power light source

Luxeon® Line

Technical Data DS21

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 features one or more power light sources mounted onto an aluminum-core printed circuit board, allowing for ease of assembly, optimum cooling and accurate light center positioning.

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

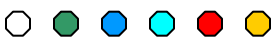
For high volume applications, custom Luxeon power light source designs are available upon request, to meet your specific needs.

Features

- Highest Flux per LED in the world
- Very long operating life (up to100k hours)
- Available in White, Green, Blue, Cyan, Red, and Amber
- Highly efficient collimating optics provide tight beams
- 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

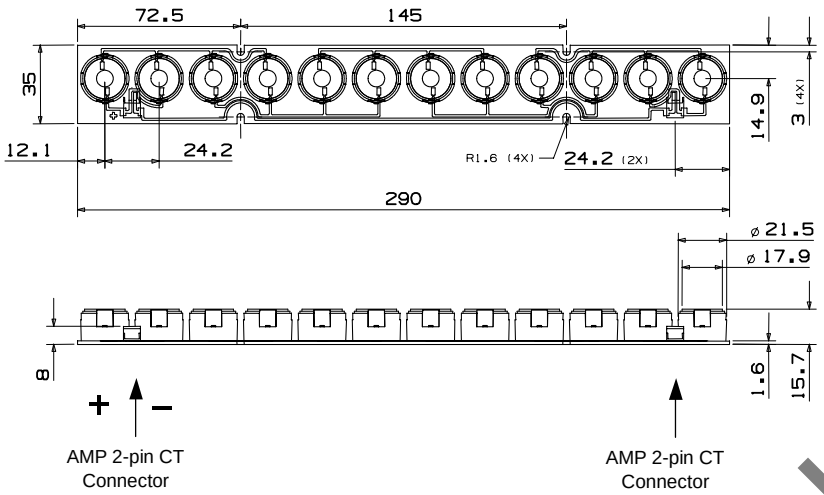
- Cove lighting
- Indoor and outdoor commercial and residential architectural lighting
- Security lighting
- Under shelf lighting



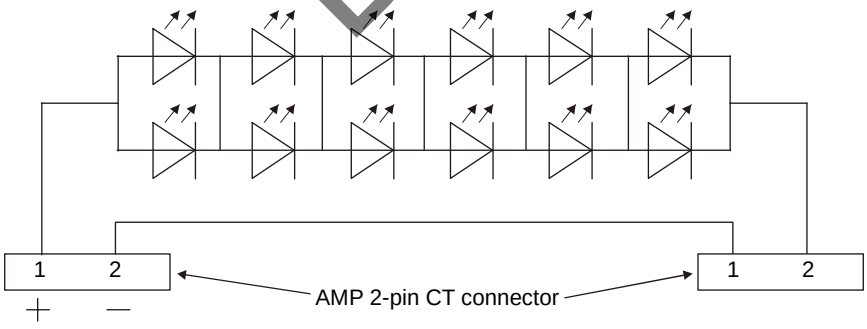
Luxeon Line is available in white, green, blue, cyan, red, and amber.

LUXEON

Mechanical Dimensions



Circuit Diagram



Notes:

1. Connector on board AMP type, code 2-179123-2; Mating connector – AMP receptacle housing assembly, code 173977-2.
2. Slots in aluminum-core PCB for M3 or #4 mounting screw.
3. Drawing not to scale.
4. All dimensions are in millimeters.
5. Luxeon Lines are provided with a jumper inserted in the right-hand connector to complete the electrical circuit. In this configuration the connector marked with a "+" should be used for connection to the power supply. This jumper may be removed and inserted in the left connector if required for the application, or removed completely to allow for daisy chain connection to drive multiple Luxeon Lines in series.

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

Color	Luxeon line	Minimum Luminous Flux (lm) Φ_V [1,2]	Typical Luminous Flux (lm) Φ_V [2]
White	LXHL-NWE9	140	250
Green	LXHL-NM99	140	300
Cyan	LXHL-NE99	140	300
Blue[3]	LXHL-NB99	40	100
Red	LXHL-ND95	310	450
Amber	LXHL-NL95	240	425

Notes:

1. Minimum luminous flux performance guaranteed within published operating conditions. Lumileds maintains a tolerance of +/-10% for luminous flux measurements.
2. Flux values for Luxeon Line with optics. 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 30 lm at 460 nm to a typical of 150 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.

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

color	Typical Dominant Wavelength[1] λD or Color Temperature[2] CCT Min.	Typ.	Max.	Spectral Half-Width[3] (nm) $\Delta\lambda_{1/2}$	Temperature Coefficient of Dominant Wavelength (nm/°C) $\Delta\lambda_D/\Delta T_J$	Viewing Angle Per LED[4] (degree) 2θ 1/2	Typical Candela on Axis per LED[8] (Cd)
White	4500 k	5500 k	10,000 k	---	---	10	250
Green	520 nm	530 nm	550 nm	35	0.04	10	600
Cyan	490 nm	505 nm	520 nm	30	0.04	10	600
Blue	460 nm	470 nm	490 nm	25	0.04	10	200[5]
Red	620.5 nm	627 nm	645 nm	20	0.05	10	660
Amber	584.5 nm	590 nm	597 nm	14	0.09	10	540

Notes:

1. Dominant wavelength is derived from the CIE 1931 Chromaticity diagram and represents the perceived color.
2. CRI (Color Rendering Index) for White product is 70.
3. Spectral width at ½ of the peak intensity.
4. θ½ is the off axis angle from lamp centerline where the luminous intensity is ½ of the peak value.
5. Typical candela on axis per LED for 470 nm devices. Due to the CIE eye response curve in the short blue wavelength range, candela values will vary over the Lumileds blue color range.
6. All red and amber products built with Aluminum Indium Gallium Phosphide (AlInGaP).
7. All white, green, cyan and blue products built with Indium Gallium Nitride (InGaN).
8. All power light sources represented here are IEC825 Class 2 for eye safety.

Electrical Characteristics at Junction Temperature, T_J = 25°C

Part Number	Color	Forward Voltage V_F (V) [1] Min.	Typ.	Max.	Dynamic resistance[2] (Ω) R_D	Temperature coefficient of forward voltage[3] (mV/°C) $\Delta V_F / \Delta T_J$	Array Thermal resistance, junction to board[4] (°C/W) $R\theta_{J-B}$	Forward test current (mA) I_F
lxhl-nwE9	White	16	21	24	3	-12	1.7	700
lxhl-nm99	Green	16	21	24	3	-12	1.7	700
lxhl-ne99	Cyan	16	21	24	3	-12	1.7	700
lxhl-nb99	Blue	16	21	24	3	-12	1.7	700
lxhl-nd95	Red	14	18	21	7.2	-12	1.9	700
lxhl-nl95	Amber	14	18	21	7.2	-12	1.9	700

Notes:

1. Lumileds maintains a tolerance of +/-0.06 Volts per LED for voltage measurements.
2. Dynamic resistance is the inverse of the slope in linear forward voltage model for LEDs. See Figures 2a and 2b.
3. Measured between 25°C ≤ T_J ≤ 110°C at I_F = 700mA.
4. To determine the junction temperature, multiply by total array power. For best optical and lifetime performance, additional heat sinking is required.

Absolute Maximum Ratings

Parameter	White/Green/ Cyan/Blue	Red/Amber
DC Forward Current (mA) [1]	700	770
Peak Pulsed Forward Current (mA)	1000	1100
Average Forward Current (mA)	700	700
ESD Sensitivity [2]	± 16,000V HBM	
LED Junction Temperature (°C)	135	120
Aluminum-Core PCB Temperature (°C)	105	105
Storage & Operating Temperature (°C)	-40 to +75	-40 to +75

Notes:

1. Proper current derating must be observed to maintain junction temperature below the maximum. For more information, consult Luxeon OEM Guide, available upon request.
2. LEDs are not designed to be driven in reverse bias. Please consult Lumileds' Application Brief AB11 for further information.

Wavelength Characteristics

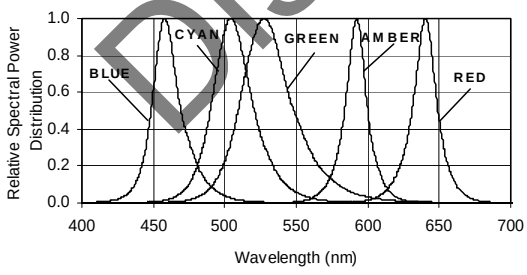


Figure 1a.
Relative Intensity vs. Wavelength.

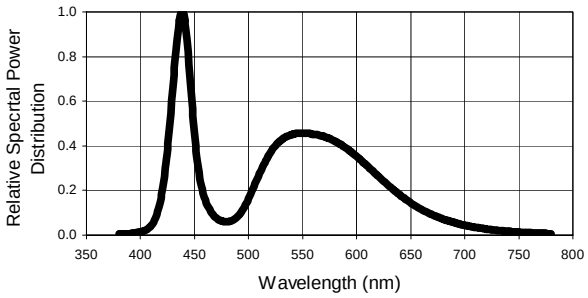


Figure 1b.
White Color Spectrum of Typical CCT Part, Integrated Measurement.

Forward Current Characteristics, T_J = 25°C

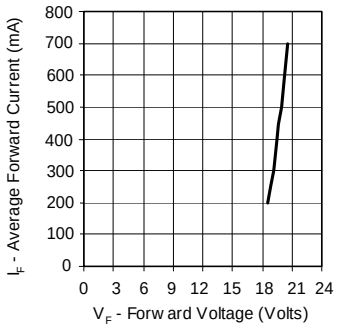


Figure 2a. Forward Current vs. Forward Voltage for White, Green, Cyan and Blue.

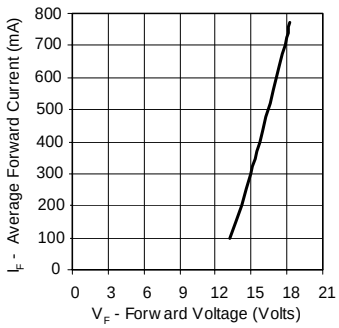


Figure 2b. Forward Current vs. Forward Voltage for Red and Amber.

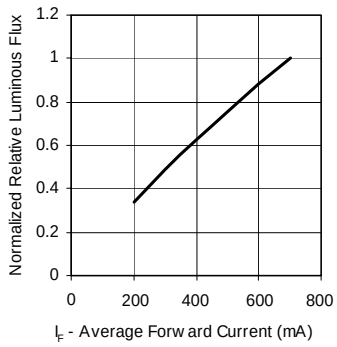


Figure 3a. Relative Luminous Flux vs. Forward Current for White, Green, Cyan and Blue at T_J = 25°C maintained.

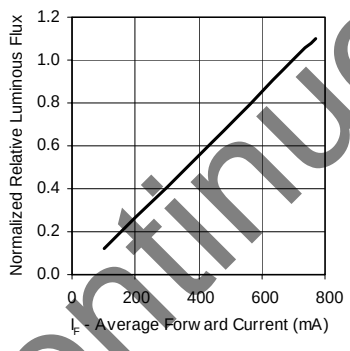


Figure 3b. Relative Luminous Flux vs. Forward Current for Red and Amber at T_J = 25°C maintained.

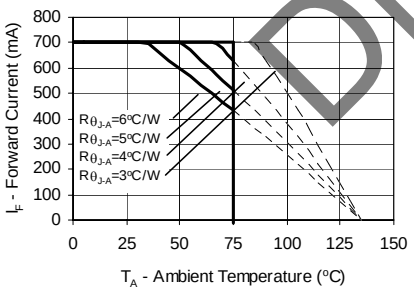


Figure 4a. Maximum Forward Current vs. Ambient Temperature. Derating based on T_{JMAX} = 135 °C for White, Green, Cyan and Blue.

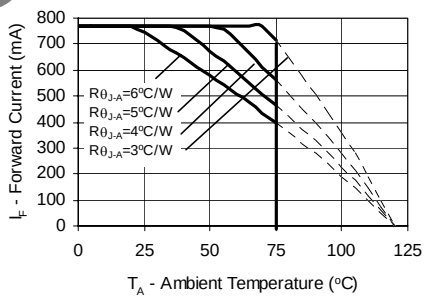


Figure 4b. Maximum Forward Current vs. Ambient Temperature. Derating based on T_{JMAX} = 120 °C for Red and Amber.

Note:

Driving these high power devices at currents less than the test conditions may produce unpredictable results and may be subject to variation in performance. Pulse width modulation is recommended for dimming effects.

Light Output Characteristics

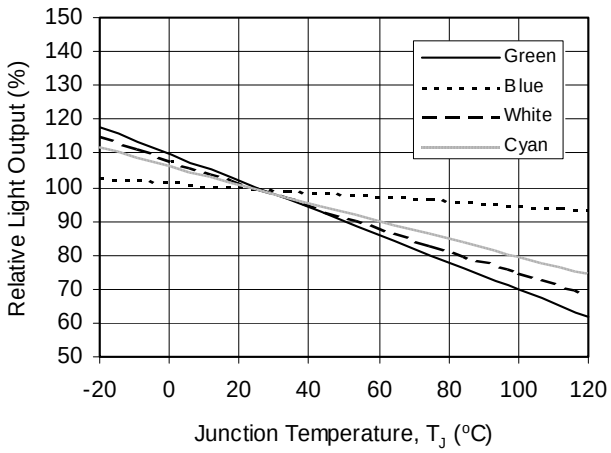


Figure 5a.
Relative Light Output vs. Junction Temperature for White, Green, Cyan and Blue.

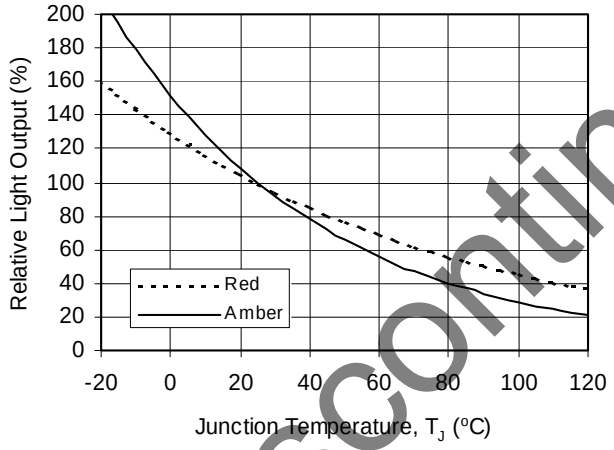


Figure 5b.
Relative Light Output vs. Junction Temperature for Red and Amber.

Representative Spatial Radiation Pattern

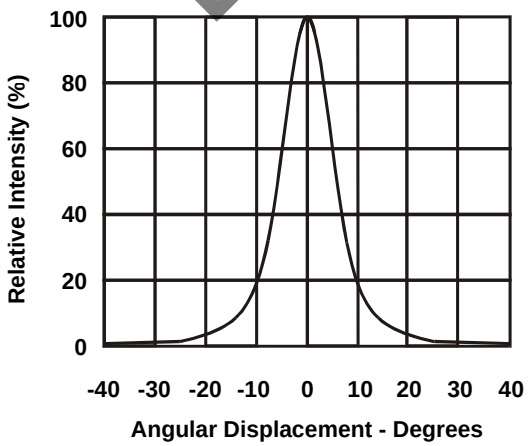


Figure 6.
Representative spatial Radiation Pattern for one Luxeon LED with optics, all colors.

Note:

For more detailed technical information regarding Luxeon radiation patterns, please consult your Lumileds Authorized Distributor or Lumileds sales representative.

Average Lumen Maintenance Characteristics

Lifetime for solid-state lighting devices (LEDs) is typically defined in terms of lumen maintenance—the percentage of initial light output remaining after a specified period of time. Lumileds projects that Luxeon products will deliver on average 70% lumen maintenance at 50,000 hours of operation. This performance is based on independent test data, Lumileds historical data from tests run on similar material systems, and internal Luxeon reliability testing. This projection is based on constant current 350 mA operation per LED (700 mA for Line) with junction temperature maintained at or below 90°C. Observation of design limits included in this data sheet is required in order to achieve this projected lumen maintenance.

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!

LUXEON

Company Information

Luxeon is developed, manufactured and marketed by Lumileds Lighting, U.S., 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.

LUMILEDS™
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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