CBT-90-UV
High Brightness UV LED

Table of Contents

Features:

- UV LED with a monolithic chip of emitting area 9 mm^2
- Unencapsulated die with low profile protective window optimizes optical coupling in fiber coupling and in etendue-limited applications
- Typical peak emission of 405 nm and 415 nm
- Ultra High thermal conductivity common anode package allows operation at up to 27A
- Chip on board package for easy thermal management and optical integration
- Environmentally friendly: RoHS, REACH and Halogen compliant

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CBT-90-UV Binning Structure

CBT-90 UV LEDs are tested at 18 A continuous current, at a constant heat sink temperature of 40°C and placed into one of the following flux and wavelength bins.

Flux Bins*

Color	Radiometric Flux Bin (F)	Min Radiometric Power (Watts) @ 18A	Max Radiometric Power (Watts) @ 18A
UV	P	16.1	17.7
	Q	17.7	19.5
	R	19.5	21.4

Note: Luminus maintains a +/-6% tolerance in flux measurements.

Wavelength Bins

Color	Peak Wavelength Bin	Min Peak Wavelength @ 18A	Max Peak Wavelength @ 18A
UV (Peak WL)	400	400	405
	405	405	410
	410	410	415
	415	415	420

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Part Number Nomenclature

CBT — 90 — CC — L## — F###

Product Family	Chip Area	Color	Package Configuration	Bin Kit [1,2,3]
CBT: Copper-core PCB	90: 9 mm^2	UV= Ultraviolet	L11: 28 mm x 26.75 mm - Common Anode Package See Mechanical Drawing section	See page 3 for complete bin definition table

Ordering Part Numbers

Wavelength Range	Radiometric Flux		Wavelength Bins	Ordering Part Number[2,,3]
	Bin Kit Flux Code	Min. Flux		
400-410	P	16.1	400, 405	CBT-90-UV-L11-P400-22
410-420	P	16.1	410, 415	CBT-90-UV-L11-P410-22

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
Note 3: For example, CBT-90-UV-L11-P410-22 represents a CBT-90-UV LED with a minimum Radiometric Power of 16.1 W and a Peak Wavelength between 410 and 420 nm

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Optical & Electrical Characteristics

Typical Device Performance

UV				
Parameter	**Symbol**	**Values [4]**		**Unit**
Peak Wavelength Range	λ	400-410	410-420	nm
Test Current for binning [5]	I	18.0	18.0	A
Peak Wavelength Typ.	λ_p	405	415	nm
Forward Voltage	$V_{F\,min}$	3.0	3.0	V
	V_F	3.6	3.6	V
	$V_{F\,max}$	4.4	4.4	V
Radiometric Flux [6]	Φ_{typ}	19.5	19.5	W
FWHM at 50% of Φ	$\Delta\lambda_{1/2}$	20	20	nm

	Symbol	**Values [4]**	**Unit**
Absolute Minimum Current (CW or Pulsed)[7]		1.0	A
Absolute Maximum Current (CW)[8]		27	A
Absolute Maximum Surge Current [8] (Frequency > 240 Hz, duty cycle =10%, t=1ms)		31.5	A
Absolute Maximum Junction Temperature [8]	T_{jmax}	150	°C
Storage Temperature Range		-40/+100	°C
Emitting Area[9]	A_e	9.0	mm^2
Emitting Area Dimensions		3.0 x 3.0	mm × mm

Note 4: All ratings are based on a drive current of 18 A with a constant heat sink temperature T_{hs} =40 °C. See Thermal Resistance section for T_{hs} definition.

Note 5: While CBT-90-UV devices are tested at 18 A, they can be driven at currents ranging from 1 A to 27 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

Note 6: Typical radiometric flux is for reference only. Minimum flux values are guaranteed based on the bin kit ordered. For product roadmap and future performance of devices, contact Luminus.

Note 7: Special design considerations must be observed for operation under 1 A. Please contact Luminus for further information.

Note 8: CBT-90-UV LEDs are designed for operation to an absolute maximum current as specified above. Product lifetime data is specified at or below maximum drive current. Sustained operation beyond absolute maximum currents will result in a reduction of device life time . Actual device lifetimes will also depend on junction temperature and operation beyond maximum junction temperature is not recommended. Contact Luminus for lifetime derating curves and for further information. In pulsed operation, rise time from 10-90% of forward current should be longer than 0.5 µseconds.

Note 9: Emitting Area is for reference only and subject to change without notice.

Important Note: The copper PCB of CBT-90-UV is electrically active with a common anode polarity.

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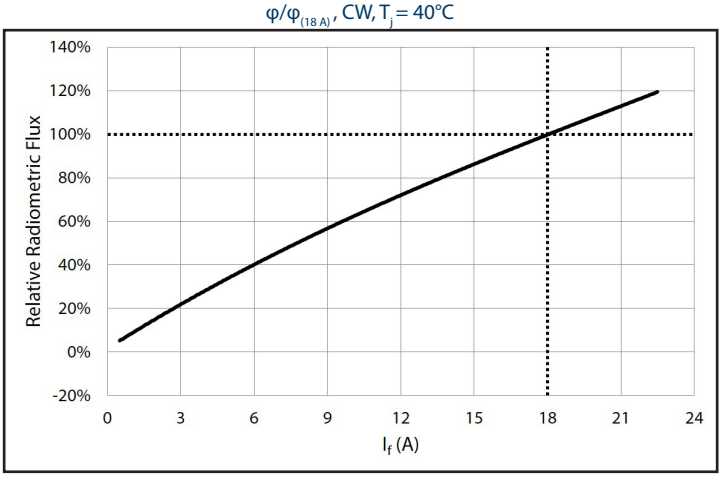
Optical & Electrical Characteristics- 405 nm

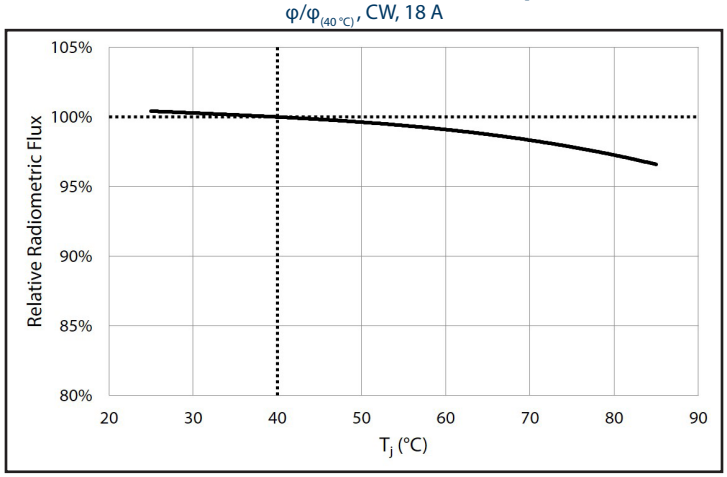
Relative Power vs. Forward Current

$\varphi/\varphi_{(18\,A)}$, CW, $T_j = 40°C$



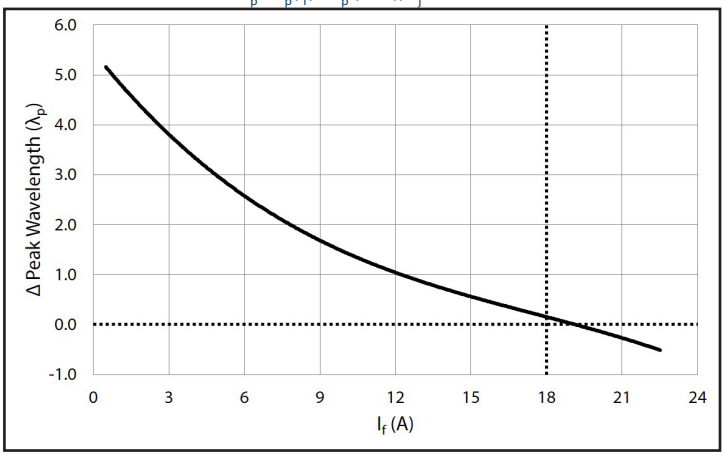
Relative Power vs. Junction Temperature

$\varphi/\varphi_{(40\,°C)}$, CW, 18 A



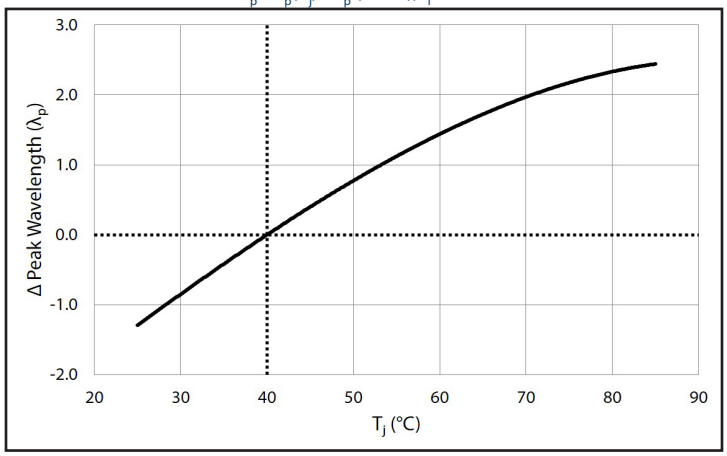
Peak Wavelength Shift vs. Forward Current

$\lambda_p = \lambda_p(I_f) - \lambda_p$ (18A), $T_j = 40°C$

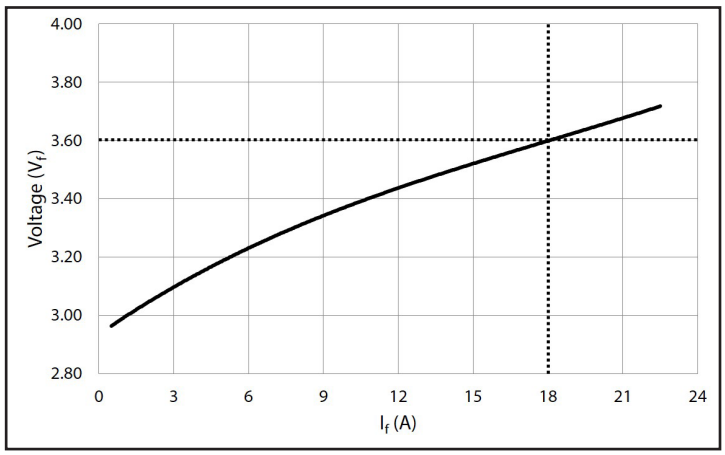


Peak Wavelength Shift vs. Junction Temperature

$\lambda_p = \lambda_p(T_j) - \lambda_p$ (40 °C), I_f =18 A

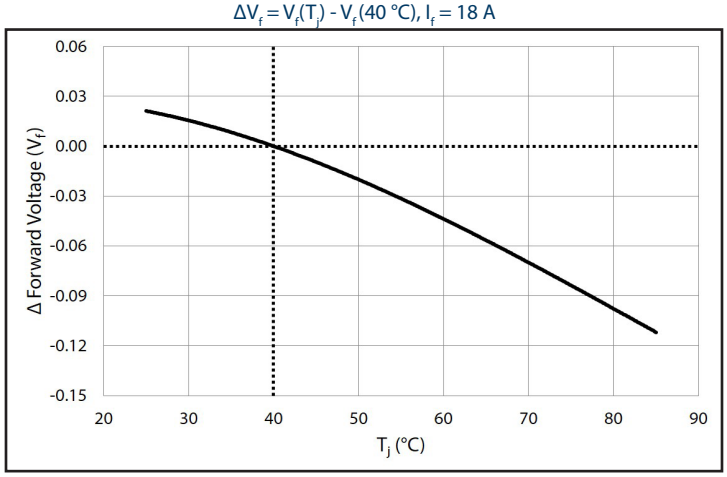


Forward Voltage vs Forward Current



Forward Voltage Shift vs. Junction Temperature

$\Delta V_f = V_f(T_j) - V_f$(40 °C), I_f = 18 A



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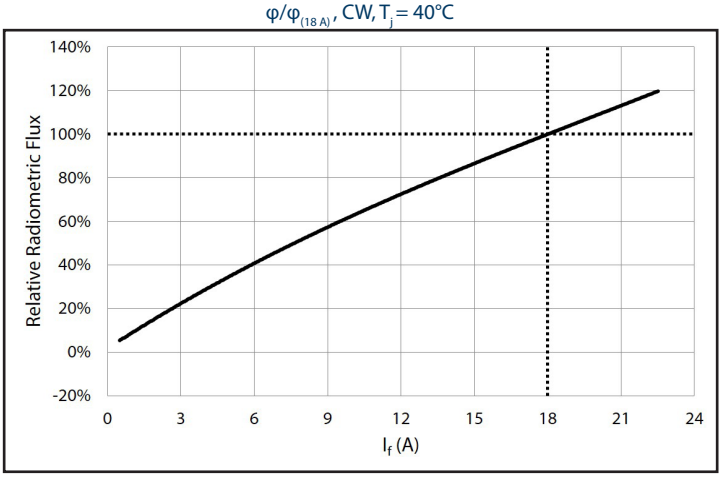
Optical & Electrical Characteristics- 415 nm

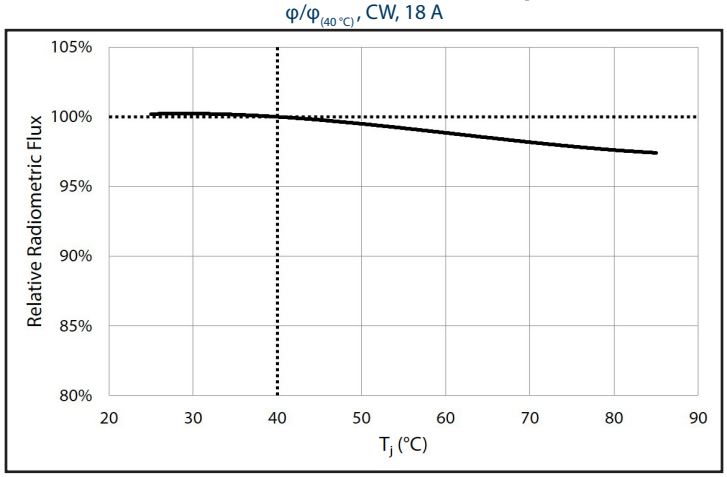
Relative Power vs. Forward Current

$\varphi/\varphi_{(18\,A)}$, CW, T_j = 40°C



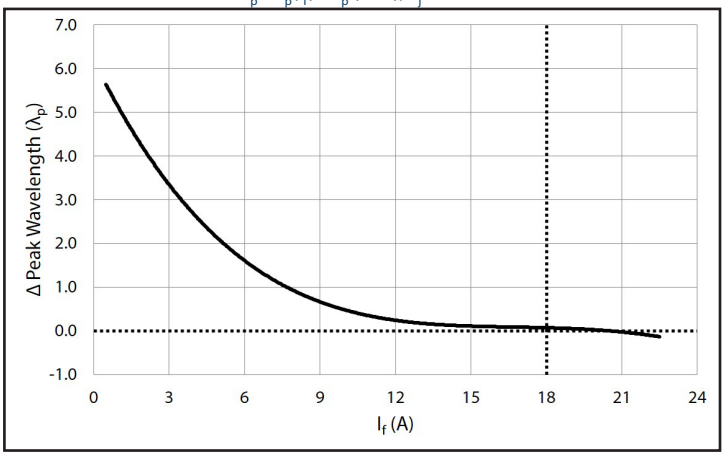
Relative Power vs. Junction Temperature

$\varphi/\varphi_{(40\,°C)}$, CW, 18 A



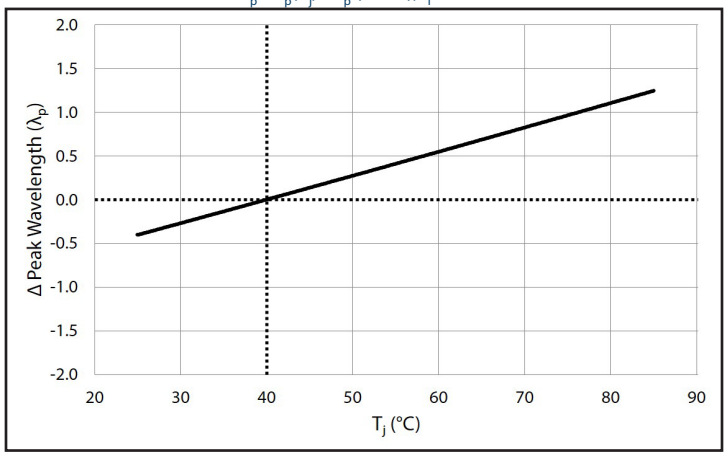
Peak Wavelength Shift vs. Forward Current

$\lambda_p = \lambda_p(I_f) - \lambda_p$ (18A), T_j = 40°C

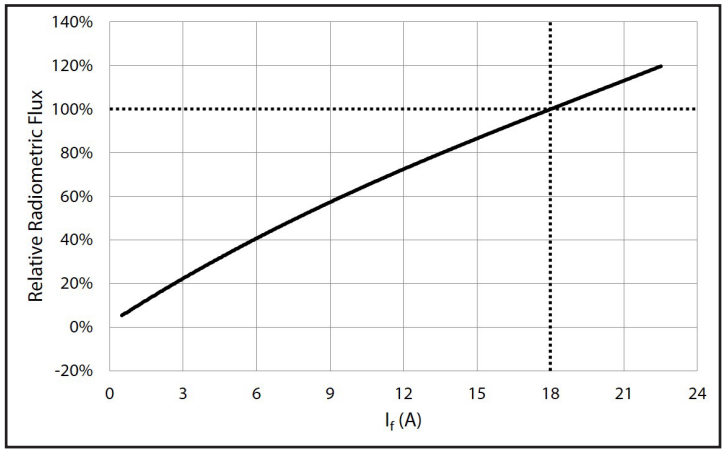


Peak Wavelength Shift vs. Junction Temperature

$\lambda_p = \lambda_p(T_j) - \lambda_p$ (40 °C), I_f =18 A

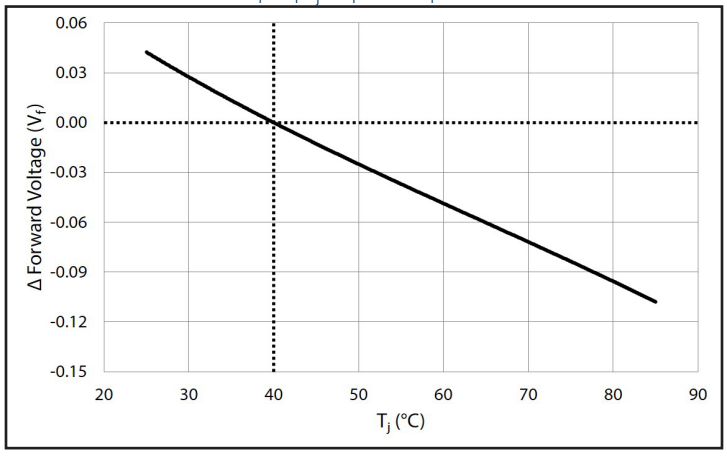


Forward Voltage vs Forward Current



Forward Voltage Shift vs. Junction Temperature

$\Delta V_f = V_f(T_j) - V_f$(40 °C), I_f = 18 A



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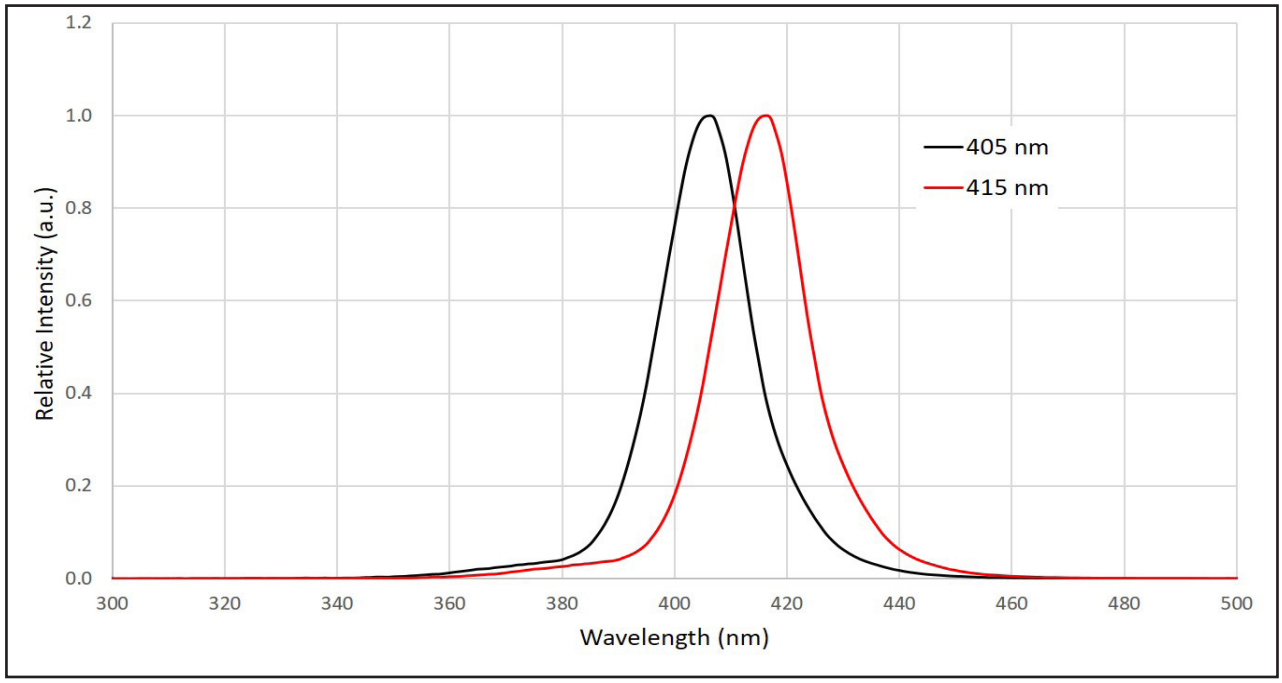
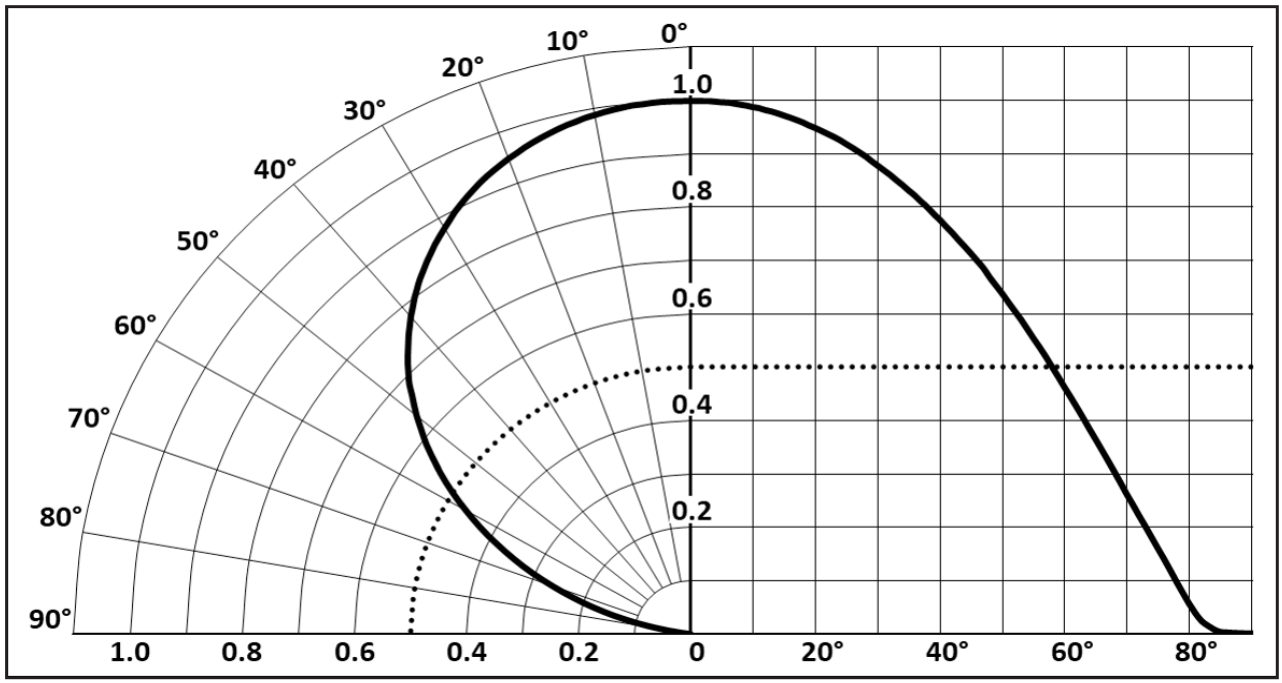
Typical Spectrum[9]



Radiation Pattern[10]



Note 9 : Typical spectrum at 18 A drive current.

Note 10: Detailed information on radiation pattern including ray trace files can be found at: http://www.luminus.com

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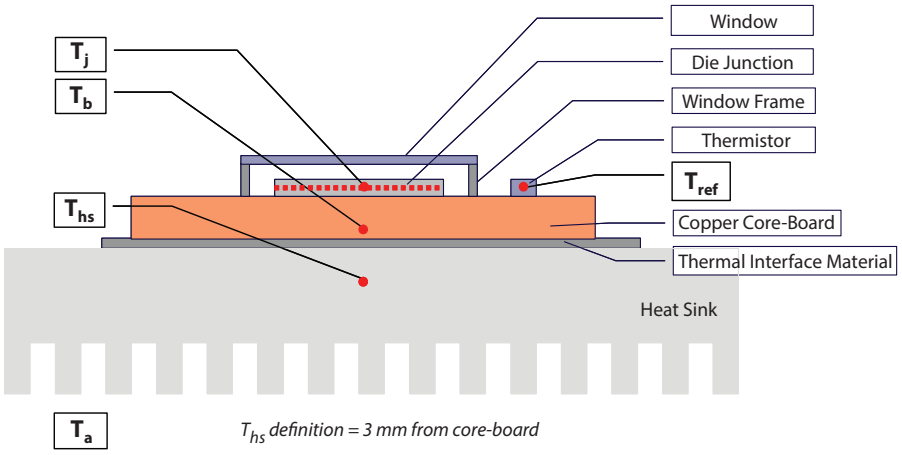
Thermal Resistance



Typical Thermal Resistance

$R_{\theta j\text{-}b}$ [1]	0.42 °C/W
$R_{\theta b\text{-}hs}$ [1]	0.2 °C/W
$R_{\theta j\text{-}hs}$ [2]	0.62 °C/W
$R_{\theta j\text{-}ref}$ [1]	0.45 °C/W

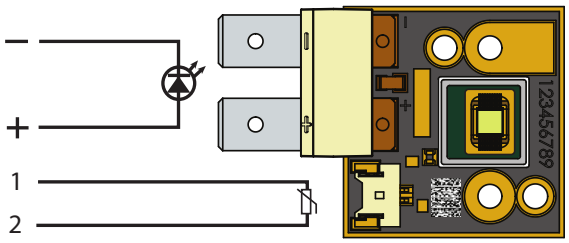
Note 1: Thermal resistance values are based on FEA model results correlated to measured $R_{\theta j\text{-}hs}$ data.

Note 2: Thermal resistance is measured using eGraf 1205 thermal interface material.

Thermistor Information

The thermistor used in CBT-90 LEDs mounted on core-boards is from Murata Manufacturing Co. The global part number is NCP18XH103J03RB. Please see http://www.murata.com/ for details on calculating thermistor temperature.

Electrical Pinout



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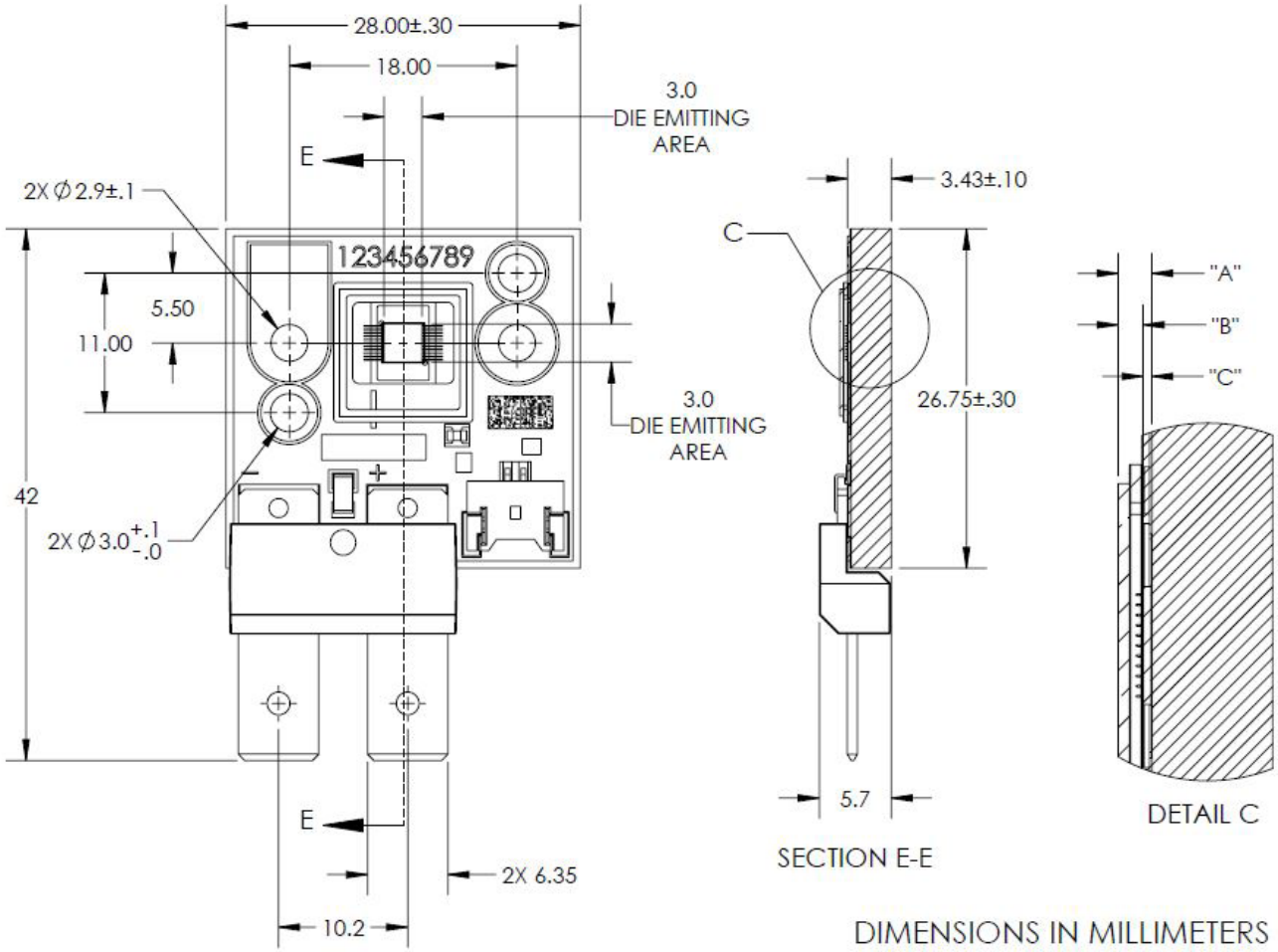
Mechanical Dimensions – CBT-90-UV Common Anode LED



DIMENSION NAME	DESCRIPTION	NOMINAL DIMENSION	TOLERANCE
"A"	TOP OF METAL SUBSTRATE TO TOP OF WINDOW	.88	±.13
"B"	TOP OF DIE EMITTING AREA TO TOP OF WINDOW	.65	±.11
"C"	TOP OF METAL SUBSTRATE TO TOP OF DIE EMITTING AREA	.23	±.02

DWG-002309

Recommended connector for Anode and Cathode: Panduit Disco Lok™ Series P/N: DNF14-250FIB or DNF10-250FIB for high current . Check NEC standards for ampacity of the power cable being used .Thermistor Connector: GCT P/N WTB08-021S-F . Recommended Female: GCT P/N WTB06-020H-A, MOLEX P/N 51146-0200 (Not recommended for new designs), or equivalent

For detailed drawing please refer to DWG-002309

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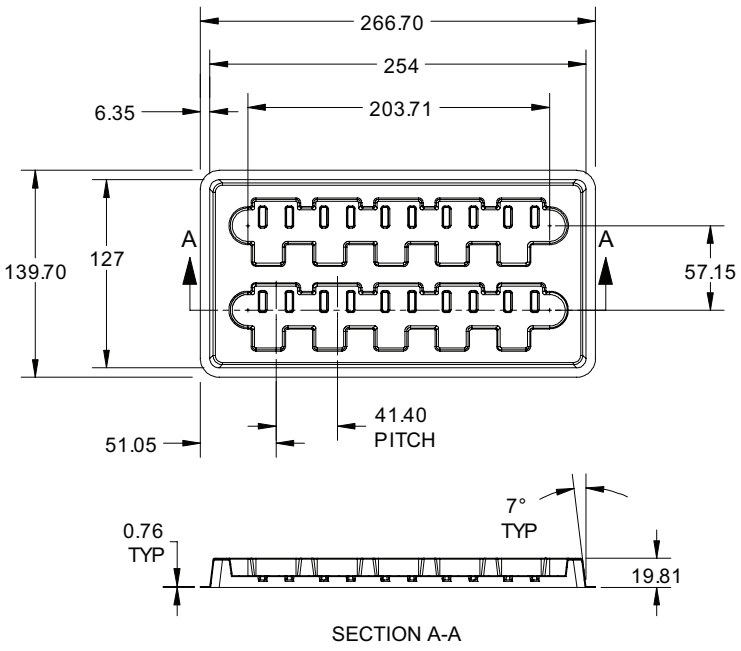
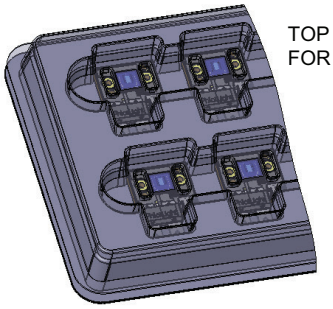
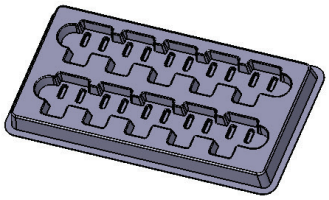
Shipping Tray Outline

DIMENSIONS IN MILLIMETERS





TOP TRAY SHOWN TRANSPARENT
FOR REFERENCE ONLY



For detailed drawing of shipping trays, please refer to document TO-0479, available upon request.

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Packing and Shipping Specification (CBT-90)

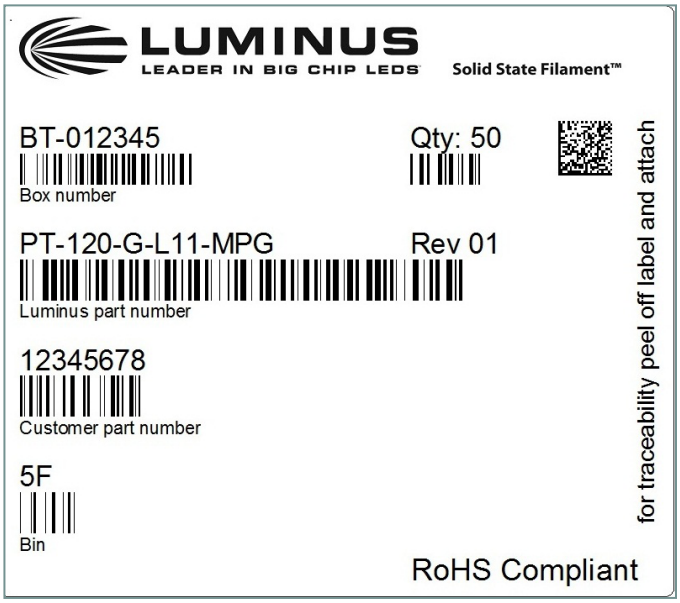
Packing Specification

Packing Configuration	Qty /Pack	Reel 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	150 x 280 x 85	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)
- Bin (FF-WW) as defined page 3
- 2D Bar code



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

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History of Changes

Rev		Description of Change
01	08/15/2021	Initial Release
02	7/7/2021	Update Bin Code

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