

Photonic Integrated Circuit - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts 2019 - 2029

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Report description:

The Photonic Integrated Circuit Market size is estimated at USD 15.11 billion in 2024, and is expected to reach USD 38.35 billion by 2029, growing at a CAGR of 20.47% during the forecast period (2024-2029).

Key Highlights

- As soon as a single chip is attached, different components of the photonics, like waveguides, lasers, modulators, and detectors, become known as photonic integrated circuits. Photonic integrated circuits are extremely fast, accommodate higher bandwidth, and have high energy efficiency compared to traditional ICs. These features have dealt with some of the fundamental drawbacks associated with traditional ICs.
- In the case of photonic ICs, the power consumed in such critical applications could be reduced by at least 50%. The frequencies that could be covered with photons are about 1,000-10,000 times higher than the spectrum covered with microelectronics, implying that by using photonic ICs, end users can achieve much higher frequencies that are far more energy-efficient than traditional ICs.
- These low costs of photonics devices manufactured through the hybrid monolithic approach are growing exponentially every year as a result of DataDriven Ecosystems, finding great demand from end users' applications.
- In addition, several market participants are working to take advantage of PIC's active developments as part of a highly integrated photonic technology and in order to meet the growing volume of network traffic driven by COVID-19 pandemic responses, particularly within data centers.
- While hybrid photonic ICs are highly efficient and have a number of advantages compared to previous generations of conventional ICs, they do not achieve the level of market penetration found in traditional ICs.
- The surveillance market is growing with threats and scenarios like COVID-19. Many public places worldwide are deploying optical and photonic sensors that enable high-sensitivity night vision sensors, cameras, and systems combined with semiconductor

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photocathode technology with silicon-based digital video technology.

Photonic Integrated Circuit Market Trends

Growing Applications in Telecommunications and Data Centers to Drive the Market

- In telecommunication businesses and data centers, hybrid PICs offer a wide range of applications. The basic factor that has led to the increased adoption of hybrid PICs in the telecommunications and data center markets is their need for a higher transfer rate, which existing ICs cannot accommodate.
- The development of high-capacity networks and 5G have also contributed to an increase in speed. Through the development and widespread acceptance of transceivers and passive components, PIC technologies have emerged as a technology well-known within the telecommunications sector. Wireless and radio technology has become a focus of the development of 5G.
- However, photonics and fiber optics have been critical in transporting signals to and from the new generation of base stations.
- Moreover, many manufacturers are benefiting from the high degree of innovation that is allowing them to develop low-cost hybrid PIC hardware in line with their needs. In addition, an increasing number of cloud applications are rapidly upscaling the traffic that has to be handled by data centers (DC).
- According to the survey conducted by Uptime Institute on the data center industry, most operators employ a mix of strategies related to DC operations. With IT workloads spread across various services and data centers, Uptime shared that about one-third of all workloads shifted to the cloud, colocation, hosting, and Software-as-a-Service (SaaS) suppliers.
- As a matter of fact, according to Cisco, 92% of the workload in data centers will be cloud computing by 2022, which indicates that there is an important need for more advanced switching and data transfer devices available through hybrid PICs.
- Additionally, booming demand for larger bandwidth and strong adoption of cloud services by SMEs typically heightened amid COVID-19 boosted the demand for data centers. A growing trend of increasing switch data and transceiver data rates is driving PIC adoption.

North America to Hold Major Market Share

- In North America, the demand for photonic integrated circuits (PIC)-based products is driven by data centers and fiber optic communication WAN applications. A growing need to transmit data at fast speeds has led to an increase in cloud computing traffic, and the rapid introduction of the Internet of photonics is likely to lead to a flourishing IC industry across the region.
- According to Cloudscene, the United States holds the highest number of data centers globally, i.e., almost 2,700, which is almost 33% of the world's.
- In addition, service providers must meet the growing demand for network capacity as mobile, video, and cloud services increasingly become an integral part of their business. In particular, it is expected that companies will base their optical networks on PICs, which may have a positive effect on the growth of the market. International companies working on PIC-based solutions for telecommunications challenges, including IBM Corporation, Intel Corporation, and Cisco Systems Inc., have worked together with academia, business, and government partners throughout the region.
- Public-private partnerships have forged national research consortiums for smaller enterprises, such as the American Institute for Manufacturing Integrated Photonics (AIM Photonics, Rochester, NY) in the United States, the Canadian Photonic Industry Consortium Florida Photonics Cluster, and the Ontario Photonics Industry Network.
- With increasing data rates and bandwidth requirements, companies have started to push for a shift toward PICs. PICs working with light and photons instead of electricity and electrons could offer higher bandwidth and efficiency, making them well-suited for future applications. PICs have been finding new ways to improve technology, like quantum computing.

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- In Dec 2022, OpenLight unveiled an 800 G DR8 photonic integrated circuit to advance the global data center interconnect industry. OpenLight has fabricated and tested these wafers using the open silicon photonics foundry platform with integrated lasers offered by open silicon photonics foundry platform with integrated lasers offered by Tower Semiconductor.

Photonic Integrated Circuit Industry Overview

The photonic integrated circuit market is moderately competitive and consists of several major players like Neophotonics Corporation, Poet Technologies, Cisco Systems Inc., and Infinera Corporation. In terms of market share, few major players currently dominate the market. However, with innovations and technological advancements, many companies are increasing their market presence by securing new contracts and tapping new markets. Some of the recent developments in the market are:

In March 2023, iPrionics created a programmable photonic chip for wireless signal processing, data centers, machine learning, and other advanced computing applications. The company is developing programmable photonic systems based on optical hardware that can be adapted to meet the needs of different applications.

In March 2022, EFFECT Photonics and Jabil Photonics announced a cooperation with the aim of developing a new generation of coherent optical modules. The modules offer a unique solution for network operators and hyper-scalers seeking to benefit from QSFP-high DD's performance, small footprint, low power consumption and cost, field replaceability, and vendor interoperability for cloud DCIs (Data Center Interconnects). The next-generation coherent optical modules handle the increased demand for data flow, service continuity, security issues, global expansion, and sustainability.

In March 2022, ColorChip Group and Skorpios Technologies Inc., a vertically integrated pioneer in heterogeneously integrated silicon photonics, established a strategic partnership to use Skorpios' disruptive optical technology to produce optical modules at previously unheard-of prices. ColorChip will sell its brand of modules and private label modules for Skorpios to sell at various speeds and performance levels. Future products, such as Co-packaged Optics and Coherent Modules, will be developed in collaboration.

Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

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