

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

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1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Model	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-	-40 ~ +105	$^{\circ}\text{C}$	-
Storage Temperature	T_{stg}	-	-40 ~ +120	$^{\circ}\text{C}$	-
LED Junction Temperature	T_J	-	150	$^{\circ}\text{C}$	-
Case Temperature	T_c	-	115	$^{\circ}\text{C}$	-
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)	$^{\circ}\text{C}/\text{W}$	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 °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 ($T_J = T_C = 85\text{ °C}$).
- 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	2349	2499	-
		2700	D4	2416	2570	-
		3000	D4	2630	2798	-
		4000	D4	2740	2915	-
		5000	D4	2704	2876	-
		5700	D4	2716	2889	-
	80	2700	D4	2329	2478	-
		3000	D4	2399	2552	-
		3500	D4	2457	2614	-
		4000	D4	2532	2694	-
		5000	D4	2569	2733	-
		5700	D4	2559	2722	-
	90	6500	D4	2527	2689	-
		2700	D4	1898	2019	-
		3000	D4	2035	2165	-
		3500	D4	2102	2236	-
		4000	D4	2203	2344	-
		5000	D4	2239	2382	-
LC019D	70	2200	D4	2813	2993	-
		2700	D4	3021	3214	-
		3000	D4	3150	3351	-
		4000	D4	3282	3491	-
		5000	D4	3238	3445	-
		5700	D4	3253	3460	-
	80	2700	D4	2790	2968	-
		3000	D4	2877	3061	-
		3500	D4	2933	3120	-
		4000	D4	3024	3217	-
		5000	D4	3077	3273	-
		5700	D4	3055	3250	-
	90	6500	D4	3027	3220	-
		2700	D4	2275	2420	-
		3000	D4	2453	2610	-
		3500	D4	2529	2690	-
		4000	D4	2632	2800	-
		5000	D4	2681	2852	-

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	3703	3939	-
		2700	D4	3911	4161	-
		3000	D4	4157	4422	-
		4000	D4	4289	4563	-
		5000	D4	4202	4471	-
		5700	D4	4281	4554	-
	80	2700	D4	3668	3902	-
		3000	D4	3859	4105	-
		3500	D4	3907	4156	-
		4000	D4	3975	4229	-
		5000	D4	4064	4323	-
		5700	D4	4025	4282	-
	90	6500	D4	3998	4253	-
		2700	D4	3031	3225	-
		3000	D4	3256	3464	-
		3500	D4	3341	3554	-
		4000	D4	3482	3704	-
		5000	D4	3568	3796	-
LC033D	70	2200	D4	4536	4825	-
		2700	D4	4871	5182	-
		3000	D4	5079	5403	-
		4000	D4	5292	5629	-
		5000	D4	5221	5554	-
		5700	D4	5244	5579	-
	80	2700	D4	4498	4785	-
		3000	D4	4741	5044	-
		3500	D4	4819	5127	-
		4000	D4	4914	5227	-
		5000	D4	4961	5277	-
		5700	D4	4961	5277	-
	90	6500	D4	4880	5192	-
		2700	D4	3765	4005	-
		3000	D4	4061	4320	-
		3500	D4	4181	4448	-
		4000	D4	4276	4549	-
		5000	D4	4323	4599	-

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	5609	5967	-
		2700	D4	5833	6205	-
		3000	D4	6167	6561	-
		4000	D4	6544	6962	-
		5000	D4	6423	6833	-
		5700	D4	6486	6900	-
	80	2700	D4	5563	5918	-
		3000	D4	5754	6122	-
		3500	D4	5960	6340	-
		4000	D4	6077	6465	-
		5000	D4	6085	6474	-
		5700	D4	6135	6527	-
	90	6500	D4	6036	6421	-
		2700	D4	4605	4899	-
		3000	D4	4878	5189	-
		3500	D4	5082	5407	-
		4000	D4	5253	5588	-
		5000	D4	5355	5697	-
LC060D	70	5700	D4	5239	5574	-
		2200	D4	8305	8836	-
		2700	D4	8664	9217	-
		3000	D4	9300	9894	-
		4000	D4	9690	10308	-
		5000	D4	9416	10017	-
	80	5700	D4	9603	10216	-
		2700	D4	8236	8762	-
		3000	D4	8680	9234	-
		3500	D4	8806	9368	-
		4000	D4	8998	9572	-
		5000	D4	9084	9664	-
	90	5700	D4	9084	9664	-
		6500	D4	8937	9507	-
		2700	D4	6810	7245	-
		3000	D4	7280	7745	-
		3500	D4	7536	8017	-
		4000	D4	7830	8329	-
		5000	D4	7916	8421	-
		5700	D4	7758	8253	-

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

a) Binning Structure

※ $\text{LCoo}_3\text{D} (I_F = 90 \text{ mA}, T_J = 85^\circ\text{C})$

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($I_F = 180 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

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($I_f = 270 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI(R _a) Min.	Nominal CCT(K)	Product Code	V _f Rank	Color Rank	Flux Rank	Flux Range (Φ _v , lm)
70	3000	SPHWAHDNC23YZV2D4	YZ	V2	D4	1524 ~
		SPHWAHDNC23YZV3D4		V3		
	4000	SPHWAHDNC23YZT2D4	YZ	T2	D4	1587 ~
		SPHWAHDNC23YZT3D4		T3		
	5000	SPHWAHDNC23YZR2D4	YZ	R2	D4	1566 ~
		SPHWAHDNC23YZR3D4		R3		
80	2700	SPHWAHDNC25YZW1D4	YZ	W1	D4	1349 ~
		SPHWAHDNC25YZW2D4		W2		
	3000	SPHWAHDNC25YZV1D4	YZ	V1	D4	1409 ~
		SPHWAHDNC25YZV2D4		V2		
	3500	SPHWAHDNC25YZU1D4	YZ	U1	D4	1438 ~
		SPHWAHDNC25YZU2D4		U2		
	4000	SPHWAHDNC25YZT1D4	YZ	T1	D4	1474 ~
		SPHWAHDNC25YZT2D4		T2		
	5000	SPHWAHDNC25YZR2D4	YZ	R2	D4	1488 ~
		SPHWAHDNC25YZR3D4		R3		
	5700	SPHWAHDNC25YZQ2D4	YZ	Q2	D4	1488 ~
		SPHWAHDNC25YZQ3D4		Q3		

90	6500	SPHWHAHDNC25YZP2D4	YZ	P2	D4	1464 ~
		SPHWHAHDNC25YZP3D4		P3		
	2700	SPHWHAHDNC27YZW1D4	YZ	W1	D4	1115 ~
		SPHWHAHDNC27YZW2D4		W2		
	3000	SPHWHAHDNC27YZV1D4	YZ	V1	D4	1202 ~
		SPHWHAHDNC27YZV2D4		V2		
	3500	SPHWHAHDNC27YZU1D4	YZ	U1	D4	1237 ~
		SPHWHAHDNC27YZU2D4		U2		
	4000	SPHWHAHDNC27YZT1D4	YZ	T1	D4	1283 ~
		SPHWHAHDNC27YZT2D4		T2		
	5000	SPHWHAHDNC27YZR2D4	YZ	R2	D4	1297 ~
		SPHWHAHDNC27YZR3D4		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	2349 ~
		SPHWWAHDNE23YZY3D4		Y3		
	2700	SPHWWAHDNE23YZW2D4	YZ	Y2	D4	2416 ~
		SPHWWAHDNE23YZW3D4		Y3		
	3000	SPHWWAHDNE23YZV2D4	YZ	V2	D4	2630 ~
		SPHWWAHDNE23YZV3D4		V3		
	4000	SPHWWAHDNE23YZT2D4	YZ	T2	D4	2740 ~
		SPHWWAHDNE23YZT3D4		T3		
	5000	SPHWWAHDNE23YZR2D4	YZ	R2	D4	2704 ~
		SPHWWAHDNE23YZR3D4		R3		
	5700	SPHWWAHDNE23YZQ2D4	YZ	Q2	D4	2716 ~
		SPHWWAHDNE23YZQ3D4		Q3		
80	2700	SPHWWAHDNE25YZW1D4	YZ	W1	D4	2329 ~
		SPHWWAHDNE25YZW2D4		W2		
	3000	SPHWWAHDNE25YZV1D4	YZ	V1	D4	2399 ~
		SPHWWAHDNE25YZV2D4		V2		
	3500	SPHWWAHDNE25YZU1D4	YZ	U1	D4	2457 ~
		SPHWWAHDNE25YZU2D4		U2		
	4000	SPHWWAHDNE25YZT1D4	YZ	T1	D4	2532 ~
		SPHWWAHDNE25YZT2D4		T2		
	5000	SPHWWAHDNE25YZR2D4	YZ	R2	D4	2569 ~
		SPHWWAHDNE25YZR3D4		R3		
	5700	SPHWWAHDNE25YZQ2D4	YZ	Q2	D4	2559 ~
		SPHWWAHDNE25YZQ3D4		Q3		

90	6500	SPHWWAHDNE25YZP2D4	YZ	P2	D4	2527 ~
		SPHWWAHDNE25YZP3D4		P3		
	2700	SPHWWAHDNE27YZW1D4	YZ	W1	D4	1898 ~
		SPHWWAHDNE27YZW2D4		W2		
	3000	SPHWWAHDNE27YZV1D4	YZ	V1	D4	2035 ~
		SPHWWAHDNE27YZV2D4		V2		
	3500	SPHWWAHDNE27YZU1D4	YZ	U1	D4	2102 ~
		SPHWWAHDNE27YZU2D4		U2		
	4000	SPHWWAHDNE27YZT1D4	YZ	T1	D4	2203 ~
		SPHWWAHDNE27YZT2D4		T2		
	5000	SPHWWAHDNE27YZR2D4	YZ	R2	D4	2239 ~
		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	SPHWWAHDNF23YZY2D4	YZ	Y2	D4	2813 ~
		SPHWWAHDNF23YZY3D4		Y3		
	2700	SPHWWAHDNF23YZW2D4	YZ	W2	D4	3021 ~
		SPHWWAHDNF23YZW3D4		W3		
	3000	SPHWWAHDNF23YZV2D4	YZ	V2	D4	3150 ~
		SPHWWAHDNF23YZV3D4		V3		
	4000	SPHWWAHDNF23YZT2D4	YZ	T2	D4	3282 ~
		SPHWWAHDNF23YZT3D4		T3		
	5000	SPHWWAHDNF23YZR2D4	YZ	R2	D4	3238 ~
		SPHWWAHDNF23YZR3D4		R3		
	5700	SPHWWAHDNF23YZQ2D4	YZ	Q2	D4	3253 ~
		SPHWWAHDNF23YZQ3D4		Q3		
80	2700	SPHWWAHDNF25YZW1D4	YZ	W1	D4	2790 ~
		SPHWWAHDNF25YZW2D4		W2		
	3000	SPHWWAHDNF25YZV1D4	YZ	V1	D4	2877 ~
		SPHWWAHDNF25YZV2D4		V2		
	3500	SPHWWAHDNF25YZU1D4	YZ	U1	D4	2933 ~
		SPHWWAHDNF25YZU2D4		U2		
	4000	SPHWWAHDNF25YZT1D4	YZ	T1	D4	3024 ~
		SPHWWAHDNF25YZT2D4		T2		
	5000	SPHWWAHDNF25YZR2D4	YZ	R2	D4	3077 ~
		SPHWWAHDNF25YZR3D4		R3		
	5700	SPHWWAHDNF25YZQ2D4	YZ	Q2	D4	3055 ~
		SPHWWAHDNF25YZQ3D4		Q3		
	6500	SPHWWAHDNF25YZP2D4	YZ	P2	D4	3027 ~
		SPHWWAHDNF25YZP3D4		P3		

90	2700	SPHWWAHDNF27YZW1D4	YZ	W1	D4	2275 ~
		SPHWWAHDNF27YZW2D4		W2		
	3000	SPHWWAHDNF27YZV1D4	YZ	V1	D4	2453 ~
		SPHWWAHDNF27YZV2D4		V2		
	3500	SPHWWAHDNF27YZU1D4	YZ	U1	D4	2529 ~
		SPHWWAHDNF27YZU2D4		U2		
	4000	SPHWWAHDNF27YZT1D4	YZ	T1	D4	2632 ~
		SPHWWAHDNF27YZT2D4		T2		
	5000	SPHWWAHDNF27YZR2D4	YZ	R2	D4	2681 ~
		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	3703 ~
		SPHWAHDNG23YZY3D4		Y3		
	2700	SPHWAHDNG23YZW2D4	YZ	W2	D4	3911 ~
		SPHWAHDNG23YZW3D4		W3		
	3000	SPHWAHDNG23YZV2D4	YZ	V2	D4	4157 ~
		SPHWAHDNG23YZV3D4		V3		
	4000	SPHWAHDNG23YZT2D4	YZ	T2	D4	4289 ~
		SPHWAHDNG23YZT3D4		T3		
	5000	SPHWAHDNG23YZR2D4	YZ	R2	D4	4202 ~
		SPHWAHDNG23YZR3D4		R3		
	5700	SPHWAHDNG23YZQ2D4	YZ	Q2	D4	4281 ~
		SPHWAHDNG23YZQ3D4		Q3		
80	2700	SPHWAHDNG25YZW1D4	YZ	W1	D4	3668 ~
		SPHWAHDNG25YZW2D4		W2		
	3000	SPHWAHDNG25YZV1D4	YZ	V1	D4	3859 ~
		SPHWAHDNG25YZV2D4		V2		
	3500	SPHWAHDNG25YZU1D4	YZ	U1	D4	3907 ~
		SPHWAHDNG25YZU2D4		U2		
	4000	SPHWAHDNG25YZT1D4	YZ	T1	D4	3975 ~
		SPHWAHDNG25YZT2D4		T2		
	5000	SPHWAHDNG25YZR2D4	YZ	R2	D4	4064 ~
		SPHWAHDNG25YZR3D4		R3		
	5700	SPHWAHDNG25YZQ2D4	YZ	Q2	D4	4025 ~
		SPHWAHDNG25YZQ3D4		Q3		
	6500	SPHWAHDNG25YZP2D4	YZ	P2	D4	3998 ~
		SPHWAHDNG25YZP3D4		P3		

90	2700	SPHWHABDNG27YZW1D4	YZ	W1	D4	3031 ~
		SPHWHABDNG27YZW2D4		W2		
	3000	SPHWHABDNG27YZV1D4	YZ	V1	D4	3256 ~
		SPHWHABDNG27YZV2D4		V2		
	3500	SPHWHABDNG27YZU1D4	YZ	U1	D4	3341 ~
		SPHWHABDNG27YZU2D4		U2		
	4000	SPHWHABDNG27YZT1D4	YZ	T1	D4	3482 ~
		SPHWHABDNG27YZT2D4		T2		
	5000	SPHWHABDNG27YZR2D4	YZ	R2	D4	3568 ~
		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	4536 ~
		SPHWAHDNH23YZY3D4		Y3		
	2700	SPHWAHDNH23YZW2D4	YZ	W2	D4	4871 ~
		SPHWAHDNH23YZW3D4		W3		
	3000	SPHWAHDNH23YZV2D4	YZ	V2	D4	5079 ~
		SPHWAHDNH23YZV3D4		V3		
	4000	SPHWAHDNH23YZT2D4	YZ	T2	D4	5292 ~
		SPHWAHDNH23YZT3D4		T3		
	5000	SPHWAHDNH23YZR2D4	YZ	R2	D4	5221 ~
		SPHWAHDNH23YZR3D4		R3		
	5700	SPHWAHDNH23YZQ2D4	YZ	Q2	D4	5244 ~
		SPHWAHDNH23YZQ3D4		Q3		
80	2700	SPHWAHDNH25YZW1D4	YZ	W1	D4	4498 ~
		SPHWAHDNH25YZW2D4		W2		
	3000	SPHWAHDNH25YZV1D4	YZ	V1	D4	4741 ~
		SPHWAHDNH25YZV2D4		V2		
	3500	SPHWAHDNH25YZU1D4	YZ	U1	D4	4819 ~
		SPHWAHDNH25YZU2D4		U2		
	4000	SPHWAHDNH25YZT1D4	YZ	T1	D4	4914 ~
		SPHWAHDNH25YZT2D4		T2		
	5000	SPHWAHDNH25YZR2D4	YZ	R2	D4	4961 ~
		SPHWAHDNH25YZR3D4		R3		
	5700	SPHWAHDNH25YZQ2D4	YZ	Q2	D4	4961 ~
		SPHWAHDNH25YZQ3D4		Q3		
	6500	SPHWAHDNH25YZP2D4	YZ	P2	D4	4880 ~
		SPHWAHDNH25YZP3D4		P3		

90	2700	SPHWHAHDNH27YZW1D4	YZ	W1	D4	3765 ~
		SPHWHAHDNH27YZW2D4		W2		
	3000	SPHWHAHDNH27YZV1D4	YZ	V1	D4	4061 ~
		SPHWHAHDNH27YZV2D4		V2		
	3500	SPHWHAHDNH27YZU1D4	YZ	U1	D4	4181 ~
		SPHWHAHDNH27YZU2D4		U2		
	4000	SPHWHAHDNH27YZT1D4	YZ	T1	D4	4276 ~
		SPHWHAHDNH27YZT2D4		T2		
	5000	SPHWHAHDNH27YZR2D4	YZ	R2	D4	4323 ~
		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	5609 ~
		SPHWAHDNK23YZY3D4		Y3		
	2700	SPHWAHDNK23YZW2D4	YZ	W2	D4	5833 ~
		SPHWAHDNK23YZW3D4		W3		
	3000	SPHWAHDNK23YZV2D4	YZ	V2	D4	6167 ~
		SPHWAHDNK23YZV3D4		V3		
	4000	SPHWAHDNK23YZT2D4	YZ	T2	D4	6544 ~
		SPHWAHDNK23YZT3D4		T3		
	5000	SPHWAHDNK23YZR2D4	YZ	R2	D4	6423 ~
		SPHWAHDNK23YZR3D4		R3		
	5700	SPHWAHDNK23YZQ2D4	YZ	Q2	D4	6486 ~
		SPHWAHDNK23YZQ3D4		Q3		
80	2700	SPHWAHDNK25YZW1D4	YZ	W1	D4	5563 ~
		SPHWAHDNK25YZW2D4		W2		
	3000	SPHWAHDNK25YZV1D4	YZ	V1	D4	5754 ~
		SPHWAHDNK25YZV2D4		V2		
	3500	SPHWAHDNK25YZU1D4	YZ	U1	D4	5960 ~
		SPHWAHDNK25YZU2D4		U2		
	4000	SPHWAHDNK25YZT1D4	YZ	T1	D4	6077 ~
		SPHWAHDNK25YZT2D4		T2		
	5000	SPHWAHDNK25YZR2D4	YZ	R2	D4	6085 ~
		SPHWAHDNK25YZR3D4		R3		
	5700	SPHWAHDNK25YZQ2D4	YZ	Q2	D4	6135 ~
		SPHWAHDNK25YZQ3D4		Q3		
	6500	SPHWAHDNK25YZP2D4	YZ	P2	D4	6036 ~
		SPHWAHDNK25YZP3D4		P3		

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2700	SPHWAHDNK27YZW1D4	YZ	W1	D4	4605 ~
	SPHWAHDNK27YZW2D4		W2		
3000	SPHWAHDNK27YZV1D4	YZ	V1	D4	4878 ~
	SPHWAHDNK27YZV2D4		V2		
3500	SPHWAHDNK27YZU1D4	YZ	U1	D4	5082 ~
	SPHWAHDNK27YZU2D4		U2		
4000	SPHWAHDNK27YZT1D4	YZ	T1	D4	5253 ~
	SPHWAHDNK27YZT2D4		T2		
5000	SPHWAHDNK27YZR2D4	YZ	R2	D4	5355 ~
	SPHWAHDNK27YZR3D4		R3		
5700	SPHWAHDNK27YZQ2D4	YZ	Q2	D4	5239 ~
	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	8305 ~
		SPHWWAHDNL231ZY3D4		Y3		
	2700	SPHWWAHDNL231ZW2D4	1Z	W2	D4	8664 ~
		SPHWWAHDNL231ZW3D4		W3		
	3000	SPHWWAHDNL231ZV2D4	1Z	V2	D4	9300 ~
		SPHWWAHDNL231ZV3D4		V3		
	4000	SPHWWAHDNL231ZT2D4	1Z	T2	D4	9690 ~
		SPHWWAHDNL231ZT3D4		T3		
	5000	SPHWWAHDNL231ZR2D4	1Z	R2	D4	9416 ~
		SPHWWAHDNL231ZR3D4		R3		
	5700	SPHWWAHDNL231ZQ2D4	1Z	Q2	D4	9603 ~
		SPHWWAHDNL231ZQ3D4		Q3		
80	2700	SPHWWAHDNL251ZW1D4	1Z	W1	D4	8236 ~
		SPHWWAHDNL251ZW2D4		W2		
	3000	SPHWWAHDNL251ZV1D4	1Z	V1	D4	8680 ~
		SPHWWAHDNL251ZV2D4		V2		
	3500	SPHWWAHDNL251ZU1D4	1Z	U1	D4	8806 ~
		SPHWWAHDNL251ZU2D4		U2		
	4000	SPHWWAHDNL251ZT1D4	1Z	T1	D4	8998 ~
		SPHWWAHDNL251ZT2D4		T2		
	5000	SPHWWAHDNL251ZR2D4	1Z	R2	D4	9084 ~
		SPHWWAHDNL251ZR3D4		R3		
	5700	SPHWWAHDNL251ZQ2D4	1Z	Q2	D4	9084 ~
		SPHWWAHDNL251ZQ3D4		Q3		
	6500	SPHWWAHDNL251ZP2D4	1Z	P2	D4	8937 ~
		SPHWWAHDNL251ZP3D4		P3		

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2700	SPHWWAHDNL271ZW1D4	1Z	W1	D4	6810 ~
	SPHWWAHDNL271ZW2D4		W2		
3000	SPHWWAHDNL271ZV1D4	1Z	V1	D4	7280 ~
	SPHWWAHDNL271ZV2D4		V2		
3500	SPHWWAHDNL271ZU1D4	1Z	U1	D4	7536 ~
	SPHWWAHDNL271ZU2D4		U2		
4000	SPHWWAHDNL271ZT1D4	1Z	T1	D4	7830 ~
	SPHWWAHDNL271ZT2D4		U2		
5000	SPHWWAHDNL271ZR2D4	1Z	R2	D4	7916 ~
	SPHWWAHDNL271ZR3D4		R3		
5700	SPHWWAHDNL271ZQ2D4	1Z	Q2	D4	7758 ~
	SPHWWAHDNL271ZQ3D4		Q3		

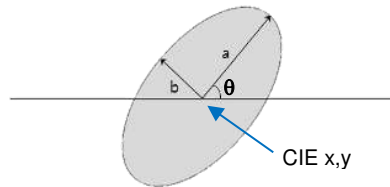
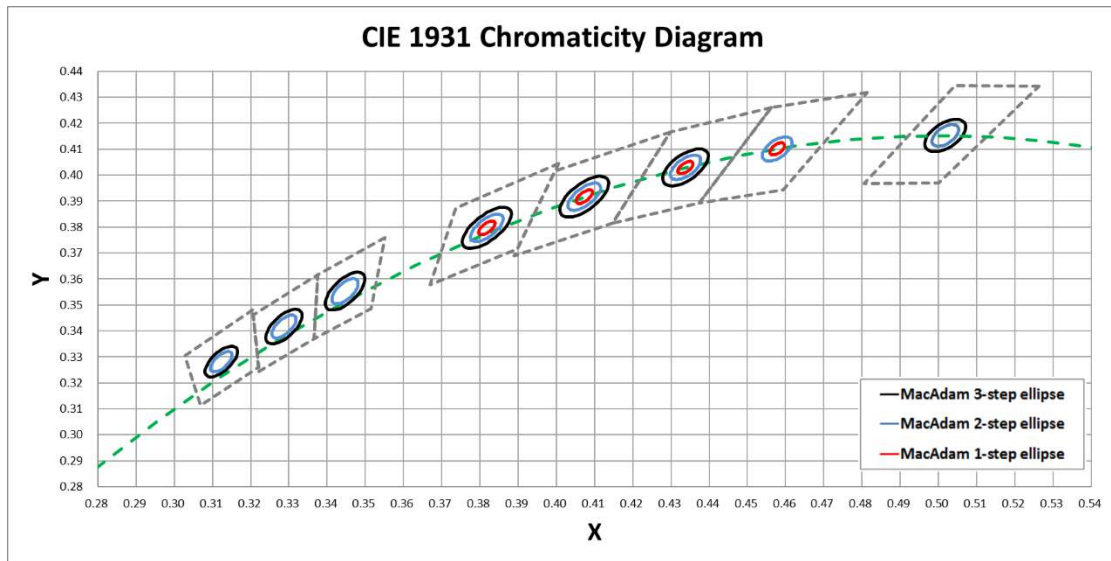
※ LCo8oD(I_F = 1620 mA, T_J = 85 °C)

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

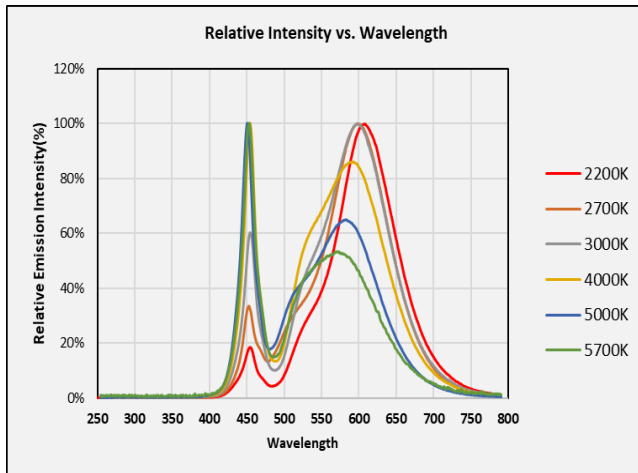
Note:

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

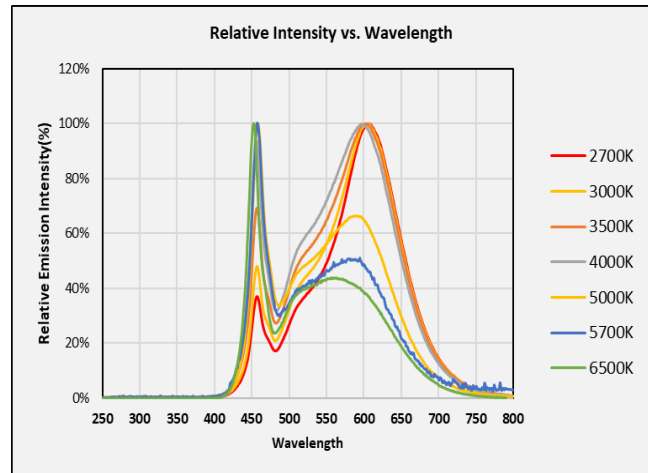
3. Typical Characteristics Graphs

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

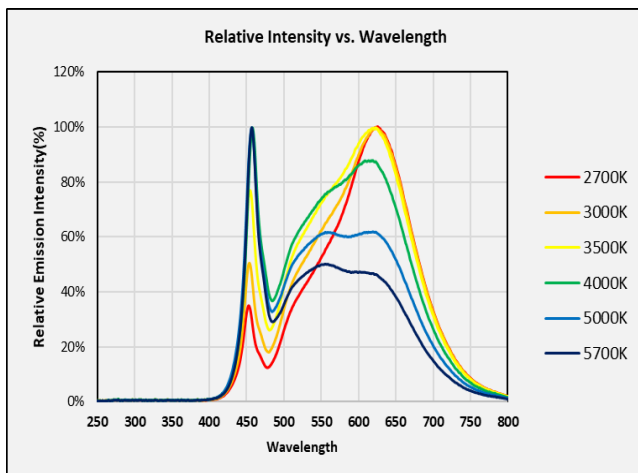
CRI Ra 70+

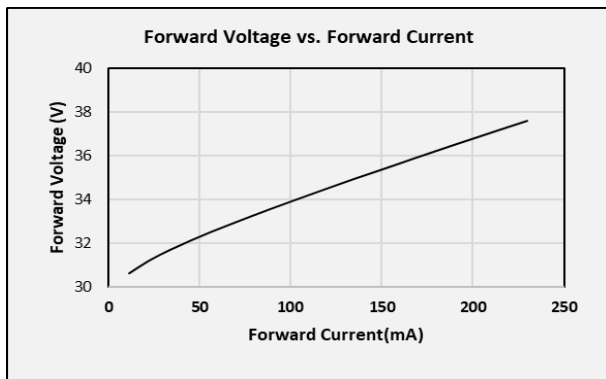
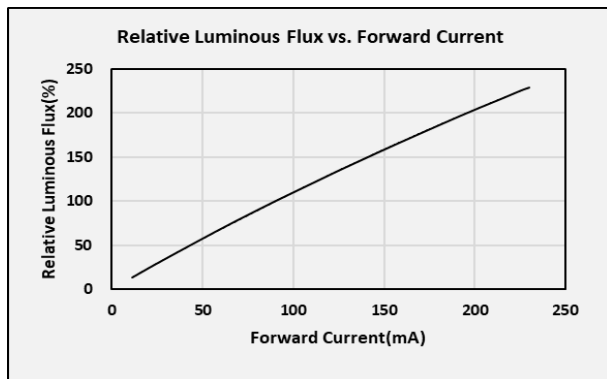
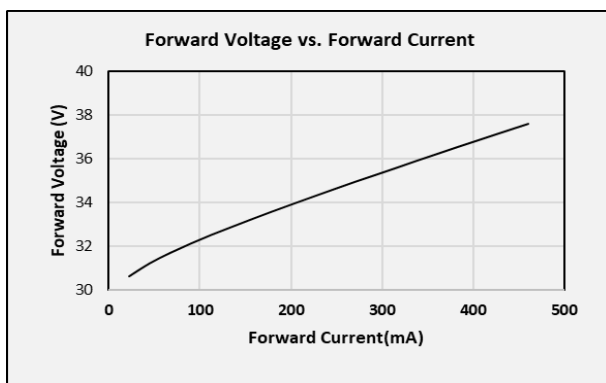
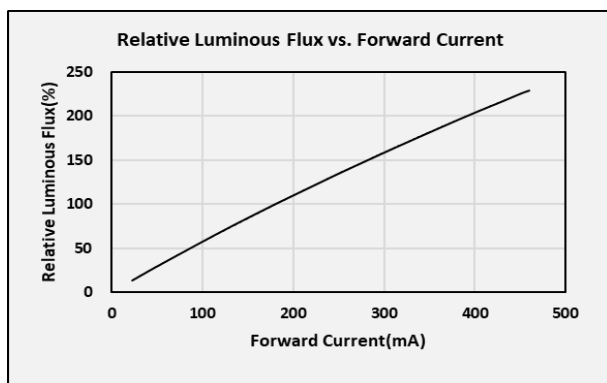
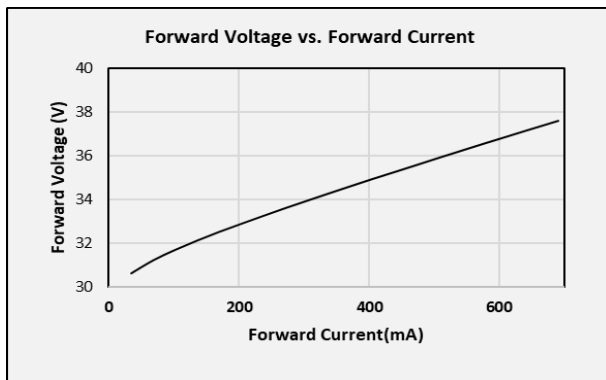
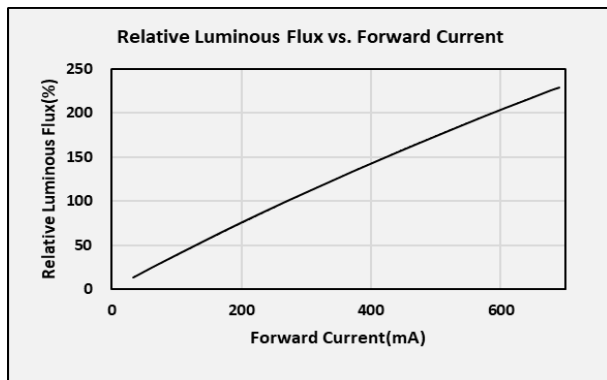


CRI Ra 80+

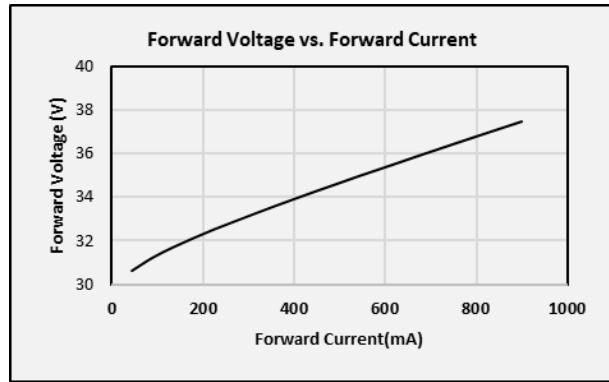
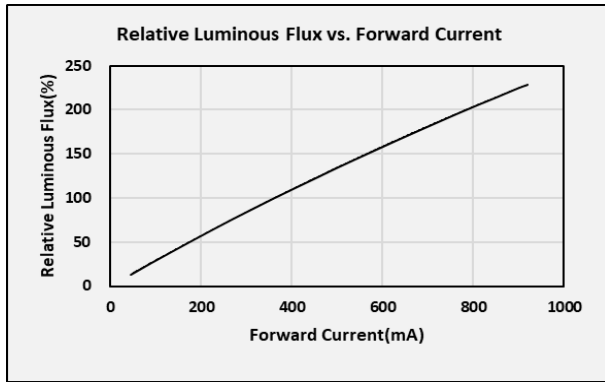


CRI Ra 90+

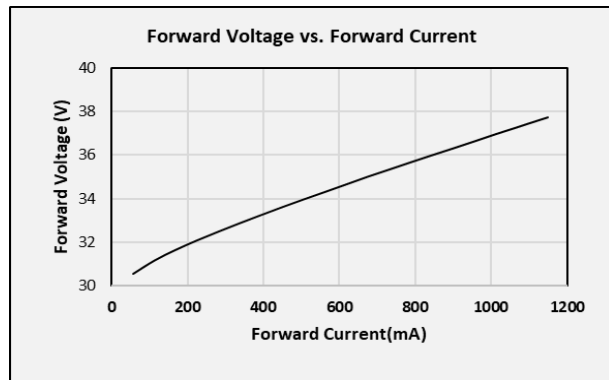
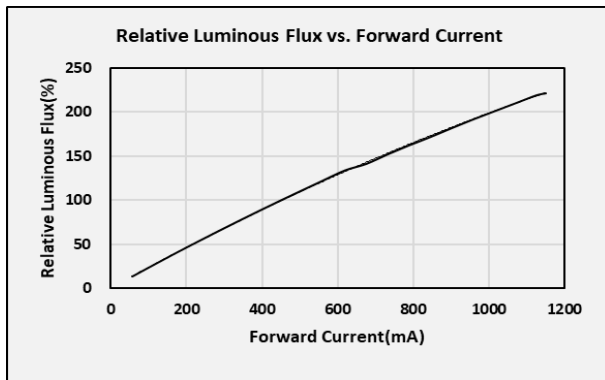


b) Forward Current Characteristics ($T_J = 85^\circ\text{C}$)**1) LC003D****2) LC006D****3) LC009D**

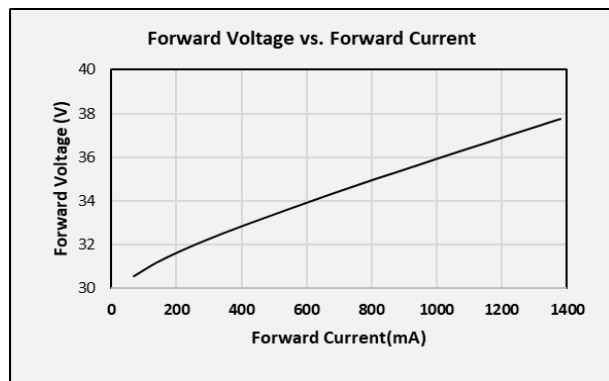
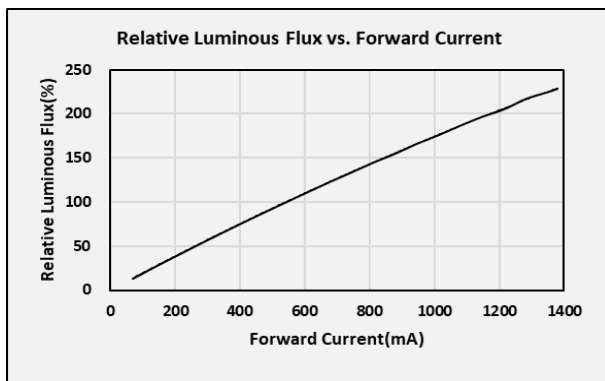
4) LC013D



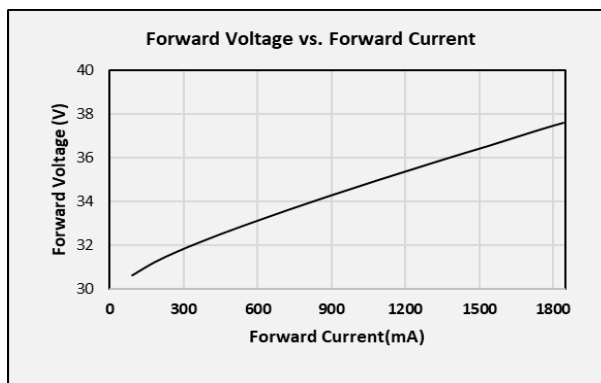
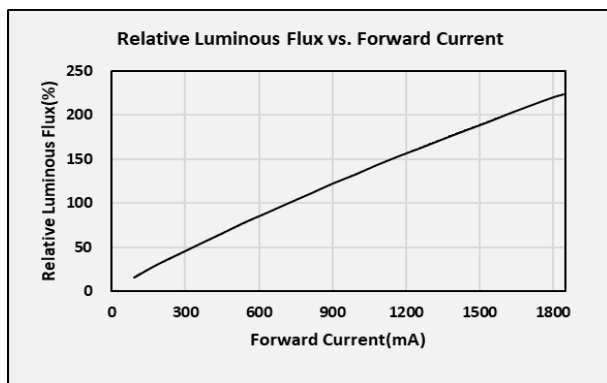
5) LC016D



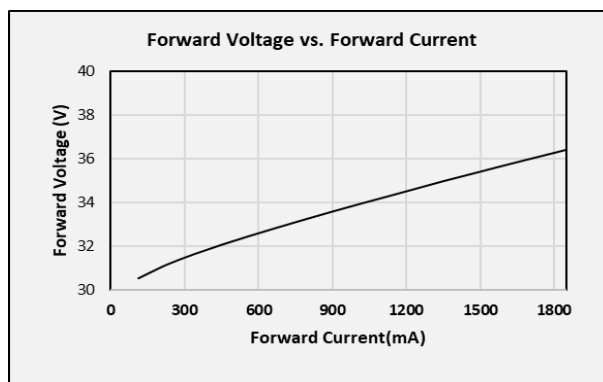
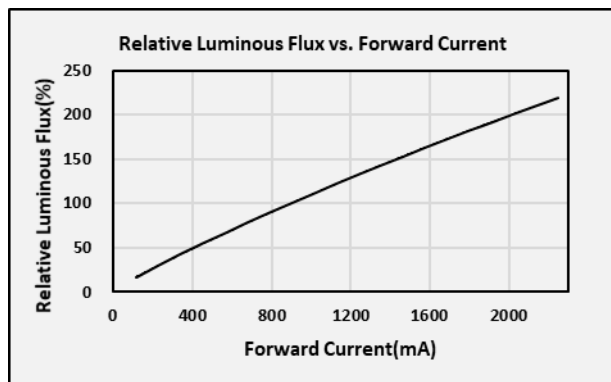
6) LC019D



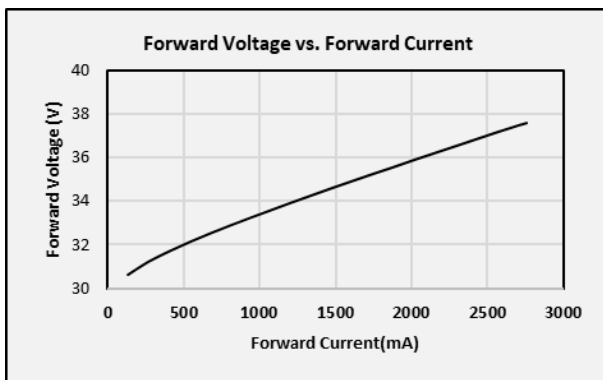
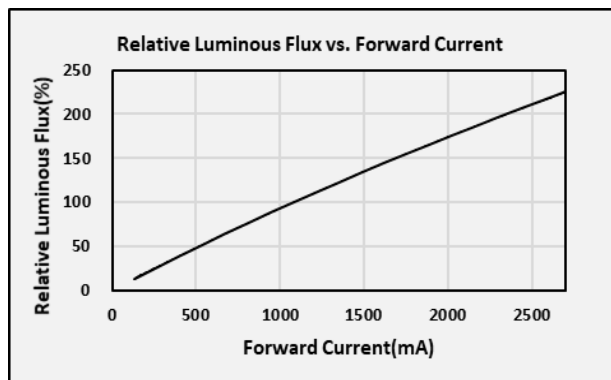
7) LC026D



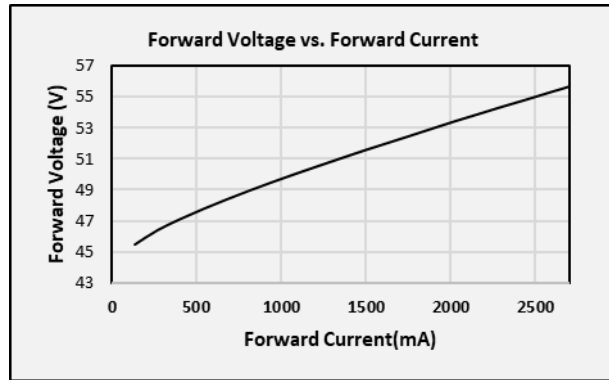
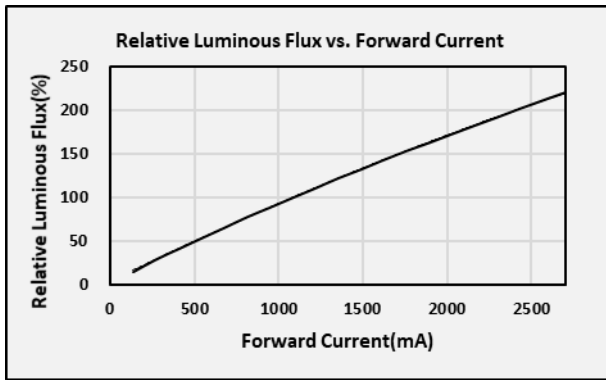
8) LC033D



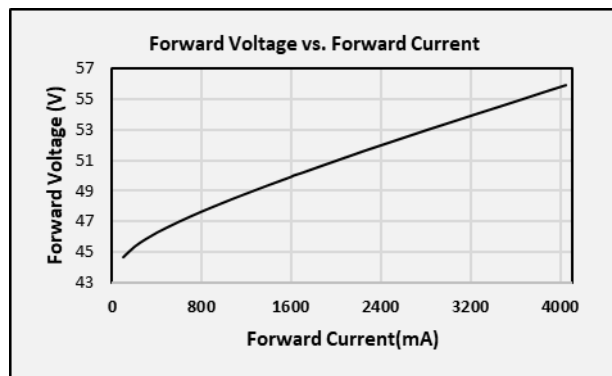
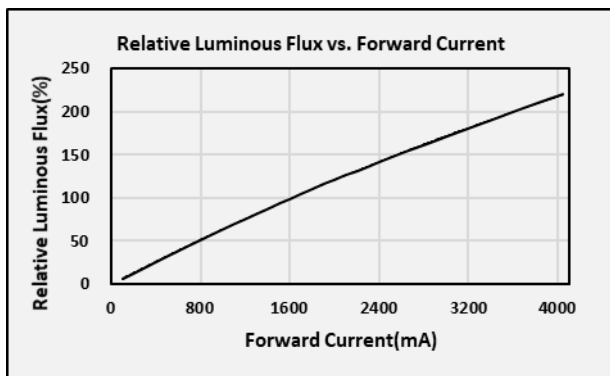
9) LC040D



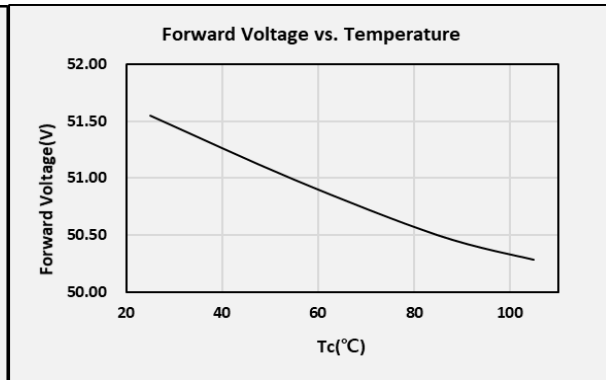
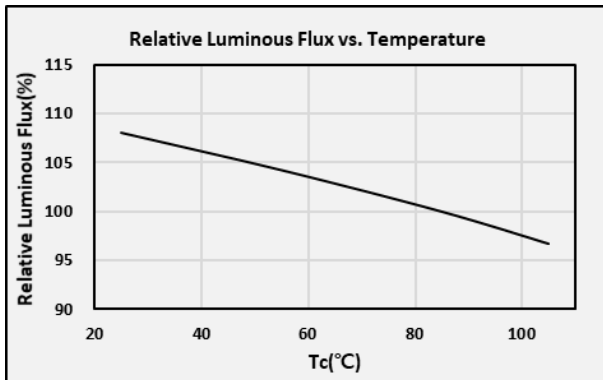
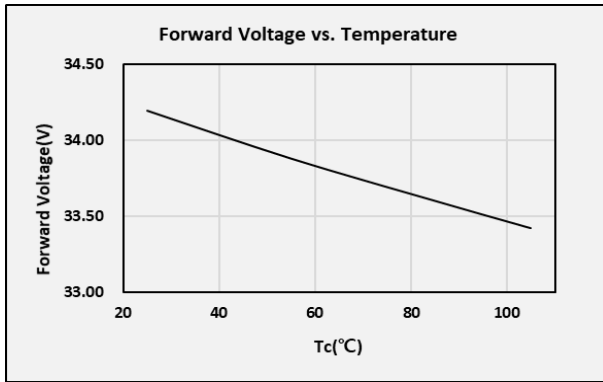
10) LC060D



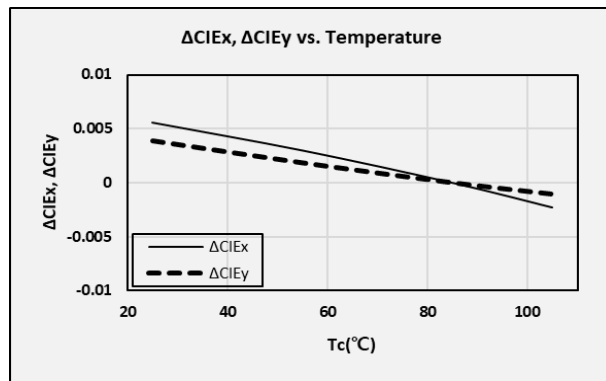
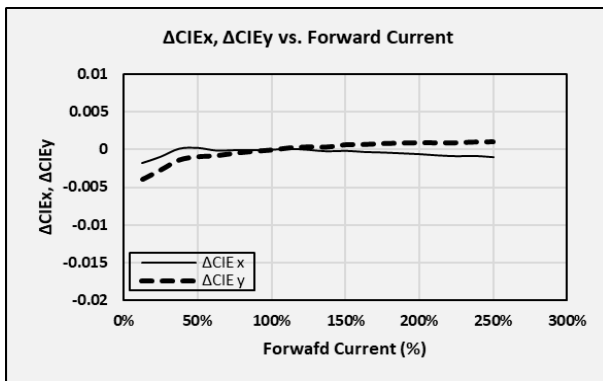
11) LC080D



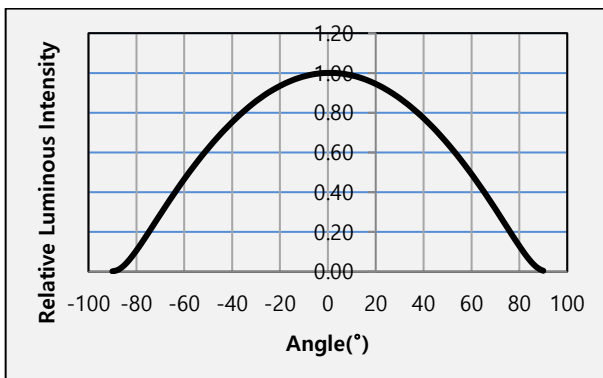
c) Temperature Characteristics (I_F = Sorting Current)



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

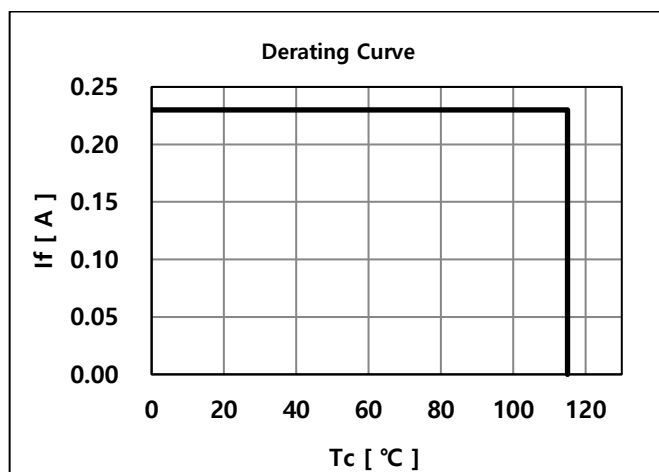


e) Beam Angle Characteristics (I_F = Sorting Current, $T_J = 85^{\circ}\text{C}$)

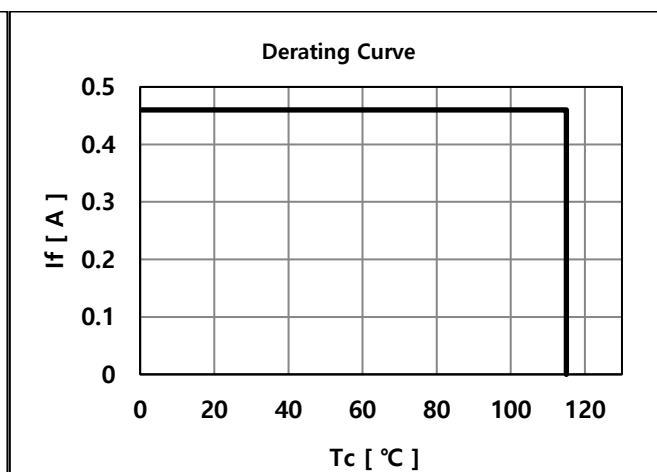


f) Derating Characteristics

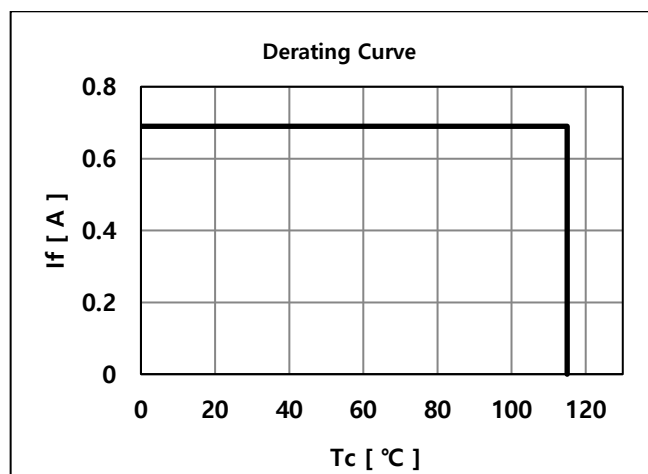
1) LC003D



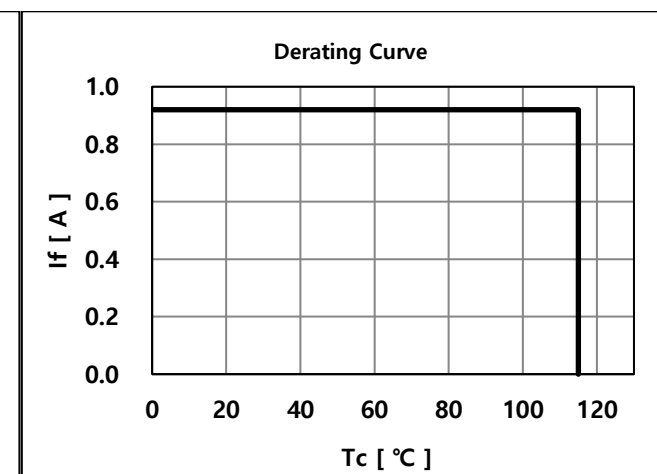
2) LC006D



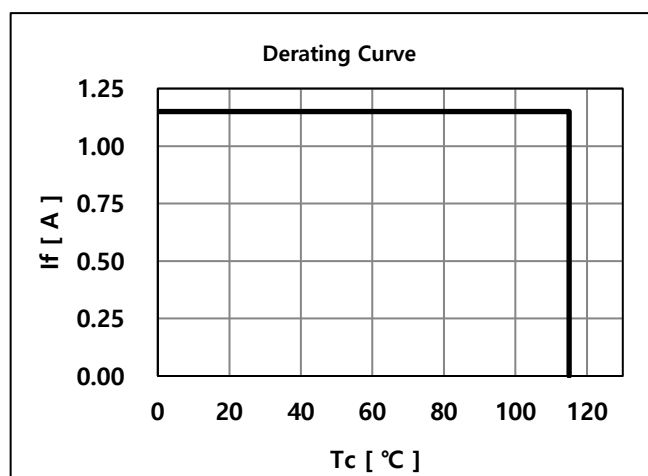
3) LC009D



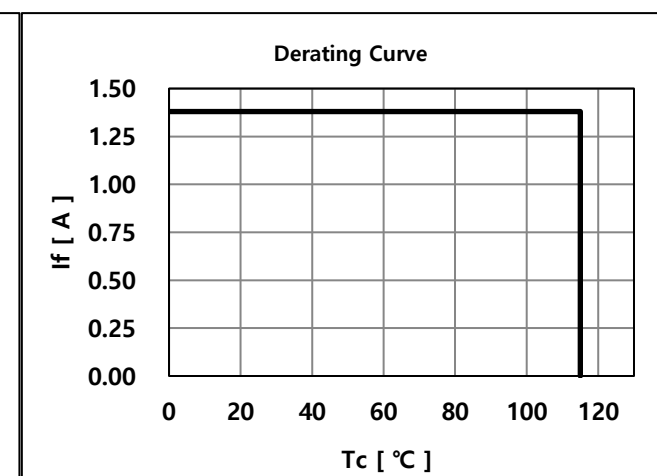
4) LC0013D



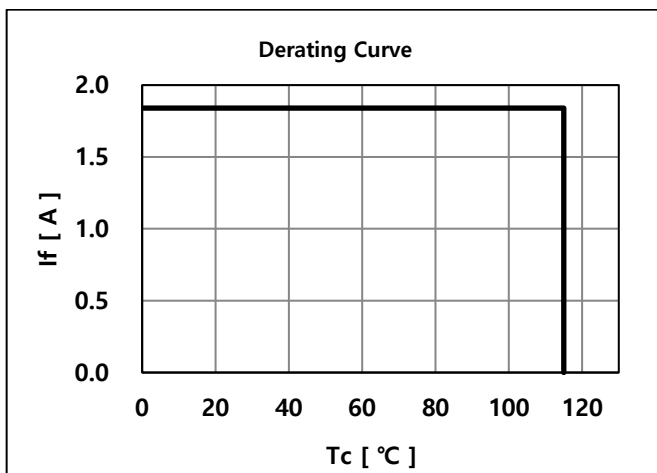
5) LC016D



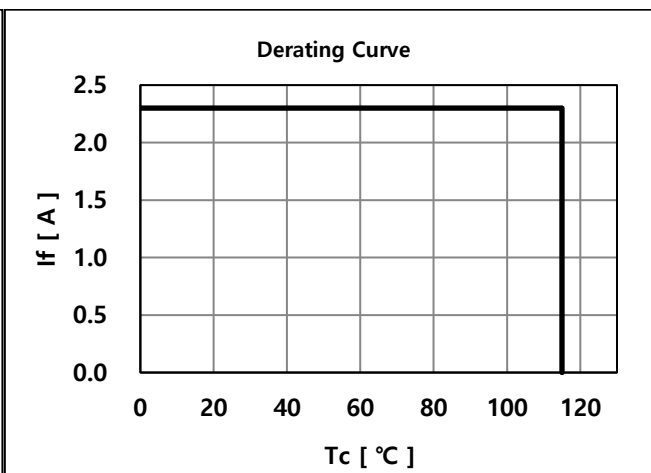
6) LC0019D



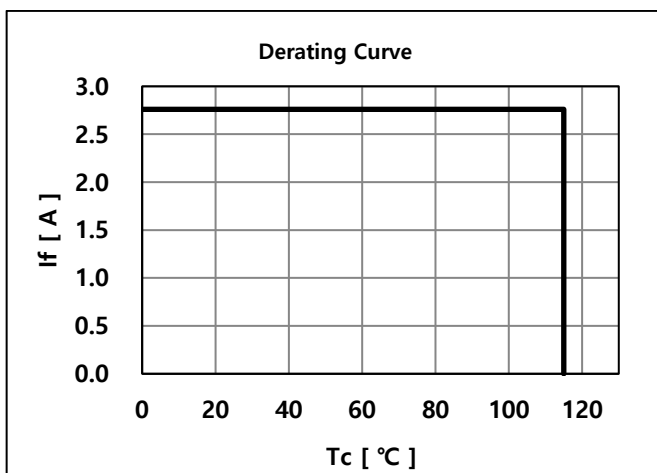
7) LC026D



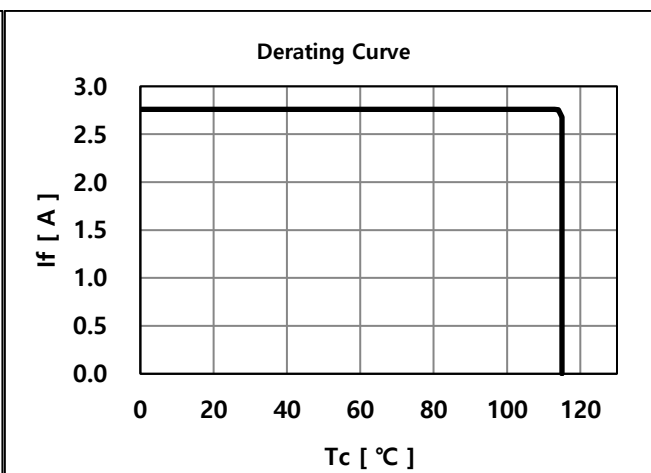
8) LC0033D



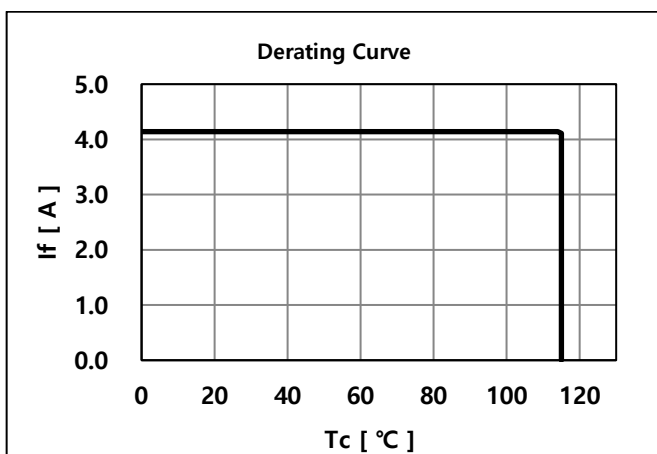
9) LC040D



10) LC060D

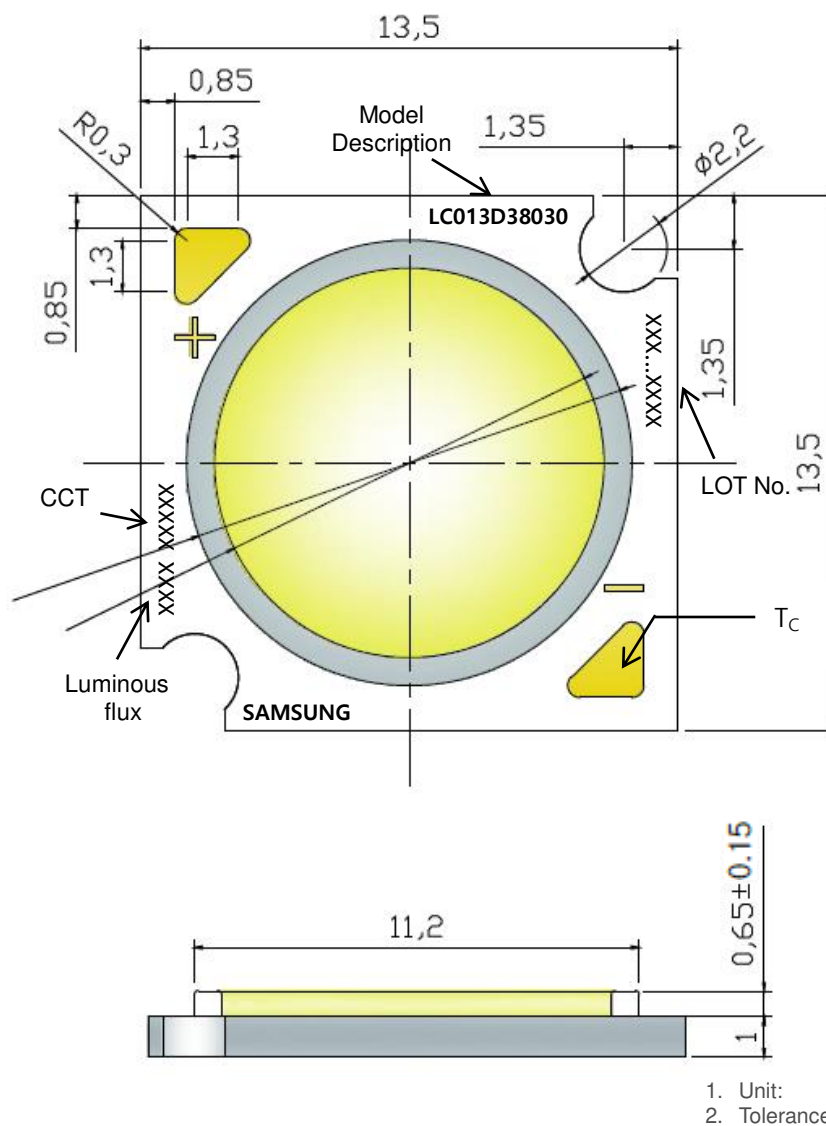


11) LC080D



4. Outline Drawing & Dimension

※ Model : LC003D, LC006D, LC009D, LC013D

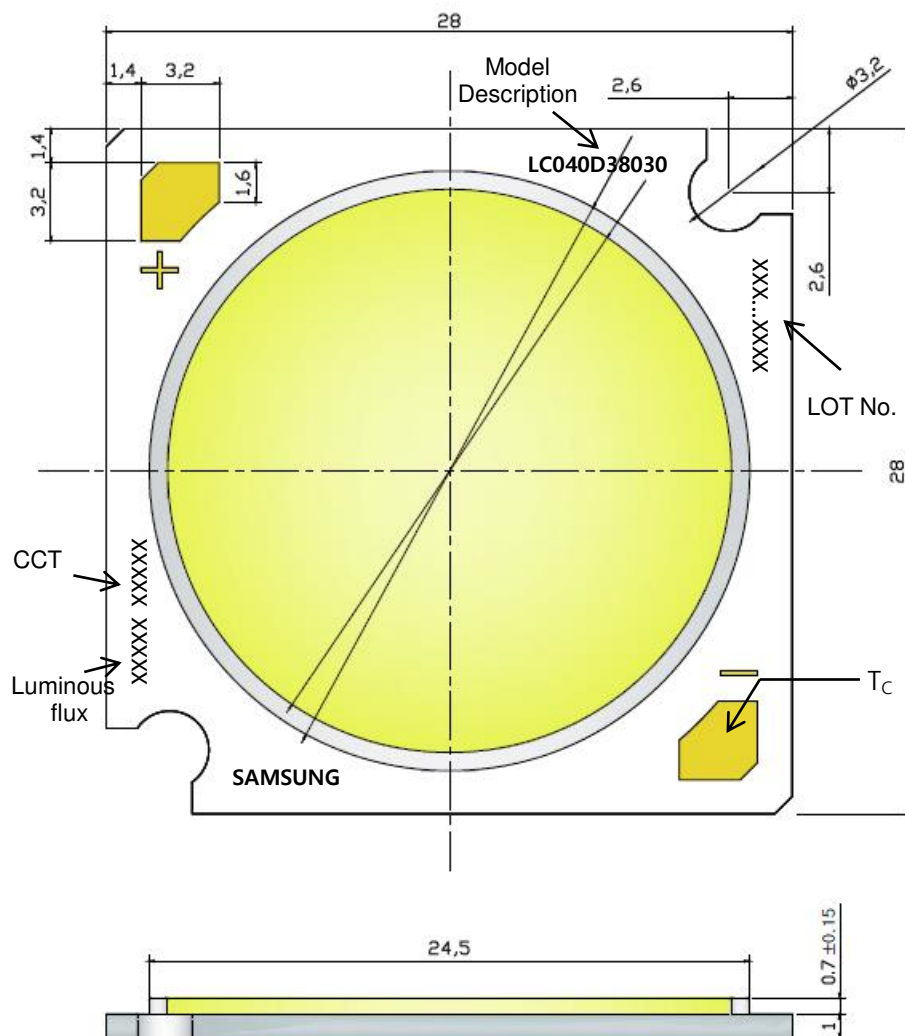


Item	Dimension	Tolerance	Unit
Length	13.5	±0.15	mm
Width	13.5	±0.15	mm
Height	Dam	±0.15	mm
	Substrate	±0.10	mm
LES Diameter	Light Emitting Surface	±0.30	mm

Note: Denoted product information above is only an example
(LC013D48030 :LC013D, Gen4, Ra80, 3000K)

Note: Denoted product information above is only an example
(LC026D48030 : LC026D, Gen4, CRI80+, 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	0.7	± 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 ($T_c = 25^\circ\text{C}$)	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 / 1(a)(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)

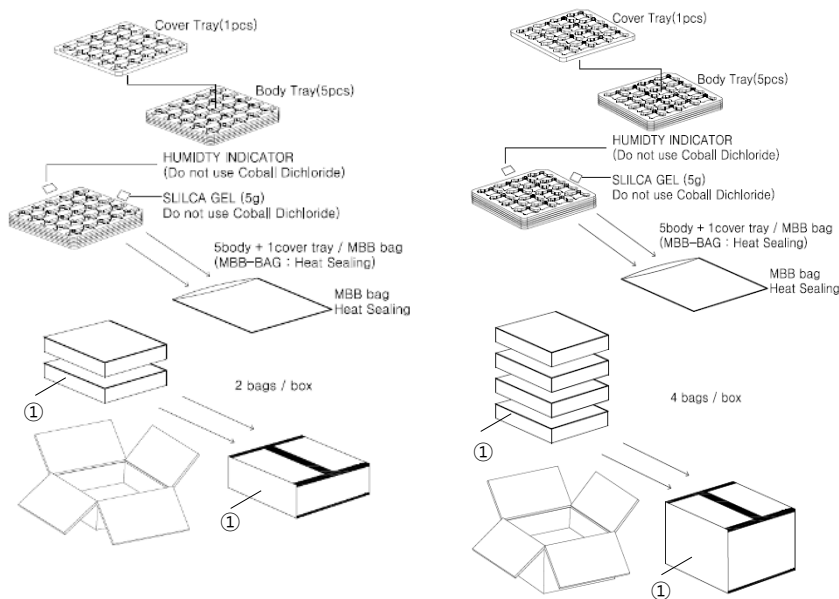
(a)(b)(c) : Product serial number (001 ~ 999)

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

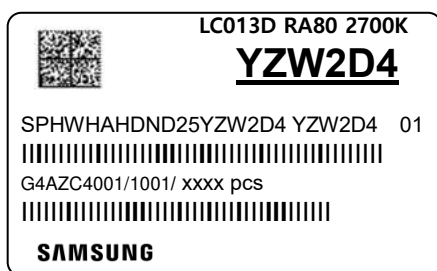


※ Small Box

※ Middle Box



① Side Label



(1P) Supplier Part Number : SPHWAHDND25YZW2D4



(33P) Bin Code / YZW2D4



(1T) Lot Number / 1001



(Q) Quantity : XXXX



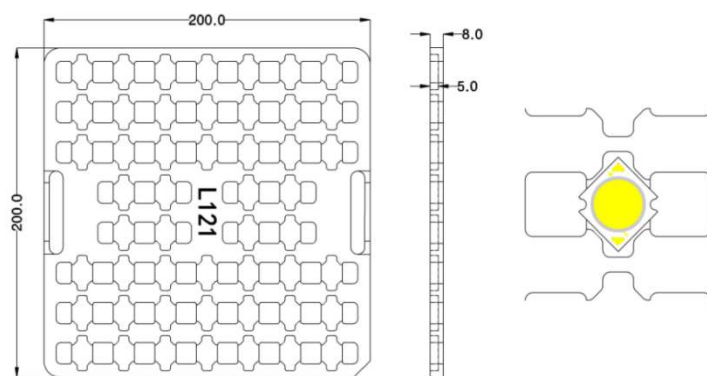
(100) Data Code : 2109



(4L) Country of Origin : CN



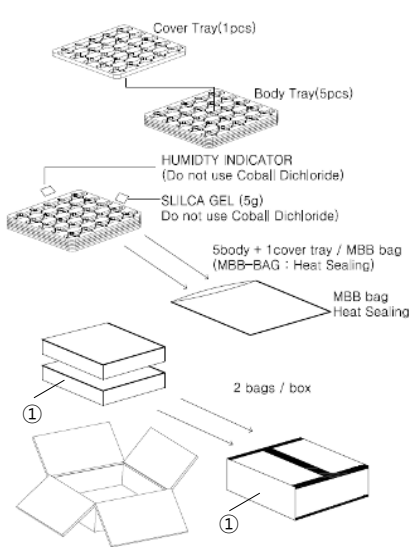
b) Tray



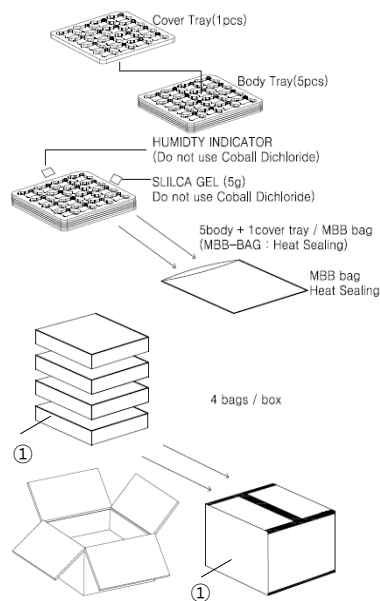
※ Model : LC016D, LC019D, LC026D, LC033D

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

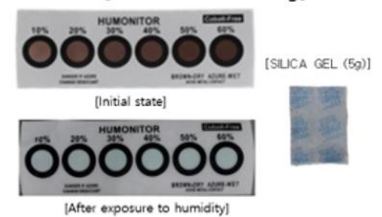
a) Packing Structure



※ Small Box



※ Middle Box



① Side Label

LC026D RA80 2700K
YZW2D4

SPHWAHDNG25YZW2D4 YZW2D4 01

G4AZC4001/1001/ xxx pcs

SAMSUNG

(1P) Supplier Part Number : SPHWAHDNG25YZW2D4



(33P) Bin Code / YZW2D4



(1T) Lot Number / 1001



(Q) Quantity : XXX



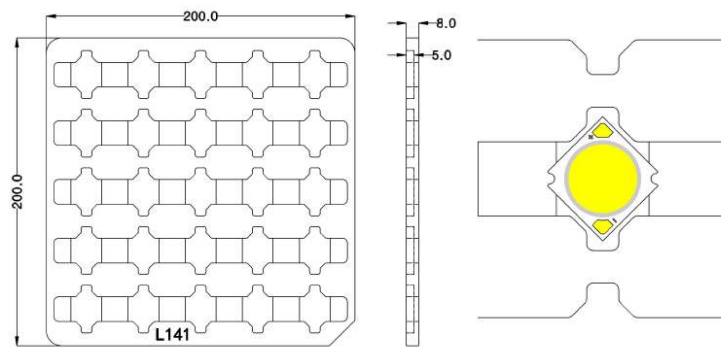
(100) Data Code : 2109



(4L) Country of Origin : CN



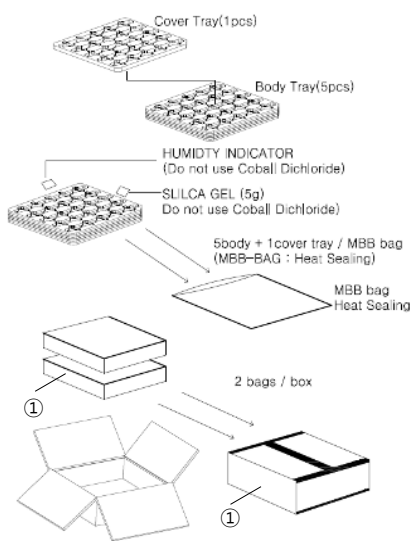
b) Tray



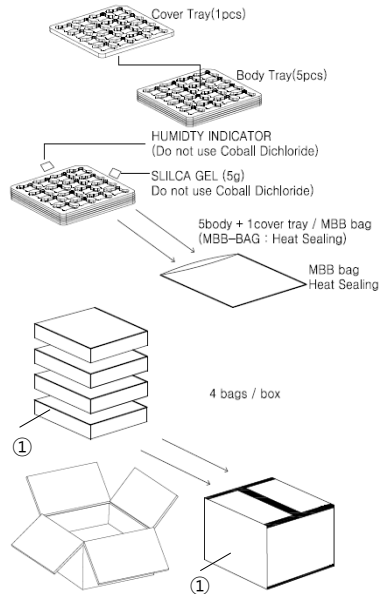
※ Model : LC040D, LC060D, LC080D

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



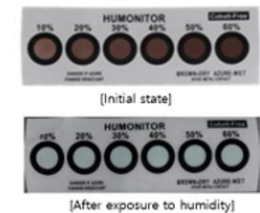
※ Small Box



※ Middle Box

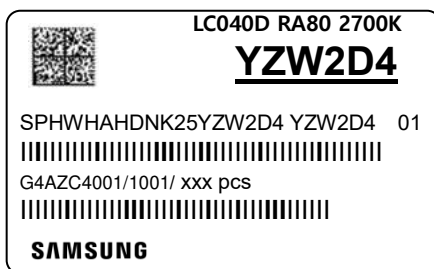


[MBB BAG drawing]



[SILICA GEL (5g)]

① Side Label



(1P) Supplier Part Number : SPHWAHDNK25YZW2D4



(33P) Bin Code / YZW2D4



(1T) Lot Number / 1001



(Q) Quantity : XXX



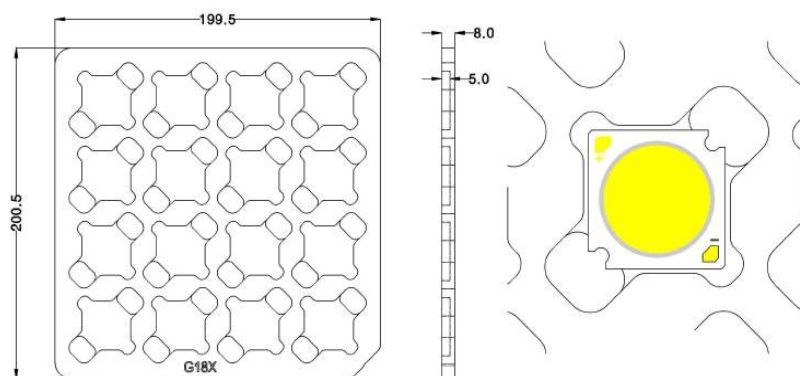
(100) Data Code : 2109



(4L) Country of Origin : CN

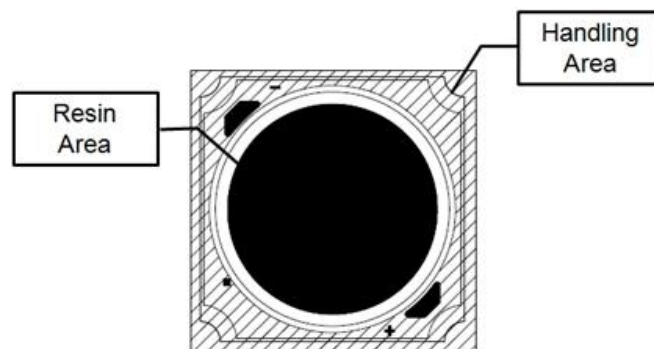


b) Tray



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.

About Samsung Electronics Co., Ltd.

Samsung Electronics Co., Ltd. inspires the world and shapes the future with transformative ideas and technologies, redefining the worlds of TVs, smartphones, wearable devices, tablets, cameras, digital appliances, printers, medical equipment, network systems and semiconductors.

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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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