

¹⁾ Sensor readout, different from pixel format

²⁾ depends on the used interface



Sensor Information

Model Name	Sony IMX255
Type	1" progressive scan CMOS
Shutter	Global Shutter
Resolution	4096 x 2160 pixels
Scan Area	14.13 mm x 7.45 mm
Pixel Size	3.45 μm x 3.45 μm

Data Quality

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

Dark Noise (σ)	2 e- typical
Saturation	9500 e- typical
Dynamic Range	71 dB typical
SNR	40 dB typical
Quantum efficiency η	47 % @ 465 nm, 58 % @ 536 nm, 53 % @ 631 nm typical

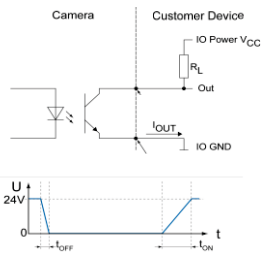
Acquisition

Resolution	4096 px x 2160 px		
Interface Frame Rate (depends on used interface performance)	Format	Resolution	max. Frame Rate (@ Trigger Mode) ²⁾
	Full Frame	4096 x 2160	41 fps
	Binning 2x2	2048 x 1080	43 fps
	Binning 2x1	2048 x 2160	43 fps
	Binning 1x2	4096 x 1080	43 fps
Acquisition Frame Rate ¹⁾	43 fps $t_{\text{readout}} = 23.1 \text{ msec}$ (max. Res. Full Frame) @ 10 bit		
	40 fps $t_{\text{readout}} = 25 \text{ msec}$ (max. Res. Full Frame) @ 12 bit		
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 4, increment 4		
Adjustable Acquisition Frame Rate	Off or 0.01 ... 1550 Hz		
Acquisition Mode	Continuous, Single Frame and Multi Frame		
Acquisition Status	AcquisitionActive, AcquisitionTrigger Wait		
Exposure Mode	Timed		
Shutter Mode	-		
Readout Mode	Overlapped, Sequential		

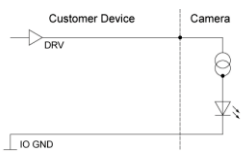
Image Pre-Processing

Analog Controls	Exposure Time (1 μsec ... 60 sec Step Size 1 μsec) Gain (0...48 dB), Offset (0 ... 255 LSB 12 bit)
Gamma Correction	Gamma (0.1 ... 2 available if LUT is enabled)
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)
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	Horizontal, vertical
Defect Pixel Correction	via Defect Pixel List with up to 512 Pixel Coordinates
Fix Pattern Noise	-
Correction	

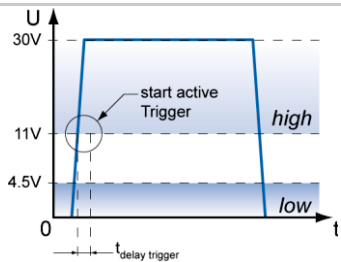
Digital Output: Low Active



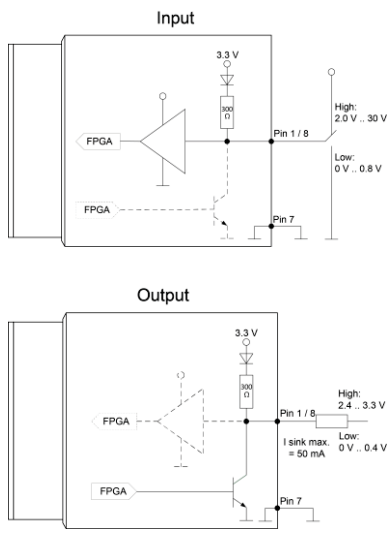
Digital Input



Trigger Mode: Start up time and valid Trigger



GPIO



Process Synchronization

Trigger Mode	Off (Free Running), On (Trigger)
Trigger Overlap Type	Readout
Trigger Sources	Hardware (Line0,1,2), Software, All or Off fixed Trigger Delay out of t _{readout} : ¹⁾ 64.4 μsec @ 10 bit 66.9 μsec @ 12 bit max. Trigger Delay during t _{readout} : ¹⁾ 69.6 μsec @ 10 bit 73 μsec @ 12 bit
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
External Flash Sync	via Exposure Active t _{delay flash} ≤ 3 μsec, t _{duration} = t _{exposure}

Digital I/Os

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

Memory

Image Buffer	330 MB 13 Images (Trigger Mode) / 1 Image (Free Running Mode)
Non-volatile Memory	128 kb

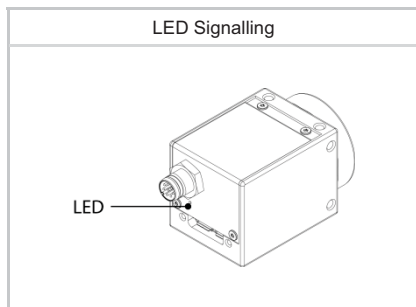
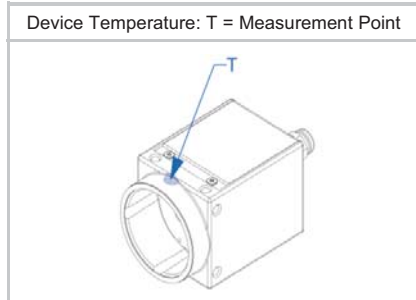
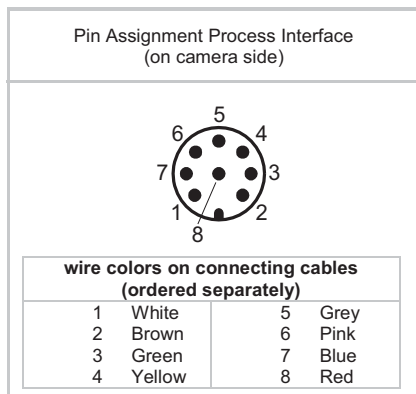
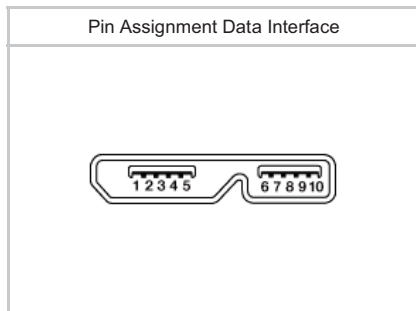
Interface Data

Interface	USB3.0 (5000 Mbits/sec)
USB Vendor ID /	0x2825 / 0x14A
Product ID	

USB 3 Vision® Features

Events Transmission via Asynchronous Message Channel	DeviceTemperatureStatusChanged, EventLost, ExposureEnd, ExposureStart, FrameEnd, FrameStart, FrameTransferSkipped, Line0..3 FallingEdge, Line0..3 RisingEdge, TransferBufferFull, TransferBufferReady, TriggerOverlapped, TriggerReady, TriggerSkipped
Frame Counter	up to 2 ³²
Payload Size	0 ... 26542280 Byte
Timestamp	64 bit, resolution in nsec, increment = 10
USB Vision	v1.0.1

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Interfaces and Connectors

Data and Power Interface	USB 3.0 USB 2.0 Connector:	Transfer Rate 5000 Mbits/sec Transfer Rate 480 Mbits/sec USB 3.0 Micro B
	Pin Assignment:	1 - VBUS 2 - D- 3 - D+ 4 - ID 5 - GND 6 - MicB_SSTX- 7 - MicB_SSTX+ 8 - GND_DRAIN MicB_SSRX- MicB_SSRX+
Process Interface	Connector: Assignment:	M8/8-pin (SACC-DSI-M8MS-8CON-M8-L180) 1 - GPIO (Line2) 2 - not connected 3 - IN1 (Line0) 4 - GND IN1 5 - Power VCC 6 - OUT1 (Line3) 7 - GND GPIO 8 - GPIO (Line1)

Caution



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

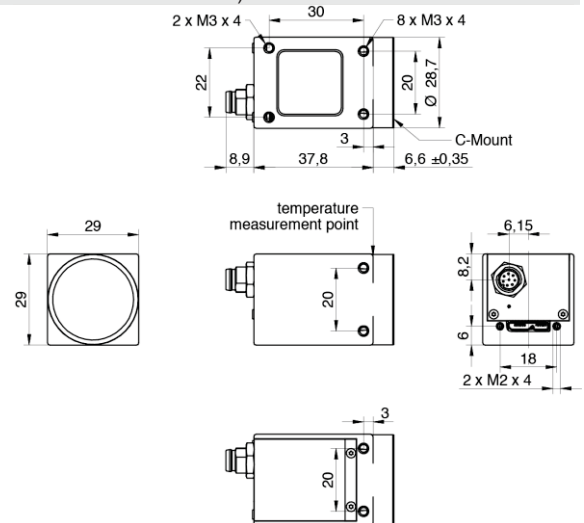
Optical Data

Lens Mount	C-Mount
Optical Filter	IR cut filter

Mechanical Data

Housing	Zinc die casting, nickel-chrome-plated, IP40 (with mounted lens and USB 3.0 cable)
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Dimensions



Weight	90 g
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Environmental Data


Storage Temperature	-10 °C ... + 70 °C
Operating Temperature	+5 °C ... +65 °C @ T = Measurement Point or *) +5 °C ... +72 °C @ internal Temperature Sensor Ambient temperature above 28 °C requires heat dissipation measures.
Int. Temperature Sensor	yes, accuracy: ±1 °C (typ) 0 °C ... +85 °C
Humidity	10 % ... 90 % non-condensing

*) the maximum temperature for Sony sensor characteristics (sensor performance) are guaranteed up to 47°C @ Measurement Point or 56°C @ internal temperature sensor

LED Signalling

LED	Green flash Green Red Yellow Red flash	Power on, no link active Link active USB 3.0 Error or Link active USB 2.0 Sensor Readout activity Update
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Electrical Data

Power Supply	bus powered via USB3.0 interface
Power Consumption	approx. 4.0 W @ 41 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 μ sec
Digital Output	Optocoupler U_{EXT} : 5 ... 30 V DC I_{OUT} : max. 50 mA t_{ON} = typ. 3 μ sec t_{OFF} = typ. 40 μ 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 μ 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 Registration No. / Date	- / -
MTBF	56 years @ T = 45 °C / 36 years @ T = 60 °C T = Measurement Point

GenICam™ Features

Short Exposure Range	yes, ShortExposureTimeEnable Short Exposure Range 1 μ sec ... 60 sec Default Exposure Range 15 μ sec ... 60 sec
Timer	Timer Selector: Timer Selector: Timer 1 TimerTriggerSource: Line0, SoftwareTrigger, ExposureStart, ExposureEnd, FrameTransferSkipped, TriggerSkipped, Off TimerDelay: 0 μ sec ... 2 sec, Step Size: 1 μ sec TimerDuration: 4 μ sec ... 2 sec, Step Size: 1 μ sec
Counter	Counter Selector: Counter 1, Counter 2 CounterValue: 0 ... 65535 Counter Event Source: Counter1End or Counter2End, ExposureActive, FrameTransferSkipped, FrameTrigger, TriggerSkipped and Off Counter Reset Source: Counter1End, Counter2End, Line0 and Off
Sequencer	Sequencer Characteristics: up to 128 sets, up to 4 possible pathes for triggered set transitions, 6 trigger sources: Counter1End, Counter2End, ExposureActive, Line0, 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

GenICam™ Features

User Sets	Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter
Acquisition Abort	Delay up to 25 msec
Chunk Data	yes, Chunk Selector: Binning, Black Level, DeviceTemperature, ExposureTime, FrameID, Gain, Height, Image, ImageControl, LineStatusAll
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
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	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 or BayerRG8

	Resolution	max. fps acquisition	max. fps interface ²⁾
UHD (4K)	3840 x 2160	43	43
Full HD	1920 x 1080	84	84
SXGA	1280 x 1024	88	88
XGA	1024 x 768	116	116
SVGA	800 x 600	145	145
VGA	640 x 480	178	178
CIF	352 x 288	276	276
QCIF	176 x 144	472	472
LineScan	4096 x 2048	45	43
	4096 x 1024	88	88
	4096 x 512	168	168
	4096 x 256	304	304
	4096 x 128	512	512
	4096 x 64	777	777
	4096 x 32	1049	1049
	4096 x 16	1270	1270
	4096 x 8	1420	1420
	4096 x 4	1510	1510
	4096 x 2	1510	1510
	4096 x 1	-	-

²⁾ depends on the used interface

Distribution in the UK & Ireland



Lambda Photometrics Limited
 Lambda House Batford Mill
 Harpenden Herts AL5 5BZ
 United Kingdom

E: info@lambdaphoto.co.uk
W: www.lambdaphoto.co.uk
T: +44 (0)1582 764334
F: +44 (0)1582 712084