PRODUCT BRIEF

REAL3™ laser driver IRS9103A

VCSEL driver IC for automotive Time-of-Flight applications

IRS9103A is the automotive grade variant of Infineon's REAL3™ VCSEL (Vertical Cavity Surface Emitting Laser) driver product portfolio. It is a highly integrated, fast switching laser diode driver IC optimized for Time-of-Flight (ToF) systems. In combination with Infineon's automotive REAL3™ image sensor it is enabling the most size, cost, and performance optimized 3D camera module designs.

The typical discrete laser driver implementation, consisting of 3 key components and two power supply rails, is replaced by the highly integrated IRS9103A with a single supply rail. This eases up the design tremendously and reduces the bill of material and module size to a minimum while improving performance and robustness at the same time.

The driver IC integrates the required LVDS receiver, gate driver and switch components within a single tiny, AEC-Q100 grade-2 qualified, 1.35 x 1.35 mm wafer level package and can be fully powered by the anyway existing 3.3 V imager power supply, which makes an extra 5 V power rail for the discrete gate driver obsolete. By supporting 10 A driving current and 14 V laser diode voltage the product can drive up to two triple-junction VCSELs in series with a modulation frequency of up to 130 MHz. Built-in fail-safe mechanisms like under voltage and over temperature protection as well as a pulse width limiter offer in combination with Infineon's REAL3™ image sensor an optimal bundle for an eye-safe 3D ToF camera module.

Besides the small footprint, the reduction of four AEC-Q100 qualified key components (including extra power supply) down to one result in further benefits: simplified design and reduced development efforts, less component tolerances for more efficient and robust conversion of electrical into optical power and finally reduced sourcing risk.

Key features

- Laser current up to 10 A
- Laser voltage up to 14 V (dual and triple junction VCSEL support)
- Fast rise and fall times < 1 ns
- Modulation frequency up to 130 MHz
- Build-in fail safe function for
  - LVDS input with always defined state
  - Thermal shut-down
  - Low supply voltage
  - Pulse width limiter ensuring max on-time < 5 µs
- Supply voltage 3.3 V
- 1.35 x 1.35 mm PG-WFWLB-9 package
- T_{amb} of -40°C to 105°C
- Qualification according to AEC-Q100, grade 2

Key benefits

- Driving high VCSEL power at fast modulation frequency
- BoM cost and module size reduced to a minimum
- Simplified design-in
- Robust performance



AEC Qualified · Hal · Pb · RoHS

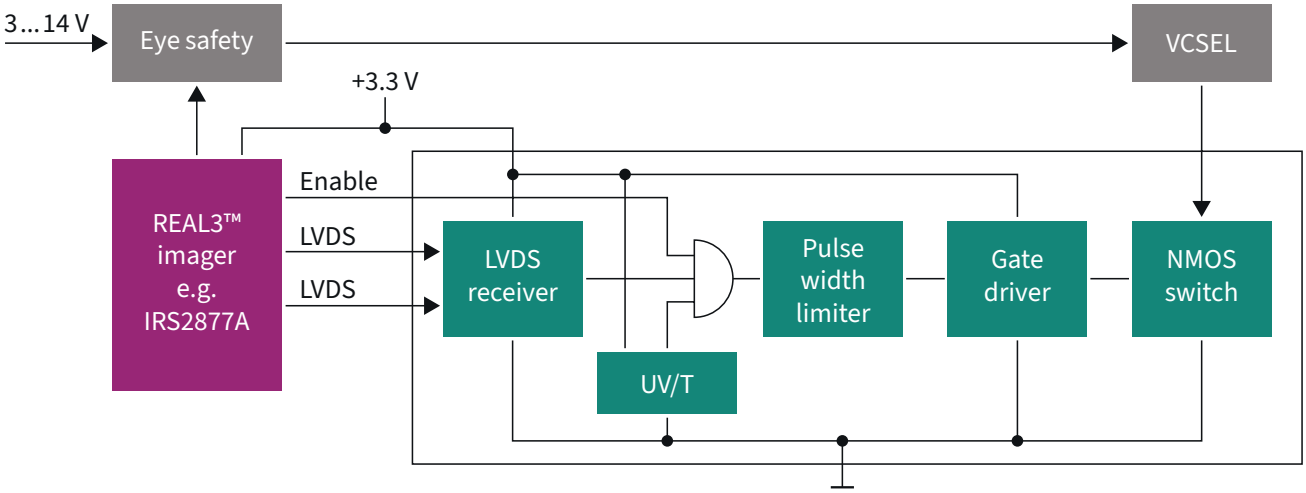
The VCSEL driver is optimized for the usage with REAL3™ Time-of-Flight image sensors (e.g. IRS2877A), utilizing an LVDS input interface for improved signal integrity and EMC robustness. The driver can be fully powered by the anyway existing 3.3 V imager power supply. Finally, in combination with the imager's integrated current monitor for eye-safe designs, the REAL3™ bundle is the most BOM optimized ToF module for automotive applications.

If the application design fits to the voltage mode driver architecture, the driver can also be used without an Infineon ToF imager for other laser powered applications like LiDar or dToF based products.

The block diagram below shows a typical ToF use-case example including a simplified overview of the main functional blocks of IRS9103A:

- LVDS receiver with a built-in fail-safe circuit
- Under-voltage and over-temperature monitor
- Pulse width limiter
- Low side NMOS switch with a gate driver
- Transient voltage protection clamp for the LD

Application block diagram



Product table

Product	Description	I_{LD} [A]	V_{LD} [V]	f_{mod} [MHz]	T_{amb} [°C]	Package
IRS9103A	VCSEL driver IC for automotive, AEC-Q100 qualified	10	14	130	-40 to 105	PG-WFWLB-9 (1.35 x 1.35 mm)

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