
INDUSTRY OVERVIEW

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In recent years, artificial intelligence (AI) industry has experienced explosive development globally, driving the rapid progress of “intelligent connectivity of everything”, which has fueled strong growth in the optoelectronics industry. The optoelectronics industry is centered on optoelectronic technology, revolving around the physical processes of photon generation, transmission, modulation, detection and storage to achieve efficient information transmission, processing, storage, and interaction. It covers multiple core areas such as information optoelectronics, energy optoelectronics, consumer optoelectronics, and optoelectronic sensing, specifically including a range of core products such as optical modules, optical interconnection equipment, laser equipment, and optoelectronic sensors. It serves as a critical foundation for new-generation information technology, high-end equipment manufacturing, and the AI industry. The Company’s three core businesses, namely optical interconnect, intelligent sensing, and intelligent manufacturing, have established a solid technological foundation serving the intelligent era, empowering industrial upgrading and innovation ecosystems both globally and in China.

In terms of data transmission and computing infrastructure, optical communication components, especially high-speed optical modules, directly support the construction of global AI computing power networks. As key components of data centers, future 6G communications, and satellite communications, they represent a strategic segment that reinforces the information infrastructure for AI development and safeguards national digital sovereignty and competitiveness.

On the sensing and interaction front, the intelligent sensor business closely aligns with the global demand for industrial intelligence, finding extensive applications in key fields such as intelligent connected vehicles, smart homes, and the Industrial Internet of Things (IIoT). By equipping various terminals with precise environmental perception and data acquisition capabilities, intelligent sensors serve as the foundational hardware for achieving ubiquitous connectivity and building the digital economy, strongly supporting the integration of AI with the real economy.

In the realm of intelligent manufacturing, intelligent laser equipment, as a critical component of industrial machine tools, precisely aligns with the “deep integration of intelligent manufacturing and industrial internet” direction set forth in the 15th Five-Year Plan. Leveraging advanced processes such as high-precision laser cutting, welding, and micromachining, it provides flexible and digital production solutions for industries including new energy vehicles, consumer electronics, and high-end equipment. This equipment is central to driving the manufacturing sector’s transformation toward intelligent and green practices.

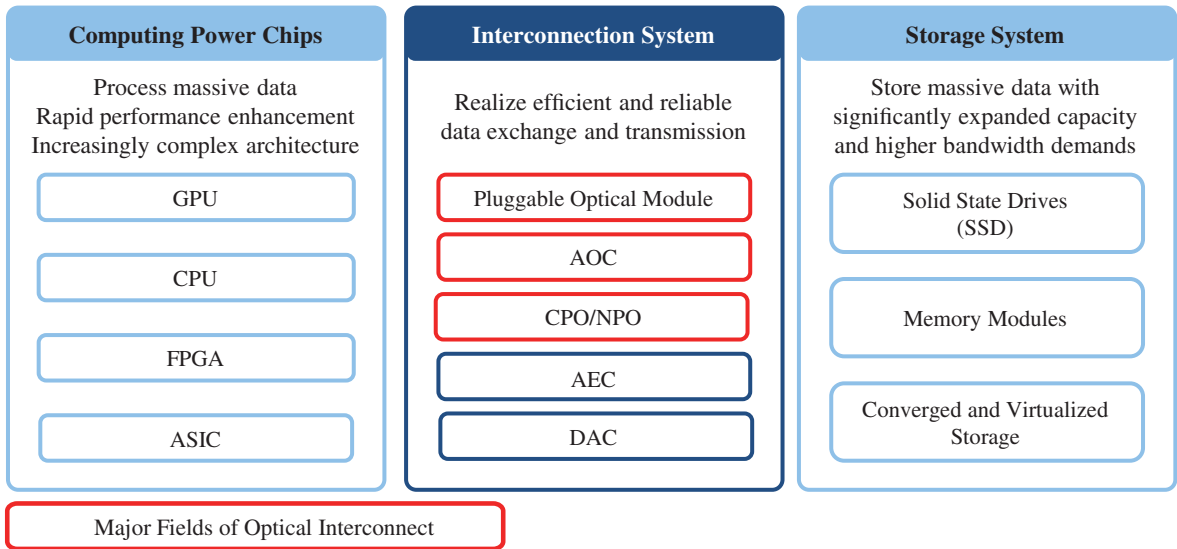
INDUSTRY OVERVIEW

ANALYSIS OF GLOBAL OPTICAL INTERCONNECT INDUSTRY

The development of AI industry drives the continuous evolution of communication networks

The rapid development of the global AI industry has imposed higher demands on communication networks in recent years, deeply driving the innovation and application of optical interconnect technology. Against the backdrop of global competition for leadership in the AI industry, massive investments by technology giants and the increasingly widespread application of AI have led to rapid growth in global AI infrastructure investment in recent years. It increased from RMB218.0 billion in 2021 to RMB2,392.9 billion in 2025, representing a CAGR of 82.0%. Due to the structural shift in computing demand toward inference and the continuous expansion of cloud-based AI services, this growth momentum is expected to continue. By 2030, global AI infrastructure investment is projected to further increase to RMB6,526.5 billion, with a CAGR of 22.2% from 2025 to 2030.

Three Pillars of AI Computing Power Infrastructure



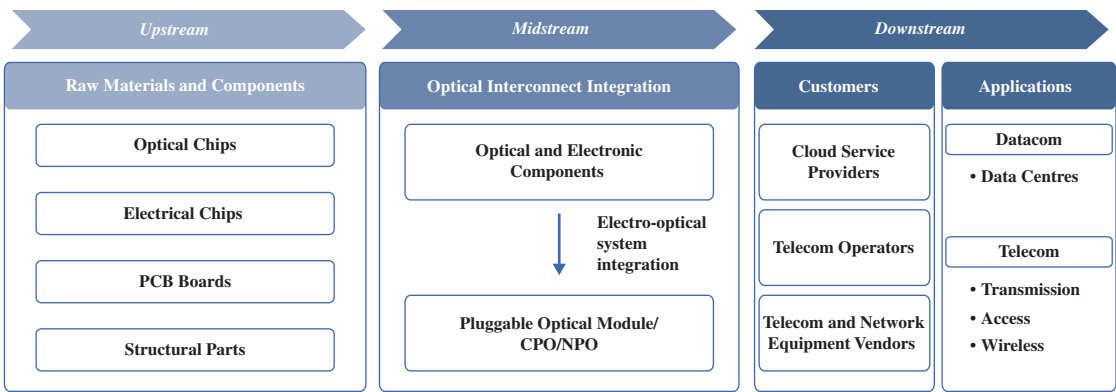
Source: Frost & Sullivan

Interconnection system, together with computing chips and storage systems, form the three major pillars of AI computing infrastructure. Optical interconnect refers to the industry that uses light waves as transmission carriers to achieve high-speed interconnection among chips, devices, and networks. They effectively break through the bandwidth and power consumption bottlenecks of electrical interconnects, serving core scenarios such as AI computing, cloud computing, 5G/6G, and supercomputing, and forming the core foundational support for computing networks and modern communications. By product type, optical interconnect products mainly include pluggable optical modules and co-packaged optics (CPO)/near-packaged optics (NPO). A pluggable optical module connects at one end to servers, GPUs, or other devices to receive electrical signals, and at the other end to optical fibers, enabling bidirectional conversion between electrical and optical signals, thereby facilitating data transmission between devices. CPO/NPO highly integrates the optical engine with the switch chip or AI accelerator chip, shortening the electrical interconnect path to achieve higher bandwidth density and lower transmission power consumption at the system level, representing a core solution for building next-generation ultra-large-scale computing clusters.

INDUSTRY OVERVIEW

The optical interconnect industry chain covers three major links: upstream material and component supply, midstream integration and manufacturing, and downstream sales and application: The upstream is centered on material and component supply, including core components such as optical chips, electrical chips, PCBs, and structural parts etc. The midstream involves the integration and manufacturing of optical interconnect product including pluggable optical modules and CPO/NPO, which integrate optical and electronic components to enable high-efficiency data transmission. The downstream customers include cloud service providers, telecommunications operators, and ICT equipment suppliers. The products are used in data communication and telecom markets. The development of the digital economy, cloud computing, and next-generation communication technologies continues to drive up the demand for optical interconnect products.

Value Chain of Optical Interconnect Market



Source: Frost & Sullivan

Market Size of Global Optical Interconnect Industry

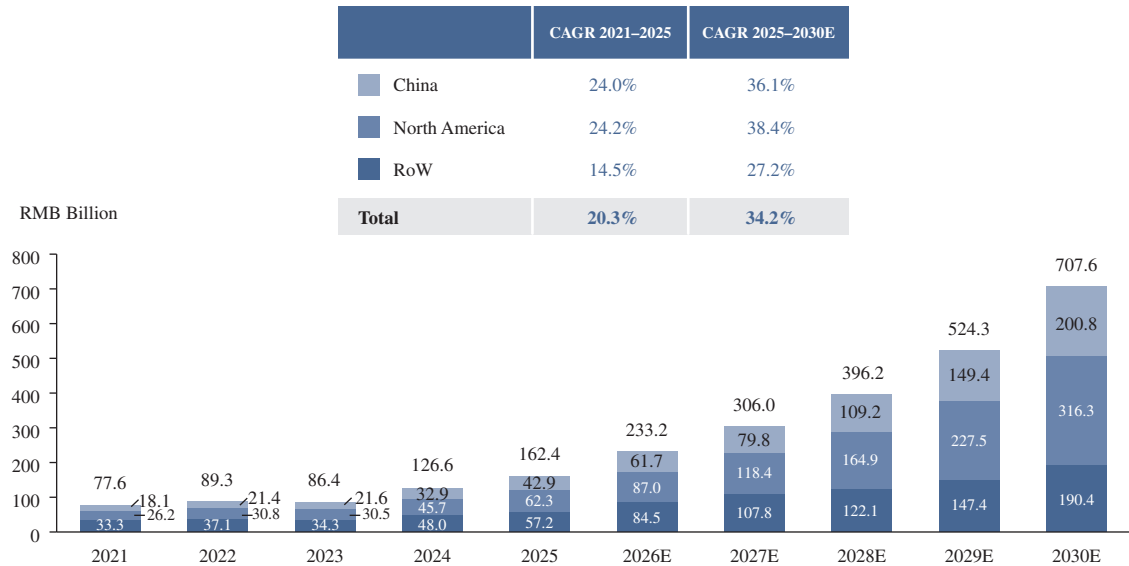
Driven by the explosive growth in AI computing demand and large-scale data center deployments, the sales of optical interconnect market grew rapidly from 2021 to 2025. Looking ahead, as technologies such as 1.6T/3.2T continue to evolve and novel CPO/NPO solutions gradually achieve commercial application, this growth trend is expected to continue. From 2021 to 2025, global sales of Optical modules increased from RMB77.6 billion to RMB162.4 billion, representing a CAGR of 20.3%. By 2030, global sales of optical modules are projected to further increase to RMB707.6 billion, with a CAGR of 34.2% from 2025 to 2030.

North America is currently the world’s largest regional market accounting for 38% of the global market in 2025. This leadership is primarily driven by sustained investments in hyperscale data centers from tech giants like Amazon and Google, coupled with exponential bandwidth demand growth triggered by the generative AI boom. These factors create long-term, robust demand for higher-speed optical interconnect products. Additionally, North America’s priority layout and technological preparedness in CPO will facilitate the sector’s early-scale deployment, sustaining North America’s market dominance.

China represents another fast-growing market globally. Its CAGR was 24.0% from 2021 to 2025 and is projected to accelerate to 36.1% between 2025 and 2030, which is continuously higher than the industry average. This expansion stems from the continued implementation of the latest policy initiatives, such as the construction of a nationwide integrated computing network and the deployment of AI computing center clusters, coupled with the boom in ultra-large-scale AI computing center construction fueled by the large-scale deployment of AI foundation models, collectively spurring an explosion in demand for high-speed optical interconnect products.

INDUSTRY OVERVIEW

Sales Value of Optical Interconnect (by Region), Global, 2021–2030E



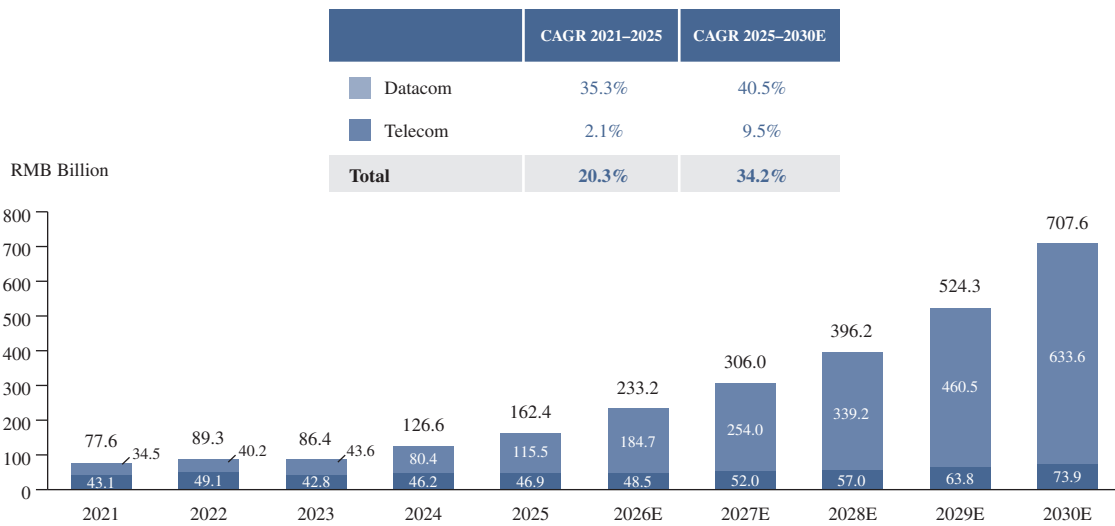
Source: Expert Interview, Frost & Sullivan

In terms of downstream application, the datacom sector serves as the primary growth engine for the optical interconnect market. In recent years, the continued expansion of hyperscale data centers worldwide and the accelerating adoption of artificial intelligence applications have consistently driven strong demand for high-speed optical modules such as 800G and 1.6T, leading to explosive growth in the global datacom optical interconnect market, which reached an estimated market size of approximately RMB115.5 billion in 2025. Meanwhile, the industrialization of co-packaged optics (CPO) has further contributed to market expansion. By integrating optical engines with switching application-specific integrated circuits (ASICs), CPO effectively addresses the power wall, bandwidth wall, and density bottlenecks faced by traditional pluggable modules at rates of 1.6T and above. Its advantages in low power consumption, high integration density, and short-distance electrical interconnection have accelerated the volume deployment of high-end optical interconnect products in the datacom sector, further reinforcing the long-term growth trend of the datacom optical interconnect industry. Looking ahead, the market size of this sector is projected to grow substantially to approximately RMB633.6 billion by 2030, representing a CAGR of 40.5% from 2025 to 2030.

Meanwhile, in 2025, the global market size of telecom optical modules reached approximately RMB46.9 billion. Going forward, the market is poised to develop steadily, driven by the deployment of 5G-Advanced/6G networks and next-generation optical access technologies such as 50G PON. Additionally, the construction of global low-Earth orbit (LEO) satellite constellations is accelerating. Inter-satellite laser communication has become a core technical route for satellite data transmission due to its advantages of high bandwidth, low latency and strong anti-interference capability. As a key component of inter-satellite laser communication terminals, optical modules play a critical role in signal generation, power amplification and high-speed data transmission. Demand for optical modules in this segment continues to expand alongside the explosive growth of the commercial aerospace industry. This emerging application scenario is expected to inject strong growth momentum into the global telecom optical module market. By 2030, the market is projected to grow to RMB73.9 billion, representing a CAGR of 9.5% from 2025 to 2030.

INDUSTRY OVERVIEW

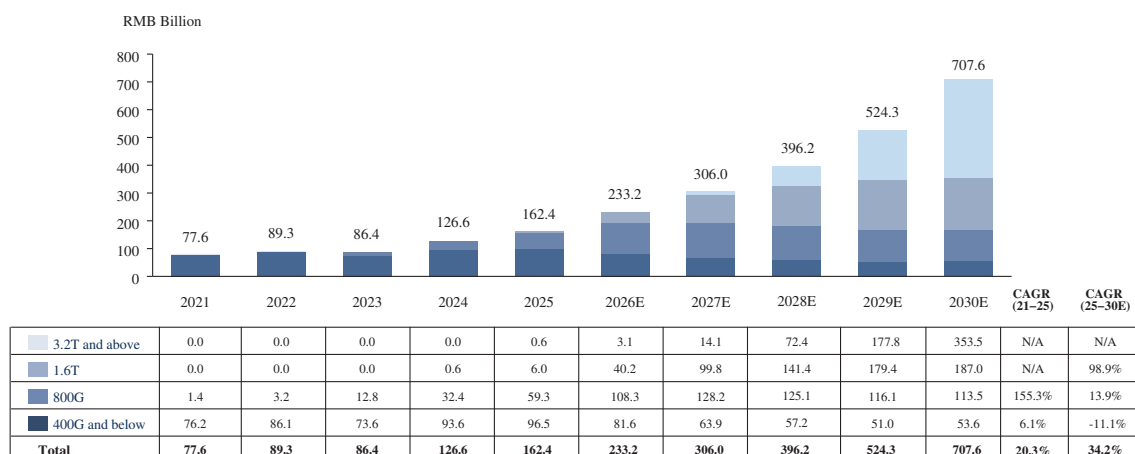
Sales Value of Optical Interconnect (by Downstream Applications), Global, 2021–2030E



Source: Expert Interview, Frost & Sullivan

The rapid expansion of global data centers and cloud computing is driving substantial growth in high-speed optical modules, particularly those supporting 800G and above. As the most advanced commercially available solution, 800G modules achieved a remarkable CAGR of 155.3% between 2021 and 2025. Moving forward, this segment is projected to maintain strong momentum with a CAGR of 13.9% from 2025 to 2030. At the same time, 1.6T optical modules, representing the cutting edge of next-generation pre-commercial technology, are expected to see explosive growth, forecast at a CAGR of 98.9% from 2025 to 2030. Key drivers include the need for higher bandwidth, improved power efficiency, and more scalable connectivity in data center and cloud networks. Additionally, accelerating advances in AI, machine learning, and large-scale data processing are further fueling demand for ultra-high-speed optical modules. Looking ahead, as hyperscale data center and cloud infrastructure continue to expand, 1.6T modules are anticipated to become mainstream, while even higher-speed solutions such as 3.2T are expected to accelerate its commercialization in the future.

Sales Value of Optical Interconnect (by Transmission Rate), Global, 2021–2030E



Source: Expert Interview, Frost & Sullivan

INDUSTRY OVERVIEW

Drivers and Development Trends of Global Optical Interconnect Market

Surge in AI computing demand drives high-speed optical interconnect products iteration. The large-scale deployment of generative AI and foundation model training imposes extreme requirements on high-speed interconnection among massive GPU clusters within data centers, directly creating an urgent need for optical interconnect products with higher bandwidth and lower latency. 800G optical interconnect products have become the mainstream configuration for AI training clusters, while 1.6T and higher-speed products are entering the pre-mass-commercialization stage. As model parameter counts continue to expand and AI application scenarios deepen, demand for high-speed, low-power optical interconnect products will remain robust over the long term, with technology iteration cycles significantly shortened, making them the core engine driving industry growth.

Increasing global digital infrastructure policies build a solid industry ecosystem. Countries around the world are designating computing infrastructure and broadband networks as strategic resources. China has introduced a series of supportive policies focusing on the nationwide integrated computing network and AI computing center construction. The EU’s “2030 Digital Compass” and similar initiatives continue to bolster high-performance computing and data center deployment, building a high-speed, ubiquitous network foundation. These policies not only directly drive demand for data centers and high-speed optical communications, but also provide multi-dimensional support across R&D, supply chains, and markets, creating a favorable environment for technological innovation and large-scale development of the optical interconnect industry.

The rise of satellite optical modules drives new market growth in the optical interconnect. Spaceborne optical modules are undergoing rapid growth and technological upgrades alongside the development of low-Earth orbit (LEO) satellite internet. With the accelerating deployment of global LEO constellations, per-satellite data rates are iterating from 100G toward 400G and 1Tbps. Products are continuously evolving toward miniaturization and lightweighting, with significant reductions in power consumption and form factor to meet satellite payload constraints. Meanwhile, domestic manufacturers have achieved mass production of 100Gbps optical modules and integrated into global supply chains, demonstrating notable advantages in cost and delivery. As commercial space ventures and space-based data centers gradually materialize, demand in this segment is rapidly surging, with the market size projected to exceed RMB10 billion by 2030, injecting long-term and stable growth momentum into the telecom optical interconnect market.

Large-scale adoption of silicon photonics technology enables industry technology upgrades and cost optimization. Leveraging mature CMOS processes, silicon photonics technology offers inherent advantages in integration density, power consumption control, and cost efficiency, and has become a core technology path for high-speed optical interconnect products. As production capacity for 800G/1.6T optical interconnect products continues to expand, the deployment scale of silicon photonics solutions in AI clusters and hyperscale data centers keeps growing. This not only accelerates the industry’s technology iteration cycle but also drives the industry’s transition from traditional packaging to integrated solutions, effectively supporting the large-scale application and cost management of high-speed optical interconnect products, thereby providing core technological support for high-quality industry development. In 2025, the market size of optical interconnect products based on silicon photonics technology reached approximately RMB63.7 billion. It is projected to expand continuously to RMB436.8 billion by 2030, representing a CAGR of 47% from 2025 to 2030.

Technology architecture iteration and upgrade toward high integration and low power consumption. As transmission rates break through to 800G/1.6T and beyond, traditional pluggable optical modules face bottlenecks in power consumption and panel port density, pushing the industry to transition toward new architectures such as co-packaged optics (CPO) and near-packaged optics (NPO).

INDUSTRY OVERVIEW

By placing the optical engine in close proximity to or integrated with the switch ASIC chip, these architectures shorten electrical traces, reduce signal loss, achieve significant power consumption reductions and higher port density, and resolve performance bottlenecks for next-generation AI clusters and hyperscale data centers. This represents the core technology evolution path for the industry.

Competitive Landscape of Global Optical Interconnect Industry

The global optical interconnect market reached a total size of RMB162.4 billion in 2025. Based on optical interconnect business revenue, the top six specialized optical interconnect product suppliers globally collectively accounted for 64.9% of the market share in 2025. The Company ranked 6th among global specialized optical interconnect product suppliers in 2025, achieving optical interconnect business revenue of RMB6.1 billion in that year, representing a global market share of 3.8%.

Ranking of Specialized Optical Interconnect Product Suppliers (by revenue), Global, 2025

Rank	Company Name	Revenue (RMB Billion)	Market Share
1	Company A	37.5	23.1%
2	Company B	24.3	15.0%
3	Company C	20.5	12.6%
4	Company D	10.5	6.5%
5	Company E	6.5	4.0%
6	Our Company	6.1	3.8%
	Others	57.0	35.1%
	Total	162.4	100.0%

Note: Specialized optical interconnect product suppliers refer to companies which produce optical interconnect product primarily for external sales, not for in-house use.

Company A is headquartered in Shandong Province, China. It is a Shenzhen Stock Exchange-listed company founded in 2005, specializing in the R&D and manufacturing of optical modules

Company B is headquartered in Sichuan Province, China. It is a Shenzhen Stock Exchange-listed company founded in 2008, and is an optical module manufacturer.

Company C is headquartered in Pennsylvania, USA. It is a New York Stock Exchange-listed company founded in 1966. The company is a vertically integrated manufacturer dedicated to the development, manufacturing, and sale of lasers, optical modules, other optical and optoelectronic equipment. Its products are widely used in the communications, industrial, instrumentation, and electronics markets.

Company D is headquartered in Hubei Province, China. It is a Shenzhen Stock Exchange-listed company founded in 2001, and is a developer and manufacturer of optoelectronic components and modules

Company E is headquartered in Shandong Province, China. It is a private enterprise founded in 2003. The company is a subsidiary of a diversified business group focusing on smart home appliances and technology industries, specializing in the R&D and manufacturing of optical modules, optical chips, and optical network terminals.

Source: Company Reports, Frost & Sullivan

Entry Barriers of Global Optical Interconnect Industry

Technology Barrier. The optical interconnect market is characterized by exceptionally high technical entry barriers across advanced domains such as silicon photonics, low-power high-speed optical communication, and high-density integration. These areas demand interdisciplinary expertise spanning materials science, optoelectronic integration, advanced packaging, and microelectronics.

INDUSTRY OVERVIEW

Companies that pioneer next-generation products often secure significant first-mover advantages, necessitating sustained R&D commitment and the ability to keep pace with rapid technological evolution.

Customer Barrier. The optical interconnect industry is defined by high customer barriers, with primary clients comprising large cloud service providers, telecom operators, and equipment manufacturers. These customers maintain high standards in product performance, reliability, delivery timelines, and technical support services. Given the strategic importance and scale of procurement, the supplier selection process is highly rigorous, often involving multiple years of verification testing, pilot deployments, and relationship cultivation before large-scale orders are finalized. This results in strong customer stickiness and substantial switching costs, creating a significant barrier to entry for new market players.

Supply Chain Barrier. The core upstream resources in the optical interconnect supply chain exhibit strong monopolistic characteristics, and not all enterprises can easily have access to them. Key optoelectronic chips such as high-frequency semiconductor lasers and high-performance photodetectors have long been dominated by a few leading international manufacturers, making it difficult for new entrants to establish stable and cost-competitive supply relationships. Raw materials such as high-end optical fibers require both strong production capacity and technical certification from suppliers, resulting in extremely high entry barriers. In addition, the priority allocation rights for upstream resources are often deeply tied to an enterprise’s technical capabilities, order scale, and industry credibility, making it even harder for small and medium-sized enterprises to break through this resource monopoly pattern.

Product Comprehensiveness Barrier. The optical interconnect market exhibits significant barriers related to product comprehensiveness, where leading competitors leverage vertically integrated portfolios spanning from optical chips to modules. This full-stack capability allows them to offer end-to-end solutions, realize technical and resource synergies, and enhance supply chain resilience while accelerating product iteration and optimizing cost structures. Such integrated offerings, which are difficult to replicate in the short term, help secure long-term customer relationships through one-stop solutions.

Globalization Barrier. The optical interconnect industry operates within a globalized market landscape, requiring participants to establish international footprints in R&D, manufacturing, and sales operations. Leading players maintain competitive advantages through localized service capabilities and worldwide logistics networks that enable rapid response to diverse regional demands. Building such global infrastructure demands not only substantial capital investment but also mature management systems, operational expertise, and long-term customer partnerships-resources that cannot be rapidly replicated.

ANALYSIS OF CHINA’S SENSOR INDUSTRY

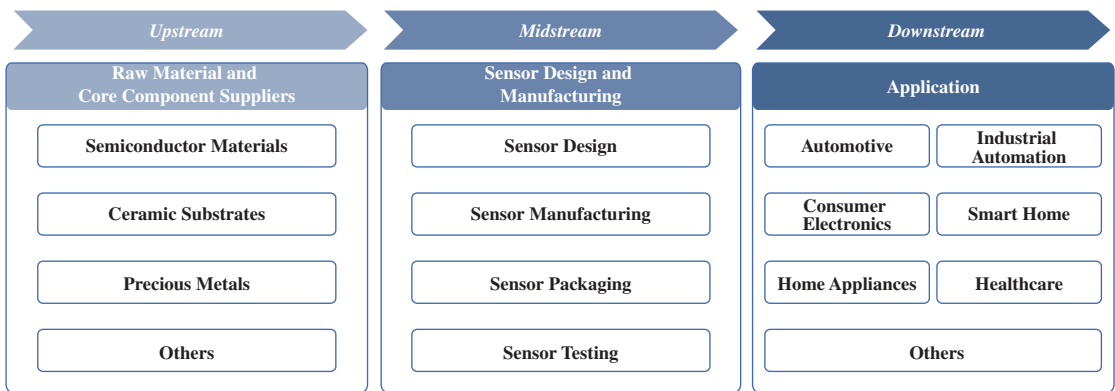
Overview of Sensor Industry

A sensor is a detection device capable of perceiving information from a measured object and converting it into an usable output signal (typically an electrical signal) according to specific principles. It serves as a core foundational component for achieving information perception, acquisition, and interaction. Based on different sensing quantity, sensors can be primarily categorized into physical quantity sensors (e.g., temperature, pressure, displacement), chemical quantity sensors (e.g., gas, humidity), and biomass sensors.

INDUSTRY OVERVIEW

The sensor industry’s value chain encompasses upstream raw material and core component suppliers, midstream sensor design and manufacturing enterprises, and downstream application sectors. Upstream primarily includes suppliers of foundational materials such as semiconductor materials, ceramic substrates, precious metals, and specialty plastics. Midstream enterprises specialize in sensor design, manufacturing, packaging, and testing, with their technical capabilities directly determining product accuracy, stability, and reliability. Downstream applications span multiple high-growth sectors including automotive electronics, industrial automation, smart home systems, consumer electronics, healthcare, and the Internet of Things (IoT). As the “senses” of modern information technology, sensors play an indispensable role in driving industrial intelligent upgrades and digital transformation.

Value Chain of Sensor Industry



Source: Frost & Sullivan

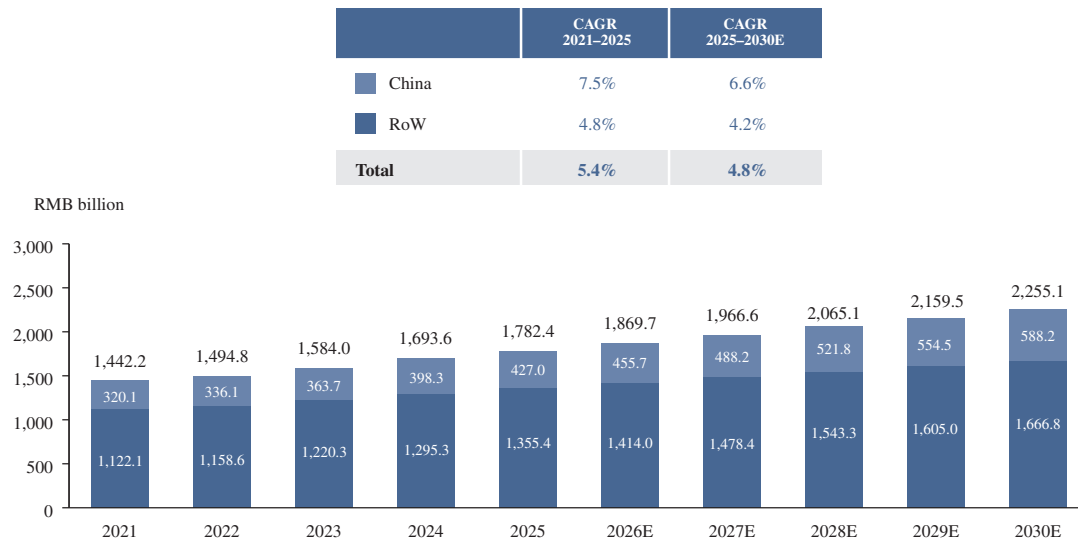
Market Size of Global and China’s Sensor

Driven by the global digitalization wave and the trend toward the Internet of Everything, the sensor market continues to expand. The global sensor market size grew from RMB1,442.2 billion in 2021 to RMB1,782.4 billion in 2025, achieving a CAGR of 5.4% during this period. It is projected to reach RMB2,255.1 billion by 2030, with a CAGR of 4.8% from 2025 to 2030.

As the world’s most dynamic growth market, China’s sensor market demonstrates even stronger momentum. Benefiting from the intelligent upgrade of domestic manufacturing, the global leadership of the new energy vehicle industry, and the vast consumer electronics, smart home, and home appliance markets, China’s sensor market size grew from RMB320.1 billion in 2021 to RMB427.0 billion in 2025, with a CAGR of 7.5% during this period. In 2025, it accounted for approximately 24.0% of the global market. By 2030, China’s sensor market is projected to reach RMB588.2 billion, growing at a CAGR of 6.6% from 2025 to 2030. This rate significantly exceeds the global average, underscoring the market’s potential and strategic importance.

INDUSTRY OVERVIEW

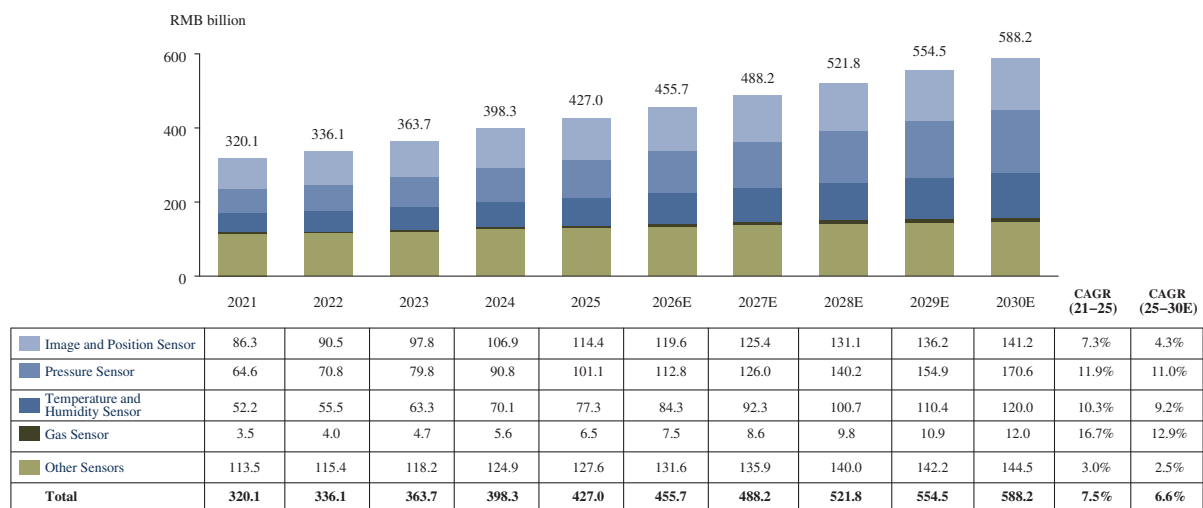
Market Size of Sensor (in terms of Revenue, by Regions), Global and China, 2021–2030E



Source: Expert Interview, Frost & Sullivan

By sensor type, China’s sensor market encompasses image and position sensors, pressure sensors, temperature and humidity sensors, gas sensors, and more. Among these, pressure sensors have the largest market size among all individual sensor categories in 2025 with a market size of RMB101.1 billion, driven by extensive and rigid-demand applications in industrial automation, new energy vehicles, consumer electronics and healthcare. As one of the core categories with the widest coverage of application scenarios, temperature and humidity sensors, benefiting from the continuous expansion of smart home, new energy vehicle, and cold chain logistics applications, reached a market size of RMB77.3 billion in 2025, maintaining a steady CAGR of 10.3% from 2021 to 2025 and demonstrating strong growth resilience and market vitality. Looking ahead, the new demand for temperature and humidity sensors in high-end manufacturing and precision agriculture will continue to be released, further unlocking its market expansion potential. Driven by the dual drivers of intensified environmental protection policies and the demand for battery safety monitoring in new energy vehicles, gas sensors emerged as the fastest-growing segment from 2021 to 2025 with a CAGR of 16.7%, reaching a market size of RMB6.5 billion in 2025.

Market Size of Sensor (in terms of Revenue, by Sensor Types), China, 2021–2030E



Source: Expert Interview, Frost & Sullivan

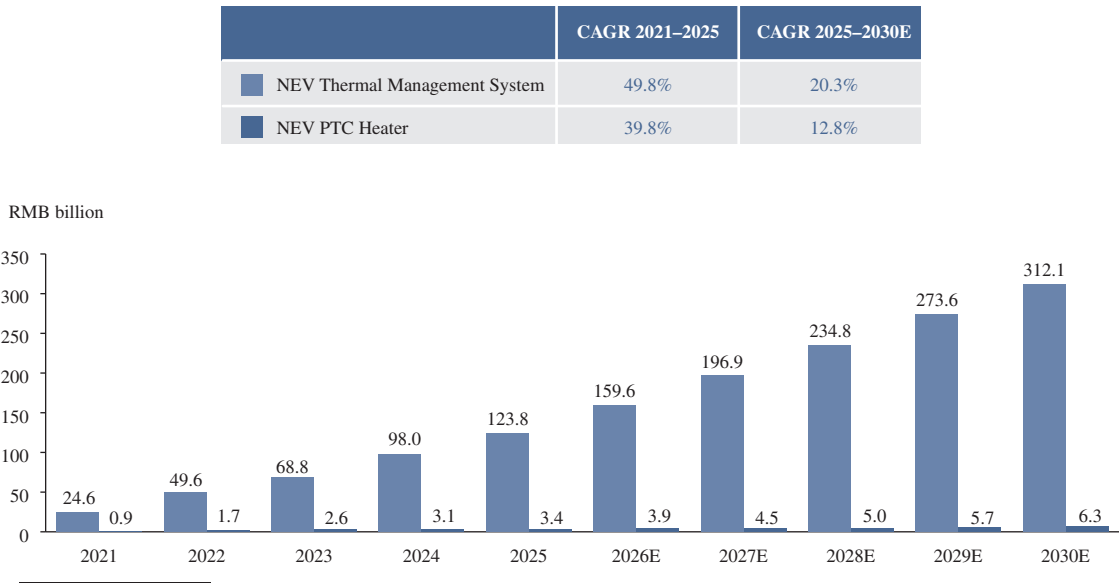
INDUSTRY OVERVIEW

Market Size of China’s New Energy Vehicle Thermal Management System

The sustained growth of new energy vehicles (NEVs) in China has created a vast incremental market for their thermal management systems. As a critical subsystem that safeguards power battery safety, enhances driving range, and ensures passenger cabin comfort, the NEV thermal management system for battery electric vehicles (BEVs) covers three core modules: motor and electronic control thermal management, battery thermal management, and cabin air conditioning system. PTC (Positive Temperature Coefficient) heaters serve as the core actuation components in its heating process.

In 2025, China’s new energy vehicle production reached 16.6 million units, with a penetration rate as high as 48.1%. Against this backdrop, the market size of China’s NEV thermal management system has grown from RMB24.6 billion in 2021 to RMB123.8 billion, registering a CAGR of 49.8% during this period. In the same timeframe, the market size of NEV PTC heaters has expanded from RMB0.9 billion in 2021 to RMB3.4 billion, achieving a CAGR of 39.8%. Looking ahead, demand for thermal management systems will remain robust as NEV penetration advances toward 85.2% by 2030. By 2030, the market size of thermal management systems is projected to grow to RMB312.1 billion, with a CAGR of 20.3% from 2025 to 2030. Meanwhile, the PTC heater market is expected to expand to RMB6.3 billion, posting a CAGR of 12.8% from 2025 to 2030, positioning it as one of the fastest-growing core segments within the sensor industry.

Market Size of New Energy Vehicle Thermal Management System and PTC Heaters (in terms of Revenue), China, 2021–2030E



Source: Expert Interview, Frost & Sullivan

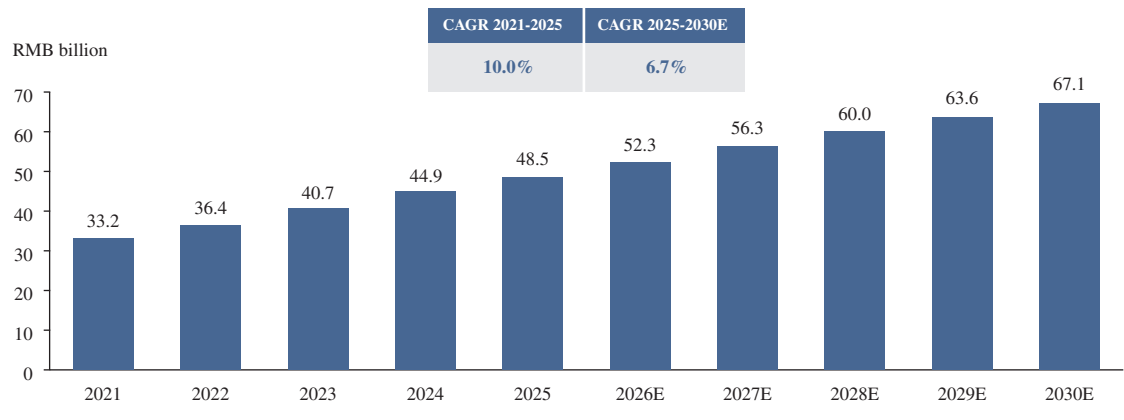
Market Size of China’s Smart Home Sensor

The proliferation of smart homes is profoundly transforming residents’ lifestyles, with various sensors serving as the foundation for intelligent perception and automatic adjustment of home environments. Smart home sensors specifically refer to sensing units integrated into connected and autonomous smart appliances, such as smart air conditioners, refrigerators, washing machines, and security systems, that utilize appliances, excluding traditional non-connected smart home sensors.

INDUSTRY OVERVIEW

Consumers’ pursuit of quality of life, energy efficiency, safety, and convenience has driven the rapid penetration of the smart home market. By 2025, China’s smart home sensor market size had grown from RMB33.2 billion in 2021 to RMB48.5 billion, achieving a CAGR of 10.0% during this period. Looking ahead, as large-model AI technology empowers end devices, smart home products are evolving from “passive response” to “proactive service”. This shift will simultaneously increase the breadth and depth of demand for multimodal sensors (e.g., temperature/humidity, human presence, gas detection, light sensing). Projected to reach RMB67.1 billion by 2030, the market is expected to grow at a CAGR of 6.7% from 2025 to 2030, demonstrating robust and substantial growth prospects.

Market Size of Smart Home Sensor (in terms of Revenue), China, 2021–2030E



Source: Expert Interview, Frost & Sullivan

Drivers and Development Trends of China’s Sensor Market

Sustained Policy Strategic Guidance and Accelerated Domestic Substitution Process. At the national level, strategic documents including the *Action Plan for High-Quality Development of the Smart Sensor Industry (2025-2030)* and the *Metrology Development Plan (2021-2035)* have been issued to clarify the direction for breakthroughs in key sensor technologies, while local governments have rolled out targeted supporting policies, laying a solid policy foundation for industry development. Coupled with rising demand for supply chain security amid intensifying Sino-US technological competition, domestic enterprises have continuously deepened their technological accumulation in MEMS, advanced packaging and other fields. Domestic substitution has expanded from low-to-mid-tier consumer scenarios to high-barrier sectors such as new energy vehicles and industrial control. Downstream customers have shifted from passive adoption to active selection of domestic products, and local enterprises are accelerating their entry into core supply chains.

Expansion of Emerging Downstream Scenarios and Continuous Release of Market Demand. The upgrade of new energy vehicles featuring “electrification, intelligence, and connectivity” has transformed them into mobile smart terminals equipped with multiple types of sensors. Scenarios including battery pack monitoring, motor speed and position sensing, smart cockpit environmental monitoring, and radars and cameras for ADAS systems are inseparable from sensors, which serve as the indispensable “nerve endings” of vehicles. This has driven an exponential increase in demand for both the quantity and performance of sensors, opening up a vast blue ocean of incremental growth. Meanwhile, against the backdrop of China’s high-quality manufacturing development, the process of industrial automation and smart manufacturing is accelerating. The demand for real-time, precise monitoring of the entire production process has directly driven robust demand for highly reliable, high-precision industrial-grade sensors.

INDUSTRY OVERVIEW

Technological Innovation Iteration and Diversified Upgrading of Product Forms. Technological innovation is the core endogenous driving force for industry development. Continuous breakthroughs made by domestic enterprises in fields such as new materials and chip design have laid a solid foundation for product performance improvement and application scenario expansion. At present, industry technologies are evolving in depth toward intelligence: sensors are deeply integrated with microprocessors and AI algorithms to evolve into intelligent sensors, and embedded edge computing capabilities enable localized data preprocessing, feature extraction and preliminary decision-making, which greatly optimizes system response efficiency and data privacy security. At the same time, breakthroughs in flexible electronics technology have driven the rapid development of flexible and wearable sensors, which can be adapted to emerging scenarios such as smart healthcare and human-machine interaction, opening up brand-new market space.

Vertical Integration of the Industrial Chain and Optimization of Industry Competition Landscape. Downstream customers’ comprehensive demands for delivery stability, cost controllability and customized development, coupled with core considerations for supply chain security, have driven the continuous deepening of industry supply chain integration. Leading sensor manufacturers are systematically strengthening internal coordination and vertically opening up all links of the industrial chain, integrating core capabilities including sensitive material synthesis, core chip manufacturing, and smart module integration. They optimize product performance boundaries through process synergy, and effectively mitigate the risk of external supply chain disruption. In the future, full-chain technological closed-loop capabilities will become the core competitive barrier for enterprises, industry resources will continue to concentrate on leading players, and the market competition landscape will be further optimized.

Competitive Landscape of China’s Sensor Market

In 2025, the top 5 Chinese sensor suppliers in China accounted for an aggregate of 4.2% of the market share in the industry in terms of revenue from sensors 2025. The Company ranked the 3rd among all Chinese sensor suppliers in China in 2025. It achieved a revenue of RMB3.8 billion in 2025, representing a market share of 0.9%.

Ranking of Chinese Sensor Suppliers (in terms of Revenue), China, 2025

Rank	Company Name	Revenue (RMB Billion)	Market Share
1	Company F	5.2	1.2%
2	Company G	4.2	1.0%
3	Our Company	3.8	0.9%
4	Company H	2.5	0.6%
5	Company I	2.1	0.5%
	Others	409.2	95.8%
	Total	427.0	100.0%

Note: Company F is headquartered in Shanghai, China. It is a Shanghai Stock Exchange STAR Market-listed company founded in 2017, specializing in the R&D, design and sales of CMOS image sensor chips, whose core products are widely used in multiple scenarios such as security monitoring, machine vision, intelligent automotive electronics and smart phones.

Company G is headquartered in Shanghai, China. It is a company founded in 2007, listed on both the Shanghai Stock Exchange Main Board and the Hong Kong Stock Exchange Main Board, focusing on the R&D, design and sales of CMOS image sensors, display drivers, touch and analog chips.

INDUSTRY OVERVIEW

Company H is headquartered in Shanghai, China. It is a Shanghai Stock Exchange STAR Market-listed company founded in 2003, dedicated to the R&D, design, manufacturing, packaging, testing and sales of CMOS image sensors and display driver chips. Its products cover multiple application fields such as mobile phones, smart IoT, automobiles and wearable devices.

Company I is headquartered in Shandong Province, China. It is a national high-tech enterprise listed on the Shanghai Stock Exchange STAR Market founded in 2009, focusing on the R&D, production and sales of infrared thermal imaging chips, detectors and complete machine systems. It also layouts in microwave and laser sensing fields.

Source: Company Reports, Frost & Sullivan

In 2025, the top 5 new energy vehicle PTC heater suppliers in China accounted for an aggregate of 98.2% of the market share in the industry in terms of revenue from new energy vehicle PTC heaters in 2025. The Company ranked the 1st among new energy vehicle PTC heater suppliers in China in 2025. It achieved a revenue of RMB2.3 billion in 2025, representing a market share of 67.2%.

Ranking of New Energy Vehicle PTC Heater Suppliers (in terms of Revenue), China, 2025

Rank	Company Name	Revenue (RMB Billion)	Market Share
1	Our Company	2.3	67.2%
2	Company J	0.3	9.8%
3	Company K	0.3	9.1%
4	Company L	0.3	8.6%
5	Company M	0.1	3.5%
	Others	0.1	1.8%
	Total	3.4	100.0%

Note: Company J is headquartered in Zhejiang Province, China. It is a private enterprise founded in 2021, specializing in the R&D and manufacturing of automotive electronics for new energy vehicles, focusing on PTC heaters for vehicle air conditioning systems and power battery pack thermal management.

Company K is headquartered in Jiangsu Province, China. It is a Shenzhen Stock Exchange-listed company founded in 2000, dedicated to the R&D, manufacturing and sale of high-performance electric heaters, new energy vehicle thermal management systems, photovoltaic new energy core equipment and lithium battery materials.

Company L is headquartered in Shanghai, China. It is a National Equities Exchange and Quotations-listed company founded in 2002, specializing in the R&D, manufacturing and sales of automotive electronic components including automotive thermal management system products and on-board power supply products.

Company M is headquartered in Guangdong Province, China. It is a private high-tech enterprise founded in 2010, specializing in the R&D and manufacturing of PTC heater components and related electronic products for automotive, home appliance and consumer electronics fields.

Source: Company Reports, Frost & Sullivan

Barriers of China’s Sensor Market

Technology barrier. Sensor R&D involves multidisciplinary integration across materials science, precision mechanics, microelectronics, and signal processing. Particularly in high-reliability applications like automotive and industrial grades, demands for long-term stability, environmental tolerance, and consistency are exceptionally stringent. New entrants struggle to rapidly master core technologies such as key materials, sensitive element fabrication, and calibration/compensation under complex conditions.

INDUSTRY OVERVIEW

Brand and Customer Barriers. Downstream large equipment manufacturers, such as automotive OEMs and home appliance giants, impose lengthy certification cycles and stringent standards on core component suppliers. Once partnerships are established, customer loyalty becomes exceptionally strong due to considerations of product quality stability, supply assurance, and collaborative development experience. New entrants must invest significant time and resources in product validation and face considerable difficulty in displacing established suppliers.

Supply Chain and Scale Barriers. Sensor manufacturing exhibits pronounced economies of scale, where large-scale, automated production lines are crucial for cost reduction and consistency assurance. Simultaneously, stable supply channels for upstream raw materials (such as specialty ceramic powders and high-purity metals) require long-term cultivation. New entrants face not only substantial initial capital investment but also the challenge of supply chain integration to achieve cost competitiveness.

Certification Barriers. In high-reliability fields such as automotive electronics and industrial control, sensor products must pass a series of stringent international certification standards, including automotive reliability testing like AEC-Q100 and functional safety certification like ISO 26262. These certifications involve lengthy cycles, high costs, and require establishing a comprehensive traceable quality management system. Even with a technical prototype, new entrants struggle to meet certification requirements and gain customer access in the short term, creating significant institutional barriers.

ANALYSIS OF CHINA’S LASER EQUIPMENT INDUSTRY

The Key Role of Intelligent Manufacturing Industry and Laser Equipment

Laser equipment is a core technological support for the intelligent manufacturing industry to achieve precise and automated production. Meanwhile, the development demands of intelligent manufacturing continue to drive the iterative upgrading of laser equipment toward higher precision and greater intelligence.

Intelligent manufacturing is a new production mode that deeply integrates new-generation information technology and advanced manufacturing technology. It aims to optimize the whole system across the full life cycle of design, production, management and services. As a core direction of manufacturing transformation and upgrading, it optimizes the whole production process by integrating digital technology, automation technology and intelligent algorithms. Its core features include data-driven decision-making, flexible response to market demand and full industrial chain collaboration. It reduces reliance on manual experience and shifts production from rigid mass production to flexible customization. As a key engine for new-quality productive forces, it improves efficiency and product quality, helps the manufacturing industry move up the value chain and enhance global competitiveness.

As high-end equipment in modern industrial processing, laser equipment is essential for precise material processing, high-efficiency joining and complex structure manufacturing. With non-contact processing, high precision and high efficiency, it can meet various material and complex process demands, break through the limits of traditional tools, and support high-end manufacturing. It can be easily integrated with automation and intelligent monitoring systems, enabling real-time control and quality traceability, and promoting unmanned and intelligent production lines. Laser equipment greatly shortens R&D and manufacturing cycles, and serves as an important link between digital technology and physical manufacturing with high precision and process consistency.

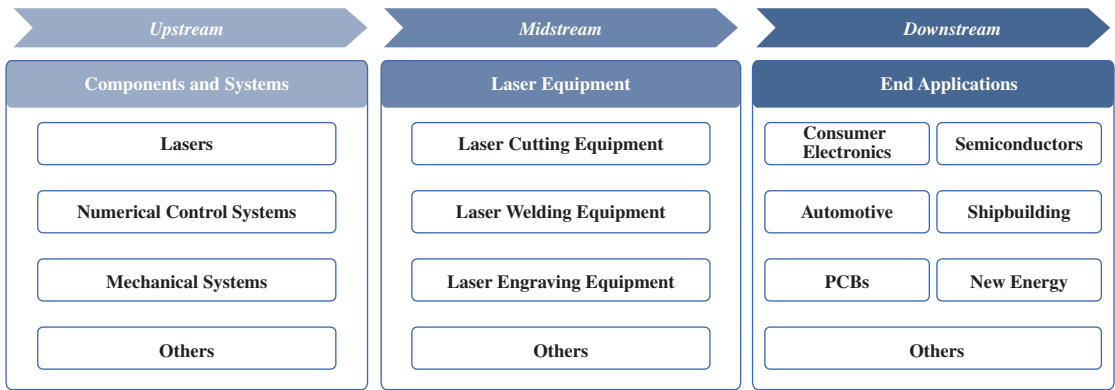
Overview of China’s Laser Equipment

The upstream of the laser equipment industry chain covers the supply of components and systems, with core key parts including lasers, numerical control systems, mechanical systems and others. The midstream of the industry chain is the integrated manufacturing of laser equipment. Laser processing technologies are mainly applied in three core fields: cutting, welding and engraving. Among them, laser cutting has become the most widely used mainstream process due to its wide application scenarios and high processing efficiency. The downstream consists of diversified end applications, covering consumer

INDUSTRY OVERVIEW

electronics, semiconductors, automobiles, shipbuilding, PCBs, new energy and other key industries. The transformation and upgrading demands of these industries continuously drive the technological iteration and capacity expansion of midstream equipment.

Value Chain of Laser Equipment

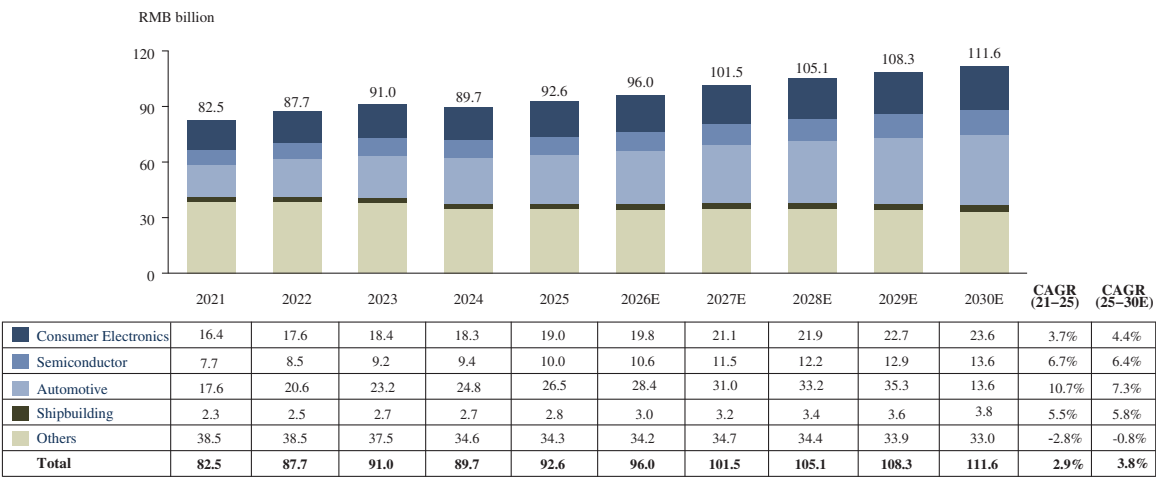


Source: Frost & Sullivan

Market Size of China’s Laser Equipment

From 2021 to 2025, the market size of China’s laser equipment industry maintained continuous growth, rising steadily from RMB82.5 billion to RMB92.6 billion. The growth was driven by the upgrading of domestic manufacturing and strong demand from new energy vehicles, lithium batteries and semiconductors. Laser equipment has been widely used to replace traditional mechanical processing. In addition, as a key area of national strategic emerging industries, laser technology has received policy support, funding and industry-university-research collaboration, which have accelerated core technological breakthroughs and domestic substitution. During the forecast period, driven by international development, downstream demand and policy support, the market size is expected to reach RMB111.6 billion by 2030.

Market Size of Laser Equipment (by Revenue, by Application Field), China, 2021–2030E



Notes: Other application areas include PCBs, new energy (lithium batteries, photovoltaics), medical, aerospace, display and other industries. The definition of application fields focuses only on the production processes of end-product suppliers, and exclude materials, parts and components or other parts in the industrial chain.

Source: CAS National Science Library (WuHan), Frost & Sullivan

INDUSTRY OVERVIEW

Drivers and Development Trends of China’s Laser Equipment Market

Sustained Expansion of Demand from Downstream High-end Manufacturing. Against the backdrop of the lightweight and miniaturization trends in traditional sectors such as automotive and 3C electronics, the reliance on laser equipment for welding, cutting, marking and other processes keeps growing. This drives the large-scale application of medium-to-high power and ultrafast laser equipment. The expansion of emerging industries including photovoltaics, new energy vehicles and semiconductors further broadens the application scenarios of laser equipment in core processes, generating a steady and continuous increase in demand.

Iteration of Core Technologies. The breakthroughs in the localization of core components have driven down the costs and improved the performance of key parts such as lasers, optical components and control systems, thereby enhancing the market competitiveness of domestic laser equipment. The continuous iteration of technologies has achieved breakthroughs in power, beam quality, stability and energy consumption control, expanding the application boundaries of laser equipment in high-end scenarios such as precision machining and special material processing.

Deepening Localization of Core Components. The localization of core components is expanding from small and medium-power laser equipment to high-power and ultrafast laser fields. This has broken overseas monopolies in special optical fibers, pump sources, control systems and other key sectors, driving down costs and ensuring supply security. The performance of domestic components such as lasers and optical assemblies keeps improving, narrowing the gap with international brands and enhancing the cost-effectiveness and market competitiveness of complete laser equipment. This localization trend not only reduces production costs for enterprises, but also strengthens the overall risk-resistance capacity of the industry.

Rising Demand for High-end Products. Against the backdrop of the overall trend toward upgrading manufacturing to high-end and intelligent production, higher requirements have been put forward for the processing precision, stability and adaptability of laser equipment. Customized solutions with specific targeting are needed, driving the upgrade of laser equipment from general-purpose models to high-end special-purpose ones. Meanwhile, national industrial policies continue to tilt toward high-end manufacturing equipment and core technologies, guiding the concentration of resources in high-end sectors. Coupled with the continuous improvement in the performance of domestically made core components, this provides solid support for the R&D and application of high-end laser equipment. This rising demand helps the industry shake off low-end homogeneous competition and step into a new stage of high-quality development.

Accelerated Globalization Layout. While consolidating their domestic market share, domestic enterprises are actively expanding into overseas markets, with their products and services gradually entering mainstream global supply chains. Leveraging their advantages in cost-effectiveness and rapid response, these enterprises have continuously increased their share in the international market and are also competing with international giants in the high-end market segment. Enterprises have started to attach importance to localized overseas operations, enhancing their service capabilities and brand influence by setting up branches and building local teams. Such a globalization layout not only expands the market scale, but also forces enterprises to improve their technological and management standards, thereby creating a positive cycle.

INDUSTRY OVERVIEW

Competitive Landscape of China’s Laser Equipment Market

The Company ranked the second among China’s laser equipment suppliers in 2025. It achieved a revenue of RMB4.1 billion in 2025, representing a market share of 4.4% in China ranked second and first respectively. In addition, in China’s automobile and shipbuilding laser equipment markets, the Company, with revenues of RMB1.1 billion and RMB0.4 billion respectively in 2025.

Ranking of Automobile Laser Equipment Suppliers (by Revenue), China, 2025

Rank	Company Name	Revenue (RMB Billion)	Market Share
1	Company N	1.8	6.8%
2	Our Company	1.1	4.3%
3	Company O	0.9	3.5%
4	Company P	0.5	2.0%
5	Company Q	0.4	1.4%
	Others	21.8	82.1%
	Total	26.5	100.0%

Notes: Company N founded in Shenzhen, China in 1996. Company N was listed on the Shenzhen Stock Exchange in 2004. It is a world-leading provider of intelligent manufacturing equipment solutions in China, focusing on the R&D, production and sales of intelligent manufacturing equipment and key components.

Company O established in Shenzhen, China in 2005. Company O was listed on the SSE STAR Market in 2020. It is a leading supplier of laser welding equipment and intelligent manufacturing solutions in China, specializing in the R&D, production and sales of precision laser welding machines and complete sets of laser welding equipment.

Company P founded in Shenzhen, China in 2008. Company P was listed on the STAR Market in 2020. It develops laser and automation equipment for various industries and provides integrated smart manufacturing solutions for key customers in China.

Company Q founded in Germany in 1923, the company is one of the market and technology leaders in machine tools and lasers for industrial manufacturing, with innovative applications across nearly all industrial sectors.

Source: Company Reports, Frost & Sullivan

Ranking of Shipbuilding Laser Equipment Suppliers (by Revenue), China, 2025

Rank	Company Name	Revenue (RMB Billion)	Market Share
1	Our Company	0.4	15.4%
2	Company N	0.3	12.0%
3	Company R	0.3	9.6%
4	Company S	0.1	2.6%
5	Company Q	0.04	1.4%
	Others	1.7	50.0%
	Total	2.8	100.0%

Notes: Company R founded in Shandong, China in 2008. Company R is a globally renowned provider of laser processing intelligent solutions, integrating R&D, production, sales and service of laser processing application products. It serves over 180 countries and regions worldwide.

Company S founded in Guangdong, China in 2009. Company S is a high-tech enterprise specializing in the R&D, production and sales of intelligent metal forming equipment. As a machine tool manufacturer, it is dedicated to providing intelligent metal forming and automated production line solutions for global users.

Source: Company Reports, Frost & Sullivan

INDUSTRY OVERVIEW

Barriers of China’s Laser Equipment Market

Technology barrier. Laser equipment involves the interdisciplinary integration of optics, electronics, machinery, automation and other fields. New entrants are required to have cross-disciplinary integration capabilities. Meanwhile, with the rapid iteration of technologies, continuous R&D investment is needed to meet the upgrading demands of downstream sectors. Existing leading enterprises have built mature technology systems and patent portfolios through long-term R&D efforts, forming technological moats that new players can hardly break through in the short term. In addition, the process of refining products from prototypes to stable mass production takes a long time, which further raises the technological threshold.

Capital Investment Barriers. The laser equipment industry has high requirements for initial capital expenditure. The construction of production lines, clean workshops and testing platforms all requires substantial investment, and sustained cash flow is needed to support production and R&D. The intensified price competition in the low-to-medium power market has squeezed profit margins, making it difficult for new enterprises without abundant capital to sustain long-term losses. Furthermore, the customized development and verification cycle of high-end products is long, leading to slow capital recovery, which further tests the financial strength of enterprises.

Brand and Customer Barriers. Downstream high-end manufacturing sectors have strict requirements for the stability and consistency of equipment. Customers tend to choose brands with proven application cases and a good reputation. Leading enterprises have accumulated brand influence and stable customer networks through long-term services. New entrants need to spend a great deal of time and resources to build brand awareness and gain customer trust. Besides, the high switching costs for customers to change suppliers further consolidate the market position of existing brands.

Supply Chain Barriers. The stable performance of laser equipment depends on the coordinated supporting of core components and the upstream and downstream supply chain. The supply and adaptation capacity of core components directly affects product quality. Leading enterprises have established long-term and stable cooperative relationships with core suppliers, while new entrants find it hard to quickly obtain high-quality supply resources. At the same time, supply chain integration involves multi-link quality control and cost management, so new enterprises need time to build a reliable supply chain system.

SOURCE OF INFORMATION AND RESEARCH METHODOLOGY

We engaged Frost & Sullivan for preparing an independent industry report in respect of the global optical interconnect, China’s sensor and laser equipment market. The information from Frost & Sullivan disclosed in this document is extracted from the Frost & Sullivan Report, a report commissioned by us for a fee of RMB500,000, and is disclosed with the consent of Frost & Sullivan. The Frost & Sullivan Report has been prepared by Frost & Sullivan independently without any influence from us or other interested parties. Frost & Sullivan is an independent global consulting firm founded in 1961 in New York. Its services include, among others, industry consulting, market strategic consulting and corporate training. Frost & Sullivan conducted (i) primary research, which involved discussing the status of the industry with certain leading industry participants, and interviews with industry experts on a best-effort basis to collect information in aiding in-depth analysis; and (ii) secondary research, which involved reviewing government statistics, industry association publication, company reports, independent research reports and data based on its own research database.