LUXEON CS CoB Gen 2

High efficacy, superior quality of light and ease for design footprints

LUXEON CS extends Lumileds CoB leadership for performance and reliability to an entirely new board footprint that enables easy design-in for new luminaire progams and as a cost-effective replacement for existing solutions where an upgrade is desired. State-of-the-art LUXEON CoB technology delivers unmatched performance, quality of light, and uncompromising product quality.

FEATURES AND BENEFITS

- Widely used square footprints for easy design-in
- High performance with superior color stability
- Low thermal resistance enables smaller heatsinks and extends the operating life span
- Supported by a comprehensive optical, mechanical, and electrical ecosystem

PRIMARY APPLICATIONS

- Track Lights
- Downlights
- Spotlights
- High Bay
- Low Bay
- More...

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General Product Information

Product Test Conditions

LUXEON CS CoB LEDs are tested and binned with a DC drive current specified below at a junction temperature, T_j, of 85°C:

180mA – L2C6-AABBCL02C0600
180mA – L2C6-AABBCL02C0900
270mA – L2C6-AABBCL03C0900
360mA – L2C6-AABBCL04C0900
450mA – L2C6-AABBCL05C1300
540mA – L2C6-AABBCL06C1300
720mA – L2C6-AABBCL08C1500
900mA – L2C6-AABBCL10C1500

Part Number Nomenclature

Part numbers for LUXEON CS CoB follow the convention below:

L 2 C 6 – **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 (90=90CRI)
C – designates SDCM (2=2-step MacAdam)
D D D – designates product configuration (example: L08=1208)
E – designates options for product specification
F F – designates light emitting surface (LES) size (06=6.3mm, 09=9.8mm, 13=13mm, 15=14.5mm)
G G – designates options for product specification

Therefore, the following part number is used for a LUXEON CS CoB 1208, 3000K 90CRI, 2 SDCM with a 14.5mm LES:

L 2 C 6 – **3 0 9 0 2 L 0 8 C 1 5 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 CS CoB 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 CS CoB at specified test current, T_j=85°C.

LES [4] (mm)	NOMINAL CCT	MINIMUM CRI [1, 2, 3]	LUMINOUS FLUX [1] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	ENERGY EFFICIENCY CLASS [5]	PART NUMBER
			MINIMUM	TYPICAL				
6	2700K	90	827	919	151	180	D	L2C6-27902L02C0600
6	3000K	90	859	954	156	180	D	L2C6-30902L02C0600
6	3500K	90	889	988	162	180	D	L2C6-35902L02C0600
6	4000K	90	890	989	162	180	D	L2C6-40902L02C0600
6	5000K	90	893	992	163	180	D	L2C6-50902L02C0600
9	2700K	90	875	972	159	180	D	L2C6-27902L02C0900
9	3000K	90	879	977	160	180	D	L2C6-30902L02C0900
9	3500K	90	907	1008	165	180	D	L2C6-35902L02C0900
9	4000K	90	908	1008	165	180	D	L2C6-40902L02C0900
9	5000K	90	910	1011	166	180	D	L2C6-50902L02C0900
9	2700K	90	1332	1480	162	270	D	L2C6-27902L03C0900
9	3000K	90	1350	1500	164	270	D	L2C6-30902L03C0900
9	3500K	90	1400	1555	170	270	D	L2C6-35902L03C0900
9	4000K	90	1393	1548	169	270	D	L2C6-40902L03C0900
9	5000K	90	1398	1554	170	270	D	L2C6-50902L03C0900
9	2700K	90	1801	2001	164	360	D	L2C6-27902L04C0900
9	3000K	90	1782	1980	162	360	D	L2C6-30902L04C0900
9	3500K	90	1877	2086	171	360	D	L2C6-35902L04C0900
9	4000K	90	1865	2072	170	360	D	L2C6-40902L04C0900
9	5000K	90	1871	2079	170	360	D	L2C6-50902L04C0900
13	2700K	90	2209	2454	161	450	D	L2C6-27902L05C1300
13	3000K	90	2263	2515	165	450	D	L2C6-30902L05C1300
13	3500K	90	2306	2563	168	450	D	L2C6-35902L05C1300
13	4000K	90	2313	2570	168	450	D	L2C6-40902L05C1300
13	5000K	90	2321	2578	169	450	D	L2C6-50902L05C1300
13	2700K	90	2646	2940	161	540	D	L2C6-27902L06C1300
13	3000K	90	2705	3006	164	540	D	L2C6-30902L06C1300
13	3500K	90	2792	3103	169	540	D	L2C6-35902L06C1300
13	4000K	90	2799	3110	170	540	D	L2C6-40902L06C1300
13	5000K	90	2810	3122	171	540	D	L2C6-50902L06C1300
15	2700K	90	3510	3900	160	720	D	L2C6-27902L08C1500
15	3000K	90	3569	3965	162	720	D	L2C6-30902L08C1500
15	3500K	90	3683	4093	168	720	D	L2C6-35902L08C1500
15	4000K	90	3710	4122	169	720	D	L2C6-40902L08C1500
15	5000K	90	3721	4134	169	720	D	L2C6-50902L08C1500
15	2700K	90	4404	4893	160	900	D	L2C6-27902L10C1500
15	3000K	90	4459	4954	162	900	D	L2C6-30902L10C1500
15	3500K	90	4538	5042	165	900	D	L2C6-35902L10C1500
15	4000K	90	4583	5092	167	900	D	L2C6-40902L10C1500
15	5000K	90	4597	5108	167	900	D	L2C6-50902L10C1500

Notes for Table 1:
1. Lumileds maintains a tolerance of ±2 on CRI and ±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.
4. Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.
5. Energy efficiency class as specified in Commission Delegated Regulation (EU) 2019/2015. The available range of energy efficiency classes is A-G.

Optical Characteristics

Table 2. Optical characteristics for LUXEON CS CoB at specified test current, T_j=85°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L2C6-xxxxxxxxCxx00	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 ½ of the peak value.

Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON CS CoB 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		
L2C6-xxxxxL02C0600	32.5	33.9	35.5	10	0.78
L2C6-xxxxxL02C0900	32.5	33.9	35.5	10	0.78
L2C6-xxxxxL03C0900	32.5	33.9	35.5	10	0.60
L2C6-xxxxxL04C0900	32.5	33.9	35.5	10	0.43
L2C6-xxxxxL05C1300	32.5	33.9	35.5	10	0.26
L2C6-xxxxxL06C1300	32.5	33.9	35.5	10	0.24
L2C6-xxxxxL08C1500	32.5	33.9	35.5	10	0.20
L2C6-xxxxxL10C1500	32.5	33.9	35.5	10	0.18

Notes for Table 3:
1. Lumileds maintains a tolerance of ±0.06V 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 CS CoB.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1, 2, 3]	2.5x test current
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 120°C
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. Exception: LUXEON CS CoB 1812 and 1818 have maximum DC forward current of 2.2x of test current.

Characteristic Curves

Spectral Power Distribution Characteristics

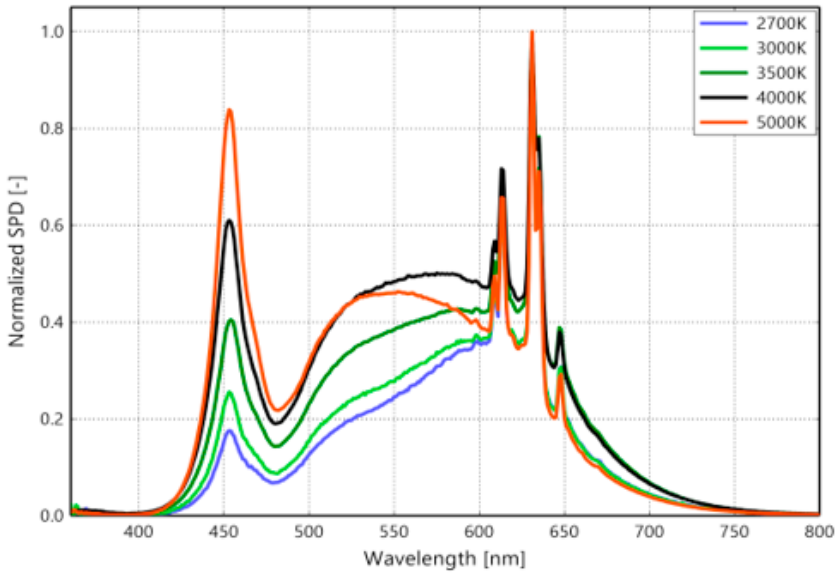

Figure 1. Typical normalized power vs. wavelength for L2C6-xx90xxxxCxx00 at specified test current, T_j=85°C.

Light Output Characteristics

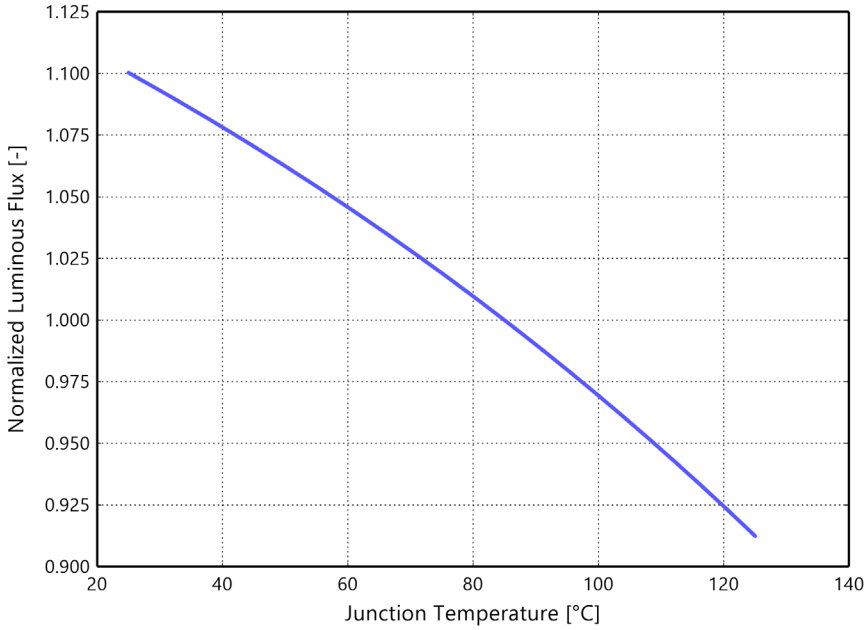

Figure 2. Typical normalized light output vs. junction temperature for L2C6-xxxxxLxxCxx00 at specified test current.

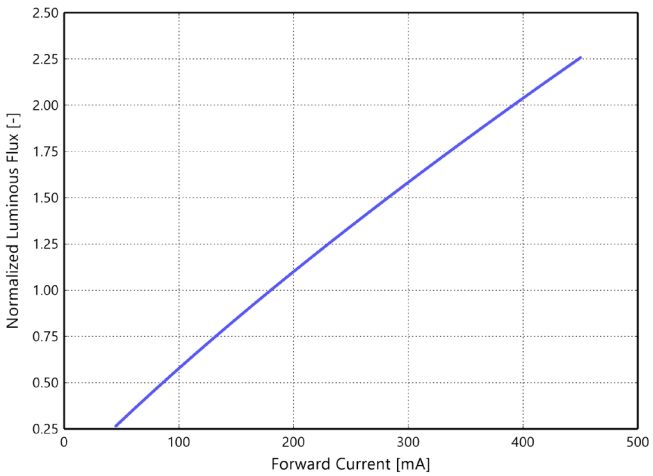

Figure 3a. Typical normalized light output vs. forward current for L2C6-xxxxxL02C0600 at T_j=85°C.

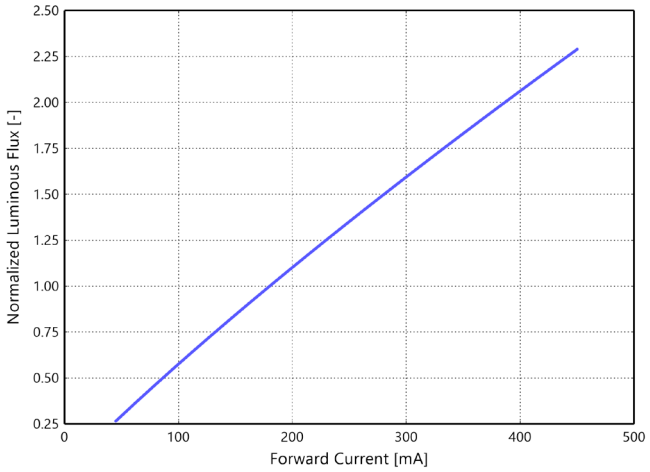

Figure 3b. Typical normalized light output vs. forward current for L2C6-xxxxxL02C0900 at T_j=85°C.

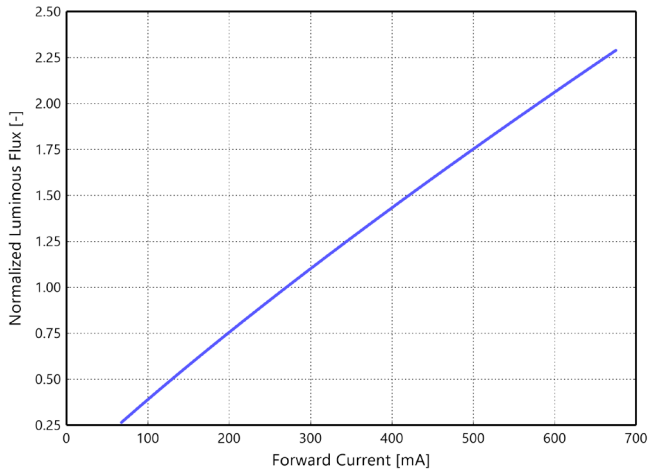

Figure 3c. Typical normalized light output vs. forward current for L2C6-xxxxxL03C0900 at T_j=85°C.

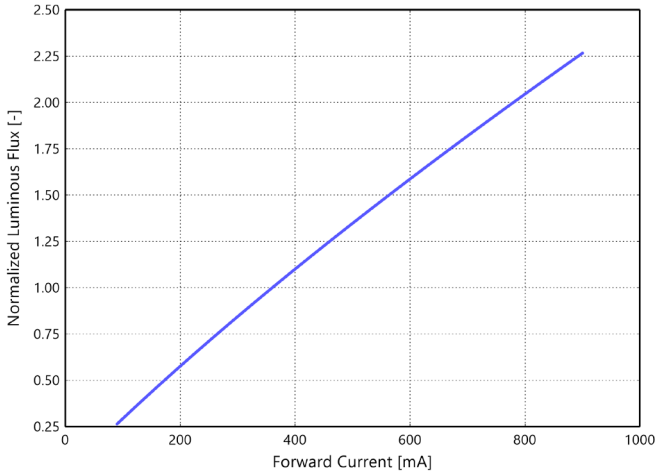

Figure 3d. Typical normalized light output vs. forward current for L2C6-xxxxxL04C0900 at T_j=85°C.

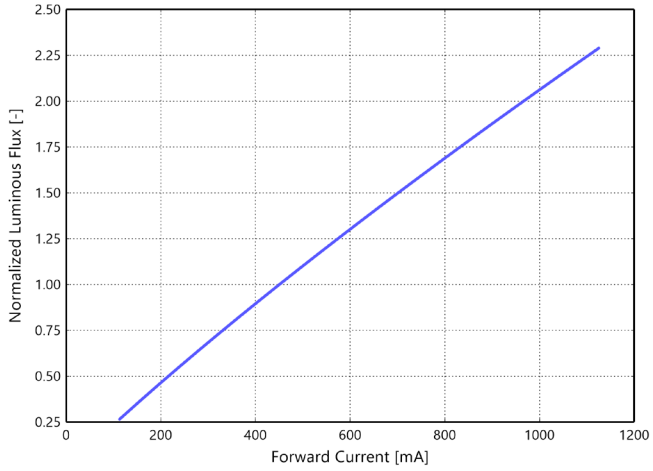

Figure 3e. Typical normalized light output vs. forward current for L2C6-xxxxxL05C1300 at T_j=85°C.

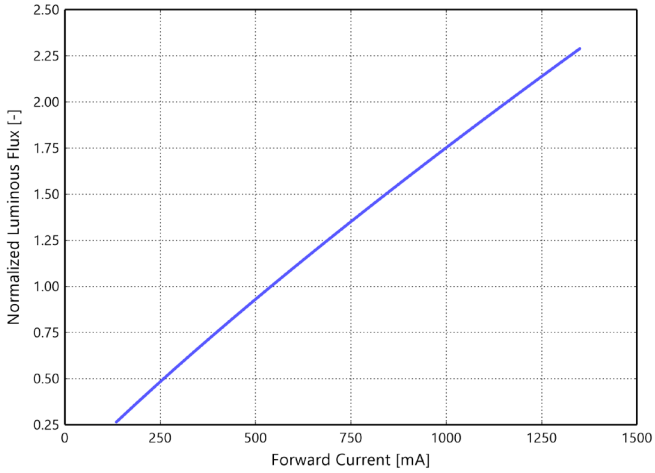

Figure 3f. Typical normalized light output vs. forward current for L2C6-xxxxxL06C1300 at T_j=85°C.

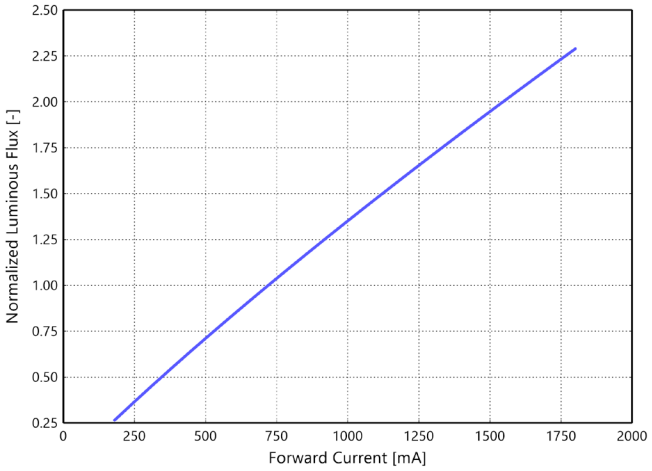

Figure 3g. Typical normalized light output vs. forward current for L2C6-xxxxxL08C1500 at T_j=85°C.

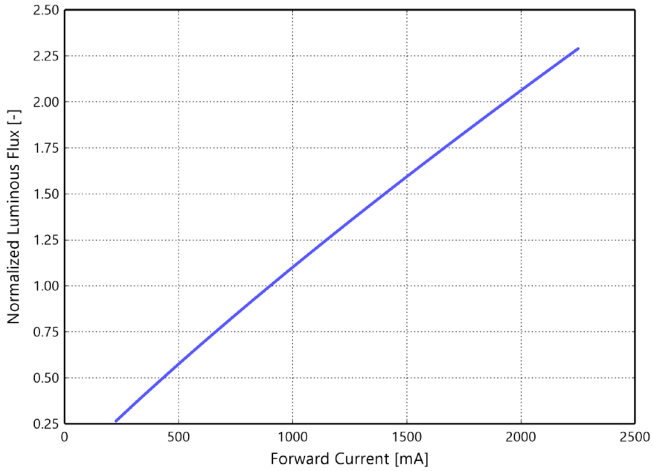

Figure 3h. Typical normalized light output vs. forward current for L2C6-xxxxxL10C1500 at T_j=85°C.

Forward Current Characteristics

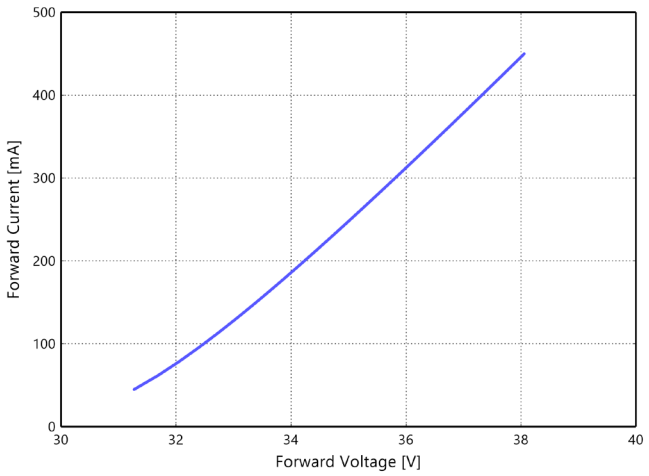

Figure 4a. Typical forward current vs. forward voltage for L2C6-xxxxxL02C0600 at T_j=85°C.

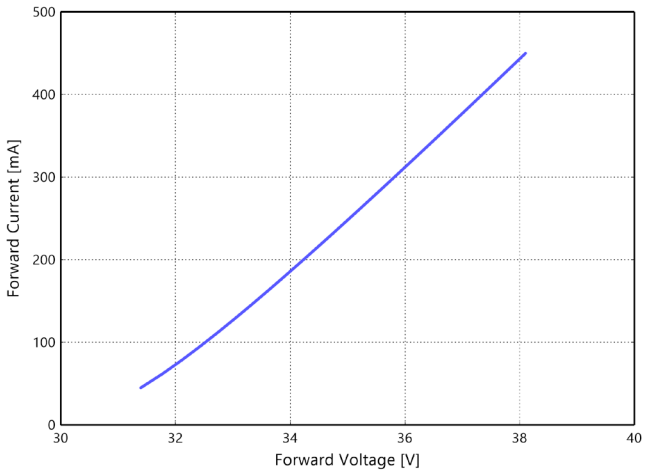

Figure 4b. Typical forward current vs. forward voltage for L2C6-xxxxxL02C0900 at T_j=85°C.

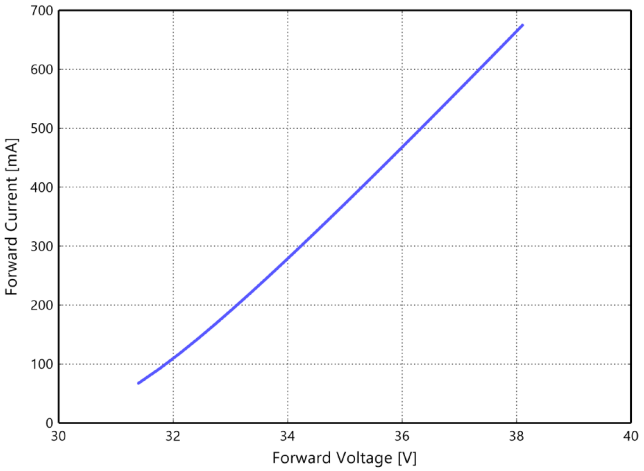

Figure 4c. Typical forward current vs. forward voltage for L2C6-xxxxxL03C0900 at T_j=85°C.

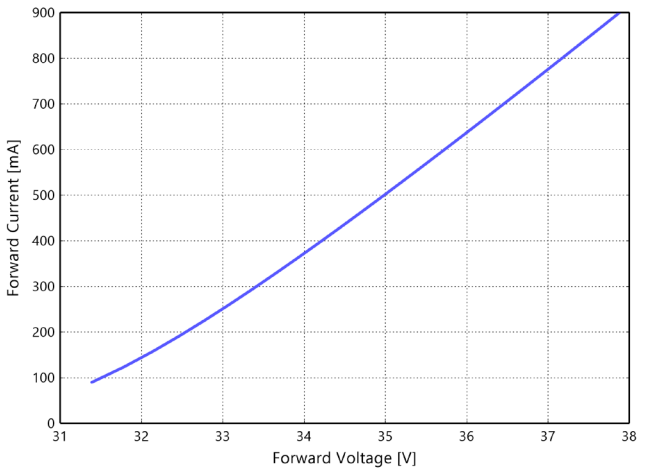

Figure 4d. Typical forward current vs. forward voltage for L2C6-xxxxxL04C0900 at T_j=85°C.

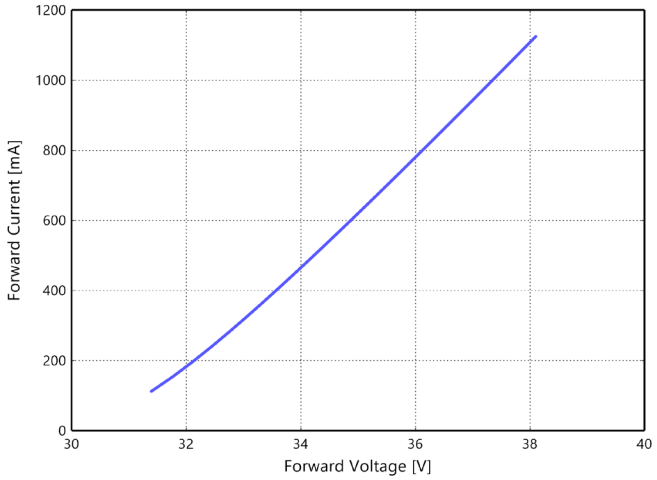

Figure 4e. Typical forward current vs. forward voltage for L2C6-xxxxxL05C1300 at T_j=85°C.

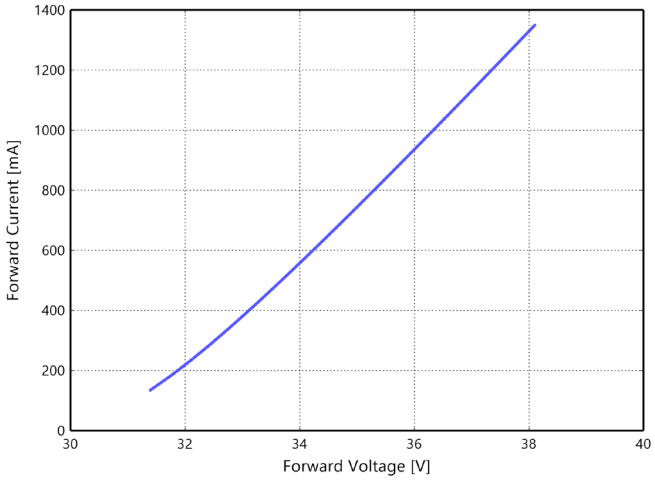

Figure 4f. Typical forward current vs. forward voltage for L2C6-xxxxxL06C1500 at T_j=85°C.

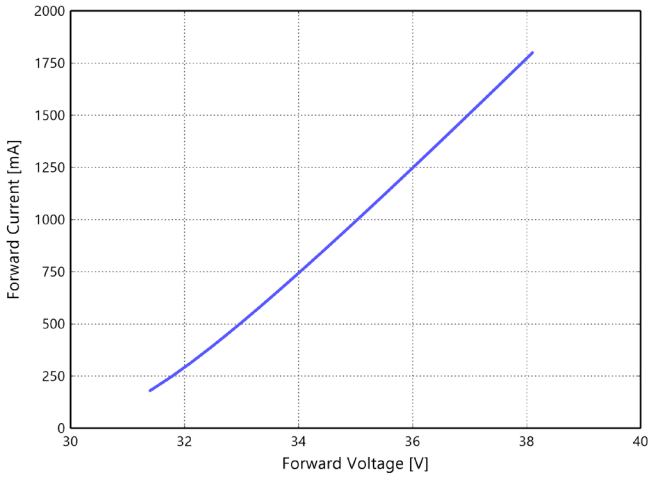

Figure 4g. Typical forward current vs. forward voltage for L2C6-xxxxxL08C1500 at T_j=85°C.

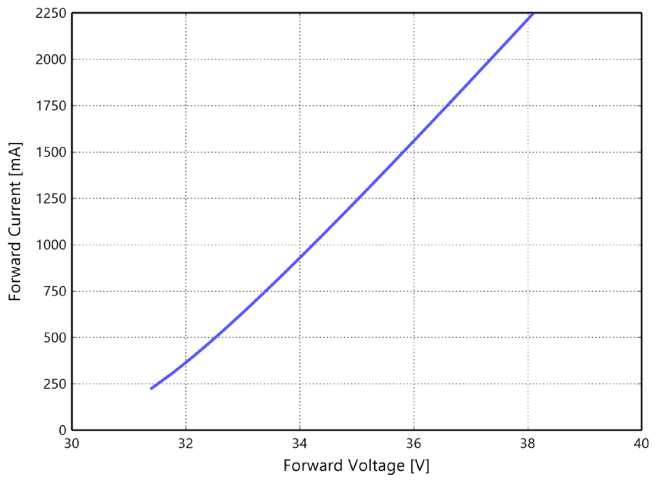

Figure 4h. Typical forward current vs. forward voltage for L2C6-xxxxxL10C1500 at T_j=85°C.

Radiation Pattern Characteristics

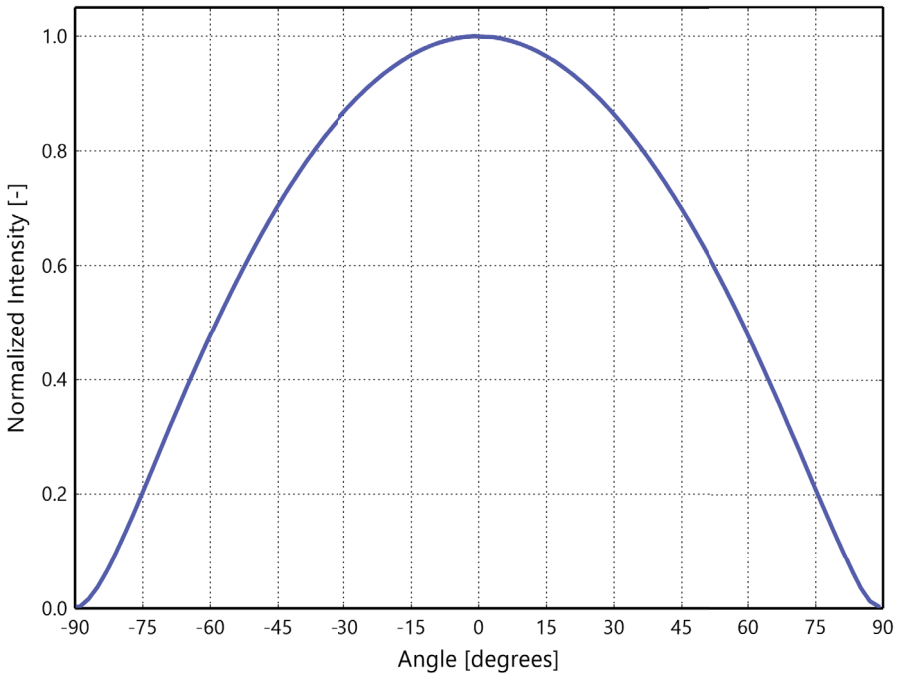

Figure 5. Typical radiation pattern for LUXEON CS CoB at specified test current, T_j=85°C.

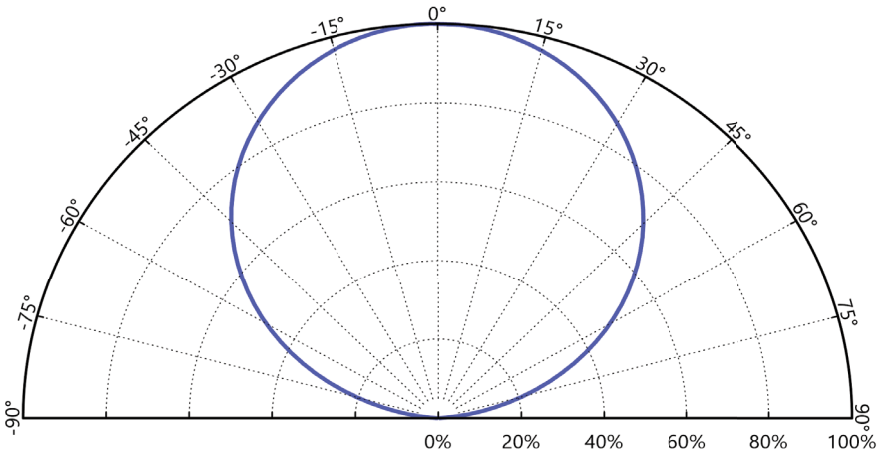

Figure 6. Typical polar radiation pattern for LUXEON CS CoB at specified test current, T_j =85°C.

Color Bin Definitions

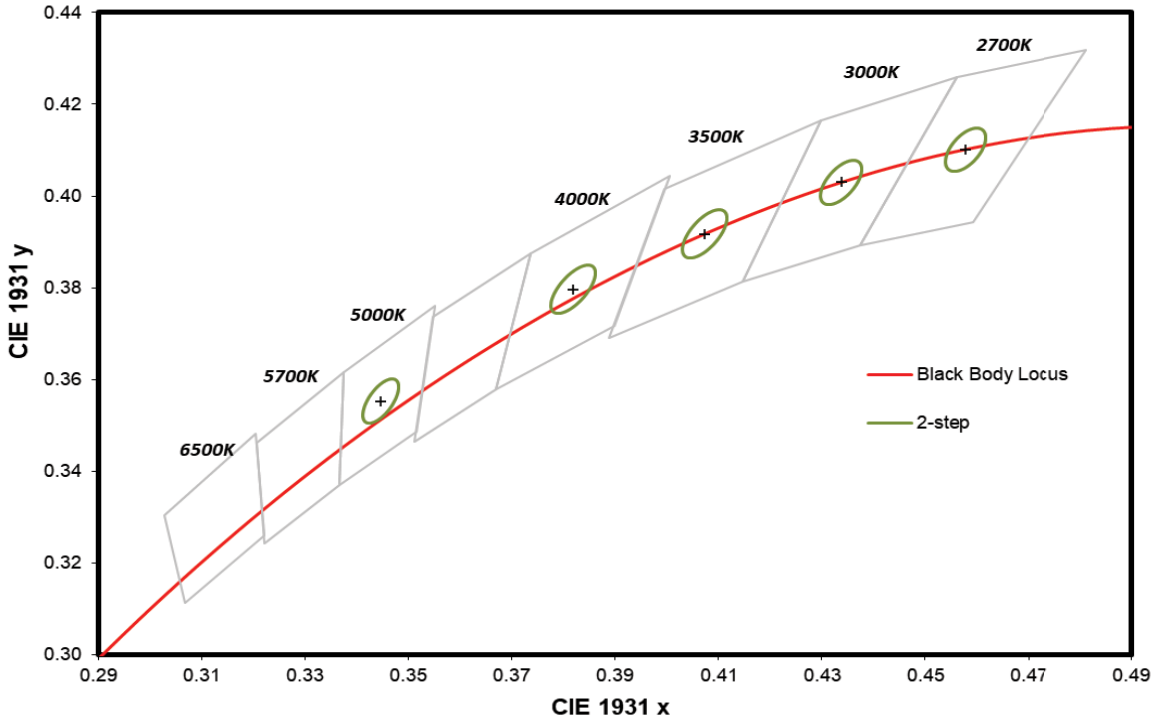

Figure 7. 2-step MacAdam ellipse illustration for Table 5.

Table 5. 2-step MacAdam ellipse color bin definitions for LUXEON CS CoB.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, θ
			2-step	2-step	
2700K	2-step MacAdam ellipse	(0.4578, 0.4101)	0.00540	0.00280	53.70°
3000K	2-step MacAdam ellipse	(0.4338, 0.4030)	0.00556	0.00272	53.22°
3500K	2-step MacAdam ellipse	(0.4073, 0.3917)	0.00618	0.00276	54.00°
4000K	2-step MacAdam ellipse	(0.3818, 0.3797)	0.00626	0.00268	53.72°
5000K	2-step MacAdam ellipse	(0.3447, 0.3553)	0.00548	0.00236	59.62°

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

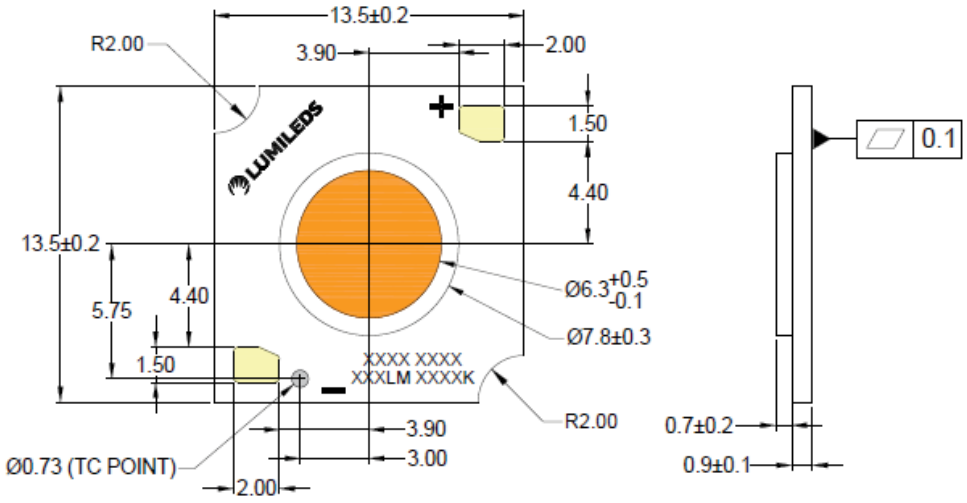

Figure 8a. Mechanical dimensions for L2C6-xxxxxL02x0600.

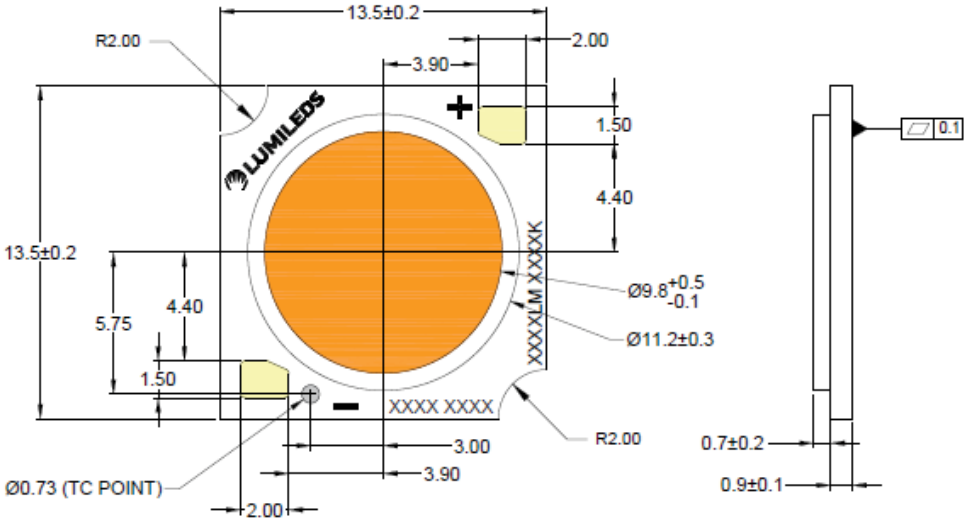

Figure 8b. Mechanical dimensions for L2C6-xxxxxL02x0900, L2C6-xxxxxL03x0900 and L2C6-xxxxxL04x0900.

Notes for Figures 8a and 8b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Dam heights: 0.7mm is applicable to L2C6-xx90xxxxxxxxx.

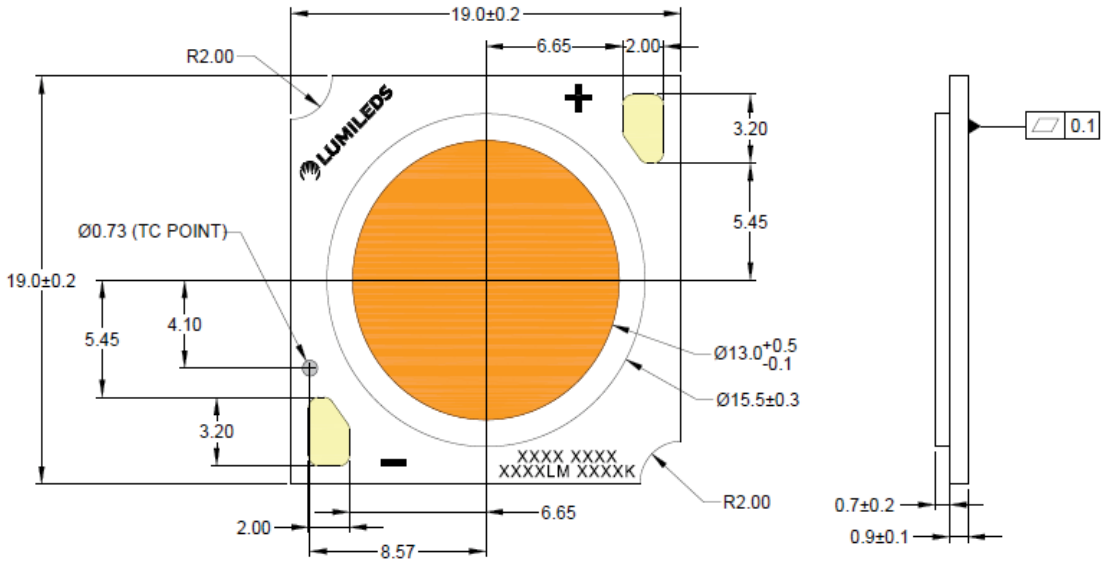

Figure 8c. Mechanical dimensions for L2C6-xxxxxL05x1300 and L2C6-xxxxxL06x1300.

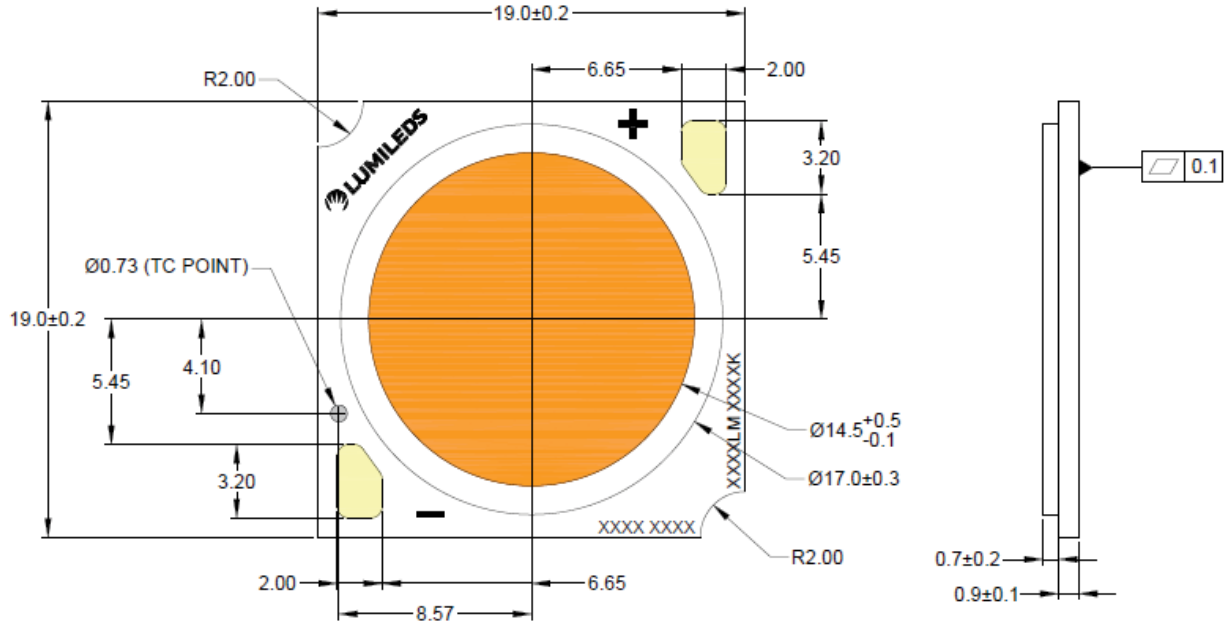

Figure 8d. Mechanical dimensions for L2C6-xxxxxL08x1500 and L2C6-xxxxxL10x1500.

Notes for Figures 8c and 8d:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Dam heights: 0.7mm is applicable to L2C6-xx90xxxxxxxx.

Packaging Information

LUXEON CS CoB LEDs are packaged in trays then in a carton box. Each tray contains a specified number of LEDs. The LEDs in each tray come from a single category code, ensuring they are all well-matched for light output, color, and forward voltage. Each tray contains a rubber stopper at one end. The tray label has both alphanumeric and bar code information. The carton boxes have printed information providing part numbers with CAT codes that indicate luminous flux, color and forward voltage bins.

Total Units per Tray

Table 6. Number of LEDs per tray for LUXEON CS CoB.

PART NUMBER	TOTAL UNITS PER TRAY	TOTAL TRAYS PER INNER BOX	TOTAL UNITS PER INNER BOX
L2C6-xxxxxL02x0600	80	2	160
L2C6-xxxxxL02x0900	80	2	160
L2C6-xxxxxL03x0900	80	2	160
L2C6-xxxxxL04x0900	80	2	160
L2C6-xxxxxL05x1300	36	2	72
L2C6-xxxxxL06x1300	36	2	72
L2C6-xxxxxL08x1500	36	2	72
L2C6-xxxxxL10x1500	36	2	72

Tray Dimensions

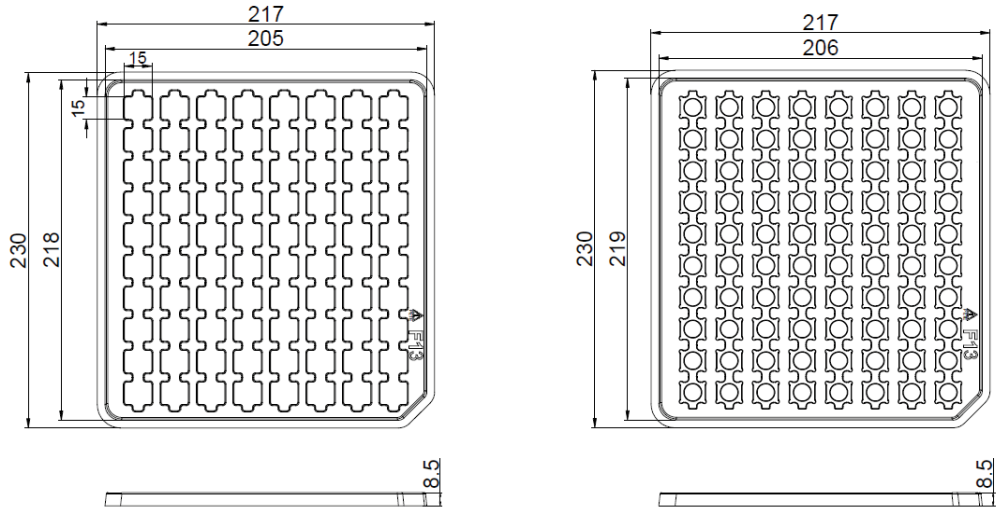

Figure 9a. Tray dimensions for L2C6-xxxxxL02x0600, L2C6-xxxxxL02x0900, L2C6-xxxxxL04x0900.

Notes for Figure 9a:
1. Drawings not to scale.
2. All dimensions are in millimeters.

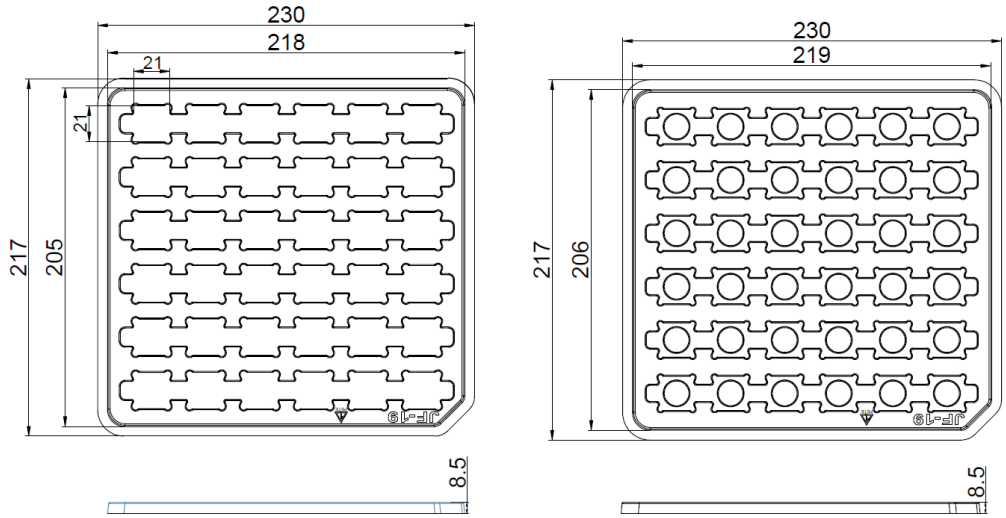

Figure 9b. Tray dimensions for L2C6-xxxxxL06x1300, L2C6-xxxxxL08x1500, L2C6-xxxxxL10x1500.

Notes for Figure 9b:
1. Drawings not to scale.
2. All dimensions are in millimeters.

Inner Box

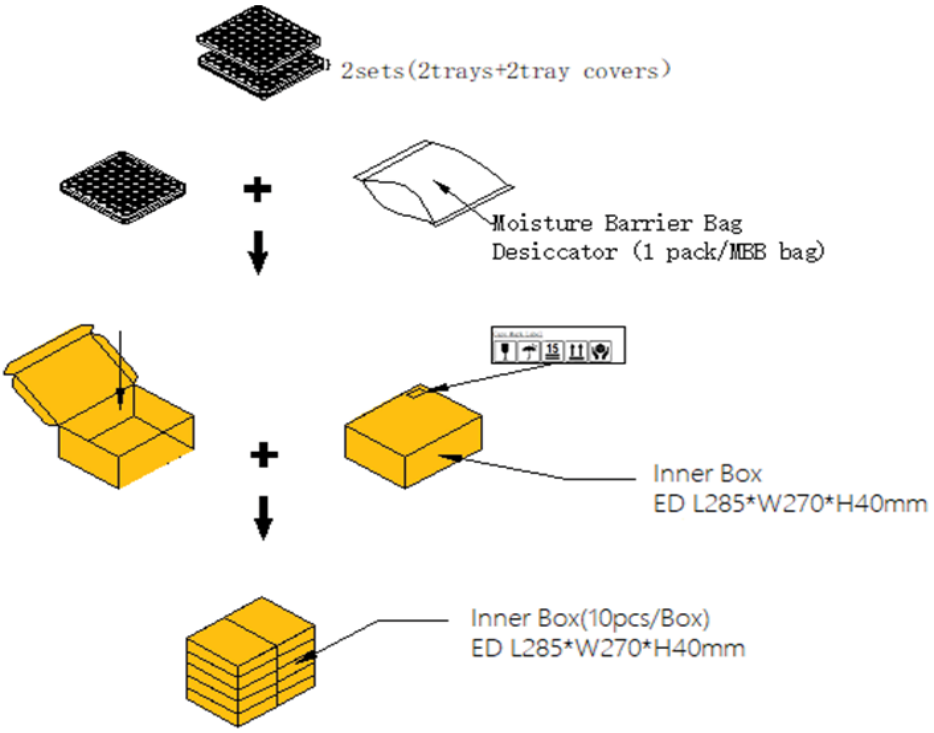

Figure 10. Dimensions for inner box and outer box packaging for LUXEON CS CoB.

Table 7. Inner box information for LUXEON CS CoB.

BOX TYPE	DIMENSIONS (mm)			AVERAGE WEIGHT (160pcs/box)
	H	L	W	
Inner Box	40	285	270	0.376Kg

Figure 11. Example of inner box label and tray label for LUXEON CS CoB.

Notes for Figure 11 – Inner Box Label descriptions for customer use:
Field labels not described are for Lumileds internal use only.

1. Lumileds part number.
2. Number of LED emitters in a box.
3. LED test date in YYWW format.
4. Customer part number for custom requests only.
5. Unique production lot identification number. This number is required for traceability purpose.
6. Product category code.
7. EU regulatory address.

Outer Box

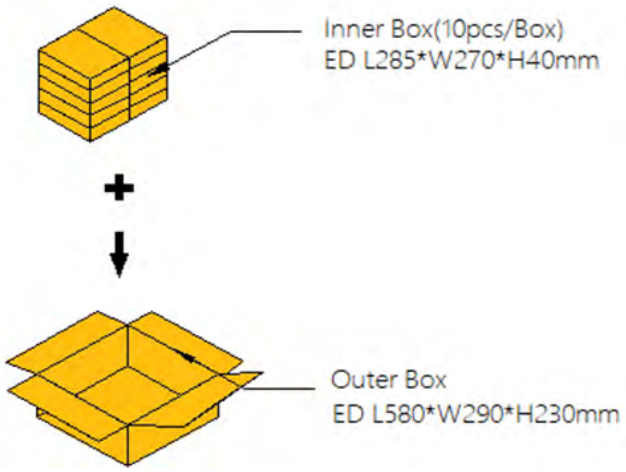

Figure 12. Dimensions for outer box packaging for LUXEON CS CoB.

Table 8. Outer box information for LUXEON CS CoB.

BOX TYPE	DIMENSIONS (mm)			MAXIMUM INNER BOXES PER OUTER BOX	MAXIMUM QUANTITY PER OUTER BOX	AVERAGE WEIGHT (1600pcs/box)
	H	L	W			
Outer Box	230	580	290	10	1600	4.412Kg

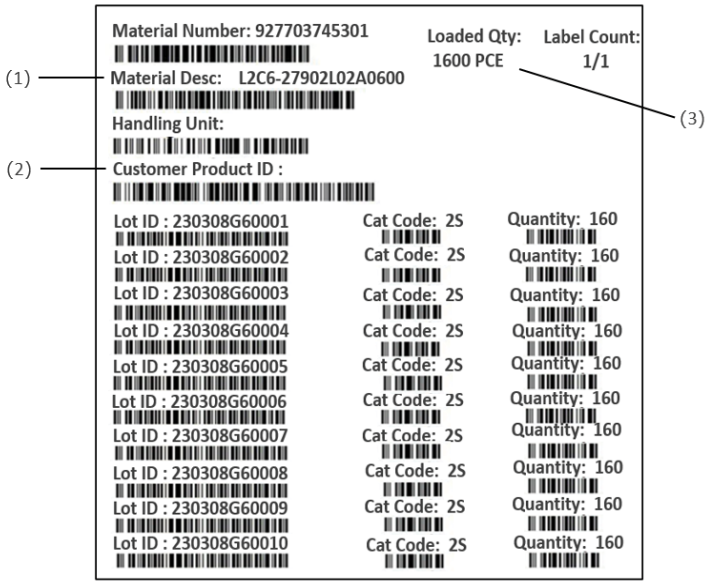

Figure 13. Example of outer box label for LUXEON CS CoB.

Notes for Figure 13 – 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.

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