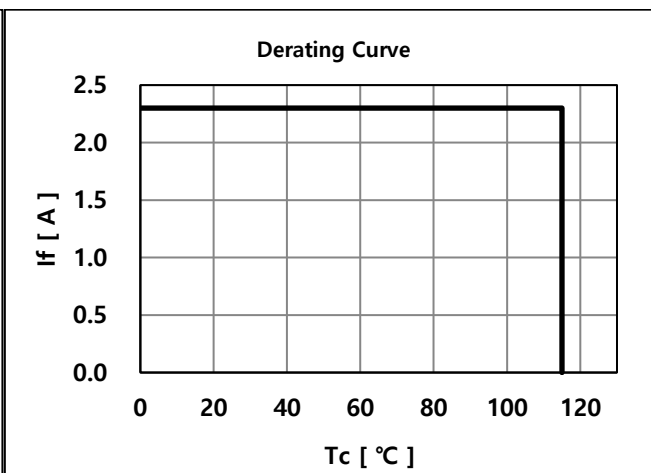
6) LC0019D



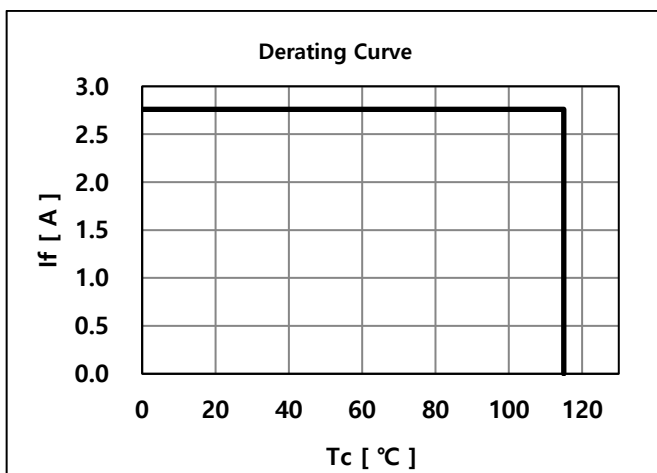
7) LC026D



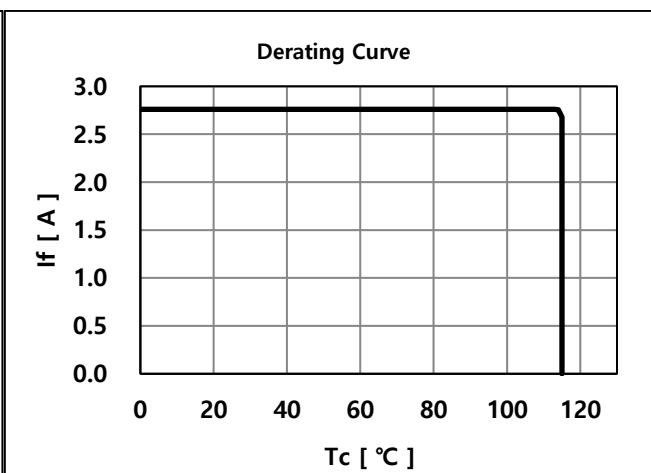
8) LC0033D



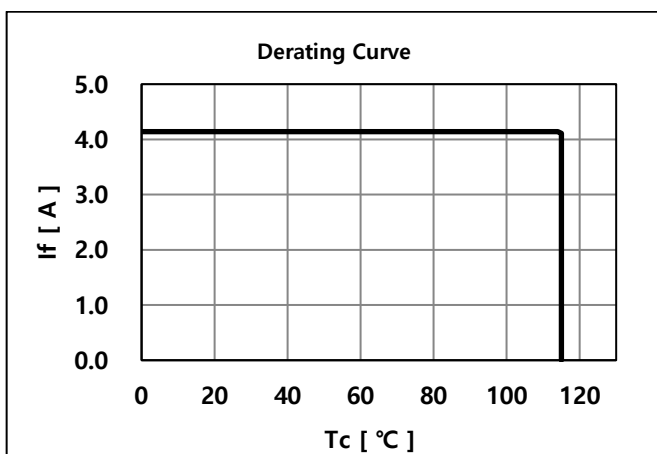
9) LC040D



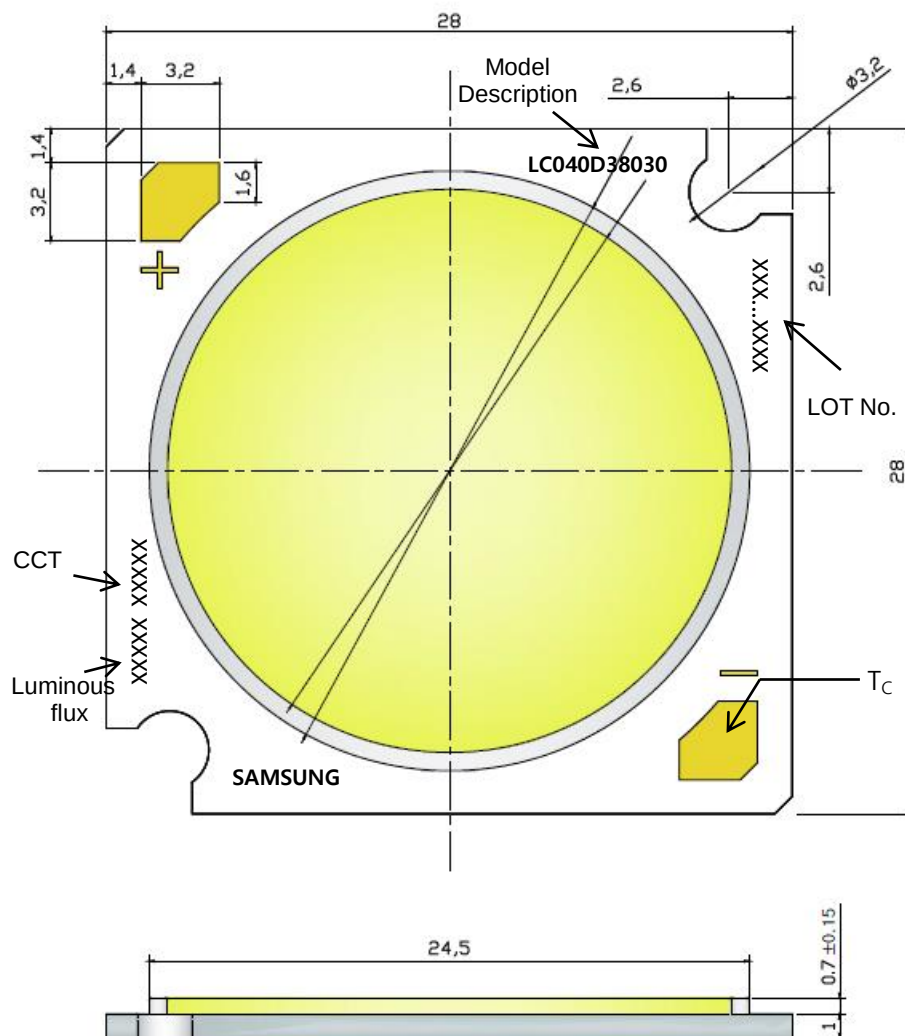
10) LC060D



11) LC080D



※ 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	0.7	± 0.15	mm
	Substrate	1.0	± 0.10	mm
LES Diameter	Light Emitting Surface	22.0	± 0.30	mm

Note: Denoted product information above is only an example
(LC040D48030 : LC040D, Gen4, CRI80+, 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	110 °C	1000 h
Low Temperature Storage	-40 °C	1000 h
Wet High Temperature Storage Test	85°C, 85% RH	1000h
Temperature Cycling	-45 °C / 15min ~ 125 °C / 15min Temperature change within 5min	500 cycle
Powered Temperature Cycle (PTC)	-40 °C/ 85 °C each 10 min, 20 min transfer power on/off each 5 min, DC Derating, I_F = max	100 cycles
ESD (HBM)	R_1 : 10 M Ω R_2 : 1.5 k Ω C: 100 pF V: ± 2 kV	5 times
Vibrations Variable Frequency	20~ 80 Hz (displacement: 0.06 inch, max. 20 g) 80 ~ 2 kHz (max. 20 g) min. frequency $\leftrightarrow$ max. frequency 4 min transfer	4 times
Mechanical Shock Test	1500g, 0.5 ms each of the 6 surfaces (3 axis x 2 sides)	5 times
Hydrogen Sulphide(H ₂ S)	25 °C 75%R.H. H ₂ S concentration 15ppm	504h

b) Criteria for Judging the Damage

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

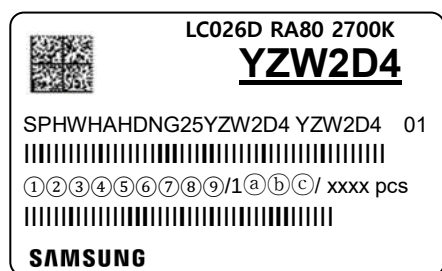
①②: Forward Voltage bin (refer to page 9)

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:



① ③④⑤⑥⑦⑧⑨ / 1a(b)c / 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 (G: 2022, H: 2023, I: 2024...)

⑤ : Month (1~9, A, B, C)

⑥⑦⑧⑨ : Day (1~9, A, B~V)

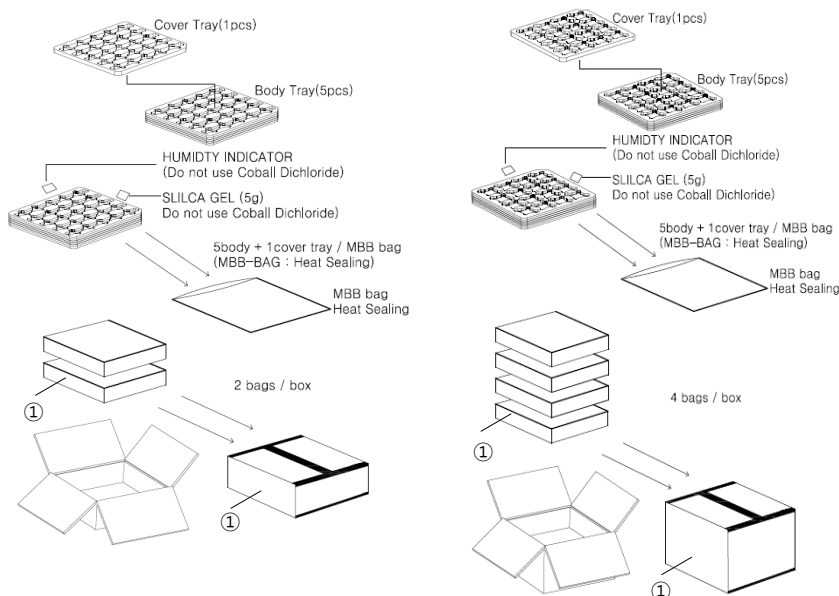
a(b)c : Product serial number (001 ~ 999)

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

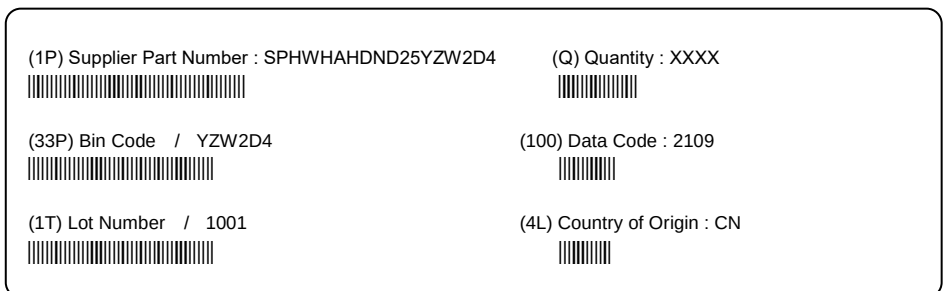
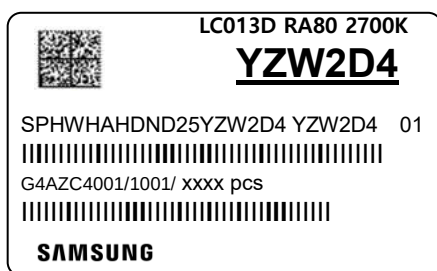


※ Small Box

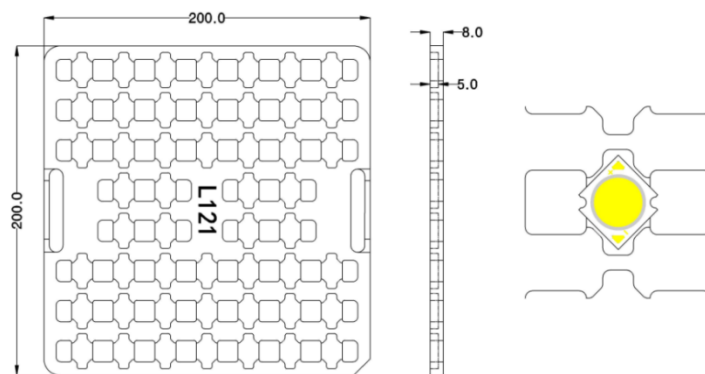
※ Middle Box



① Side Label



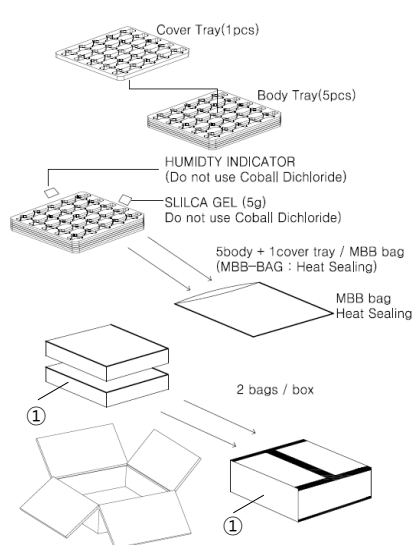
b) Tray



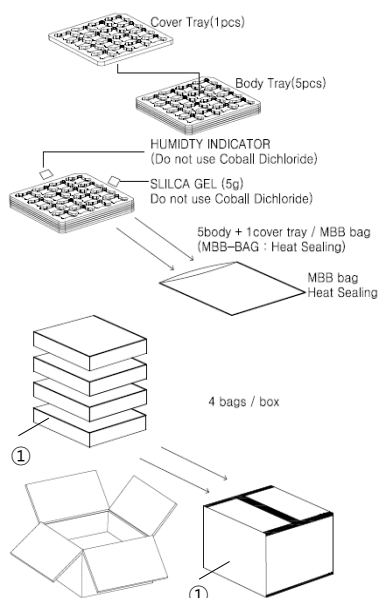
※ Model : LC016D, LC019D, LC026D, LC033D

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



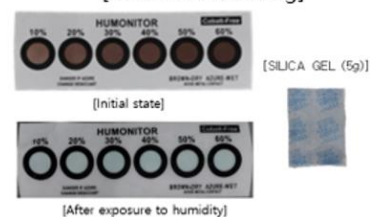
※ Small Box



※ Middle Box



[MBB BAG drawing]



① Side Label



LC026D RA80 2700K
YZW2D4

SPHWAHDNG25YZW2D4 YZW2D4 01
G4AZC4001/1001/ xxx pcs

SAMSUNG

(1P) Supplier Part Number : SPHWAHDNG25YZW2D4



(Q) Quantity : XXX



(33P) Bin Code / YZW2D4



(100) Data Code : 2109



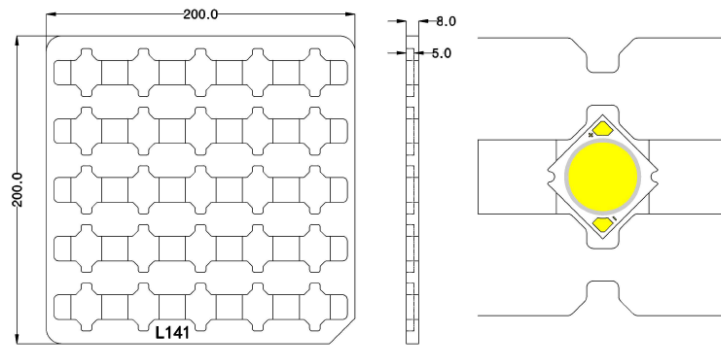
(1T) Lot Number / 1001



(4L) Country of Origin : CN



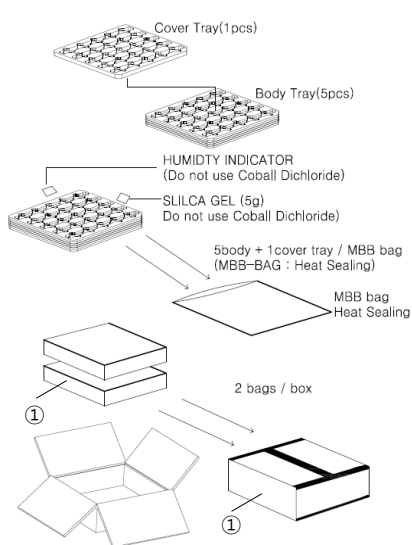
b) Tray



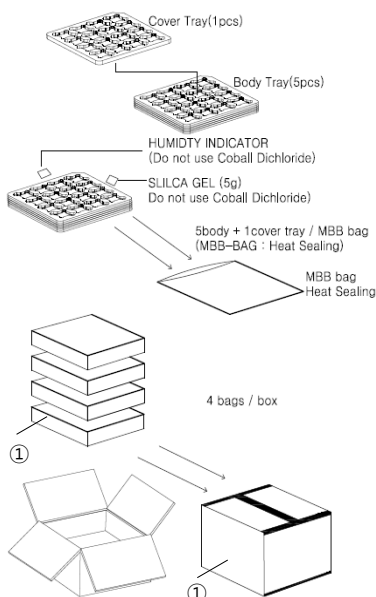
※ Model : LC040D, LC060D, LC080D

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



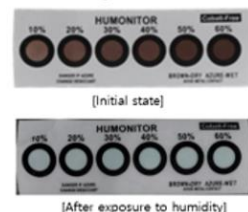
※ Small Box



※ Middle Box

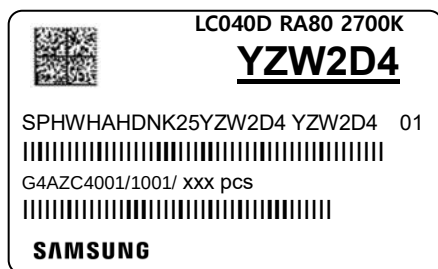


[MBB BAG drawing]



[SILICA GEL (5g)]

① Side Label



(1P) Supplier Part Number : SPHWAHDNK25YZW2D4



(33P) Bin Code / YZW2D4



(1T) Lot Number / 1001



(Q) Quantity : XXX



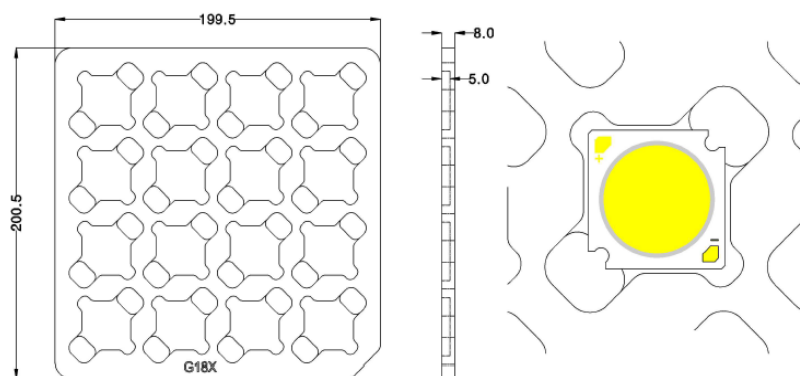
(100) Data Code : 2109



(4L) Country of Origin : CN

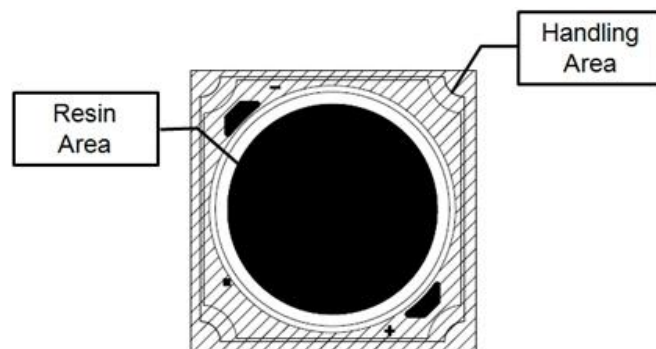


b) Tray



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.



Legal and additional information.

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