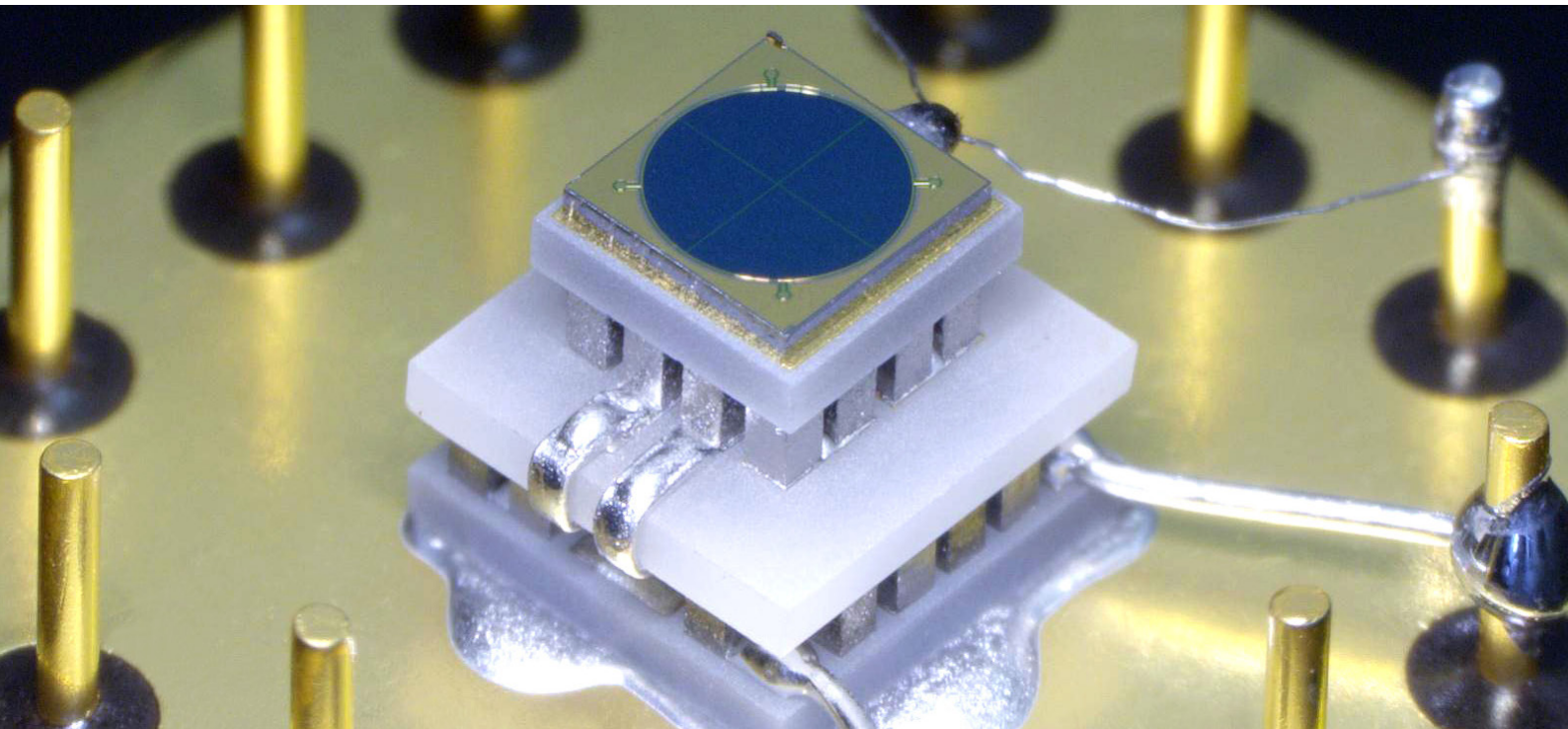


AVALANCHE PHOTODIODES AND SINGLE PHOTON AVALANCHE DIODES



AT A GLANCE

InGaAs-based surface illuminated APDs and SPADs for QKD and sensing applications

Features

- low noise and high efficiency
- room-temperature or TEC-cooled operation intended
- single diode, segmented diodes or array configuration
- backside or front side illumination
- lens integration for back side illuminated photodiode (optional)
- flip-chip or wire bonding

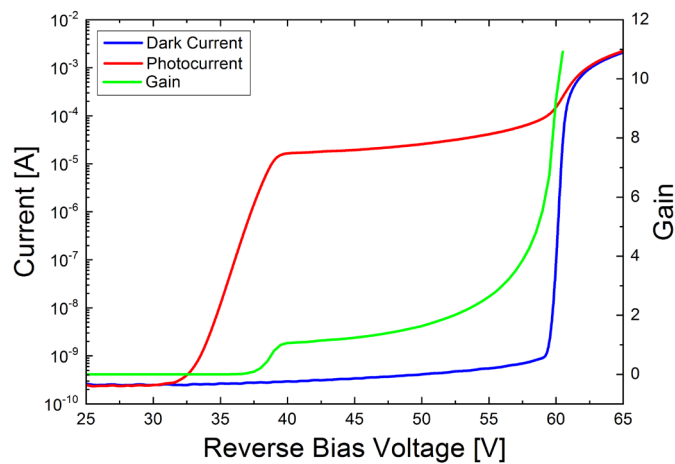
Applications

- quantum key distribution
- SWIR sensing and imaging

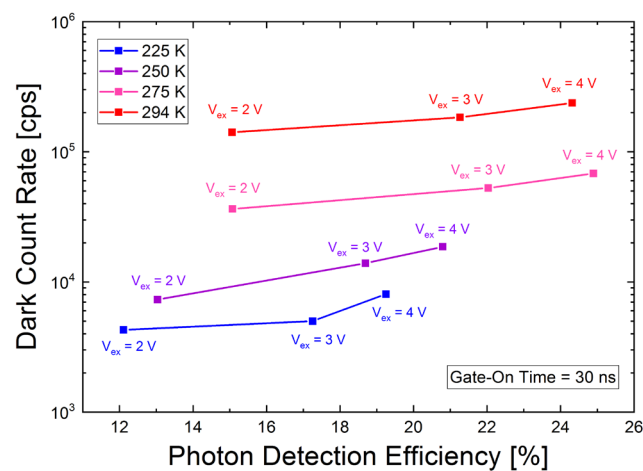
Technical Background

Surface-illuminated APDs and SPADs with low noise and high quantum efficiency are key components for short wavelength infrared (SWIR) quantum key distribution (QKD) and sensing applications. The InGaAs avalanche photodiodes are operated at a wavelength of 820 nm up to 1650 nm. For the single photon avalanche diodes the upper absorption wavelength reduces to 1570 nm.

The photodiode chips are based on mature InP technology and are fabricated at the wafer process line of HHI, having Telcordia and space-qualified processes. The chips are packaged to TO-cans with fibre pig-tail interface. Due to the ability of customizing the photodiode chips, customers obtain the optimal performance for their application.



Analog characteristics of fibre pig-tail InGaAs avalanche photodiode



Geiger-mode characteristics of InGaAs single photon avalanche diode at 1540 nm

Dr.-Ing. Patrick Runge
 Photonic Components

Phone +49 30 31002-498
 patrick.runge@hhi.fraunhofer.de

Fraunhofer Heinrich Hertz Institute
 Einsteinufer 37, 10587 Berlin
 Germany

www.hhi.fraunhofer.de/pc

Applications

- customized operation points for customer applications
- planar or pseudo-mesa type photodiodes
- single photodiode, segmented photodiode or array configuration
- segmented photodiodes and arrays with common or isolated cathode
- backside or front side illumination
- lens integration for backside illuminated photodiode
- flip-chip or wire bonding
- customized pitches and pad configurations