Thursday, October 21, 2021

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Semiconductor Position-Sensitive Detectors (PSDs): Technology and Applications

Thursday, November 4, 2021 1:00 PM - 2:00 PM EDT

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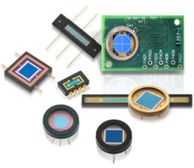
.: About This Webinar



Photodetectors are commonly used for measuring light power. They are also used as position-sensitive detectors (PSDs) in a wide variety of applications including human eye movement monitoring, manufacturing robotics, satellite and mirror alignment, auto focusing in microscopes, machine tool alignment, and vibration analysis. To better understand which photodetectors are suitable for specific applications and use cases, two PSD technologies are discussed in this presentation: segmented and lateral-effect.

Segmented PSDs are common substrate photodiodes divided into either two or four segments, which are separated by gaps or dead regions. A symmetrical optical beam generates equal photocurrents in all segments if positioned at the center. Segmented PSDs offer position resolution better than 0.1 µm and accuracy higher than lateral-effect PSDs.

Lateral-effect PSDs are continuous single-element, planar-diffused photodiodes with no gaps or dead areas. Lateral-effect PSDs provide a direct readout of a light spot displacement across the entire active area. An analog output — directly proportional to both the position and intensity of a light spot present on the detector active area — provides information on the position of the beam or light spot. The generated photocurrent is inversely proportional to the resistance between the incident light spot and the contact. When the input light spot is exactly at the device center, equal current signals are generated. By moving the light spot over the active area, the amount of current generated at the contacts will determine the exact light spot position at each instant of time. The main advantage of lateral-effect diodes is their wide dynamic range. They are independent of the light spot profile and intensity distribution that affect the segmented diodes' position readings. The input light beam may be of any size and shape. These devices can resolve positions better than 0.5 µm.

This webinar explores the technologies and applications for PSDs composed of different materials, including silicon and InGaAs.

Pictured: Semiconductor position-sensitive detectors (PSDs). Courtesy of OSI Optoelectronics.

Who should attend:
Engineers, researchers, students, and other professionals interested in developing or working with semiconductor position-sensitive detectors (PSDs). This webinar provides a basic educational foundation on the design and applications of both segmented and lateral-effect silicon and InGaAs PSDs used for optical beam position detection.

About the presenter:
Oleks Goushcha, Ph.D., is a highly respected, seasoned veteran in optoelectronics and semiconductor technologies. He has held key positions as vice president of research and development, chief technology officer, and chief scientist at various U.S. companies before his appointment at OSI Optoelectronics as lead scientist, semiconductor devices. He has 15 patents in semiconductor devices and optoelectronics, has authored papers in over 100 peer-reviewed and professional journals, and has presented many technical papers at leading research conferences.

Goushcha received his bachelor's and master's degrees in physics and solid-state optics from Taras Shevchenko University in Ukraine, and his Ph.D. in solid-state physics from the Institute of Physics, Ukrainian Academy of Sciences. His academic activity included research work at Max Planck Institute for Radiochemistry (Germany) and the University of California, Riverside. He was awarded multiple research grants from the Ukrainian Academy of Sciences, Max Planck Society, and the Netherlands Ministry of Sciences.

About OSI Optoelectronics:
OSI Optoelectronics is a major global provider of innovative photonics, optoelectronics, and advanced electronic systems for leading aerospace and defense, medical, and industrial OEMs that demand high-reliability, high-performance, market-driven technology solutions today.

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