

LUXEON CX Plus CoB (Gen 2)

High efficacy with industry
standard footprint

LUXEON CX Plus CoB (Gen 2) family of products delivers a new breakthrough in efficacy for arrays. Available in 80 and 90 CRI across multiple electrical configurations, LUXEON CX Plus CoB (Gen 2) is packaged in industry standard footprints enabling it to benefit from an existing ecosystem for fast and immediate design-in while retaining existing optics, clamps, and documentation.



FEATURES AND BENEFITS

Higher efficacy to benefit luminaire design

An immediate, effortless upgrade to existing designs currently using legacy CoBs with a square footprint

MCPCB substrate that enables more robust systems than ceramic substrate

2- and 3-step MacAdam ellipse ensuring color consistency from luminaire to luminaire

PRIMARY APPLICATIONS

Spotlights

Track Lights

Downlights

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General Product Information

Product Test Conditions

LUXEON CX Plus CoB (Gen 2) LEDs are tested and binned with a DC drive current specified below at a junction temperature, T_j , of 85°C:

100mA	–	LUXEON CX Plus CoB S01
200mA	–	LUXEON CX Plus CoB M02
350mA	–	LUXEON CX Plus CoB M03
450mA	–	LUXEON CX Plus CoB L04
550mA	–	LUXEON CX Plus CoB L05
800mA	–	LUXEON CX Plus CoB L08

Part Number Nomenclature

Part numbers for LUXEON CX Plus CoB (Gen 2) follow the convention below:

L 2 C 4 – **A A B B C D D D E F F G G**

Where:

A A	–	designates nominal CCT (27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K)
B B	–	designates minimum CRI (80=80CRI, 90=90CRI)
C	–	designates SDCM (2=2-step MacAdam ellipse, 3=3-step MacAdam ellipse)
D D D	–	designates product configuration (example: S01, M02, M03, L04, L05, L08)
E	–	designates options for product specification
F F	–	designates light emitting surface (LES) size (06=6mm, 09=9mm, 12=12mm, 14=14mm)
G G	–	designates options for product specification

Therefore, the following part number is used for a LUXEON CX Plus CoB (Gen 2), 3000K 80CRI, 3-step MacAdam ellipse, M03, 9mm LES:

L 2 C 4 – **3 0 8 0 3 M 0 3 F 0 9 0 0**

Lumen Maintenance

Please contact your local Sales Representative or Lumileds Technical Solutions Manager for more information about the long-term performance of this product.

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON CX Plus CoB (Gen 2) is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS Directive 2011/65/EU and REACH Regulation (EC) 1907/2006. Lumileds LLC will not intentionally add the following restricted materials to its products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

Performance Characteristics

Product Selection Guide

Table 1. Product performance of LUXEON CX Plus CoB (Gen 2) at specified test current, $T_j=85^{\circ}\text{C}$.

PRODUCT	NOMINAL CCT	MINIMUM CRI ^[1, 2, 3]	LUMINOUS FLUX ^[1, 4] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	LES ^[5] (mm)	PART NUMBER ^[6]
			MINIMUM	TYPICAL				
LUXEON CX Plus CoB S01	2700K	80	439	477	138	100	6	L2C4-2780xS01F0600
	3000K	80	455	495	143	100	6	L2C4-3080xS01F0600
	3500K	80	472	513	149	100	6	L2C4-3580xS01F0600
	4000K	80	480	522	151	100	6	L2C4-4080xS01F0600
	5000K	80	480	522	151	100	6	L2C4-5080xS01F0600
	2700K	90	370	402	117	100	6	L2C4-2790xS01F0600
	3000K	90	391	425	123	100	6	L2C4-3090xS01F0600
	3500K	90	425	462	134	100	6	L2C4-3590xS01F0600
	4000K	90	434	471	137	100	6	L2C4-4090xS01F0600
LUXEON CX Plus CoB M02	2700K	80	869	945	137	200	9	L2C4-2780xM02F0900
	3000K	80	924	1004	146	200	9	L2C4-3080xM02F0900
	3500K	80	936	1017	147	200	9	L2C4-3580xM02F0900
	4000K	80	957	1040	151	200	9	L2C4-4080xM02F0900
	5000K	80	957	1040	151	200	9	L2C4-5080xM02F0900
	2700K	90	752	817	118	200	9	L2C4-2790xM02F0900
	3000K	90	790	859	124	200	9	L2C4-3090xM02F0900
	3500K	90	861	936	136	200	9	L2C4-3590xM02F0900
	4000K	90	877	954	138	200	9	L2C4-4090xM02F0900
LUXEON CX Plus CoB M03	2700K	80	1548	1683	137	350	9	L2C4-2780xM03F0900
	3000K	80	1594	1733	141	350	9	L2C4-3080xM03F0900
	3500K	80	1661	1805	147	350	9	L2C4-3580xM03F0900
	4000K	80	1706	1854	151	350	9	L2C4-4080xM03F0900
	5000K	80	1706	1854	151	350	9	L2C4-5080xM03F0900
	2700K	90	1292	1405	115	350	9	L2C4-2790xM03F0900
	3000K	90	1372	1491	122	350	9	L2C4-3090xM03F0900
	3500K	90	1438	1563	128	350	9	L2C4-3590xM03F0900
	4000K	90	1491	1621	132	350	9	L2C4-4090xM03F0900
LUXEON CX Plus CoB L04	2700K	80	1927	2095	133	450	12	L2C4-2780xL04F1200
	3000K	80	2092	2274	144	450	12	L2C4-3080xL04F1200
	3500K	80	2112	2296	146	450	12	L2C4-3580xL04F1200
	4000K	80	2223	2416	153	450	12	L2C4-4080xL04F1200
	5000K	80	2223	2416	153	450	12	L2C4-5080xL04F1200
	2700K	90	1685	1832	116	450	12	L2C4-2790xL04F1200
	3000K	90	1811	1969	125	450	12	L2C4-3090xL04F1200
	3500K	90	1865	2027	129	450	12	L2C4-3590xL04F1200
	4000K	90	1919	2086	132	450	12	L2C4-4090xL04F1200

Table 1 continued on next page:

1. Lumileds maintains a tolerance of ± 2 on CRI and $\pm 6.5\%$ on luminous flux measurements.
2. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. R9 value of 90CRI products is >50 and for 80CRI products it is >0 .
4. Maximum luminous flux is 10% above typical luminous flux.
5. Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.
6. Part number "x" designates SDCM (2=2-step MacAdam ellipse, 3=3-step MacAdam ellipse).

Table 1. Product performance of LUXEON CX Plus CoB (Gen 2) at specified test current, T_j=85°C continued.

PRODUCT	NOMINAL CCT	MINIMUM CRI ^[1, 2, 3]	LUMINOUS FLUX ^[1, 4] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	LES ^[5] (mm)	PART NUMBER ^[6]
			MINIMUM	TYPICAL				
LUXEON CX Plus CoB L05	2700K	80	2359	2565	133	550	12	L2C4-2780xL05F1200
	3000K	80	2561	2784	145	550	12	L2C4-3080xL05F1200
	3500K	80	2586	2811	146	550	12	L2C4-3580xL05F1200
	4000K	80	2721	2957	154	550	12	L2C4-4080xL05F1200
	5000K	80	2721	2957	154	550	12	L2C4-5080xL05F1200
	2700K	90	2049	2227	116	550	12	L2C4-2790xL05F1200
	3000K	90	2214	2406	125	550	12	L2C4-3090xL05F1200
	3500K	90	2266	2463	128	550	12	L2C4-3590xL05F1200
	4000K	90	2332	2535	132	550	12	L2C4-4090xL05F1200
LUXEON CX Plus CoB L08	2700K	80	3466	3767	136	800	14	L2C4-2780xL08F1400
	3000K	80	3647	3964	144	800	14	L2C4-3080xL08F1400
	3500K	80	3719	4042	146	800	14	L2C4-3580xL08F1400
	4000K	80	3941	4284	155	800	14	L2C4-4080xL08F1400
	5000K	80	3941	4284	155	800	14	L2C4-5080xL08F1400
	2700K	90	2999	3260	118	800	14	L2C4-2790xL08F1400
	3000K	90	3222	3503	127	800	14	L2C4-3090xL08F1400
	3500K	90	3318	3607	131	800	14	L2C4-3590xL08F1400
	4000K	90	3414	3711	134	800	14	L2C4-4090xL08F1400

Notes for Table 1:

1. Lumileds maintains a tolerance of ± 2 on CRI and $\pm 6.5\%$ on luminous flux measurements.
2. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. R9 value of 90CRI products is >50 and for 80CRI products it is >0 .
4. Maximum luminous flux is 10% above typical luminous flux.
5. Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.
6. Part number "x" designates SDCM (2=2-step MacAdam ellipse, 3=3-step MacAdam ellipse).

Optical Characteristics

Table 2. Optical characteristics for LUXEON CX Plus CoB (Gen 2) at specified test current, T_j=85°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE ^[1]	TYPICAL VIEWING ANGLE ^[2]
L2C4-xxxxxxxFxx00	135°	115°

Notes for Table 2:

1. Total angle at which 90% of total luminous flux is captured.
2. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is 1/2 of the peak value.

Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON CX Plus CoB (Gen 2) at specified test current, T_j=85°C.

PART NUMBER	FORWARD VOLTAGE ^[1] (V _f)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE ^[2] (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO CASE ^[3] (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L2C4-xxxxxS01F0600	32.5	34.5	37.0	-16	2.55
L2C4-xxxxxM02F0900	32.5	34.5	37.0	-16	1.35
L2C4-xxxxxM03F0900	32.5	35.0	37.0	-16	0.90
L2C4-xxxxxL04F1200	32.5	35.0	37.0	-16	0.75
L2C4-xxxxxL05F1200	32.5	35.0	37.0	-16	0.68
L2C4-xxxxxL08F1400	32.5	34.5	37.0	-16	0.57

Notes for Table 3:

1. Lumileds maintains a tolerance of $\pm 2\%$ on forward voltage measurements.
2. Measured between 25°C and 85°C.
3. Thermal resistance is measured between junction and the bottom of the LUXEON CoB substrate.

Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON CX Plus CoB (Gen 2).

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current ^[1, 2]	2x test current, except for S01 rated at 250mA (see derating curve below)
LED Junction Temperature ^[1] (DC & Pulse)	125°C
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 3B
Operating Case Temperature ^[1]	-40°C to 105°C
LED Storage Temperature	-40°C to 105°C
Allowable Reflow Cycles ^[3]	—
Reverse Voltage ($V_{reverse}$)	LUXEON LEDs are not designed to be driven in reverse bias

Notes for Table 4:

1. Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
2. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple," are acceptable if the following conditions are met:
 - The frequency of the ripple current is 100Hz or higher
 - The average current for each cycle does not exceed the maximum allowable DC forward current
 - The maximum amplitude of the ripple does not exceed the maximum peak pulsed forward current.
3. CoB product shall not be subjected to reflow soldering process.

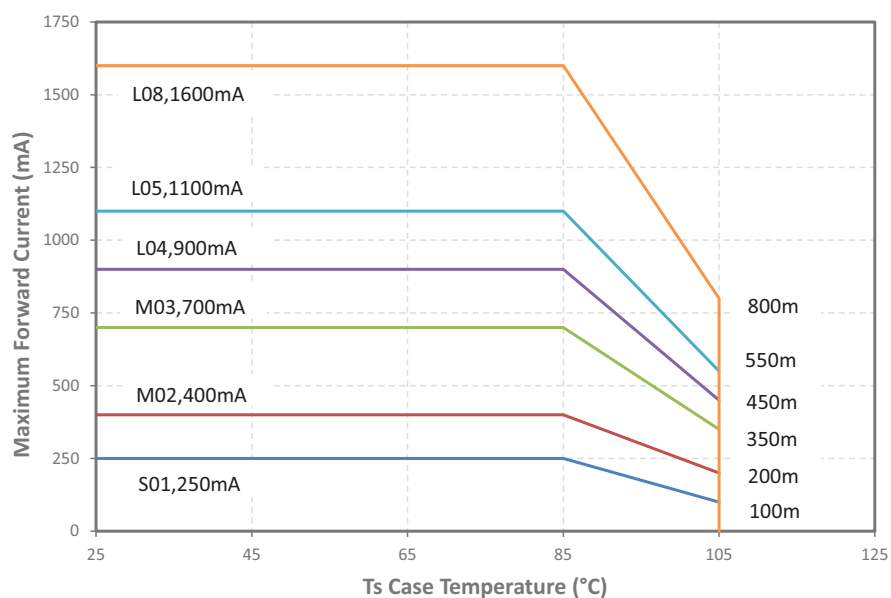


Figure 1. Maximum forward current vs. case temperature for LUXEON CX Plus CoB (Gen 2) at specified test current.

Characteristic Curves

Spectral Power Distribution Characteristics

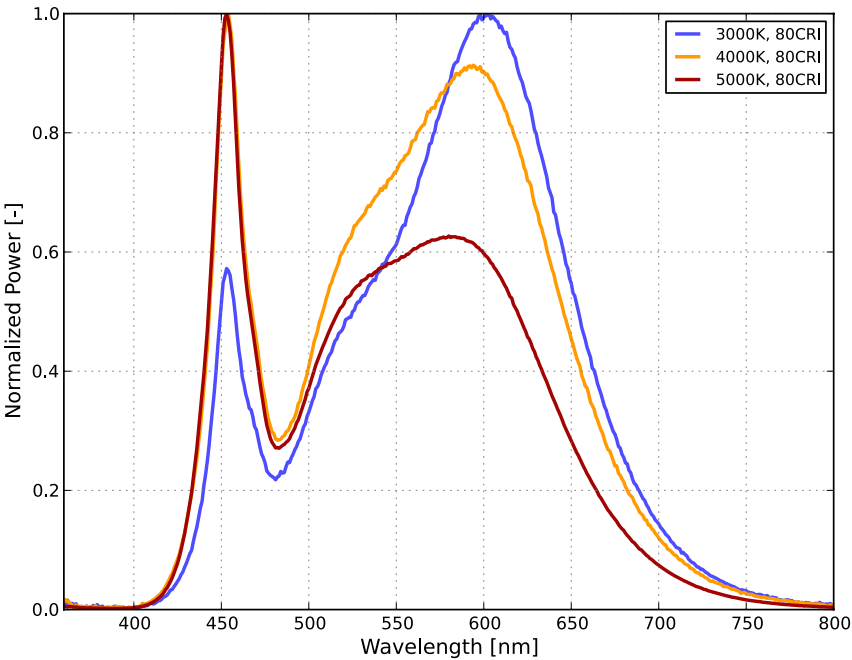


Figure 2a. Typical normalized power vs. wavelength for LUXEON CX Plus CoB (Gen 2) 80CRI at specified test current, $T_j=85^{\circ}\text{C}$.

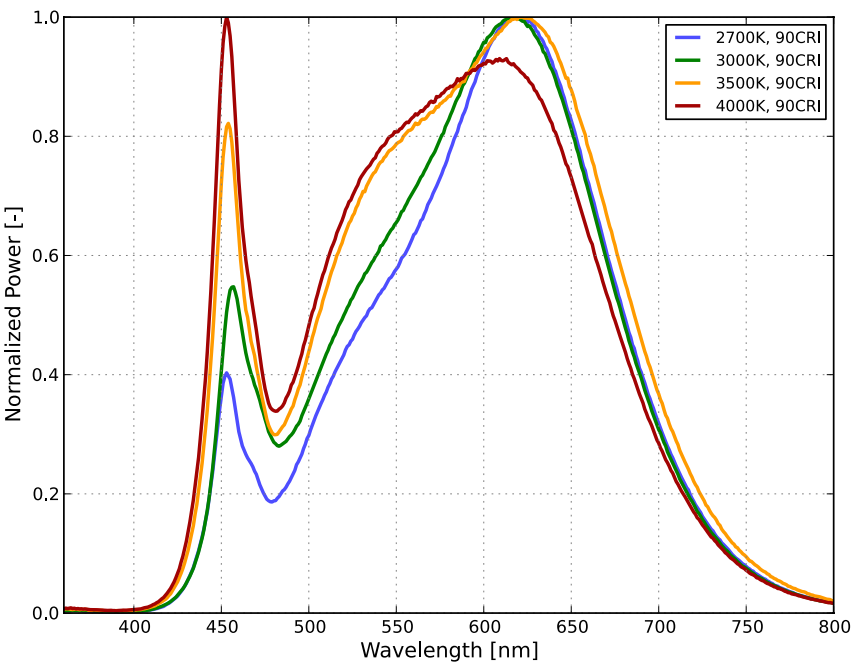


Figure 2b. Typical normalized power vs. wavelength for LUXEON CX Plus CoB (Gen 2) 90CRI at specified test current, $T_j=85^{\circ}\text{C}$.

Light Output Characteristics

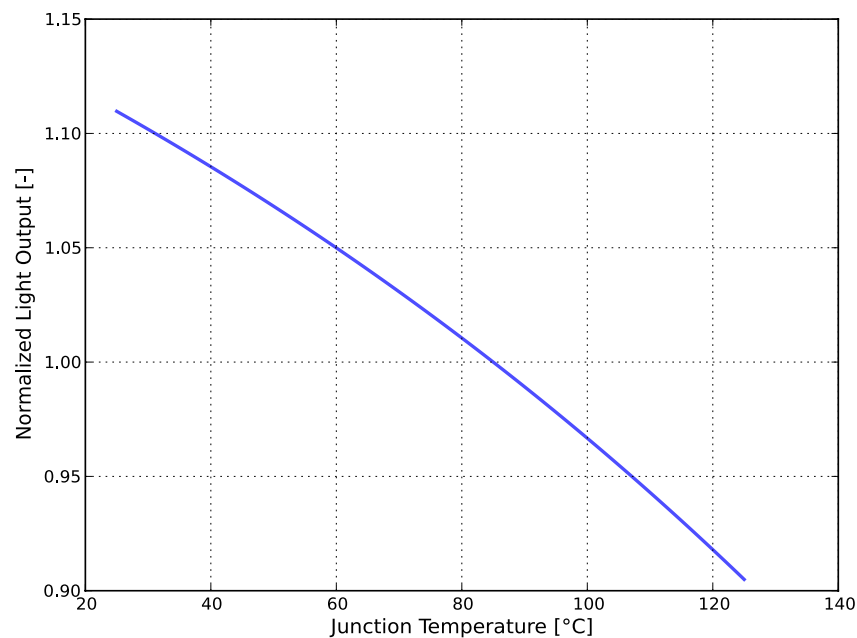


Figure 3. Typical normalized light output vs. junction temperature for LUXEON CX Plus CoB (Gen 2).

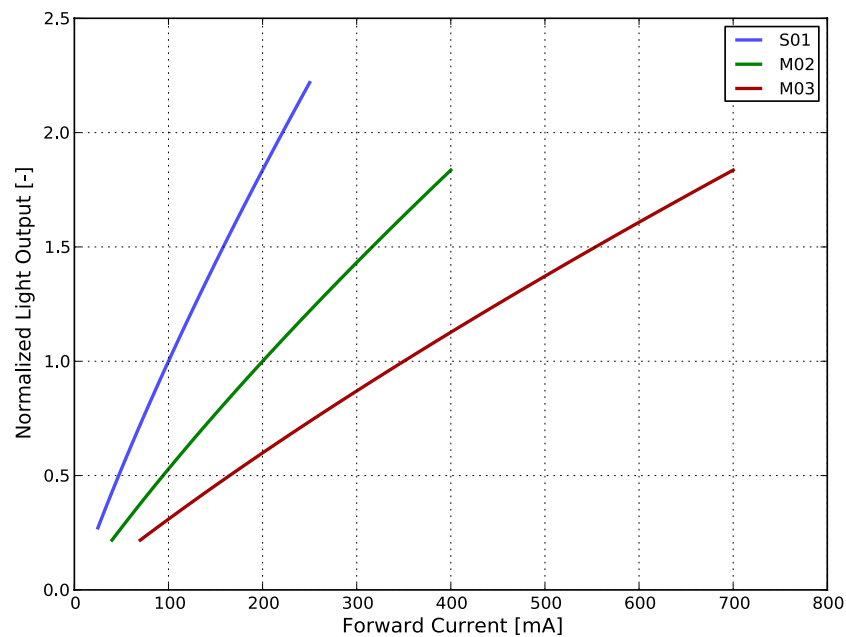


Figure 4a. Typical normalized light output vs. forward current for LUXEON CX Plus CoB (Gen 2) S01, M02 and M03 at $T_j=85^{\circ}\text{C}$.

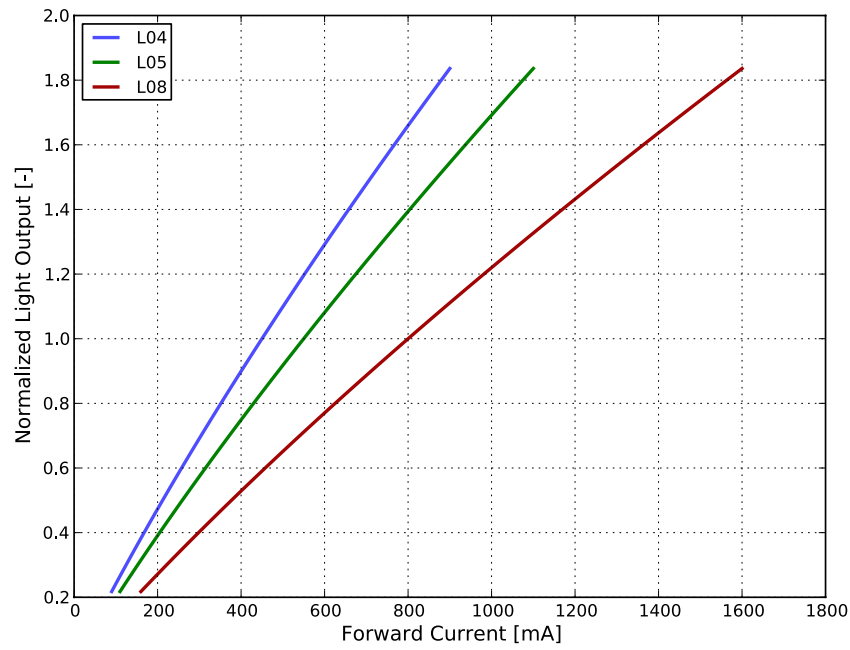


Figure 4b. Typical normalized light output vs. forward current for LUXEON CX Plus CoB (Gen 2) L04, L05 and L08 at $T_j=85^{\circ}\text{C}$.

Forward Current Characteristics

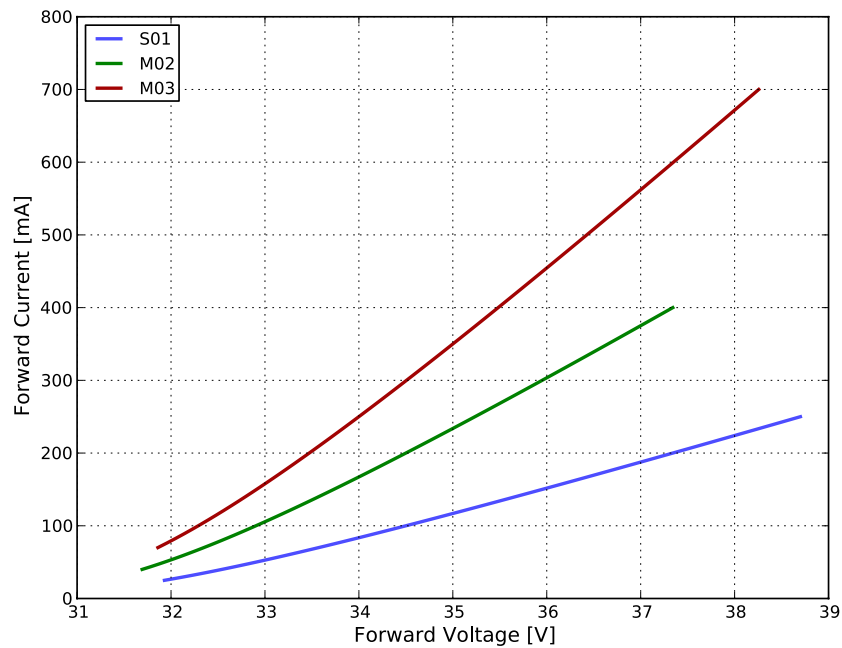


Figure 5a. Typical forward current vs. forward voltage for LUXEON CX Plus CoB (Gen 2) S01, M02 and M03 at $T_j=85^{\circ}\text{C}$.

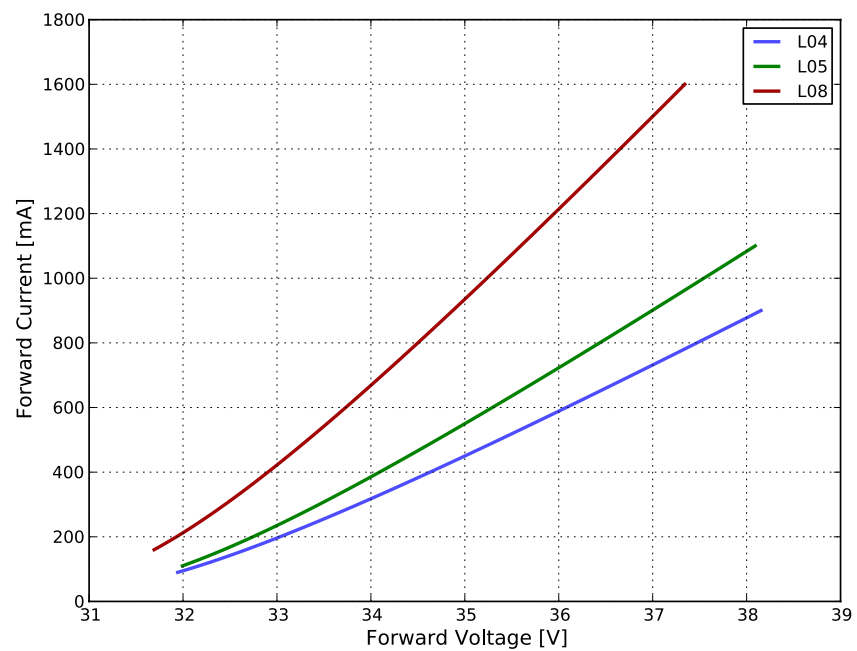


Figure 5b. Typical forward current vs. forward voltage for LUXEON CX Plus CoB (Gen 2) L04, L05 and L08 at $T_j=85^{\circ}\text{C}$.

Radiation Pattern Characteristics

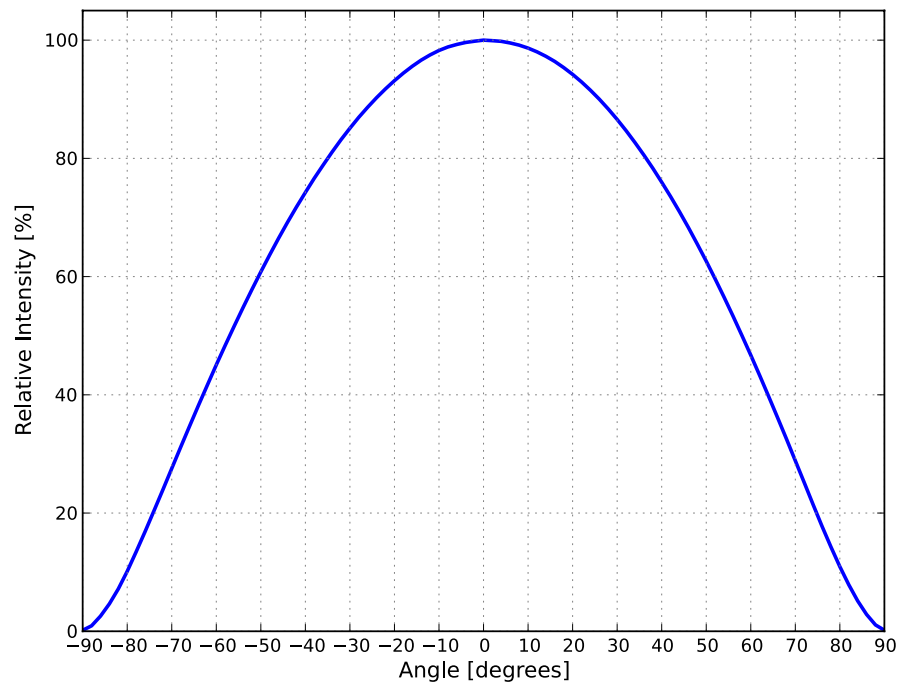


Figure 6. Typical radiation pattern for LUXEON CX Plus CoB (Gen 2) at specified test current, $T_j=85^{\circ}\text{C}$.

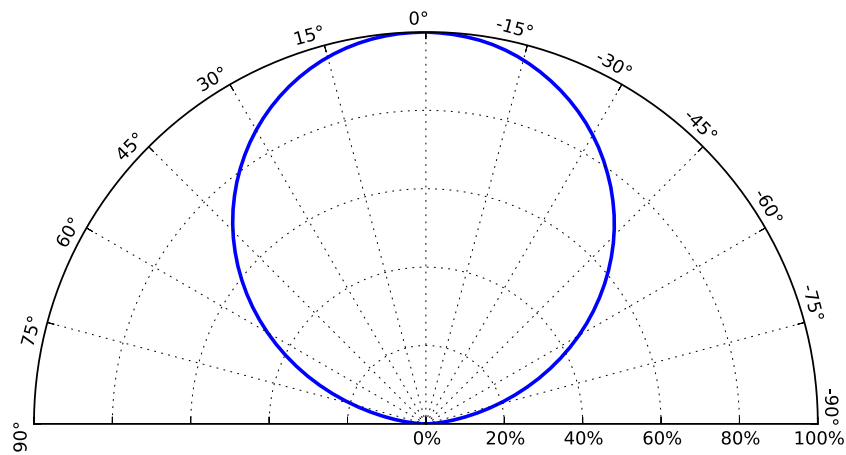


Figure 7. Typical polar radiation pattern for LUXEON CX Plus CoB (Gen 2) at specified test current, $T_j=85^{\circ}\text{C}$.

Color Bin Definitions

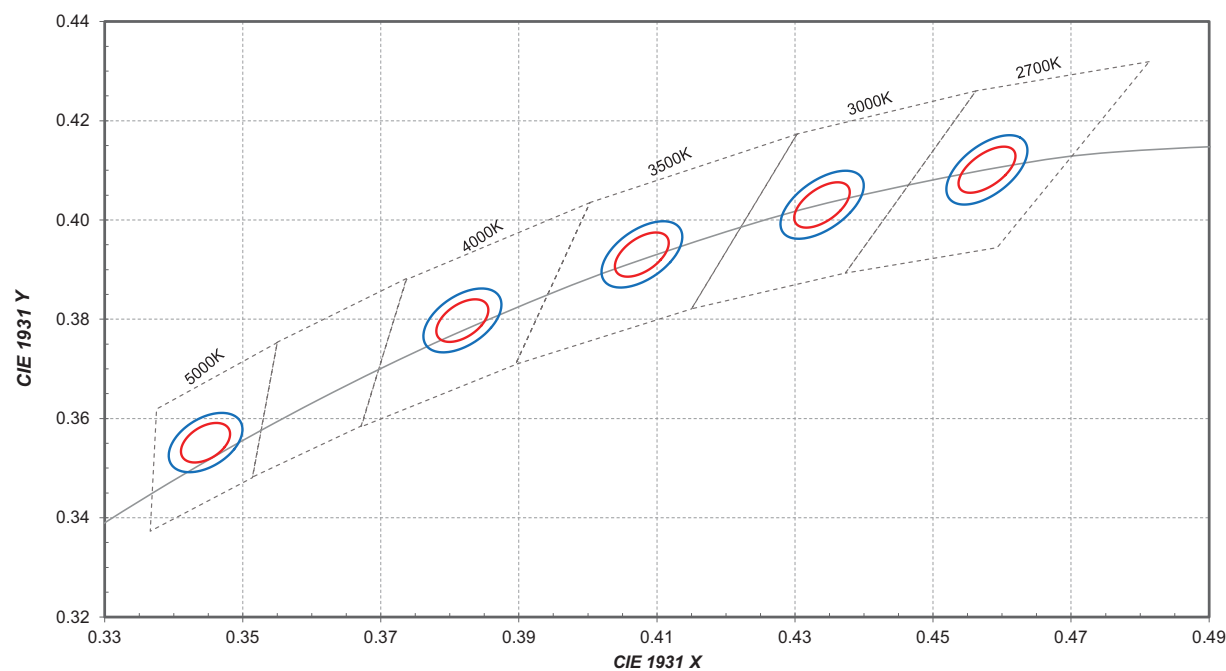


Figure 8. 2- and 3-step MacAdam ellipse illustration for Table 5.

Table 5. 2- and 3-step MacAdam ellipse color bin definitions for LUXEON CX Plus CoB (Gen 2).

NOMINAL CCT	CENTER POINT ^[1] (cx, cy)	2 SDCM		3 SDCM		ELLIPSE ROTATION ANGLE, θ
		MAJOR AXIS, a	MINOR AXIS, b	MAJOR AXIS, a	MINOR AXIS, b	
2700K	(0.4578, 0.4101)	0.00540	0.00280	0.00810	0.00420	53.70°
3000K	(0.4338, 0.4030)	0.00556	0.00272	0.00834	0.00408	53.20°
3500K	(0.4073, 0.3917)	0.00618	0.00276	0.00927	0.00414	54.00°
4000K	(0.3818, 0.3797)	0.00626	0.00268	0.00939	0.00402	53.70°
5000K	(0.3447, 0.3553)	0.00548	0.00236	0.00822	0.00354	59.60°

Notes for Table 5:

1. Lumileds maintains a tolerance of ±0.005 on x and y coordinates in the CIE 1931 color space.

Mechanical Dimensions

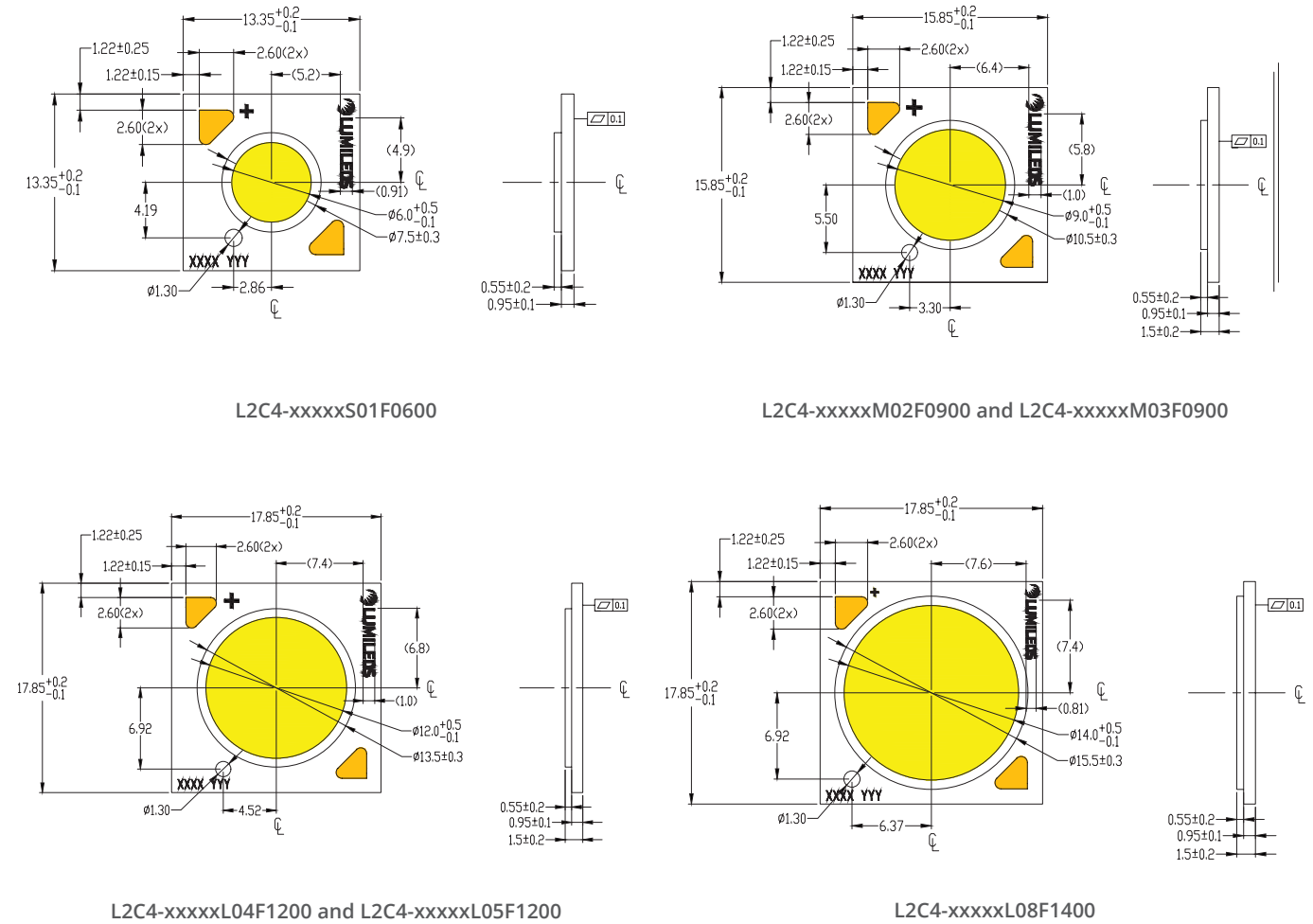


Figure 9. Mechanical dimensions for LUXEON CX Plus CoB (Gen 2).

Notes for Figure 9:

1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Diameter and tolerance refer to dielectric opening.

Packaging and Labeling Information

Table 6. Number of LEDs per tray and per inner box for LUXEON CX Plus CoB (Gen 2).

PART NUMBER	TOTAL UNITS PER TRAY	TOTAL TRAYS PER INNER BOX	TOTAL UNITS PER INNER BOX
L2C4-xxxxxS01F0600	90	2	180
L2C4-xxxxxM02F0900	72	2	144
L2C4-xxxxxM03F0900	72	2	144
L2C4-xxxxxL04F1200	56	2	112
L2C4-xxxxxL05F1200	56	2	112
L2C4-xxxxxL08F1400	56	2	112

Tray Dimensions

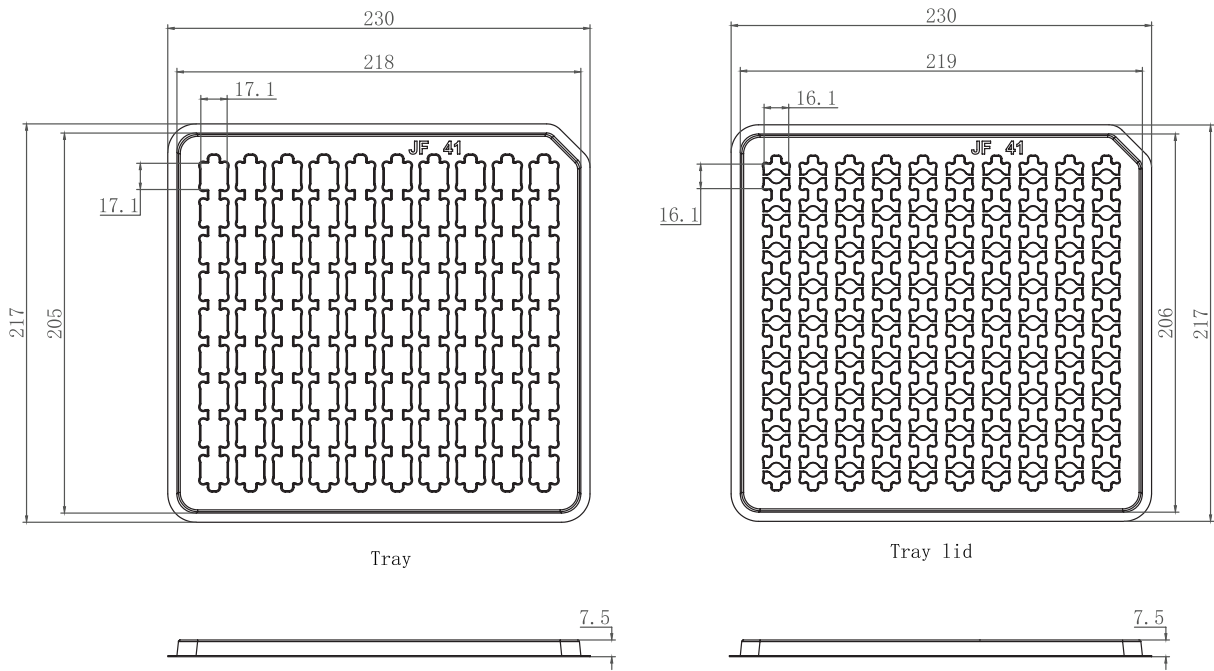


Figure 10a. Tray dimensions for L2C4-xxxxxS01F0600.

- Notes for Figure 10a:
1. Drawings are not to scale.
 2. All dimensions are in millimeters.

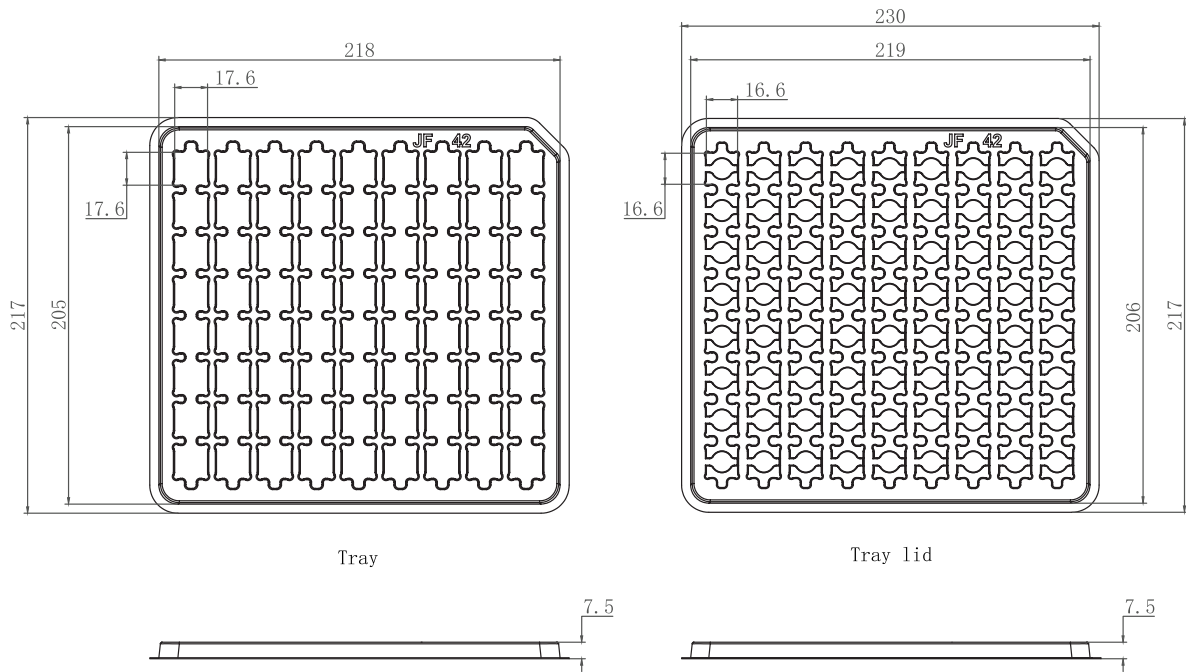


Figure 10b. Tray dimensions for L2C4-xxxxxM02F0900 and L2C4-xxxxxM03F0900.

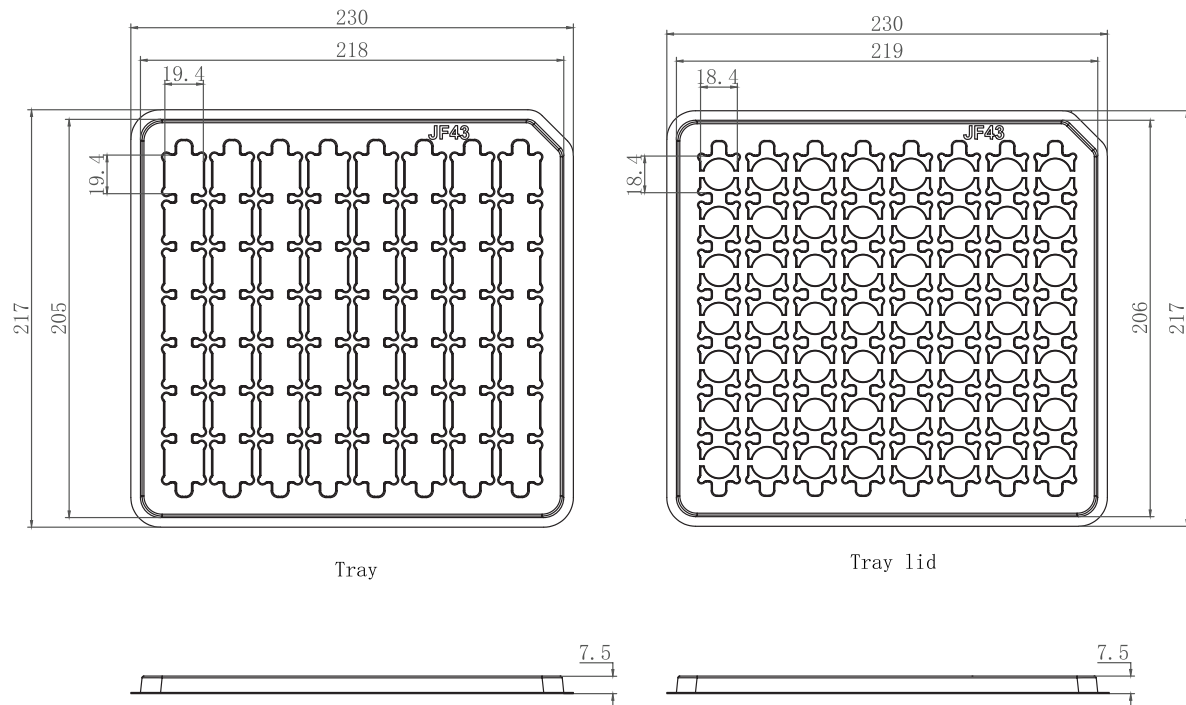


Figure 10c. Tray dimensions for L2C4-xxxxxL04F1200, L2C4-xxxxxL05F1200, and L2C4-xxxxxL08F1400.

Notes for Figures 10b and 10c:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

Inner Box

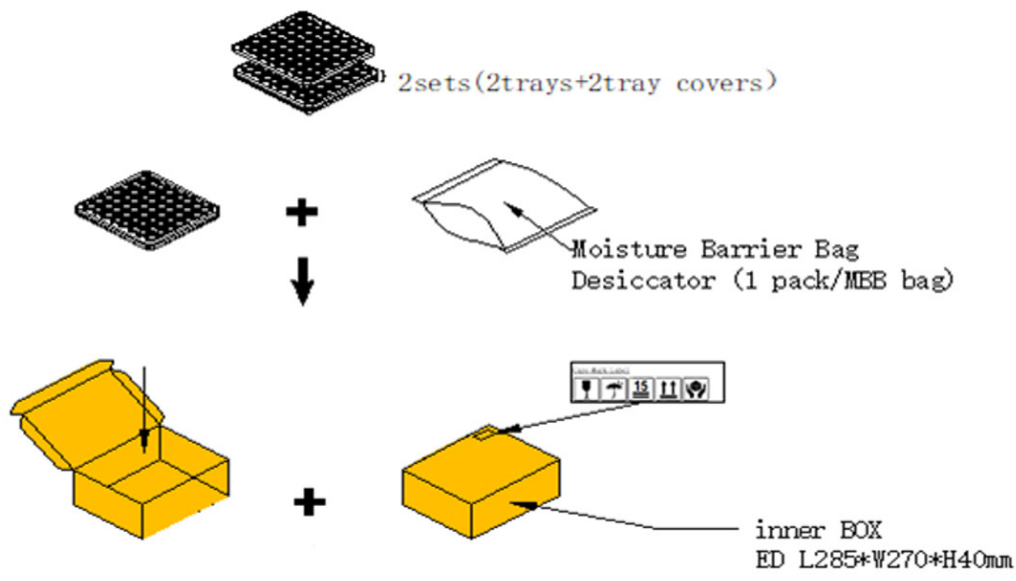


Figure 11. Dimensions for inner box packaging for LUXEON CX Plus CoB (Gen 2).

Table 7. Inner box information for LUXEON CX Plus CoB (Gen 2)

BOX TYPE	DIMENSIONS (mm)			AVERAG	AVERAG	AVERAGE WEIGHT (180pcs/box)
	H	L	W			
Inner box	40	285	270	0.385Kg	0.395Kg	0.4Kg

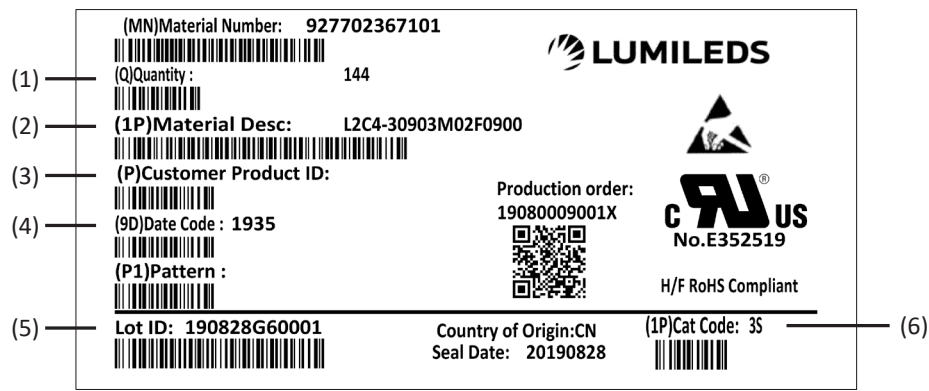


Figure 12. Example of a tray, MBB bag, and inner box label for LUXEON CX Plus CoB (Gen 2).

Notes for Figure 12 – Inner Box Label descriptions for customer use:
Field labels not described are for Lumileds internal use only.

- 1. Number of LED emitters in an MBB bag.
- 2. Lumileds part number.
- 3. Customer part number for custom requests only.
- 4. LED test date in YYWW format.
- 5. Unique production lot identification number. This number is required for traceability purpose.
- 6. Product category code.

Outer Box

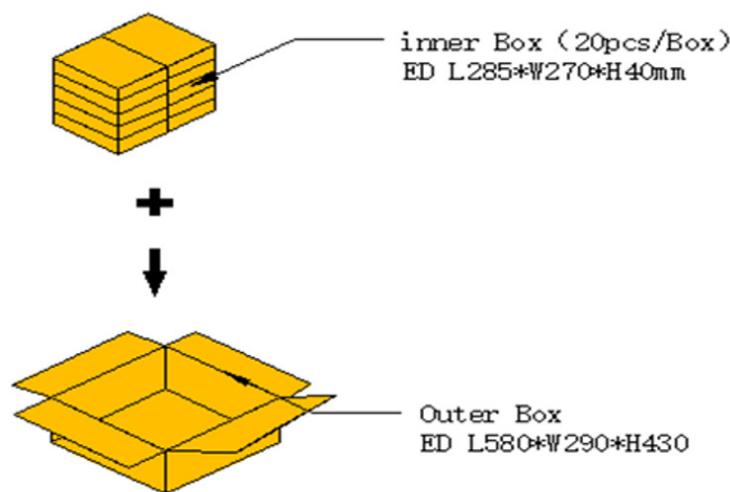


Figure 13. Dimensions for outer box packaging for LUXEON CX Plus CoB (Gen 2).

Table 8. Outer box information for LUXEON CX Plus CoB – High Density.

BOX TYPE	DIMENSIONS (mm)			MAXIMUM INNER BOX PER OUTER BOX	AVERAGE WEIGHT (3600pcs/box)	AVERAGE WEIGHT (2880pcs/box)	AVERAGE WEIGHT (2240pcs/box)
	H	L	W				
Outer Box	430	580	290	20	8.563Kg	8.763Kg	8.856Kg

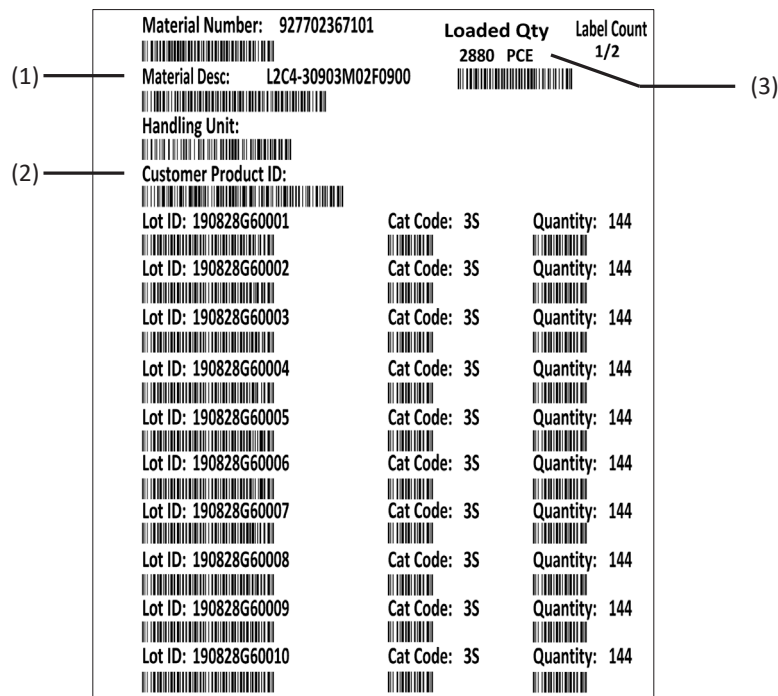


Figure 14. Example of outer box label for LUXEON CX Plus CoB (Gen 2).

Notes for Figure 14 – Outer Box Label descriptions for customer use:
Field labels not described are for Lumileds internal use only.
1. Lumileds part number.
2. Customer part number for custom requests only.
3. Total number of LED emitters in a shipment box.

About Lumileds

Companies developing automotive, mobile, IoT and illumination lighting applications need a partner who can collaborate with them to push the boundaries of light. With over 100 years of inventions and industry firsts, Lumileds is a global lighting solutions company that helps customers around the world deliver differentiated solutions to gain and maintain a competitive edge. As the inventor of Xenon technology, a pioneer in halogen lighting and the leader in high performance LEDs, Lumileds builds innovation, quality and reliability into its technology, products and every customer engagement. Together with its customers, Lumileds is making the world better, safer, more beautiful—with light.

To learn more about our lighting solutions, visit lumileds.com.