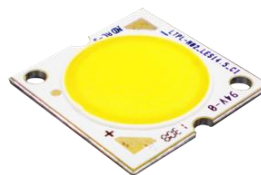




LED HIGH POWER CoB Product Series Data Sheet

Created Date: 02 / 06 / 2013
Revision: 2.0, 05 / 21 / 2013



LED HIGH POWER CoB Product Series

1. Description

The LiteON CoB Product series is a revolutionary, energy efficient and ultra compact new light source, combining the lifetime and reliability advantages of Light Emitting Diodes with the brightness of conventional lighting. It gives you total design freedom and unmatched brightness, creating a new opportunities for solid state lighting to displace conventional lighting technologies.

1.1 Features

- Compact high flux density light source
- Uniform high quality illumination
- Streamlined thermal path
- MacAdam compliant binning structure
More energy efficient than incandescent, halogen and fluorescent lamps
- Instant light with unlimited dimming
- RoHS compliant and Pb free

1.2 Benefits Features

- Enhanced optical control
- Clean white light without pixilation
- Uniform consistent white light
- Significantly reduced thermal resistance and increased operating temperatures
- Lower operating costs
- Reduced maintenance costs
- ESD rating is 8KV in HBM

1.3 Naming Rule

L T PL - M 0 2 X X X Z S X X - X X
Code1 Code2 Code3 Code4 Code5 Code6 Code7 Code8

Code 1: Product Line
PL: High Power LED.

Code 2: Package Type/Platform
M02: Metal substrate with 20x20mm square.

Code 3: Light Emitting Surface
5: 14.5mm excluding dam
6: 9mm excluding dam

Code 4: Wattage
08: 8W package
10: 10W package
20: 20W package
30: 30W package

Code 5: Emission Color Characteristics
Z: White Color Rendering Index 80 Type.
Q: White Color Rendering Index 90 Type.

Code 6: Chip
S: No limitation/Standard chip

Code7: Color Temperature
27: 2700K at 85degC
30: 3000K at 85degC
35: 3500K at 85degC
40: 4000K at 85degC
50: 5000K at 85degC
Note: The Color Temperature follow ANSI C78.377A Doc.

Code8: Hue Bin by MacAdam Ellipse Step
T0: 3-Step SDCM Ellipse+Main Lumen Bin (Except 5000K)
S1: 5-Step SDCM Ellipse/ANSI+Full Lumen Bins (Except 5000K)
F1: 5-Step SDCM Ellipse+Full Lumen Bins (5000K)
S1: ANSI+Full Lumen Bins (5000K)

LED HIGH POWER CoB Product Series

1.4 Product List

PN	Watt	CCT	CRI	Color Bin			Lumen Bin	
				3SDCM	5SDCM	7SDCM	-8%~+8%	-15%~+15%
LTPL-M02608ZS27-T0	8	2700K	80	☆			☆	
LTPL-M02608ZS27-S1	8	2700K	80		☆	☆		☆
LTPL-M02608ZS30-T0	8	3000K	80	☆			☆	
LTPL-M02608ZS30-S1	8	3000K	80		☆	☆		☆
LTPL-M02608ZS35-T0	8	3500K	80	☆			☆	
LTPL-M02608ZS35-S1	8	3500K	80		☆	☆		☆
LTPL-M02608ZS40-T0	8	4000K	80	☆			☆	
LTPL-M02608ZS40-S1	8	4000K	80		☆	☆		☆
LTPL-M02608ZS50-F1	8	5000K	80		☆		☆	
LTPL-M02608ZS50-S1	8	5000K	80			☆		☆
LTPL-M02608QS30-T0	8	3000K	90	☆			☆	
LTPL-M02608QS30-S1	8	3000K	90		☆	☆		☆
LTPL-M02610ZS27-T0	10	2700K	80	☆			☆	
LTPL-M02610ZS27-S1	10	2700K	80		☆	☆		☆
LTPL-M02610ZS30-T0	10	3000K	80	☆			☆	
LTPL-M02610ZS30-S1	10	3000K	80		☆	☆		☆
LTPL-M02610ZS35-T0	10	3500K	80	☆			☆	
LTPL-M02610ZS35-S1	10	3500K	80		☆	☆		☆
LTPL-M02610ZS40-T0	10	4000K	80	☆			☆	
LTPL-M02610ZS40-S1	10	4000K	80		☆	☆		☆
LTPL-M02610ZS50-F1	10	5000K	80		☆		☆	
LTPL-M02610ZS50-S1	10	5000K	80			☆		☆
LTPL-M02610QS30-T0	10	3000K	90	☆			☆	
LTPL-M02610QS30-S1	10	3000K	90		☆	☆		☆
LTPL-M02520ZS27-T0	20	2700K	80	☆			☆	
LTPL-M02520ZS27-S1	20	2700K	80		☆	☆		☆
LTPL-M02520ZS30-T0	20	3000K	80	☆			☆	
LTPL-M02520ZS30-S1	20	3000K	80		☆	☆		☆
LTPL-M02520ZS35-T0	20	3500K	80	☆			☆	
LTPL-M02520ZS35-S1	20	3500K	80		☆	☆		☆
LTPL-M02520ZS40-T0	20	4000K	80	☆			☆	
LTPL-M02520ZS40-S1	20	4000K	80		☆	☆		☆

LED HIGH POWER CoB Product Series

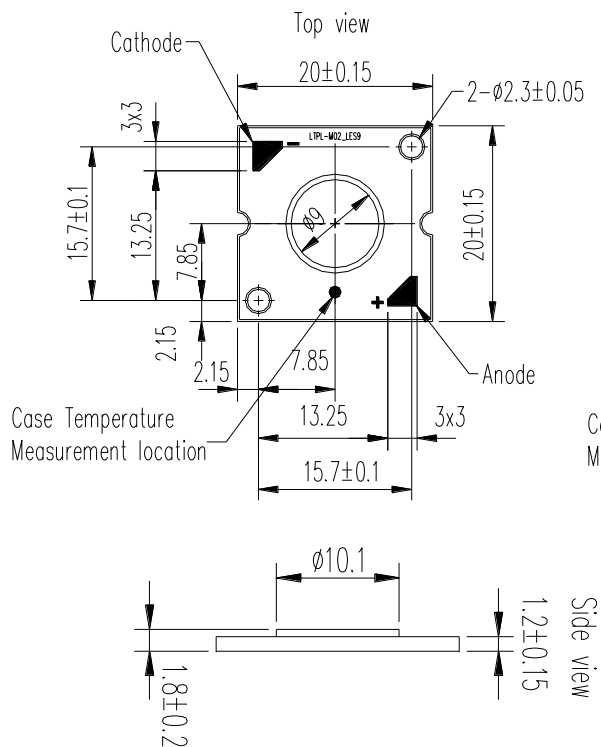
LTPL-M02520ZS50-F1	20	5000K	80		☆		☆	
LTPL-M02520ZS50-S1	20	5000K	80			☆		☆
LTPL-M02520QS30-T0	20	3000K	90	☆			☆	
LTPL-M02520QS30-S1	20	3000K	90		☆	☆		☆
LTPL-M02530ZS27-T0	30	2700K	80	☆			☆	
LTPL-M02530ZS27-S1	30	2700K	80		☆	☆		☆
LTPL-M02530ZS30-T0	30	3000K	80	☆			☆	
LTPL-M02530ZS30-S1	30	3000K	80		☆	☆		☆
LTPL-M02530ZS35-T0	30	3500K	80	☆			☆	
LTPL-M02530ZS35-S1	30	3500K	80		☆	☆		☆
LTPL-M02530ZS40-T0	30	4000K	80	☆			☆	
LTPL-M02530ZS40-S1	30	4000K	80		☆	☆		☆
LTPL-M02530ZS50-F1	30	5000K	80		☆		☆	
LTPL-M02530ZS50-S1	30	5000K	80			☆		☆
LTPL-M02530QS30-T0	30	3000K	90	☆			☆	
LTPL-M02530QS30-S1	30	3000K	90		☆	☆		☆

LED HIGH POWER CoB Product Series

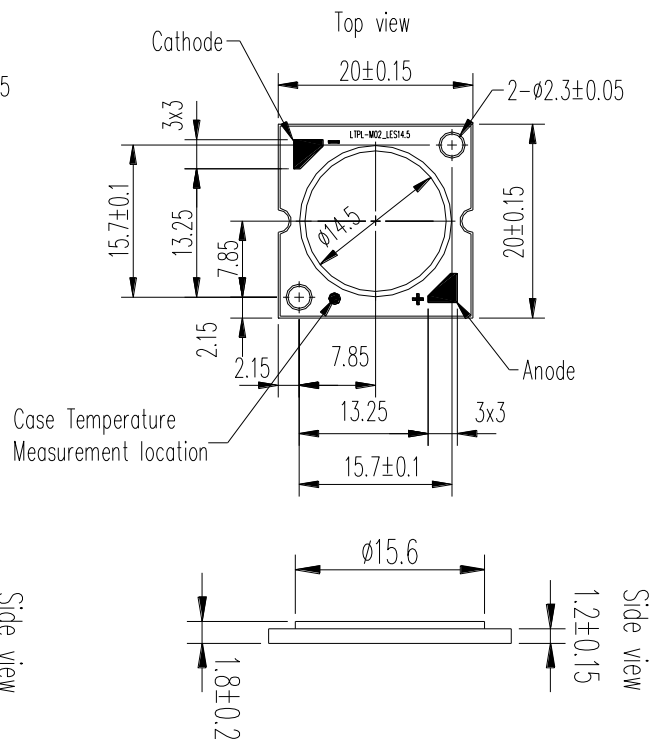
2. Outline Dimensions

2.1 Form Factor of CoB

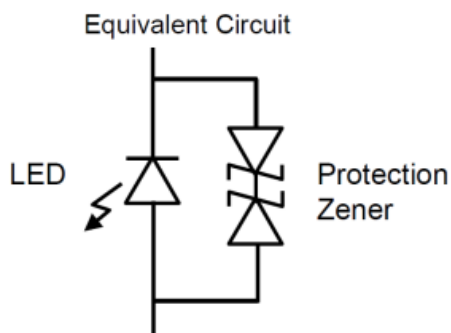
10W Product. (Code 4: 8/10)



20W/30W Product. (Code 4: 20/30)



2.2 Internal Equivalent Circuit



2.3 Notes

1. All dimensions are in millimeters.
2. Tolerance is ± 0.2 mm (0.008") unless otherwise noted.
3. LED of equivalent circuit means all series/parallel in CoB package.

LED HIGH POWER CoB Product Series

3. Rating and Characteristics

3.1 Absolute Maximum Ratings at Ta=25°C.

Parameter	Symbol	Code 4	Rating	Unit
Power Dissipation	P _o	08	12.8	W
		10	19.2	
		20	32.0	
		30	44.8	
Forward Current	I _F	08	320	mA
		10	480	
		20	800	
		30	1120	
Reverse Voltage	V _R		45	V
Junction Temperature	T _j		125	°C
Thermal Resistance, Junction-Case	R _{th, J-C}	08	2.40	°C / W
		10	2.05	
		20	1.20	
		30	0.80	
Operating Temperature Range	T _{opr}		-40 to 85	°C
Storage Temperature Range	T _{stg}		-40 to 100	°C
Breakdown Voltage(DC)	V _B		2.25	KV
Electrostatic Discharge	ESD		8	KV

Notes :

1. The pulse mode condition is 1/10 duty cycle with 100 msec pulse width.
2. Forbid to operating at reverse voltage condition
3. ESD spec is reference to AEC-Q101-001 HBM.
4. The unit of Rth is °C/W electrical
5. Code 4 means Watt of CoB product.
6. The M02 CoB does not suggest processing the IR-reflow, suggest that manual soldering only, the condition of soldering temperature is under 350degC and could not over 3.5sec.

LED HIGH POWER CoB Product Series

3.2 Electro-Optical Characteristics

■ CRI 80 Series Product

Dominant CCT	Code 4	Current (mA)	VF (V) @25°C	Flux(lm) @25°C	VF (V) @85°C	Flux(lm) @85°C	Eff.(lm/W) @25°C	Eff.(lm/W) @85°C
2700K	08	230	37.8	900	36.7	810	104	96
	10	350	37.8	1370	36.7	1233	104	96
	20	580	38.0	2250	36.9	2025	102	95
	30	840	38.0	3300	36.9	2970	103	96
3000K	08	220	37.8	900	36.7	810	108	100
	10	330	37.8	1370	36.7	1233	110	102
	20	550	37.8	2250	36.7	2025	108	100
	30	800	37.8	3300	36.7	2970	109	101
3500K	08	210	37.7	900	36.6	810	114	105
	10	320	37.7	1370	36.6	1233	114	105
	20	540	37.7	2250	36.6	2025	111	102
	30	780	37.7	3300	36.6	2970	112	104
4000K	08	200	37.4	900	36.4	810	120	111
	10	310	37.5	1370	36.4	1233	118	109
	20	520	37.5	2250	36.4	2025	115	107
	30	750	37.5	3300	36.4	2970	117	109
5000K	08	200	37.4	900	36.3	810	120	111
	10	300	37.4	1370	36.3	1233	122	113
	20	510	37.4	2250	36.3	2025	118	109
	30	730	37.4	3300	36.3	2970	121	112

LED HIGH POWER CoB Product Series

■ CRI 90 Series Product

Dominant CCT	Code 4	Current (mA)	VF (V) @25°C	Flux(lm) @25°C	VF (V) @85°C	Flux(lm) @85°C	Eff.(lm/W) @25°C	Eff.(lm/W) @85°C
3000K	08	220	37.8	700	36.7	630	84	78
	10	330	37.8	1050	36.7	945	84	78
	20	550	37.8	1750	36.7	1575	84	78
	30	800	37.8	2600	36.7	2340	86	80

Notes

1. Code 4 means Watt of CoB product.
2. All of VF value are typical, the real range is 33.0-39.8 volt, please refer page 9 "VF Binning Parameter".
3. All of Flux value are typical, the real Bin range please refer page 10 "Flux Binning Parameter".
4. Tolerance of flux is $\pm 7\%$, tolerance of CCX/CCY is ± 0.007 , tolerance of CRI is ± 2 .
5. Typical viewing angle is 120deg.
6. R9>0 for CRI80 product, R9>50 for CRI90 product

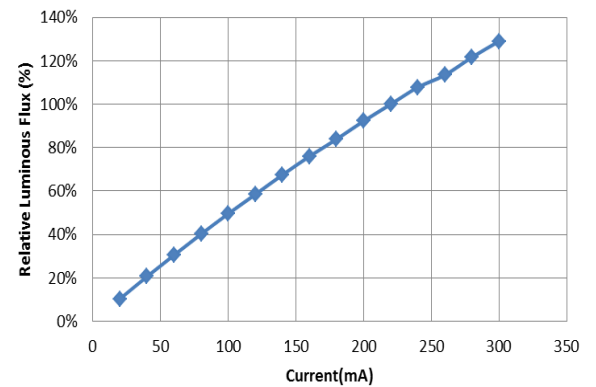
LED HIGH POWER CoB Product Series

■ Efficiency Comparison Table (25degC)

CRI 80 Series

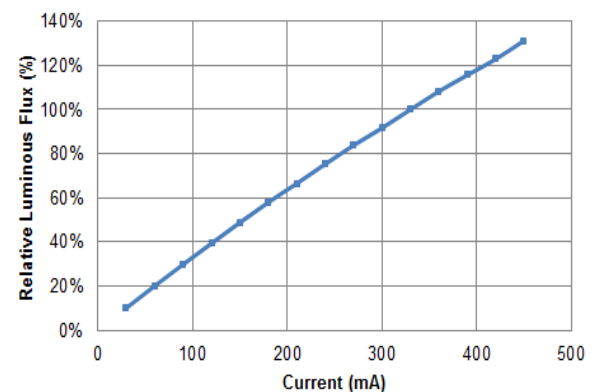
8W Series Product

Current (mA)	VF (V)	Lumen (lm)				
		2700K	3000K	3500K	4000K	5000K
140	36.52	576	606	615	643	661
160	36.66	652	687	697	727	748
180	37.07	726	764	775	810	833
200	37.41	794	835	848	886	911
220	37.8	867	912	926	967	994
240	38.18	938	987	1002	1047	1076
260	38.55	1002	1055	1070	1118	1150
280	38.81	1065	1121	1137	1187	1222
300	39.19	1137	1197	1215	1269	1304



10W Series Product

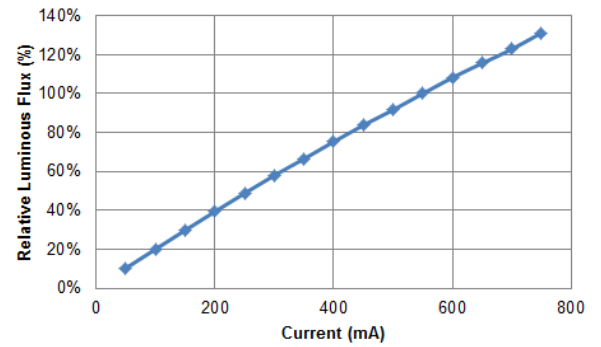
Current (mA)	VF (V)	Lumen (lm)				
		2700K	3000K	3500K	4000K	5000K
210	36.52	864	909	923	964	991
240	36.66	978	1030	1045	1091	1123
270	37.07	1089	1146	1163	1215	1249
300	37.41	1191	1253	1272	1329	1366
330	37.80	1300	1368	1389	1450	1491
360	38.18	1407	1481	1503	1570	1614
390	38.55	1503	1582	1606	1677	1724
420	38.81	1597	1681	1706	1781	1832
450	39.19	1706	1795	1822	1903	1957



LED HIGH POWER CoB Product Series

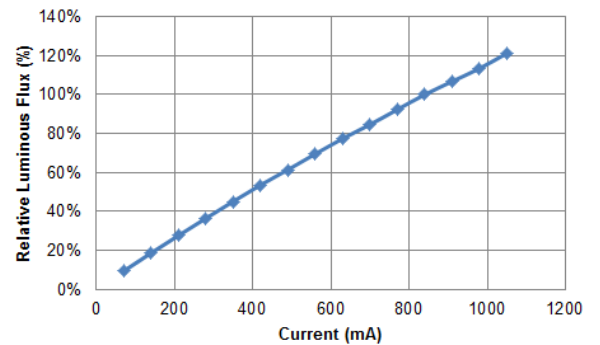
20W Series Product

Current (mA)	VF (V)	Lumen (lm)				
		2700K	3000K	3500K	4000K	5000K
350	36.52	1410	1484	1506	1573	1618
400	36.66	1596	1680	1705	1781	1831
450	37.07	1776	1870	1898	1982	2038
500	37.41	1943	2045	2076	2168	2229
550	37.80	2121	2232	2265	2366	2433
600	38.18	2296	2417	2453	2562	2635
650	38.55	2453	2582	2621	2737	2814
700	38.81	2605	2742	2783	2906	2989
750	39.19	2783	2929	2973	3105	3193



30W Series Product

Current (mA)	VF (V)	Lumen (lm)				
		2700K	3000K	3500K	4000K	5000K
490	36.52	2016	2122	2154	2249	2313
560	36.66	2282	2403	2439	2547	2619
630	37.07	2540	2674	2714	2834	2915
700	37.41	2778	2925	2969	3100	3188
770	37.8	3033	3193	3241	3384	3480
840	38.18	3283	3456	3508	3663	3767
910	38.55	3508	3692	3747	3914	4024
980	38.81	3725	3921	3980	4157	4274
1050	39.19	3980	4189	4252	4441	4566



LED HIGH POWER CoB Product Series

CRI 90 Series

3000K

8W			10W			20W			30W		
Current (mA)	VF (V)	Lumen (lm)	Current (mA)	VF (V)	Lumen (lm)	Current (mA)	VF (V)	Lumen (lm)	Current (mA)	VF (V)	Lumen (lm)
140	36.52	467	210	36.52	700	350	36.52	1158	490	36.52	1676
160	36.66	530	240	36.66	793	400	36.66	1310	560	36.66	1898
180	37.07	590	270	37.07	882	450	37.07	1459	630	37.07	2112
200	37.41	645	300	37.41	965	500	37.41	1595	700	37.41	2311
220	37.8	700	330	37.8	1050	550	37.8	1750	770	37.8	2522
240	38.18	760	360	38.18	1140	600	38.18	1885	840	38.18	2730
260	38.55	815	390	38.55	1218	650	38.55	2014	910	38.55	2917
280	38.81	860	420	38.81	1294	700	38.81	2139	980	38.81	3098
300	39.19	921	450	39.19	1382	750	39.19	2285	1050	39.19	3309

LED HIGH POWER CoB Product Series

4. Typical Electrical/Optical Characteristics Curve

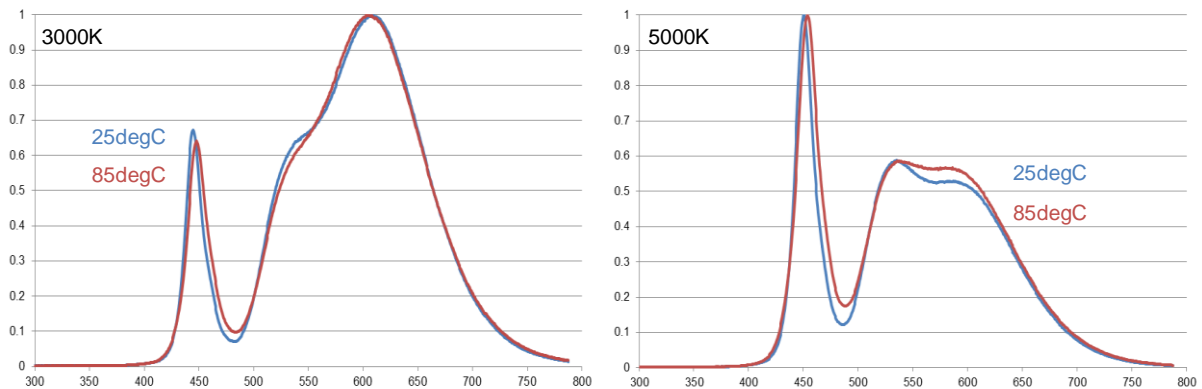


Fig 1. Relative Spectrum of Emission at typical current.

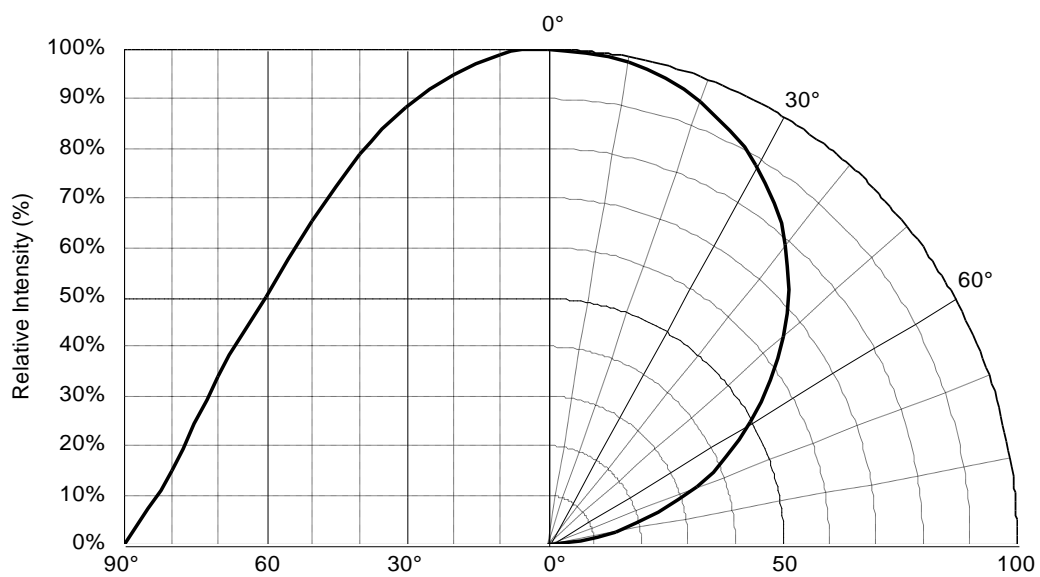


Fig 2. Radiation Characteristics

**LED HIGH POWER
CoB Product Series**

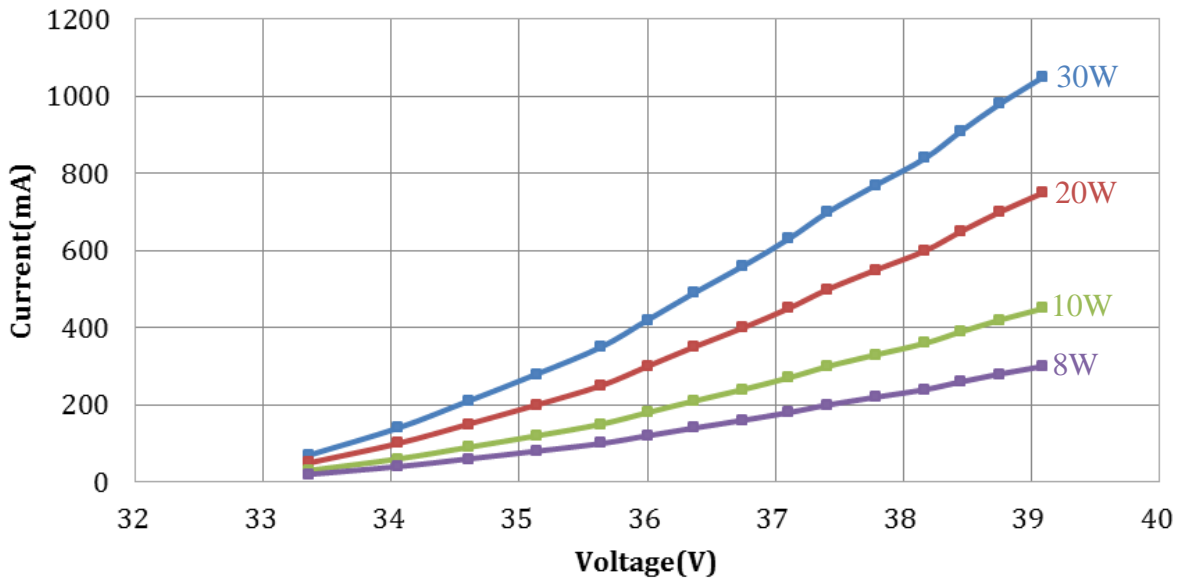


Fig 3. Forward Current vs. Forward Voltage-Curve

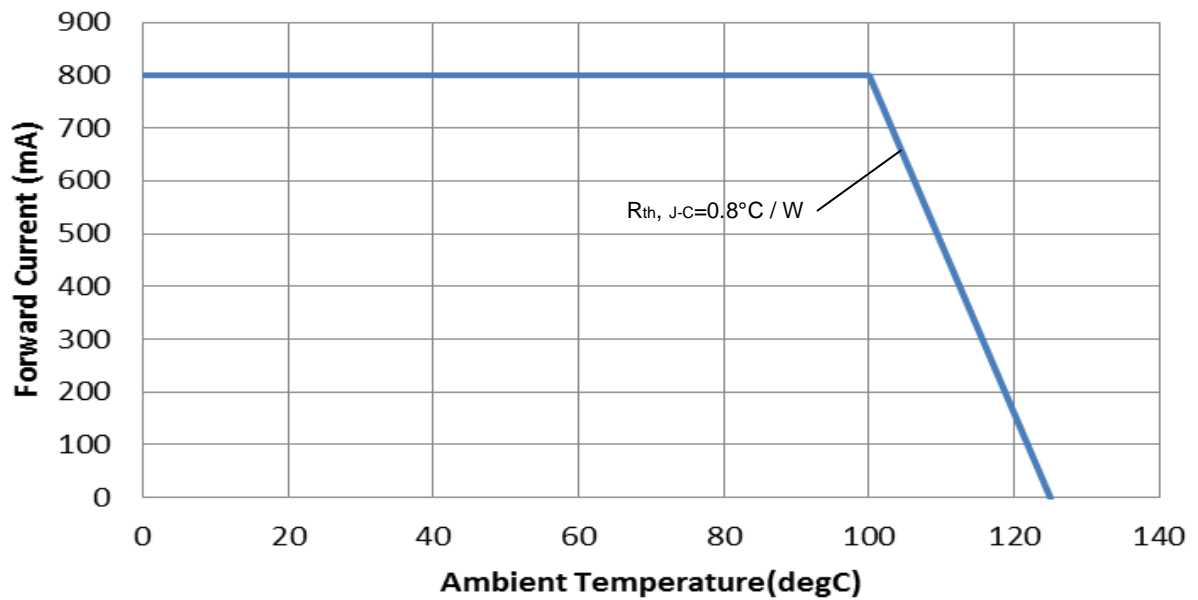


Fig 4. Forward Current Degrading Curve

**LED HIGH POWER
CoB Product Series**

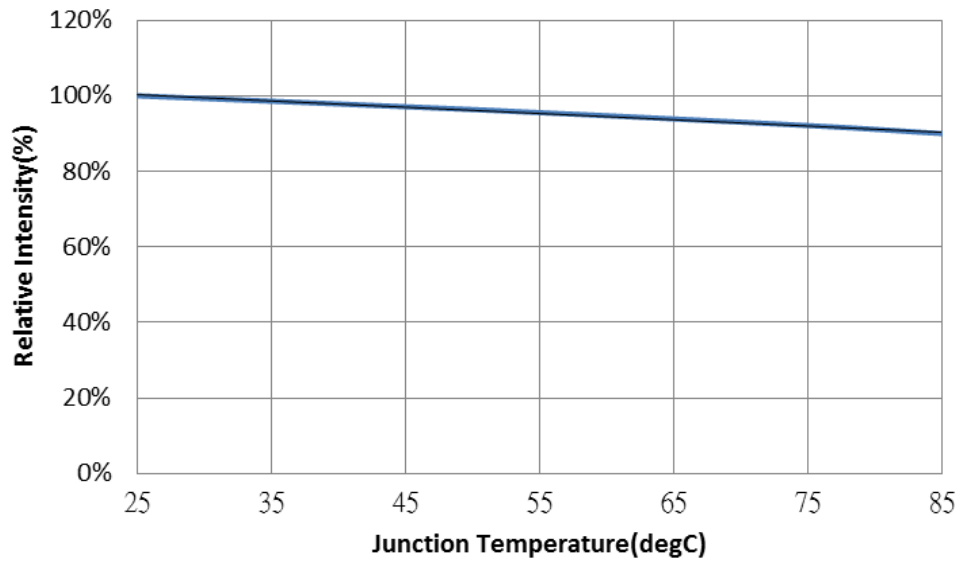
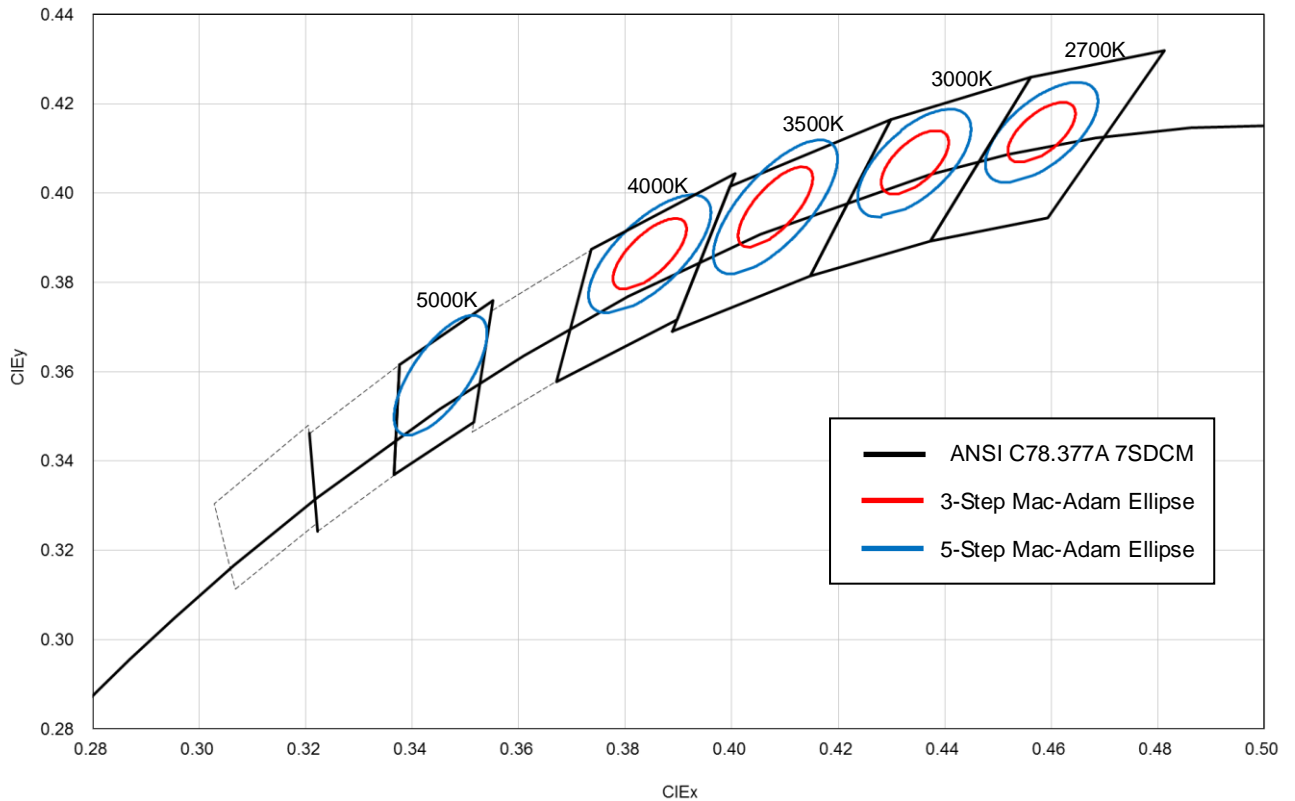


Fig 5. Junction temperature vs. Relative intensity

LED HIGH POWER CoB Product Series

5. CoB Mac-Adam Ellipse Color Definition

■ LiteOn 3/5/7Step Mac-Adam Chromaticity Coordinate Groups (25degC)



Notes

1. The LiteOn Chromaticity Coordinate Groups follow ANSI norm for 7 Mac-Adam square.
2. The (CIE_x, CIE_y) center of 3/5 Mac-Adam ellipse follow ANSI norm.
3. The ellipse equation expression: $SDCM = (g11*(x-x_0)^2 + 2*g12*(x-x_0)*(y-y_0) + g22*(y-y_0)^2)^{0.5}$

■ Forward Voltage Binning Parameter (25degC)

Parameter	Bin	Symbol	Min	Max	Unit	Condition
Forward Voltage	V1	VF	33.0	39.8	V	IF=Typical Current

LED HIGH POWER CoB Product Series

Forward Flux Binning Parameter (25degC)

CRI 80 Series

Parameter	Code 4	Bin	Symbol	Min	Max	Unit	Code 9=0	Code 9=1
Luminous Flux	08 (8W)	A1A	ΦV	650	750	lm	Main Bin	Full Bins
		AC		750	950			
		CD		950	1050			
	10 (10W)	EF		1150	1250		Main Bin	Full Bins
		FH		1250	1500			
		HI		1500	1600			
	20 (20W)	KL		1900	2050		Main Bin	Full Bins
		LN		2050	2450			
		NO		2450	2600			
	30 (30W)	PQ		2800	3050		Main Bin	Full Bins
		QS		3050	3550			
		ST		3550	3800			

8W Product (Code 4=08)



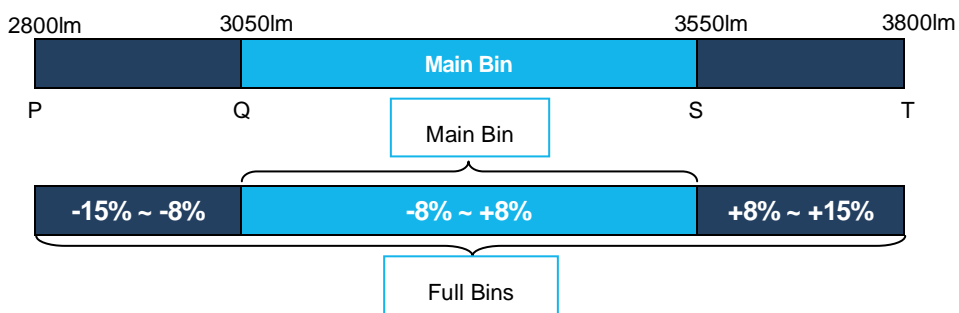
10W Product (Code 4=10)



20W Product (Code 4=20)



30W Product (Code 4=30)



LED HIGH POWER CoB Product Series

CRI90 Series

Parameter	Code 4	Bin	Symbol	Min	Max	Unit	Code 9=0	Code 9=1	
Luminous Flux	08 (8W)	A0A1	ΦV	550	650	lm		Full Bins	
		A1B		650	850				Main Bin
		BC		850	950				
	10 (10W)	BC		850	950			Full Bins	
		CE		950	1150				Main Bin
		EF		1150	1250				
	20 (20W)	HI		1500	1600			Full Bins	
		IK		1600	1900				Main Bin
		KL		1900	2050				
	30 (30W)	MN		2050	2450			Full Bins	
		NP		2450	2800				Main Bin
		PQ		2800	3050				

8W Product (Code 4=08)



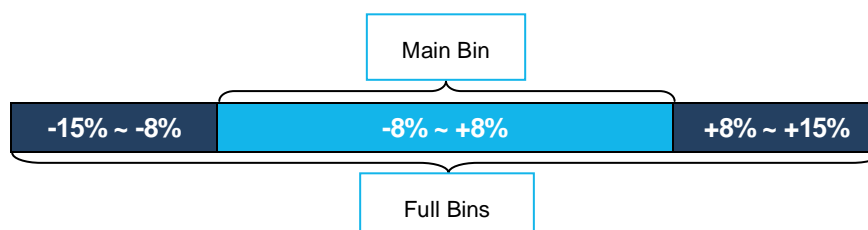
10W Product (Code 4=10)



20W Product (Code 4=20)



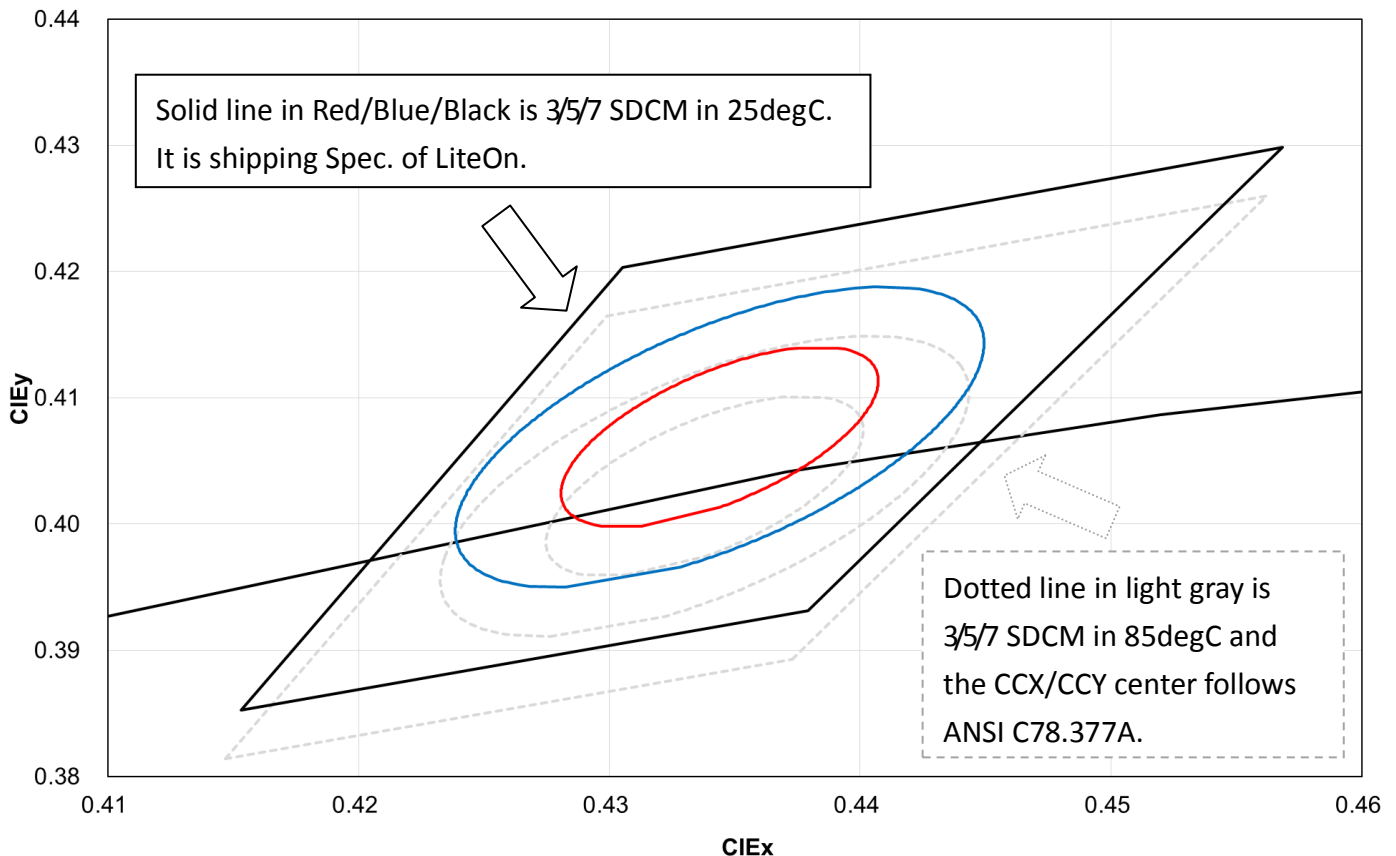
30W Product (Code 4=30)



LED HIGH POWER CoB Product Series

■ Example of LiteOn CoB Mac-Adam Ellipse Color Definition

(EX: CRI80, 3000K series)



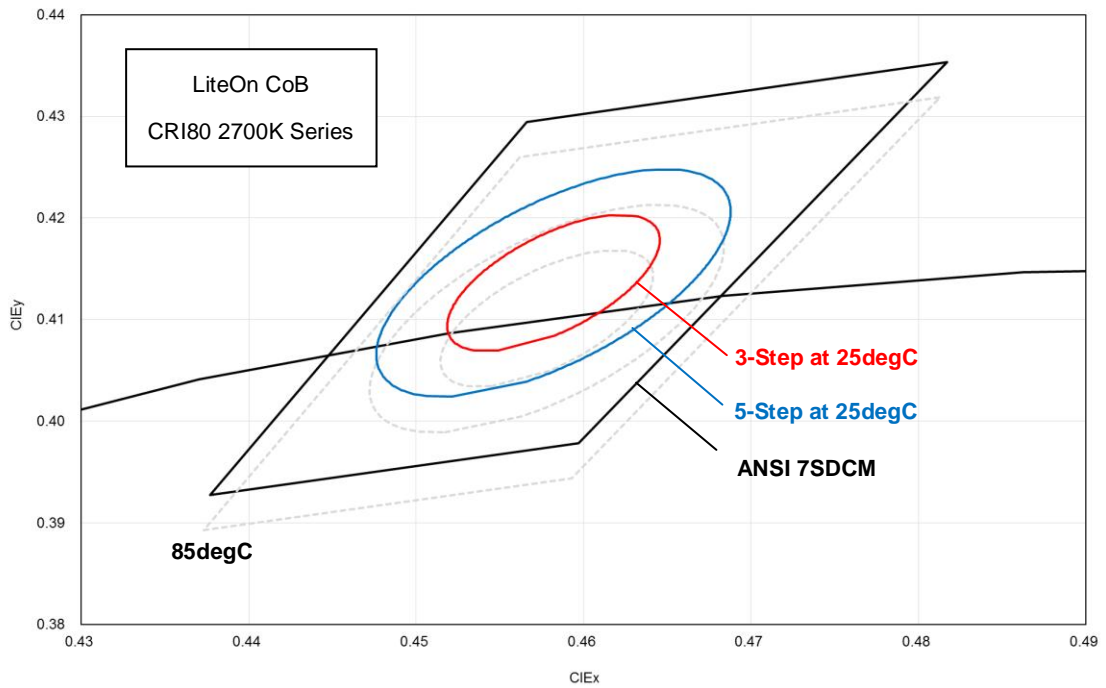
CRI	CCT	25degC (LiteOn Spec.)		85degC (ANSI)		Hot/Cold Factor	
		CCX	CCY	CCX	CCY	CCX	CCY
80	2700	0.4582	0.4136	0.4578	0.4101	-0.0004	-0.0035
	3000	0.4344	0.4069	0.4338	0.4030	-0.0006	-0.0039
	3500	0.4082	0.4221	0.4073	0.3917	-0.0009	-0.0052
	4000	0.3827	0.3841	0.3818	0.3797	-0.0009	-0.0044
	5000	0.3667	0.3828	0.3447	0.3553	-0.0006	-0.0039
90	3000	0.4323	0.4072	0.4338	0.4030	0.0015	-0.0042

Notes

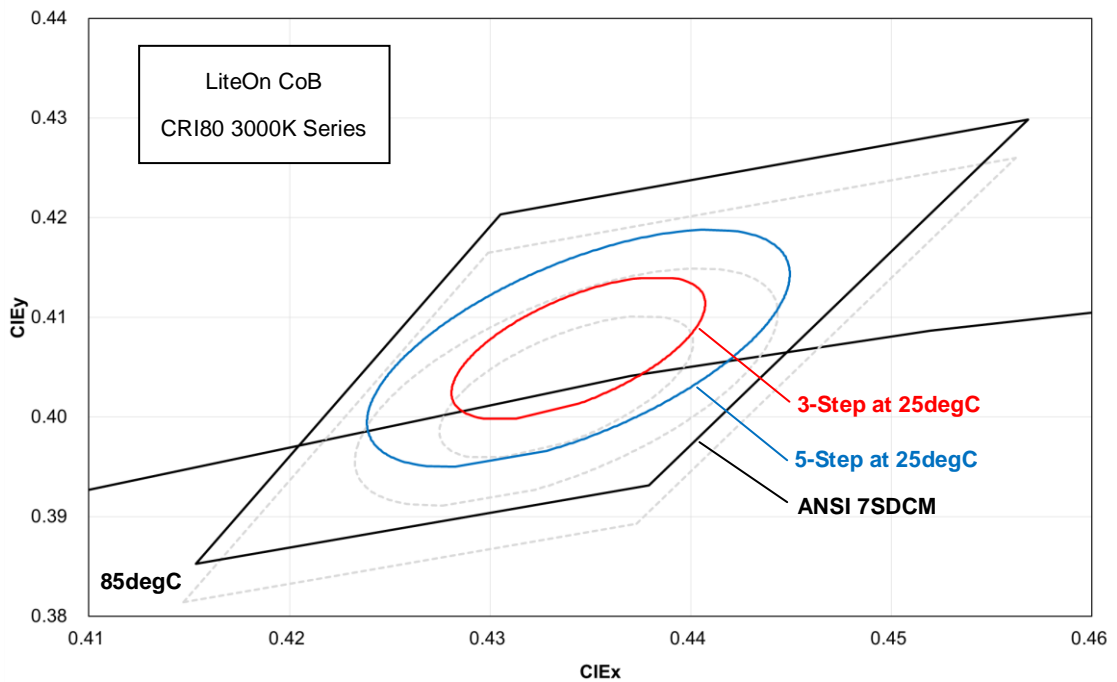
1. LiteOn tester and shipping spec follow the color bin with 25degC CCX/CCY center.
2. The Hot/Cold Factor means the CCX/CCY shift from 25degC to 85degC.
3. The Hot/Cold shift is measured by LiteOn CAS 140B instrument system.

LED HIGH POWER CoB Product Series

■ LiteOn CoB CRI80 2700K Series

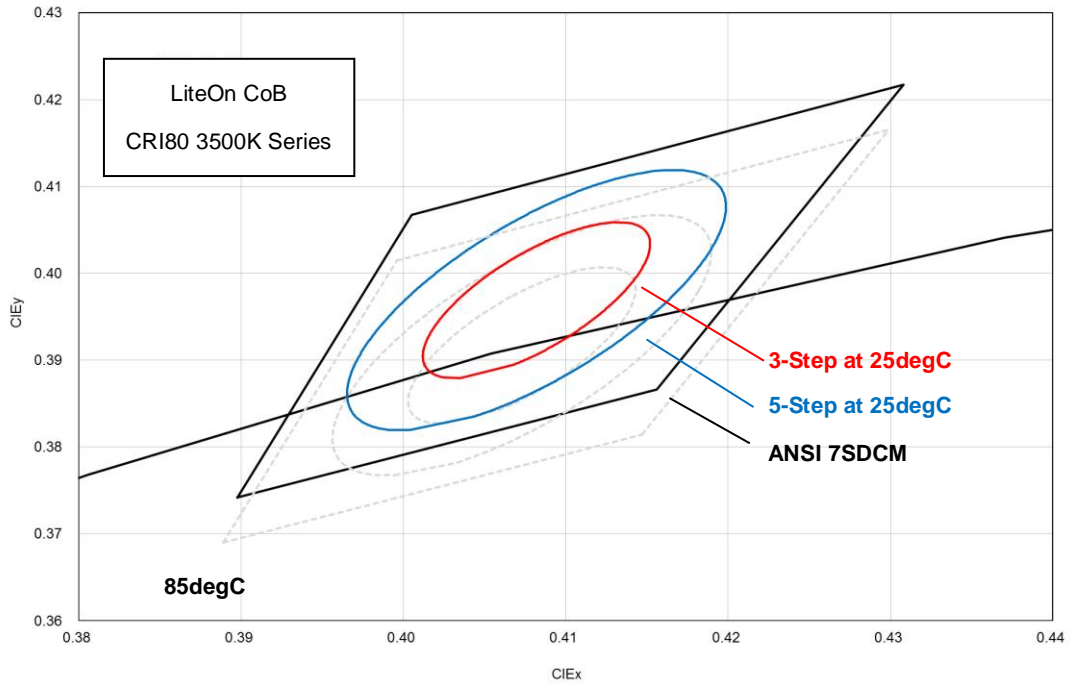


■ LiteOn CoB CRI80 3000K Series

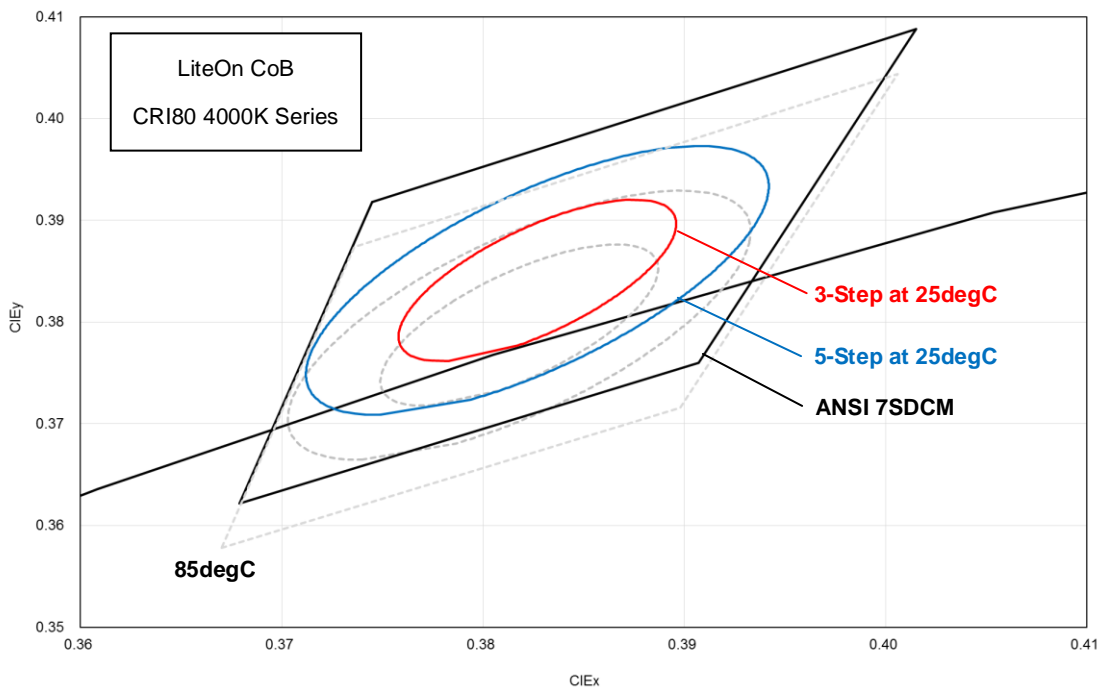


LED HIGH POWER CoB Product Series

■ LiteOn CoB CRI80 3500K Series

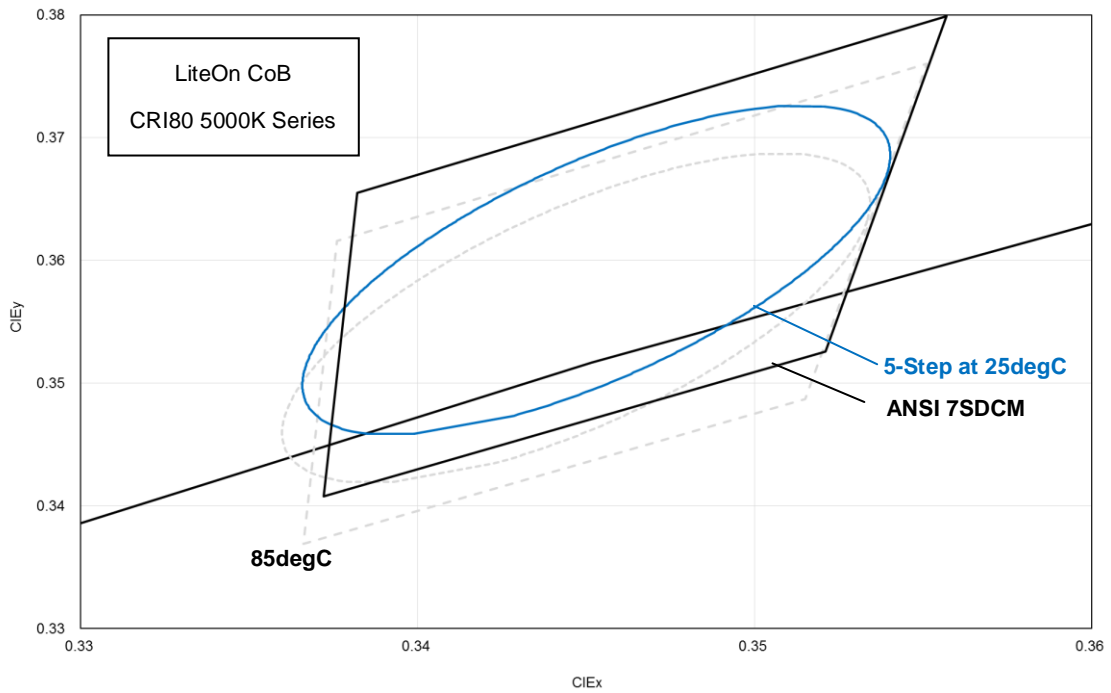


■ LiteOn CoB CRI80 4000K Series

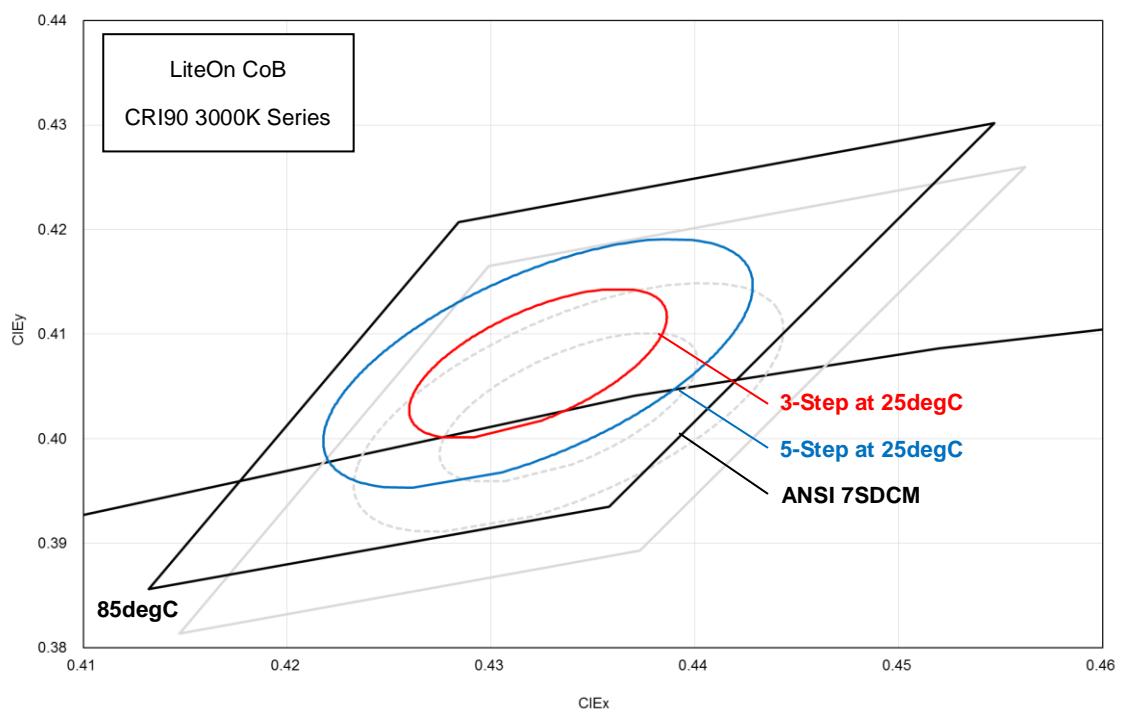


LED HIGH POWER CoB Product Series

■ LiteOn CoB CRI80 5000K Series



■ LiteOn CoB CRI90 3000K Series



LED HIGH POWER CoB Product Series

6. Reliability Test Plan

No	Test item	Condition	Duration	Result
1	High Temperature Operating Life	Tc=85°C, IF=Typical Current	1K hours	Pass
2	Wet High Temperature Operating Life	60°C/90%RH, IF=Typical Current(DC) 30 min ON/OFF	1K hours	Pass
3	Thermal Shock	-40°C to 125°C, 15minutes dwell, <10 seconds transfer, measurement in every 250 cycle	500 cycles	Pass
4	Fast Switch Cycling Test	40000cycles, 2 mins On/Off, Room temperature(25°C+/-5°C), measurement in every 5000 cycle	40K cycles	Pass
5	High Temperature Storage Life	Ta=120°C	1K hours	Pass
6	Low Temperature Storage Life	Ta=-55°C	1K hours	Pass
7	Mechanical Shock	1500G, 0.5ms pulse, 5 shocks each 6 axis	30 Times (5 shocks each 6 axis)	Pass
8	Variable Vibration Frequency	10-2000-10 Hz, log or linear sweep rate, 20G for approximately minute 1.5mm, each applied three times per axis over 6 hrs.	18 hrs (three times per axis over 6 hrs.)	Pass

Criteria for Judging the Damage

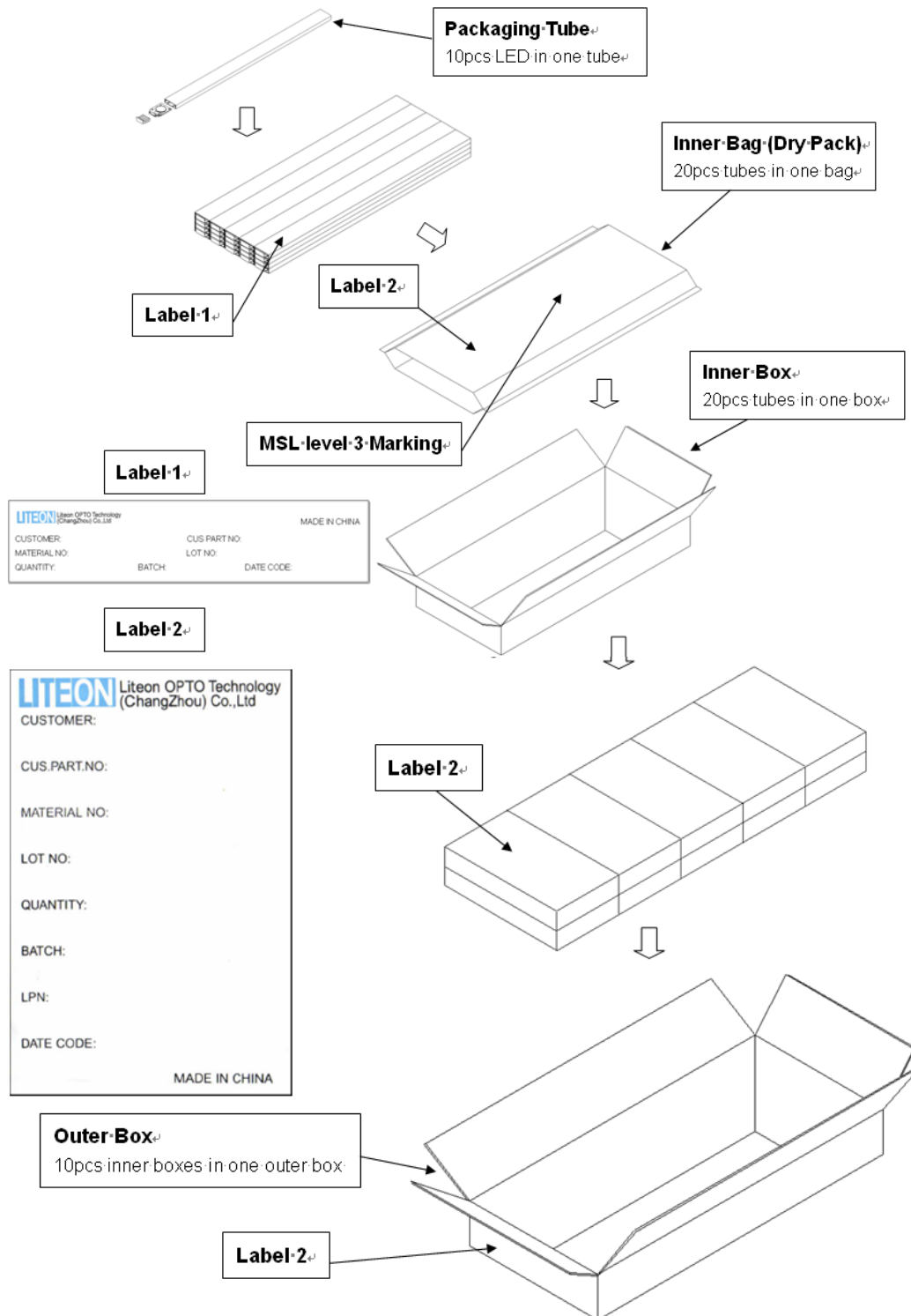
Item	Symbol	Test Condition	Criteria for Judgment	
			Min.	Max.
Forward Voltage	Vf	IF=Typical Current		U.S.L. x 1.1
Luminous Flux	Lm	IF=Typical Current	L.S.L. x 0.7	
CCX&CCY	X,Y	IF=Typical Current		Shift<0.02

Notes:

1. Operating life test are mounted on thermal heat sink
2. Storage item are only component, not put on heat sink.

LED HIGH POWER CoB Product Series

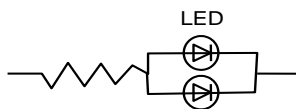
7. Packing Specifications



LED HIGH POWER CoB Product Series

8. Cautions

8.1 An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit below.



(A) Recommended circuit.

(B) The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

8.2 Do not put any pressure on the light emitting surface either by finger or any hand tool and do not stack the COB products. Stress or pressure may cause damage to the wires of the LED array.

8.3 This product is not designed for the use under any of the following conditions, please confirm the performance and reliability are well enough if you use it under any of the following conditions

- Do not use sulfur-containing materials in commercial products including the materials such as seals and adhesives that may contain sulfur.
- Do not put this product in a place with a lot of moisture (over 85% relative humidity), dew condensation, briny air, and corrosive gas (Cl, H₂S, NH₃, SO₂, NO_x, etc.), exposure to a corrosive environment may affect silver plating.

ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED. Suggestions to prevent ESD damage:

- Use of a conductive wrist band or anti-electrostatic glove when handling these LEDs.
- All devices, equipment, and machinery must be properly grounded.
- Work tables, storage racks, etc. should be properly grounded.
- Use ion blower to neutralize the static charge which might have built up on surface of the LED's plastic lens as a result of friction between LEDs during storage and handling.

ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or "no light up" at low currents.

To verify for ESD damage, check for "light up" and VF of the suspect LEDs at low currents.