

AUTOMOTIVE



# **MicroLED for digital headlighting**

High-resolution light source for highly dynamic adaptive beams



### FEATURES AND BENEFITS

- 20k (246 × 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<sup>2</sup> enables most compact direct-imaging optical system
- Superior contrast level for sharp cut-off lines and perfect road projection
- High optical efficiency from additive MicroLED technology
- Hot-flux output of 0.4 lm/px enables high center-beam brightness

Digital headlighting applications call for highly dynamic adaptivebeam 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.

#### **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

# **Fulfill your ambitious application** needs 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 × PMMA, 1 × PC; 40 mm outer lens diameter
- Optical efficiency\*: 33%
- 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\*.

# High intensity enables brilliant visibility of digital contents in beam

#### MicroLED performance:

- Typical HB profile (2.3 mA, 110 °C T<sub>i</sub>): 0.36 lm/px and 72 Mcd/m<sup>2</sup>
- Single-pixel max. rating (3.8 mA, 110 °C T<sub>i</sub>): 0.55 lm and 109 Mcd/m<sup>2</sup>

Beam performance:

- Typical HB profile: I<sub>max</sub>\* = 58000 cd
- Single-pixel max. rating: I<sub>max</sub>\* = 87800 cd



40 mm

Typical HB profile



# Excellent contrast in beam for precise symbol projection and high-resolution ADB

#### MicroLED characteristic:

Single-pixel contrast 1:150 over 80 µm (2 px)

Beam contrast:

MicroLED dynamics:

Up to 60 frames/s

with smooth grayscale

- Pixel-center to pixel-center contrast: 1:5
- Smallest hole to fulfill glare level in ADB: 7 × 7 px

10-bit pixel dimming (dimmable down to 0.1%)

Flicker-free beam-projection sequences



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Smooth gradients where desired

## 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, I<sup>2</sup>C).

Reference designs and laboratory electronics are available upon request.





\* including 15% losses at the cover glass

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Minimum ADB gap: 7 × 7 pixel



60 mm



Symbol projection