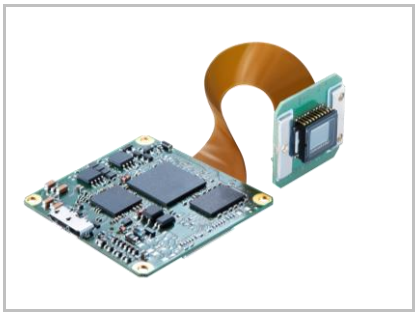
Baumer

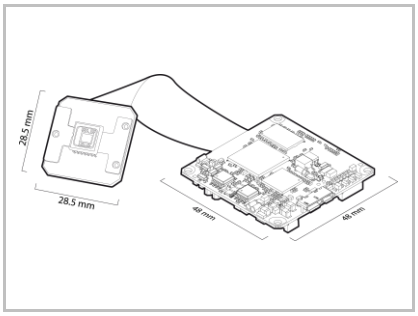
Passion for Sensors

MXU20

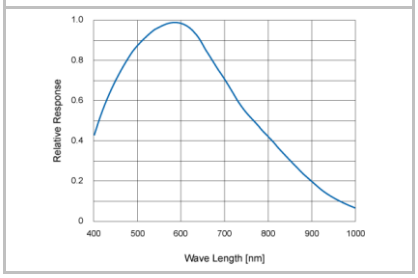
Technical Data

Art. No. 11115789

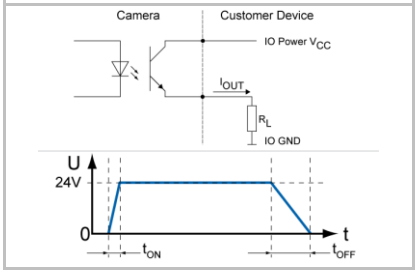




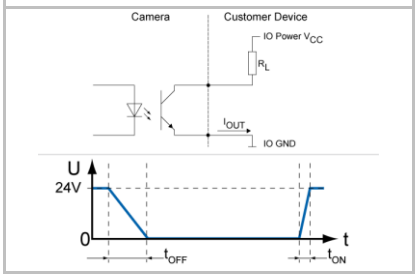
Sensor Graph: Relative Response



Digital Output: High Active



Digital Output: Low Active



Digital Monochrome Matrix Camera Module, USB 3.0

Sensor Information

Model Name	SONY ICX274
Type	1/1.8“ progressive scan CCD
Shutter	Global
Native Resolution	1624 x 1228 pixels
Scan Area	7.15 mm x 5.40 mm
Pixel Size	4.4 µm x 4.4 µm

Data Quality

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

Readout Noise (σ)	0.3 LSB @ 8 bit, 4.4 LSB @ 12 bit (typical)
Dynamic Range	59 dB (typical)

Acquisition Formats

Image Formats	Format	Resolution	Frame Rate	$t_{readout}$
	Full Frame	1624 x 1228	27 fps	36.3 msec
Pixel Formats	Mono8, Mono12, Mono12p			
Partial Scan	Not available			

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	Not available
Binning Vertical	Not available
Image Flipping	Horizontal
Defect Pixel Correction	via Defect Pixel List with up to 511 Pixel Coordinates

Process Synchronization

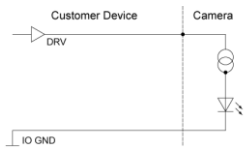
Modes	Free Running, Trigger
Free Running	Continuous or Adjustable Acquisition Frame Rate[1] (0 … 27 Hz)
Trigger Sources	Hardware, Software, All or Off
Trigger Delay	0 ... 2 sec, Tracking and buffering of up to 256 triggers
Sequencer Characteristics	up to 128 sets of parameters, up to 65536 loop passes, up to 65536 repetitions of sets of parameters, up to 65536 images per trigger event
Sequencer Parameters	Exposure Time, Gain Factor, Output Line
External Flash Sync	via Exposure Active $t_{delay\ flash} \leq 3$ µsec, $t_{duration} = t_{exposure}$

Digital I/Os

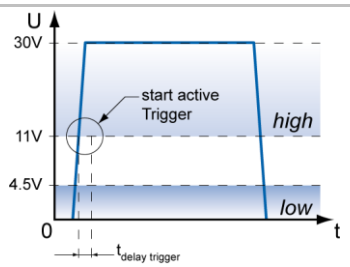
Lines	Input: Line 0, Output: Line3, GPIO: Line 1, Line 2
Circuit Times	Digital Output: t_{ON} = typ. 3 µsec t_{OFF} = typ. 40 µsec GPIO: t_{ON} = typ. 1.6 nsec t_{OFF} = typ. 3 nsec
Output Sources	Off, ExposureActive, Line 0, Timer1 … 3, ReadoutActive, User0 … 2, TriggerReady, TriggerOverlapped, TriggerSkipped, Sequencer Output 0 ... 2
Line Debouncer	Low and high signal separately selectable Debouncing Time 0 … 5 msec, Step Size: 1 µsec

[1] Max. Acquisition Frame Rate can be achieved by using the following camera settings: min. Exposure + max. Binning | min. Size Y + Mono8

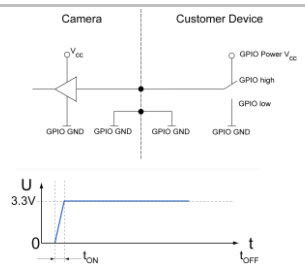
Digital Input



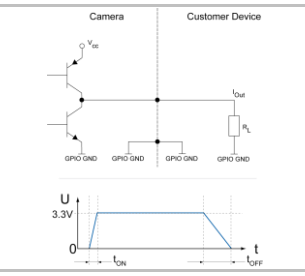
Trigger Mode: Start up time and valid Trigger



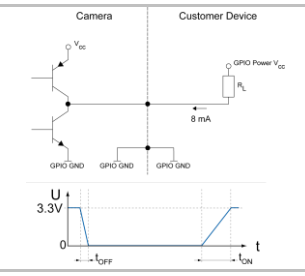
GPIO IN



GPIO OUT High Active

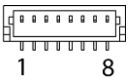


GPIO OUT Low Active



Pin Assignment Data Interface

Pin Assignment Power and Process Interface



Interfaces and Connectors

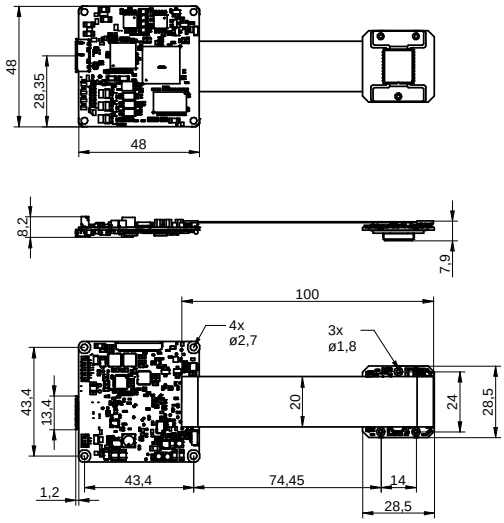
Data Interface	USB 3.0	Transfer Rate	5000 Mbits/sec
	Connector:	USB 3.0 Micro B	
	Pin Assignment:	1 – VBUS	6 – MicB_SSTX-
		2 – D-	7 – MicB_SSTX+
		3 – D+	8 – GND_DRAIN
		4 – ID	9 – MicB_SSRX-
		5 – GND	10 – MicB_SSRX+
Process Interface	Connector:	JST BM08B-SRSS-TB	
	Assignment:	1 – Shielding	5 – GPIO1*
		2 – IN1	6 – GPIO2*
		3 – IO GND	7 – IO Power VCC
		4 – OUT 1	8 – GPIO_GND

Caution

* The GPIO's are configured as input by default camera settings. They must be connected to GPIO_GND if not used or not configured as output.

Mechanical Data

Housing	Board Level Module without Housing
Dimensions	



Weight	23 g (without Optics Adapter)

Optical Data

Lens Mount	C-Mount (Adapter), S-Mount (Adapter)
Optical Filter	Dust Protection Glass

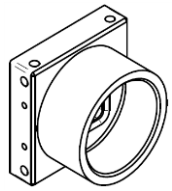
Electrical Data

Power Supply	via USB3.0 interface	
Power Consumption	approx. 3.3 W @ 27 fps	
Digital Input	$U_{IN(low)}$:	0.0 … 4.5 VDC
	$U_{IN(high)}$:	11.0 … 30.0 VDC
	I_{IN} :	6.0 … 10 mA
	min. Impulse Length:	2.0 µsec
	Trigger Delay out of $t_{readout}$:	1.0 µsec
	max. Trigger Delay during $t_{readout}$:	36.0 µsec
Digital Output	IO Power V_{CC}:	5 … 30 V DC
	I_{OUT}:	max. 50 mA
GPIO	GPIO Power V_{CC}:	3.3 V DC*
	I_{OUT}:	max. 8 mA

Caution

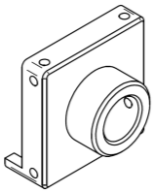
* The General Purpose I/Os (GPIOs) are not potential-free and do not have an overrun cut-off. Incorrect wiring (overvoltage, undervoltage or voltage reversal) can lead to defects in the electronic system.

C-Mount Adapter Kit (optional)



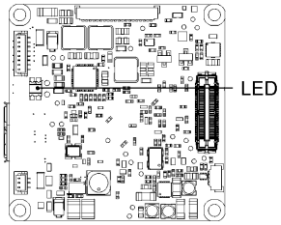
Art. No. 11097369 (mono)
Art. No. 11097380 (color)

S-Mount Adapter Kit (optional)

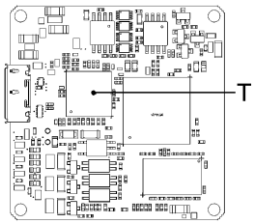


Art. No. 11117913 (mono)
Art. No. 11117915 (color)

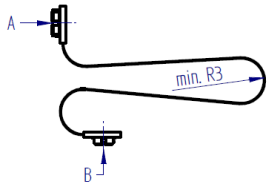
LED Signalling



Device Temperature: Measurement Point



Flexprint Cable



Length from A to B = 94 mm

Conformity

LED Signalling

LED	Green	USB3.0
	Green flash	Receiving
	Yellow	USB2.0

Environmental Data

Storage Temperature	-10 °C bis +70 °C
Operating Temperature	Depends on the thermal encapsulation
Device Temperature	T_{max} = 80 °C @ Measurement Point
Humidity	10 % … 90 % non-condensing

Interface Data

Interface	USB3.0	5000 Mbits/sec
Image Buffer	16 Images	
USB Vendor ID / Product ID	0x2825 / 0x0104	

USB3 Vision® Features

Events Transmission via Asynchronous Message Channel	EventLost, EventDiscarded, Line0RisingEdge, Line0FallingEdge, Line1RisingEdge, Line1FallingEdge, Line2RisingEdge, Line2FallingEdge, Line3RisingEdge, Line3FallingEdge, ExposureStart, ExposureEnd, FrameStart, FrameEnd, TriggerReady, TriggerOverlapped, TriggerSkipped
Frame Counter	up to 2^{32}
Payload Size	0 … 5.983.088 Byte
Timestamp	64 bit

GenICam™ Features

Timer	Timer Selector: Timer 1 … 3 TimerTriggerSource: Line0, SoftwareTrigger, CommandTrigger, 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 36.2 msec	

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	Line3, invert = false, line source = Off