

A Multi-Channel LED Driver IC Approach for Exterior Lighting with High Flexibility

Andreas Laute, Melexis

DVN Workshop
Munich, 5 Feb 2026

Session 4 – Innovative Technology



A Multi-Channel LED Driver IC with High Flexibility

Exterior Lighting Applications and Use Cases

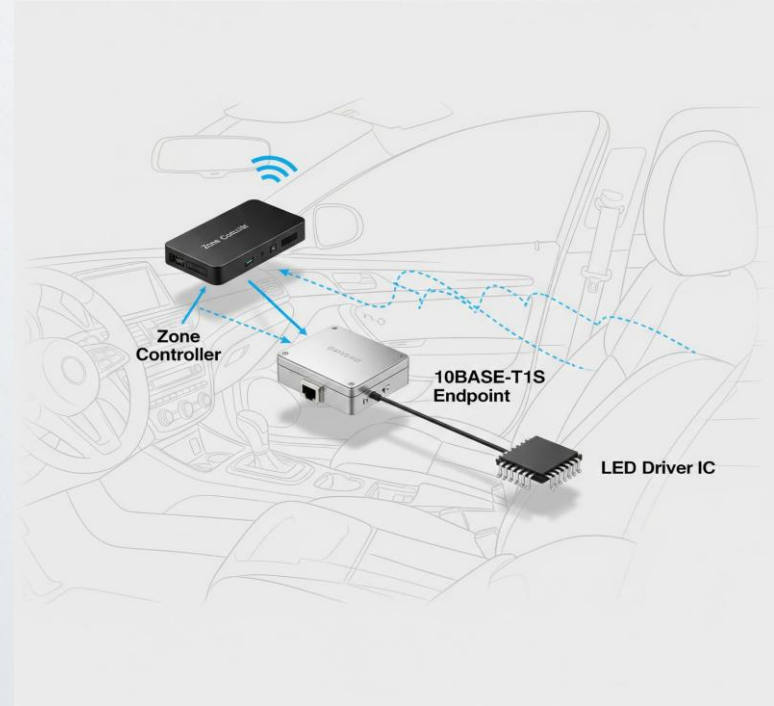
- Exterior displays
- Illuminated grille and front bar
- Rear lamp
- Logo illumination
- DRL, turn indicator, position light
- Ground projection
- Signaling
- Signatures
- Communication
- Branding



A Multi-Channel LED Driver IC with High Flexibility

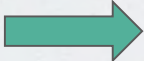
System Requirements

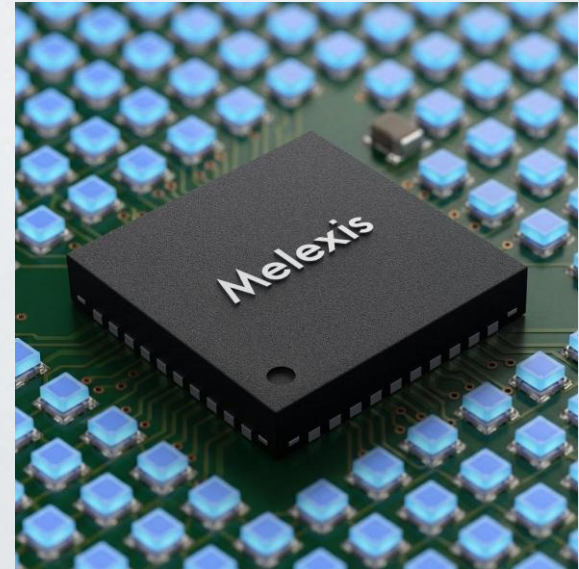
- Typical resolutions 200 to 2000 pixels
- LED displays and LEDs on foil
- Support of panels and “hidden-until-lit”
- High-speed interface to commander unit
- Support of local and remote commander
 - e.g. 10BASE-T1S endpoint topology
- Single-color LEDs
- RGB LEDs - optionally
- Automotive-graded AEC-Q100
- Functional safety ISO26262 for ASIL-B



A Multi-Channel LED Driver IC with High Flexibility

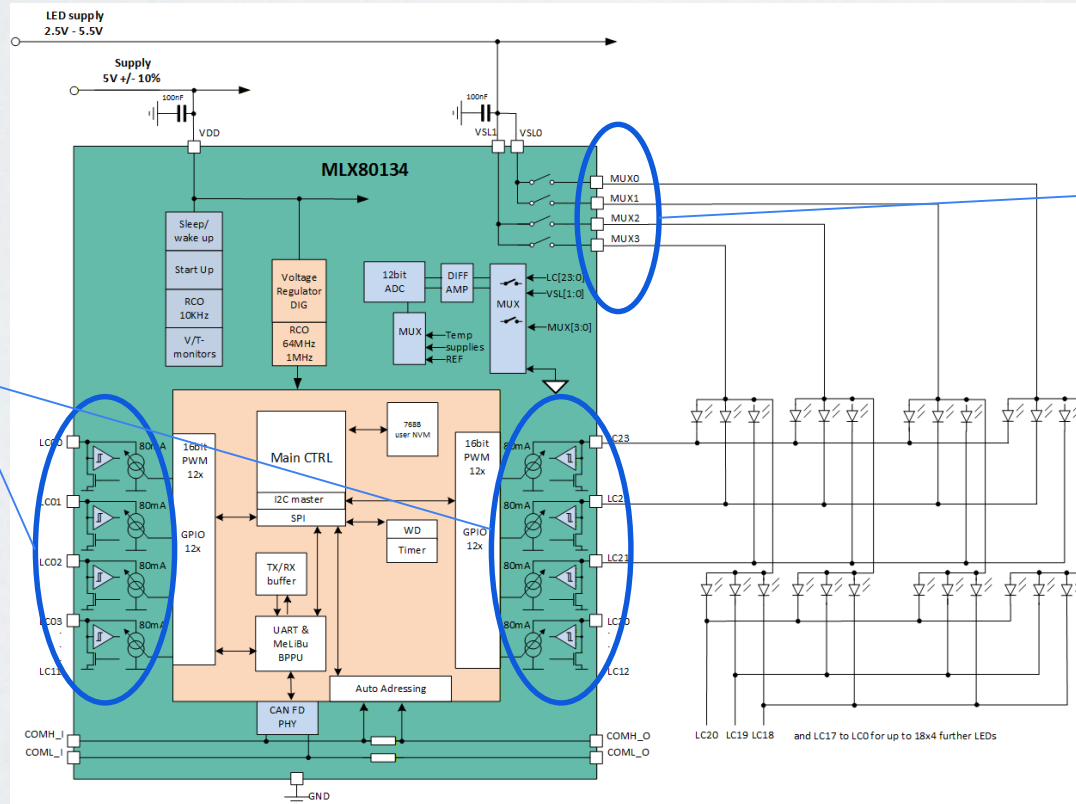
LED Driver IC Requirements

- Integrated code-free feature sets - mainly for single-color LEDs
- User programmability - potentially for RGB LEDs
- Scalability  MeLiBu UART-over-CAN for up to 254 LED drivers
- High number of singly addressable LEDs
- LED multiplexing, usually 4-fold
- Advanced multiplexing features
- Small package size, e.g. QFN (no BGA)
- Wide range of LED currents, typ. 1 to 100mA
- High-resolution PWM, e.g. 16bit at 1kHz
- Channel bundling for high-current use cases
- Control of external DC/DC converters



A Multi-Channel LED Driver IC with High Flexibility

MLX80134 LED Driver IC - Standard Multiplexing for 96 LEDs



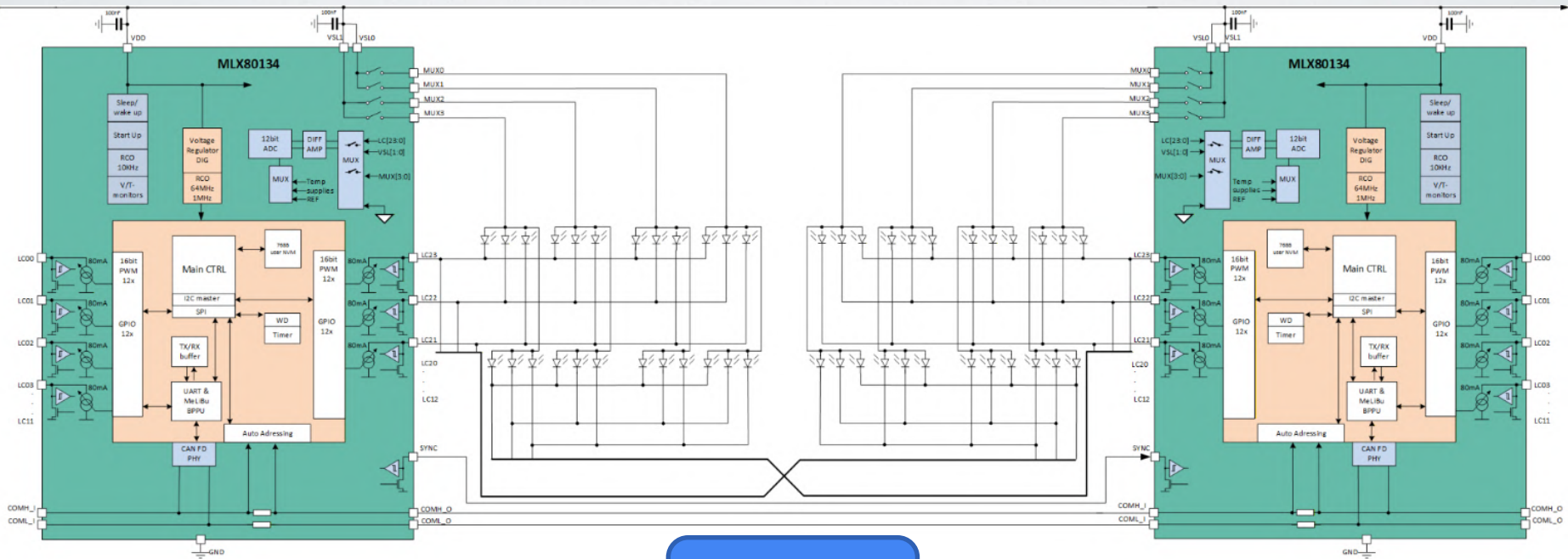
- 24 current sources
- 1.25 to 80mA
- 16bit PWM
- LED diagnostics
- ADC measurement

- 4 multiplex switches
- 110mΩ

- 24 x 4 singly addressable LEDs

A Multi-Channel LED Driver IC with High Flexibility

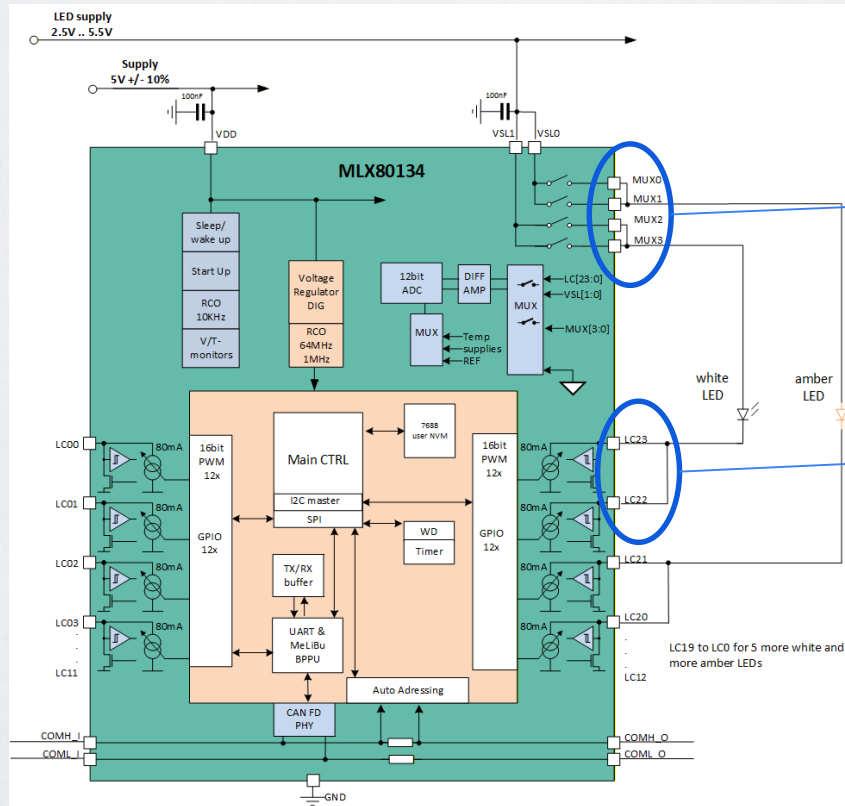
MLX80134 LED Driver IC - Stackable Multiplexing for 384 LEDs



$2^2 \times (24 \times 4) = 384$
single addressable LEDs

A Multi-Channel LED Driver IC with High Flexibility

MLX80134 LED Driver IC - Channel Bundling and Bi-Color Switching



multiplex switches for LED color selection

channel bundling for combining outputs up to $24 \times 80\text{mA} = 1.92\text{A}$

Melexis Lighting Applications

More LEDs, Single Control, Interior and Exterior, ...

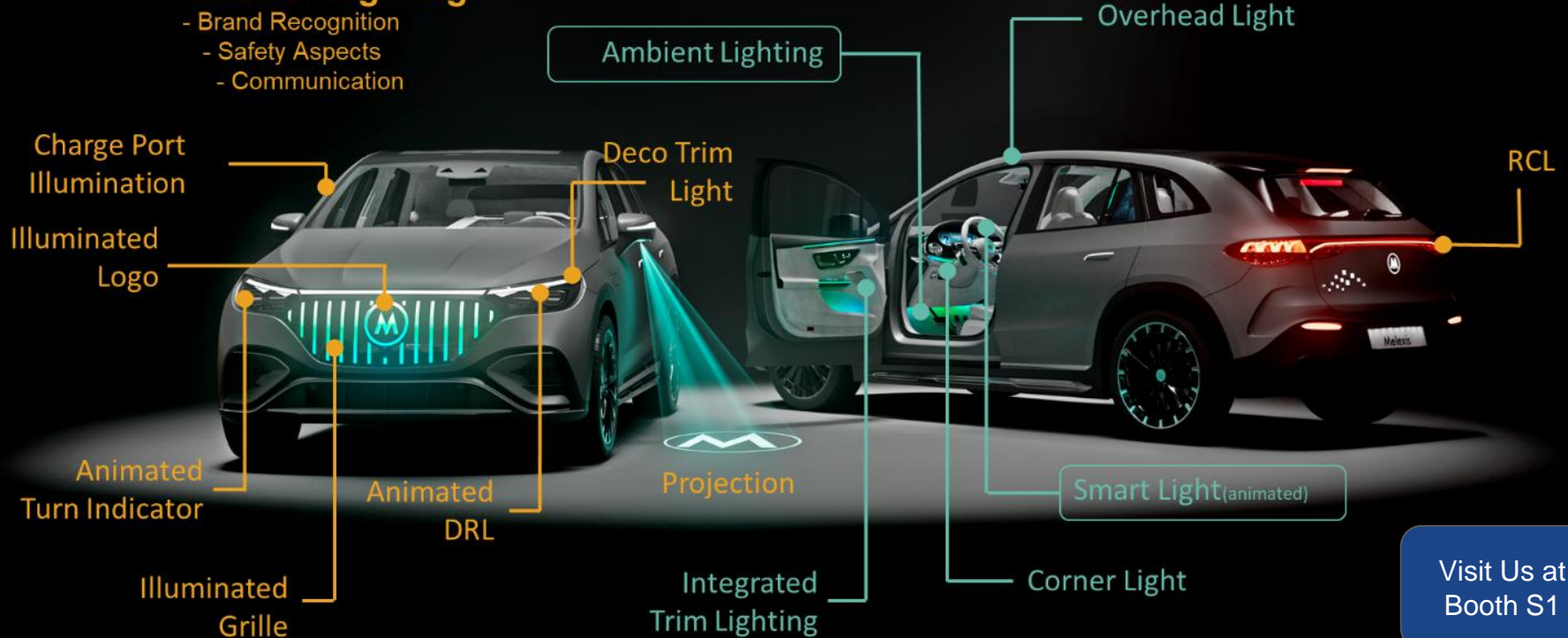
Interior RGB Lighting

- Modern
- Stylish
- Passenger Information

Large Portfolio
of LED Driver
ICs

Exterior Lighting

- Brand Recognition
- Safety Aspects
- Communication



Visit Us at
Booth S1

A 3D rendering of the Melexis logo in a dark blue, metallic font. The letters are mounted on a white, curved wall in a futuristic hallway with glowing blue light strips. The hallway recedes into the distance, creating a sense of depth. The logo is the central focus, with a glowing blue oval highlighting it.

Melexis