LUXEON CoB Core Range High Density Gen 2

Double the flux in the same form factor

LUXEON CoB Core Range – High Density focuses on achieving the highest Center Beam Candle Power (CBCP). Using the mechanical dimensions of our LUXEON CoB Core Range, the High Density range will also benefit from the ability to utilize existing an ecosystem of holders, optics and drivers.

FEATURES AND BENEFITS

- Highest flux densities with the smallest LES
- 3-step MacAdam ellipse color definition: *Freedom from Binning* for color consistency from luminaire to luminaire
- Superior thermal resistance, enabling smaller heatsinks and higher lumens
- Supported by a comprehensive optical, mechanical and electrical ecosystem

PRIMARY APPLICATIONS

- Spotlights
- Track Lights
- Downlights

ATG D ATG E ATG F c UL us No. E352519 RoHS COMPLIANT

Table of Contents

General Product Information

Product Test Conditions

LUXEON CoB Core Range High Density Gen 2 LEDs are tested and binned with a DC drive current specified below at a junction temperature, T_J, of 85°C:

350mA – LUXEON CoB 1202HD
700mA – LUXEON CoB 1204HD
900mA – LUXEON CoB 1205HD

Part Number Nomenclature

Part numbers for LUXEON CoB Core Range High Density Gen 2 follow the convention below:

L 2 C 5 – **A A B B C C C C D E E F F**

Where:

A A – designates nominal CCT (27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K, 65=6500K)

B B – designates minimum CRI (70=70CRI, 80=80CRI, 90=90CRI)

C C C C – designates product configuration (example: 1202, 1204, 1205)

D – designates options for product specification

E E – designates light emitting surface (LES) size (06=6mm, 09=9mm, 11=11mm)

F F – designates options for product specification

Therefore, the following part number is used for a LUXEON CoB Core Range High Density Gen 2 1204, 3000K 80CRI, 9mm LES:

L 2 C 5 – **3 0 8 0 1 2 0 4 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 CoB Core Range High Density 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 CoB Core Range High Density (Gen 2) at specified test current, T_j=85°C.

LES [1] (mm)	NOMINAL CCT	MINIMUM CRI [2, 3, 4]	LUMINOUS FLUX [2] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	ENERGY EFFICIENCY CLASS [5]	PART NUMBER
			MINIMUM	TYPICAL				
6	4000K	70	1654	1838	144	350	E	L2C5-40701202FH600
6	5000K	70	1654	1838	144	350	E	L2C5-50701202FH600
6	2700K	80	1418	1576	123	350	E	L2C5-27801202FH600
6	3000K	80	1473	1637	128	350	E	L2C5-30801202FH600
6	3500K	80	1514	1682	132	350	E	L2C5-35801202FH600
6	4000K	80	1549	1721	135	350	E	L2C5-40801202FH600
6	5000K	80	1538	1709	134	350	E	L2C5-50801202FH600
6	5700K	80	1538	1709	134	350	E	L2C5-57801202FH600
6	2700K	90	1244	1382	108	350	F	L2C5-27901202FH600
6	3000K	90	1299	1443	113	350	F	L2C5-30901202FH600
6	3500K	90	1312	1458	114	350	F	L2C5-35901202FH600
6	4000K	90	1315	1461	114	350	F	L2C5-40901202FH600
9	3000K	70	3230	3589	140	700	E	L2C5-30701204F0900
9	3500K	70	3262	3624	142	700	E	L2C5-35701204F0900
9	4000K	70	3293	3659	143	700	E	L2C5-40701204F0900
9	5000K	70	3293	3659	143	700	E	L2C5-50701204F0900
9	5700K	70	3308	3675	144	700	E	L2C5-57701204F0900
9	6500K	70	3303	3670	144	700	E	L2C5-65701204F0900
9	2700K	80	2804	3116	122	700	E	L2C5-27801204F0900
9	3000K	80	3011	3345	131	700	E	L2C5-30801204F0900
9	3500K	80	3064	3404	133	700	E	L2C5-35801204F0900
9	4000K	80	3184	3538	138	700	E	L2C5-40801204F0900
9	5000K	80	3099	3443	135	700	E	L2C5-50801204F0900
9	5700K	80	3099	3443	135	700	E	L2C5-57801204F0900
9	2700K	90	2441	2712	106	700	F	L2C5-27901204F0900
9	3000K	90	2588	2875	113	700	F	L2C5-30901204F0900
9	3500K	90	2626	2918	114	700	F	L2C5-35901204F0900
9	4000K	90	2742	3047	119	700	E	L2C5-40901204F0900
11	4000K	70	4325	4805	146	900	D	L2C5-40701205F1100
11	5000K	70	4325	4805	146	900	D	L2C5-50701205F1100
11	2700K	80	3633	4037	123	900	E	L2C5-27801205F1100
11	3000K	80	3806	4229	129	900	E	L2C5-30801205F1100
11	3500K	80	3996	4440	135	900	E	L2C5-35801205F1100
11	4000K	80	4004	4449	135	900	E	L2C5-40801205F1100
11	5000K	80	3889	4321	132	900	E	L2C5-50801205F1100
11	5700K	80	3889	4321	132	900	E	L2C5-57801205F1100
11	2700K	90	3177	3530	107	900	F	L2C5-27901205F1100
11	3000K	90	3314	3682	112	900	F	L2C5-30901205F1100
11	4000K	90	3598	3998	122	900	E	L2C5-40901205F1100

Notes for Table 1:
1. Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.
2. Lumileds maintains a tolerance of ±2 on CRI and ±6.5% on luminous flux measurements.
3. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
4. R9 value of 90CRI products are >50.
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 CoB Core Range High Density (Gen 2) at specified test current, T_j=85°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L2C5-xxxx12xxFxx00	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 CoB Core Range High Density (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		
L2C5-xxxx1202FH6xx	33.6	36.5	39.4	-16	0.83
L2C5-xxxx1204F09xx	33.6	36.5	39.4	-16	0.38
L2C5-xxxx1205F11xx	33.6	36.5	39.4	-16	0.30

Notes for Table 3:
1. Lumileds maintains a tolerance of ±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 CoB Core Range High Density (Gen 2).

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1, 2]	700mA (1202HD), 1350mA (1204HD), 1650mA (1205HD)
LED Junction Temperature [1] (DC & Pulse)	150°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 20% of the maximum allowable DC forward current

Characteristic Curves

Spectral Power Distribution Characteristics

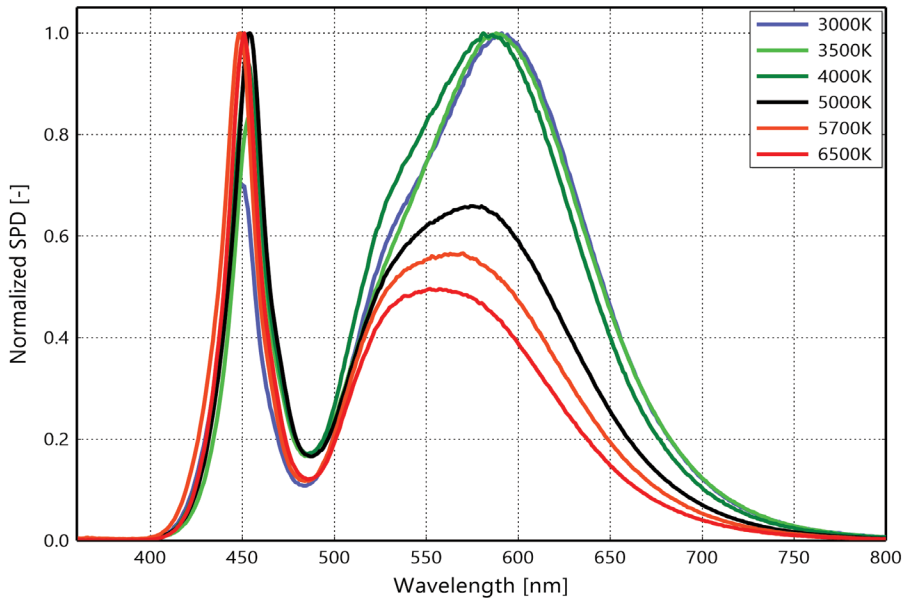


Figure 1a. Typical normalized power vs. wavelength for L2C5-xx7012xxFxx00 at specified test current, T_j=85°C.

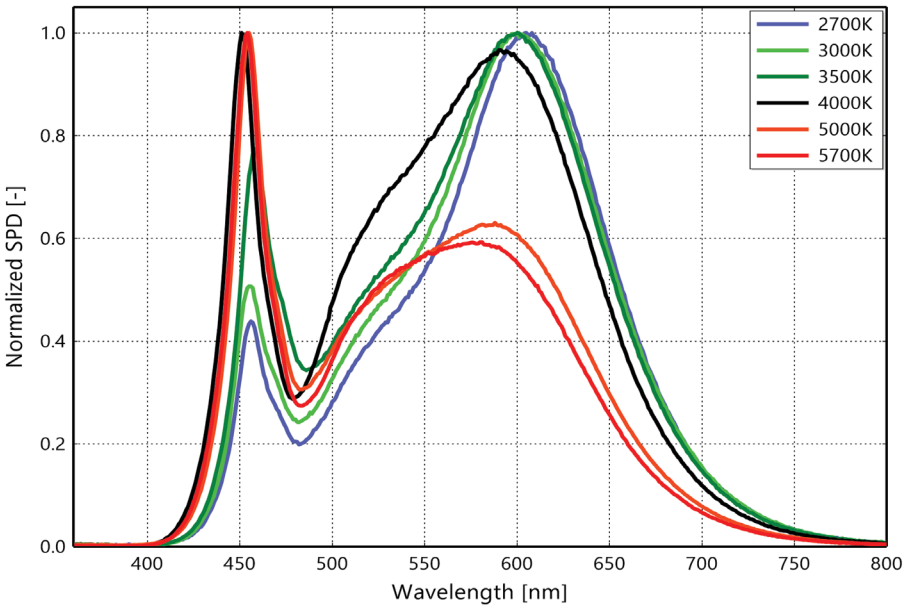


Figure 1b. Typical normalized power vs. wavelength for L2C5-xx8012xxFxx00 at specified test current, T_j=85°C.

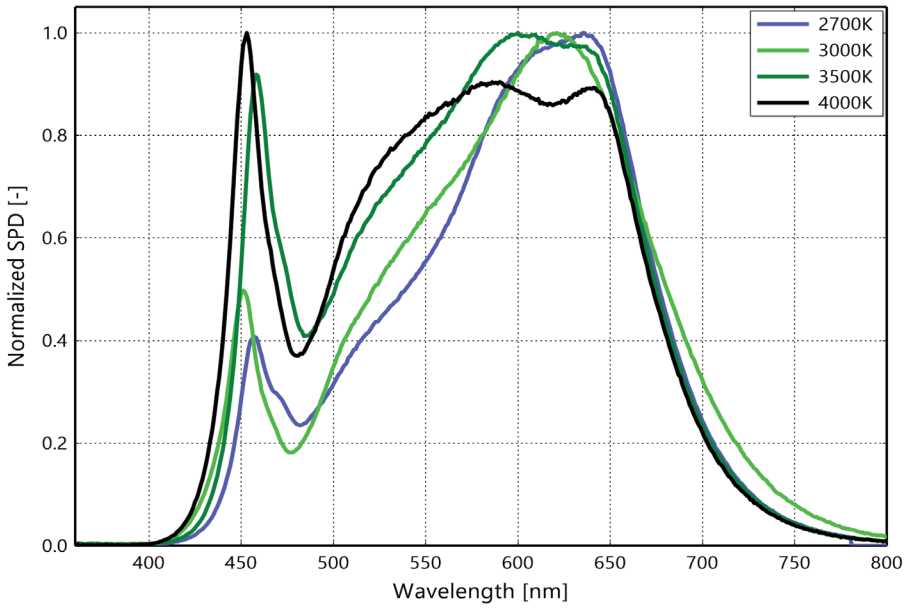


Figure 1c. Typical normalized power vs. wavelength for L2C5-xx9012xxFxx00 at specified test current, T_j=85°C.

Light Output Characteristics

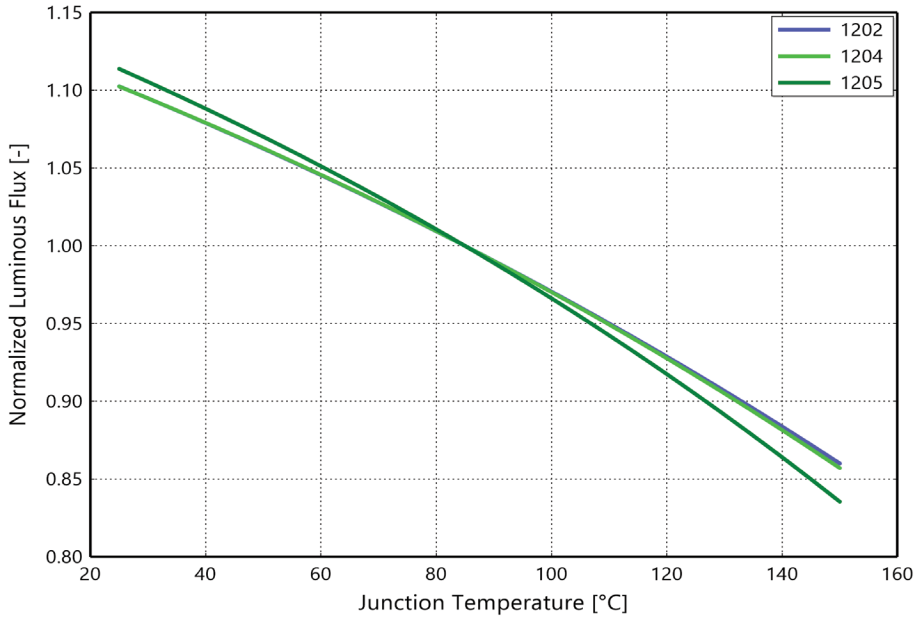


Figure 2. Typical normalized light output vs. junction temperature for L2C5-xxxx12xxFxx00 at specified test current.

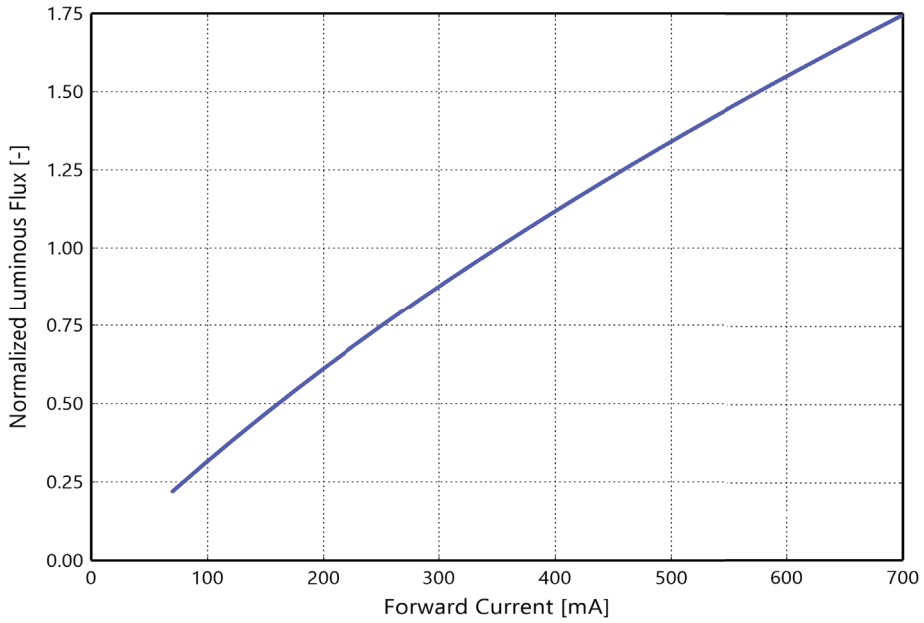


Figure 3a. Typical normalized light output vs. forward current for L2C5-xxxx1202F0600 at T_j =85°C.

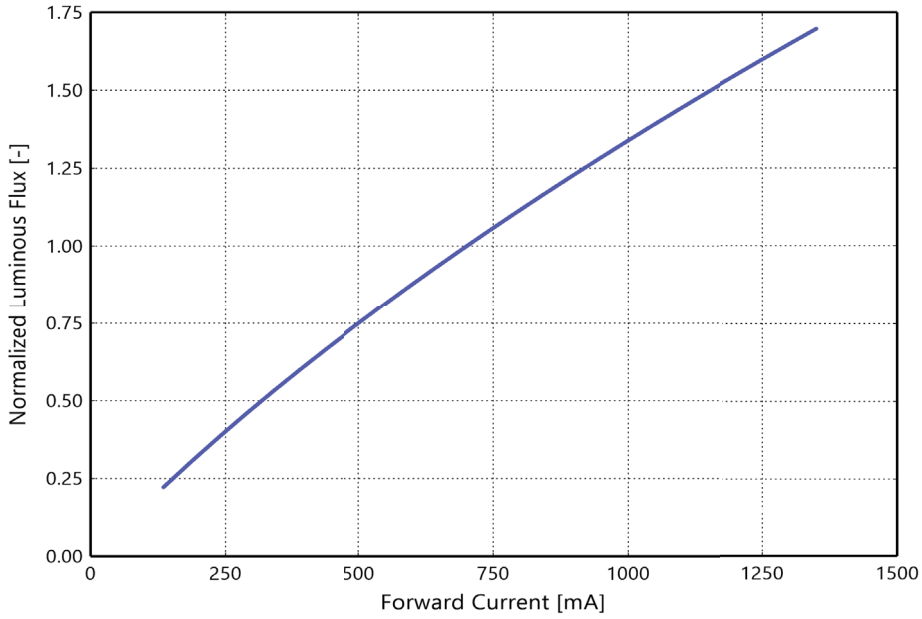


Figure 3b. Typical normalized light output vs. forward current for L2C5-xxxx1204F0900 at T_j =85°C.

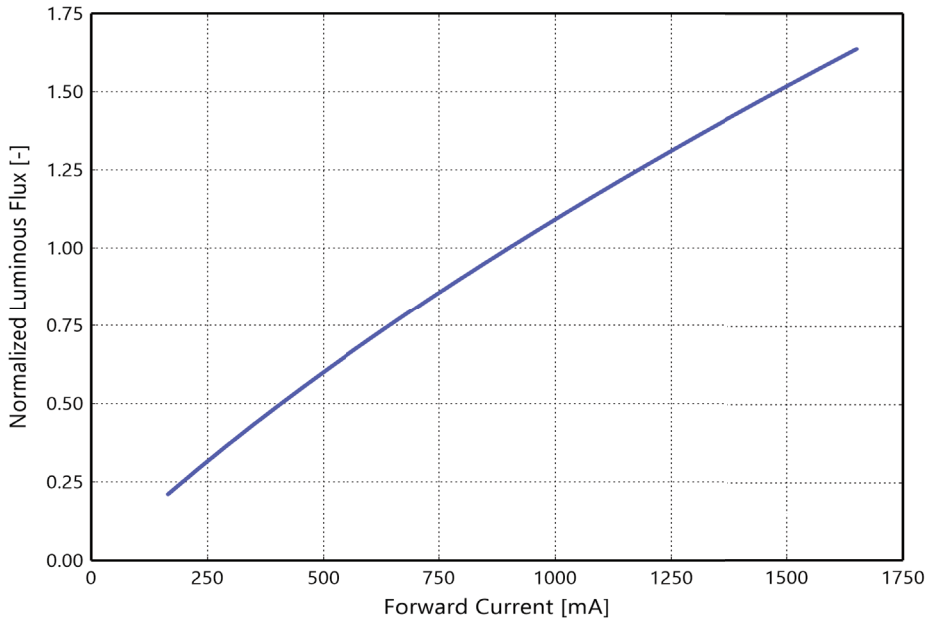


Figure 3c. Typical normalized light output vs. forward current for L2C5-xxxx1205F1100 at T_j =85°C.

Forward Current Characteristics

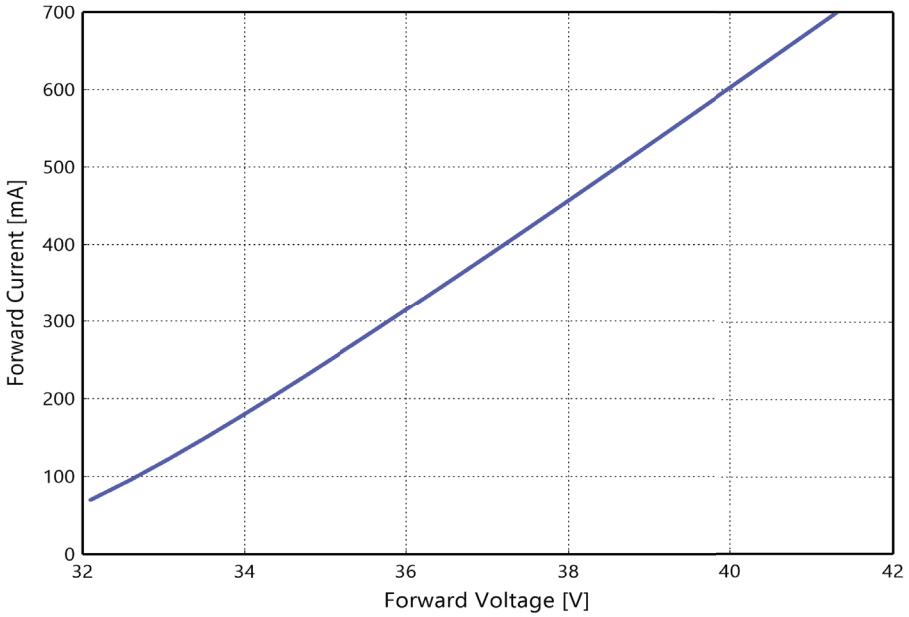


Figure 4a. Typical forward current vs. forward voltage for L2C5-xxxx1202F0600 at T_j=85°C.

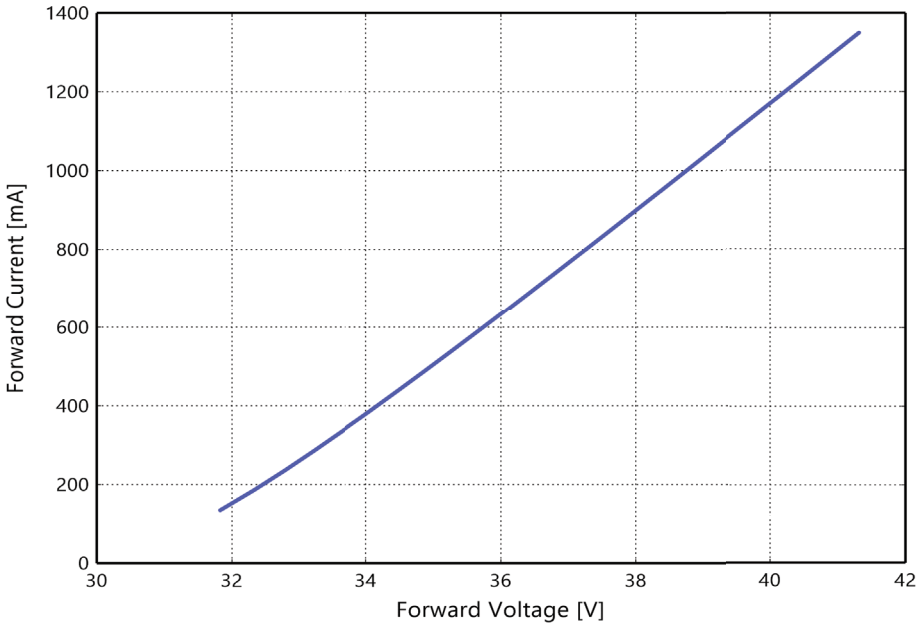


Figure 4b. Typical forward current vs. forward voltage for L2C5-xxxx1204F0900 at T_j=85°C.

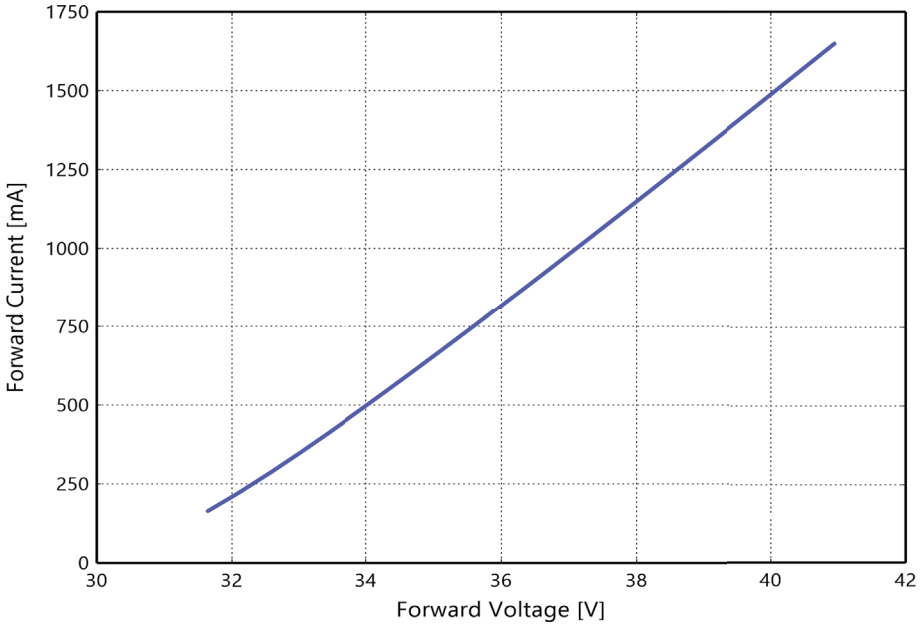


Figure 4c. Typical forward current vs. forward voltage for L2C5-xxxx1205F1100 at T_j=85°C.

Radiation Pattern Characteristics

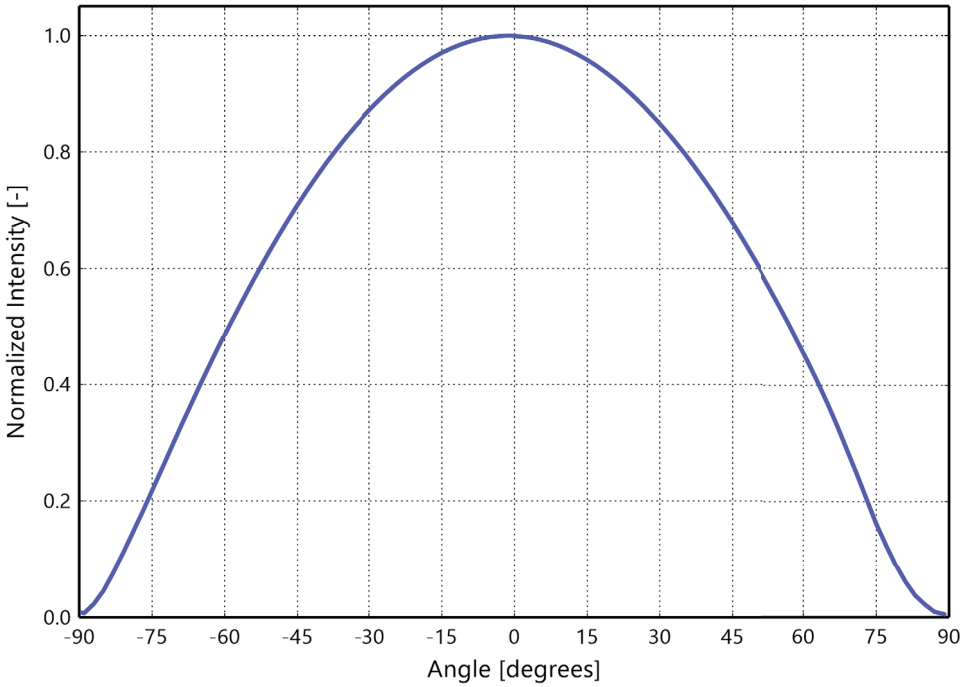


Figure 5. Typical radiation pattern for LUXEON CoB Core Range – High Density at specified test current, T_j=85°C.

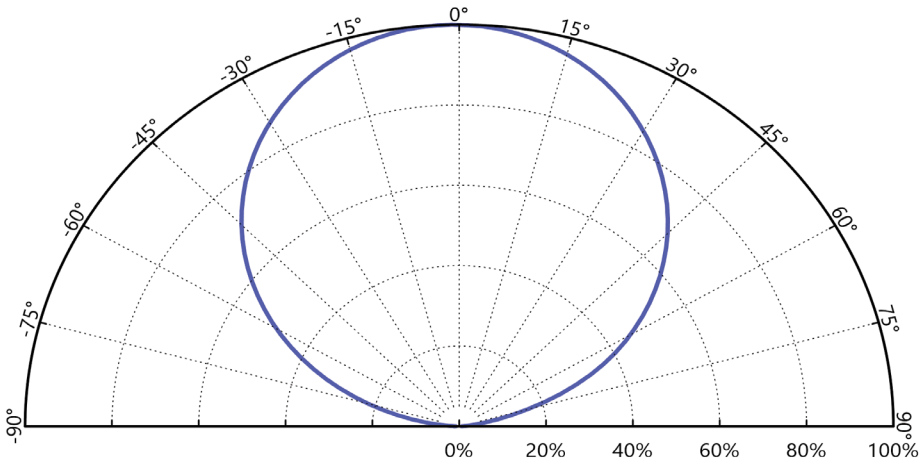


Figure 6. Typical polar radiation pattern for LUXEON CoB Core Range – High Density at specified test current, T_j=85°C.

Color Bin Definitions

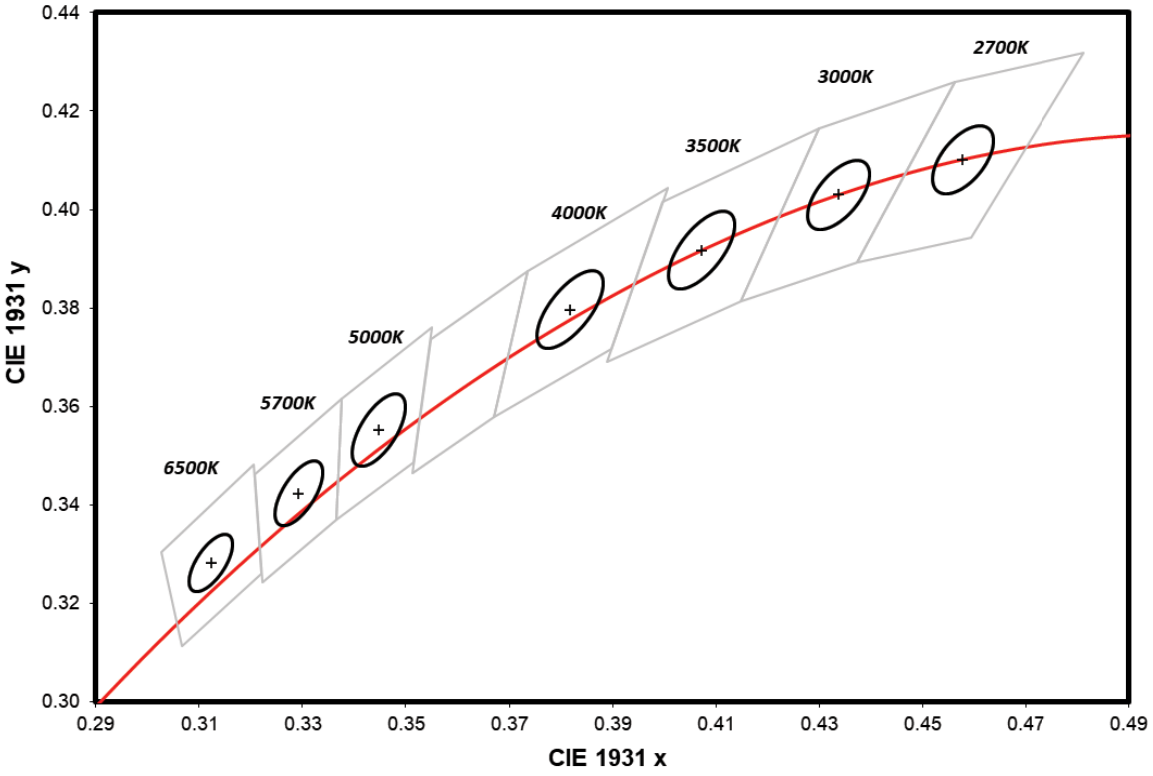


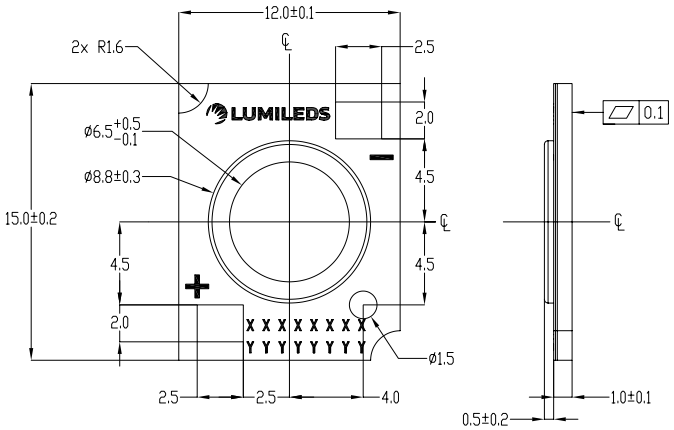
Figure 7. 3-step MacAdam ellipse illustration for Table 5.

Table 5. 3-step MacAdam ellipse color bin definitions for LUXEON CoB Core Range High Density Gen 2.

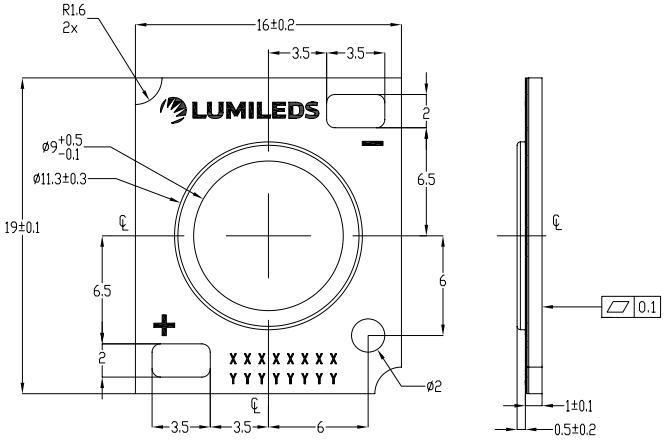
NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, θ
2700K	Single 3-step MacAdam ellipse	(0.4578, 0.4101)	0.00810	0.00420	53.70°
3000K	Single 3-step MacAdam ellipse	(0.4338, 0.4030)	0.00834	0.00408	53.20°
3500K	Single 3-step MacAdam ellipse	(0.4073, 0.3917)	0.00927	0.00414	54.00°
4000K	Single 3-step MacAdam ellipse	(0.3818, 0.3797)	0.00939	0.00402	53.70°
5000K	Single 3-step MacAdam ellipse	(0.3447, 0.3553)	0.00822	0.00354	59.60°
5700K	Single 3-step MacAdam ellipse	(0.3287, 0.3417)	0.00745	0.00320	59.09°
6500K	Single 3-step MacAdam ellipse	(0.3123, 0.3282)	0.00669	0.00285	58.57°

Notes for Table 5:
1. Lumileds maintains a tolerance of ±0.005 on x and y coordinates in the CIE 1931 color space.

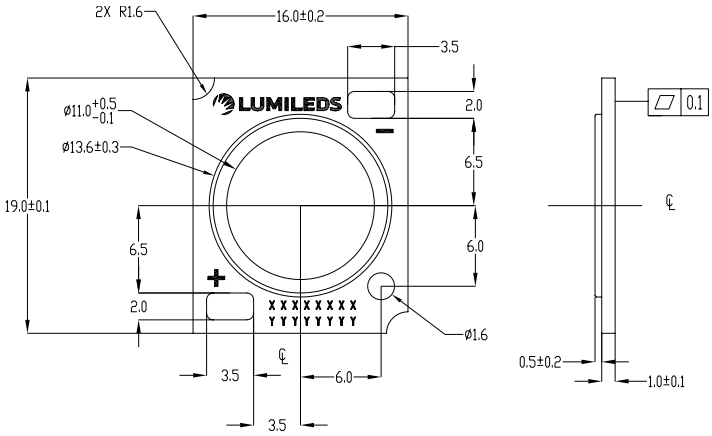
Mechanical Dimensions



L2C5-xxxx1202FH600



L2C5-xxxx1204F0900



L2C5-xxxx1205F1100

Figure 8. Mechanical dimensions for LUXEON CoB Core Range High Density Gen 2.

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

Packaging Information

LUXEON CoB Core Range High Density Gen 2 LEDs are packaged in tubes then in a carton box. Each tube contains a specified number of LEDs. The LEDs in each tube come from a single category code, ensuring they are all well-matched for light output, color, and forward voltage. Each tube contains a rubber stopper at one end. The tube 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.

Table 6. Number of LEDs per tube for LUXEON CoB Core Range High Density (Gen 2).

PART NUMBER	TOTAL UNITS PER TUBE	TOTAL TUBES PER INNER BOX	TOTAL UNITS PER INNER BOX
L2C5-xxxx1202FH600	20	5	100
L2C5-xxxx1204F0900	20	5	100
L2C5-xxxx1205F1100	20	5	100

Tube Dimensions

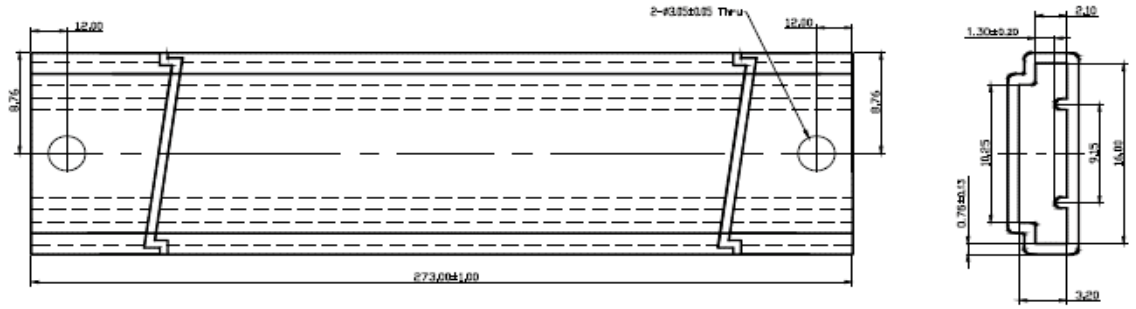


Figure 9a. Tube dimensions for L2C5-xxxx1202FH6xx.

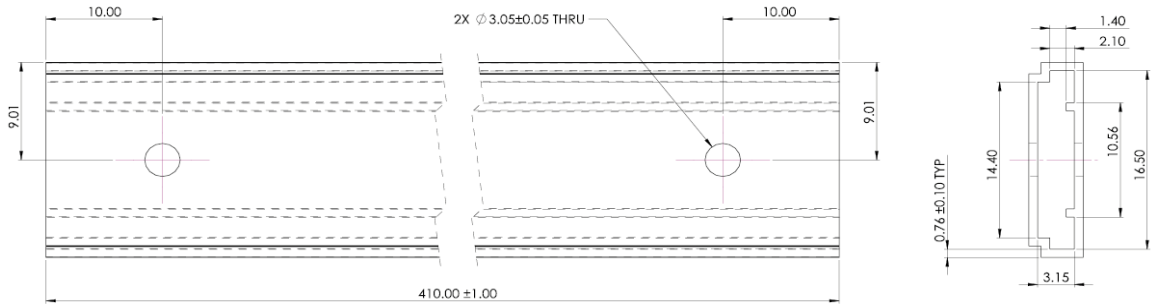


Figure 9b. Tube dimensions for L2C5-xxxx1204F0900 and L2C5-xxxx1205F1100.

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

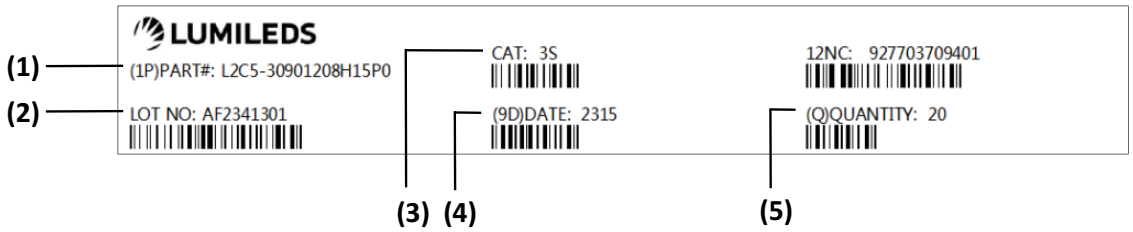


Figure 10. Example of a tube label for LUXEON CoB Core Range High Density Gen 2.

Notes for Figure 10 - Tube Label descriptions for customer use:
Field labels not described are for Lumileds internal use only.

1. Lumileds part number.
2. Unique production lot identification number. This number is required for traceability purpose.
3. Product category code.
4. LED test date in YYWW format
5. Number of LED emitters in a tube.

Inner Box

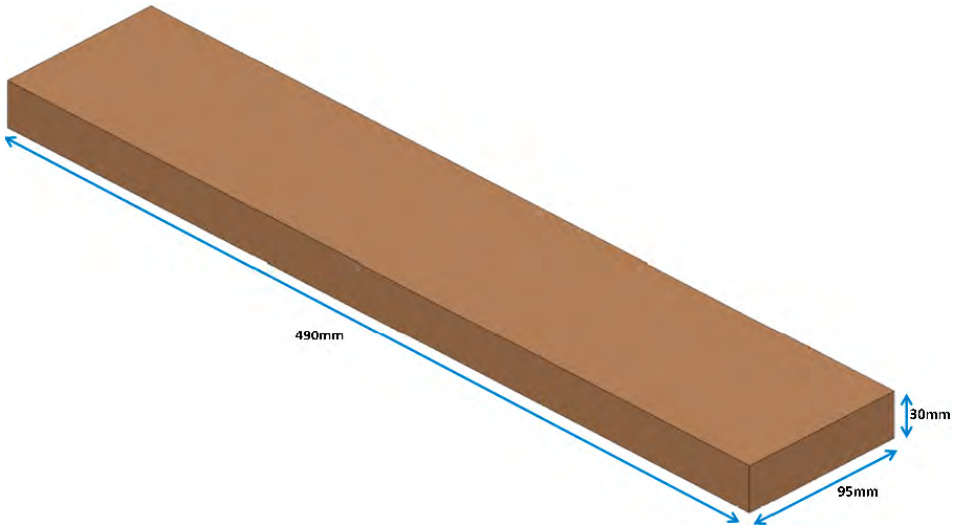


Figure 11. Dimensions for inner box packaging for LUXEON CoB Core Range High Density Gen 2.

Table 7. Inner box information for LUXEON CoB Core Range High Density Gen 2.

BOX TYPE	DIMENSIONS (mm)			AVERAGE WEIGHT (100pcs/box)	AVERAGE WEIGHT (50pcs/box)
	H	L	W		
Inner Box	30	490	95	0.340Kg	0.305Kg

Figure 12. Example of inner box label for LUXEON CoB Core Range High Density 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 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

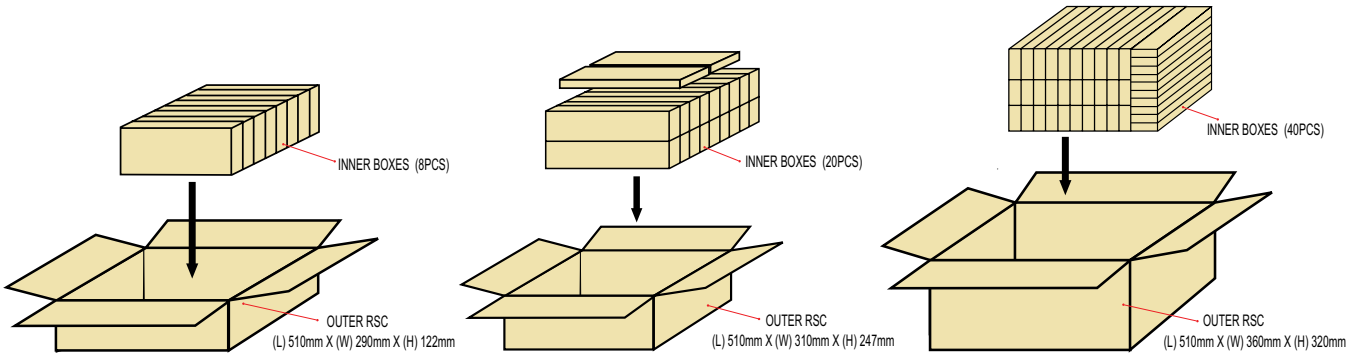


Figure 13. Dimensions for outer box packaging for LUXEON CoB Core Range High Density Gen 2.

Table 8. Outer box information for LUXEON CoB Core Range High Density Gen 2.

BOX TYPE	DIMENSIONS (mm)			MAXIMUM INNER BOXES PER OUTER BOX	MAXIMUM QUANTITY PER OUTER BOX	AVERAGE WEIGHT (100pcs/box)	AVERAGE WEIGHT (50pcs/box)
	H	L	W				
Outer Box 8	122	510	290	8	800	3.05kg	2.77kg
Outer Box 20	247	510	310	20	2000	7.55kg	6.85kg
Outer Box 40	320	510	360	40	4000	15.10kg	13.70kg

Figure 14. Example of outer box label for LUXEON CoB Core Range High Density 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. Unique production lot identification number. This number is required for traceability purpose.
4. 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.

LUMILEDS