power light source

Luxeon™ V Star

Technical Data DS30

Luxeon is a revolutionary, energy efficient and ultra compact new light source, combining the lifetime and reliability advantages of Light Emitting Diodes with the brightness of conventional lighting.

Luxeon Power Light Sources give you total design freedom and unmatched brightness, creating a new world of light.

The Luxeon V offers extreme luminous density, providing lumens per package of 4X a standard Luxeon or up to 50X that of alternative solid state light sources creating new opportunities for solid state lighting to displace conventional lighting technologies.

For high volume applications, custom Luxeon power light source designs are available upon request, to meet your specific needs.

Luxeon V Star is available in green, blue, royal blue and cyan.

Features

- Highest Flux per LED in the world – 4X the Flux of a comparable Luxeon and up to 50X the Flux of standard through hole LEDs
- Extreme Luminous Density – 20X the lm/mm^2 of a standard through hole LED
- Very long operating life (up to 100k hours)
- Available in Green, Blue, Royal Blue, and Cyan
- Lambertian or Side Emitting Distribution Pattern
- More Energy Efficient than Incandescent and most Halogen lamps
- Low voltage DC operated
- Cool beam, safe to the touch
- Instant light (less than 100 ns)
- Fully dimmable
- No UV
- Superior ESD protection

Typical Applications

- Portable (flashlight, bicycle)
- Architectural Detail Lighting
- Decorative
- Fiber Optic Alternative
- Medical Applications
- Power Signaling / Airfield / Taxiway Lighting
- **Edge-Lit Signs (Exit, Point Of Sale)**
- **LCD Backlights / Light Guides**

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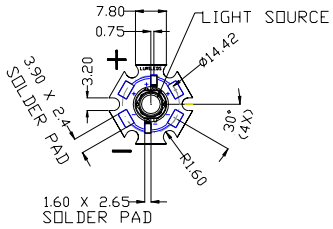
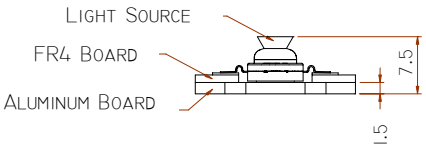
Mechanical Dimensions

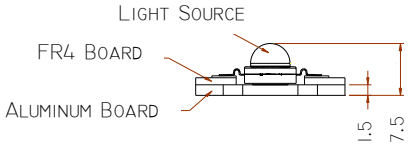
Luxeon V Star



Side Emitting



Lambertian



Notes:

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Electrical insulation between neighboring Stars is required – aluminum board is not electrically neutral.
4. Drawings not to scale.
5. All dimensions are in millimeters.

Flux Characteristics at 700mA, Junction Temperature, T_J = 25°C

Color	Part Number	Minimum Luminous Flux (lm) or Radiometric Power (mW) Φ_V [1,2]	Typical Luminous Flux (lm) or Radiometric Power (mW) Φ_V [2]	Radiation Pattern
Green	LXHL-LM5C	67.2	160	Lambertian
Cyan	LXHL-LE5C	67.2	160	
Blue[3]	LXHL-LB5C	23.5	48	
Royal Blue[4]	LXHL-LR5C	275 mW	700 mW	
Green	LXHL-FM5C	67.2	145	Side Emitting
Cyan	LXHL-FE5C	67.2	145	
Blue[3]	LXHL-FB5C	23.5	43	
Royal Blue[4]	LXHL-FR5C	275 mW	630 mW	

Notes:

1. Minimum luminous flux or radiometric power performance guaranteed within published operating conditions. Lumileds maintains a tolerance of ± 10% on flux and power measurements.
2. Luxeon types with even higher luminous flux levels will become available in the future. Please consult your Lumileds Authorized Distributor or Lumileds sales representative for more information.
3. Minimum flux value for 470 nm devices. Due to the CIE eye response curve in the short blue wavelength range, the minimum luminous flux will vary over the Lumileds' blue color range. Luminous flux will vary from a minimum of 18.1 lm at 460 nm to a typical of 80 lm at 480 nm due to this effect. Although the luminous power efficiency is lower in the short blue wavelength range, radiometric power efficiency increases as wavelength decreases. For more information, consult the Luxeon Design Guide, available upon request.
4. Royal Blue product is binned by radiometric power and peak wavelength rather than photometric lumens and dominant wavelength.

Optical Characteristics at 700mA, Junction Temperature, T_J = 25°C

Radiation Pattern	Color	Dominant Wavelength[1] λD or Peak Wavelength[2] λP Min.	Typ.	Max.	Spectral Half-Width[3] (nm) $\Delta\lambda_{1/2}$	Temperature Coefficient of Dominant Wavelength (nm/°C) $\Delta\lambda_D/\Delta T_J$
Lambertian	Green	520 nm	530 nm	550 nm	35	0.04
	Cyan	490 nm	505 nm	520 nm	30	0.04
	Blue	460 nm	470 nm	490 nm	25	0.04
	Royal Blue[2]	440 nm	455 nm	460 nm	20	0.04
Side Emitting	Green	520 nm	530 nm	550 nm	35	0.04
	Cyan	490 nm	505 nm	520 nm	30	0.04
	Blue	460 nm	470 nm	490 nm	25	0.04
	Royal Blue[2]	440 nm	455 nm	460 nm	20	0.04

Optical Characteristics at 700mA, Junction Temperature, T_J = 25°C, Continued

Radiation pattern	Color	Total included angle[4] (degree) $\theta_{0.90V}$	viewing angle[5] (degree) 2θ 1/2
Lambertian	Green	150	150
	Cyan	150	150
	Blue	150	150
	Royal Blue	150	150

Optical Characteristics at 700mA, Junction Temperature, T_J = 25°C, Continued

Radiation Pattern	Color	Typical total flux percent within first 45°[6] Cum $\Phi_{45°}$	Typical angle of peak intensity[7] θ_{PEAK}
Side Emitting	Green	<30%	75° - 85°
	Cyan	<30%	75° - 85°
	Blue	<30%	75° - 85°
	Royal blue	<30%	75° - 85°

Notes: (for all three optical tables)

1. Dominant wavelength is derived from the CIE 1931 Chromaticity diagram and represents the perceived color. Lumileds maintains a tolerance of ± 0.5nm for dominant wavelength measurements.
2. Royal Blue product is binned by radiometric power and peak wavelength rather than photometric lumens and dominant wavelength. Lumileds maintains a tolerance of ± 2nm for peak wavelength measurements.
3. Spectral width at ½ of the peak intensity.
4. Total angle at which 90% of total luminous flux is captured.
5. θ½ is the off axis angle from lamp centerline where the luminous intensity is ½ of the peak value.
6. Cumulative flux percent within ± 45° from optical axis.
7. Off axis angle from lamp centerline where the luminous intensity reaches the peak value. On axis peak may be higher than off axis peak.
8. All products built with Indium Gallium Nitride (InGaN).
9. Blue and Royal Blue power light sources represented here are IEC825 Class 2 for eye safety.

Electrical Characteristics at 700mA, Junction Temperature, T_J = 25°C

Color	Forward Voltage V_F (V)[1] Min.	Typ.	Max.	Dynamic resistance[2] (Ω) R_D	Temperature coefficient of forward voltage[3] (mV/°C) $\Delta V_F / \Delta T_J$	Thermal resistance, junction to board (°C/W) $R\theta_{J-B}$
Green	5.43	6.84	8.31	1.0	-4.0	11
Cyan	5.43	6.84	8.31	1.0	-4.0	11
Blue	5.43	6.84	8.31	1.0	-4.0	11
Royal Blue	5.43	6.84	8.31	1.0	-4.0	11

Notes:

1. Lumileds maintains a tolerance of ± 0.06V on forward voltage measurements.
2. Dynamic resistance is the inverse of the slope in linear forward voltage model for LEDs. See Figure 3.
3. Measured between 25°C ≤ TJ ≤ 110°C at I_F = 700mA.

Absolute Maximum Ratings

Parameter	Green/Cyan/ Blue/Royal Blue
DC Forward Current (mA) [1]	700
Peak Pulsed Forward Current (mA)	1000
Average Forward Current (mA)	700
ESD Sensitivity [2]	± 16,000V HBM
LED Junction Temperature (°C)	135
Aluminum-Core PCB Temperature (°C)[3]	70
Storage & Operating Temperature (°C)	-40 to +120

Notes:

1. Proper current derating must be observed to maintain junction temperature below the maximum. For more information, consult Luxeon Design Guide, available upon request.
2. LEDs are not designed to be driven in reverse bias. Please consult Lumileds' Application Brief AB11 for further information.
3. Allowable board temperature to avoid exceeding maximum junction temperature at maximum V_f limit at 700 mA based on thermal resistance of Star assembly.

Wavelength Characteristics, T_J = 25°C

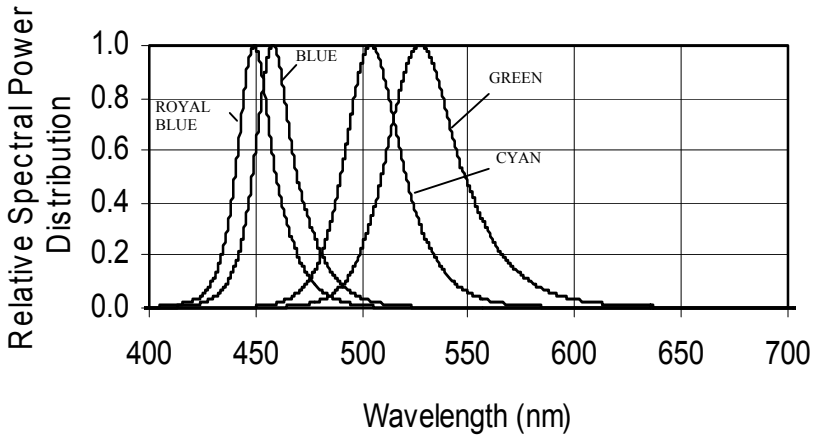


Figure 1.
Relative Intensity vs. Wavelength.

Light Output Characteristics

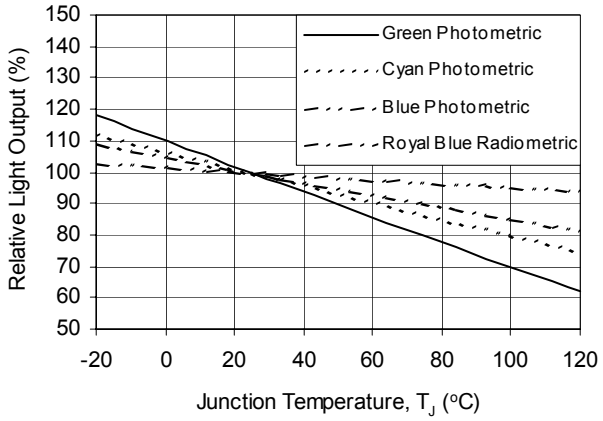


Figure 2.
Relative Light Output vs. Junction Temperature.

Forward Current Characteristics, T_J = 25°C

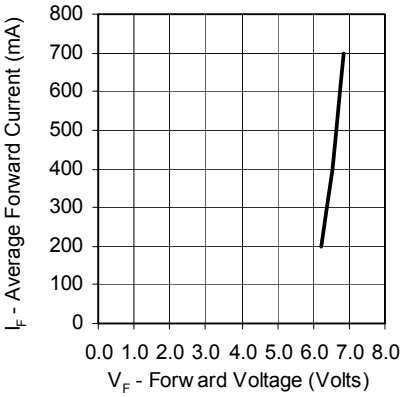


Figure 3.
Forward Current vs. Forward Voltage.

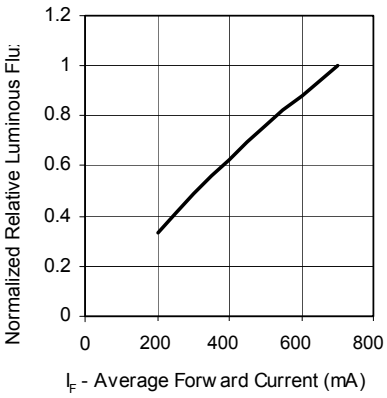


Figure 4.
Relative Luminous Flux vs. Forward Current at T_J = 25°C maintained.

Current Derating Curve

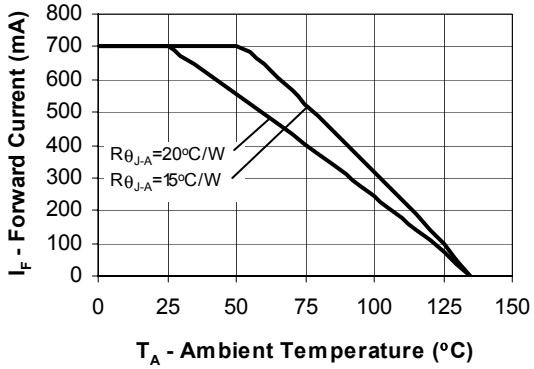


Figure 5.
Maximum Forward Current vs. Ambient Temperature. Derating based on T_{JMAX} = 135 °C.

Note:
Additional heatsinking is required, even for extremely brief periods. Please consult AB05, Luxeon Thermal Design Guide, for additional information.

Representative Typical Spatial Radiation Pattern

Lambertian Radiation Pattern

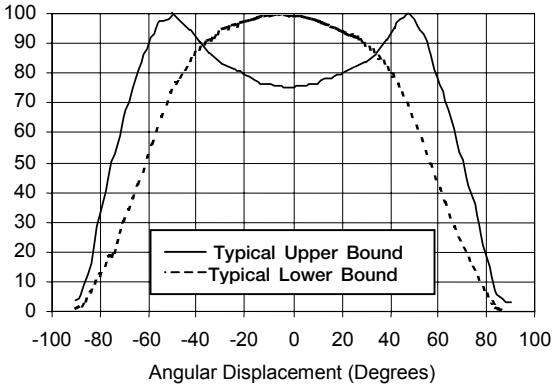


Figure 6.
Representative Typical Spatial Radiation Pattern for Luxeon V Star.

Side Emitting Radiation Pattern

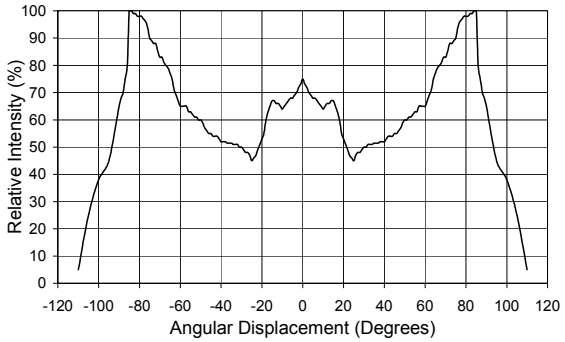


Figure 7.
Representative Typical Spatial Radiation Pattern for Luxeon V Star.

About Luxeon

Luxeon is the new world of solid state lighting (LED) technology. Luxeon Power Light Source Solutions offer huge advantages over conventional lighting and huge advantages over other LED solutions. Luxeon enables partners to create and market products that, until now, were impossible to create. This means the opportunity to create products with a clear competitive advantage in the market. Products that are smaller, lighter, sleeker, cooler, and brighter. Products that are more fun to use, more efficient, and more environmentally conscious than ever before possible!

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Company Information

Luxeon is developed, manufactured and marketed by Lumileds Lighting, LLC. Lumileds is a world-class supplier of Light Emitting Diodes (LEDs) producing billions of LEDs annually. Lumileds is a fully integrated supplier, producing core LED material in all three base colors (Red, Green, Blue) and White. Lumileds has R&D development centers in San Jose, California and Best, The Netherlands. Production capabilities in San Jose, California and Malaysia.

Lumileds is pioneering the high-flux LED technology and bridging the gap between solid state LED technology and the lighting world. Lumileds is absolutely dedicated to bringing the best and brightest LED technology to enable new applications and markets in the Lighting world.

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LIGHT FROM SILICON VALLEY

Lumileds may make process or materials changes affecting the performance or other characteristics of Luxeon. These products supplied after such change will continue to meet published specifications, but may not be identical to products supplied as samples or under prior orders.

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