Photonic Integrated Circuit Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

Market Report | 2023-01-23 | 171 pages | Mordor Intelligence

AVAILABLE LICENSES:

- Single User License $4750.00
- Team License (1-7 Users) $5250.00
- Site License $6500.00
- Corporate License $8750.00

Report description:

The photonic integrated circuit market (henceforth referred to as the market studied) was valued at USD 7,998.63 million in 2021, and it is projected to be worth USD 26,421.83 million by 2027, registering a CAGR of 20.47% during the forecast period (2022-2027).

Key Highlights
When integrated on a single chip, multiple photonic components, such as waveguides, lasers, modulators, and detectors, are referred to as photonic ICs. Compared to traditional ICs, photonic ICs are extremely fast, accommodate higher bandwidth, and are highly power efficient. These features have been addressing some of the critical drawbacks of 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.
This low-cost photonic hardware manufactured through a hybrid or monolithic process is finding great demand from end-user applications, such as data centers growing high in capacity every year due to data-driven ecosystems.
Also, amid the highly integrated photonics technology, multiple market players are working on PIC-led active developments to help meet the growth in data/network traffic, especially within data centers exacerbated by responses to the COVID-19 pandemic.
Although hybrid photonic integrated circuits are highly efficient and pose several advantages compared to their predecessors/traditional ICs, they experience a very low level of market penetration than traditional ICs.
The surveillance market is growing with growing threats and recent 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 photocathode technology with silicon-based digital video technology.

Photonic Integrated Circuit Market Trends

Growing Applications in Telecommunications and Data Centers

Hybrid PICs find great applications in the telecommunication business and data centers. The need for a high rate of data transfer, which traditional ICs cannot accommodate, is the primary factor leading to the increased adoption of hybrid PICs in the telecom and data center markets.
Further acceleration has been attributed to the development of high-speed networks and 5G. The PICs have been a well-known technology in the telecom sector via the development and widespread deployment of transceivers and passive components.
The onset of 5G has put the focus on wireless and radio technology. However, photonics and fiber optics have been acting as critical support in transporting signals to and from the new generation of base stations.
Additionally, there is a high degree of innovation that is helping several manufacturers to develop low-cost hybrid PIC hardware to meet their requirements. In addition, an increasing number of cloud applications are rapidly upscaling the traffic that has to be handled by data centers (DC). As per Uptime Institute's Data Center Industry Survey, most operators have a hybrid strategy for DC operation. With IT workloads being spread across a range of 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 in 2021.
According to Cisco's 2015-2020 GCI, as of 2022, 92% of workloads could be on the cloud across the data centers, indicating a critical need for advanced switching and data transfer hardware that could be met by hybrid PICs.
Additionally, booming demand for larger bandwidth and strong adoption of cloud services by SMEs typically heightened amid the COVID-19 situation boosted the demand for data centers. A growing trend of increasing switch data and transceiver data rates is driving the PIC adoption.

North America to Hold a Major Market Share

In North America, the demand for photonic integrated circuits (PIC)-based products is driven by data centers and WAN applications of fiber optic communication. The growing need for high-speed data transmission increased the data traffic in cloud computing, and the rapid roll-out of IoT has created a potentially booming photonic integrated circuit industry in the region.
According to Cisco Cloud Index, North America was expected to generate the most cloud traffic (7.7 ZB per year) by the end of 2021. Such trends are expected to increase market adoption.
According to Cloudscene, the United States holds the highest number of data centers globally, i.e., almost 2,600 data centers, which is almost 33% of the entire world.
Service providers face increasing demand for bandwidth, much of which is being driven by mobile, video, and cloud-based services. Companies are expected to base their optical networks on the PIC, which is likely to positively contribute to the market's growth. In the region, multinational companies, such as IBM Corporation, Intel Corporation, and Cisco, are working with partners in academia, business, and the government to develop PIC-based solutions for communications challenges.
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 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 more efficiency, making them well suited for future applications. PICs have been finding new ways to improve technology, like quantum computing.
In November 2021, researchers from Purdue introduced a new optical isolation technique, which removes the need for magnets.

Purdue's Magnetic-free Optical Isolator was aimed to push Photonic ICs forward. The future of data and communications is expected to require higher bandwidths and greater efficiency, driving the use of PICs. With advances like this from researchers of Purdue, widespread adoption of PIC technology is expected in the region.

Photonic Integrated Circuit Market Competitor Analysis

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:

March 2022 - EFFECT Photonics and Jabil Photonics announced a collaboration to develop 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.
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.
September 2021 - NeoPhotonics announced the launch of the high output power version of its 400G Multi-Rate CFP2-DCO coherent pluggable transceiver with 0 dBm output power and designed to operate in the metro, regional, and long-haul ROADM based optical networks. It is based on NeoPhotonics' vertically integrated Indium Phosphide technology platform, including the ultra-pure Nano tunable laser and Class 40 Coherent Driver Modulator (CDM) and Coherent Receiver (ICR).

Additional Benefits:

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

Table of Contents:

Photonic Integrated Circuit Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

Market Report | 2023-01-23 | 171 pages | Mordor Intelligence

To place an Order with Scotts International:

- - Print this form
- - Complete the relevant blank fields and sign
- - Send as a scanned email to support@scotts-international.com

ORDER FORM:

Select license	License	Price
	Single User License	$4750.00
	Team License (1-7 Users)	$5250.00
	Site License	$6500.00
	Corporate License	$8750.00
	VAT	
	Total	

*Please circle the relevant license option. For any questions please contact support@scotts-international.com or 0048 603 394 346.

** VAT will be added at 23% for Polish based companies, individuals and EU based companies who are unable to provide a valid EU Vat Numbers.

Email*		Phone*	
First Name*		Last Name*	
Job title*			
Company Name*		EU Vat / Tax ID / NIP number*	
Address*		City*	
Zip Code*		Country*	
		Date	2026-02-27
		Signature