

Evaluation Board

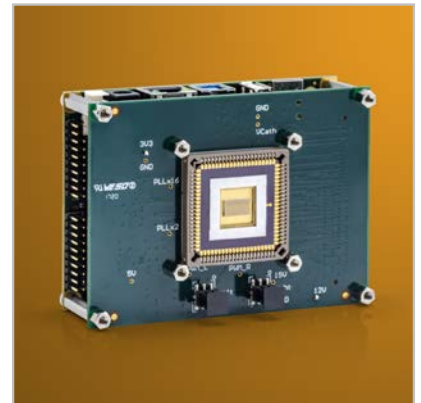
Description

The SPAD Evaluation Board enables easy evaluation of the solid-state CMOS sensor for highly sensitive imaging applications. It's providing reference voltages, data acquisition, sensor control, and two optional triggers.

The sensor provides timing and counting mode to measure time between the start of measuring window and the first photon detection or the amount of detections inside a measurement window.

The board supports USB 2.0 B data communication and is recognized as test and measurement device on the PC side. This allows easy and independent integration into the application software.

Two optional trigger outputs are accessible via six pin header, additional +1.5 V DC and GND is available on it.



Features

- Solid-state CMOS sensor
 - 192 x 2 Pixel
 - Highly sensitive single-photon avalanche diodes
 - In-pixel TDC with 312.5 ps resolution
 - Adjustable background light rejection
 - Timing and counting mode
- Evaluation board
 - 47,8 kHz framerate
 - Two optional trigger signals (e.g. laser triggering)
 - Reference voltage generation on board
 - Easy communication via USB 2.0
 - DC 12 V power supply

Applications

- 3D Imaging
- Automotive
- Quantum imaging
- Surveillance
- Robotics

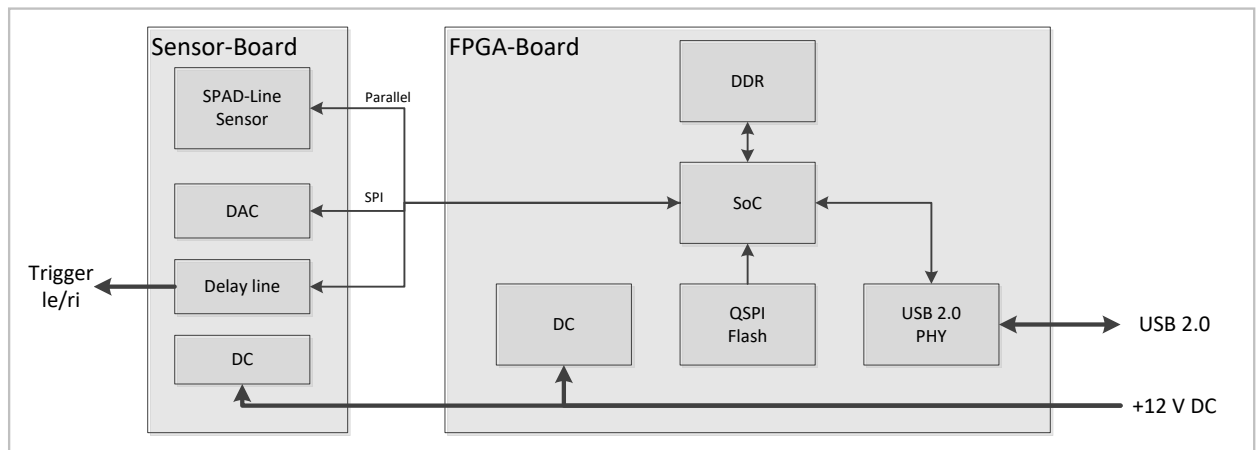
Specifications

	Value	Units
Dimension (d/w/h)	27 x 100 x 71	mm
Communication	USB 2.0	
USB class	test & measurement	
Maximum framerate	47800	Hz

Sensor Chip Characteristics

	Value	Units
Dimension	8960 x 5200	μm
Technology	0.35 μm CMOS	
Pixel count	192 x 2	
SPADs per pixel	4	
Pixel size (active area)	40.56 x 209.6	μm
Fill factor	5.32	%
Line spacing	1019.78	μm
Frame rate @ 20 MHz readout clock	52	kfps

Block Diagram



Absolute Maximum Ratings

	Value			Units
	Min	Typ	Max	
Storage temperature	5		70	°C
Operating temperature	10		50	°C
Total power dissipation			24	W
Maximum data rate @ max. frame rate			294	Mbit/s

Electrical Characteristics

	Value	Units
Power supply voltage	12	V
Minimum DC supply current	500	mA

SPAD Characteristics

	Value			Units
	Min	Typ	Max	
Diameter		12		µm
Breakdown voltage		26		V
Temperature coefficient of breakdown voltage		37.8		mV/K
Operation Voltage		31		V
Photon detection efficiency		2		%
Dead time	16	20		ns
Dark count rate		10		Hz
Dynamic range		134		dB

TDC Characteristics

	Value			Units
	Min	Typ	Max	
Temporal resolution		312.5		ps
Full scale range		1.28		μs
Raw data length		16		Bit

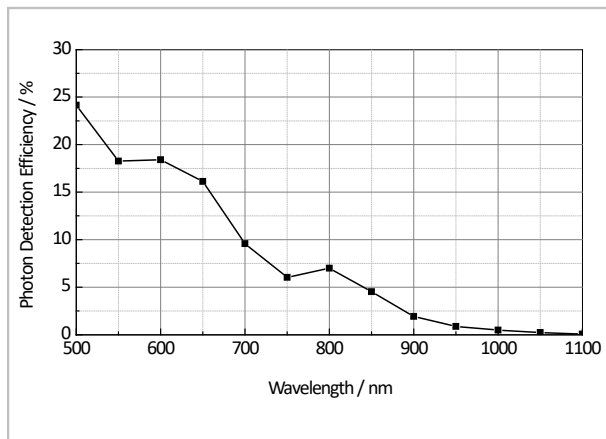


Fig. 1: Photon Detection Efficiency vs. Wavelength

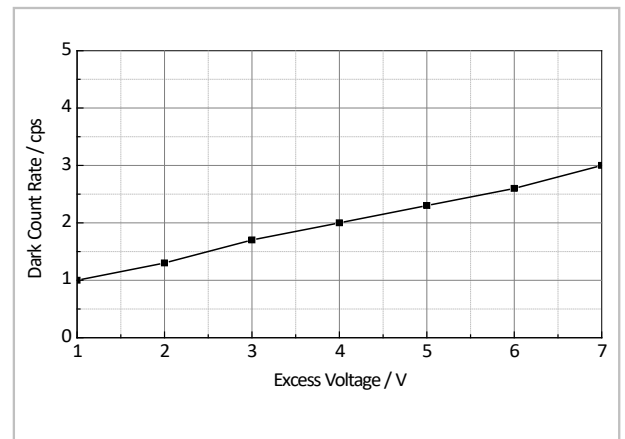


Fig. 2: Dark Count Rate @ 10 μm SPAD Diameter vs. Excess Voltage