Photonic Integrated Circuits: Global Markets with Special Focus on Silicon Photonics

Market Research Report | 2025-03-12 | 142 pages | BCC Research

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Report description:

Description

Report Scope
The report analyzes the photonic integrated circuits (PICs) market across components, integration types, raw materials, and applications, offering insights into key trends and market drivers. The study focuses on components such as transceivers, lasers, modulators, detectors, multiplexers/demultiplexers (MUX/DEMUX), and optical amplifiers, assessing their adoption across diverse applications that include optical communication, sensing, biophotonics, and optical signal processing.
The report provides a comprehensive regional analysis covering North America, Europe, Asia-Pacific, and the Rest of the World (RoW), including Latin America, the Middle East, and Africa. It evaluates the market dynamics, including drivers, challenges, and emerging trends, while highlighting innovations in material design and performance enhancement. The study concludes with an analysis of major market competitors and their offerings. The base year for the study is 2023, with projections for the years 2024 through 2029, including the compound annual growth rate (CAGR) for the forecast period.
Report Includes
- 59 data tables and 40 additional tables
- In-depth analyses of the global market trends for photonic integrated circuits (PICs), with market revenue data for 2023, estimates for 2024, forecast for 2026 and 2028, and projected CAGRs through 2029
- Estimates of the size and growth forecasts of the global PICs market, and a corresponding market share analysis by component, integration type, raw material type, application, and region
- Facts and figures pertaining to the market dynamics, technical advances, regulatory landscape, and the impact of macroeconomic factors
- Insights derived from the Porter's Five Forces model, as well as global supply chain and PESTLE analyses
- Review of emerging trends and new developments with special focus on silicon photonics technology
- Evaluation of recent patent activity and key granted and published patents
- Overview of sustainability trends and ESG developments, with emphasis on consumer attitudes, and the ESG scores and

practices of leading companies
- Analysis of the industry structure, including companies' market shares and rankings, strategic alliances, M&A activity and a venture funding outlook
- Profiles of leading companies, including Infinera Corp., Intel Corp., Cisco Systems Inc., Coherent Corp., and Ciena Corp.

Executive Summary

Summary:

The global market for photonic integrated circuits (PICs) is expected to grow from $13.9 billion in 2024 and projected to reach $24.2 billion by 2029, at a compound annual growth rate (CAGR) of 11.8% from 2024 through 2029.

PICs are devices that combine several photonic functions onto a single chip, allowing for the manipulation of light signals in a range of applications. Unlike typical electronic circuits, which rely on electrons, PICs employ photons, providing benefits such as increased speed, bigger bandwidth, and lower energy usage.

The PICs market is growing rapidly, driven by increasing demand for high-speed data transmission and energy-efficient solutions in telecommunications, data centers, and sensing applications. Multiple photonic functions are integrated into a single chip in PICs, giving superior performance, miniaturization, and cost-effectiveness compared to traditional optical systems. The need for high bandwidth and the trend of cloud computing and 5G networks have accelerated the adoption of PIC-based technologies.

Technological advances in materials such as silicon photonics and silicon nitride are reshaping the PICs market landscape. Silicon photonics is likely to become a leading technology because it is compatible with existing semiconductor manufacturing processes and is also scalable. This could help reduce production costs and make PICs solutions more accessible to a larger number of applications.

However, significant initial investment requirements and complex manufacturing processes restrict market growth. Looking forward, PICs are expected to witness strong growth supported by increasing governmental and private investments in photonics R&D. Applications are going to expand across new and emerging fields such as quantum computing, augmented reality (AR), virtual reality (VR), and environmental sensing. They will play a crucial role in shaping the future of technology.

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