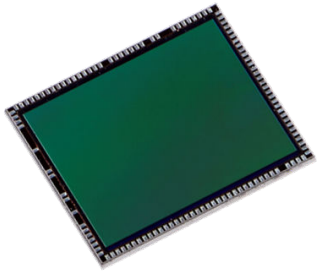
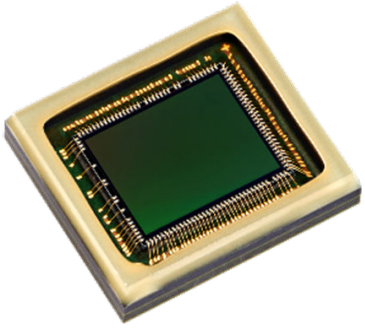
VB1943, VD1943
VB5943, VD5943

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

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice.

In the event of any conflict between the provisions of this document and the provisions of any contractual arrangement in force between the purchasers and ST, the provisions of such contractual arrangement shall prevail.

The purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgment.

The purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of the purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

If the purchasers identify an ST product that meets their functional and performance requirements but that is not designated for the purchasers' market segment, the purchasers shall contact ST for more information.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.