

Photonics Market by Product Type (LED), Wavelength (Infrared, Visible), Material (Silicon, Glass), Application (Information & Communication Technology), End-use Industry (Industrial, Media & Telecommunication), & Region - Global Forecast to 2030

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Report description:

The photonics market is projected to grow from USD 1,093.96 billion in 2025 to USD 1,481.80 billion by 2030, at a CAGR of 6.3% during the forecast period. The photonics market is driven by the growing need for high-bandwidth communication solutions, particularly due to advancements in 5G technology, cloud computing, and the increasing number of Internet of Things (IoT) protocols. These advancements require optical fibers and transceivers to enhance data transmission speeds. In the realm of industrial manufacturing, lasers and optical sensors are improving the precision of cutting, welding, and quality control processes, contributing to the rise of automated assembly lines, much like the impact of Industry 4.0. In healthcare, the rising use of non-invasive diagnostic techniques, such as infrared spectroscopy and biophotonics, is stimulating market growth to support an aging population. Additionally, in consumer electronics, there is a high demand for products like smartphones, as well as augmented reality (AR) and virtual reality (VR) devices. This demand is driving the need for visible-wavelength LEDs and micro-LED displays.

<https://www.marketsandmarkets.com/Images/photonics-market-Overview.webp>

"Detectors, sensors, and imaging devices segment to register the fastest growth during the forecast period ."

The detectors, sensors, and imaging devices segment is projected to register the fastest growth in the photonics market during the forecast period. This growth is driven by their widespread adoption in diverse, high-growth industries such as automotive, healthcare, consumer electronics, defense, and industrial automation. The increasing reliance on photonic sensors for

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high-precision smart systems is fueling the demand for real-time data acquisition across various applications. In the automotive sector, for example, the emergence of advanced driver-assistance systems (ADAS) and fully autonomous vehicles has significantly increased the production volumes of LiDAR systems, infrared detectors, and 3D imaging sensors. These technologies depend on photonics to detect obstacles, scan terrain, and enhance safety in all weather conditions. In healthcare, photonic imaging devices such as optical coherence tomography (OCT), fluorescence imaging, and bio-photonic sensors are enabling earlier and more accurate disease diagnoses than ever before. Non-invasive imaging and real-time monitoring, using both near-infrared (NIR) and visible light modalities, have become essential in surgical applications and diagnostic point-of-care settings. As the global population ages and the prevalence of chronic conditions rises, the demand for advanced diagnostic capabilities is expected to grow.

"Glass segment to register the fastest growth in the photonics market in terms of value."

Glass is the fastest-growing material segment in the photonics market due to its excellent optical properties, chemical durability, and versatility across a wide range of applications. Its growth is primarily driven by its use in the manufacture of optical fibers, which enable high-speed internet services, 5G networks, and long-haul data transmission infrastructures. As global data transfer and cloud computing continue to expand rapidly, telecom companies have made significant investments in fiber optic networks that benefit from the low optical attenuation and high transmission efficiency of silica-based glass. Additionally, glass is increasingly utilized in high-performance lenses, substrates, prisms, and waveguides for imaging (ocular), sensing (photonic), and laser applications. Specialty glasses, such as borosilicate, fused silica, and chalcogenide glass, offer a diverse range of optical properties like high thermal resistance, UV or IR transparency, and low dispersion, making them suitable for various specialized applications in aerospace, defense, healthcare, and industrial lasers. The growing acceptance of glass components is also fueled by the rise of high-precision medical devices, including diagnostic imaging systems and surgical tools. Glass is becoming indispensable for manufacturers due to its biocompatibility and dimensional stability.

"Visible wavelength segment to register the fastest growth in the photonics market in terms of value."

The visible wavelength segment is projected to register the fastest growth in the photonics market due to its wide applications in imaging, display, lighting, and consumer electronics. With wavelengths ranging from roughly 400 to 700 nanometers, visible light is the most relevant spectrum to drive human interactions, making it easier to permit possible integration into any applicable technology that would be used in the daily lives of people. The drive for high-resolution display panels has grown significantly over the past few years, with OLED, micro-LED, and quantum dot displays driving displays in phones, TVs, monitors, and AR/VR. This established demand for display screen technology has driven the adoption of visible light photonic technologies. Companies in countries like South Korea, China, and Japan, familiar with the electronics and display market, are investing heavily in visible-light photonics in new display technologies. Another major driver of growth is solid-state lighting (SSL) technologies, including LEDs (which mostly impact visible light and some IR), as governments are requiring energy efficiency metrics and mass LED adoption in commercial, residential, and public infrastructure projects.

"Lighting segment to register the fastest growth in the photonics market in terms of value."

Lighting is emerging as the fastest-growing application segment of the photonics market, owing to the increased adoption of energy-efficient lighting sources, rapid urbanization, and global goals aimed at carbon neutrality. The conversion from traditional incandescent and fluorescent lighting to solid-state lighting (SSL)-specifically light-emitting diodes (LEDs) and organic LEDs (OLEDs)-has triggered a considerable demand for photonic technologies. Photonic technologies have luminous efficacy that far exceeds traditional light source alternatives, significantly longer operating lives, and reduce energy consumption to become a viable solution in commercial, residential, industrial, and public infrastructure applications. Governments have been instituting stringent energy-efficiency regulations and subsidies/mandates to encourage the adoption of LED-based lighting solutions in the Asia Pacific, Europe, and North America, also impacting the projected growth of the market. Reality capture smart lighting systems that employ photonics-based controls and sensors are becoming increasingly desirable and consumed in smart homes and smart cities. These smart lighting systems are adjustable based on occupancy or ambient changes (dynamics) and modify their brightness and color temperature, respectively, utilizing photonics-based components such as light sensors, photodetectors,

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and controls.

Media & telecommunication segment to register the fastest growth in the photonics market in terms of value."

The media and telecommunication segment is the fastest-growing end-use segment in the photonics market, largely fueled by the increasing need for remote high-speed data transmission, 5G infrastructure, and the development of optical communication systems. Photonics technologies, particularly fiber optic technologies and optical transceivers, represent the most advanced telecommunications solutions that make today's telecommunications networks operate faster, more securely, and with more bandwidth and less loss, all over long distances. As the quantity of global internet usage increases, along with the speed and quantity of data traffic, telecoms are currently transitioning away from copper infrastructures and toward fiber optic networks. This transition is creating a great need for telecommunication photonic components. The development of 5G commercial networks and the anticipated development towards 6G will also require photonic solutions to accommodate the number of devices connected to the networks. The number of devices streaming content and the latency requirements for applications such as augmented reality (AR), virtual reality (VR), and cloud computing will also require greater bandwidth and a lower latency telecommunication infrastructure. Photonic integrated circuits (PICs), lasers, and photodetectors are being integrated into state-of-the-art data centers and wireless communications hubs in order to meet upcoming demands in bandwidth and latency. New developments in wavelength division multiplexing (WDM) and coherent optical systems significantly increase the efficiency of optical communications systems, furthering the need for photonic technologies in media and telecommunications.

In-depth interviews were conducted with chief executive officers (CEOs), marketing directors, other innovation and technology directors, and executives from various key organizations operating in the photonics market, and information was gathered from secondary research to determine and verify the market size of several segments.

□ By Company Type: Tier 1 ? 50%, Tier 2 ? 30%, and Tier 3 ? 20%

□ By Designation: Managers? 15%, Directors ? 20%, and Others ? 65%

□ By Region: North America ? 14%, Europe ? 16%, Asia Pacific ? 58%, and the Rest of the World ? 12%.

The photonics market comprises Thorlabs, Inc. (US), IPG Photonics Corporation (US), Lumentum Operations LLC (US), ams-OSRAM AG (Austria), Hamamatsu Photonics K.K. (Japan), Corning Incorporated (US), Coherent Corp(US), OFS Fitel, LLC (US), ON SEMICONDUCTOR CORPORATION (US), and Signify Holding (Netherlands). The study includes an in-depth competitive analysis of these key players in the photonics market, with their company profiles, recent developments, and key market strategies.

Research Coverage

This report segments the photonics market on the basis of product type, material, wavelength, application, end-use industry, and region, and provides estimations for the overall value of the market across various regions. A detailed analysis of key industry players has been conducted to provide insights into their business overviews, products & services, key strategies, and expansions associated with the photonics market.

Key benefits of buying this report

This research report is focused on various levels of analysis - industry analysis (industry trends), market ranking analysis of top players, and company profiles, which together provide an overall view of the competitive landscape; emerging and high-growth segments of the photonics market; high-growth regions; and market drivers, restraints, opportunities, and challenges.

The report provides insights on the following pointers:

□ Analysis of drivers: (advancements in photonic-integrated circuits enabling miniaturization and cost-effective high-performance solutions), restraints (high optical losses in silicon nitride and SOI (silicon-on-insulator) waveguide fabrication), opportunities (integration of photonics with artificial intelligence and Internet of things to enable smart cities, precision agriculture, and

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industrial automation), and challenges (signal distortion from non-linear effects in high-power photonic systems).

?□Market Penetration: Comprehensive information on the photonics market offered by top players in the photonics market.

?□Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities, partnerships, agreements, and collaboration in the market.

?□Market Development: This report provides comprehensive information about lucrative emerging markets and analyzes the photonics market across regions.

?□Market Capacity: Production capacities of companies producing photonics are provided wherever available with upcoming capacities for the photonics market.

?□Competitive Assessment: In-depth assessment of market shares, strategies, products, and manufacturing capabilities of leading players in the photonics market.

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