

SOPHIA® 2048 CCD CAMERA

KEY FEATURES

- Large 2048 x 2048 sensor
- Teledyne e2V CCD42-40 or CCD230-42 sensor options
- Balanced 13.5 μm or 15 μm pixel options to maximize sensitivity
- Back-illuminated CCD with > 95% peak QE
- Liquid or air cooling down to -90 °C for low dark current
- ArcTec™ deep cooling
- High frame rates with up to 4-port readout
- Ultra-low 2 e⁻ read noise
- Ultra-flexible performance
- Complete triggering support
- Independently optimized clocking
- Field-replaceable internal mechanical shutter

TYPICAL APPLICATIONS

- Semiconductor failure analysis
- Astronomy
- Photometry
- Laser beam profiling
- Luminescence and fluorescence
- *In vivo* imaging
- Nanotechnology characterization

RELIABILITY

- One-year warranty
- Lifetime vacuum guarantee

Ultra-Low-Noise, Ultra-Large-Format CCD Camera

The SOPHIA® family of CCD cameras represents a breakthrough in high-performance CCD cameras designed from the ground up for the most demanding low-light applications. SOPHIA CCD cameras feature ultra-low-noise electronics, high sensitivity 95% quantum efficiency sensors, high-speed readout, and flexibility with multi-port readout capabilities up to 16 MHz. Additionally, they incorporate ArcTec™ technology, allowing for thermoelectric cooling without the need for chillers or cryocoolers.

This model is the SOPHIA 2048, which features either a Teledyne e2v CCD42-40 or CCD230-42, both 2048 x 2048 sensor arrays with a 13.5 μm or 15 μm pixels respectively. SOPHIA CCDs feature a large sensor with proprietary 2-port and 4 port readout modes, ultra-high-vacuum all-metal seal design for deep cooling, and the latest UHV technology with industry-standard CF interface.



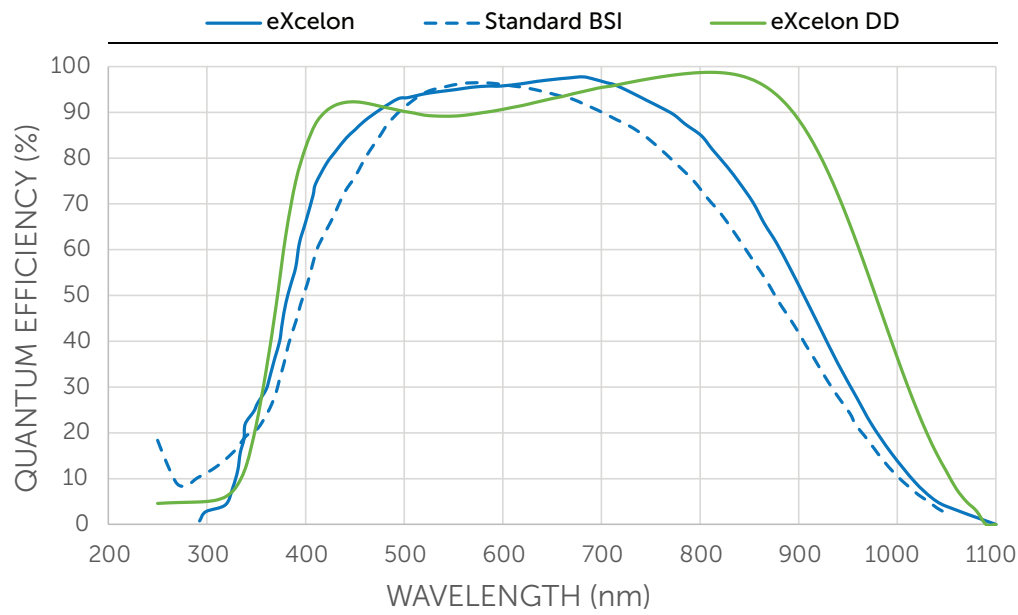
SOPHIA 2048 SPECIFICATIONS

SPECIFICATIONS	SOPHIA 2048-132	SOPHIA 2048-154
CCD Sensor Format	Teledyne e2v CCD42-40, Grade 1	Teledyne e2v CCD230-42, Grade 1
	Front/back-illuminated with eXcelon® coating; UV-optimized and deep-depleted options available	
Active Array Size	2048 x 2048 pixels	
Pixel Area	13.5 μm x 13.5 μm (182.25 μm^2)	15 μm x 15 μm (225 μm^2)
Sensor Area	27.6 mm x 27.6 mm (39 mm diagonal)	30.7 mm x 30.7 mm (43.4 mm diagonal)
Spectral Response	250 – 1100 nm	
Full Well Capacity	> 100,000 e ⁻ (single pixel)	> 150,000 e ⁻ (single pixel)
ADC Rates	8 MHz, 2 MHz, 200 kHz	16 MHz, 4 MHz, 400 kHz
Non-linearity	<1% @ 100 kHz	
System Read Noise (per port) (typical)	3.5 e ⁻ @ 100 kHz 7.0 e ⁻ @ 1 MHz 19 e ⁻ @ 4 MHz	3.6 e ⁻ @ 100 kHz 8.0 e ⁻ @ 1 MHz 22 e ⁻ @ 4 MHz
Dark Current (typical)	0.0001 e ⁻ /p/s @ -90 °C	0.00025 e ⁻ /p/s @ -90 °C
Cooling Options	Thermoelectric air or liquid cooling (liquid chiller required) < -90 °C (typical) with air or liquid	
Thermostating Precision	±0.05 °C across temperature range	
Vertical Shift Speed	24 μsec /row (programmable)	
Software Selectable Gains	1, 2, 4 e ⁻ /ADU (low-noise input, typical)	
I/O Signals	Two MCX connectors for programmable frame readout, shutter, trigger in	
Output Interface	USB 3.0 (5 m cable provided) Optional fiberoptic interface available for remote operation	
Digitization	16-bit	
Operating Temperature Range	5 °C to 30 °C (non-condensing)	
Camera Weight	14.3 lbs, 6.5 kg	
Camera Dimensions	251.6 x 129 x 142.8 mm (H x W x D)	
Bake-out Temperature	70 °C (maximum)	
Certification	CE	
Lens Mount	F-Mount with integral 45 mm shutter	

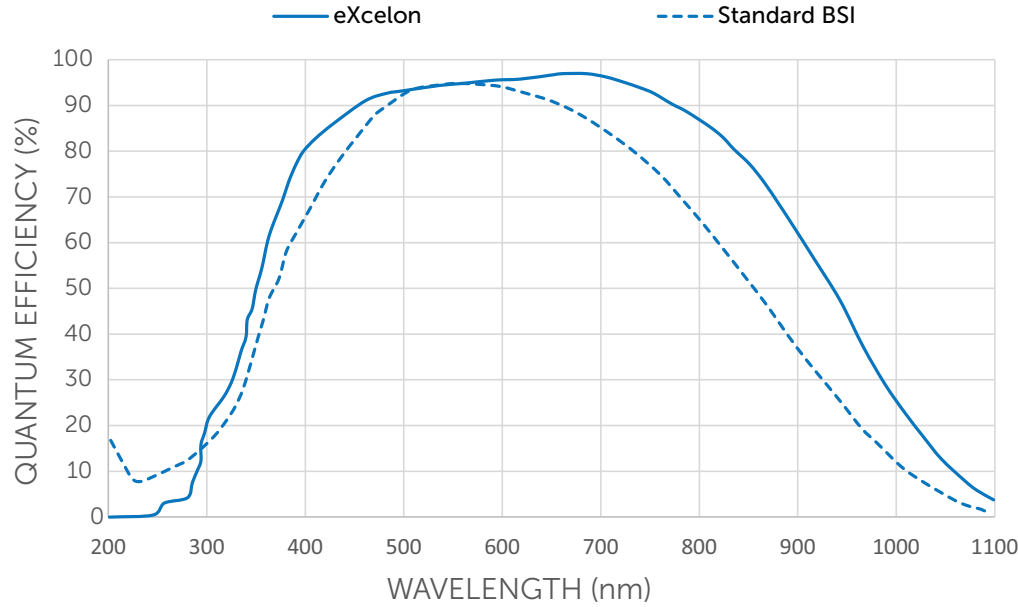
SOPHIA 2048 FRAME RATES

	SOPHIA 2048-132			SOPHIA 2048-154		
Binning	8 MHz	2 MHz	100 kHz	16 MHz	4 MHz	100 kHz
1 x 1	1.35	0.43	0.05	3.2	0.9	0.09
2 x 2	2.82	1.34	0.18	7.4	2.9	0.33
4 x 4	3.76	2.82	0.65	14.3	7.7	1.05
8 x 8	4.30	3.76	1.82	22.2	15.4	2.9

SOPHIA 2048-132 QE CURVES

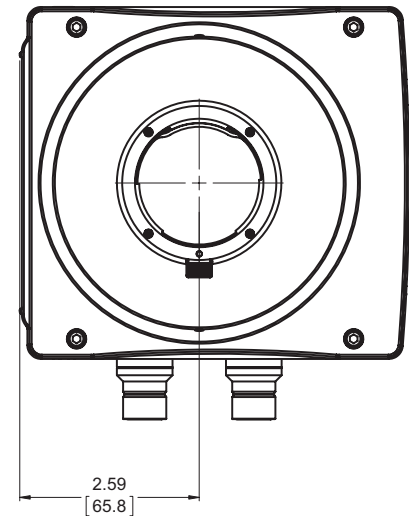
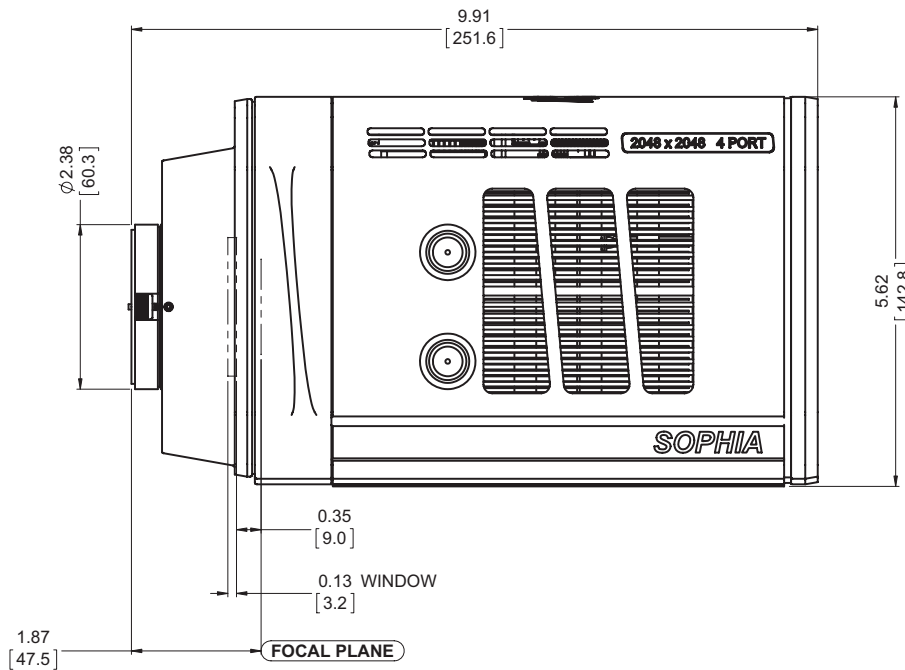
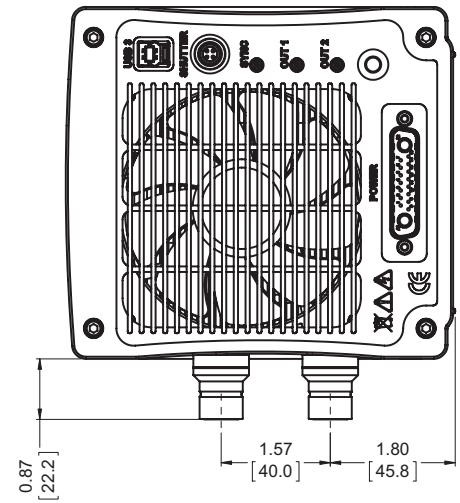
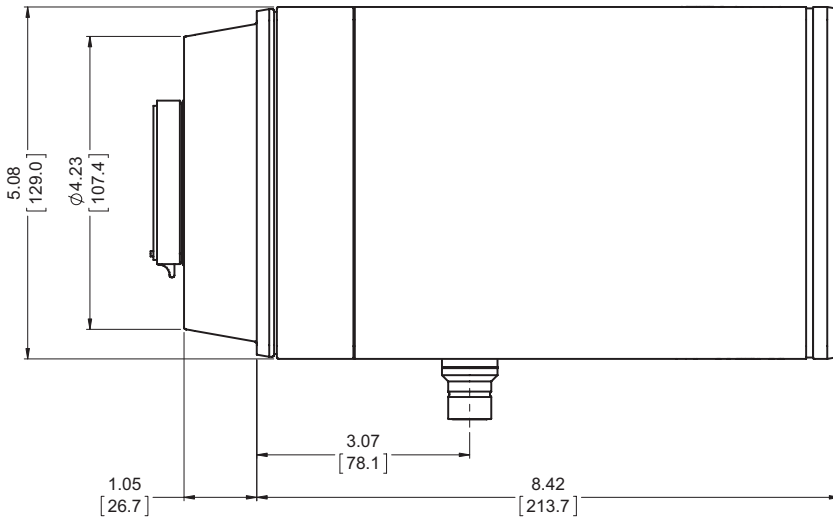


SOPHIA 2048-154 QE CURVES



SOPHIA 2048 ACCESSORIES

AIR COOLING ACCESSORIES (included)		LIQUID COOLING ACCESSORIES (included)	
Power supply/cables	Data acquisition software	Power supply/cables	Coolant hoses
MCX to BNC cables (x3)	Certificate of Performance	MCX to BNC cables (x3)	Certificate of Performance
USB 3.0 interface cable		USB 3.0 interface cable	Data acquisition software
		External coolant circulator	

DIMENSIONAL OUTLINES (Unit: mm)

FOR MORE INFORMATION REACH OUT ONLINE:

CONTACT US: www.teledynevisionsolutions.com/contact/contact-us

FOR OEM INQUIRIES: www.teledynevisionsolutions.com/solutions/custom-oem

CONTACT SUPPORT: www.teledynevisionsolutions.com/support/support-center

Specifications in this datasheet are subject to change.
Refer to the Teledyne Princeton Instruments website for most current specifications.

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