ELFYS

PHOTODIODES: THE ULTIMATE ADVANTAGE

Capturing every ray of light

Find the right solution for
your applications at elfys.fi

LIMITLESS APPLICATIONS FROM SAFETY AND SECURITY TO MEDTECH AND WEARABLES

Where innovation meets the demanding applications

ElFys provides advanced photodetector products and services based on innovative black-silicon induced-junction technology. We support our customers to evaluate photodetector performance for proof-of-concept. We design and develop tailored photodetector solutions with our in-depth know-how. We manufacture and supply photodetector products with small volume and mass production.

We offer

Standard product portfolio

- Photodetector products with different sizes and packaging options
- Samples for quick demonstration and evaluation of the photodetector technology
- High-volume production capability

Customized solutions with production

- Customized photodetector design
- Prototyping and validation in small volume
- High-volume production capability

Black silicon induced junction technology and semiconductor processing services

- Core know-how technology available for outsourcing or licencing
- Cleanroom detector processing services

Manufacturing

ElFys has two manufacturing sites at its disposal. The company utilizes the state-of-the-art processing facilities at Micronova Nanofabrication Center in Finland: 2600 square meters of CMOS compatible facilities suitable for both R&D and semi-mass production. For high-volume mass production, ElFys has partnered with an external, European foundry.

About us

ElFys, Inc. was founded in autumn 2017 and is located in Espoo, Finland. The company is based on long-term research work at Aalto University. Our core team consists of former senior researchers, engineering leaders and business professionals. 40 % of ElFys staff are women, and we speak 7 languages at native level.

ElFys provides light sensors with better sensitivity than anything seen before, literally catching every ray of light. The technology greatly improves any light sensing application ranging from health monitoring to analytical instrumentation and security X-ray imaging. The superior performance of ElFys photodetectors is based on an inventive combination of modern MEMS nanotechnology and atomic layer deposition. The core technologies are patented and in the possession of the company.

Contact

ElFys, Inc.
Tekniikantie 12, 02150, Espoo, Finland
Phone number: +358 40 120 9111
E-mail address: info@elfys.fi
www.elfys.fi
VAT: FI28496888

THE MOST SENSITIVE PHOTODETECTOR FOR UV-VIS-NIR PRODUCT AND TECHNOLOGY OFFERING

Innovation package

We help our customers to evaluate our advanced photodetector technology in their applications. The purpose is to prove the design concept at initial stage, and to verify the intended performance. This provides an easy, fast and low-risk approach for product development.

We offer

- ◊ Photodetector technology support and consultation
- ◊ Demonstration photodetector chips and evaluation samples of standard form factor and configuration
- ◊ Demonstration photodetector performance characterization and measurement report

Delivery time: 2 weeks
Indicative price: 2950 EUR

Custom solution package

We provide tailored photodetector solutions based on our advanced technology for the customer's applications. The purpose is to create an optimized solution with unmatched performance and quality for each individual use case. We design and prototype product samples with the customer's specification, enabling the customer to quickly verify the new solution on a system level, and guaranteeing a short time-to-market.

We offer

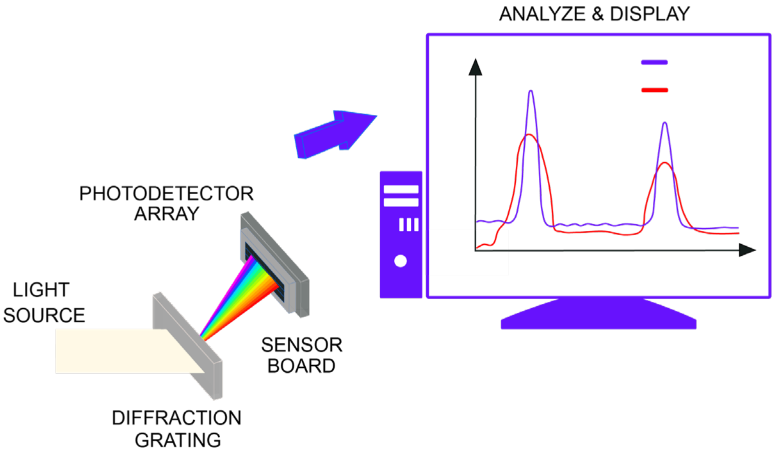
- ◊ Customized photodetector chip design based on specifications
- ◊ Customized photodetector packaging design based on specifications
- ◊ Manufacturing prototypes in small volume
- ◊ Comprehensive testing for quality verification

Delivery time: 3 - 4 months
Indicative price: Contact sales for quotation

Continuous delivery

We build long-term relationships with our customers. We promise to provide products and services to our customers consistently. We actively manage our product life-cycle in the best interest of our customers. We apply the lean production principles to our future production efficiency development. **We offer small batch delivery as well as mass production.**

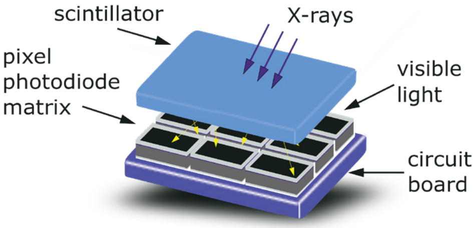
APPLICATIONS



ElFys photodetectors, spanning from ultraviolet to near-infrared, are designed to provide a competitive edge in various applications:

- Wearable electronics
- Spectroscopy applications
- Health monitoring
- Defence applications
- Industrial & environmental sensing
- Safety & security imaging

Our photodetectors are available with different designs and can be **customized** for your use.



PHOTODETECTOR PRODUCTS

Product line	Product name	Bias voltage - Max.	Photosensitive area
		[V]	[mm^2]
SM	SM322	6	3.22
	SM446		4.46
PD	PD1sM	10	1
	PD1sH		1
	PD4sM	20	4
	PD25sM		25
	PD25sH		25
	PD100sM		100
	PD100sH		100
	PD5sMG	100	5
	PD5sHG		5
	PD25sMG		25
	PD25sHG		25
	PD100sMG		100
	PD100sHG		100

*Customized packaging is available for all products upon customer request, bare chip is available off-the-shelf for all products.

Dark current @ -10mV - Max	Capacitance @ 0 V, 100 kHz	Responsivity @ λ_p		Default packaging*
[pA]	[pF]	[A/W]	λ_p (nm)	
40	60	0.71	970	SMD
50	80	0.71	970	SMD
12	20	0.80	1010	TO-46
255	11	0.81	1040	TO-46
15	65	0.80	1010	TO-46
30	370	0.80	1010	TO-8
700	110	0.81	1040	TO-8
1500	1200	0.80	1010	PCB
60	340	0.81	1040	PCB
15	105	0.80	1010	PCB
400	30	0.81	1040	PCB
30	370	0.80	1010	PCB
700	110	0.81	1040	PCB
60	1200	0.80	1010	PCB
1500	340	0.81	1040	PCB

Visit www.elfys.fi to view datasheets

PHOTODETECTOR PRODUCTS

SM PRODUCT LINE

Key benefits

- Superior photosensitivity at multiple wavelengths: Green, Red, and NIR
- Low dark current
- Compact SMD packaging

Key applications:

- Health monitoring
- Wearable electronics
- and more

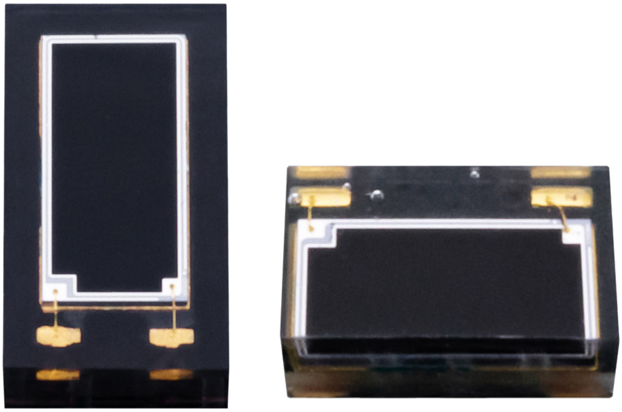
PD PRODUCT LINE

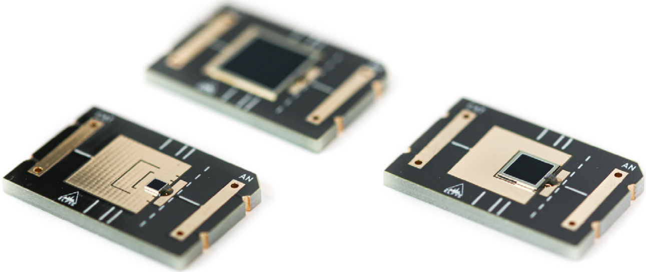
Key benefits

- Enhanced photosensitivity with wide spectrum: UV, Vis and NIR
- Optimized electrical properties
- Maximum environmental protection with TO-can packaging

Key applications:

- High precision photometry
- Analytical instruments
- Defence applications
- and more

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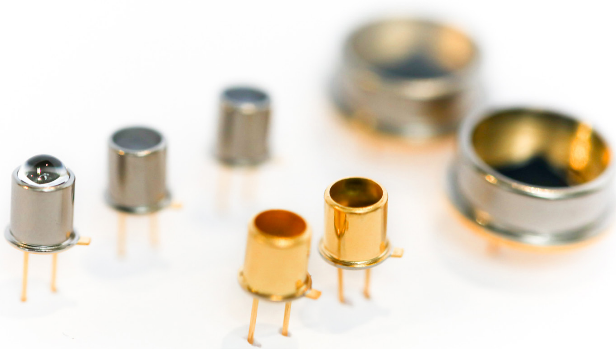
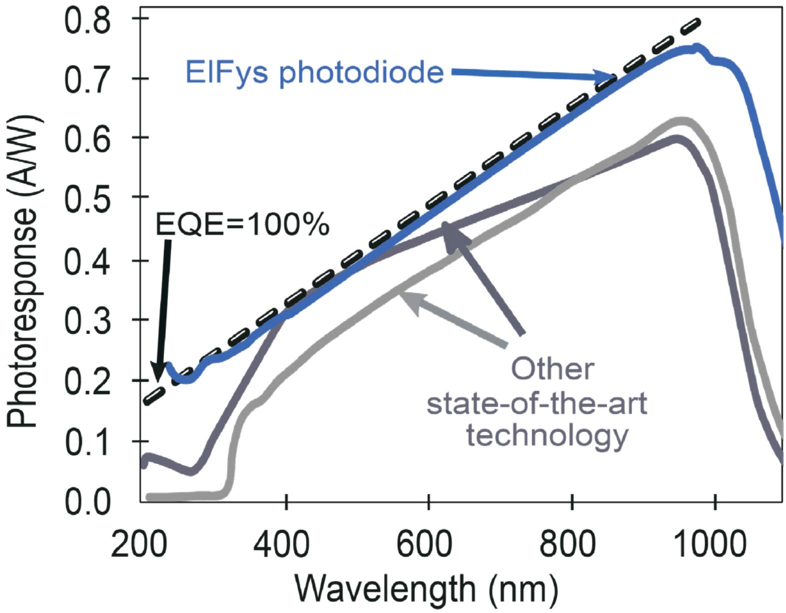


KEY BENEFITS

Key benefits for your applications

- High responsivity (> 96% EQE) over entire optical spectrum range (200 nm to 1050 nm)
- Ultra wide sensing angle with extremely high absorbance (> 95% @ 60°)
- Superior responsivity in ultraviolet wavelength range (no signal losses in the photodetector surface layer)
- Customized design with optimal electrical properties

Data certified by PTB - Physikalisch-Technische Bundesanstalt



INNOVATIONS

Core technology: Black Silicon Induced Junction

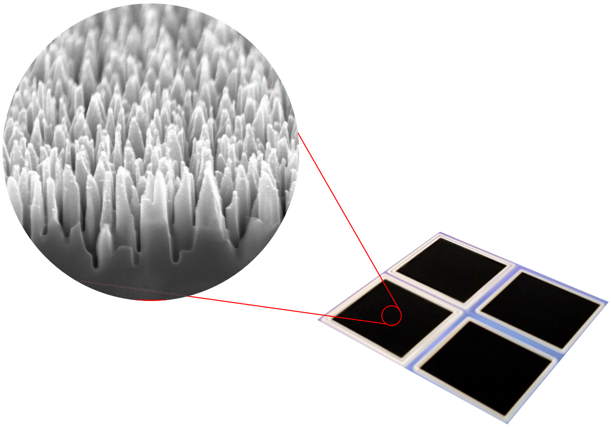
- Nano-engineered surface structure
- Defect-free induced junction
- Advanced ALD passivation

Patents

Our photodiode technology is protected by our patent families worldwide

Scientific publications

- M.A. Juntunen et al, Nature Photonics, 2016, 10, 777-781
- M. Garin et al, Physical Review Letters, 2020, 125, 117702
- J. Heinonen et al, IEEE Transactions on Electron Devices, 2020, 67 (4)
- T. Tsang et al, Optics Express 2020, 28,13299
- J. Heinonen et al, Nuclear Instruments and Methods in Physics Research A, 2020, 977, 164294



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