

INDUSTRY OVERVIEW

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BACKGROUND AND DRIVERS IN THE DEVELOPMENT OF GLOBAL IC INDUSTRY

Deepening Application of AI Drives IC Industry Upgrades

As a strategic technology influencing national competitiveness and driving industrial transformation, AI has become the focus in the global technological competition, accelerating the intelligent upgrades of devices across various industries. In this process, IC, as the foundational hardware for the implementation of AI, is embracing dual development opportunities of scale expansion and performance leap. From the demand perspective, a smart device needs to integrate a growing number and types of chips to achieve complex AI functions. From the performance perspective, differentiated requirements are imposed on chip performance for massive data processing and code execution. In the future, the rapid development of AI will further fuel substantial market demand for the IC industry while driving its evolution towards higher performance and greater reliability.

Key Downstream Application Scenarios of Global IC Industry

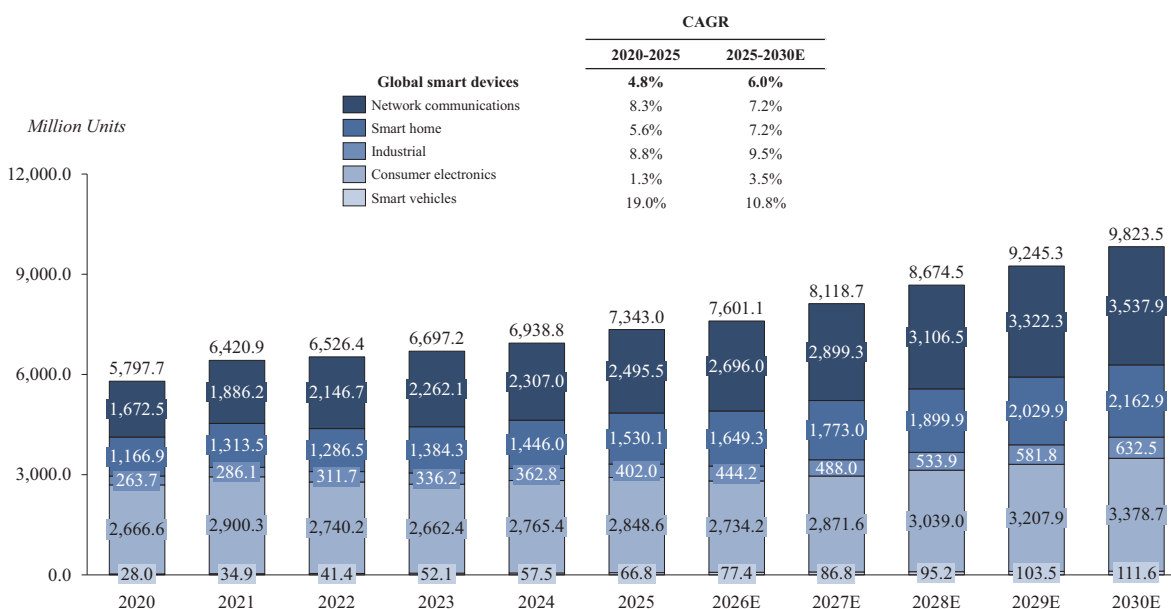
- **Network communications:** With the popularization of 5G/6G networks and Gbit broadband, alongside the advancements of Wi-Fi 6/7 technologies, the shipments of smart network communication devices maintained steady growth. In the AI era, these devices impose stricter requirements on ICs to achieve higher communication efficiency, real-time data transmission and stable storage. For example, to optimize network bandwidth configuration based on real-time network traffic analysis, routers and optical modems demand flash memory with high reliability and fast read/write capabilities. Meanwhile, base stations and switches need analog ICs with high power density and anti-interference capabilities to ensure stable data transmission under high load and complex electromagnetic environments.
- **Smart home:** The growing demand for intelligent and personalized living spaces and technology advancements are not only driving the widespread adoption of established products such as robotic vacuum cleaners, smart locks and smart cameras, but also enable a broader range of household devices to achieve intelligent functionality, further accelerating the growth of global smart home product shipments. Driven by AI technologies, smart home products are shifting from single-device intelligence to whole-house connectivity and proactive services, necessitating real-time perception of user behaviors and requirements. In this context, smart locks generate storage demands for door-opening videos and access records, calling for flash memory with high density for multi-sensor and multi-module data. Meanwhile, to reduce additional power consumption resulting from the integration of smart modules, analog ICs are required to enable low-power management.

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- **Industrial:** The global shipments of devices such as smart meters and smart sensors are experiencing sustained growth as traditional production lines undergo transformation towards automation and intelligence. Meanwhile, emerging smart devices such as AI servers and humanoid robots are transitioning from the technological exploration phase to scaled commercialization. To support intelligent and AI functions, these devices generate substantial storage demand for algorithms and models, necessitating flash memory to support high P/E and fast read/write performance. Moreover, complex operating environments in industrial settings place higher reliability requirements on chips. For instance, flash memory requires wide temperature tolerance to ensure reliable data storage in harsh environment; Analog ICs need to provide wide input voltage ranges and high output current to accommodate fluctuations of the industrial power grid and ensure stable power supply for high-power loads; MCUs require robust anti-interference capabilities to achieve high-precision control and fault prediction.
- **Consumer electronics:** With the steady recovery of global economy and market demand, the global shipments of consumer electronics such as smartphones, TWS earphones, and smart watches continues to grow. Although the corresponding shipments declined between 2021 and 2023 due to market inventory adjustments and technological innovation slowdown, the market rebounded in 2024. Looking ahead, consumer electronics are expected to evolve under the empowerment of AI, providing personalized services to users, raising demand for more advanced chips. For instance, TWS earphones and smart watches witness growing demand for flash memory with high density and data encryption capabilities to support local storage of user multimedia data and ensure data security. Meanwhile, to keep pace with the thinner and lighter trend, analog ICs must feature miniaturization and low power consumption characteristics to fit compact device spaces and extend battery life.
- **Automotive electronics:** Driven by growing demands for smarter, more convenient, and comfortable driving experiences, the intelligence process is accelerating in the automobile industry, fueling the growth in the sales volume of smart vehicles. With the deep integration of AI algorithms, intelligent driving systems are required to store and instantly retrieve high-definition map data and perception-decision algorithm models, necessitating flash memory with high density and reliability. Meanwhile, intelligent cockpit systems need to simultaneously process multimodal sensory information such as visual and auditory inputs, demanding MCUs to feature high computing power to process such multimodal information and execute decisions in real time.

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Global Shipments of Smart Devices, 2020–2030E



Sources: Expert interviews, Industry publications, CIC

ANALYSIS OF GLOBAL FLASH MEMORY INDUSTRY

Definition and Classification of Flash Memory

Flash memory are non-volatile semiconductor memory chips that utilize floating-gate transistors to store electric charges to achieve data recording. They are characterized by their capability to be electrically erased and reprogrammed multiple times during operation, while maintaining data integrity for extended periods without relying on a continuous power supply. Based on the type of information stored, flash memory can be further categorized:

- Code storage flash memory:** Code storage flash memory is primarily designed to store boot-up codes, application codes, driver codes, firmware codes and security upgrade codes, which are respectively responsible for the initialization during device startup, enabling the core functionalities, as well as software upgrades and security protection, and play a critical role in the stable operation of devices and the data transmission among hardware components. These chips feature characteristics such as fast read speeds, high data stability, and reliability. However, they generally have low memory density, slow write speeds, and relatively high unit storage costs. Code storage flash memory consists of NOR Flash and SLC NAND Flash:
 - NOR Flash:** NOR Flash exhibits a relatively lower density and offers advantages including high reliability, fast read speeds, and low power consumption. It is typically used for the storage and quickly retrieval of small- to medium-density codes which usually ranges from 521Kb to 4Gb. It is widely used in scenarios that emphasize access flexibility and code reliability, such as personal computers, servers, medical devices and industrial applications;

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- **SLC NAND Flash:** SLC NAND Flash exhibits a relatively high density and features a lower unit cost of storage as well as faster erase speeds. Under equivalent density specifications, NOR Flash is typically 6 to 10 times the price of SLC NAND Flash. It is typically used for the storage and quickly erasing of high-density codes, which usually ranges from 512Mb to 8Gb. These advantages enable it to better serve scenarios requiring high density, long data retention and high-speed writing, such as consumer electronics, automotive electronics, network communications, and smart home devices.
- The price difference between the above two products primarily arises from their different functional positioning and storage architectures. To support random code reading and execute-in-place, NOR Flash adopts a parallel interconnect and independent addressing design, under which each memory cell requires a dedicated connection line. This results in more complex internal routing, lower density and higher cost per bit. By contrast, SLC NAND Flash does not support code execution and it therefore mainly reads and writes in serial pages and blocks, which greatly simplifies internal interconnections, allows for a denser memory cell arrangement, and results in a lower cost per bit.
- NOR Flash and SLC NAND Flash are not fully substitutes of one another, and their substitutability is mainly determined by the trade-off between code execution performance and storage density cost. In cost-sensitive sectors such as consumer electronics and automotive electronics, SLC NAND Flash is gradually replacing medium- to high-density NOR Flash by virtue of its lower cost. By contrast, in scenarios such as industrial applications and servers, which require higher read speeds and reliability, NOR Flash still retains strong irreplaceability.
- **Data storage flash memory:** Data storage flash memory is designed to store high-density data. These chips offer higher storage density and deliver lower storage costs, but have lower reliability and shorter P/E endurance compared to code storage flash memory. Data storage flash memory includes MLC, TLC, and QLC NAND Flash.

Value Chain of Flash Memory Industry

The upstream of the flash memory value chain comprises various key infrastructure suppliers, mainly including IC designing tools, packaging and testing equipment, manufacturing equipment, and wafers. The midstream covers companies engaged in IC designing, wafer fabrication, and packaging and testing. The downstream comprises various device manufacturers across sectors such as network communications, smart home, industrial, consumer electronics, and automotive electronics.

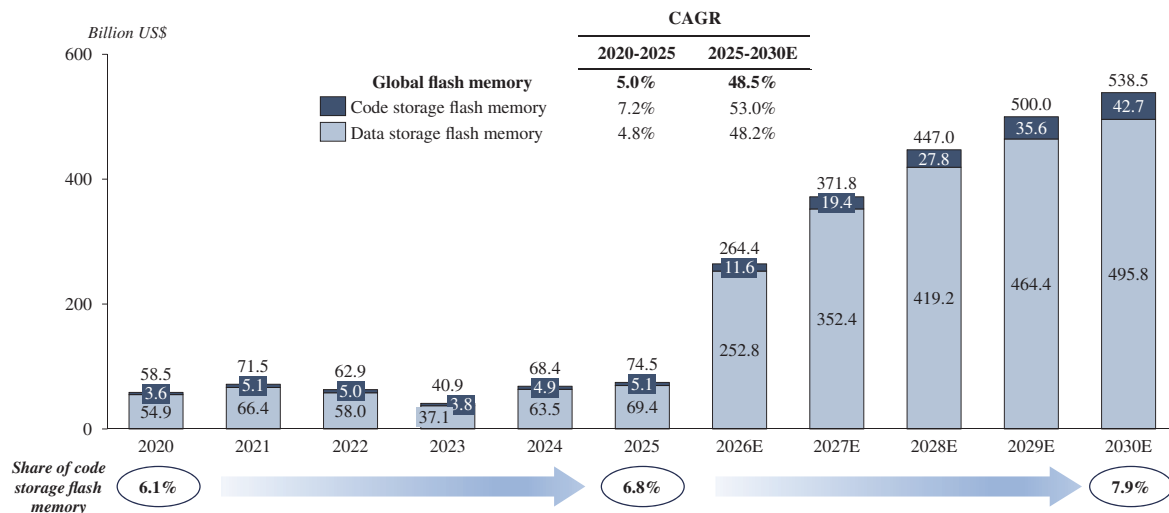
IC designing acts as the core segment in the midstream, directly determining the performance, and cost-effectiveness of flash memory. Companies engaged in the IC designing are categorized into Integrated Device Manufacturer (IDM) and fabless companies based on their business model. IDMs refer to those that integrate the entire process of IC designing, wafer fabrication, packaging and testing, and sales, which constitutes a capital-intensive operation; fabless companies focus solely on IC designing and outsource manufacturing and other stages, constituting an asset-light operation. By avoiding substantial costs, fabless companies can concentrate resources on IC designing, while also escaping the constraints of maintaining proprietary manufacturing lines. Consequently, they maintain high flexibility in selecting manufacturing processes and design architectures and act as a key force of technology advancement and product innovation in the flash memory industry.

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Global Market Size of Flash Memory Industry

The flash memory industry exhibits a certain level of cyclicality, typically following a cycle of three to four years, leading to short-term market fluctuations. Due to impact of the COVID-19 pandemic, flash companies faced raw material shortages, and coupled with the global economic downturn, the global market size of flash memory in terms of revenue has declined from US\$58.5 billion in 2020 to US\$40.9 billion in 2023. With the economic recovery, the global market size of flash memory saw a turning point in 2024, and is currently in a rapid rebounding phase. In terms of revenue, the global market size of flash memory increased to US\$68.4 billion in 2024 with a year-on-year growth rate of 67.0%. Meanwhile, the maturity and widespread adoption of AI technologies has become a key market driver, expected to sustain continuous market growth. Specifically, this not only drives up the demand for flash memory, but also propels product mix upgrades toward high value-added products featuring high performance, density and reliability. On the supply side, due to the relatively long cycle for the release of new production capacity, short-term supply struggles to keep pace with rapidly growing demand, resulting in a supply-demand imbalance and rising prices. Consequently, the market has entered a phase of simultaneous increase in both volume and price. Against this backdrop, the upgoing cycle of the flash memory industry is expected to extend beyond the historical pattern of approximately two years and enter a new phase continuously driven by technological innovation and high-end applications. The global market size of flash memory is projected to reach US\$538.5 billion by 2030 with a CAGR of 48.5% from 2025 to 2030. Within this landscape, the accelerated deployment of AI technologies in edge devices has endowed code storage flash memory, a critical component for enhancing the real-time performance and reliability of localized code storage and execution, with strong market momentum. As a result, the share of code storage flash memory in the overall flash memory market continues to rise, increasing from 6.1% in 2020 to 6.8% in 2025, and is expected to reach 7.9% by 2030.

Global Market Size of Flash Memory, in terms of Revenue, 2020–2030E

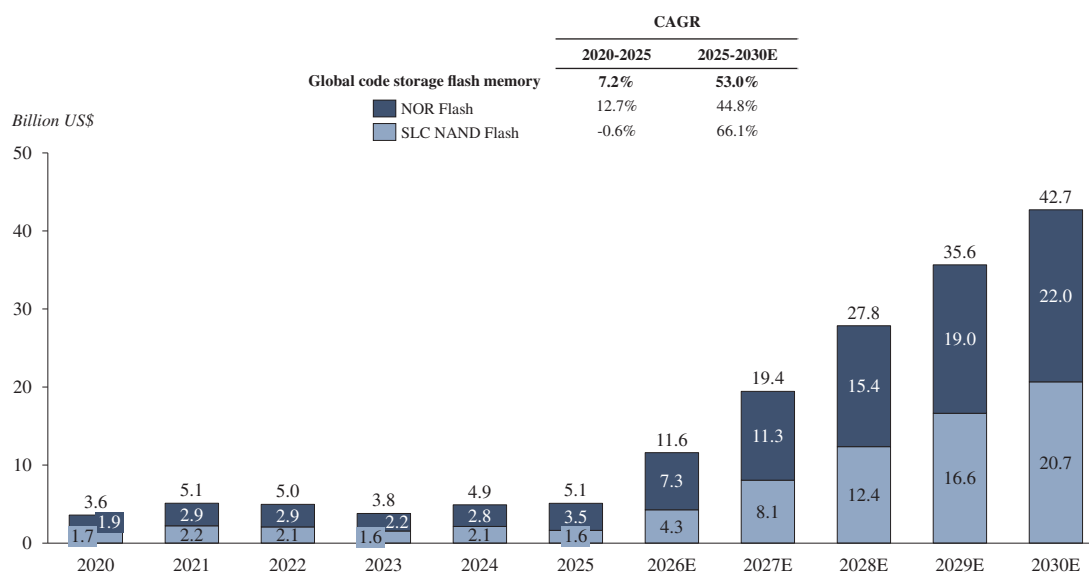


Global Market Size of Code Storage Flash Memory by Product Type

In terms of revenue, the global market sizes of NOR Flash and SLC NAND Flash were US\$3.5 billion and US\$1.6 billion, respectively, in 2025, and are projected to reach US\$22.0 billion and US\$20.7 billion, respectively, by 2030, with CAGRs of 44.8% and 66.1%, respectively, from 2025 to 2030.

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Global Market Size of Code Storage Flash Memory, by Product Type, in terms of Revenue, 2020–2030E



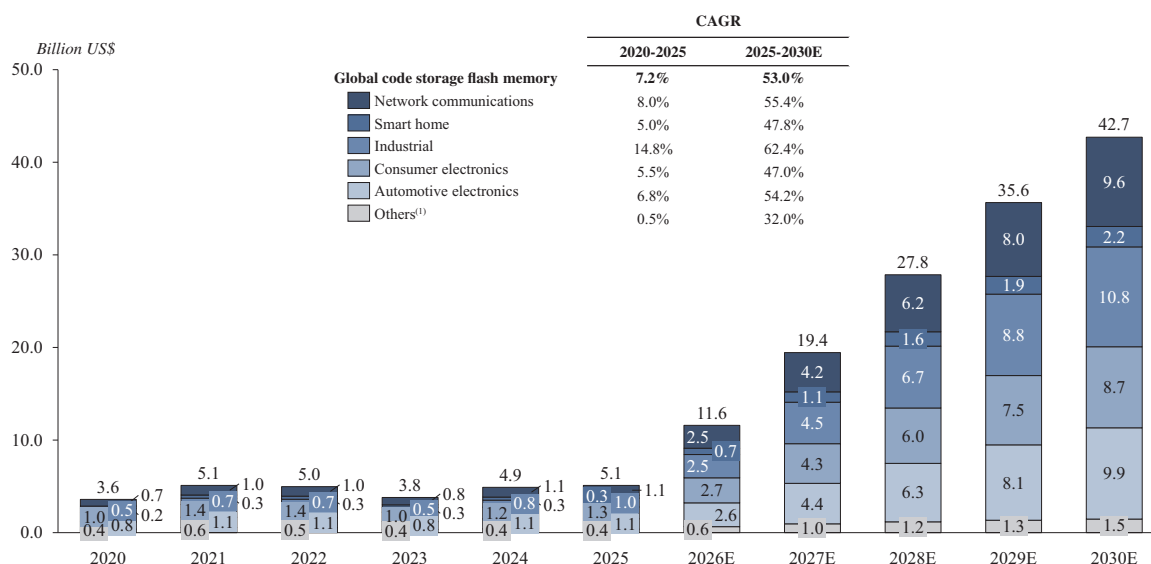
Source: Expert interviews, Industry publications, CIC

Global Market Size of Code Storage Flash Memory by Downstream Application Scenarios

Network communications, smart home, industrial, consumer electronics, and automotive electronics are currently the core application scenarios for code storage flash memory. In 2025, the market shares of these sectors within the overall market size of the code storage flash memory accounted for 20.8%, 6.1%, 18.7%, 25.0%, and 22.1%, respectively. In 2030, the global market size of code storage flash memory within these sectors are expected to increase to US\$9.6 billion, US\$2.2 billion, US\$10.8 billion, US\$8.7 billion and US\$9.9 billion, respectively.

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Global Market Size of Code Storage Flash Memory, by Application Scenarios, in terms of Revenue, 2020–2030E



Note:

- (1) The global market size of code storage flash memory in other sectors mainly includes the market sizes of code storage flash memory in sectors such as aerospace, maritime, and medical devices.

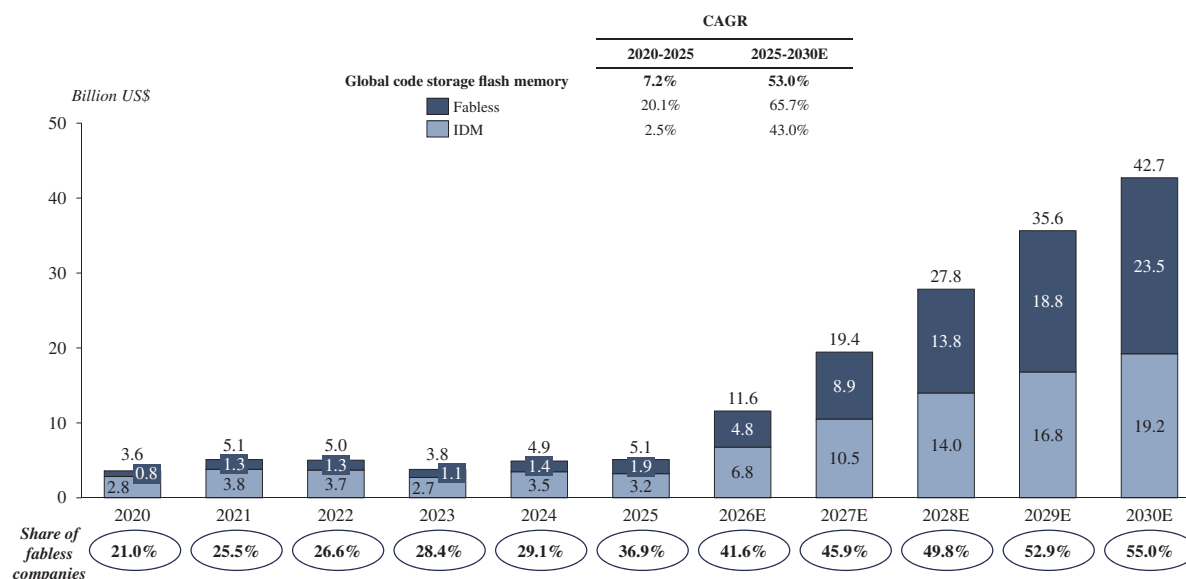
Sources: Expert interviews, Industry publications, CIC

Global Market Size of Code Storage Flash Memory by Business Model

In 2025, the global market sizes of IDMs and fabless companies in the code storage flash memory industry were US\$3.2 billion and US\$1.9 billion. Historically, IDMs have held a significant market share by leveraging their extensive technical expertise and value chain resources. However, unburdened by the substantial capital expenditure of building and maintaining manufacturing facilities, fabless companies can focus resources on IC design and R&D. This allows for greater flexibility in selecting fabrication processes and partners, enabling them to better adapt to market dynamics and meet the differentiated demands arising from expanding application scenarios. By 2030, the global market size of fabless companies in code storage flash memory industry is projected to increase to US\$23.5 billion with a CAGR of 65.7% from 2025 to 2030.

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Global Market Size of Code Storage Flash Memory, by Business Model, in terms of Revenue, 2020–2030E



Sources: Expert interviews, Industry publications, CIC

Global Market Size of Code Storage Flash Memory by Region

As a globally leading manufacturing powerhouse, the substantial demand of smart device manufacturing in China has created broad market opportunities for code storage flash memory, driving the continuous expansion of the corresponding market size. From 2020 to 2025, the market size of code storage flash memory in China increased from US\$1.9 billion to US\$2.7 billion, with a CAGR of 8.0%, and it is projected to reach US\$23.9 billion, accounting for 56.0% of the global market by 2030 with a CAGR of 54.4%.

Growth Drivers of Global Flash Memory Industry

- The era of AI presents broad development opportunities for the flash memory industry:** In the era of AI, intelligent upgrades across various sectors led to a growing number of smart devices. Additionally, there is an explosive growth in global data volume. As a key carrier for massive codes and data, flash memory is poised to capitalize on broad development opportunities.
- Increasing intelligence of devices drives demand for high-performance code storage:** By deploying and invoking AI models or algorithms locally, devices are evolving from passive responders to intelligent agents capable of autonomous decision-making. For example, AIPC achieves real-time translation and document summarization through local execution of large models, while smart vehicles utilize embedded AI algorithms to assess road conditions and automatically adjust their driving paths. This significantly increases the volume and complexity of firmware code. Therefore, there is a growing need for low-latency and high reliability flash memory to support the execution of complex computing tasks and ensure rapid system startup and stable operation.

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- ***Exponential data growth drives demand for high-specification data storage:*** The emergence of AI-enabled scenarios across various smart devices is driving an exponential growth in data volume. For example, when AI smartphones offer motion state recognition and voice assistant interactions, the volume of unstructured and multimodal data that requires storage has increased significantly. Meanwhile, built-in AI large models necessitate frequent reading and writing operations of large-scale parameter data to support various intelligent functions. Therefore, there is a demand for flash memory with high density and high data throughput rates to facilitate the real-time transfer and processing of the massive data flows.
- ***Emerging application scenarios unlock incremental markets:*** In recent years, emerging scenarios such as AI data centers, humanoid robots, and low-altitude economy aircrafts have continued to gain traction. These scenarios not only generate massive complex data and control instructions but also place high demands on real-time data processing, rapid code loading, and secure execution, driving the demand for flash memory with advanced data processing capabilities, low latency, and high reliability.
- ***Favorable policy and regulatory support:*** Flash memory provides critical storage support for various devices and have become a key focus in global technological competition, prompting governments worldwide to introduce supportive policies to support their development. In China, the MIIT and other five departments jointly issued the “Action Plan for the High-Quality Development of Computing Power Infrastructure” in October 2023, setting a target for advanced memory density to account for over 30% of the total by 2025. In the United States, the Congress passed the “CHIPS and Science Act” in August 2022, offering financial support to encourage the R&D in cutting-edge chip technologies. In Europe, the European Commission released the “Chips Act” in February 2022, outlining plans to strengthen the R&D and mass production capabilities of advanced memory chips.

Development Trends of Global Flash Memory Industry

- ***Synergistic breakthroughs in new materials and new device technologies:*** At the material level, the application of silicon nitride and hafnium oxide is expected to drive flash memory towards higher memory density and faster read/write speeds. At the device level, the advancement of chip stacking technology enables significant enhancements in density and functionality within compact spaces.
- ***The iteration of new technologies such as CIM drives the breakthroughs of flash memory energy efficiency:*** With the rapid penetration of AI technologies, the volume of data and code that smart devices need to process has increased significantly. Traditional chip computing architectures are facing limited bandwidth and low energy efficiency. In this context, near-memory computing, a technology that places computing units closer to memory units to shorten data transfer paths, has emerged as an interim solution to alleviate these bottlenecks. Driven by advancements in advanced packaging and novel memory media, it is gradually advancing toward CIM, which directly embed computing units within memory units. By performing computations directly where data is stored, CIM entirely avoids the energy consumption and latency associated with data movement and thus maximizes the energy efficiency of flash memory.

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- ***Accelerated commercialization of new memory devices such as ReRAM:*** ReRAM offers advantages in high read/write speeds, ultra-low power consumption, high process compatibility, and compatibility with CIM, aligning with the high-precision local inference requirements of smart devices. FRAM combines the characteristics of both ROM and RAM, offering low power consumption. MRAM features high read/write speeds and high erase/write durability, and is suitable for scenarios such as automotive electronics with stringent storage stability requirements. These new memory devices are expected to become an important supplement to traditional flash memory.
- ***SLC NAND Flash continues to iterate toward advanced process nodes:*** The fabrication process of SLC NAND Flash is accelerating towards more advanced nodes, from 40nm to the current mainstream of 3xnm and 2xnm nodes, and it is progressing toward 1xnm. This trend will facilitate further reduction in chip costs and power consumption, while improving data reading speeds and reliability.
- ***Continuous upgrades of NOR Flash process platforms:*** With the industry’s growing demand for cost-efficiency and cross-scenario adaptation, new process platforms such as NORD are emerging, aiming to strike a better balance among features. The NORD platform combines ETOX’s broad temperature range compatibility and long data retention with SONOS’s small size, low power consumption, and fast P/E speed. Meanwhile, as a domestic process platform, the adoption of NORD can significantly reduce reliance on imported processes, laying the foundation for the autonomy and controllability of the value chain. Leveraging these advantages, the NORD process platform is expected to further deepen its application across numerous sectors.

Competitive Landscape of Global Code Storage Flash Memory Industry

Participants in Global Code Storage Flash Memory Industry

Participants in global code storage flash memory industry include IDMs and fabless companies. Due to significant differences in their business structures and resource allocation, IDMs focus on the synergies and stability of manufacturing process, whereas fabless companies emphasize on design capabilities and flexible allocation of supply chain resources. Consequently, their business performance and value creation also differ. Compared with IDMs whose production line upgrades are limited by their in-house equipment, fabless companies can flexibly integrate external advanced manufacturing processes and resources, and thus have stronger technological iteration capabilities. They demonstrate agility in identifying evolving market demands and have consequently gained recognition from downstream customers. Therefore, fabless companies are expected to continue increasing their market share and assume an increasingly important position in the market.

Rankings of Chip Companies in Global Code Storage Flash Memory Industry

In terms of revenue from code storage flash memory, the Company ranked fifth among global fabless companies and eleventh among all chip companies with a market share of 1.3% in 2025.

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Rankings of Chip Companies in Global Code Storage Flash Memory Industry, in terms of Revenue from Code Storage Flash Memory, 2025

Ranking	Company	Business model	Revenue ⁽¹⁾ (US\$ Million)	Market share ⁽²⁾ (%)
1	Company A ⁽³⁾	IDM	~987.7	19.4%
2	Company B ⁽⁴⁾	Fabless	~697.1	13.7%
3	Company C ⁽⁵⁾	IDM	~685.3	13.4%
4	Company D ⁽⁶⁾	IDM	~631.2	12.4%
5	Company E ⁽⁷⁾	Fabless	~458.2	9.0%
6	Company F ⁽⁸⁾	IDM	~371.2	7.3%
7	Company G ⁽⁹⁾	IDM	~302.1	5.9%
8	Company H ⁽¹⁰⁾	Fabless	~168.1	3.3%
9	Company I ⁽¹¹⁾	IDM	~163.1	3.2%
10	Company J ⁽¹²⁾	Fabless	~90.2	1.8%
11	The Company	Fabless	64.0	1.3%
Sub-total			~4,618.2	90.7%

Note:

- (1) Refers to the combined revenue of NOR Flash and SLC NAND Flash.
- (2) Market share is calculated by dividing a company’s revenue from code storage flash memory by the global market size of code storage flash memory industry.
- (3) Company A is a listed company founded in 1987 and headquartered in Taiwan, China. It is engaged in the R&D, design, manufacture and sales of customized memory solution and code storage flash memory.
- (4) Company B is a listed company founded in 2005 and headquartered in Beijing, China. It is engaged in the design, development, and sales of memory products, microcontrollers, and sensor solutions.
- (5) Company C is a listed company founded in 1989 and headquartered in Taiwan, China. It is engaged in the R&D, design, manufacture and sales of non-volatile memory products.
- (6) Company D is a listed company founded in 1978 and headquartered in Idaho, the United States. It is engaged in the design, development, manufacture and sales of memory products.
- (7) Company E is a listed company founded in 2016 and headquartered in Shanghai, China. It is engaged in the R&D, design and sales of low-power SPI NOR Flash and high-reliability IIC EEPROM memory chips.
- (8) Company F is a listed company founded in 1999 and headquartered in Neubiberg, Germany. It is engaged in the design, development, manufacture and sale of semiconductor and system solutions.
- (9) Company G is a listed company founded in 2017 and headquartered in Tokyo, Japan. It is engaged in the R&D, design, manufacture and sales of memory and SSD products.
- (10) Company H is a listed company founded in 2005 and headquartered in Beijing, China. It is engaged in the R&D and sales of computing, memory, and analog ICs.
- (11) Company I is an unlisted company founded in 2006 and is headquartered in Hubei, China. It is engaged in the 12-inch specialty process wafer foundry business, multi-project wafer services and photomask-related supporting services.
- (12) Company J is a listed company founded in 2014 and headquartered in Shanghai, China. It is engaged in the R&D, design and sales of small- to medium-density NAND, NOR and DRAM.

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Sources: Expert interviews, Public filings of listed companies, CIC

In terms of revenue from SLC NAND Flash, the Company ranked fourth among global fabless companies and eighth among all chip companies with a market share of 2.4% in 2025. In terms of revenue from NOR Flash, the Company ranked fifth among global fabless companies and tenth among all chip companies with a market share of 0.7% in 2025.

Rankings of Chip Companies in Global SLC NAND Flash Industry, in terms of Revenue, 2025					Rankings of Chip Companies in Global NOR Flash Industry, in terms of Revenue, 2025				
Ranking	Company	Business model	Revenue ⁽¹⁾ (US\$ Million)	Market share ⁽²⁾ (%)	Ranking	Company	Business model	Revenue ⁽¹⁾ (US\$ Million)	Market share ⁽²⁾ (%)
1	Company D	IDM	~326.0	19.9%	1	Company A	IDM	~773.9	22.3%
2	Company G	IDM	~302.1	18.4%	2	Company B	Fabless	~640.2	18.4%
3	Company A	IDM	~213.8	13.0%	3	Company C	IDM	~565.5	16.3%
4	Company E	Fabless	~213.0	13.0%	4	Company F	IDM	~371.2	10.7%
5	Company C	IDM	~119.7	7.3%	5	Company D	IDM	~305.2	8.8%
6	Company J	Fabless	~85.5	5.2%	6	Company E	Fabless	~245.2	7.1%
7	Company B	Fabless	~56.9	3.5%	7	Company H	Fabless	~157.1	4.5%
8	The Company	Fabless	39.8	2.4%	8	Company I	IDM	~134.9	3.9%
9	Company K ⁽³⁾	Fabless	~35.6	2.2%	9	Company M ⁽⁵⁾	Fabless	~58.3	1.7%
10	Company L ⁽⁴⁾	Fabless	~28.3	1.7%	10	The Company	Fabless	24.2	0.7%
Sub-total			~1,420.7	86.6%	Sub-total			~3,275.7	94.4%

Notes:

- (1) Refers to the revenue from SLC NAND Flash or NOR Flash.
- (2) Market share is calculated by dividing a company's revenue from SLC NAND Flash or NOR Flash by the global market size of SLC NAND Flash or NOR Flash industry.
- (3) Company K is a listed company founded in 1999 and headquartered in Guangdong, China. It is engaged in the R&D, design, packaging testing, manufacture, and sales of semiconductor memory products.
- (4) Company L is an unlisted company founded in 2016 and headquartered in Jiangsu, China. It is engaged in the R&D, design, and sales of flash memory controllers and application solutions for NAND Flash memory products.
- (5) Company M is a listed company founded in 2015 and headquartered in Anhui, China. It is engaged in the R&D, design and sales of NOR Flash and MCU.

Sources: Expert interviews, Public filings of listed companies, CIC

Entry Barriers of Global Flash Memory Industry

- **Product development barriers:** Flash memory must operate stably under various extreme conditions and maintain long-term data retention. To meet differentiated requirements for density, voltage, packaging, and performance, chip companies need to invest substantial R&D resources in developing a multi-specification product matrix and conducting stringent quality control and reliability testing.
- **Technological R&D barriers:** The flash memory industry is a highly technology-intensive industry. Its designing process requires overcoming the challenge of balancing multiple performance metrics, resulting in an elevated technological threshold. Such complex technological R&D capabilities depend on long-term R&D accumulation and extensive intellectual property reserves.
- **Supply chain management barriers:** Amid the increasingly complex global semiconductor supply chain environment, chip companies need to establish stable cooperative relationships across the value chain. They must also implement refined supply chain management through multi-source procurement and building digital systems to regulate inventory and match

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supply with demand in time. This helps mitigate risks such as production capacity fluctuations and geopolitical uncertainties, preventing delivery delays or disruptions while enhancing cost-control capabilities.

- ***Brand and customer stickiness barriers:*** To mitigate risks and ensure product quality, downstream customers prefer to cooperate with chip companies that have undergone long-term market validation and established a proven reputation for product performance, quality assurance, and service capabilities. Additionally, these customers place high requirements for supply stability and continuity, leading them to maintain long-term cooperative relationships with existing chip companies.
- ***Talent barriers:*** The designing of flash memory integrates technologies from multiple fields, including semiconductor designing, materials science, and microelectronic engineering, requiring practitioners to possess comprehensive knowledge. However, the market supply of such talents is limited, and the training cycle for such talents is lengthy, as they need to accumulate experience through practical application.

OVERVIEW OF GLOBAL MCP MARKET

Definition of MCPs

MCPs are chips that combine two or more chips with different functions within a single package. MCPs offer advantages such as high integration, reduced PCB space, lower power consumption and enhanced system reliability, enabling devices to meet increasingly complex functional requirements with a more compact physical footprint. In the field of memory, typical MCPs include integrating SLC NAND Flash and DRAM in a single package, as well as integrating NOR Flash and SRAM in a single package. These solutions can operate stably under industrial-grade temperature ranges and are well suited to devices with high requirements for space, battery life and memory density. They are widely used across devices in network communications, consumer electronics, smart home, industrial, medical, and automotive electronics.

Global Market Size of MCPs

In the AI era, as various devices continue to evolve toward miniaturization and higher performance, demand for MCPs has continued to grow steadily. This is primarily driven by their advantages of high integration that improves space utilization, and shorter interconnect paths between modules that enhance transmission efficiency. The global market size of MCPs increased from US\$5.4 billion in 2020 to US\$8.4 billion in 2025 with a CAGR of 9.1%, and is expected to increase to US\$17.0 billion by 2030 with a CAGR of 15.0% from 2025 to 2030.

OVERVIEW OF GLOBAL ANALOG IC MARKET

Definition and Classification of Analog ICs

Analog ICs are chips that enable functions related to power management and signal processing in electronic systems, and are primarily responsible for power conversion, distribution, as well as signal acquisition and conditioning. Analog ICs cover a wide range of products, including AC-DC and DC-DC converters, motor chips, protection chips, sensor chips, interface chips, real-time clock chips, amplifier chips, and data conversion chips. They find wide applications in scenarios including in-vehicle systems

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of new energy vehicles, power supplies and sensor systems of robotic vacuum cleaners and smart locks, and motor control modules as well as high-precision measurement feedback components of industrial automation equipment.

Global Market Size of Analog ICs

From 2020 to 2025, the global market size of analog ICs grew rapidly from US\$55.7 billion to US\$86.5 billion. Looking ahead, the accelerated penetration of AI technologies and the rising demand for on-device decision-making and data processing across devices are driving the sustained growth for analog ICs. Meanwhile, analog ICs have continued to upgrade in process technology, reliability, level of integration, and precision, thereby pushing up the average unit price of products. Fueled by the dual drivers of expanding demand and value enhancement, the global market size of analog ICs is expected to increase to US\$123.3 billion by 2030 with a CAGR of 7.4%.

OVERVIEW OF GLOBAL MCU MARKET

Definition and Classification of MCUs

MCUs are single-chip computing systems that integrate processors, memory, timers, counters, and multiple I/O interfaces. MCUs enable the real-time control, signal processing, and power management of devices through the execution of preprogrammed instructions. With high integration and low-power consumption features, MCUs can be embedded in devices at a low cost and in a compact size to realize intelligent control. They are indispensable foundational hardware in automotive electronics, industrial automation, and smart home products. Classified by processor bit width, MCUs are primarily categorized into 8-bit MCUs, 16-bit MCUs, and 32-bit MCUs, of which 32-bit MCU boast high computing power, high integration, and abundant peripheral resources. 32-bit MCUs are suitable for scenarios involving high-complexity intelligent control and edge data processing, and have become the current market mainstream.

Global Market Size of MCUs

Driven by the rapid development of sectors such as automotive electronics, industrial automation, and smart home products, the global demand for MCUs has maintained steady growth. The corresponding market size grew from US\$23.4 billion in 2020 to US\$33.5 billion in 2025, with a CAGR of 7.5%. To meet the growing intelligent demand in these sectors, MCU have achieved enhancements in both performance and technological value. This fuels the continuous growth of the market size. It is expected that the global market size of MCUs to reach US\$52.3 billion by 2030 with a CAGR of 9.3% from 2025 to 2030.

CHALLENGES OF GLOBAL IC INDUSTRY

- **Intensifying market competition.** IC industry is highly competitive. Leading players have established a dominant position in the global market by leveraging their first-mover advantages in technological know-how, brand recognition and stable customer bases. At the same time, with the advancement of domestic substitution and the expansion of application scenarios, numerous emerging chip companies are accelerating their entry into the market and competing in niche application segments, further intensifying market competition.
- **Volatility in raw material prices and supply chain uncertainties.** Wafers are the key raw material for ICs, and their major suppliers are currently concentrated among a limited number of overseas companies. In recent years, macro uncertainties such as rising trade protectionism and

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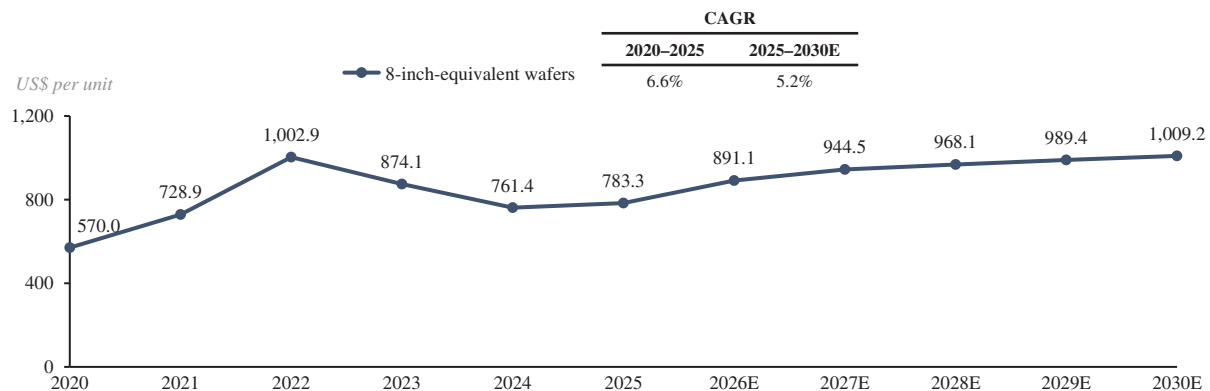
heightened geopolitical tensions may further disrupt the stable supply of wafers, resulting in shortages or significant price volatility. Such uncertainties increase the costs of chip companies and place continuing pressure on their ability to maintain stable delivery.

- **Accelerated technology iteration and product innovation bottlenecks.** IC industry is characterized by rapid technological iteration and short product upgrade cycles. As downstream applications continue to expand, higher requirements are being placed on performance, power consumption and reliability. Against this backdrop, chip companies must devote substantial resources to technological iteration and product innovation, while addressing challenges such as long development cycles, increasing process complexity and high uncertainty in the commercialization of R&D results.

RAW MATERIAL OF GLOBAL IC INDUSTRY

Wafers are the core raw material for ICs, directly impacting final chip pricing. Wafer prices are driven by global supply chain landscape, downstream demand structure, and process nodes migration. From 2020 to 2022, wafer prices trended upward due to the supply-demand mismatch triggered by COVID-19. From 2023 to 2024, the economic recovery and capacity expansion eased the supply-demand conditions, leading to declined wafer prices. Starting from 2025, driven by the sustained surge in high-performance demand in the AI era, relatively cautious capacity expansion, and the advancement of process nodes, wafer prices are expected to maintain a slight upward trend.

Historical and Forecasted Global Average Price Changes of Wafers⁽¹⁾, 2020-2030E



Notes:

(1) Calculated based on the average selling price of 8-inch-equivalent wafers from major foundries.

Sources: Industry publications, CIC

SOURCE OF INFORMATION

In connection with the [REDACTED], we engaged CIC, an independent market research consultant, to conduct an analysis of, and to prepare a report about global flash memory industry. The CIC Report has been prepared by CIC independent of the influence of our Group and other interested parties. We have agreed to pay CIC a total fee of RMB600,000 for the preparation and use of the CIC Report, and we believe that such fees are consistent with the market rate. CIC is a consulting firm

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founded in Hong Kong and provides professional industry consulting services across multiple industries. CIC’s services include industry consultancy services, commercial due diligence and strategic consulting.

CIC conducted both primary and secondary research using a variety of resources. Primary research involved interviewing key industry experts and leading industry participants. Secondary research involved analyzing data from various publicly available data sources. The market projections in the commissioned report are based on the following key assumptions: (i) given China’s enduringly stable political system, effective social governance and economic foundation, it is anticipated that the overall social, economic and political environments in China will remain stable during the forecast period; (ii) according to the National Bureau of Statistics of China, key economic indicators such as gross Domestic Product (“GDP”), industrial added value, and urbanization rate have shown an upward trend in China over the past decade. Therefore, we believe that the economic and industry development in China is likely to maintain a steady growth trajectory during the forecast period, accompanied by continuing urbanization; (iii) related key industry drivers such as the era of AI presents broad development opportunities for the flash memory industry, emerging application scenarios unlock incremental markets and favorable policy and regulatory support are likely to propel continued growth in the global flash memory industry throughout the forecast period; and (iv) there will be no extreme force majeure event or unforeseen industry regulation that may significantly or fundamentally affect the relevant market and industry.

Unless otherwise specified, all data and forecasts contained in this section are derived from the consultancy report of CIC. The Directors, upon acting with reasonable prudence, confirmed that there has been no occurrence of adverse change in the overall market information that would subject the data to significant restrictions, contradiction or negative effects since the date of the consultancy report.