

Iluminación de vitrinas con diodos LED

Aquí presento el trabajo que he realizado para probar la iluminación de vitrinas basándonos en diodos LED. Para ello he seleccionado los nuevos LEDs Luxeon de 18 lúmenes y 1 vatio de consumo de potencia, de la firma Lumiled. Estos diodos, que pueden proporcionar hasta 800.000 mcd, se sirven en diferentes montajes y ópticas y he escogido el montaje en estrella para soldar, con óptica batwing (ala de murciélago). En el apéndice puede verse la forma de la curva de iluminación de esa disposición.

Su precio está entre 9 y 14 euros la unidad según modelo y en España los ofrece la firma Amidata, que está en Getafe y sirven sin coste en sus oficinas con lo que se puede ahorrar un poco de dinero.

Para el montaje en muebles y vitrinas conviene elegir el modelo cálido, que da una luz más agradable. Hay un transformador que proporciona una intensidad constante y es especial para estos LEDs, se trata del modelo i-Xitanium de 17 vatios y 750 mA, que cuesta 34 €. Permite instalar 2 grupos de 6 LEDs, es decir hasta 12 LEDs. Si se necesita instalar más cantidad hay otro modelo mayor no mucho mas caro. Al final he añadido las especificaciones y un esquema de montaje.

En las fotos puede compararse la iluminación de los LED con la de una lámpara dicroica de 25 w. La principal ventaja es la ausencia de calor y el tamaño minúsculo de los LEDs, lo que les permite quedar empotrados en espacios muy pequeños.

En cuanto a los diodos, la elección que he realizado se basa en conseguir un diodo de alta potencia pero que no llegue a calentarse mucho. Los diodos de 3 y 5 vatios pueden ser algo más delicados térmicamente, amén de su mayor precio. En ese último aspecto, hay que reseñar que recientemente ha salido al mercado un competidor de Lumiled, que es la firma china Prolight, ofertando diodos de idénticas especificaciones al Lumiled pero a muy inferior coste. En particular el diodo de 1 vatios cuesta en Inglaterra 4 libras.

Link útiles:

<http://www.amidata.es>

<http://www.lumileds.com>

<http://www.led-bulbs.com/>

<http://www.ledmuseum.org/>



Foto 1. Vitrinas con dicroicas pero sin LED



Foto 2. Vitrinas con dicroicas y 6 LEDs en la izquierda



Foto 3. Vitrinas, solo con los 6 LEDs en la izquierda



Foto 4. Vista interior de la vitrina abierta con 6 LEDs

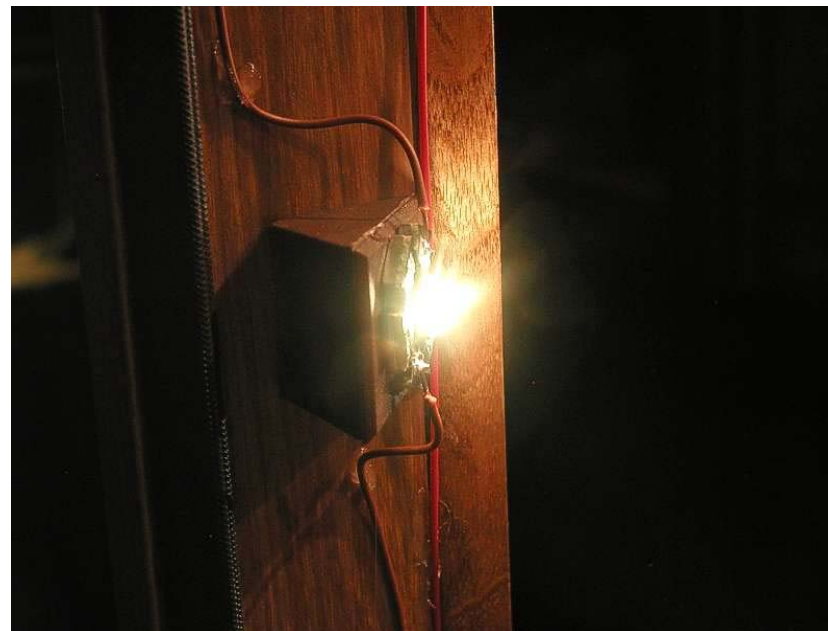


Foto 5. LED lumiled de 1 watio conectado

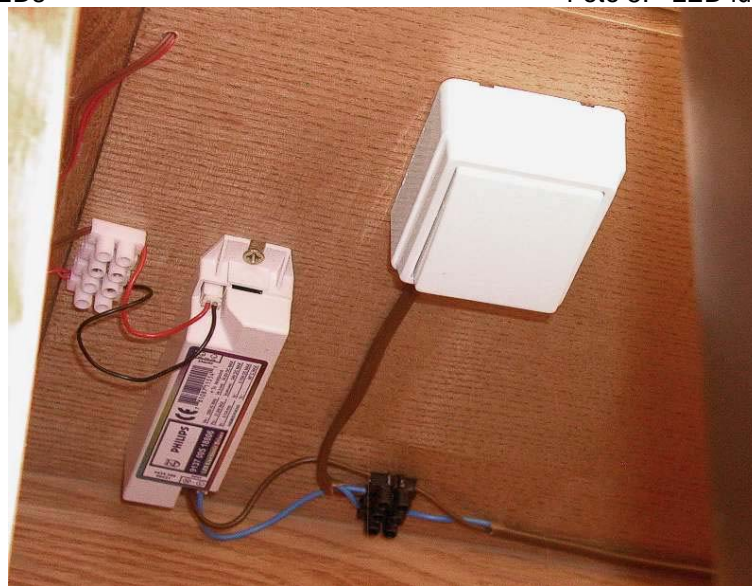


Foto 6. Vista de la fuente y el cableado



Búsqueda Rápida 1-Watt Star Hexagonal and Luxeon Star with Connector

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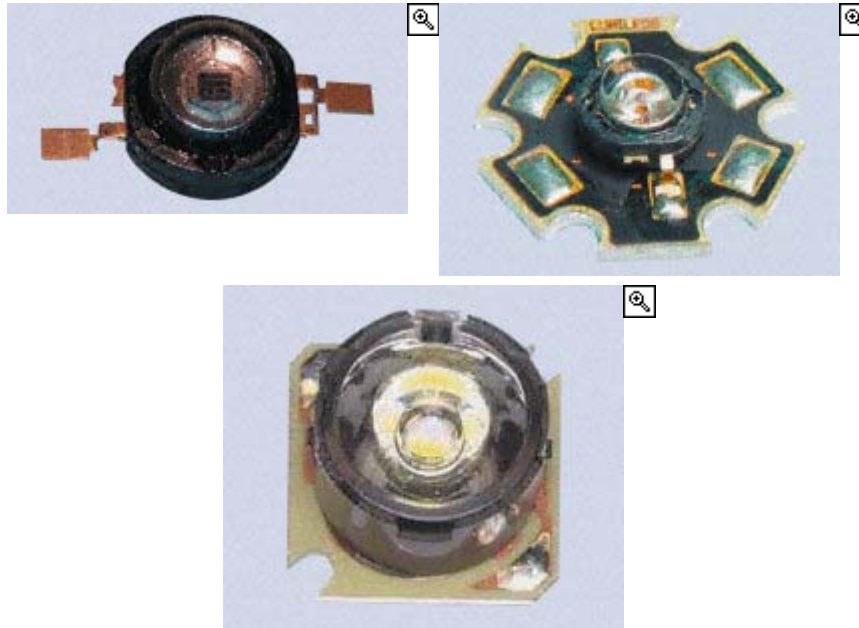
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High Dome Lens (Lambertian Curve)

Unidades por Lote = 1

		código RS		precio unitario		
		LXHL-	1-24	25-99		
<input type="button" value="Pedido"/>	White	MW1D	449-1797	14,13 €	12,32 €	<input type="button" value="Info técnica"/>
<input type="button" value="Pedido"/>	Green	MM1D	449-1810	14,13 €	12,32 €	<input type="button" value="Info técnica"/>
<input type="button" value="Pedido"/>	Cyan	ME1D	449-1826	14,13 €	12,32 €	<input type="button" value="Info técnica"/>
<input type="button" value="Pedido"/>	Blue	MB1D	449-1832	14,13 €	12,32 €	<input type="button" value="Info técnica"/>
<input type="button" value="Pedido"/>	Red	MD1D	449-1848	14,13 €	12,32 €	<input type="button" value="Info técnica"/>
<input type="button" value="Pedido"/>	Red-Orange	MH1D	449-1854	14,13 €	12,32 €	<input type="button" value="Info técnica"/>
<input type="button" value="Pedido"/>	Amber	ML1D	449-1860	14,13 €	12,32 €	<input type="button" value="Info técnica"/>

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Low Dome Lens (Batwing Curve)

Unidades por Lote = 1

		LXHL-	código RS	precio unitario		
				1-24	25-99	
<input type="checkbox"/>	White	MW1C	449-1719	14,13 €	12,32 €	<input type="button" value="Info técnica"/>

Unidades por Lote = 1

				precio unitario		
				1-24	25-99	
<input type="checkbox"/>	White					
<input type="checkbox"/>	(enhanced)	MWEC	<input type="checkbox"/> 467-7503	11,20 €	10,35 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	White (warm)	MWEC	<input type="checkbox"/> 468-5879	10,55 €	9,17 €	<input type="button" value="Info técnica"/>

Unidades por Lote = 1

				precio unitario		
				1-24	25-99	
<input type="checkbox"/>	Green	MM1C	449-1725	14,13 €	12,32 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Cyan	ME1C	449-1731	14,13 €	12,32 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Blue	MB1C	449-1753	14,13 €	12,32 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Royal Blue	MRRC	449-1769	14,13 €	12,32 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Red	MD1C	449-1775	10,59 €	9,24 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Amber	ML1C	449-1781	10,59 €	9,24 €	<input type="button" value="Info técnica"/>

Los productos marcados con este símbolo son nuevos.

Funnel Lens (Side Emitting Curve)

Unidades por Lote = 1

		LXHL-	código RS	precio unitario		
				1-24	25-99	
<input type="checkbox"/>	White	FW1C	<input type="checkbox"/> 467-7698	11,22 €	10,36 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Green	FM1C	<input type="checkbox"/> 467-7705	11,22 €	10,36 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Cyan	FE1C	<input type="checkbox"/> 467-7711	11,22 €	10,36 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Blue	FB1C	<input type="checkbox"/> 467-7727	11,22 €	10,36 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Royal Blue	FR1C	<input type="checkbox"/> 467-7733	11,22 €	10,36 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Red	FD1C	<input type="checkbox"/> 467-7749	11,22 €	10,36 €	<input type="button" value="Info técnica"/>
<input type="checkbox"/>	Amber	FL1C	<input type="checkbox"/> 467-7755	11,22 €	10,36 €	<input type="button" value="Info técnica"/>

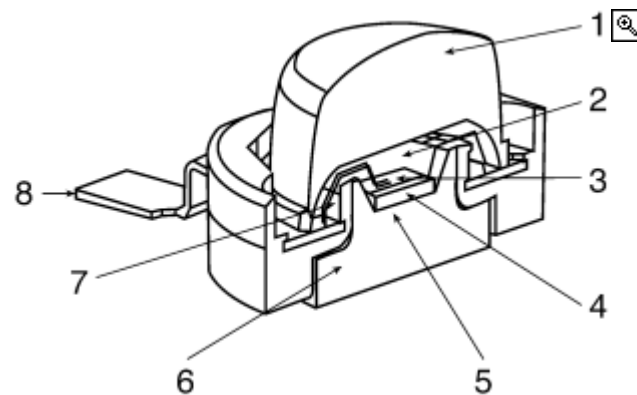
Los productos marcados con este símbolo son nuevos.

Luxeon Star with Optic - Low Dome Lens (Batwing Curve)

Unidades por Lote = 1

			código RS precio unitario			
			1-24	25-99		
Pedido	White	LXHL-NW98	449-1876	19,43 €	16,93 €	Info técnica
Unidades por Lote = 1						
			precio unitario			
			1-24	25-99		
Pedido	White (enhanced)	MWE8	N 467-7519	15,42 €	14,26 €	Info técnica
Unidades por Lote = 1						
			precio unitario			
			1-24	25-99		
Pedido	Green	NM98	449-1882	19,43 €	16,93 €	Info técnica
Pedido	Cyan	NE98	449-1898	19,43 €	16,93 €	Info técnica
Pedido	Blue	NB98	449-1905	19,43 €	16,93 €	Info técnica
Pedido	Red	ND98	449-1927	15,90 €	13,87 €	Info técnica
Pedido	Amber	NL98	449-1933	15,90 €	13,87 €	Info técnica

N Los productos marcados con este símbolo son nuevos.



- 1. Plastic lens
- 2. Silicone encapsulant
- 3. InGaN Flip Chip
- 4. Solder connection
- 5. Sub-mount Chip
- 6. Heatsink slug
- 7. Gold wire
- 8. Cathode lead

The Luxeon range is suitable for a wide range of applications.
 The LED's are even suitable for backlighting.
 There are different power ranges available to be chosen from.

- High-output solid-state lighting source
- Ideal for luminaire and wave-guide designs
- Very high brightness
- Lifetime in excess of 10 years (continuous use)
- Extreme light density
- Better lumen maintenance designed in
- Energy savings of up to 10x of conventional sources
- Saturated monochromatic output for excellent full spectrum light control
- Environmentally friendly solutions - no mercury, no UV or heat in the beam

Star with optic

- Produces a narrow collimated beam due to the inclusion of the collimating optic

Caution: No re-flow soldering; a suitable heatsink required for best performance

Características técnicas

I_F (typ)	350mA			
View angle (typ.)	110°			
Operating temperature	-40°C to +105°C			
V_R (max.)	> 5V			
	white	green	cyan	blue
Wavelength (peak) (nm)	8000 K	550	520	490
V_F (typ.)	3,42	3,42	3,42	3,42
Luminous Flux (lm)				
-Lambertian	18	25	30	5
-Batwing	18	25	30	5
-Side emitting	13,9	13,9	13,9	3,8
	royal blue	red	red orange	amber
Wavelength (peak) (nm)	460	645	620	597
V_F (typ.)	3,42	2,95	2,95	2,95
Luminous Flux (lm)				
-Lambertian	-	44	55	36
-Batwing	-	25	-	20
-Side emitting	-	30,9	-	23,5



White (enhanced)

- Minimum luminous flux improvement of 30%
- Improved angular color uniformity - no yellow halo in beam pattern
- Reduction of optical source size for improved coupling into secondary optics
- Compatibility with Lumileds™ new white binning structure

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Avda. de Córdoba, 21- 28026 Madrid / Carrer Comte Borrell, 115- 08015 Barcelona

i-Xtanium™ LED Electronic Driver

350mA and 700mA Constant Current Output



Selection Guide

Part Number	Description
9137 005 18806	230V/17W/0.7A Xtanium LED Driver
9137 005 34408	230V/12W/0.35A Xtanium LED Driver

Electrical Characteristics

Input

Parameter	Symbol	9137 005 18806	9137 005 34408	Units
Input Voltage Range	V_{in}	207 – 253	207 – 253	V
Frequency	f	50	50	Hz
Power Consumption Range	P_{in}	6.8 – 21.5	1.1 – 15.0	W
Efficiency	–	80% typical	80% typical	%

Output

Parameter	Symbol	9137 005 18806	9137 005 34408	Units
Power Output Range	P_o	5.5 – 17.2	0.9 – 12.0	W
Output Current	I_o	700 (± 35)	350 (± 17)	mA
Total Harmonic Distortion	THD	20 Maximum	20 Maximum	%
Power Factor	P_f	0.9 Minimum	0.9 Minimum	–
Crest Factor LED Current	I_{pk}/I_{avg}	1.5 Maximum	1.5 Maximum	–
Output Voltage Range	V_o	7.8 – 24.6	2.6 – 32.8	V

Notes:

1. Electrical characteristics at 25°C ambient temperature.
2. Output insulation 3.25KV 60 Hz.
3. FCC Class B.

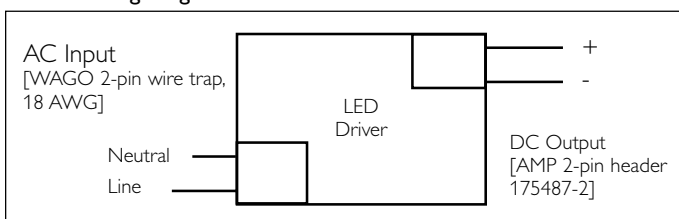
Environmental Ratings

Parameter	Symbol	Minimum	Maximum	Units
Operating Ambient Temperature	T_{op}	-40/-40	+60/+140	°C/°F
Storage Ambient Temperature	T_{st}	-40/-40	+80/+176	°C/°F
Case Temperature	T_c	–	+90/+194	°C/°F
Relative Humidity	RH	–	80	%
Lifetime (failures after 50,000 hrs)	L_{50k}	–	5	%

Notes:

1. Case temperature should be measured at test point T_c , as marked on driver label.

Driver Wiring Diagram



Description

These drivers are included in the i-Xtanium (illumination) segment of the Xtanium family of products. The 350mA and 700mA i-Xtanium Constant Current Output drivers provide the constant DC current output required to enhance the long life and optimum operation of high brightness LEDs. Xtanium Drivers have an operating life matching that of the LEDs.

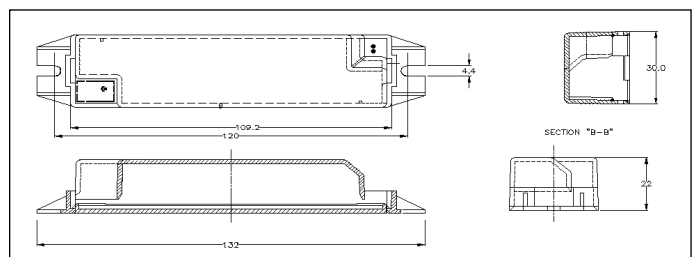
Features

- Slim housing, small size (132x30x22 mm)
- Meet approbation requirements (CE, ENEC)
- DC constant current output
- Long life (50,000 hrs)
- Power Efficiency
- Compliant with all colours of standard and custom Luxeon™ Power Light Sources

Benefits

- Light weight.
- Provides freedom (flexibility) to designers.
- Support spatial unobtrusiveness of LEDs.
- Customer pays for the power required and no more (optimised cost of ownership –COO).
- It is a hazard free product; It can be installed in practically any location.
- It can operate any LED lamp design the customer is developing or already marketing.
- No binning of LEDs results in cost savings.
- Drivers last as long as LEDs
- Optimisation of the usage of the total system power; Power losses (up to 40% of total power) saved by this operation mode.

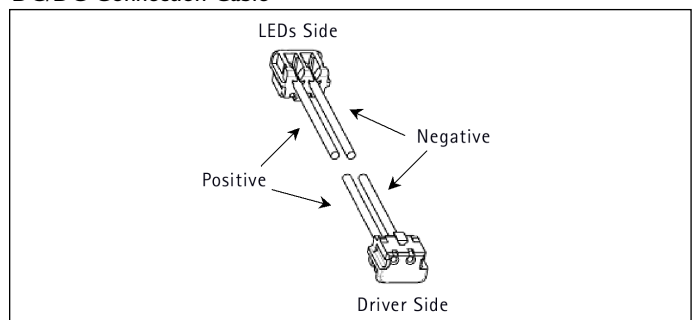
Mechanical Dimensions



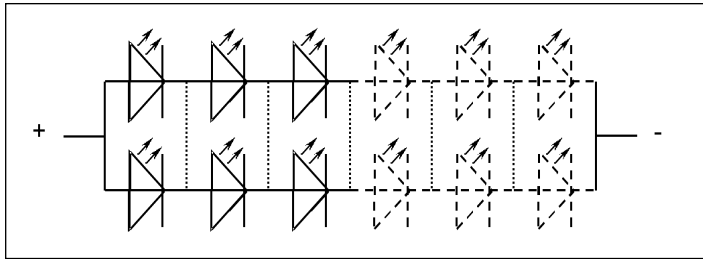
Notes:

1. All dimensions are in millimeters.
2. Drawing not to scale.
3. Feature two slots for mounting with M4 or #6 size screws.
4. AC input WAGO 2-pin wire trap, 18AWG. Leads must be solid core or tinned if multi-stranded wire is used.
5. DC output AMP 2-pin header type 175487-2. Use AMP DC/DC connection cable 1496-992-1.
6. Housing material Noryl HS2000, UL 94-V0 flame retardant, colour black.
7. Driver weight, 60 grams.

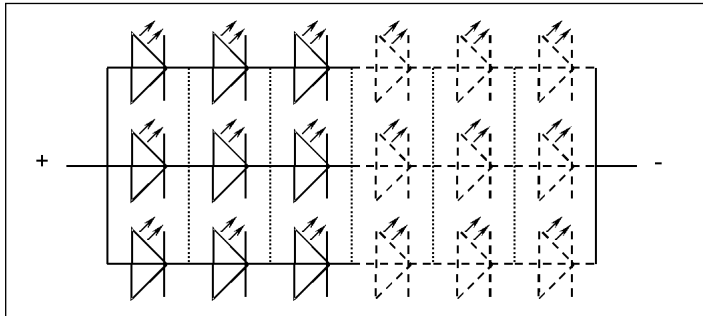
DC/DC Connection Cable



Configuration arrays when using Luxeon™ LEDs with Xitanium™ Drivers:
With the 700mA Output Current Xitanium™:

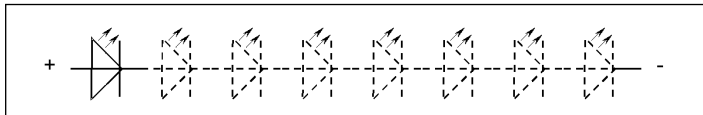


To drive at 350mA/LED: from 3 to 6 LEDs in series; 2 LEDs in parallel.
With or without crossovers.



To drive at 233mA/LED: from 3 to 6 LEDs in series; 3 LEDs in parallel.
With or without crossovers.

With the 350mA Output Current Xitanium™:



To drive at 350mA/LED: from 1 to 8 LEDs in series



power light source

Luxeon™ Star

Technical Datasheet DS23

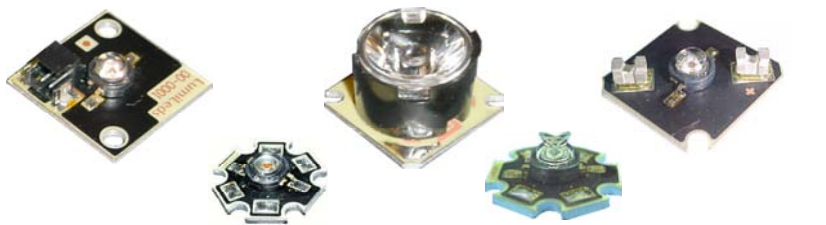
Luxeon is a revolutionary, energy efficient and ultra compact new light source, combining the lifetime and reliability advantages of Light Emitting Diodes with the brightness of conventional lighting.

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.

For tight beams, optional and highly efficient collimating optics are available.

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.



Luxeon Star is available in white, warm white, green, blue, royal blue, cyan, red, red-orange and amber.

Features

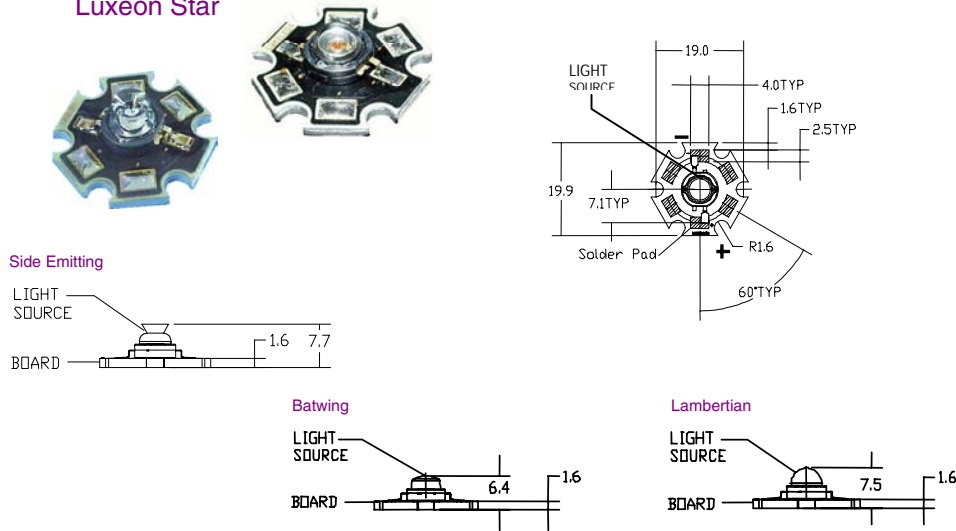
- Highest Flux per LED family in the world
- Very long operating life (up to 100k hours)
- Available in White, Green, Blue, Royal Blue, Cyan, Red, Red-Orange and Amber
- Lambertian, Batwing, Side Emitting or Collimated Radiation Pattern
- More Energy Efficient than Incandescent and most Halogen lamps
- 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

- Reading lights (car, bus, aircraft)
- Portable (flashlight, bicycle)
- Orientation
- Mini-accent
- Decorative
- Fiber Optic Alternative
- Appliance
- Sign and Channel Letter
- Architectural Detail
- Cove Lighting
- Automotive Exterior (Stop-Tail-Turn, CHMSL, Mirror Side Repeat)
- Edge-Lit Signs (Exit, Point Of Sale)

Mechanical Dimensions

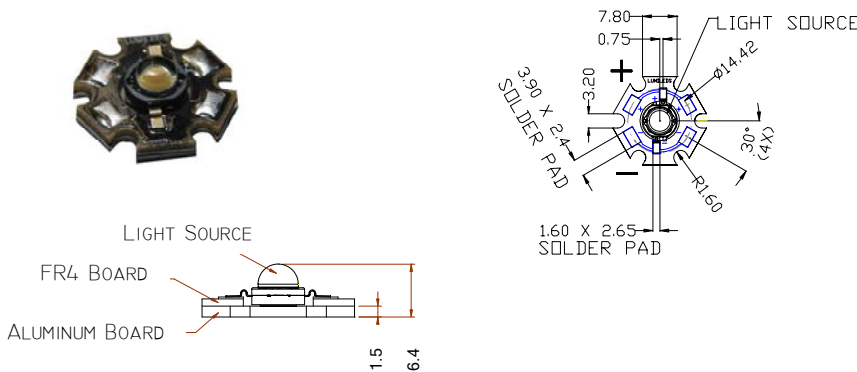
Luxeon Star



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. Drawings not to scale.
4. All dimensions are in millimeters.

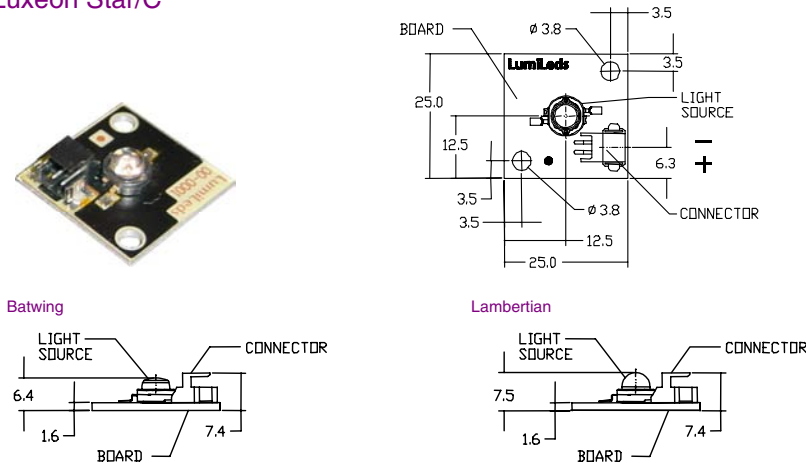
Luxeon Star Warm White



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.

Luxeon Star/C



Notes:

1. Holes in aluminum-core PCB for M3 or #4 mounting screw.
2. Connector on board AMP type, code 2-179123-2 ; Mating connector - AMP receptacle housing assembly, code 173977-2.
3. Positive and negative pins in connector are as indicated on the drawing.
4. Drawings not to scale.
5. All dimensions are in millimeters.

Typical Representative Spatial Radiation Pattern

Batwing Radiation Pattern (without optics)

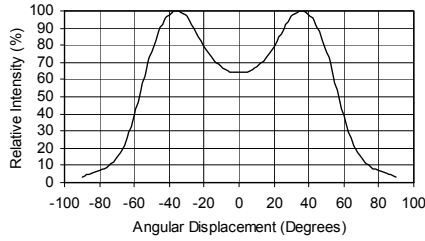


Figure 6a.
Typical Representative Spatial Radiation Pattern for Luxeon Star White (LXHL-MW1C, LXHL-MW1A, LXHL-MW1E) and Warm White (LXHL-MWGC).

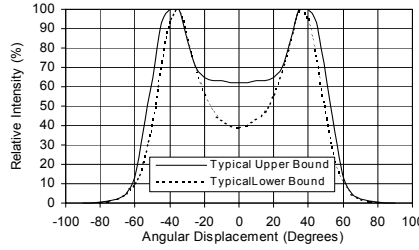


Figure 6b.
Typical Representative Spatial Radiation Pattern for Luxeon Star Green, Cyan, Blue, Royal Blue and White.

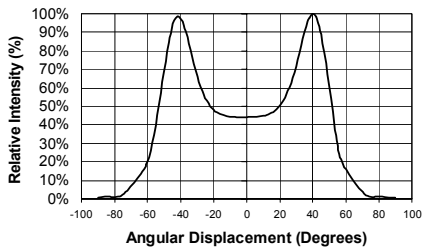


Figure 6c.
Typical Representative Spatial Radiation Pattern for Luxeon Star White (LXHL-BW02).

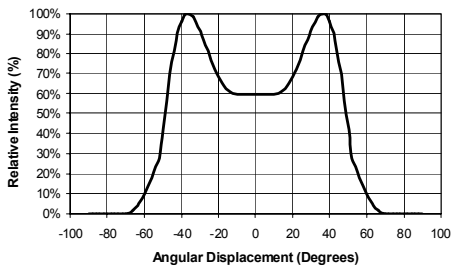


Figure 6d.
Typical Representative Spatial Radiation Pattern for Luxeon Star Red and Amber (LXHL-BD01 and LXHL-BL01)

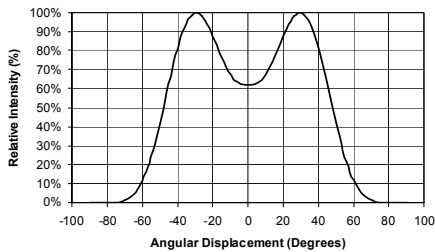


Figure 6e.
Typical Representative Spatial Radiation Pattern for Luxeon Star Red, Red-Orange and Amber (LXHL-BD03, BH03 and BL03).

Note:

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