

Sensor Information

Model Name	ON Semiconductor MT9P031
Type	1/2.5" progressive scan CMOS
Shutter	Rolling Shutter, Global Reset Shutter
Resolution	2592 x 1944 pixels
Scan Area	5.7 mm x 4.27 mm
Pixel Size	2.2 μm x 2.2 μm

Data Quality

@ 20 °C, gain = 1, exposure time = 4 msec

Dark Noise (σ)	12 e- typical
Saturation	5500 e- typical
Dynamic Range	56 dB typical
SNR	38 dB typical
Quantum efficiency η	41 % @ 465 nm, 44 % @ 536 nm, 32 % @ 631 nm typical

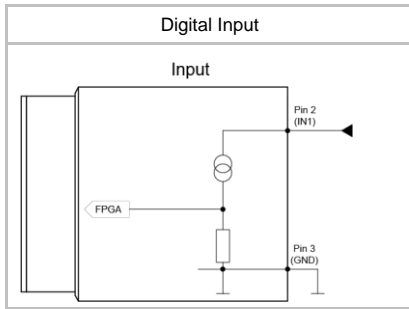
Acquisition

Resolution	2592 px x 1944 px		
Interface Frame Rate (depends on used interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode) ²⁾
	Full Frame	2592 x 1944	14 fps
	Binning 2x2	1296 x 972	14 fps
	Binning 2x1	1296 x 1944	14 fps
	Binning 1x2	2592 x 972	14 fps
Acquisition Frame Rate ¹⁾	14 fps $t_{\text{readout}} = 68.6 \text{ msec}$ (max. Res. Full Frame) @ 12 bit		
Pixel Formats	BayerRG8, BayerRG12, BayerRG12p		
Partial Scan	True Partial Scan with increasing Frame Rate on X and Y direction, Region of Interest (ROI) arbitrary Width: minimum 16, increment 16 Height: minimum 2, increment 2		
Adjustable Acquisition	no		
Frame Rate	no		
Acquisition Mode	Continuous, Single Frame and Multi Frame		
Acquisition Status	AcquisitionActive, AcquisitionTrigger Wait		
Exposure Mode	Timed		
Shutter Mode	Rolling, Global Reset		
Readout Mode	not available		

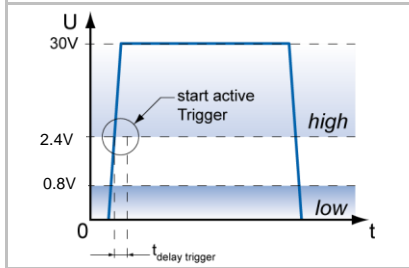
Image Pre-Processing

Analog Controls	Exposure Time (20 μsec ... 1 sec Step Size 1 μsec) Gain (0... 12 dB), Offset (0 ... 255 LSB 12 bit)
Color Models	Raw Bayer
Color Processing	-
Color Adjustment	Manual White Balance Automatic White Balance (Once or Continuous)
Color Enhancement	Color Transformation to sRGB color space by optimized Matrix for 6500 K, 3000 K Lightsource or User defined Matrix
Color Tolerance	-
Binning Horizontal	1 or 2
Binning Vertical	1 or 2
Image Flipping	no
Defect Pixel Correction	via Defect Pixel List with up to 512 Pixel Coordinates
Fix Pattern Noise	yes
Correction	

¹⁾ Sensor readout, different from pixel format



Trigger Mode: Start up time and valid Trigger



Process Synchronization

Trigger Mode	Off (Free Running), On (Trigger)
Trigger Overlap Type	Trigger Mode On: Off Trigger Mode Off: Not available
Trigger Sources	Hardware (Line0), Software or Off max. Trigger Delay out of t _{readout} : ¹⁾ 315.1 µsec / 332.5 µsec @ 12 bit (Rolling / Global Reset) max. Trigger Delay during t _{readout} : ¹⁾ 315.1 µsec / 332.5 µsec @ 12 bit (Rolling / Global Reset)
Trigger Delay	-
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
Output Sources	Off, ExposureActive
Line Debouncer	Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 µsec

Memory

Image Buffer	15 MB 1 Images (Trigger Mode) / 1 Image (Free Running Mode)
Non-volatile Memory	128 kb

Network Interface Data

Interface	Gigabit Ethernet 1000BASE-T 1000 Mbits/sec Fast Ethernet 100 BASE-T 100 Mbits/sec
Ethernet IP Configuration	Persistent IP, DHCP, LLA
Packet Size	576 ... 9000 Byte, Jumbo Frames supported
Image Buffer	1 Images (Trigger Mode) / 1 Image (Free Running Mode)

GigE Vision® Features

Events	-
Transmission via Asynchronous Message Channel	-
Frame Counter	up to 2 ³²
Payload Size	0 ... 10077696 Byte
Timestamp	64 bit, resolution in nsec, increment = 8
Packet Delay	0 .. 2 ³² - 1 Ticks
Packet Resend	Resend Buffer: 87 MB (6 Images)
GigE Vision	v2.0 (v1.2 backward compatible)

Interfaces and Connectors

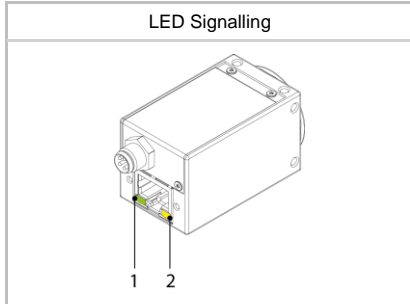
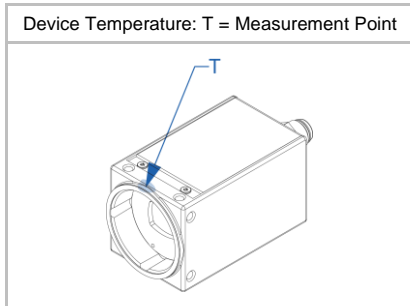
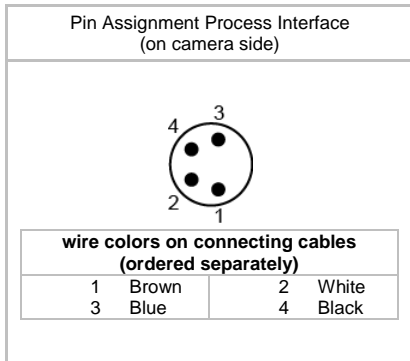
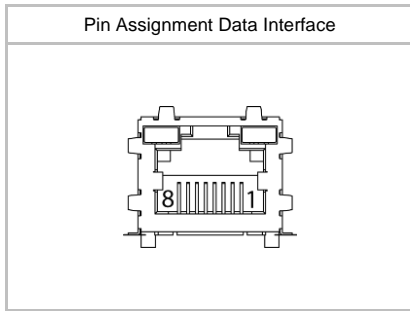
Data and Power Interface	Gigabit Ethernet Transfer Rate 1000 Mbits/sec Fast Ethernet Transfer Rate 100 Mbits/sec Connector: 8P8C Modular Jack (RJ45) screw lock type Pin Assignment: 1 - MX1+ 5 - MX3- 2 - MX1- 6 - MX2- 3 - MX2+ 7 - MX4+ 4 - MX3+ 8 - MX4-
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Process Interface	Connector: M8/4-pin (SACC-DSI-M 8MS-4CON-L180) Assignment: 1 - VCC 3 - GND (Power and OUT) (Power and IN) 2 - IN+ 4 - OUT
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* Note I/Os: Ground loops are to be avoided and can lead to destruction of the device.

¹⁾ Sensor readout, different from pixel format



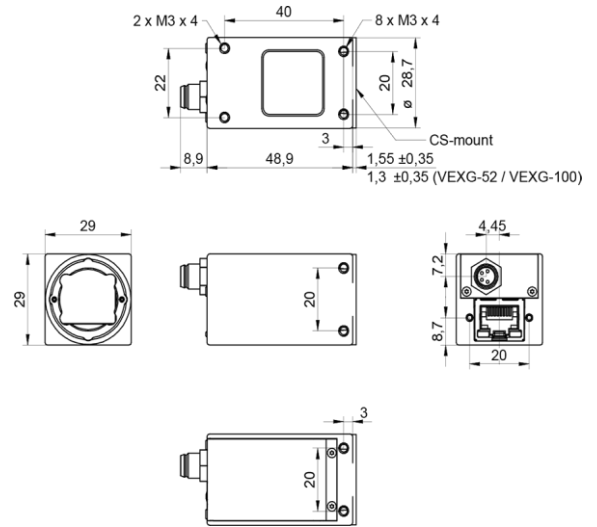
Optical Data

Lens Mount	CS-Mount
Optical Filter	IR cut filter

Mechanical Data

Housing	Zinc die casting, nickel-chrome-plated IP40 (with mounted lens and GigE cable)
Protection Class	IP40 (with mounted lens and GigE cable)
Weight	120 g

Dimensions



Environmental Data

Storage Temperature	-10 °C ... +70 °C
Operating Temperature	+5 °C ... +60 °C @ T = Measurement Point
	Ambient temperature above 40 °C requires heat dissipation measures
Int. Temperature Sensor	no
Humidity	10 % ... 90 % non-condensing

LED Signalling

LED	Green flash	RX active
	Green	Link ON
	Yellow	Error
	Yellow flash	TX active

Electrical Data

Power Supply (ext.)	VCC: 12 ... 24 V DC ± 20%
	I: 83 ... 167 mA
Power over Ethernet	-
Power Consumption	approx. 2.0 W @ 12VDC and 14 fps
Digital Input	direct, without optocoupler
	$U_{IN(low)}$: 0.0 ... 0.8 VDC
	$U_{IN(high)}$: 3.3 ... 30 VDC
	I_{IN} : <10 mA
	min. Impulse Length: 2.0 µsec
Digital Output	direct, without optocoupler
	U_{EXT} : VCC
	I_{OUT} : max. 50 mA
	t_{ON} = typ. 3 µsec t_{OFF} = typ. 40 µsec

Caution



* The digital I/Os are not potential-free and do not have an overrun cut-off. Incorrect wiring (overvoltage, undervoltage or voltage reversal) can lead to defect in the electronic system.
Ground loops are to be avoided and can lead to destruction of the device.

Conformity

Conformity	CE, RoHS, REACH, KC, EAC
KC Registration No. / Date	R-REI-BkR-VEXG-52MR / 10.07.2018
MTBF	81 years @ T = 45 °C / 54 years @ T = 60 °C T = Measurement Point

GenICam™ Features

Timer	-
User Sets	Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1 Parameters: any user definable Parameter
Acquisition Abort	Delay up to 68.6 msec
SFNC Version	v2.3

Factory Settings after Start-Up

Trigger Mode	Off (Free Running)
Analog Controls	Exposure Time: 4 msec, Gain: 0 dB, Offset: 0
Pixel Format	Mono8
Partial Scan	Off
Acquisition Frame Rate	-
Timer	-
Defect Pixel Correction	ON
Fixed Pattern Noise Correction	ON
Digital Input	Line0, invert = false
Digital Output	Line1, invert = false, line source = Off
GPIO 1/2	-
TriggerSource	Off

Partial Scan @ FullFrame, min Exposure, Mono8 or BayerRG8

	Resolution	max. fps acquisition	max. fps interface ²⁾
Full HD	1920 x 1080	32	32
SXGA	1280 x 1024	44	44
XGA	1024 x 768	66	66
SVGA	800 x 600	95	95
VGA	640 x 480	130	130
CIF	352 x 288	260	260
QCIF	176 x 144	571	571
LineScan	2592 x 1024	27	27
	2592 x 512	54	54
	2592 x 256	104	104
	2592 x 128	196	196
	2592 x 64	349	349
	2592 x 32	572	572
	2592 x 16	841	841
	2592 x 8	1099	1099
	2592 x 4	1299	1299
	2592 x 2	1429	1429
	2592 x 1	-	-

²⁾ depends on the used interface