

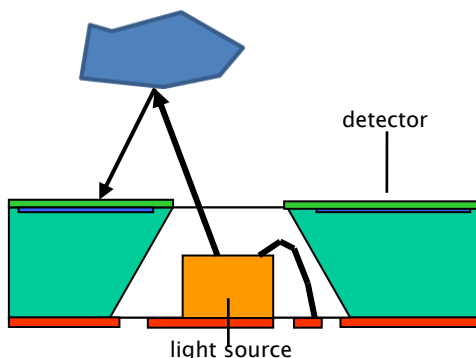
MICRO-HOLE CHIP TECHNOLOGY FOR NEXT LEVEL OF INTEGRATED OPTICAL DETECTOR SYSTEMS



First Sensor

To meet the growing need for very compact and highly integrated detector systems First Sensor AG, a leading manufacturer of silicon based detectors, announces a new chip technology. By including holes or cavities in the silicon wafer the radiation source can be literally mounted inside the detector die. This new degree of design freedom enables more compact detector concepts.

With its latest PIN photodiode development First Sensor AG opens up a new possibility for mounting light sources or optical fibers inside a high performance detector chip in a very precise and compact manner.

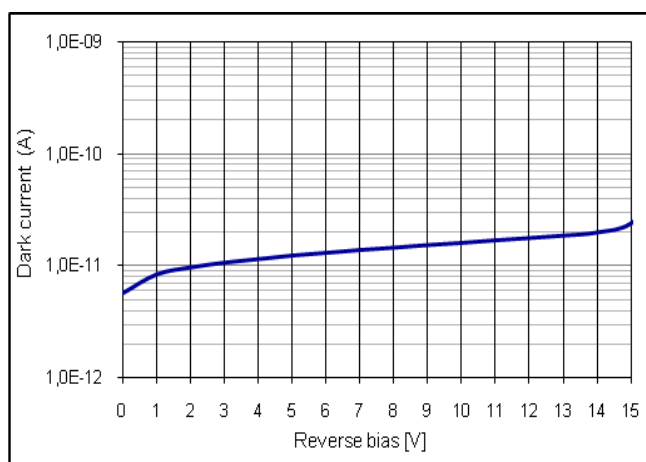
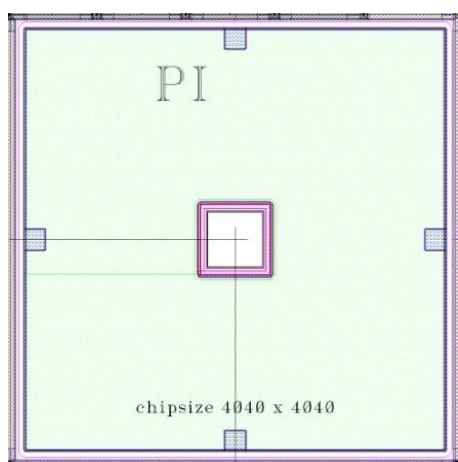


The open area inside of a detector die may be covered with a mask pattern or any wavelength filter structure. Hole dimensions can be adapted to the needs of any laser or LED light source or a specific beam dimension.

This micro-hole chip technology can be used in light scattering applications as well for other axis symmetrical detector system geometries and very tiny tube mounted detection systems. The chips are suitable for switches in harsh environments, end point and color detectors and to detect tiny objects or their moving directions.

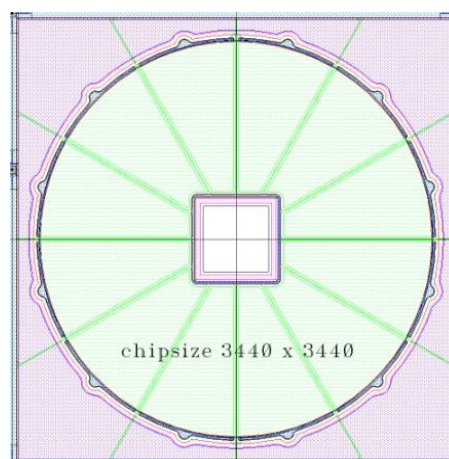
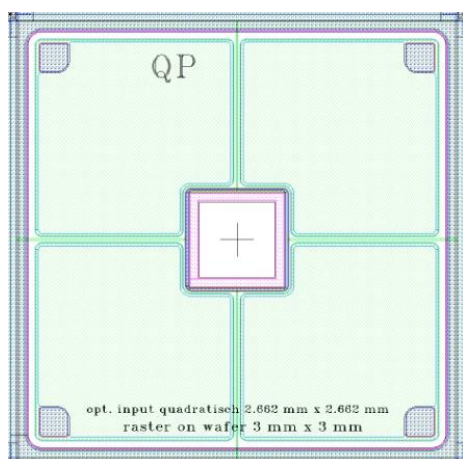


In the figure below we present the layout of a single area detector using a centered 500 μm square hole for the light source. The figure also shows the measured dark current characteristic. Other geometries can be designed to provide the optimized detector solution.



The chip uses a highly resistive epitaxial silicon layer. Bulk substrates and wafer bonded substrates are also available. Specific anti reflective coatings are used to maximize sensitivity for the target wavelength.

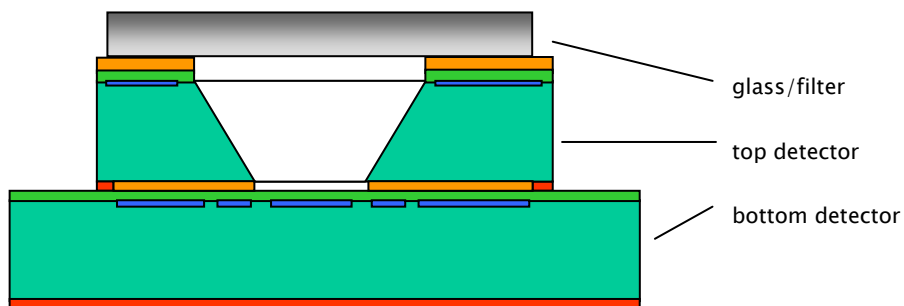
To address axis symmetrical detector geometries we can offer quadrant chips and multi-segmented diodes as shown in the figures below. Furthermore, the micro-hole chip technology can be combined with fine pitched diode arrays, too.





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The presented technology can also be applied to multi spectral measurement using stacked chips as drafted in the next figure. By properly designing the upper and lower diode the detector can be adopted to the application.



First Sensor provides cutting edge technology for sophisticated sensor applications. For full details and customization options feel free to contact us at sales.opto@first-sensor.com.

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