



## Device Information

Model Name	
Vendor Name	

## Sensor Information

Sensor Name	Sony IMX249 Gen1
Type	1/1.2" progressive scan CMOS
Shutter	Global Shutter
Resolution	1920 x 1200 pixels
Scan Area	11.25 mm x 7.03 mm
Pixel Size	5.86 $\mu$ m x 5.86 $\mu$ m

## Data Quality

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

Dark Noise ( $\sigma$ )	7 e- typical
Saturation	28500 e- typical
Dynamic Range	71 dB typical
SNR	44 dB typical
Quantum efficiency $\eta$	56% @ 465 nm, 56% @ 536 nm, 46% @ 631 nm typical

## Acquisition

Resolution	1920 px x 1200 px		
Interface Frame Rate (depends on used interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode) <sup>2)</sup>
	Full Frame	1920 x 1200	39 fps
	Binning 2x2	960 x 600	39 fps
	Binning 2x1	960 x 1200	39 fps
	Binning 1x2	1920 x 600	39 fps

Acquisition Frame Rate<sup>1)</sup> 39 fps |  $t_{readout} = 25.6$  msec (max. Res. Full Frame) @ 12 bit (Burst Mode)

Pixel Formats BayerRG8, BayerRG10, BayerRG12, BayerRG12p Mono8, Mono10, Mono12, Mono12p, RGB8, BGR8

Partial Scan True Partial Scan with increasing Frame Rate on Y direction, Region of Interest (ROI) arbitrary  
Width: minimum 16, increment 16  
Height: minimum 2, increment 2

Adjustable Acquisition Frame Rate Off or 0,01 ... 65535 Hz

Acquisition Mode Continuous, Single Frame and Multi Frame

Acquisition Status AcquisitionActive, AcquisitionTrigger Wait

Exposure Mode Timed

Shutter Mode Global

Readout Mode Overlapped, Sequential

## Image Pre-Processing

Analog Controls Exposure Time (57  $\mu$ sec ... 60 sec | Step Size 1  $\mu$ sec)  
Gain (0...48 dB), Offset (0 ... 255 LSB | 12 bit)

Auto Function ExposureAuto and GainAuto  
with BrightnessAutoPriority based on BrightnessAuto ROI  
BalanceWhiteAuto and ColorTransformationAuto based on BalanceWhiteAuto ROI

LUT Luminance (12 bit)

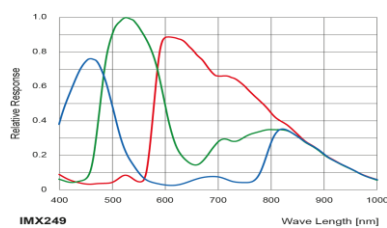
Color Models Mono, Raw Bayer, RGB and BGR

Color Processing Integrated color processor for high quality color calculation

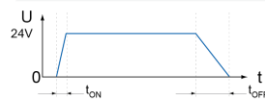
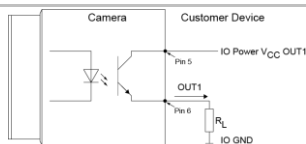
Color Adjustment

Manual White Balance  
Automatic White Balance (Once or Continuous) based on Region of Interest (ROI)

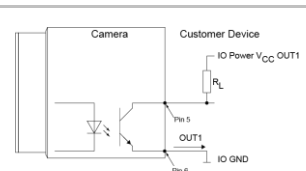
Sensor Graph: Relative Response



Digital Output: High Active

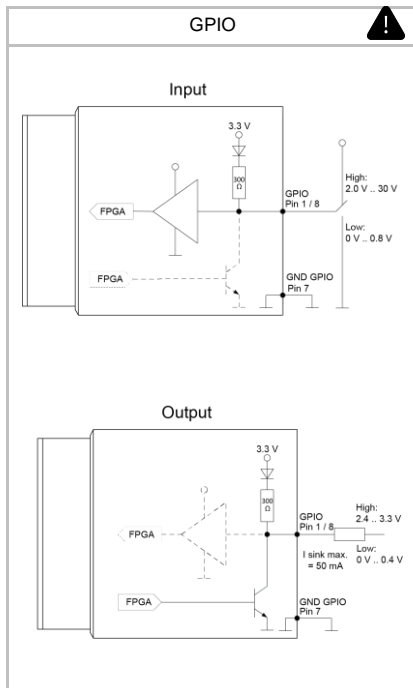
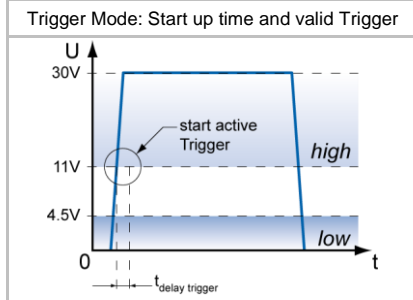
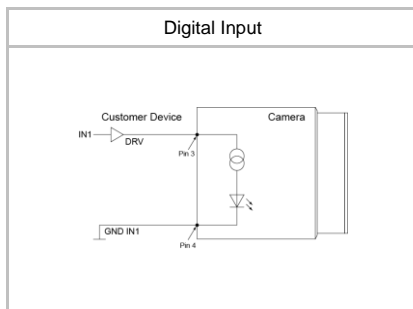


Digital Output: Low Active



<sup>1)</sup> Sensor readout, different from pixel format

<sup>2)</sup> depends on the used interface



## Image Pre-Processing

Color Enhancement	Color Transformation to sRGB color space by optimized Matrix for 3000 K, 5000 K, 6500 K and 9500 K Lightsource or User defined Matrix
Color Tolerance	-
Binning Horizontal	1 or 2
Binning Vertical	1 or 2
Defect Pixel Correction	via Defect Pixel List with up to 512 Pixel Coordinates
Image Flipping	Horizontal, vertical
Fix Pattern Noise Correction	-

## Process Synchronization

Trigger Mode	Off (Free Running), On (Trigger)
Trigger Overlap Type	Readout
Trigger Sources	Hardware (Line0, 1, 2), Software, Counter 1, 2 End, Action CMD (Action 1), All or Off fixed Trigger Delay out of t <sub>readout</sub> : <sup>1)</sup> 46 µsec @ 12 bit max. Trigger Delay during t <sub>readout</sub> : <sup>1)</sup> 61,7 µsec @ 12 bit
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
External Flash Sync	via Exposure Active t <sub>delay flash</sub> ≤ 3 µsec, t <sub>duration</sub> = t <sub>exposure</sub>
Encoder Function	yes, via Counter and Trigger Source
PTP Function	-

## Digital I/Os

Lines	Input: Line 0, Output: Line3, GPIO: Line 1, Line 2
Line Sources (Output)	Off, ExposureActive, Timer1, ReadoutActive, UserOutput 1-3 and TriggerReady
Line Debouncer (Input)	Low and high signal separately selectable Debouncing Time 0 ... 5 msec, Step Size: 1 µsec

## Memory

Image Buffer	53 MB 8 Images (Trigger Mode) / 1 Image (Free Running Mode)
Non-volatile Memory	128 kb

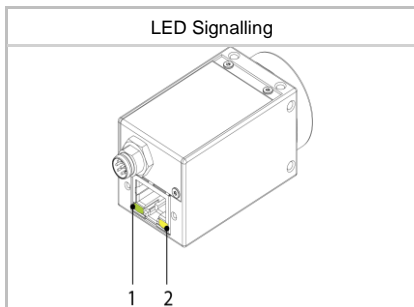
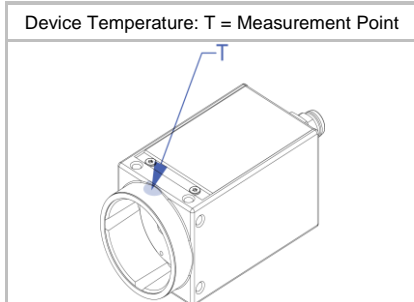
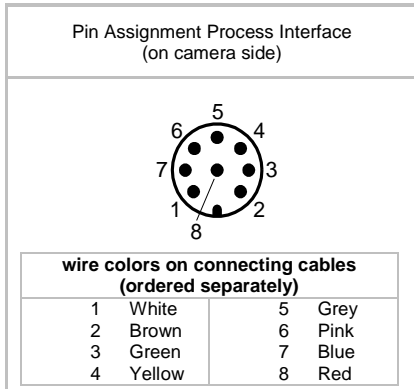
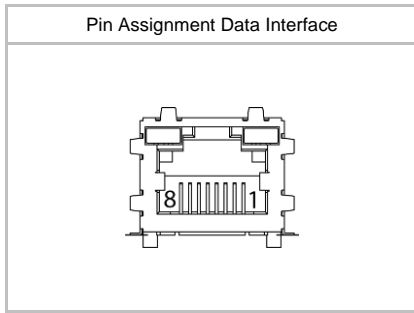
## Network Interface Data

Interface	Gigabit Ethernet 1000BASE-T 1000 Mb/s/sec Fast Ethernet 100 BASE-T 100 Mb/s/sec
Ethernet IP Configuration	Persistent IP, DHCP, LLA
Packet Size	576 ... 9000 Byte, Jumbo Frames supported

## GigE Vision® Features

Events Transmission via Asynchronous Message Channel	DeviceTemperatureStatusChanged, EventLost, ExposureEnd, ExposureStart, FrameEnd, FrameStart, FrameTransferSkipped, GigE VisionError, GigE VisionHeartbeatTimeOut, PrimaryApplicationSwitch, Line0..2 FallingEdge, Line0..2 RisingEdge, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped
Action CMD	yes, Action 1 for Trigger
Frame Counter	up to 2 <sup>32</sup>
Payload Size	0 ... 6912224 Byte
Timestamp	64 bit, resolution in nsec, increment = 8
Packet Delay	0 ... 2 <sup>32</sup> - 1 nsec
Packet Resend	Resend Buffer: 53 MB (8 Images)
GigE Vision	v2.0 (v1.2 backward compatible)

<sup>1)</sup> Sensor readout, different from pixel format



## 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	
Process Interface	Connector:	M8/8-pin (SACC-DSI-M8MS-8CON-M8-L180)	
	Assignment:	1 - MX1+	2 - MX1-
		3 - MX2+	4 - MX3+
		5 - MX3-	6 - MX2-
		7 - MX4+	8 - MX4-

Caution



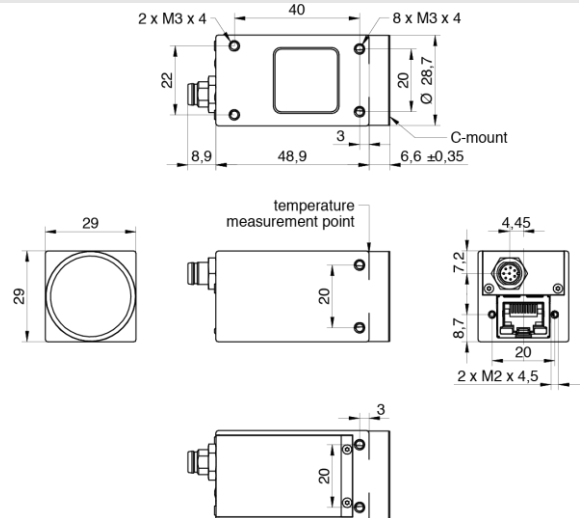
\* Note GPIOs: Ground loops are to be avoided and can lead to destruction of the device.

## Optical Data

Lens Mount	C-Mount
Optical Filter	IR cut filter

## Mechanical Data

Housing	Zinc die casting, baked varnish (until 02-2020 nickel-chrome-plated)
Protection Class	IP40 (with mounted lens and GigE cable)
Weight	120 g
Dimensions	



Additional Cooling Pipe	no
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## Environmental Data


Storage Temperature	-10 °C ... + 70 °C
Operating Temperature	0 °C ... +65 °C @ T = Measurement Point or 0 °C ... +75 °C @ internal Temperature Sensor
	Note: Ambient temperature above 36 °C requires heat dissipation measures.
Int. Temperature Sensor	yes, accuracy: ±2 °C (typ) -40 °C ... 0 °C ±1 °C (typ) 0 °C ... +85 °C
Humidity	10 % ... 90 % non-condensing

<sup>1)</sup> the maximum temperature for Sony sensor characteristics (sensor performance) are guaranteed up to 53 °C @ Measurement Point or up to 60 °C @ internal temperature sensor

## LED Signalling

LED	LED 1	Green static	Link ON
		Green flash	RX active
	LED 2	Yellow static	Error
		Yellow flash	TX active

## Electrical Data

Power Supply (ext.)	VCC: 12 ... 24 V DC $\pm$ 20% I: 96 ... 193 mA
Power over Ethernet	Class 1 device VCC: 36 ... 57 V DC I: 58 mA @ 48 VDC
Power Consumption	approx. 2.3 W @ 12VDC and 39 fps approx. 2.7 W @ 48 VDC (PoE) and 39 fps (Factory Setting "Default")
Digital Input	Optocoupler $U_{IN(low)}$ : 0.0 ... 4.5 VDC $U_{IN(high)}$ : 11.0 ... 30.0 VDC $I_{IN}$ : 3.0 ... 10.0 mA min. Impulse Length: 2.0 $\mu$ sec
Digital Output	Optocoupler $U_{EXT}$ : 5 ... 30 V DC $I_{OUT}$ : max. 50 mA $t_{ON}$ = typ. 3 $\mu$ sec $t_{OFF}$ = typ. 40 $\mu$ sec
GPIO	direct, without optocoupler
GPIO used as Input:	$U_{IN(low)}$ : 0.0 ... 0.8 VDC $U_{IN(high)}$ : 2.0 ... 30.0 VDC min. Impulse Length: 2.0 $\mu$ sec
GPIO used as Output:	$U_{Out(low)}$ : 0.0 ... 0.4 VDC ( $I_{sink\ max}$ : 50 mA) $U_{Out(high)}$ : 2.4 ... 3.3VDC ( $I_{max}$ : 1 mA)
Caution 	* The General Purpose I/Os (GPIOs) are not potential-free and do not have an overrun cut-off. Incorrect wiring (overvoltage, undervoltage or voltage reversal) can lead to defects 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-R-BkR-VCXG-23C / 13.05.2021
MTBF	52 years @ T = 45 °C / 33 years @ T = 60 °C T = Measurement Point

## GenICam™ Features

Short Exposure Range	-
Timer	Timer Selector: Timer 1 TimerTriggerSource: Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameTransferSkipped, TriggerSkipped, Action 1 and Off TimerDelay: 0 $\mu$ sec ... 2 sec, Step Size: 1 $\mu$ sec TimerDuration: 4 $\mu$ sec ... 2 sec, Step Size: 1 $\mu$ sec
Counter	Counter Selector: Counter 1, Counter 2 CounterValue: 0 ... 65535 Counter Event Source: Counter1End or Counter2End, ExposureActive, FrameTransferSkipped, FrameTrigger, TriggerSkipped, Line0..2 and Off Counter Reset Source: Counter1End, Counter2End, Line0..2 and Off

## GenICam™ Features

Sequencer	Sequencer Characteristics: up to 128 sets, up to 4 possible pathes for triggered set transitions, 6 trigger sources: Counter1End, Counter2End, ExposureActive, Line0..2, ReadoutActive, Timer1End Sequencer Parameters for Exposure, Gain, Trigger, ROI and Output: ExposureTime, CounterDuration, CounterEventActivation, CounterEventSource, CounterResetSource, ExposureMode, ExposureTime, Gain, Height, OffsetX, OffsetY, TriggerMode, UserOutputValue, UserOutputValueAll, Width
User Sets	Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter
Acquisition Abort	Delay up to 25.6 msec
Chunk Data	yes, Chunk Selector: Binning, BlackLevel, CounterValue, DeviceTemperature, ExposureTime, FrameID, Gain, Height, Image, ImageControl, LineStatusAll, OffsetX, OffsetY, PixelFormat, SequencerSetActive, Timestamp, Width
Device Temperature	InHouse Event generation for Normal to High, High to Exceeded and Exceeded to Normal Exceeded (no image transfer) = max. internal temperature sensor + 1 °C
Device Link Throughput Limit	yes, up to max. Device Link Speed
Custom Data	yes, 128 Byte
SFNC Version	v2.4

### Factory Settings after Start-Up

Ethernet IP Configuration	DHCP, LLA
Trigger Mode	Off (Free Running)
Analog Controls	Exposure Time: 4 msec, Gain: 0 dB, Offset: 0
Pixel Format	BayerRG8
Partial Scan	Off
Acquisition Frame Rate	Off
Timer/Counter/Sequencer	Off
Defect Pixel Correction	ON
Fixed Pattern Noise Correction	-
Digital Input	Line0, invert = false
Digital Output	Line3, invert = false, line source = Off
GPIO 1/2	Line1, Line2, invert = false, LineMode = Input
TriggerSource	All

**Partial Scan** @ FullFrame, min Exposure, Mono8 (monochrome camera) or BayerRG8 (color camera)

	Resolution	max. fps acquisition	max. fps interface <sup>2)</sup>
Full HD	1920 x 1080	43	43
SXGA	1280 x 1024	45	45
HD720	1280 x 720	63	63
XGA	1024 x 768	60	60
SVGA	800 x 600	75	75
VGA	640 x 480	93	93
CIF	352 x 288	147	147
QVGA	320 x 240	172	172
QCIF	176 x 144	261	261
LineScan	1920 x 1024	45	45
	1920 x 512	87	87
	1920 x 256	163	163
	1920 x 128	285	285
	1920 x 64	457	457
	1920 x 32	655	655
	1920 x 16	835	835
	1920 x 8	968	968
	1920 x 4	1052	1052
	1920 x 2	1100	1100
	1920 x 1	-	-

<sup>2)</sup> depends on the used interface