

Sensor Information

| | |
|------------|------------------------------|
| Model Name | Sony IMX265 |
| Type | 1/1.8" progressive scan CMOS |
| Shutter | Global Shutter |
| Resolution | 2048 x 1536 pixels |
| Scan Area | 7.06 mm x 5.29 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 | 2048 px x 1536 px | | |
| Interface Frame Rate | Format | Resolution | max. Frame Rate |
| (depends on used interface performance) | | | |
| | Full Frame | 2048 x 1536 | 39 fps |
| | Binning 2x2 | 1024 x 768 | 56 fps |
| | Binning 2x1 | 1024 x 1536 | 56 fps |
| | Binning 1x2 | 2048 x 768 | 56 fps |

Acquisition Frame Rate ¹⁾ 56 fps | $t_{readout} = 17.9$ 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 Off or 0.01 ... 65535 Hz

Acquisition Mode Continuous, Single Frame and Multi Frame

Acquisition Status AcquisitionActive, AcquisitionTrigger Wait

Exposure Mode Timed

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)

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

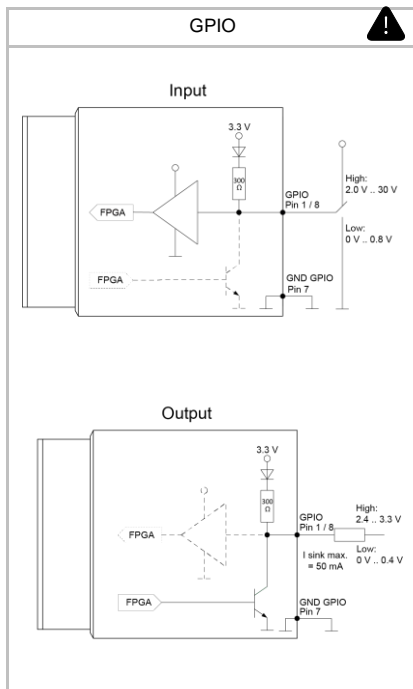
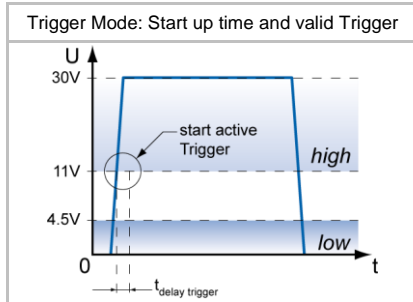
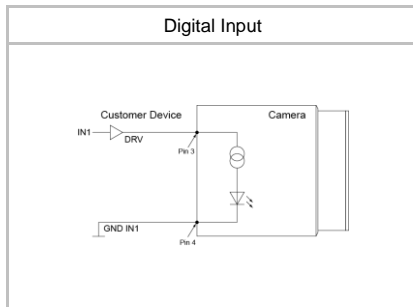
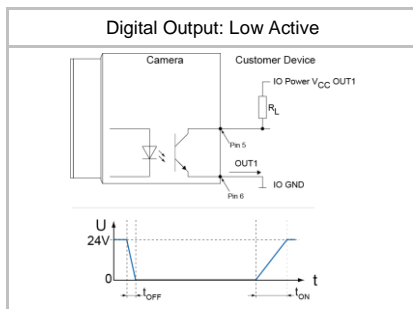
Color Adjustment Manual White Balance
Automatic White Balance (Once or Continuous) based on Region of Interest (ROI)

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 -

¹⁾ Sensor readout, different from pixel format

²⁾ depends on the used interface



¹⁾ Sensor readout, different from pixel format

Image Pre-Processing

| | |
|------------------------------|--|
| 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 | - |

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 _{readout} : ¹⁾ 66.7 μsec @ 12 bit max. Trigger Delay during t _{readout} : ¹⁾ 73.1 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} |
| Encoder Function | yes, via Counter and Trigger Source |
| PTP Function | - |

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

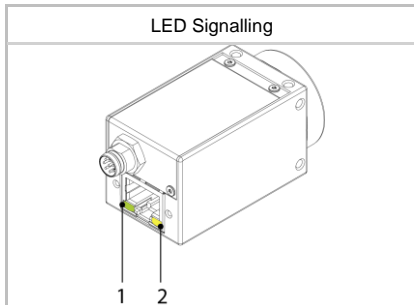
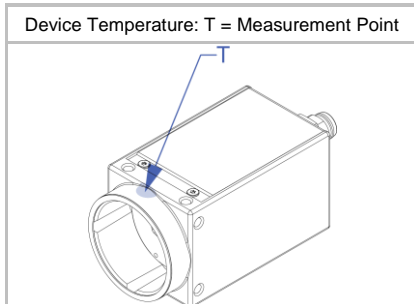
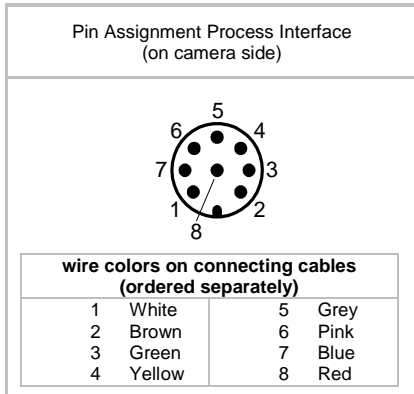
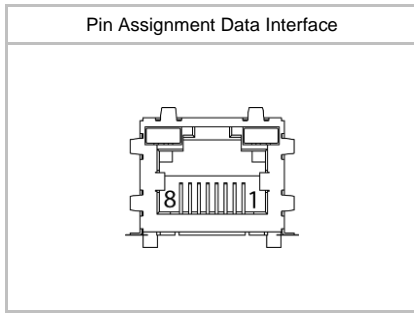
| | |
|---------------------|--|
| Image Buffer | 72 MB 8 Images (Trigger Mode) / 1 Image (Free Running Mode) |
| Non-volatile Memory | 128 kb |

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 |

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 ³² |
| Payload Size | 0 ... 9437408 Byte |
| Timestamp | 64 bit, resolution in nsec, increment = 8 |
| Packet Delay | 0 .. 2 ³² - 1 nsec |
| Packet Resend | Resend Buffer: 72 MB (8 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 | |
| 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- |
| | | Assignment: | 1 - GPIO (Line2) |
| | | 3 - IN1 (Line0) | 4 - GND IN1 |
| | | 5 - Power VCC OUT | 6 - OUT1 (Line3) |
| | | 7 - GND (Power, GPIO) | 8 - GPIO (Line1) |

Caution



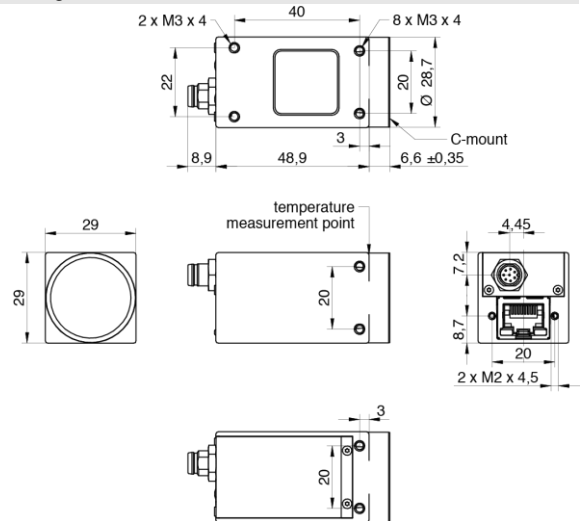
* Note GPIOs: Ground loops are to be avoided and can lead to destruction of the device.

Optical Data

| | |
|----------------|---------------|
| Lens Mount | C-Mount |
| Optical Filter | IR cut filter |

Mechanical Data

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



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 |
| | Ambient temperature above 32 °C requires heat dissipation measures. |
| Int. Temperature | yes, accuracy: |
| Sensor | ±2 °C (typ) -40 °C ... 0 °C ±1 °C (typ) 0 °C ... +85 °C |
| Humidity | 10 % ... 90 % non-condensing |

¹⁾ the maximum temperature for Sony sensor characteristics (sensor performance) are guaranteed up to 50°C @ Measurement Point or 56°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: 108 ... 218 mA |
| Power over Ethernet | Class 1 device VCC: 36 ... 57 V DC I: 65 mA @ 48 VDC |
| Power Consumption | approx. 2.6 W @ 12VDC and 39 fps approx. 3.1 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 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, EAC |
| KC Registration No. / Date | MSIP-REI-BkR-VCXG-51C / 02.05.2017 |
| MTBF | 51 years @ T = 45 °C / 33 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 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, Line0..2 and Off Counter Reset Source: Counter1End, Counter2End, Line0..2 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..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 |

GenICam™ Features

| | |
|------------------------------|--|
| User Sets | Factory Settings: UserSet0 (read only) Freely Programmable: UserSet1, UserSet2, UserSet3 Parameters: any user definable Parameter |
| Acquisition Abort | Delay up to 17.9 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 with CustomDataKonfiguration Mode |
| SFNC Version | v2.4 |

Factory Settings after Start-Up

| | |
|--------------------------------|--|
| Ethernet IP Configuration | |
| 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 ²⁾ |
|----------|-------------|----------------------|----------------------------------|
| Full HD | 1920 x 1080 | 78 | 59 |
| SXGA | 1280 x 1024 | 83 | 83 |
| HD720 | 1280 x 720 | 116 | 116 |
| XGA | 1024 x 768 | 109 | 109 |
| SVGA | 800 x 600 | 137 | 137 |
| VGA | 640 x 480 | 169 | 169 |
| CIF | 352 x 288 | 267 | 267 |
| QVGA | 320 x 240 | 312 | 312 |
| QCIF | 176 x 144 | 472 | 472 |
| LineScan | 2048 x 1024 | 83 | 58 |
| | 2048 x 512 | 159 | 117 |
| | 2048 x 256 | 295 | 235 |
| | 2048 x 128 | 516 | 470 |
| | 2048 x 64 | 824 | 824 |
| | 2048 x 32 | 1173 | 1173 |
| | 2048 x 16 | 1488 | 1488 |
| | 2048 x 8 | 1719 | 1719 |
| | 2048 x 4 | 1864 | 1864 |
| | 2048 x 2 | 1945 | 1945 |
| | 2048 x 1 | - | - |

²⁾ depends on the used interface