

Product Brief: QIS4 Camera

4.2 Megapixel Quanta Image Sensor Camera Reliable Photon Counting at Room Temperature at Full Speed



The Gigajot QIS4 Camera is a complete camera platform ready for integration into systems that operate in extreme low-light conditions and require photon counting and photon number resolving. The camera is equipped with Gigajot's 4.2 Megapixel (GJ00422) Quanta Image Sensor (QIS) and utilizes the convenient USB 3.0 SuperSpeed interface. Gigajot's user friendly software enables control of the camera settings, image/video capture, real-time processing, and analysis. Alternatively, Gigajot's software development kit (SDK) allows control of the camera and customization for integration into your own application platform.

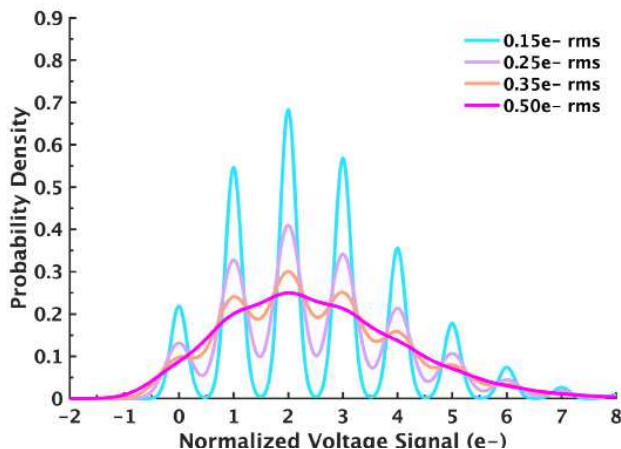
Key Features

- 4.2 Megapixel QIS
- Photon counting at room temperature & full speed
- Accurate photon number resolving
- High dynamic Range
- Market leading low read noise
- Market leading low dark current
- Sensor with advanced stacked CMOS BSI process
- Equipped with TE temperature stabilization
- USB 3.0 interface
- Software for camera control and image acquisition
- SDK & 3rd party software support for system integration

Applications

- Bio-luminescence
- Fluorescence
- Microscopy
- Live cell imaging
- Spectroscopy
- Astronomy
- Quantum physics

Photon Counting Capability



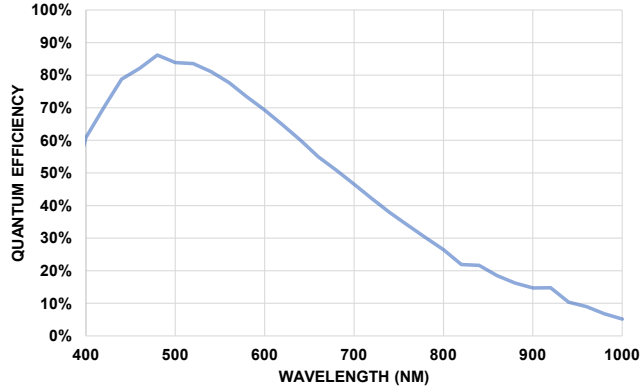
Read Noise	Is Photon Counting Possible?
0.5 e-	✗
0.3 e-	✓
<0.2 e-	✓ (<1% error rate)

Specification

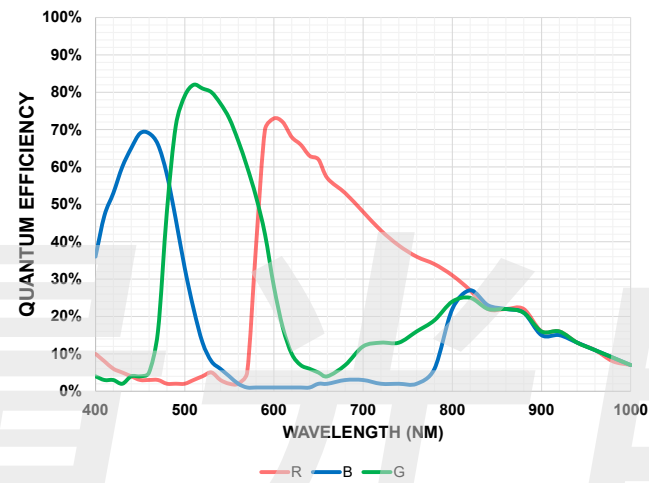
	QIS4TS Temperature Stabilized	QIS4C Compact Camera
Sensor Temperature	10°C	25-35°C at ambient 25°C
QIS Sensor	GJ00422	
Resolution	2048 x 2048 (4.2 MP)	
Pixel Size	2.2 μm x 2.2 μm	
Optical Format	1/2.8" (6.37 mm diagonal)	
Active Area	4.5 mm x 4.5 mm	
Read Noise @ full speed (RMS)	0.33 e- peak	
	0.37 e- median	
	0.52 e- rms	
Dark Current	0.03 e-/s/pix (10°C)	0.20 e-/s/pix (25°C)
Full Well Capacity	20,000 e-	
Non-linearity	<1.0%	
Dynamic Range	96 dB	
Peak QE (mono)	86%	
Chroma	Mono/Color	
Shutter Type	Rolling Shutter	
Exposure Time at Full Resolution	416 μs to 1800 s	
Sensor Modes	Ultra Low Light	
	Low Light	
	HDR	
Digital Binning	2 x 2	
Windowing	User selectable ROI (see table below)	
Interface	USB 3.0 SuperSpeed	
Digital Output	14 bits	
Frame Rate	26 frames/s at full resolution	
	2,784 frames/s at 32 rows & 512 columns	
Input Trigger	Start image capture	
Output Trigger	Global exposure start and stop	
Lens Mount	C-mount	
Recommended Operating Environment	0 to 40°C, 30 to 80% humidity (no condensation)	
Recommended Storage Environment	-10 to 50°C, 90% max. humidity (no condensation)	
External Power Supply	100 V to 240 V AC, 50 Hz/60 Hz	
Power Input	5.9 VDC @ 7 A	
Dimensions	110mm x 112mm x 131mm	77mm x 111mm x 79mm
Weight	4.7 lbs. (2.1 kg)	1.3 lbs. (0.6 kg)



Monochrome QE



Color QE

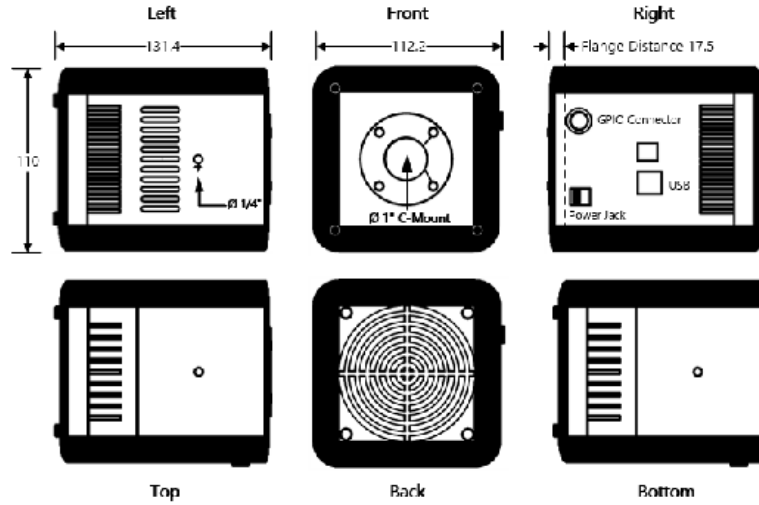


ROI

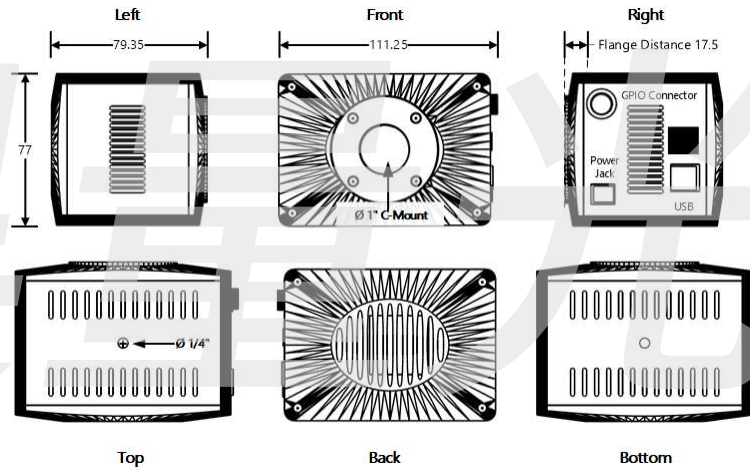
Frame Rate (fps) with USB	Horizontal Scan Range (# Columns)									
	Ultra Low Light Mode			Low Light Mode			HDR Mode			
	2048	1024	512	2048	1024	512	2048	1024	512	
Vertical Scan Range (# Rows)	2048	24	29	35	26	35	43	15	22	28
	1024	47	59	69	52	71	87	30	44	56
	512	94	117	139	103	142	174	60	87	113
	256	189	235	277	206	284	348	120	174	226
	128	378	470	554	413	568	696	239	349	452
	64	755	939	1108	825	1136	1392	479	697	904
32	1511	1879	2216	1650	2272	2784	957	1394	1807	



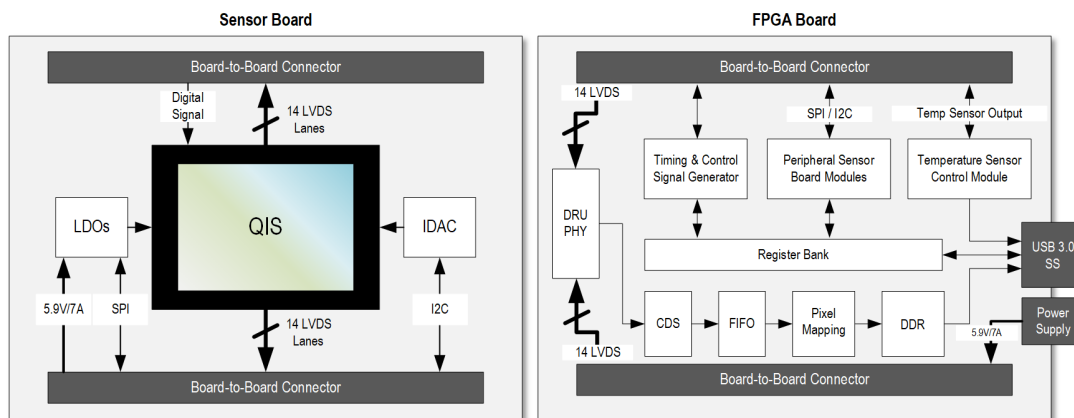
QIS4TS Dimensions (units: mm)



QIS4C Dimensions (units: mm)

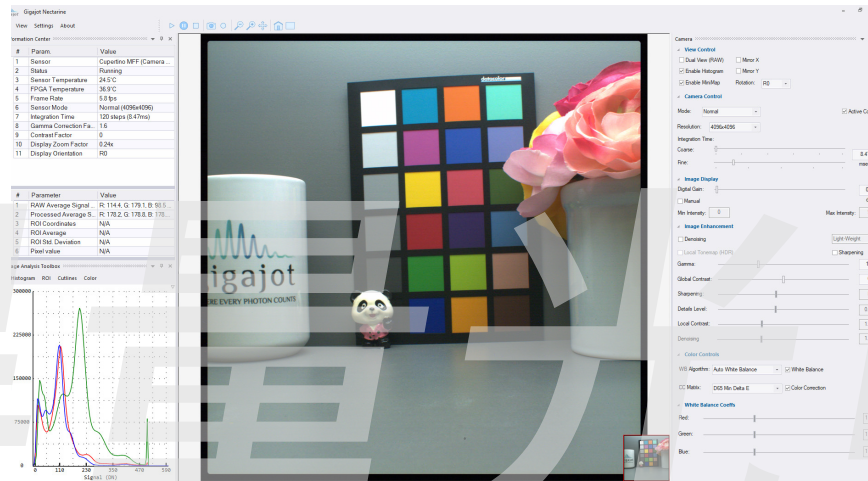


QIS4 Block Diagram



Software

- User friendly GUI
- Sensor control: integration time, binning, cropping
- RAW image processing: row and column noise correction, dark frame subtraction, defect correction
- HDR processing
- AI-based low-light noise reduction
- Color processing: automatic and manual white balance, color correction using predefined 3x3 matrices
- Image enhancement: image sharpening, contrast enhancement, global and local tone mapping for HDR mode
- Image analysis tools: image histogram and ROI histogram, image signal level and ROI signal level, horizontal (x-cut) and vertical (y-cut) pixel line plots
- Image manipulation tools: zoom in and out, image rotation and mirroring
- SDK to allow control of camera from Python, MATLAB, LabVIEW and MicroManager under Windows or Linux



Included in Box

- Sensor board and FPGA board in enclosure
- USB 3.0 cable
- Power supply: 5.9V AC adapter
- CDK User's Manual
- Download access to camera software
- Lens not included

Recommended System Requirements

- Intel Core™ i7 9000 Series CPU
- 16GB RAM
- Windows 10 v1909
- NVIDIA GPU (GTX 1660 Ti recommended)
- Nvidia Driver v452
- Microsoft Visual C++ Redistributable v142 (2019)
- 20GB free disk space (Including space for data acquisition)
- USB 3.0 SuperSpeed

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