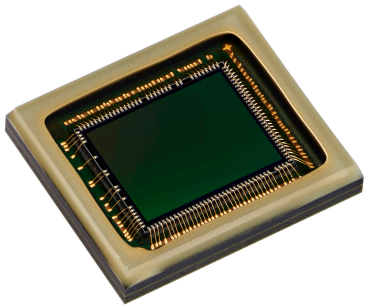
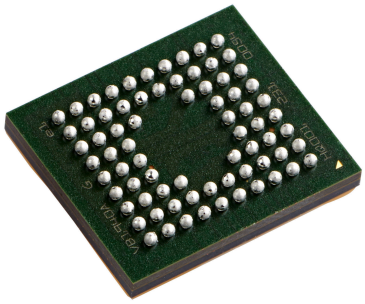
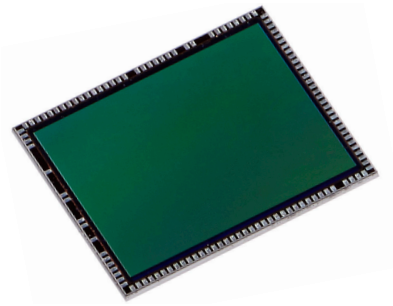
VB1740, VD1740

Data brief

Automotive grade 2.7 megapixel backside illuminated global and rolling shutter sensor for near infrared and visible scenes







Root part number	Description
VB1740	OBGA package
VD1740	Bare die

Features

Automotive compliancy

- AEC-Q100 automotive grade 2 qualified
- Operating junction temperature: -40°C to 125°C
- ISO26262 compliant to support ASIL B system integration
- Cybersecurity features

Hybrid 2.7 MP global and rolling shutter features

- 3D stacked sensor 40 nm/65 nm
- 2.7 MP sensor (1920 x 1432)
- 2.25 µm x 2.25 µm BSI (backside illuminated) pixel
- RGB/NIR pixel technology with RGB NIR 4x4 pattern
- Image array size: 4.3 mm x 3.2 mm
- Optical format 1/3 inch
- Bare die or OBGA package

Innovative features

- Dual exposure controls (RGB and IR)
- On-chip bayerization ISP (image signal processor)
- On-chip color HDR (high dynamic range) merges
- On-chip NIR smart upscale
- 4 programmable contexts, in a versatile sequence, with up to 32 elements

Interface

- Quad-lane transmitter MIPI CSI-2 (copyright© 2005-2010 MIPI Alliance, Inc. Standard for camera serial interface 2 (CSI-2) version 1.1), up to 1.5 Gbps per lane
- 4 programmable GPIOs (general-purpose input/outputs) to control the LED (light-emitting diode)
  - Output synchronized with sensor integration periods
  - PWM (pulse-width modulation) control
- Fast mode plus I²C control interface

Unique imaging performance

- HDR linear dynamic range up to 100 dB in rolling shutter mode
- Up to 60 frames per second at full resolution
- Ultralow noise

Application

The VB1740 and VD1740 are new 2.7 MP imagers aimed at addressing a large field of view (door to door) in cabin monitoring applications. The sensor integrates a full suite of features enabling its use in pure NIR systems or RGB NIR systems: global and rolling shutter operations, flexible context management, on-chip HDR merge, smart NIR scaling and RGB Bayerization. Its unique 4:3 optical format can be used in a machine vision setup while covering the usual full HD format for viewing/display needs. The VB1740 and VD1740 are pin-to-pin compatible with the VB1940 and VD1940 5.1 MP, allowing ST customers to scale the image sensor resolution with minimal redesign effort.

Description

The VB1740 and VD1740 are 2.7 MP image sensors with both rolling and global shutter modes.

In rolling shutter mode, the VB1740 and VD1740 produce a single HDR color frame output through the MIPI CSI-2 interface. This is achieved by combining a short and long exposure. In addition, the user can activate a function that converts the RGB NIR pattern to an RGB format. Such a format is compatible with any standard automotive ECU (electronic control unit).

In global shutter mode, the RGB pixels upscale the NIR image to full resolution. This innovative use of the NIR information is achieved thanks to the independent exposition of the NIR and RGB pixels.

The sensor captures up to 60 frames per second in a 1920 x 1432 resolution format. The device is fully configurable through the I²C serial interface. It also provides flexible frame-to-frame configuration changes via the use of programmable contexts. Up to four contexts can be sequenced in a versatile loop of up to 32 elements.

The sensor is designed as a SEOOC (safety element out of context). It is compliant with ISO26262 standards and ASIL-B safety levels.

The VB1740 and VD1740 are designed with a full set of cybersecurity features.

1 Overview

Figure 1. **VB1740, VD1740 block diagram**

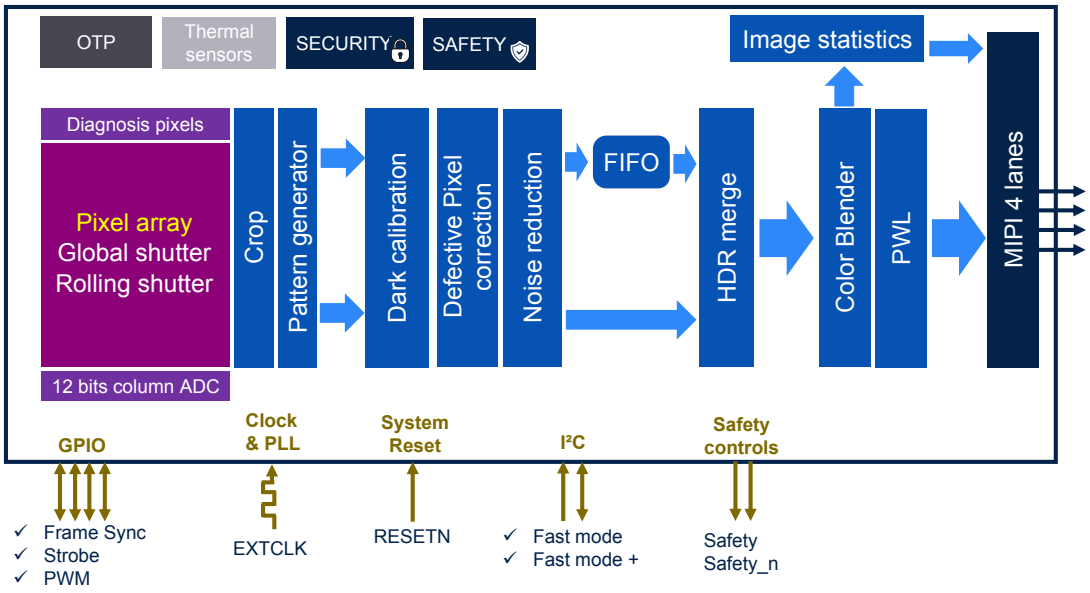
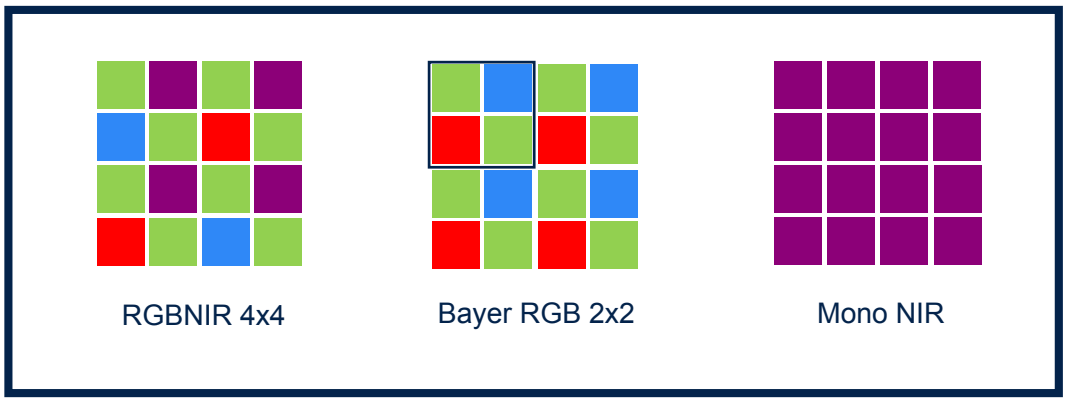


Figure 2. **VB1740, VD1740 output formats**



Revision history

Table 1. **Document revision history**

Date	Version	Changes
12-Nov-2024	1	Initial release
18-Sep-2025	2	Updated *Features* and *Description* for MIPI CSI-2 version, and four programmable GPIOs, rather than six.

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