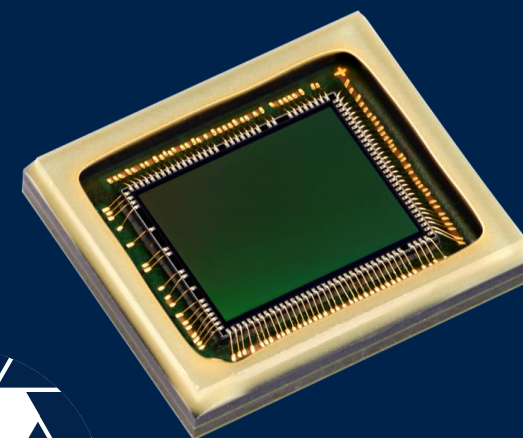




Introducing VD1943, VB1943, VD5943, VB5943

5-megapixel CMOS image sensors
designed to accelerate new applications
and simplify innovation





A powerful addition to the ST BrightSense portfolio





ST BrightSense portfolio

A broad and growing CMOS image sensors offer

Partner with an experienced and reliable industry leader



Patented technologies awarded by top players



Proven supply chain with billions of units shipped



Comprehensive imaging portfolio (CIS, ALS, dTOF, iTOF)

Build smart and power-efficient vision systems



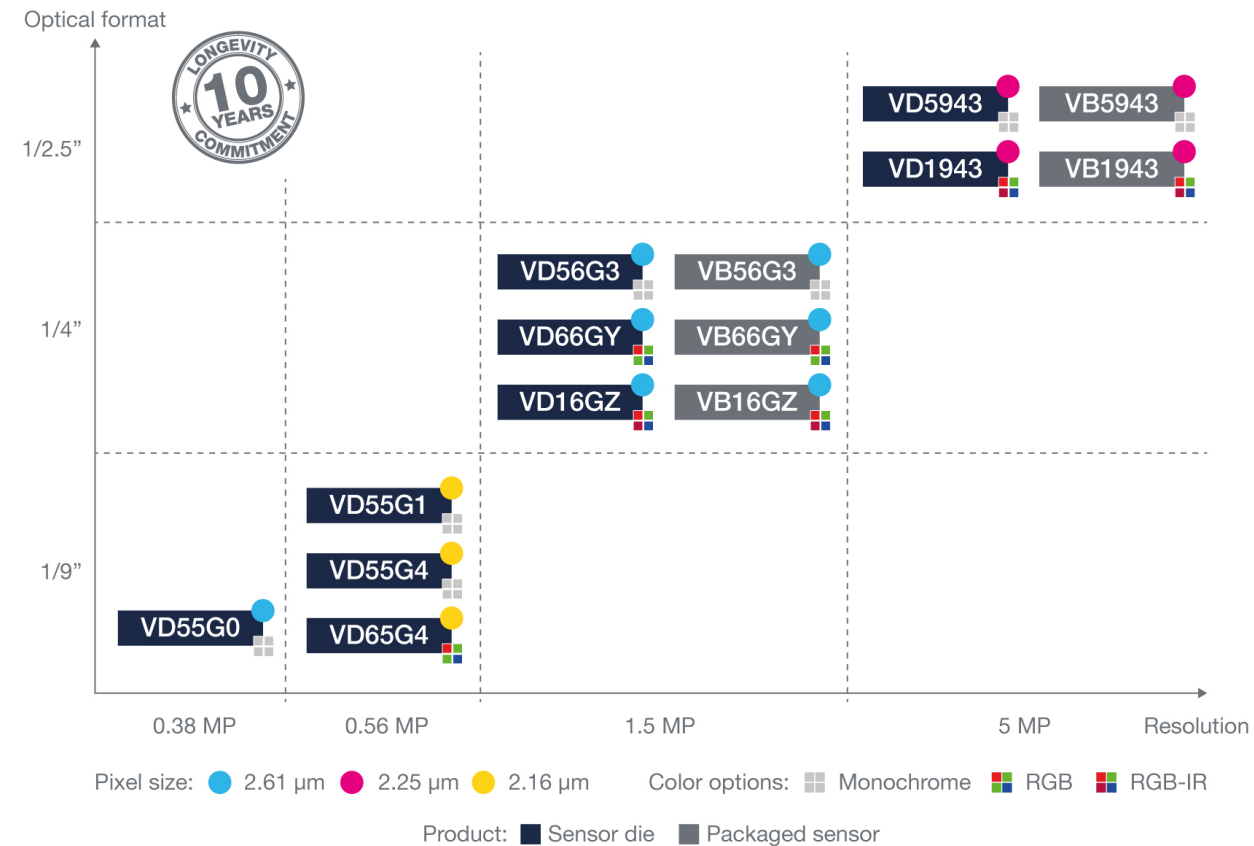
Extend battery time with low power & auto-wake up



Optimize processing through smart in-sensor features



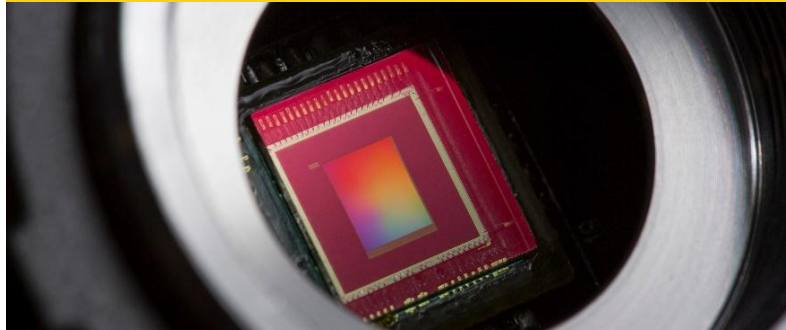
Maximize ergonomics and size with slim sensor designs





ST BrightSense overview

Bring computer vision to the next level



Build up precise and responsive systems

Capture high-quality images in any condition with our advanced pixel technologies and features

Reveal the unseen with near infrared

Benefit from sensors superior NIR sensitivity for face ID, low-light imaging, or bio sign monitoring

Stay at the forefront of innovation

Benefit from state-of-the-art patented technologies from ST's proprietary wafer fab

Create smart & power-efficient vision solutions



Develop new smart functionalities

Leverage smart on-chip features to develop new functions and save processing resources

Vision systems designed to fit everywhere

Rely on ultra-compact sensors to build tiny and discrete embedded vision systems

Extend battery life in mobile systems

Leverage low operating power and auto-wake up feature to get rid of inefficient 24/7 operation

Save resources and accelerate time-to-market



Everything you need in a few clicks

Documentation, reference designs & turnkey hardware to operate with various platforms

Effortless evaluation & development

Use turnkey drivers with optimized ISP configuration to maximize image quality

Support from prototype to production

Wide range of evaluation camera modules available then in production from various partners



Explore a pioneering 5 MP imaging product

Cutting-edge 2.25 μm pixels with dual global & rolling shutter

On-chip single-frame HDR for enhanced image quality

Low power and MIPI CSI-2 output ideal for edge AI vision systems

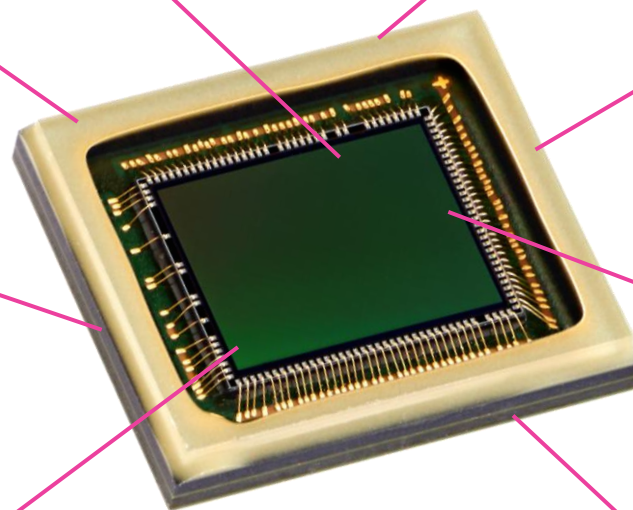
Available as bare die and packaged sensor

Superior sensitivity and sharpness for accurate imaging

Industry-leading footprint enabled by advanced pixel technologies

Smart built-in features including embedded RGB-IR separation

Available in monochrome and RGB-IR versions



Vx1943 & Vx5943

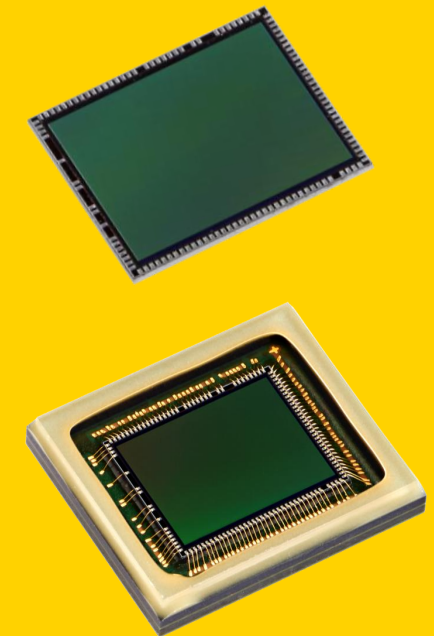
Features overview

Category	Parameters	Specifications
Optical	Resolution	5.08 MP
	Pixel array – H x V	2560 x 1984
	Aspect ratio	4 : 3
	Optical format	1/2.5" (7.29mm)
	CRA	20°
Pixel	Pixel size	2.25 µm
	Shutter type	Global (GS) & Rolling (RS)
	Technology	BSI, CDTI, 3D stacking
Electronic	Frame rate max	100fps at full resolution
	Output interface	MIPI CSI-2, up to 4 lanes
	Output format	RAW8, RAW10, RAW12
	Control interface	I ² C
	Supply voltages	1.15 V – 1.8 V – 2.8 V
Mechanical	Die dimension – H x V	5.76 x 4.46 mm ²
	Package dimension – H x V	10.3 x 8.9 mm ²
Options	Chroma	Monochrome or RGB-IR
	Deliverable	Die or packaged sensor

Embedded features:

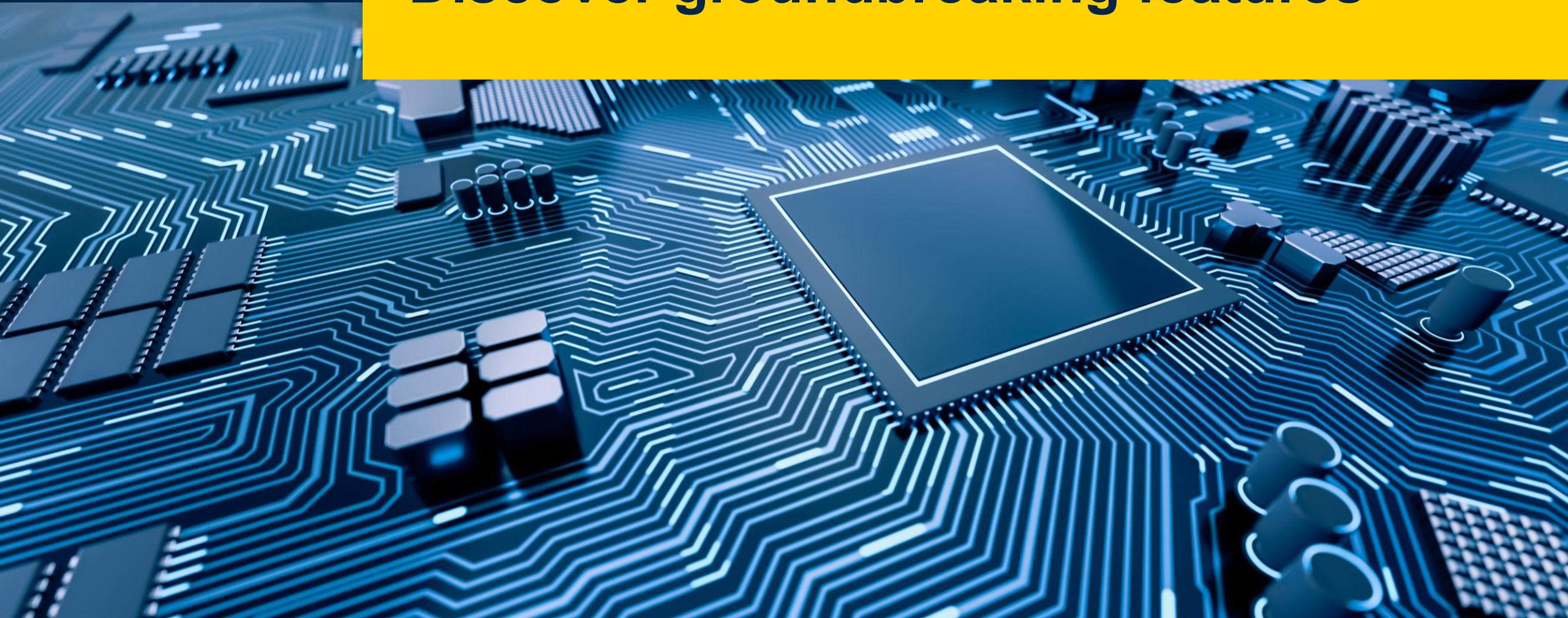
- Linear HDR
- Global & rolling shutter mode
- On-chip RGB-IR conversion (RGB, IR, smart upscale IR)
- Multi-exposure
- Image statistics
- Cropping
- Sub-sampling
- Noise reduction
- Dark calibration
- Defective pixel correction
- Mirror/Flip
- Context management
- GPIOs x4
- Test pattern generation
- Temperature sensor

And more





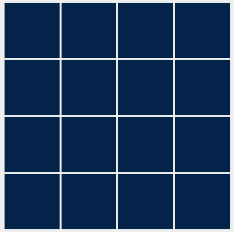
Discover groundbreaking features



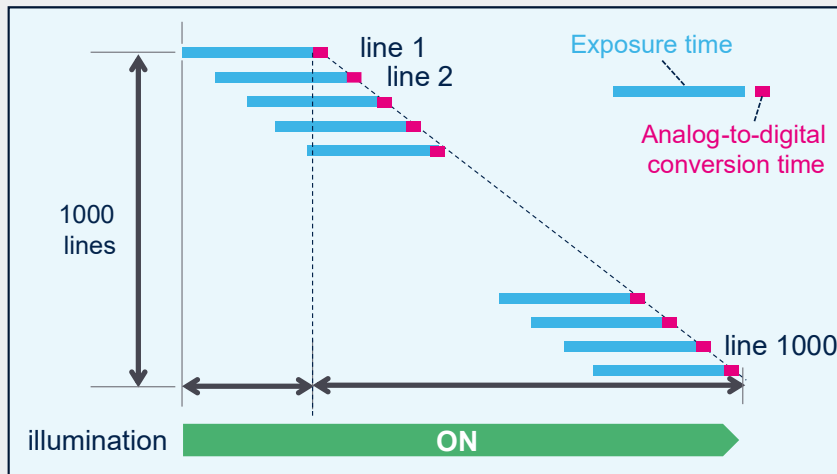
Innovative dual global / rolling shutter

No more compromises — Harness the best of both worlds

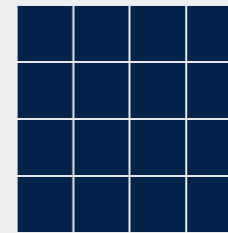
Rolling shutter



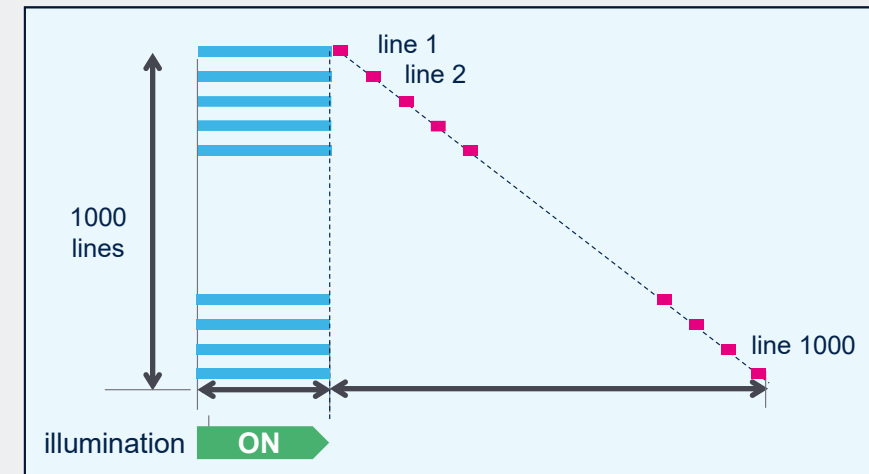
Exposure to light is “rolling”:
Pixel rows are exposed to light one after the other with a delay.



Global shutter



Exposure to light is “global”:
Pixel rows are all exposed at the same time.



Innovative dual global / rolling shutter

No more compromises — Harness the best of both worlds

Rolling shutter



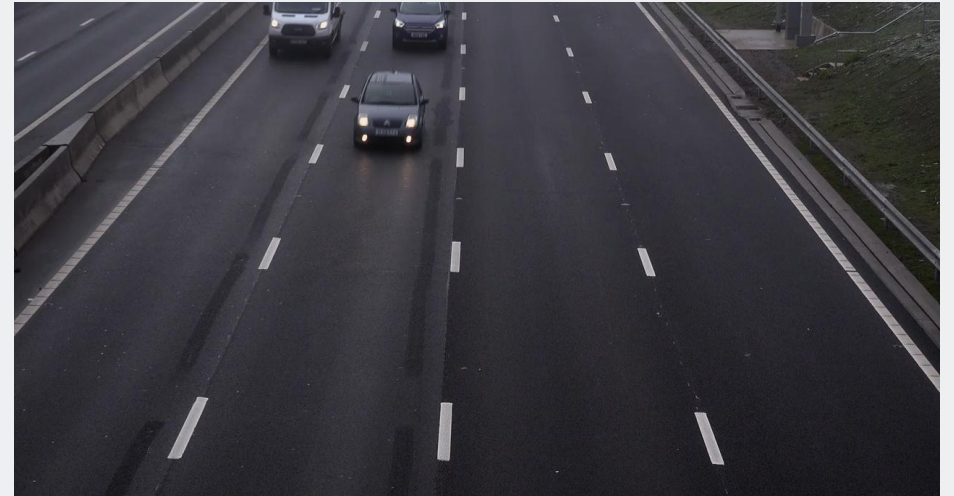
Enhance image contrast

through extended dynamic range capabilities

Improve signal-to-noise ratio

for superior performance in low-light environments

Global shutter



Eliminate motion blur and lighting artifacts

for high-speed image and video capture

Reduce power consumption and illumination needs

with ultra-short exposure times



Experience superior 5 MP image quality

Powered by ST's proprietary 2.25 μm pixel technology & advanced wafer fabrication



On-chip HDR with linear single-frame operation, making it ideal for challenging outdoor environments



Superior sensitivity and sharpness with BSI and CDTI technologies for high-performance machine vision



Extended dynamic range and low noise in rolling shutter mode for excellent low-light performance

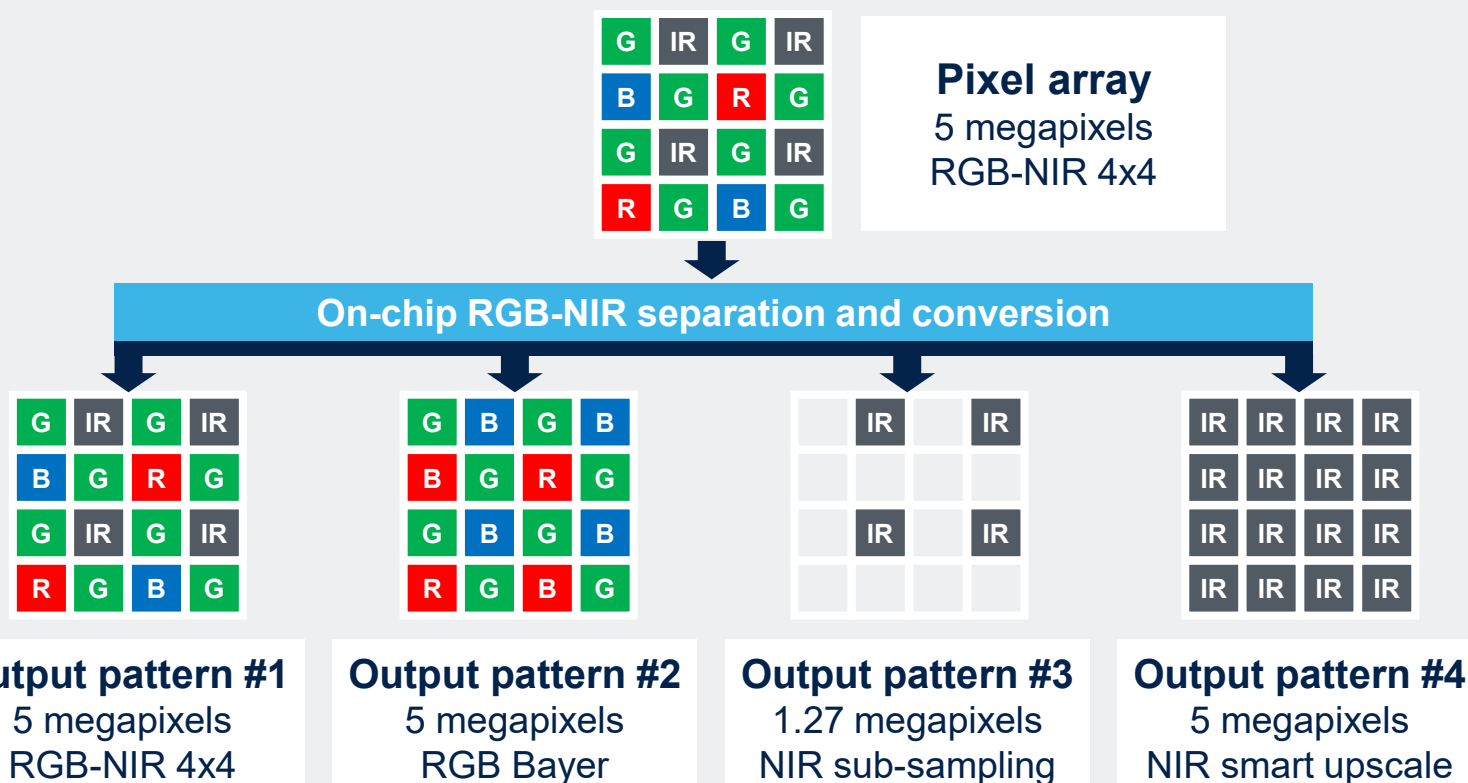


High-speed, artifact-free image capture in global shutter mode, supporting up to 100 fps frame rate



On-chip RGB-IR separation and conversion

From daylight to nighttime, from color to multispectral



Switch the output pattern instantly at any frame with a single register change

Benefit from balanced imaging through independent RGB & IR exposure times

Achieve full 5MP NIR resolution leveraging proprietary on-chip smart upscale

On-chip RGB-IR separation and conversion

Making RGB & IR streaming simple and affordable



No extra companion chips required



Simplify software with built-in demosaicing



Full-resolution color and NIR with smart upscale

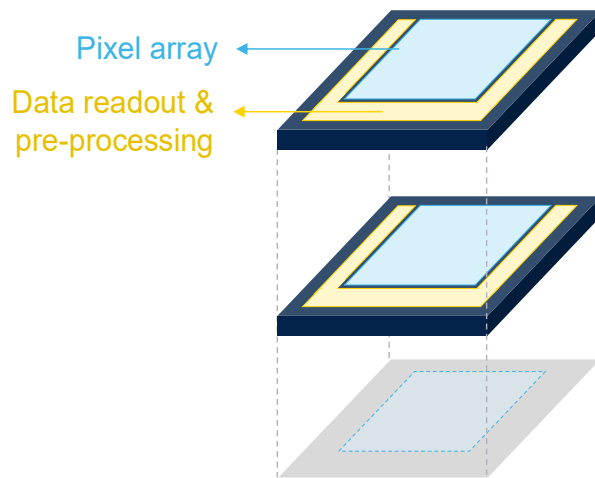


Easily unlock color or NIR with one register

Capture more light. Take up less space.

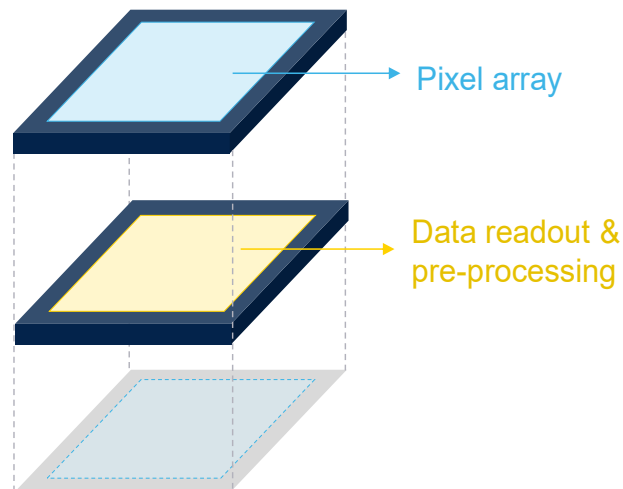
Industry-leading image array-to-die size ratio

Existing solutions with regular 3D stacking

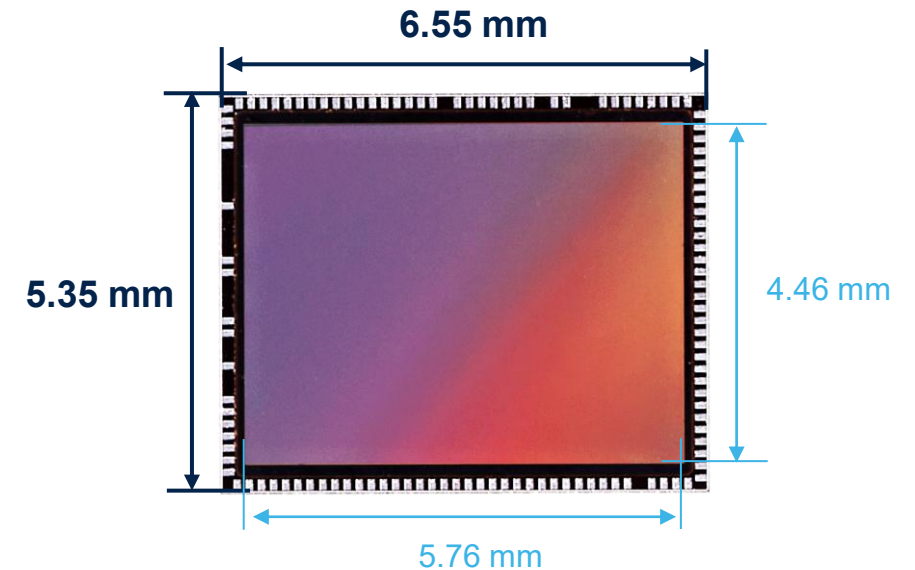


~33% of the die surface is occupied by the pixel array.

ST BrightSense solutions with advanced 3D stacking



73% of the die surface is occupied by the pixel array.



Opening new paths in computer vision



Factory automation



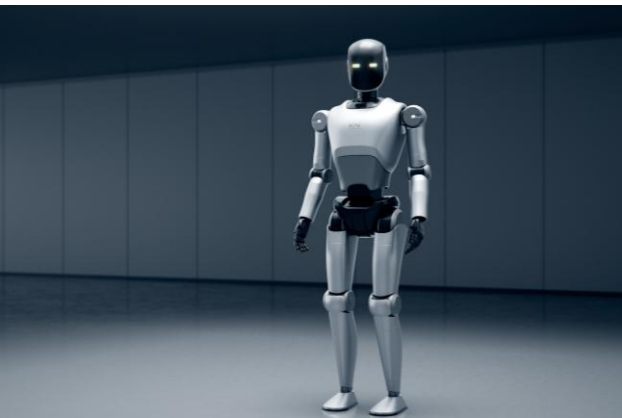
Barcode & logistics



Intelligent transportation



Smart building & security



Robotics



Drones



Edge AI vision



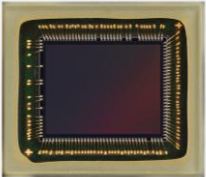
Smart retail



Get started with VD1943, VD5943, VB1943, VB5943



The VD1943, VD5943, VB1943, and VB5943 sensors are ready for evaluation and sampling

Illustration	Category	Ordering code	Description
	VD5943 Sensor die	VD5943CE/RW	Monochrome sensor bare die in reconstructed wafer
	VD1943 Sensor die	VD1943CE/RW	RGB-IR sensor bare die in reconstructed wafer
	VB5943 Packaged sensor	VB5943CAJX	Monochrome OBGA packaged sensor
	VB1943 Packaged sensor	VB1943CAJX	RGB-IR OBGA packaged sensor

To learn more and request detailed documentation, evaluation kits, or product samples, reach out to your local ST sales representative or an authorized distributor.



A comprehensive ecosystem

A broad range of complementary deliverables



Open product
documentation



Turnkey
evaluation tools



Free software
tools & drivers



Experienced
ST Partners



Knowledge base
and community

Everything needed to speed up your projects

Product evaluation

- Open datasheet
- Evaluation kit
- Evaluation software

Hardware prototyping

- Development kits
- Camera modules
- Board reference designs

Application development

- Comprehensive SDK
- Example software
- Software partners

Software integration

- Open user manual
- Software drivers
- Getting started tutorials

Mass production

- Camera module partners
- High to low volume support
- Longevity program



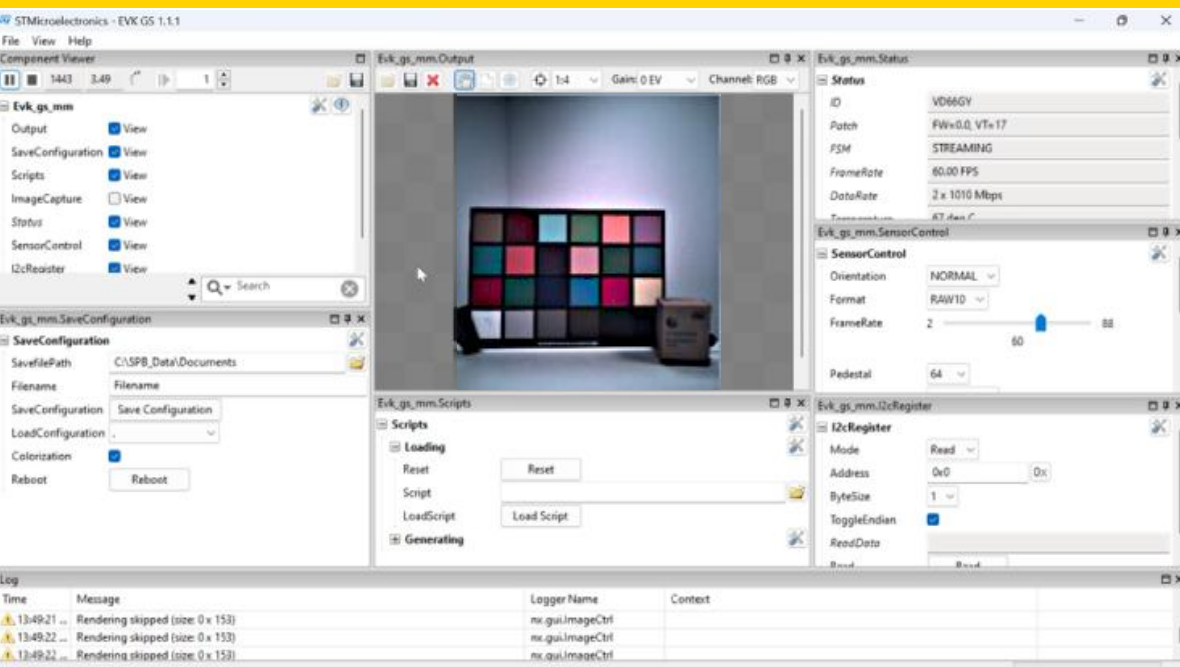
Software tools





ST BrightSense evaluation software

A versatile PC evaluation software for Windows & Ubuntu



Compatible hardware: EVK Main (STEVAL-EVK-U0I) in combination with any promodule or S-Board



Versatile evaluation software

Evaluate any ST BrightSense image sensor effortlessly. Save data and configurations seamlessly for optimal performance.



Easy-to-use interface

Access live image streaming, sensor control, status information, and key measurements like distribution profile with ease.



Find your optimal configuration

Individually write registers through the user interface or use the embedded script generator to upload complete configurations.

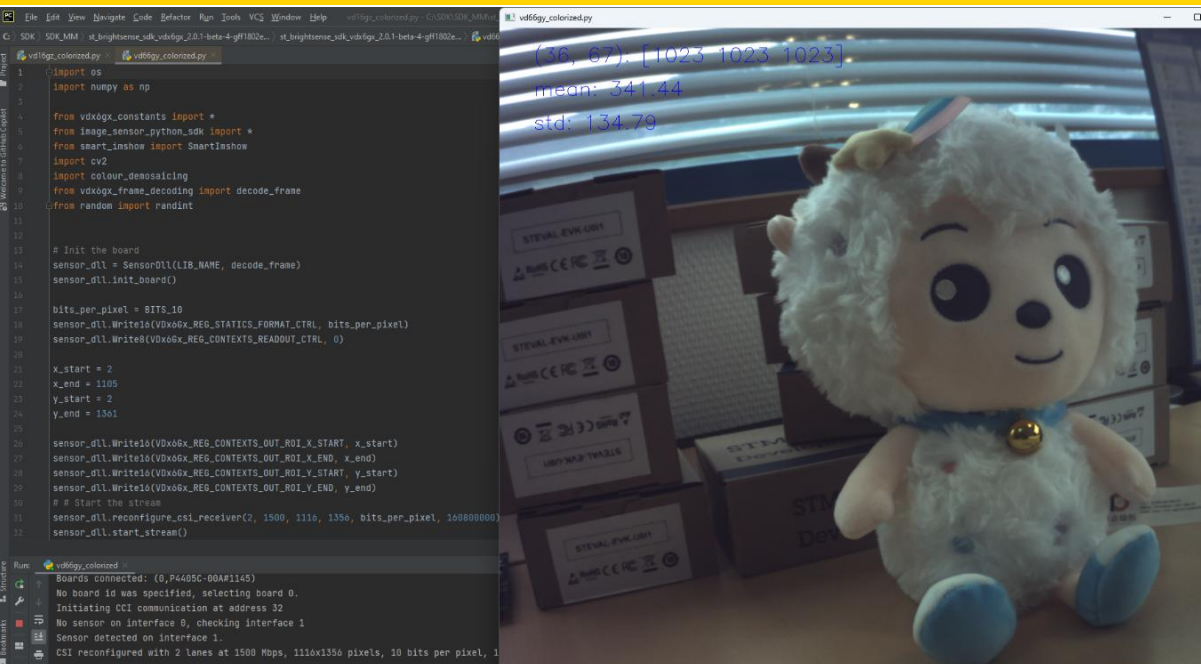
Today available on demand from ST and distributors





ST BrightSense SDK

Develop, test, and extend camera apps with ease



Compatible hardware: EVK Main (STEVAL-EVK-U01) in combination with any promodule or S-Board



Streamlined application development

Comprehensive and easy-to-use free Python SDK to streamline camera application development on PC.



Powerful development toolkit

Extensive tools library, including constants index, advanced sensor functionalities, and computer vision tools for AI applications.



Versatile solution

Supports multiple OS (Windows, Ubuntu), and software environments (Python natively, MATLAB, C++, and more via easy porting).

Today available on demand from ST and distributors



VD5943 software drivers

Built to simplify integration across platforms



Software code	Software type	Supported platforms
STSW-VD5943_V4L2	Generic V4L2 driver	All Linux-based
STSW-VD5943_RPI	libcamera package	Raspberry Pi
STSW-VD5943_N6	Camera Middleware driver	STM32N6

Compatible hardware: VD5943 S-Board OR a combination of P-Board ([STEVAL-CAM-M0I](#)) and promodules ([CAM-5943-081CLR](#) or [CAM-5943-155CLR](#))

ST software reference: STSW-VD5943



VD1943 software drivers

Built to simplify integration across platforms



Software code	Software type	Supported platforms
STSW-VD1943_V4L2	Generic V4L2 driver	All Linux-based
STSW-VD1943_RPI	libcamera package	Raspberry Pi
STSW-VD1943_N6	Camera Middleware driver	STM32N6
STM32N6-AI	AI vision demo examples	STM32N6

Compatible hardware: VD1943 S-Board OR a combination of P-Board ([STEVAL-CAM-M0I](#)) and promodules (CAM-1943-***)

ST software reference: STSW-VD1943





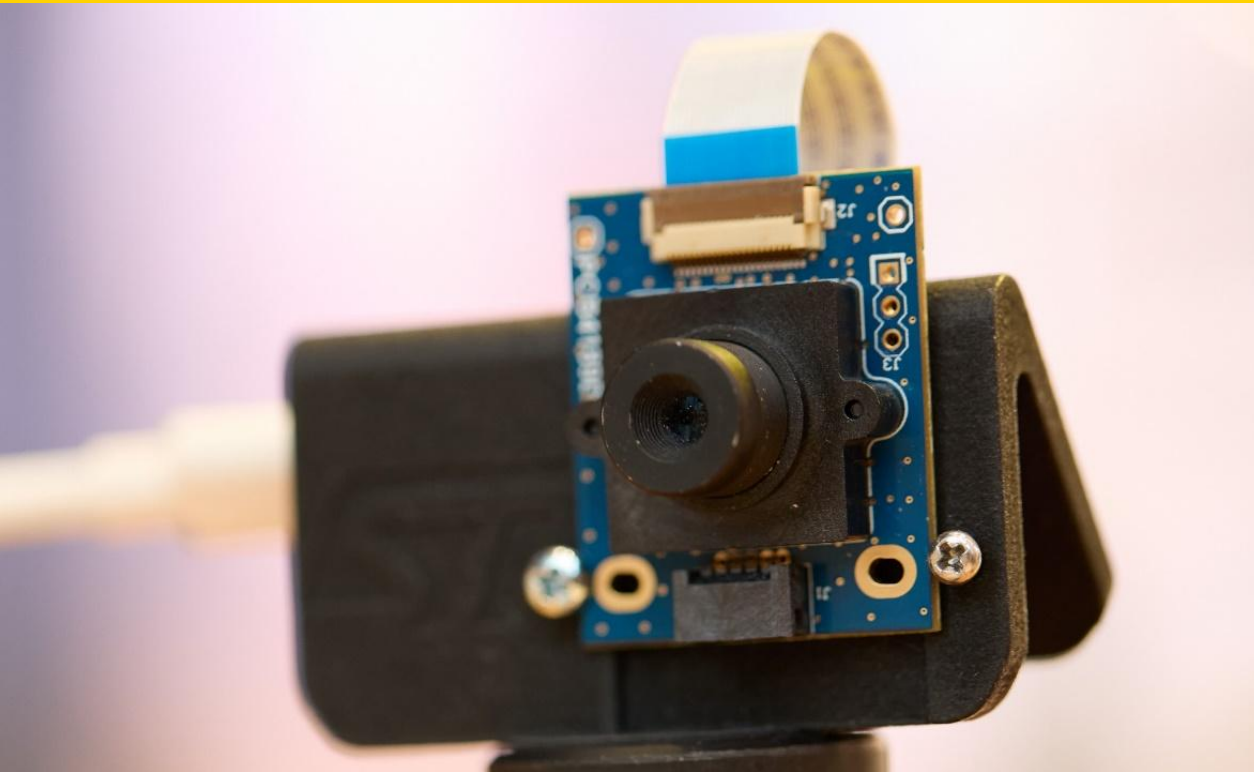
Hardware tools





STEVAL-EVK-U0I: ST BrightSense **EVK Main**

A versatile and reusable generic kit to evaluate any ST BrightSense sensor



Effortless evaluation setup

Plug in a camera module or S-Board, connect the kit via USB to your PC and start your evaluation instantly.



Flexible positioning

Use the included mechanical holder to set up your evaluation on a desk, mounted on your PC as a webcam, or fixed on a tripod.



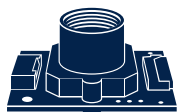
Seamless integration

Download the free evaluation software and SDK from our website for effortless testing and streamlined application development.



STEVAL-1943 / STEVAL-5943: S-Boards

Turnkey sensor boards to connect to embedded platforms



Optimize your optical settings

Effortlessly adjust the focus by screwing or unscrewing the default lens provided in the kit or customize with any M12 lens of your choice.



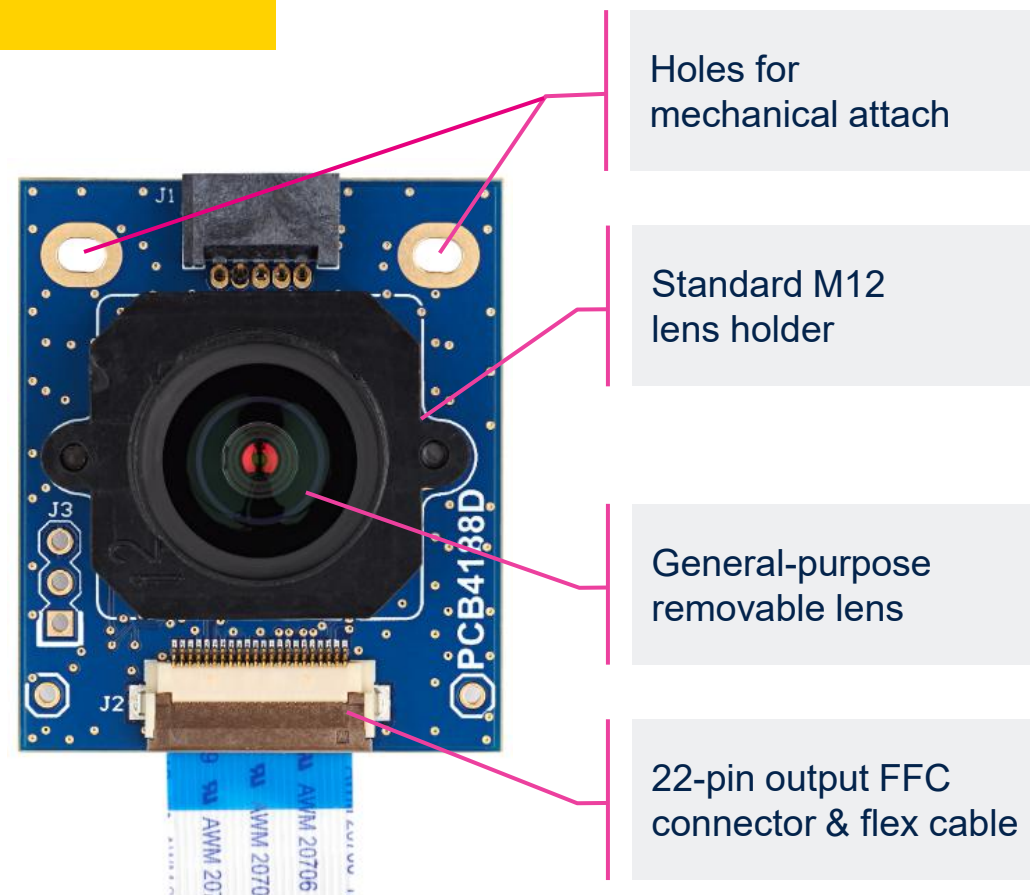
Connect to various processing boards

Use the 22-pin FFC connector and included flex cable to connect seamlessly to STM32N6, STM32MP2, Raspberry Pi, NVIDIA, and more.



Jumpstart your development

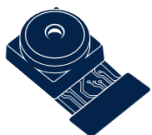
Use our free complementary software packages, including drivers and IQ tuning, to get going instantly.





STEVAL-CAM-M01: ST BrightSense P-Board

A reusable board to connect any promodule to embedded platforms



Plug in camera modules

Connect any evaluation camera module from ST and its partners via the input module connector – plenty of lens options to suit your needs.



Connect to various processing boards

Use the 22-pin FFC connector and included flex cable to connect seamlessly to STM32N6, STM32MP2, Raspberry Pi, NVIDIA, and more.

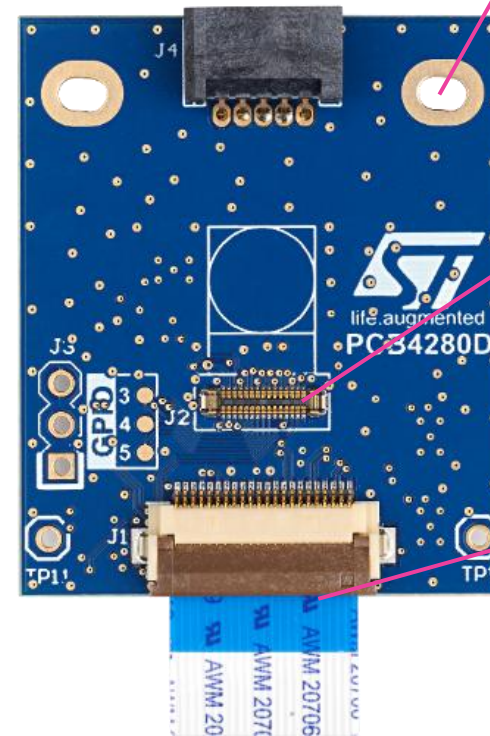


Jumpstart your development

Use our free complementary software packages, including drivers and IQ tuning, to get going instantly.



Buy now



Holes for mechanical attach

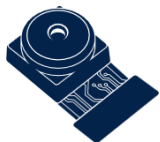
Input connector for camera modules

22-pin output FFC connector & flex cable



CAM-1943 / CAM-5943 promodules

Turnkey evaluation camera modules with standard connector



Plug-and-play camera modules

Start instantly with all-in-one modules ready to integrate, featuring VD5943 / VD1943 CMOS image sensor, lens holder, lens and connector.



Versatile lens options

Choose the ideal lens for you from a wide selection modules, all featuring a consistent connector and pinout for plugging directly on ST's EVK Main or P-Board.



Seamless transition to production

Buy from our numerous ST Partners production units as is or opt for lens customization and scale effortlessly from testing to production.



Discover available options in the next slides



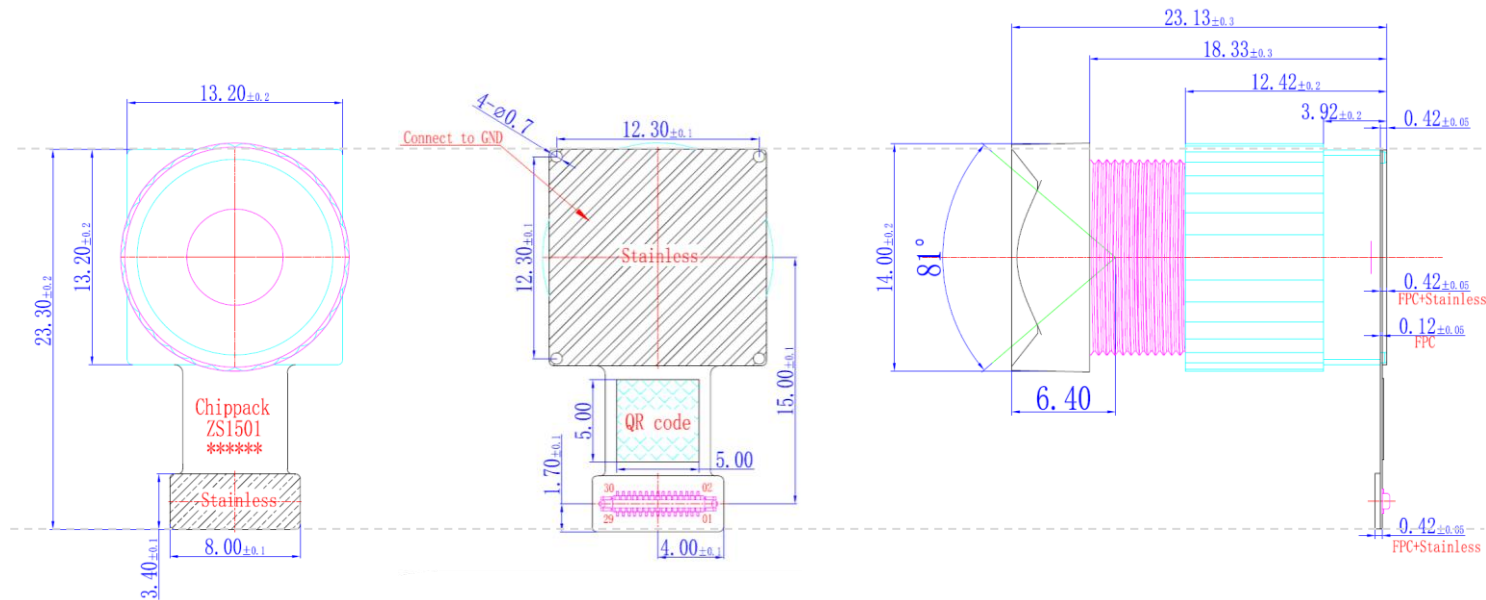


CAM-5943-081CLR promodule

Status: Available from ST and partner



Buy now



Optical parameters	Specifications
Resolution	5.08 MP
Chroma	Monochrome
Pixel size	2.25 μ m
Aperture	F/2.2
EFL	4.2 mm
Field of view – H V D	68° 55° 81°
Focusing range	64.1 cm -> 227.9 cm
Optical distortion	< 1%
Filter	Clear

Integration specifications	
Output interface	MIPI CSI-2, 2 or 4 lanes
Output format	RAW8, RAW10, RAW12
Control interface	I ² C
Connector type	30 pins, FPC-to-board, Hirose
Power supplies	1.15V, 1.8V, 2.8V
P-Board compatible?	Yes
Weight	6 g
Additional resources	Data brief Schematics 3D step files

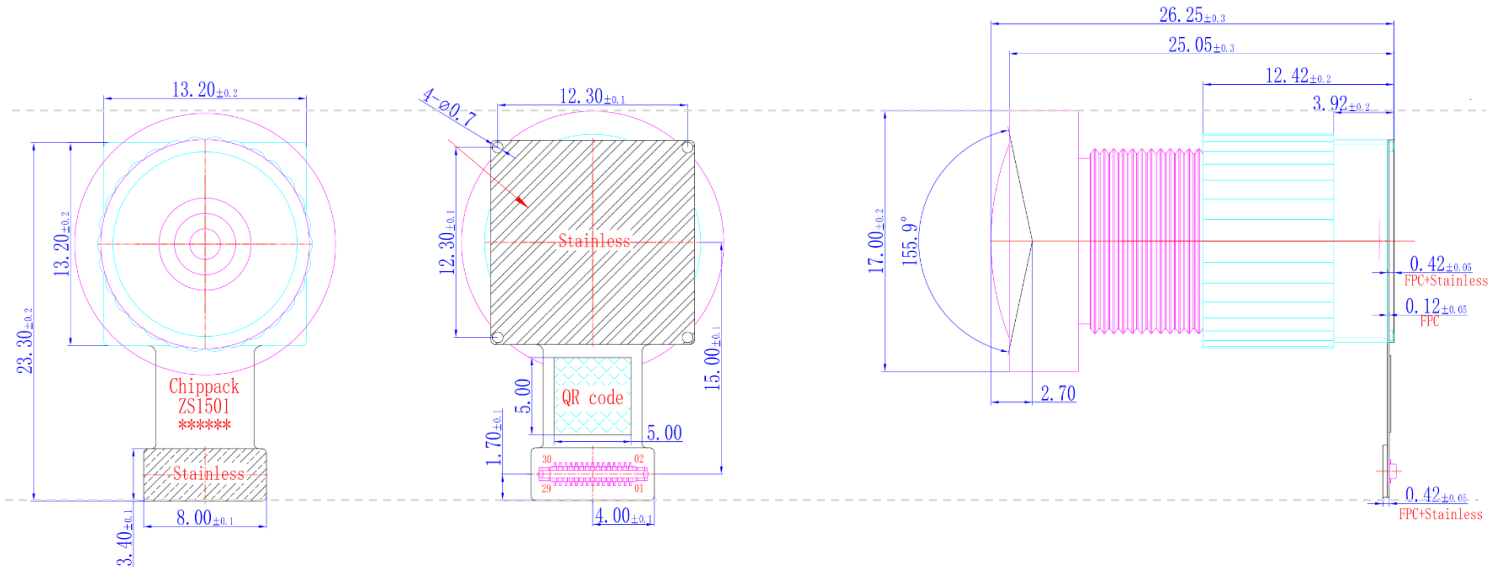


CAM-5943-155CLR promodule

Status: Available from ST and partner



Buy now



Optical parameters	Specifications
Resolution	5.08 MP
Chroma	Monochrome
Pixel size	2.25 μ m
Aperture	F/2.0
EFL	2.9 mm
Field of view – H V D	119° 90° 155°
Focusing range	49 cm -> INF
Optical distortion	< 33.02% (TV)
Filter	Clear

Integration specifications	
Output interface	MIPI CSI-2, 2 or 4 lanes
Output format	RAW8, RAW10, RAW12
Control interface	I ² C
Connector type	30 pins, FPC-to-board, Hirose
Power supplies	1.15V, 1.8V, 2.8V
P-Board compatible?	Yes
Weight	9 g
Additional resources	Data brief Schematics 3D step files





Evaluation tools ordering codes

Everything you need in just a few clicks

Item	Ordering code	Description
EVK Main	STEVAL-EVK-U0I1	Generic USB kit for evaluating ST BrightSense image sensors on a PC
P-Board	STEVAL-CAM-M0I1	Generic MIPI CSI-2 kit for integrating ST BrightSense camera modules on embedded platforms
VD5943 promodules	CAM-5943-081CLR	Evaluation camera module for VD5943 image sensor, equipped with a general-purpose 81-degree lens
	CAM-5943-155CLR	Evaluation camera module for the VD5943 image sensor, equipped with an ultra-wide-angle 155-degree lens
VD1943 promodules	CAM-1943-*	<i>Coming soon</i>
VD5943 S-Board	STEVAL-5943-*	<i>Coming soon</i>
VD1943 S-Board	STEVAL-1943-*	<i>Coming soon</i>





Resources & Technical support



Leverage various design resources

Accelerate your layout with our reference designs

Root code	Description	Resources
STEVAL-EVK-U0I	EVK Main	• Data brief • Schematics • Bill of material • Gerber • 3D step files board and holder • 3MF file holder
STEVAL-CAM-M0I	P-Board	• Data brief • Schematics • Bill of material • Gerber files • 3D step files
CAM-5943-081CLR	VD5943 promodule	• Data brief • Schematics • 3D step files
CAM-5943-155CLR	VD5943 promodule	• Data brief • Schematics • 3D step files
CAM-1943-*	VD1943 promodule	<i>Coming soon</i>
STEVAL-1943-*	VD1943 S-Board	<i>Coming soon</i>
STEVAL-5943-*	VD5943 S-Board	<i>Coming soon</i>



Join our active imaging community



Reach out



Access valuable insights

through tutorials, articles, design tips and more.



Get online support anytime

from community peers and ST experts.



Celebrate your accomplishments

To foster innovation and gain recognition.



Inspire and make a difference

by sharing impactful projects to benefit the world.

Our technology starts with You



Find out more at st.com/brightsense

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