

# LUXEON CS HE CoB

Very high efficacy, superior quality of light and ease for design footprints

LUXEON CS HE CoBs extend Lumileds leadership for performance and reliability to an entirely new board footprint that offers very high efficacy, enables easy design-in for new luminaire programs, and is 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 HE CoB LEDs are tested and binned with a DC drive current specified below at a junction temperature,  $T_j$ , of 85°C. Part numbers for LUXEON CS HE CoB LEDs follow the convention below:

720mA – L2C6-AABBCL08B1500  
990mA – L2C6-AABBCL11B2200

## Part Number Nomenclature

Part numbers for LUXEON CS HE 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, 57=5700K)
- B B** – designates minimum CRI (80=80CRI)
- C** – designates SDCM (2=2-step MacAdam, 3=3-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 (15=14.5mm, 22=22mm)
- G G** – designates options for product specification

Therefore, the following part number is used for a LUXEON CS HE CoB 1208, 3000K 80CRI, 3 SDCM with a 14.5mm LES:

L 2 C 6 – **3 0 8 0 3 L 0 8 B 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 HE 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 HE CoB at specified test current,  $T_j=85^\circ\text{C}$ .

LES <sup>[4]</sup> (mm)	NOMINAL CCT	MINIMUM CRI <sup>[1, 2, 3]</sup>	LUMINOUS FLUX <sup>[1]</sup> (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	ENERGY EFFICIENCY CLASS <sup>[5]</sup>	PART NUMBER
			MINIMUM	TYPICAL				
15	2700K	80	3382	3758	159	720	D	L2C6-2780xL08B1500
15	3000K	80	3541	3935	166	720	D	L2C6-3080xL08B1500
15	3500K	80	3603	4003	169	720	D	L2C6-3580xL08B1500
15	4000K	80	3710	4122	174	720	C	L2C6-4080xL08B1500
15	5000K	80	3710	4122	174	720	C	L2C6-5080xL08B1500
15	5700K	80	3664	4071	172	720	D	L2C6-57803L08B1500
22	2700K	80	4711	5234	161	990	D	L2C6-2780xL11B2200
22	3000K	80	4956	5507	169	990	D	L2C6-3080xL11B2200
22	3500K	80	5023	5581	171	990	D	L2C6-3580xL11B2200
22	4000K	80	5189	5766	177	990	C	L2C6-4080xL11B2200

**Notes for Table 1:**

- Lumileds maintains a tolerance of  $\pm 2$  on CRI and  $\pm 6.5\%$  on luminous flux measurements.
- Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
- R9 value of 90CRI products is  $>50$ .
- Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.
- 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 HE CoB at specified test current,  $T_j=85^\circ\text{C}$ .

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup>	TYPICAL VIEWING ANGLE <sup>[2]</sup>
L2C6-xxxxxxxBxx00	135°	115°

**Notes for Table 2:**

- Total angle at which 90% of total luminous flux is captured.
- Viewing angle is the off axis angle from the LED centerline where the luminous intensity is  $\frac{1}{2}$  of the peak value.

## Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON CS HE CoB at specified test current,  $T_j=85^\circ\text{C}$ .

PART NUMBER	FORWARD VOLTAGE <sup>[1]</sup> ( $V_f$ )			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE <sup>[2]</sup> (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO CASE <sup>[3]</sup> (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L2C6-xxxxxL08B1500	31.5	32.9	34.5	12	0.20
L2C6-xxxxxL11B2200	31,5	32.9	34.5	12	0.16

**Notes for Table 3:**

- Lumileds maintains a tolerance of  $\pm 0.06\text{V}$  on forward voltage measurements.
- Measured between  $25^\circ\text{C}$  and  $85^\circ\text{C}$ .
- 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 HE CoB.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current <sup>[1, 2, 3]</sup>	2.5x test current
LED Junction Temperature <sup>[1]</sup> (DC & Pulse)	125°C
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 3B
Operating Case Temperature <sup>[1]</sup>	-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:**

- Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
- 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 20% of the maximum allowable DC forward current
- Exception: LUXEON CS HE CoB 1812 and 1818 have maximum DC forward current of 2.2x of test current.

## Characteristic Curves

### Spectral Power Distribution Characteristics

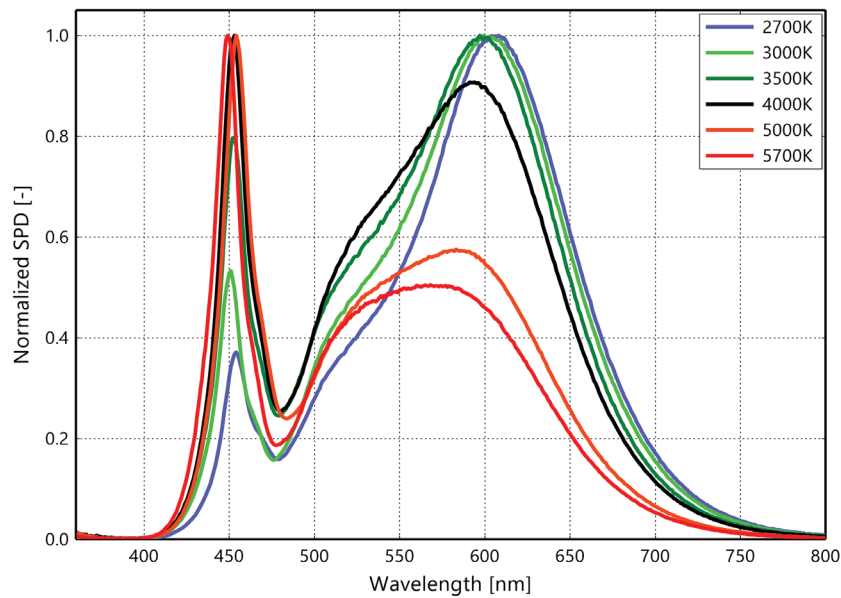


Figure 1. Typical normalized power vs. wavelength for L2C6-xx80xxxxBxx00 at specified test current,  $T_j=85^\circ\text{C}$ .

# Light Output Characteristics

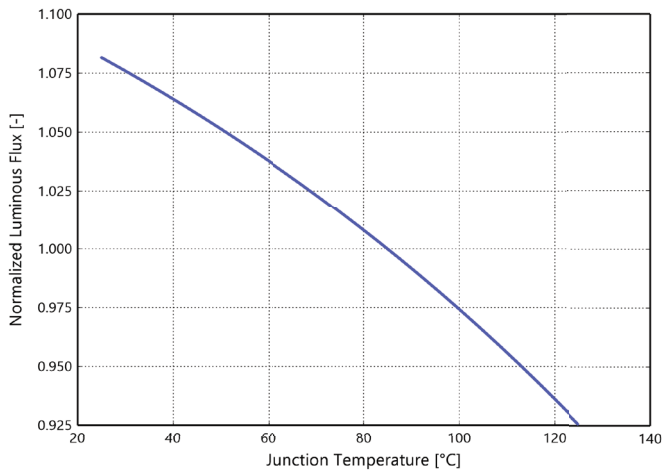


Figure 2. Typical normalized light output vs. junction temperature for L2C6-xxxxLxxBxx00 at specified test current.

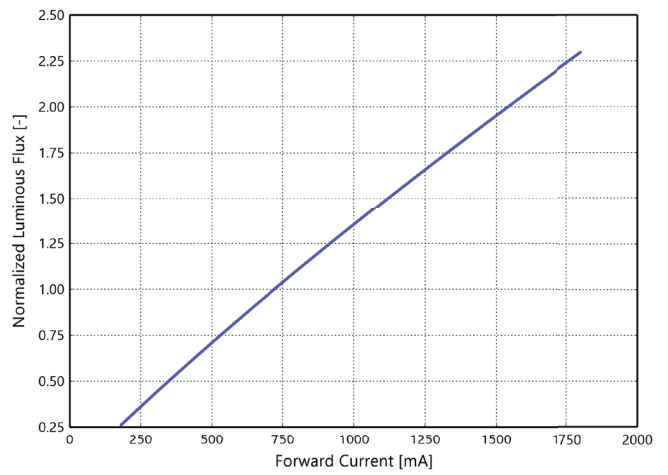


Figure 3a. Typical normalized light output vs. forward current for L2C6-xxxxxL08B1500 at  $T_j=85^\circ\text{C}$ .

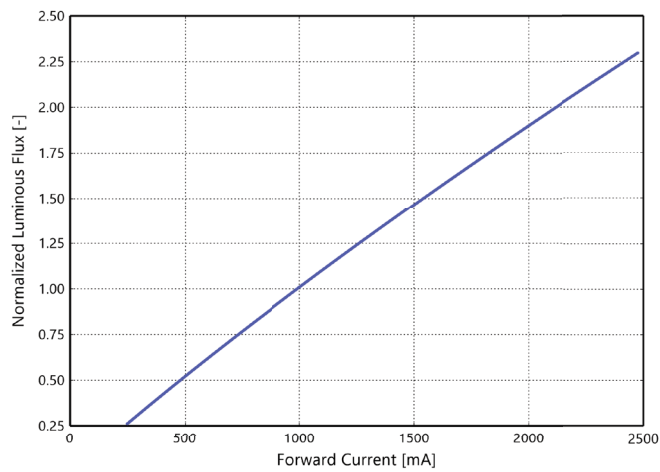


Figure 3b. Typical normalized light output vs. forward current for L2C6-xxxxxL11B2200 at  $T_j=85^\circ\text{C}$ .

# Forward Current Characteristics

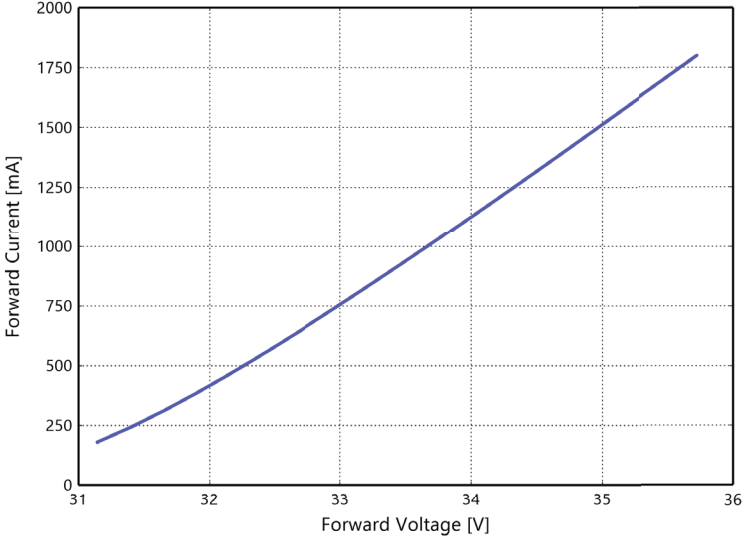


Figure 4a. Typical forward current vs. forward voltage for L2C6-xxxxxL08A15X0 at  $T_j=85^\circ\text{C}$ .

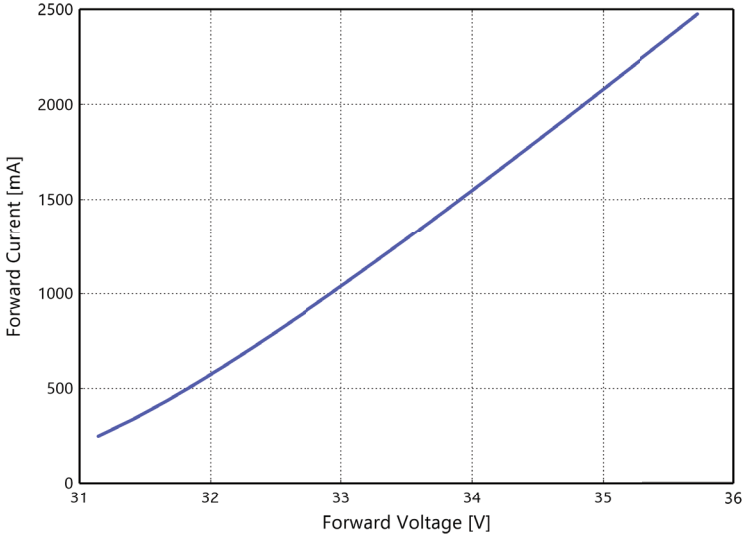


Figure 4b. Typical forward current vs. forward voltage for L2C6-xxxxxL11B1500 at  $T_j=85^\circ\text{C}$ .

# Radiation Pattern Characteristics

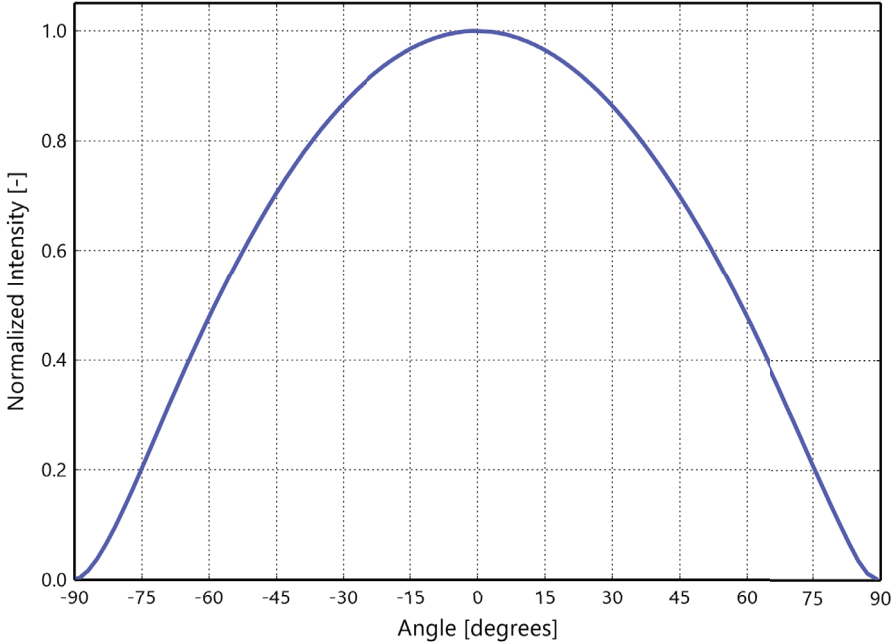


Figure 5. Typical radiation pattern for LUXEON CS HE CoB at specified test current,  $T_j=85^{\circ}\text{C}$ .

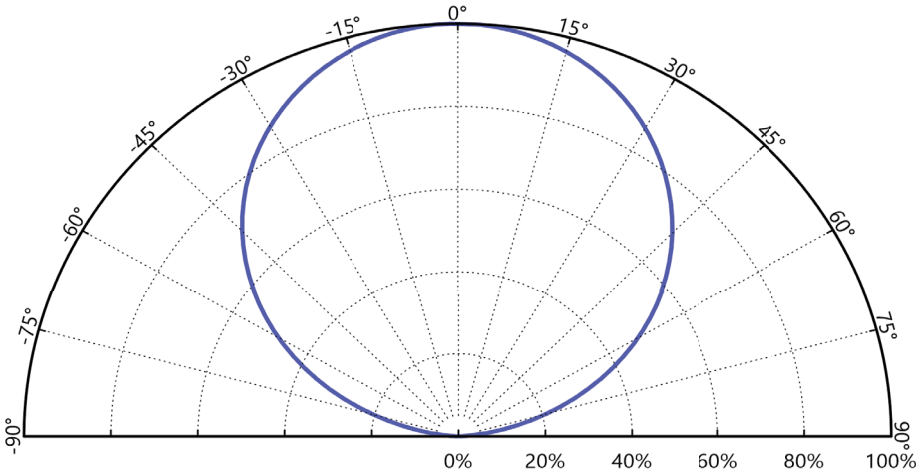


Figure 6. Typical polar radiation pattern for LUXEON CS HE CoB at specified test current,  $T_j=85^{\circ}\text{C}$ .



# Color Bin Definitions

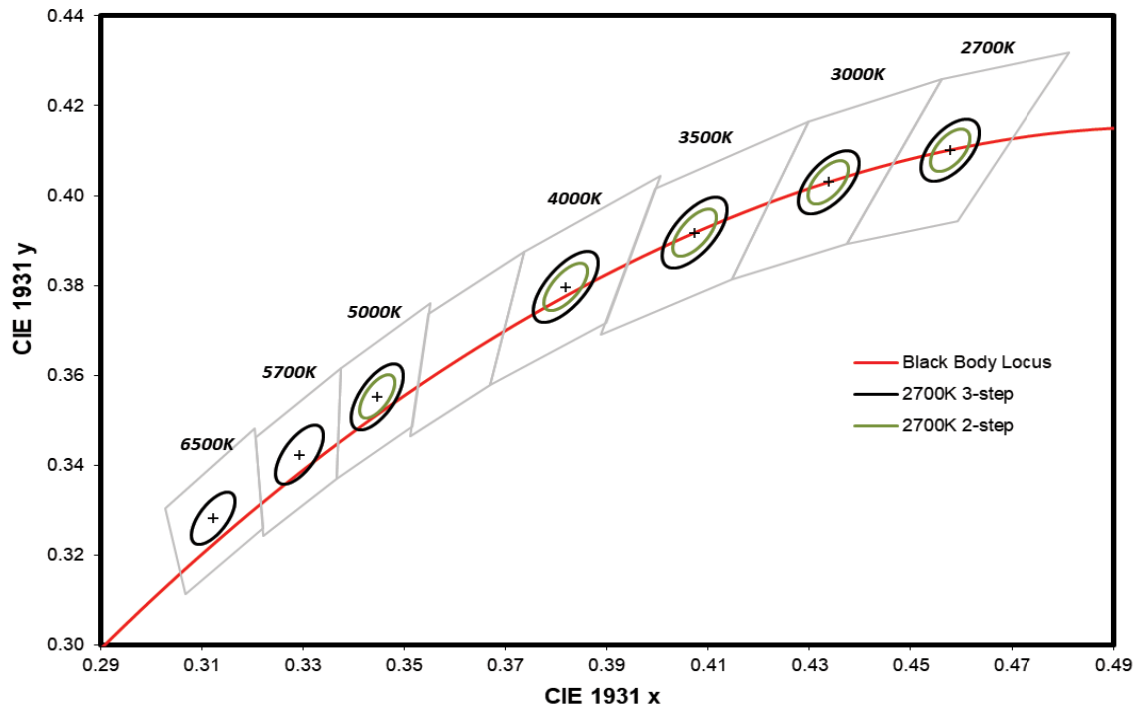


Figure 7. 2-step and 3-step MacAdam ellipse illustration for Table 5.

Table 5. 2-step and 3-step MacAdam ellipse color bin definitions for LUXEON CS HE CoB.

NOMINAL CCT	COLOR SPACE	CENTER POINT <sup>(1)</sup> (cx, cy)	MAJOR AXIS, a		MINOR AXIS, b		ELLIPSE ROTATION ANGLE, $\theta$
			2-step	3-step	2-step	3-step	
2700K	2-step, 3-step MacAdam ellipse	(0.4578, 0.4101)	0.00540	0.00810	0.00280	0.00420	53.70°
3000K	2-step, 3-step MacAdam ellipse	(0.4338, 0.4030)	0.00556	0.00834	0.00272	0.00408	53.20°
3500K	2-step, 3-step MacAdam ellipse	(0.4073, 0.3917)	0.00618	0.00927	0.00276	0.00414	54.00°
4000K	2-step, 3-step MacAdam ellipse	(0.3818, 0.3797)	0.00626	0.00939	0.00268	0.00402	53.70°
5000K	2-step, 3-step MacAdam ellipse	(0.3447, 0.3553)	0.00548	0.00822	0.00236	0.00354	59.60°
5700K	2-step, 3-step MacAdam ellipse	(0.3287, 0.3417)	-	0.00745	-	0.00320	59.09°

**Notes for Table 5:**

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

# Mechanical Dimensions

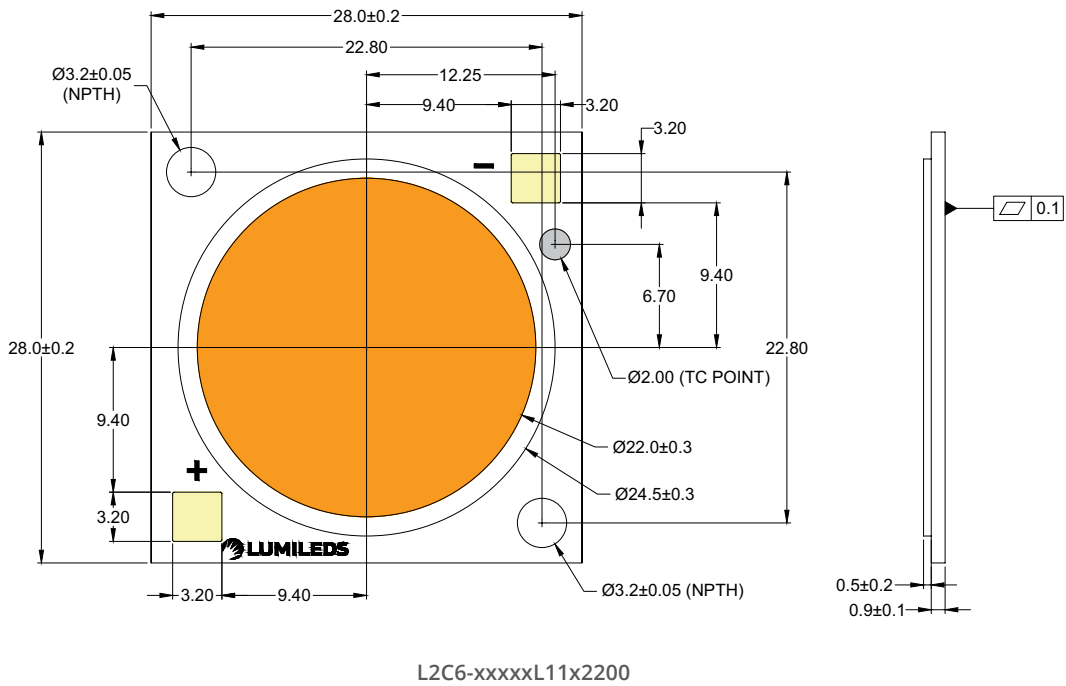
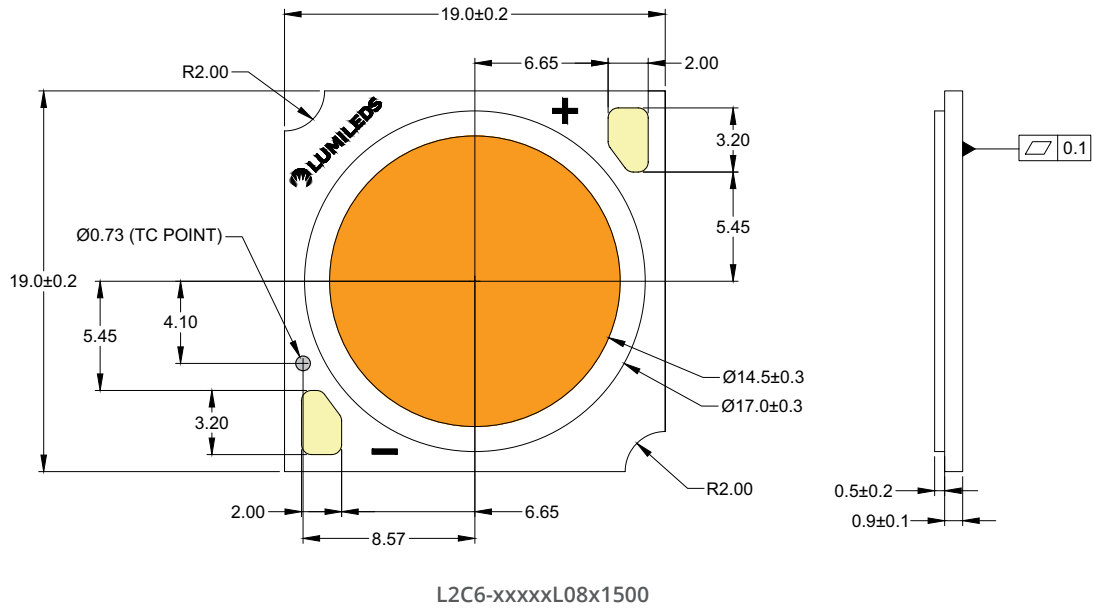


Figure 8. Mechanical dimensions for LUXEON CS HE CoB.

**Notes for Figure 8:**

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

# Packaging Information

LUXEON CS HE 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 HE CoB.

PART NUMBER	TOTAL UNITS PER TRAY	TOTAL TRAYS PER INNER BOX	TOTAL UNITS PER INNER BOX
L2C6-xxxxxL08x1500	36	2	72
L2C6-xxxxxL11x2200	30	2	60

## Tray Dimensions

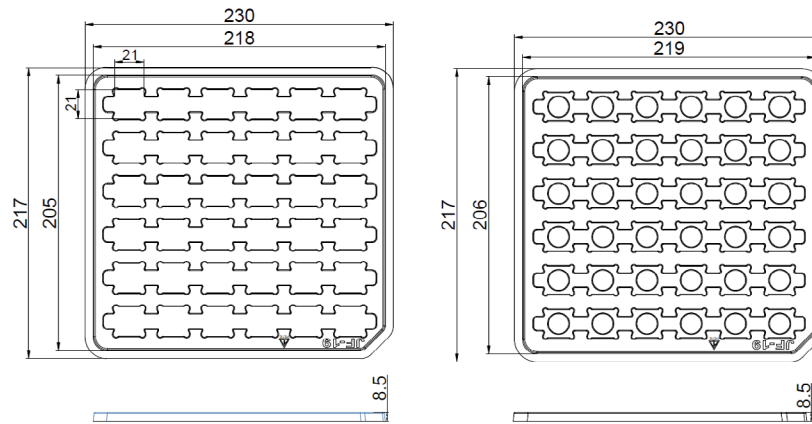


Figure 9a. Tray dimensions for L2C6-xxxxxL08x1500.

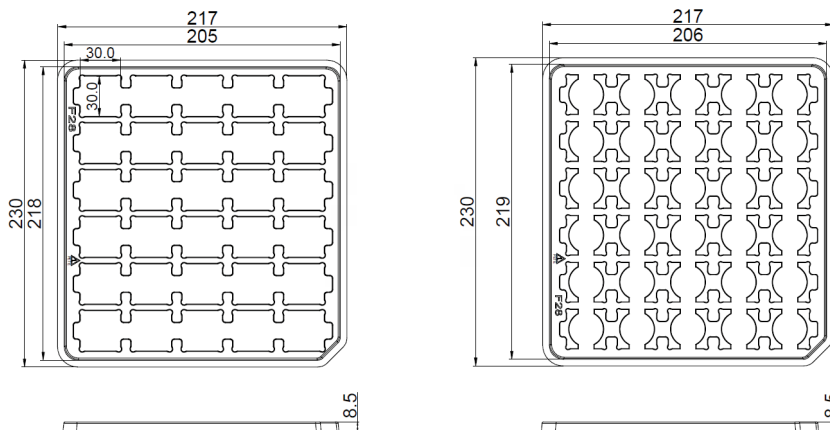


Figure 9b. Tray dimensions for L2C6-xxxxxL11x2200.

Notes for Figures 9a and 9b:

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

# Inner Box

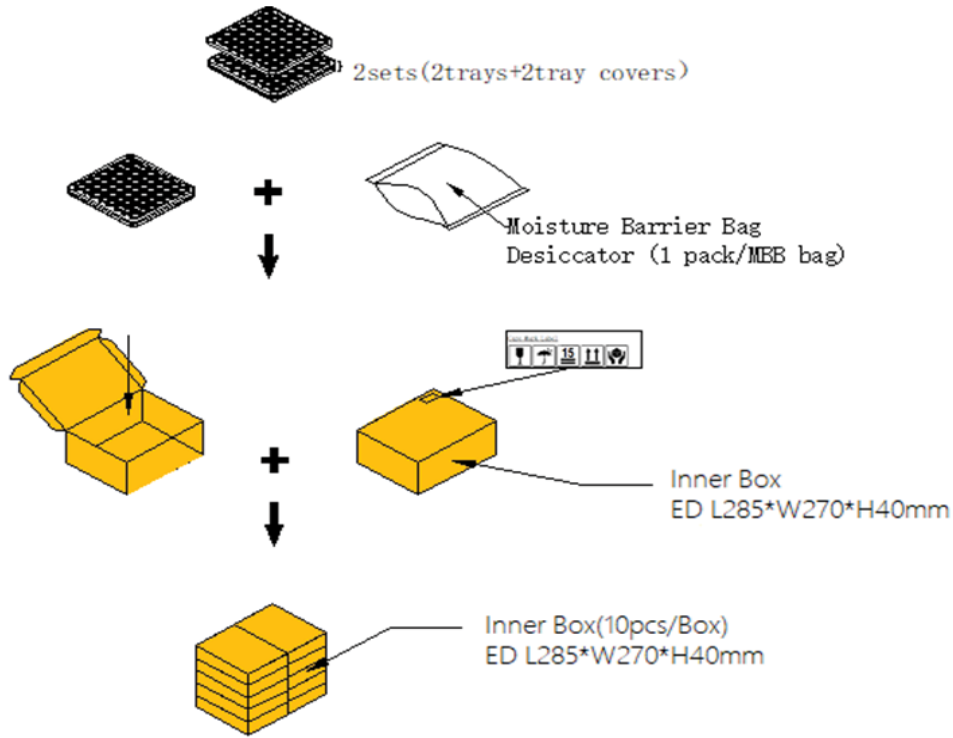


Figure 10. Dimensions for inner box and outer box packaging for LUXEON CS HE CoB.

Table 7. Inner box information for LUXEON CS HE 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 HE 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

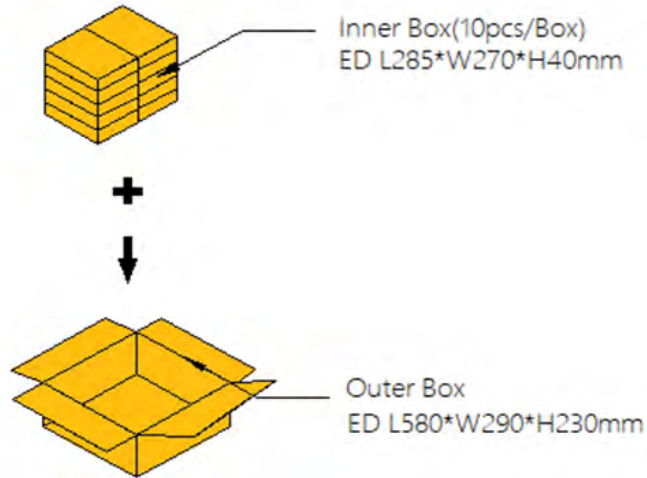


Figure 12. Dimensions for outer box packaging for LUXEON CS HE CoB.

Table 8. Outer box information for LUXEON CS HE 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

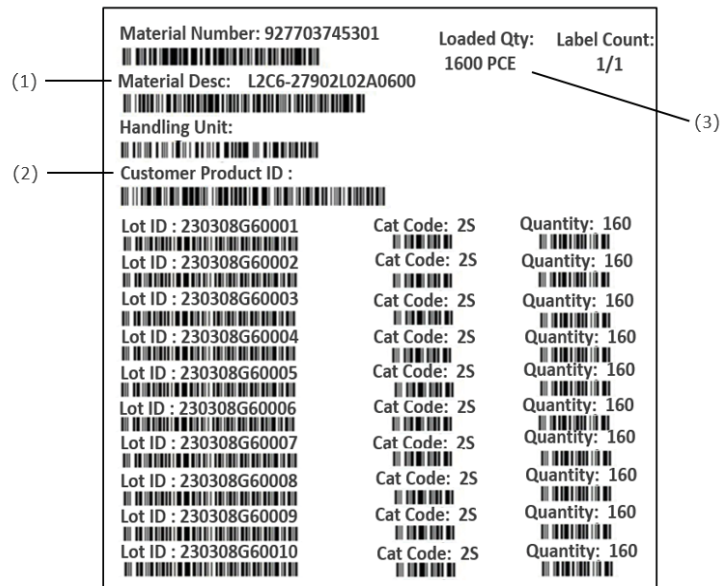


Figure 13. Example of outer box label for LUXEON CS HE CoB.

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](http://lumileds.com).



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