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# The Global Photonics Packaging Market 2026-2036

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## Abstracts

Photonics packaging has entered a period of structural transformation with few parallels in the recent history of the semiconductor industry. What was once a specialised, largely bespoke activity confined to the manufacturing back end of optical transceiver production has become a strategic industrial priority — one that sits at the intersection of artificial intelligence infrastructure, advanced semiconductor packaging, next-generation display technology, and quantum computing hardware. This evolution is not incremental. It represents a fundamental redefinition of what photonics packaging is, what it is worth, and who in the supply chain captures that value.

For most of its commercial history, photonics packaging was anchored in optical transceivers for datacentre and telecommunications networks. The supply chain that emerged to serve this market was concentrated, efficient, and oriented around throughput and cost reduction. Companies such as Fabrinet, Jabil, and Luxshare dominated module assembly; foundries like TSMC and GlobalFoundries supplied the photonic integrated circuits; laser houses such as Coherent and Lumentum provided the III-V light sources. The result was a mature, well-optimised ecosystem well-suited to the requirements of pluggable transceiver manufacturing — but one whose architecture is now being disrupted at every level simultaneously.

The primary disruptive force is the explosive growth of generative artificial intelligence. Training and running large language models at the scale demanded by leading technology companies requires computing clusters of tens to hundreds of thousands of accelerators operating in tightly coupled parallel. The aggregate bandwidth these clusters require is extraordinary, and it cannot be delivered by conventional pluggable optical transceiver architectures within acceptable power budgets. The electrical path between a switch ASIC and a front-panel transceiver cage — involving PCB traces, connectors, and SerDes circuitry — consumes a growing and increasingly untenable fraction of total system power as signal speeds increase. Co-Packaged Optics solves

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this by collapsing that electrical path from centimetres to millimetres, placing the optical engine directly on the same package substrate as the switch or compute chip. The result is a dramatic reduction in power per bit and a corresponding increase in achievable bandwidth density. This transition is not a future aspiration — first commercial CPO switch deployments occurred in 2026, and GPU-level optical interconnects are following closely behind.

The second major growth vector is augmented reality. The commercialisation of MicroLED display technology — combining gallium nitride light-emitting arrays at microscale pixel pitches with CMOS backplane integration — is creating a new and entirely distinct photonics packaging market. Achieving the brightness, resolution, and power efficiency required for mainstream consumer AR glasses demands mass transfer of millions of individual MicroLED dies onto CMOS backplanes at unprecedented precision and yield. This is a packaging challenge of a different character from datacom — characterised by display physics and consumer electronics form factors rather than network bandwidth — but one that requires equally demanding photonic integration expertise.

Beyond these two dominant growth engines, photonics packaging is expanding across FMCW LiDAR for automotive sensing, quantum computing hardware platforms, medical imaging, and defence sensing. Each application brings its own demanding packaging requirements: coherent detection stability across automotive temperature ranges for LiDAR; sub-0.01 dB coupling loss per interface for quantum photonics; radiation-hardened hermetic packages for aerospace. Together, these applications are converting photonics packaging from a single-segment market into a diversified, multi-application industry with structural growth characteristics.

Underpinning all of these trends is a technological transition of comparable importance to the shift from through-hole to surface-mount assembly in conventional electronics: the move from module-level assembly toward wafer-level heterogeneous integration. Foundries, advanced OSATs, and photonics design companies are converging on platforms — 2.5D silicon and glass interposers, fan-out wafer-level packaging, hybrid bonding — that enable photonic and electronic chiplets to be co-integrated at the wafer scale using lithographically defined alignment rather than active mechanical servo control. This transition raises the packaging content value per unit, compresses alignment tolerances, and moves the locus of competitive advantage upstream from module assembly houses toward foundries and design-driven packaging platforms.

Standardisation is the critical variable that will determine how quickly these transitions

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reach production scale. Process Design Kits, Assembly Design Kits, CPO fibre interface standards, and common electrical interface specifications between switch ASICs and optical engines are all in active development — but none is yet mature. The pace at which industry consortia including the Optical Internetworking Forum, the Co-Packaged Optics Alliance, and SEMI can establish and promote these standards will materially influence the trajectory of the market across the forecast decade.

The Global Photonics Packaging Market 2026–2036 is the first dedicated market research report to define, quantify, and forecast photonics packaging as a standalone global market across a ten-year horizon. The report is based on primary interviews with over 80 industry stakeholders — including foundries, advanced OSATs, PIC designers, module assemblers, equipment vendors, hyperscalers, and quantum hardware developers — combined with a bottom-up modelling approach that builds market size estimates from unit volumes, packaging content values, and technology mix assumptions at the individual application and product level.

The report defines photonics packaging as the complete set of materials, processes, equipment, and intellectual property involved in assembling photonic integrated circuits and optical components into functional modules and systems. This encompasses module-level assembly, hybrid and heterogeneous integration of photonic and electronic dies, wafer-level packaging, fiber-to-chip coupling, and precision alignment processes. It explicitly excludes the intrinsic fabrication cost of photonic or electronic chips themselves, focusing on the packaging value added across the supply chain.

Six application segments are covered in full: optical transceivers for datacom and telecom; co-packaged optics for AI datacentre switches and GPU interconnects; augmented reality display engines; automotive FMCW LiDAR; quantum computing and quantum networking; and other applications including medical imaging, defence, and industrial sensing. Each segment receives dedicated technology analysis, supply chain mapping, competitive landscape assessment, and a quantitative ten-year forecast with annual granularity from 2026 to 2036.

The technology coverage spans the complete spectrum of photonics packaging approaches currently in production or development — from conventional wire bond and flip-chip module assembly through fan-out wafer-level packaging, 2.5D silicon and glass interposer integration, 3D micro-bump stacking, Cu-Cu hybrid bonding, and ultimately monolithic photonic-electronic integration. The report provides comparative benchmarks of all major platforms, traces the evolution of fiber-to-chip coupling from V-groove arrays to photonic wire bonding and detachable CPO connectors, and maps the progression of

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EIC/PIC integration from 2D through to SoIC hybrid bonding. Technology roadmaps are provided for the full forecast period.

Co-Packaged Optics receives a dedicated chapter of particular depth, covering the definition and architecture of optical engines, a detailed comparison with pluggable optics, the AI datacentre network hierarchy and switch ASIC bandwidth scaling trajectory, the divergent CPO ecosystem strategies of NVIDIA and Broadcom, the three CPO packaging structure types, and a comprehensive suite of quantitative forecasts covering GPU optical I/O units and revenue, CPO network switch units and revenue, total CPO market overview, technology mix by integration architecture, and a generation-by-generation scale-out network system roadmap through 2036.

The ecosystem and supply chain analysis maps ten value chain segments from raw wafer to end-customer system deployment, with revenue and margin profiles for each. Regional analysis covers Taiwan, North America, Europe, and Asia-Pacific. The competitive landscape chapter addresses market share by player and segment, M&A and partnership activity from 2023 to 2026, vertical integration trends, and a strategic outlook through 2036. The report includes 71 data tables, 35 figures, and detailed profiles of 69 companies across the full photonics packaging value chain.

**Report Contents include**

Chapter 1: Executive Summary — key findings, market definition and scope, drivers and restraints, market size and growth, strategic implications by stakeholder type

Chapter 2: Market Context and Background — historical evolution, AI-driven growth catalysts, semiconductor packaging overview, photonics packaging vs conventional semiconductor packaging, standardisation imperative

Chapter 3: Technology Landscape — light source integration approaches, wafer-level packaging, 2.5D and 3D packaging, hybrid bonding, interconnection techniques, fiber-to-chip coupling, EIC/PIC integration, module-level packaging, solutions for quantum, technology roadmap 2026–2036

Chapter 4: Co-Packaged Optics — CPO definition and architecture, optical engine composition, CPO vs pluggable comparison, AI datacenter architecture, NVIDIA vs Broadcom strategies, CPO packaging structures, full market forecasts 2026–2036, challenges matrix

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The report profiles 79 companies spanning the complete photonics packaging ecosystem including Aeva, Amkor Technology, Anello Photonics, Ansys, Applied Materials, ASE Group, ASM AMICRA, ASMPT, Aurora Innovation, AyarLabs, Bay Photonics, Broadcom, Cisco, Corning Incorporated, Diamond Photonics, Eoptolink, EV Group, Fabrinet, FEMTOprint, Ficontec, Finetech, FOXCONN, GIS, Goertek, Google, ICON Photonics, IMEC, Innolight, IonQ, izmo Microsystems, Jabil, JBD (Jade Bird Display), LAM Research, Lightmatter and more...

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# List Of Tables

## LIST OF TABLES

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# List Of Figures

## LIST OF FIGURES

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