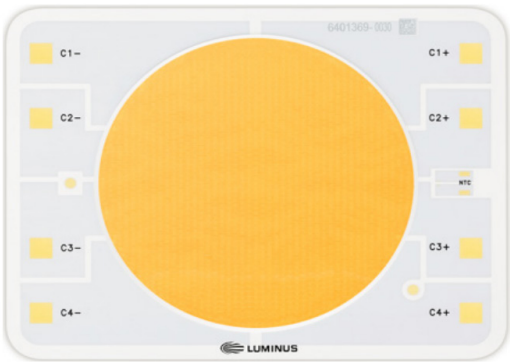


Generation 5 CVM-53

COB Arrays LED
LED Entertainment Lighting



Features

- High lumen output
 - Typical 53,000 lm @ 3150K, 6A@85°C
 - Typical 61,000 lm @ 5600K, 6A@85°C
- 95 CRI minimum
- 95 TLCI minimum
- Excellent solution for very high power COB
- Excellent optical emission uniformity and color over angle consistency
- Exceptional long term color stability
- Superior thermal conductivity for uniform heat spreading
- ENEC License Number: ENEC-04137



Applications

- TV Studio
- Film Production
- Still Photography
- Stage/Set Lights
- Architectural/Hospitality

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Ordering Information

Ordering Part Numbers

The following tables describe products with typical flux and minimum flux measured at 6 A and specified at $T_j = 85^\circ\text{C}$. The values at 25°C are calculated and shown for reference only.

Minimum-CRI ²	CCT	Luminous Flux ¹ (lm)			Ordering Part Number	
		Typical Flux (85°C)	Minimum Flux (85°C)	Calculated Typical Flux (25°C)	3-step MacAdam Ellipse	2-step MacAdam Ellipse
95	3150K	53000	49300	58300	CVM-53-31-95-90-BA50-F6-3	CVM-53-31-95-90-BA50-F6-2
	5600K	64000	56700	67100	CVM-53-56-95-90-BA52-F6-3	CVM-53-56-95-90-BA52-F6-2

Note:

1. Luminus maintains a +/- 6% tolerance on flux measurements.
2. Luminus maintains a +/- 2% tolerance on CRI measurements.



Ordering Information

Part Number Nomenclature

All Luminus COB products are packaged and labeled with part numbers as outlined in the table on page 2. Luminus may include any smaller chromaticity bin that is contained in the larger bin as part of the ordered part. When shipped, each package will contain only a single flux and chromaticity bin. The part number designation is as follows:

CVM	53	NN	XX	VV	QQPP	FG	W
Product Family	LES ¹	CCT ²	Minimum CRI ³	Typical Voltage	Package Configurator	Flux Bin	Chromaticity Bin
Chip on Board, Multi-die	53 mm LES diameter	See Note 2 below	95: CRI > 95	Volts (V)	BA52	Lumens	See page 4 for bins

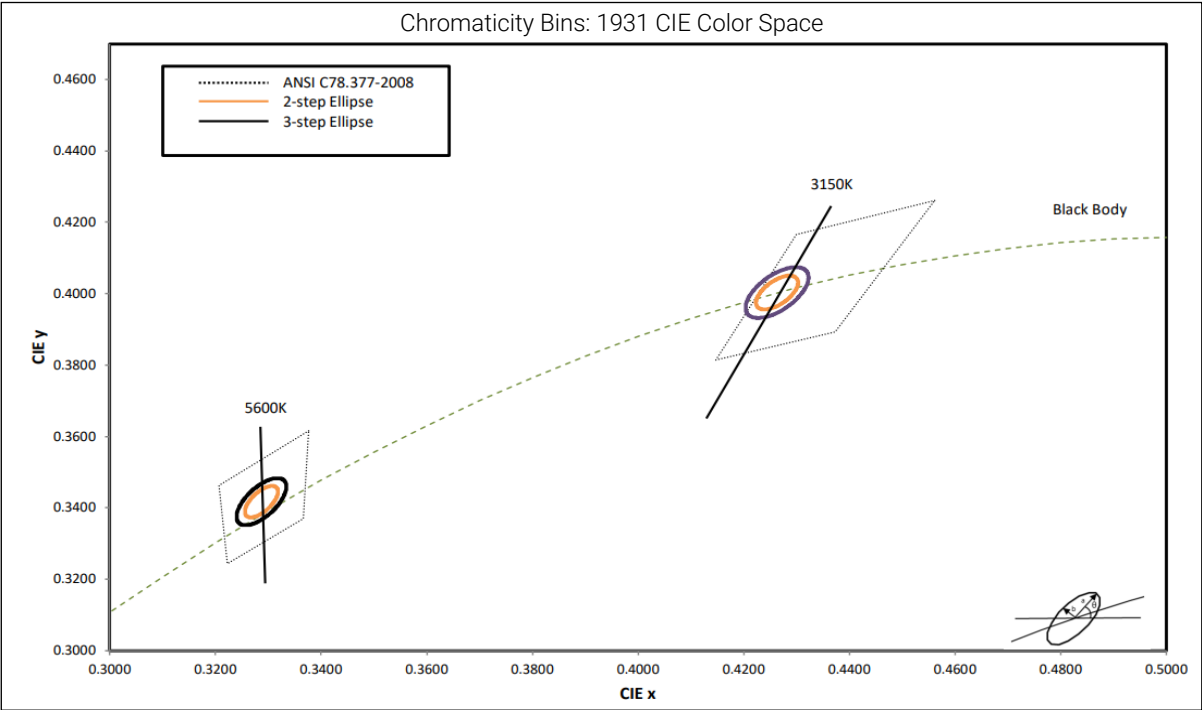
Note:

1. Light Emitting Surface (LES) Diameter.
2. Correlated Color Temperature (CCT), NN nomenclature corresponds to the following:
31 = 3150K
56 = 5600K
3. Minimum Color Rendering Index (CRI).
4. Luminus part numbers may be accompanied by prefixes or suffixes. The most common is the "Rev01" suffix indicating a part is fully released and carries a full warranty. These additional characters may appear on shipping labels, packing slips and invoices. In all cases the basic part number described above will always be included.



Binning Structure

Chromaticity Binning Diagram ¹



The following tables describe the chromaticity bin center points, the orientation angle for the MacAdam ellipse, and the maximum radii for the ellipses. The ANSI Bin is provided for reference.

CCT	Center point		Angle(deg)	3-step Bin		2-step Bin	
	x	y	Φ	a	b	a	b
3150K	0.4263	0.4003	53.2	0.00834	0.00408	0.00556	0.00272
5600K	0.3330	0.3390	45.0	0.00746	0.00320	0.00497	0.00213

Note:

1. Luminus maintains a +/- 0.005 tolerance on chromaticity (CIE_x and CIE_y) measurements.



Absolute Maximum Ratings¹

Parameter		Symbol	Value	Unit
Forward Current	Typical	$I_{f\text{ typ}}$	6.0	A
	Maximum	$I_{f\text{ max}}$	16.0	
Power Dissipation	Typical	$P_{d\text{ typ}}$	504	W
	Maximum	$P_{d\text{ max}}$	1400	
Operating Case Temperature	Maximum	T_c	120	°C
Junction Temperature	Maximum	T_j	140	°C

Notes:

1. To prevent damage refer to operating conditions and derating curves for appropriate maximum operating conditions



Characteristics^{1,2,3}

Parameter		Symbol	Value	Unit
Light Emitting Surface Diameter		LES	53.0	mm
Forward Voltage	Minimum	$V_{f\ min}$	78	V
	Typical	$V_{f\ typ}$	86	
	Maximum	$V_{f\ max}$	94	
Thermal Resistance		$R_{th\ J-C}$	0.09	°C/W
Viewing Angle		$2\theta_{1/2}$	120	°

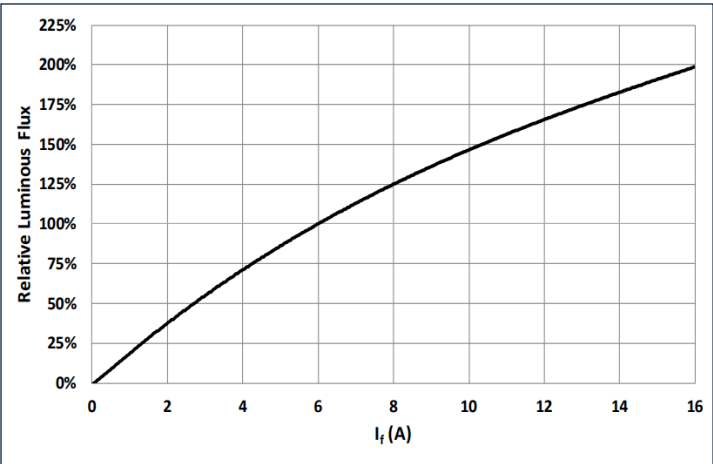
Notes:

1. Ratings are based on operation at a constant junction temperature of $T_j = 85^\circ\text{C}$
2. Voltage is rated at typical forward current. For voltage at higher drive current, refer to performance graphs
3. Device operation not recommended at drive currents less than 10% of the typical value
4. Caution must be taken not to stare at the light emitted from these LEDs. Under special circumstances, the high intensity could damage the eye
5. All product operating specifications are subject to change without advance notice
6. CVM-53 design features four separate channel inputs. The maximum current is 16 A total or 4 A per channel. Multiple inputs allow for a variety of driver options



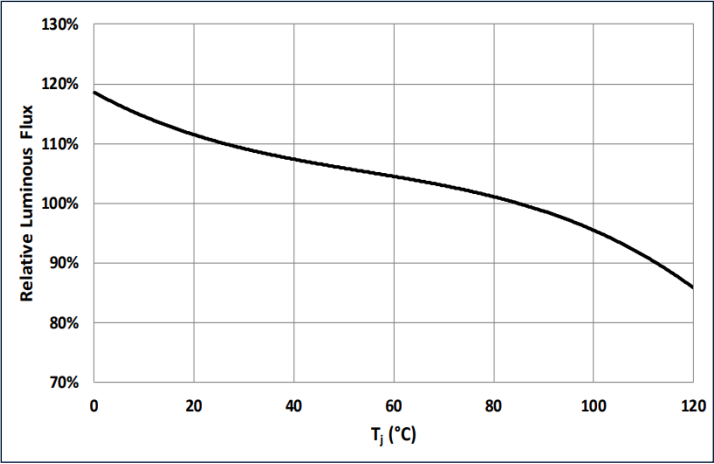
Relative Luminous Flux vs Forward Current

$T_j = 85^\circ\text{C}$



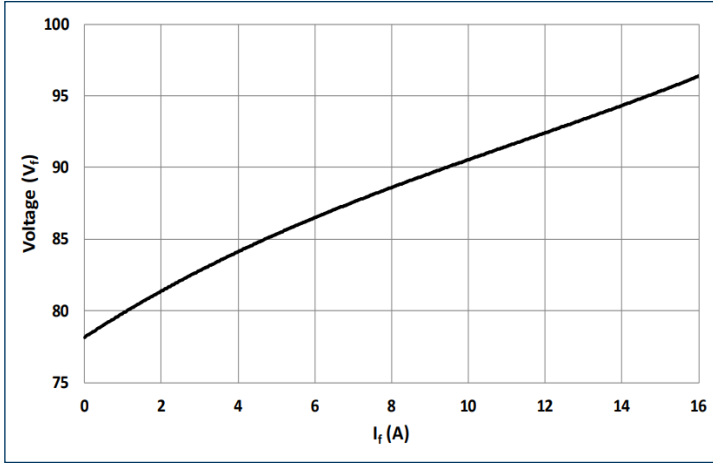
Relative Luminous Flux vs Temperature

$I_f = 6\text{ A}$



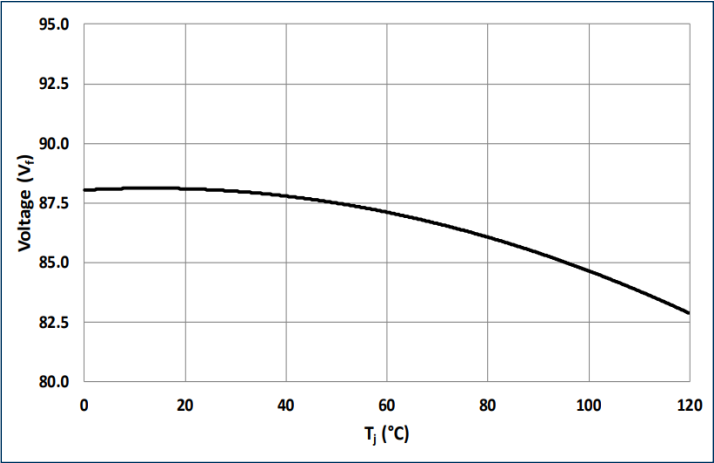
Forward Voltage vs Forward Current

$T_j = 85^\circ\text{C}$



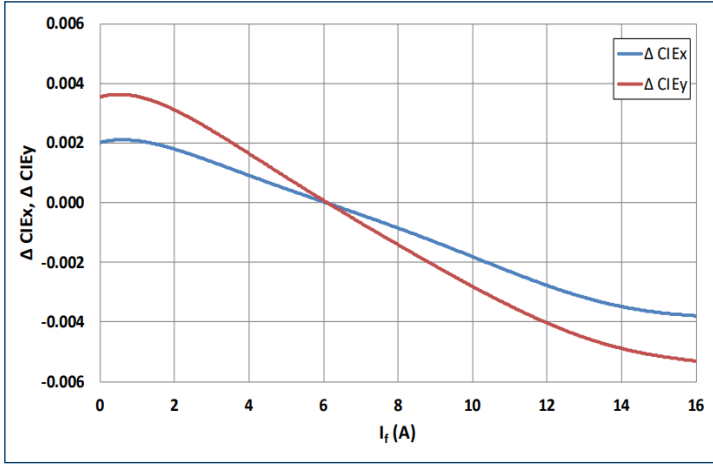
Forward Voltage vs Temperature

$I_f = 6\text{ A}$



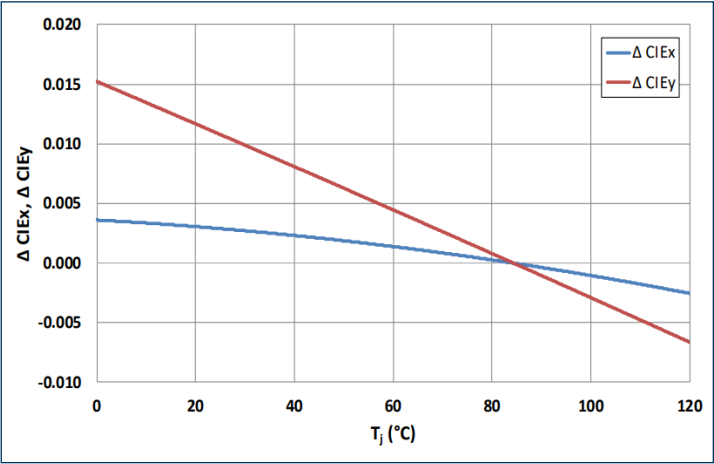
Relative Chromaticity vs Forward Current

$T_j = 85^\circ\text{C}$



Relative Chromaticity vs Temperature

$I_f = 6\text{ A}$

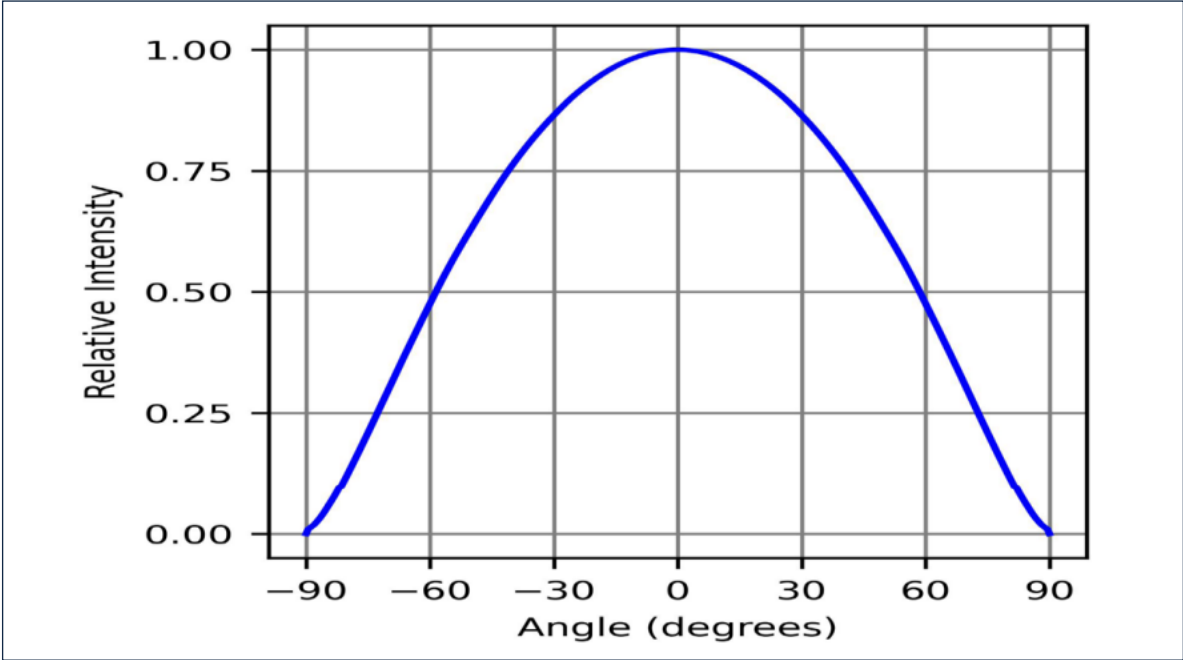




Angular Distribution and Typical Spectrum

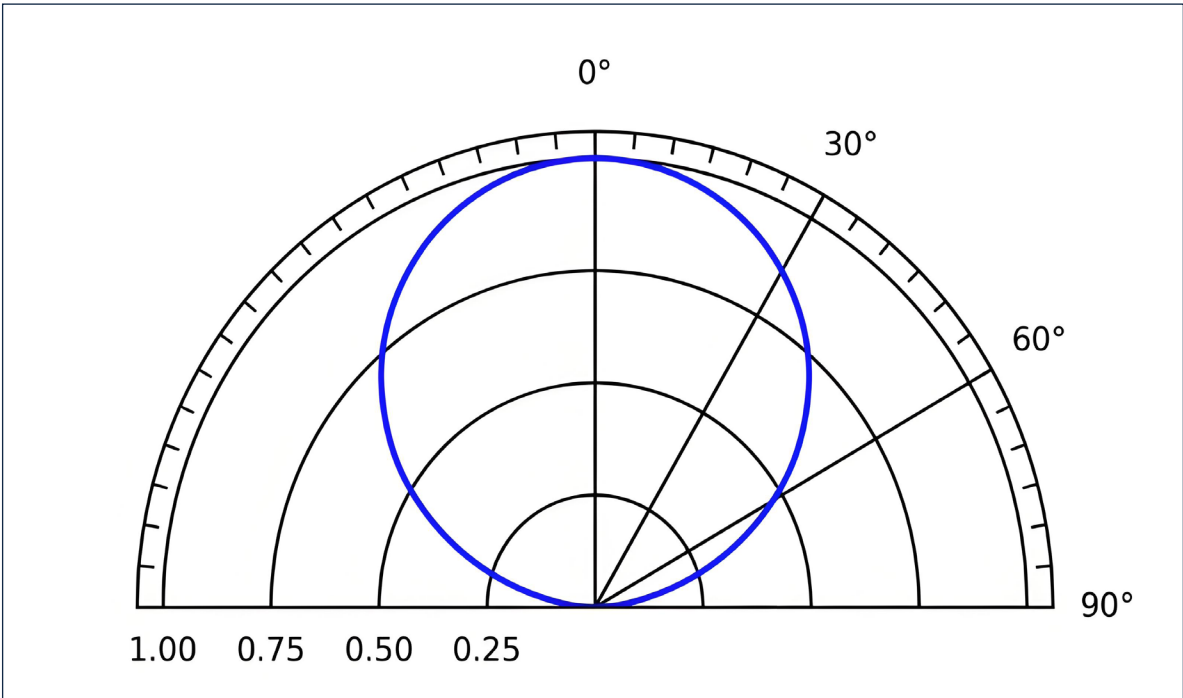
Angular Distribution

$T_j = 85^{\circ}\text{C}$



Polar Distribution

$T_j = 85^{\circ}\text{C}$

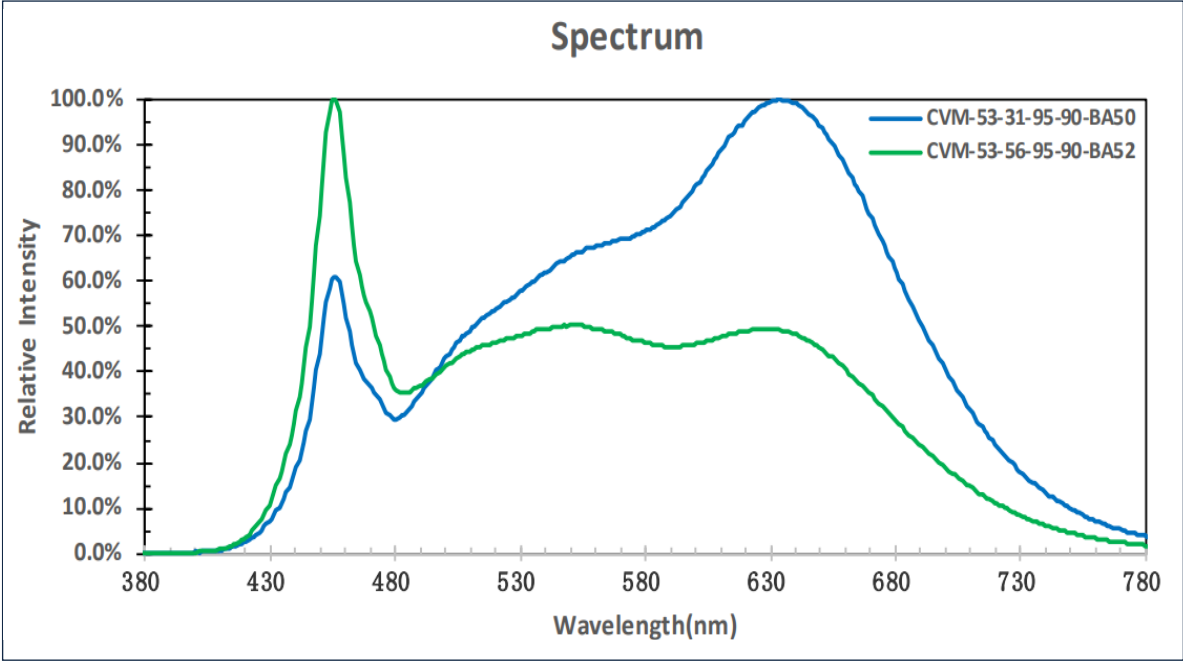




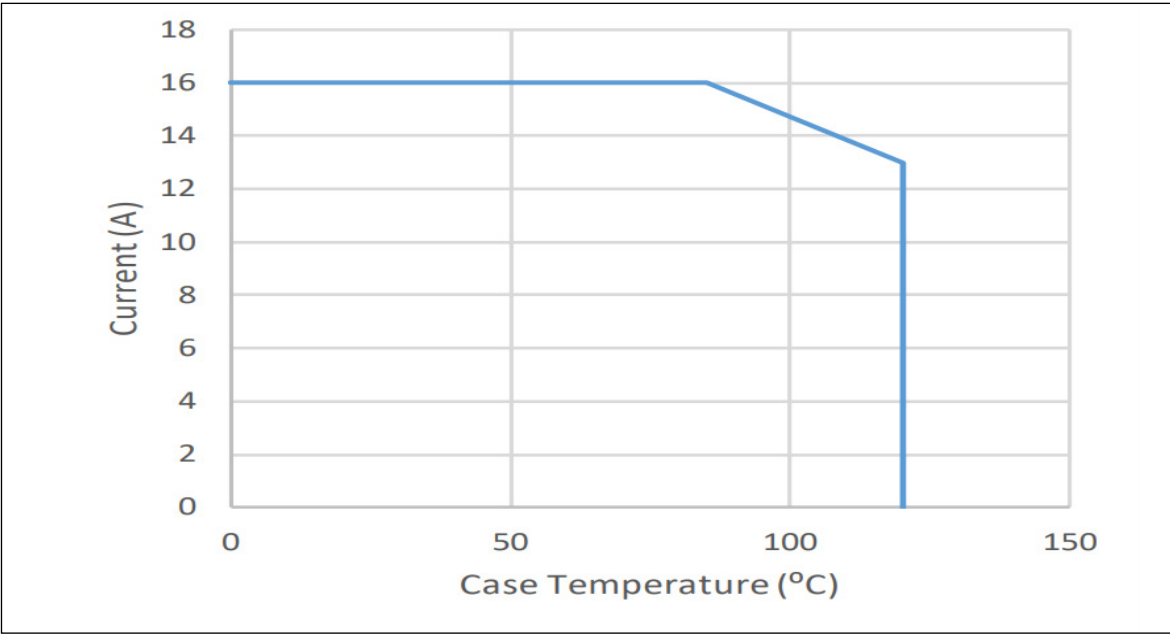
Angular Distribution and Typical Spectrum

Relative Spectral Power Distribution

T_j = 85°C

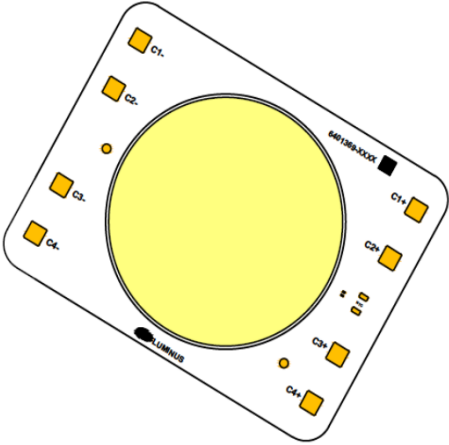
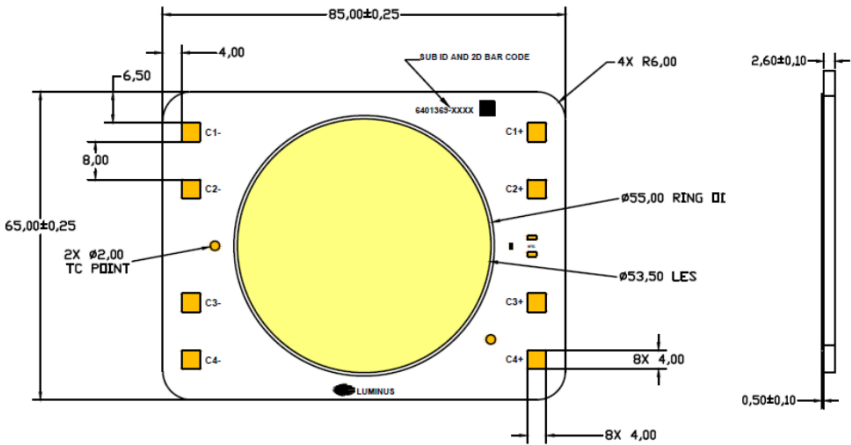


Derating Curve





Mechanical Dimensions¹



Note:

1. Unless otherwise specified, tolerance is $\pm 0.3\text{mm}$.



Shipping Tray Outline



Package model -- for illumination



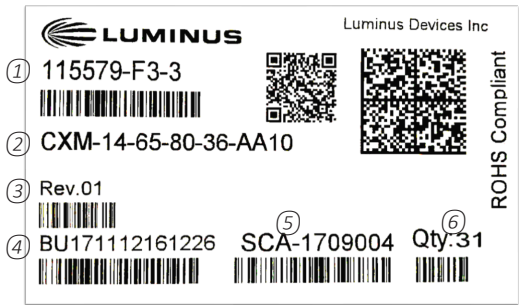
Packing Configuration:

- 4 pcs per tray and 5 trays are stacked together to be sealed in an anti-static bag.
- The anti-static bag is boxed for easier storage, 20 pcs per box.



Shipping Label

Label on Packaging Box



Label model -- for illumination only

Notes:

- ① Manufacturer part number, flux bin and chromaticity bin
- ② Customer part number
- ③ Rev.01 indicates a fully released product
- ④ Box ID
- ⑤ Production ID
- ⑥ Total number of units in a box



Technology Overview

Luminus Chip-on-Board (COB) LED series offers a complete lighting class solution for high performance studio and stage lighting. The selection covers the two key color point 3150K and 5600K as well as customized color point, all with >95 TLCI and CRI. These LEDs offer lighting designers solid-state solutions for applications delivering high lumen output, wonderful color rendering and operational peace of mind.

Reliability

Designed from the ground up, the Luminus COB LED is one of the most reliable light sources in the world today. Having passed a rigorous suite of environmental and mechanical stress tests, including mechanical shock, vibration, temperature cycling and humidity. Only then are the devices qualified for use in a wide range of lighting application including some of the most demanding commercial applications. Delivered with fully qualified LM80 test data and TM21 lifetime results that certify lumen maintenance at 50,000 hours or more, Luminus COB LEDs are ready for the toughest challenges.

UL and IEC Recognized Compliance

Luminus COB arrays are tested in accordance with ANSI/UL 8750 to ensure safe operation for their intended applications.

REACH & RoHS Compliance

All LED products manufactured by Luminus are REACH and RoHS compliant and free of hazardous materials, including lead and mercury.

IEC and ENEC License Compliance

Luminus COB arrays are tested in accordance with EN IEC 62031:2020, EN IEC 62031:2020/A11:2021.

Test Specifications

Every Luminus LED is fully tested to ensure it meets the high quality standards customers have come to expect from Luminus' products.

Traceability

Each Luminus COB LED is marked with a 2D bar code that contains a unique serial number. With this serial number, Luminus has the ability to provide customers with actual test data measurements for a specific LED. In addition, the 2D bar code is linked to manufacturing date codes that enables traceability of production processes and materials.

Testing Temperature

Luminus COB products are measured at temperatures typical for the LED operating in the fixture. Each device is tested at 85°C junction temperature eliminating the need to scale data sheet specifications to real world situations.

Chromaticity Bin Range

Chromaticity binning delivers color consistency for every order. Standard products are delivered with a 3-step MacAdam ellipse. This ensures color performance matching in the application. For the most demanding application, Luminus is one of only a few companies that can provide a 2 SDCM bin distribution. These tightly controlled, small distribution bins provide customers predictable, repeatable colors.



Handling Notes

Luminus products are designed for robust performance in general lighting application. However, care must be taken when handling and assembling the LEDs into their fixtures. To avoid damaging Luminus COBs please follow these guidelines.

The following is an overview of the application notes detailing some of the practices to follow when working with these devices. More detailed information is available on the Luminus web site at www.luminus.com.

General Handling

Devices are made to be lifted or carried with tweezers on two adjacent corners opposite the contact pads. At no time should the devices be handled by or should anything come in contact with the light emitting surface (LES) area. This area includes the yellow colored circular area and the ring surrounding it. There are electrical connections under the LES which if damaged will cause the device to fail. In addition, the ring frame itself should not be used for moving, lifting or carrying the device. Also do not attach any optics or mechanical holders to the ring as it is not capable of handling the mechanical stress.

Storage Condition

Please follow the conditions below.

Before opening	Temperature 5~30°C, relative humidity less than 60%.
After opening	Temperature 5~30°C, relative humidity less than 60%. After opening, LED should be kept in an aluminum moisture proof bag with a moisture absorbent material.
Avoid Corrosive gas	Avoid exposing to air with corrosive gas. If exposed, contact pad solderability may be affected. Furthermore, if the device is stored in an environment which contain elements that could volatize resin material, then the volatized resin particles may stick to electrodes, which may result in connection failures.

Static Electricity

Luminus COBs are electronic devices which can be damaged by electrostatic discharge (ESD). Please use appropriate measures to assure the devices do not experience ESD during their handling and or storage. ESD protection guidelines should be used at all time when working with Luminus COBs.

Storage	Luminus products are delivered in ESD shielded bags and should be stored in these bags until used.
Transporting	When transporting the devices from one assembly area to another, ESD shielded carts and carriers should be used.
Assembly	Individuals handling Luminus COBs during assembly should be trained in ESD protection practices. Assemblers should maintain constant conductive contact with a path to ground by means of a wrist strap, ankle straps, mat or other ESD protection system.



Chemical Compatibility

The resin material used to form the LES can get hydrocarbons from the surrounding environment. As a result, certain chemical compounds (H₂SO₄, H₂S, SO₂, NH₃, H₃PO₄, etc.) are not recommended for use with the Luminus products. Use of these compounds can cause damage to the light output of the device and may permanently damage the device. Please refer to the table below for a list of the compounds not recommended for use with the Luminus COB products.

Common Chemicals Know to Adversely Affect Luminus Devices		
Acetates	Ethers	Potassium hydroxide
Acetic acid	Cl, F or Br containing compounds	Siloxanes
Acrylates	Liquid hydrocarbons	Sodium Hydroxide
Aldehydes	Hydrochloric Acid	Sulfur compounds
Aldehydes	Ketones	Sulfuric Acid
Amines	Nitric Acid	Toluene
Benzene	Phosphoric acid	Xylenes
Dienes		

Thermal Interface Material (TIM)

Proper thermal management is critical for successful operation of any LED system. Excess operating temperature can reduce the light output of the device. Excessive heating can cause permanent damage to the device. Proper TIM material is a crucial component for effective heat transfer away from the LED during normal operation. Please refer to www.luminus.com for specific recommendations for TIM solutions and compounds recommended for use with the Luminus COB products.



Revision History

Rev	Date	Description of Change
01	09/28/2021	Initial release
02	05/16/2023	Edit and update
03	01/26/2025	Update new template, add ENEC mark