TMF8829

Datasheet

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TMF8829 Time-of-flight sensor

1 General description

The TMF8829 is a direct time-of-flight (dToF) sensor with a resolution of up to 48x32. It has a very wide field of view (FOV) of 80° and achieves a detection range of up to 11 m.

The TMF8829 is a direct time-of-flight (dToF) sensor available in a small footprint modular package with an integrated Vertical Cavity Surface Emitting Laser (VCSEL). The dToF device is based on SPAD, TDC, and histogram technology and achieves a detection range of up to 11000 mm. Due to its lens on the SPAD, it supports 8x8, 16x16, 32x32 and 48x32 depth pixels and a very wide field of view. A multi-lens-array (MLA) inside the package above the VCSEL widens the FOI (field of illumination). All processing of the raw data is performed on-chip, and the TMF8829 provides distance information along with confidence values, signal amplitude, and ambient light on its interface.

Internally, the TMF8829 uses dToF histograms and peak detection, and therefore, it is highly tolerant to smudges on the cover glass. Additionally, the TMF8829 can handle multiple objects per depth point simultaneously without degrading accuracy. It reports the distance of all depth points with a resolution of 0.25 mm.

The device uses an I3C (I²C compatible) communication interface and a fully featured SPI interface for control and raw data streaming. A VBUS supply pin allows operation of the I²C/I3C or SPI with 1.2V, 1.8V, or 3V I/O supplies.

Raw data streaming, including all algorithm results, allows further processing on the host for “AI-enabled” applications.

The TMF8829 is a fully contained optical module measuring only 5.7 mm x 2.9 mm x 1.5 mm.

1.1 Key benefits & features

The benefits and features of TMF8829, Time-of-flight sensor are listed below:

Table 1: Added value of using TMF8829

Benefits	Features
Matches autofocus region of interest of mobile phone cameras including wide angle camera	80° FOV (diagonal, aspect ratio 4:3); rectangular SPADs
Detect object in a wide distance range	8x8 zone dToF operating mode
Distinguish several objects in field of view	16x16 zone dToF operating mode
High resolution for support of hand gestures and face identification support	32x32 and 48x32 zone dToF operating mode
Multi-objects detection. Cover glass smudge tolerant	dToF operation with up to 4 objects per depth point
Off-load host processing power	Full internal processing
AI enabled	Raw data streaming including processed distance data due to fast I3C and SPI interface
Wide range of host processors including newest generation 1v2 I/O supply	1.2V, 1.8V and 3V compliant I/O with dedicated I/O supply pin using I3C (I²C compatible)
Support macro range to telephoto range of mobile phone autofocus (LDAF)	1 cm minimum distance and 0.25 mm resolution
Wide range of applications	-40ºC to 85ºC temperature range
Allow integrations in space constrained applications	Module size 5.7 mm x 2.9 mm x 1.5 mm Smallest high resolution dToF sensor

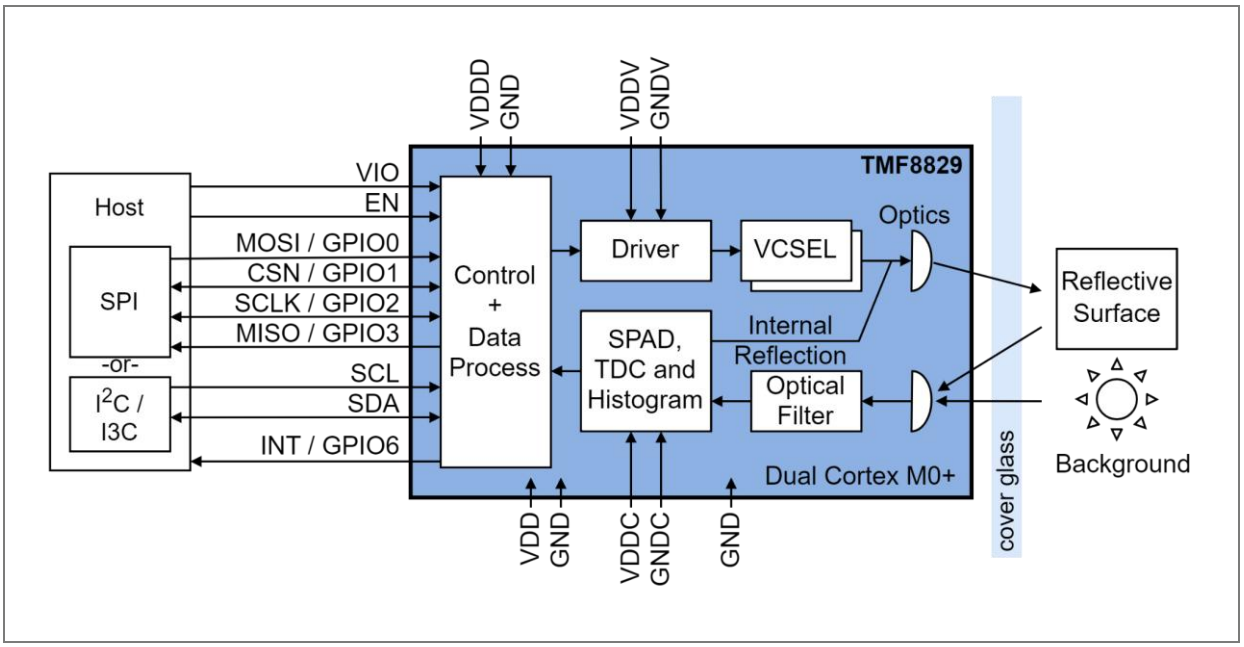
1.2 Applications

- LDAF - Laser detect autofocus
- Bokeh effect for cameras
- SLAM - Simultaneous Localization and Mapping
- Robot automation like obstacle avoidance, cliff detection and room scanning
- People counting
- Advanced gesture detection

1.3 Block diagram

The functional blocks of this device are shown below:

Figure 1: Functional blocks of TMF8829



2 Ordering information

Product type	Ordering code	Package	Marking	Delivery form	Delivery quantity
TMF8829-1AM	Q65115A1077	Optical module	8-digit tracecode	Tape & reel 7'' reels	500 pcs/reel
TMF8829-1A	Q65113A9854			Tape & reel 11'' reels	3500 pcs/reel

3 Laser eye safety

The TMF8829 is designed to meet the Class 1 laser safety limits including single faults in compliance with IEC / EN 60825-1:2014, EN 60825-1:2014+A11:2021 and Class 1 consumer laser product according to EN 50689:2021. This applies to the stand-alone device and the included software supplied by ams OSRAM. In an end application system environment, the system may need to be tested to ensure it remains compliant. The system must not include any additional lens to concentrate the laser light or parameters set outside of the recommended operating conditions. Use outside of the recommended condition or any physical modification to the module during development could result in hazardous levels of radiation exposure.

Figure 2: Laser eye safety certificate

IEC 60825-1:2014,
EN 60825-1:2014+A11:2021 and
EN 50689:2021

Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

CAUTION:

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Example: Adding a converging lens on top of the TMF8829.

4 Revision information

Document status	Product status	Definition
Product Preview	Pre-development	Information in this datasheet is based on product ideas in the planning phase of development. All specifications are design goals without any warranty and are subject to change without notice
Preliminary Datasheet	Pre-production	Information in this datasheet is based on products in the design, validation or qualification phase of development. The performance and parameters shown in this document are preliminary without any warranty and are subject to change without notice
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Changes from previous version to current revision v1-00	Page
Initial production version	
Major update of all sections	All

- Page and figure numbers for the previous version may differ from page and figure numbers in the current revision.
- Correction of typographical errors is not explicitly mentioned.

5 Legal information

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