

Singular<sup>™</sup>  
Photonics



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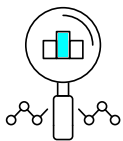
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## Company overview

Singular Photonics, a company with deep roots from the world leading University of Edinburgh CMOS Sensors and Systems group, are bringing to market the next generation of sensors based on single photon avalanche diodes (SPADs). These sensors can detect and time single photons (light quanta) enabling simultaneous capture of depth and temporal dimensions generating 4D images.

## Why choose us



### Deep industry experience

Our founding team have over 60 years combined industry and academic expertise in the design of SPAD sensors.



### Innovation

We are committed to providing innovative solutions that will help create a better tomorrow for everyone.



### Integration

Our solutions are designed to seamlessly integrate into your solution.

## Overview



### Andarta

- 2D Array
- 3D Stacked
- BSI SPADs

### Why SPAD arrays?

- CMOS integration
- Low DCR
- Single Photon Sensitive
- Room Temperature Operation

### Applications

- Time gated FLIM
- Diffuse Correlation Spectroscopy
- Time gated Raman
- Fluorescence Correlation Spectroscopy
- Ultra high speed imaging
- Microscopy

### Modes

- Photon counting (Rolling / Global shutter)
- Autocorrelation
- Time gated
- Burst

### Software & Firmware

- Universal API
- Integration with LabView, Matlab, Python and other languages



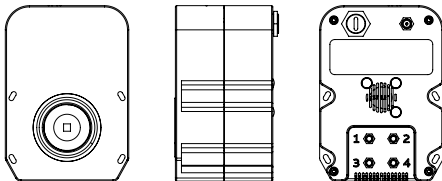
## Andarta Sensor

|                           |                                             |
|---------------------------|---------------------------------------------|
| Detector Type             | CMOS SPAD                                   |
| Technology                | 65 nm / 40 nm (BSI Stacked)                 |
| Sensor Dimension          | 5 mm x 5 mm                                 |
| Peak Detection Efficiency | 47% @ 785 nm (see plot below)               |
| Fill Factor               | 100% (with micro lenses)                    |
| Median dark count rate    | 500 cps<br>Reverse bias = 23V @ 25 Degree C |
| Dead Time                 | 4.3 ns                                      |
| Pixel Array/Macro Pixels  | 512 x 512 / 128 x 128                       |
| Pixel Pitch               | 10.17 $\mu$ m                               |



## Dimensions and Mounting

|                       |                                                                                                                         |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------|
| Camera Unit WxHxD:    | 102 mm x 145 mm x 85.25 mm                                                                                              |
| Clear Aperture:       | 22 mm diameter                                                                                                          |
| Mounting Options:     | <ul style="list-style-type: none"><li>• 4x M4 screws in through holes</li><li>• 1x 1/4"-20 (M6) bottom thread</li></ul> |
| Optional Accessories: | <ul style="list-style-type: none"><li>• 20 mm diameter protective window</li><li>• C or CS mount lens</li></ul>         |



## Data Handling

|                     |                                         |
|---------------------|-----------------------------------------|
| Data Compression:   | Yes                                     |
| Data rate (Mpix/s): | 3.6E+10 (Burst)<br>1.6E+07 (Continuous) |
| DCS Frame Rate:     | 40 fps                                  |
| Ensemble DCS Rate:  | 27,000 fps                              |
| Burst length:       | 32                                      |
| Max frame rate:     | 1 Kfps (Continuous)                     |

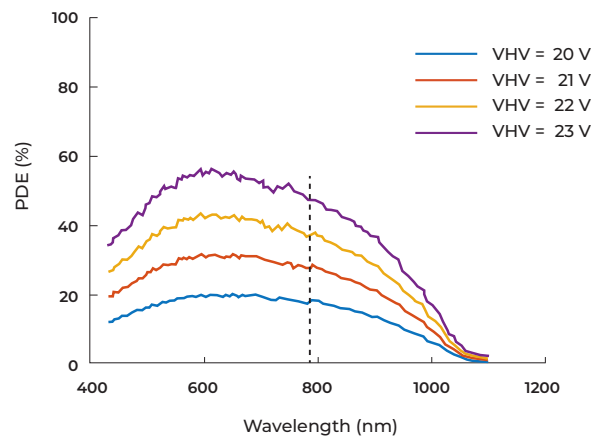


## Timing and Control

|                         |                                               |
|-------------------------|-----------------------------------------------|
| Timing Function         | Gated                                         |
| Timing Jitter           | 350 ps                                        |
| Time Resolution         | 30 ps (minimum)                               |
| On-chip Delay Generator | Yes                                           |
| Counting                | Intensity mode : 22 bit<br>Burst mode : 5 bit |



## Photon Detection Efficiency



## Interfaces

|                        |                                  |
|------------------------|----------------------------------|
| Power:                 | 12 V<br>AC / DC brick provided   |
| Data Connection:       | USB-C                            |
| Synchronisation ports: | 4 (Factory configurable TTL/NIM) |

Datasheets are subject to change



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We recognise the importance of our **PEOPLE**

We strive for **EXCELLENCE**

We operate with **INTEGRITY**

We deliver **RESULTS**