



# LUXEON CoB with CrispWhite Technology Line

Retail lighting that makes an impact

LUXEON CoB with CrispWhite Technology creates the most impactful retail lighting ever available, by revealing the richest whites, vibrant reds and colors that pop. LUXEON CoB with CrispWhite Technology delivers the warm saturated colors of high 90CRI solutions while creating the natural crisp whiteness by activating the fluorescent whitening agents in paints and fabrics to properly display merchandise in retail shops; ideal for CDM/CMH replacements.



## FEATURES AND BENEFITS

Lumen packages from 500 to 5,000 lumens for a range of options

Industry's smallest light emitting surface for highest flux densities

Up to 4x better thermal resistance than competitors enabling smaller heat sinks and higher lumens

Contains violet LEDs and does NOT contain UV LEDs for minimal amount of damage, much lower than that from traditional CDM shop lighting

Mouse bites for M2 and M3 makes it easy to work with

## PRIMARY APPLICATIONS

Lamps

Spotlights

# Table of Contents

- General Information ..... 2
  - Part Number Nomenclature..... 2
  - Average Lumen Maintenance Characteristics..... 2
  - Environmental Compliance ..... 2
- Product Performance and Characterization Guide ..... 3
- Electrical Characteristics ..... 3
- Absolute Maximum Ratings ..... 4
- Mechanical Dimensions ..... 5
- Characteristic Curves ..... 6
- Typical Forward Current Characteristics ..... 7
- Typical Relative Luminous Flux vs. Forward Current ..... 8
- Typical Radiation Patterns ..... 9
- Color Bin Definition..... 10
- Package Info and Dimensions ..... 11

# General Information

## Part Number Nomenclature

LUXEON CoB with CrispWhite Technology is tested and binned hot at  $T_j = 85^\circ\text{C}$  with a current pulse duration of 20ms.

The part number designation is explained as follows:

**L H C A – B B C C – D D E E C R S P (Traditional)**

Where:

A — designates the generation of the product family

B B — designates ANSI color point (e.g. 30 for 3000K)

C C — designates minimum CRI level (e.g. 90 for minimum 90CRI)

D D E E — designates product configuration (e.g. 1203 for the 1,000 – 2,000 lumen package)

C R S P — designates LUXEON CoB with CrispWhite Technology

**L 2 C A – B B C C D D E E F F G G G (New Part Number Scheme for New Products)**

Where:

A — designates the generation of the product family

B B — designates ANSI color point (e.g. 30 for 3000K)

C C — designates minimum CRI level (e.g. 80 for minimum 80CRI)

D D E E — designates product configuration (e.g. 1202 for the low lumen package)

F F — designates light emitting surface (e.g. 06 for 6mm LES)

G G G — designates manufacturing technology (e.g. ACO for crisp white)

Therefore 3000K, 90 CRI LUXEON CoB with CrispWhite Technology products will be:

L H C 1 – 3 0 9 0 – 1 2 0 3 C R S P

L 2 C 1 – 3 0 9 0 1 2 0 2 0 6 A C O

CAT codes of LUXEON CoB with CrispWhite Technology:

3S: color within 3-step MacAdam ellipse color definition

## Average Lumen Maintenance Characteristics

Lumen maintenance for solid-state lighting devices (LEDs) is typically defined in terms of the percentage of initial light output remaining after a specified period of time. Lumileds projects that LUXEON CoB with CrispWhite Technology will deliver—on average—70% lumen maintenance (L70) at 50,000 hours of operation at its nominal, tested conditions. Observation of design limits included in this data sheet is required in order to achieve this projected lumen maintenance. This performance is based on independent test data, Lumileds historical data from tests run on similar material systems, and internal LUXEON reliability testing.

## Environmental Compliance

Lumileds is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON CoB with CrispWhite Technology is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS and REACH directives. Lumileds will not intentionally add the following restricted material to the LUXEON CoB with CrispWhite Technology: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

# Product Performance and Characterization Guide

**Table 1. Performance and Electrical Characteristics**

Part Number	Nominal CCT	CRI <sup>[1]</sup>		Test Current I <sub>t</sub> (mA)	Luminous Flux <sup>[1, 2]</sup>		Efficacy Typ. (lm/W)	LES <sup>[3]</sup> (mm)
		Min.	Typ.		Min. (lm)	Typ. (lm)		
L2C1-309012006AC0	3000K	90	92	200	550	600	85	6.5
LHC1-3090-1202CRSP	3000K	90	92	200	550	625	90	9
LHC1-3090-1203CRSP	3000K	90	92	300	850	950	90	9
LHC1-3090-1204CRSP	3000K	90	92	450	1250	1400	90	13
LHC1-3090-1205CRSP	3000K	90	92	600	1700	1900	90	13
LHC1-3090-1208CRSP	3000K	90	92	900	2500	2800	90	15
LHC1-3090-1211CRSP	3000K	90	92	1200	3400	3750	90	19

Notes for Table 1:

1. Lumileds maintains a tolerance of  $\pm 6.5\%$  on luminous flux,  $\pm 2$  on CRI.
2. Maximum luminous flux is 10% above typical luminous flux.
3. Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.

**Table 2. Optical Characteristics**

Nominal CCT	Typical Total Included Angle <sup>[1]</sup>	Typical Viewing Angle <sup>[2]</sup>
	$\theta_{0.90V}$	$2\theta^{1/2}$
L2C1-xxxx120206xCx	135°	115°
LHC1 - xxxx - xxxxCRSP	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 lamp centerline where the luminous intensity is  $1/2$  of the peak value.

## Electrical Characteristics

**Table 3. Electrical Characteristics**

Part Number	Nominal CCT	Forward Voltage (V) <sup>[1, 2]</sup>			Typical Temperature Coefficient of Forward Voltage <sup>[1]</sup> (mV/°C) $\Delta V_F / \Delta T_J$	Typical Thermal Resistance Junction to Case <sup>[3]</sup> (°C/W) $R\theta_{J-C}$
		Min.	Typ.	Max.		
L2C1-xxxx120206AC0	3000K	33	35.5	38	-16	0.98
LHC1-xxxx-1202CRSP	3000K	33	35.5	38	-16	0.91
LHC1-xxxx-1203CRSP	3000K	33	35.5	38	-16	0.70
LHC1-xxxx-1204CRSP	3000K	33	35.5	38	-16	0.53
LHC1-xxxx-1205CRSP	3000K	33	35.5	38	-16	0.45
LHC1-xxxx-1208CRSP	3000K	33	35.5	38	-16	0.29
LHC1-xxxx-1211CRSP	3000K	33	35.5	38	-16	0.23

Notes for Table 3:

1. Measured between  $T_1 = 25^\circ\text{C}$  and  $T_1 = 105^\circ\text{C}$  at test current.
2. Voltage tester tolerance  $\pm 2\%$ .
3. Junction temperature to back of the PCB and measurement tolerance of  $\sim 10\%$ .

# Absolute Maximum Ratings

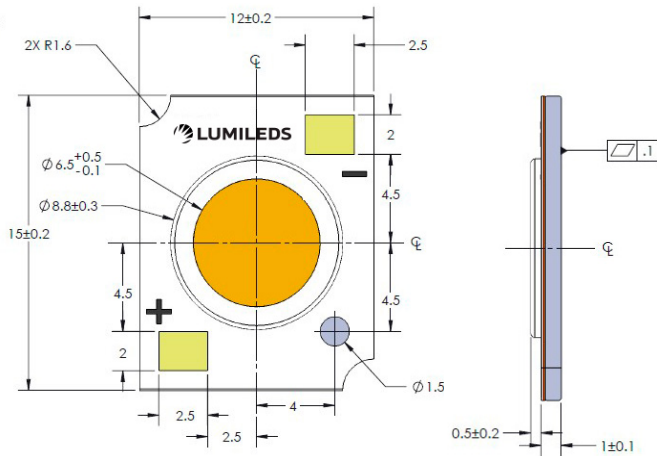
**Table 4. Operating Condition and Ratings**

Parameter	Maximum Performance
DC Forward Current	2x test current <sup>[2]</sup>
ESD Sensitivity	< 8000V Human Body Model (HBM) Class 3A JESD22-A114-E < 400V Machine Model (MM) Class B JESD22-A115-B
Storage Temperature	-40°C - 120°C
LED Junction Temperature <sup>[1]</sup>	125°C
Operating Case Temperature at Nominal Current	-40°C - 105°C
Reverse Voltage	LUXEON CoB with CrispWhite Technology is not designed to be driven in reverse bias

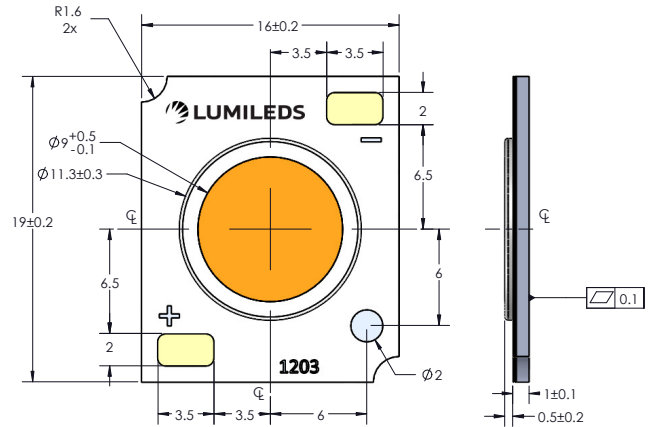
**Notes for Table 4:**

1. Proper current derating must be observed to maintain junction temperature below the maximum, please see application brief for additional information on thermal measurement guidelines.
2. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple", with frequencies  $\geq 100$  Hz and amplitude  $\pm 20\%$  are acceptable, assuming the average current throughout each cycle does not exceed 2x test  $I_f$ .

# Mechanical Dimensions

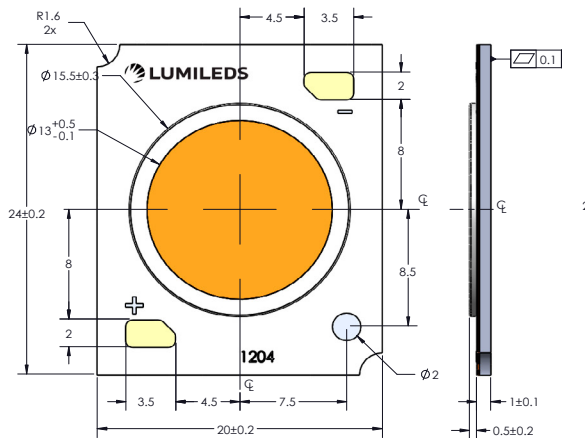


L2C1-xxxx120206xCx

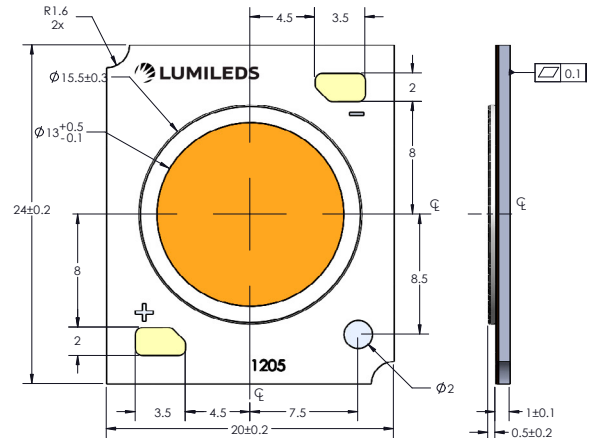


LHC1-xxxx-1202CRSP

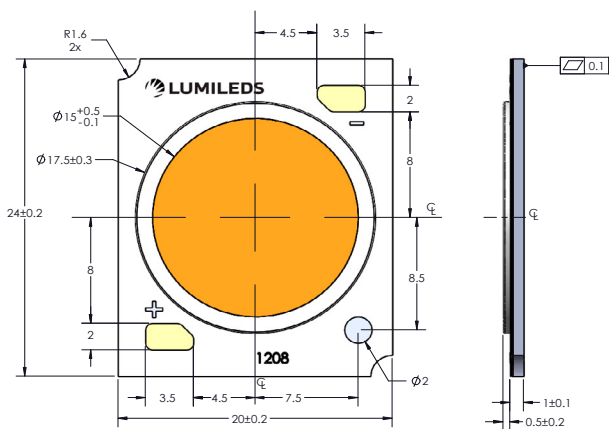
LHC1-xxxx-1203CRSP



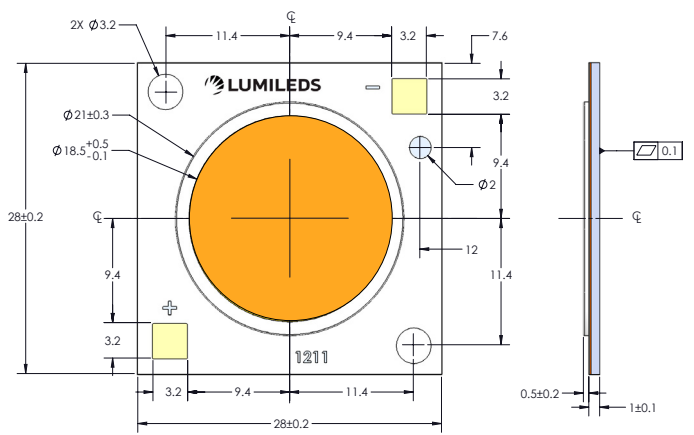
LHC1-xxxx-1204CRSP



LHC1-xxxx-1205CRSP



LHC1-xxxx-1208CRSP



LHC1-xxxx-1211CRSP

# Characteristic Curves

Relative Spectral Distribution vs. Wavelength  
Junction Temperature = 85°C, at Test Current

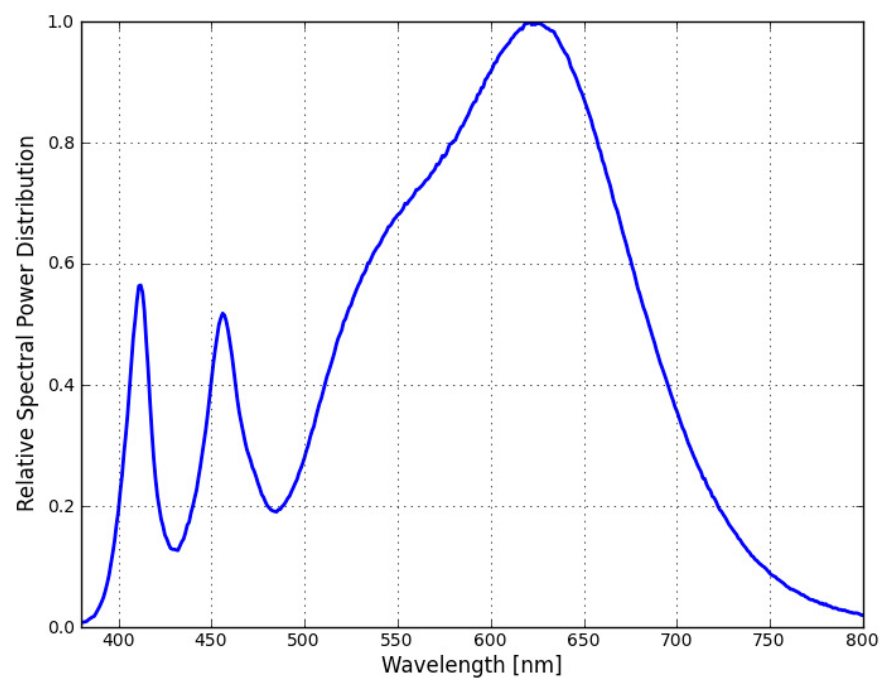


Figure 1. Color spectrum of 3000K, 90 minimum CRI CrispWhite, integrated measurement.

Relative Light Output Characteristics over Temperature at Test Current

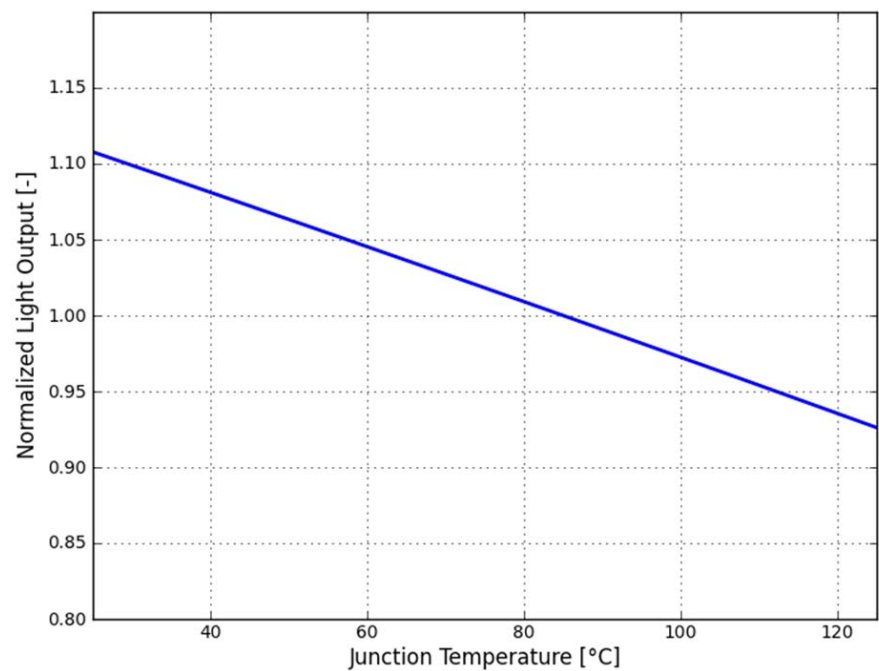


Figure 2. Relative light output vs. junction temperature.

# Typical Forward Current Characteristics

LUXEON CoB with CrispWhite Technology  
LHC1 – xxxx – xxxx / L2C1-xxxxxxxxxxxxCx, Junction Temperature = 85°C

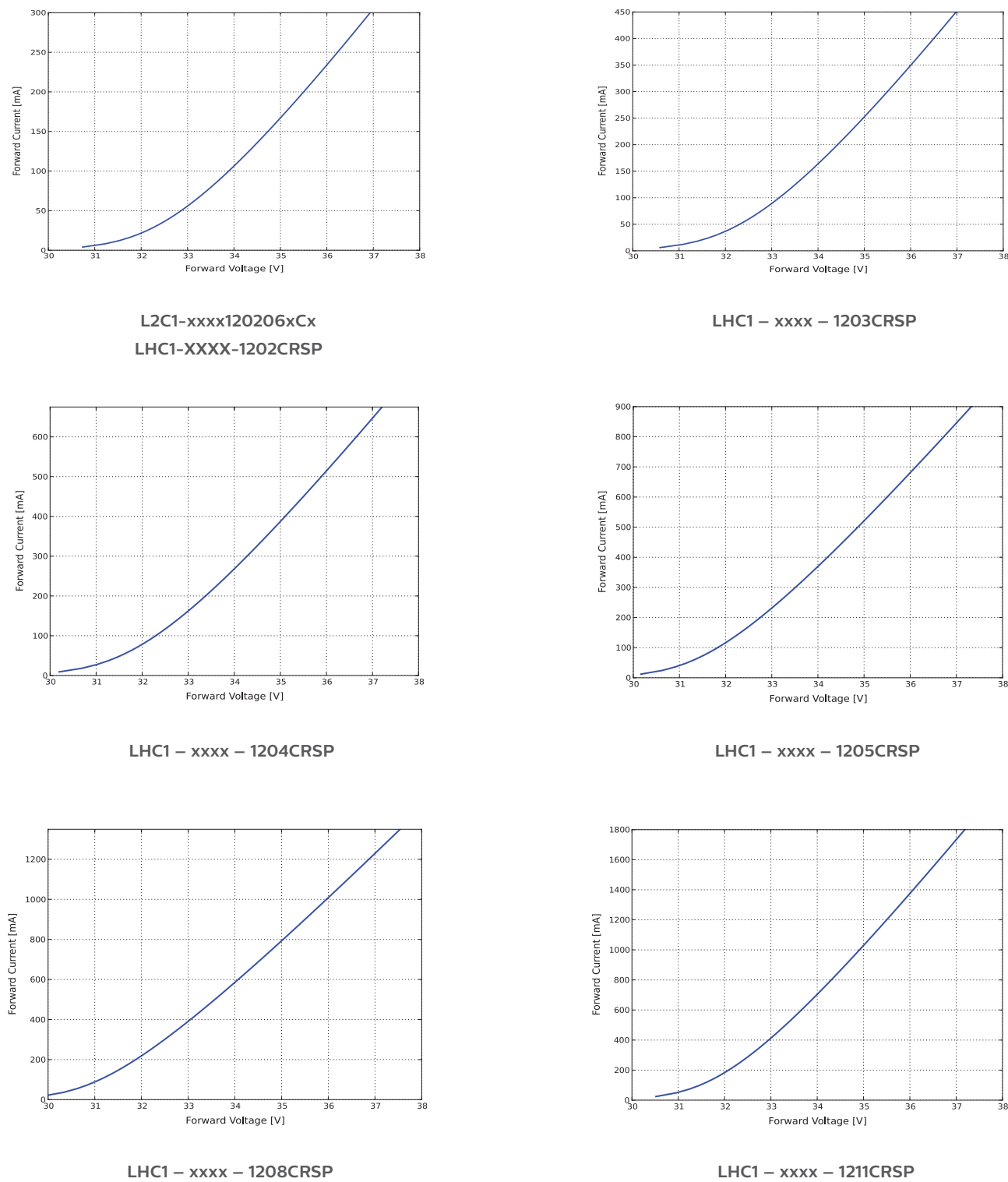


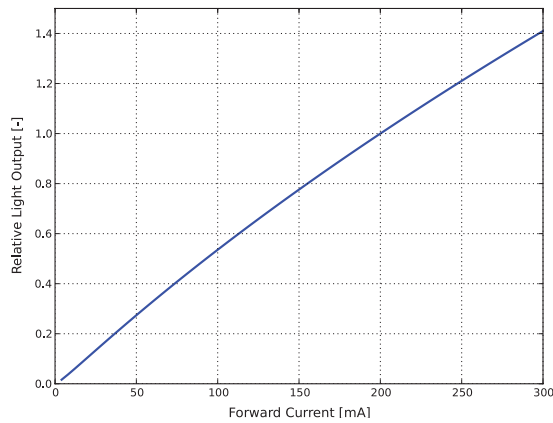
Figure 3. Forward current vs. forward voltage.



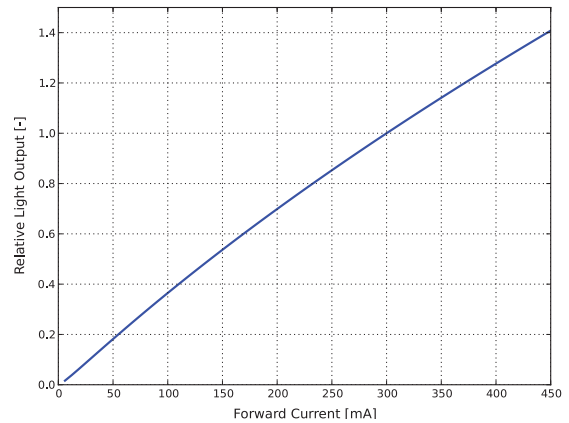
# Typical Relative Luminous Flux vs. Forward Current

LUXEON CoB with CrispWhite Technology

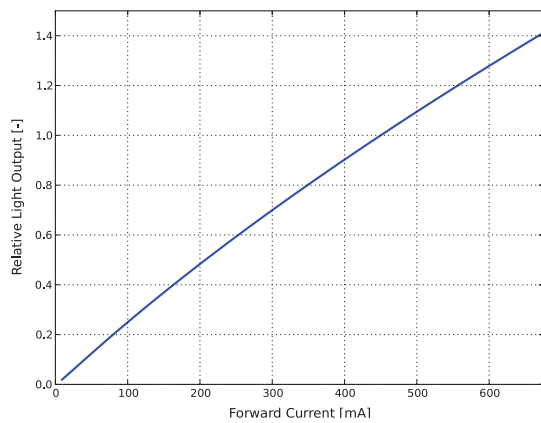
LHC1 – xxxx – xxxx / L2C1-xxxxxxxxxxxxCx, Junction Temperature = 85°C



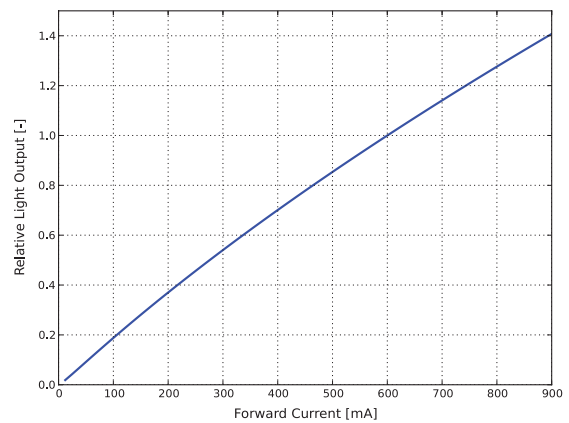
L2C1-xxxx120206xCx  
LHC1 – xxxx – 1202CRSP



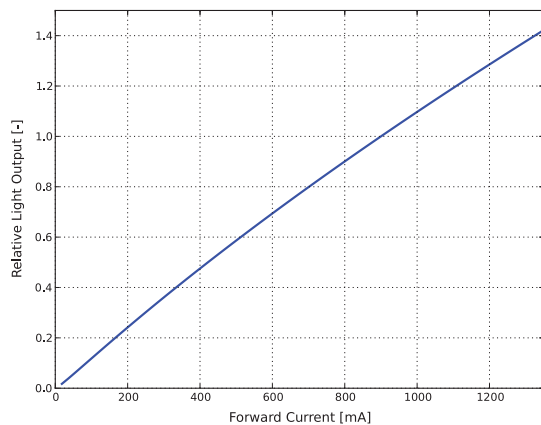
LHC1 – xxxx – 1203CRSP



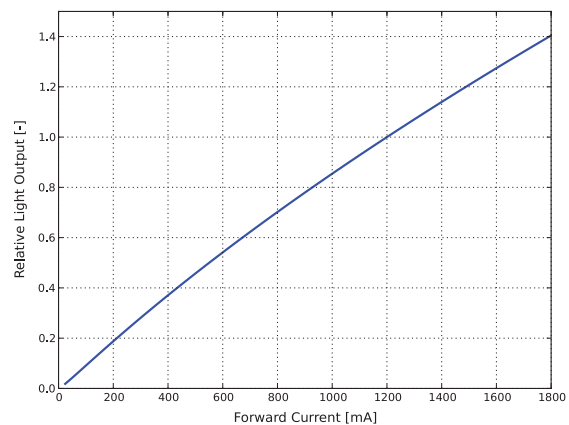
LHC1 – xxxx – 1204CRSP



LHC1 – xxxx – 1205CRSP



LHC1 – xxxx – 1208CRSP



LHC1 – xxxx – 1211CRSP

Figure 4. Typical relative luminous flux vs. current.

# Typical Radiation Patterns

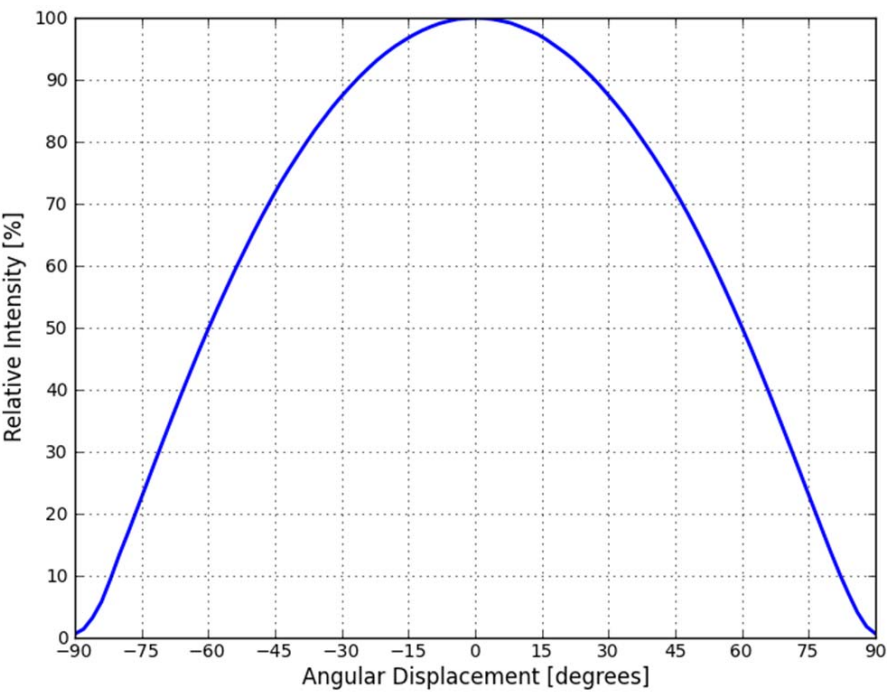


Figure 5. Radiation pattern for LHC1 – xxxx – 120xCRSP / L2C1-xxxx120xxxxCx.

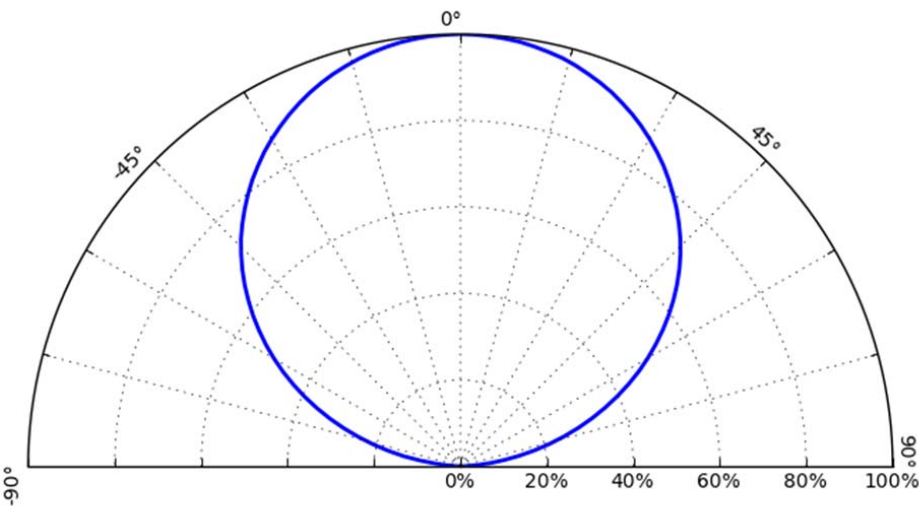


Figure 6. Polar radiation pattern for LHC1 – xxxx – 120xCRSP / L2C1-xxxx120xxxxCx.

# Color Bin Definition

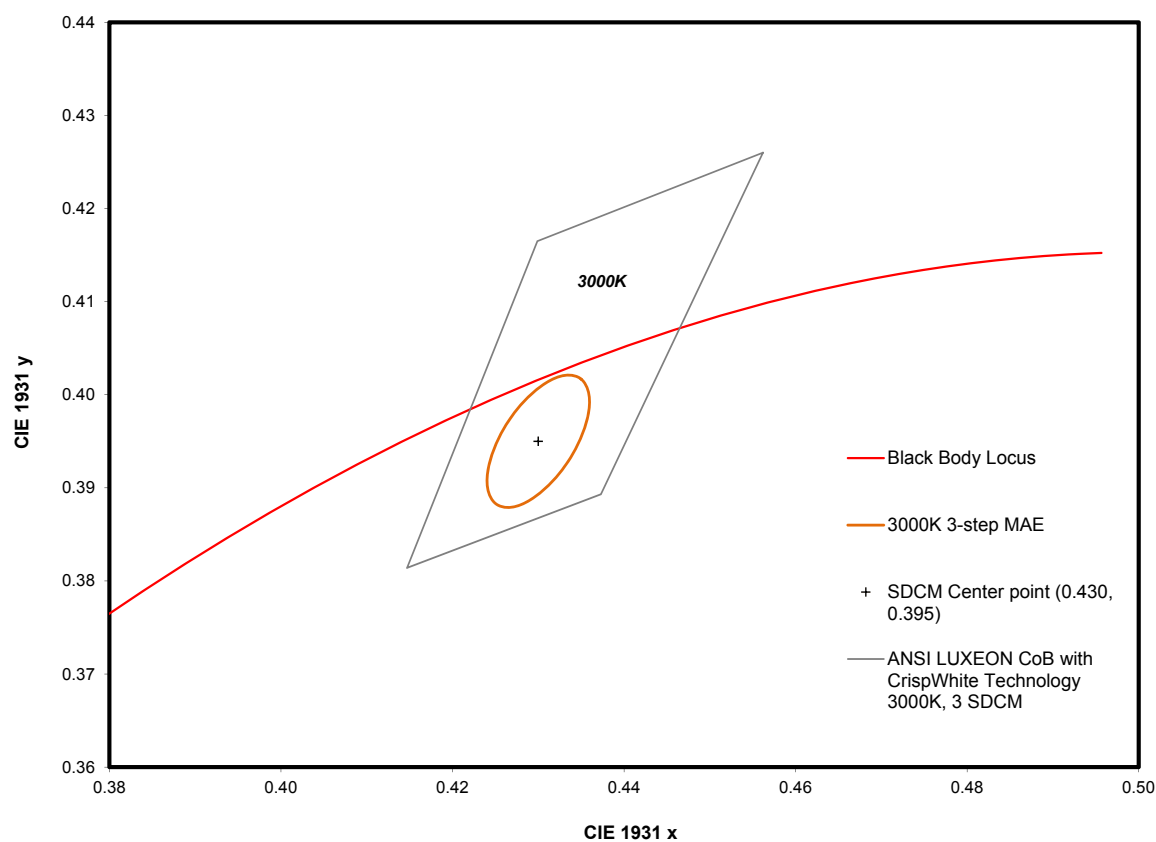


Figure 7. 3-step MacAdam ellipse color bin.

Table 5. 3-step MacAdam Ellipse Color Definition

Nominal ANSI CCT	Color Space	Center Point (cx, cy)	Major Axis, a	Minor Axis, b	Ellipse Rotation Angle
3000K	Single 3-Step MacAdam ellipse	(0.430, 0.395) <sup>[1]</sup>	0.00834 <sup>[2]</sup>	0.00408 <sup>[2]</sup>	53.2°

Notes for Table 5:

- 1. Lumileds maintains a tester tolerance of ±0.005 on x,y coordinates.
- 2. Major and minor axis (a,b) from table 5 are a reference as depicted in figure 7.

# Package Info and Dimensions

Table 6. Package Info

	L2C1- xxxx120206xCx	LHC1 – xxxx – 1202CRSP	LHC1 – xxxx – 1203CRSP	LHC1 – xxxx – 1204CRSP	LHC1 – xxxx – 1205CRSP	LHC1 – xxxx – 1208CRSP	LHC1 – xxxx – 1211CRSP
Total Units per Tube	20	20	20	20	20	20	10
Total Tubes per Box	5	5	5	5	5	5	5
Total Units per Box	100	100	100	100	100	100	50

## L2C1-xxxx120206xCx

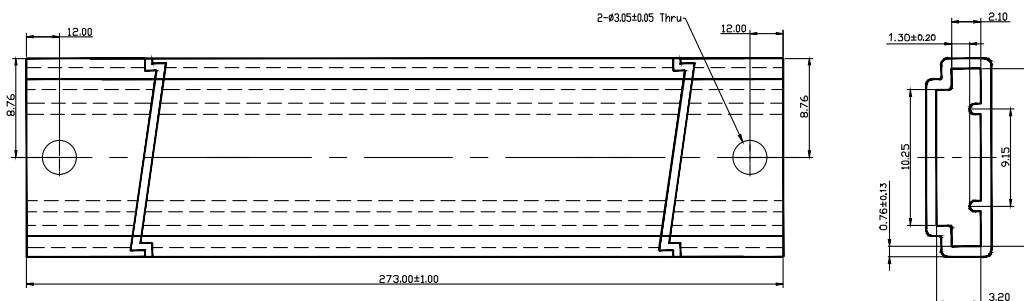


Figure 8. Package ray dimension for LUXEON CoB with CrispWhite Technology L2C1-xxxx120206xCx.

## LHC1 – xxxx – 1202CRSP and 1203CRSP

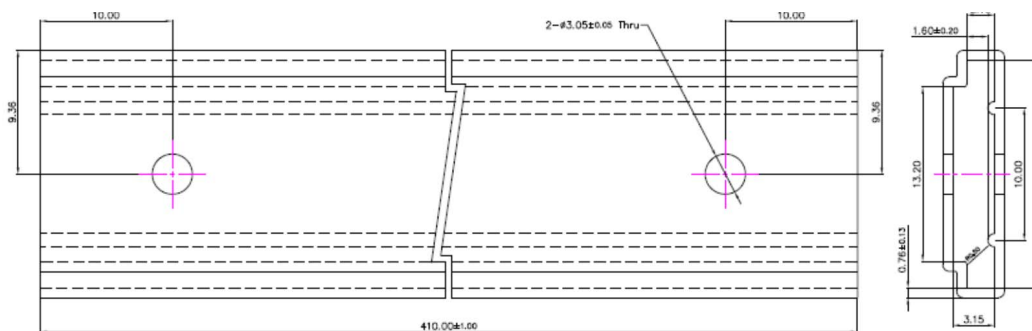


Figure 9. Package ray dimension for LUXEON CoB with CrispWhite Technology LHC1 – xxxx – 1202CRSP and 1203CRSP.

## LHC1 – xxxx – 1204CRSP, 1205CRSP and 1208CRSP

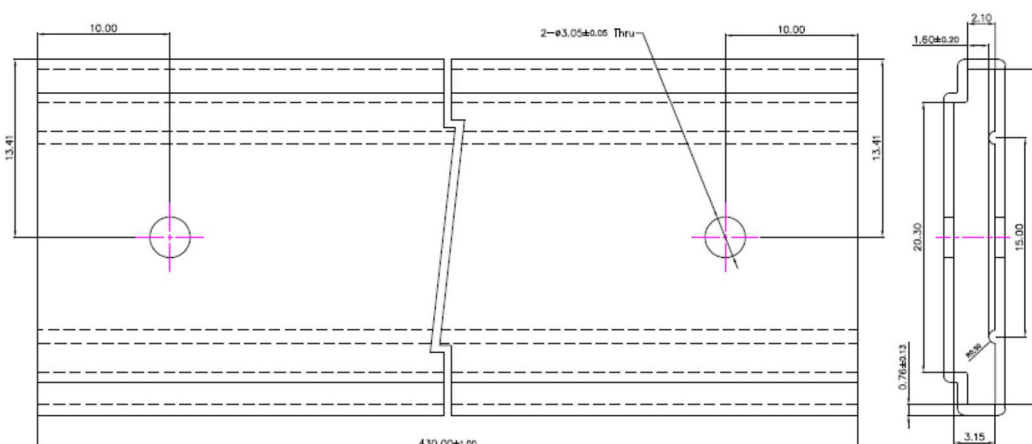


Figure 10. Package ray dimension for LUXEON CoB with CrispWhite Technology LHC1 – xxxx – 1204CRSP, 1205CRSP and 1208CRSP.

## LHC1 – xxxx – 1211CRSP

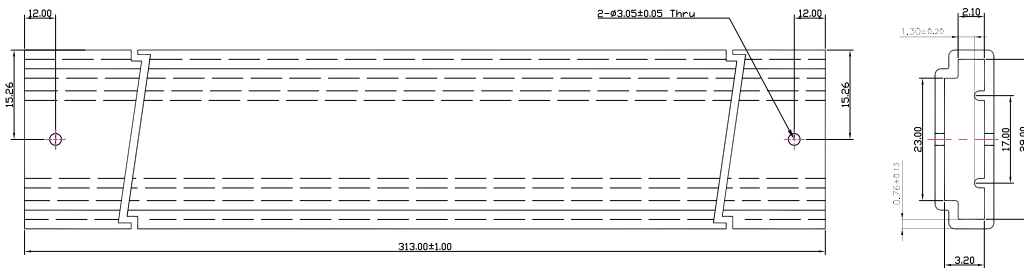


Figure 11. Package ray dimension for LUXEON CoB with CrispWhite Technology LHC1 – xxxx – 1211CRSP.

# About Lumileds

Lumileds is the light engine leader, delivering innovation, quality and reliability.

For 100 years, Lumileds commitment to innovation has helped customers pioneer breakthrough products in the automotive, consumer and illumination markets.

Lumileds is shaping the future of light with our LEDs and automotive lamps, and helping our customers illuminate how people see the world around them.

To learn more about our portfolio of light engines visit [lumileds.com](http://lumileds.com).



©2015 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](http://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.