CBM-160X-UV

Ultraviolet Chip On Board LED

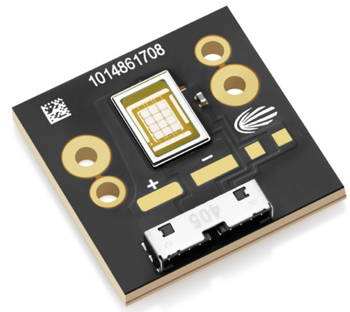

Table of Contents

Features:

- Mosaic Array UV LED chipset with surface emitting area of 16 mm^2, 4:3 aspect ratio
- Latest UVX technology enables ultra-high power density operation up to 4 A/mm^2
- Electrically Isolated, high thermal conductivity copper coreboard package
- Available in wide range of UVA wavelengths: 365 nm - 410 nm
- Low-profile window for efficient coupling into small-etendue systems
- Environmentally friendly: REACH, RoHS and Halogen compliant
- Over 60 Watts of optical power at maximum rated drive conditions

Applications:

- 3D printing and Additive Manufacturing
- Machine Vision
- Maskless Lithography
- Curing
    - Inks
    - Coatings
    - Adhesives
- Medical and Scientific Instrumentation

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Binning Structure

CBM-160X-UV LEDs are specified for flux and peak wavelength at a drive current of 3 A with a 20 ms pulse at 25°C and placed into one of the following Power Bins and Wavelength Bins.

Flux Bins

Color	Flux Bin (FF)	Binning @ 3A, 20ms pulse, T_c= 25°C[3]	
		Minimum Flux (W)	Maximum Flux (W)
UV	Q	17.7	19.5
	R	19.5	21.0
	S	21.0	22.5
	T	22.5	24.0
	U	24.0	25.1

Peak Wavelength Bins

Color	Wavelength Bin (WWW)	Binning @ 3A, 20ms pulse, T_c= 25°C[3]	
		Minimum Wavelength (nm)	Maximum Wavelength (nm)
UV	365	365	370
	370	370	375
	380	380	385
	385	385	390
	400	400	405
	405	405	410

Note 1: Luminus maintains a +/- 6% tolerance on flux measurements.

Note 2: Products are production tested then sorted and packed by bin.

Note 3: Ratings are based on operation at a constant temperature of T_c = 25 °C.

Note 4: Luminus maintains a +/- 1nm tolerance on wavelength measurements.

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Ordering Information

Product	Ordering Part Number	Description
CBM-160X-UV	CBM-160X-UV-Y32-FWWW-2#	CBM-160X-UV Mosaic Array chipset consisting of 12 UV chips, a thermistor, and a connector on a copper-core PCB.

Part Number Nomenclature

CBM	160X	UV	Y32	FWWW-2#
Product Family	**Chip Area**	**Color**	**Package Configuration**	**Bin Kit**
CBM: Copper-core PCB, Mosiac Array	160X:16 mm^2	UV: Ultraviolet	Y32: 32 mm x 32 mm See Mechanical Drawing section	See ordering part numbers table below for complete bin definition

Ordering Part Numbers

Wavelength Range	Radiometric Flux		Wavelength Bins	Ordering Part Number[1,2]
	Min. Flux Bin	Min. Flux (W)		
365-375	Q	17.7	365, 370	CBM-160X-UV-Y32-Q365-22
380-390	Q	17.7	380, 385	CBM-160X-UV-Y32-Q380-22
400-410	Q	17.7	400, 405	CBM-160X-UV-Y32-Q400-22

Note 1: A Bin Kit represents a group of flux and wavelength bins that are shippable for a given ordering part number. Individual bins are not always orderable-contact Luminus for special requests.

Note 2: Flux Bin listed is minimum bin shipped - higher bins may be included at Luminus' discretion

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Typical Device Performance (T_c = 25°C)

Parameter	Symbol	Value			Unit
Peak Wavelength Range	λ	365-375	380-390	400-410	nm
Test Current for binning [3]	I	3.0	3.0	3.0	A
Peak Wavelength Typ.	λ_p	365	385	405	nm
Forward Voltage	$V_{F\,min}$	12.8	12.4	12.8	V
	V_F	14.8	13.8	14.8	V
	$V_{F\,max}$	17.0	16.4	16.8	V
Radiometric Flux [4]	Φ_{typ}	21.6	19.2	18.0	W
FWHM at 50% of Φ	$\Delta\lambda_{1/2}$	15	15	15	nm

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Absolute Minimum Current (CW or Pulsed) [5]	I_{min}	0.6	A
Absolute Maximum Current (CW) [6] for 365-375 nm	I_{max}	7.5	A
Absolute Maximum Current (CW) [6] for 385-405 nm	I_{max}	12	A
Absolute Maximum Surge Current [6] for 365-375 nm	I_s	11.25	A
Absolute Maximum Surge Current [6] for 385-405 nm	I_s	18	A
Maximum Junction Temperature [6]	T_{jmax}	125	°C
Storage Temperature Range	T_s	-40 to +100	°C
ESD Sensitivity (HBM)	Vb	8	kV

Note 3: Unless otherwise noted, values listed are typical. Devices are production tested and specified at 3 A with a 20 ms pulse at 25°C.

Note 4: 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 5: Special design considerations must be observed for operation under 1 A. Please contact Luminus for further information.

Note 6: CBM-160X-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.

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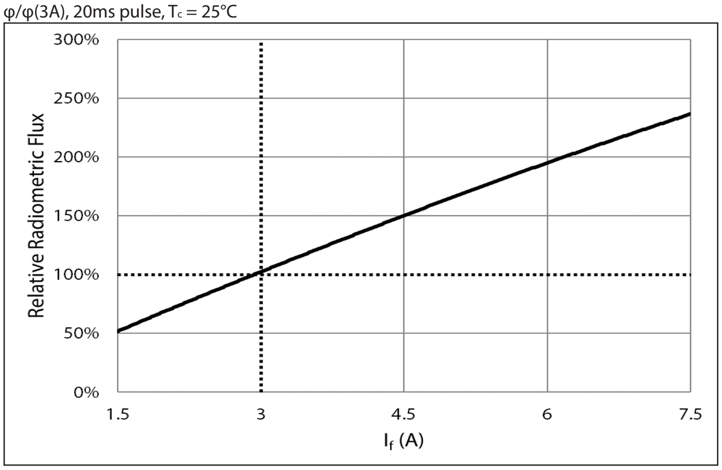
Optical & Electrical Characteristics - 365 nm

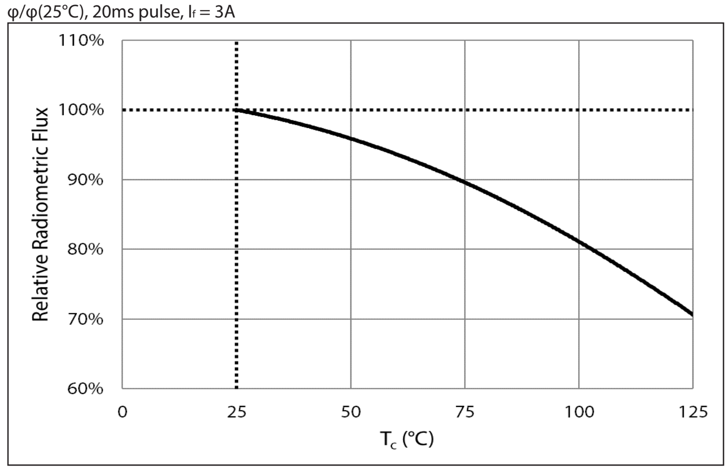
Relative Radiometric Flux vs. Forward Current

$\varphi/\varphi(3A)$, 20ms pulse, $T_c = 25°C$



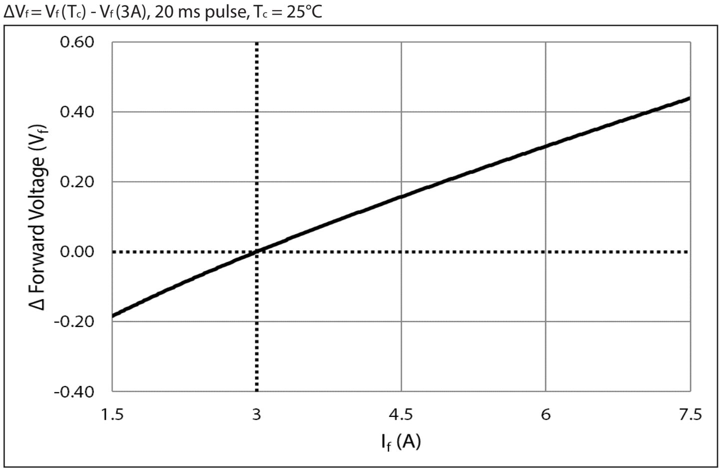
Relative Radiometric Flux vs. Temperature

$\varphi/\varphi(25°C)$, 20ms pulse, $I_f = 3A$



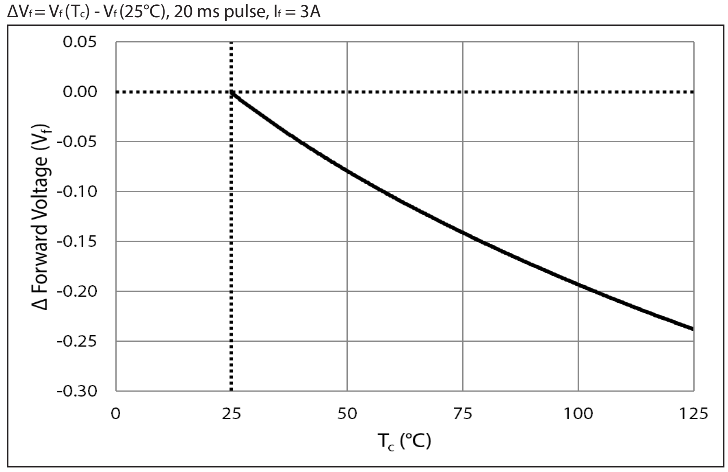
Forward Voltage Shift vs. Forward Current

$\Delta V_f = V_f(T_c) - V_f(3A)$, 20 ms pulse, $T_c = 25°C$



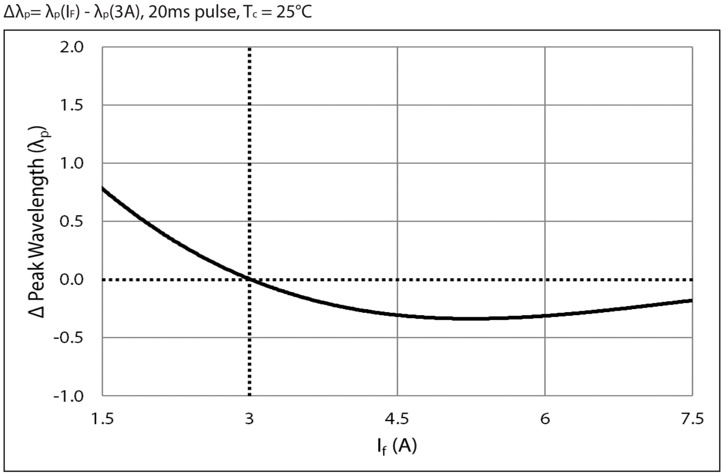
Forward Voltage Shift vs. Temperature

$\Delta V_f = V_f(T_c) - V_f(25°C)$, 20 ms pulse, $I_f = 3A$



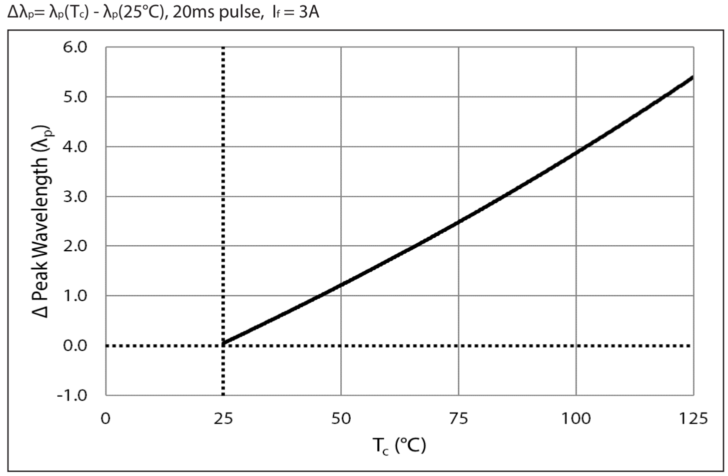
Peak Wavelength Shift vs. Forward Current

$\Delta\lambda_p = \lambda_p(I_F) - \lambda_p(3A)$, 20ms pulse, $T_c = 25°C$



Peak Wavelength Shift vs. Temperature

$\Delta\lambda_p = \lambda_p(T_c) - \lambda_p(25°C)$, 20ms pulse, $I_f = 3A$



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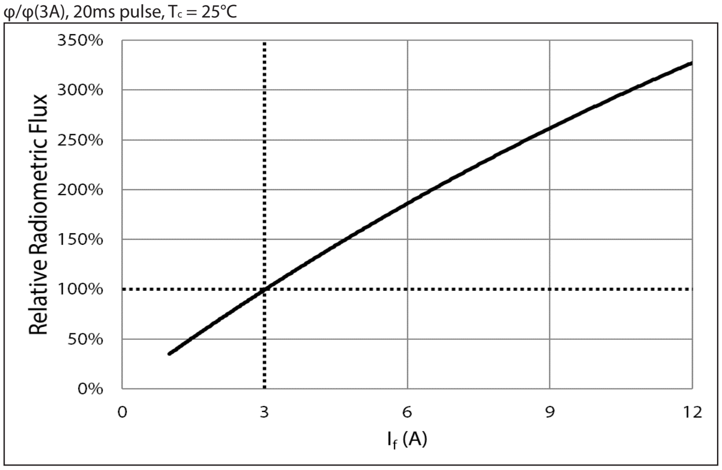
Optical & Electrical Characteristics - 385 nm

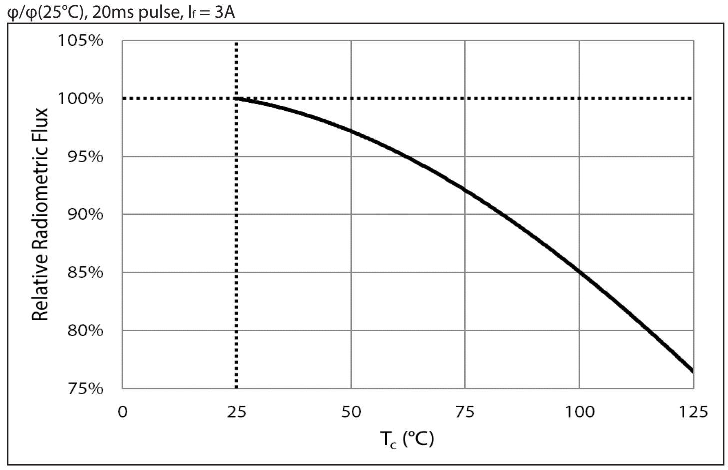
Relative Radiometric Flux vs. Forward Current

φ/φ(3A), 20ms pulse, T_c = 25°C



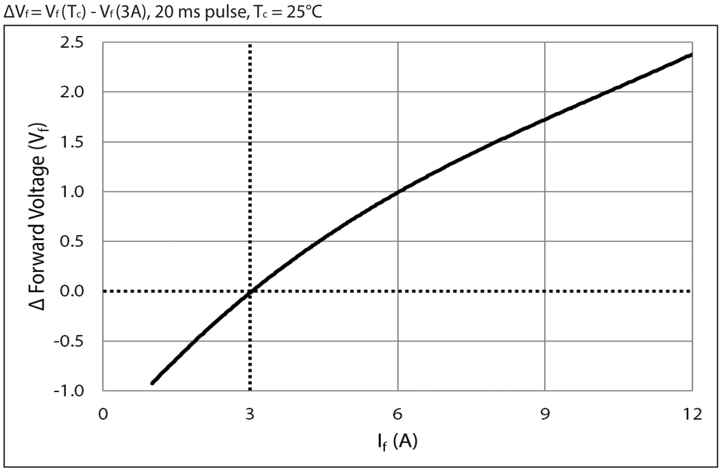
Relative Radiometric Flux vs. Temperature

φ/φ(25°C), 20ms pulse, I_f = 3A



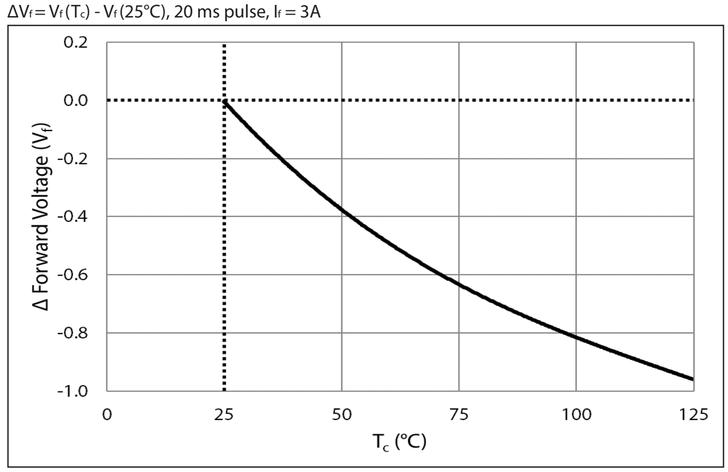
Forward Voltage Shift vs. Forward Current

$\Delta V_f = V_f(T_c) - V_f(3A)$, 20 ms pulse, T_c = 25°C



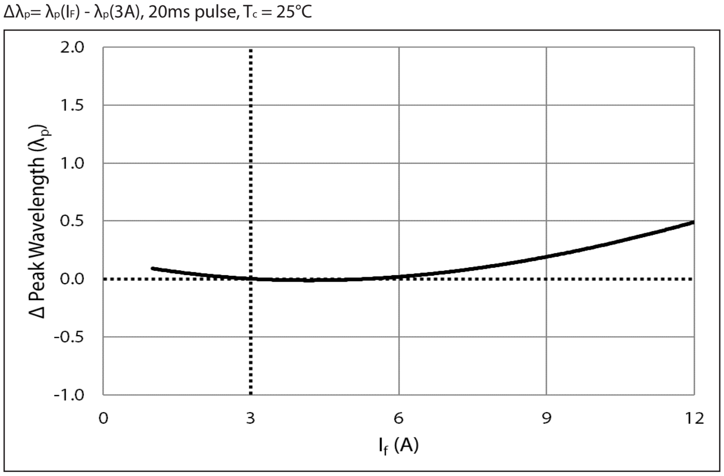
Forward Voltage Shift vs. Temperature

$\Delta V_f = V_f(T_c) - V_f(25°C)$, 20 ms pulse, I_f = 3A



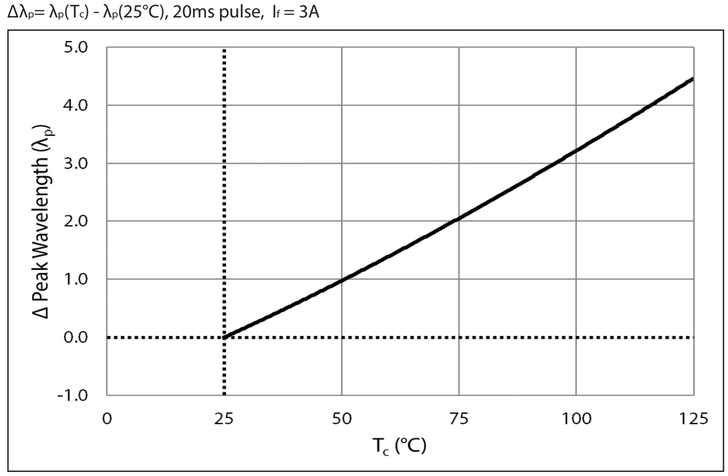
Peak Wavelength Shift vs. Forward Current

$\Delta\lambda_p = \lambda_p(I_F) - \lambda_p(3A)$, 20ms pulse, T_c = 25°C



Peak Wavelength Shift vs. Temperature

$\Delta\lambda_p = \lambda_p(T_c) - \lambda_p(25°C)$, 20ms pulse, I_f = 3A



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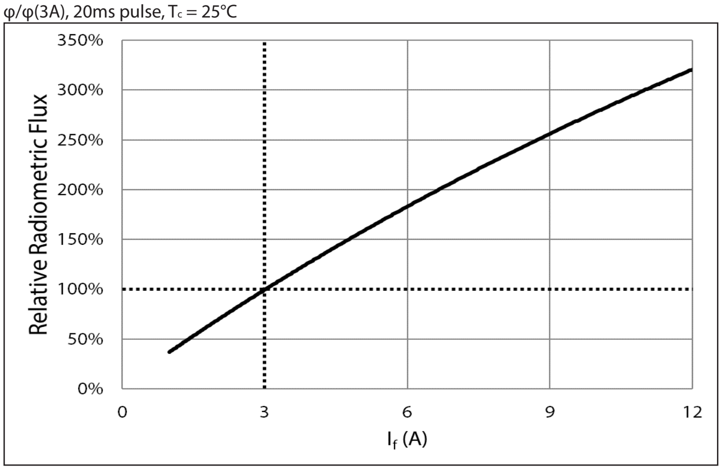
Optical & Electrical Characteristics - 405 nm

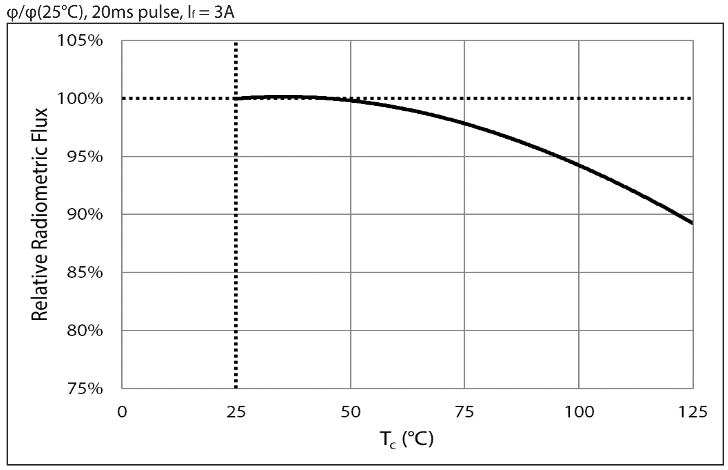
Relative Radiometric Flux vs. Forward Current

φ/φ(3A), 20ms pulse, T_c = 25°C



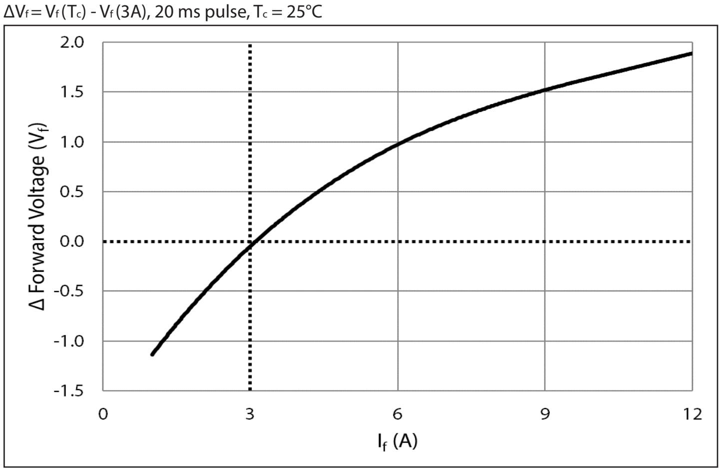
Relative Radiometric Flux vs. Temperature

φ/φ(25°C), 20ms pulse, I_f = 3A



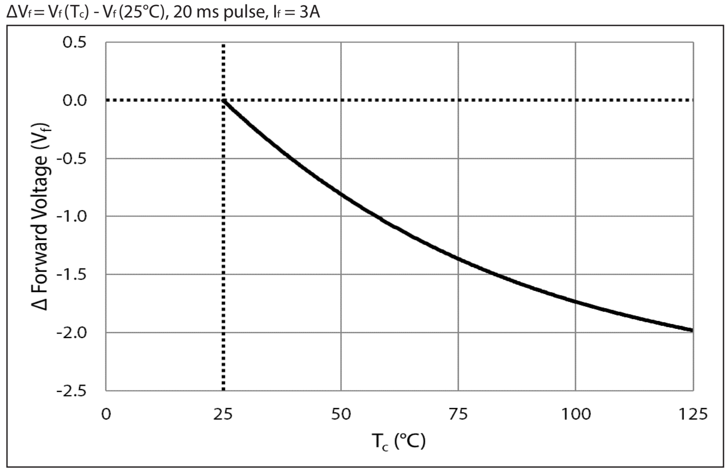
Forward Voltage Shift vs. Forward Current

$\Delta V_f = V_f(T_c) - V_f(3A)$, 20 ms pulse, T_c = 25°C



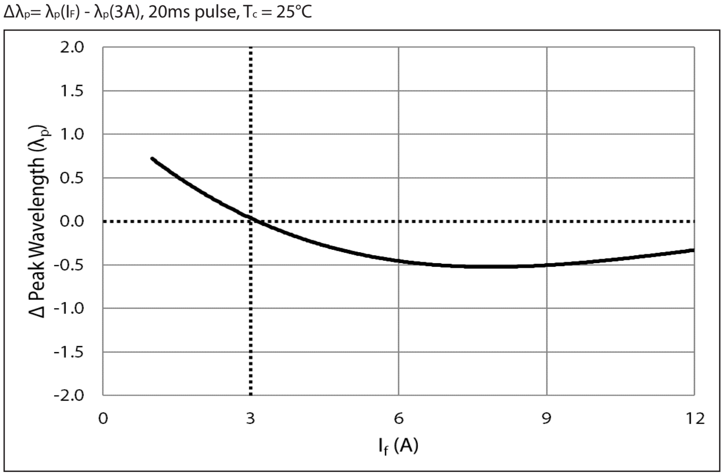
Forward Voltage Shift vs. Temperature

$\Delta V_f = V_f(T_c) - V_f(25°C)$, 20 ms pulse, I_f = 3A



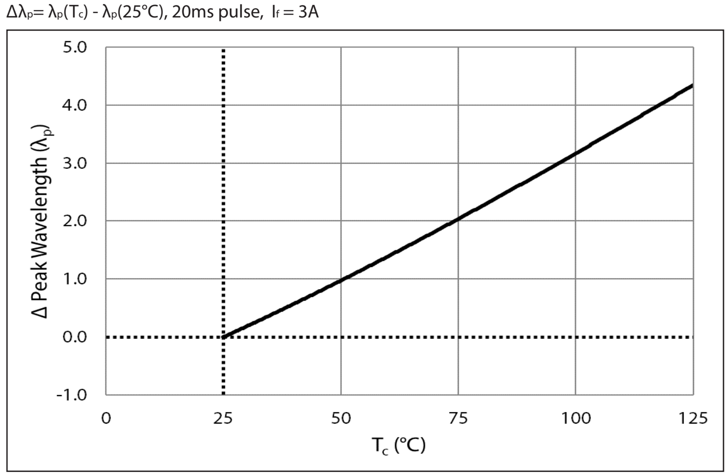
Peak Wavelength Shift vs. Forward Current

$\Delta\lambda_p = \lambda_p(I_F) - \lambda_p(3A)$, 20ms pulse, T_c = 25°C



Peak Wavelength Shift vs. Temperature

$\Delta\lambda_p = \lambda_p(T_c) - \lambda_p(25°C)$, 20ms pulse, I_f = 3A



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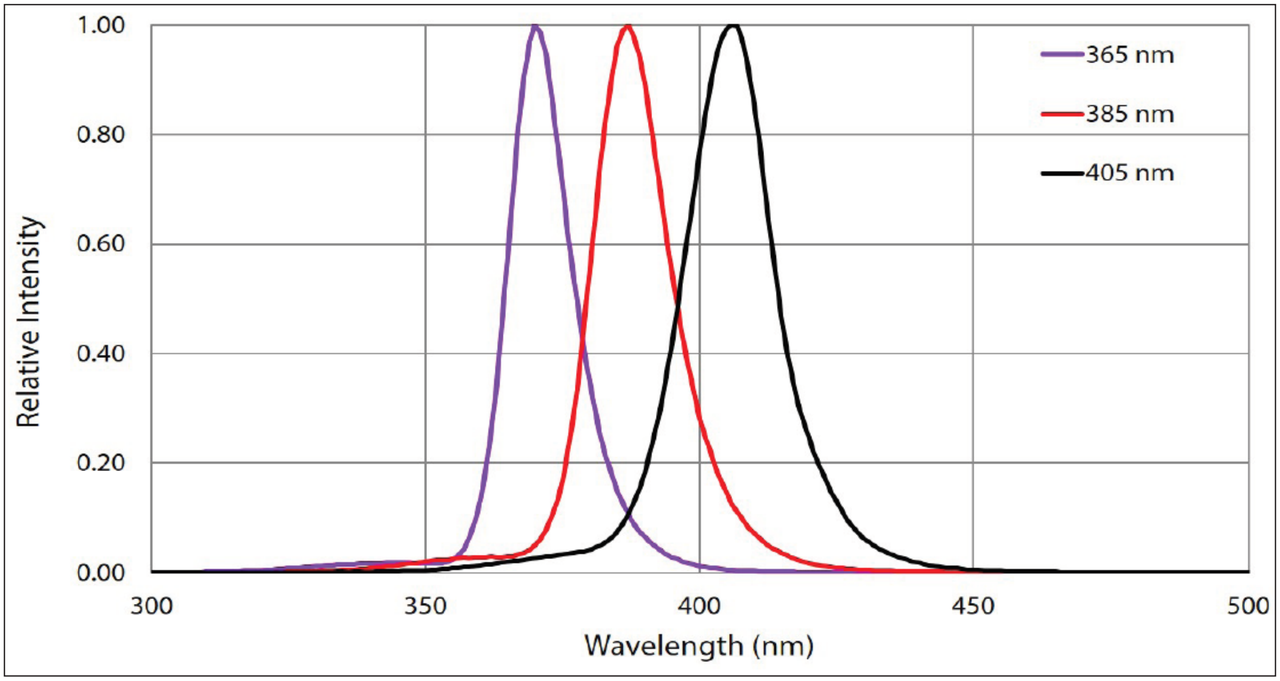
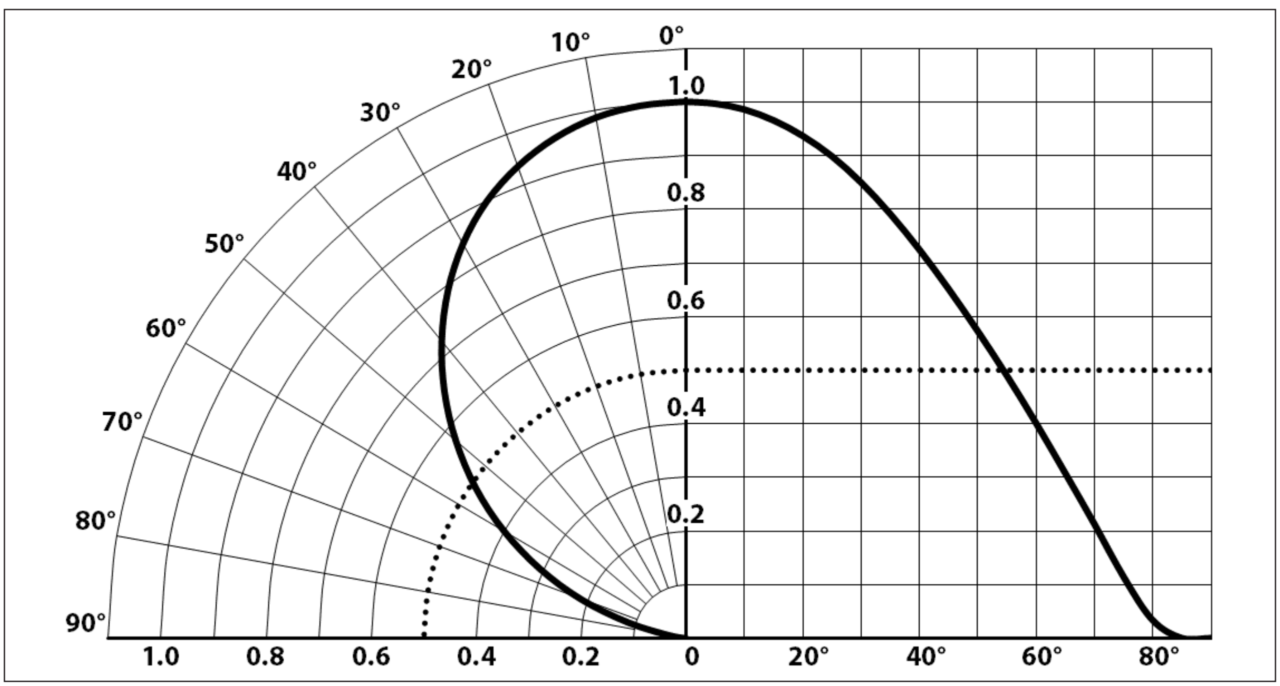
Typical Spectrum [8]



Radiation Pattern [9]



Note 8 : Typical spectrum at 3 A drive current.

Note 9: Detailed information on radiation pattern including ray trace files can be found at: http://www.luminus.com

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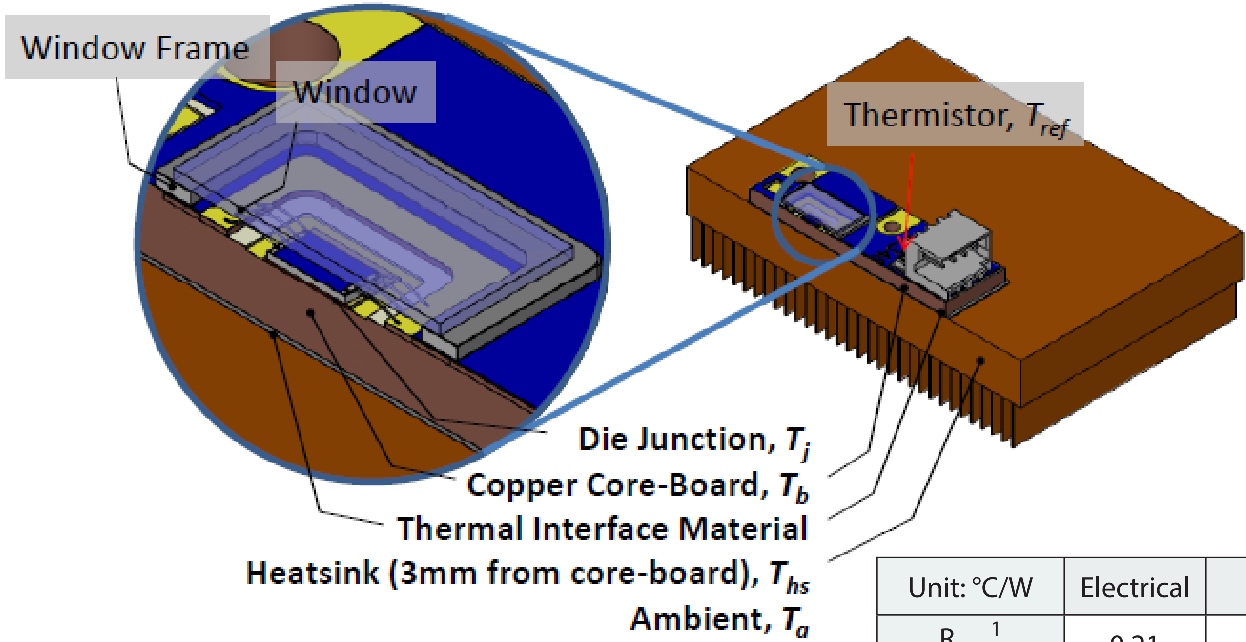
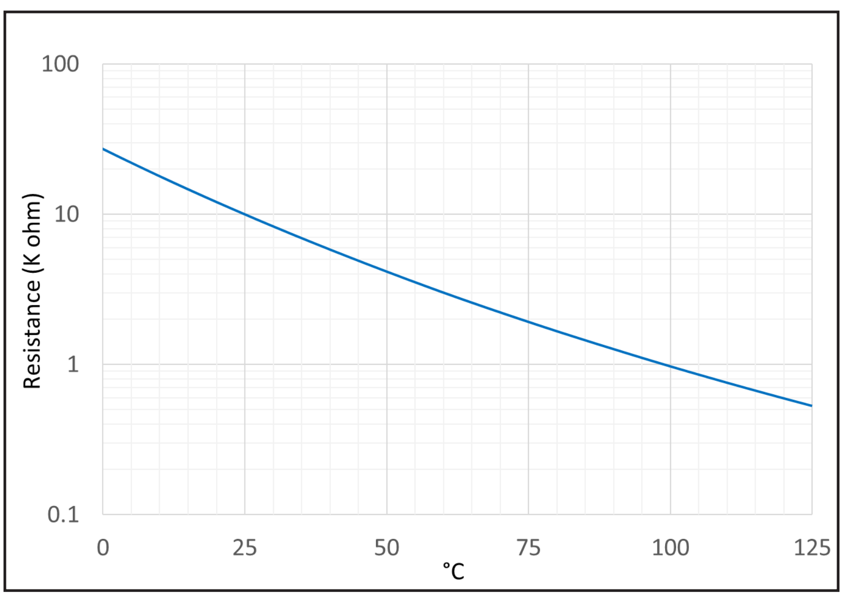
Thermal Resistance



Unit: °C/W	Electrical	Real
$R_{\theta j\text{-}b}$ [1]	0.21	0.30
$R_{\theta j\text{-}ref}$ [1]	0.21	0.30

Note 1: Drive current 9A.

Thermistor Information



For more about calculating thermistor temperature, please see https://luminusdevices.zendesk.com/hc/en-us/articles/4412023747341-How-do-I-determine-the-temperature-from-Luminus-on-board-Thermistor-

Important note: The CBM-160X-UV copper PCB is electrically isolated and not active.

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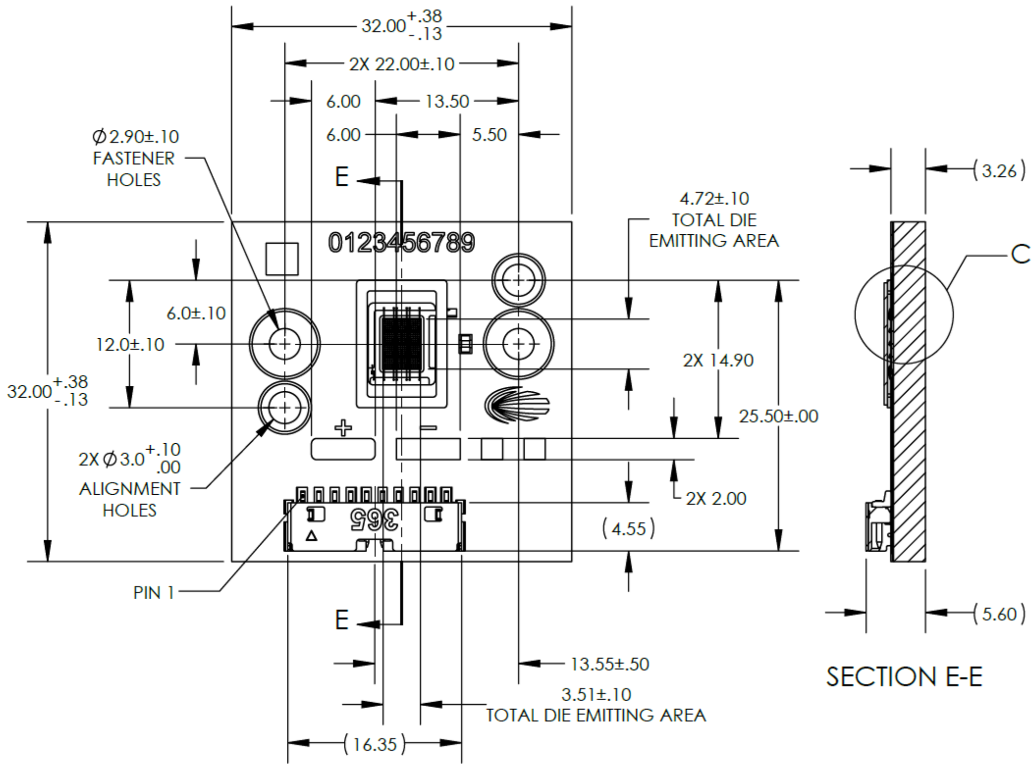
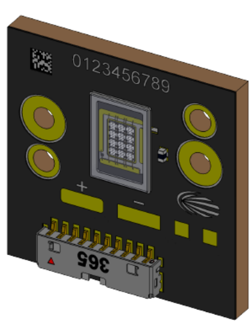
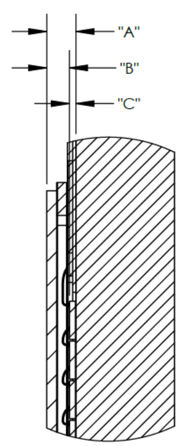
Mechanical Dimensions and Electrical Pin Out







PIN NO(S).	ASSIGNMENT
1,2,3,4	ANODE (+)
5,6,7,8	CATHODE (-)
9	THERMISTOR (+)
10	THERMISTOR (-)

DETAIL C

Connector: Tarng Yu, P/N TU1503WGR-10SD-GO-NL-A GCT P/N WTB08-021S-F

Recommended Female: Tarng Yu, P/N HTQ001002-190429-01

Note1: The coreboards and windows of LEDs may have minor cosmetic differences, for e.g. slightly different hues, because of different supply sources. These differences are only cosmetic and do not affect form, fit or function of the LED.

Note2: Back of the coreboard is electrically neutral.

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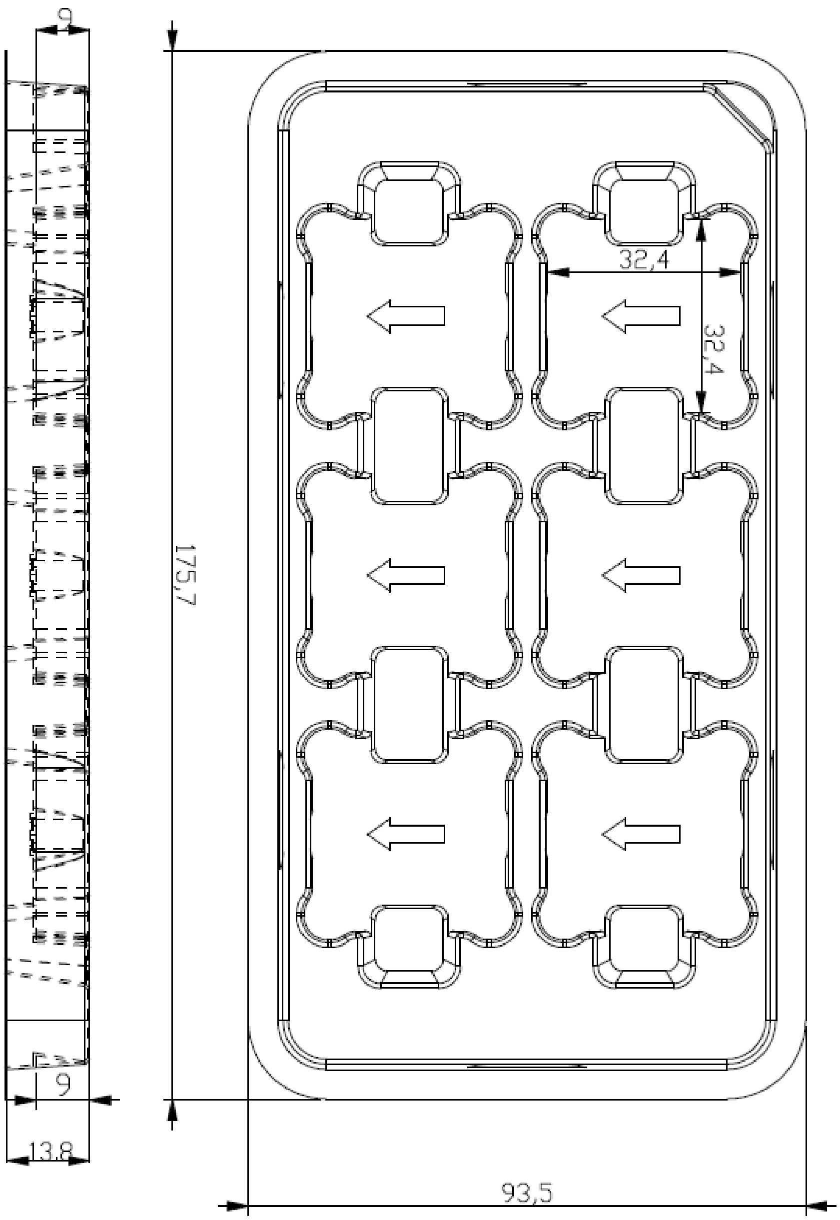
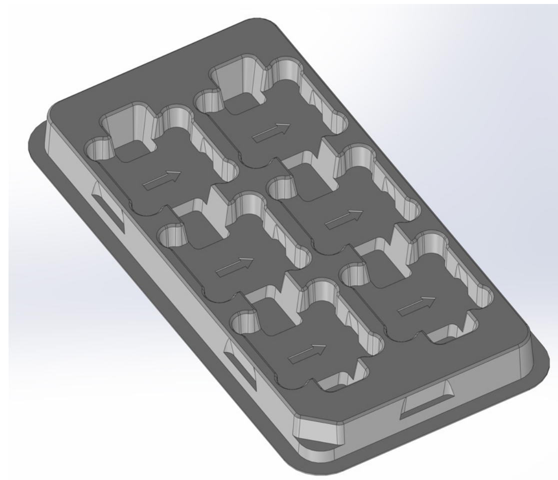
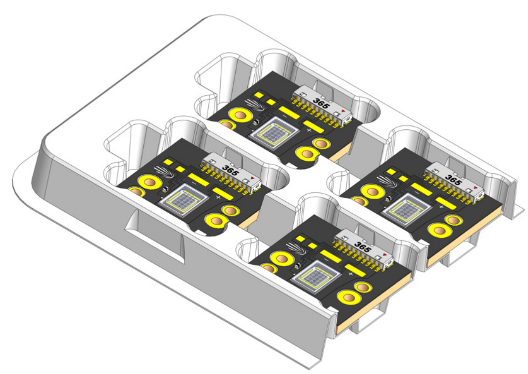
Shipping Tray Outline







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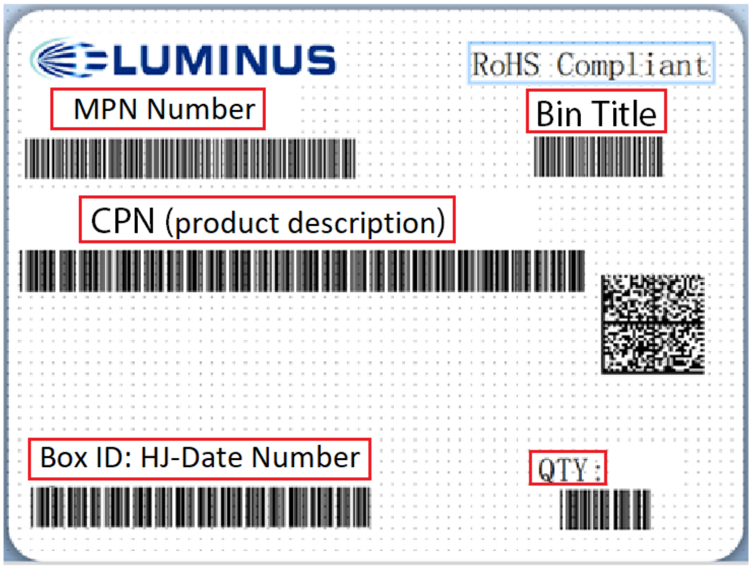
Shipping Label



Label Fields:

- CPN: Customer ordering part number
- MPN: Luminus part number
- Bin Title: Bin as defined on page 3
- QTY: Quantity of devices in pack
- Box ID: Package identification

Packing Configuration:

- Maximum stack of 5 trays per pack with 6 devices per tray
- Partial pack or tray may be shipped
- Each pack is enclosed in anti-static bag
- Shipping label is placed on top of each pack

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Precautions for storage, handling and use of UV LEDs

1. UV Light

CBM-160X-UV LEDs are short wavelength, UV LEDs. During operation, the LED emits high intensity UVA radiation, which is harmful to skin and eyes, and may cause cancer. Avoid exposure to UV light when LED is operational.

2. Static Electricity (ESD)

While CBM-160X LEDs are robust in nature, they are particularly sensitive to ESD (Electrostatic Discharge). Static electricity and surge voltages seriously damage UV LEDs and can result in complete failure of the device. Anti-electrostatic wristband or gloves are recommended when handling the LEDs. All devices, equipment and machinery must be properly grounded and precautions must be taken against surge voltages.

Reference: APN-002815 Electrical Stress Damage to LEDs and How to Prevent It

3. Operating Conditions

In order to ensure the correct functioning of these LEDs, compliance to maximum allowed specifications is important. UV LEDs are particularly sensitive to drive currents that exceed the max operating specifications and may be damaged by such drive curents. The use of current regulated drive circuits is strongly recommended when operating these devices. Customers should also provide adequate thermal management to ensure LEDs do not exceed maximum recommended temperatures. Operating LEDs at temperatures in excess of specification will result in damage and possibly complete failure of the device.

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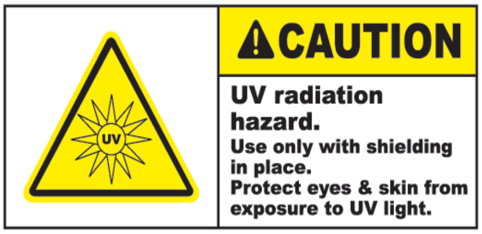
Revision History

Rev	Date	Description of Change
01	02/01/2023	Initial Release
02	07/17/2023	Editorial changes
03	05/20/2024	Added 365 nm



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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.

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