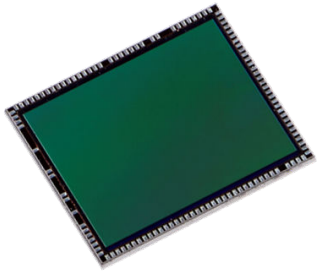
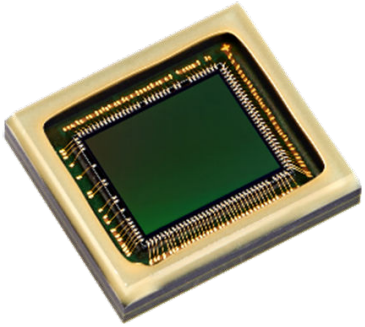
# VB1943, VD1943
# VB5943, VD5943

Data brief

## Feature-rich 5 MP image sensors with dual global & rolling shutter





ST Bright Sense

| Order code | Description |
|---|---|
| VB1943CAJX/1 | RGB-IR, OBGA packaged sensor |
| VD1943CE/RW | RGB-IR, sensor bare die in reconstructed wafer |
| VB5943CAJX/1 | Monochrome, OBGA packaged sensor |
| VD5943CE/RW | Monochrome, sensor bare die in reconstructed wafer |

## Features

- **Resolution**: 5.08 MP (2560 x 1984)
- **Chroma**: Monochrome or RGB-IR
- **Optical format**: 1/2.5" (7.29 mm)
- **Pixel technology**:
  - Pixel pitch: 2.25 µm
  - Shutter type: dual global and rolling shutter
  - Technologies: BSI, CDTI, 3D stacking
- **Embedded features**:
  - Image enhancement: dual global & rolling shutter, on-chip HDR, multiexposure, noise reduction, and more.
  - Data and frame rate optimization: RGB-IR conversion (for RGB-IR version), image statistics, cropping, and more.
  - Others: context management, GPIOs x4, and more.
- **Frame rate**: up to 100 fps, full resolution
- **Output**:
  - Pattern:
    - Monochrome: 5 MP gray scale
    - RGB-IR: 5 MP RGB-IR 4x4, or 5 MP RGB Bayer, or 1.27 MP IR, or 5MP IR (smart upscale)
  - Format: RAW8, RAW10, RAW12 with dynamic compression
- **Interfaces**:
  - Data output interface: MIPI CSI-2 (2 or 4 lanes), up to 1.5 Gbps/lane
  - Control interface: I²C
- **Deliverable types**: Bare die in reconstructed wafer or OBGA packaged sensor

## Application

- Robotics
- Drones
- Machine vision
- Barcode scanning
- 3D stereo vision
- Security
- Biometrics
- Intelligent transportation systems
- Smart building
- Medical imaging

## Description

The VB1943, VB5943, VD1943, and VD5943 are advanced 5-megapixel CMOS image sensors featuring dual global and rolling shutter technology for superior image quality in diverse conditions and advanced on-chip features such as RGB-IR conversion and smart upscale, opening new possibilities across diverse applications.

Combining simultaneous pixel exposure (global shutter) with sequential exposure (rolling shutter), these sensors optimize image capture under diverse lighting and motion conditions. Global shutter mode eliminates motion artifacts for distortion-free imaging, while rolling shutter enhances dynamic range and low-light sensitivity, supported by on-chip 18-bit HDR. This dual-mode operation provides flexible tuning to meet specific application demands, ensuring artifact-free clarity and superior signal-to-noise ratio.

Available in monochrome and RGB-IR variants, the monochrome models (VD5943, VB5943) output raw gray scale, while RGB-IR models (VD1943, VB1943) feature on-chip RGB-IR separation and smart upscale, eliminating external chips and complex demosaicing. Smart upscale boosts the IR channel, providing full 5 MP IR images alongside 5 MP RGB output. This makes the sensors ideal for applications requiring both high-resolution color and near infrared imaging.

Featuring advanced 2.25 µm pixels with BSI and CDTI technologies, the sensors deliver superior sensitivity and MTF across visible and near infrared spectra. Coupled with on-chip HDR and frame rates up to 100 fps at full resolution, they deliver crisp, detailed images directly from the sensor.

Designed for easy integration, the sensors include advanced on-chip processing and a streamlined MIPI CSI-2 interface (two or four lanes). This design reduces processing load and power consumption in compact embedded vision systems. Their compact 1/2.5” optical format further supports flexible system design.

For maximum design flexibility, the sensors come in robust, ready-to-solder OBGA packages with dual-side antireflective coating for enhanced optical performance. Bare die versions are also available for customized camera modules, enabling manufacturers to tailor solutions to exact specifications.

## Revision history

Table 1. **Document revision history**

| Date | Version | Changes |
|---|---|---|
| 03-Oct-2025 | 1 | Initial release |

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