# 1D Time-of-Flight Sensing

## www.ams.com/TMF8701

### TMF8701 – Time-of-Flight Sensor Family

- High accuracy distance measurement with <1 mm resolution through fast Time-to-Digital converter direct Time-of-Flight measurement
- Compensates for dirt/smudges on cover glass with built-in histogram
- Provides class 1 eye safety through narrow <500 psec fast pulse 940 nm VCSEL driver
- Enables ultra-compact use through industry's smallest modular package: 2.2 x 3.6 x 1.0 mm

**Sensing is life.**

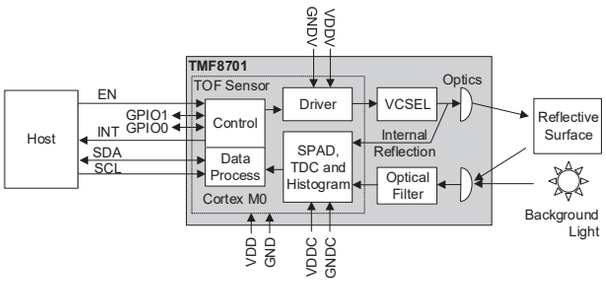
## General Description

The TMF8701 is a robust true direct time-of-flight (ToF) sensor system which offers highly accurate depth accuracy detection through a sub-nanosecond light pulse and an antialiasing "stop-watch" method to measure round-trip time of pulse. It provides single zone detection of an object irrespective of the color, reflectivity and texture of the object. The single module with VCSEL emitter offers high dynamic range and operates in either a proximity mode (0 – 10 cm) or a ranging mode (10 – 60 cm) for detection sensing. The device utilizes highly sensitive SPAD detection with fast compact time-to digital converters to make high accurate distance measurement within 5% and is capable of operation in dark environments. A built-in histogram is featured to detect cover glass and objects behind glass to select object with highest SNR while compensating for dirt and smudges on cover glass to produce artifact free measurement of multiple objects. The histogram enables greater distance between cover glass, delivers dynamic cover glass calibration and crosstalk compensation. Class 1 eye safety is also featured through the narrow sub-nanosecond (<500 psec) fast pulse 940 nm VCSEL driver. Background light noise is minimized through on-chip superior sunlight rejection filter. An integrated micro controller is featured with all algorithms included on-chip with no need for external optics. Ultra compact technology use is featured through the industry's smallest modular package size of 2.2 x 3.6 x 1.0 mm.

## Applications

- 3D facial recognition
- Proximity detection
- Presence detection
- Object detection
- Distance measurement
- Collision avoidance

## TMF8701 Block Diagram




## Features

- True direct Time-of-Flight measurement
- Single Photon Avalanche Diode detection
- Fast compact Time-To digital Converters
- Sub-nanosecond (<500 psec) light pulse driver
- High accuracy distance measurement (5%) -- 1mm resolution
- Histogram based architecture
- SoC with integrated micro-controller – All algorithms on-chip
- Dynamic cover glass calibration
- Dirt/Smudge cover glass detection and compensation
- Sunlight rejection filter
- 940 nm VCSEL driver
- Class 1 Eye Safe
- 940 µA active mode current consumption at 10 Hz (proximity mode)
- 26 mA active mode current consumption at 60 Hz (proximity and distance mode)
- I²C fast-mode compatible interface
- Modular OLGA package with lens – 2.2 x 3.6 x 1.0 mm

| Device | Package | I²C Interface | | Ordering Number |
|---|---|---|---|---|
| | | Address | Bus Voltage | |
| TMF8701 | OLGA | 0X41 | 1.8V | TMF8701-1B |



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