

SPECIFICATIONS

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

1) 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	180 / 6.6	mA / W	-
		LC006D	360 / 13.2		-
		LC009D	540 / 19.8		-
		LC013D	720 / 26.4		-
		LC016D	900 / 33.0		-
		LC019D	1080 / 39.5		-
		LC026D	1440 / 52.7		-
		LC033D	1800 / 65.9		-
		LC040D	2160 / 79.1		-
		LC060D	2160/118.4		-
		LC080D	3240/177.6		-
ESD (HBM)	-		±2	kV	-

2) Electro-optical Characteristics (I_F = Sorting Current, $T_J = 85^\circ\text{C}$)

Item	Unit	Model	Rank	Min.	Typ.	Max.
Forward Voltage (V_F)	V	All Model	YZ	31.2	34.0	36.9
			1Z 60W	46.8	51.0	55.2
			80W	46.8	50.5	52.5
Color Rendering Index(R_a)	V	All Model	3	70	-	-
			5	80	-	-
			7	90	-	-
Beam Angle	deg.		-	-	115	-
Nominal Power / Sorting Current	W / mA	LC003D	-	-	3.0 / 90	-
		LC006D	-	-	6.1 / 180	-
		LC009D	-	-	9.1 / 270	-
		LC013D	-	-	12.1 / 360	-
		LC016D	-	-	15.2 / 450	-
		LC019D	-	-	18.2 / 540	-
		LC026D	-	-	24.3 / 720	-
		LC033D	-	-	30.3 / 900	-
		LC040D	-	-	36.4 / 1080	-
		LC060D	-	-	54.6 / 1080	-
		LC080D	-	-	81.9 / 1620	-
Thermal Resistance (Junction to chip case)	$^\circ\text{C} / \text{W}$	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 ($T_J = T_C = T_a = 85^\circ\text{C}$)
- 2) Dongbuled maintains measurement tolerance of : forward voltage = $\pm 5\%$ %, CRI = ± 1
- 3) Refer to the derating curve, ' 3. Typical Characteristics Graph designed within the range.

3) Luminous Flux Characteristics (I_F = Sorting Current)

Model	CRI (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ $T_J = 85^\circ\text{C}$		
				Min.	Typ.	Max.
LC003DC	80	2700	DC	450	479	-
		3000	DC	468	498	-
		3500	DC	485	516	-
		4000	DC	495	526	-
		5000	DC	504	536	-
		5700	DC	497	529	-
		6500	DC	489	520	-
	90	2700	DC	382	407	-
		3000	DC	402	428	-
		3500	DC	415	441	-
		4000	DC	423	450	-
		5000	DC	431	459	-
LC006DC	80	2700	DC	888	945	-
		3000	DC	924	983	-
		3500	DC	960	1021	-
		4000	DC	976	1038	-
		5000	DC	993	1056	-
		5700	DC	976	1038	-
		6500	DC	960	1022	-
	90	2700	DC	748	796	-
		3000	DC	787	838	-
		3500	DC	813	865	-
		4000	DC	831	884	-
		5000	DC	848	902	-

Notes :

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

Model	CRI (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C		
				Min.	Typ.	Max.
LC009DC	70	3000	DC	1491	1586	-
		4000	DC	1513	1610	-
		5000	DC	1528	1625	-
	80	2700	DC	1322	1406	-
		3000	DC	1375	1463	-
		3500	DC	1428	1519	-
		4000	DC	1457	1550	-
		5000	DC	1481	1576	-
		5700	DC	1462	1555	-
		6500	DC	1437	1529	-
	90	2700	DC	1119	1190	-
		3000	DC	1179	1254	-
		3500	DC	1217	1294	-
		4000	DC	1243	1322	-
		5000	DC	1267	1348	-
LC013DC	70	3000	DC	1972	2098	-
		4000	DC	2005	2133	-
		5000	DC	2033	2162	-
	80	2700	DC	1757	1869	-
		3000	DC	1828	1945	-
		3500	DC	1899	2020	-
		4000	DC	1933	2056	-
		5000	DC	1965	2090	-
		5700	DC	1934	2057	-
		6500	DC	1912	2034	-
	90	2700	DC	1484	1579	-
		3000	DC	1561	1661	-
		3500	DC	1609	1712	-
		4000	DC	1644	1748	-
		5000	DC	1684	1792	-

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) Dongbuled maintains measurement tolerance of: Luminous flux = ±7 %, CRI = ±1

Model	CRI (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C		
				Min.	Typ.	Max.
LC016DC	70	3000	DC	2563	2727	-
		4000	DC	2598	2763	-
		5000	DC	2629	2797	-
	80	2700	DC	2280	2426	-
		3000	DC	2373	2524	-
		3500	DC	2464	2621	-
		4000	DC	2509	2669	-
		5000	DC	2550	2713	-
		5700	DC	2510	2670	-
		6500	DC	2470	2627	-
	90	2700	DC	1924	2047	-
		3000	DC	2025	2154	-
		3500	DC	2089	2223	-
		4000	DC	2136	2273	-
		5000	DC	2189	2328	-
LC019DC	70	3000	DC	3087	3284	-
		4000	DC	3133	3332	-
		5000	DC	3167	3369	-
	80	2700	DC	2749	2925	-
		3000	DC	2861	3044	-
		3500	DC	2971	3161	-
		4000	DC	3025	3218	-
		5000	DC	3075	3271	-
		5700	DC	3024	3217	-
		6500	DC	2975	3164	-
	90	2700	DC	2321	2469	-
		3000	DC	2442	2597	-
		3500	DC	2519	2680	-
		4000	DC	2573	2738	-
		5000	DC	2636	2804	-

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) DongbuLED maintains measurement tolerance of: Luminous flux = ±7 %, CRI = ±1

Model	CRI (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C		
				Min.	Typ.	Max.
LC026DC	70	3000	DC	4032	4289	-
		4000	DC	4086	4347	-
		5000	DC	4132	4396	-
	80	2700	DC	3587	3816	-
		3000	DC	3733	3971	-
		3500	DC	3877	4125	-
		4000	DC	3946	4198	-
		5000	DC	4012	4268	-
		5700	DC	3949	4201	-
	90	6500	DC	3885	4133	-
		2700	DC	3029	3222	-
		3000	DC	3185	3389	-
		3500	DC	3287	3496	-
		4000	DC	3358	3572	-
		5000	DC	3443	3663	-
LC033DC	70	3000	DC	4946	5261	-
		4000	DC	5017	5337	-
		5000	DC	5098	5424	-
		5700	DC	4990	5309	-
	80	2700	DC	4405	4686	-
		3000	DC	4583	4875	-
		3500	DC	4760	5064	-
		4000	DC	4841	5150	-
		5000	DC	4926	5240	-
		5700	DC	4848	5158	-
		6500	DC	4784	5089	-
	90	2700	DC	3718	3955	-
		3000	DC	3911	4160	-
		3500	DC	4036	4293	-
		4000	DC	4123	4386	-
		5000	DC	4224	4493	-

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) Dongbuled maintains measurement tolerance of: Luminous flux = ±7 %, CRI = ±1

Model	CRI (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C		
				Min.	Typ.	Max.
LC040D	70	3000	DC	6060	6446	-
		4000	DC	6166	6560	-
		5000	DC	6241	6639	-
		2700	DC	5393	5737	-
		3000	DC	5610	5968	-
	80	3500	DC	5827	6199	-
		4000	DC	5932	6311	-
		5000	DC	6030	6414	-
		5700	DC	5934	6313	-
		6500	DC	5868	6242	-
	90	2700	DC	4565	4856	-
		3000	DC	4802	5108	-
		3500	DC	4944	5260	-
		4000	DC	5052	5374	-
		5000	DC	5177	5507	-
LC060D	70	3000	DC	9010	9585	-
		4000	DC	9140	9723	-
		5000	DC	9278	9870	-
	80	2700	DC	8025	8537	-
		3000	DC	8349	8882	-
		3500	DC	8672	9225	-
		4000	DC	8820	9383	-
		5000	DC	8973	9546	-
		5700	DC	8832	9395	-
		6500	DC	8698	9253	-
	90	2700	DC	6773	7206	-
		3000	DC	7124	7579	-
		3500	DC	7351	7821	-
		4000	DC	7510	7990	-
		5000	DC	7695	8186	-

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) Dongbuled maintains measurement tolerance of: Luminous flux = ±7 %, CRI = ±1

Model	CRI (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux@ T _J = 85 °C		
				Min.	Typ.	Max.
LC080D	70	3000	DC	13242	14087	-
		4000	DC	13433	14290	-
		5000	DC	13582	14449	-
	80	2700	DC	11738	12487	-
		3000	DC	12211	12990	-
		3500	DC	12683	13492	-
		4000	DC	12911	13735	-
		5000	DC	13123	13961	-
		5700	DC	12941	13767	-
		6500	DC	12770	13585	-
	90	2700	DC	9955	10590	-
		3000	DC	10471	11139	-
		3500	DC	10805	11495	-
		4000	DC	11038	11743	-
		5000	DC	11255	11974	-

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) Dongbuled 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	C

Digit	PKG informaiont	Code	Specification
1 2 3	Donblu 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℃)
		5	Min 80 (85℃)
		7	Min 90 (85℃)
13 14	Forward Voltage (V)	YZ	31.0 ~ 37.0
		1Z	46.4 ~ 54.8
15	CCT (K)	W	2700K
		V	3000K
		U	3500K
		T	4000K
		R	5000K
		Q	5700K
		P	6500K
16	MacAdam Setp	1	MacAdam 1 - Step
		2	MacAdam 2 - Step
		3	MacAdam 3 - Step
17 18	Luminous Flux (Lm)	DC	COB D-serise Gen.3 Plus

1) Binning Structure

– LC003D ($I_F = 90 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
80	2700	SPHWAHDNA25YZW1DC	YZ	W1	DC	450~
		SPHWAHDNA25YZW2DC		W2		
		SPHWAHDNA25YZW3DC		W3		
	3000	SPHWAHDNA25YZV1DC	YZ	V1	DC	468~
		SPHWAHDNA25YZV2DC		V2		
		SPHWAHDNA25YZV3DC		V3		
	3500	SPHWAHDNA25YZU1DC	YZ	U1	DC	485~
		SPHWAHDNA25YZU2DC		U2		
		SPHWAHDNA25YZU3DC		U3		
	4000	SPHWAHDNA25YZT1DC	YZ	T1	DC	195~
		SPHWAHDNA25YZT2DC		T2		
		SPHWAHDNA25YZT3DC		T3		
	5000	SPHWAHDNA25YZR2DC	YZ	R2	DC	504~
		SPHWAHDNA25YZR3DC		R3		
	5700	SPHWAHDNA25YZQ2DC	YZ	Q2	DC	497~
		SPHWAHDNA25YZQ3DC		Q3		
	6500	SPHWAHDNA25YZP2DC	YZ	P2	DC	489~
		SPHWAHDNA25YZP3DC		P3		
90	2700	SPHWAHDNA27YZW1DC	YZ	W1	DC	382~
		SPHWAHDNA27YZW2DC		W2		
		SPHWAHDNA27YZW3DC		W3		
	3000	SPHWAHDNA27YZV1DC	YZ	V1	DC	402~
		SPHWAHDNA27YZV2DC		V2		
		SPHWAHDNA27YZV3DC		V3		
	3500	SPHWAHDNA27YZU1DC	YZ	U1	DC	415~
		SPHWAHDNA27YZU2DC		U2		
		SPHWAHDNA27YZU3DC		U3		
	4000	SPHWAHDNA27YZT1DC	YZ	T1	DC	423~
		SPHWAHDNA27YZT2DC		T2		
		SPHWAHDNA27YZT3DC		T3		
	5000	SPHWAHDNA27YZR2DC	YZ	R2	DC	431~
		SPHWAHDNA27YZR3DC		R3		

– LC006D ($I_F = 180 \text{ mA}$, $T_J = 85^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
80	2700	SPHWAHADB25YZW1DC	YZ	W1	DC	888~
		SPHWAHADB25YZW2DC		W2		
		SPHWAHADB25YZW3DC		W3		
	3000	SPHWAHADB25YZV1DC	YZ	V1	DC	924~
		SPHWAHADB25YZV2DC		V2		
		SPHWAHADB25YZV3DC		V3		
	3500	SPHWAHADB25YZU1DC	YZ	U1	DC	960~
		SPHWAHADB25YZU2DC		U2		
		SPHWAHADB25YZU3DC		U3		
	4000	SPHWAHADB25YZT1DC	YZ	T1	DC	976~
		SPHWAHADB25YZT2DC		T2		
		SPHWAHADB25YZT3DC		T3		
	5000	SPHWAHADB25YZR2DC	YZ	R2	DC	993~
		SPHWAHADB25YZR3DC		R3		
	5700	SPHWAHADB25YZQ2DC	YZ	Q2	DC	976~
		SPHWAHADB25YZQ3DC		Q3		
	6500	SPHWAHADB25YZP2DC	YZ	P2	DC	960~
		SPHWAHADB25YZP3DC		P3		
90	2700	SPHWAHADB27YZW1DC	YZ	W1	DC	748~
		SPHWAHADB27YZW2DC		W2		
		SPHWAHADB27YZW3DC		W3		
	3000	SPHWAHADB27YZV1DC	YZ	V1	DC	787~
		SPHWAHADB27YZV2DC		V2		
		SPHWAHADB27YZV3DC		V3		
	3500	SPHWAHADB27YZU1DC	YZ	U1	DC	813~
		SPHWAHADB27YZU2DC		U2		
		SPHWAHADB27YZU3DC		U3		
	4000	SPHWAHADB27YZT1DC	YZ	T1	DC	831~
		SPHWAHADB27YZT2DC		T2		
		SPHWAHADB27YZT3DC		T3		
	5000	SPHWAHADB27YZR2DC	YZ	R2	DC	848~
		SPHWAHADB27YZR3DC		R3		

– LC009D ($I_F = 270 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
70	3000	SPHWAHDNC23YZV2DC	YZ	V2	DC	1491~
		SPHWAHDNC23YZV3DC		V3		
	4000	SPHWAHDNC23YZT2DC	YZ	T2	DC	1513~
		SPHWAHDNC23YZT3DC		T3		
	5000	SPHWAHDNC23YZR2DC	YZ	R2	DC	1528~
		SPHWAHDNC23YZR3DC		R3		
80	2700	SPHWAHDNC25YZW1DC	YZ	W1	DC	1322~
		SPHWAHDNC25YZW2DC		W2		
		SPHWAHDNC25YZW3DC		W3		
	3000	SPHWAHDNC25YZV1DC	YZ	V1	DC	1375~
		SPHWAHDNC25YZV2DC		V2		
		SPHWAHDNC25YZV3DC		V3		
	3500	SPHWAHDNC25YZU1DC	YZ	U1	DC	1428~
		SPHWAHDNC25YZU2DC		U2		
		SPHWAHDNC25YZU3DC		U3		
	4000	SPHWAHDNC25YZT1DC	YZ	T1	DC	1457~
		SPHWAHDNC25YZT2DC		T2		
		SPHWAHDNC25YZT3DC		T3		
	5000	SPHWAHDNC25YZR2DC	YZ	R2	DC	1481~
		SPHWAHDNC25YZR3DC		R3		
	5700	SPHWAHDNC25YZQ2DC	YZ	Q2	DC	1462~
		SPHWAHDNC25YZQ3DC		Q3		
	6500	SPHWAHDNC25YZP2DC	YZ	P2	DC	1437~
		SPHWAHDNC25YZP3DC		P3		
90	2700	SPHWAHDNC27YZW1DC	YZ	W1	DC	1119~
		SPHWAHDNC27YZW2DC		W2		
		SPHWAHDNC27YZW3DC		W3		
	3000	SPHWAHDNC27YZV1DC	YZ	V1	DC	1179~
		SPHWAHDNC27YZV2DC		V2		
		SPHWAHDNC27YZV3DC		V3		
	3500	SPHWAHDNC27YZU1DC	YZ	U1	DC	1217~
		SPHWAHDNC27YZU2DC		U2		
		SPHWAHDNC27YZU3DC		U3		
	4000	SPHWAHDNC27YZT1DC	YZ	T1	DC	1243~
		SPHWAHDNC27YZT2DC		T2		
		SPHWAHDNC27YZT3DC		T3		
	5000	SPHWAHDNC27YZR2DC	YZ	R2	DC	1267~
		SPHWAHDNC27YZR3DC		R3		

– LC013D ($I_F = 360 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
70	3000	SPHWAHDND23YZV2DC	YZ	V2	DC	1972~
		SPHWAHDND23YZV3DC		V3		
	4000	SPHWAHDND23YZT2DC	YZ	T2	DC	2005~
		SPHWAHDND23YZT3DC		T3		
	5000	SPHWAHDND23YZR2DC	YZ	R2	DC	2033~
		SPHWAHDND23YZR3DC		R3		
80	2700	SPHWAHDND25YZW1DC	YZ	W1	DC	1757~
		SPHWAHDND25YZW2DC		W2		
		SPHWAHDND25YZW3DC		W3		
	3000	SPHWAHDND25YZV1DC	YZ	V1	DC	1828~
		SPHWAHDND25YZV2DC		V2		
		SPHWAHDND25YZV3DC		V3		
	3500	SPHWAHDND25YZU1DC	YZ	U1	DC	1899~
		SPHWAHDND25YZU2DC		U2		
		SPHWAHDND25YZU3DC		U3		
	4000	SPHWAHDND25YZT1DC	YZ	T1	DC	1933~
		SPHWAHDND25YZT2DC		T2		
		SPHWAHDND25YZT3DC		T3		
	5000	SPHWAHDND25YZR2DC	YZ	R2	DC	1965~
		SPHWAHDND25YZR3DC		R3		
	5700	SPHWAHDND25YZQ2DC	YZ	Q2	DC	1934~
		SPHWAHDND25YZQ3DC		Q3		
	6500	SPHWAHDND25YZP2DC	YZ	P2	DC	1912~
		SPHWAHDND25YZP3DC		P3		
90	2700	SPHWAHDND27YZW1DC	YZ	W1	DC	1484~
		SPHWAHDND27YZW2DC		W2		
		SPHWAHDND27YZW3DC		W3		
	3000	SPHWAHDND27YZV1DC	YZ	V1	DC	1561~
		SPHWAHDND27YZV2DC		V2		
		SPHWAHDND27YZV3DC		V3		
	3500	SPHWAHDND27YZU1DC	YZ	U1	DC	1609~
		SPHWAHDND27YZU2DC		U2		
		SPHWAHDND27YZU3DC		U3		
	4000	SPHWAHDND27YZT1DC	YZ	T1	DC	1644~
		SPHWAHDND27YZT2DC		T2		
		SPHWAHDND27YZT3DC		T3		
	5000	SPHWAHDND27YZR2DC	YZ	R2	DC	1684~
		SPHWAHDND27YZR3DC		R3		

– LC016D ($I_F = 450 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
70	3000	SPHWAHDNE23YZV2DC	YZ	V2	DC	2563~
		SPHWAHDNE23YZV3DC		V3		
	4000	SPHWAHDNE23YZT2DC	YZ	T2	DC	2598~
		SPHWAHDNE23YZT3DC		T3		
	5000	SPHWAHDNE23YZR2DC	YZ	R2	DC	2629~
		SPHWAHDNE23YZR3DC		R3		
80	2700	SPHWAHDNE25YZW1DC	YZ	W1	DC	2280~
		SPHWAHDNE25YZW2DC		W2		
		SPHWAHDNE25YZW3DC		W3		
	3000	SPHWAHDNE25YZV1DC	YZ	V1	DC	2373~
		SPHWAHDNE25YZV2DC		V2		
		SPHWAHDNE25YZV3DC		V3		
	3500	SPHWAHDNE25YZU1DC	YZ	U1	DC	2464~
		SPHWAHDNE25YZU2DC		U2		
		SPHWAHDNE25YZU3DC		U3		
	4000	SPHWAHDNE25YZT1DC	YZ	T1	DC	2509~
		SPHWAHDNE25YZT2DC		T2		
		SPHWAHDNE25YZT3DC		T3		
	5000	SPHWAHDNE25YZR2DC	YZ	R2	DC	2550~
		SPHWAHDNE25YZR3DC		R3		
	5700	SPHWAHDNE25YZQ2DC	YZ	Q2	DC	2510~
		SPHWAHDNE25YZQ3DC		Q3		
	6500	SPHWAHDNE25YZP2DC	YZ	P2	DC	2470~
		SPHWAHDNE25YZP3DC		P3		
90	2700	SPHWAHDNE27YZW1DC	YZ	W1	DC	1924~
		SPHWAHDNE27YZW2DC		W2		
		SPHWAHDNE27YZW3DC		W3		
	3000	SPHWAHDNE27YZV1DC	YZ	V1	DC	2025~
		SPHWAHDNE27YZV2DC		V2		
		SPHWAHDNE27YZV3DC		V3		
	3500	SPHWAHDNE27YZU1DC	YZ	U1	DC	2089~
		SPHWAHDNE27YZU2DC		U2		
		SPHWAHDNE27YZU3DC		U3		
	4000	SPHWAHDNE27YZT1DC	YZ	T1	DC	2136~
		SPHWAHDNE27YZT2DC		T2		
		SPHWAHDNE27YZT3DC		T3		
	5000	SPHWAHDNE27YZR2DC	YZ	R2	DC	2189~
		SPHWAHDNE27YZR3DC		R3		

– LC019D ($I_F = 540 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
70	3000	SPHWAHDNF23YZV2DC	YZ	V2	DC	3087~
		SPHWAHDNF23YZV3DC		V3		
	4000	SPHWAHDNF23YZT2DC	YZ	T2	DC	3133~
		SPHWAHDNF23YZT3DC		T3		
	5000	SPHWAHDNF23YZR2DC	YZ	R2	DC	3167~
		SPHWAHDNF23YZR3DC		R3		
80	2700	SPHWAHDNF25YZW1DC	YZ	W1	DC	2749~
		SPHWAHDNF25YZW2DC		W2		
		SPHWAHDNF25YZW3DC		W3		
	3000	SPHWAHDNF25YZV1DC	YZ	V1	DC	2861~
		SPHWAHDNF25YZV2DC		V2		
		SPHWAHDNF25YZV3DC		V3		
	3500	SPHWAHDNF25YZU1DC	YZ	U1	DC	2971~
		SPHWAHDNF25YZU2DC		U2		
		SPHWAHDNF25YZU3DC		U3		
	4000	SPHWAHDNF25YZT1DC	YZ	T1	DC	3025~
		SPHWAHDNF25YZT2DC		T2		
		SPHWAHDNF25YZT3DC		T3		
	5000	SPHWAHDNF25YZR2DC	YZ	R2	DC	3075~
		SPHWAHDNF25YZR3DC		R3		
	5700	SPHWAHDNF25YZQ2DC	YZ	Q2	DC	3024~
		SPHWAHDNF25YZQ3DC		Q3		
	6500	SPHWAHDNF25YZP2DC	YZ	P2	DC	2975~
		SPHWAHDNF25YZP3DC		P3		
90	2700	SPHWAHDNF27YZW1DC	YZ	W1	DC	2321~
		SPHWAHDNF27YZW2DC		W2		
		SPHWAHDNF27YZW3DC		W3		
	3000	SPHWAHDNF27YZV1DC	YZ	V1	DC	2442~
		SPHWAHDNF27YZV2DC		V2		
		SPHWAHDNF27YZV3DC		V3		
	3500	SPHWAHDNF27YZU1DC	YZ	U1	DC	2519~
		SPHWAHDNF27YZU2DC		U2		
		SPHWAHDNF27YZU3DC		U3		
	4000	SPHWAHDNF27YZT1DC	YZ	T1	DC	2573~
		SPHWAHDNF27YZT2DC		T2		
		SPHWAHDNF27YZT3DC		T3		
	5000	SPHWAHDNF27YZR2DC	YZ	R2	DC	2636~
		SPHWAHDNF27YZR3DC		R3		

– LC026D ($I_F = 720 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
70	3000	SPHWAHDNG23YZV2DC	YZ	V2	DC	4032~
		SPHWAHDNG23YZV3DC		V3		
	4000	SPHWAHDNG23YZT2DC	YZ	T2	DC	4086~
		SPHWAHDNG23YZT3DC		T3		
	5000	SPHWAHDNG23YZR2DC	YZ	R2	DC	4132~
		SPHWAHDNG23YZR3DC		R3		
80	2700	SPHWAHDNG25YZW1DC	YZ	W1	DC	3587~
		SPHWAHDNG25YZW2DC		W2		
		SPHWAHDNG25YZW3DC		W3		
	3000	SPHWAHDNG25YZV1DC	YZ	V1	DC	3733~
		SPHWAHDNG25YZV2DC		V2		
		SPHWAHDNG25YZV3DC		V3		
	3500	SPHWAHDNG25YZU1DC	YZ	U1	DC	3877~
		SPHWAHDNG25YZU2DC		U2		
		SPHWAHDNG25YZU3DC		U3		
	4000	SPHWAHDNG25YZT1DC	YZ	T1	DC	3946~
		SPHWAHDNG25YZT2DC		T2		
		SPHWAHDNG25YZT3DC		T3		
	5000	SPHWAHDNG25YZR2DC	YZ	R2	DC	4012~
		SPHWAHDNG25YZR3DC		R3		
	5700	SPHWAHDNG25YZQ2DC	YZ	Q2	DC	3949~
		SPHWAHDNG25YZQ3DC		Q3		
	6500	SPHWAHDNG25YZP2DC	YZ	P2	DC	3885~
		SPHWAHDNG25YZP3DC		P3		
90	2700	SPHWAHDNG27YZW1DC	YZ	W1	DC	3029~
		SPHWAHDNG27YZW2DC		W2		
		SPHWAHDNG27YZW3DC		W3		
	3000	SPHWAHDNG27YZV1DC	YZ	V1	DC	3185~
		SPHWAHDNG27YZV2DC		V2		
		SPHWAHDNG27YZV3DC		V3		
	3500	SPHWAHDNG27YZU1DC	YZ	U1	DC	3287~
		SPHWAHDNG27YZU2DC		U2		
		SPHWAHDNG27YZU3DC		U3		
	4000	SPHWAHDNG27YZT1DC	YZ	T1	DC	3358~
		SPHWAHDNG27YZT2DC		T2		
		SPHWAHDNG27YZT3DC		T3		
	5000	SPHWAHDNG27YZR2DC	YZ	R2	DC	3443~
		SPHWAHDNG27YZR3DC		R3		

– LC033D ($I_F = 900 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
70	3000	SPHWAHDNH23YZV2DC	YZ	V2	DC	4946~
		SPHWAHDNH23YZV3DC		V3		
	4000	SPHWAHDNH23YZT2DC	YZ	T2	DC	5017~
		SPHWAHDNH23YZT3DC		T3		
	5000	SPHWAHDNH23YZR2DC	YZ	R2	DC	5098~
		SPHWAHDNH23YZR3DC		R3		
	5700	SPHWAHDNH23YZQ2DC	YZ	Q2	DC	4990~
		SPHWAHDNH23YZQ3DC		Q3		
	2700	SPHWAHDNH25YZW1DC	YZ	W1	DC	4405~
		SPHWAHDNH25YZW2DC		W2		
		SPHWAHDNH25YZW3DC		W3		
80	3000	SPHWAHDNH25YZV1DC	YZ	V1	DC	4583~
		SPHWAHDNH25YZV2DC		V2		
		SPHWAHDNH25YZV3DC		V3		
	3500	SPHWAHDNH25YZU1DC	YZ	U1	DC	4760~
		SPHWAHDNH25YZU2DC		U2		
		SPHWAHDNH25YZU3DC		U3		
	4000	SPHWAHDNH25YZT1DC	YZ	T1	DC	4841~
		SPHWAHDNH25YZT2DC		T2		
		SPHWAHDNH25YZT3DC		T3		
	5000	SPHWAHDNH25YZR2DC	YZ	R2	DC	4926~
		SPHWAHDNH25YZR3DC		R3		
	5700	SPHWAHDNH25YZQ2DC	YZ	Q2	DC	4848~
		SPHWAHDNH25YZQ3DC		Q3		
	6500	SPHWAHDNH25YZP2DC	YZ	P2	DC	4784~
		SPHWAHDNH25YZP3DC		P3		

– LC033D ($I_F = 900 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
90	2700	SPHWAHDNH27YZW1DC	YZ	W1	DC	3718~
		SPHWAHDNH27YZW2DC		W2		
		SPHWAHDNH27YZW3DC		W3		
	3000	SPHWAHDNH27YZV1DC	YZ	V1	DC	3911~
		SPHWAHDNH27YZV2DC		V2		
		SPHWAHDNH27YZV3DC		V3		
	3500	SPHWAHDNH27YZU1DC	YZ	U1	DC	4036~
		SPHWAHDNH27YZU2DC		U2		
		SPHWAHDNH27YZU3DC		U3		
	4000	SPHWAHDNH27YZT1DC	YZ	T1	DC	4123~
		SPHWAHDNH27YZT2DC		T2		
		SPHWAHDNH27YZT3DC		T3		
	5000	SPHWAHDNH27YZR2DC	YZ	R2	DC	4224~
		SPHWAHDNH27YZR3DC		R3		

– LC040D ($I_F = 1080 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
70	3000	SPHWAHDNK23YZV2DC	YZ	V2	DC	6060~
		SPHWAHDNK23YZV3DC		V3		
	4000	SPHWAHDNK23YZT2DC	YZ	T2	DC	6166~
		SPHWAHDNK23YZT3DC		T3		
	5000	SPHWAHDNK23YZR2DC	YZ	R2	DC	6241~
		SPHWAHDNK23YZR3DC		R3		
80	2700	SPHWAHDNK25YZW1DC	YZ	W1	DC	5393~
		SPHWAHDNK25YZW2DC		W2		
		SPHWAHDNK25YZW3DC		W3		
	3000	SPHWAHDNK25YZV1DC	YZ	V1	DC	5610~
		SPHWAHDNK25YZV2DC		V2		
		SPHWAHDNK25YZV3DC		V3		
	3500	SPHWAHDNK25YZU1DC	YZ	U1	DC	5827~
		SPHWAHDNK25YZU2DC		U2		
		SPHWAHDNK25YZU3DC		U3		
	4000	SPHWAHDNK25YZT1DC	YZ	T1	DC	5932~
		SPHWAHDNK25YZT2DC		T2		
		SPHWAHDNK25YZT3DC		T3		
	5000	SPHWAHDNK25YZR2DC	YZ	R2	DC	6030~
		SPHWAHDNK25YZR3DC		R3		
	5700	SPHWAHDNK25YZQ2DC	YZ	Q2	DC	5934~
		SPHWAHDNK25YZQ3DC		Q3		
	6500	SPHWAHDNK25YZP2DC	YZ	P2	DC	5868~
		SPHWAHDNK25YZP3DC		P3		
90	2700	SPHWAHDNK27YZW1DC	YZ	W1	DC	4565~
		SPHWAHDNK27YZW2DC		W2		
		SPHWAHDNK27YZW3DC		W3		
	3000	SPHWAHDNK27YZV1DC	YZ	V1	DC	4802~
		SPHWAHDNK27YZV2DC		V2		
		SPHWAHDNK27YZV3DC		V3		
	3500	SPHWAHDNK27YZU1DC	YZ	U1	DC	4944~
		SPHWAHDNK27YZU2DC		U2		
		SPHWAHDNK27YZU3DC		U3		
	4000	SPHWAHDNK27YZT1DC	YZ	T1	DC	5052~
		SPHWAHDNK27YZT2DC		T2		
		SPHWAHDNK27YZT3DC		T3		
	5000	SPHWAHDNK27YZR2DC	YZ	R2	DC	5177~
		SPHWAHDNK27YZR3DC		R3		

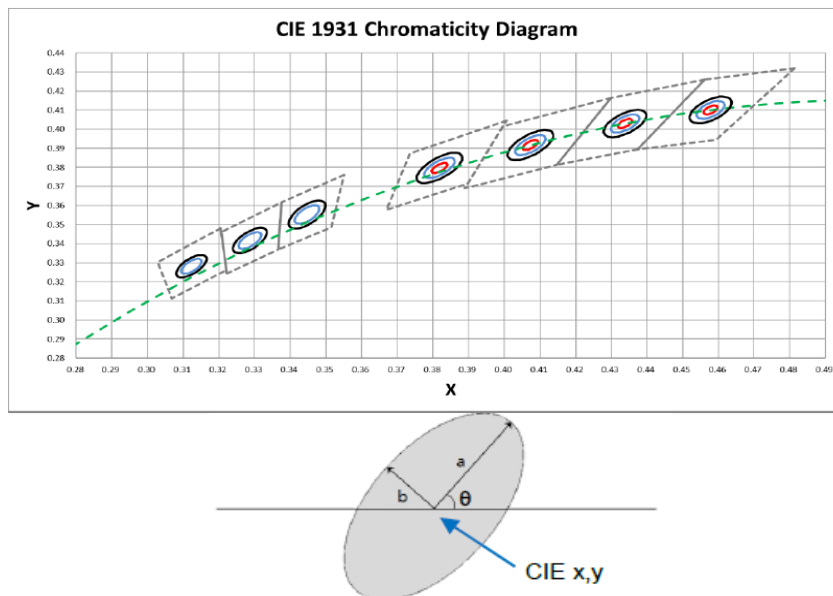
– LC060D ($I_F = 1080 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
70	3000	SPHWAHDNL23YZV2DC	YZ	V2	DC	9010~
		SPHWAHDNL23YZV3DC		V3		
	4000	SPHWAHDNL23YZT2DC	YZ	T2	DC	9140~
		SPHWAHDNL23YZT3DC		T3		
	5000	SPHWAHDNL23YZR2DC	YZ	R2	DC	9278~
		SPHWAHDNL23YZR3DC		R3		
80	2700	SPHWAHDNL25YZW1DC	YZ	W1	DC	8025~
		SPHWAHDNL25YZW2DC		W2		
		SPHWAHDNL25YZW3DC		W3		
	3000	SPHWAHDNL25YZV1DC	YZ	V1	DC	8349~
		SPHWAHDNL25YZV2DC		V2		
		SPHWAHDNL25YZV3DC		V3		
	3500	SPHWAHDNL25YZU1DC	YZ	U1	DC	8672~
		SPHWAHDNL25YZU2DC		U2		
		SPHWAHDNL25YZU3DC		U3		
	4000	SPHWAHDNL25YZT1DC	YZ	T1	DC	8820~
		SPHWAHDNL25YZT2DC		T2		
		SPHWAHDNL25YZT3DC		T3		
	5000	SPHWAHDNL25YZR2DC	YZ	R2	DC	8973~
		SPHWAHDNL25YZR3DC		R3		
	5700	SPHWAHDNL25YZQ2DC	YZ	Q2	DC	8832~
		SPHWAHDNL25YZQ3DC		Q3		
	6500	SPHWAHDNL25YZP2DC	YZ	P2	DC	8698~
		SPHWAHDNL25YZP3DC		P3		
90	2700	SPHWAHDNL27YZW1DC	YZ	W1	DC	6773~
		SPHWAHDNL27YZW2DC		W2		
		SPHWAHDNL27YZW3DC		W3		
	3000	SPHWAHDNL27YZV1DC	YZ	V1	DC	7124~
		SPHWAHDNL27YZV2DC		V2		
		SPHWAHDNL27YZV3DC		V3		
	3500	SPHWAHDNL27YZU1DC	YZ	U1	DC	7351~
		SPHWAHDNL27YZU2DC		U2		
		SPHWAHDNL27YZU3DC		U3		
	4000	SPHWAHDNL27YZT1DC	YZ	T1	DC	7510~
		SPHWAHDNL27YZT2DC		T2		
		SPHWAHDNL27YZT3DC		T3		
	5000	SPHWAHDNL27YZR2DC	YZ	R2	DC	7695~
		SPHWAHDNL27YZR3DC		R3		

– LC080D ($I_F = 1080 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Color Rank	Flux Rank	Flux Range (Φ_v , lm)
70	3000	SPHWAHDNM231ZV2DC	1Z	V2	DC	13242~
		SPHWAHDNM231ZV3DC		V3		
	4000	SPHWAHDNM231ZT2DC	1Z	T2	DC	13433~
		SPHWAHDNM231ZT3DC		T3		
	5000	SPHWAHDNM231ZR2DC	1Z	R2	DC	13582~
		SPHWAHDNM231ZR3DC		R3		
80	2700	SPHWAHDNM251ZW1DC	1Z	W1	DC	11738~
		SPHWAHDNM251ZW2DC		W2		
		SPHWAHDNM251ZW3DC		W3		
	3000	SPHWAHDNM251ZV1DC	1Z	V1	DC	12211~
		SPHWAHDNM251ZV2DC		V2		
		SPHWAHDNM251ZV3DC		V3		
	3500	SPHWAHDNM251ZU1DC	1Z	U1	DC	12683~
		SPHWAHDNM251ZU2DC		U2		
		SPHWAHDNM251ZU3DC		U3		
	4000	SPHWAHDNM251ZT1DC	1Z	T1	DC	12911~
		SPHWAHDNM251ZT2DC		T2		
		SPHWAHDNM251ZT3DC		T3		
	5000	SPHWAHDNM251ZR2DC	1Z	R2	DC	13123~
		SPHWAHDNM251ZR3DC		R3		
	5700	SPHWAHDNM251ZQ2DC	1Z	Q2	DC	12941~
		SPHWAHDNM251ZQ3DC		Q3		
	6500	SPHWAHDNM251ZP2DC	1Z	P2	DC	12770~
		SPHWAHDNM251ZP3DC		P3		
90	2700	SPHWAHDNM271ZW1DC	1Z	W1	DC	9955~
		SPHWAHDNM271ZW2DC		W2		
		SPHWAHDNM271ZW3DC		W3		
	3000	SPHWAHDNM271ZV1DC	1Z	V1	DC	10741~
		SPHWAHDNM271ZV2DC		V2		
		SPHWAHDNM271ZV3DC		V3		
	3500	SPHWAHDNM271ZU1DC	1Z	U1	DC	10805~
		SPHWAHDNM271ZU2DC		U2		
		SPHWAHDNM271ZU3DC		U3		
	4000	SPHWAHDNM271ZT1DC	1Z	T1	DC	11038~
		SPHWAHDNM271ZT2DC		T2		
		SPHWAHDNM271ZT3DC		T3		
	5000	SPHWAHDNM271ZR2DC	1Z	R2	DC	11255~
		SPHWAHDNM271ZR3DC		R3		

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



MacAdam Ellipse (W1, W2, W3)					
Step	CIE x	CIE y	θ	a	b
1-step	0.4578	0.4101	53.70	0.0027	0.0014
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 (V1, V2, V3)					
Step	CIE x	CIE y	θ	a	b
1-step	0.4338	0.4030	53.22	0.0028	0.0014
2-step	0.4338	0.4030	53.22	0.0056	0.0027
3-step	0.4338	0.4030	53.22	0.0083	0.0041

MacAdam Ellipse (U1, U2)					
Step	CIE x	CIE y	θ	a	b
1-step	0.4073	0.3917	54.00	0.0031	0.0014
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 (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	0.0040

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

MacAdam Ellipse (Q2, Q3)					
Step	CIE x	CIE y	θ	a	b
2-step	0.3287	0.3417	59.10	0.0050	0.0021
3-step	0.3287	0.3417	59.10	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

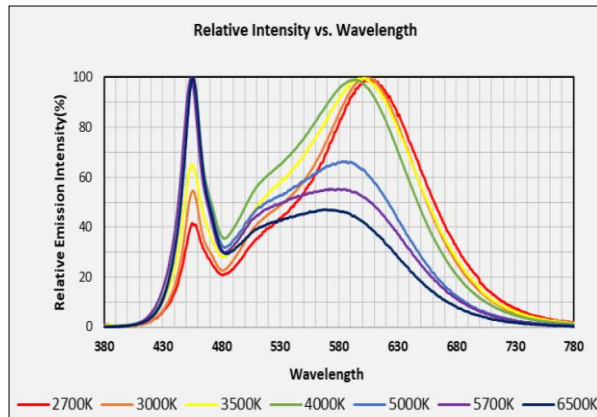
Notes :

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

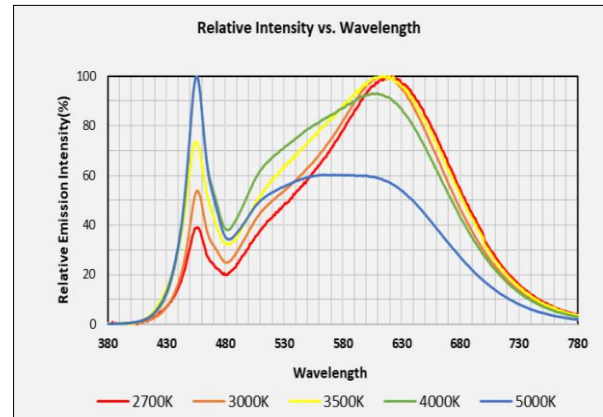
3. Typical Characteristics Graphs

1) Spectrum Distribution (I_F = Sorting Current, T_J = 85 °C)

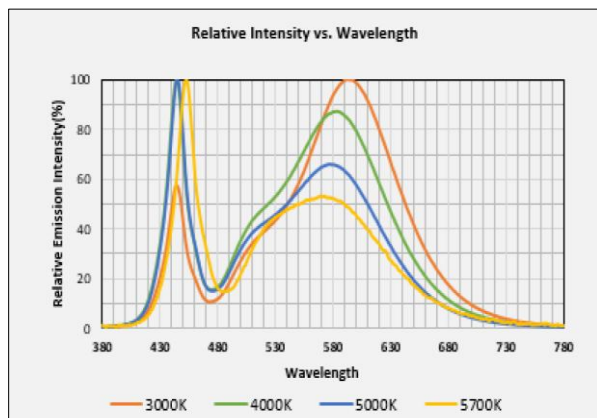
- CRI 80+



- CRI 90+

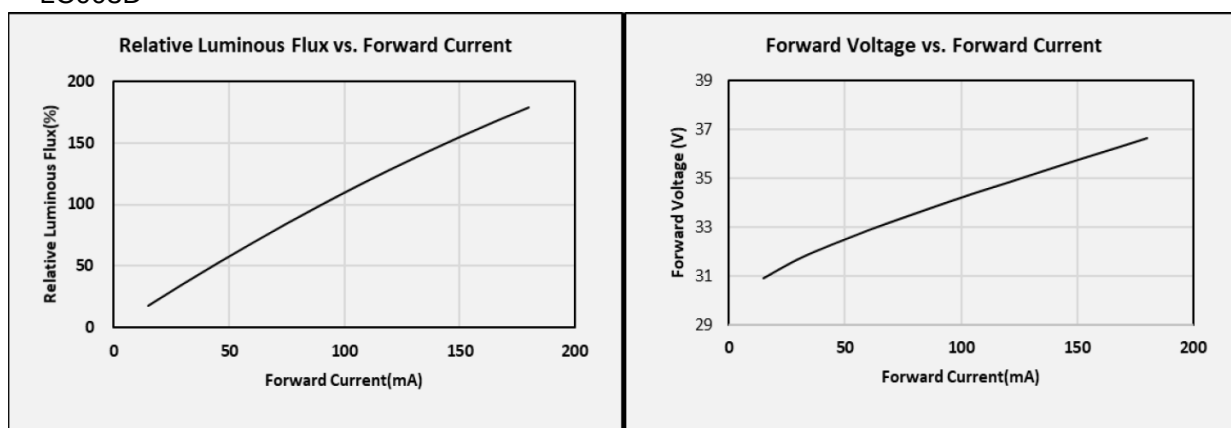


- CRI 70+

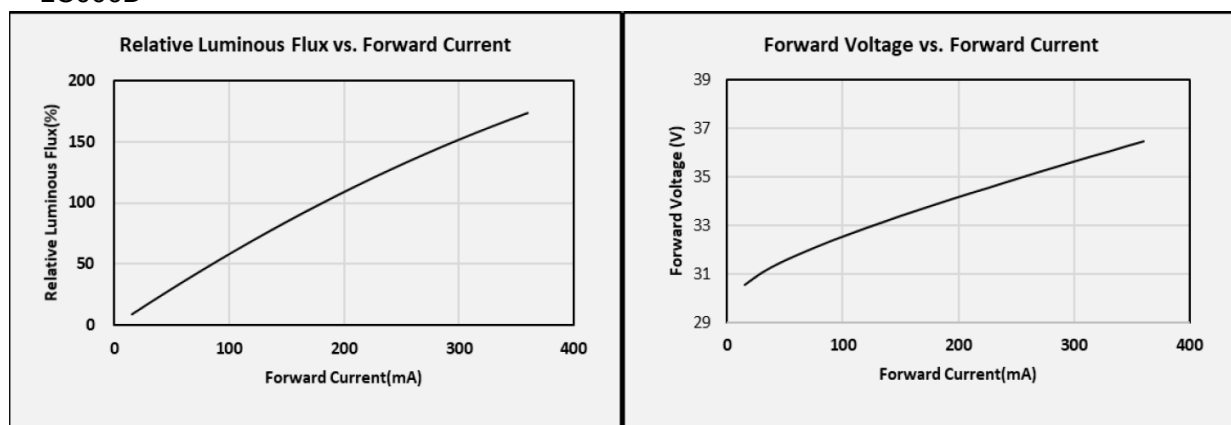


2) Forward Current Characteristics ($T_J = 85^\circ\text{C}$)

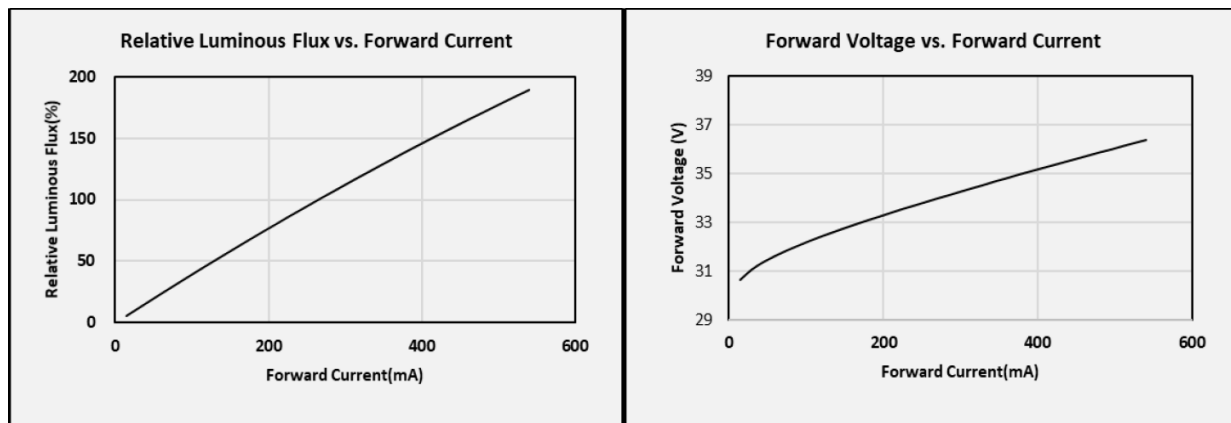
- LC003D



- LC006D

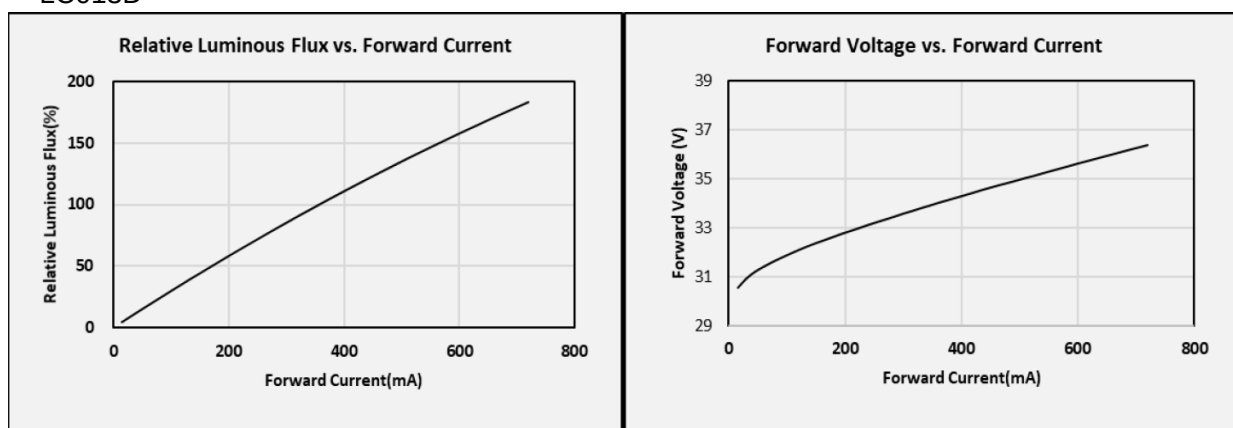


- LC009D

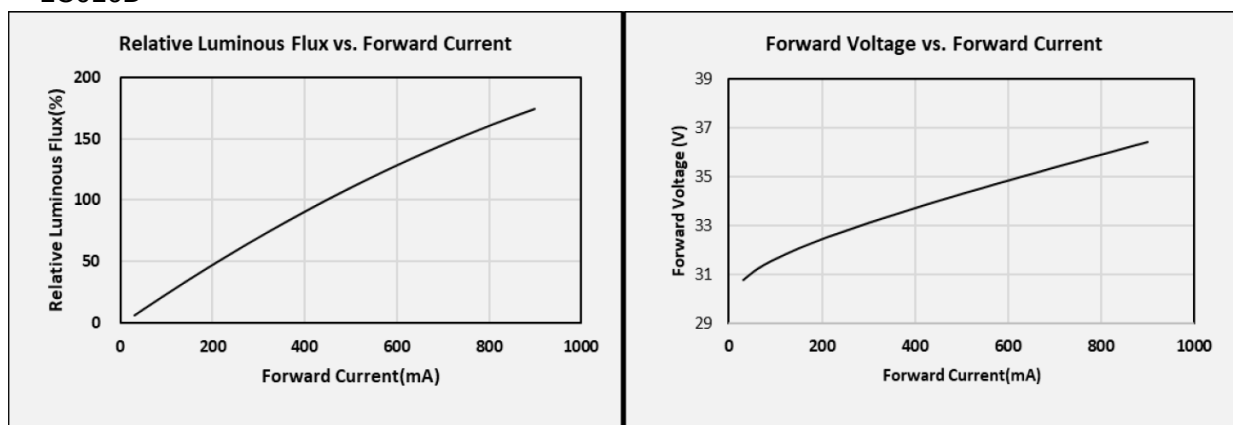


2) Forward Current Characteristics ($T_J = 85^\circ\text{C}$)

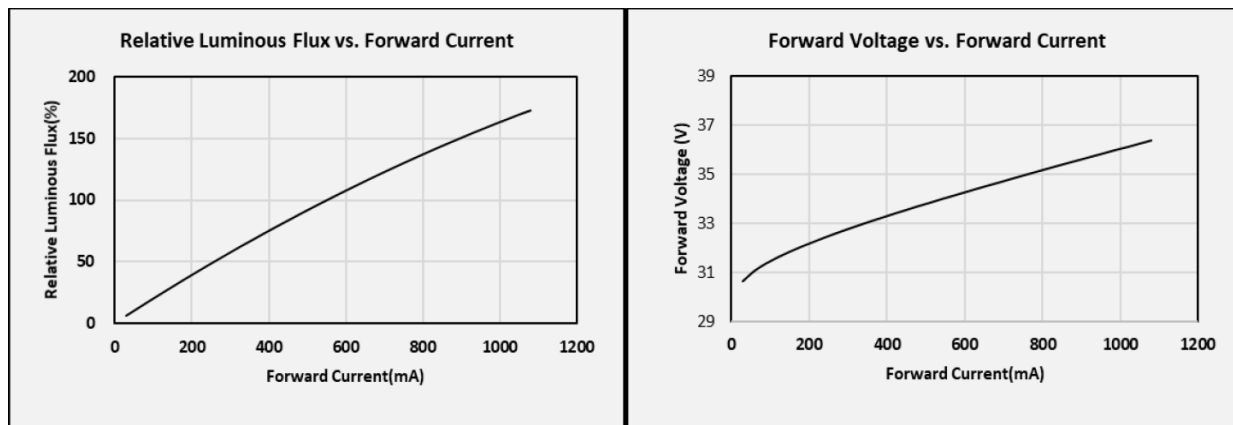
- LC013D



- LC016D

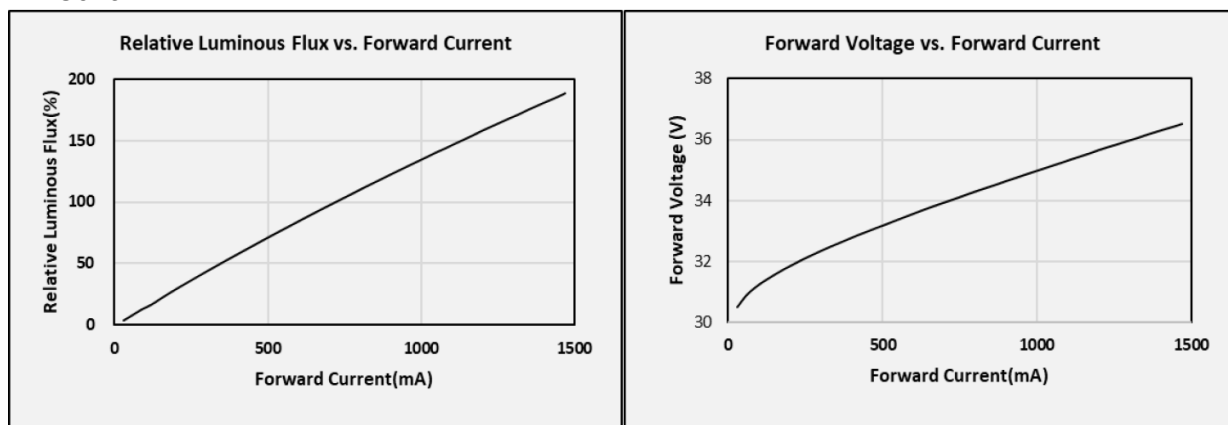


- LC019D

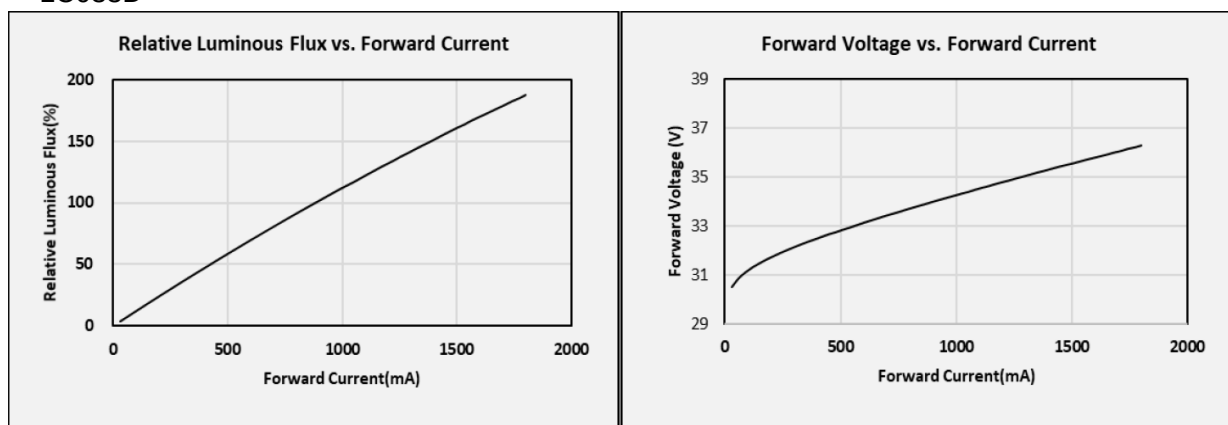


2) Forward Current Characteristics ($T_J = 85^\circ\text{C}$)

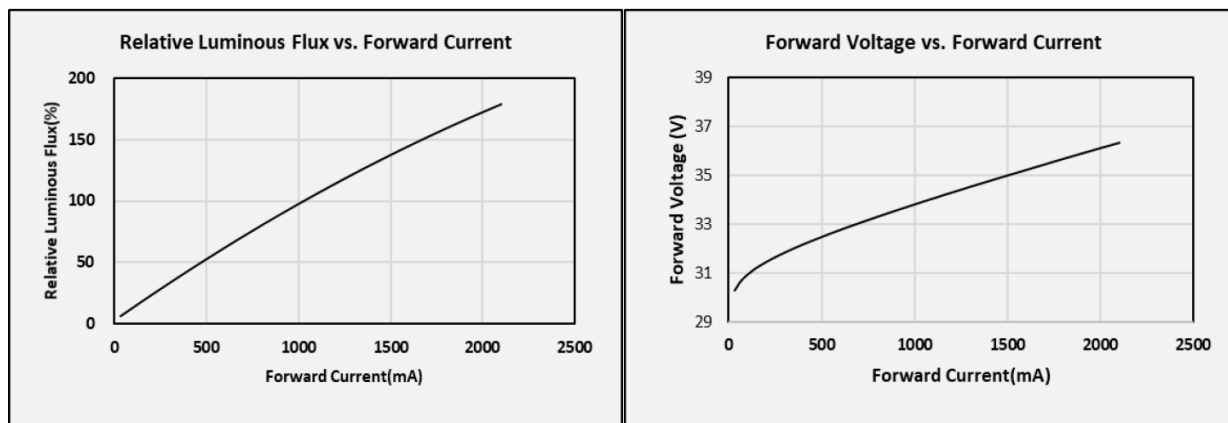
- LC026D



- LC033D

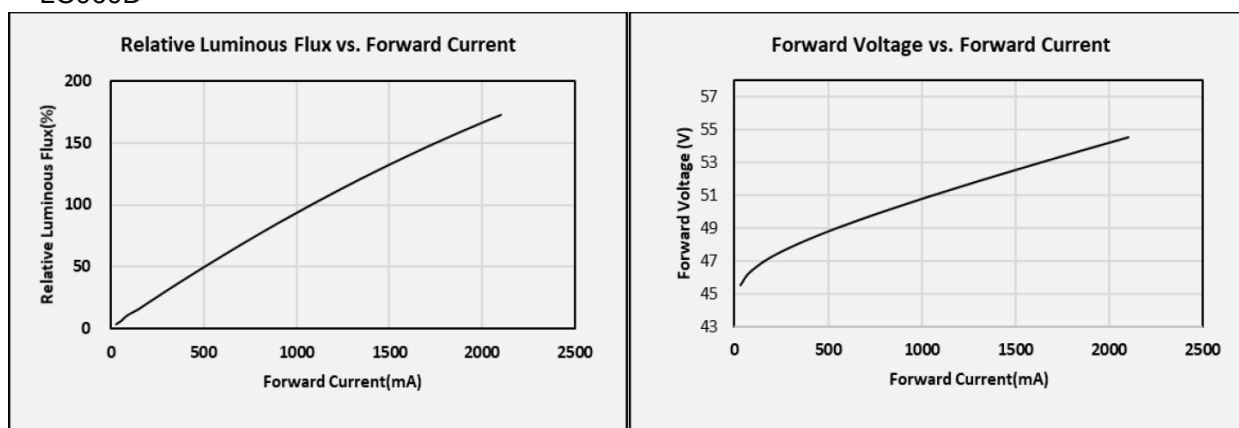


- LC040D

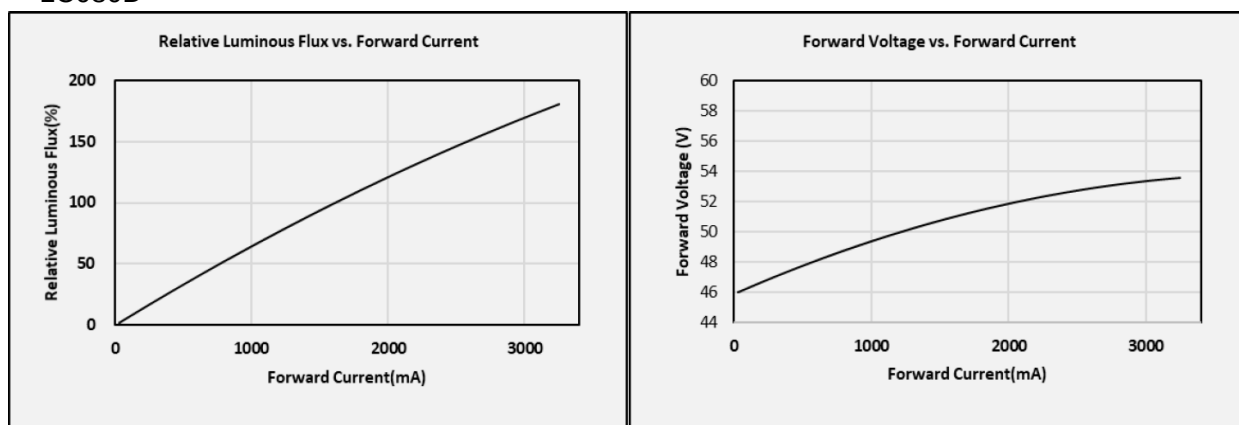


2) Forward Current Characteristics ($T_J = 85^\circ\text{C}$)

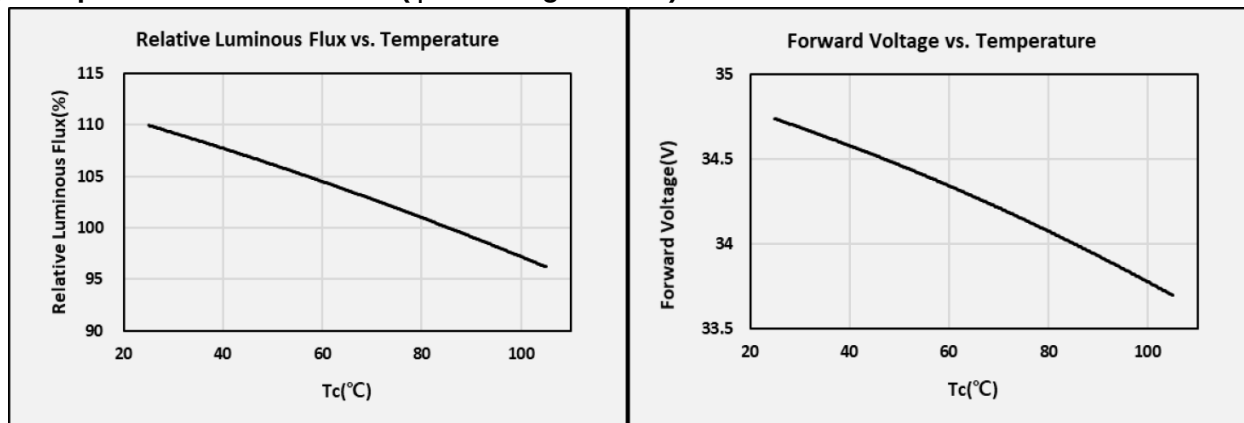
- LC060D



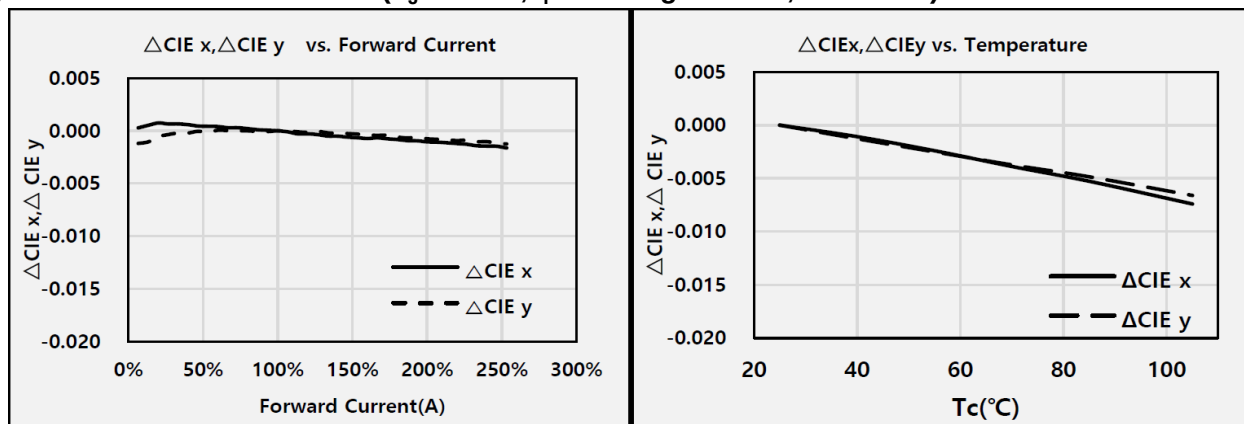
- LC080D



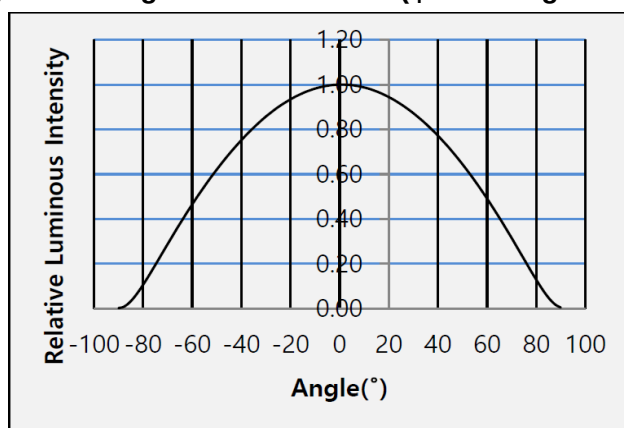
3) Temperature Characteristics (I_F = Sorting Current)



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

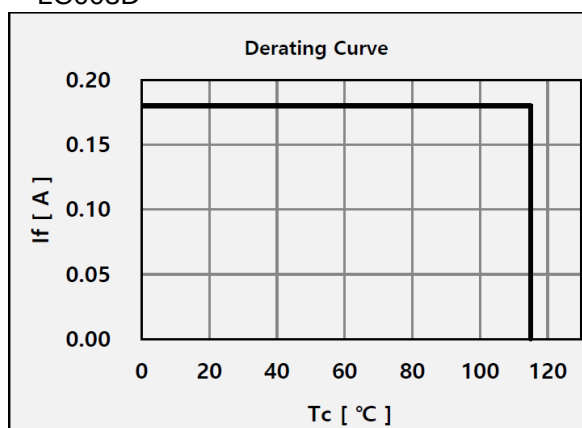


5) Beam Angle Characteristics (I_F = Sorting Current, $T_J = 85^{\circ}\text{C}$)

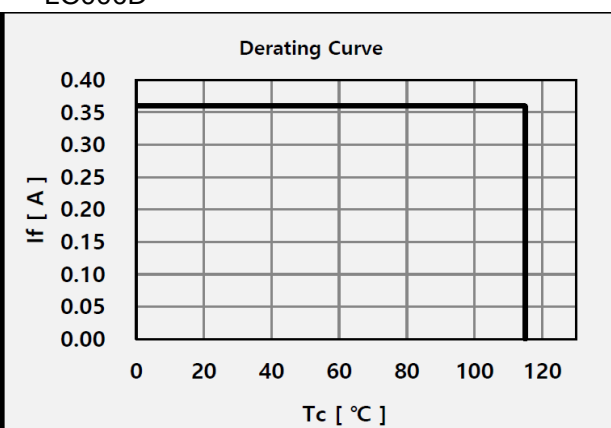


6) Derating Characteristics

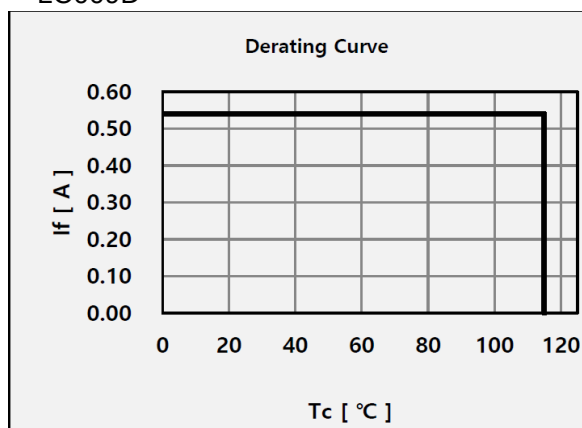
– LC003D



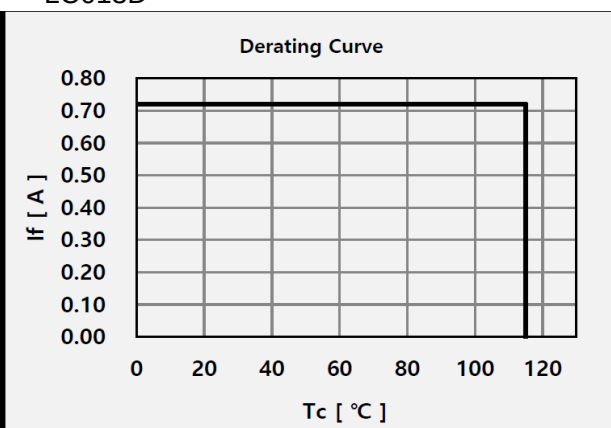
– LC006D



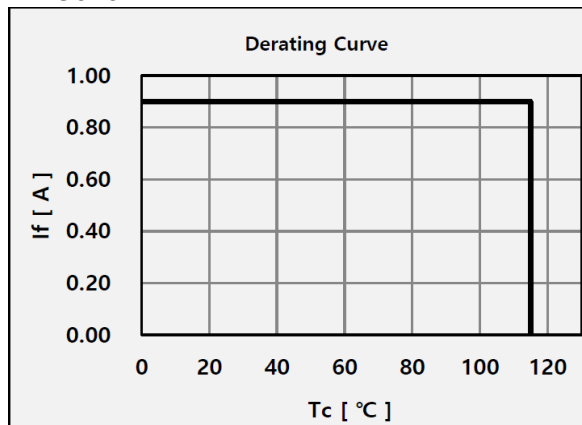
– LC009D



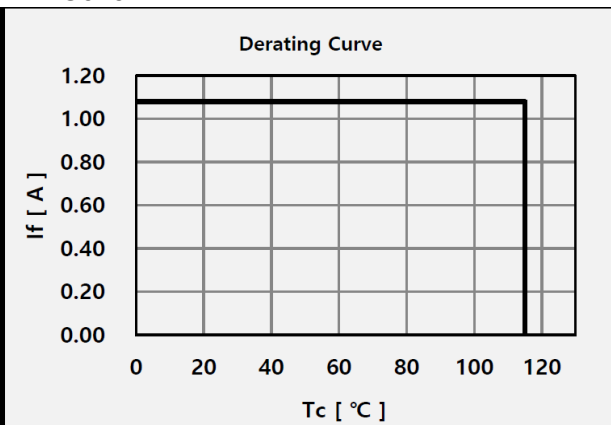
– LC013D



– LC016D

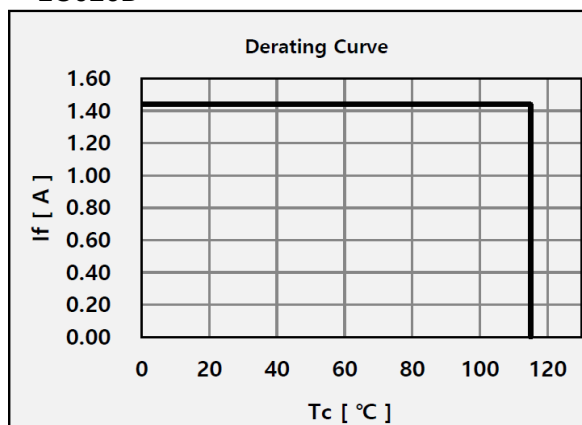


– LC019D

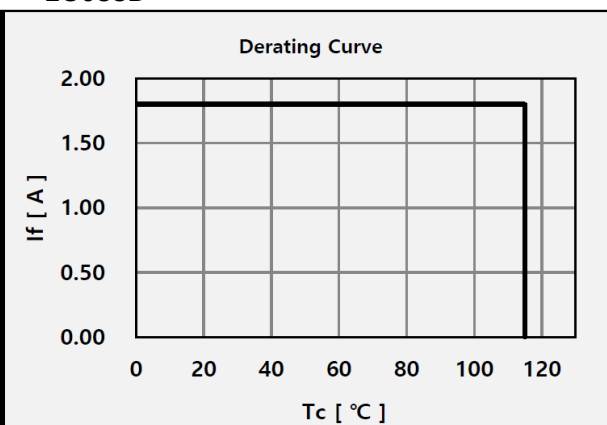


6) Derating Characteristics

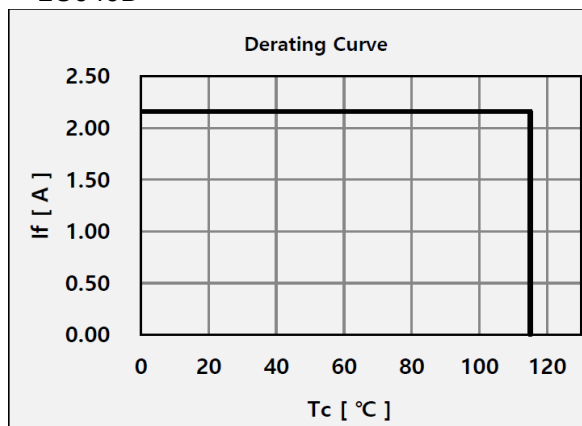
– LC026D



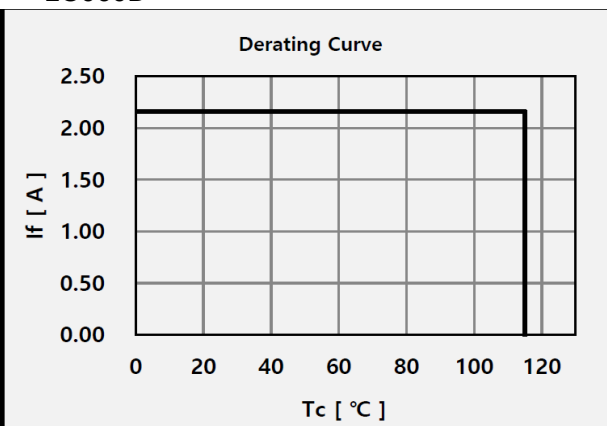
– LC033D



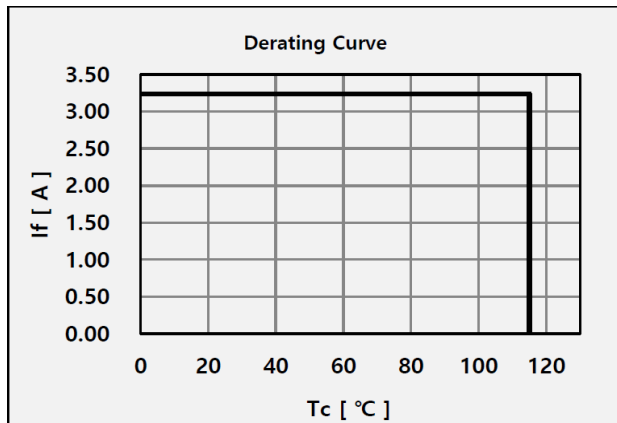
– LC040D



– LC060D

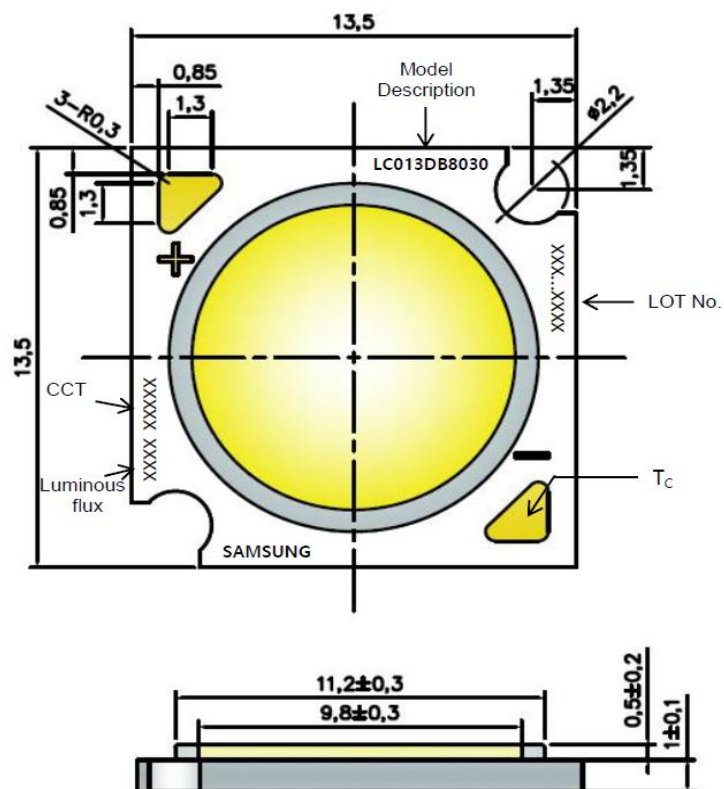


– LC080D



4. Outline Drawing & Dimension

- Model = LC003D, LC006D, LC009D, LC013D



1. Unit : mm
2. Tolerance : ± 0.3 mm

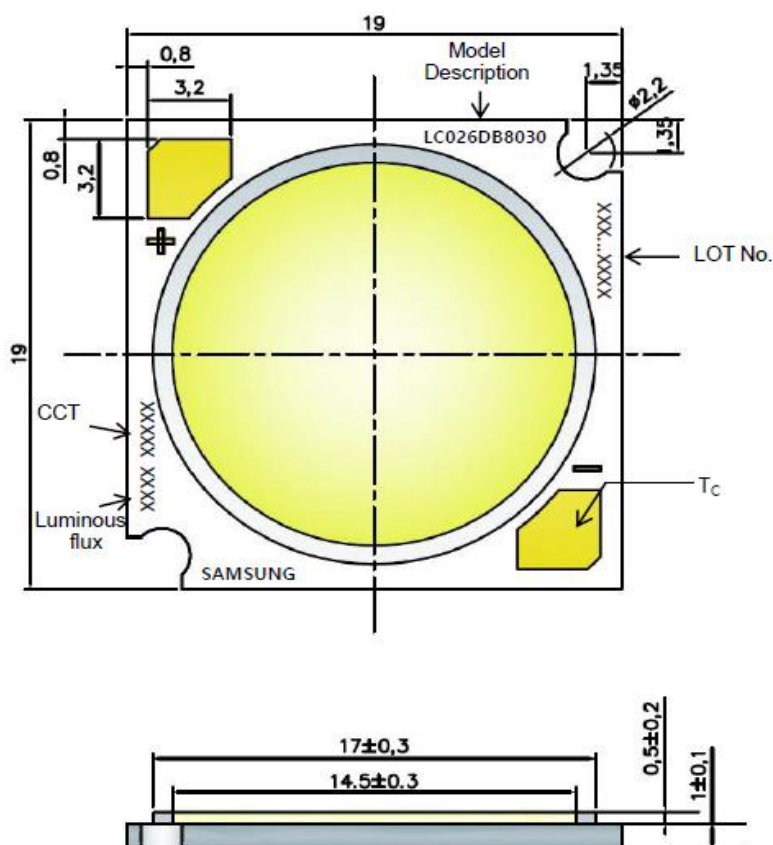
Item	Dimension	Tolerance	Unit
Length	13.5	± 0.15	mm
Width	13.5	± 0.15	mm
Height	Dam	0.5	± 0.20 mm
	Substrate	1	± 0.10 mm
LED Diameter	Light Emitting Surface	9.8	± 0.30 mm

Notes :

Denoted product information above is only an example

(LC013DC8030 : LC013D, Gen3 Plus, Ra80, 3000K)

- Model = LC016D, LC019D, LC026D, LC033D



1. Unit : mm
2. Tolerance : ± 0.3 mm

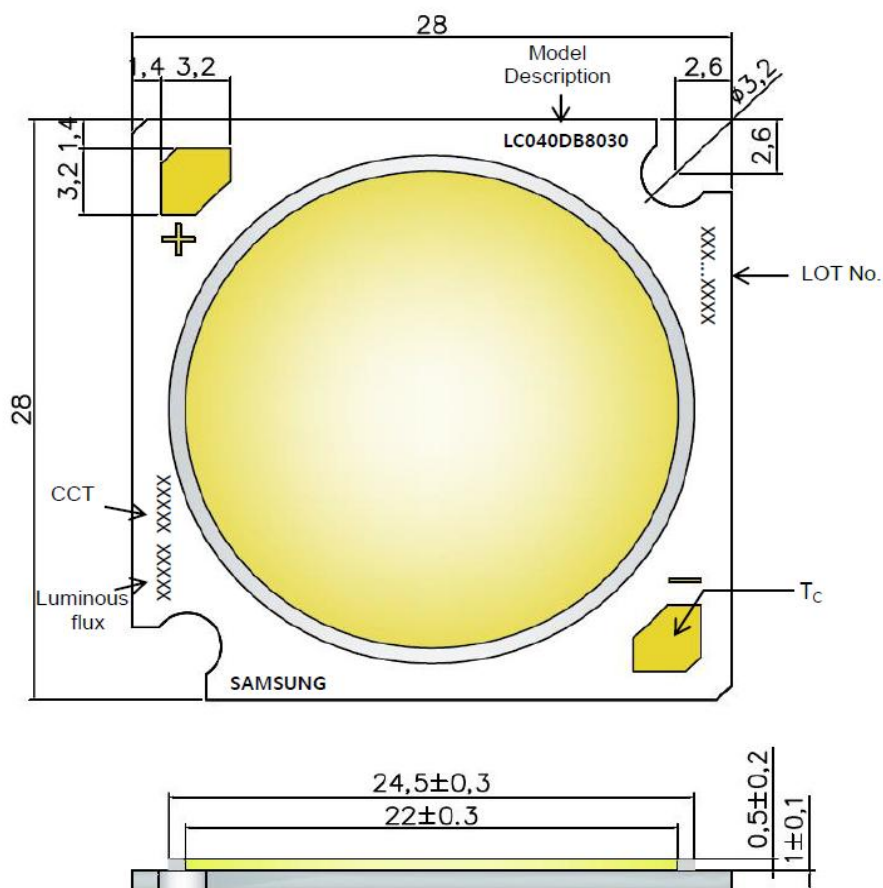
Item	Dimension	Tolerance	Unit
Length	19.0	± 0.15	mm
Width	19.5	± 0.15	mm
Height	Dam	0.5	± 0.20 mm
	Substrate	1.0	± 0.10 mm
LED Diameter	Light Emitting Surface	14.5	± 0.30 mm

Notes :

Denoted product information above is only an example

(LC026DC8030 : LC026D, Gen3 Plus, Ra80+, 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	0.5	± 0.20	mm
	Substrate	1.0	± 0.10	mm
LED Diameter	Light Emitting Surface	22.0	± 0.30	mm

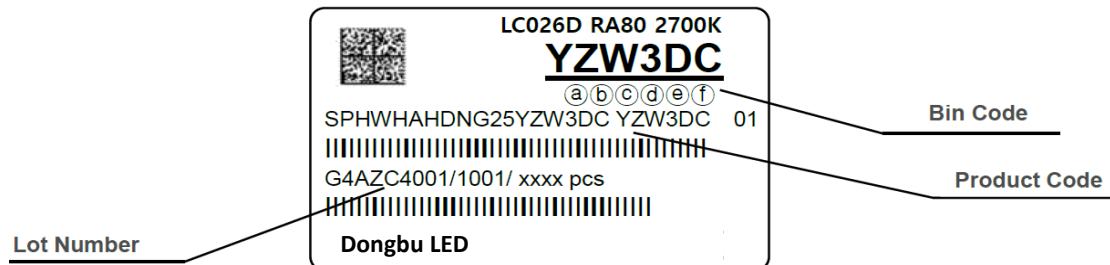
Notes :

Denoted product information above is only an example

(LC040DC8030 : LC040D, Gen3 Plus, Ra80+, 3000K)

5. Label Structure

1) Label



Note : Denoted ncode and product code above is only an example (see description on page5)

Bin Code

- (a)(b) : Forward Voltage bin (refer to page 9)
- (c)(d) : Chromaticity bin (refer to page 21)
- (e)(f) : Luminous Flux bin (refer to page 5-8)

2) Lot Number

The lot number is composed of the following characters:



① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ / 1 (a)(b)(c) / x xxx 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 (F : 2021 , G : 2022, H : 2023.....)
- ⑤ : Month (1~9, A, B, C)
- ⑥ ⑦ ⑧ ⑨ : Day (1~9, A, V)
- (a)(b)(c) : Product serial number (001 ~ 999)

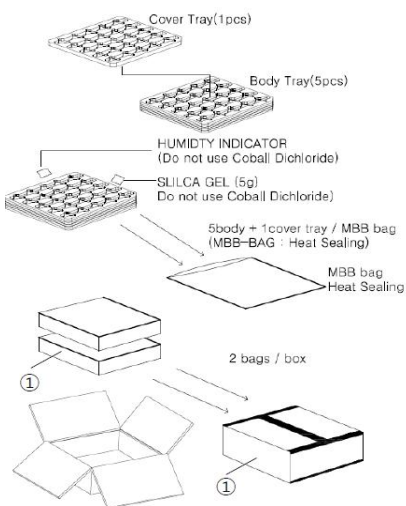
6. Packing Structure

- Model : L003D, LC006D, LC009D, LC013D

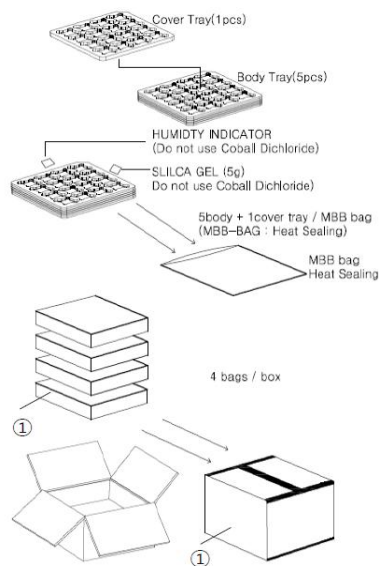
Packing Material	Max. quantity In pcs fo COM	Dimension (mm)			
		Length	Width	Height	Tolerance
Tray	50	200	200	8	1
Anti-Static Bag	250 (5 trays)	320	270	-	± 0.5
Outer Box (small)	500 (2 bags)	225	225	65	5
Outer Box (Middle)	1,000 (4 bags)	225	225	130	5

1) Packing Structure

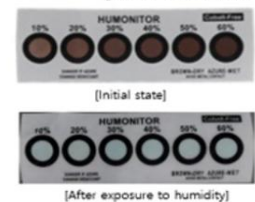
- Small Box



- Middlel Box

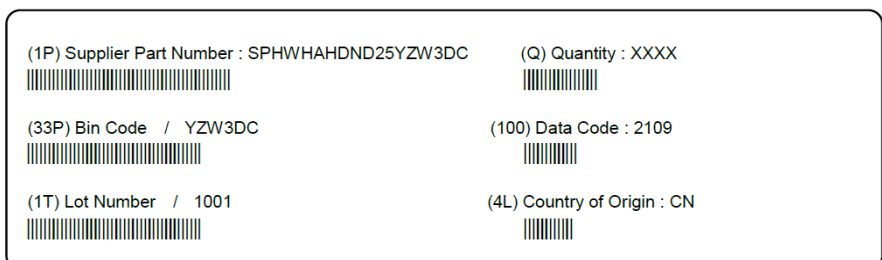
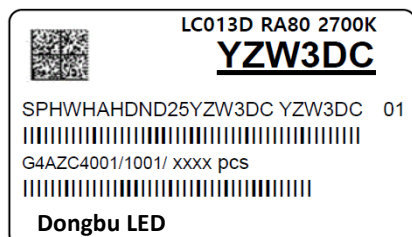


[MBB BAG drawing]

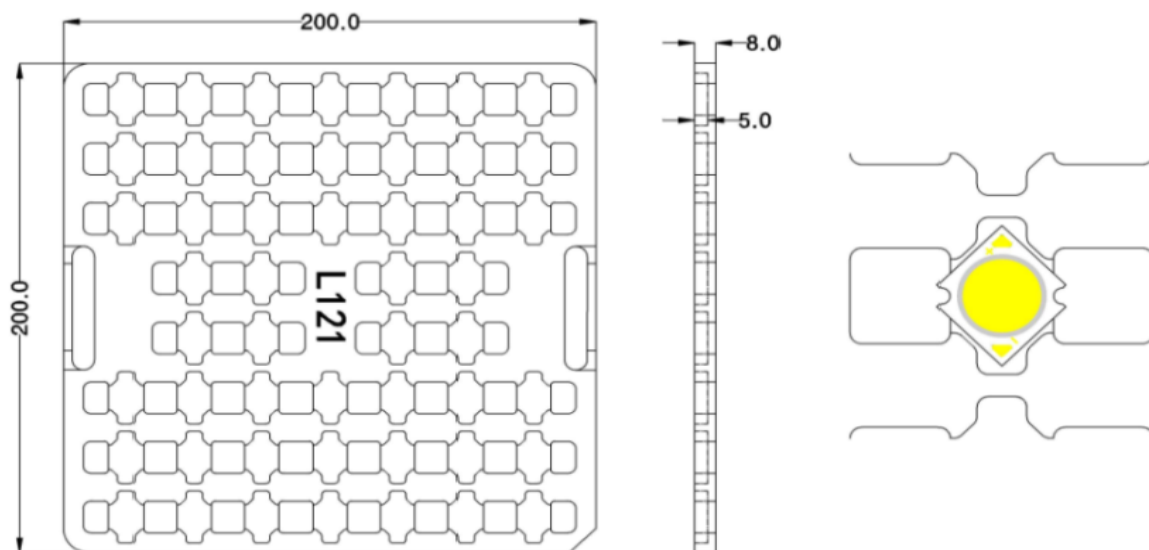


[SILICA GEL (5g)]

- ① Side Laber



2) Tray

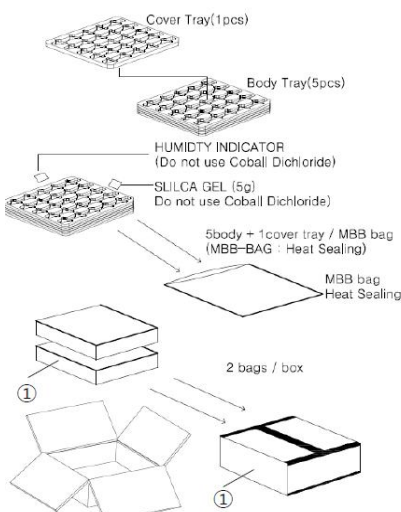


- Model : L016D, LC019D, LC026D, LC033D

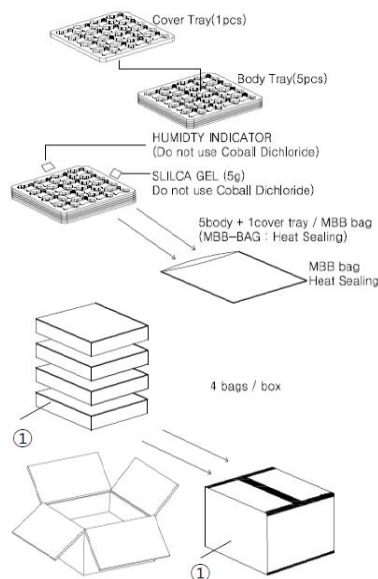
Packing Material	Max. quantity In pcs fo COM	Dimension (mm)			
		Length	Width	Height	Tolerance
Tray	25	200	200	8	1
Anti-Static Bag	125 (5 trays)	320	270	-	± 0.5
Outer Box (small)	250 (2 bags)	225	225	65	5
Outer Box (Middle)	500 (4 bags)	225	225	130	5

1) Packing Structure

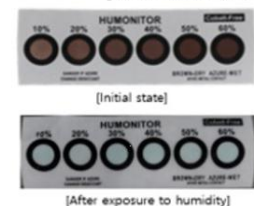
- Small Box



- Middlel Box



[MBB BAG drawing]

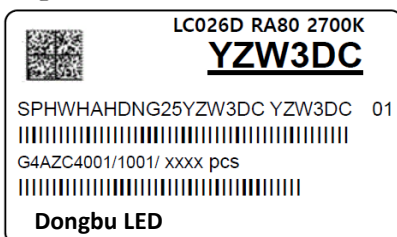


[Initial state]

[After exposure to humidity]

[SILICA GEL (5g)]

- ① Side Laber



(1P) Supplier Part Number : SPHWHADNG25YZW3DC



(Q) Quantity : XXXX



(33P) Bin Code / YZW3DC



(100) Data Code : 2109



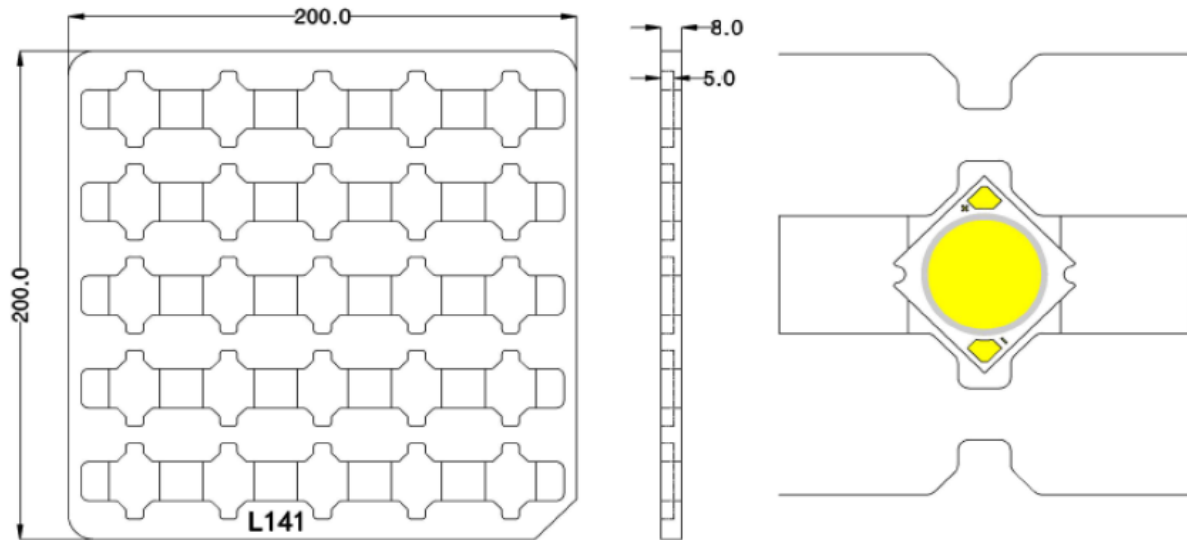
(1T) Lot Number / 1001



(4L) Country of Origin : CN



2) Tray

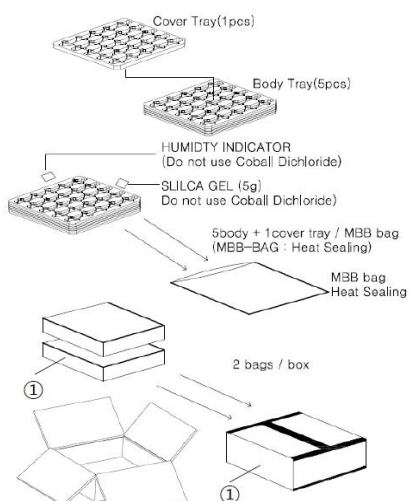


- Model : L040D, LC060D, LC080D

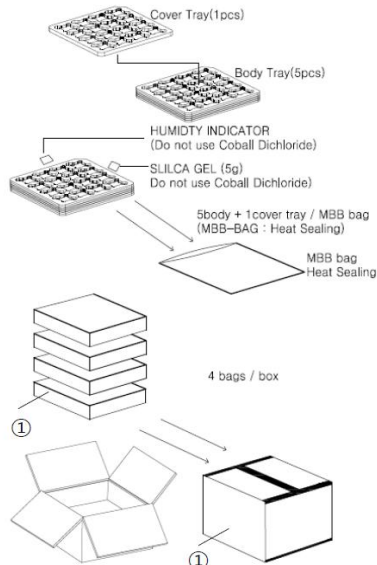
Packing Material	Max. quantity In pcs fo COM	Dimension (mm)			
		Length	Width	Height	Tolerance
Tray	16	200	200	8	1
Anti-Static Bag	80 (5 trays)	320	270	-	± 0.5
Outer Box (small)	160 (2 bags)	225	225	65	5
Outer Box (Middle)	320 (4 bags)	225	225	130	5

1) Packing Structure

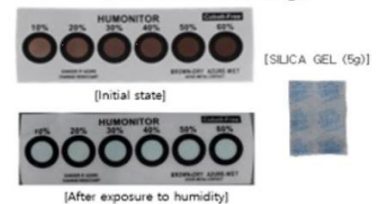
- Small Box



- Middlel Box



[MBB BAG drawing]



- ① Side Laber

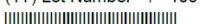


LC040D RA80 2700K
YZW3DC

SPHWHADN25YZW3DC YZW3DC 01
G4AZC4001/1001/ xxxx pcs
Dongbuled

(1P) Supplier Part Number : SPHWHADN25YZW3DC


(33P) Bin Code / YZW3DC

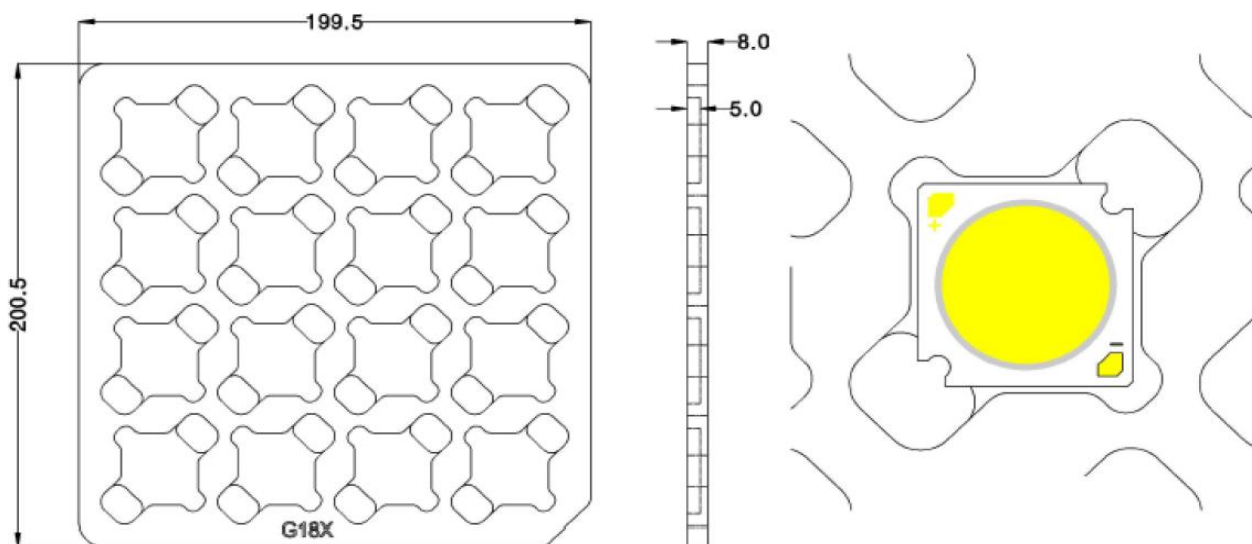

(1T) Lot Number / 1001


(Q) Quantity : XXXX


(100) Data Code : 2109


(4L) Country of Origin : CN


2) Tray



7. 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. 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) wiring), or other high temperature processes must
 - 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 (If_min), chips might exhibit different brightness due to the variation in I V characteristic s 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.

