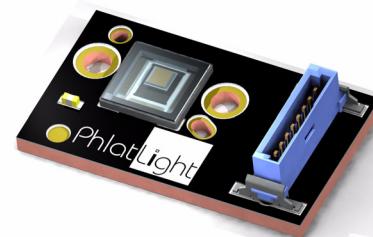


## PRODUCT DATA SHEET

# PhlatLight™ PT39 Projection Chipset



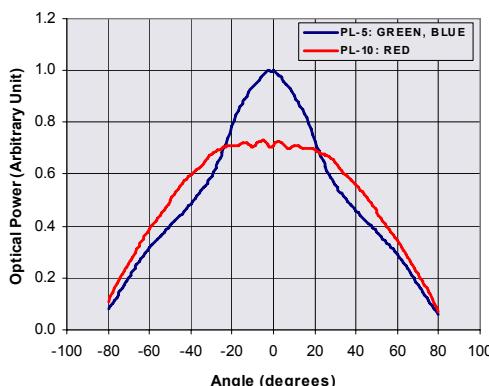
## Technology Overview

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 3.9mm<sup>2</sup> emitting area designed for small projector 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
- Aspect ratio compatible with 4:3 micro-displays
- Over 900 emitted white lumens at 8000K color temperature from single chipset under Continuous Wave Operation
- Over 625 emitted white lumens at 8000K color temperature from single chipset under Pulsed Operation
- Uniform surface emission
- Thermally efficient Type CX (lowest thermal resistance, Common Anode)
- RoHS (lead-free) compliant

## Applications

- Specifically engineered for pocket-size, ultra portable front projectors, head-up projection displays
- Optimized for Micro-Display diagonal sizes ranging from 0.4" to 0.55" with 4:3 aspect ratio.
- Suitable for DLP™ (0.55" SVGA), LCoS and HTPS microdisplays

## Optical and Electrical Characteristics

	Symbol	Red	Green	Blue	Unit
Emitting Area		3.9	3.9	3.9	mm <sup>2</sup>
Emitting Area Dimensions		2.09x1.87	2.09x1.87	2.09x1.87	mmxmm
<b>Characteristics at recommended Continuous Drive Current I<sub>F</sub> (Continuous Waveform)<sup>1</sup></b>					
Recommended Drive Current	typ	I <sub>F</sub>	5.9	5.9	A
Luminous Flux <sup>2,3</sup>	typ	Φ <sub>V</sub>	290	625	lm
Dominant Wavelength <sup>4</sup>	typ	λ <sub>d</sub>	625	528	nm
Color Saturation <sup>5</sup>	typ		1.00	0.84	0.99
FWHM - Spectral bandwidth at 50% of Φ <sub>V</sub>	typ	Δλ <sub>d</sub>	18	38	25 nm
Chromaticity Coordinates <sup>5,6</sup>	typ	x	0.701	0.171	0.143
	typ	y	0.299	0.736	0.036
Forward Voltage	min	V <sub>Fmin</sub>	2	3.5	3.5 V
	typ	V <sub>F</sub>	2.7	4.5	4.6 V
	max	V <sub>Fmax</sub>	3.5	5.6	5.7 V
Dynamic Resistance	typ	Ω <sub>dyn</sub>	0.08	0.12	0.07 Ω
<b>Characteristics at recommended Pulsed Drive Current I<sub>F</sub><sup>1,7</sup></b>					
Reference Duty Cycle <sup>8</sup>			25	50	25 %
Recommended Peak Drive Current	typ	I <sub>F</sub>	9.8	9.8	9.8 A
Peak Luminous Flux <sup>2,3</sup>	typ	Φ <sub>V</sub>	460	925	180 lm
Dominant Wavelength <sup>4</sup>	typ	λ <sub>d</sub>	625	525	462 nm
FWHM - Spectral bandwidth at 50% of Φ <sub>V</sub>	typ	Δλ <sub>d</sub>	19	38	26 nm
Color Saturation <sup>5</sup>	typ		1.00	0.80	0.99
Chromaticity Coordinates <sup>5,6</sup>	typ	x	0.700	0.156	0.144
	typ	y	0.300	0.728	0.035
Forward Voltage	min	V <sub>Fmin</sub>	2.2	3.8	4.0 V
	typ	V <sub>F</sub>	3.0	5.0	5.1 V
	max	V <sub>Fmax</sub>	3.8	5.9	6.0 V
Dynamic Resistance	typ	Ω <sub>dyn</sub>	0.08	0.12	0.07 Ω
<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

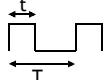
Note 3: Based on Type CX package. Small variations in performance may be expected in Type C package due to a higher thermal resistance, resulting in a higher junction temperature.

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

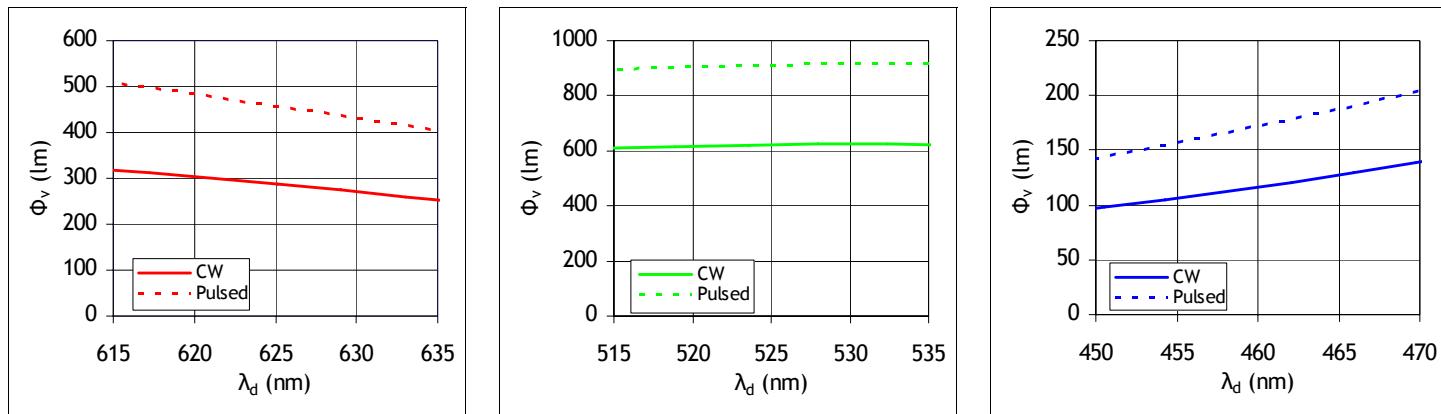
## Absolute Maximum Ratings

	Symbol	Red	Green	Blue	Unit
Maximum Current <sup>1</sup>	Max	12	12	12	A
Maximum Operating Junction Temperature	Max	$T_{max}$	80	120	$^{\circ}\text{C}$
Maximum Transient Junction Temperature <sup>2</sup>	Max	$T_{jtrans}$	125	150	$^{\circ}\text{C}$
Storage Temperature Range		-40/+100	-40/+100	-40/+100	$^{\circ}\text{C}$

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.

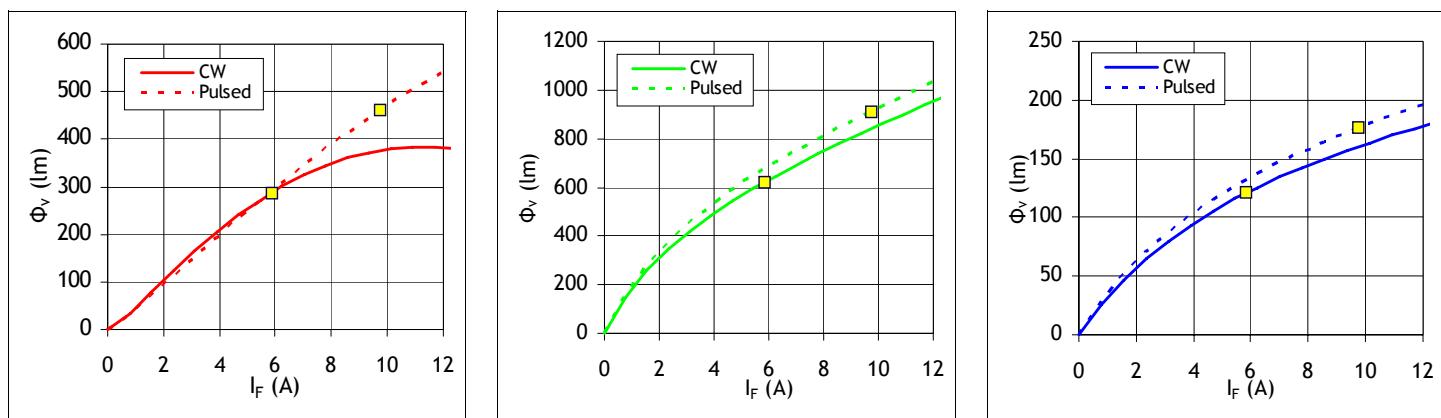
Note 2: Sustained operation above Maximum Operating Junction Temperature ( $T_{jmax}$ ) may result in reduced device life time.

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



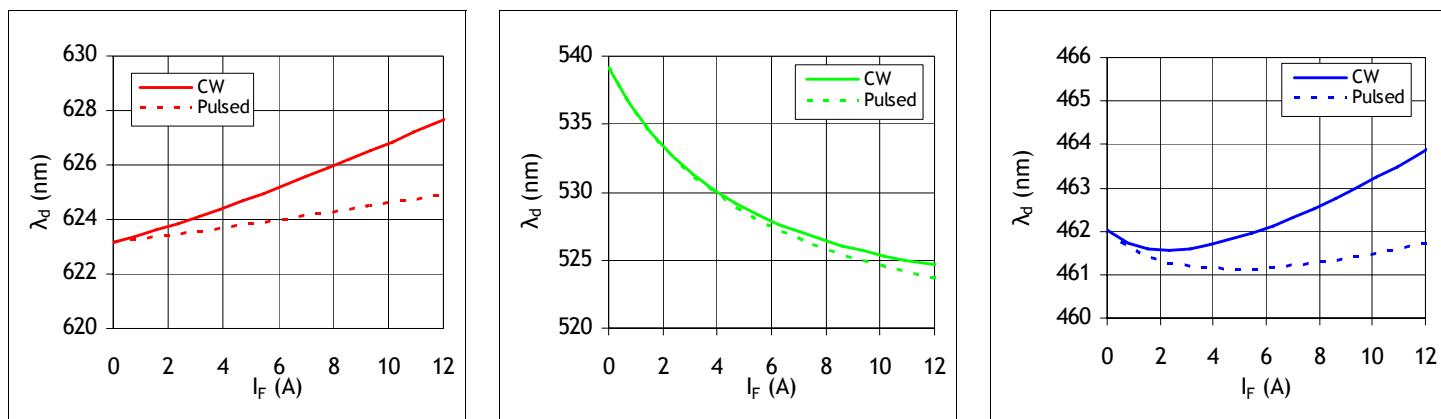
See note 1 on page 5.

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



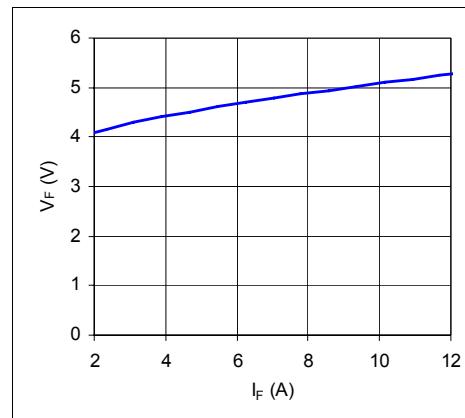
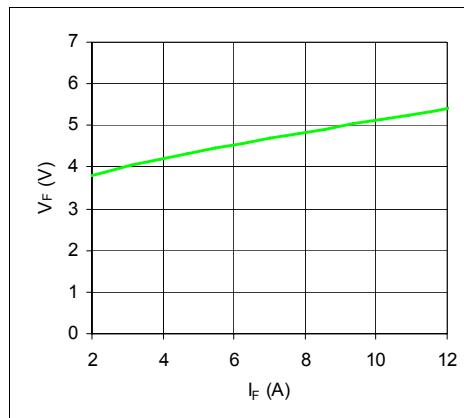
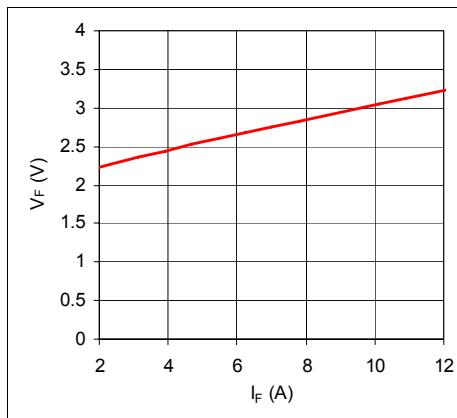
See notes 1,2 on page 5.

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

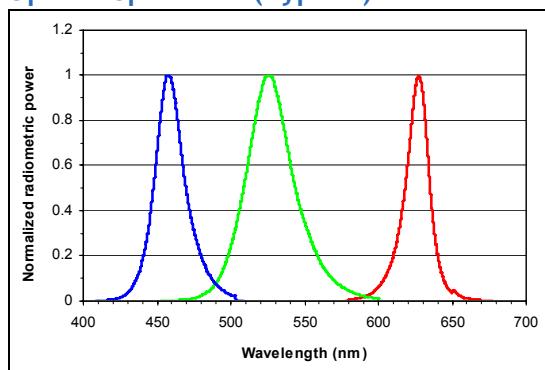


See notes 1,2 on page 5.

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



### Optical Spectrum (Typical)

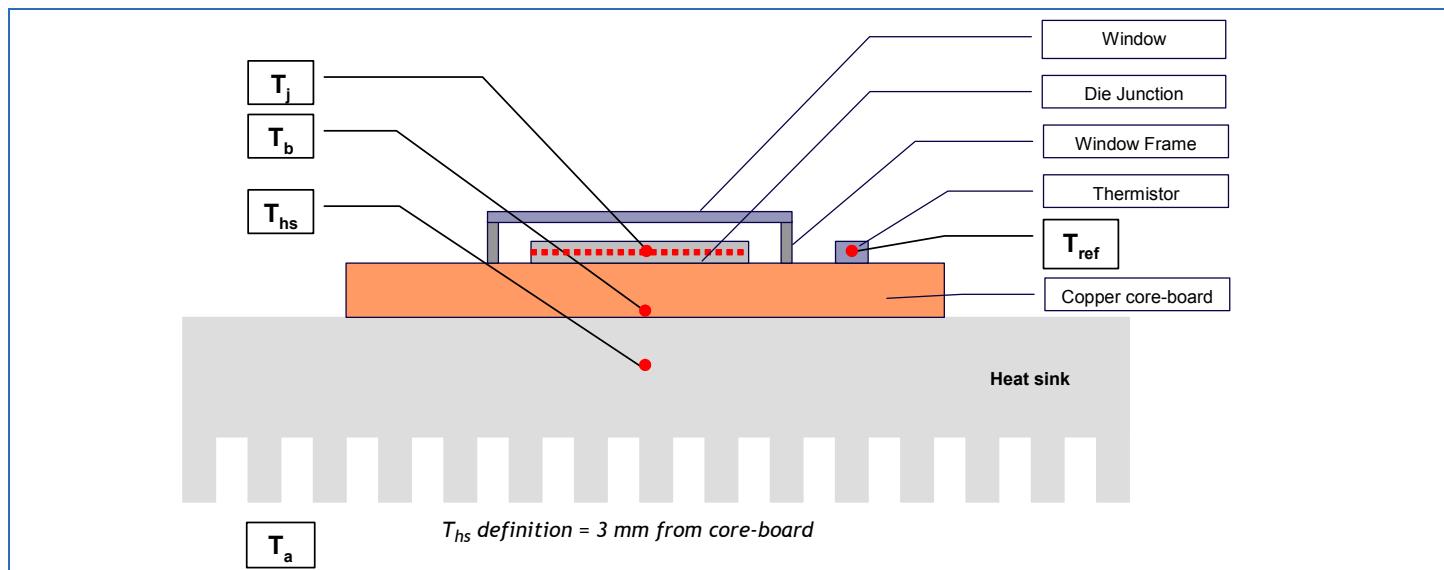


See note 3 on page 5.

### 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.

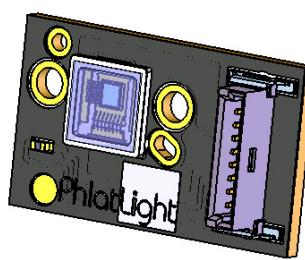
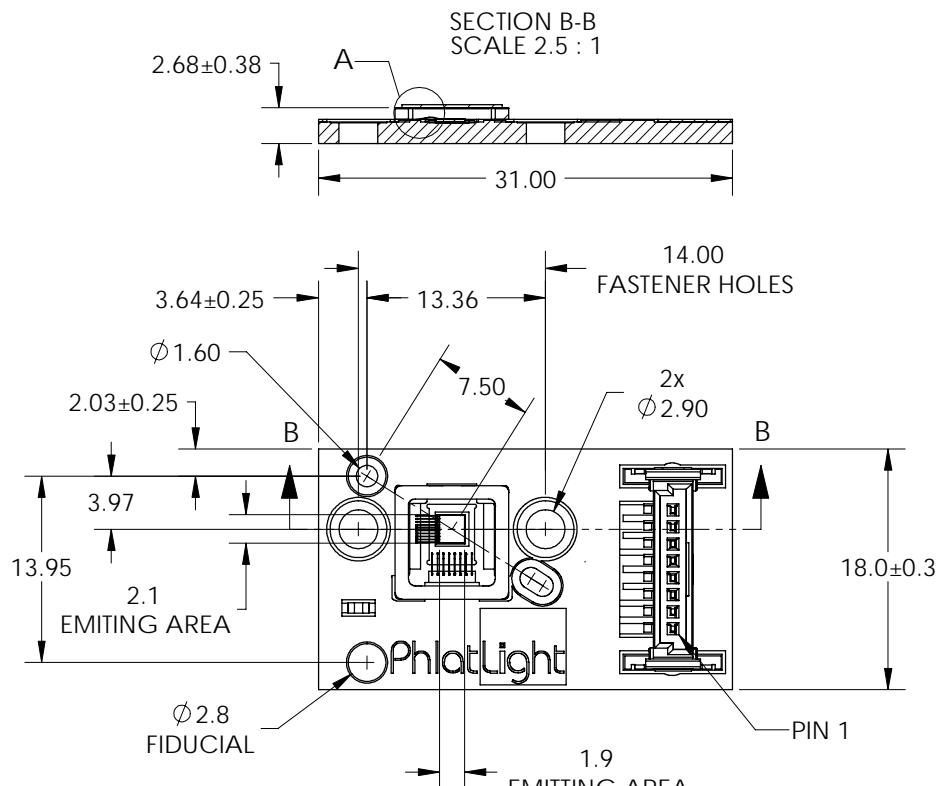
## Thermal Resistance



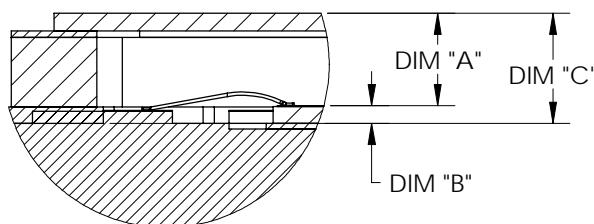
Package		$R_{\theta j-b}$	$R_{\theta b-hs}$	$R_{\theta j-hs}$	$R_{\theta j-ref}$
Type CX	Typical	0.96	0.40	1.36	1.29

## 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****DIMENSIONS IN MILLIMETERS**

Pin assignment	
1	Thermistor or
2	Thermistor or
3-5	Power (+)
6-8	Power (-)



DETAIL A

Detail A dimensions	Type C	Type CX
Emitting surface to top of glass (DIM "A")	0.60+/-0.26	1.08+/-0.26
Top of coreboard to emitting surface (DIM "B")	0.69+/-0.15	0.21+/-0.15
Top of coreboard to top of glass (DIM "C")	1.29+/-0.12	1.29+/-0.12

Connector: ERNI, P/N 214019

For detailed drawing of Type CX package, please refer to DWG-000956 document

## Ordering Information

Chipset Part Number	Device Part Number	Color	Package	Description
112614	112611	Red	Type CX	PT39 chipset consisting of 1 Red, 1 Green, 1 Blue in Common Anode configuration.
	112612	Green		
	112613	Blue		

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Luminus Devices  
 1100 Technology Park Drive  
 Billerica, MA 01821      +1-978-528-8000 (T)  
 +1-978-528-8001 (F)

Email: [sales@luminus.com](mailto:sales@luminus.com)      [www.luminus.com](http://www.luminus.com)