

The 5th
"Trento" Workshop
on
Advanced Silicon
Radiation Detectors
24-26 February 2010



Photodiodes for the 21st Century Silicon Sensor International AG



www.silicon-sensor.com

Tel. +49(0)30/6399 2399

Welcome to the Silicon Sensor Group



Si-PIN Photodiodes,
Si-APD

Custom & OEM
Solutions

Systems,
Modules

Subsidiaries:



Sensor Packaging



Optical and
Micro Mechanical
Sensor Systems



Sensor Packaging



Sensor Systems,
Modules

What we are:



- Manufacturer of highly sophisticated customised optical sensors, sensor systems and sensor applications
- Manufacturer of high reliability custom-made hybrids
- Strong position in the field of customised optosensors
- Offering the whole product lifecycle: Design to Full – System Assembly
- Own production plants in Europe and US

We solve the problems of our customers!



History and Facts



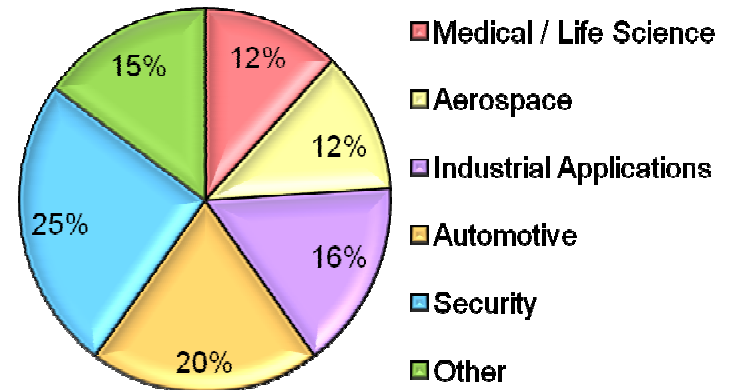
- 1991 Formation of Silicon Sensor GmbH
- 1999 Silicon Sensor International AG went public

Turnover : 45 Mill. Euro (2008)

Personnel: 300 employees worldwide

Distributors: in 8 countries

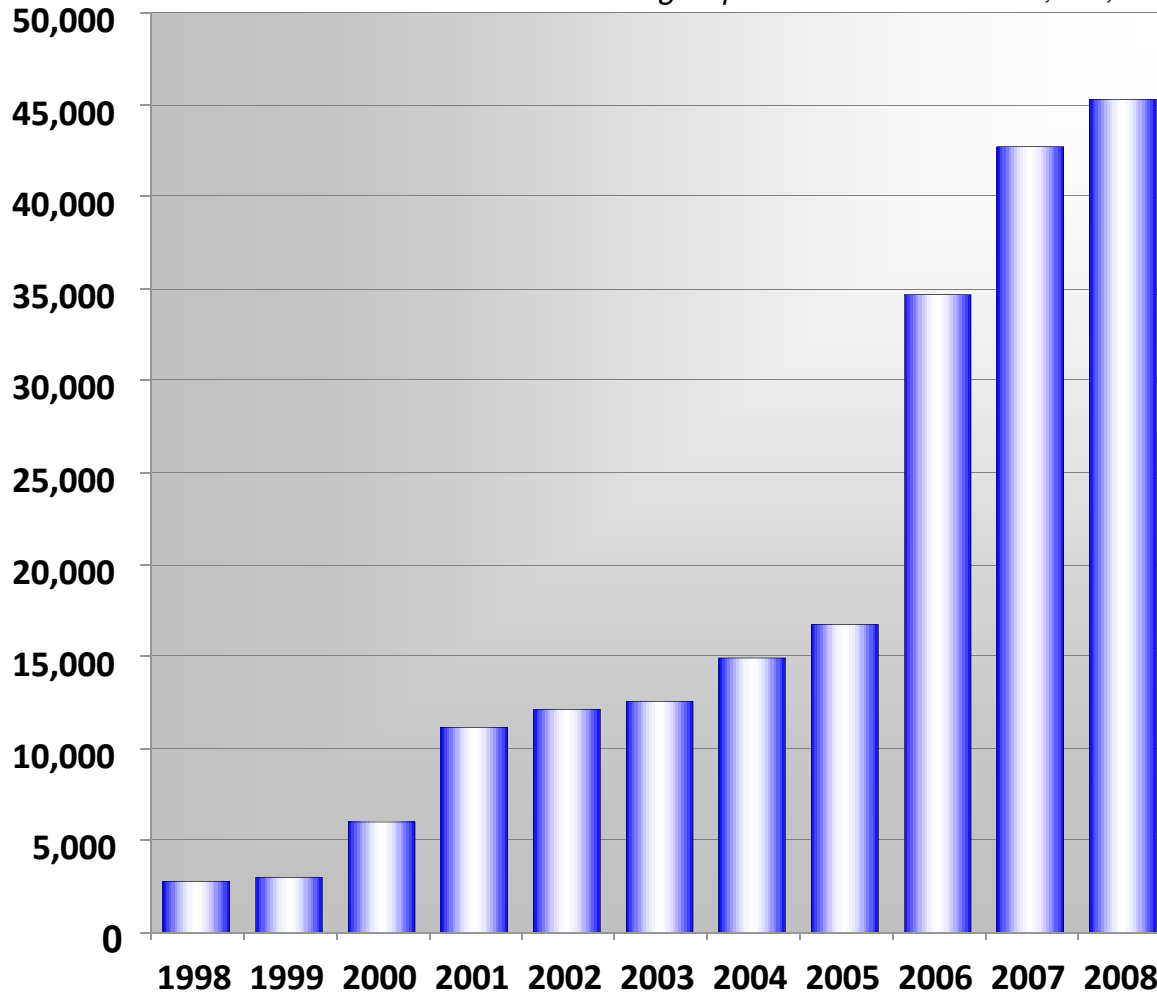
Turnover according to sectors



Sound growth



Total sales of Silicon Sensor group before consolidation, € 1,000



Turnover : 45 Mill. Euro (2008)
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Silicon Sensor Group



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Our core capabilities

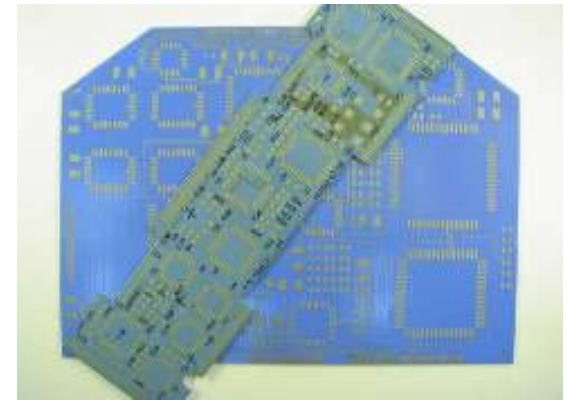


GmbH

Location: Oberdischingen (near Ulm / Germany)
Founded: 1967

Focus:

Design and manufacturing of
customized high-rel electronic circuits



Inhouse Technologies

- Hybrid technology, MCM, COB
- Die- and wirebonding
- Bare die and SMD soldering
- Hermetic Encapsulation
- Electrical testing, dc to 50 GHz
- Screening / Qualifications
- High accuracy fibre assembly



Our core capabilities



Location: Dresden
Founded: 2007

Focus:

Develop, design and produce state of the art customer specific optical and micro mechanical sensor systems



Inhouse Technologies

- Optical Sensor Systems: Camera
 - Extreme temperature range and cycling capability
 - High mechanical stress sustainability
 - Wide voltage range tolerance
- MEMS: Pressure Transducers



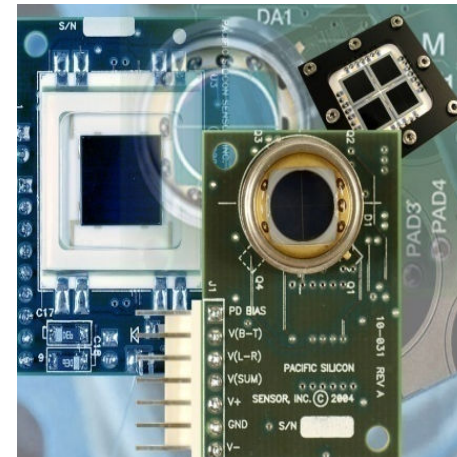
Our core capabilities



- Subsidiary since 1999
- Located in Westlake Village, California, USA
- Distributing the whole product range
- Support in development of customized photodiodes

Focus

- Hybrid Modules
- Customized Packaging
- Smart Detector Boards



Our core capabilities

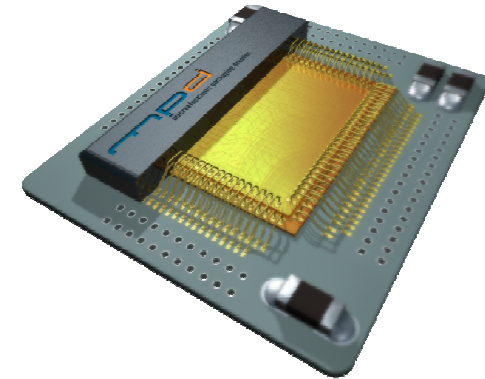


Microelectronic Packaging Dresden

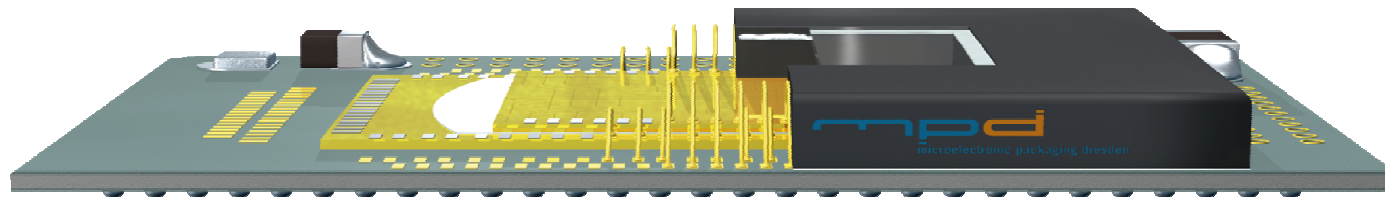
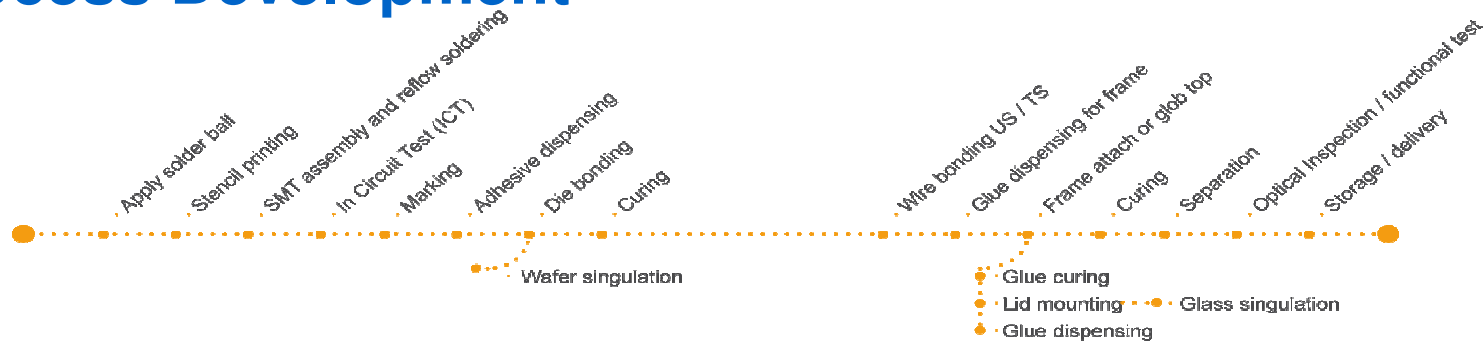
Location: Dresden
Founded: 1966

Focus:

Design and manufacturing of electronic microsystems



Process Development

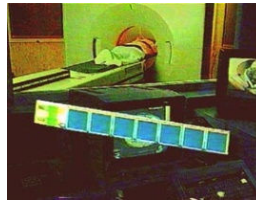
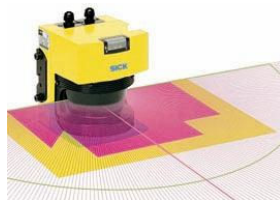


What we do:



Developing and Manufacturing OEM and custom solutions for application fields such as:

- Industrial
- Life Sciences, Health Care
- Automotive industry
- Aerospace and Defense
- Commercial and Consumer
- X-Ray



What we do:



Developing and Manufacturing OEM and custom solutions for application fields such as:

Industrial

- Automation
- Motion Control
- Distance Measurement
- Range Finding
- Speed Control
- Laser Levelling
- Proximity Sensors

Life Science Health Care

- Medical Imaging
- Blood Control
- Pulse Oximetry
- Nuclear Imaging
- Water Analysis
- Ophthalmology
- Gamma Detection

Automotive

- LIDAR
- ACC
- Pre Crash Detect.
- Blind Spot Detect.
- Communication
- Virtual Controls
- Solar Altitude Det.

Aerospace Defense/Security

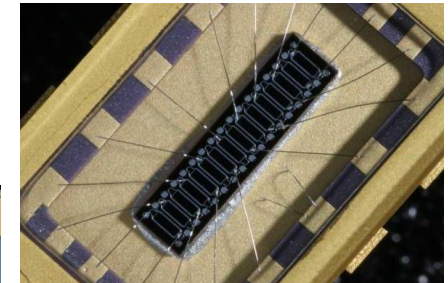
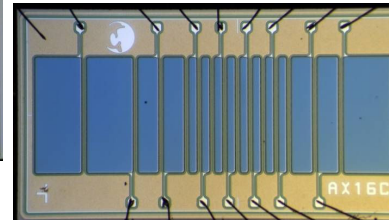
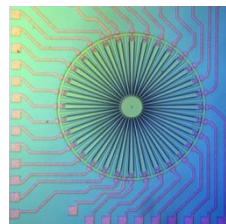
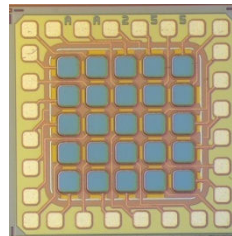
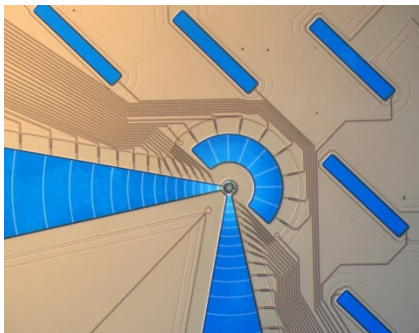
- Mars Camera
- Baggage Control
- Laser Guidance
- Simulation Tools
- FoF Systems
- Laser Range Finder
- Nuclear Radiation Sensors

What we offer:



SIS AG offers complete custom facilities for optimization of Electro-Optical performance

- Chip geometry – to suit your application
- Responsivity – optimised for your operating wavelength
- Risetime – to meet your bandwidth requirements
- Capacitance – to reduce noise
- Dark current – to improve sensitivity

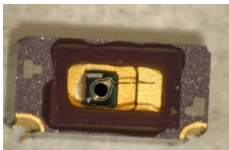
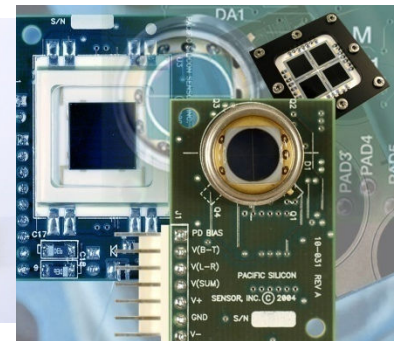
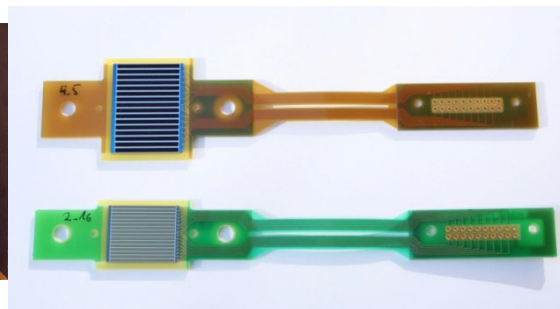
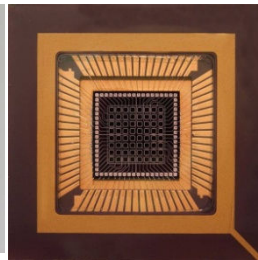


What we offer:



SIS AG offers complete custom facilities for optimization of Electro-Optical performance

- A.R. coating – to reduce optical losses
- Filtering – for reduction of ambient light effects
- Integration – Electronics for amplification and signal processing
- Packaging – to optimise cost vs. performance



All the above can be included in *your* custom design!

Take advantage our wide custom capabilities to achieve the optimum solution.

References



Thank You

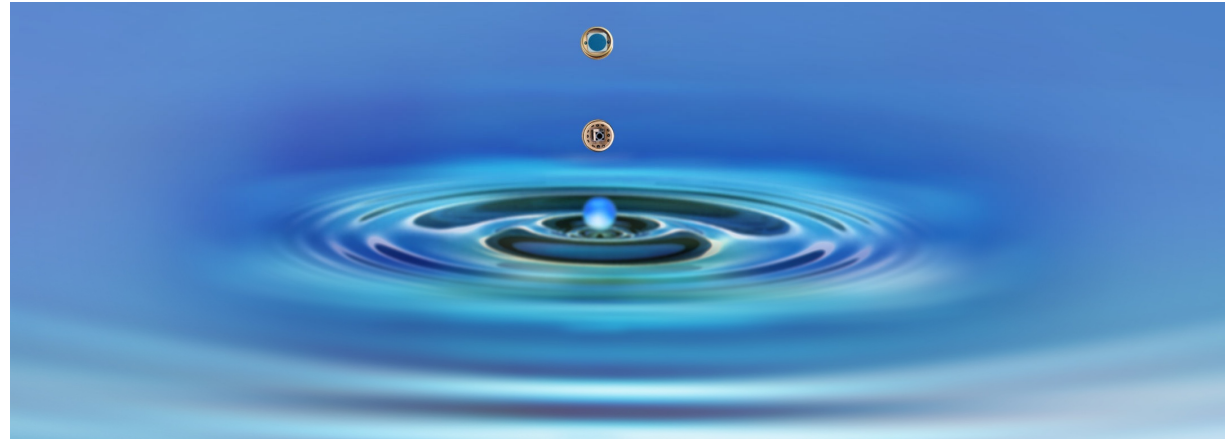


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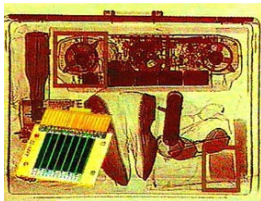


What we do:



Custom-made Optosensors and Hybrids for:

- government applications (e.g. baggage control, traffic speed control and monitoring)
- communications (e.g. optical fiber measurement systems, free space optical communication)
- graphics industry/semiconductor industry (e.g. automatic exposure control)
- military applications (e.g. training systems, simulation systems, weapon guidance systems)



What we offer:



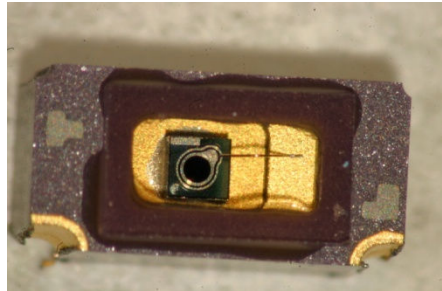
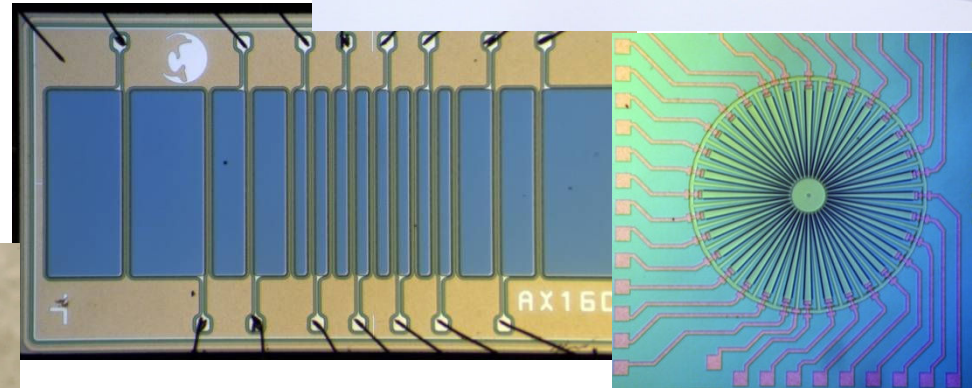
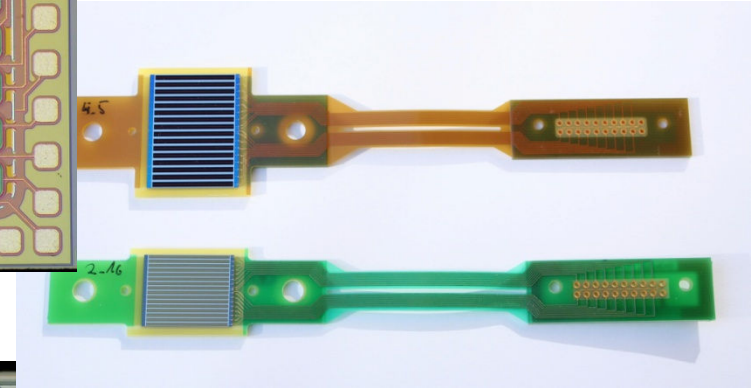
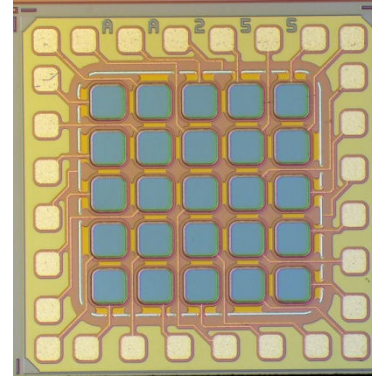
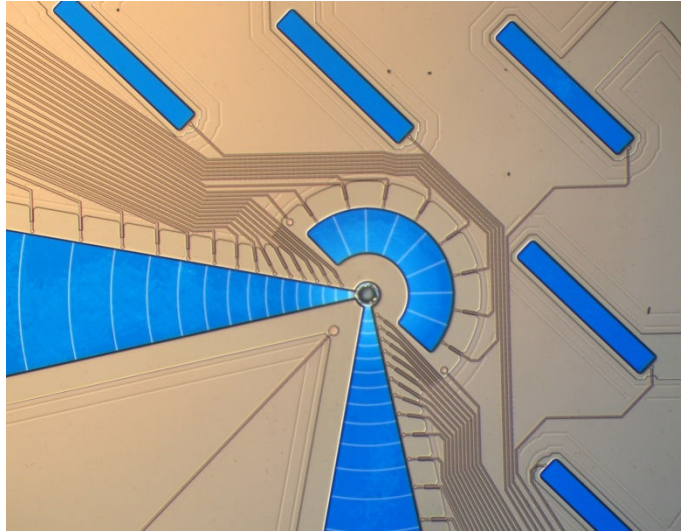
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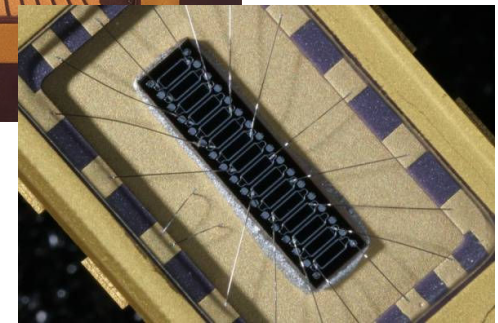
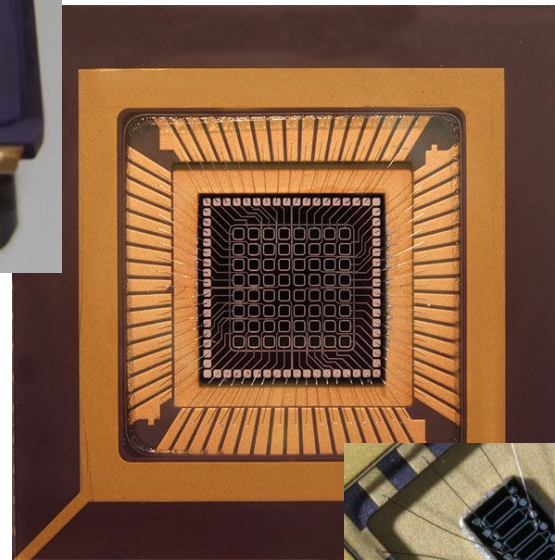
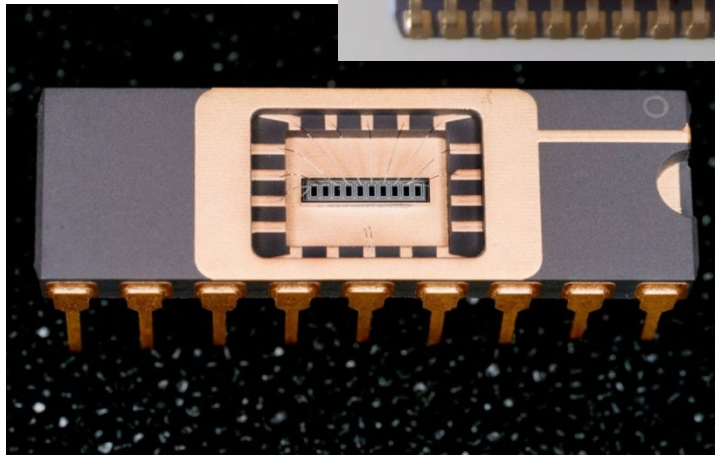
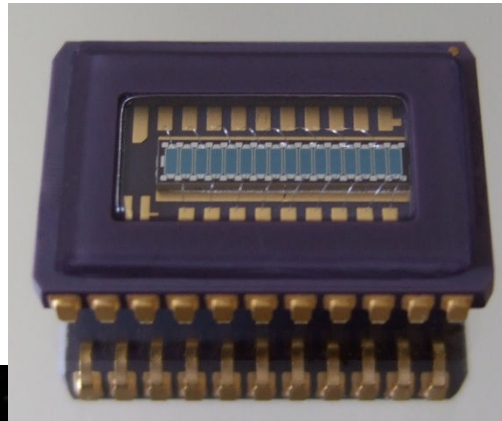
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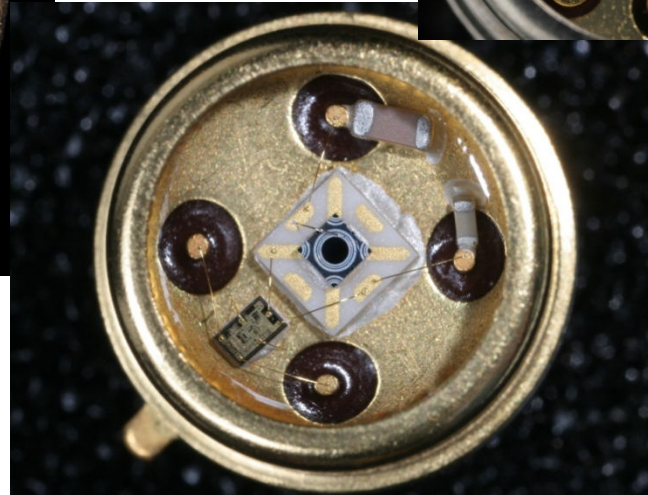
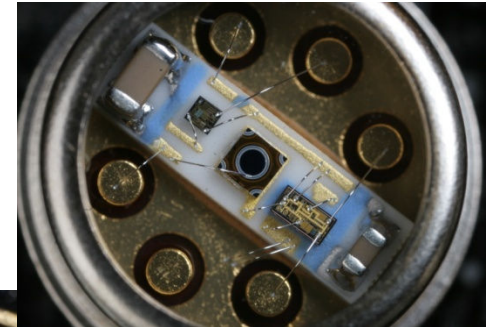
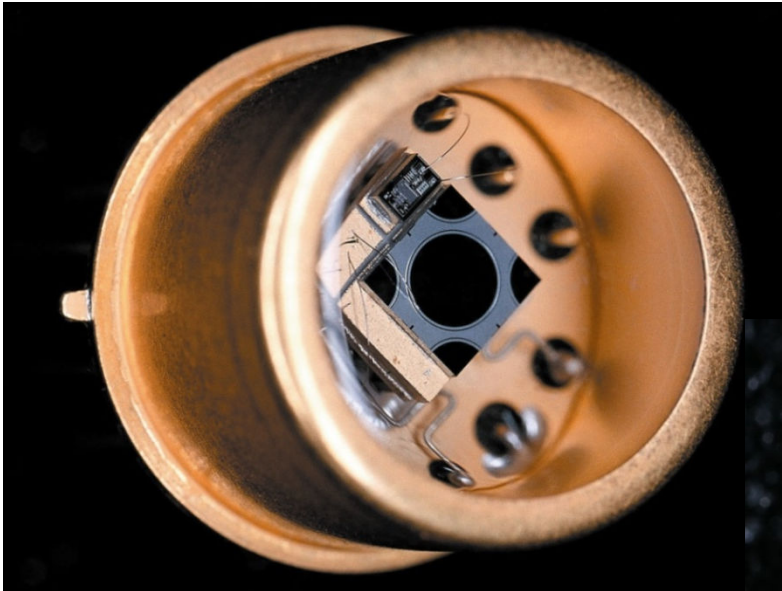
Chip Design



APD Arrays



Avalanche Photodiode Modules



Applications PIN – Photodiodes



For machine tools:

linear encoders

rotary encoders

angular encoders



For medical technology:

blood sugar control (self control)





Applications Avalanche – Photodiodes

Distance measuring lasers (red)



Range finders (NIR)



Automation for industry



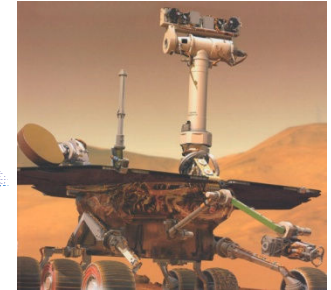
Security applications



Applications APD –Linear Arrays



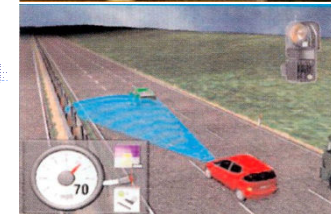
ESA – Marsrover (3D - Camera)



Traffic Control (Scanner)



Adaptive Cruise Control

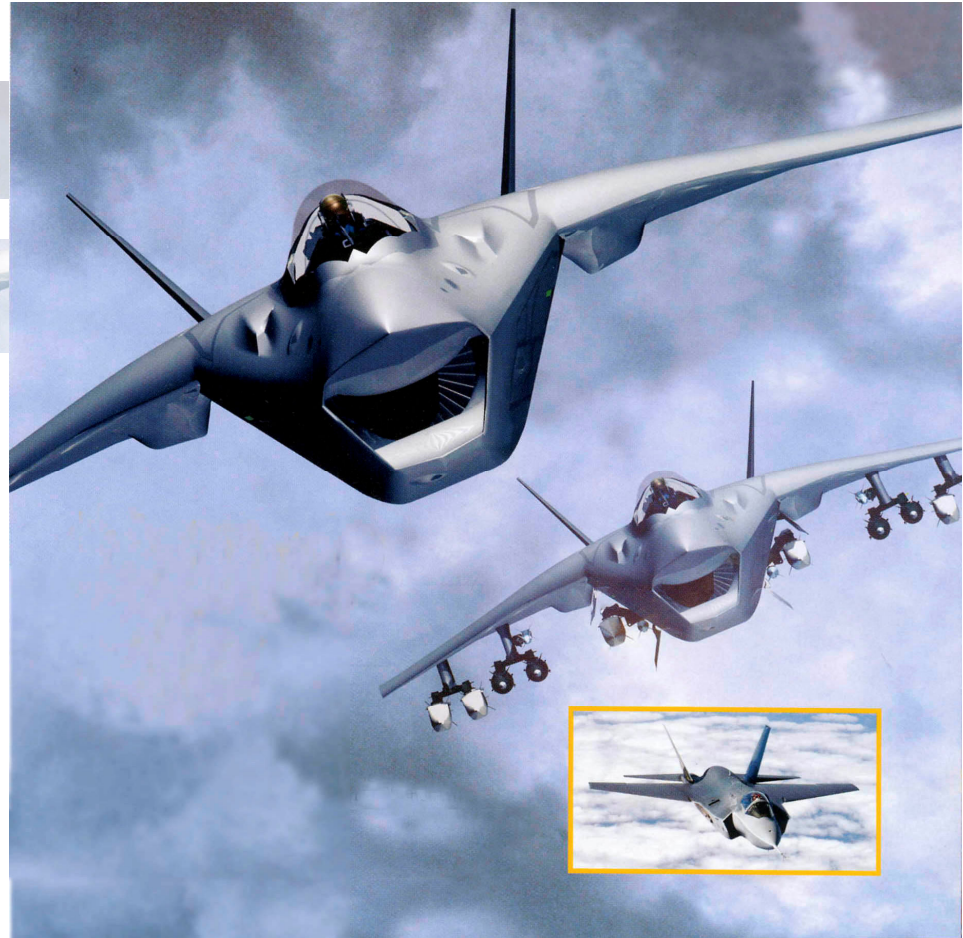




Photodiodes for target finders

- NEW 1064 nm PIN

- NEW 1064 nm APD

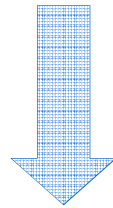


Sales Strategy



Head Office Germany:

International Sales



Distributors:

China, Israel, Great Britain, France,
Italy, Austria, India, Japan



Subsidiary Pacific Silicon Sensor, Inc.

responsible for the US Market

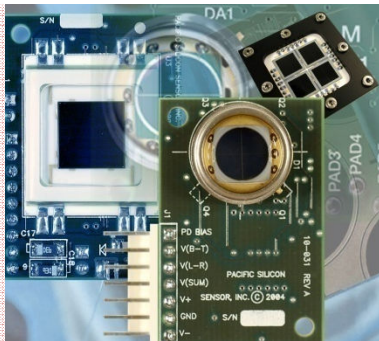
Distribution Alliance with
Mouser.com (online selling)

Pacific Silicon Sensor, Inc.

Responsible for the US market



- Subsidiary since 1999
- Located in Westlake Village, California, USA
- Distributing the whole product range
- Support in development of customized photodiodes



Core Capabilities

- Hybrid Modules
- Customized Packaging
- Smart Detector Boards

Distributors



USA:

Pacific Silicon
Sensor, Inc.

Germany:

Gigahertz-Optik
GmbH

France:

OPTOPRIM

Israel:

ODEM
Technologies Ltd.

Great Britain:

APC-Hero Advanced Power
Components plc.

Italy:

Laser Optronic

Austria:

Roithner
Lasertechnik

China:

Light Catcher
Co.,Ltd.

Shenzhen Valueplus2
Electronic Corp., Ltd.

Pinnacle Scientific
Corporation

Our Unique Selling Proposition



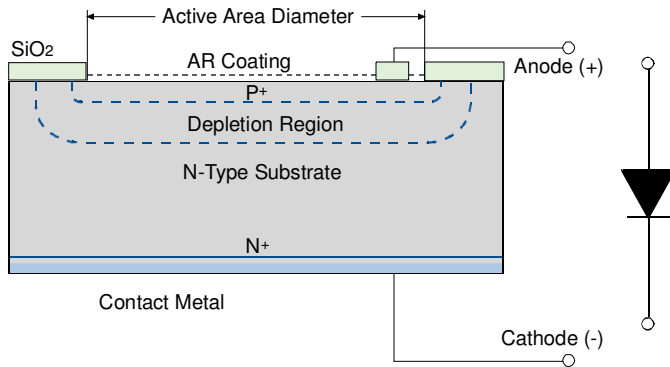
- 30+ years of experience and know how
- Highly trained and motivated staff
- New technologies & ongoing R&D
- High specification sensors
- Successful expansion into world market



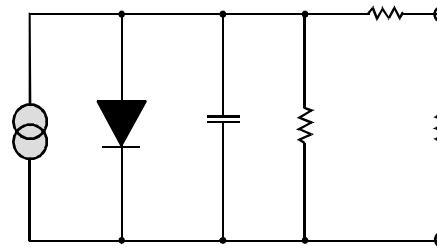
Principles



Photodiode

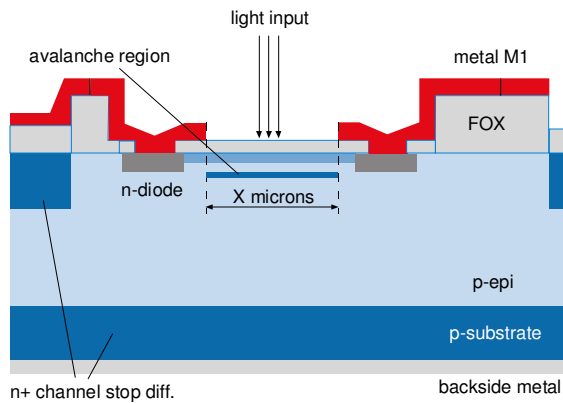


Equivalent Circuit

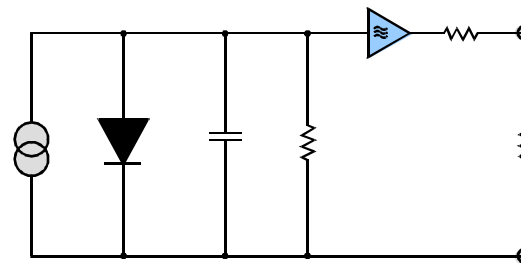


$$I_{ph} \sim P$$

Avalanche Photodiode



Equivalent Circuit



$$M \times I_{ph} \sim P$$

