

# VLU-02M

## Technical Data

 Art. No.  
11129463


### Digital Monochrome Matrix Camera, USB 3.0

#### Sensor Information

Model Name	SONY ICX618
Type	1/4" progressive scan CCD, EXview HAD technology
Shutter	Global
Native Resolution	656 x 490 pixels
Scan Area	3.67 mm x 2.74 mm
Pixel Size	5.6 μm x 5.6 μm

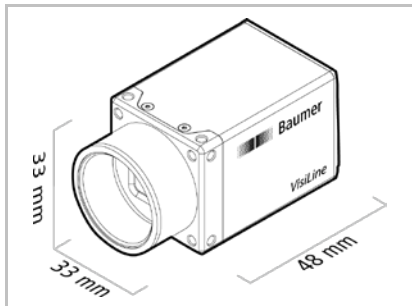
#### Data Quality

@ 20 °C, gain = 1, exposure time = 32 msec

Readout Noise ( $\sigma$ )	0.2 LSB @ 8 bit, 3.5 LSB @ 12 bit (typical)
Dynamic Range	61 dB typical

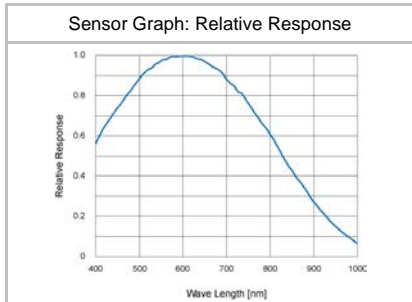
#### Acquisition Formats

Image Formats	Format	Resolution	Frame Rate	$t_{\text{readout}}$
	Full Frame	656 x 490	160 fps	6.25 msec
Pixel Formats	Mono8, Mono12, Mono12p			
Partial Scan	True Partial Scan, Region of Interest (ROI) arbitrary			



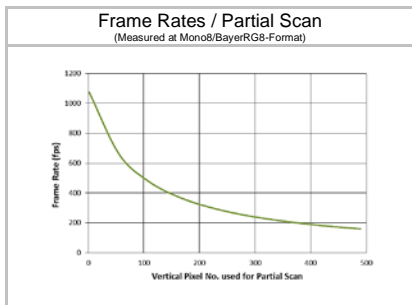
#### Image Pre-Processing

Analog Controls	Exposure Time (4 μsec ... 60 sec   Step Size 1 μsec) Gain (0 ... 29.5 dB), Offset (0 ... 1023 LSB   14 bit)
Gamma Correction	Gamma (0.1 ... 2   available if LUT is enabled)
LUT	Luminance (12 bit)
Color Models	Mono
Color Tolerance	Only on Color Cameras
Color Processing	Only on Color Cameras
Color Adjustment	Only on Color Cameras
Binning Horizontal	1 or 2
Binning Vertical	1 or 2
Image Flipping	Horizontal
Defect Pixel Correction	via Defect Pixel List with up to 511 Pixel Coordinates



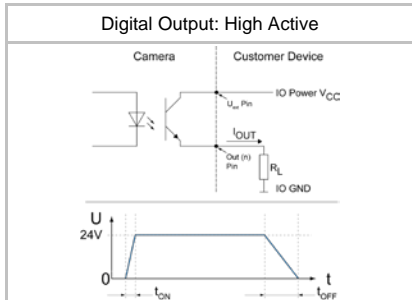
#### Process Synchronization

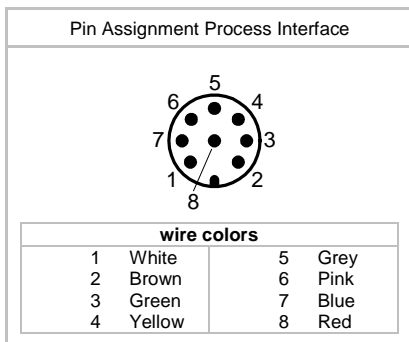
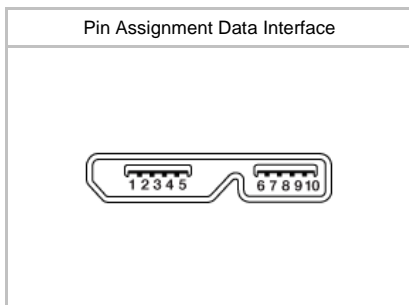
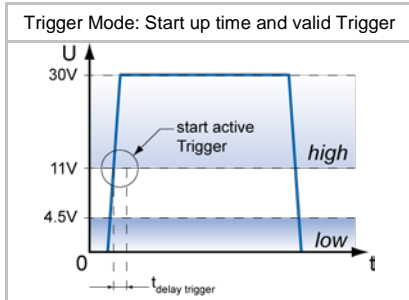
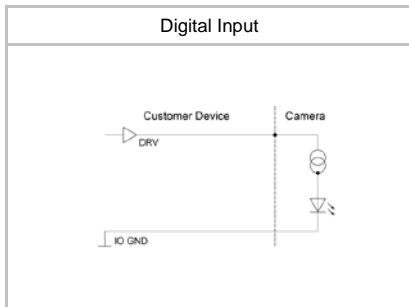
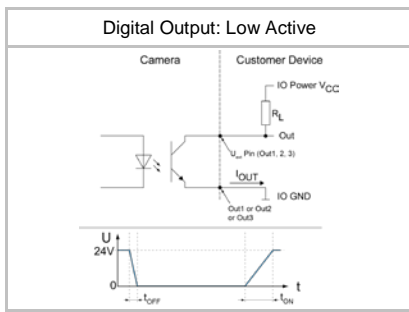
Modes	Free Running, Trigger
Free Running	Continuous or Adjustable Acquisition Frame Rate <sup>1</sup> (0.01 ... 1072 Hz)
Trigger Sources	Hardware, Software, All or Off
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
Sequencer Characteristics	up to 128 sets of parameters, up to 65536 loop passes, up to 65536 repetitions of sets of parameters, up to 65536 images per trigger event
Sequencer Parameters	Exposure Time, Gain Factor, Output Line, ROI Offset x, ROI Offset y
External Flash Sync	via Exposure Active $t_{\text{delay flash}} \leq 3 \mu\text{sec}$ , $t_{\text{duration}} = t_{\text{exposure}}$



#### Digital I/Os

Lines	Input: Line 0, Output: Line1, Line2, Line3
Circuit Times	Digital Output: $t_{\text{ON}} = \text{typ. } 3 \mu\text{sec}$ $t_{\text{OFF}} = \text{typ. } 40 \mu\text{sec}$
Output Sources	Off, ExposureActive, Line 0, Timer1 ... 3, ReadoutActive, User0 ... 2, TriggerReady, TriggerOverlapped, TriggerSkipped, Sequencer Output 0 ... 2
Line Debouncer	Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 μsec


<sup>1</sup> Max. Acquisition Frame Rate can be achieved by using the following camera settings: min. Exposure + max. Binning + ROI | min. Size Y + Mono8

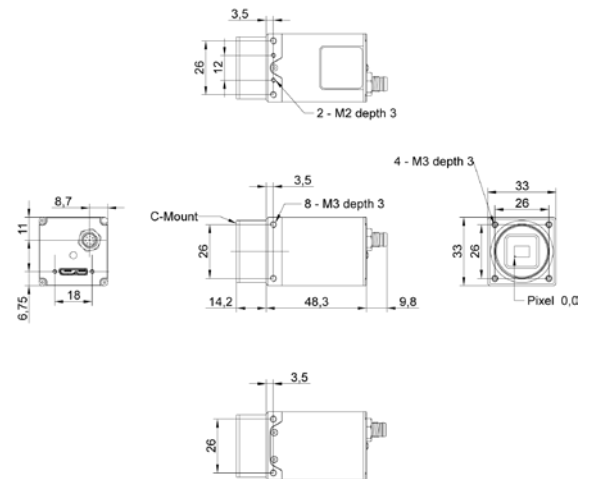


## Interfaces and Connectors

<b>Data and Power Interface</b>	USB 3.0 Connector: Pin Assignment:	Transfer Rate 5000 Mbits/sec USB 3.0 Micro B 1 – VBUS            6 – MicB_SSTX- 2 – D-                7 – MicB_SSTX+ 3 – D+                8 – GND_DRAIN 4 – ID                 9 – MicB_SSRX- 5 – GND              10 – MicB_SSRX+
<b>Process Interface</b>	Connector: Assignment:	M8/8-pin (SACC-DSI-M8FS-8CONM10-L180 SH) 1 – OUT3 (Line2)    5 – IO Power VCC 2 – not connected 6 – OUT1 (Line3) 3 – IN1 (Line0)     7 – not connected 4 – IO GND          8 – OUT2 (Line1)

## Mechanical Data

<b>Housing</b>	Zinc die casting, nickel-plated, IP40
<b>Dimensions</b>	



<b>Weight</b>	140 g
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## Optical Data

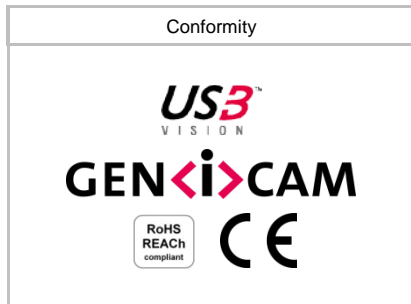
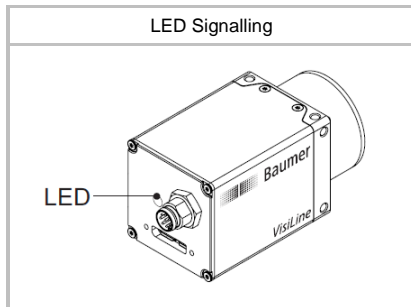
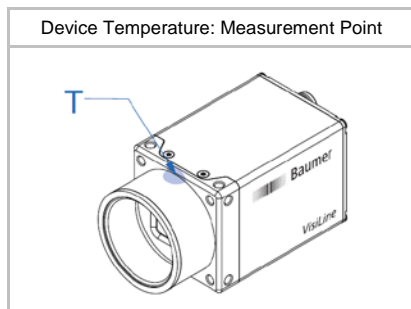
<b>Lens Mount</b>	C-Mount
<b>Optical Filter</b>	Dust Protection Glass

## Electrical Data

<b>Power Supply</b>	bus powered via USB3.0 interface
<b>Power Consumption</b>	approx. 2.6 W @ 160 fps
<b>Digital Input</b>	$U_{IN(low)}$ : 0.0 ... 4.5 VDC $U_{IN(high)}$ : 11.0 ... 30.0 VDC $I_{IN}$ : 6.0 ... 10 mA min. Impulse Length: 2.0 $\mu$ sec Trigger Delay out of treadout: 1.0 $\mu$ sec max. Trigger Delay during treadout: 14.0 $\mu$ sec
<b>Digital Output</b>	IO Power $V_{CC}$ : 5 ... 30 V DC $I_{OUT}$ : max. 50 mA

## LED Signalling

<b>LED</b>	Green	USB3.0
	Green flash	Transmitting
	Yellow	USB2.0 (settings possible, no image)



### Environmental Data

Storage Temperature	-10 °C bis +70 °C
Operating Temperature	+5°C ... +50°C
Device Temperature	T <sub>max</sub> = 50 °C @ Measurement Point
Humidity	10 % ... 90 % non-condensing

### Interface Data

Interface	USB 3.0 5000 Mbits/sec
Image Buffer	16 Images
USB Vendor ID / Product ID	0x2825 / 0x010A

### USB3 Vision® Features

Events	EventLost, EventDiscarded, Line0RisingEdge, Line0FallingEdge, Line1RisingEdge, Line1FallingEdge, Line2RisingEdge, Line2FallingEdge, Line3RisingEdge, Line3FallingEdge, ExposureStart, ExposureEnd, FrameStart, FrameEnd, TriggerReady, TriggerOverlapped, TriggerSkipped
Transmission via Asynchronous Message Channel	
Frame Counter	up to 2 <sup>32</sup>
Payload Size	0 ... 643.152 Byte
Timestamp	64 bit
USB3 Vision	v1.0

### GenICam™ Features

Timer	Timer Selector: Timer 1 ... 3 TimerTriggerSource: Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameStart, FrameEnd, TriggerSkipped, Off TimerDelay: 0 µsec ... 2 sec, Step Size: 1 µsec TimerDuration: 10 µsec ... 2 sec, Step Size: 1 µsec
User Sets	Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter
Acquisition Abort	Delay up to 6.3 msec
SFNC Version	v2.0

### Factory Settings after Start-Up

Operation Mode	Free Running
Analog Controls	Exposure Time: 4 msec, Gain: 0 dB, Offset: 0
Pixel Format	Mono8
Partial Scan	Off
Acquisition Frame Rate	Off
Timer	Off
Defect Pixel Correction	On
Digital Input	Line0, invert = false, trigger source = All
Digital Output	Line1, Line2, Line3, invert = false, line source = Off