Optical Sensor - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

Market Report | 2025-07-01 | 120 pages | Mordor Intelligence

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Report description:

Optical Sensor Market Analysis

The optical sensors market reached USD 26.61 billion in 2025 and is projected to climb to USD 44.59 billion by 2030, advancing at a 10.88% CAGR. Consistent regulatory pressure on automotive safety, environmental monitoring, and data privacy is steering demand toward integrated, cost-efficient silicon-photonics-based designs. Price drops in wafer-level photonics and the proliferation of AI workloads at the network edge are accelerating sensor adoption in 5G infrastructure, autonomous vehicles, and distributed fiber-optic monitoring. Material-supply risks around high-purity silica and germanium underscore the need for diversified sourcing, while miniaturization requirements in wearables and smartphones continue to shift volume production to Asia-Pacific. Competitive intensity is rising as smaller firms deploy photonic integration to rival long-established semiconductor players.

Global Optical Sensor Market Trends and Insights

Miniaturization Demand for Wearable Optics in APAC Consumer Electronics

AR glasses and smart wearables now require sub-millimeter optical stacks that still meet luminous-efficiency targets. Single-layer meta-optics introduced by STMicroelectronics cut lens height by 70%, permitting under-display proximity sensing in flagship smartphones. Indium-phosphide VCSELs are replacing GaAs emitters, delivering tighter beam divergence for space-constrained devices. APAC contract manufacturers leverage these developments to secure design wins from Western brands, reinforcing the

region's 33% revenue share position.

Industrial IoT Adoption Fuelling Fiber-optic Sensors in Harsh Environments

Distributed fiber sensing provides kilometre-scale temperature and strain data immune to electromagnetic interference, enabling predictive maintenance across refineries, pipelines, and high-voltage substations. Rockwell Automation notes that early-warning analytics on such data can eliminate 30% of unplanned downtime in process industries. Coupling AI-based pattern recognition with continuous optical feedback is becoming a cornerstone of Industry 4.0 strategies in North America and Europe.

Supply-Chain Constraints for High-Purity Silica Preforms

Quartz mined from a handful of Appalachian deposits accounts for most global preform feedstock; Hurricane-induced outages in 2024 exposed how a single locale can squeeze optical-fiber availability. Coupled with China's export restrictions on germanium, manufacturers are negotiating long-term contracts at price premiums, delaying large-volume deployments of distributed fiber solutions. Synthetic-silica start-ups are emerging, but commercial scaling remains two to three years out.

Other drivers and restraints analyzed in the detailed report include:

Automotive ADAS & LiDAR Integration Accelerating NIR Image Sensors in Europe / Advances in Silicon Photonics Lowering Bill-of-Materials Cost for Integrated Optical Sensors / Data-Privacy Concerns Around Biometric Optical Sensors in EU /

For complete list of drivers and restraints, kindly check the Table Of Contents.

Segment Analysis

Image sensors retained 42% share of the optical sensors market in 2024, buoyed by multi-camera smartphones and ADAS roll-outs. Sony's stacked CMOS technology pushes 120 fps 4-K capture, meeting machine-vision tolerances for factory automation. Fiber-optic sensors, while smaller in absolute revenue, are forecast to post the highest 12.7% CAGR as infrastructure operators shift toward kilometre-scale structural health monitoring. This traction lifts the optical sensors market size for fiber-optic solutions from USD 4.7 billion in 2025 toward USD 8.6 billion by 2030. Distributed acoustic sensing, pipeline security, and perimeter intrusion systems are the chief volume drivers.

Diversification across photoelectric, ambient light, and proximity sensors remains steady, although ASP erosion pressures component suppliers. Ultra-mini proximity modules like Vishay's 0.5 mm-thick device cater to bezel-less phone designs, while global-shutter industrial cameras eliminate motion blur in robotic pick-and-place. Multi-spectral imagers within the "Others" bucket are gaining double-digit growth, supporting precision agriculture and food-safety fluorescence assays.

Cutting-edge photodetectors such as single-photon avalanche diodes (SPADs) and avalanche photodiodes (APDs) sell at premium prices even though they ship in lower volumes than standard photodiodes. SPAD arrays deliver picosecond-level time-of-flight data that LiDAR systems rely on for accurate distance readings in self-driving cars. On the emitter side, design teams are moving from LEDs to VCSELs and edge-emitting lasers to gain higher optical power and tighter spectral control; VCSELs also couple easily into fiber while meeting consumer eye-safety rules.

Optics and filters contribute the most value per gram because their precision coatings and tight tolerances are hard for new entrants to match. Meta-optics is shaking up lens design by replacing multi-element stacks with single, patterned layers that keep performance but trim size and weight. Processing electronics are following the same path: more functions now sit on the sensor die, so edge AI can run locally, cutting latency and easing bandwidth demands.

Optical Sensors Market is Segmented by Sensor Type (Image Sensor, Fiber-Optic Sensor, and More), Sensing Technology (Extrinsic Optical Sensor and More), Component (Photodetectors, Light Sources, and More), Wavelength (Ultraviolet, Visible, and More), Output End-User Application (Consumer Electronics, Industrial Automation & Robotics and More), and Geography. The Market Forecasts are Provided in Terms of Value (USD).

Geography Analysis

Asia-Pacific accounted for 33% of 2024 revenue, reflecting its tight coupling of component fabs, module assembly, and consumer electronics brands. Contract manufacturers in China and Vietnam now produce proximity-sensor die at sub-USD 0.09 ASP, reinforcing the region's cost leadership. Japan's precision optics ecosystem supports automotive LiDAR modules meeting AEC-Q102 grade, while South Korea's foundries push the envelope on stacked-image-sensor yields.

Europe's outlook centers on regulatory-driven applications. German Tier-1 suppliers are booking long-term contracts for NIR imaging arrays that comply with Euro NCAP vision-system mandates. Fiber-optic gas-leak monitoring around North Sea platforms is expanding as EU methane-emissions rules tighten. GDPR compliance is steering OEMs toward on-device biometric analysis, supporting intrinsic sensor adoption.

North America continues to test emerging concepts ahead of other regions. Venture funding into photonic start-ups exceeded USD 700 million in 2024-2025, with a focus on edge-AI optical links. Environmental agencies deploy distributed fiber networks for methane quantification, often financed through green-bond issuances. Meanwhile, Saudi Arabia and the UAE are installing hyperspectral camera arrays across smart-city projects, driving the Middle East's 13.6% CAGR outlook.

List of Companies Covered in this Report:

ams-OSRAM AG / Sony Group Corporation / Hamamatsu Photonics K.K. / ON Semiconductor Corp. / ROHM Co., Ltd. / SICK AG / Keyence Corporation / Teledyne Technologies Inc. / STMicroelectronics N.V. / Vishay Intertechnology Inc. / Honeywell International Inc. / IFM Electronic GmbH / Pepperl + Fuchs SE / Rockwell Automation Inc. / Samsung Electronics Co. Ltd. / Cognex Corporation / FLIR Systems (Teledyne FLIR) / Omnivision Technologies Inc. / Lumentum Holdings Inc. / Excelitas Technologies Corp. / Thorlabs, Inc. /

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