

# PhlatLight™ PT120 Projection Chipset



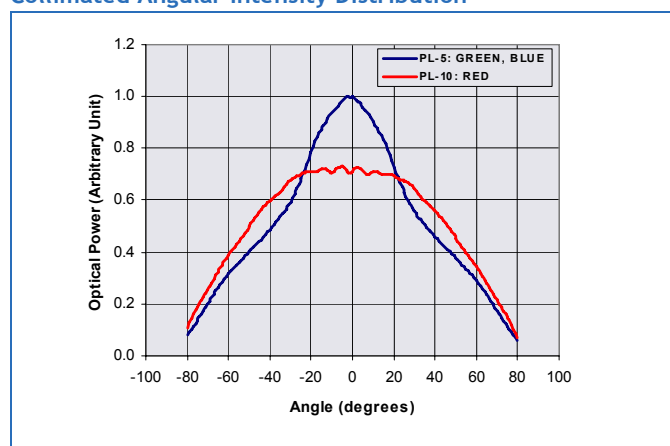
## Technology Overview

Luminus Devices' Projection Technology is an innovative solid-state light source created to replace arc lamps in projection systems. Enabled by unique use of Photonic Lattice technology, PhlatLight™ chipsets represent a major breakthrough in brightness that delivers all the benefits of solid state light sources in projections applications:

- Wide color gamut for vivid colors, exceeds NTSC.
- Instant turn-on, no more wait time.
- Lifetime of light source at par with TV's - no more bulb replacement.
- Environmentally friendly technology - Mercury-free.
- Electronic control of color points and light intensity on a frame by frame basis

PhlatLight™ products benefit from numerous innovations in the domain of packaging, thermal management and optical coupling that allow designers to achieve efficient light engine designs and deliver high screen brightness.

## Collimated Angular Intensity Distribution



## Features

- Matched RGB Chipset with 12mm<sup>2</sup> emitting area designed for projection applications
- Photonic lattice technology for very high surface brightness
- 100% surface emission for high collection efficiency and low optical losses
- Wide color gamut: RED 625 nm, GREEN 525 nm, BLUE 462 nm typical dominant wavelength
- Single emitting area per color allows for collection with single lens for simplified optics
- 16:9 aspect ratio matched with micro-display and screen aspect ratio
- Over 3000 emitted white lumens at 8000K color temperature from single chipset (Continuous Wave Operation)
- Over 2000 emitted white lumens at 8000K color temperature from single chipset under Pulsed Operation
- Uniform surface emission
- Thermally efficient Type CX Common Anode package
- RoHS (lead-free) compliant

## Applications

- Specifically engineered for Rear-Projection TVs, front projectors, head-up projection displays
- Optimized for Micro-Display diagonal sizes ranging from 0.6" to 0.95" with 16:9 aspect ratio.
- Suitable for DLP™ (xHD5), LCoS and HTPS microdisplays

## Optical and Electrical Characteristics

	Symbol	Red	Green	Blue	Unit
Emitting Area		11.96	11.96	11.96	mm <sup>2</sup>
Emitting Area Dimensions		4.6x2.6	4.6x2.6	4.6x2.6	mmxmm
<b>Characteristics at recommended Continuous Drive Current <math>I_F</math> (Continuous Waveform)<sup>1</sup></b>					
Recommended Drive Current	typ $I_F$	18	18	18	A
Luminous Flux <sup>2,3</sup>	typ $\Phi_V$	875	2100	400	lm
Dominant Wavelength <sup>4</sup>	typ $\lambda_d$	626	528	463	nm
Color Saturation <sup>5</sup>	typ	1.00	0.83	0.99	
FWHM - Spectral bandwidth at 50% of $\Phi_V$	typ $\Delta\lambda_d$	19	39	25	nm
Chromaticity Coordinates <sup>5,6</sup>	typ x	0.702	0.174	0.142	
	typ y	0.298	0.731	0.037	
Forward Voltage	min $V_{Fmin}$	2	3.5	3.5	V
	typ $V_F$	2.7	4.5	4.6	V
	max $V_{Fmax}$	3.5	5.6	5.7	V
Dynamic Resistance	typ $\Omega_{dyn}$	0.03	0.04	0.02	$\Omega$
<b>Characteristics at recommended Pulsed Drive Current <math>I_F</math><sup>1,7</sup></b>					
Reference Duty Cycle <sup>8</sup>		25	50	25	%
Recommended Peak Drive Current	typ $I_F$	30	30	30	A
Peak Luminous Flux <sup>2,3</sup>	typ $\Phi_V$	1500	3100	600	lm
Dominant Wavelength <sup>4</sup>	typ $\lambda_d$	625	525	462	nm
FWHM - Spectral bandwidth at 50% of $\Phi_V$	typ $\Delta\lambda_d$	19	39	26	nm
Color Saturation <sup>5</sup>	typ	1.00	0.79	0.99	
Chromaticity Coordinates <sup>5,6</sup>	typ x	0.700	0.160	0.143	
	typ y	0.300	0.724	0.036	
Forward Voltage	min $V_{Fmin}$	2.2	3.8	4.0	V
	typ $V_F$	3.0	5.0	5.1	V
	max $V_{Fmax}$	3.8	5.9	6.0	V
Dynamic Resistance	typ $\Omega_{dyn}$	0.03	0.04	0.02	$\Omega$
<b>Common Characteristics CW/Pulsed</b>					
Photometric Thermal Efficiency Coefficient	typ	-0.69	-0.18	-0.007	% / °C

## Optical and Electrical Characteristics

	Symbol	Red	Green	Blue	Unit
Radiometric Thermal Efficiency Coefficient	typ	-0.52	-0.20	-0.17	% / °C
Forward Voltage Temperature Coefficient	typ	-1.3	-4.6	-3.5	mV / °C
Median Lifetime <sup>9</sup>		>60,000	>60,000	>60,000	Hours

Note 1: All ratings are based on operation with a constant heat sink temperature  $T_{hs} = 40^{\circ}\text{C}$ . See Thermal Resistance section for  $T_{hs}$  definition.

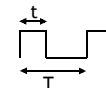
Note 2: Total flux from emitting area at typical dominant wavelength

Note 3: Based on Type CX package. Small variations in performance may be expected in Type C package due to a higher thermal resistance, resulting in a higher junction temperature.

Note 4: Minimum and Maximum Dominant Wavelengths are based on typical values +/- 5nm for Red, +/- 8nm for Green and +/- 6nm for Blue

Note 5: In CIE 1931 chromaticity diagram coordinates, normalized to  $X+Y+Z=1$

Note 6: For Reference only

Note 7: Parameters rated at typical duty cycle and Pulsed operation frequency  $f > 240\text{Hz}$ ;  $DC = \frac{t}{T}$  

Note 8: Duty Cycle used to specify device ratings under Pulsed operation. PhlatLight devices can operate at duty cycles ranging from 1% to 100%. At higher duty cycles, drive current should be adjusted to maintain the junction temperature at desired levels to meet the application lifetime requirements.

Note 9: Assuming  $T_j < 80^{\circ}\text{C}$  for Red devices and  $T_j < 120^{\circ}\text{C}$  for Green and Blue devices

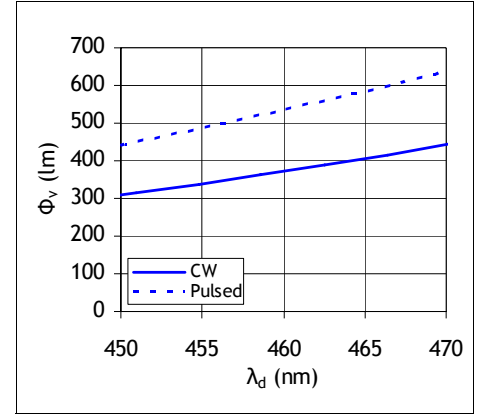
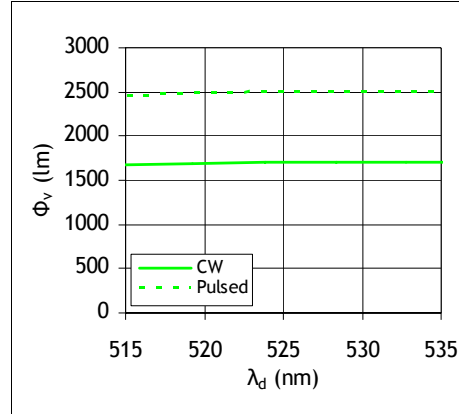
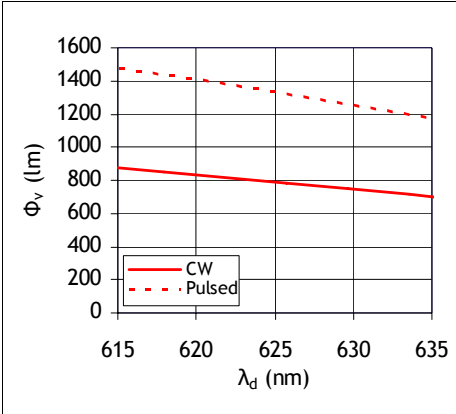
## Absolute Maximum Ratings

	Symbol	Red	Green	Blue	Unit
Maximum Current <sup>1</sup>	Max	36	36	36	A
Maximum Operating Junction Temperature	Max $T_{max}$	80	120	120	°C
Maximum Transient Junction Temperature <sup>2</sup>	Max $T_{jtrans}$	125	150	150	°C
Storage Temperature Range		-40/+100	-40/+100	-40/+100	°C

Note 1: Based on maximum allowed current density. Sustained operation beyond recommended drive current values may result in reduced life time. Thermal calculations should be performed to ensure  $T_j$  is maintained below  $T_{jmax}$  rating or device life may be reduced.

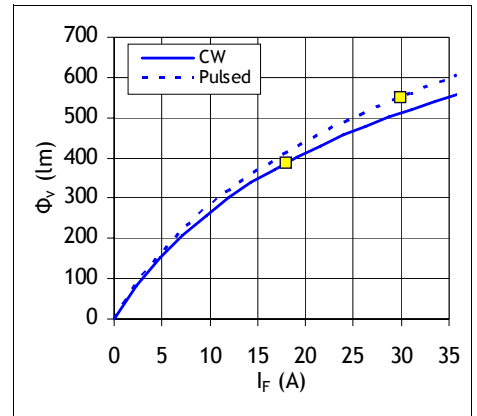
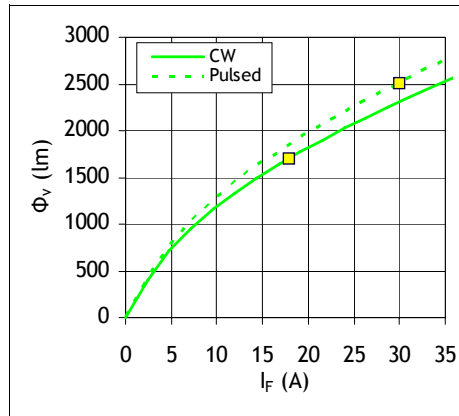
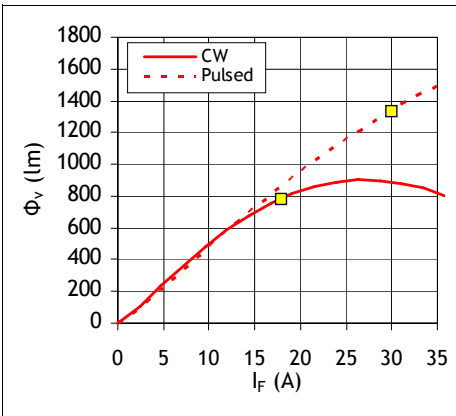
Note 2: Sustained operation above Maximum Operating Junction Temperature ( $T_{jmax}$ ) may result in reduced device life time.

**Luminous Flux variation with Wavelength:  $\Phi_v = f(\lambda_d)$  at Recommended Operating Current  $I_F$**



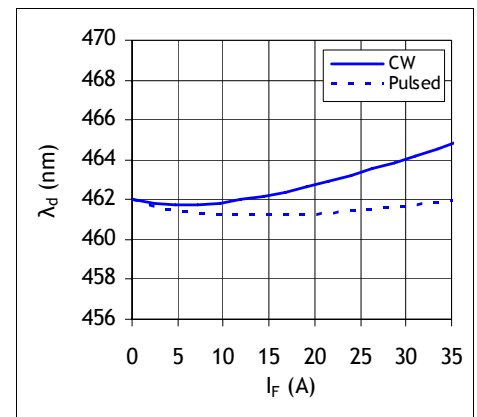
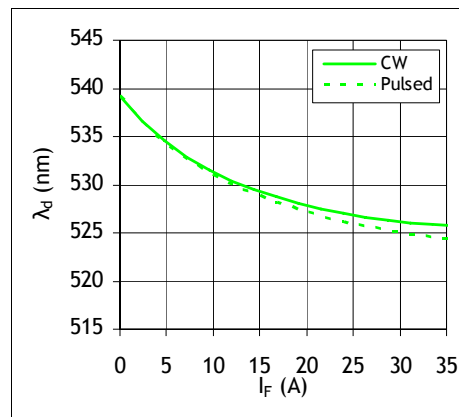
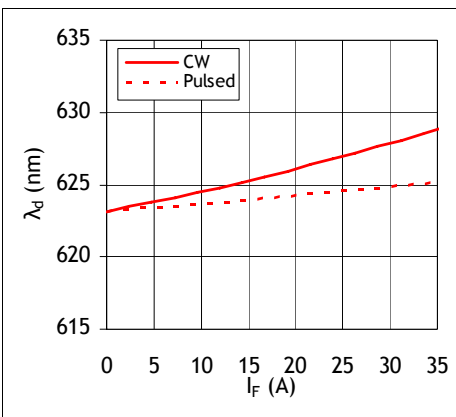
See note 1 on page 5.

**Luminous Flux variation with Drive Current -  $\Phi_v = f(I_F)$  - Typical**



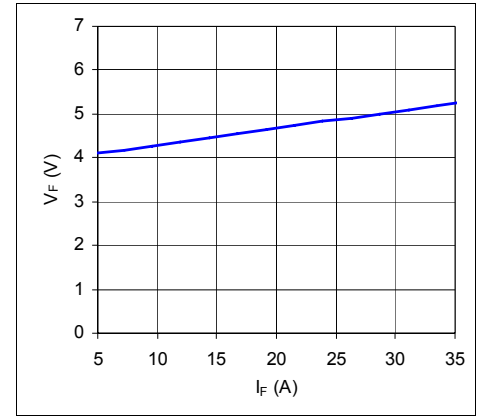
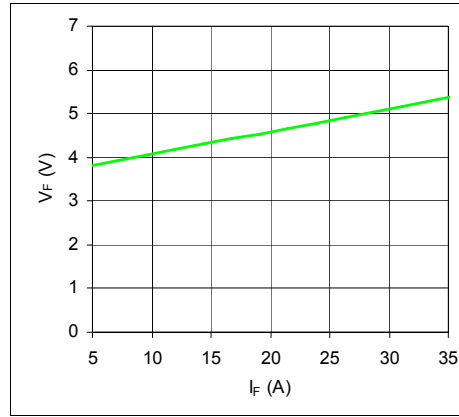
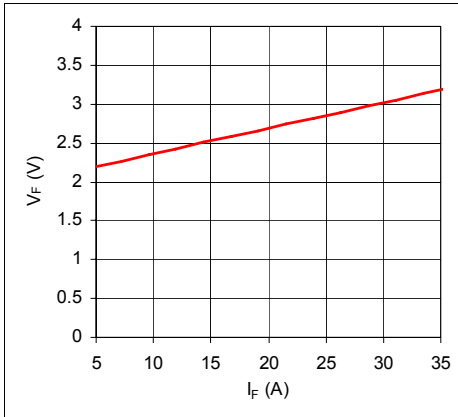
See notes 1,2 on page 5.

**Dominant Wavelength variation with Forward Current -  $\lambda_d = f(I_F)$  - Typical**

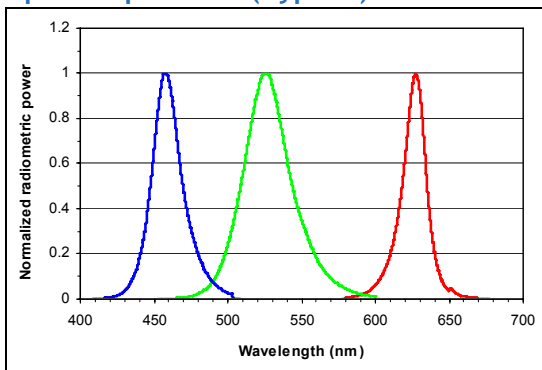


See notes 1,2 on page 5.

**Forward Voltage variation with Drive current -  $V_F = f(I_F)$  - Typical**



**Optical Spectrum (Typical)**

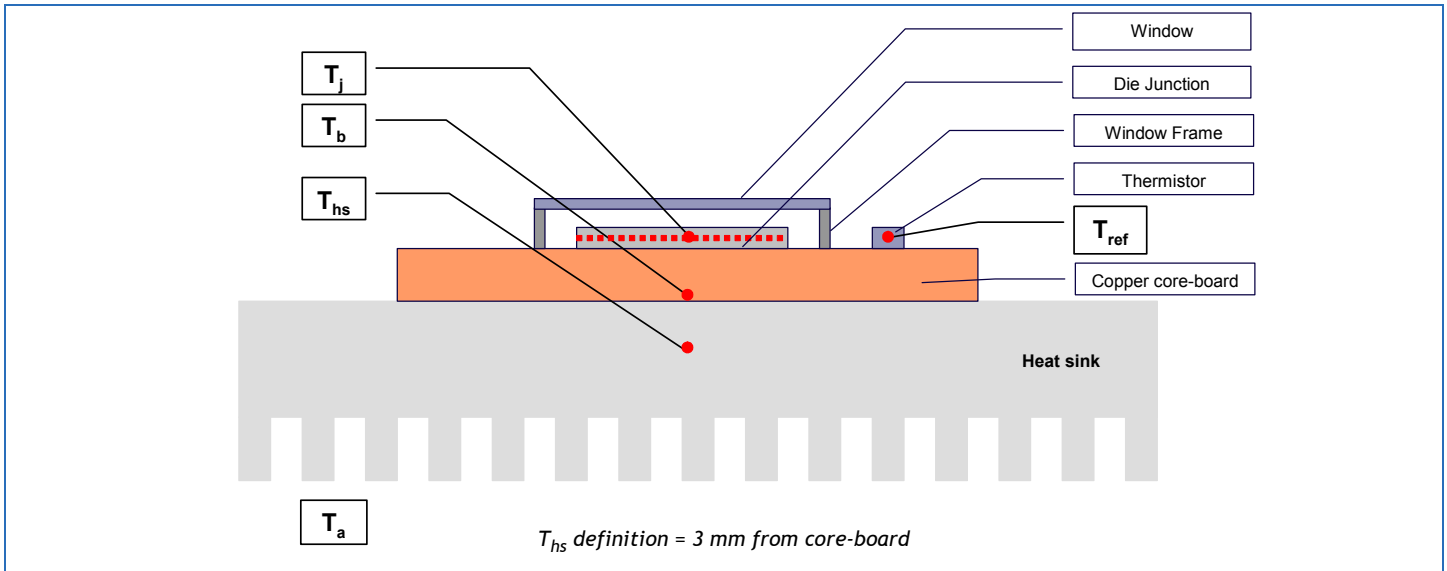


See note 3 on page 5.

**Chart Notes**

- Note 1: For Pulsed operation, typical RGB duty cycles used are 25%, 50% and 25% respectively for pulsed operation.
- Note 2: Yellow square indicate device operating point under recommended conditions listed in the Optical and Electrical Characteristics table.
- Note 3: Typical Spectrum at recommended peak drive current.

### Thermal Resistance



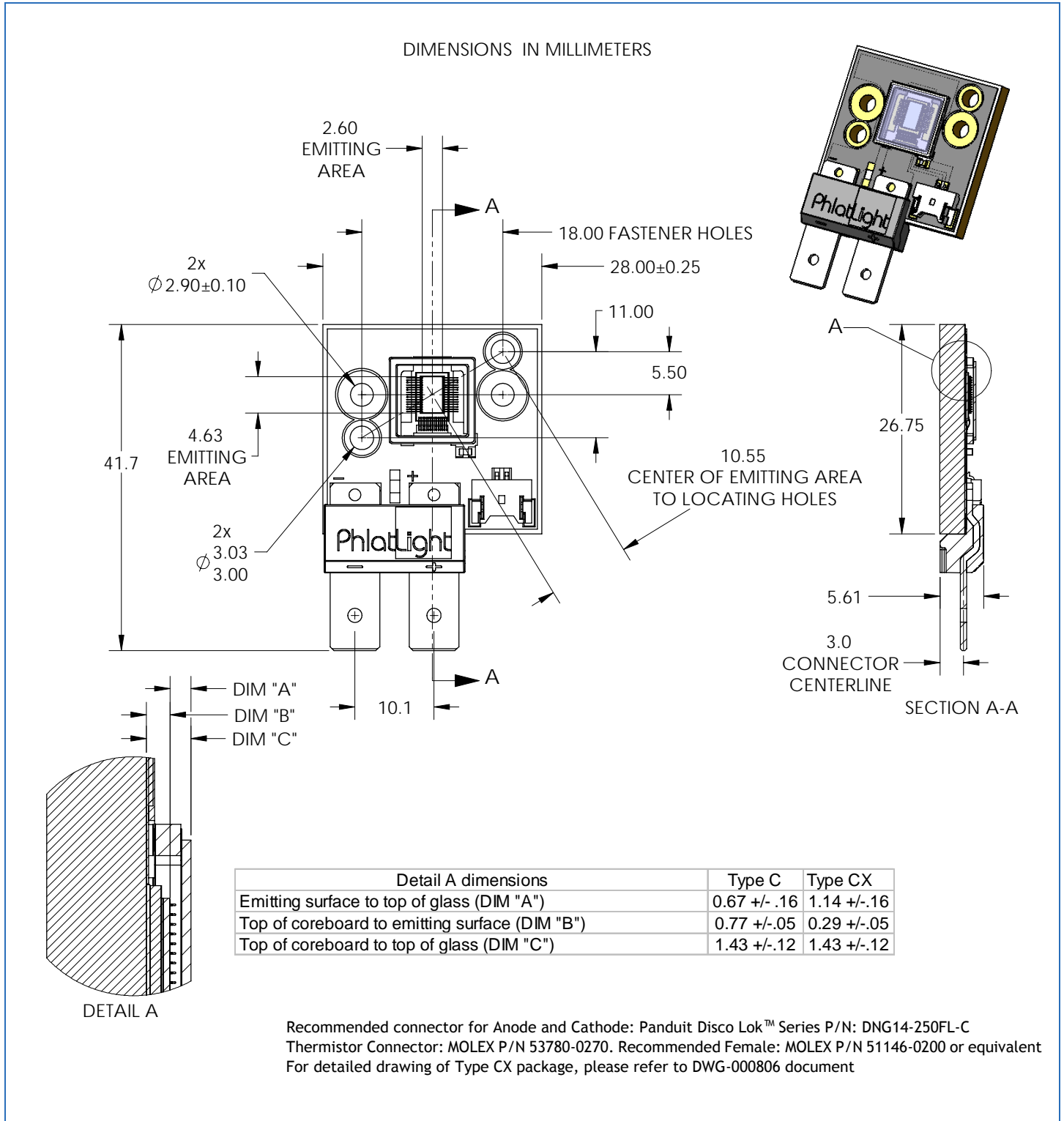
Package		$R_{\theta j-b}$	$R_{\theta b-hs}$	$R_{\theta j-hs}$	$R_{\theta j-ref}$
Type CX	Typical	0.43	0.17	0.60	0.53

### Thermistor Information

The thermistor used in PhlatLight™ devices mounted on core-boards is from Murata Manufacturing Co. The global part number is NCP15XH103J03RC. Please see <http://www.murata.com/> or <http://www.murata.co.jp> for details on calculating thermistor temperature.

Mechanical Dimensions

Package: Type CX



## Ordering Information

Chipset Part Number	Device Part Number	Color	Package	Description
112602	112599	Red	Type CX	PT120 chipset consisting of 1 Red, 1 Green, 1 Blue in Common Anode configuration.
	112600	Green		
	112601	Blue		

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