

Photonic Integrated Circuit (PIC) Market to Surpass USD 45.05 Billion by 2032 | SNS Insider

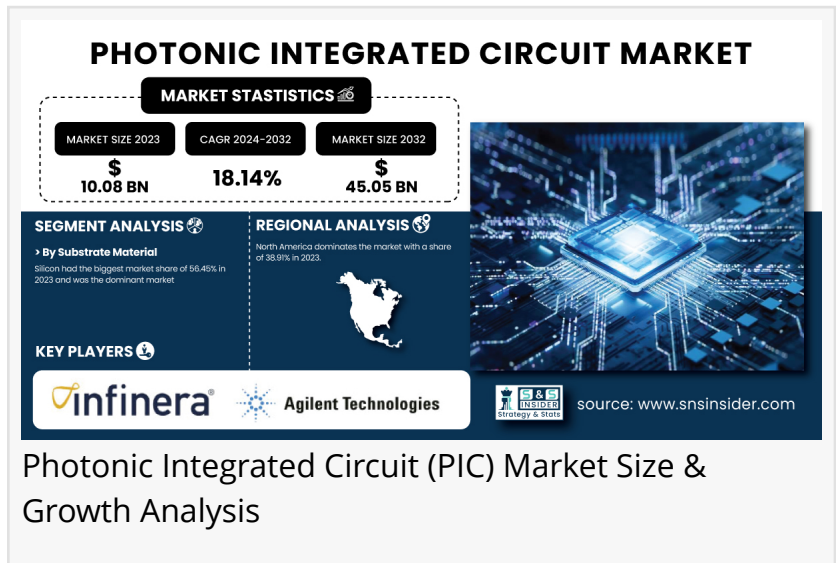
The Photonic Integrated Circuit Market is expanding with demand for high-speed, energy-efficient data transmission in telecommunications, healthcare & computing

AUSTIN, TX, UNITED STATES, February 25, 2025 /EINPresswire.com/ -- Market Size & Industry Insights

According to the SNS Insider Report, "The [Photonic Integrated Circuit \(PIC\) Market](#) size was valued at USD 10.08 billion in 2023 and is expected to reach USD 45.05 billion by 2032 and grow at a CAGR of 18.14% over the forecast period 2024-2032."

The market is driving the growth of the market is the increasing demand of light-weightwide-bandwidth fast speed data transmission, in telecommunication and data centers. For these, use of PIC designs help increase bandwidth efficiency while reducing power consumption. Hyperscale data centers and cloud computing are also seeing rapid growth, particularly at the hands of AWS, Google Cloud, and Microsoft Azure, all of which are driving more PIC implementations. And with the global 5G rollout and expanding IoT ecosystem, there will be rising demand for energy-efficient optical components used in base stations, transceivers and backhaul networks. Silicon photonics is set to transform semiconductor manufacturing by allowing small-scale, high-performance chips used in everything from AI, LiDAR, and quantum computing applications. Government initiatives and investments in optical communication infrastructure, particularly in North America, Europe, and Asia-Pacific, are accelerating market growth.

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Photonic Integrated Circuit (PIC) Market Size & Growth Analysis

SWOT Analysis of Key Players as follows:

- Infinera Corp
- Agilent Technology
- Intel Corp
- Acacia Communications Inc.
- TE Connectivity
- Neophotonics Corp
- Cyoptics Designs
- Emcore Corp.
- Colorchip Ltd
- NeoPhotonics Corp
- POET Technologies
- II-VI Incorporated

Key Market Segmentation:

By Substrate Material, Indium Phosphide (InP) PICs Dominating and Silicon-based PICs Fastest Growing

The Photonic Integrated Circuit (PIC) Market, categorized by substrate material, is led by Indium Phosphide (InP) PICs, while Silicon PICs are expanding at the fastest pace. Indium Phosphide dominates due to its exceptional optical efficiency, making it the preferred choice for high-speed optical transceivers, LiDAR, and advanced telecommunication networks. Companies like Infinera, Lumentum, and Broadcom leverage InP for its superior performance in data center interconnects and fiber-optic communication.

Silicon-based PICs are growing rapidly Over the forecast period 2024-2032 , owing to advantages such scalability, cost-effectiveness and compatibility advantage with CMOS manufacturing, which makes them suited for applications such as AI processing, quantum computing, and 5G networks. Intel, Cisco, GlobalFoundries and other tech giants are pouring money into silicon photonics to take miniaturization and integration to a new level. As demand for high-bandwidth, energy-efficient optical devices continues to grow, the future lies with InP and Silicon PICs.

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By Integration Type, Hybrid Integrated PICs Dominating and Monolithic Integration PICs Fastest Growing

The Photonic Integrated Circuit (PIC) Market, segmented by integration type, is dominated by Hybrid Integrated PICs, which dominated in 2023 due to their ability to combine multiple optical and electronic components on a single platform. These PICs are widely used in optical transceivers, LiDAR, and 5G infrastructure, with key players like Infinera, Lumentum, and Intel leveraging hybrid solutions for enhanced performance and power efficiency.

Monolithic Integration PICs are anticipated to witness rapid growth over the forecast period 2024-2032, driven by advancements in silicon photonics, quantum computing, and AI accelerators. Monolithic PICs, which integrate all photonic components on a single substrate, offer improved scalability and cost efficiency, making them attractive for high-performance computing (HPC) and next-gen optical networks. Companies like Intel, IBM, and Rockley Photonics are investing heavily in this technology. With increasing 5G deployment, AI expansion, and cloud computing demand, both hybrid and monolithic integration types will play crucial roles in shaping the future of photonic technology.

By Integration Level, Large-Scale PICs Dominated and Medium-Scale PICs fastest growing

Large-Scale PICs dominate the market due to their ability to integrate thousands of photonic components on a single chip, making them vital for high-speed optical communication, AI accelerators, and data center interconnects. Companies such as Intel, Infinera, and Rockley Photonics are advancing large-scale integration to enhance efficiency in telecom, LiDAR, and quantum computing.

Medium-Scale PICs are the fastest-growing segment over the forecast period 2024-2032, due to their widespread implementation in 5G networks, biomedical imaging, as well as industrial sensors allowing for good performance per cost ratio. PICs, both Large-Scale and Medium-Scale, will play a pivotal role in the development of future systems in high-density, low-power optical solutions to the demand for which is expected to grow significantly with each new generation of computing and AI applications, in addition to high-bandwidth data transfer.

By Application, Optical Fiber Communication Dominating and Quantum Computing Fastest Growing

Optical Fiber Communication dominates the Photonic Integrated Circuit (PIC) Market, due to high demand for high-speed data transmission, growing 5G rollout, and increasing demand for hyperscale data centers. PICs are essential for telecom operators, cloud providers and data centre networks, notably by improving network efficiency, lowering power consumption and allowing high-bandwidth optical interconnects. To meet the increasing demand for faster and energy-efficient communication systems, industry leaders such as Infinera, Lumentum, and Nokia are at the forefront of developing photonic integrated circuits (PIC) based optical networking solutions.

Quantum Computing is the fastest-growing segment, fueled by innovations in silicon photonics, quantum photonic chips, and photon-based qubits, which hold the potential to revolutionize computational capabilities. Companies such as Google, IBM, and PsiQuantum are heavily investing in photonic quantum processors to advance next-generation computing. As AI, IoT, and high-performance computing continue to evolve, Optical Fiber Communication will remain dominant, while Quantum Computing experiences the most rapid expansion within the PIC

market.

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Photonics Power Shift: North America's Dominance and Asia-Pacific's Rapid Growth in the PIC Market

North America dominates the Photonic Integrated Circuit (PIC) Market, owing to the strong telecommunications, data center, and advanced computing technology industry. The area and surrounding hills have attracted major investments by tech giants including Intel, Infinera and Lumentum, as well as governments aiding deployment of 5G, advancements in AI, or research into quantum computing. The growing demand for high-speed optical communication and energy-efficient data processing is driving the rapid deployment of PIC devices across a broad range of applications, including cloud computing, LiDAR, and high-performance networking.

Asia Pacific is the fastest-growing market over the forecast period 2024-2032, driven by rapid industrialization, growing adoption of 5G technology, and the start-up of semiconductor manufacturing hubs in China, Japan, and South Korea among other countries. This booming photonic cluster is a result of companies like Huawei, Fujitsu, and TSMC investing heavily in silicon photonics and quantum photonic technologies. North America will continue to dominate the PIC market, with Asia Pacific growing the fastest due to growing demand for high-bandwidth, low-power optical solutions.

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