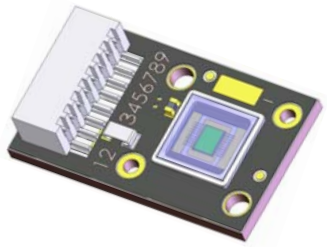
PRODUCT DATA SHEET

PhlatLight™ PT54 Projection Chipset



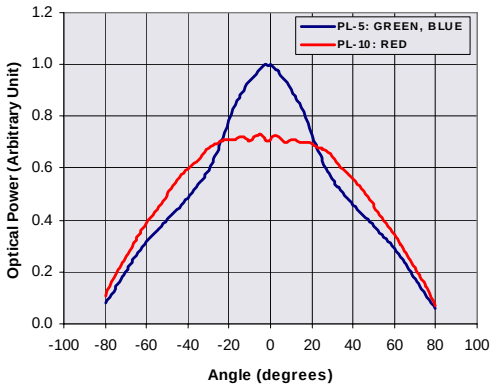
Technology Overview

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 5.4mm^2 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
- 4:3 Aspect ratio optimized for SVGA and XGA micro-displays
- Over 1300 emitted white lumens at 8000K color temperature from single chipset under Continuous Wave Operation
- Over 900 emitted white lumens at 8000K color temperature from single chipset under Pulsed Operation
- Uniform surface emission
- Thermally efficient Type CX Common Anode package
- RoHS compliant (EU-2002/95/EC Directive)

Applications

- Specifically engineered for high brightness pocket-size, ultra portable front projectors, head-up projection displays
- Optimized for Micro-Display diagonal sizes ranging from 0.4" to 0.6" 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			5.4	5.4	5.4	mm^2
Emitting Area Dimensions			2.7x2.0	2.7x2.0	2.7x2.0	mmxmm
Characteristics at recommended Continuous Drive Current I_F (Continuous Waveform)[1]						
Recommended Drive Current	typ	I_F	8.1	8.1	8.1	A
Luminous Flux[2]	typ	Φ_v	425	950	190	lm
Dominant Wavelength[3]	typ	λ_d	625	528	462	nm
Color Saturation[5]	typ		1.00	0.84	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	0.171	0.143	
	typ	y	0.299	0.735	0.036	
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	Ω_{dyn}	0.06	0.09	0.05	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	13.5	13.5	13.5	A
Peak Luminous Flux[2]	typ	Φ_v	700	1400	275	lm
Dominant Wavelength[3]	typ	λ_d	625	525	462	nm
FWHM - Spectral bandwidth at 50% of Φ_v	typ	$\Delta\lambda_d$	19	38	26	nm
Color Saturation[5]	typ		1.00	0.80	0.99	
Chromaticity Coordinates[4,5]	typ	x	0.700	0.157	0.144	
	typ	y	0.300	0.728	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	5.9	6.0	V
Dynamic Resistance	typ	Ω_{dyn}	0.06	0.09	0.05	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]			>120,000	>120,000	>120,000	Hours

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

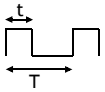
Note 2: Total flux from emitting area at typical dominant wavelength

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>240Hz; $DC = \frac{t}{T}$



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 Tj<80°C for Red devices , Tj<120°C for Blue devices and Tj<130°C for Green devices

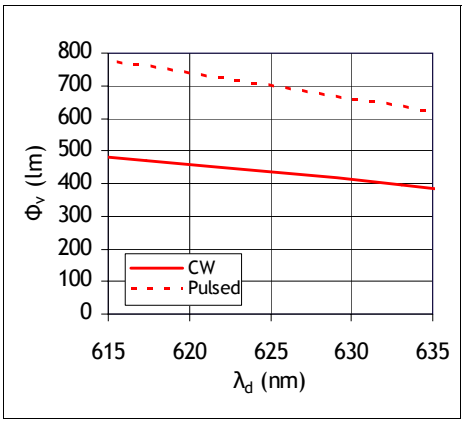
Absolute Maximum Ratings

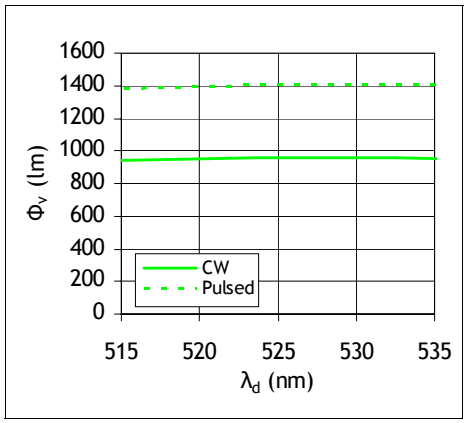
		Symbol	Red	Green	Blue	Unit
Maximum Current[1]	Max		16	16	16	A
Maximum Operating Junction Temperature	Max	T_{max}	80	130	120	°C
Maximum Transient Junction Temperature[2]	Max	T_{jtrans}	125	150	150	°C
Storage Temperature Range			-40/+100	-40/+100	-40/+100	°C

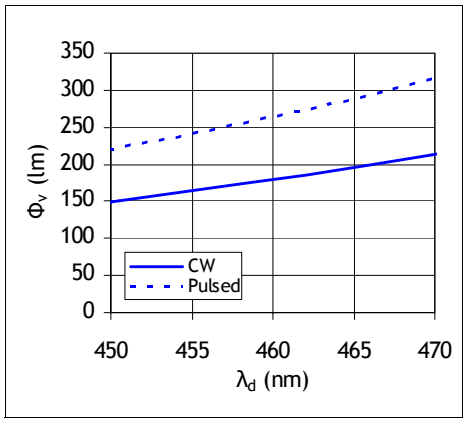
Note 1: Based on maximum allowed current density. Sustained operation beyond recommended drive current values may result in reduced life time. Thermal calculations should be performed to ensure Tj is maintained below T_{jmax} rating or device life may be reduced.

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

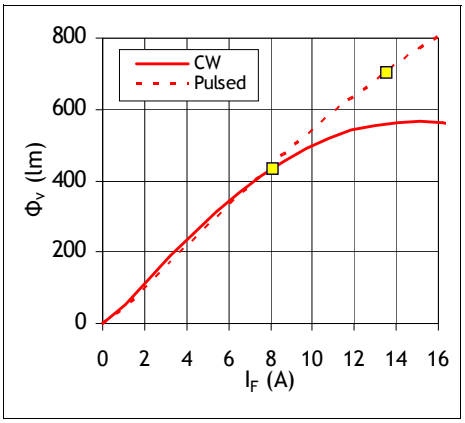


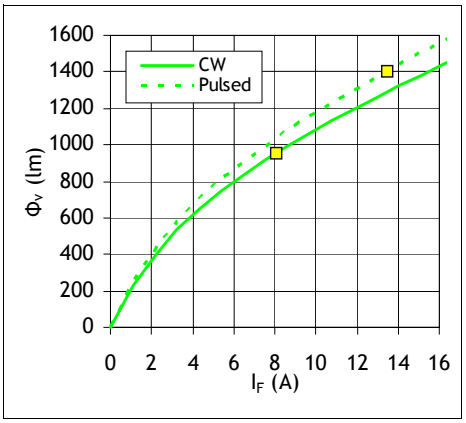


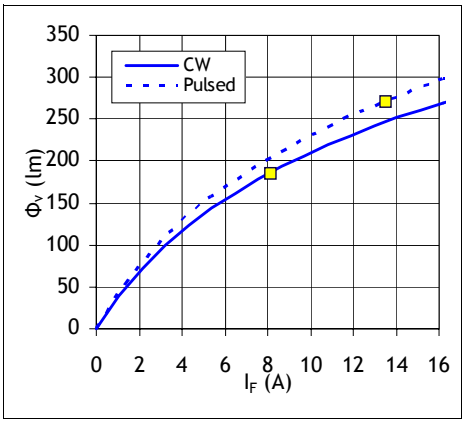


See note 1 on page 5.

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

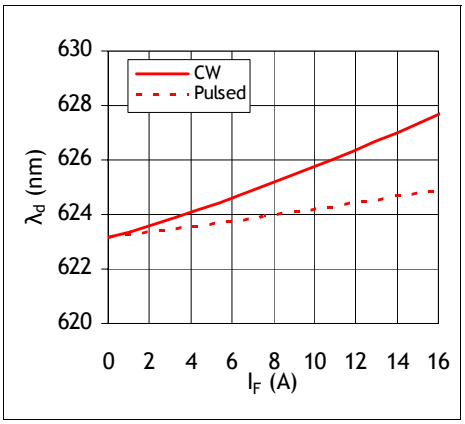


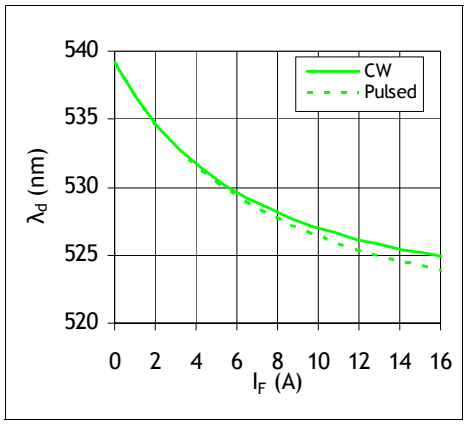


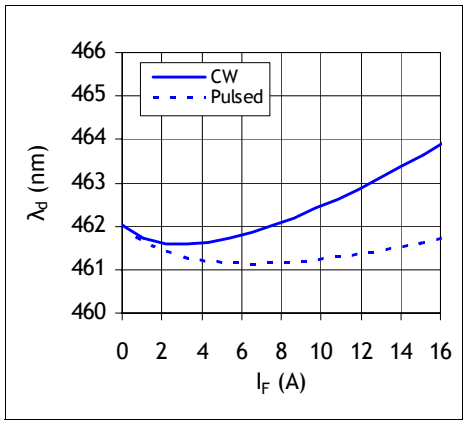


See notes 1,2 on page 5.

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

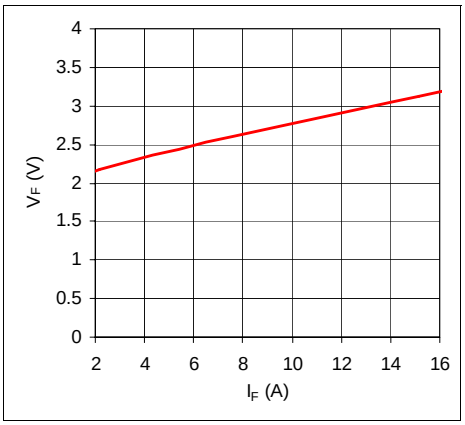


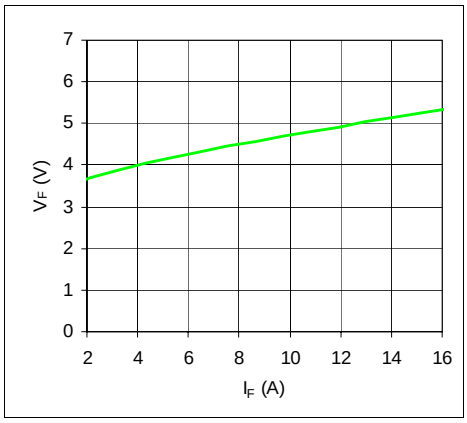


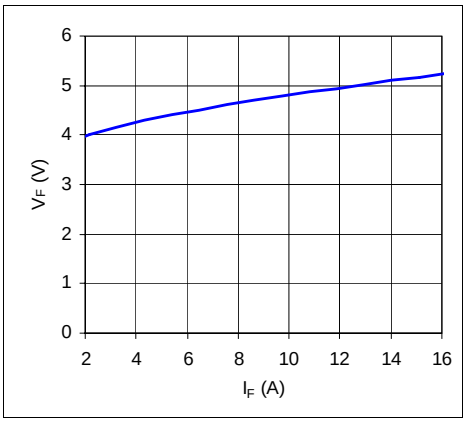


See notes 1,2 on page 5.

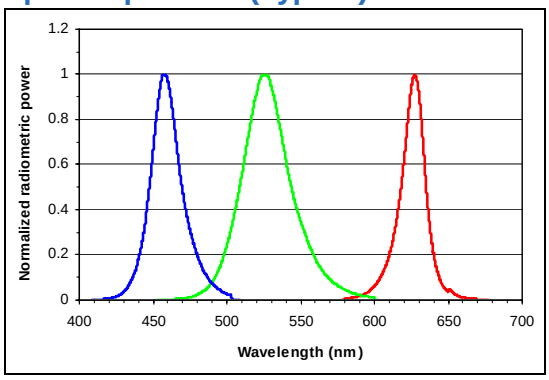
Forward Voltage variation with Drive current - $V_F = f(I_F)$ - Typical







Optical Spectrum (Typical)



See note 3 on page 5.

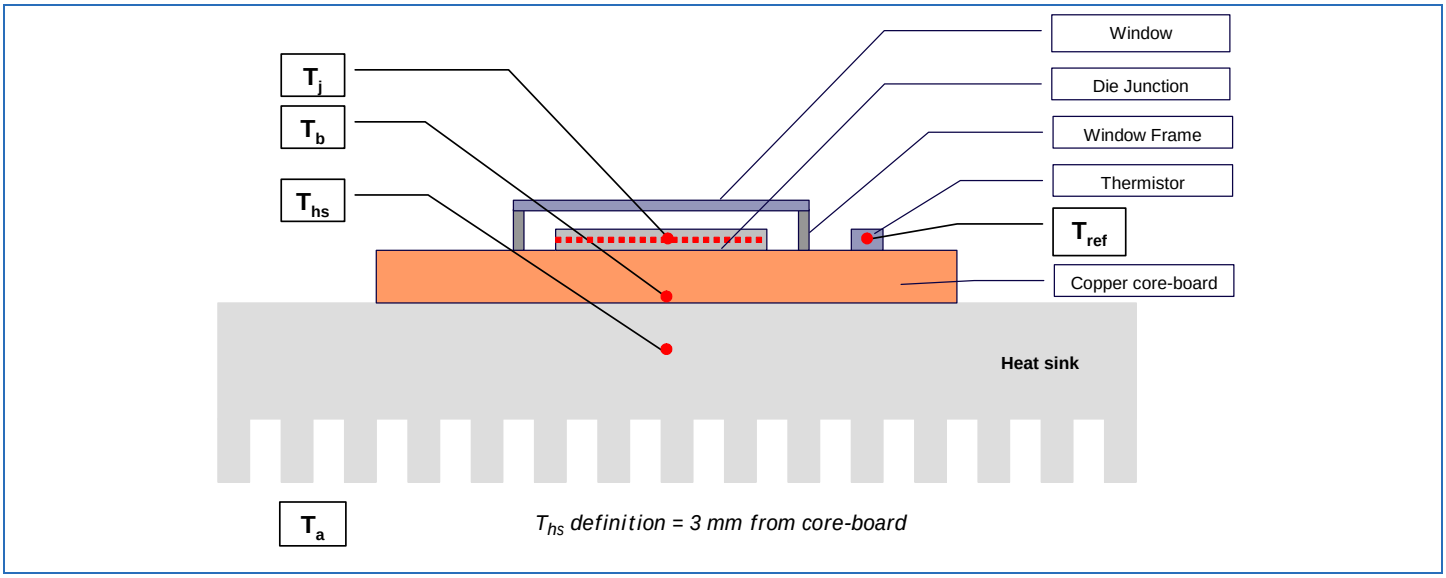
Chart Notes

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		$R_{\theta j\text{-}b}$	$R_{\theta b\text{-}hs}$(*)	$R_{\theta j\text{-}hs}$(*)	$R_{\theta j\text{-}ref}$
Type CX	Typical	0.60	0.40	1.00	0.94

(*): Thermal Resistance is based on eGraph 1205 Thermal interface

Mechanical Dimensions

Red, Green and Blue PT54 PhlatLight™ LEDs are individually assembled into a Type CX, Common Anode Copper Core-Board with a foot-print of 26.5 mm x 16 mm.

Please Refer to DWG-001069 for detailed mechanical specifications of the PT54

Connector

Part Number: MOLEX 874380843. Please refer to DWG-001069 for pin-out information

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.

Ordering Information

Chipset Part Number	Device Part Number	Color	Package	Description
112661	112658	Red	Type CX	PT54 chipset consisting of 1 Red, 1 Green, 1 Blue in Common Anode configuration.
	112659	Green		
	112660	Blue		

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