LUMILEDS

ILLUMINATION

For NEW designs consider these replacement products:

- LUXEON CoB Core Range (Gen 3)

LUXEON CoB Core Range

High-efficacy LED with a small light emitting surface and greater uniformity of light

LUXEON CoB Core Range consists of high uniformity LEDs that represent a new breakthrough in efficacy for chip-on-board. Due to its industry-leading small Light Emitting Surfaces (LES), LUXEON CoB arrays are easy to work with, enabling less expensive designs. All emitters within the LUXEON CoB Core Range are available in 3-step MacAdam ellipse, ensuring uniform optical performance in general lighting applications. In addition, LUXEON CoB Core Range LEDs are hot-tested at 85°C—real world operating conditions—which means luminaire design is simplified and testing can be minimized.

NOT RECOMMENDED FOR NEW DESIGNS

FEATURES AND BENEFITS

- Highest flux densities with industry's smallest LES
- R9 between 80 and 90 for vibrant reds
- 3-step MacAdam ellipse color definition: *Freedom from Binning* for color consistency from luminaire to luminaire
- Up to 4x lower thermal resistance than competition, enabling smaller heat sinks and higher lumens
- Supported by a comprehensive optical, mechanical and electrical ecosystem

PRIMARY APPLICATIONS

- Architectural
- Downlights
- High Bay & Low Bay
- Lamps
- Outdoor
- Specialty Lighting
- Spotlights

 ©2016 Lumileds Holding B.V. All rights reserved.

c UL us No. E352519 RoHS COMPLIANT

Table of Contents

General Product Information **2**
- Product Test Conditions 2
- Part Number Nomenclature 2
- Lumen Maintenance 2
- Environmental Compliance 2

Performance Characteristics **3**
- Product Selection Guide 3
- Optical Characteristics 6
- Electrical and Thermal Characteristics 6

Absolute Maximum Ratings **6**

Characteristic Curves **7**
- Spectral Power Distribution Characteristics 7
- Light Output Characteristics 8
- Forward Current Characteristics 12
- Radiation Pattern Characteristics 15
- Color Bin Definition 16

Mechanical Dimensions **17**

Packaging Information **20**
- Unit Totals per Box 20
- Tube Dimensions 20

NOT RECOMMENDED FOR NEW DESIGNS

General Product Information

Product Test Conditions

LUXEON CoB Core Range LEDs are tested and binned with a drive current of 200mA for LUXEON CoB 1202s and LUXEON CoB 1202, 300mA for LUXEON CoB 1203, 450mA for LUXEON CoB 1204, 600mA for LUXEON CoB 1205, 900mA for LUXEON CoB 1208 and 1200mA for LUXEON 1211 at a junction temperature, T_j, of 85ºC.

Part Number Nomenclature

Part numbers for LUXEON CoB Core Range follow the convention below:

L H C 1 – **A A B B** – **C C C C** (Traditional Part Number Scheme)

L 2 C 1 – **A A B B** 1 2 0 2 0 6 A 0 0 (New Part Number Scheme)

Where:

A A – designates nominal CCT (22=2200K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K)

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

C C C C – designates product configuration (1202=1202, 1203=1203, 1204=1204, 1205=1205, 1208=1208, 1211=1211)

Therefore, the following part numbers are used for LUXEON CoB Core Range 1203 3000K CCT 80CRI:

L H C 1 – **3 0 8 0** – **1 2 0 3**

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 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).

NOT RECOMMENDED FOR NEW DESIGNS

Performance Characteristics

Product Selection Guide

Table 1. Product performance of LUXEON CoB Core Range at test current, T_j=85°C.

PRODUCT	NOMINAL CCT	MINIMUM CRI [1, 2]	LUMINOUS FLUX [1] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
			MINIMUM	TYPICAL			
LUXEON CoB 1202s	2200K	80	550	625	88	200	L2C1-2280120206A00
	2700K	80	645	725	101	200	L2C1-2780120206A00
	3000K	80	700	775	109	200	L2C1-3080120206A00
	3500K	80	700	775	109	200	L2C1-3580120206A00
	4000K	80	700	800	113	200	L2C1-4080120206A00
	5000K	80	725	825	116	200	L2C1-5080120206A00
	2200K	90	450	525	75	200	L2C1-2290120206A00
	2700K	90	525	600	85	200	L2C1-2790120206A00
	3000K	90	550	625	88	200	L2C1-3090120206A00
	3500K	90	575	650	92	200	L2C1-3590120206A00
	4000K	90	600	700	100	200	L2C1-4090120206A00
LUXEON CoB 1202	2200K	80	575	650	92	200	LHC1-2280-1202
	2700K	80	675	750	106	200	LHC1-2780-1202
	3000K	80	725	800	115	200	LHC1-3080-1202
	3500K	80	750	825	119	200	LHC1-3580-1202
	4000K	80	750	850	122	200	LHC1-4080-1202
	5000K	80	775	875	124	200	LHC1-5080-1202
	2200K	90	475	550	44	200	LHC1-2290-1202
	2700K	90	550	625	90	200	LHC1-2790-1202
	3000K	90	575	650	93	200	LHC1-3090-1202
	3500K	90	600	675	96	200	LHC1-3590-1202
	4000K	90	650	725	100	200	LHC1-4090-1202
LUXEON CoB 1203	3000K	70	1172	1300	122	300	LHC1-3070-1203
	3500K	70	1172	1300	122	300	LHC1-3570-1203
	4000K	70	1225	1375	130	300	LHC1-4070-1203
	5000K	70	1225	1375	130	300	LHC1-5070-1203
	5700K	70	1225	1375	130	300	LHC1-5770-1203
	2200K	80	825	950	92	300	LHC1-2280-1203
	2700K	80	1025	1125	106	300	LHC1-2780-1203
	3000K	80	1100	1225	115	300	LHC1-3080-1203
	3500K	80	1150	1275	119	300	LHC1-3580-1203
	4000K	80	1175	1300	122	300	LHC1-4080-1203
	5000K	80	1175	1325	124	300	LHC1-5080-1203
	2200K	90	700	825	80	300	LHC1-2290-1203
	2700K	90	850	950	90	300	LHC1-2790-1203
	3000K	90	900	1000	93	300	LHC1-3090-1203
	3500K	90	925	1025	96	300	LHC1-3590-1203
	4000K	90	1000	1100	100	300	LHC1-4090-1203

Notes for Table 1 (continued on next page):
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.

NOT RECOMMENDED FOR NEW DESIGNS

Table 1 Continued. Product performance of LUXEON CoB Core Range at test current, T_j=85ºC.

PRODUCT	NOMINAL CCT	MINIMUM CRI [1, 2]	LUMINOUS FLUX [1] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
			MINIMUM	TYPICAL			
LUXEON CoB 1204	3000K	70	1725	1950	122	450	LHC1-3070-1204
	3500K	70	1725	1950	122	450	LHC1-3570-1204
	4000K	70	1825	2050	130	450	LHC1-4070-1204
	5000K	70	1825	2050	130	450	LHC1-5070-1204
	5700K	70	1825	2050	130	450	LHC1-5770-1204
	2200K	80	1325	1475	92	450	LHC1-2280-1204
	2700K	80	1550	1700	106	450	LHC1-2780-1204
	3000K	80	1625	1825	115	450	LHC1-3080-1204
	3500K	80	1725	1900	119	450	LHC1-3580-1204
	4000K	80	1725	1950	122	450	LHC1-4080-1204
	5000K	80	1750	1975	124	450	LHC1-5080-1204
	2200K	90	1075	1250	78	450	LHC1-2290-1204
	2700K	90	1275	1425	90	450	LHC1-2790-1204
	3000K	90	1325	1475	93	450	LHC1-3090-1204
	3500K	90	1400	1525	96	450	LHC1-3590-1204
	4000K	90	1450	1600	100	450	LHC1-4090-1204
LUXEON CoB 1205	3000K	70	2325	2600	122	600	LHC1-3070-1205
	3500K	70	2325	2600	122	600	LHC1-3570-1205
	4000K	70	2450	2750	130	600	LHC1-4070-1205
	5000K	70	2450	2750	130	600	LHC1-5070-1205
	5700K	70	2450	2750	130	600	LHC1-5770-1205
	2200K	80	1700	1950	92	600	LHC1-2280-1205
	2700K	80	2000	2250	106	600	LHC1-2780-1205
	3000K	80	2200	2450	115	600	LHC1-3080-1205
	3500K	80	2250	2550	119	600	LHC1-3580-1205
	4000K	80	2325	2600	122	600	LHC1-4080-1205
	5000K	80	2350	2650	124	600	LHC1-5080-1205
	2200K	90	1400	1600	79	600	LHC1-2290-1205
	2700K	90	1700	1900	90	600	LHC1-2790-1205
	3000K	90	1800	2000	93	600	LHC1-3090-1205
	3500K	90	1850	2075	96	600	LHC1-3590-1205
	4000K	90	1925	2150	100	600	LHC1-4090-1205

Notes for Table 1 (continued on next page):
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.

NOT RECOMMENDED FOR NEW DESIGNS

Table 1 Continued. Product performance of LUXEON CoB Core Range at test current, T_j=85ºC.

PRODUCT	NOMINAL CCT	MINIMUM CRI [1, 2]	LUMINOUS FLUX [1] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
			MINIMUM	TYPICAL			
LUXEON CoB 1208	3000K	70	3500	3900	122	900	LHC1-3070-1208
	3500K	70	3500	3900	122	900	LHC1-3570-1208
	4000K	70	3650	4100	130	900	LHC1-4070-1208
	5000K	70	3700	4100	130	900	LHC1-5070-1208
	5700K	70	3700	4100	130	900	LHC1-5770-1208
	2200K	80	2600	2925	92	900	LHC1-2280-1208
	2700K	80	3050	3400	106	900	LHC1-2780-1208
	3000K	80	3275	3650	115	900	LHC1-3080-1208
	3500K	80	3400	3800	119	900	LHC1-3580-1208
	4000K	80	3500	3900	122	900	LHC1-4080-1208
	5000K	80	3500	3950	124	900	LHC1-5080-1208
	2200K	90	2125	2450	79	900	LHC1-2290-1208
	2700K	90	2550	2850	90	900	LHC1-2790-1208
	3000K	90	2650	2950	93	900	LHC1-3090-1208
	3500K	90	2775	3075	96	900	LHC1-3590-1208
	4000K	90	2900	3200	100	900	LHC1-4090-1208
LUXEON CoB 1211	3000K	70	4775	5200	122	1200	LHC1-3070-1211
	3500K	70	4775	5200	122	1200	LHC1-3570-1211
	4000K	70	5050	5600	130	1200	LHC1-4070-1211
	5000K	70	5050	5600	130	1200	LHC1-5070-1211
	5700K	70	5050	5600	130	1200	LHC1-5770-1211
	2200K	80	3550	3975	92	1200	LHC1-2280-1211
	2700K	80	4150	4600	106	1200	LHC1-2780-1211
	3000K	80	4500	5000	115	1200	LHC1-3080-1211
	3500K	80	4675	5200	119	1200	LHC1-3580-1211
	4000K	80	4775	5200	122	1200	LHC1-4080-1211
	5000K	80	4850	5300	124	1200	LHC1-5080-1211
	2200K	90	2925	3425	80	1200	LHC1-2290-1211
	2700K	90	3500	3875	90	1200	LHC1-2790-1211
	3000K	90	3650	4000	93	1200	LHC1-3090-1211
	3500K	90	3775	4200	96	1200	LHC1-3590-1211
	4000K	90	4050	4400	100	1200	LHC1-4090-1211

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.

NOT RECOMMENDED FOR NEW DESIGNS

Optical Characteristics

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

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L2C1–xxxx120206xxx	135°	115°
LHC1-xxxx-xxxx	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 at test current, T_j=85°C.

PART NUMBER	FORWARD VOLTAGE (V_f) [1]			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L2CI-xxxx120206xxx	33	35.5	38	-16	0.98
LHC1-xxxx-1202	33	35.5	38	-16	0.98
LHC1-xxxx-1203	33	35.5	38	-16	0.70
LHC1-xxxx-1204	33	35.5	38	-16	0.55
LHC1-xxxx-1205	33	35.5	38	-16	0.51
LHC1-xxxx-1208	33	35.5	38	-16	0.29
LHC1-xxxx-1211	33	35.5	38	-16	0.23

Notes for Table 3:
1. Lumileds maintains a tolerance of ±2% on forward voltage measurements.
2. Measured between 25°C and 85°C.

Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON CoB Core Range.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1,2]	2x test current [2]
LED Junction Temperature [1] (DC & Pulse)	125°C [3]
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
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 15% of the maximum allowable DC forward current

NOT RECOMMENDED FOR NEW DESIGNS

Characteristic Curves

Spectral Power Distribution Characteristics

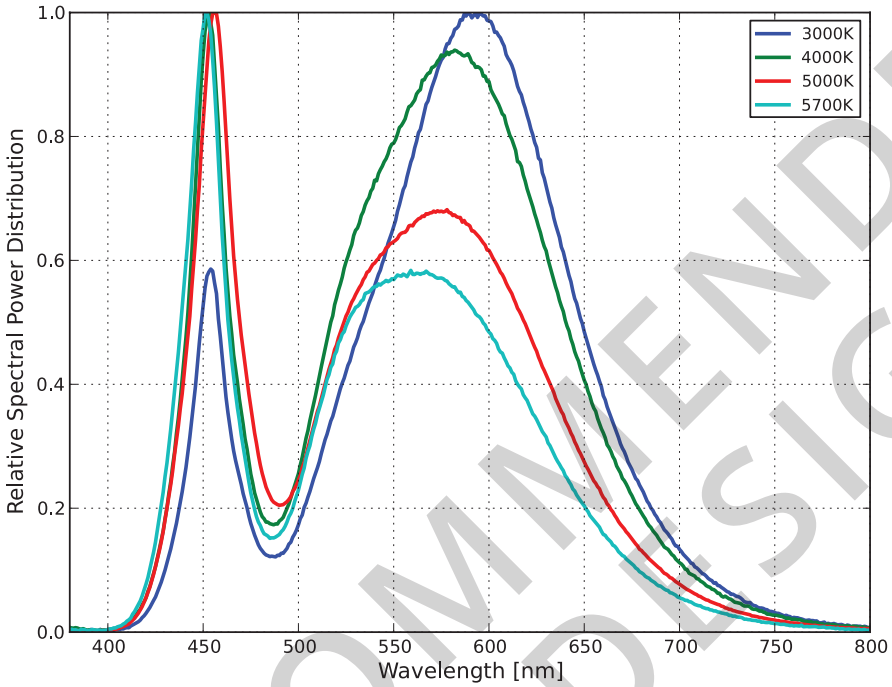

Figure 1a. Typical normalized power vs. wavelength for LHC1-xx70-1203 at test current, T_j=85ºC.

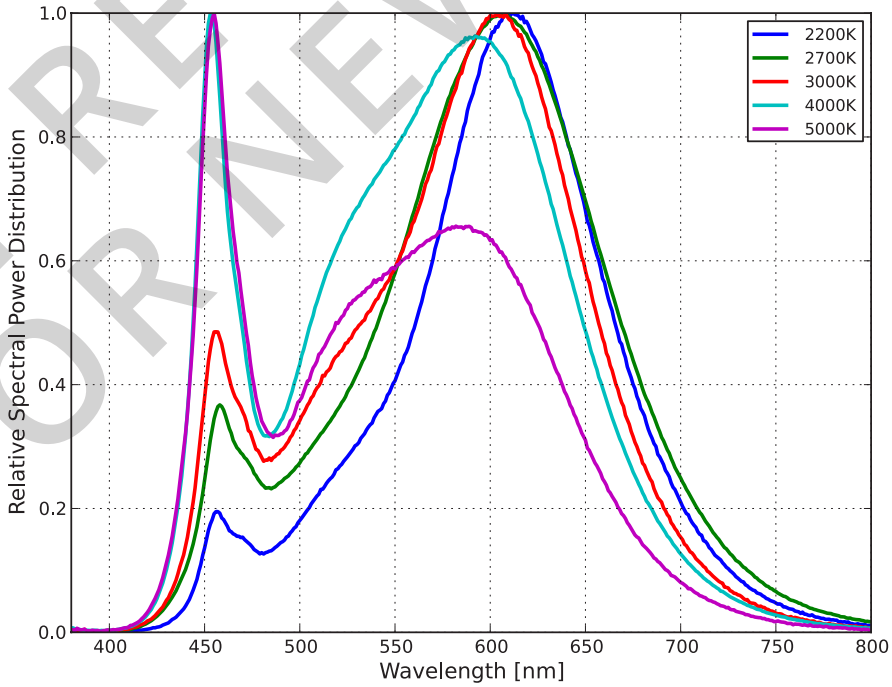

Figure 1b. Typical normalized power vs. wavelength for L2C1–xx80120206xxx and LHC1-xx80-1202at test current, T_j=85ºC.

NOT RECOMMENDED FOR NEW DESIGNS

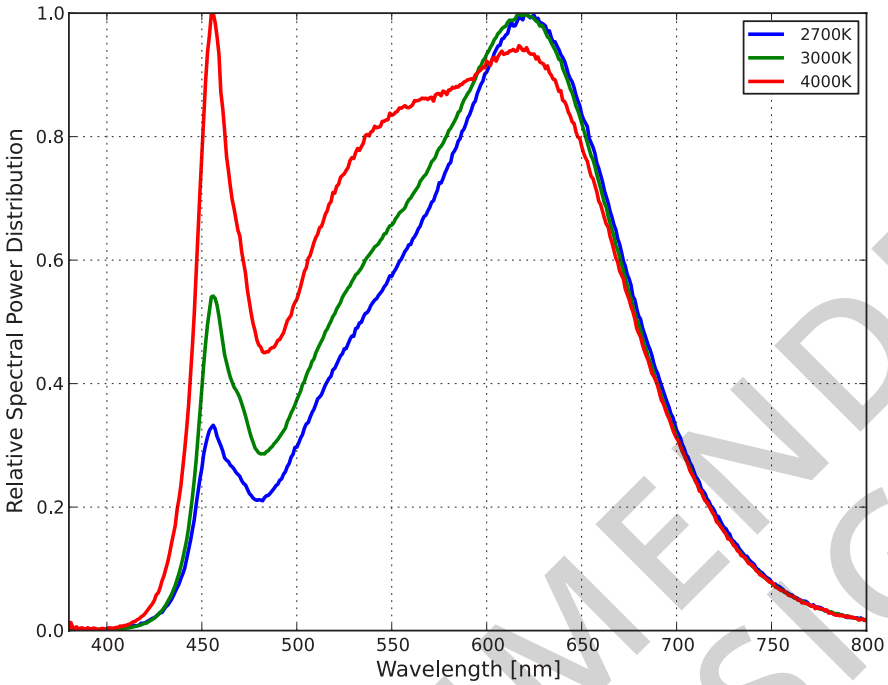

Figure 1c. Typical normalized power vs. wavelength for L2C1–xx90120206xxx and LHC1-xx90-1202 at test current, T_j=85°C.

Light Output Characteristics

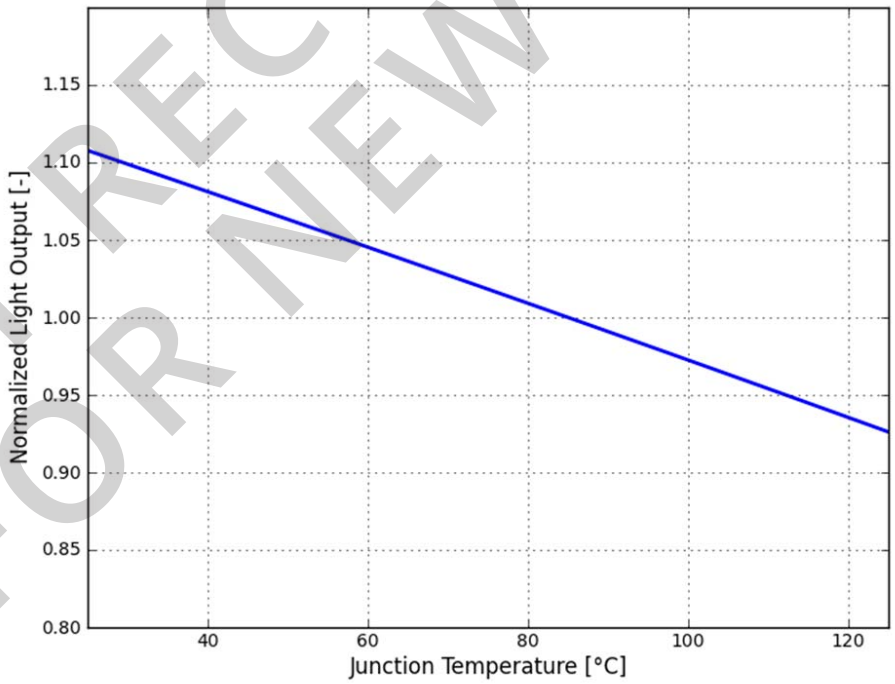

Figure 2. Typical normalized light output vs. junction temperature for L2C1–xxxx120206xxx and LHC1-xxxx-xxxx at test current.

NOT RECOMMENDED FOR NEW DESIGNS

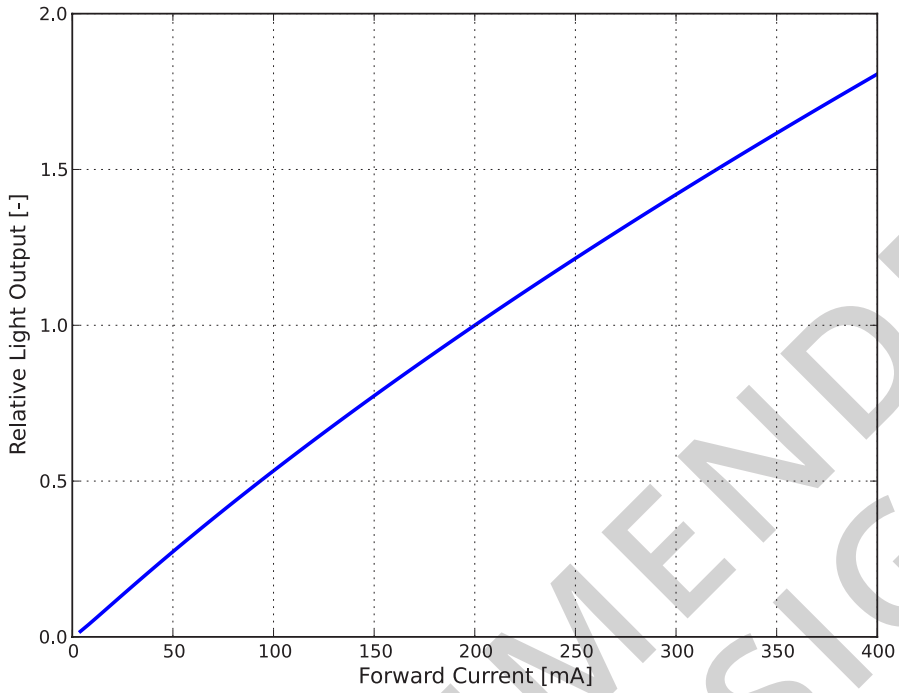

Figure 3a. Typical normalized light output vs. forward current for L2C1–xxxx120206xxx and LHC1-XXXX-1202, T_j=85ºC

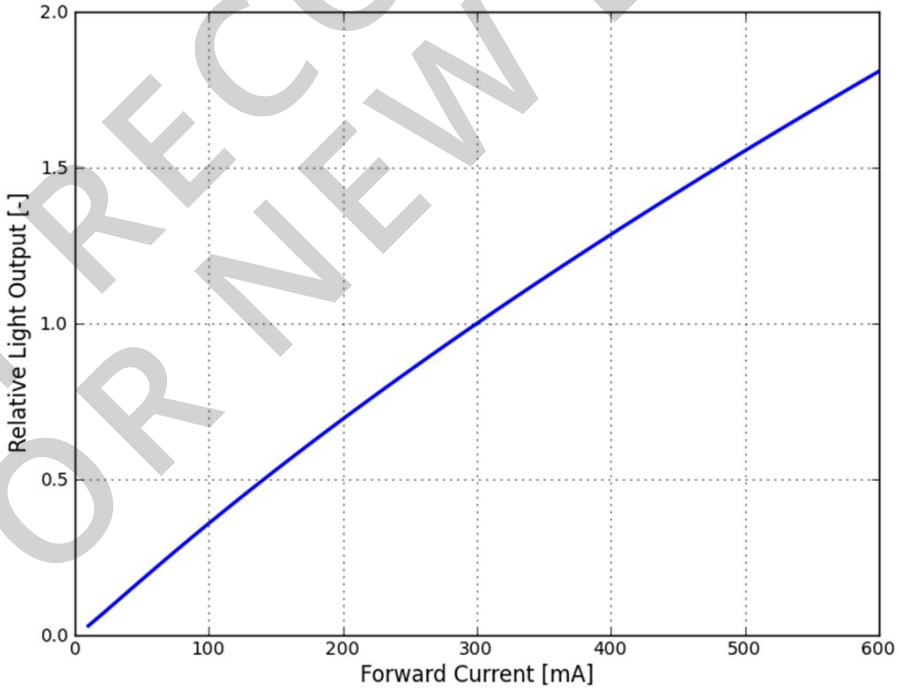

Figure 3b. Typical normalized light output vs. forward current for LHC1–xxxx–1203, T_j=85ºC.

NOT RECOMMENDED FOR NEW DESIGNS

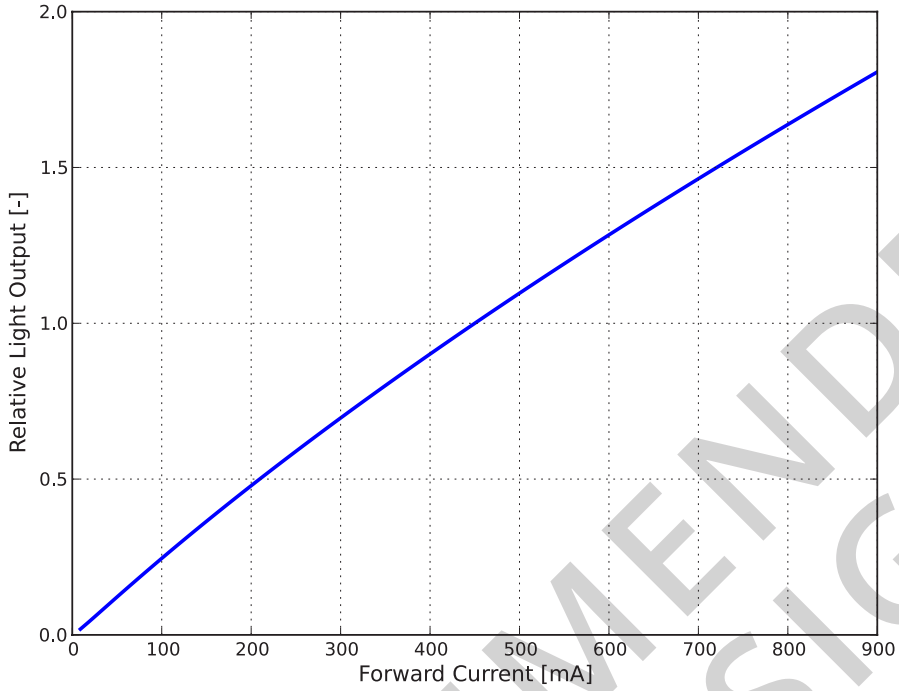

Figure 3c. Typical normalized light output vs. forward current for LHC1–xxxx–1204, T_j=85°C.

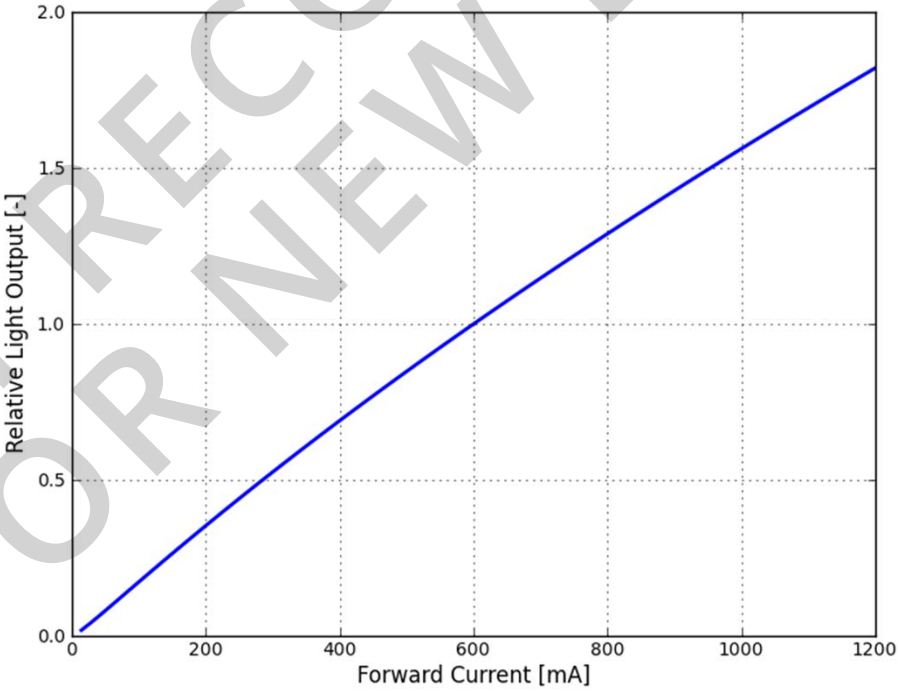

Figure 3d. Typical normalized light output vs. forward current for LHC1–xxxx–1205, T_j=85°C.

NOT RECOMMENDED FOR NEW DESIGNS

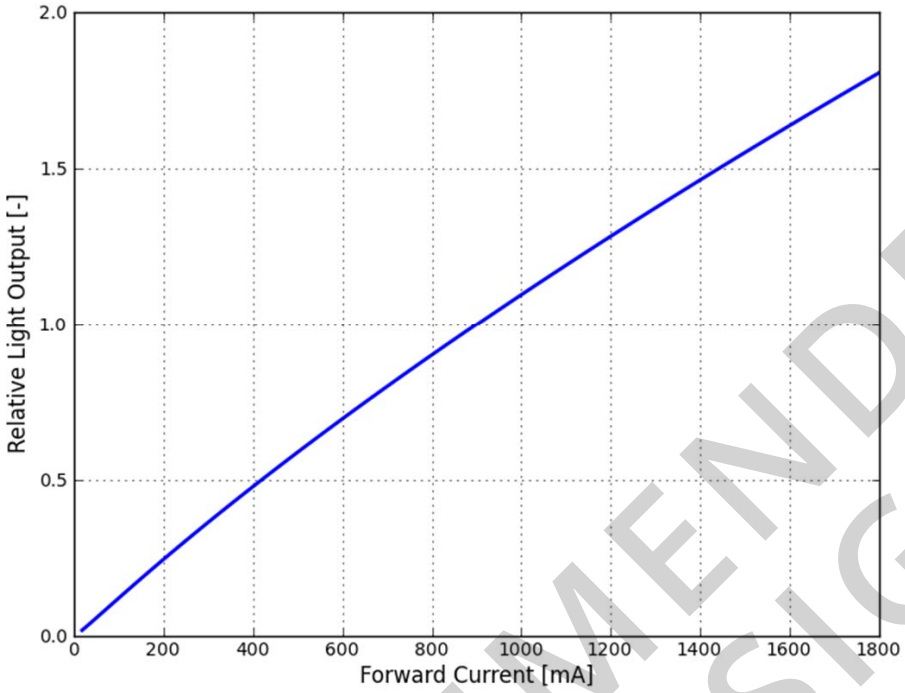

Figure 3e. Typical normalized light output vs. forward current for LHC1–xxxx–1208, T_j=85°C.

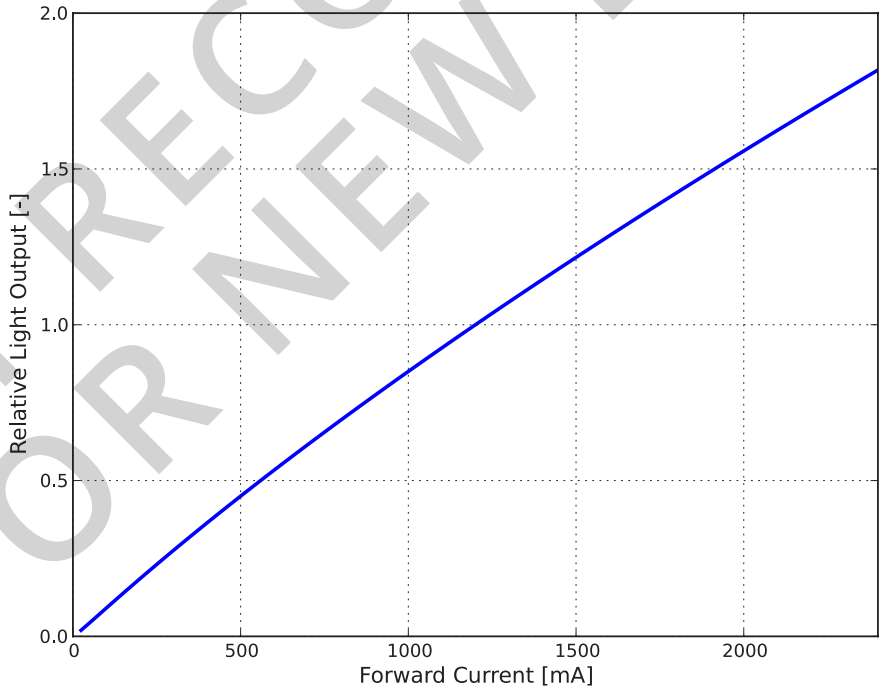

Figure 3f. Typical normalized light output vs. forward current for LHC1–xxxx–1211, T_j=85°C.

NOT RECOMMENDED FOR NEW DESIGNS

Forward Current Characteristics

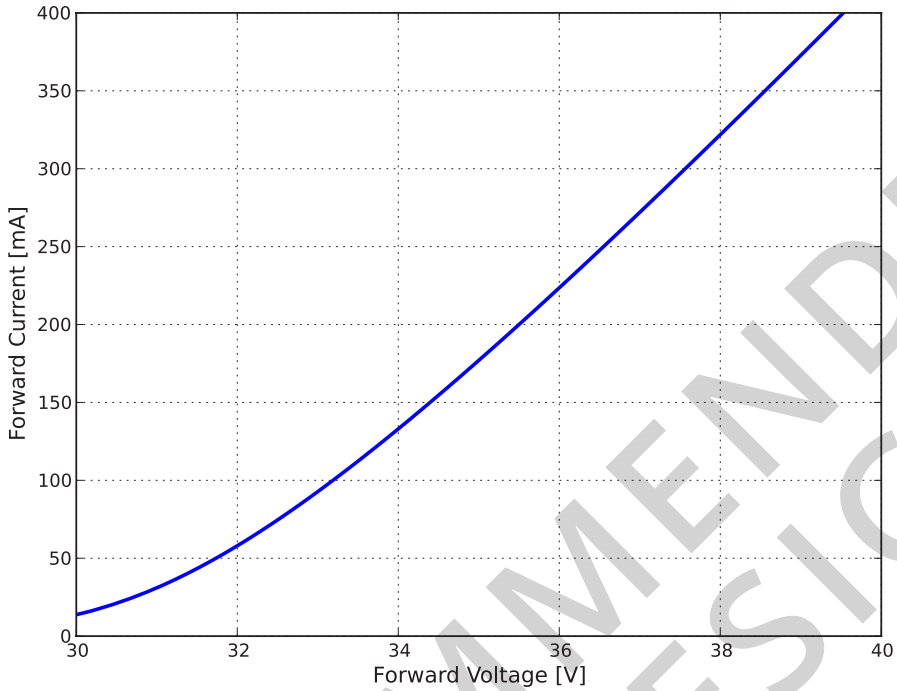

Figure 4a. Typical forward current vs. forward voltage for L2C1–xxxx120206xxx and LHC1-xxxx-1202, T_j=85°C.

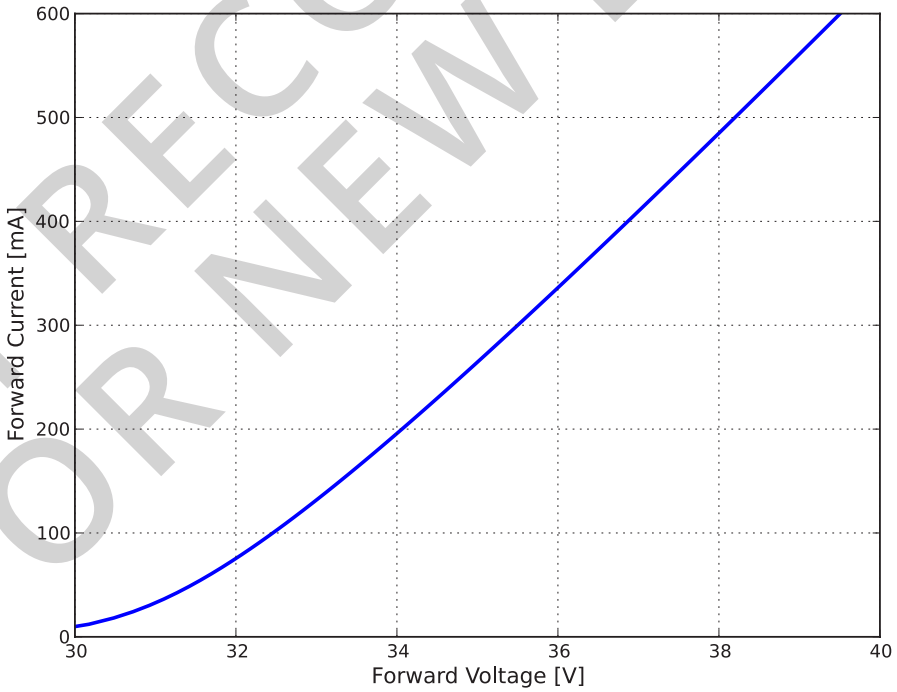

Figure 4b. Typical forward current vs. forward voltage for LHC1–xxxx–1203, T_j=85°C.

NOT RECOMMENDED FOR NEW DESIGNS

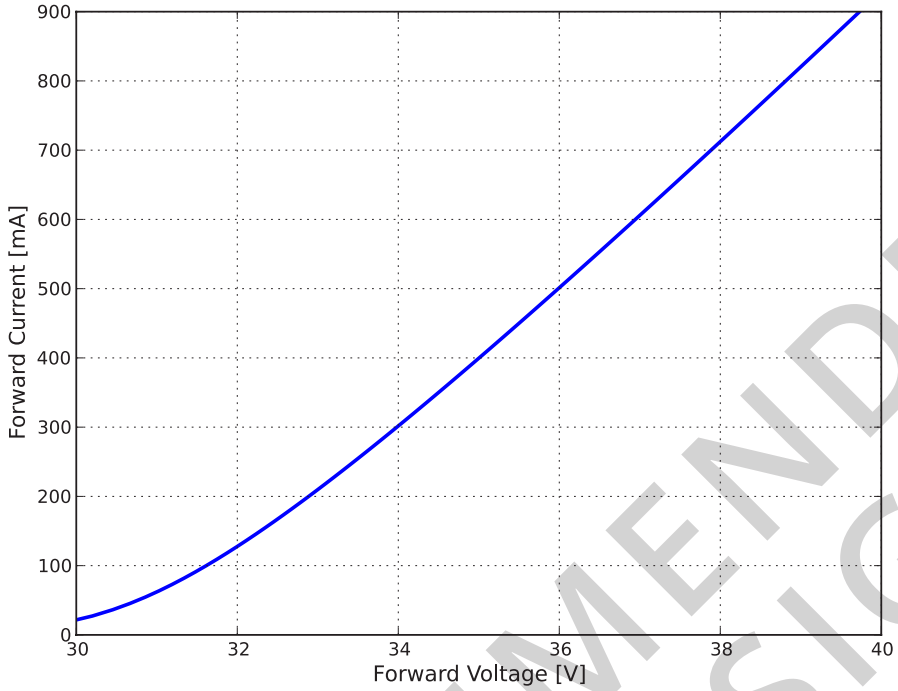

Figure 4c. Typical forward current vs. forward voltage for LHC1–xxxx–1204, T_j=85°C.

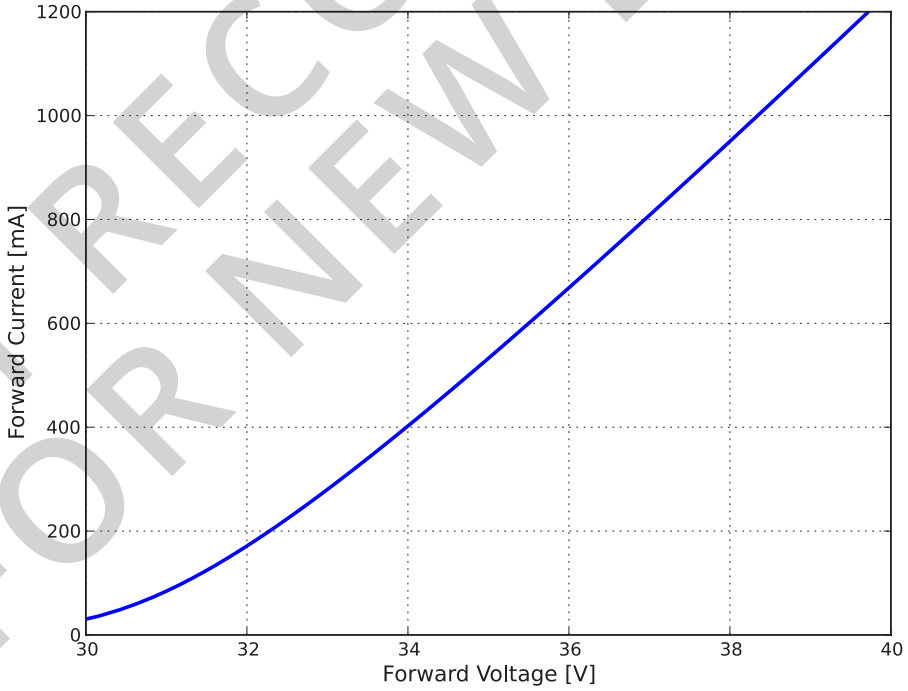

Figure 4d. Typical forward current vs. forward voltage for LHC1–xxxx–1205, T_j=85°C.

NOT RECOMMENDED FOR NEW DESIGNS

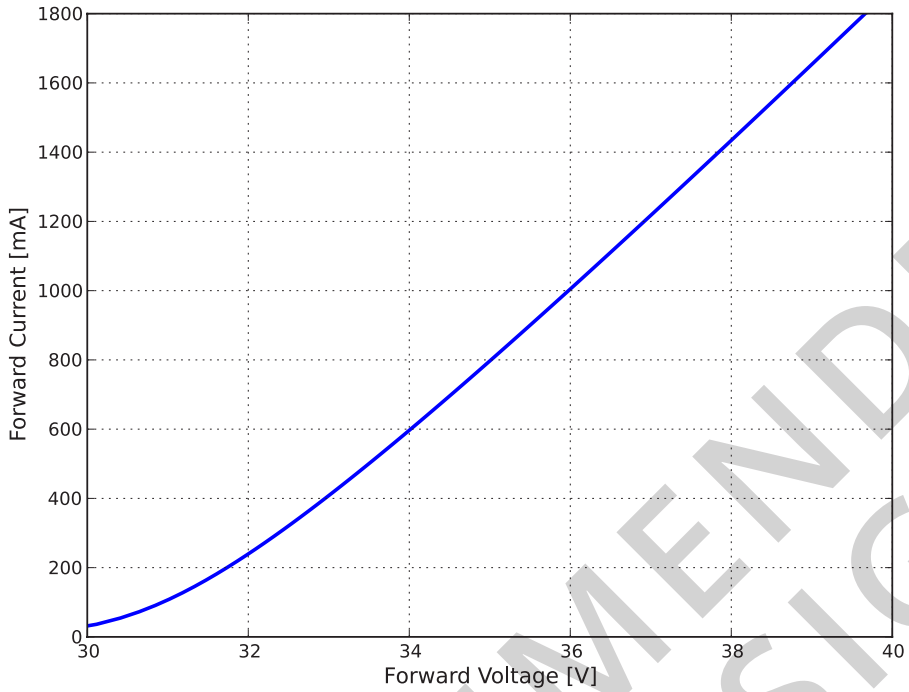

Figure 4e. Typical forward current vs. forward voltage for LHC1–xxxx–1208, T_j=85°C.

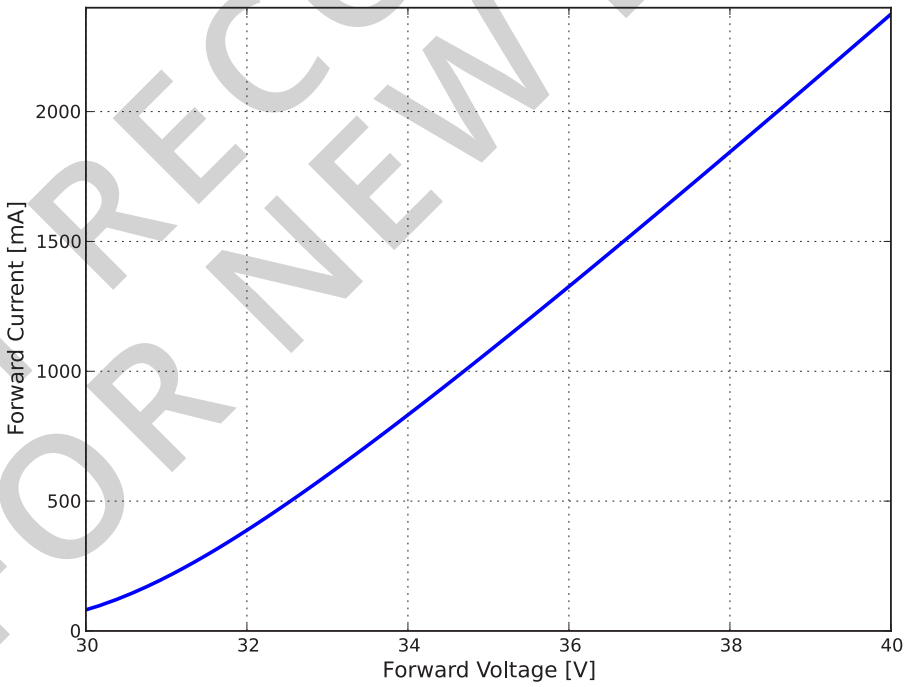

Figure 4f. Typical forward current vs. forward voltage for LHC1–xxxx–1211, T_j=85°C.

NOT RECOMMENDED FOR NEW DESIGNS

Radiation Pattern Characteristics

Figure 5. Typical radiation pattern for L2C1–xxxx120206xxx and LHC1-xxxx-xxxx at test current, T_j=85°C.

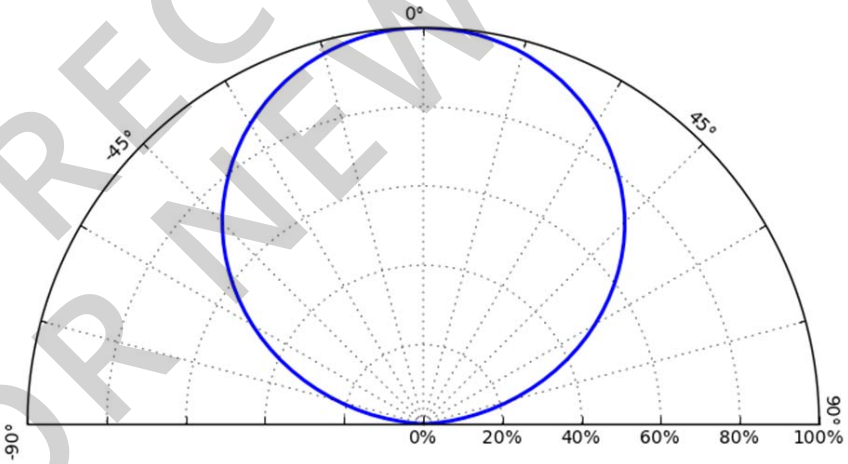

Figure 6. Typical polar radiation pattern for L2C1–xxxx120206xxx and LHC1-xxxx-xxxx at test current, T_j=85°C.

NOT RECOMMENDED FOR NEW DESIGNS

Color Bin Definition

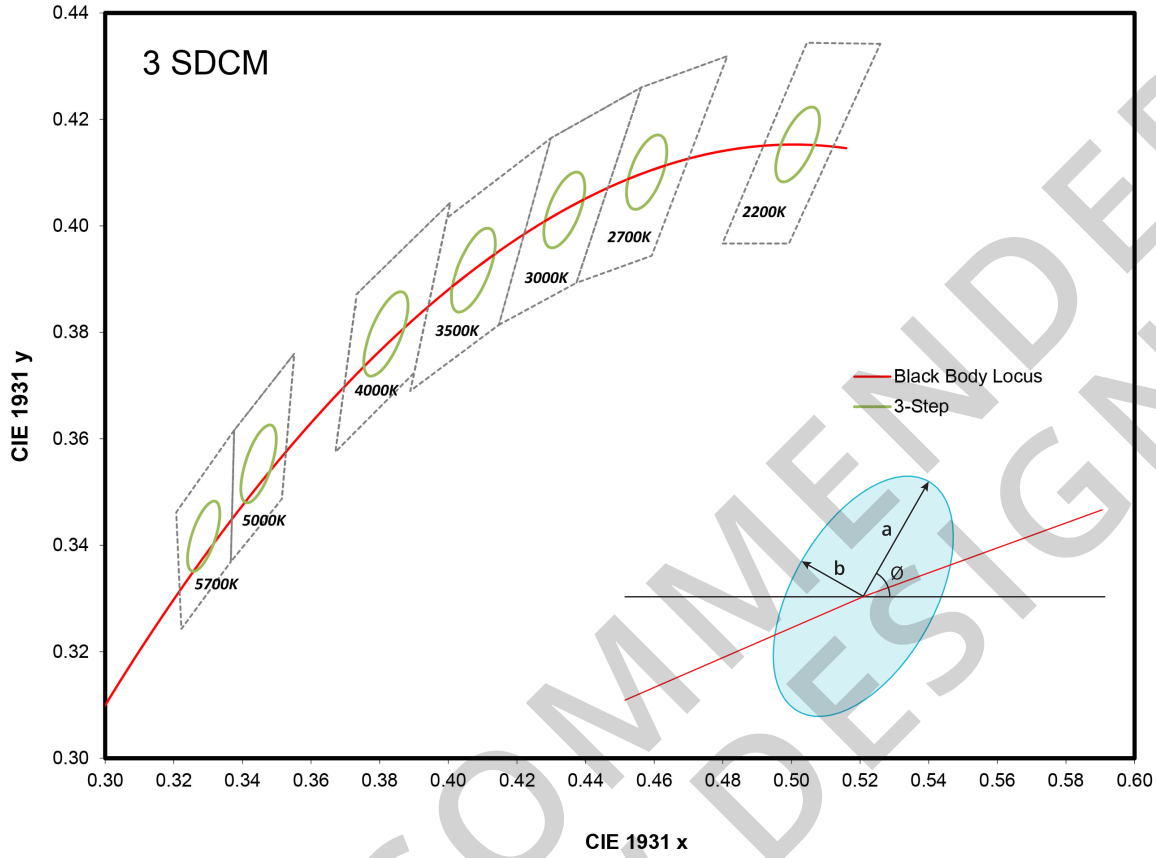

Figure 7. 3-step MacAdam ellipse illustration for Table 5.

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

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, θ
2200K	Single 3-step MacAdam ellipse	(0.5020, 0.4155)	0.00862	0.00397	49.30°
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°

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

NOT RECOMMENDED FOR NEW DESIGNS

Mechanical Dimensions

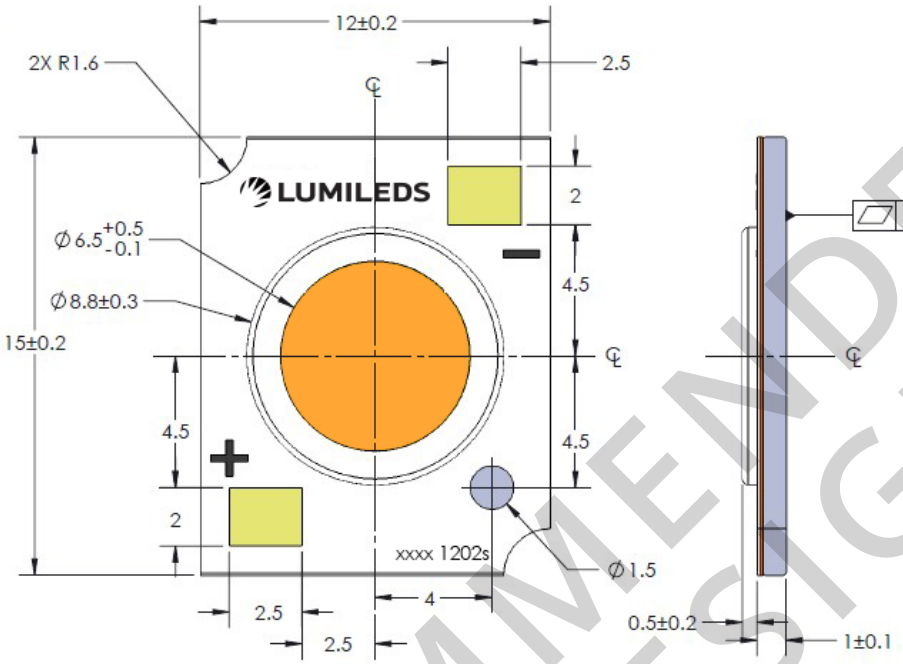

Figure 8a. Mechanical dimensions for L2C1–xxxx120206xxx.

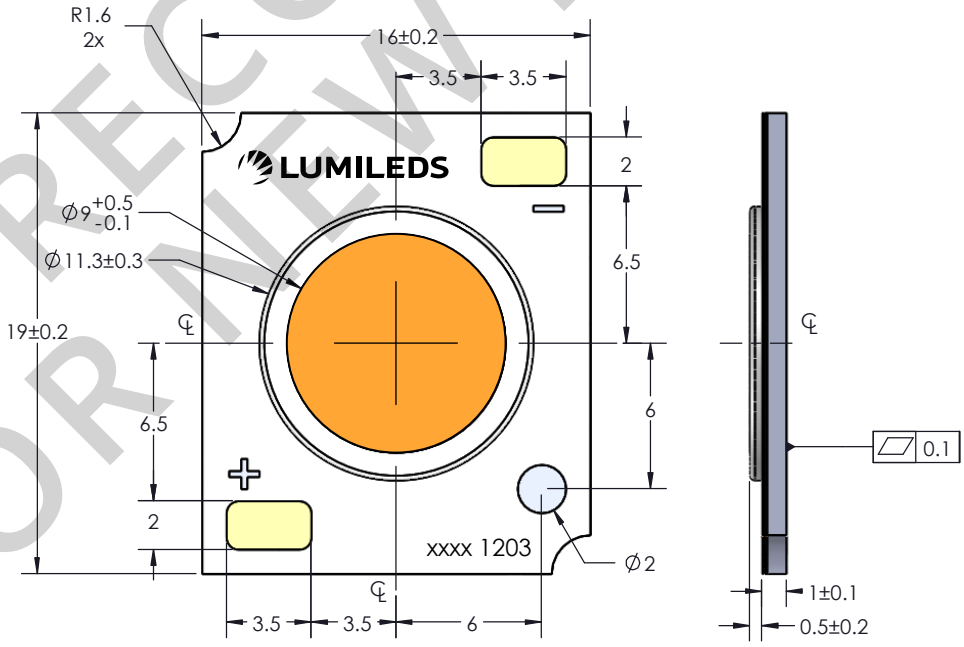

Figure 8b. Mechanical dimensions for LHC1–xxxx–1202 and LHC1–xxxx–1203.

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

NOT RECOMMENDED FOR NEW DESIGNS

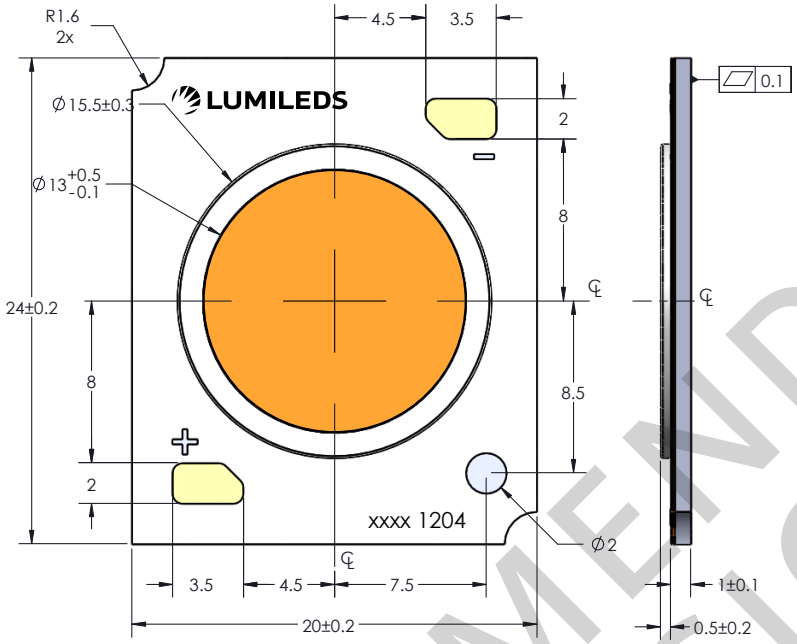

Figure 8c. Mechanical dimensions for LHC1–xxxx–1204.

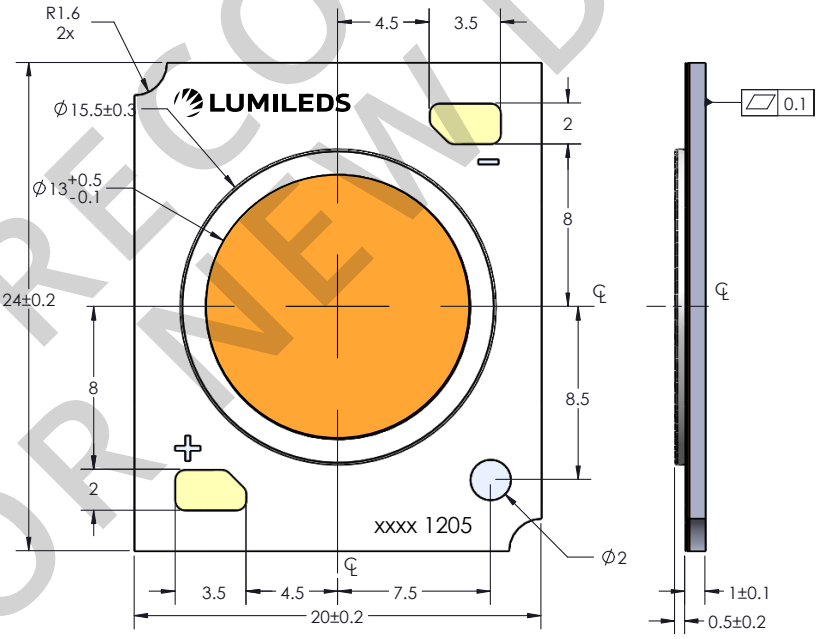

Figure 8d. Mechanical dimensions for LHC1–xxxx–1205.

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

NOT RECOMMENDED FOR NEW DESIGNS

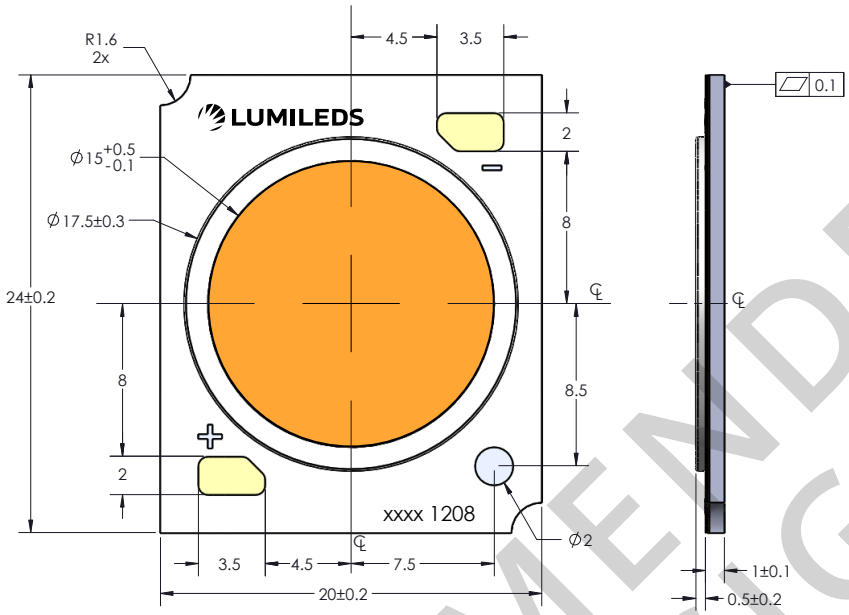

Figure 8e. Mechanical dimensions for LHC1–xxxx–1208.

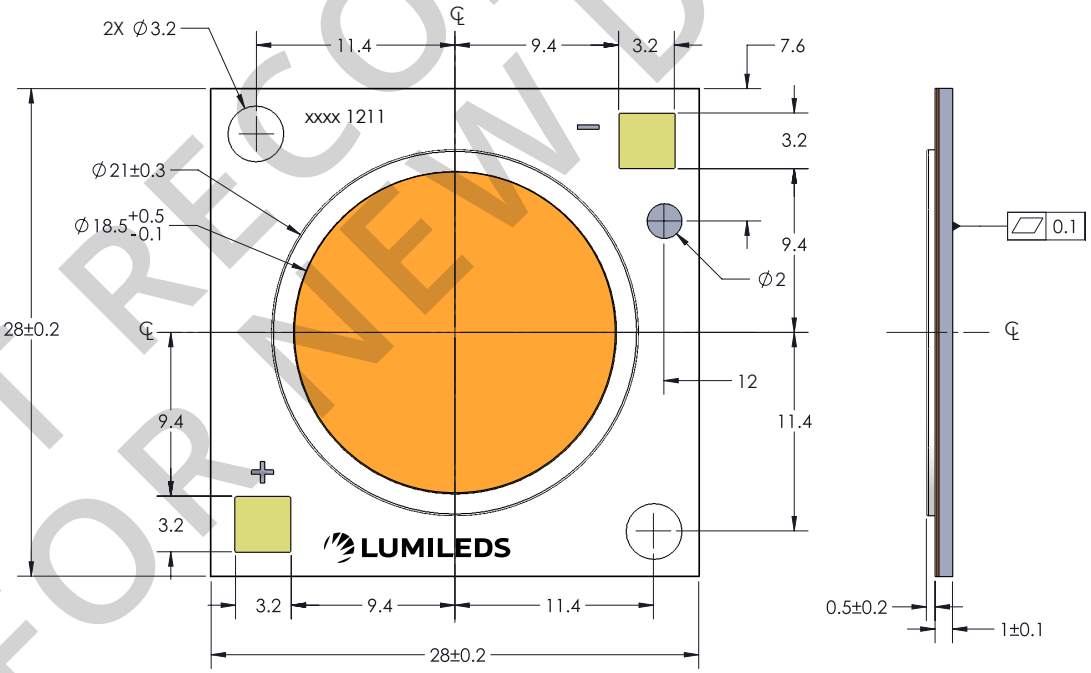

Figure 8f. Mechanical dimensions for LHC1–xxxx–1211.

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

NOT RECOMMENDED FOR NEW DESIGNS

Packaging Information

Unit Totals per Box

Table 6. Unit totals per box for LUXEON CoB with CrispWhite Technology.

TOTAL	L2CI-xxxx120206xxx	LHC1-xxxx-1202	LHC1-xxxx-1203	LHC1-xxxx-1204	LHC1-xxxx-1205	LHC1-xxxx-1208	LHC1-xxxx-1211
Units per Tube	20	20	20	20	20	20	10
Tubes per Box	5	5	5	5	5	5	5
Units per Box	100	100	100	100	100	100	50

Tube Dimensions

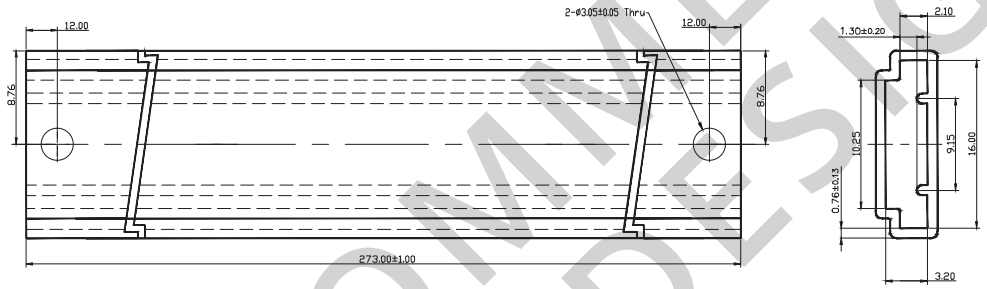

Figure 9a. Tube dimensions for LUXEON CoB Core Range L2C1–xxxx120206xxx.

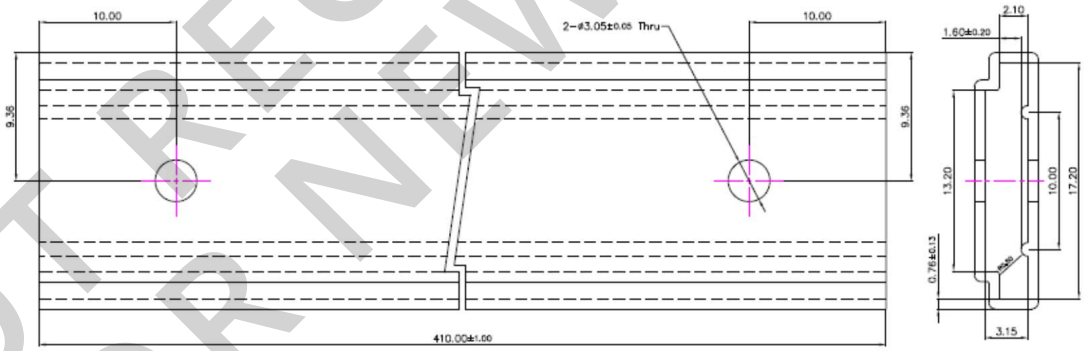

Figure 9b. Tube dimensions for LUXEON CoB LHC1–xxxx-1202 and LHC1–xxxx-1203.

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

NOT RECOMMENDED FOR NEW DESIGNS

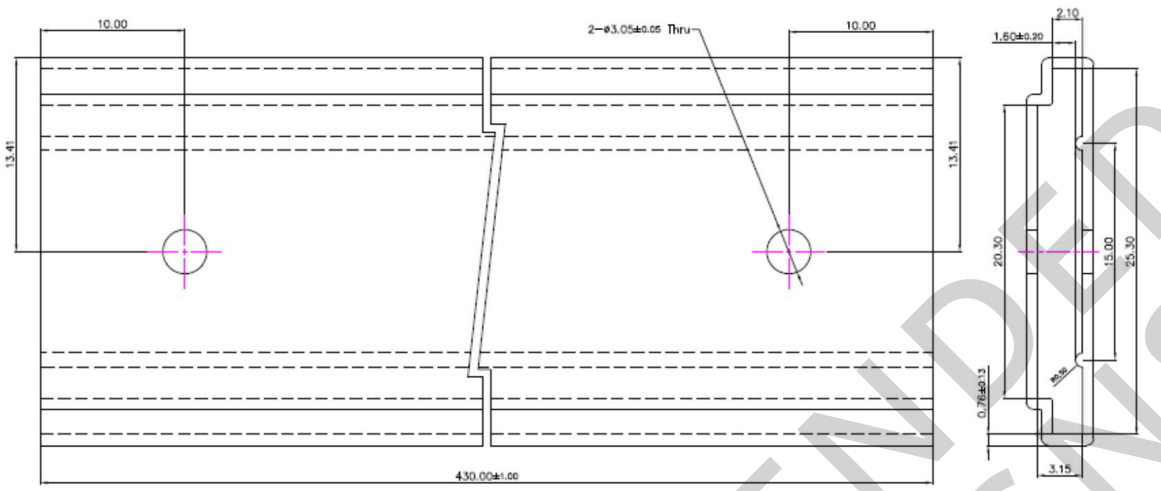

Figure 9c. Tube dimensions for LUXEON CoB LHC1–xxxx–1204, LHC1–xxxx–1205 and LHC1–xxxx–1208.

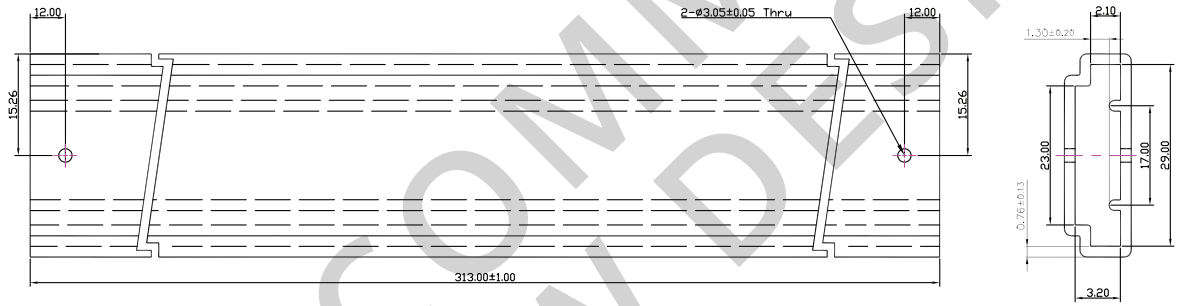

Figure 9d. Tube dimensions for LUXEON CoB LHC1–xxxx–1211.

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

NOT RECOMMENDED FOR NEW DESIGNS

About Lumileds

Lumileds is the global leader in light engine technology. The company develops, manufactures and distributes groundbreaking LEDs and automotive lighting products that shatter the status quo and help customers gain and maintain a competitive edge.

With a rich history of industry "firsts," Lumileds is uniquely positioned to deliver lighting advancements well into the future by maintaining an unwavering focus on quality, innovation and reliability.

To learn more about our portfolio of light engines, visit lumileds.com.

NOT RECOMMENDED FOR NEW DESIGNS

LUMILEDS

©2016 Lumileds Holding B.V. All rights reserved.
LUXEON is a registered trademark of the Lumileds Holding B.V. in the United States and other countries.
lumileds.com

Neither Lumileds Holding B.V. nor its affiliates shall be liable for any kind of loss of data or any other damages, direct, indirect or consequential, resulting from the use of the provided information and data. Although Lumileds Holding B.V. and/or its affiliates have attempted to provide the most accurate information and data, the materials and services information and data are provided "as is," and neither Lumileds Holding B.V. nor its affiliates warrants or guarantees the contents and correctness of the provided information and data. Lumileds Holding B.V. and its affiliates reserve the right to make changes without notice. You as user agree to this disclaimer and user agreement with the download or use of the provided materials, information and data.