

PhlatLight™ PT85 Projection Chipset



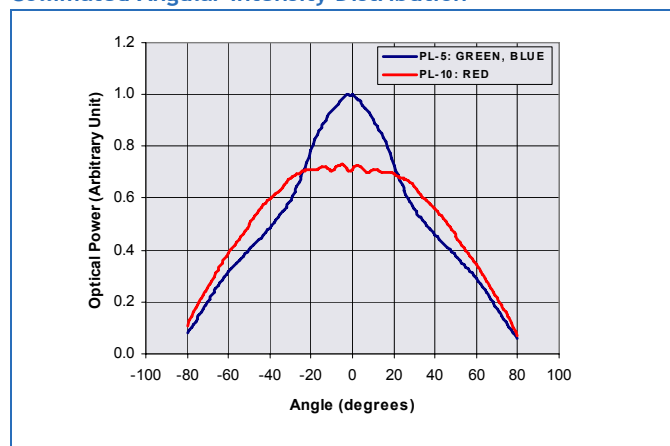
Technology Overview

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 8.56 mm² 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 2150 emitted white lumens at 8000K color temperature from single chipset under Continuous Wave Operation.
- Over 1500 emitted white lumens at 8000K color temperature from single chipset under Pulsed Operation.
- Uniform surface emission
- Thermally efficient Type CX Common Anode packaging
- 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 0.55" to 0.78" with 16:9 aspect ratio.
- Suitable for DLP™, LCoS and HTPS microdisplays

Optical and Electrical Characteristics

	Symbol	Red	Green	Blue	Unit
Emitting Area		8.56	8.56	8.56	mm ²
Emitting Area Dimensions		3.9 x 2.19	3.9 x 2.19	3.9 x 2.19	mmxmm
Characteristics at recommended Continuous Drive Current I_F (Continuous Waveform)¹					
Recommended Drive Current	typ I_F	12.8	12.8	12.8	A
Luminous Flux ²	typ Φ_V	660	1500	300	lm
Dominant Wavelength ³	typ λ_d	625	528	462	nm
Color Saturation ⁵	typ	1.00	0.83	0.99	
FWHM - Spectral bandwidth at 50% of Φ_V	typ $\Delta\lambda_d$	18	38	25	nm
Chromaticity Coordinates ^{4,5}	typ x	0.701	0.172	0.142	
	typ y	0.299	0.734	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	5.6	V
Dynamic Resistance	typ Ω_{dyn}	0.04	0.06	0.03	Ω
Characteristics at recommended Pulsed Drive Current I_F^{1,6}					
Reference Duty Cycle ⁷		25	50	25	%
Recommended Peak Drive Current	typ I_F	21.4	21.4	21.4	A
Peak Luminous Flux ²	typ Φ_V	1100	2200	425	lm
Dominant Wavelength ³	typ λ_d	625	525	462	nm
FWHM - Spectral bandwidth at 50% of Φ_V	typ $\Delta\lambda_d$	19	40	26	nm
Color Saturation ⁵	typ	1.00	0.80	0.99	
Chromaticity Coordinates ^{4,5}	typ x	0.700	0.158	0.143	
	typ y	0.300	0.727	0.035	
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	5.8	6.0	V
Dynamic Resistance	typ Ω_{dyn}	0.04	0.06	0.03	Ω
Common Characteristics CW/Pulsed					
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 ⁸		>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.

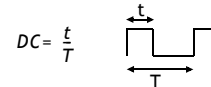
Note 2: Total flux from emitting area at typical dominant wavelength

Note 3: Minimum and Maximum Dominant Wavelengths are based on typical values +/- 5nm for Red, +/- 8nm for Green and +/- 6nm for Blue

Note 4: In CIE 1931 chromaticity diagram coordinates, normalized to $X+Y+Z=1$

Note 5: For Reference only

Note 6: Parameters rated at typical duty cycle and Pulsed operation frequency $f > 240\text{Hz}$;



Note 7: 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 8: Assuming $T_j < 80^{\circ}\text{C}$ for Red devices and $T_j < 120^{\circ}\text{C}$ for Green and Blue devices

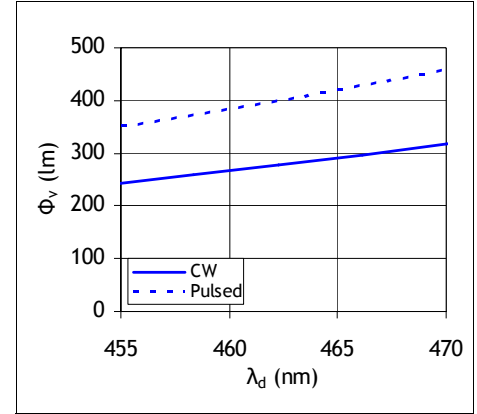
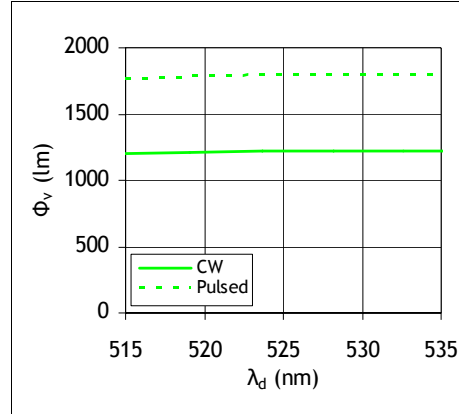
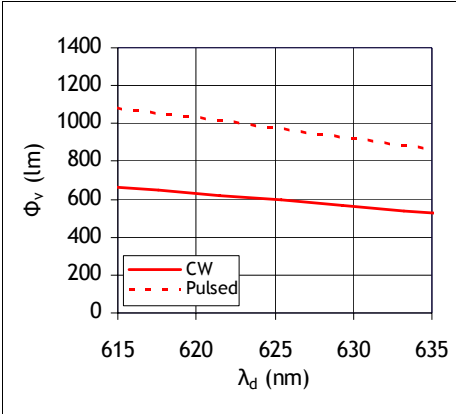
Absolute Maximum Ratings

	Symbol	Red	Green	Blue	Unit
Maximum Current ¹	Max	25	25	25	A
Maximum Operating Junction Temperature	Max T_{max}	80	120	120	°C
Maximum Transient Junction Temperature ²	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.

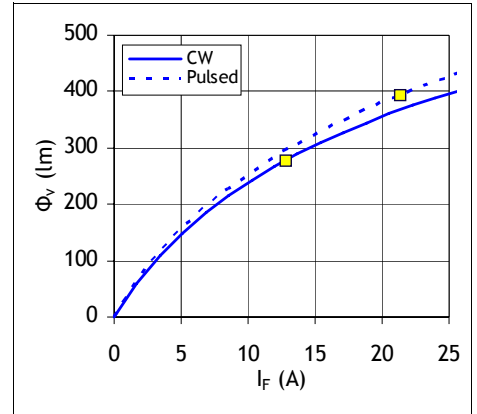
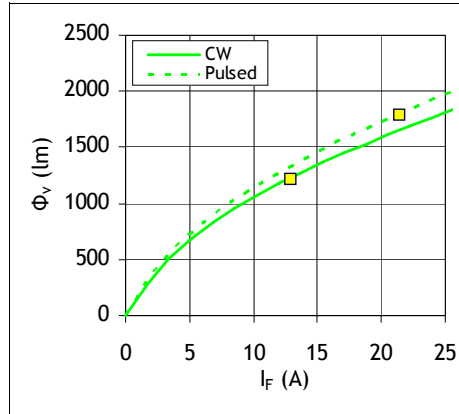
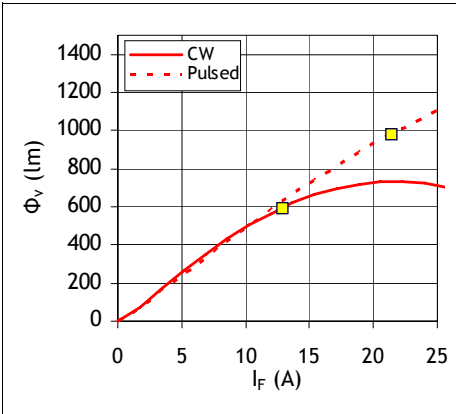
Note 2: Sustained operation above Maximum Operating Junction Temperature (T_{jmax}) may result in reduced device life time.

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



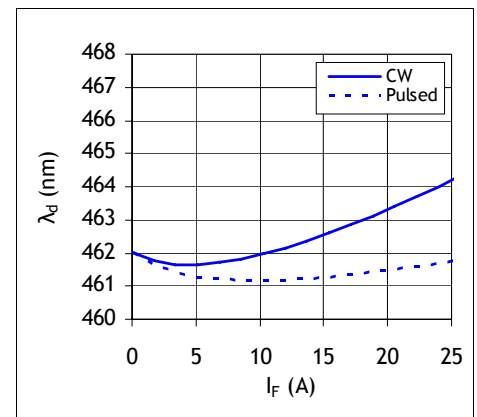
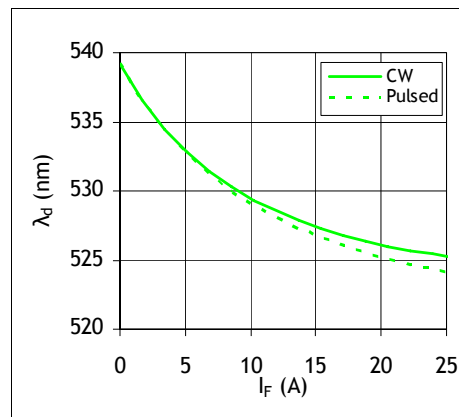
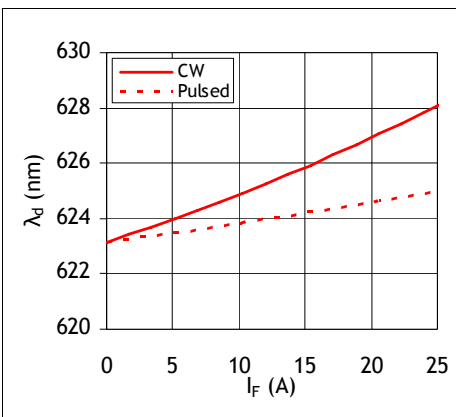
See note 1 on page 5.

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



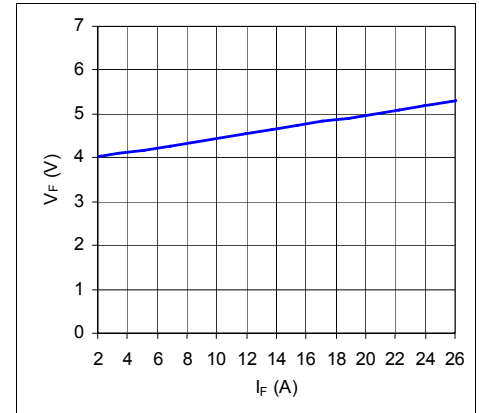
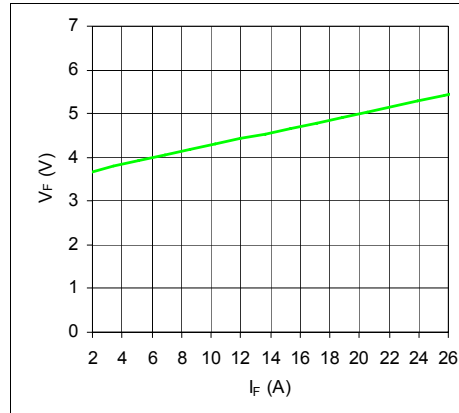
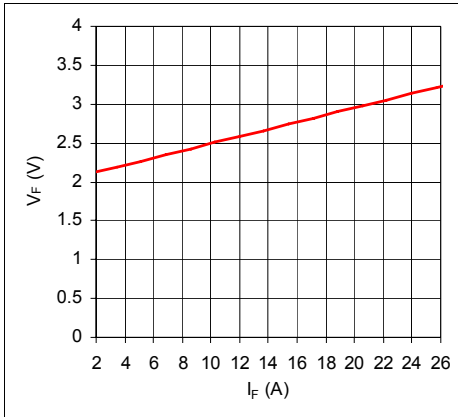
See notes 1,2 on page 5.

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

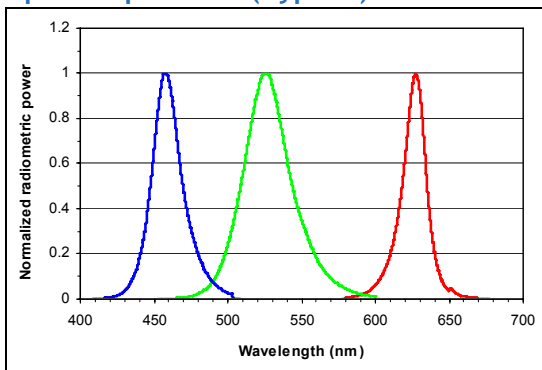


See notes 1,2 on page 5.

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



Optical Spectrum (Typical)

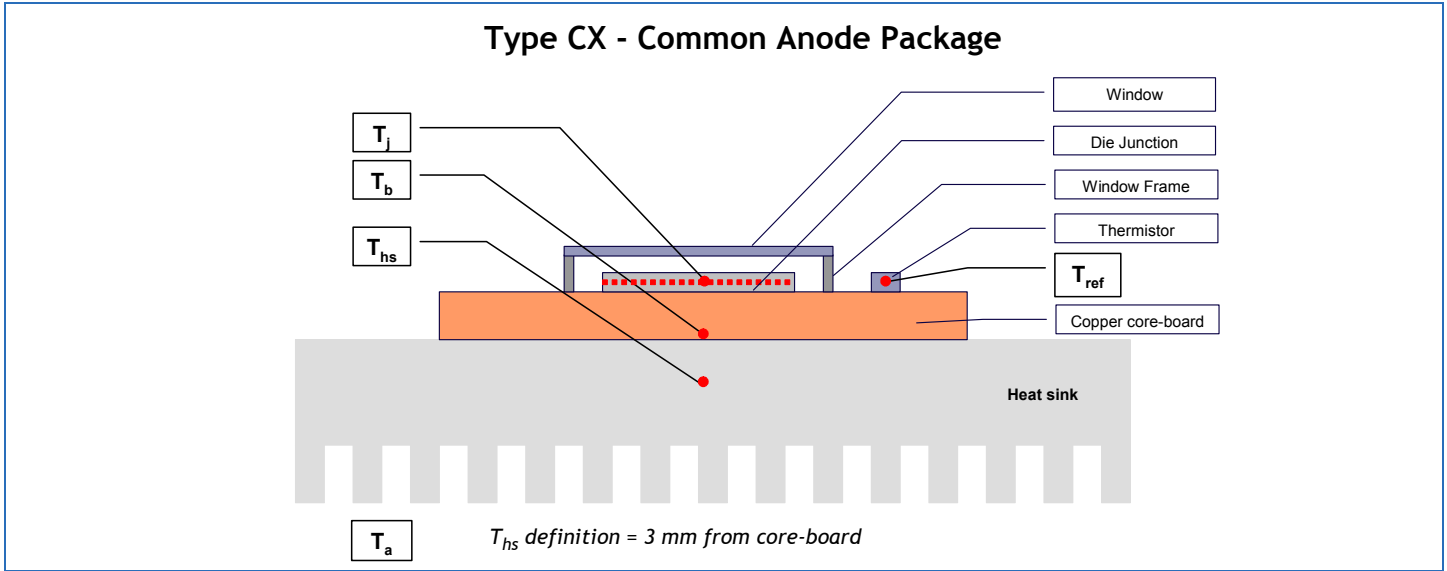


See note 3 on page 5.

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



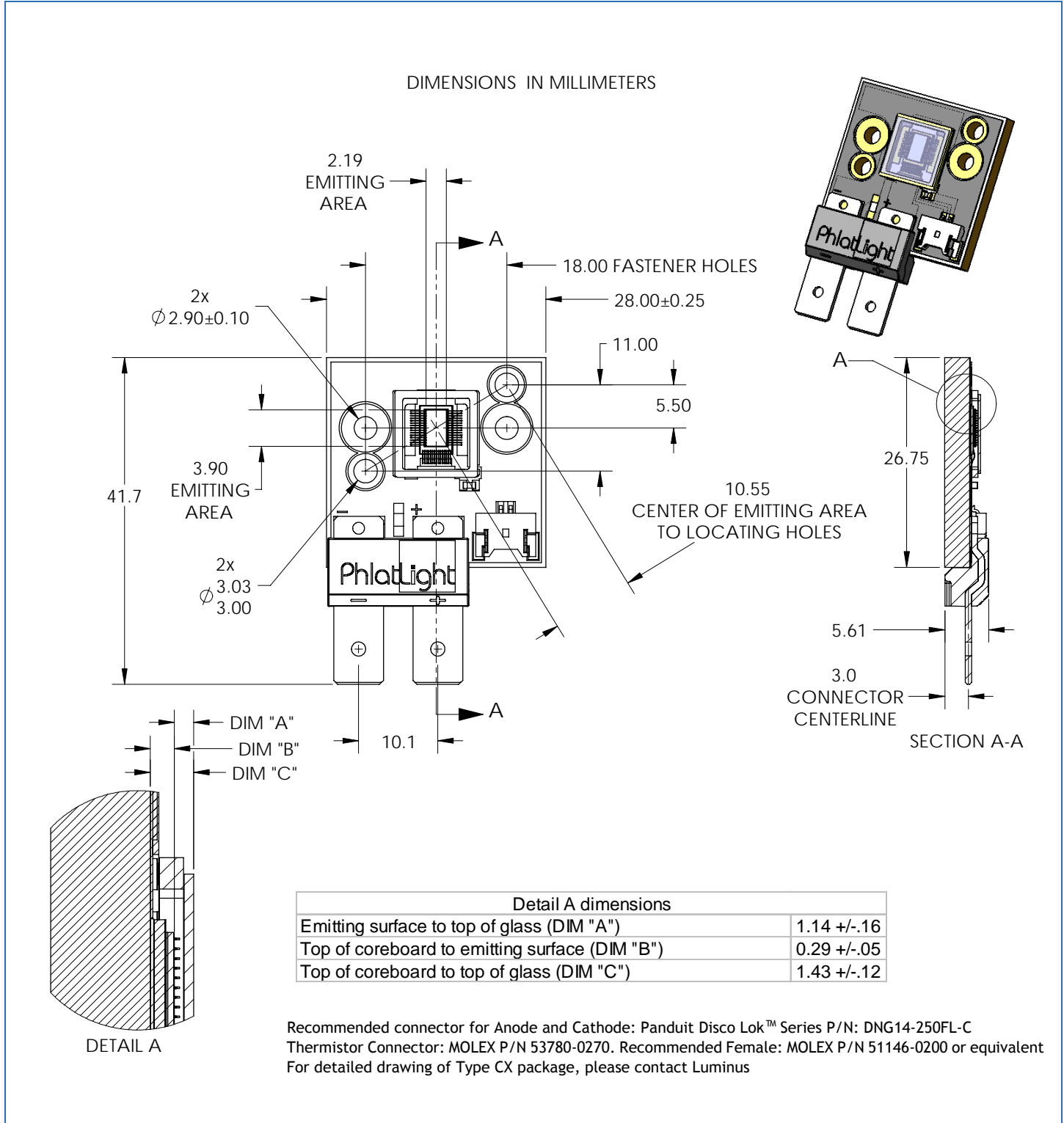
Package		$R_{\theta j-b}$	$R_{\theta b-hs}$	$R_{\theta j-hs}$	$R_{\theta j-ref}$
Type CX	Typical	0.52	0.22	0.74	0.63

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
112624	112621	Red	Type CX	PT85 chipset consisting of 1 Red, 1 Green, 1 Blue in Common Anode configuration.
	112622	Green		
	112623	Blue		

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