ASL60x; ASL61x

Matrix LED controller product brief

Rev. 1.0 — 16 May 2025 **Product brief**

1 General description

The ASL61xxyHz family is a matrix LED controller (MLC) targeting advanced automotive exterior lighting applications to enable the dynamic adaption of LED light patterns. The family consists of MLCs with different part numbers depending on the type of communication, CAN or CAN FD and maximum LED current capability. All parts meet the requirements of automotive applications, being AEC-Q100 grade 1 and AEC-Q006 qualified, operating over the –40 °C to 125 °C ambient temperature range.

The ASL61xxyHz provides 16 channels, each consisting of an integrated switch for bypassing current from the LED/segment. A microcontroller can control multiple MLCs through the CAN interface.

Each output channel can be driven in Pulse Width Modulation (PWM) mode. PWM mode provides 12-bit resolution and an individually programmable duty cycle (DC) via the user interface, to enable fine regulation of the light intensity and freely definable lighting patterns. The PWM frequency is tunable and the PWM phase can be individually programmed. This allows the LED current and voltage to be interleaved, preventing the maximum allowable string current and voltage from being exceeded. Furthermore, this allows PWM dimming to be synchronized across multiple MLCs.

The MLC has an internal 200 MHz oscillator that avoids the need of an external quartz for clock generation and synchronization.

The MLC meets ASIL B functional safety requirements. The MLC can detect a loss of communication with the external microcontroller and switch to Limp Home mode (LHM) to ensure vehicle safety.

The ASL61xxyHz family is available in two thermally enhanced 48-pin small packages - HVQFN48 with wettable flanks or HLQFP48 leaded package.

2 Features

- Automotive-grade product, AEC-Q100 grade 1 and AEC-Q006 qualified
- ASIL B compliant with ISO 26262 2nd Edition
- 16 channels, arranged in four configurable blocks of 4 switches
- Programmable 12-bit PWM dimming
- Synchronized PWM frequency and phase when using multiple MLC devices
- Advanced diagnosis
  - Undervoltage lockout (UVLO) function bringing the MLC to a safe state upon detection of a VCC undervoltage
  - Charge pump monitoring and fail-safe operation (CPFSO)
  - Detection of V_{MAX} shorted to ground, to diagnose external capacitor failure
  - Individual detection of open/shorted LED with a bypass feature
  - Configurable open-circuit detection threshold
  - Smart open-circuit detection when paralleling LED blocks
  - Individual channel voltage measurement for single LED short detection in a segment
  - CAN communication diagnosis, including flagging of illegal actions
- CAN/CAN-FD communication protocol with bit rate switching up to 2 Mbps
- Integrated 200 MHz oscillator
- Built-in non-volatile multiple time programmable memory
- Sleep mode with low current consumption

3 Applications

- Automotive lighting
  - Glare-free high beam (GFHB)
  - Matrix/pixel adaptive high/low beam
  - Dynamic turning indicator
  - Welcome scenarios
  - Dynamic rear lights
  - Dynamic cornering lights
  - Daytime running lights (DTRL)

4 Orderable information

Table 1. Orderable part variations of ASL61xxyHz (xx = switch max current, y = type of CAN communication, z = type of package)

xx (switch max current)	y (type of CAN communication)	z (type of package)	Description	Part
12	S	N	Direct PWM data for every channel – 1.2 A switch – CAN – HVQFN48 package vers. SOT619-17(D)	ASL6112SHN
08	S	N	Direct PWM data for every channel – 0.8 A switch – CAN – HVQFN48 package vers. SOT619-17(D)	ASL6108SHN
12	F	N	Direct PWM data for every channel – 1.2 A switch – CAN-FD – HVQFN48 package vers. SOT619-17(D)	ASL6112FHN
08	F	N	Direct PWM data for every channel – 0.8 A switch – CAN-FD – HVQFN48 package vers. SOT619-17(D)	ASL6108FHN
12	S	V	Direct PWM data for every channel – 1.2 A switch – CAN – HLQFP48 package vers. SOT1571-1	ASL6112SHV
08	S	V	Direct PWM data for every channel – 0.8 A switch – CAN – HLQFP48 package vers. SOT1571-1	ASL6108SHV
12	F	V	Direct PWM data for every channel – 1.2 A switch – CAN-FD – HLQFP48 package vers. SOT1571-1	ASL6112FHV
08	F	V	Direct PWM data for every channel – 0.8 A switch – CAN-FD – HLQFP48 package vers. SOT1571-1	ASL6108FHV

5 Block diagram

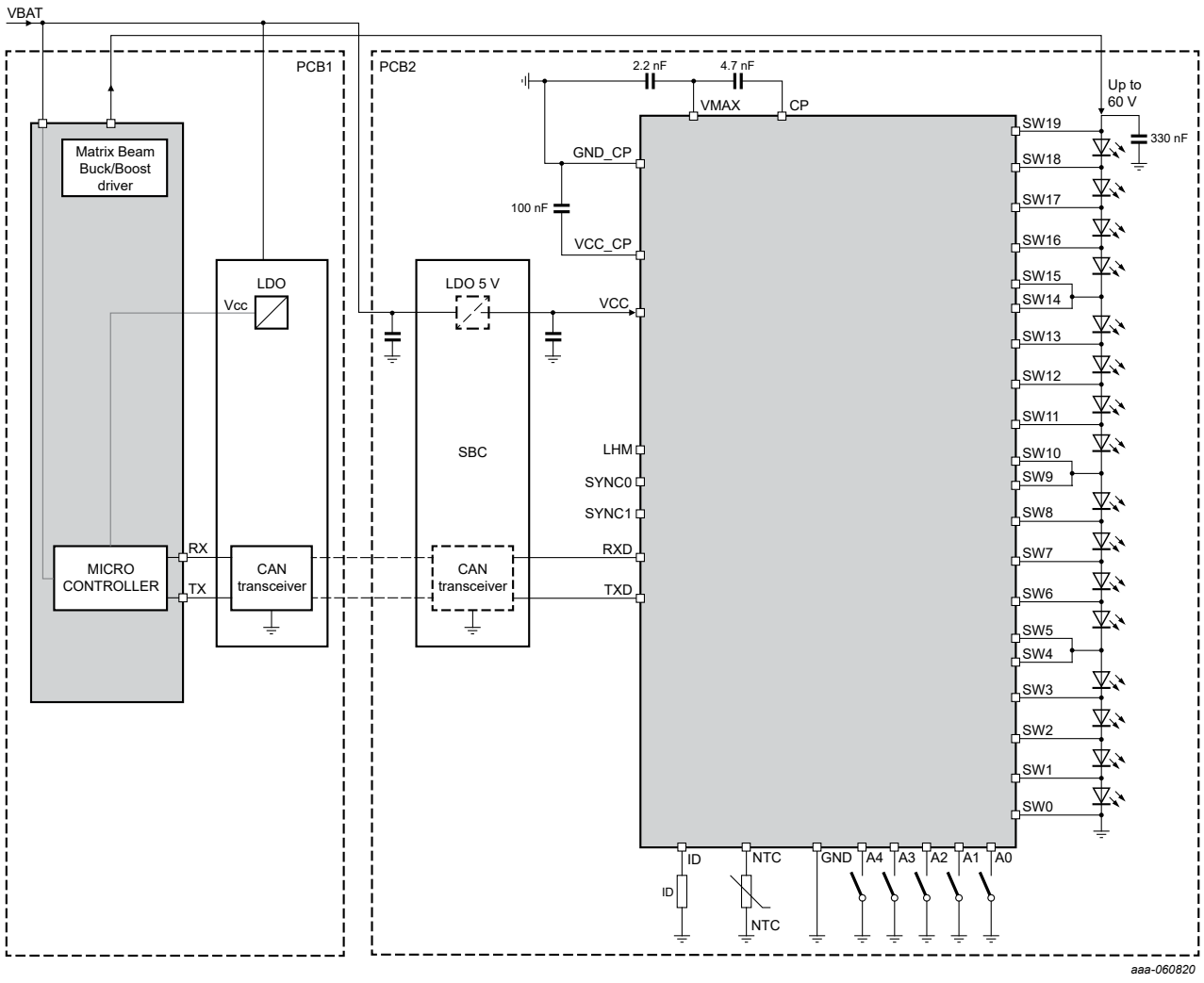

Figure 1. Block diagram

6 Revision history

Table 2. Revision history

Document ID	Release date	Description
ASL610X_ASL611X_PB v.1.0	16 May 2025	Initial version

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