

Photonic Integrated Circuit Market – Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Type of Raw Material (III-V Material, Lithium Niobate, Silica-on-silicon), By Integration Process (Hybrid, Monolithic), By Application (Telecommunications, Biomedical, Data Centers), By Region & Competition, 2020-2030F

<https://marketpublishers.com/r/P3ED6D305932EN.html>

Date: November 2025

Pages: 180

Price: US\$ 4,500.00 (Single User License)

ID: P3ED6D305932EN

Abstracts

The Global Photonic Integrated Circuit Market, valued at USD 3.39 Billion in 2024, is projected to experience a CAGR of 23.10% to reach USD 11.80 Billion by 2030. A Photonic Integrated Circuit (PIC) is a microchip integrating multiple photonic components to generate, manipulate, and detect light signals, using photons for information transfer. Market growth is primarily driven by increasing demand for high-speed data communication and expanding data centers. The rollout of 5G networks, progress towards 6G, and advancements in quantum computing also provide substantial impetus.

Key Market Drivers

The escalating demand for high-speed data transmission serves as a primary catalyst for the Global Photonic Integrated Circuit market. Modern digital infrastructure, particularly within hyperscale data centers and advanced communication networks, necessitates unprecedented bandwidth and minimal latency to support expanding cloud computing services and emerging artificial intelligence applications. For instance, according to Ciena, in March 2024, 'Ciena Celebrates Major Customer Milestones and Optical Leadership at OFC 2024 in San Diego', network operator Vocus deployed Ciena's 1.6 terabits per second technology in Australia, demonstrating the critical need

for ultra-fast data pipelines in real-world applications.

Key Market Challenges

A significant impediment to the expansion of the Global Photonic Integrated Circuit (PIC) Market is the high cost and technical complexity inherent in PIC packaging. This challenge necessitates specialized expertise and precision manufacturing techniques, directly increasing product costs and extending development cycles. The intricate process of integrating various photonic and electronic components, often with sub-micron alignment tolerances, leads to substantial manufacturing expenses and limits throughput for high-volume production.

Key Market Trends

The Global Photonic Integrated Circuit (PIC) market is significantly influenced by the emergence of Co-Packaged Optics for data centers. This trend involves the integration of optical engines directly within the same package as high-bandwidth electrical ASICs, such as network switches, to overcome escalating electrical interconnect bottlenecks. This architectural shift addresses the critical need for higher bandwidth density and reduced power consumption in modern data centers, particularly with the proliferation of artificial intelligence and machine learning workloads.

Key Market Players

Intel Corporation

Cisco Systems, Inc.

Huawei Technologies Co., Ltd.

Ciena Corporation

Broadcom Inc.

Nokia Corporation

Fujitsu Limited

Alcatel-Lucent Enterprise Inc.

Lumentum Operations LLC

Report Scope:

In this report, the Global Photonic Integrated Circuit Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Photonic Integrated Circuit Market, By Type of Raw Material:

III-V Material

Lithium Niobate

Silica-on-silicon

Photonic Integrated Circuit Market, By Integration Process:

Hybrid

Monolithic

Photonic Integrated Circuit Market, By Application:

Telecommunications

Biomedical

Data Centers

Photonic Integrated Circuit Market, By Region:

North America

United States

Canada

Mexico

Europe

France

United Kingdom

Italy

Germany

Spain

Asia Pacific

China

India

Japan

Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies presents in the Global Photonic Integrated Circuit Market.

Available Customizations:

Global Photonic Integrated Circuit Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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