

# ELFys PD4sM

## Photodetector Datasheet



### 1. Product Description and Key Features

ELFys PD series photodiode products consist of ELFys patented Black Silicon Induced Junction Technology. Product patent information can be found at <https://www.elfys.fi/index.php/technology/patent/>. ELFys PD series photodiode products provide superior performance in photosensitivity across wide spectrum of wavelengths, from deep UV, Vis to NIR. ELFys PD series photodiode products are suitable for various high precision photometry applications.

Key features:

- Enhanced photosensitivity to UV, Vis and NIR

Part number	PD4sM
Photosensitive area (mm)	2.0 x 2.0
Sensor material	silicon
Packaging	TO-46
Window options	No window, Schott UV-glass
Maximum rating	
Reverse Voltage (V)	20
Reverse Current (mA)	3
Operating Temperature (°C)	-20 ... +60
Storage Temperature (°C)	-45 ... +85

Note: The environmental protection of the photodetector depends on the selected packaging option. ELFys provides customized packaging solutions based on customer specifications.



## 2. Electrical and Optical Performance

Part number	PD4sM	
Window options	Schott UV-glass	No window
Spectral response range (nm)	200 - 1100	170 - 1100
Peak response wavelength, $\lambda_p$ (nm)	1010	
Photosensitivity – Typical		
@ $\lambda_p$ (A/W)	0.73	0.80
@ 200 nm (A/W)	0.11	0.20
@ 630 nm (A/W)	0.46	0.50
@ 930 nm (A/W)	0.68	0.73
Dark current		
@ $V_R = 10$ mV Max (pA)	15	
@ $V_R = 10$ V Max (nA)	1	
Capacitance @ $f = 100$ kHz, Typ.		
@ $V_R = 0$ V (pF)	65	
@ $V_R = 10$ V (pF)	13	
Rise / Fall time @ $R_L = 50 \Omega$ , $V_R = 10$ V, Typ.		
@ 405 nm (ns)	23 / 28 *	
@ 650 nm (ns)	25 / 29 *	
@ 980 nm (us)	5.5 / 4.3	
Noise equivalent power, NEP @ $\lambda_p$ , Typ.		
@ $V_R = 10$ mV (W/√Hz)	$7.1 \times 10^{-15}$	$6.5 \times 10^{-15}$
Saturation Limit of optical power (mW/mm <sup>2</sup> )	7 **	
Damage threshold of optical power (mW/mm <sup>2</sup> )	80 **	

\*: Rise and Fall time will increase when photodiode reaches the saturation limit of input optical power. Rise and Fall time will increase slightly when incident light spot is significantly smaller than photosensitive area.

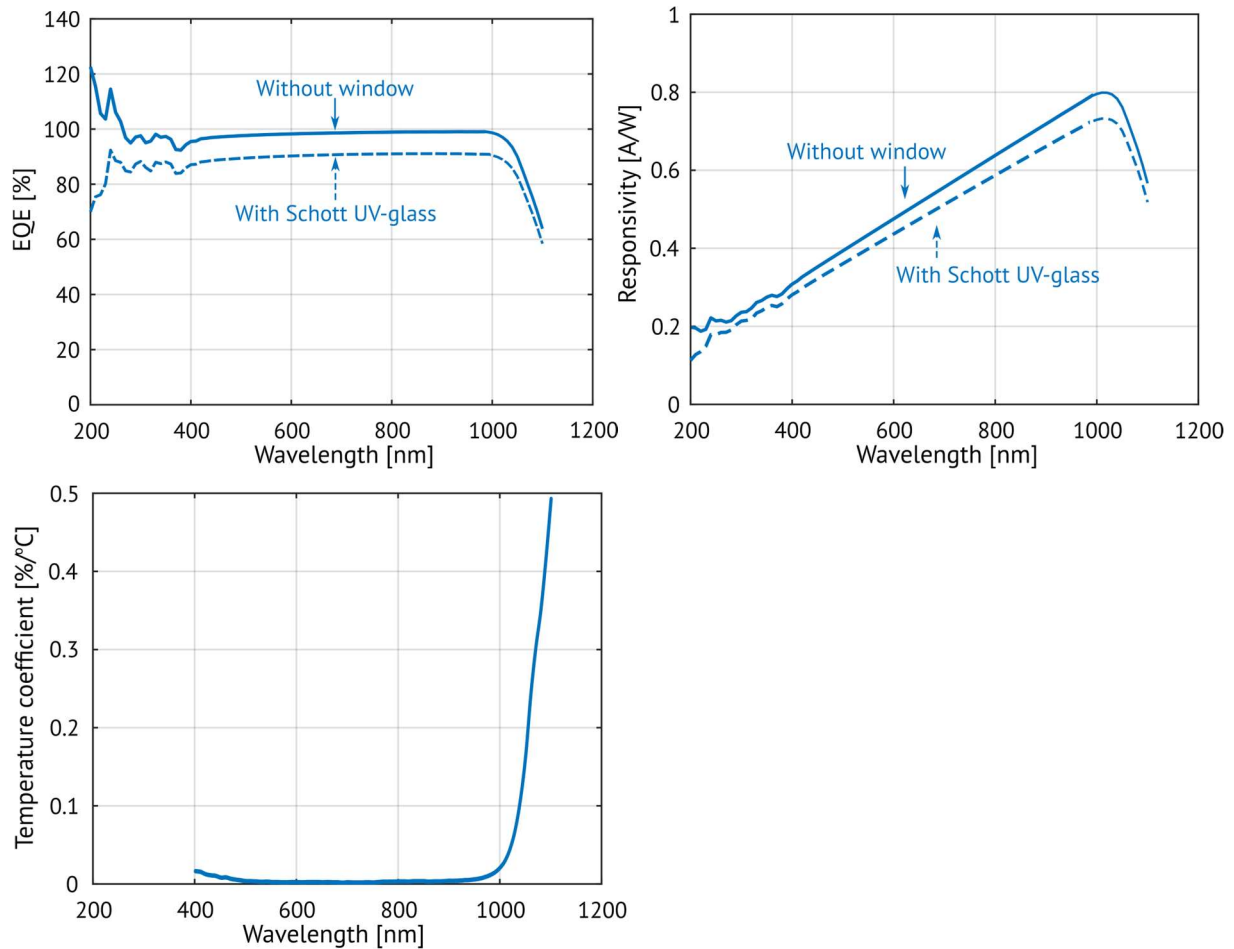
\*\*: Saturation limit and Damage threshold will increase when incident light spot is considerably smaller than photosensitive area.

### Note:

All data are specified at typical ambient temperature (25°C) and under normal working conditions. Photosensitivity performance will be affected by the optical properties of the window and filter applied in the packaging or end application. Photodiode characteristics, including photosensitivity may degrade when exposed to UV below 240nm. Potential degradation depends on total exposure dose and ambient conditions.

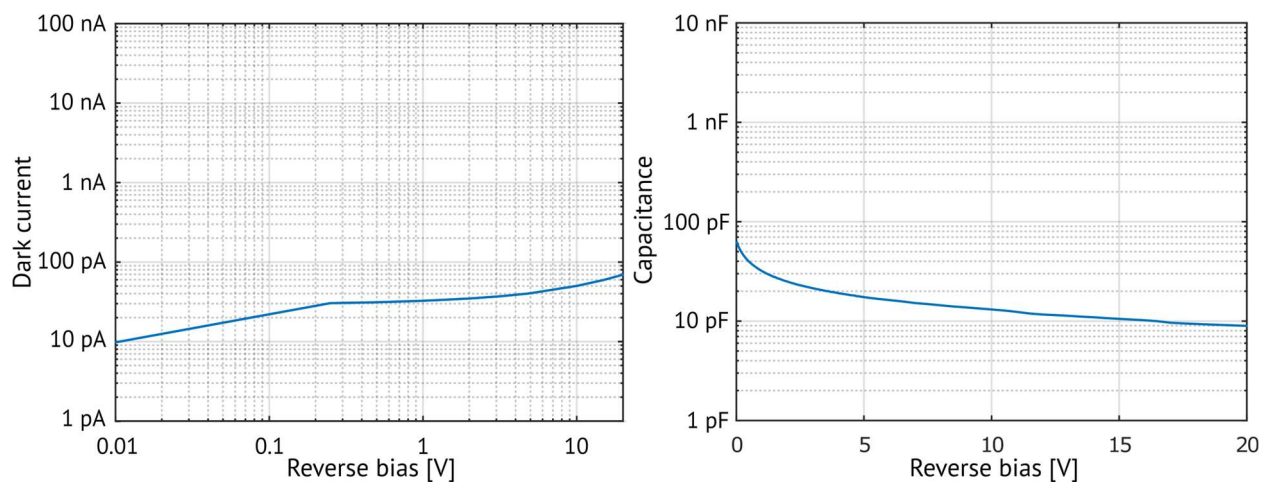


### 3. Spectral Response (Typical)



Note: the temperature coefficient in the range 200-400 nm can be provided upon customer request.

### 4. Dark Current and Capacitance vs Reverse Bias (Typical)

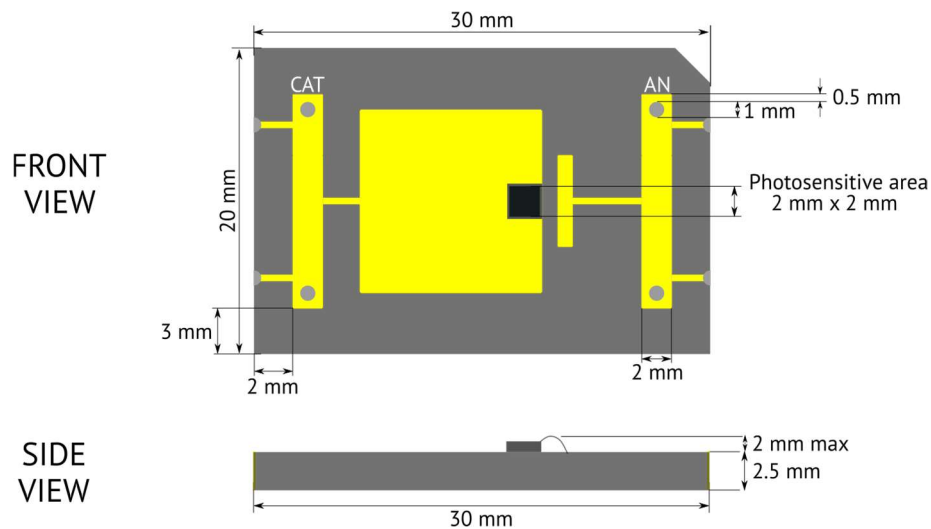


## 5. Packaging options

### PCB

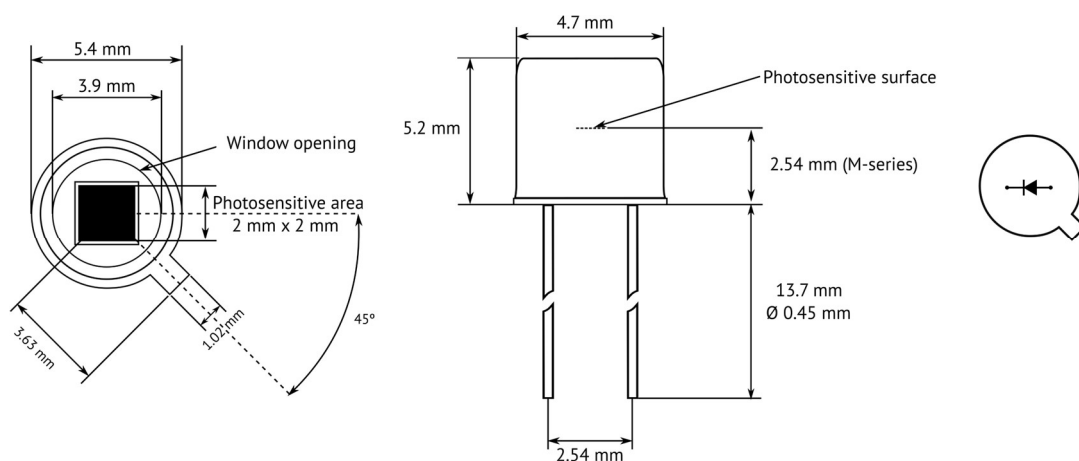
The photodetector is available by default on a demonstration board (30mm x 20mm). Customized demonstration board is available upon request according to customer specifications.

The electrical connections are anode (AN) and cathode (CAT). The default demonstration board is suitable for Surface Mount, Through Hole Mount, and Soldering Wire.



### TO-46

Another packaging option is TO-46 with Schott UV-glass. Other window materials and/or anti-reflective coatings of window are also available upon request. The cathode contact is connected to the body of the can.



Assembly conditions:

Soldering with 30 W iron temperature (maximum): + 300 °C, within 5 s (accordingly suitable solder material profile).

ElFys, Inc. reserves the right to change product specification without prior notice.