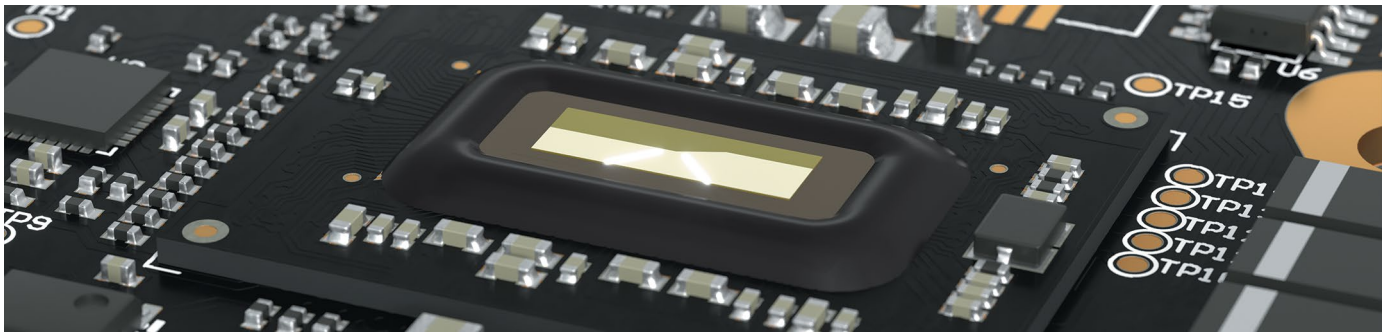
LUMILEDS

AUTOMOTIVE



MicroLED for digital headlighting

High-resolution light source for highly dynamic adaptive beams

Digital-headlighting applications call for highly dynamic adaptive-beam control and the highest resolution. Lumileds MicroLED is a high-resolution, 20k-pixel, monolithic light source designed for direct-imaging projection systems with small optics and the most compact built-in depth.
Along with the ability to generate an infinite number of customized light distributions, it offers superior contrast for perfect road projection and sharp cut-off lines.

FEATURES AND BENEFITS

- 20k (246 x 82) high-resolution (40 µm pixel) monolithic light source for precisely controlled and highly dynamic AFS/ADB light distributions and novel road-projection functionalities
- Small light-emitting area of 32 mm^2 enables most compact direct-imaging optical system
- Superior contrast level for sharp cut-off lines and perfect road projection
- Hot-flux output of 0.4 lm/px enables high center-beam brightness
- Embedded closed-loop LED supply control for energy-efficient operation
- Direct voltage-driver control eliminates the need for adaptation of existing LED driver modules

PRIMARY APPLICATIONS

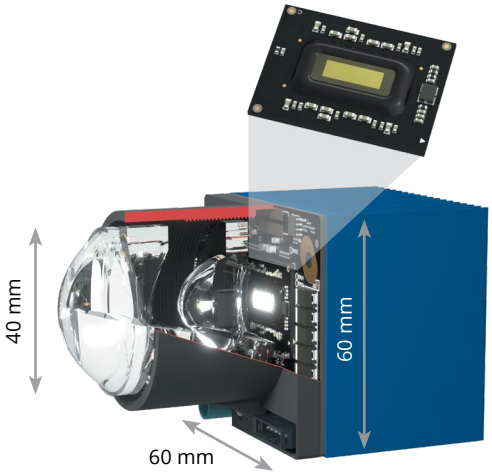
- Adaptive driving beam (ADB)
- Adaptive front-lighting system (AFS) functionality with digital swiveling and leveling of high-beam/low-beam spots
- Driver-assistance road projections

Create your future digital beam with Lumileds MicroLED

Reference-system design and performance

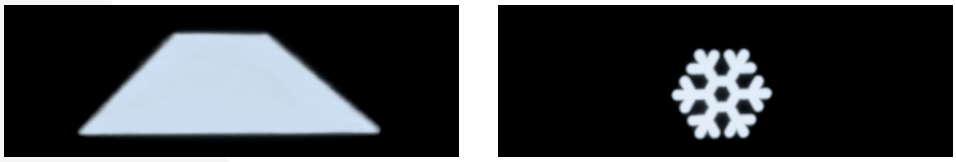
- Total flux from light source: 2400 lm for high-beam (HB) drive
- Field of view: 21° × 7°, angular resolution: 0.085°
- 3 lenses: 2 x PMMA, 1 × PC; 40 mm outer-lens diameter
- Optical efficiency*: 33%
- Max. intensity for typical HB profile: I_{max}* = 58000 cd
- Max. intensity for single pixel: I_{max}* = 87800 cd
- Due to its small light-emitting area, Lumileds MicroLED also supports smaller optics: for example, a reduction to 30 mm lens height still yields 28% optical efficiency*.

* including 15% losses at the cover glass



High pixel brightness and maximum pixel contrast for sharp road projections

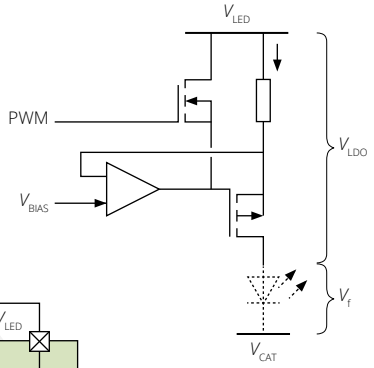
- 10×10-pixel performance at max. current (3.8 mA) and 110 °C T_j: 0.55 lm/px and 109 Mcd/m²
- Single-pixel contrast: 1:150 over 120 µm (3 px)

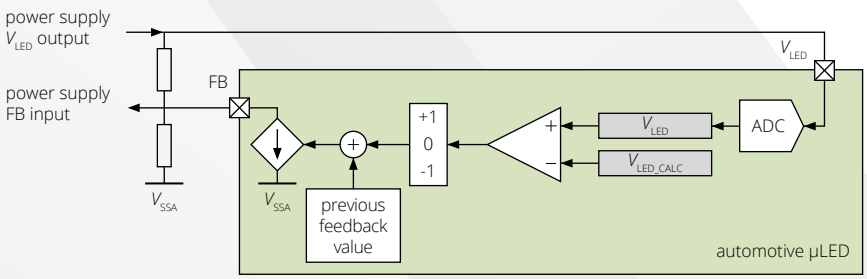


Real projected images

Embedded closed-loop voltage control for energy-efficient operation

- LDO-type constant current driver per pixel powered by external V_{LED} voltage supply
- Brightness control by 10-bit PWM dimming per pixel
- Continuous measurement of V_f for all pixels
- Integrated control-loop algorithms to minimize V_{LED} vs. V_{LDO} and V_f
- Two different ways to use control loop
  1. Digital readout via control interface
  2. Direct hardware control of V_{LED} voltage supply by using feedback connection (FB)

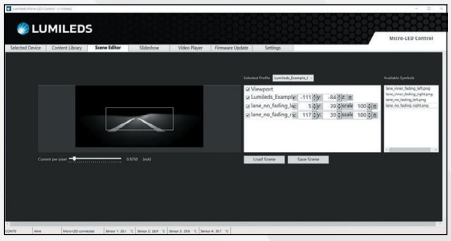




Lumileds MicroLED design-in support for customer systems

Lumileds offers comprehensive design-in support for MicroLED customer systems covering optical design, thermal management, and electronics. We also help with the implementation of both the image interface (parallel, SPI, UART) and control interface (UART, I²C).

Reference designs and laboratory electronics are available upon request.



Control software