Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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Contact us

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CBT-90-UV LEDs

Monolithic Die Series

Ultraviolet Chip on Board LEDs

Table of Contents

Features:

- Greater than 12 W of optical power from 400 nm to 410 nm.
- High thermal conductivity package .
  - Junction to heat sink thermal resistance of 0.9 °C/W
- Luminus technology for very high power density and uniform surface emission
- Large, monolithic chip with surface emitting area of 9 mm^2
- Low-profile window for efficient coupling into small-etendue systems
- High radiometric efficiency
- Environmentally friendly: RoHS compliant, mercury-free
- Variable drive currents: 0.2A through 22.5 A

Applications

- Spot-curing
- Inspection
- Machine Vision
- Fiber-coupled illumination
- Rapid Prototyping and 3D printing
- Medical and Scientific Instrumentation

Technology Overview

Luminus LEDs™ benefit from innovations in device technology, chip packaging and thermal management. This suite of technologies give engineers and system designers the freedom to develop solutions both high in power and efficiency.

Luminus Technology

Luminus' technology enables large area LED chips to emit photons uniformly over the entire LED chip surface. The intense optical power density produced by these UV LEDs™ facilitate designs which replace arc and halogen lamps where arrays of traditional high power LEDs cannot.

For UV devices, Luminus engineers the LEDs™ to maximize light extraction and to emit with a Lambertian far-field distribution pattern. The design maximizes efficiency and allows for flexible optical designs.

Packaging Technology

Thermal management is critical in high power LED applications. With a thermal resistance from junction to heat sink of 0.9°C/W, Luminus CBT-90-UV LEDs have the lowest thermal resistance of any LED on the market. This allows the LED to be driven at higher current densities while maintaining a low junction temperature, thereby resulting in brighter solutions and longer lifetimes.

Reliability

Designed from the ground up, Luminus LEDs are one of the most reliable light sources in the world today. Luminus LEDs have passed a rigorous suite of environmental and mechanical stress tests, including mechanical shock, vibration, temperature cycling and humidity, and have been fully qualified for use in extreme high power and high current applications. With very low failure rates and median lifetimes that typically exceed 10,000 hours, Luminus LEDs are ready for even the most demanding applications.

Environmental Benefits

Luminus LEDs help reduce power consumption and the amount of hazardous waste entering the environment. All LED products manufactured by Luminus are RoHS compliant and free of hazardous materials, including lead and mercury.

Understanding Luminus LED Test Specifications

Every Luminus LED is fully tested to ensure that it meets the high quality standards expected from Luminus' products.

Testing Temperature

Luminus core board products are typically measured in such a way that the characteristics reported agree with how the devices will actually perform when incorporated into a system. This measurement is accomplished by mounting the devices on a 40°C heat sink and measuring the device while fully powered.

This method of measurement ensures that Luminus LEDs perform in the field just as they are specified.

Multiple Operating Points

The tables on the following pages provide typical optical and electrical characteristics. Since the LEDs can be operated over a wide range of drive conditions(currents from 0.2A to22.5A, and duty cycle from <1% to 100%), multiple drive conditions maybe listed.

CBT-90-UV devices are production specified at 13.5 A. Driving devices beyond recommended driving conditions shortens lifetime (see derating curves on page 6).

Ordering Information

Part Number Nomenclature

CBT — 90 — CC — C## — FF###-2#

Product Family	Chip Area	Color	Package Configuration	Bin Kit [1,2,3]
CBT: Copper-core PCB, Monolithic Die	90: 9 mm^2	UV = Ultraviolet	C31: 28 mm x 26.75 mm - Square Package See Mechanical Drawing section	See below for bin definition table

Note 1: A Bin Kit represents a group of individual flux or power bins that are shippable for a given ordering part number. Individual flux bins are not orderable..
Note 2: Flux Bin listed is minimum bin shipped - higher bins may be included at Luminus' discretion

CBT-120-UV Bin Kit Order Codes

The following tables describe the bin kit ordering codes for the CBT-90-UV. The power and wavelength bins included in the bin kit. Each kit specifies a minimum power and the listed wavelength. A maximum power is not specified. Within each kit, Luminus may ship any part meeting or exceeding the minimum power specification. Shipments will always meet the listed wavelength bin's range. For information on ordering bin kits not listed below, please contact Luminus or an official distributor.

Products	Ordering Part Number	Description
CBT-90-UV	CBT-90-UV-C31-x123-22	CBT-90 -UV consisting of a 9 mm^2 LED, a thermistor, connectors, and a square copper-core PCB.

Color	Bin Kit Code	Power (W)	Wavelength (nm)	
		Minimum Allowed	Min.	Max.
UV	K400-22	11.0	400	410
	L400-22	12.1	400	410
	M400-22	13.3	400	410

CBT-90-UV Bin Structure

CBT-90 LEDs are specified for Radiant Flux (power) and wavelength at a drive current of13.5 A (1.5 A/mm^2) and placed into one of the following luminous flux (F) and wavelength (123) bins:

Power Bins

Color	Power Flux Bin (F)	Minimum Flux (W)	Maximum Flux (W)
UV	K	11.0	12.1
	L	12.1	13.3
	M	13.3	14.6

*Note: Luminus maintains a +/- 6% tolerance on power measurements.

Wavelength Bins

Color	Wavelength Bin (123)	Minimum Wavelength (nm)	Maximum Wavelength (nm)
UV	400	400	405
	405	405	410

For ordering information, please refer to page 5 of CBT-90-UV Binning & Labeling Document PDS-002172.

Reference Optical & Electrical Characteristics (T_{hs} = 40°C)[1,2]

UV				
Drive Condition		**9A**	**13.5 A**	
Parameter	**Symbol**	**Values[3]**		**Unit**
Current Density	J	1.0	1.5	A/mm^2
Forward Voltage	$V_{F\,min}$	-	3.2	V
	V_F	3.3	3.4	V
	$V_{F\,max}$	-	4.0	V
Radiometric Flux[4]	Φ_{typ}	8.9	13.4	W
Radiometric Flux Density	Φ_R	0.55	0.83	W/mm^2
Wavelength Range	λ	400 - 410	400 - 410	nm
Peak Wavelength	λ_p	405	405	nm
FWHM	$\Delta\lambda_{1/2}$	14	14	nm

	Symbol	UV	Unit
Emitting Area		9	mm^2
Emitting Area Dimensions		3 × 3	mm × mm
Dynamic Resistance	Ω_{dyn}	0.02	Ω

Absolute Maximum Ratings

	Symbol	UV	Unit
Minimum Current[5]		0.2	A
Maximum Current		22.5	A
Maximum Junction Temperature[7]	T_{jmax}	150	°C
Storage Temperature Range		-40 to +100	°C

Note 1: *Data verified with NIST calibration standard.*

Note 2: *All data are based on test conditions with a constant heat sink temperature* T_{hs} *= 40°C under pulse testing conditions. Listed drive conditions are typical for common applications. CBT-90-UV devices can be driven at currents ranging from 0.2 A to 22.5 A and at duty cycles ranging from 1% to 100%. Drive current and duty cycle should be adjusted as necessary to maintain the junction temperature desired to meet application lifetime requirements. See Thermal Resistance section for* T_j *and* T_{hs} *definition.*

Note 3: *Unless otherwise noted, values listed are typical. Devices are production tested and specified at 13.5 A.*

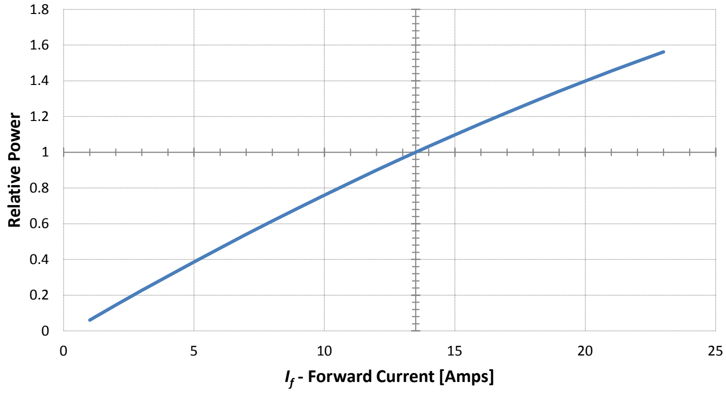
Note 4: *Total flux from emitting area at listed peak wavelength. Reported performance is included to show trends for a selected power level. For product roadmap and future performance of devices, contact Luminus.*

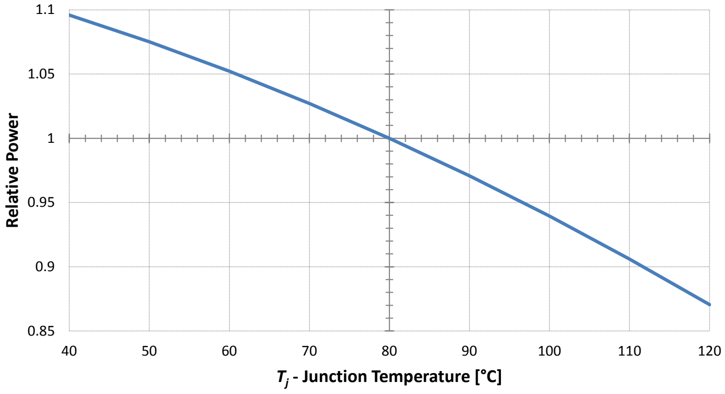
Note 5: *CBT-90-UV LEDs are designed for operation to an absolute maximum current as specified above. Product lifetime data is specified at recommended forward drive currents. Sustained operation at or beyond absolute maximum currents will result in a reduction of device life time compared to recommended forward drive currents. Actual device lifetimes will also depend on junction temperature. Refer to the lifetime derating curves for further information. In pulsed operation, rise time from 10-90% of forward current should be longer than 0.5 µseconds.*

Note 6: *Special design considerations must be observed for operation under 1 A. Please contact Luminus for further information.*

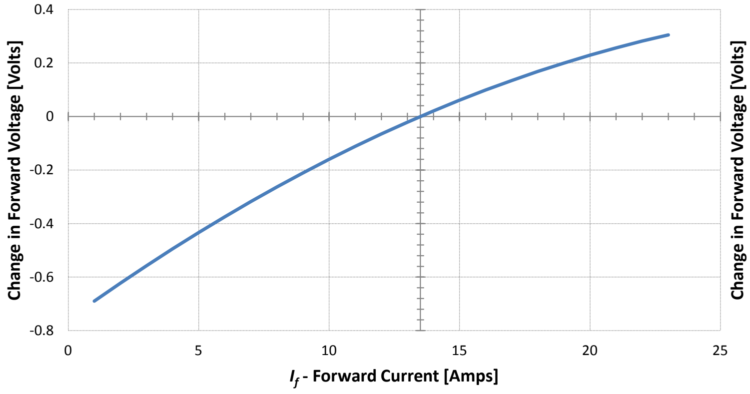
Note 7: *Lifetime dependent on LED junction temperature. Input power and thermal system must be properly managed to ensure lifetime. See charts on page 8 for further information*

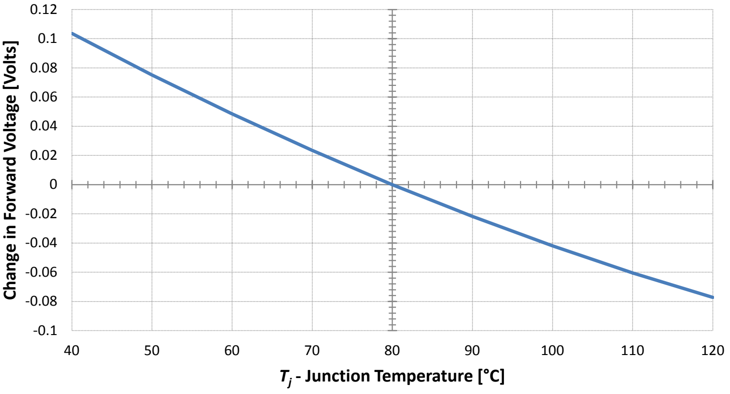
Optical Power Characteristics


Relative Power *vs* Forward Current (I_f)
Normalized to 13.5 A

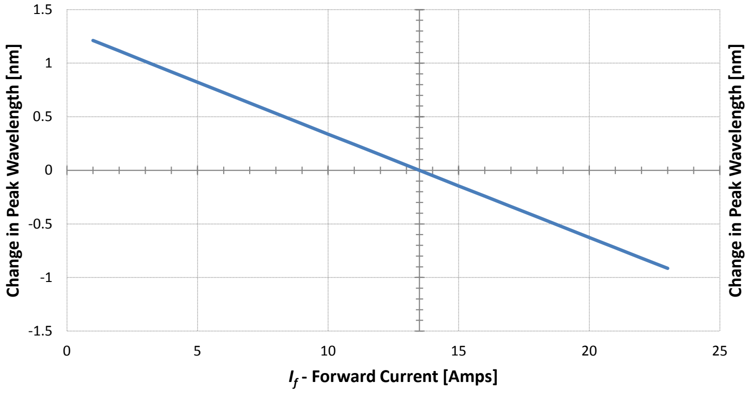

Relative Power *vs* Junction Temperature (T_j)
Normalized to 80°C

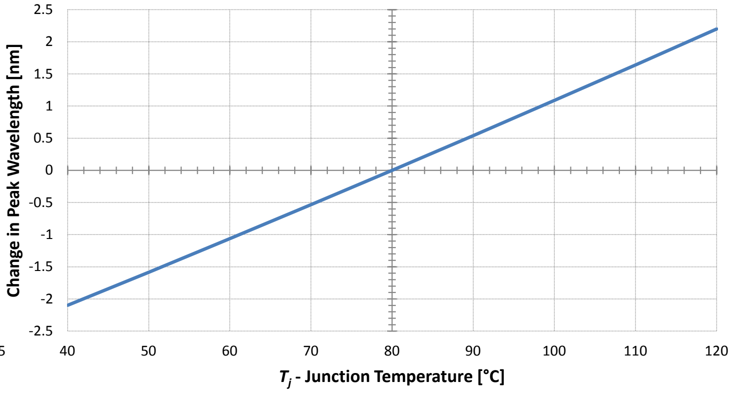
Forward Voltage Characteristics


Change in Forward Voltage (V_f) vs Forward Current (I_f)
Referenced to 13.5 A

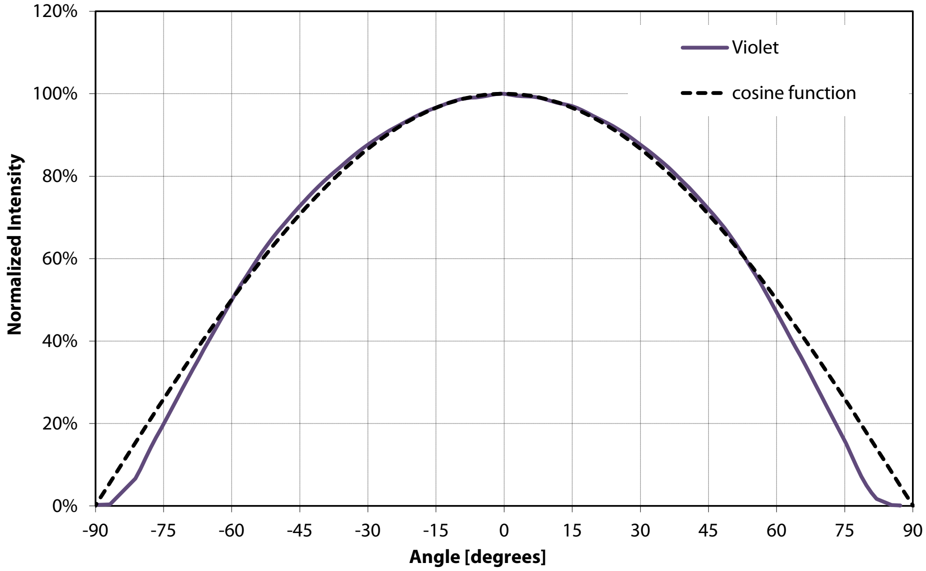

Change in Forward Voltage (V_f) *vs* Junction Temperature (T_j)
Referenced to 80°C

Peak Wavelength Characteristics

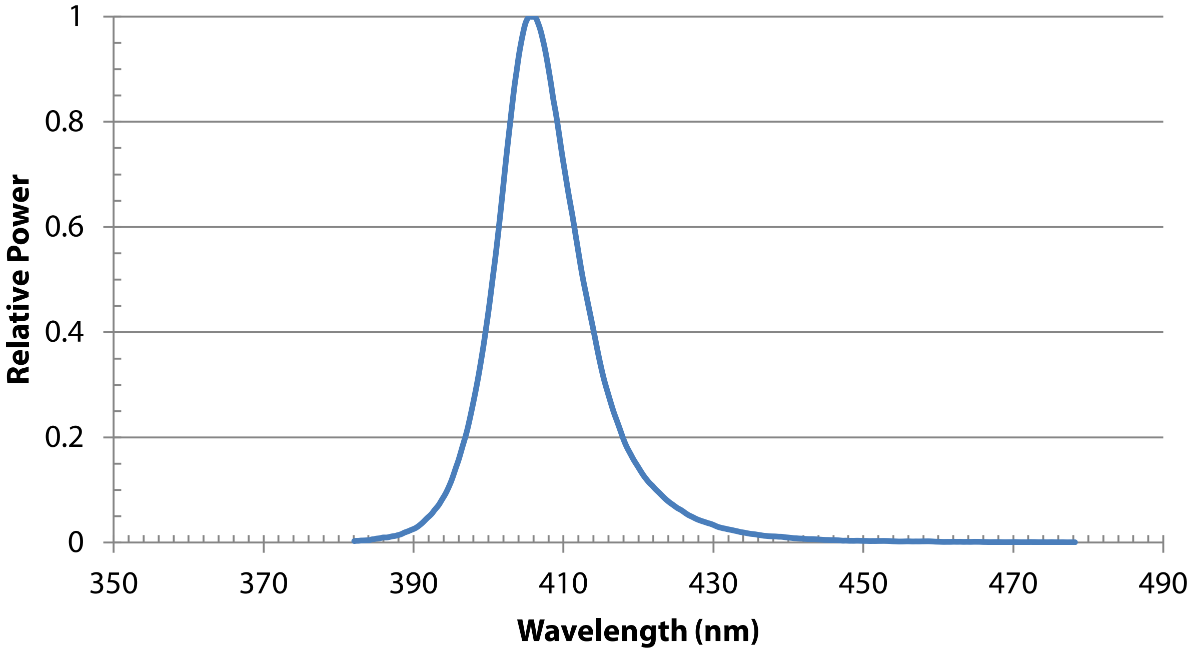

Change in Peak Wavelength (λ_p) *vs* Forward Current (I_f)
Referenced to 13.5 A


Change in Peak Wavelength (λ_p) *vs* Temperature (T_j)
Referenced to 80°C

Typical Radiation Pattern

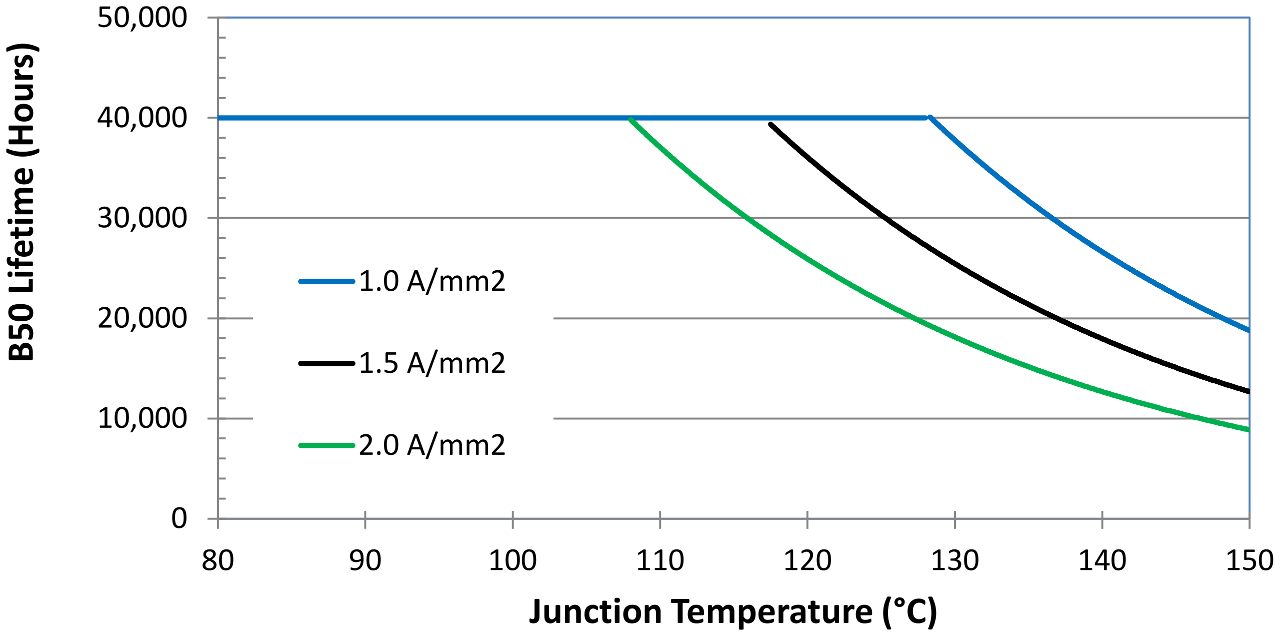


Typical Spectrum

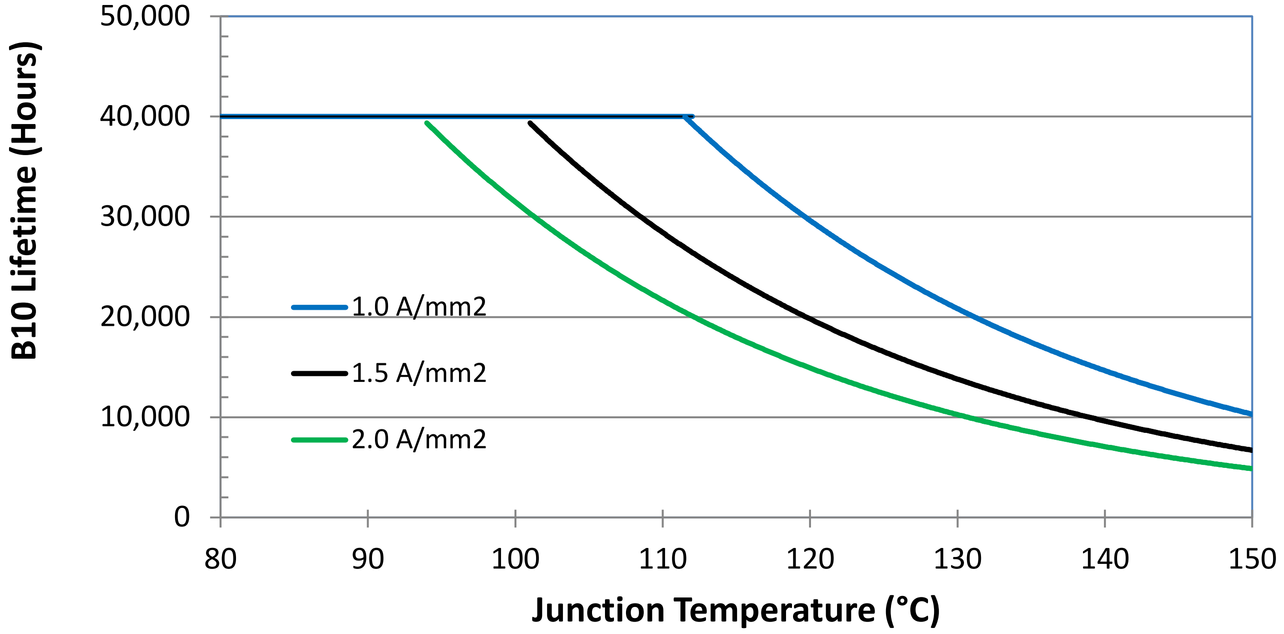


CBT-90-UV Reliability[8]

CBTxx-UV-405nm B50 Lifetime

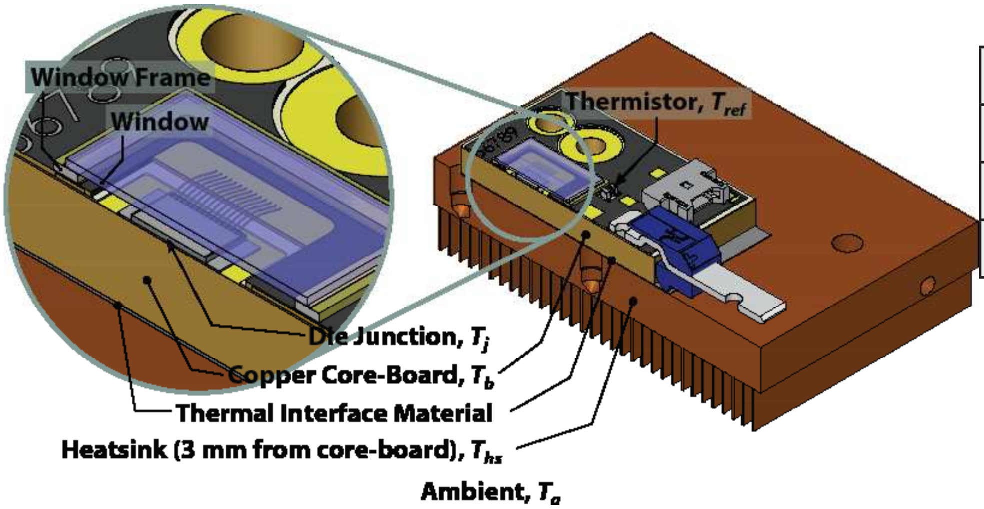


CBTxx-UV-405nm B10 Lifetime



Note 8 Lifetime defined as time to 70% of initial intensity. Based on preliminary lifetime test data. Data can be used to model failure rate over typical product lifetime.

Thermal Resistance



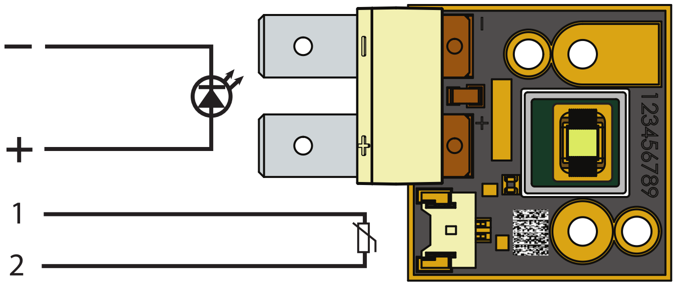
Typical Thermal Resistance

$R_{\theta j\text{-}b}$[9]	0.80 °C/W
$R_{\theta b\text{-}hs}$[9]	0.12 °C/W
$R_{\theta j\text{-}hs}$[10]	0.92 °C/W
$R_{\theta j\text{-}ref}$[9]	0.83 °C/W

Note 9: Thermal resistance values are based on FEA model results correlated to measured $R_{\theta j\text{-}hs}$ data.

Note 10: Thermal Resistance is based on eGraf 1205 Thermal interface.

Electrical Pinout

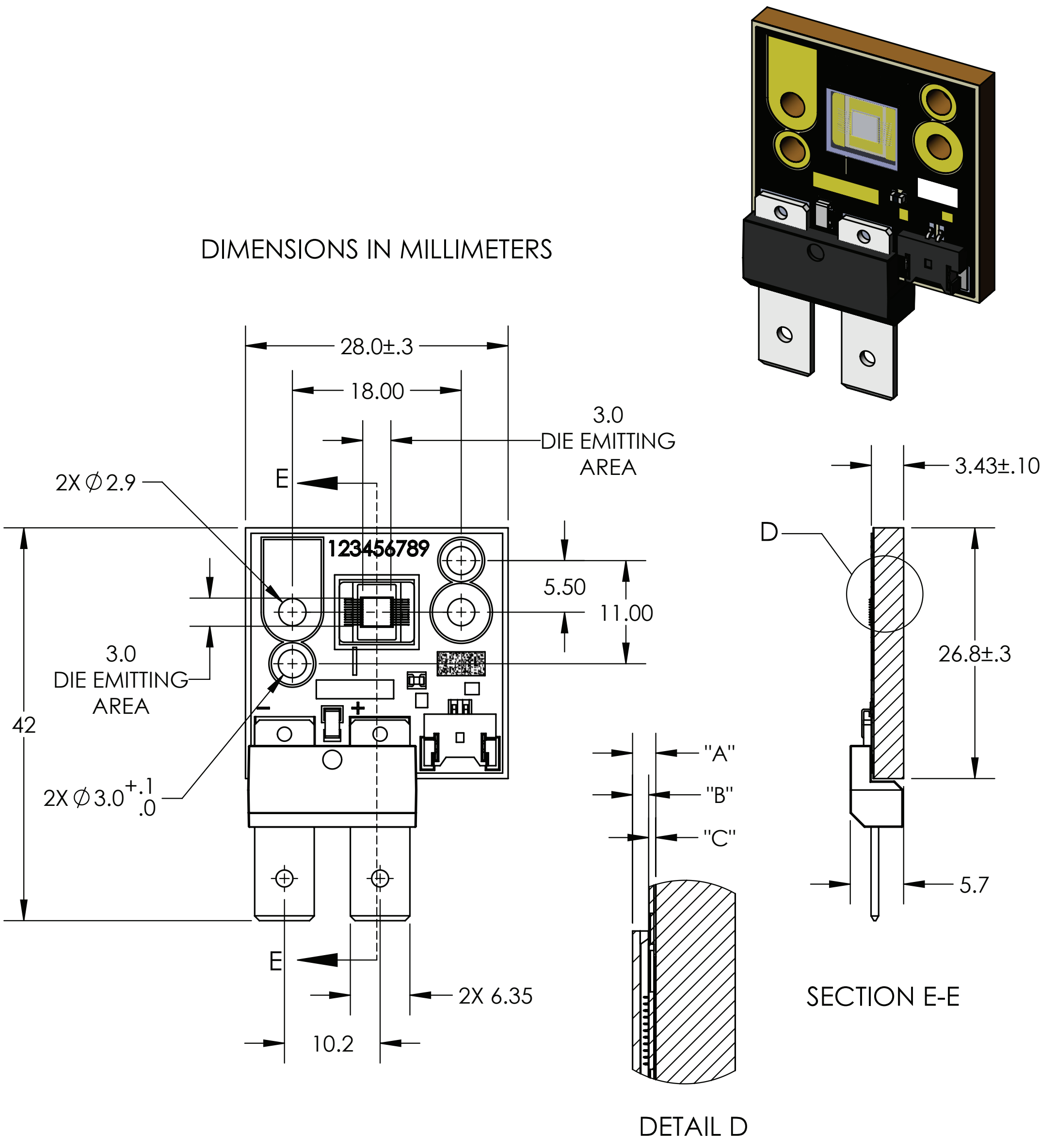


Thermistor Information

The thermistor used in CBT-120 devices mounted on coreboards is from Murata Manufacturing Co. The global part number is NCP18XH103J03RB. Please see http://www.murata.com/ for details on calculating thermistor temperature.

For more information on use of the thermistor, please contact Luminus directly.

Mechanical Dimensions – CBT-90-UV-C31 Emitter



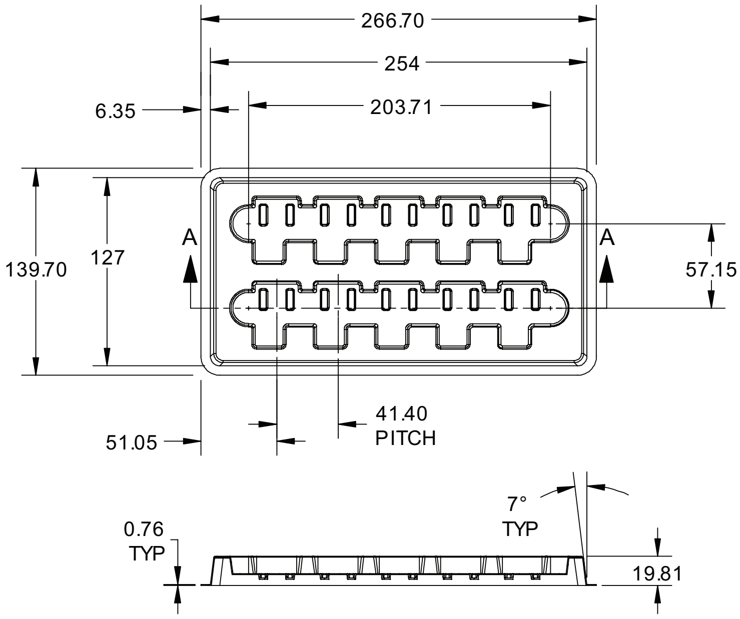
DIMENSION NAME	DESCRIPTION	NOMINAL DIMENSION	TOLERANCE
"A"	TOP OF METAL SUBSTRATE TO TOP OF WINDOW	.91	±.13
"B"	TOP OF DIE EMITTING AREA TO TOP OF WINDOW	.64	±.11
"C"	TOP OF METAL SUBSTRATE TO TOP OF DIE EMITTING AREA	.27	±.02

DWG-002183

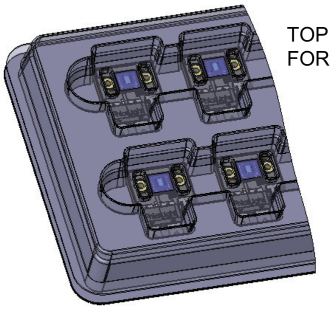
Recommended connector for Anode and Cathode: Panduit Disco Lok™ Series P/N: DNG14-250FL-C.
Thermistor Connector: MOLEX P/N 53780-0270 or GCT P/N WTB08-021S-F.
Recommended Female: MOLEX P/N 51146-0200, GCT P/N WTB06-021S-F or equivalent

Shipping Tray Outline - CBT-90-C31

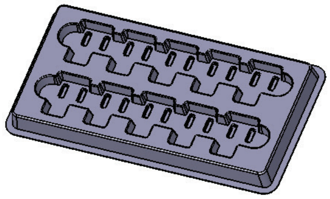
DIMENSIONS IN MILLIMETERS



SECTION A-A



TOP TRAY SHOWN TRANSPARENT
FOR REFERENCE ONLY



Packing and Shipping Specification (CBT-90-C31)

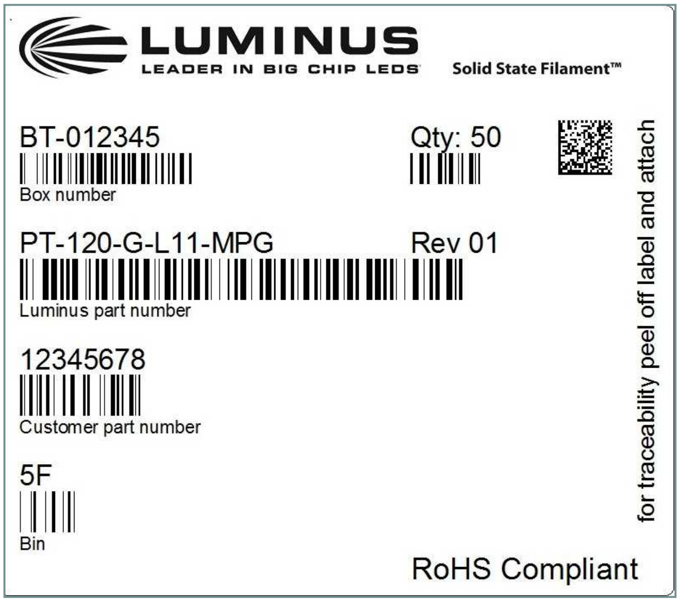
Packing Specification

Packing Configuration	Qty /Pack	Box Dimensions (diameter x W, mm)	Gross Weight (kg)
Stack of 5 trays with 10 devices per tray Each pack is enclosed in ESD bag	50	140 x 280 x 70	2.7

Product Label Specification

Label Fields (subject to change):

- 6-8 digit Box number (for Luminus internal use)
- Luminus ordering part number
- Quantity of devices in pack
- Part number revision (for Luminus internal use)
- Customer's part number (optional)
- Flux Bin
- 2D Bar code



LUMINUS
LEADER IN BIG CHIP LEDS
Solid State Filament™

BT-012345 Qty: 50
Box number

PT-120-G-L11-MPG Rev 01
Luminus part number

12345678
Customer part number

5F
Bin

RoHS Compliant

for traceability peel off label and attach

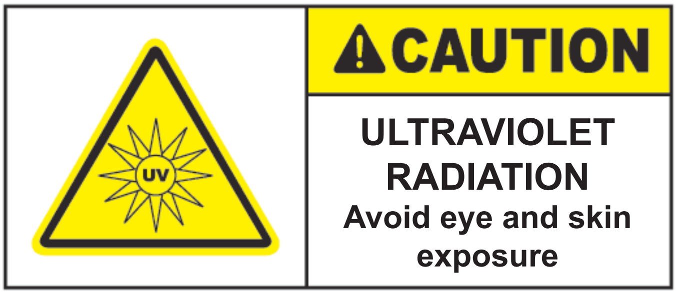
Sample label –for illustration only

Shipping Box

Shipping Box	Quantity	Material	Dimensions (L x W x H, mm)
Carton Box	1 -20 packs (50 - 1000 Devices)	S4651	560 x 560 x 200

History of Changes

Rev	Date	Description of Change
01	04/04/2013	Initial Release
02	08/09/2013	Updated Window Implemented
03	08/21/2014	Updated Binning
04	10/05/2015	Updated Formatting and Binning
05	03/29/2016	Updated Reliability



This product is protected by U.S. Patents 6,831,302; 7,074,631; 7,083,993; 7,084,434; 7,098,589; 7,105,861; 7,138,666; 7,166,870; 7,166,871; 7,170,100; 7,196,354; 7,211,831; 7,262,550; 7,274,043; 7,301,271; 7,341,880; 7,344,903; 7,345,416; 7,348,603; 7,388,233; 7,391,059 Patents Pending in the U.S. and other countries.