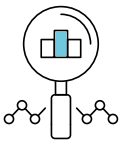
Singular Photonics™

Company overview

Singular Photonics is redefining how information is captured, processed, and understood - one photon at a time. We transform light into insight through state-of-the-art single-photon avalanche diode (SPAD) sensor technology with advanced on-chip compute. Our sensors combine ultra-sensitive light detection with intelligent in-pixel processing, enabling real-time data processing at the source.



60+ years combined CMOS and SPAD sensor design expertise

Advanced CMOS-integrated with embedded timing functions

Architectures designed for scalable system integration

Litavis

3D stacked BSI SPAD image sensor with integrated timing architecture for high-resolution time-resolved imaging

Key Features: 256 × 256 SPAD array | 64 × 64 macropixel timing architecture (4 × 4 SPAD grouping) | 47% PDE @ 785 nm | 37 ps timing resolution | 4.3 ns dead time | 100% fill factor (microlenses) | single-photon sensitivity | Low dark counts | Room-temperature operation

Operating Modes: Photon counting (full-frame, HDR) | Time-correlated single-photon counting (TCSPC) | Multi-event histogramming | Time gating

Integration: GUI for interactive control | Universal API via CFFI | Official Python SDK

Applications: LiDAR and time-of-flight | FLIM and TCSPC imaging | Raman spectroscopy | Fluorescence correlation spectroscopy (FCS) | Quantum optics | Low-light imaging

Litavis

Technical Specifications

Litavis Sensor

Sensor Type	CMOS SPAD, 65 nm / 40 nm, 3D stacked BSI
SPAD Array	256 × 256
Macropixel Array	64 × 64
Pixel Pitch	10.17 µm / 40.68 µm (macropixel)
Sensor Size	3.5 mm × 3.5 mm
Fill Factor	100% (with microlenses)
Photon Detection Efficiency	47% @ 785 nm (@ VSB 21 V and 20 ºC)
Dark Count Rate	~ 60 cps (@ VSB 18.8 V and 20 ºC)
Dead Time	4.3 ns
Mean IRF (FWHM)	1145 ps @ 450 nm 224 ps @ 640 nm

Timing Performance

Timing Function	**TCSPC**	**Histogram**
TDC Operation	First photon detection	Multi-event TDC
Temporal Bins	-	8 or 16 bins per pixel
Time Resolution / bin width	~37 ps	300 ps - 614.4 ns
Timing Range	~1 us	up to 9.8 ms
Data/Counter Depth	15-bit	14-bit/28-bit
Clocking	Internal / External	

Interfaces

Power: 12 V AC/DC

Data Connection: USB-C

Sync ports: 4 SMA ports (factory configurable TTL/NIM, ≥ 50Ω)

Photon Counting Mode

Normal Mode	Resolution	256 × 256
	Data Length	14-bit
HDR Mode	Resolution	128 x 256
	Data Length	28-bit

Dimensions and Mounting

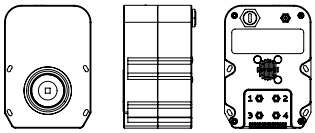
Camera Unit WxHxD: 102 mm x 145 mm x 85.25 mm

Clear Aperture: SM1.5 thread, 21 x 21 mm square

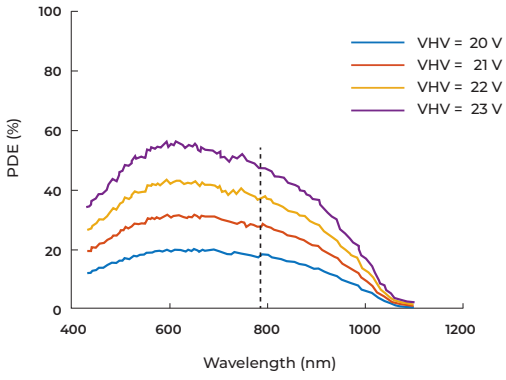
Flange Focal Distance: 9.0 mm

Mounting Options:
- 4× M4 screws in through holes
- 1× 1/4”-20 bottom thread

Optional Accessory:
- C-mount/CS-mount adapter
- Protective window



Photon Detection Efficiency



Data Handling

Intensity Mode: 850 fps (full-frame) / 3,300 fps (64 rows)

TCSPC Mode: 8,800 fps (full-frame) / 27,400 fps (16 rows)

Histogram Mode: 850 fps (full-frame) / 3,300 fps (16 rows)

Measured at 10 MHz system clock

Datasheets are subject to change

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