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Global Quantum Photonic Integrated Circuit Chip Market 2026 by Company, Regions, Type and Application, Forecast to 2032

https://marketpublishers.com/r/G104ACB23D61EN.html
Date: June 2026
Pages: 158
Price: US$ 3,480.00 (Single User License)
ID: G104ACB23D61EN

Abstracts

According to our (Global Info Research) latest study, the global Quantum Photonic Integrated Circuit Chip market size was valued at US$ 122 million in 2025 and is forecast to a readjusted size of US$ 869 million by 2032 with a CAGR of 30.5% during review period.

A Quantum Photonic Integrated Circuit Chip refers to a specialized photonic integrated chip, packaged chip or chip-level module that uses photons as quantum information carriers and integrates quantum optical functions such as photon generation, modulation, interference, routing, delay, detection, quantum-state preparation, quantum-state measurement, quantum random number generation and quantum optical interfacing onto a compact semiconductor or hybrid photonic platform. The core technology platforms include silicon photonics, silicon nitride, thin-film lithium niobate, indium phosphide, quantum-dot single-photon sources, integrated waveguides, phase shifters, beam splitters platforms include silicon photonics, silicon nitride, thin-film lithium niobate,, interferometric meshes, on-chip detectors and hybrid photonic packaging.

This study focuses on chips and chip-level modules used in photonic quantum computing, quantum key distribution, quantum random number generation, quantum-secure communications, quantum networking, quantum sensing and research-grade quantum optical systems.

Indicative pricing varies significantly by product maturity and configuration: standard QRNG chips or compact security modules may range from hundreds to several thousand U.S. dollars; research-grade single-photon source chips, chip-scale QKD

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modules and programmable quantum photonic processors may range from tens of thousands to several hundred thousand U.S. dollars; customized photonic QPUs, quantum photonic chipsets and dedicated tape-out or packaging services are usually priced on a project, wafer, system or strategic collaboration basis.

Based on our research, the Quantum Photonic Integrated Circuit Chip market should not be treated as a generic sub-segment of the broader photonic integrated circuit industry. Its industrial essence lies in converting quantum optical experiments from bulky, alignment-sensitive and laboratory-based optical benches into compact, packaged and manufacturable chip-level hardware. Compared with classical silicon photonics for data communications or AI optical interconnects, quantum photonic integrated chips require far more stringent performance metrics, including single-photon quality, quantum-state fidelity, optical loss, phase stability, interference accuracy, noise suppression and system-level scalability. Therefore, the appropriate reporting scope should focus on quantum-application-specific photonic chips and chip-level modules, rather than all silicon photonic or integrated photonic devices.

From a supply-side perspective, the global industry is structured around four layers: full-stack photonic quantum computing companies, quantum security chip and module suppliers, specialized photonic foundry platforms, and emerging quantum networking chip developers. PsiQuantum, Xanadu, Quandela, QuiX Quantum, ORCA Computing, TuringQ and QBoson are more closely associated with photonic QPU or photonic quantum computer architectures. ID Quantique, KETS, Quside, Quantum Dice and KEEQuant are more focused on QRNG, QKD and quantum-secure communication use cases. LIGENTEC, GlobalFoundries, imec, SMART Photonics and New Origin provide the process, prototyping and manufacturing infrastructure required for scaling quantum photonic hardware. Because revenue is often recognized through systems, projects, government contracts or cloud access, chip-level revenue must be estimated conservatively and separated from broader system-level value.

From a demand-side perspective, the clearest near-term commercial opportunities are in quantum random number generation, quantum-secure communications, research-grade quantum optical platforms and early photonic quantum processor systems. Longer-term demand is expected to come from fault-tolerant quantum computing, quantum networking, quantum data-center infrastructure and national quantum technology programs. Policy and funding momentum in the United States, Europe and China is supporting the transition from laboratory demonstrations to manufacturable quantum photonic devices. Nevertheless, the market remains constrained by fabrication yield, low-loss integration, photonic packaging, cryogenic or temperature-stable

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operation, electronic control integration and the lack of large-scale end-user application validation.

From a technology-route perspective, silicon photonics and silicon nitride platforms offer advantages in manufacturability, wafer-scale processing, low-loss waveguides and compatibility with existing semiconductor infrastructure. Thin-film lithium niobate is strategically relevant for high-speed modulation and nonlinear photonic functions, while quantum-dot single-photon sources, on-chip detectors and heterogeneous integration are critical to the scalability of photonic quantum processors. Future competition will not be determined by a single chip metric alone. It will depend on the ability to combine chip design, fabrication, packaging, testing, control electronics, software stack, application ecosystem and capital-intensive manufacturing scale-up.

Overall, the industry is still in an emerging growth phase. It offers high medium-term growth potential, but it also faces meaningful technology-route uncertainty. Superconducting, trapped-ion, neutral-atom and semiconductor-spin quantum computing platforms remain strong alternative routes. Photonic quantum chips are most likely to generate clearer revenue first in QRNG, chip-scale QKD, deterministic single-photon sources, quantum networking interfaces and research-grade photonic processors, before expanding into larger-scale photonic QPUs and quantum data-center infrastructure.

This report is a detailed and comprehensive analysis for global Quantum Photonic Integrated Circuit Chip market. Both quantitative and qualitative analyses are presented by company, by region & country, by Product Function and by Application. As the market is constantly changing, this report explores the competition, supply and demand trends, as well as key factors that contribute to its changing demands across many markets. Company profiles and product examples of selected competitors, along with market share estimates of some of the selected leaders for the year 2025, are provided.

Key Features:

Global Quantum Photonic Integrated Circuit Chip market size and forecasts, in consumption value ($ Million), 2021-2032

Global Quantum Photonic Integrated Circuit Chip market size and forecasts by region and country, in consumption value ($ Million), 2021-2032

Global Quantum Photonic Integrated Circuit Chip market size and forecasts, by Product

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Function and by Application, in consumption value ($ Million), 2021-2032

Global Quantum Photonic Integrated Circuit Chip market shares of main players, in revenue ($ Million), 2021-2026

The Primary Objectives in This Report Are:

To determine the size of the total market opportunity of global and key countries

To assess the growth potential for Quantum Photonic Integrated Circuit Chip

To forecast future growth in each product and end-use market

To assess competitive factors affecting the marketplace

This report profiles key players in the global Quantum Photonic Integrated Circuit Chip market based on the following parameters - company overview, revenue, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include PsiQuantum, Xanadu, Quandela, QuiX Quantum, ORCA Computing, ID Quantique, KETS Quantum Security, Sparrow Quantum, Aegiq, Quantum Dice, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Market segmentation

Quantum Photonic Integrated Circuit Chip market is split by Product Function and by Application. For the period 2021-2032, the growth among segments provides accurate calculations and forecasts for Consumption Value by Product Function and by Application. This analysis can help you expand your business by targeting qualified niche markets.

Market segment by Product Function

Photonic QPU / Processor Chip

Quantum Security Chip

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Quantum Light Source Chip

Quantum Interface / Networking Chip

Market segment by Technology Platform

Silicon Photonics

Silicon Nitride

Thin-film Lithium Niobate

Other / Hybrid Platforms

Market segment by Supplier Type

Full-stack Quantum Hardware Company

Chip / Module Supplier

Photonic Foundry / Pilot Line

Research-to-Commercial Supplier

Market segment by Application

Quantum Computing

Quantum Communication

Quantum Random Number Generation

Quantum Sensing / Research

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Market segment by players, this report covers

PsiQuantum

Xanadu

Quandela

QuiX Quantum

ORCA Computing

ID Quantique

KETS Quantum Security

Sparrow Quantum

Aegiq

Quantum Dice

Quside Technologies

KEEQuant

TuringQ

QBoson

Quantum Computing Inc.

LIGENTEC

GlobalFoundries

SMART Photonics

imec

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QphoX

Cisco Systems

Toshiba Group

New Origin

QPICs

Market segment by regions, regional analysis covers

North America (United States, Canada and Mexico)

Europe (Germany, France, UK, Russia, Italy and Rest of Europe)

Asia-Pacific (China, Japan, South Korea, India, Southeast Asia and Rest of Asia-Pacific)

South America (Brazil, Rest of South America)

Middle East & Africa (Turkey, Saudi Arabia, UAE, Rest of Middle East & Africa)

The content of the study subjects, includes a total of 13 chapters:

Chapter 1, to describe Quantum Photonic Integrated Circuit Chip product scope, market overview, market estimation caveats and base year.

Chapter 2, to profile the top players of Quantum Photonic Integrated Circuit Chip, with revenue, gross margin, and global market share of Quantum Photonic Integrated Circuit Chip from 2021 to 2026.

Chapter 3, the Quantum Photonic Integrated Circuit Chip competitive situation, revenue, and global market share of top players are analyzed emphatically by landscape contrast.

Chapter 4 and 5, to segment the market size by Product Function and by Application,

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with consumption value and growth rate by Product Function, by Application, from 2021 to 2032.

Chapter 6, 7, 8, 9, and 10, to break the market size data at the country level, with revenue and market share for key countries in the world, from 2021 to 2026.and Quantum Photonic Integrated Circuit Chip market forecast, by regions, by Product Function and by Application, with consumption value, from 2027 to 2032.

Chapter 11, market dynamics, drivers, restraints, trends, Porters Five Forces analysis.

Chapter 12, the key raw materials and key suppliers, and industry chain of Quantum Photonic Integrated Circuit Chip.

Chapter 13, to describe Quantum Photonic Integrated Circuit Chip research findings and conclusion.

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