

# CFT-90-W

## Specialty White LED



### Features

- Second generation monolithic 9 mm<sup>2</sup> specialty white LED delivers increased peak lumens and drive current over CBT-90-W
- High current operation: up to 27 A DC
- Over 6,500 lumens at maximum drive current
- Available in 5700K, 6500K and 7800K (typical) color temperatures
- Window-less package design improves optical coupling efficiency
- Low thermal resistance chip-on-board packaging technology: 0.45°C/W typical junction to back of board
- Common cathode chip technology delivers increased performance and simplifies system design
- Hot lumens specification, production tested at 22.5 A DC, 90°C junction temperature



### Applications

- Fiber illumination including:
  - Medical endoscopy
  - Machine vision
  - Microscopy and other instrumentation
- Inspection and industrial applications
- Stage and Entertainment spot lights, narrow beam projectors
- Architectural Lighting
- Off-road vehicle and truck projector lights
- Search Lights
- Beacons

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## Ordering Information

### Ordering Part Numbers<sup>1</sup>

| Color Point | Luminous Flux |           | Chromaticity Bins              | Binkit | Ordering Part Number |
|-------------|---------------|-----------|--------------------------------|--------|----------------------|
|             | Min. Flux Bin | Min. Flux |                                |        |                      |
| WDS         | UA            | 3,680 lm  | H, J, HJH, HJL, K, KH          | UA500  | CFT-90-WDS-X11-UA500 |
|             |               |           | H, J, HJH, HJL                 | UA501  | CFT-90-WDS-X11-UA501 |
|             |               |           | H, J                           | UA502  | CFT-90-WDS-X11-UA502 |
|             | UB            | 3,955 lm  | H, J, HJH, HJL, K, KH          | UB500  | CFT-90-WDS-X11-UB500 |
|             |               |           | H, J, HJH, HJL                 | UB501  | CFT-90-WDS-X11-UB501 |
|             |               |           | H, J                           | UB502  | CFT-90-WDS-X11-UB502 |
|             | VA            | 4,230 lm  | H, J, HJH, HJL, K, KH          | VA500  | CFT-90-WDS-X11-VA500 |
|             |               |           | H, J, HJH, HJL                 | VA501  | CFT-90-WDS-X11-VA501 |
|             | VB            | 4,545 lm  | H, J, HJH, HJL, K, KH          | VB500  | CFT-90-WDS-X11-VB500 |
|             |               |           | H, J, HJH, HJL                 | VB501  | CFT-90-WDS-X11-VB501 |
|             | WA            | 4,860 lm  | H, J, HJH, HJL, K, KH          | WA500  | CFT-90-WDS-X11-WA500 |
| WCS         | UA            | 3,680 lm  | D, E, F, G, DEH, DEL, FGH, FGL | UA600  | CFT-90-WCS-X11-UA600 |
|             |               |           | F, G, FGH, FGL                 | UA601  | CFT-90-WCS-X11-UA601 |
|             | UB            | 3,955 lm  | D, E, F, G, DEH, DEL, FGH, FGL | UB600  | CFT-90-WCS-X11-UB600 |
|             |               |           | F, G, FGH, FGL                 | UB601  | CFT-90-WCS-X11-UB601 |
|             | VA            | 4,230 lm  | D, E, F, G, DEH, DEL, FGH, FGL | VA600  | CFT-90-WCS-X11-VA600 |
|             |               |           | F, G, FGH, FGL                 | VA601  | CFT-90-WCS-X11-VA601 |
|             | VB            | 4,545 lm  | D, E, F, G, DEH, DEL, FGH, FGL | VB600  | CFT-90-WCS-X11-VB600 |
|             |               |           | F, G, FGH, FGL                 | VB601  | CFT-90-WCS-X11-VB601 |
|             | WA            | 4,860 lm  | D, E, F, G, DEH, DEL, FGH, FGL | WA600  | CFT-90-WCS-X11-WA600 |
|             | WSS           | 3,680 lm  | C, D, E, DEH, DEL              | UA700  | CFT-90-WSS-X11-UA700 |
|             |               |           | D, E, DEH, DEL                 | UA701  | CFT-90-WSS-X11-UA701 |
|             |               |           | B, C, D                        | UA900  | CFT-90-WSS-X11-UA900 |
|             | UB            | 3,955 lm  | C, D, E, DEH, DEL              | UB700  | CFT-90-WSS-X11-UB700 |
|             |               |           | D, E, DEH, DEL                 | UB701  | CFT-90-WSS-X11-UB701 |
|             |               |           | B, C, D                        | UB900  | CFT-90-WSS-X11-UB900 |
|             | VA            | 4,230 lm  | C, D, E, DEH, DEL              | VA700  | CFT-90-WSS-X11-VA700 |
|             |               |           | D, E, DEH, DEL                 | VA701  | CFT-90-WSS-X11-VA701 |
|             | VB            | 4,545 lm  | C, D, E, DEH, DEL              | VB700  | CFT-90-WSS-X11-VB700 |

**Note:**

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



## Ordering Information

Part Number Nomenclature

| CFT                                                                                    | 90                      | W<tc>                                                                                                       | X11                   | <Bin kit>                                             |
|----------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------|
| Product Family                                                                         | Chip Area               | Color                                                                                                       | Package Configuration | Bin Kit                                               |
| C : Chip on board<br>F : Flat-top window-less package<br>T : single monolithic emitter | 90: 9.0 mm <sup>2</sup> | W: White<br>t: Color temperature<br>D: Daylight<br>C: Cool White<br>S: Stage White<br>c: CRI<br>S: Standard | Internal package code | Refer to ordering<br>part numbers in this<br>document |



## Binning Structure

### Flux Bins<sup>1,2</sup>

| Color | Luminous Flux Bin <sup>3</sup> | Binning @ 22.5 A, T <sub>hs</sub> = 40°C <sup>4,5</sup> |                   |
|-------|--------------------------------|---------------------------------------------------------|-------------------|
|       |                                | Minimum Flux (lm)                                       | Maximum Flux (lm) |
| White | UA                             | 3,680                                                   | 3,955             |
|       | UB                             | 3,955                                                   | 4,230             |
|       | VA                             | 4,230                                                   | 4,545             |
|       | VB                             | 4,545                                                   | 4,860             |
|       | WA                             | 4,860                                                   | 5,225             |
|       | WB                             | 5,225                                                   | 5,590             |
|       | XA                             | 5,590                                                   | 6,011             |
|       | XB                             | 6,011                                                   | 6,430             |
|       | YA                             | 6,430                                                   | 6,910             |

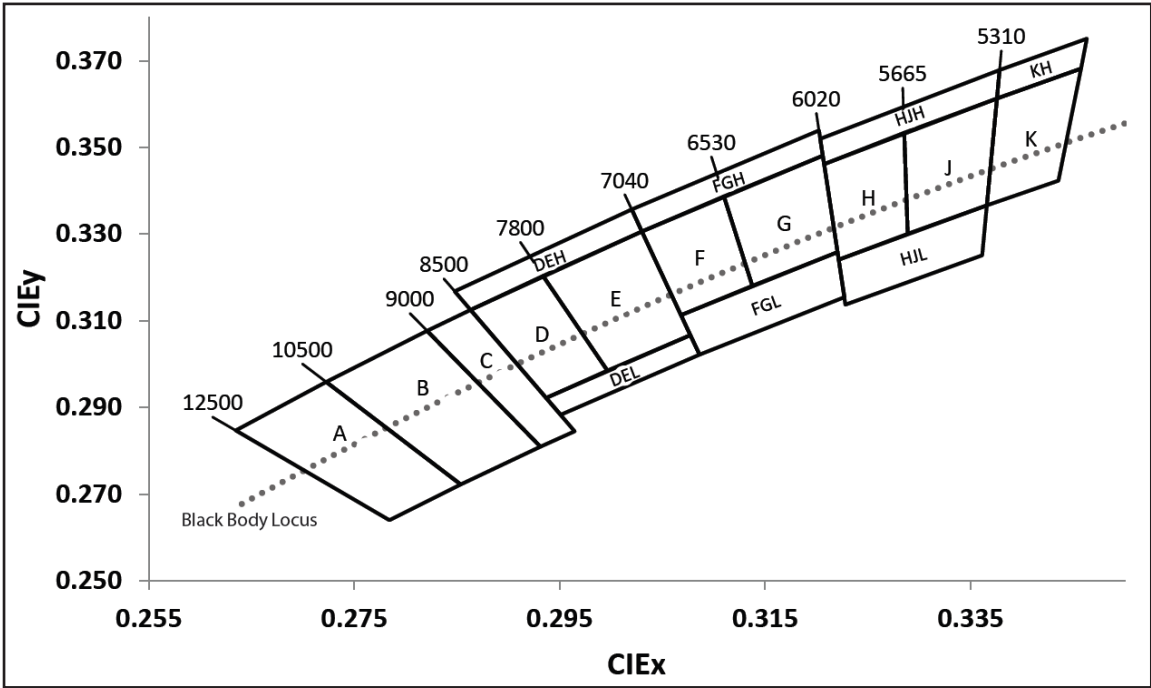
#### Note:

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: 22.5 A DC, 40°C heat sink temperature.
5. T<sub>hs</sub> = heat sink temperature.



Binning Structure

Chromaticity Bins



Note:

1. Product test condition: 22.5 A DC, 40°C heat sink temperature.



## Binning Structure

### Chromaticity Binning Coordinates<sup>1</sup>

| Bin Code | CIEx  | CIEy  | Bin Code | CIEx  | CIEy  | Bin Code | CIEx  | CIEy  | Bin Code | CIEx  | CIEy  |
|----------|-------|-------|----------|-------|-------|----------|-------|-------|----------|-------|-------|
| A        | 0.263 | 0.285 | DEH      | 0.285 | 0.317 | G        | 0.311 | 0.339 | K        | 0.338 | 0.361 |
|          | 0.272 | 0.296 |          | 0.302 | 0.336 |          | 0.321 | 0.348 |          | 0.346 | 0.368 |
|          | 0.285 | 0.272 |          | 0.303 | 0.331 |          | 0.322 | 0.326 |          | 0.344 | 0.342 |
|          | 0.278 | 0.264 |          | 0.286 | 0.313 |          | 0.314 | 0.318 |          | 0.337 | 0.337 |
| B        | 0.272 | 0.296 | E        | 0.293 | 0.320 | H        | 0.321 | 0.346 | KH       | 0.338 | 0.368 |
|          | 0.282 | 0.308 |          | 0.303 | 0.331 |          | 0.329 | 0.353 |          | 0.346 | 0.375 |
|          | 0.293 | 0.281 |          | 0.308 | 0.307 |          | 0.329 | 0.330 |          | 0.346 | 0.368 |
|          | 0.285 | 0.272 |          | 0.300 | 0.298 |          | 0.322 | 0.324 |          | 0.338 | 0.361 |
| C        | 0.282 | 0.308 | F        | 0.303 | 0.331 | HJL      | 0.322 | 0.324 |          |       |       |
|          | 0.286 | 0.313 |          | 0.311 | 0.339 |          | 0.337 | 0.337 |          |       |       |
|          | 0.296 | 0.285 |          | 0.314 | 0.318 |          | 0.336 | 0.325 |          |       |       |
|          | 0.293 | 0.281 |          | 0.307 | 0.311 |          | 0.323 | 0.314 |          |       |       |
| D        | 0.286 | 0.313 | FGH      | 0.302 | 0.336 | HJH      | 0.320 | 0.352 |          |       |       |
|          | 0.293 | 0.320 |          | 0.320 | 0.354 |          | 0.338 | 0.368 |          |       |       |
|          | 0.300 | 0.298 |          | 0.321 | 0.348 |          | 0.338 | 0.361 |          |       |       |
|          | 0.294 | 0.292 |          | 0.303 | 0.331 |          | 0.321 | 0.346 |          |       |       |
| DEL      | 0.294 | 0.292 | FGL      | 0.307 | 0.311 | J        | 0.329 | 0.353 |          |       |       |
|          | 0.308 | 0.307 |          | 0.322 | 0.326 |          | 0.338 | 0.361 |          |       |       |
|          | 0.309 | 0.302 |          | 0.323 | 0.315 |          | 0.337 | 0.337 |          |       |       |
|          | 0.295 | 0.288 |          | 0.309 | 0.302 |          | 0.329 | 0.330 |          |       |       |

**Note:**

1. Product test condition: 22.5 A DC, 40°C heat sink temperature.



## Absolute Maximum Ratings

| Parameter                                                                                  | Symbol                 | Values | Unit |
|--------------------------------------------------------------------------------------------|------------------------|--------|------|
| Forward Current (CW) <sup>1</sup>                                                          | $I_{f \min}$           | 0.2    | A    |
|                                                                                            | $I_{f \max}$           | 27     |      |
| Forward Surge Current (Pulsed) <sup>2</sup><br>(Frequency >240Hz, duty cycle <10%, t<=1ms) | $I_{\text{surge max}}$ | 36     | A    |
| Storage Temperature                                                                        | $T_{s \min}$           | -40    | °C   |
|                                                                                            | $T_{s \max}$           | 100    |      |
| Junction Temperature <sup>2</sup>                                                          | $T_{j \max}$           | 150    | °C   |
| Operating Temperature                                                                      | $T_{\text{opr min}}$   | -40    | °C   |
|                                                                                            | $T_{\text{opr max}}$   | 85     |      |

**Note:**

- For reference only.
- CFT-90-W LED is designed for operation to an absolute maximum current 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

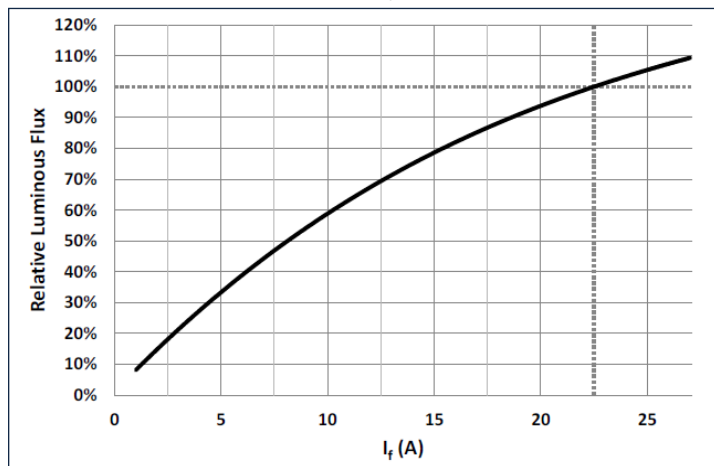
| Optical and Electrical Characteristics                   | Symbol                | Value     |       |       | Unit            |
|----------------------------------------------------------|-----------------------|-----------|-------|-------|-----------------|
|                                                          |                       | WSS       | WCS   | WDS   |                 |
| Emitting Area                                            | A <sub>E</sub>        | 9.0       |       |       | mm <sup>2</sup> |
| Emitting Area Dimension                                  |                       | 3.0 x 3.0 |       |       | mm x mm         |
| Typical Peak Luminous Flux <sup>1,2</sup>                | Φ <sub>V</sub>        | 5,300     | 5,400 | 5,500 | lm              |
| Typical Peak Radiometric Flux <sup>1,2</sup>             | Φ <sub>E</sub>        | 17.4      | 17.2  | 17.0  | W               |
| Viewing Angle (50% of peak flux)                         | 2 Ø <sub>1/2</sub>    | 120       |       |       | degrees         |
| Forward Voltage <sup>1</sup>                             | V <sub>f min</sub>    | 2.9       |       |       | V               |
|                                                          | V <sub>f</sub>        | 3.4       |       |       |                 |
|                                                          | V <sub>f max</sub>    | 4.2       |       |       |                 |
| Typical Color Rendering Index                            | CRI                   | 65        | 65    | 65    |                 |
| Thermal Characteristics                                  |                       |           |       |       |                 |
| Thermal Resistance (junction to coreboard) <sup>3</sup>  | R <sub>th j-b</sub>   | 0.35-0.55 |       |       | °C/W            |
| Thermal Resistance (junction to thermistor) <sup>3</sup> | R <sub>th j-ref</sub> | 0.38-0.58 |       |       | °C/W            |
| Thermal Coefficient of Radiometric Flux (typical)        |                       | -0.3      |       |       | %/°C            |

**Note:**

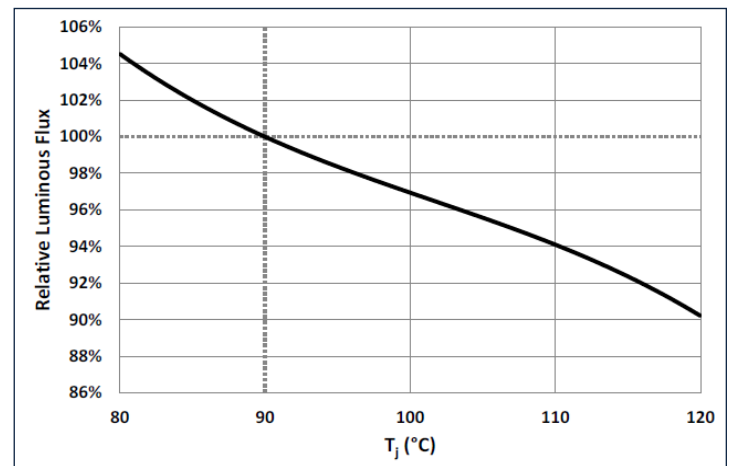
1. Unless otherwise noted, values listed are typical. All ratings are based on operation with a constant temperature = 90°C.
2. Total flux from emitting area at listed dominant wavelength. Reported performance is included to show trends for a selected power level. For specific minimum and maximum values, use bin tables. For product roadmap and future performance of devices, contact Luminus.
3. 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>

## Relative Luminous Flux

Forward current:  $\phi_v/\phi_v(22.5\text{ A})$  DC,  $T_{hs} = 40^\circ\text{C}$

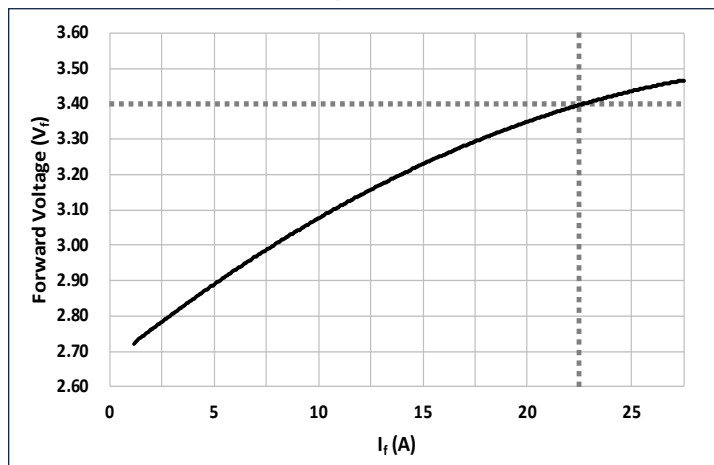


Temperature:  $\phi_v/\phi_v(90^\circ\text{C})$  DC,  $I_f = 22.5\text{ A}$

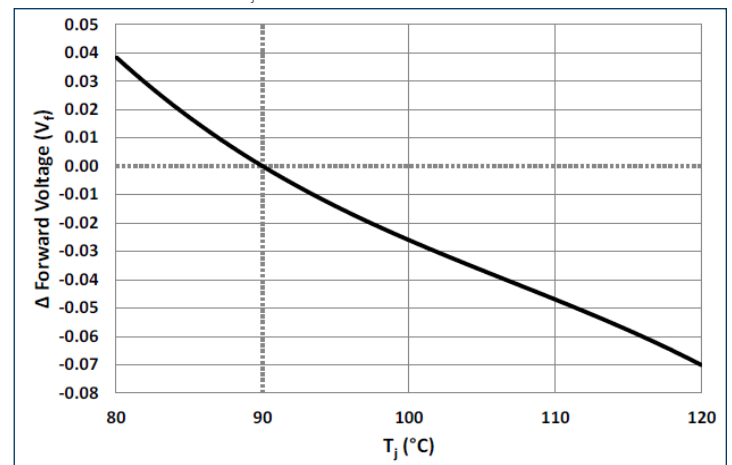


## Forward Voltage

Forward current:  $V_f = V(I_f)$  DC,  $T_{hs} = 40^\circ\text{C}$

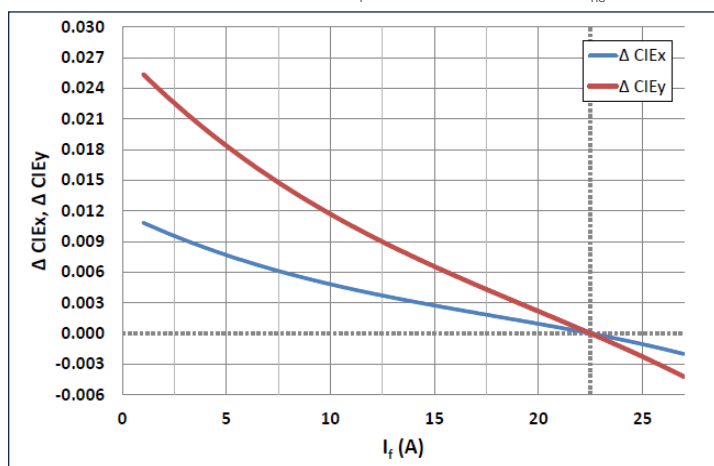


Temperature:  $\Delta V_f = V(T_j) - V(90^\circ\text{C})$  DC,  $I_f = 22.5\text{ A}$

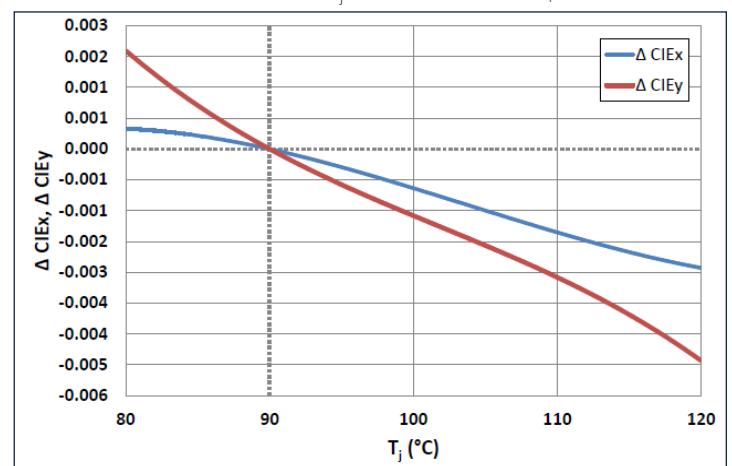


## Relative Chromaticity Shift

Forward current:  $\Delta \text{CIEx,y} = \text{CIEx,y}(I_f) - \text{CIEx,y}(22.5\text{ A})$  DC,  $T_{hs} = 40^\circ\text{C}$



Temperature:  $\Delta \text{CIEx,y} = \text{CIEx,y}(T_j) - \text{CIEx,y}(90^\circ\text{C})$  DC,  $I_f = 22.5\text{ A}$

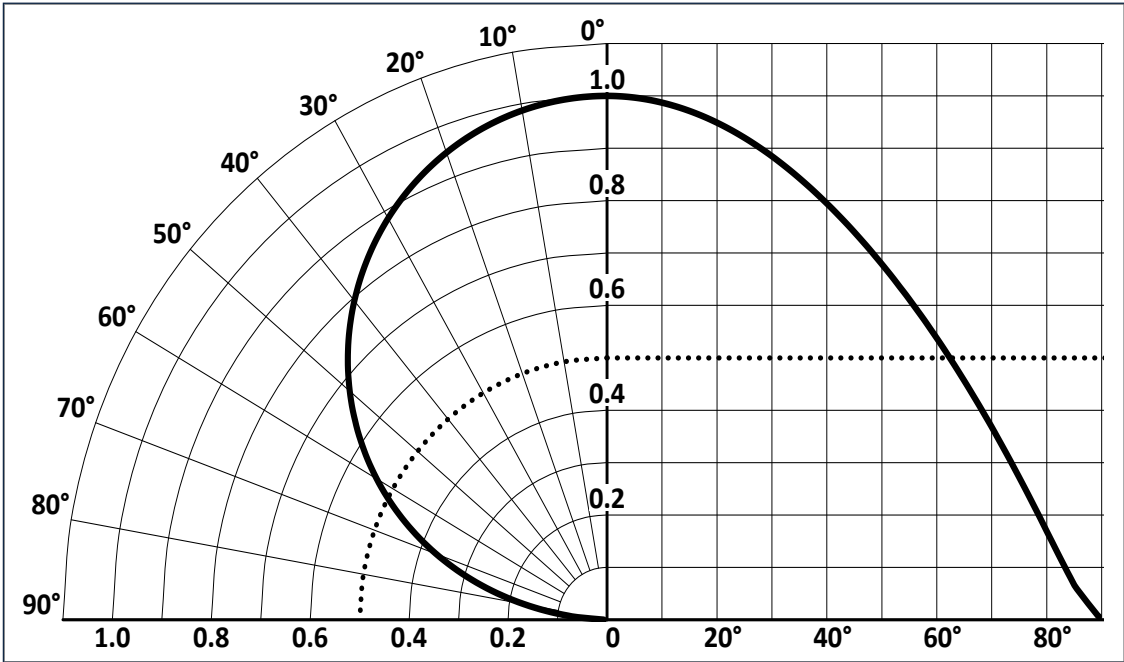




## Angular Distribution and Typical Spectrum

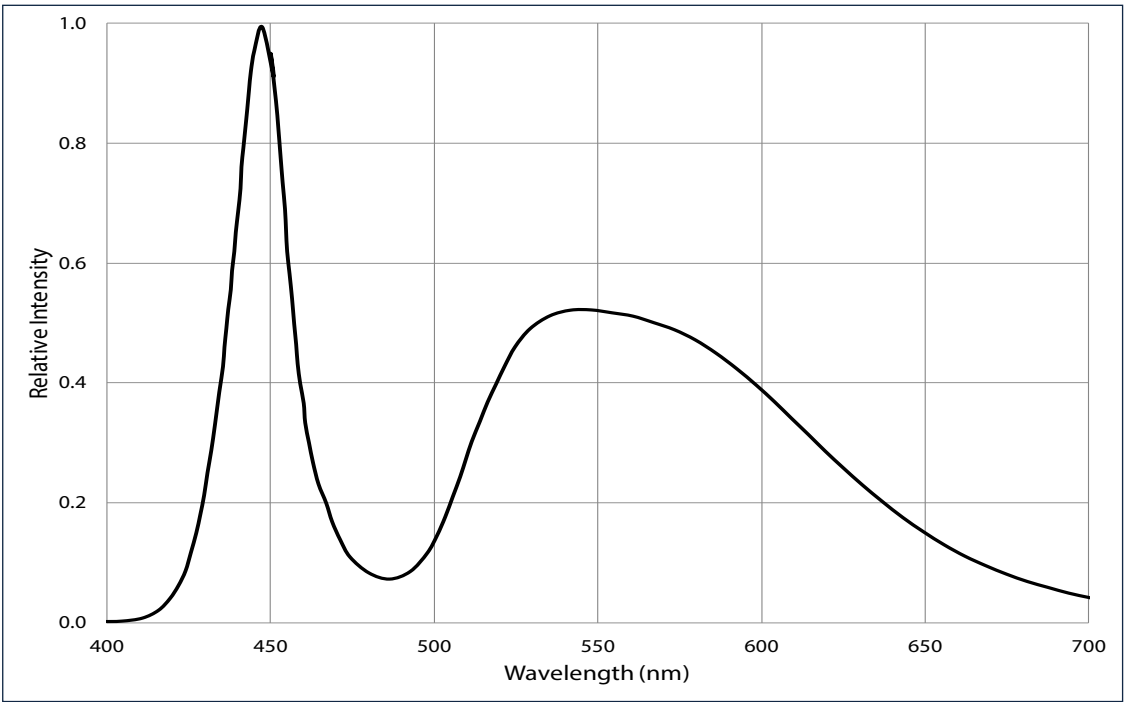
### Angular Intensity Distribution

$I_{ref} = f(\Phi); T_c = 25^{\circ}\text{C}$



### Typical Spectrum

$\Phi_{ref} = f(\lambda); I_f = 22.5\text{ A}; T_c = 25^{\circ}\text{C}$

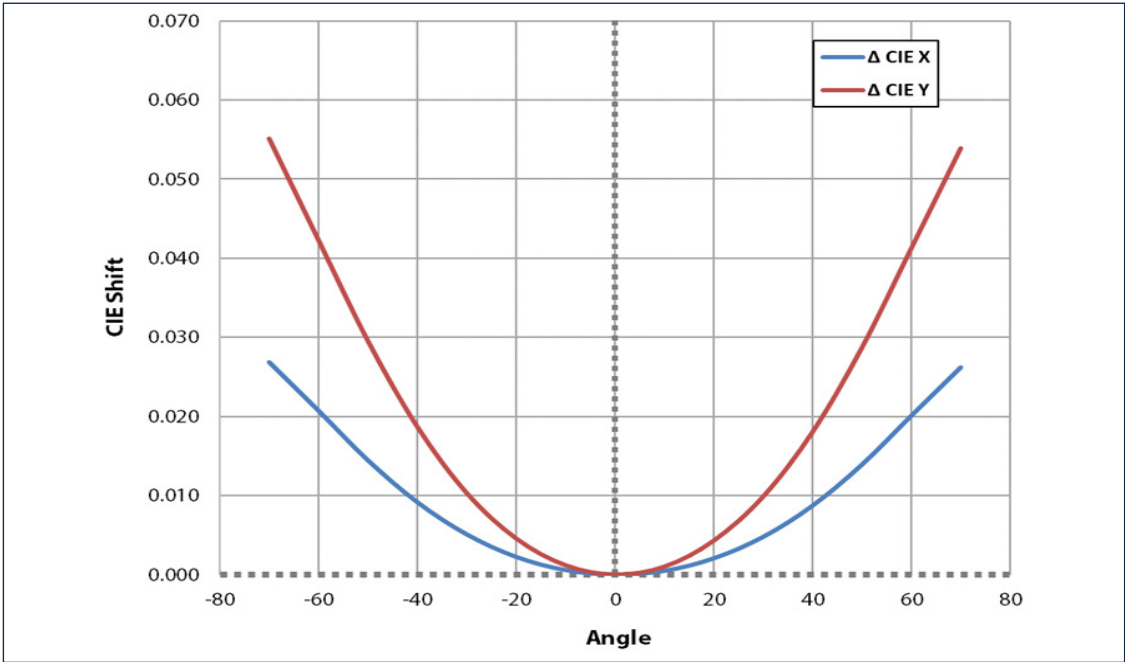




## Angular Distribution and Typical Spectrum

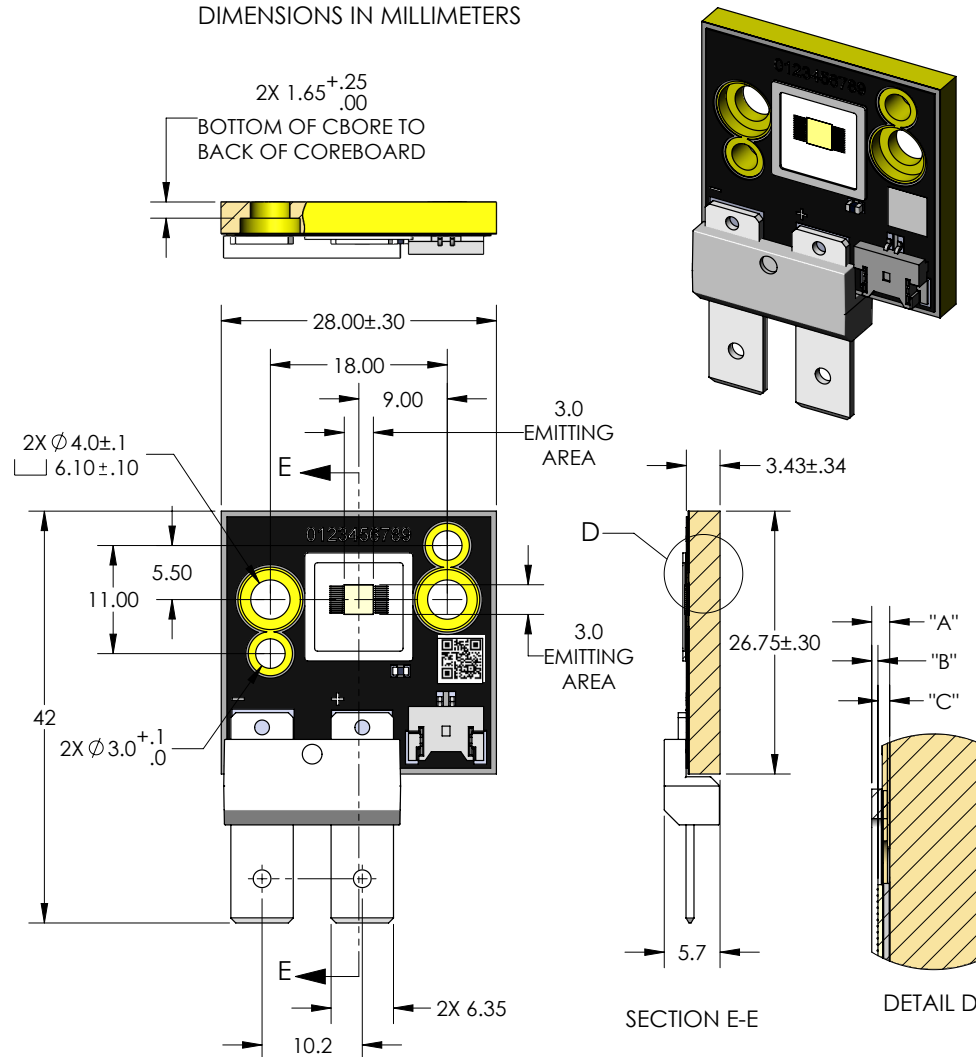
### Color Over Angle

$I_{ref} = f(\Phi); T_c = 25^{\circ}\text{C}$



## Mechanical Dimensions

DIMENSIONS IN MILLIMETERS



| 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-002705 REV04

Recommended Connector for Anode and Cathode:

Panduit Disco Lok™ Series P/N: DNG14-250FL-C

Male Thermistor Connector on board:

TYU P/N TU1212WBR-02S-C1-NL-A and MOLEX P/N 53780-0270

Check NEC standards for ampacity of the power cable being used.

Please note that the CFT-90-W copper PCB is electrically active with a common Cathode (-) polarity.

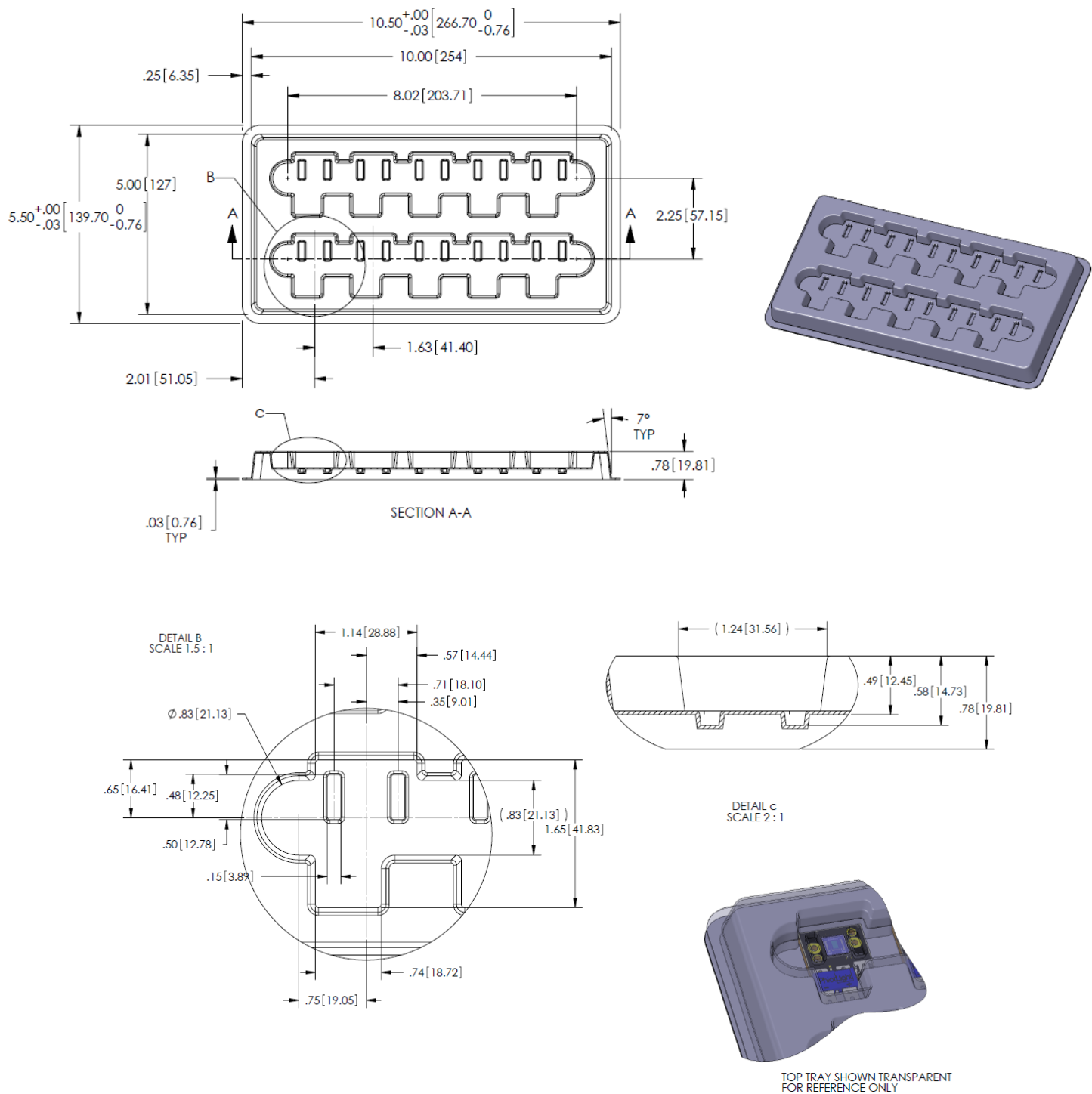
Recommended Female Thermistor Connector (Mating connector):

TYU P/N TU1212HNO-02 or equivalent

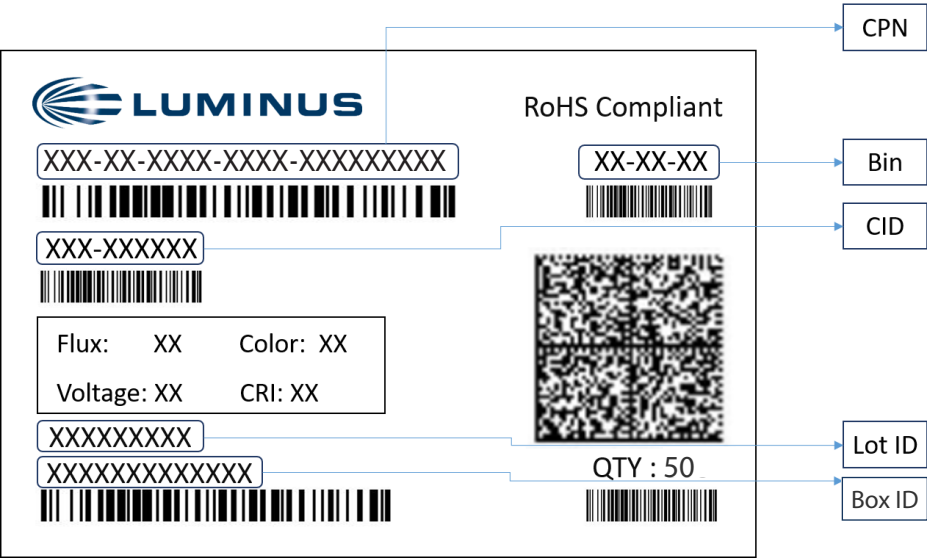
For detailed drawing please refer to DWG-002705 document



# Shipping Tray Outline



## 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 6
- 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



Revision History

| Rev | Date       | Description of Change                                                                             |
|-----|------------|---------------------------------------------------------------------------------------------------|
| 01  | 01/18/2017 | Initial release                                                                                   |
| 02  | 06/14/2017 | Remove preliminary. Add B chromaticity bin and eliminated TB flux bin. Updated ordering bin kits. |
| 03  | 07/07/2017 | Add comment on mechanical drawing page.                                                           |
| 04  | 06/05/2024 | Update template, drawing, product image, characteristics and thermistor connector information     |
| 05  | 12/06/2024 | Editorial update on page 5 and 6 notes.Update recommended female thermistor connector PN.         |