LUMILEDS

ILLUMINATION

LUXEON CS CoB with CrispColor Technology

Fashion retail lighting that makes an impact, highlighting rich colors and increasing contrast

The LUXEON CS CoB with CrispColor Technology LED is the ultimate solution that makes colors pop and makes fabrics come to life. With efficient solid state lighting technology, the contrast of colors has never been so vivid. Our special phosphor technology has created a higher gamut color rendering than existing solutions with a specific color point be low the Black Body Line to allow for Class A products. Combined with industry leading performance, LUXEON CS CoB with CrispColor Technology creates a highly impactful retail experience with all of the advantages, including lowest Rth, small Light Emitting Surface (LES) and 3-step MacAdam ellipse color definition, which is tested at 85°C.

FEATURES AND BENEFITS

- Widely used square footprints for easy design-in
- High performance with superior color quality
- 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
- Indoor Area Lighting
- Lamps
- More...

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General Product Information

Product Test Conditions

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

180mA – L2C6-AAHGBL02A0600
270mA – L2C6-AAHGBL03A0900
360mA – L2C6-AAHGBL04A0900
450mA – L2C6-AAHGBL05A1300
720mA – L2C6-AAHGBL08A1500
900mA – L2C6-AAHGBL11A2200

Part Number Nomenclature

Part numbers for LUXEON CS CoB with CrispColor Technology follow the convention below:

L 2 C 6 – **A A** H G **B C C C D E E F F**

Where:

A A – designates nominal CCT (27=2700K, 30=3000K, 33=3250K, 35=3500K, 40=4000K, 50=5000K)
B – designates SDCM (3=3-step MacAdam)
C C C – designates product configuration (example: L08=1208)
D – designates options for product specification
E E – designates light emitting surface (LES) size (06=6.3mm, 09=9.8mm, 13=13mm, 15=14.5mm, 22=22mm)
F F – designates options for product specification

Therefore, the following part number is used for a LUXEON CS CoB with CrispColor Technology 1208, 3000K 90CRI, 3 SDCM with a 14.5mm LES:

L 2 C 6 – **3 0 H G 3 L 0 8 A 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 with CrispColor Technology is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the ROHS Directive 2011/65/EU including amendments 2015/863/EU & 2017/2102/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 with CrispColor Technology 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	605	672	110	180	F	L2C6-27HG3L02A0600
6	3000K	90	653	726	119	180	E	L2C6-30HG3L02A0600
6	3250K	90	666	740	121	180	E	L2C6-33HG3L02A0600
6	3500K	90	675	750	123	180	E	L2C6-35HG3L02A0600
6	4000K	90	710	789	129	180	E	L2C6-40HG3L02A0600
6	5000K	90	736	818	134	180	E	L2C6-50HG3L02A0600
9	2700K	90	925	1028	112	270	F	L2C6-27HG3L03A0900
9	3000K	90	992	1102	120	270	E	L2C6-30HG3L03A0900
9	3250K	90	1038	1153	126	270	E	L2C6-33HG3L03A0900
9	3500K	90	1057	1174	128	270	E	L2C6-35HG3L03A0900
9	4000K	90	1087	1208	132	270	E	L2C6-40HG3L03A0900
9	5000K	90	1129	1254	137	270	E	L2C6-50HG3L03A0900
9	2700K	90	1247	1386	114	360	F	L2C6-27HG3L04A0900
9	3000K	90	1309	1454	119	360	E	L2C6-30HG3L04A0900
9	3250K	90	1380	1533	126	360	E	L2C6-33HG3L04A0900
9	3500K	90	1396	1551	127	360	E	L2C6-35HG3L04A0900
9	4000K	90	1451	1612	132	360	E	L2C6-40HG3L04A0900
9	5000K	90	1522	1691	139	360	E	L2C6-50HG3L04A0900
13	2700K	90	1555	1728	113	450	F	L2C6-27HG3L05A1300
13	3000K	90	1687	1874	123	450	E	L2C6-30HG3L05A1300
13	3250K	90	1725	1917	126	450	E	L2C6-33HG3L05A1300
13	3500K	90	1753	1948	128	450	E	L2C6-35HG3L05A1300
13	4000K	90	1831	2034	133	450	E	L2C6-40HG3L05A1300
13	5000K	90	1918	2131	140	450	E	L2C6-50HG3L05A1300
15	2700K	90	2437	2708	111	720	F	L2C6-27HG3L08A1500
15	3000K	90	2713	3014	123	720	E	L2C6-30HG3L08A1500
15	3250K	90	2727	3030	124	720	E	L2C6-33HG3L08A1500
15	3500K	90	2754	3060	125	720	E	L2C6-35HG3L08A1500
15	4000K	90	2878	3198	131	720	E	L2C6-40HG3L08A1500
15	5000K	90	2977	3308	136	720	E	L2C6-50HG3L08A1500
22	2700K	90	3473	3859	115	990	F	L2C6-27HG3L11A2200
22	3000K	90	3753	4170	124	990	E	L2C6-30HG3L11A2200
22	3250K	90	3832	4258	127	990	E	L2C6-33HG3L11A2200
22	3500K	90	3913	4348	130	990	E	L2C6-35HG3L11A2200
22	4000K	90	4090	4544	135	990	E	L2C6-40HG3L11A2200
22	5000K	90	4283	4759	142	990	E	L2C6-50HG3L11A2200

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 with CrispColor Technology at specified test current, T_j=85°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L2C6-xxxxxxxxAxx00	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 with CrispColor Technology 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-xxxxxL02A0600	32.5	33.9	35.5	-11	0.78
L2C6-xxxxxL03A0900	32.5	33.9	35.5	-11	0.60
L2C6-xxxxxL04A0900	32.5	33.9	35.5	-11	0.43
L2C6-xxxxxL05A1300	32.5	33.9	35.5	-11	0.26
L2C6-xxxxxL06A1300	32.5	33.9	35.5	-11	0.24
L2C6-xxxxxL08A1500	32.5	33.9	35.5	-11	0.20
L2C6-xxxxxL11A2200	32.5	33.9	35.5	-11	0.16

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 with CrispColor Technology.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1, 2]	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.

Characteristic Curves

Spectral Power Distribution Characteristics

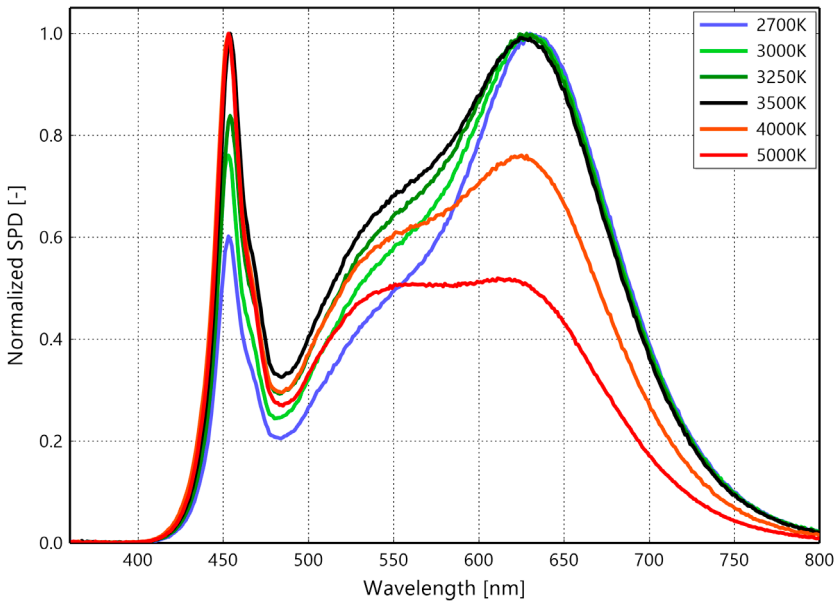

Figure 1. Typical normalized power vs. wavelength for L2C6-xxHGxxxxAxx00 at specified test current, T_j=85°C.

Light Output Characteristics

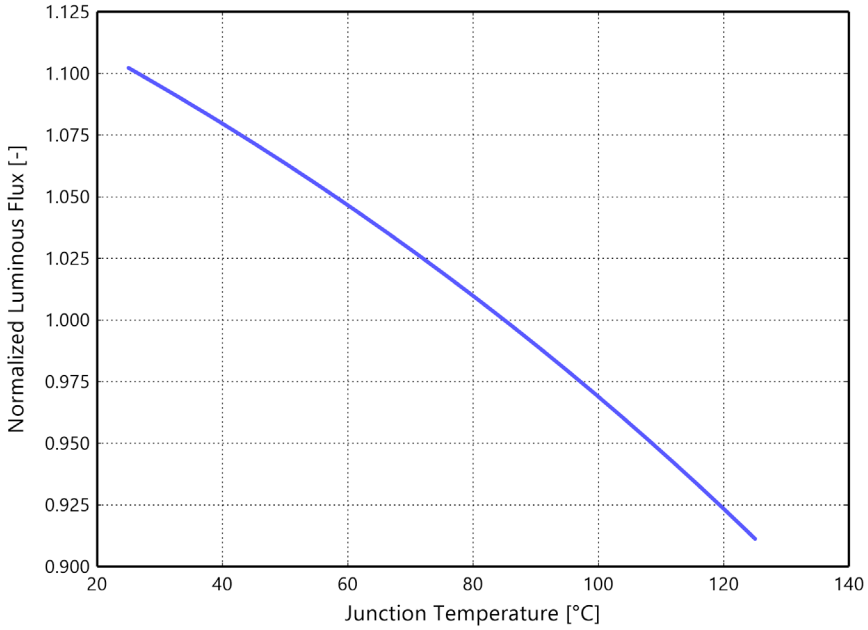

Figure 2. Typical normalized light output vs. junction temperature for L2C6-xxHGxLxxAxx00 at specified test current.

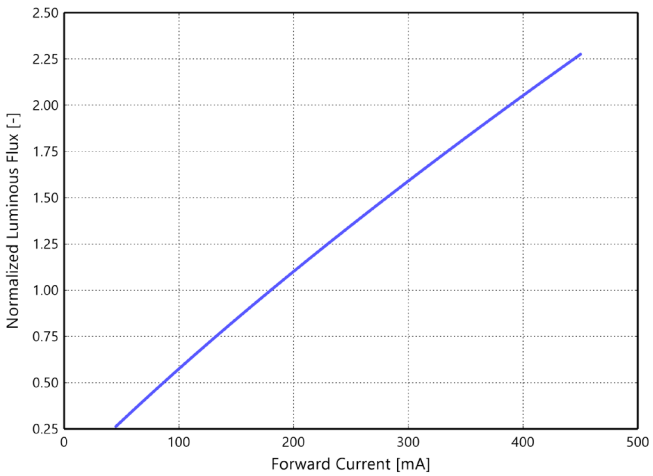

Figure 3a. Typical normalized light output vs. forward current for L2C6-xxHGxL02A0600 at T_j=85°C.

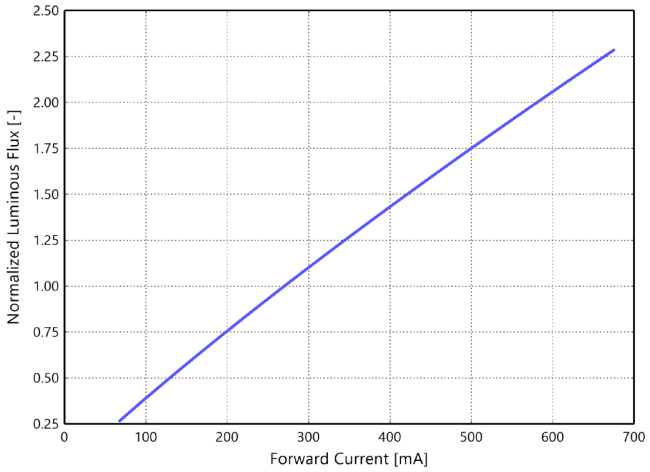

Figure 3b. Typical normalized light output vs. forward current for L2C6-xxHGxL03A0900 at T_j=85°C.

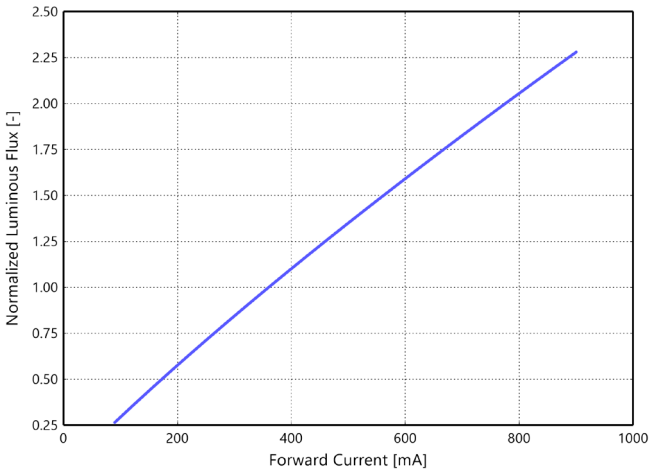

Figure 3c. Typical normalized light output vs. forward current for L2C6-xxHGxL04A0900 at T_j=85°C.

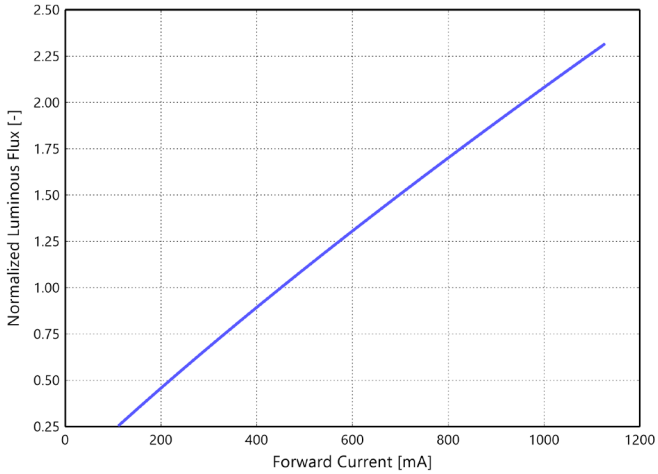

Figure 3d. Typical normalized light output vs. forward current for L2C6-xxHGxL05A1300 at T_j=85°C.

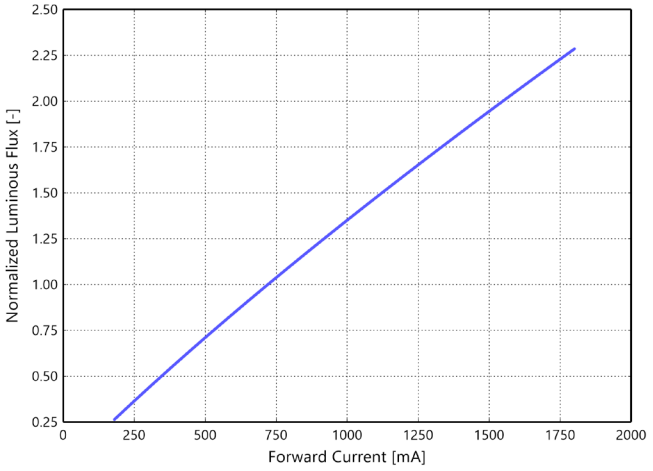

Figure 3e. Typical normalized light output vs. forward current for L2C6-xxHGxL08A1300 at T_j=85°C.

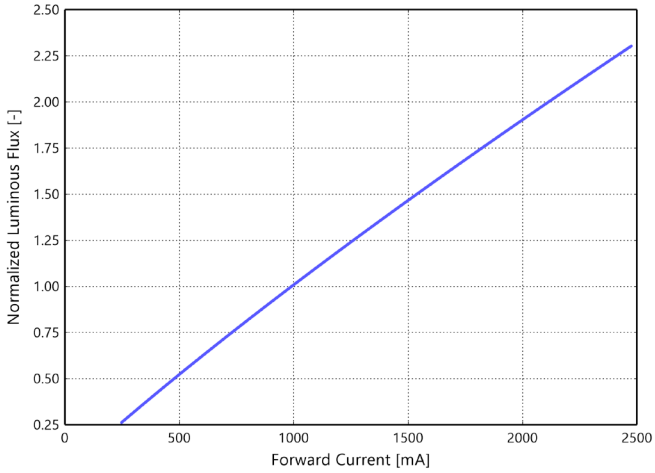

Figure 3f. Typical normalized light output vs. forward current for L2C6-xxHGxL11A2200 at T_j=85°C.

Forward Current Characteristics

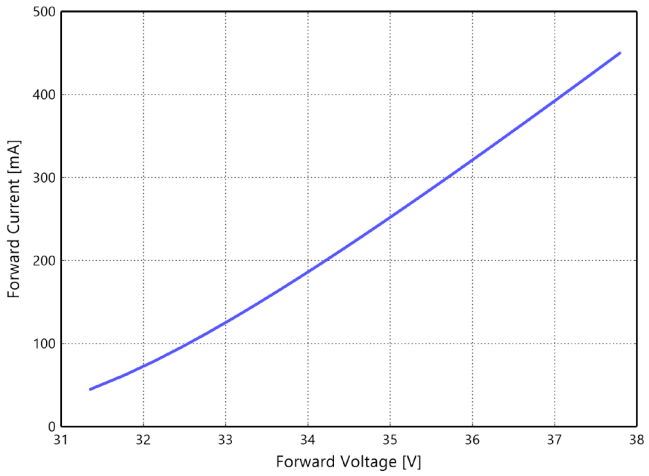

Figure 4a. Typical forward current vs. forward voltage for L2C6-xxHGxL02A0600 at T_j=85°C.

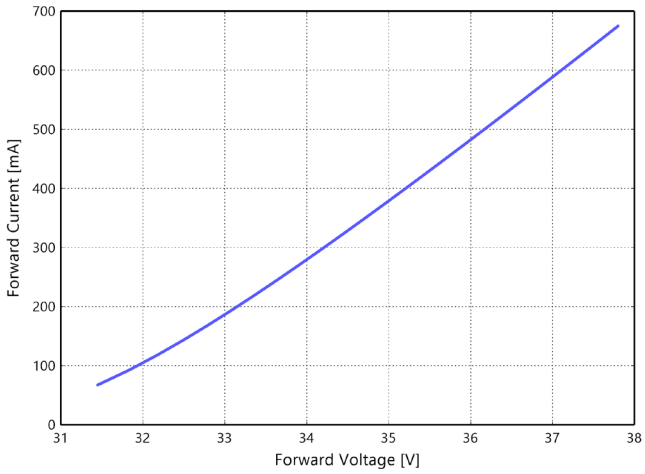

Figure 4b. Typical forward current vs. forward voltage for L2C6-xxHGxL03A0900 at T_j=85°C.

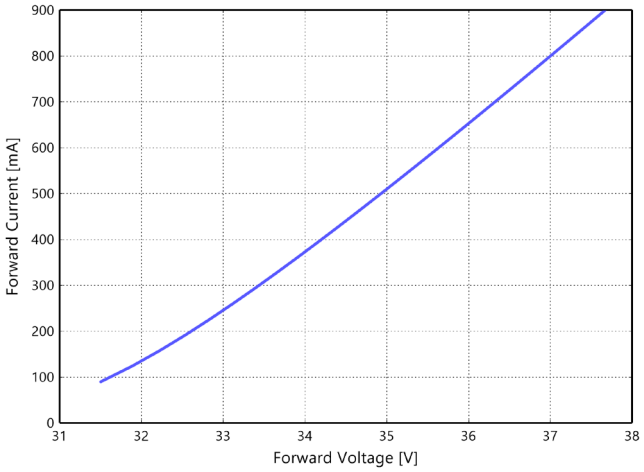

Figure 4c. Typical forward current vs. forward voltage for L2C6-xxHGxL04A0900 at T_j=85°C.

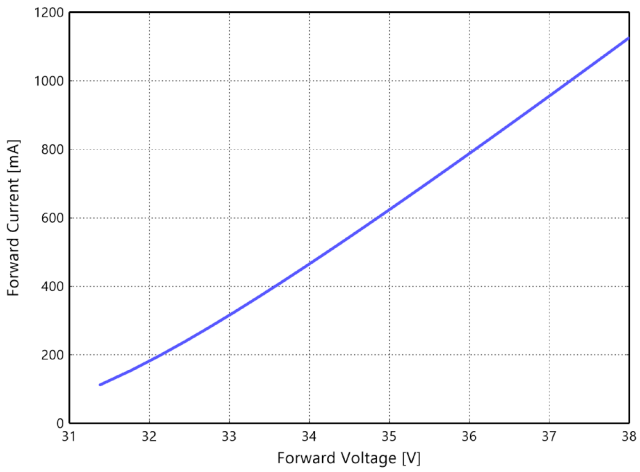

Figure 4d. Typical forward current vs. forward voltage for L2C6-xxHGxL05A1300 at T_j=85°C.

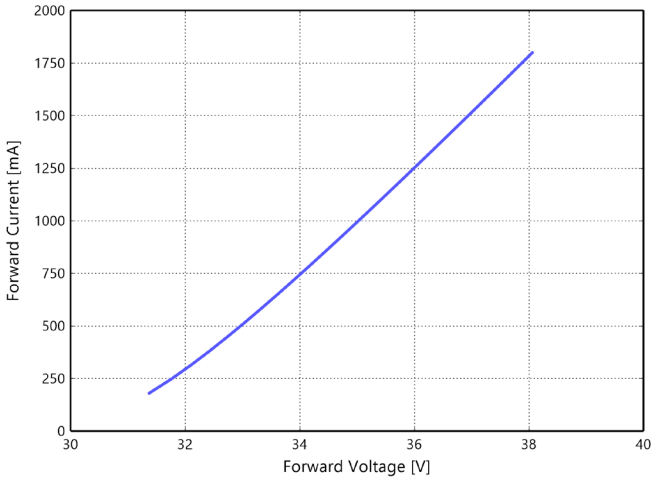

Figure 4e. Typical forward current vs. forward voltage for L2C6-xxHGxL08A1500 at T_j=85°C.

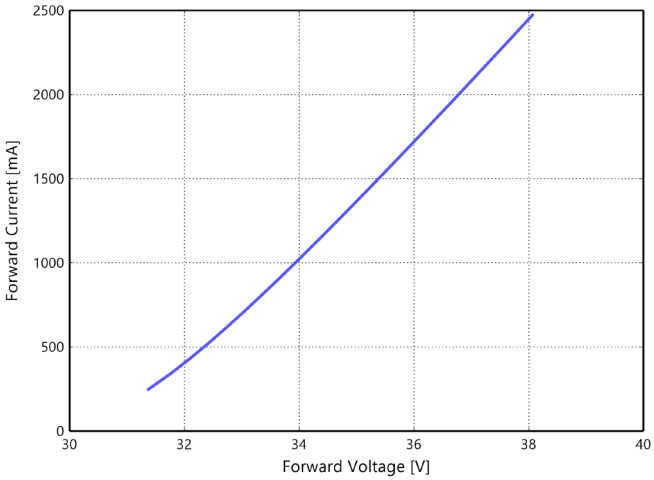

Figure 4f. Typical forward current vs. forward voltage for L2C6-xxHGxL11A2200 at T_j=85°C.

Radiation Pattern Characteristics

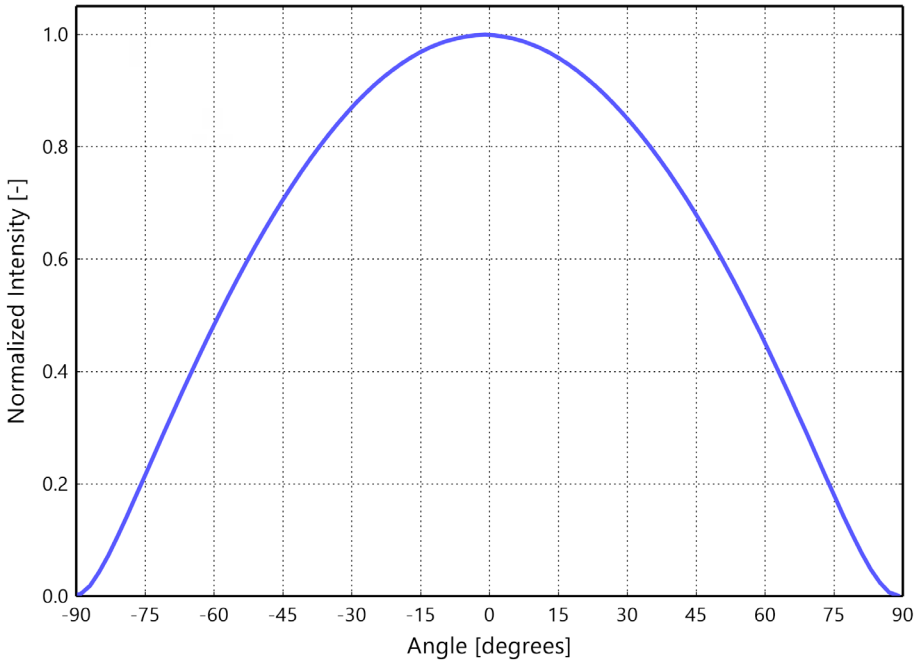

Figure 5. Typical radiation pattern for LUXEON CS CoB with CrispColor Technology at specified test current, T_j=85°C.

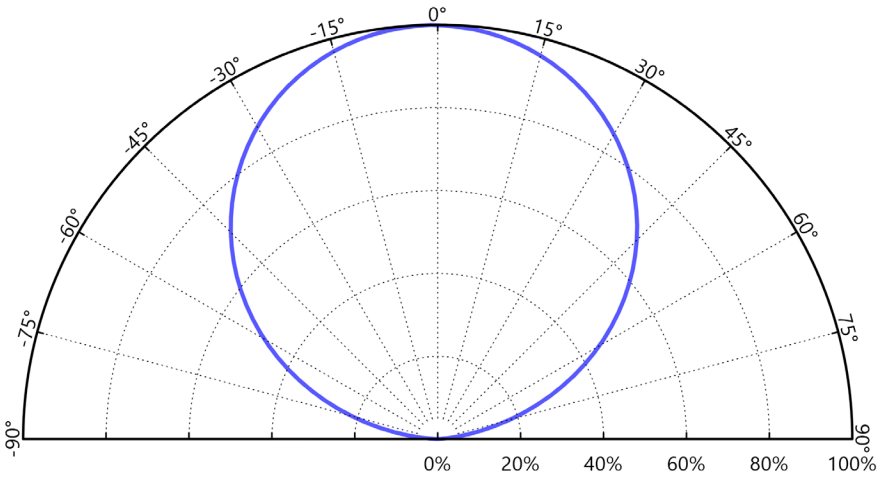

Figure 6. Typical polar radiation pattern for LUXEON CS CoB with CrispColor Technology at specified test current, T_j =85°C.

Color Bin Definitions

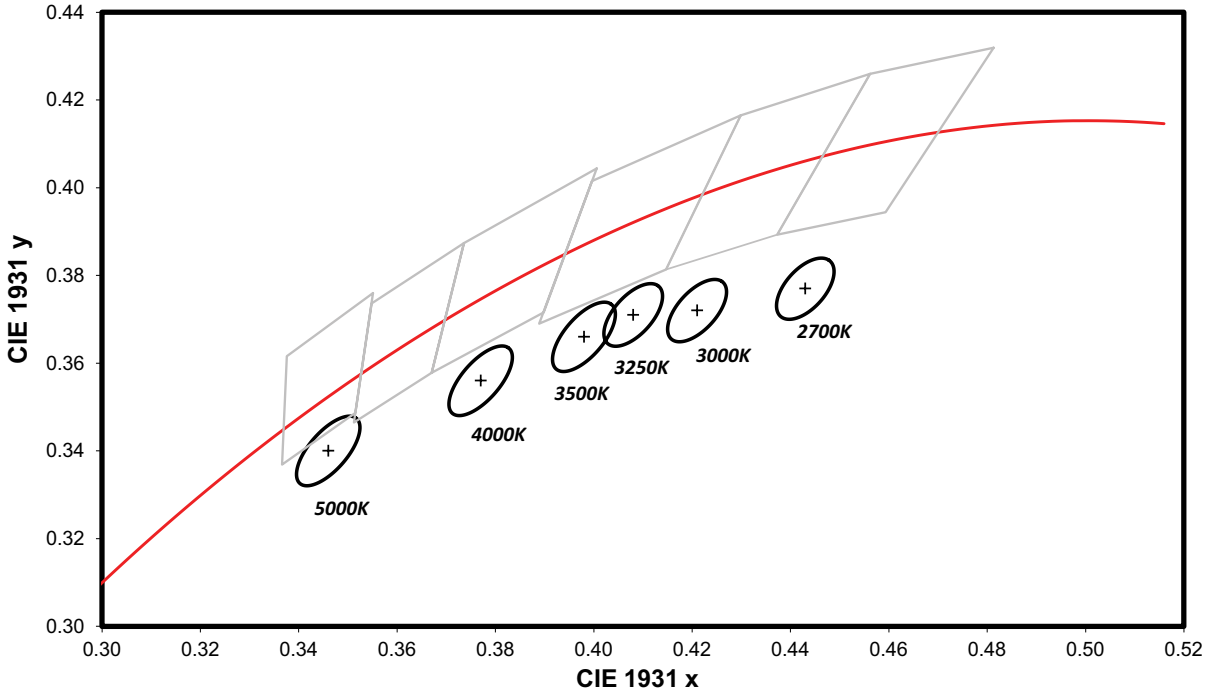

Figure 7. 3-step MacAdam ellipse illustration for Table 5.

Table 5. 3-step MacAdam ellipse color bin definitions for LUXEON CS CoB with CrispColor Technology.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, θ
2700K	Single 3-step MacAdam ellipse	(0.443, 0.377)	0.00810	0.00420	53.70°
3000K	Single 3-step MacAdam ellipse	(0.421, 0.372)	0.00834	0.00408	53.20°
3250K	Single 3-step MacAdam ellipse	(0.408, 0.371)	0.00834	0.00408	53.20°
3500K	Single 3-step MacAdam ellipse	(0.398, 0.366)	0.00927	0.00414	54.00°
4000K	Single 3-step MacAdam ellipse	(0.377, 0.356)	0.00939	0.00402	53.70°
5000K	Single 3-step MacAdam ellipse	(0.346, 0.340)	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

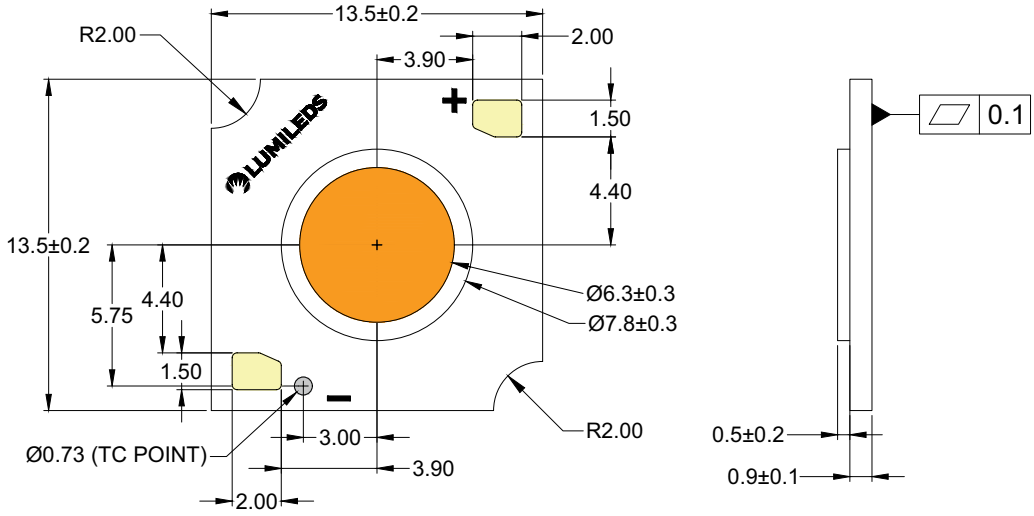

Figure 8a. Mechanical dimensions for L2C6-xxHGxL02x0600.

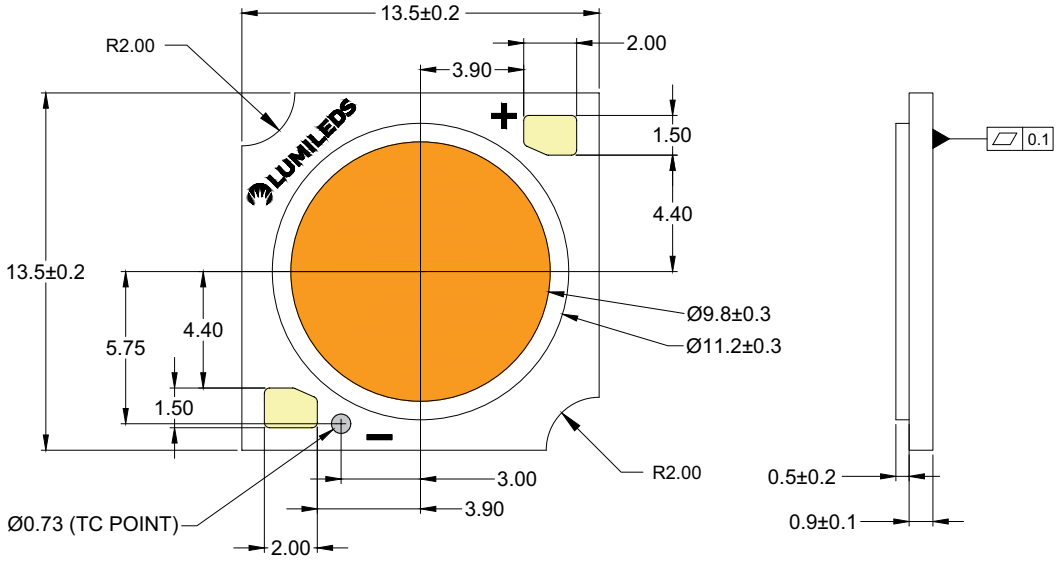

Figure 8b. Mechanical dimensions for L2C6-xxHGxL03x0900 and L2C6-xxHGxL04x0900.

Notes for Figures 8a and 8b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

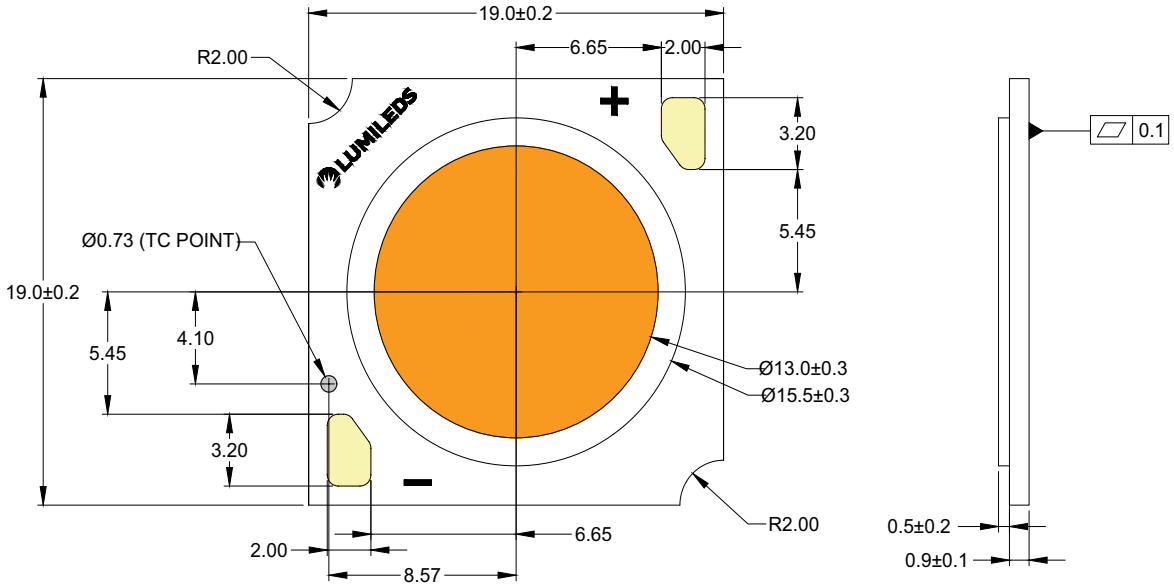

Figure 8c. Mechanical dimensions for L2C6-xxHGxL05x1300.

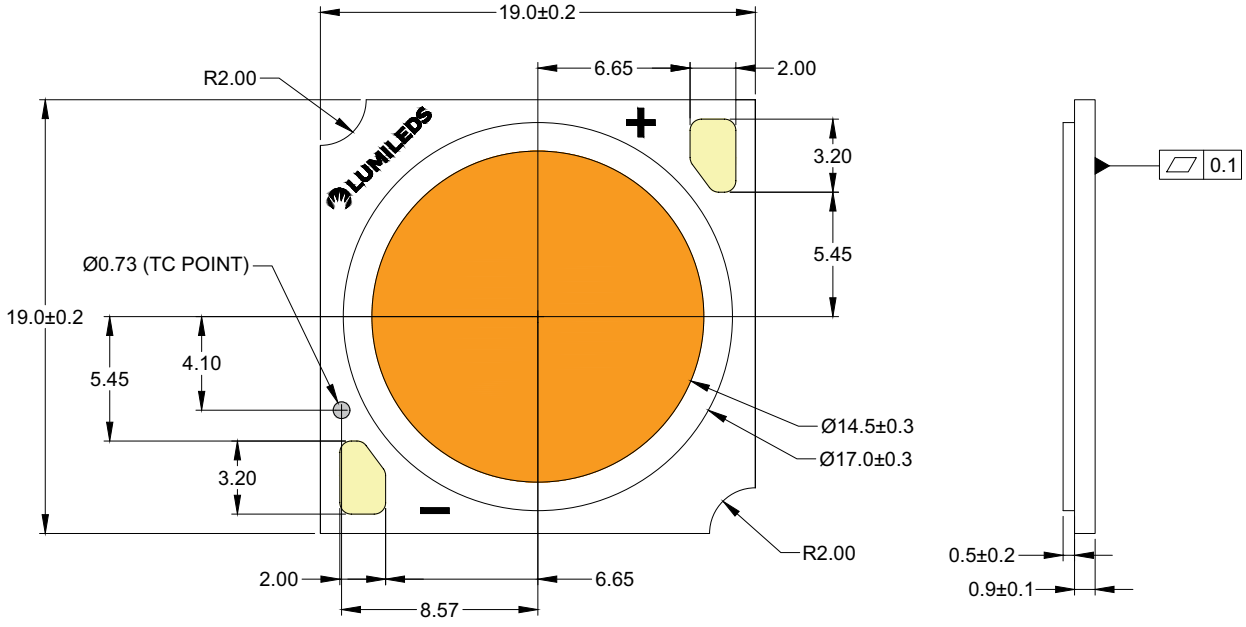

Figure 8d. Mechanical dimensions for L2C6-xxHGxL08x1500 and L2C6-xxHGxL10x1500.

Notes for Figures 8c and 8d:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

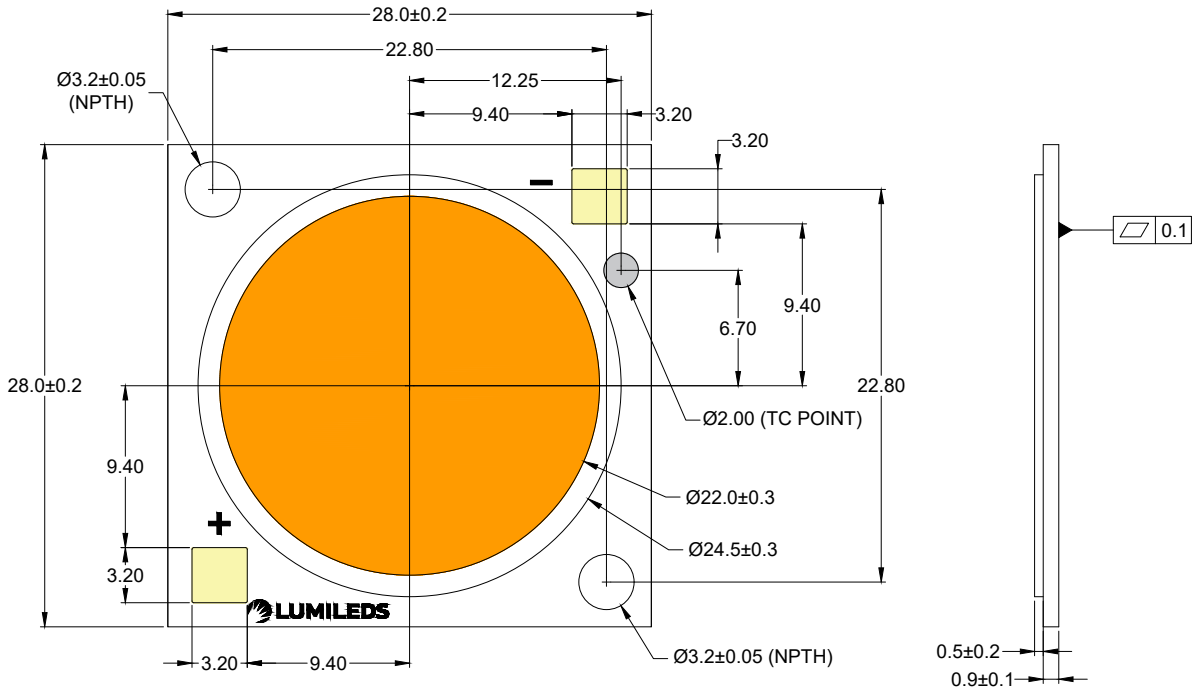

Figure 8e. Mechanical dimensions for L2C6-xxHGxL11x2200.

Notes for Figure 8e:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

Packaging Information

LUXEON CS CoB with CrispColor Technology 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 with CrispColor Technology.

PART NUMBER	TOTAL UNITS PER TRAY	TOTAL TRAYS PER INNER BOX	TOTAL UNITS PER INNER BOX
L2C6-xxHGxL02x0600	80	2	160
L2C6-xxHGxL03x0900	80	2	160
L2C6-xxHGxL04x0900	80	2	160
L2C6-xxHGxL05x1300	36	2	72
L2C6-xxHGxL08x1500	36	2	72
L2C6-xxHGxL11x2200	30	2	60

Tray Dimensions

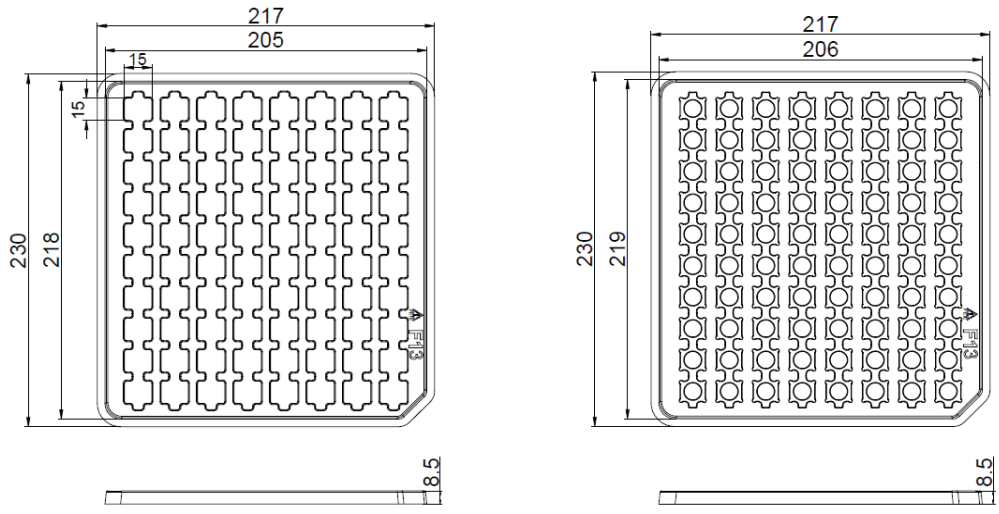

Figure 9a. Tray dimensions for L2C6-xxHGxL02x0600, L2C6-xxHGxL02x0900and L2C6-xxHGxL04x0900.

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

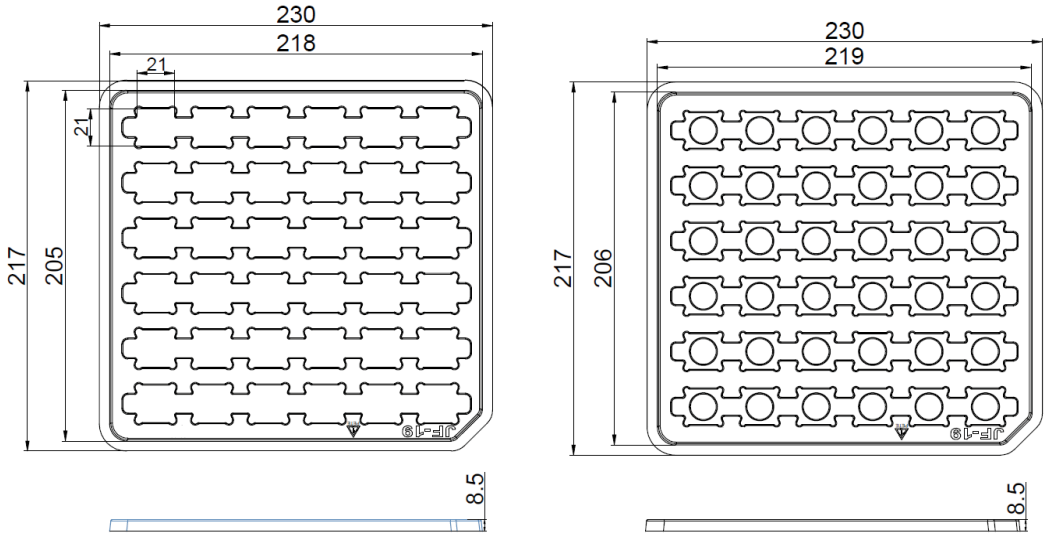

Figure 9b. Tray dimensions for L2C6-xxHGxL06x1300, L2C6-xxHGxL08x1500, L2C6-xxHGxL10x1500.

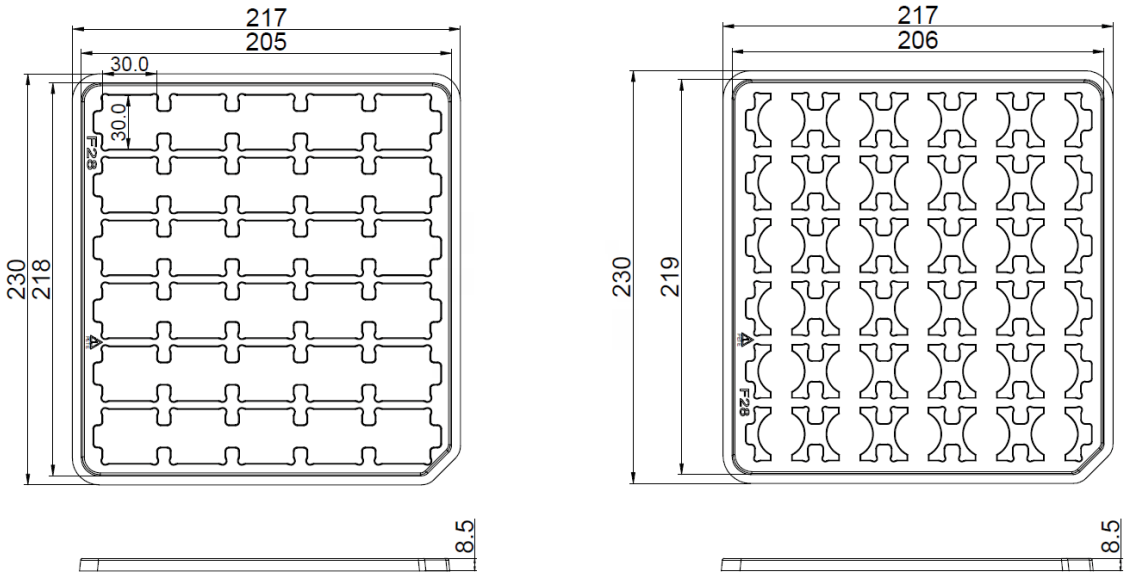

Figure 9c. Tray dimensions for L2C6-xxHGxL11x2200.

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

Inner Box

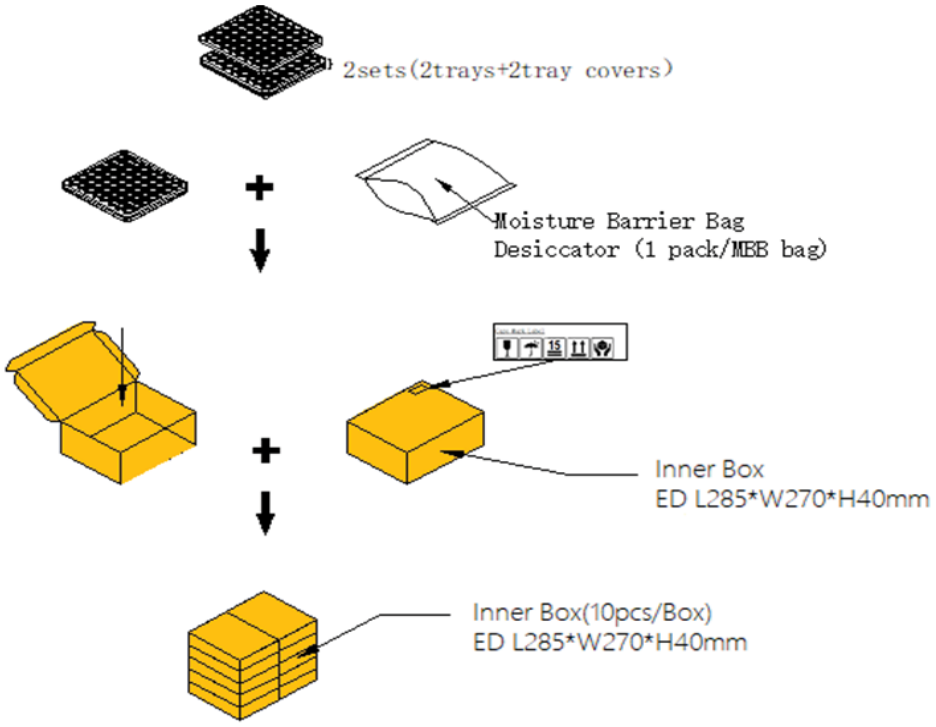

Figure 10. Dimensions for inner box and outer box packaging for LUXEON CS CoB with CrispColor Technology.

Table 7. Inner box information for LUXEON CS CoB with CrispColor Technology.

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 with CrispColor Technology.

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

1. Number of LED emitters in a box.
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.
7. EU regulatory address.

Outer Box

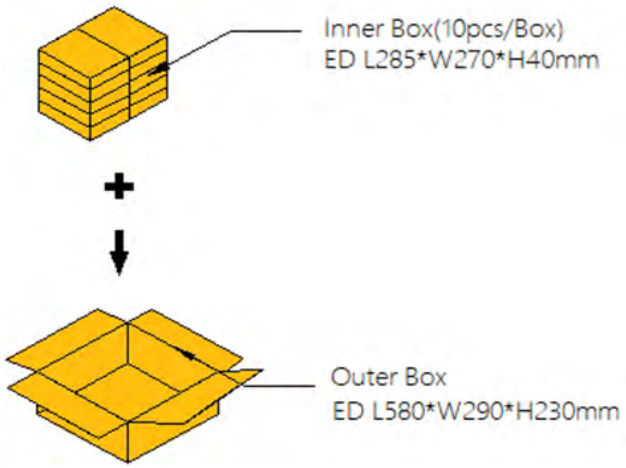

Figure 12. Dimensions for outer box packaging for LUXEON CS CoB with CrispColor Technology.

Table 8. Outer box information for LUXEON CS CoB with CrispColor Technology.

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

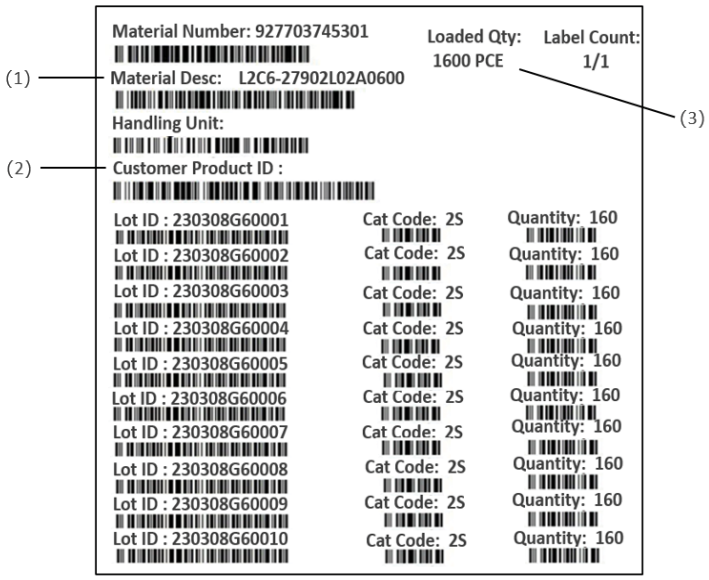

Figure 13. Example of outer box label for LUXEON CS CoB with CrispColor Technology.

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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