

LUXEON® Benefits Over Competitive LED Products

LUXEON Emitters are the Brightest LEDs in the World

Flux levels delivered by LUXEON® are one to two orders of magnitude greater than competitive devices. Today the standard LUXEON delivers 20-30 lumens in white and over 50 lumens in red. The LUXEON V will deliver greater than 100 lumens in white, roughly 50 times the luminous output of alternative small signal devices currently available.



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LUXEON Enables Extreme Luminous Density (lm/mm²)

Small powerful light sources and optics allow for compact unobtrusive lighting solutions. The LUXEON package has been engineered to deliver extremely high lumens per unit area, enabling never before possible lighting solutions. A standard white LUXEON can provide 5X the luminous density of a competitive product. The LUXEON V white will deliver 4X the luminous density compared to a standard LUXEON or 20X the lm/mm² of other competitive products.

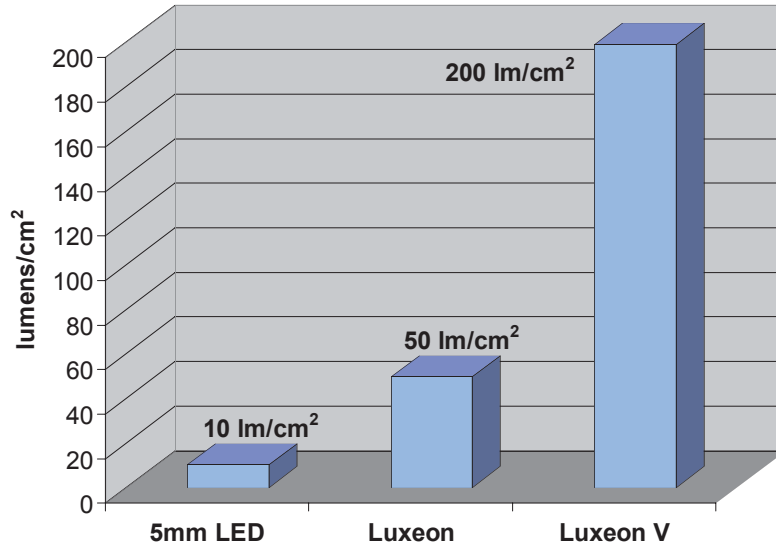


Figure 1. Lumen Density Comparison.

Superior White Lumen Maintenance by Design

LUXEON is superior by design compared to competitive solid-state lighting solutions, delivering unmatched lumen maintenance. The LUXEON emitter is structurally different and superior to competitive LEDs, containing no epoxy. The epoxy, present in nearly all other solid state products, is prone to rapid aging and degradation resulting in dramatic reduction of light output over time. Independent test results have confirmed this performance advantage. LUXEON (colored and white) is expected to show an astounding 70% average lumen maintenance (30% degradation) even after 50,000 hours.

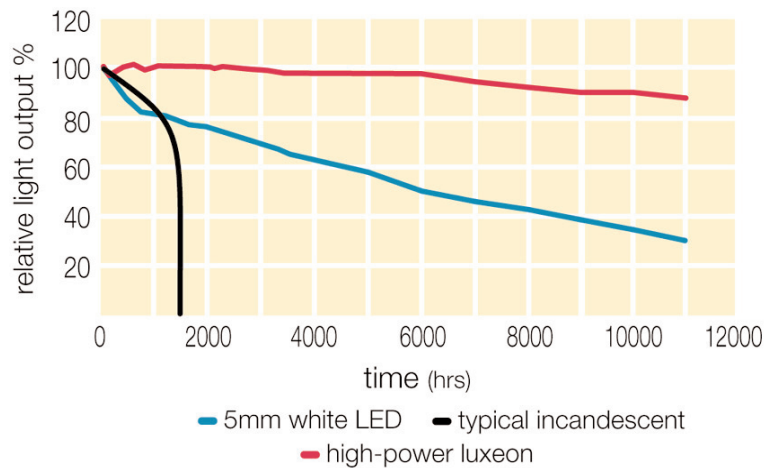


Figure 2. Lumen Maintenance Comparison.

LUXEON Offers You Flexibility in Design

LUXEON is available both in raw emitter form to maximize design flexibility as well as in plug and play components enabling rapid system development. Whether you wish to create a fully integrated design solution including LUXEON Emitters and additional electronics or if you prefer to receive a higher level of integration, LUXEON offers standard products ideally suited to your needs.

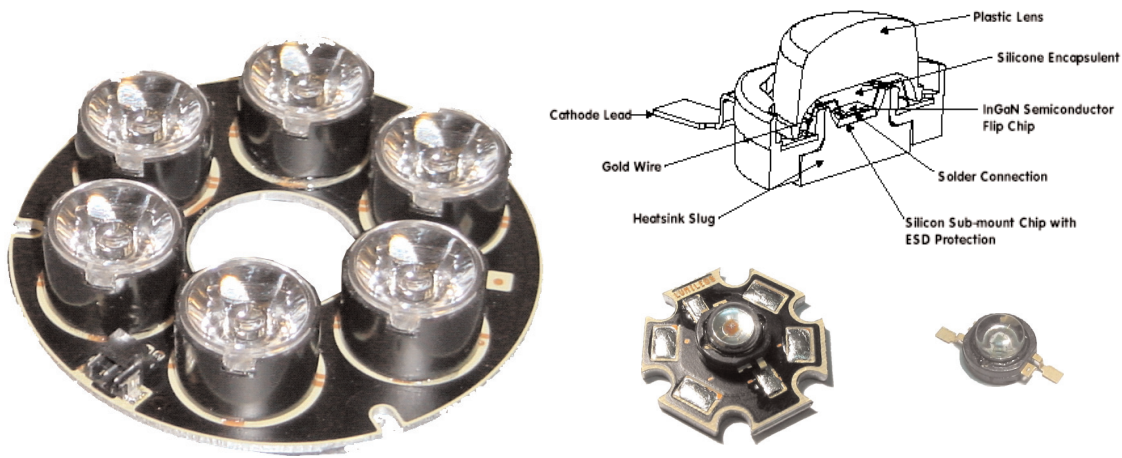


Figure 3. Cross Sectional View of the Luxeon Emitter.

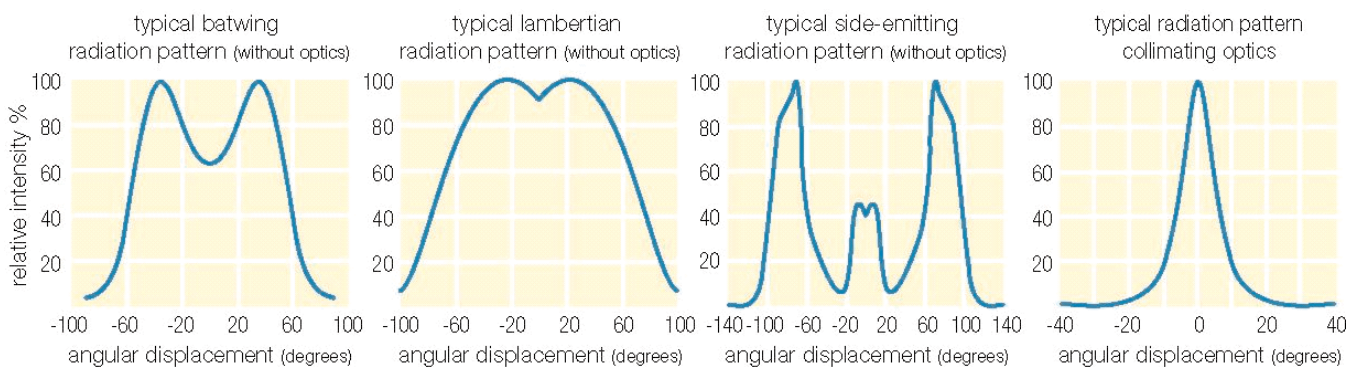
Figures 4, 5 and 6. Photographs of (Left to Right) LUXEON 6-Up Ring, LUXEON Star, LUXEON Emitter.

More Energy Efficient than Incandescent and Most Halogen Lamps

LUXEON delivers >20 lm/W in white today, with development roadmaps to surpass 30 lm/W in 2003 and 50 lm/W by 2005. The directed nature of LUXEON further enhances the system efficiency of a LUXEON based lighting solution.

Flexibility in Optical Design

Whether you prefer a point source pattern for maximum flexibility in designing your own optical system, a highly efficient collimating optic, or somewhere in between, LUXEON provides the options you need to tailor your design. Today's optical solutions include:



Figures 7, 8, and 9. Spatial Radiation Patterns (Left to Right) of Lambertian, Batwing, and Collimated Beams.

Improved Thermal Management

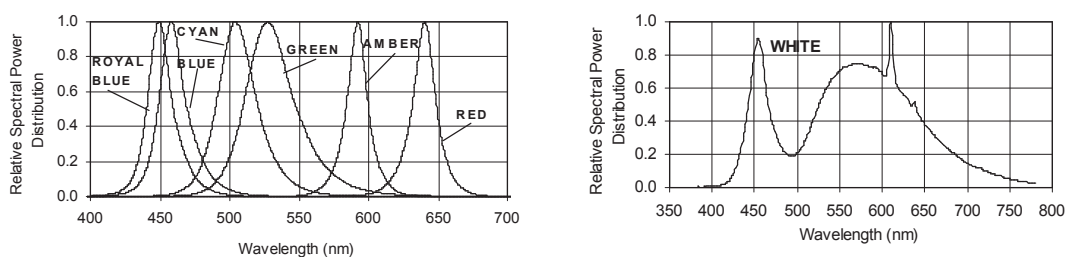
LUXEON delivers a low thermal resistance due to a revolutionary power package design. The thermal resistance of LUXEON is lower by an order of magnitude compared to competitive devices. Thermal resistance for LUXEON is a mere 15-17 °C/W compared to a value on the order of 250 °C/W for a typical through-hole device. This reduction in thermal resistance allows for increased power handling capability and improved system thermal management by design.

Superior ESD Protection by Design

All LUXEON products are internally protected and are not sensitive to ESD damage (± 16 kV by HBM condition).

Saturated Colors and White Available

Philips Lumileds is the only vertically integrated LED manufacturer supplying product across all colors and white. Whether your design requires a single color or the entire spectrum, LUXEON delivers the performance, flexibility, and color gamut you desire.



Figures 10 and 11. Relative Intensity vs. Wavelength for Luxeon Monochromatic and White Devices.



Company Information

LUXEON® is developed, manufactured and marketed by Philips Lumileds Lighting Company. Philips Lumileds is a world-class supplier of Light Emitting Diodes (LEDs) producing billions of LEDs annually. Philips Lumileds is a fully integrated supplier, producing core LED material in all three base colors (Red, Green, Blue) and White. Philips Lumileds has R&D centers in San Jose, California and in The Netherlands and production capabilities in San Jose and Penang, Malaysia. Founded in 1999, Philips Lumileds is the high-flux LED technology leader and is dedicated to bridging the gap between solid-state LED technology and the lighting world. Philips Lumileds technology, LEDs and systems are enabling new applications and markets in the lighting world.

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



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