High-Current VCSEL/IR Driver with HV Buck and Diagnostics for Automotive Driver Monitoring

MAX25616

General Description

The MAX25616 is a highly integrated IC that includes a high-current VCSEL/IR driver, high-voltage DC-DC step-down converter, and I²C digital interface, providing a compact solution for automotive driver monitoring systems.

The high-current VCSEL/IR driver features an Analog Devices-proprietary driver that is designed to operate from 4V to 36V and provide peak currents up to 10A. The output voltage of the step-down converter is set at 3.3V (factory-adjustable from 2.8V to 5.2V in 50mV increments) and can provide up to 3A current.

The device features an I²C serial interface for communication with an external microcontroller. The I²C interface programming options include: VCSEL/IR current, VCSEL/IR maximum on-time, and switching frequency of the VCSEL/IR driver. Additionally, the device provides fault and diagnostic information through the I²C interface. An integrated 8-bit ADC converts the VCSEL/IR voltage and VCSEL/IR instantaneous current. By connecting a resistor-divider with an NTC to the AIN1/AIN2 input, the VCSEL/IR temperature can be sensed and read through the I²C interface.

The device is available in a 28-pin, 5mm x 5mm FC2QFN package and is specified for -40°C to +125°C operation.

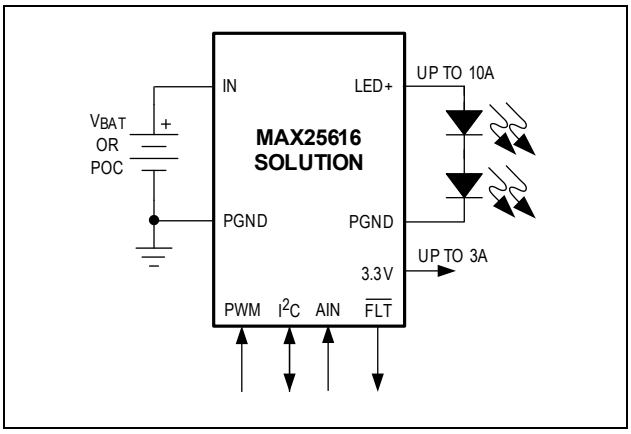
Applications

- Automotive Driver Monitoring Systems
- ADAS Camera Systems

Benefits and Features

- Automotive Ready
  - AEC-Q100 Grade 1 and ASIL B Compliant
  - -40°C to +125°C Operating Temperature Range
- Integration Minimizes BOM and PCB Area
  - Integrated Low-R_{DSON} Power Switches for VCSEL/IR Driver: 17.5mΩ for LS and 30mΩ for HS
  - Integrated Switches for the Step-down Converter
  - Space-Saving, 5mm x 5mm FC2QFN Package
  - I²C Programming and Monitoring
- Comprehensive Fault Protection
  - VCSEL/IR V_{MAX} and V_{MIN} Monitoring
  - VCSEL/IR Overcurrent Protection (I_{MAX}) and Current Monitoring for Eye Safety
  - PWM Duration Protection
  - VCSEL/IR Temperature Monitoring
  - Step-down Converter Undervoltage/Overvoltage Protection
  - Thermal Warning and Thermal Shutdown
- EMI Mitigation
  - Spread-Spectrum Frequency Option
  - Low-Inductance FC2QFN Package

Simplified Application Diagram



***Ordering Information* appears at end of data sheet.**

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19-101841; Rev 1; 9/25