CFT-90-WDH
High CRI
Specialty White LED

Table of Contents

Features:

- Second generation 9 mm^2 Specialty White LED with a monolithic emitter delivering improved flux and coupling interface over CBT-90-W57H
- High Color Rendering Index (CRI) of 93 typical
- Centered around a 6000K (typ) color temperature
- 3,200 lumen typical output at 22.5 A DC and 90 °C junction temperature production test conditions
- High current operation of up to 27A DC
- Low thermal resistance chip-on-board packaging technology: 0.45 °C/W typical junction to back of core board
- Window-less package design improves optical coupling efficiency
- Environmentally friendly, compliant with RoHS and REACH requirements

Applications

- Fiber Illumination applications requiring high color rendering, including:
  - medical endoscopy
  - machine vision
  - microscopy and other instrumentation
- Xenon lamp replacement
- Inspection and industrial applications
- Stage and Entertainment spot lights, narrow beam projectors
- Architectural Lighting

PDS-003092 Rev 03

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General Considerations

Environmental Considerations:

As a leading provider of solid-state Lighting solutions, Luminus implements strict substance control policies to ensure all of its products are environmentally friendly. As all Luminus LEDs, the CFT-90-WDH series are compliant with the Restriction of Hazardous Substances (RoHS) and REACH directives from the European Community. Restricted materials including lead, mercury, cadmium , hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ether (PBDE) are not used.

Product Testing:

Every CFT-90-WDH LED is fully production tested to ensure it meets the high quality standards customers have come to expect from Luminus products. Devices are tested and binned at a controlled 40ºC heat sink temperature and with a 22.5 A DC current, corresponding to a nominal junction temperature of 90ºC. As a result, the devices lumens and chromaticity are binned "hot" and their characteristics are close to in-system operating conditions. Current and temperature curves are provided in this document allowing users to predict the LED performance and characteristics under their own driving and thermal conditions

Reliability:

Luminus CFT-90-WDH LED series are required to pass a rigorous suite of environmental and mechanical stress tests, including mechanical shock, vibration, temperature cycling and humidity. These tests ensure that the devices deliver high performance and achieve reliable long term operation in demanding high power applications. Please contact Luminus for further information.

Static Electricity:

The products are sensitive to static electricity, and care should be taken when handling them. Static electricity or surge voltage will damage the LEDs. It is recommended to wear an anti-electrostatic wristband or an anti-electrostatic gloves when handling the LEDs. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

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

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Ordering Information

Ordering Part Numbers

Color Bin	Minimum Flux Bin	Minimum Flux (lm)	Minimum CRI Bin	Chromaticity Bins	Ordering Part Number
WDH 6000K	SB	2,990	C2	T, S (5310K - 6275K)	CFT-90-WDH-X11-SB257
	SA	2,780	C2		CFT-90-WDH-X11-SA257
	SA	2,780	C5		CFT-90-WDH-X11-SA557
	SB	2,990	C2	S, R (5665K - 6785K)	CFT-90-WDH-X11-SB260
	SA	2,780	C2		CFT-90-WDH-X11-SA260
	SA	2,780	C5		CFT-90-WDH-X11-SA560
	SB	2,990	C2	T, S, R (5310K-6785K)	CFT-90-WDH-X11-SB261
	SA	2,780	C2		CFT-90-WDH-X11-SA261
	SA	2,780	C5		CFT-90-WDH-X11-SA561

Part Number Nomenclature

CFT — <XX> — W<tc> — X11 — <BinKit>

Product Family	LED Emission Area	Color Code	Package Configuration	Bin Kit
C: chip on board F: Flat-top window-less package T: single monolithic emitter"	90 = 9.0 mm^2	W = White t : color temperature - D : Daylight - C : Cool White - S : Stage White c: CRI - S = Standard - H = High	Internal package code	Refer to ordering codes table in this document

Note 1: The minimum flux of each bin kit is determined by the minimum flux bin. Higher flux bins are eligible to ship against shown bin kits and part numbers.

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Binning Structure

CFT-90-WDH LED series are production tested and binned at 22.5A DC, 40°C heat sink temperature.

Flux Bins

Flux Bin (FF)	Binning @ 22.5A DC, T_{hs} = 40°C	
	Minimum Flux (lm)	Maximum Flux (lm)
UB	3,955	4,230
UA	3,680	3,955
TB	3,440	3,680
TA	3,200	3,440
SB	2,990	3,200
SA	2,780	2,990

CRI Bins

CRI Bin (CC)	Binning @ 22.5A DC, T_{hs} = 40°C	
	Minimum CRI	Maximum CRI
C7	93	100
C5	91	93
C2	88	91

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

Note 2: Luminus maintains a +/- 1 tolerance on CRI measurements

Note 3: Products are production tested then sorted and packed by bin

Note 4: Individual bins are not orderable. Please refer to the Product Ordering information page for a list of orderable bin kits

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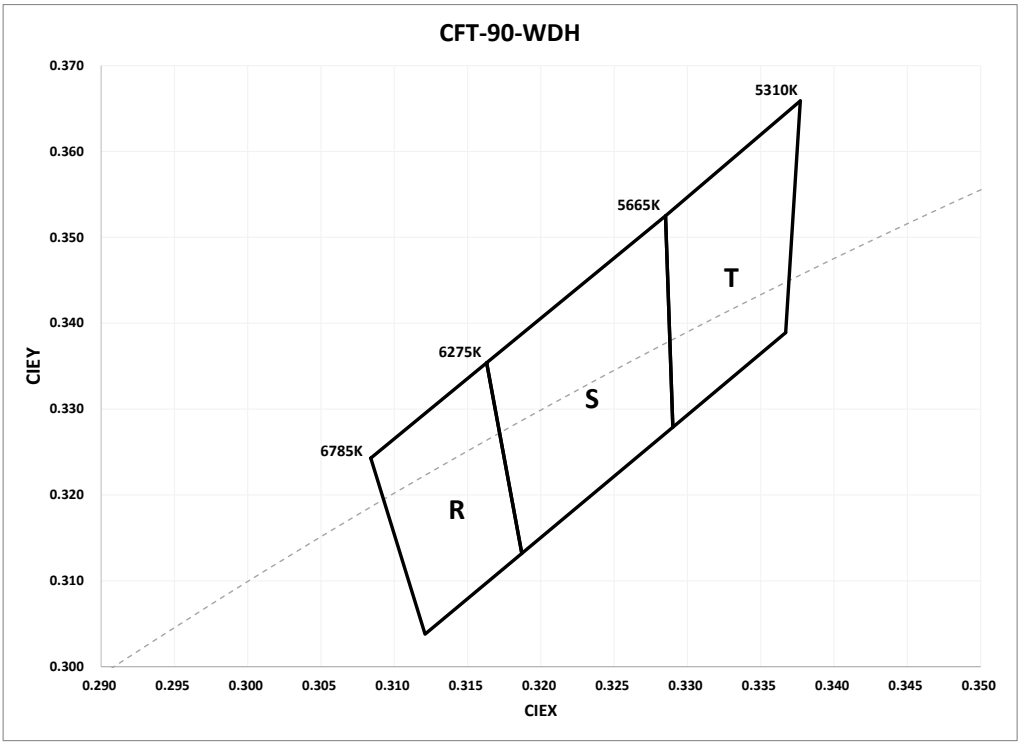
Chromaticity Bins



The following tables describe the four chromaticity points that bound each chromaticity bin.

Chromaticity Bins	Binning @ 22.5A DC, T_{hs} = 40°C	
	x	y
R	0.3084	0.3243
	0.3121	0.3038
	0.3163	0.3354
	0.3187	0.3132
S	0.3163	0.3354
	0.3187	0.3132
	0.3290	0.3279
	0.3285	0.3525
T	0.3290	0.3279
	0.3285	0.3525
	0.3367	0.3389
	0.3377	0.3659

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Typical Deviece Performance

Unless specified otherwise, all characteristics are based on nominal T_{hs} = 40°C, I_f = 22.5 A DC.

Parameter		Symbol	Value	Unit
Emitting Area Dimension[1]	typ		3 x 3	mm x mm
Viewing angle (50% of peak flux)	typ		120	degrees
Forward Voltage	min	V_F	2.9	V
	typ		3.5	V
	max		4.2	V
Device Thermal Characteristics				
Electrical Thermal Resistance of junction to coreboard	typ	$R_{\theta j\text{-}c}$, elec.	0.45	°C/W
Electrical Thermal Resistance of junction to thermistor	typ	$R_{\theta j\text{-}ref}$, elec.	0.5	°C/W
Real Thermal Resistance of junction to coreboard [2]	typ	$R_{\theta j\text{-}c}$, Real	0.53	°C/W
Real Thermal Resistance of junction to thermistor [2,3]	typ	$R_{\theta j\text{-}ref}$, Real	0.59	°C/W

Note 1: Please refer to mechanical drawing for dimensions and tolerancing.

Note 2: Measurements are in accordance with JEDEC 51-14. For more about thermal resistance calculation, please see https://luminusdevices.zendesk.com/hc/en-us/articles/4416807960717-Thermal-Heatsink-Required-Rth-Calculator

Note 3: 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-

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Absolute Maximum Ratings

	Symbol	Value	Unit
Maximum Current (CW)[1]	I_F	27	A
Minimum Current (CW)[2]	I_F	0.2	A
Maximum surge Current (t < 10 ms, Duty cycle < 0.1)	I_S	36	A
Maximum reverse Current[3]	I_R	N/A	A
ESD rating[4]	V_{ESD}	8	kV
Maximum Junction operating temperature[5]	T_j	150	°C
Storage Temperature range		-40 to 130	°C
Operating Temperature range		-40 to 85	°C

Note 1: Sustained operation at maximum current will result in shortened lifetime.

Note 2: Special design considerations must be observed for operation at low current density. Please contact Luminus for further information.

Note 3: Not designed for reverse current operation.

Note 4: ESD measured using Human Body Model and Charge Device Model.

Note 5: Sustained operation at maximum operating T_j will result is shortened lifetime and may cause premature product failure.

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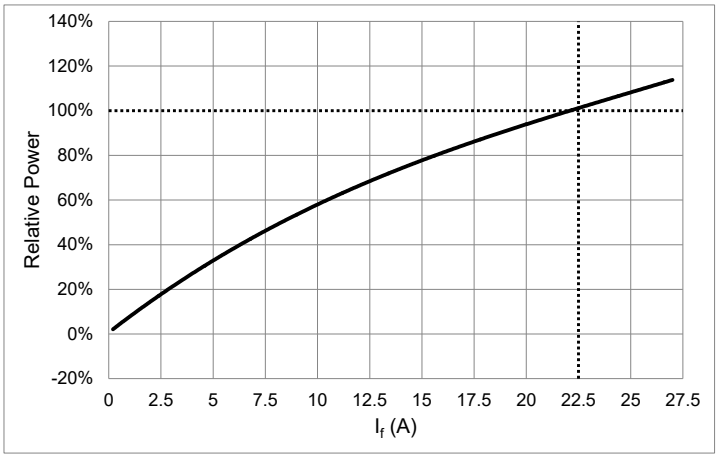
Optical & Electrical Characteristics

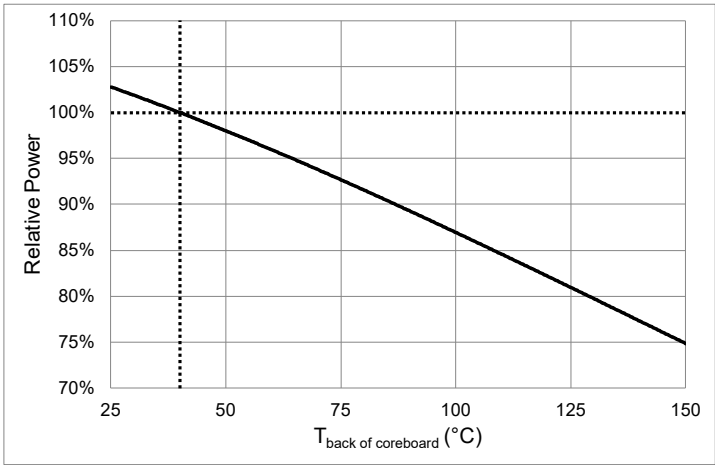
Relative Luminous Flux vs. I_f

φv/φv(22.5A), Single Pulse 20ms - $T_{Heatsink}$: 40°C



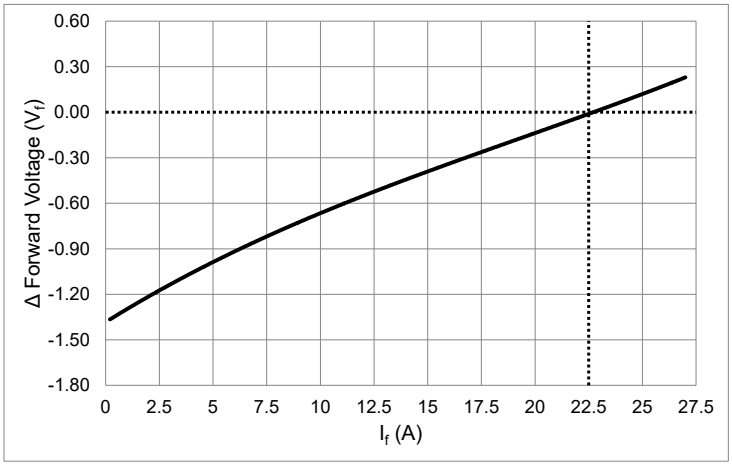
Relative Luminous Flux vs. T_{hs}

φv/φv$_{(40°C)}$ I_f = 22.5 A Single Pulse 20ms



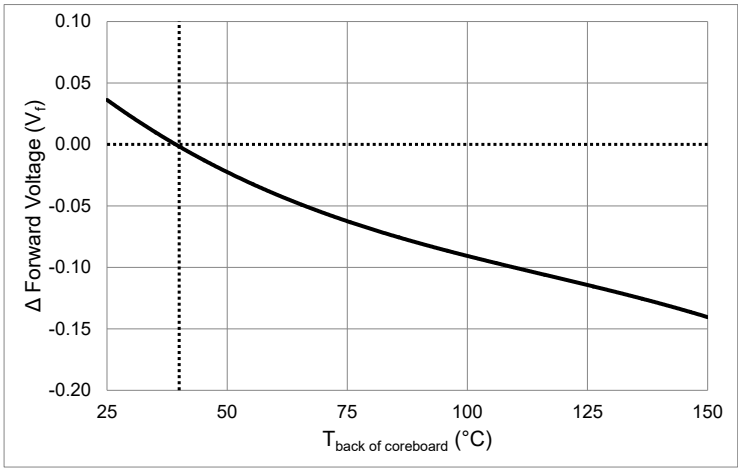
Relative Forward Voltage vs. I_f

V_f =f(I_f) , Single Pulse 20ms - $T_{Heatsink}$ = 40°C



Relative Forward Voltage vs. T_{hs}

$\Delta V_f = V(T_j) - V(40°C)$ I_f = 22.5 A Single Pulse 20ms



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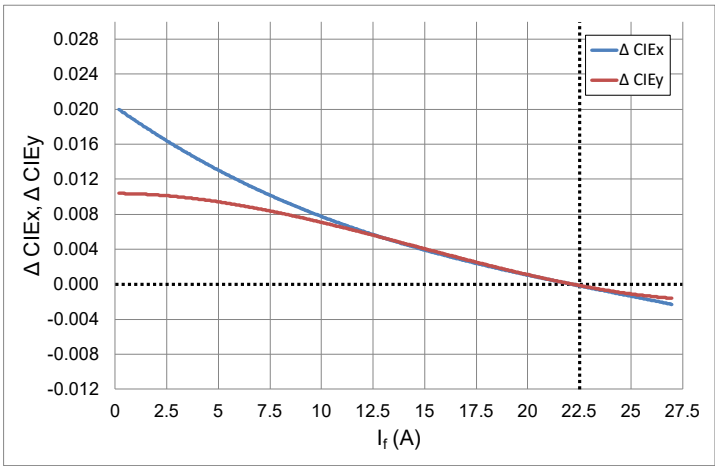
Optical & Electrical Characteristics

Relative Chromaticity Shift vs. I_f

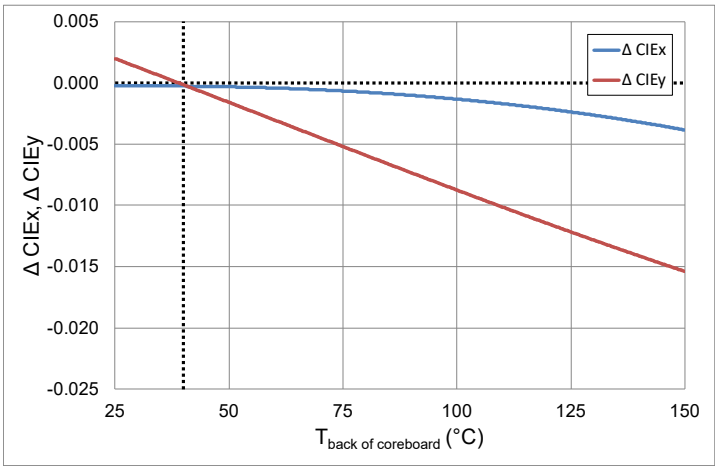
ΔCIEx,y = CIEx,y(I_f)-CIEx,y (22.5A) - Single Pulse 20ms ,

Heatsink Temperature: 40°C



Relative Chromaticity Shift vs. T_{hs}

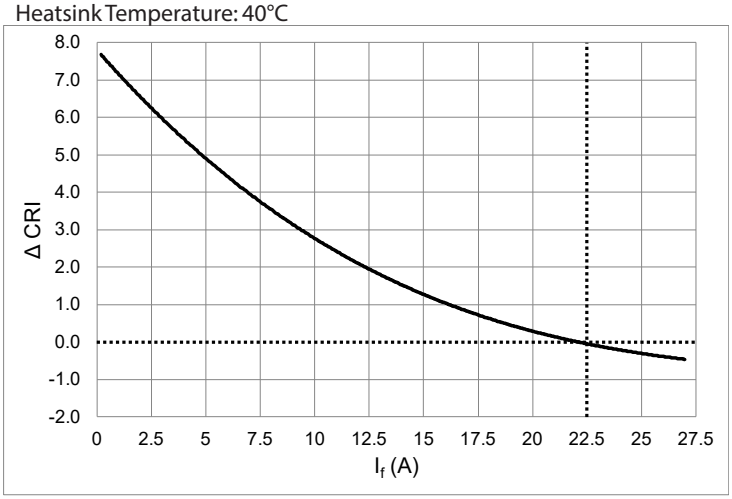
ΔCIEx,y = CIEx,y(T_j) -CIEx,y(40°C) I_f= 22.5 A Single Pulse 20ms



Relative CRI Shift vs. I_f

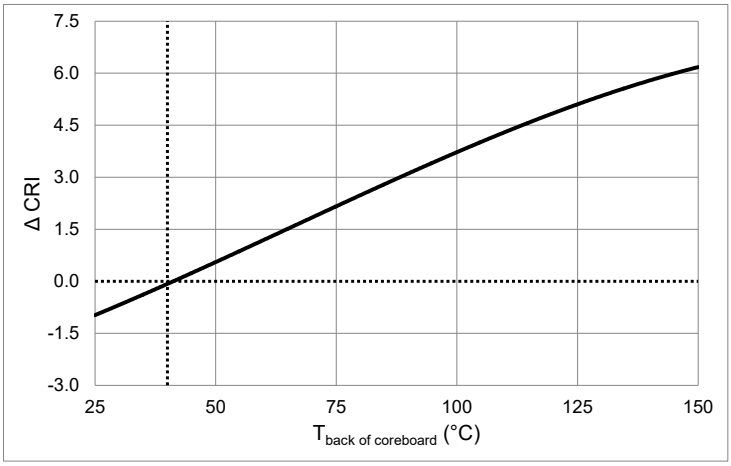
ΔCRI = CRI(I_f)-CRI (22.5A) - Single Pulse 20ms ,

Heatsink Temperature: 40°C



Relative CRI Shift vs. T_{hs}

ΔCRI = CRI(T_j) -CRI(40°C) I_f= 22.5 A Single Pulse 20ms



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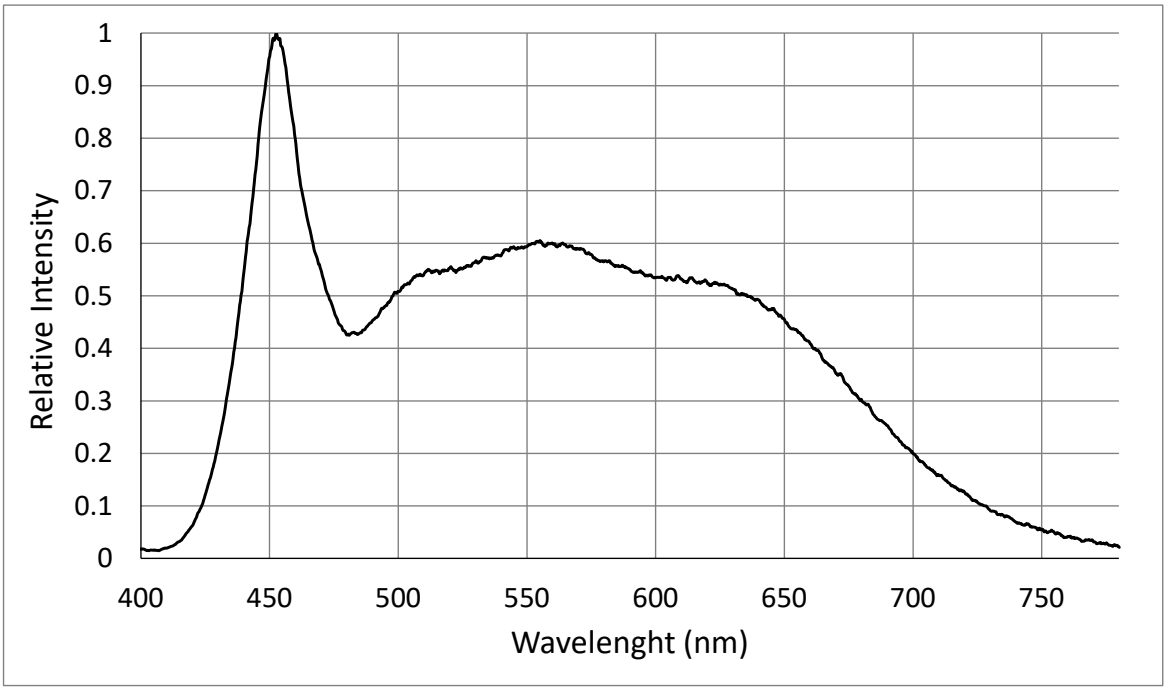
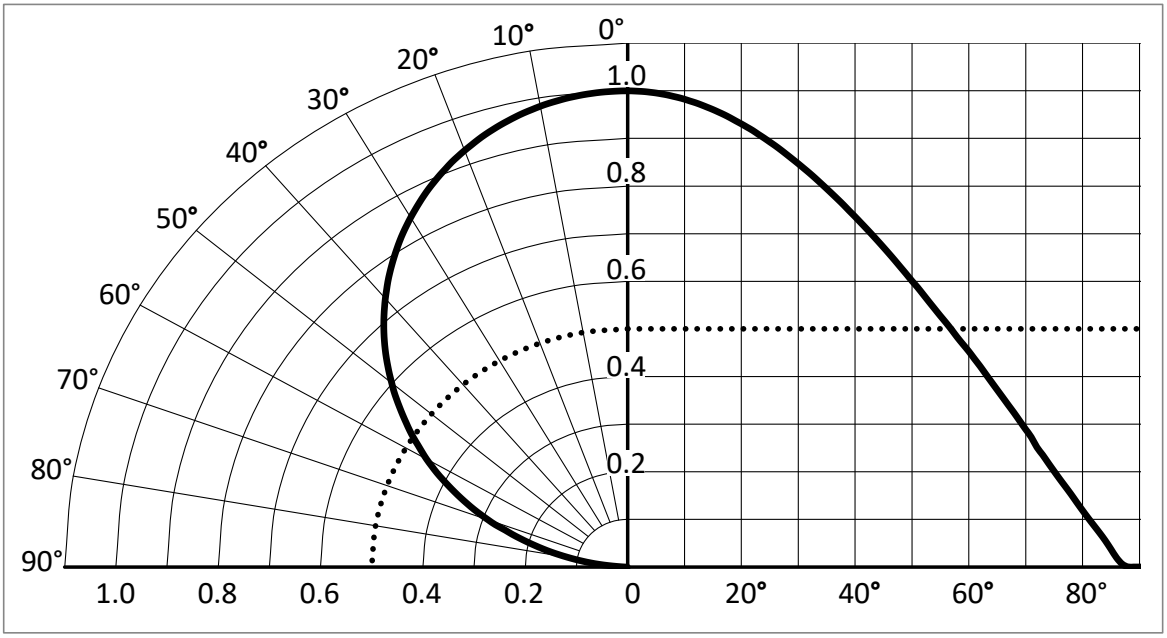
Typical Spectrum



Typical Angular Distribution



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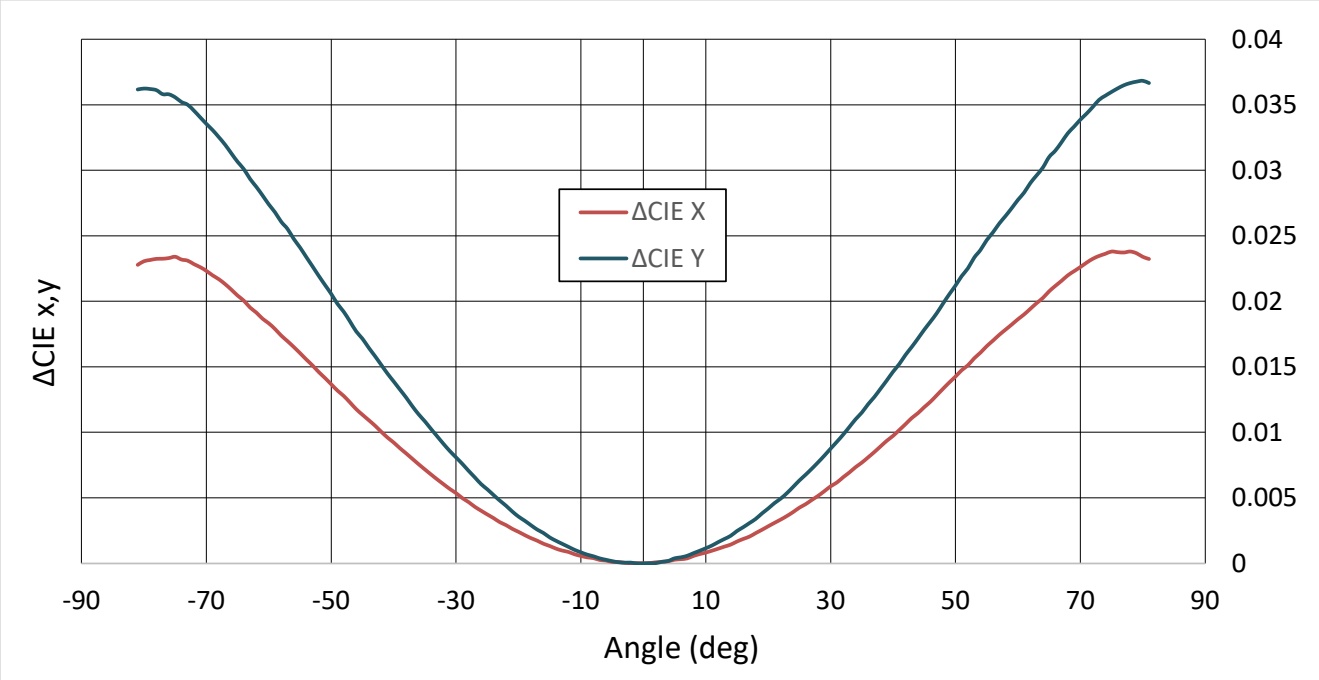
Color Over Angle



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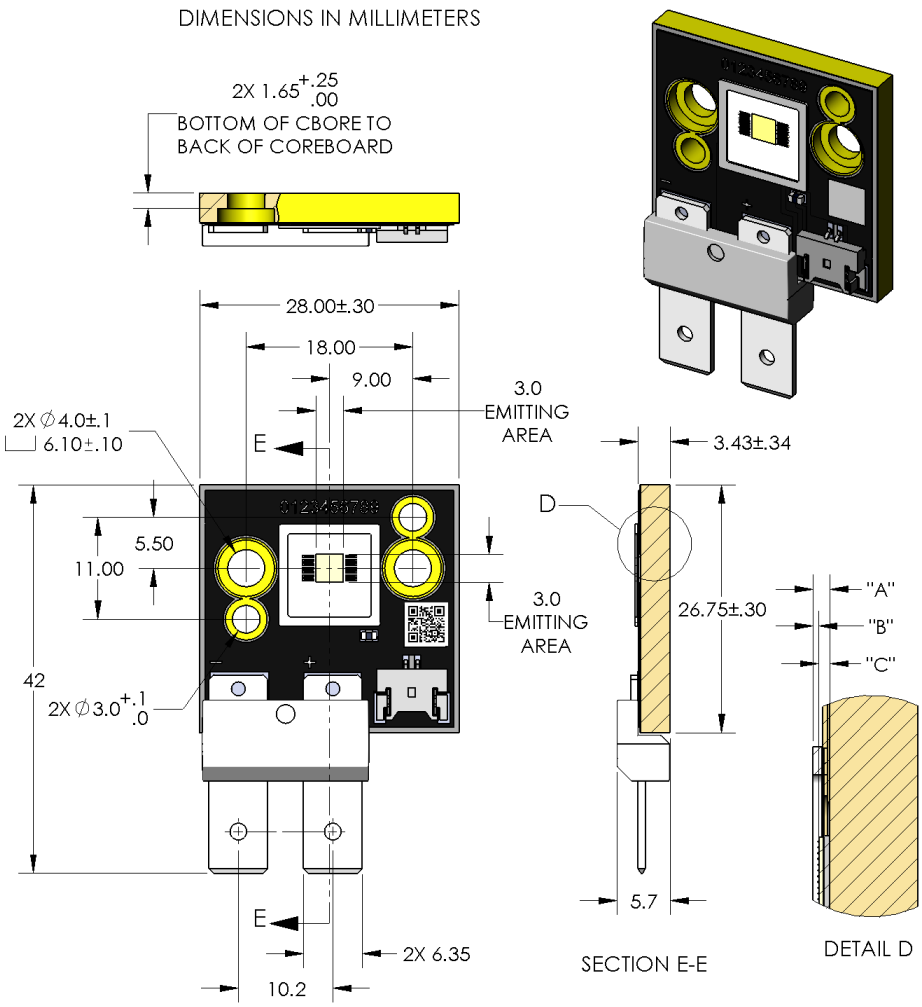
Mechanical Dimensions



DIMENSION NAME	DESCRIPTION	NOMINAL DIMENSION	TOLERANCE
"A"	TOP OF METAL SUBSTRATE TO TOP OF FRAME	.61	±.08
"B"	TOP OF EMITTING AREA TO TOP OF FRAME	.21	±.12
"C"	TOP OF METAL SUBSTRATE TO TOP OF EMITTING AREA	.40	±.075

DWG-003158 REV01

Recommended Anode/Cathode:
For 16 to14 AWG use Panduit Disco Lok™ Series P/N: DNF14-250FIB-C or JST Manufacturing Co: SPS-61T-250
For 12 to10 AWG use Panduit Disco Lok™ Series P/N: DNF10-250FIB-L or JST Manufacturing Co: SPS-91T-250
Recommended Female:
GCT P/N WTB06-020H-A or equivalent like MOLEX P/N 51146-0200 (not recommended for new designs)

Check NEC standards for ampacity of the power cable being used.
For detailed drawing please refer to DWG-003158 document.

Note 1: Please note that the CFT-90 copper PCB is electrically active with a common cathode polatity.

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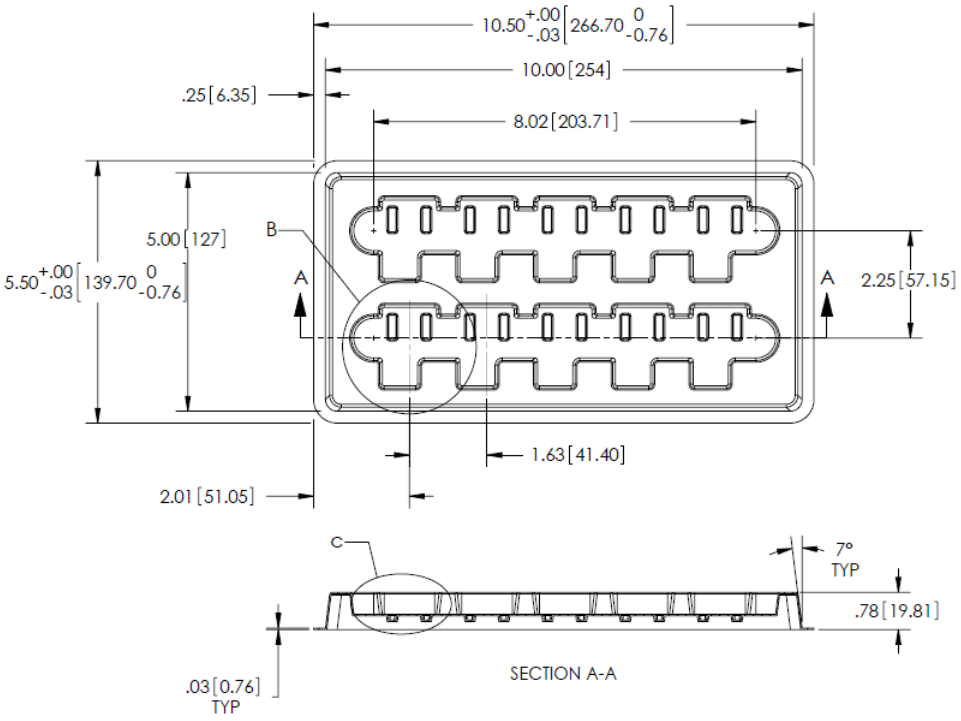
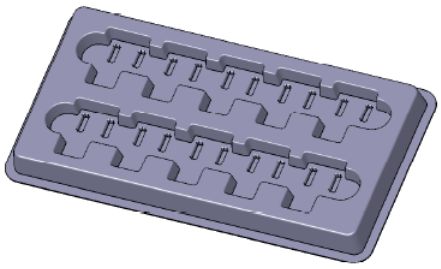
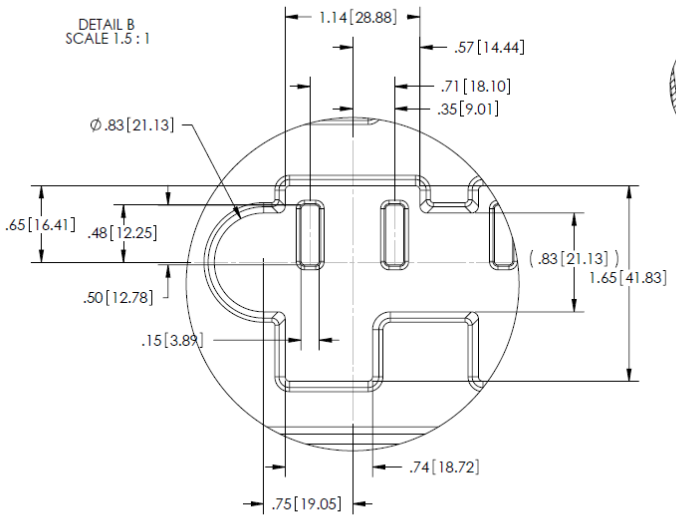
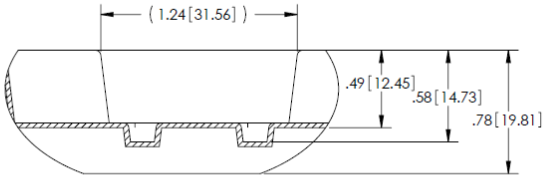
Shipping Tray Outline









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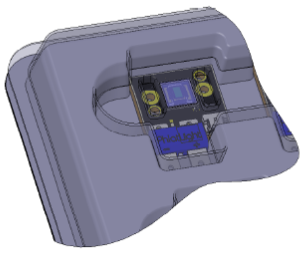
SCALE 2 : 1



TOP TRAY SHOWN TRANSPARENT
FOR REFERENCE ONLY

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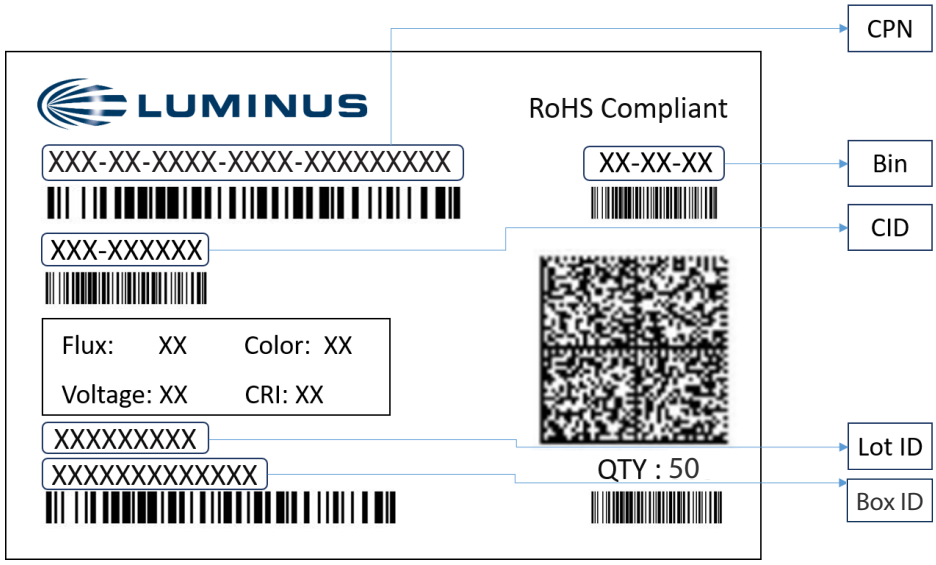
Shipping Label



Label Fields:

- CPN: Luminus ordering part number
- CID: Customer's part number
- QTY: Quantity of devices in pack
- Flux: Bin as defined on page 4
- Voltage: NA
- Color: Bin as defined on page 5
- CRI: Bin as defined on page 4

Packing Configuration:

- Maximum stack of 5 trays per pack with 10 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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Revision History

Revision	Date	Description
01	04/14/2021	Initial release
02	04/19/2022	Updated picture in the front page Removed RB bin and updated CRI tolerances on page 3 Updated graphs on pages 8 and 9 Updated mechanical drawing and notes on page 11 Edited notes and corrected typos Updated Shipping Tray Outline on page 12 Updated Packing and Shipping Specification on page 13
03	08/11/2022	Update CRI bin structure Update ordering information Update Device Thermal Characteristics Other editorial changes

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