

D3 intelligent components

Remote-Sensor Cameras

Base Unit and Sensor Boards

- Freely positionable external sensor board connected to the base unit by flex-foil cable
- Programmable camera with Ubuntu Linux OS
- 1 GHz ARM® Cortex™-A8 Core, 700 MHz C674x™ DSP, both with FPU
- 2 GB DDR3-800 RAM, 32 GB flash memory
- Gigabit Ethernet
- Wide support of embedded image processing software, e.g. Common Vision Blox Embedded, EyeVision, GStreamer, HALCON Embedded, OpenCV, and VM_LIB
- Same API on all cameras; development and debugging of camera software on the PC

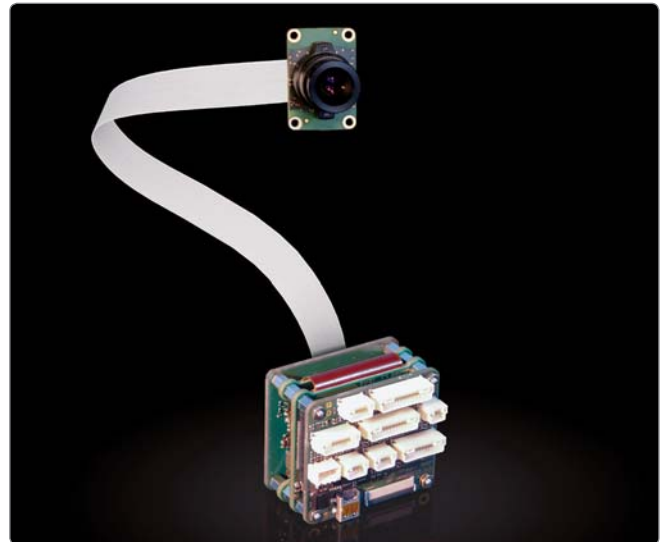


Photo similar to original product

Camera Configuration

Configure your remote sensor camera with

- one base unit **VRmD3C-X-E** and
- one sensor board **VRm(M)S-X**. Different sensor boards are available.



Available Sensor Board Designs

OEM: sensor board without optics

COB M9LP: sensor board with M9 low profile lens mount and 6.0 mm F2.8 lens coated with IR-cut filter (sensor board VRmMS-12 only)

COB S-mount M12: sensor board with M12 lens mount, 12.0 mm F2.0 lens, and filter glass

COB C-mount: sensor board with C-mount and filter glass (no lens included)

Options

Flex Foil Cables

- Cable lengths up to 100 cm (standard: 21 cm)

Optics (COB designs only)

- Filter glass: window glass, IR-pass/cut filter, without filter (COB M12 and COB C-mount only).
- Further lenses on request (COB M12 only).

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VRmD3C-X-E

D3 Intelligent Camera Base Unit

Physical Characteristics

Dimensions

Number of Boards	4
Board Stack Size	42 x 38 x 29 mm
Mounting Holes	36 x 32 mm
Inter-board Distance	5 mm

Ambient Conditions

Operating Temperature	0 ... +40 °C
Storage Temperature	-30 ... +80 °C

Camera Features

Wide range of interfaces available on different interface boards for flexible embedded control

Mono™-compatible .NET interface, Qt®

Cortex-A8 NEON™ Architecture, Real-time clock

User programmable windowing and panning

Freely definable region of interest (ROI)

Gamma, contrast, luminance (via LUT), optional auto white balance

Interfaces

Communication

Gigabit Ethernet, 2 x USB 2.0 host/device, up to 44 GPIOs, RS232, RS485, CAN bus, SPI bus, I2C bus

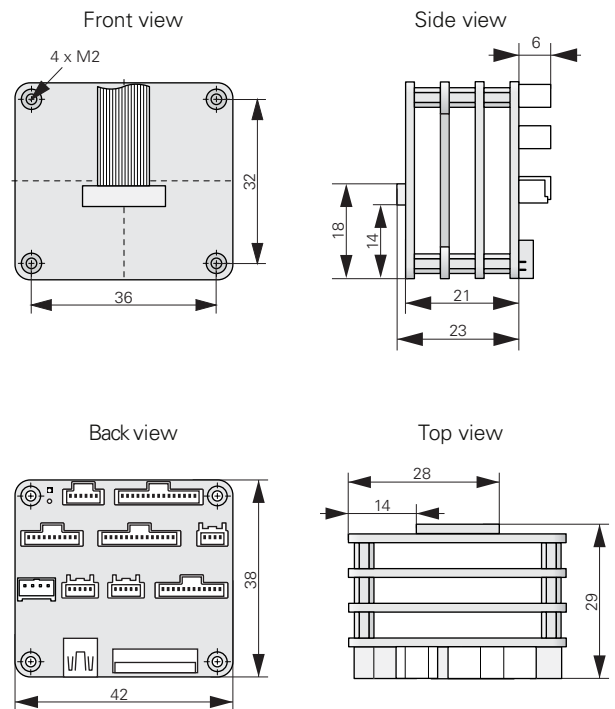
Video/Audio

HDMI, RGB888, S-Video, Analog audio (line in/out, mic in), Digital audio (S/PDIF out)

Further Interfaces

SD card reader, trigger, strobe, Watchdog, 5 V DC power in

Base Unit



Interface Boards

The camera is available with various interface board options.

- **VRmCUEO3** OEM interface board with miniature connectors: Features all above-mentioned interfaces (see drawings and separate datasheet)
- **VRmEIO3** interface evaluation board with industry standard connectors (not pictured, see separate data sheet): Large euroboard featuring all above-mentioned interfaces and additional SATA and JTAG interfaces
- **Custom** interface boards available for production quantities

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VRmS-8

Sensor Board

Sensor Characteristics

Type	Aptina MT9T031
Technology	CMOS, rolling shutter
Mono/Color	color
Sensor Size	1/2"
Resolution	2056 x 1544
Pixel Size	3.2 μm x 3.2 μm
Max. Frame Rate *	13 Hz
Min. Exposure Time	60 μs
Bit Depth	8/10 bit
Pixel Clock	10 ... 48 MHz
Responsivity	> 1 V/lux·sec
Dynamic Range	61 dB linear

Physical Characteristics

Dimensions

Board Size

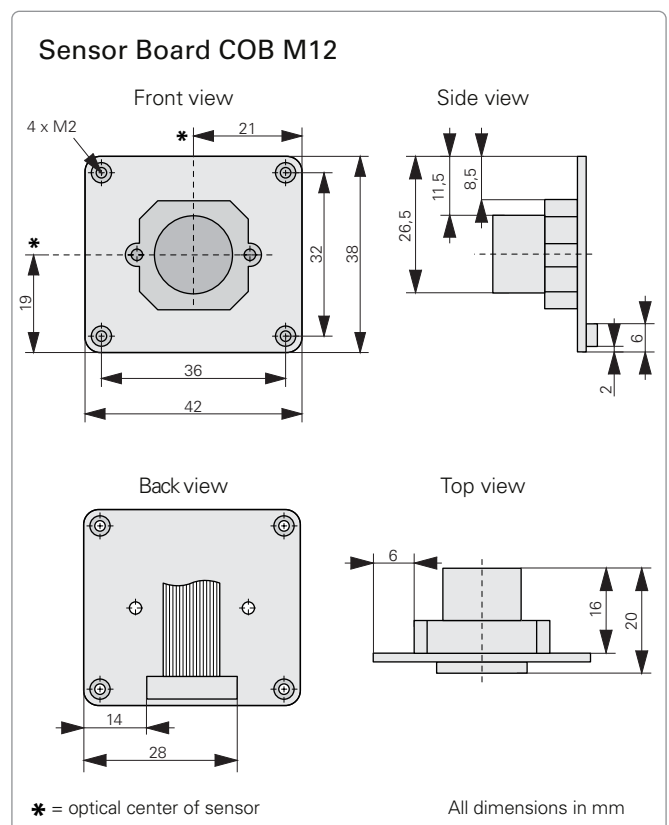
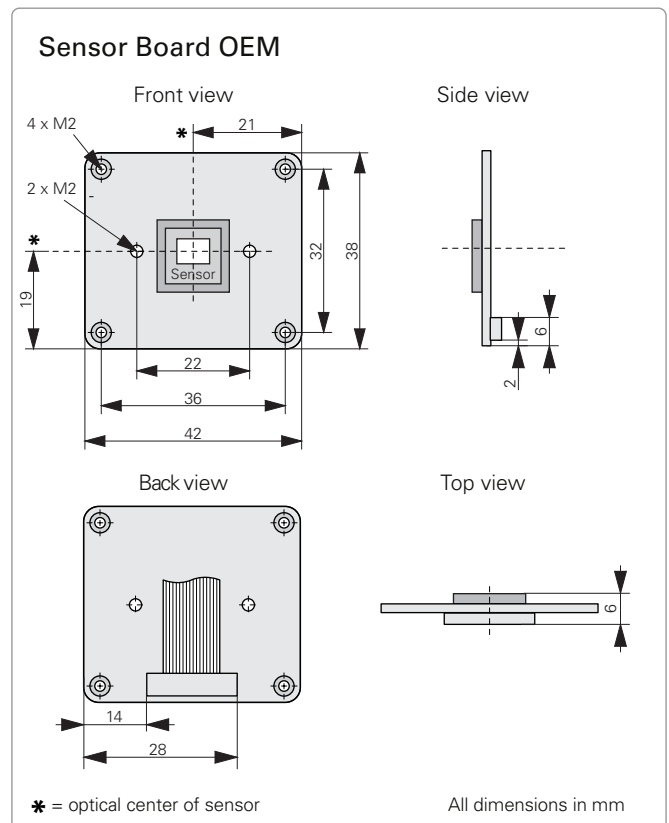
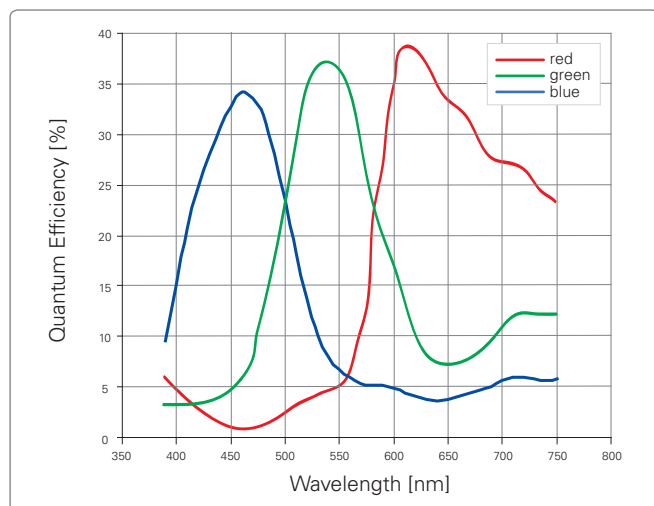
OEM	42 x 38 x 6 mm
COB S-mount M12	42 x 38 x 20 mm
COB C-mount	46 x 42 x 24 mm

Mounting Holes 36 x 32 mm

Ambient Conditions

Operating Temperature 0 ... +40 °C

Storage Temperature -30 ... +80 °C



* Maximum value at full ROI with minimum exposure time. Actual value depends on pixel clock, sensor settings, and image format.

D3 intelligent components

VRmS-9

Sensor Board

Sensor Characteristics

Type	Aptina MT9M001
Technology	CMOS, rolling shutter
Mono/Color	monochrome
Sensor Size	1/2"
Resolution	1288 x 1032
Pixel Size	5.2 μm x 5.2 μm
Max. Frame Rate *	30 Hz
Min. Exposure Time	38 μs
Bit Depth	8/10 bit
Pixel Clock	10 ... 48 MHz
Responsivity	> 2.1 V/lux·sec
Dynamic Range	68 dB linear

Physical Characteristics

Dimensions

Board Size

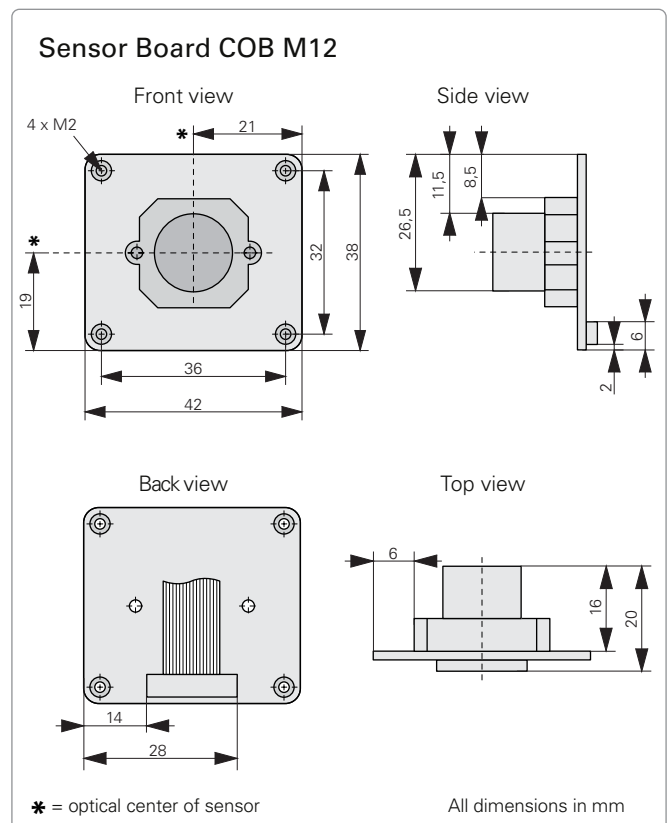
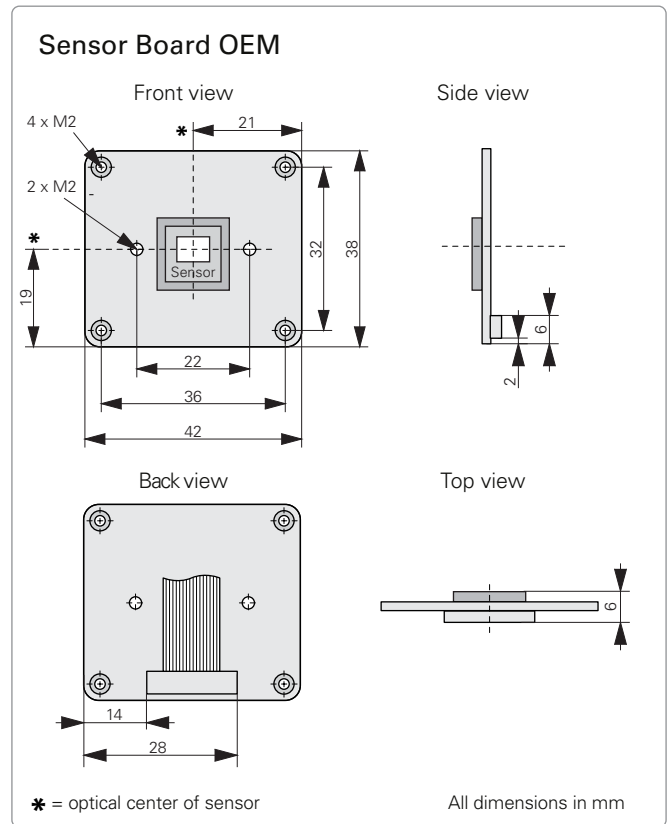
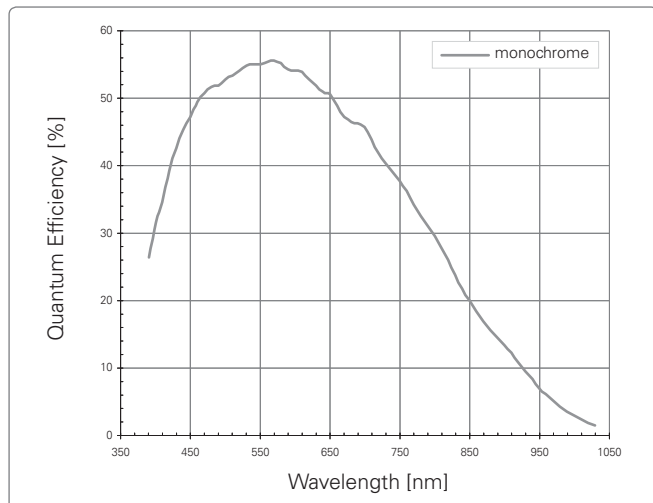
OEM	42 x 38 x 6 mm
COB S-mount M12	42 x 38 x 20 mm
COB C-mount	46 x 42 x 24 mm

Mounting Holes 36 x 32 mm

Ambient Conditions

Operating Temperature 0 ... +40 °C

Storage Temperature -30 ... +80 °C



* Maximum value at full ROI with minimum exposure time. Actual value depends on pixel clock, sensor settings, and image format.

D3 intelligent components

VRmS-12

Sensor Board

Sensor Characteristics

Type	Aptina MT9V024
Technology	CMOS, global shutter
Mono/Color	monochrome or color
Sensor Size	1/3" wide
Resolution	754 x 480
Pixel Size	6 μm x 6 μm
Max. Frame Rate *	70 Hz
Min. Exposure Time	30 μs
Bit Depth	8/10 bit
Pixel Clock	13 ... 27 MHz
Responsivity	4.8 V/lux-sec
Dynamic Range	55 dB linear 80 ... 100 dB high dynamic

Physical Characteristics

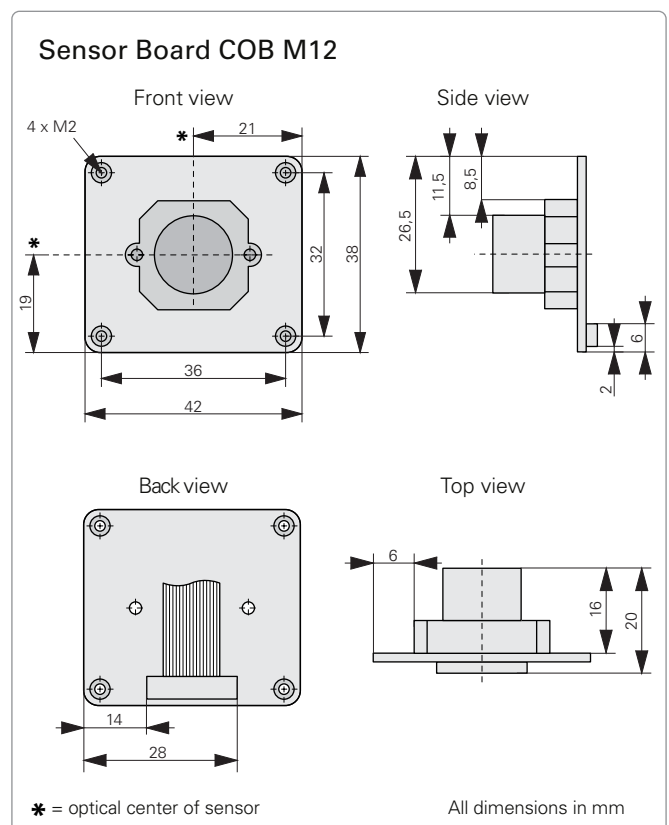
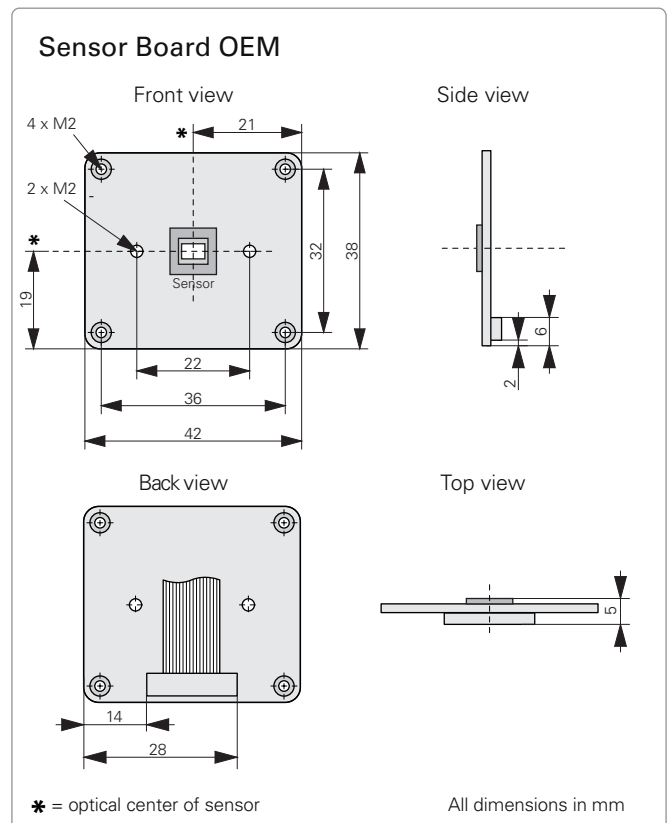
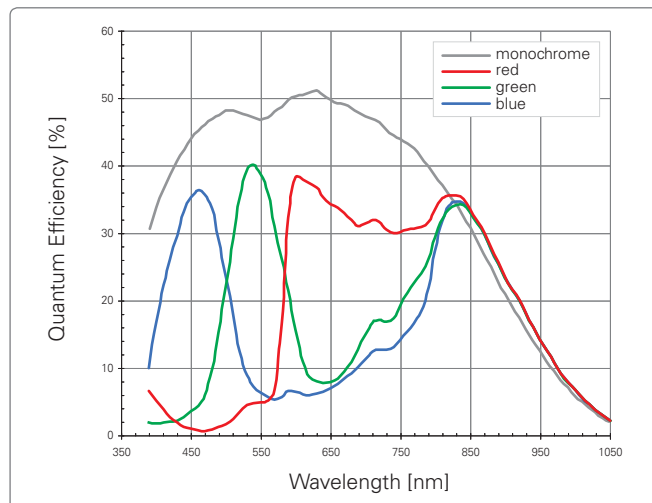
Dimensions

Board Size	
OEM	42 x 38 x 5 mm
COB S-mount M12	42 x 38 x 20 mm
COB C-mount	46 x 42 x 24 mm

Mounting Holes 36 x 32 mm

Ambient Conditions

Operating Temperature	0 ... +40 °C
Storage Temperature	-30 ... +80 °C



* Maximum value at full ROI with minimum exposure time. Actual value depends on pixel clock, sensor settings, and image format.

D3 intelligent components

VRmMS-12

Small Sensor Board

Sensor Characteristics

Type	Aptina MT9V024
Technology	CMOS, global shutter
Mono/Color	monochrome or color
Sensor Size	1/3" wide
Resolution	754 x 480
Pixel Size	6 μm x 6 μm
Max. Frame Rate *	70 Hz
Min. Exposure Time	30 μs
Bit Depth	8/10 bit
Pixel Clock	13 ... 27 MHz
Responsivity	4.8 V/lux·sec
Dynamic Range	55 dB linear 80 ... 100 dB high dynamic

Physical Characteristics

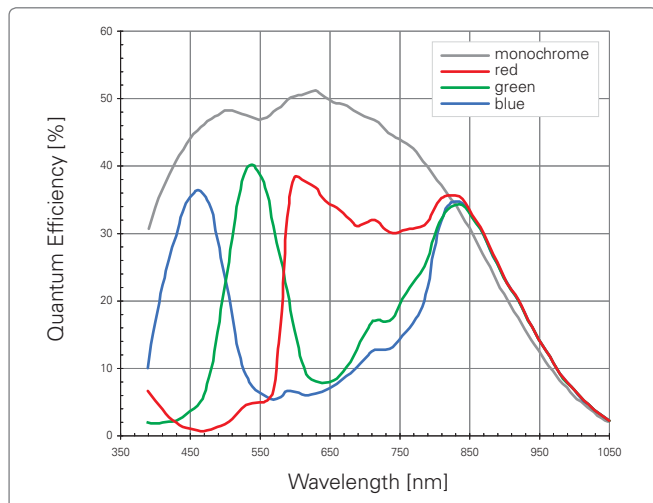
Dimensions

Board Size	
OEM	28 x 19 x 5 mm
COB M9LP	28 x 19 x 11 mm
COB S-mount M12	28 x 19 x 17 mm

Mounting Holes	24 x 15 mm
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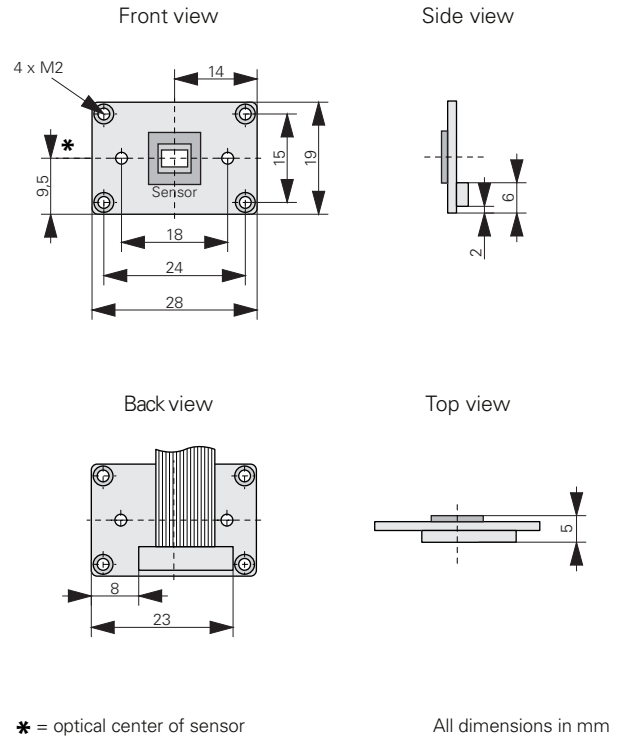
Ambient Conditions

Operating Temperature	0 ... +40 °C
Storage Temperature	-30 ... +80 °C

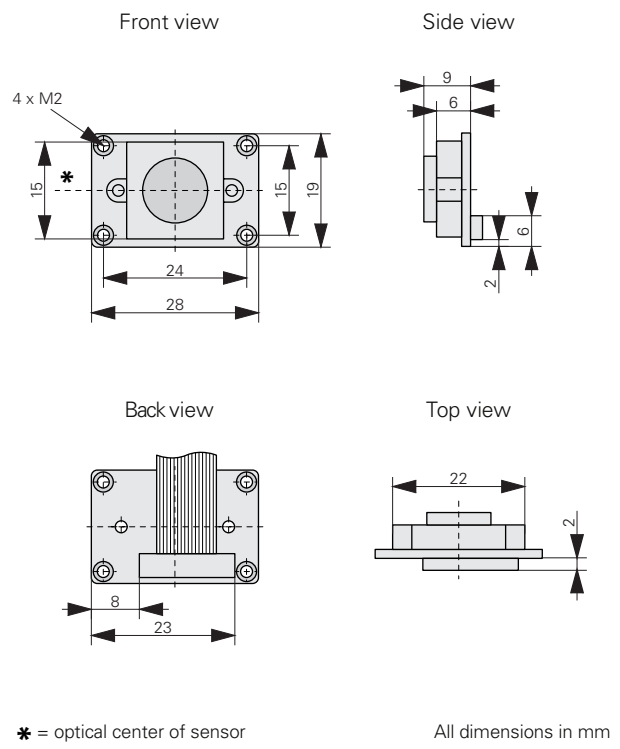


* Maximum value at full ROI with minimum exposure time. Actual value depends on pixel clock, sensor settings, and image format.

Sensor Board OEM



Sensor Board COB M9LP



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VRmS-14

Sensor Board

Sensor Characteristics

Type	Sony ICX445
Technology	CCD, interline transfer
Mono/Color	Monochrome or color
Sensor Size	1/3"
Resolution	1296 x 966
Pixel Size	3.75 μm x 3.75 μm
Max. Frame Rate *	22 Hz
Min. Exposure Time	15 μs
Bit Depth	8/10 bit
Pixel Clock	36 MHz

Physical Characteristics

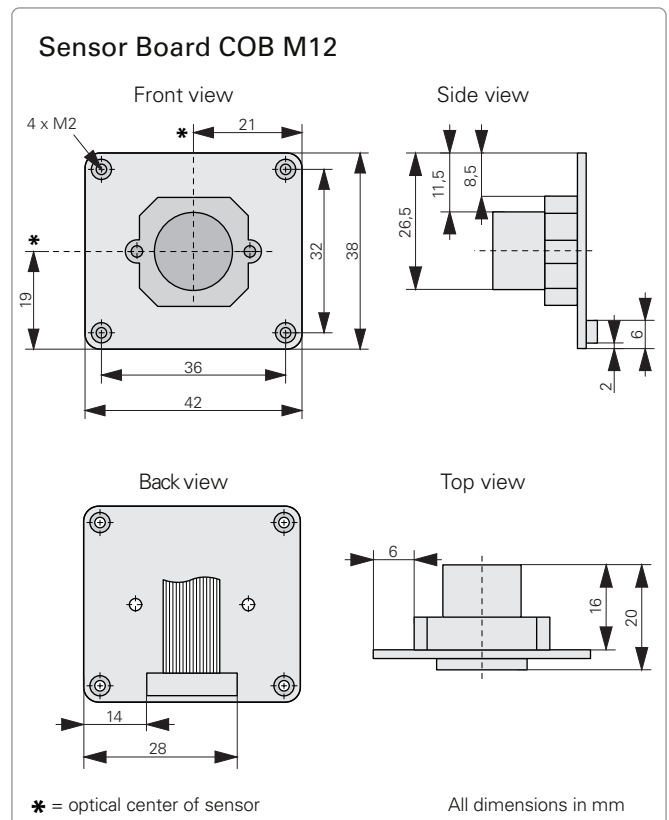
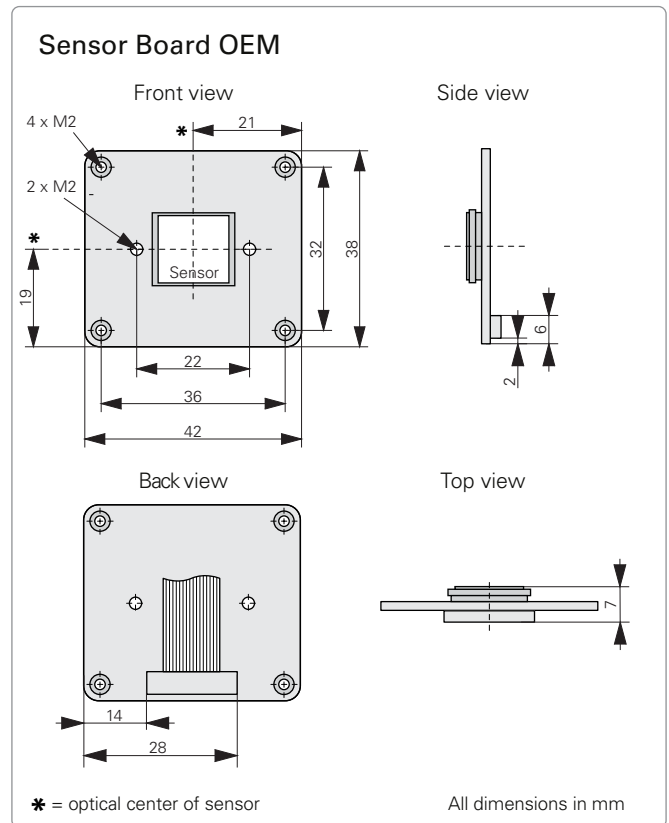
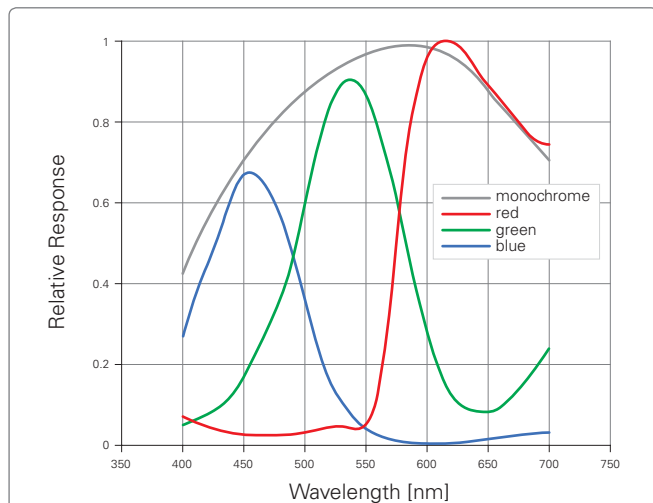
Dimensions

Board Size	
OEM	42 x 38 x 7 mm
COB S-mount M12	42 x 38 x 20 mm
COB C-mount	46 x 42 x 24 mm

Mounting Holes 36 x 32 mm

Ambient Conditions

Operating Temperature	0 ... +40 °C
Storage Temperature	-30 ... +80 °C



* Maximum value at full ROI with minimum exposure time. Actual value depends on pixel clock, sensor settings, and image format.

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VRmS-16

Sensor Board

Sensor Characteristics

Type	Aptina MT9M021
Technology	CMOS, global shutter
Mono/Color	Monochrome or color
Sensor Size	1/3"
Resolution	1280 x 960
Pixel Size	3.75 μm x 3.75 μm
Max. Frame Rate *	40 Hz
Min. Exposure Time	67 μs
Bit Depth	8/10 bit
Pixel Clock	66 MHz

Physical Characteristics

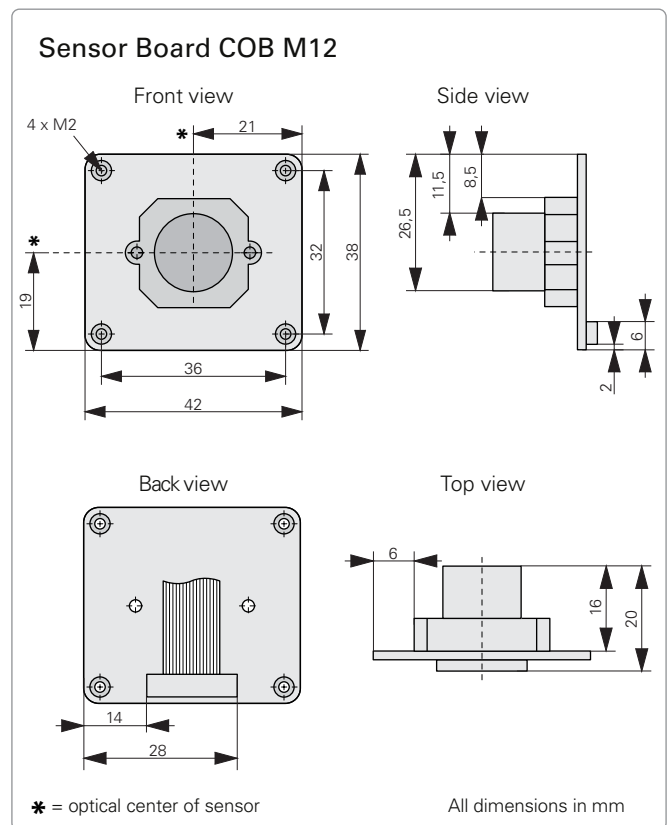
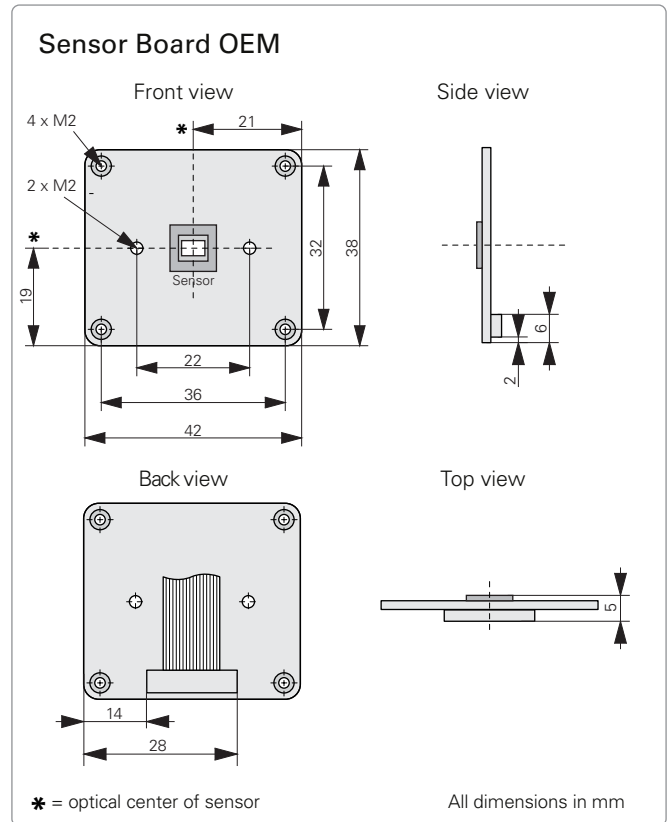
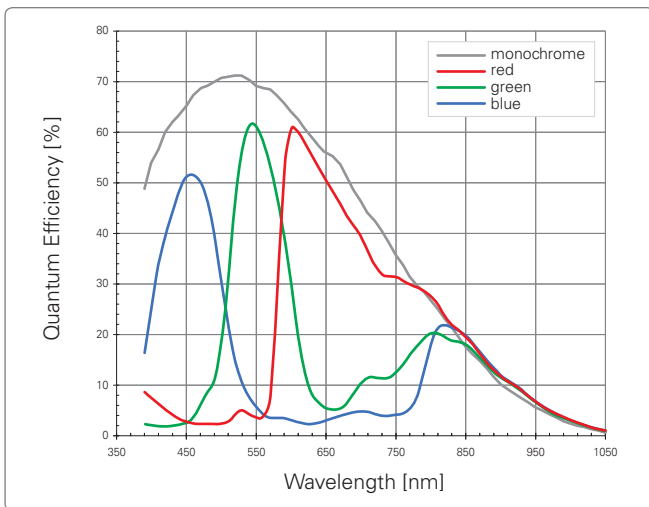
Dimensions

Board Size	
OEM	42 x 38 x 5 mm
COB S-mount M12	42 x 38 x 20 mm
COB C-mount	46 x 42 x 24 mm

Mounting Holes 36 x 32 mm

Ambient Conditions

Operating Temperature	0 ... +40 °C
Storage Temperature	-30 ... +80 °C



* Maximum value at full ROI with minimum exposure time. Actual value depends on pixel clock, sensor settings, and image format.

VRmS-18

Sensor Board

Sensor Characteristics

Type	Aptina MT9M024
Technology	CMOS, rolling shutter
Mono/Color	Monochrome or color
Sensor Size	1/3"
Resolution	1280 x 960
Pixel Size	3.75 μm x 3.75 μm
Max. Frame Rate *	40 Hz
Min. Exposure Time	22 μs
Bit Depth	8/10 bit
Pixel Clock	66 MHz

Physical Characteristics

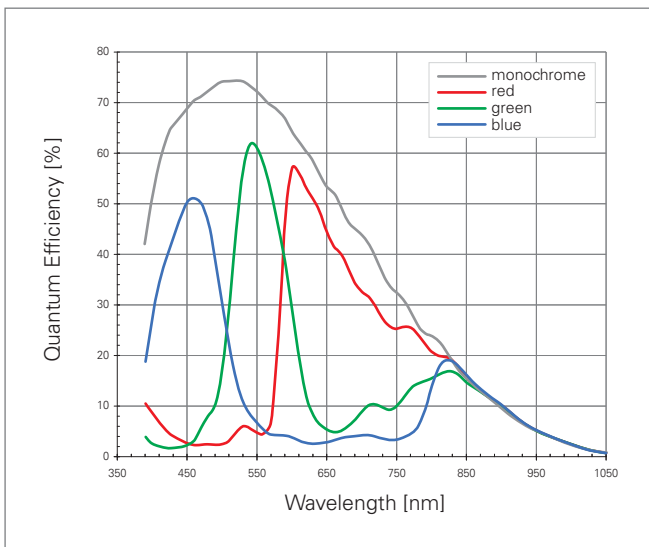
Dimensions

Board Size	
OEM	42 x 38 x 5 mm
COB S-mount M12	42 x 38 x 20 mm
COB C-mount	46 x 42 x 24 mm

Mounting Holes 36 x 32 mm

Ambient Conditions

Operating Temperature	0 ... +40 °C
Storage Temperature	-30 ... +80 °C



* Maximum value at full ROI with minimum exposure time. Actual value depends on pixel clock, sensor settings, and image format.

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