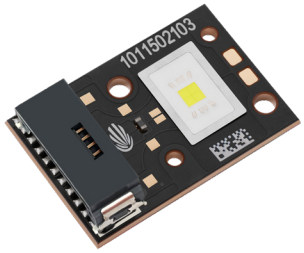
CFT-50X-WxS

Standard CRI Cool White LED



Features

- Monolithic electrically isolated White LED with 5 mm^2 emitting area for optimal coupling into 2-4 mm diameter fiber bundles
- Over 4800 lumens at maximum drive current
- Comprehensive product line spanning the entire visible range in the same package platform
- High drive current operation: up to 10 A under CW conditions and 12.5 A under pulse conditions
- Windowless package improves coupling-efficiency into fiber optics
- Excellent peak wavelength stability with current and temperature across the spectrum
- Compatible with high voltage / low current operation

RoHS REACH

Applications

- Fiber-coupled Illumination
- Life-science/ Biomedical
- Fluorescence microscopy
- Machine Vision
- Industrial Lighting
- Light engines

Table of Contents

Ordering Information

Ordering Part Numbers[1]

Color	Luminous flux		Chromaticity	Ordering Part Number
	Min. Flux Bin	Min. Flux	Bins	
WCS	LL	3,500 lm	F, G, FGL, FGH	CFT-50X-WCS-L42-LL600

Part Number Nomenclature

CFT **50X** **W<tc>** **L42** **<Bin kit>**

Product Family	Chip Area	Color	Package Configuration	Bin Kit
CFT: Copper-core PCB, no encapsulation	50X: 5.0 mm^2	W: White t: Color temperature -C: Cool White c: CRI -S: Standard	Internal package code	Refer to ordering part numbers in this document

Note

1. Flux Bin listed is minimum bin shipped, higher bins may be included at Luminus' discretion.

Binning Structure

Flux Bins[1,2]

Color	Luminous Flux Bin[3]	Binning @ 7.5 A, T_c= 25°C[4]	
		Minimum Flux (lm)	Maximum Flux (lm)
WCS	LL	3500	3750
	LM	3750	4000
	LN	4000	4300
	LP	4300	4600

Note:

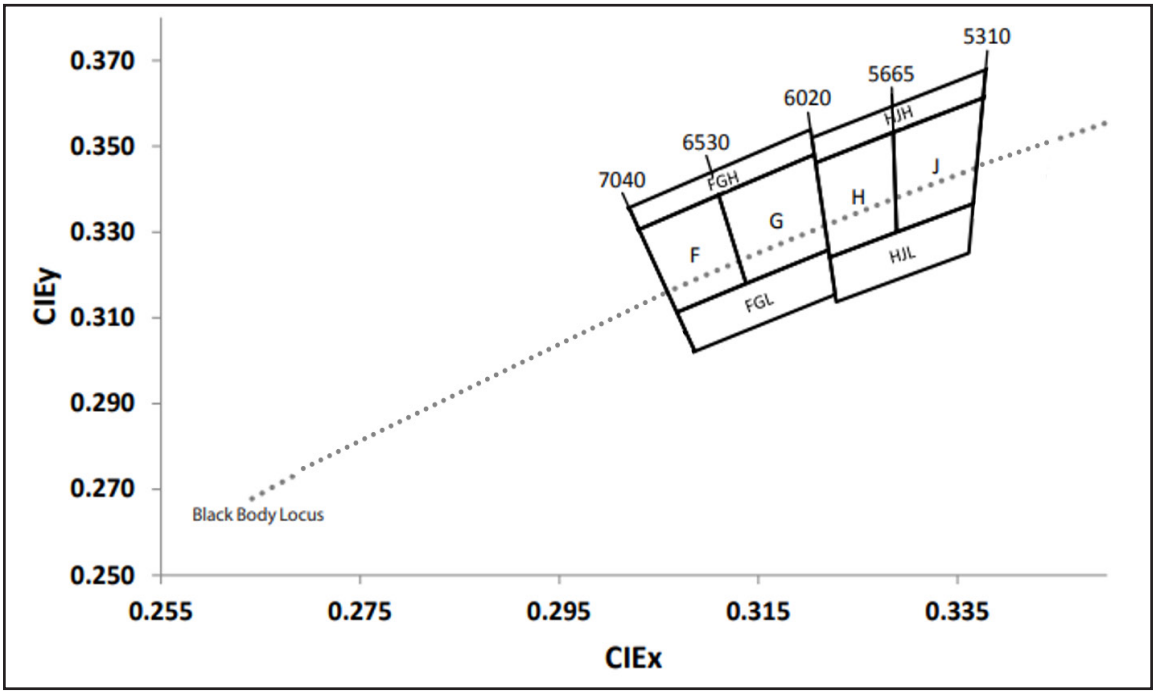
1. Luminus maintains a +/- 6% tolerance on flux measurements.
2. Products are production tested then sorted and packed by bin.
3. Individual bins are not orderable. Please refer to the Product Ordering information page for a list of orderable bin kits.
4. Product test condition: 7.5 A, 20 ms single pulse, 25°C case temperature.

Binning Structure

Chromaticity Binning Coordinates[1]

Bin Code	CIEx	CIEy	Bin Code	CIEx	CIEy	Bin Code	CIEx	CIEy	Bin Code	CIEx	CIEy
F	0.3030	0.3306	G	0.3110	0.3387	FGH	0.3020	0.3357	FGL	0.3068	0.3113
	0.3110	0.3387		0.3206	0.3480		0.3202	0.3539		0.3220	0.3258
	0.3137	0.3181		0.3220	0.3258		0.3206	0.3480		0.3227	0.3154
	0.3068	0.3113		0.3137	0.3181		0.3030	0.3306		0.3086	0.3022
H	0.3205	0.3460	J	0.3290	0.3530	HJL	0.3220	0.3240	HJH	0.3200	0.3520
	0.3290	0.3530		0.3380	0.3610		0.3370	0.3370		0.3380	0.3680
	0.3290	0.3300		0.3370	0.3370		0.3360	0.3250		0.3380	0.3610
	0.3220	0.3240		0.3290	0.3300		0.3230	0.3140		0.3205	0.3460

Chromaticity Bins



Note:

1. Product test condition: 7.5 A, 20 ms single pulse, 25°C case temperature.

Absolute Maximum Ratings

	Symbol	Values	Unit
Minimum Forward Current (CW or Pulsed)[1]	$I_{f\ min}$	0.1	A
Maximum Forward Current (CW)[2]	$I_{f\ CW\ max}$	10.0	
Maximum Forward Current (Pulsed)[2] (duty cycle < 50%)	$I_{f\ Pulsed\ max}$	12.5	
Forward Surge Current (Pulsed)[2] (Frequency >240Hz, duty cycle <10%, t=1ms)	$I_{surge\ max}$	15	A
Storage Temperature		100	°C
Junction Temperature[2]	$T_{j\ max}$	150	°C

Note:

1. For reference only.
2. CFT-50X-WxS LED is designed for operation at current up to 10 A under CW conditions, 12.5 A under pulse conditions and temperature as specified above. Product lifetime data is specified at recommended forward drive currents. Sustained operation at or beyond absolute maximum currents or temperatures will result in a reduction of device lifetime compared to recommended conditions.

Device Characteristics[1,2,3]

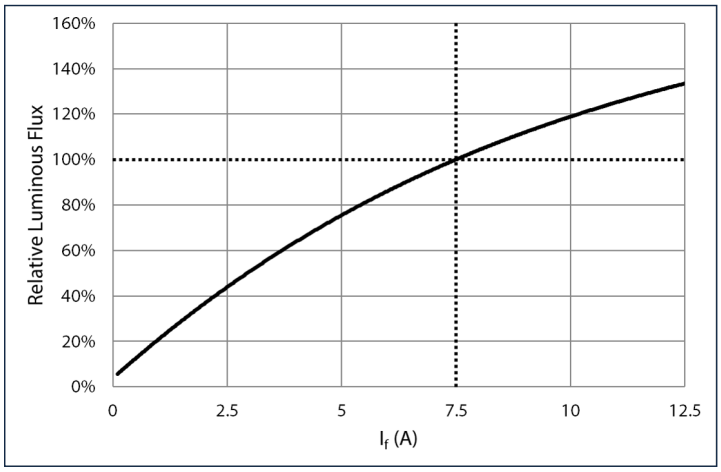
Optical and Electrical Characteristics	Symbol	Value	Unit
Emitting Area	A_E	4.95	mm^2
Emitting Area Dimension		2.225 x 2.225	mm x mm
Test Peak Drive Current	I_f	7.5	A
Peak Luminous Flux[4,5,6]	Φ_V	4000	lm
Peak Radiometric Flux[4,5,6]	Φ_E	11	W
Forward Voltage	$V_{f\,min}$	6.4	V
	V_f	7.2	
	$V_{f\,max}$	8.0	
Color Rendering Index	CRI	65	
Thermal Characteristics			
Thermal Resistance (junction to case)[8]	$R_{\Theta j\text{-}c\ real}$	0.75	°C/W
Thermal Resistance at WPE = 25% (junction to case)[8,9]	$R_{\Theta j\text{-}c\ elec}$	0.56	°C/W
Thermal Resistance at WPE = 25% (junction to thermistor)[8,9]	$R_{\Theta j\text{-}ref\ elec}$	0.68	°C/W
Thermal Coefficient of Photometric Flux		-0.3	%/°C
Thermal Coefficient of Radiometric Flux		-0.2	%/°C
Forward Voltage Temperature Coefficient		-4.5	mV/°C

Note:

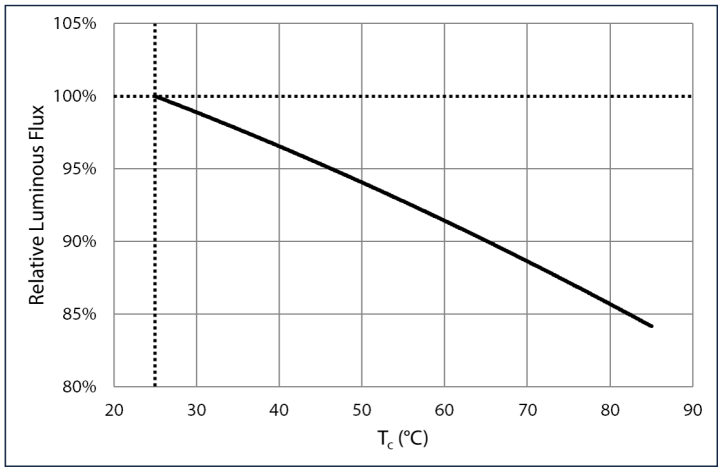
1. All ratings are based on operation with a constant case temperature T_c =25°C.
2. CFT-50X-WxS device can be driven at currents ranging from 100 mA to 12.5 A and at duty cycles ranging from 1% to 100%. Drive current and duty cycle should be adjusted as necessary to maintain the junction temperature desired to meet application lifetime requirements.
3. Tested at Current of 7.5 A, 20 ms single pulse.
4. Unless otherwise noted, values listed are typical. Devices are production tested and specified at 7.5 A.
5. Total flux from emitting area at listed peak wavelength. Reported performance is included to show trends for a selected power level. For specific minimum and maximum values, use bin tables. For product roadmap and future performance of devices, contact Luminus.
6. Caution must be taken not to stare at the light emitted from these LEDs. Under special circumstances, the high intensity could damage the eye.
7. In CIE 1931 chromaticity diagram coordinates, normalized to X+Y+Z=1.
8. Measurements are in accordance with JEDEC 51-14.
9. $R_{\Theta j\text{-}ref}$ is measured on a water-cooled stage with e-graf as the thermal interface material. $R_{\Theta j\text{-}ref}$ is system-dependent. For instructions on how to calculate $R_{\Theta j\text{-}ref}$ for your specific system, please refer to application brief https://download.luminus.com/datasheets/Luminus-White-Paper-Thermal-Mgmt_Thermistors.pdf

Relative Luminous Flux-Single Pulse Mode

Forward current: φ_v/φ_v(7.5 A) Single Pulse 20 ms, T_c = 25°C

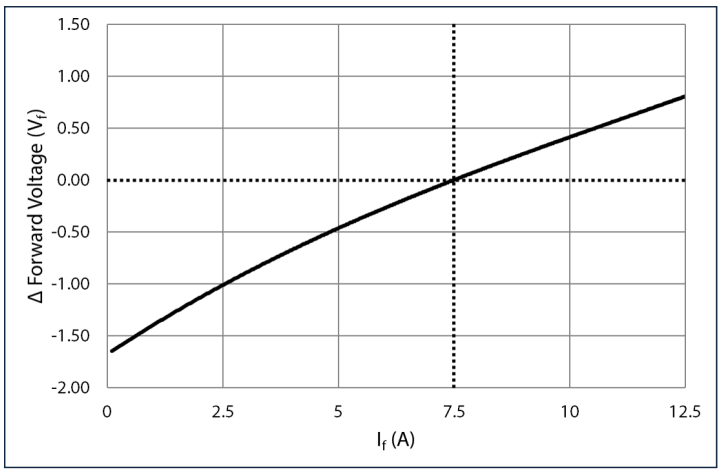


Temperature: φ_v/φ_v(25°C) Single Pulse 20 ms, I_f = 7.5 A

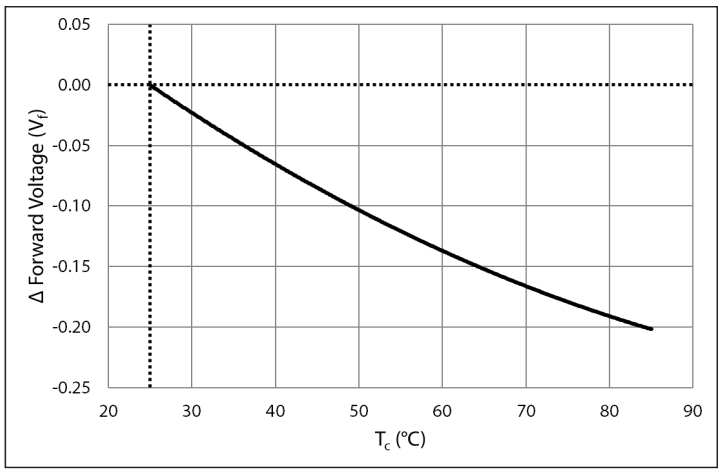


Forward Voltage-Single Pulse Mode

Forward current: $\Delta V_f = V_f(I_f) - V_f$(7.5 A) Single Pulse 20 ms, T_c = 25°C

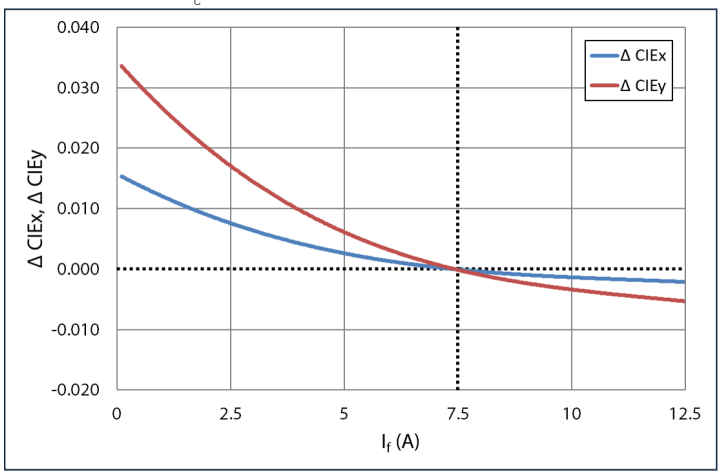


Temperature: $\Delta V_f = V(T_c) - V$(25°C) Single Pulse 20 ms, I_f = 7.5 A

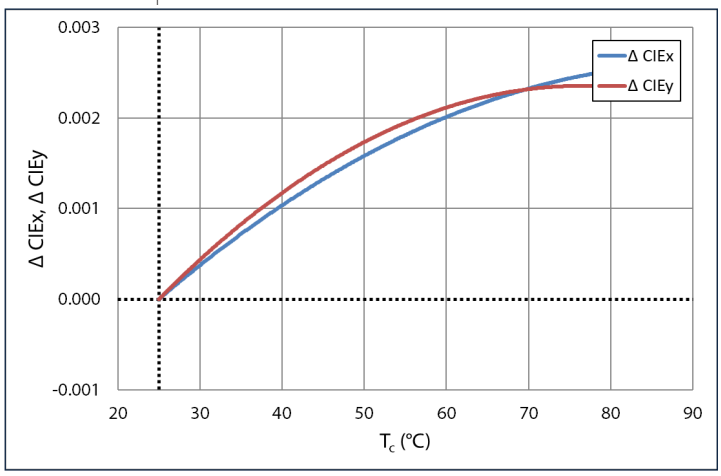


Chromaticity Shift-Single Pulse Mode

Forward current: ΔCIEx,y= CIEx,y(I_f) -CIEx,y(7.5 A) Single Pulse 20 ms, T_c = 25°C

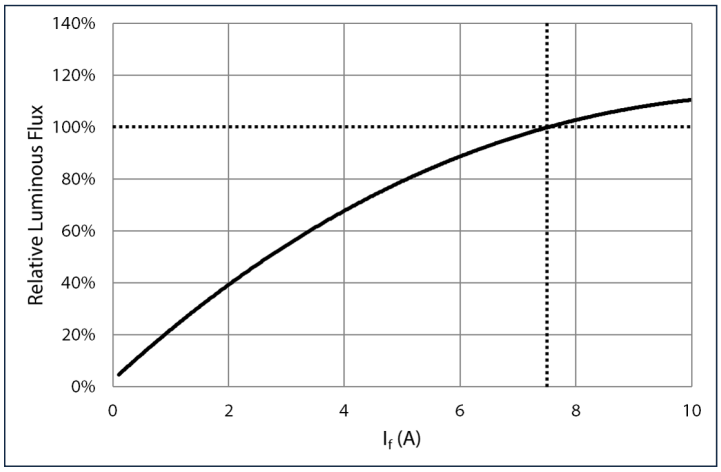


Temperature: ΔCIEx,y= CIEx,y(T_c) -CIEx,y(25°C) Single Pulse 20 ms, I_f = 7.5 A

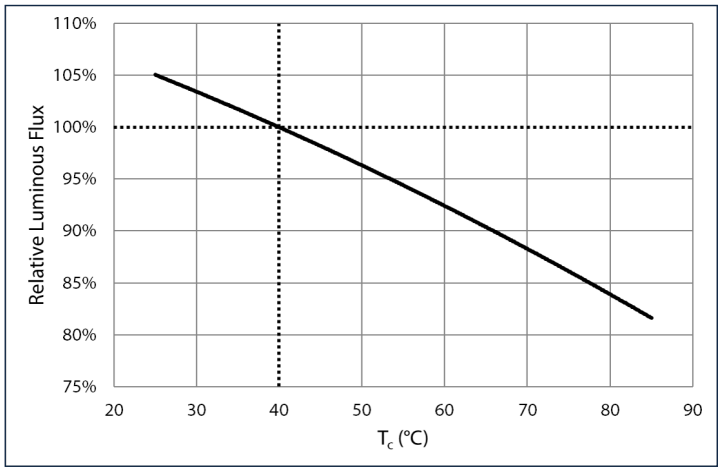


Relative Luminous Flux-CW Mode

Forward current: $\varphi_v/\varphi_v(7.5\ A)$ CW, $T_c = 40°C$

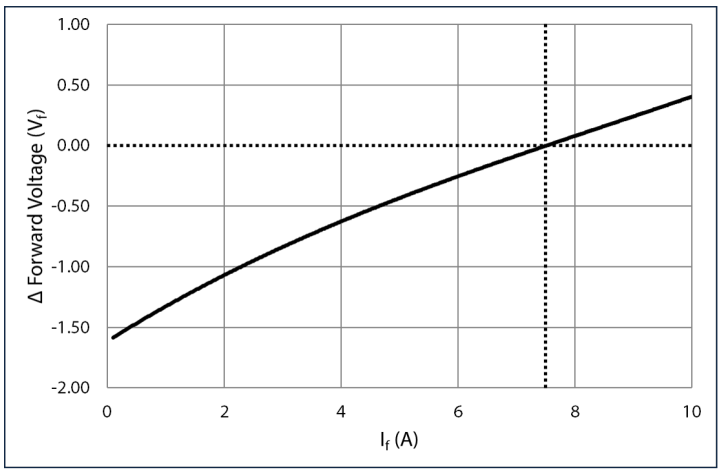


Temperature: $\varphi_v/\varphi_v(40°C)$ CW, $I_f = 7.5\ A$

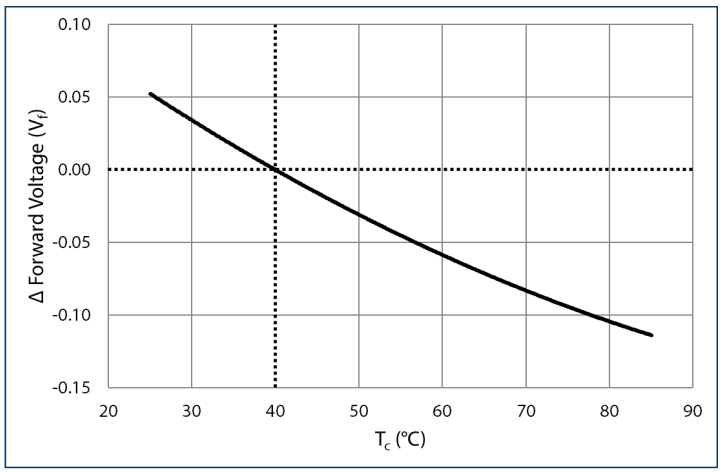


Forward Voltage-CW Mode

Forward current: $\Delta V_f = V_f(I_f) - V_f(7.5\ A)$ CW, $T_c = 40°C$

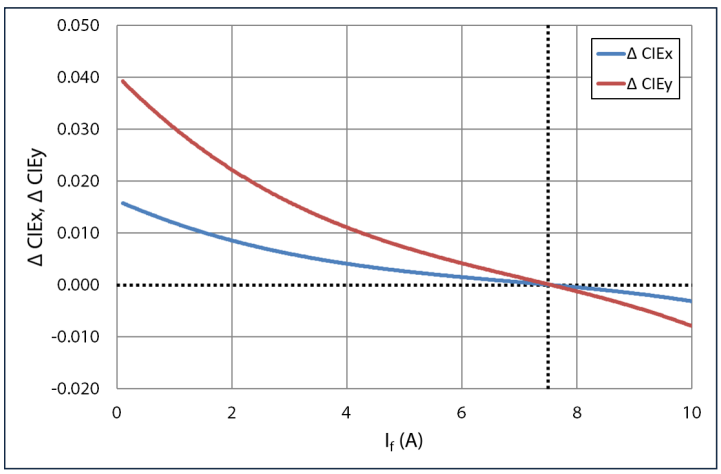


Temperature: $\Delta V_f = V(T_c) - V(40°C)$ CW, $I_f = 7.5\ A$

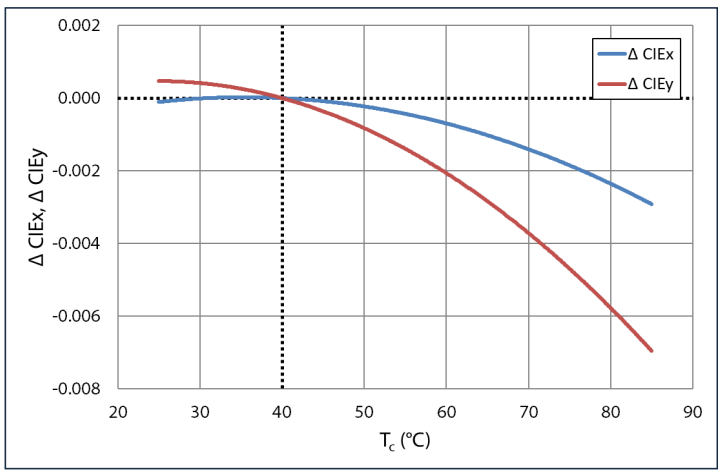


Chromaticity Shift-CW Mode

Forward current: $\Delta CIEx,y = CIEx,y(I_f) - CIEx,y(7.5\ A)$ CW, $T_c = 40°C$



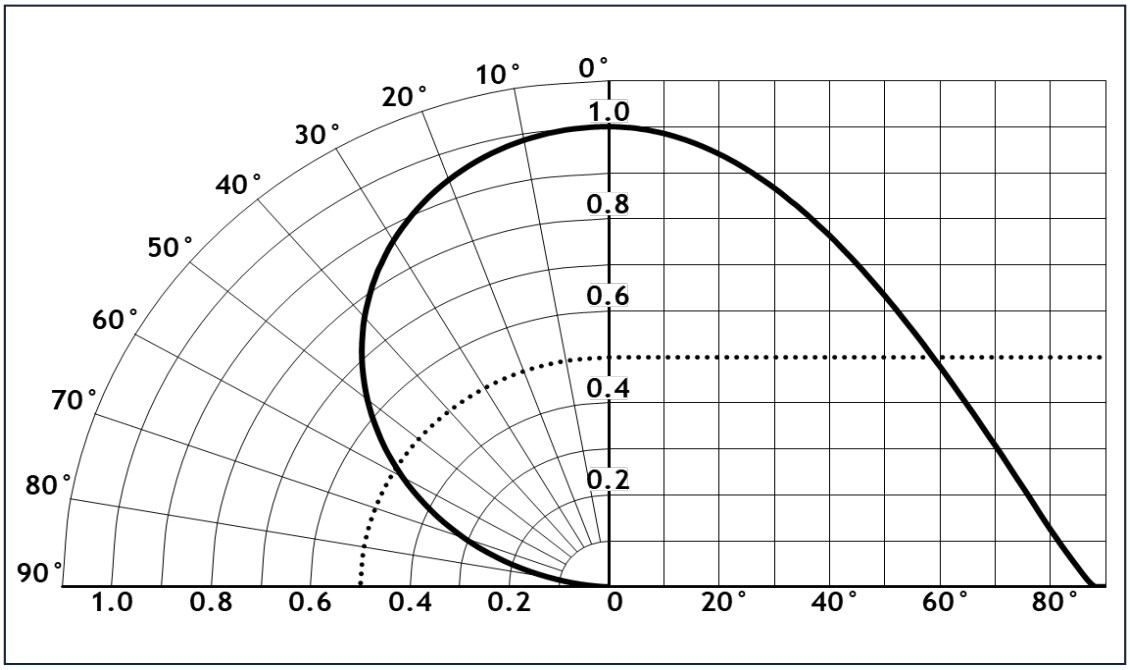
Temperature: $\Delta CIEx,y = CIEx,y(T_c) - CIEx,y(40°C)$ CW, $I_f = 7.5\ A$



Angular Distribution and Typical Spectrum

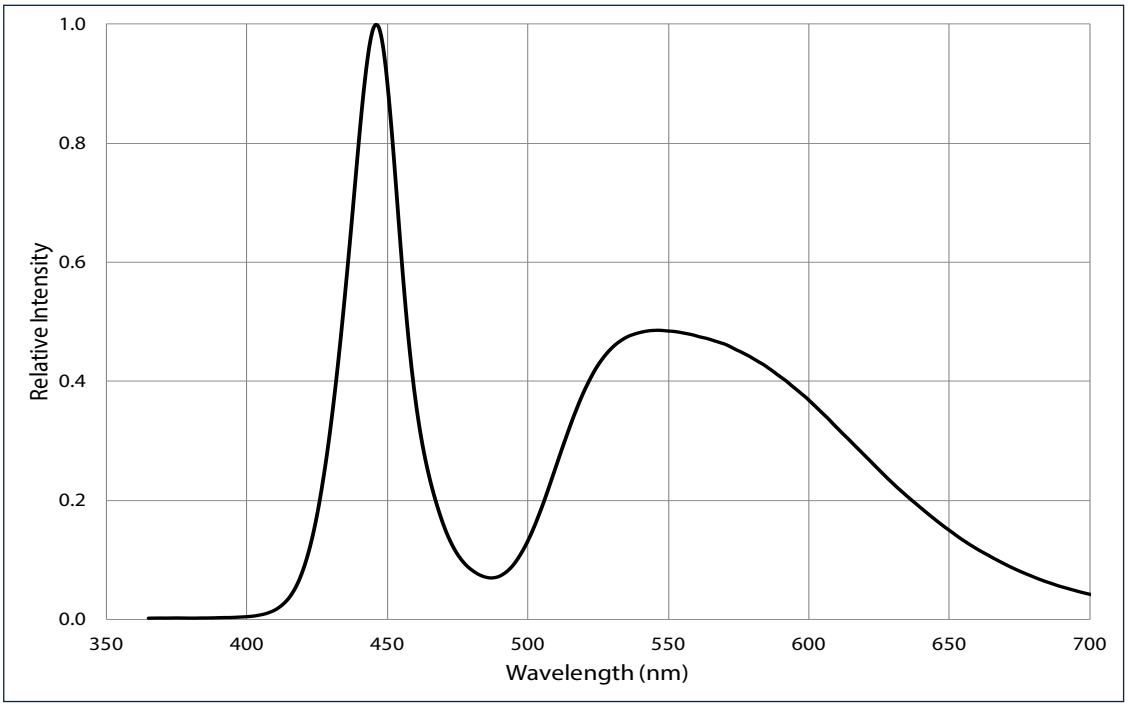
Angular Intensity Distribution

$I_{ref} = f(\Phi)$; $T_c = 25°C$



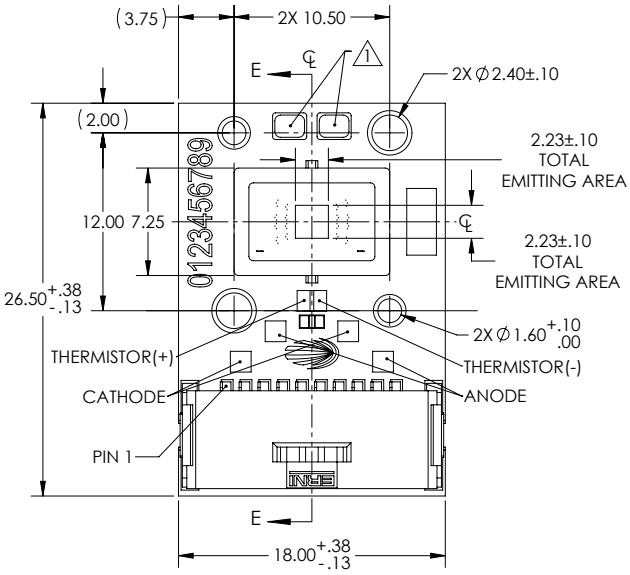
Typical Spectrum

$\Phi_{ref} = f(\lambda)$; $I_f = 7.5$ A; $T_c = 25°C$

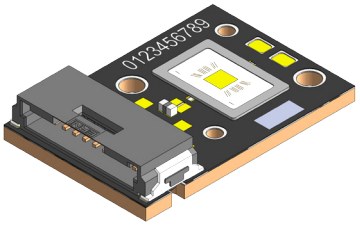


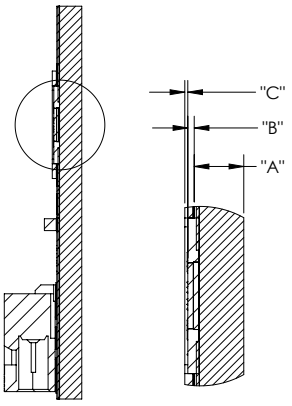
Mechanical Dimensions

DIMENSIONS IN MILLIMETERS

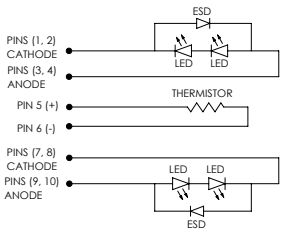


NOTES:
1. TEST PADS ARE ELECTRICALLY CONNECTED TO THE BOARD COPPER BASE.





SECTION E-E



PINS 1, 2, 7, 8 (CATHODE) AND 3, 4, 9, 10 (ANODE) MUST BE POWERED SIMULTANEOUSLY

LED CIRCUIT DIAGRAM

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

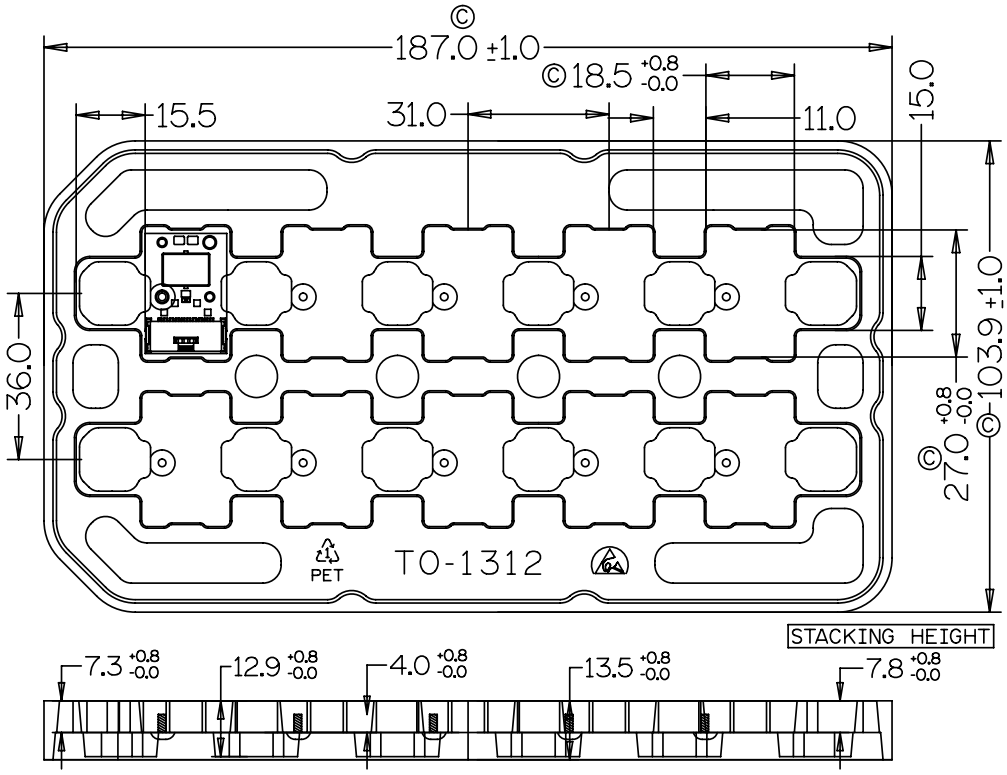
DEVICE CONFIG. CFT-50X	DIMENSIONS					
	"A"		"B"		"C"	
WCS	1.67	±.10	.21	±.04	.11	±.13
WDH			.22	±.04	.10	
"A" - TOP OF METAL SUBSTRATE TO BACK OF COREBOARD						
"B" - TOP OF METAL SUBSTRATE TO TOP OF LIGHT EMITTING AREA						
"C" - TOP OF LIGHT EMITTING AREA TO TOP OF FRAME						

DWG-003415 REVA

- For detailed drawing please refer to DWG-003415 document.
- The CFT-50X-WxS copper PCB is electrically neutral.
- Mating connector P/N: TE Connectivity (ERNI) 484084-E
- Check NEC standards for ampacity of the power cable being used.
- Recommended wire: MIL-W-16878/6 Type ET or equivalent
- Minimum requirements, manufacturer:

  - Gauge: AWG 22, Type: 7-strand plated copper or solid copper core
  - Maximum Outer Diameter (OD): 1.27 mm
  - Insulation material: PTFE or ETFE required for high-temperature and high-current rating

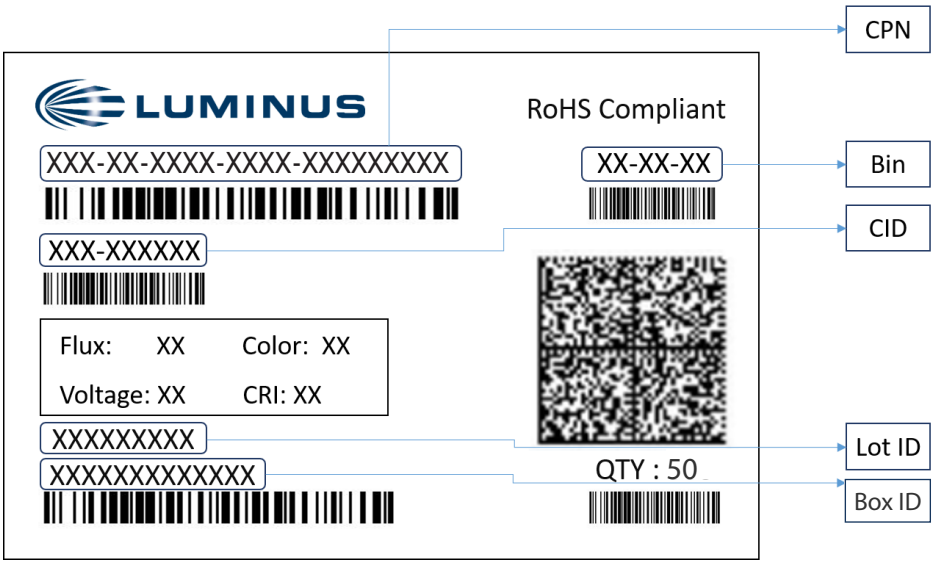
Shipping Tray Outline



Note:

1. The maximum draft is 5 degrees unless otherwise stated.
2. All radii are to be 1.25 mm unless otherwise stated.
3. The surface resistivity is 10E6 ~ 10E9 Ohm/sq unless otherwise stated.
4. All cells are identical.
5. All dimensions are in millimeters (mm).
6. All numbers with © symbol designate a manufacturing inspection point.
7. All numbers without © symbol are for reference purposes only.
8. The material used is RoHS compliant.

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 3
- Voltage: NA
- Color: Bin as defined on page 3
- CRI: NA

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

Notes

Static Electricity

This product is 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 anti-electrostatic gloves when handling the LEDs. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken to isolate LED processing equipment from potential sources of voltage surges.

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

Eye Safety

According to the test specification risk group IEC 62471: 2006-Worst case under 10 A, this product complies to Risk group 2 (RG2) Moderate risk.

Do not stare at operating lamp, may be harmful to the eyes.

For more information, please refer to: https://luminusdevices.zendesk.com/hc/en-us/articles/10532958752397.

Revision History

Rev	Date	Description of Change
01	11/25/2024	Initial release.
02	12/24/2024	Editorial change without impacting the technical content.