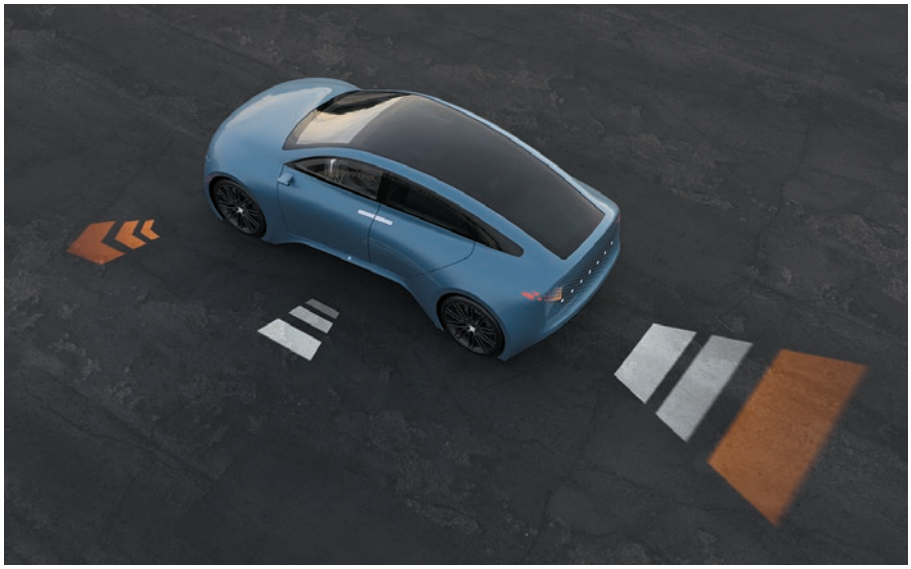
LUMILEDS

AUTOMOTIVE

High-brightness LEDs for surround projection

Optical concepts to enable static and dynamic road projection



Interest in surround-car projection systems will grow significantly in the coming years to increase safety and comfort.
The following application case studies present some high-brightness LED optical concepts with small form factor that meet the key requirements: brightness, field of view, and dynamics of projection.

FEATURES AND BENEFITS

- High-flux, high-luminance LEDs for high-brightness projection and better visibility
- Optical system architecture achieving dynamic road projection without moving parts
- Compact optical designs addressing thermal design constraints and mechanical limitations
- High brightness for visibility in near-daylight conditions

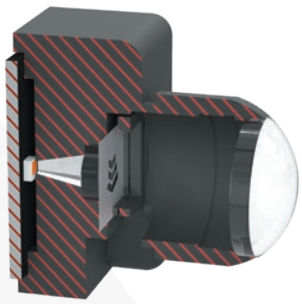
PRIMARY APPLICATIONS

- Projected turn-signal indicators
- Welcome carpet
- Parking assist lighting
- Road user communication

Surround-car projection offering enhanced safety and extra comfort features around the vehicle

Static front-turn signal pattern projection:

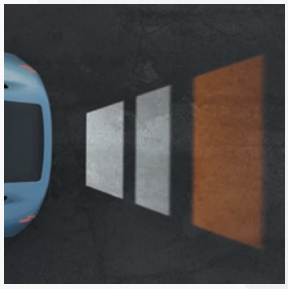
Single-LED approach for compact size and high efficiency



- Optical concept: static graphical optical block out (gobo)
- Compact system with reflector–lens combination and projection lens
- Featured product: 1 x LUXEON FX2 Plus PC Amber
- High contrast in dusk and dawn situations
- Daylight visibility
- System dimensions: 25 mm depth, 12 mm lens diameter
- Light-field dimensions: 40 cm × 60 cm
- Projected flux: 78 lm (incl. gobo blocking), with a reference flux of 250 lm from the LED
- Intensity: 3000 cd, corresponding to 500-1000 lx @ 1.5 m, 10 000 cd with a system of double size and four LEDs shown by simulations

Dynamic back-up light with warning function:

Multi-LED collimating optics for large-area illumination



- Optical concept: dynamic graphical optical block out (gobo)
- Featured products: LUXEON FX2-L; 2 x PC Amber, 4 x Cool White
- High optical efficiency
- System dimensions: 44 mm depth, 25 mm maximum width
- Light-field dimensions: 140 cm × 160 cm
- Projected flux: 460 lm, with a reference flux 2 x 200 lm from the PCA and 4 x 250 lm from the CW LEDs
- Intensity: 1500 cd, corresponding to 150-800 lx @ 1.5 m

Dynamic, segmented, and homogeneous carpet light:

LED matrix in combination with MLA optics for high brightness and contrast

- Optical concept: micro-lens array (MLA)
- Featured product: LUXEON Altilon Intense 1x1, arranged in a 3 × 3 matrix
- Very compact system for easy design integration
- Dynamic features without moving parts
- System dimensions: 10 mm depth × 11 mm width × 10 mm height
- Light-field dimensions: 55 cm × 70 cm
- Projected flux: 40 lm on the road, with a reference flux of 9 x 100 lm from the LEDs
- Intensity: 1000 cd, corresponding to 150-300 lx @ 1.5 m

Featured LUXEON products

	LUXEON FX2-L Plus PC Amber	LUXEON FX2-L Cool White	LUXEON FX2-L PC Amber	LUXEON Altilon Intense 1x1
Typical luminous flux	277 lm @ 1000 mA, 85 °C	382 lm @ 1000 mA, 85 °C	277 lm @ 1000 mA, 85 °C	380 lm @ 1500 mA, 85 °C
Maximum DC current	1000 mA	1500 mA	1000 mA	1600 mA
Light-emitting area	1.15 mm × 1.15 mm	1.15 mm × 1.15 mm	1.15 mm × 1.15 mm	0.88 mm × 0.68 mm
$R_{th,j\text{-}c,el}$	4.1 K/W	3.7 K/W	4.6 K/W	7.3 K/W