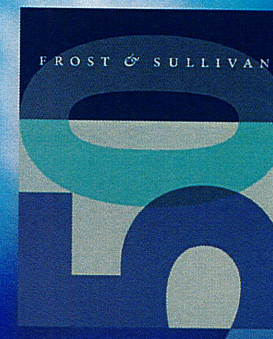


Global and China Analog IC Industry Market Research

Project Nova

Frost & Sullivan

2025



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Scope

■ The project scope is defined as follows:

Research Period	• Historical Years: 2020-2024 • Base Year: 2024 • Forecast Years: 2025-2029
Geographic Scope	• Global • China
Industry Scope	• Global and China Analog IC Market • Global and China Sensor Market

Limitations

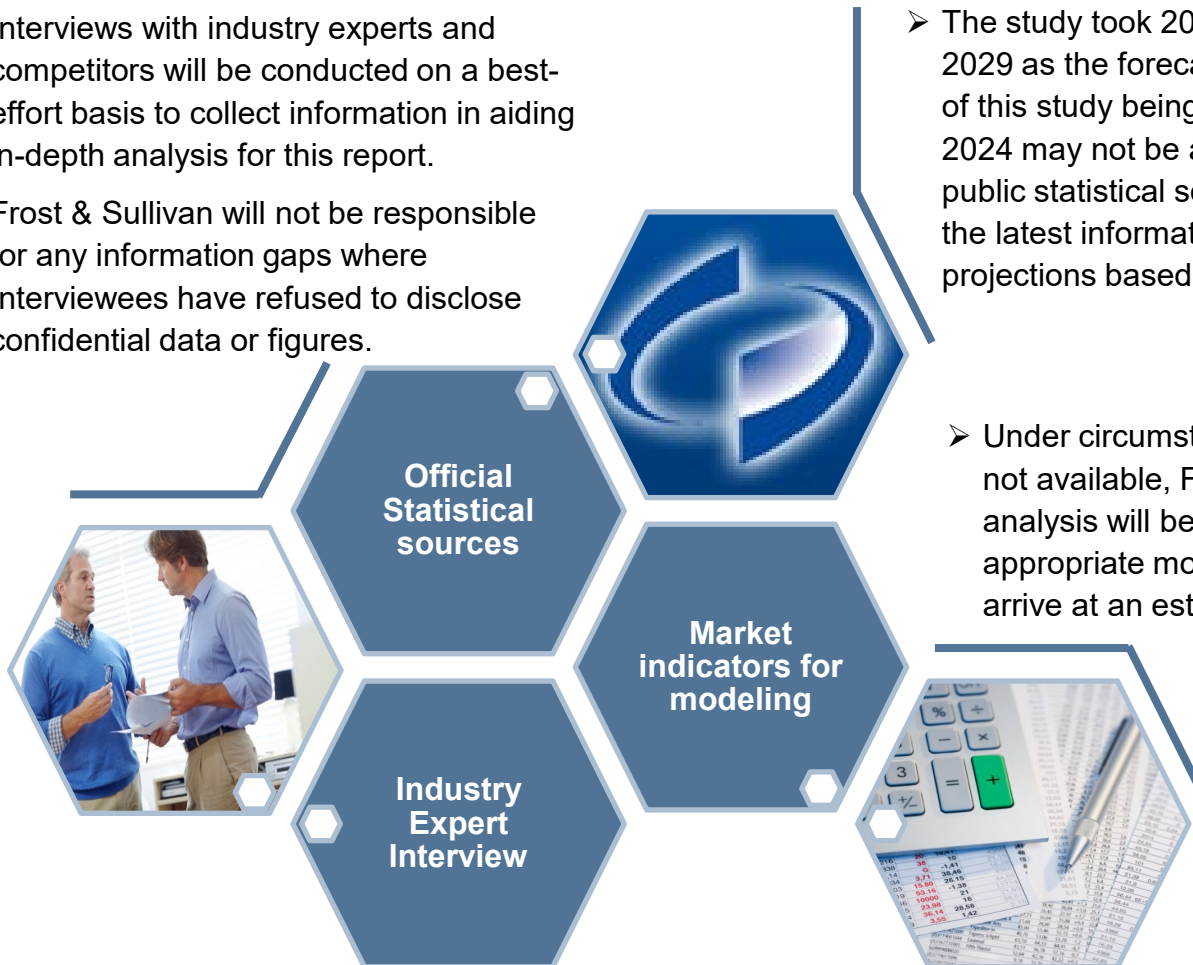
■ Source of Information

- Interviews with industry experts and competitors will be conducted on a best-effort basis to collect information in aiding in-depth analysis for this report.
- Frost & Sullivan will not be responsible for any information gaps where Interviewees have refused to disclose confidential data or figures.

- The study took 2024 as the base year and 2025-2029 as the forecast period. However, as the point of this study being 2024, some of the figures of 2024 may not be available at the moment from public statistical sources. Frost & Sullivan will use the latest information available (e.g. 2023) or make projections based on historical trends.

- Under circumstances where information is not available, Frost & Sullivan in-house analysis will be leveraged using appropriate models and indicators to arrive at an estimate.

- Source of information will be stated in the right hand corner at the bottom on each slide for easy reference.



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Competitive Landscape of Global and Chinese Sensor Industry

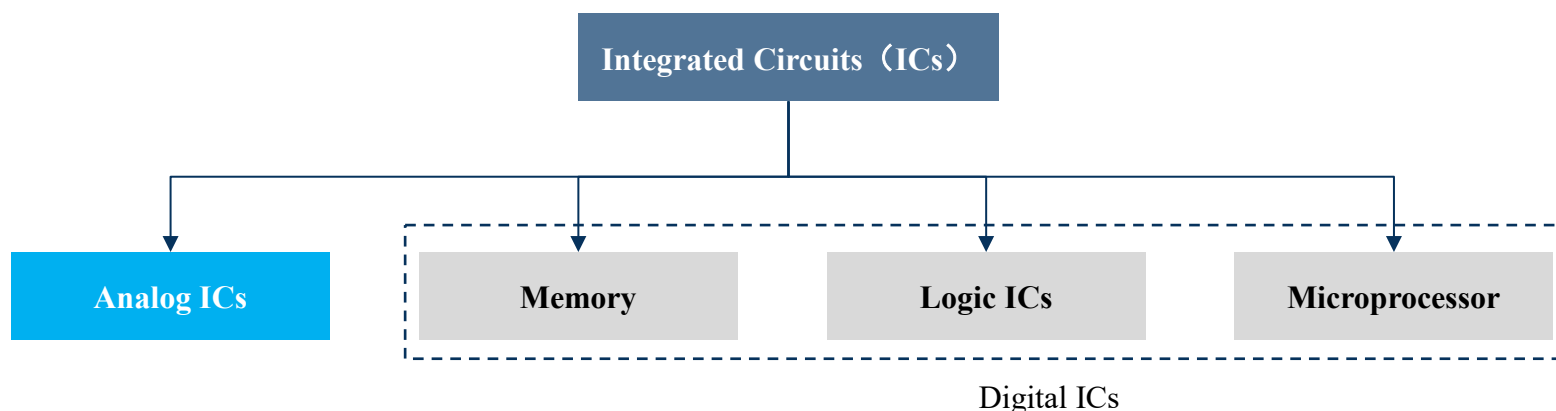
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Appendix

Overview of Global and China Analog IC Market

Definition and Classification of Integrated Circuits and Analog Integrated Circuits

- Analog integrated circuits (Analog ICs), or analog chips, a type of integrated circuits, are specifically designed to capture, process, and transmit continuous analog signals, such as sound, temperature, and light. Analog signals use a series of continuously changing electromagnetic waves or voltage signals to represent information content.
- Integrated circuits (ICs) can be divided into analog ICs, microprocessor, logic ICs and memory. Microprocessor, logic ICs and memory can be collectively referred to as digital IC. Analog ICs are an important part of integrated circuits, accounting for approximately 15% of the overall integrated circuits market size in terms of the sales revenue in 2024.
- With the increasing integration of semiconductors and the continuous expansion of application, some integrated circuits now incorporate both analog and digital IC circuits and functions, forming analog-digital hybrid chips. This further elevates the internal complexity and functional requirements.



Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Mergers and Acquisitions in The Analog Integrated Circuits Industry

- Since its inception, the Analog integrated circuits industry has witnessed frequent mergers and acquisitions (M&A) activities. There are profound industry logics and market-driven factors behind this phenomenon.
- The Analog ICs market is dominated by leading companies such as Texas Instruments (TI), Analog Devices (ADI), and Infineon, with the top ten players accounting for over 50% of the global market share. However, due to the vast and complex variety of Analog ICs, many small and medium-sized manufacturers are still active in some unique fields and design and produce products specifically adapted to that field. This market structure has generated a strong demand for integration. Companies fill technological gaps and expand their product portfolios through mergers and acquisitions, achieving economies of scale and synergy.
- From a technological perspective, the competitive edge of the Analog integrated circuits industry does not rely solely on advanced manufacturing processes but rather on long-term technological accumulation and process innovation. This characteristic has built a profound technological barrier and patent moat. For companies, mergers and acquisitions have become a key strategic means to quickly acquire core technologies and break through development bottlenecks.

Merger and Acquisition Development Cases

01

In 2000, TI spent \$7.6 billion to acquire Burr Brown, greatly enhancing its competitiveness in the data converter and amplifier markets

02

In 2011, TI acquired National Semiconductor for \$6.5 billion. In addition to Analog ICs and technology, this acquisition also enhanced TI's manufacturing capabilities

03

In 2017, ADI acquired Linear Technology for a transaction amount of \$14.8 billion, occupying a leading position in the data converter and power management ICs markets

04

In 2020, ADI spent \$21 billion to acquire Maxim, in order to increase its market share in the automotive and 5G ICs fields

01

In 2025, SouthICs Semiconductor acquired 100% of Sinh Micro for RMB 160 million, combining Analog and MCU technologies to offer integrated solutions for consumer electronics.

02

In 2024, Halo Micro acquired 100% stake in CX Micro via share issuance and cash, synergizing power management and motor control technologies for consumer and automotive markets.

03

In 2024, Novosense fully acquires Shanghai MagnTek for 1 billion yuan in cash, integrating its magnetic sensor technology

04

In 2024, Shanghai Bright Power Semiconductor acquired the control of Sichuan E-Charge through a private placement

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Status Quo of Analog Integrated Circuits

In 2024, the global analog integrated circuits market reached RMB565.7 billion, marking a 47.4% growth compared to 2020. Driven by robust market demand, China's analog IC market has achieved rapid expansion. With a market size of RMB195.3 billion in 2024, accounted for over 35% of the global market share. Although international companies still dominate China's market, domestic companies have witnessed significant growth in recent years, demonstrating continuous technological breakthroughs and escalating market penetration. The sustained enhancement of domestic companies' competitiveness and the acceleration of localization have become the defining trends in China's analog IC industry development.

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Main Characteristics of Analog ICs Products and Markets



Analog ICs Primarily Utilize Mature Process Nodes

The Analog integrated circuits industry predominantly relies on mature process technologies (28nm and above), contrasting sharply with digital ICs' pursuit of process miniaturization. This stems from Analog ICs' unique requirements for precise current/voltage control and high signal-to-noise ratio, where mature processes offer superior device matching, process stability, and cost efficiency. China has sufficient production capacity for mature domestic processes and is less affected by international trade conflicts.



Long product validation cycle and high replacement cost

Analog ICs are mainly used for core functional modules such as device power management and signal conditioning, and require functional verification and reliability testing for up to 12-24 months. For example, compared to other application areas, automotive simulation chips need to meet higher technical requirements, including longer product certification cycles, stricter testing standards, and higher product reliability. Usually, it takes about 2 years for a single car simulation chip to develop and complete vehicle level certification. The industry requires a long supply cycle guarantee, resulting in high overall costs for customers to switch suppliers. In addition, changing analog IC suppliers may incur high implicit costs, including system redesign, testing and certification, as well as downtime risks.



Fragmented Applications and Complex Product Portfolios

The downstream of Analog ICs covers consumer electronics, industrial control, automotive, communications and other sub sectors. A single manufacturer needs to maintain a large number of different item numbers to match customer needs. Take TI and ADI as examples. Their product catalogs can contain more than 50,000 models, and the life cycle of some products could last more than 10 years. Although the product catalogs of leading Chinese companies only contain thousands of models, still lag behind those of international counterparts, these companies are rapidly enriching their product portfolios.



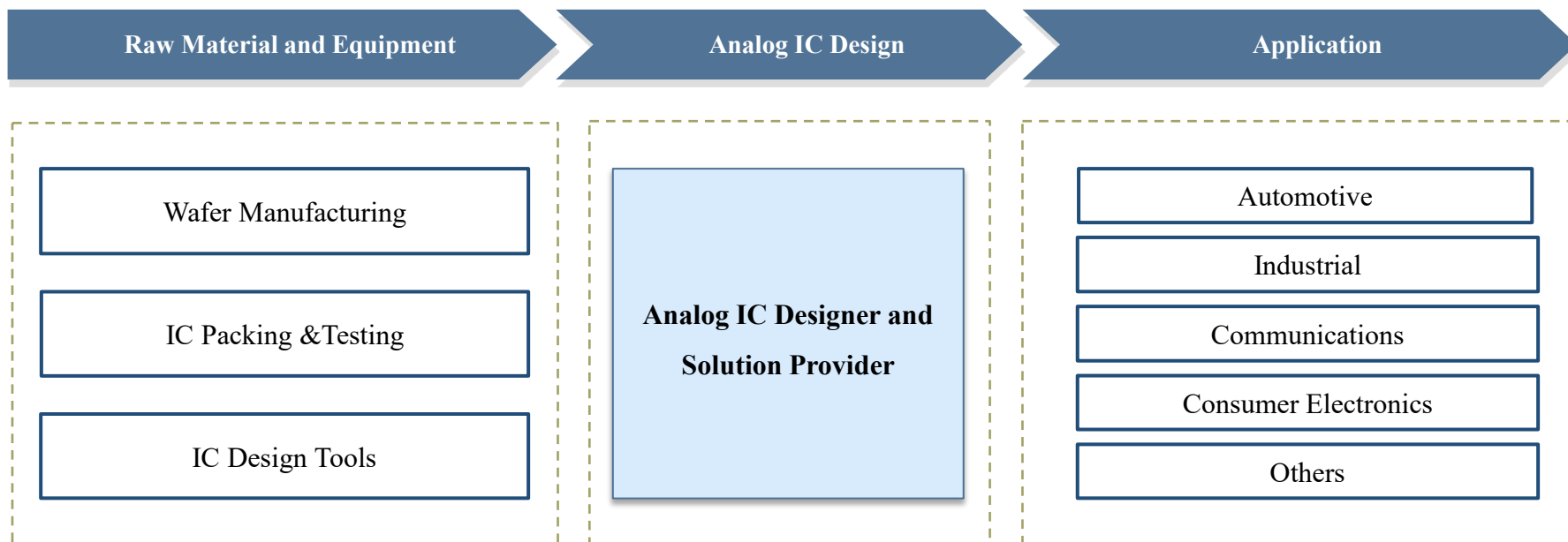
Popularity of Distribution Model

Due to the wide range of downstream applications, almost all electronic products require Analog ICs, so distributors are very important in the sales process of Analog ICs. The dominant sales channel of Analog ICs is the distribution channel. Manufacturers reach scattered small and medium-sized customers through authorized dealer networks, and reduce service costs with the support of dealers. The direct selling mode mainly serves the key strategic customers, but the distribution system considering still irreplaceable in regional coverage, inventory buffer and small batch order response. Some leading enterprises are integrating online technology platforms and offline technical support to build a more efficient channel ecosystem.

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Industry Chain and Value Chain of Analog IC



- The upstream of the analog ICs industry chain mainly includes wafer fabrication, IC packaging & testing and IC design tools, providing the necessary technical foundation and manufacturing conditions. The midstream is centered on analog IC designers and solution providers, who complete circuit design and verification based on their innovation capability and accumulation of expertise. The design process needs to balance performance, power consumption and cost. The downstream demand is scattered in the fields of such as automotive, industrial, communications, consumer electronics and others. The diversity of downstream demands drive designers to build a huge product library, and meet the needs of different customers through flexible product combinations.

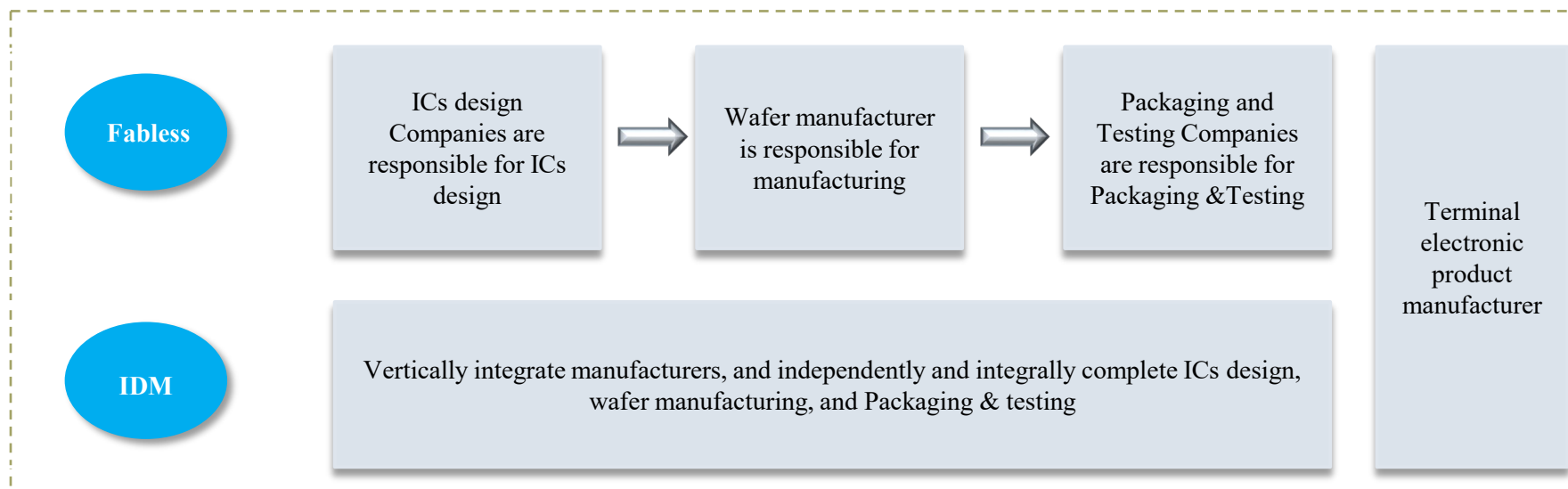
Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Business Model of Analog IC Companies

The analog ICs industry primarily operates under two models – IDM and Fabless.

- In the IDM model, companies design analog ICs and complete manufacturing and packaging & testing process in house. This enables them to have stronger resource aggregation capabilities and can integrate design and production processes to develop new products, but it also requires huge financial support. Since production equipment requires a large amount of capital investment.
- In the Fabless Model, companies focus on analog IC design, and outsource manufacturing and packaging & testing process. Therefore, they can significantly reduce production line investment, concentrate resources on research and development, and respond more agilely to market demand by providing customized services based on customer needs.
- Leading fabless companies are exploring new models by not only focusing on integrated circuit design, but also having their own process platforms. It requests wafer manufacturers to cooperate in applying unique manufacturing processes and proprietary equipment, but the production line itself does not belong to the fabless companies. This new model can better optimize design process collaboration, accelerate product iteration, and enhance market competitiveness without largely investing on fixed asset.

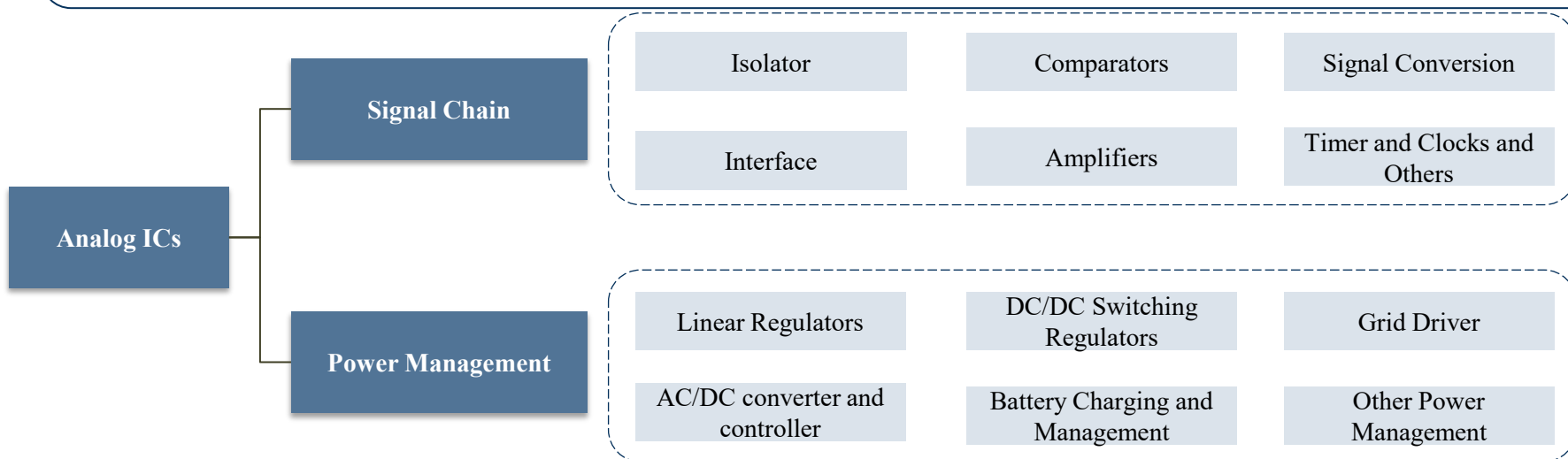


Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Classification of Analog IC

- Analog ICs are classified according to their functions and application fields, mainly including power management ICs and signal chain ICs.
- Signal chain ICs is an integrated circuit with the functions of receiving, transmitting, converting, amplifying and filtering Analog signals. The signal chain ICs can be highly integrated and reduce the complexity of the system. It can collect various signal types, carry out high-precision and stable A/D conversion (analog and digital conversion), and realize digital filtering, signal gain and other functions. It has flexibility and scalability, and can be customized and upgraded according to requirements. Its product categories mainly include amplifiers, D/A converters, clocks, timers, comparators, etc. The signal chain ICs is widely used in the fields of automotive, industrial automation, medical equipment and communication equipment to improve the control and monitoring accuracy and provide support for medical diagnosis, communication quality and stability.
- Power management ICs is an integrated circuit used to manage the relationship between battery and circuit, and is responsible for the conversion, distribution, detection and monitoring of electric energy. Its ICs categories can be mainly divided into linear voltage regulator, battery charging and management ICs, DC/DC switching voltage regulator, AC/DC converter and controller, LED driver, display power driver and grid driver, which are applied to voltage regulator, power monitoring, power switch, charge management, electrical control, LED driver, etc.



Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Core Technologies and Main Technical Difficulties of Analog ICs

- High performance Analog ICs design faces multiple challenges, among which low power consumption, high precision and low noise are the key indicators. In mobile devices, IOT devices and Automotive Electronics, low power consumption is the core design goal, which directly affects the endurance capability of devices. High precision requires high resolution and high linearity of data converter (ADC/DAC) to ensure the accuracy of signal processing. At the same time, signal chain ICs (such as amplifiers) are extremely sensitive to noise and distortion. Low noise design is a necessary condition to ensure signal integrity.
- Manufacturing process has significant constraints on Analog ICs design. Analog ICs need to adapt to different process nodes, which requires designers to adjust circuit layout and parameters for each process. Analog ICs design also needs interdisciplinary knowledge, including physics, circuit and signal processing, which requires high comprehensive ability of designers.
- Compared with digital circuit, Analog circuit design needs to make a trade-off between speed, power consumption, gain, accuracy, power supply voltage, noise, area and other factors, while digital circuit design only needs to make a balance between power consumption, speed and area. With the continuous reduction of process size, the reduction of power supply voltage and the secondary effect of devices have a much more serious impact on Analog circuits than digital circuits, which has brought new challenges to Analog design. The influence of layout on Analog circuit is much greater than that of digital circuit. The same layout with poor circuit will cause the ICs to fail to work.

	Analog ICs	Digital ICs
Technical Difficulties	• The design is difficult, with an average learning curve of 10 to 15 years	• Computer-aided design, average learning curve 3 to 5 years
	• Analog ICs design relies more on engineers' experience	• Most of them are generated automatically with the assistance of EDA software
	• Analog ICs design needs to adapt to different process nodes, and the circuit layout and parameters need to be adjusted for each process.	• In digital integrated circuit design, it usually focuses on a specific process.

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

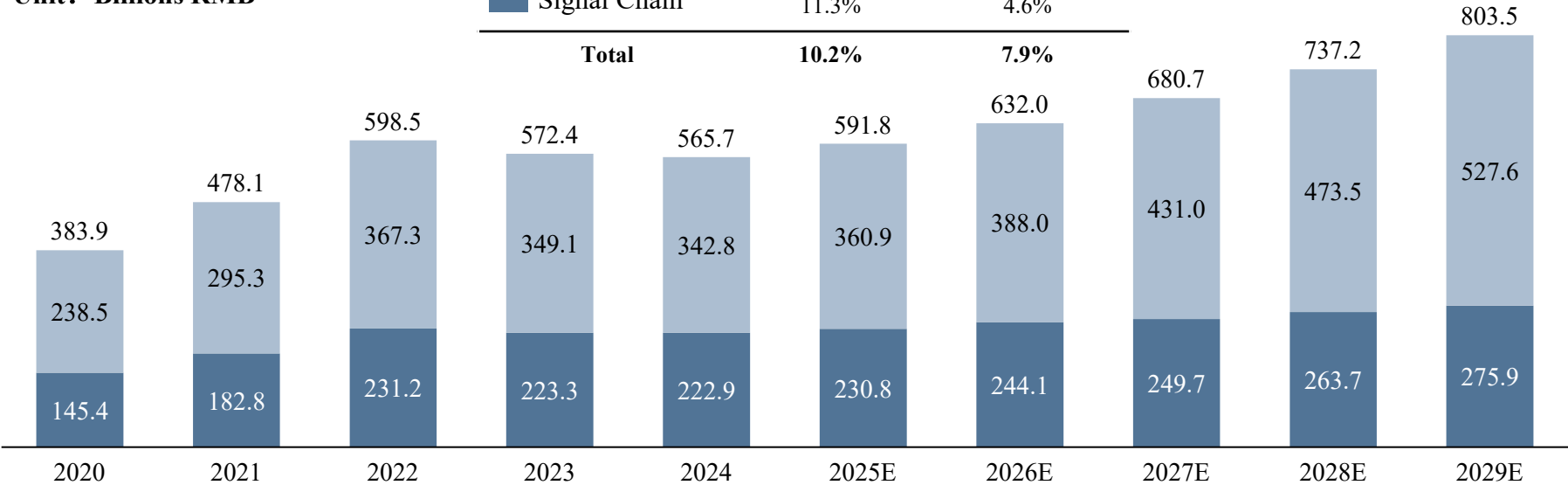
Global Analog IC Market Size, 2020-2029E

- The global market Size of Analog ICs has increased from RMB 383.9 billion in 2020 to RMB 565.7 billion in 2024. During the forecast period, from 2025 to 2029, the global market Size of Analog ICs is expected to grow at a CAGR of 7.9%. By 2029, the global market Size of Analog ICs is expected to reach RMB 803.5 billion. In the future, there will be an increase in demand in multiple downstream fields, especially in the development of downstream industries such as automotive electronics and industrial automation such as humanoid robots and AI servers, which will generate a large demand for ICs; At the same time, technological innovation, industry integration and the support of policies and industrial environment also provide strong guarantees for market development.

Global Analog IC Market Size , by Sale Revenue

	CAGR	2020-2024	2025E-2029E
Power Management		9.5%	10.0%
Signal Chain		11.3%	4.6%
Total		10.2%	7.9%

Unit: Billions RMB



Source: WSTS, Frost & Sullivan

Overview of Global and China Analog IC Market

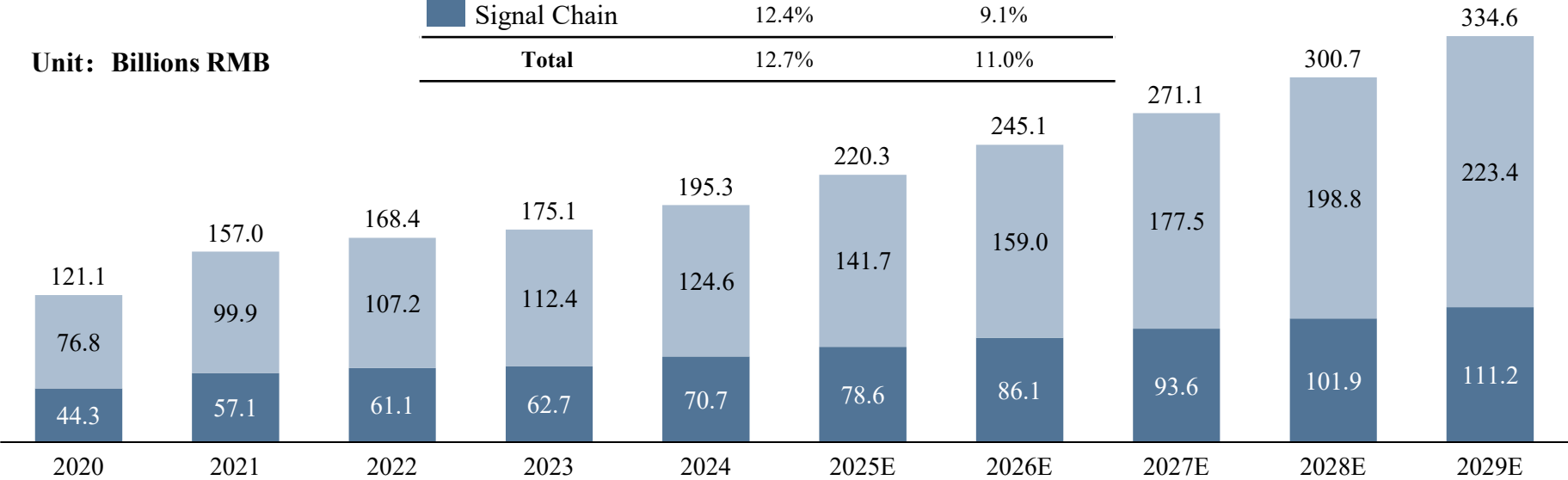
China Analog IC Market Size, 2020-2029E

- In 2020, the Size of China's Analog IC market was RMB 121.1 billion. By 2024, the Chinese market reached RMB 195.3 billion, with a CAGR of 12.7%. From a segmented market perspective, the power management ICs market has grown from RMB 76.8 billion in 2020 to RMB 124.6 billion in 2024, achieving a CAGR of 12.9%, driven by the escalating demand for high-efficiency solutions in AI infrastructure, power systems for new energy vehicles, and smart devices. This segment is expected to maintain strong momentum, expanding to RMB 223.4 billion by 2029 at a CAGR of 12.1% (2025–2029). The slightly slower growth of Signal Chain ICs compared to power management ICs is primarily due to maturing demand in downstream sectors such as industrial applications, where Signal Chain ICs have traditionally held strong, while rapidly evolving fields like AI servers and NEVs continue to drive higher demand for PMICs.

China Analog IC Market Size , by Sale Revenue

	CAGR	2020-2024	2025E-2029E
Power Management		12.9%	12.1%
Signal Chain		12.4%	9.1%
Total		12.7%	11.0%

Unit: Billions RMB



Source: Frost & Sullivan

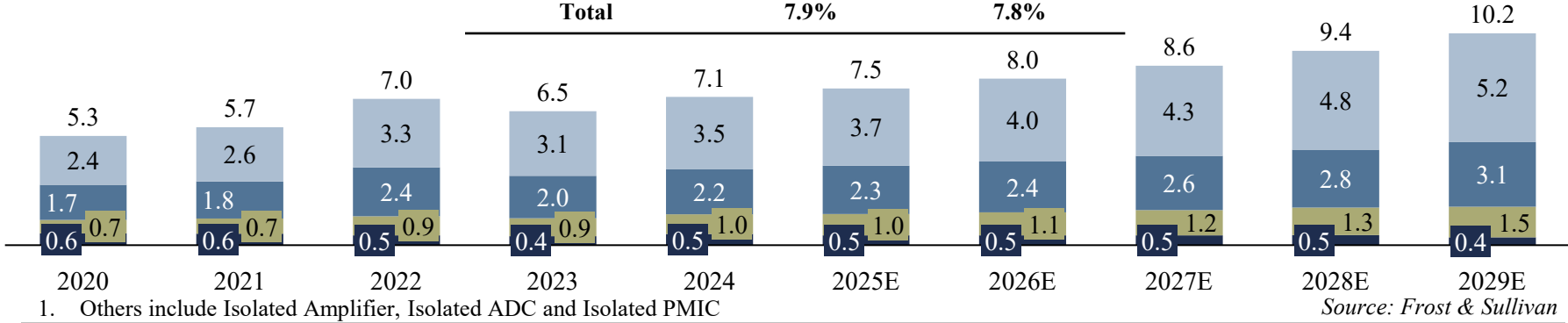
Overview of Global and China Digital Isolator IC Market

China Digital Isolated IC Market Size, 2020-2029E

- Isolated ICs are Analog ICs that ensure circuit safety. Realize signal coupling transmission in an electrically isolated state. Isolated ICs are widely used in medium and high voltage scenarios such as electric vehicles and industries. Depending on the implementation principle, Isolated ICs can be divided into two types: optoelectronic coupling isolators and digital Isolated ICs. Among them, digital Isolated ICs are further divided into digital isolators, isolated drivers, isolated interfaces, and other isolation functional devices.
- Standard digital isolators are the simplest form of Isolated ICs products, only responsible for achieving electrical isolation and signal transmission. Integrating standard digital isolators with different Analog ICs can further enrich the product form of Isolated ICs and expand their application scenarios. Isolated driver is the most important type of digital Isolated ICs, it can prevent the closure of current circuits and reduce the risk of signal distortion and equipment damage. The market size of digital Isolated ICs in China increased from RMB 5.3 billion in 2020 to RMB 7.1 billion in 2024. In 2024, the proportion of Isolated ICs in the analog ICs market is 3.6%. Driven by the continuous expansion and deepening of high and low voltage conversion scenarios, the market size is expected to grow to RMB 10.2 billion by 2029.

China Digital Isolator IC Market Size, by Sale Revenue

	CAGR	2020-2024	2025E-2029E
Isolated Driver		10.2%	8.9%
Digital Isolator		6.4%	7.6%
Isolated Interface		9.8%	9.4%
Others		-1.3%	-5.2%
Total		7.9%	7.8%

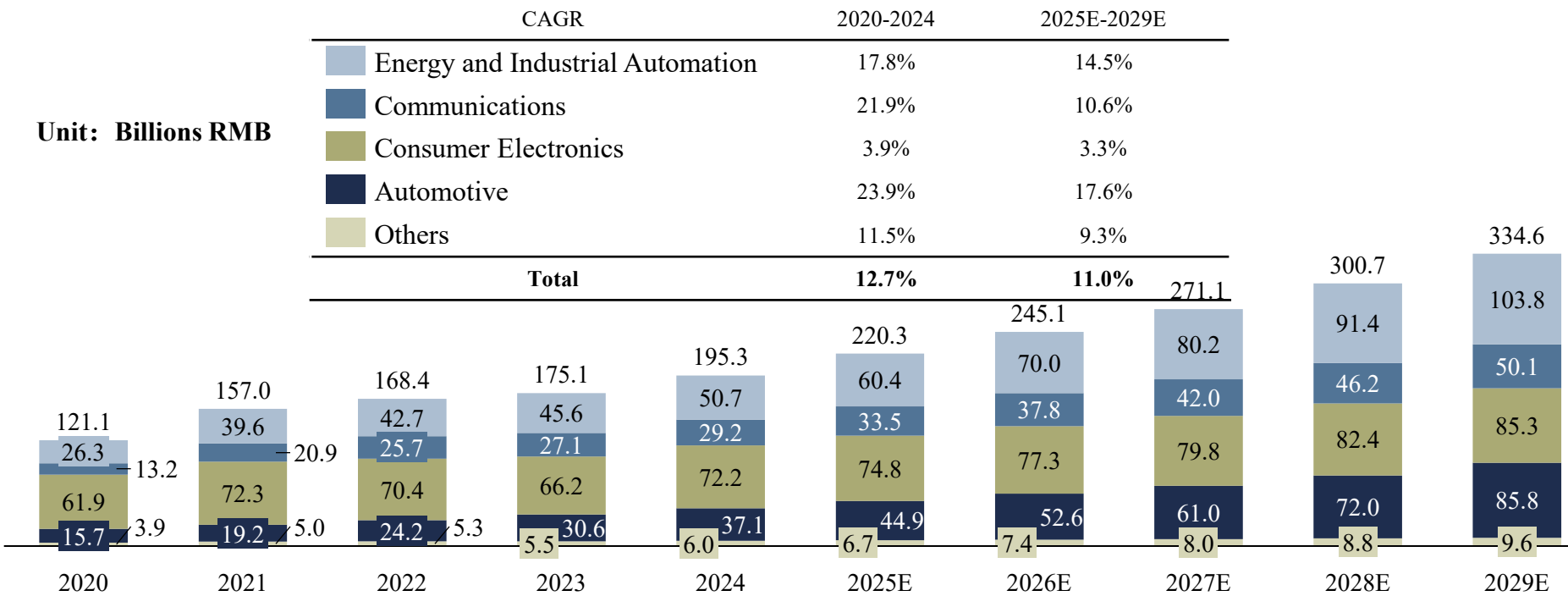


Overview of Global and China Analog IC Market

China Analog IC Market Size by Downstream Industry, 2020-2029E

- In the China analog IC market, consumer electronics, the largest downstream application field, occupied a market share of 37% by 2024, with a market size of RMB72.2 billion. The automotive electronics field relies on the development of new energy vehicles and advancement of autonomous driving technology, and therefore the demand of analog ICs continues to increase. In 2024, the market size of analog ICs in automotive application reached RMB37.1 billion. It is expected that the corresponding market size will expand to RMB85.8 billion by 2029. In addition, driven by the development of the smart manufacturing industry and new energy power generation (such as solar power and energy storage) in the fields of energy and industrial automation, as well as the increasing demand for servers, the use of analog ICs is constantly growing. It is expected that the market size of energy and industrial automation segment will increase from RMB 50.7 billion in 2024 to RMB 103.8 billion in 2029, with a CAGR of 14.5% from 2025 to 2029.

China Analog IC Market Size by Downstream Industry



1. Others refer to downstream such as medical equipment, aerospace, humanoid robots, e-VOTL, etc.

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Market Drivers of Analog IC

The downstream mainstream application market continues to expand and upgrade

Analog chips have extremely extensive downstream applications, and there is a substantial demand for them in electronic-related products and industries. In communication facilities, analog chips are responsible for signal modulation, demodulation, and amplification, ensuring high-speed and stable transmission of network data. In the automotive field, analog chips facilitate precise control of the power system, processing of in-vehicle sensor signals, and optimization of in-car entertainment, supporting the efficient and safe operation of vehicles as well as providing a comfortable experience. Regarding consumer electronics, analog chips accurately manage the power supply of devices such as mobile phones and tablets, optimize audio and video signals, and enhance users' audio-visual experience and battery life. In medical equipment, analog chips convert physiological signals into electrical signals and process them precisely, providing crucial support for the high precision and reliability of diagnostic and monitoring devices. With the rapid development of artificial intelligence and the surging demand for data center computing, analog ICs play an increasingly prominent role in key components such as servers and battery management systems. In servers, they manage power precisely for stable CPU, GPU and storage operation. In battery management, they monitor parameters in real-time for data center continuity, jointly providing hardware support for AI development. The continuous development of these fields and the upgrading of equipment jointly create a vast market space and stable growth for analog chips.

The development of Emerging fields continues to release growth momentum

Emerging markets are also further expanding the market space for analog ICs. The sensor signal processing of the humanoid robot and the sensing system in eVTOL requires a large number of signal chain ICs to process the collected continuous Analog signals. At the same time, the motor controlling the motion of the robot and eVTOL also requires a large number of power management ICs. In the future, with the development of robot and eVTOL technology, the analog ICs market will continue to rise.

National policy support to accelerate industry development

Since 2018, tighter export controls from major tech-producing countries have restricted China's access to advanced Analog ICs, exemplified by limitations on high-performance data converters. These measures have highlighted the critical importance of domestic Analog ICs production and technology self-sufficiency within China's Analog ICs industry. The development of domestic Analog ICs is emphasized as essential for protecting national data security, ensuring supply chain stability, and supporting economic growth. For Example, Several Policies to Promote the High-quality Development of Integrated Circuit Industry and Software Industry in the New Period (《新时期促进集成电路产业和软件产业高质量发展的若干政策》) was released to promote the domestic development of integrated circuit including analog ICs.

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Market Trends of Analog IC(1/2)

The self-sufficiency rate of Analog ICs in mainland China continues to increase

In recent years, with the domestic semiconductor industry policy support and enterprises increasing investment, the self-sufficiency rate of Analog ICs in mainland China has risen steadily. Local manufacturers have continuously overcome key technologies, increasingly enriched their product lines, gradually replaced some imported products, and increased their penetration in fields such as consumer electronics, automotive electronics and industrial control, which has effectively promoted the sustainable growth of self-sufficiency rate.

In the field of consumer electronics, China's analog ICs localization rate has reached 40%-50%, especially in the field of mobile phones, and the localization rate of power management ICs has reached 90%. In the field of communications, China's analog ICs localization rate reached 20% - 25%, but in the field of automotive electronics, although China's analog ICs manufacturers have made breakthroughs, the localization rate is still low, about 5%, and 10-15% in the field of industrial.

R & D and innovation continue to improve the performance of Analog ICs products

The technology of Analog ICs industry changes rapidly, and domestic enterprises attach great importance to R & D and innovation. By setting up a professional R & D team and investing a large amount of money, domestic companies have made in-depth research on core technologies such as Analog circuit design and process. Continuously optimize product performance, such as improving accuracy, reducing power consumption and enhancing stability, to meet the stringent requirements of downstream markets for high-performance Analog ICs.

M & A and expansion further concentrated the market share to local leading manufacturers

The intensification of industry competition has prompted enterprises to seek large-scale development. Local Analog ICs manufacturers actively carry out M & A and expansion by virtue of their capital and technical advantages. By integrating high-quality assets, expanding product lines, improving the layout of the industrial chain, enhancing market competitiveness, attracting more customer resources, and thus accelerating the convergence of market share to leading enterprises, the industry concentration is expected to increase.

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Market Trends of Analog IC(2/2)

Improvement of the global competitiveness of local enterprises promotes the implementation of the overseas strategy

With technology accumulation and product performance optimization, the global competitiveness of Analog ICs enterprises in mainland China has significantly increased. Leading enterprises have emerged in the international market by virtue of cost-effective advantages and localized services. Actively expand overseas markets, promote products to the world by establishing overseas subsidiaries and sales networks, realize the steady implementation of the sea going strategy, and enhance international influence.

As one of the world's largest automobile producers and consumers, China's development in the field of new energy vehicles is particularly rapid, China's new energy vehicle production and sales have ranked first in the world for eight consecutive years. New energy vehicles require a large number of analog ICs in the production process, which also provides a large market for Chinese analog ICs manufacturers. China auto manufacturers are more inclined to choose local analog ICs companies to ensure the stability of the supply chain and reduce costs. Is a huge driving force in the development of analog ICs.

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Development Challenges of Analog IC

Technical challenges

- High - end Analog ICs demand advanced semiconductor Professional knowledge and R&D experience. Their complex circuit designs require in - depth knowledge of Analog circuit theory. These high technical requirements translate into high commercial value. The few domestic companies that can produce such ICs face difficulties in mastering key technologies like high - precision Analog - to - digital conversion, making domestic substitution mainly occur in mid - and low - end products, while high - end products lag far behind and need significant time to close the gap.

Competition Pressure

- Giants in the international market, such as Texas Instruments (TI), not only reduce prices but also continuously innovate in product features. Their well - established brand images and large - scale production enable them to offer cost - effective products. In contrast, domestic products have a long way to go in brand building and expanding production scale. In mid - and high - end fields, customers are extremely cautious about product quality, and the ability to ensure continuous delivery over time. Long - term cooperation is essential to build the necessary trust, which is a major obstacle for domestic emerging companies.

Industry Chain

- Some key software for ICs design, like advanced electronic design automation (EDA) tools, and high - end manufacturing equipment are mainly supplied by foreign companies. This means domestic ICs design and production are still dependent on foreign technology. Although China's packaging and testing industry has a large - scale and high - efficiency advantage globally, there are weaknesses in design algorithms and manufacturing precision. Fluctuations in the international economic situation, such as trade disputes and sanctions, can disrupt the supply of these critical software and equipment, severely restricting the development of the domestic ICs industry.

Safety Certification

- High - end Analog ICs used in industries like aerospace and automotive electronics must meet extremely strict safety certification standards. For example, in the automotive industry, they need to pass functional safety certifications such as ISO 26262. Obtaining recognition from different countries, various industries, and diverse target markets around the world involves complex procedures, including multiple rounds of product testing, documentation review, and on - site audits. This is a long - drawn - out and resource - intensive process that poses a major challenge to the promotion of high - end Analog ICs.

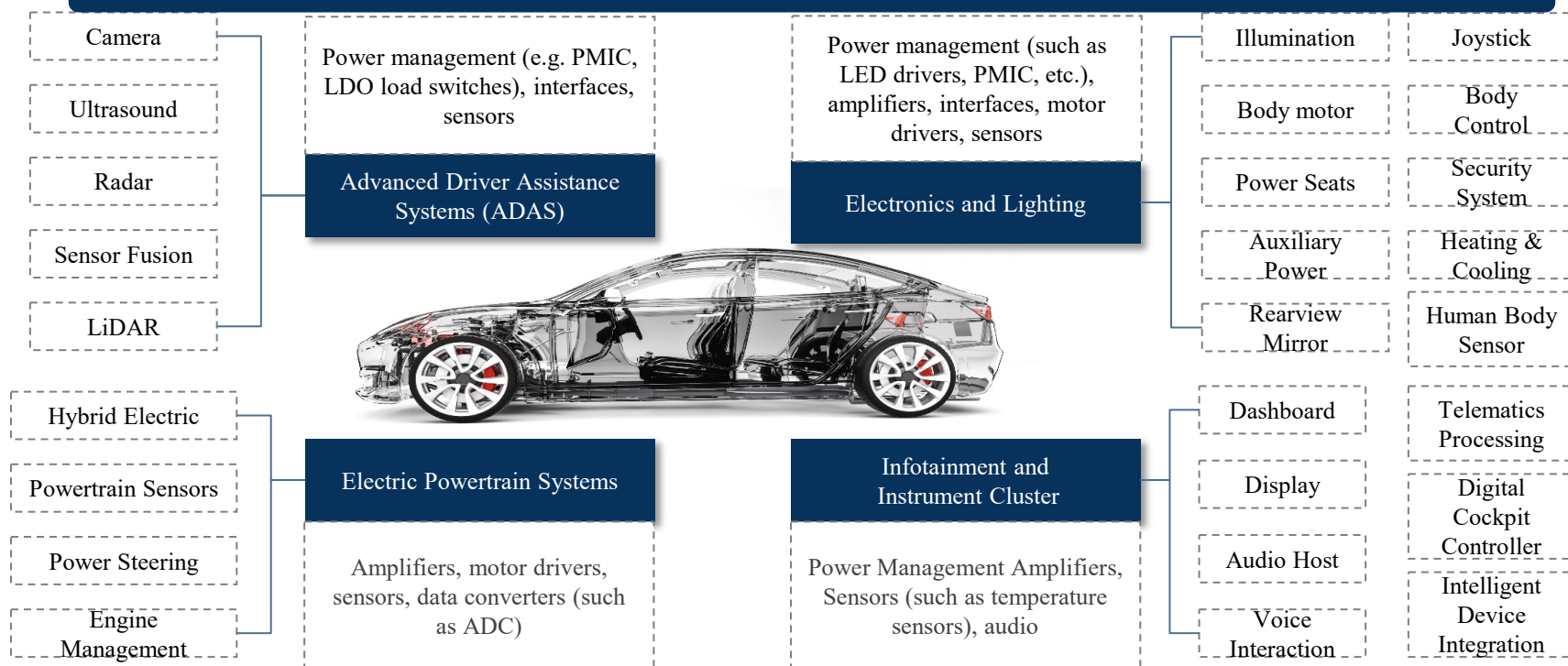
Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Application of Analog IC in the Automotive Field

- Driven by automotive electrification and intelligence, Analog ICs bridge physical and digital domains in vehicle electronics. Unlike traditional fuel vehicles, the power mode of new energy vehicles consists of batteries, motors, and electronic controls, and the system involves multiple energy conversions, which requires the use of a large number of analog devices. And they power traditional systems and NEV components while enabling intelligent features like multi-screen cockpits and autonomous sensor processing. NEVs lead as the fastest growing, most innovative Analog ICs segment, fueled by high voltage architectures and advanced function iteration, driving industry-wide tech advancements and market growth. In 2024, the value of analog ICs in a single new energy vehicle is about RMB 1500- RMB 2800, and it is expected to reach RMB 2200 - RMB 4000 in 2029

Application of Analog ICs in Automotive Field



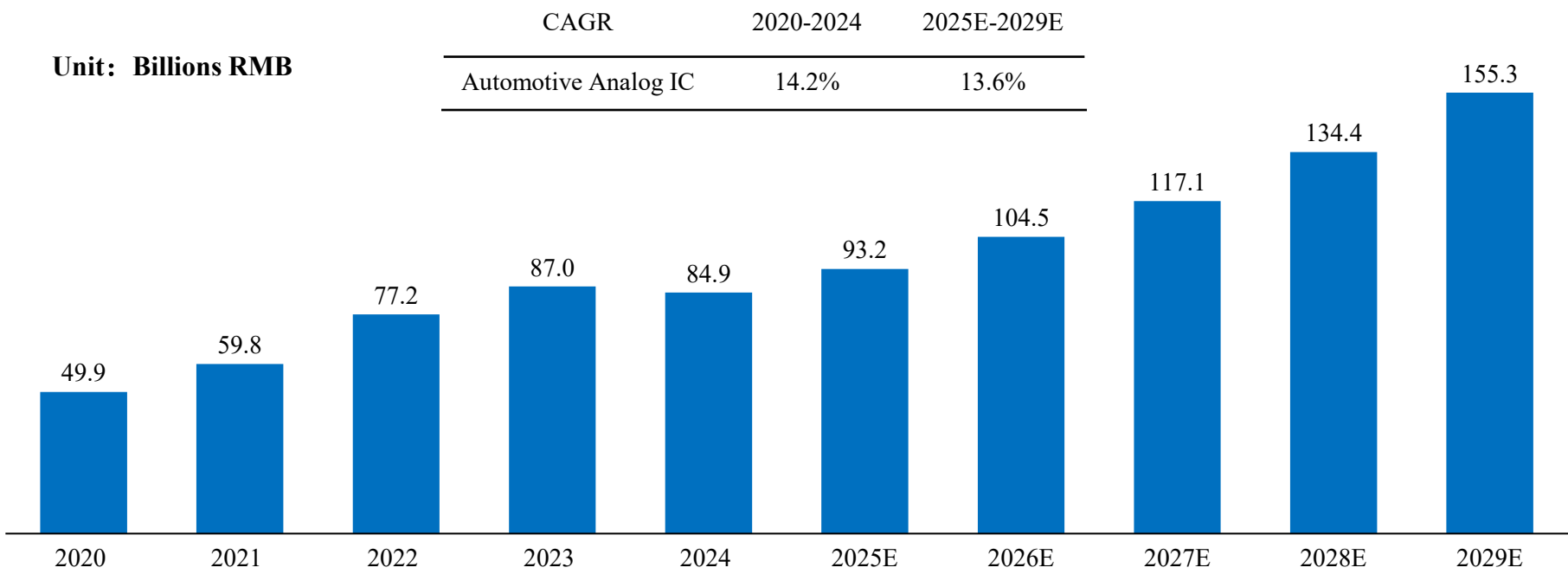
Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Global Automotive Analog IC Market Size, 2020-2029E

- The market size of Global Automotive Analog ICs has grown from RMB 49.9 billion to RMB 84.9 billion, and the CAGR of the global automotive Analog ICs market from 2020 to 2024 is 14.2%. During the forecast period of 2025 to 2029, the CAGR of it is expected to be 13.6%, and the market size will further expand to RMB 155.3 billion. This is mainly due to the rapid development of automotive intelligence and electrification, which has increased the demand for Analog integrated circuits in battery management, sensor interfaces, power management, and other areas, driving market growth.

Global Automotive Analog IC Market Size



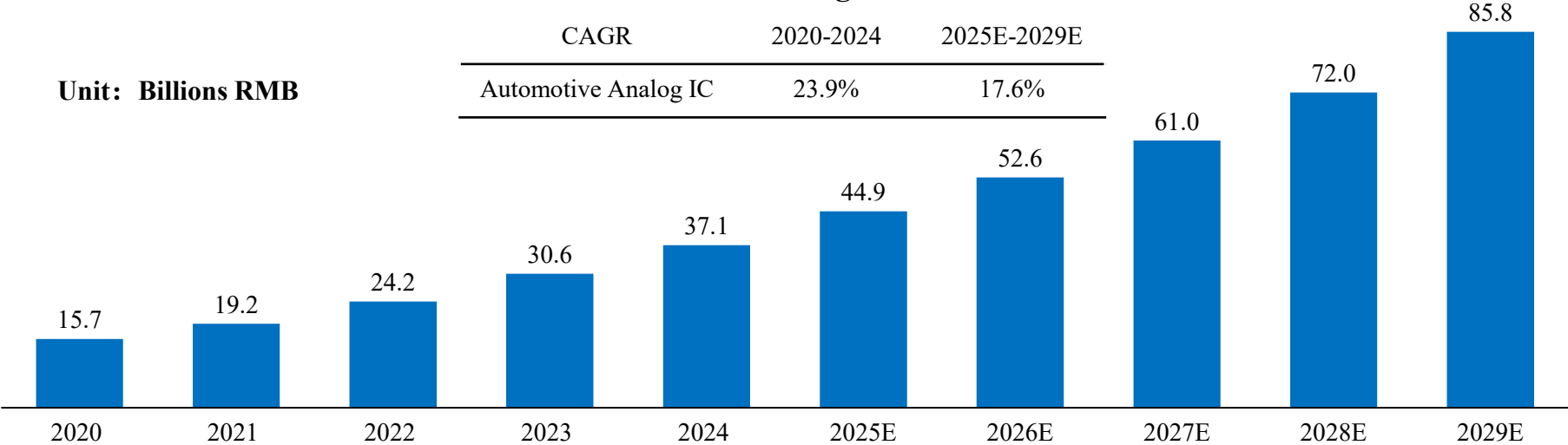
Source: WSTS, Frost & Sullivan

Overview of Global and China Analog IC Market

China Automotive Analog IC Market Size, 2020-2029E

- In 2024, the market size of China’s automotive Analog ICs has reached RMB 37.1 billion, benefiting from the booming development of new energy vehicles and the rapid growth in demand for automotive electronics; Compared to traditional cars, the demand for Analog ICs in new energy vehicles is driven by electrification and intelligence. Such fields as power systems, body domain, car cabin, autonomous driving, in car entertainment, body electronics, and lighting. The penetration rate of new energy vehicles (including pure electric/plug-in hybrid/extended range) in China rapidly increased from 5.4% in 2020 to 40.9% in 2024. In the light of continuous development of the Chinese automotive industry in the future, the Chinese automotive electronic analog chip industry will continue to flourish, with a growth rate exceeding the global average growth rate .The Chinese automotive analog ICs market is expected to steadily grow, reaching RMB 85.8 billion by 2029, with a CAGR of 16.7%.
- Due to high technological barriers and reliability requirements, the automotive industry currently stands as one of the sectors with the lowest localization rate of analog ICs in China. In 2024, the localization rate of analog chips in automotive sector was merely around 5%. However, with the continuous enhancement of China’s automotive industry’s position in the international market, increasing the localization rate of chips has become a common aspiration within the industry. Coupled with the increasing R&D investments and active sales deployments made by domestic analog IC companies targeting on automotive, the market share of domestic analog IC companies in the automotive sector is expected to rise significantly. It is expected that by 2029, the localization rate of analog ICs in China’s automotive industry will increase to 20%.

China Automotive Analog IC Market Size



Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Market Drivers and Trends of Automotive Analog IC



China's automobile production and sales growth drives Analog ICs demand expansion

China's automobile production and sales continue to rise, injecting strong momentum into the analog IC market. In 2024, the sales volume of automobiles in China has reached a new high with a sales volume totaled 31.4 million units. For the same year, China exported more than 5.8 million units of automobiles, making it the country with the largest number of automobile exports in the world for the second consecutive year. The huge scale of China's automotive industry and its continuous growth momentum serve as a solid foundation for the development of the domestic automotive analog chip industry. It is also expected to enable domestic analog chip manufacturers to participate more deeply in international market competition.



The electrification transformation has led to a surge in the value of single-vehicle ICs

China is leading the growing of the global new energy vehicle industry. In 2024, the sales volume of new energy vehicles in China exceeded 12.8 million units, nearly ten times the scale in 2020, accounting for more than 65% of the global new energy vehicle market share. In 2024, the penetration rate of new energy vehicles in China reached 40.9%. It is expected that by 2029, the penetration rate will exceed 75%. The development of the new energy vehicle industry will provide long-term demand support for the analog chip market. The power system of new energy vehicles is composed of power batteries, motors, electronic control, etc. The multiple energy conversions and interconnections among these electrical systems require a large number of analog chips, making the value of analog chips in new energy vehicles three times higher than that in traditional fuel-powered vehicles.



Intelligent technology innovation has given rise to emerging application scenarios

The intelligent development of automobiles has become one of the important development trends in the automotive industry. Automobile manufacturers are constantly enriching the intelligent functions of vehicles to attract consumers' attention. . Advancement in smart cockpit and autonomous driving technologies are accelerating the expansion of the Analog ICs market. Multi-sensor fusion solutions (such as LiDAR, millimeter-wave radar, and cameras) make up for the shortcomings of pure vision solutions, driving demand for signal chain and power management ICs. In addition, the continuous popularization large-screen and multi-screen smart cockpits also drives the growth of display driver ICs. Besides the electrification of automobiles, the intelligent development of automobiles will serve as another key factor driving the growth of the automotive analog chip market.

Overview of Global and China Analog IC Market

Market Drivers and Trends of Automotive Analog IC



The rise of domestic automobile brands has strengthened the security defense line of Analog ICs supply chain

With the continuous improvement of the proportion of domestic automobile brands in China market, from less than 40% in 2020 to 61% in 2024, the demand for supply chain security in the automotive industry has become increasingly prominent. Automotive analog integrated circuit as a key component, its stable supply is crucial, but the current automotive electronic analog chip localization rate is still very low with only 5%. In order to get rid of the dependence on foreign ICs, domestic automotive brands actively promote the localization of analog ICs to ensure the independent control of the supply chain and effectively drive the development of China domestic analog IC market. Domestic analog chip manufacturers are expected to embrace new opportunities, and their market share will be further enhanced. The localization rate is expected to reach 20% in 2029

Overview of Global and China Analog IC Market

Market Drivers and Trends of Analog IC in the Other Application Fields



Analog ICs application in energy and power industry

As the world pays more attention to sustainable development and reducing carbon emissions, the energy and power industry is undergoing a major transformation. High-efficiency, low-energy Analog ICs have become one of the key factors in achieving these goals. For example, in the field of renewable energy such as solar and wind power, efficient power conversion and management technology is essential. Analog ICs play an important role in optimizing energy conversion efficiency and improving system reliability and stability.



Analog ICs application in emerging fields industry

The development of emerging fields such as humanoid robots, eVTOL (electric vertical take-off and landing vehicles), and AI servers has put forward new demands on high-performance Analog ICs. These applications require ICs to have higher accuracy, faster response speed, and stronger environmental adaptability. The market size of analog ICs in the field of Pan-energy fields which includes these emerging industries reached RMB 50.7 billion in 2024, and is expected to reach RMB 103.8 billion in 2029, with a CAGR of 14.5% during the forecast period.



Analog ICs application in Consumer Electronics industry

In order to meet the market demand for miniaturization, portable devices and energy-saving solutions, the design trend of Analog ICs is to continuously increase integration while reducing power consumption. Product complexity can be reduced by adopting advanced manufacturing processes and innovative design methods. Consumer electronics such as mobile phones, computers and home appliances are getting smaller and smaller, and the degree of intelligence is getting higher and higher, which also puts higher requirements and more demands on analog chips.



Analog ICs application in Industrial control industry

As various applications increase their signal processing requirements, Analog ICs need to be able to maintain stable and accurate signal conversion capabilities under a wider range of environmental conditions. For example, in the field of industrial control, accurate capture and processing of sensor signals is crucial, and key performance indicators such as product linearity, dynamic range, and signal-to-noise ratio will continue to improve.

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Entry Barriers



Technology and Talent barriers

Analog ICs design demands a comprehensive and intricate consideration of a wide array of parameters, including power consumption, accuracy, and power supply voltage. This complexity makes it highly reliant on long - term accumulated experience. Talent reserves are also crucial. However, a large number of top - tier talents are concentrated in leading companies like Texas Instruments. These leading firms offer better pay, more advanced R & D facilities, and greater career development opportunities. As a result, new entrants face significant challenges in attracting and cultivating high - level teams, which severely restricts their technological innovation and product development capabilities.



Capital barriers

Analog ICs necessitate long - term and substantial R & D investment. With the continuous advancement of technology, the process difficulty escalates under advanced processes. Moreover, leading companies, such as Analog Devices, have formed significant scale advantages through years of accumulation. They can spread the high R & D costs over a large number of products. In contrast, new entrants not only need to invest heavily in R & D but also have to bear the risk of initial losses due to low market share and high costs, making it extremely difficult for them to break into the market.



Customer and Verification Barriers

End customers, particularly in the automotive and industrial fields, have extremely high requirements for ICs reliability. ICs used in cars, for example, must endure harsh environmental conditions like high temperatures, vibrations, and electromagnetic interference. This requires long-term and rigorous testing and verification. Leading companies have established strong customer and verification barriers through stable supply and excellent product reputation over the years. Customers in these industries are highly risk-averse and tend to choose partners with a proven track record of good historical performance. New entrants find it arduous to obtain orders quickly as they lack the necessary certification and customer recognition, which hinders their market penetration.



Supply Chain barriers

Analog ICs mainly adopt either the IDM or Fabless model. For new entrants, establishing stable cooperation with wafer fabs is essential. However, the resources of leading foundries are limited. These foundries prioritize large - scale customers with long - term contracts. Small companies often struggle to secure production capacity. Although trade frictions and ICs shortages have disrupted the original closed - loop supply chain, they have also introduced greater risks of supply chain fluctuations. For example, sudden disruptions in the supply of raw materials or manufacturing capacity constraints can affect product delivery. Companies need to have a rapid response mechanism in place to deal with such uncertainties, which poses another challenge for new entrants in the Analog ICs market.

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Cost and Price Analysis of Analog Integrated Circuits

The cost of analog ICs is primarily composed of wafer fabrication, and packaging & testing. Among these, wafer fabrication and packaging & testing each account for 50% of the cost structure. Given the extensive application scenarios and diverse product models of analog ICs, their price range spans from a few cents to several dollars. Typically, consumer-grade analog ICs have lower prices, industrial-grade analog ICs occupy a mid-range price segment, while automotive-grade analog ICs command higher prices due to high technical barriers. The pricing of analog ICs is primarily influenced by product specifications and market competition dynamics.

In recent years, influenced by fluctuations in market demand and changes in the competitive environment, analog ICs have exhibited varying trends of change across different downstream sectors. Particularly in the automotive industry, with the enhancement of the technological capabilities of domestic companies and breakthrough in localization, domestic players have engaged in intense competition with some overseas companies in this field, resulting in a significant decline in product prices. By deeply exploring customer needs, domestic companies are expected to continuously engage in product and application innovation to expand their differentiated competition with international manufacturers in the future.

Source: Frost & Sullivan

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Competitive Landscape of Global and Chinese Sensor Industry

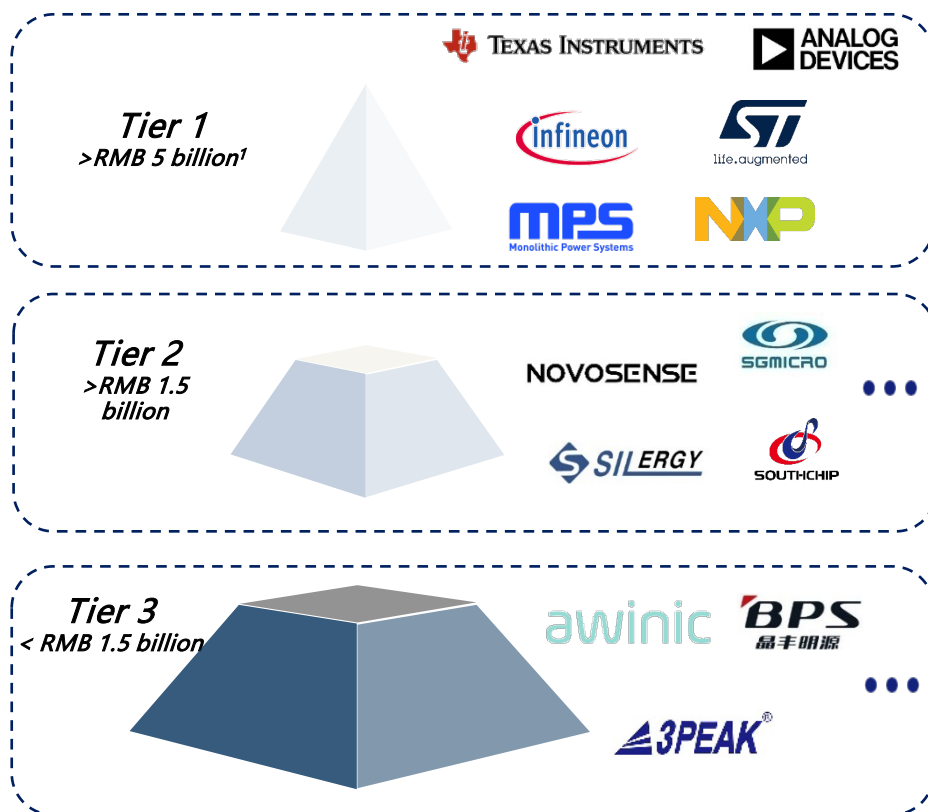
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Appendix

Competitive Analysis of China's Analog IC Market

Competitive Landscape Overview

- China's analog IC industry exhibits a diversified competitive landscape, featuring global leaders, rising domestic challengers, and niche players—all vying for market share and driving technological advancements. The competitive landscape of China's analog IC industry is stratified into distinct tiers by revenue in China, each comprising companies with varying market influence and revenue levels.



Tier 1: Dominated by global giants such as Texas Instruments (TI), Analog Devices (ADI), Infineon, Monolithic Power Systems (MPS), STMicroelectronics (STM), and NXP Semiconductors (NXP). These companies are recognized as market leaders in analog ICs, holding significant global market shares and generating revenues ranging from RMB 5 billion to RMB 15 billion in China, with continuous innovation to maintain their competitive edge.

Tier 2: Includes leading Chinese analog IC firms such as NOVOSENSE, Silergy, SG Micro, and Southchip Technology. These companies have been rapidly emerging in recent years, steadily expanding their competitiveness. While they do not dominate the market like first-tier global players, they hold notable positions in China, with annual revenues typically exceeding RMB 1.5 billion.

Tier 3: Comprises smaller-scale analog IC companies such as AWinic, Bright Power, and 3PEAK. Compared to upper-tier players, these firms have limited resources and market influence, mainly targeting the consumer electronics sector, with revenues generally below RMB 1.5 billion. Despite their smaller size, they play a vital role in fostering industry innovation and competition.

Note:

- Sales revenue generated in China from Analog ICs products in 2024.

Source: Frost & Sullivan

Competitive Landscape of Analog IC

International Analog IC Provider Introduction

Main Application Field		Company Background
A	Industrial, Automotive,	A listed company founded in 1930, headquartered in the U.S. mainly engaging in developing analog integrated circuits and other types of semiconductor products (e.g. Logic & Voltage Translation, Microcontrollers & Processors). The company's business covers the global market. In 2024, the company generated USD 15.6 billion of revenue.
B	Industrial, Automotive, Consumer Electronics	A listed company founded in 1965, headquartered in the U.S. mainly engaging in developing analog integrated circuits and other types of semiconductor products (e.g. Sensors, Amplifiers, Data Converters). The company's business covers the global market. In 2024, the company generated USD 9.4 billion of revenue.
-	Communications, Others	A listed company founded in 1962, headquartered in the U.S. mainly engaging in developing analog integrated circuits and other types of semiconductor products.
C	Automotive, Industrial, Others	A listed company founded in 1999, headquartered in Germany, mainly engaging in developing analog integrated circuits and other types of semiconductor products (e.g. Metal-Oxide-Semiconductor Field-Effect Transistor, Insulated-Gate Bipolar Transistor). The company's business covers the global market. In 2024, the company generated EUR 15.0 billion of revenue.
D	Automotive, Industrial, Others	A listed company founded in 2004, headquartered in the U.S. mainly engaging in developing analog integrated circuits and other types of semiconductor products (e.g. Power Converters, Automotive Power Integrated Circuits). The company's business covers the global market. In 2024, the company generated USD 2.2 billion of revenue.
E	Automotive, Consumer Electronics, Industrial	A listed company founded in 1987, headquartered in Switzerland, mainly engaging in developing analog integrated circuits and other types of semiconductor products (e.g. Secure Microcontrollers, Discrete & Power Transistors). The company's business covers the global market. In 2024, the company generated USD 13.3 billion of revenue.

Competitive Landscape of Analog IC

International Analog IC Provider Introduction

	Main Application Field	Company Background
F	Automotive, Communications, Industrial	A listed company founded in 2006, headquartered in the Netherlands, mainly engaging in developing analog integrated circuits and other types of semiconductor products (e.g. Embedded Processors & Controllers, Integrated Circuits). The company's business covers the global market. In 2024, the company generated USD 12.6 billion of revenue.
I	Automotive, Industrial, Others	A listed company founded in 1999, headquartered in the U.S. mainly engaging in developing analog integrated circuits and other types of semiconductor products (e.g. Power Management Integrated Circuits, Signal Management Integrated Circuits). The company's business covers the global market. In 2024, the company generated USD 7.1 billion of revenue.
L	Automotive, Industrial, Others	A listed company founded in 1958, headquartered in Japan, mainly engaging in developing analog integrated circuits and other types of semiconductor products (e.g. Power Stage Integrated Circuits, Complementary Metal-Oxide-Semiconductor Operational Amplifiers). The company's business covers the global market. In 2024, the company generated JPY 448.5 billion of revenue.
N	Automotive, Industrial, Consumer Electronics	A listed company founded in 2003, headquartered in Japan, mainly engaging in developing analog integrated circuits and other types of semiconductor products (e.g. Microcontrollers & Microprocessors, Automotive Products). The company's business covers the global market. In 2024, the company generated JPY 1348.5 billion of revenue.
K	Communications, Others	A listed company founded in 1957, headquartered in the U.S., mainly engaging in developing analog integrated circuits and other types of semiconductor products (e.g. Active Antenna Systems, Frequency Converters & Sources). The company's business covers the global market. In 2024, the company generated USD 3.8 billion of revenue.

Competitive Landscape of Analog IC

China Analog IC Provider Introduction

	Main Application Field	Company Background
G	Automotive, Industrial, Consumer Electronics	A listed company founded in 2008, headquartered in Hangzhou, China, mainly engaging in developing power management integrated circuits (e.g. Direct Current to Direct Current Converters and Alternating Current to Direct Current Converters, Power Modules). The company's business covers China's market. In 2024, the company generated TWD 18.5 billion of revenue.
H	Consumer Electronics, Communications, Industrial	A listed company founded in 2007, headquartered in Beijing, China, mainly engaging in developing analog integrated circuits (e.g. Voltage References, Interface). The company's business covers China's market. In 2024, the company generated RMB 3.4 billion of revenue.
J	Consumer Electronics, Industrial, Others	A listed company founded in 2015, headquartered in Shanghai, China, mainly engaging in developing power management integrated circuits (e.g. Controller Area Network Chips, Buck-Boost Chargers). The company's business covers China's market. In 2024, the company generated RMB 2.6 billion of revenue.
	Industrial, Consumer Electronics	A listed company founded in 1988, headquartered in Shanghai, China. Mainly engaging in developing power management and other types of semiconductor products.
-	Automotive, Industrial, Energy, Consumer Electronics	Established in 2013 and headquartered in Suzhou. Its main business is design, development and sales of analog and mixed signal chips, focusing on sensor, signal chain and power management. Its products are widely applied in such markets as automotive electronics, industrial automation, renewable energy, consumer electronics etc. The company was listed on the Shanghai STAR Market in 2022.
M	Communications, Consumer Electronics, Others	A listed company founded in 2013, headquartered in Hangzhou, China, mainly engaging in developing power management integrated circuits (e.g. Power Management Chips, Battery Management Chips). The company's business covers China's market. In 2024, the company generated RMB 1.7 billion of revenue.
	Communications, Consumer Electronics, Others	A listed company founded in 2008, headquartered in Shanghai, China, mainly engaging in developing analog integrated circuits and other types of semiconductor products.
	Consumer Electronics, Industrial, Others	A listed company founded in 2008, headquartered in Suzhou, China, mainly engaging in developing analog integrated circuits.
-	Industrial, Others	A private company founded in 2016, headquartered in Chengdu, China. , mainly engaging in developing analog integrated circuits.

Competitive Landscape of Analog ICs

Ranking of China Analog ICs Market Participants in 2024, by Revenue of Analog IC Products

- In terms of revenue of Analog ICs in the Chinese market in 2024, NOVOSENSE ranked 14th in the Chinese Analog ICs market and 5th among Chinese manufacturers.

Ranking	Code	Business Model	Region	Revenue ¹ (Billion RMB)	Market share
1	A	IDM	United States	16.5	8.4%
2	B	IDM	United States	12.1	6.2%
3	C	IDM	Germany	10.3	5.3%
4	D	Fabless	United States	8.7	4.4%
5	E	IDM	Switzerland	7.6	3.9%
6	F	IDM	Netherlands	6.5	3.3%
7	G	Fabless	China	4.1	2.1%
8	H	Fabless	China	3.3	1.7%
9	I	IDM	United States	2.9	1.5%
10	J	Fabless	China	2.6	1.3%
11	K	IDM	United States	2.3	1.2%
12	L	IDM	Japan	2.2	1.1%
13	M	Fabless	China	1.7	0.9%
14	-	Fabless	China	1.7	0.9%
15	N	IDM	Japan	1.5	0.8%
16	-	Fabless	China	1.5	0.8%
Others				109.8	56.2%
Total				195.3	100.0%

Note:

- Revenue refers to sales revenue generated in China from Analog ICs products in 2024.

Source: Frost & Sullivan

Competitive Landscape of Signal Chain ICs

Ranking of Signal Chain ICs Market Participants in 2024, by Revenue of Signal Chain IC Products

- In terms of revenue of Signal Chain ICs in the Chinese market in 2024, NOVOSENSE ranked 9th in the Chinese Signal Chain ICs market and 2nd among Chinese manufacturers. The following table presents the ranking of manufacturers in China Signal Chain ICs market, as measured by revenue of Signal Chain ICs in 2024.

Ranking	Code	Business Model	Region	Revenue ¹ (Billion RMB)	Market share
1	B	IDM	United States	11.5	16.3%
2	A	IDM	United States	6.6	9.3%
3	F	IDM	Netherlands	5.9	8.3%
4	E	IDM	Switzerland	4.3	6.1%
5	C	IDM	Germany	3.6	5.1%
6	K	IDM	United States	1.9	2.6%
7	I	IDM	United States	1.2	1.6%
8	H	Fabless	China	1.1	1.5%
9	-	Fabless	China	1.0	1.4%
10	-	IDM	United States	0.9	1.3%
Others				32.7	46.5%
Total				70.7	100.0%

Note:

1. Revenue refers to sales revenue generated in China from Signal Chain ICs products in 2024.

Source: Frost & Sullivan

Competitive Landscape of Automotive Analog ICs

Ranking of Automotive Analog ICs Market Participants in 2024, by Revenue of Automotive Analog ICs

- In terms of revenue of Automotive Analog ICs in the Chinese market in 2024, NOVOSENSE ranked 10th in the Chinese Automotive Analog ICs market and ranked 1st among Chinese manufacturers. The following table presents the ranking of manufacturers in China Automotive Analog ICs market, as measured by revenue of Automotive Analog ICs in 2024.

Ranking	Code	Business Model	Region	Revenue ¹ (Billion RMB)	Market share
1	A	IDM	United States	7.4	20.0%
2	B	IDM	United States	6.1	16.4%
3	C	IDM	Germany	4.6	12.5%
4	D	Fabless	United States	4.1	11.0%
5	F	IDM	Netherlands	3.4	9.1%
6	E	IDM	Switzerland	2.9	7.8%
7	I	IDM	United States	1.3	3.4%
8	L	IDM	Japan	0.8	2.1%
9	N	IDM	Japan	0.8	2.0%
10	-	Fabless	China	0.7	1.8%
11	G	Fabless	China	0.4	1.1%
12	M	Fabless	China	0.2	0.5%
13	H	Fabless	China	0.2	0.4%
Others				4.2	11.9%
Total				37.1	100.0%

Note:

- Revenue refers to sales revenue generated in China from Automotive Analog ICs products in 2024.

Source: Frost & Sullivan

Competitive Landscape of Digital Isolated ICs

Ranking of Digital Isolated ICs Market Participants in 2024, by Revenue of Digital Isolated ICs

- In terms of revenue of Digital Isolated ICs in the Chinese market in 2024, NOVOSENSE ranked 2nd in the Chinese Digital Isolated ICs market and ranked 1st among Chinese manufacturers. The following table presents the ranking of manufacturers in China Digital Isolated ICs market, as measured by revenue of Digital Isolated ICs in 2024.

Ranking	Code	Business Model	Region	Revenue ¹ (Billion RMB)	Market share
1	A	IDM	United States	1.6	23.1%
2	-	Fabless	China	1.1	15.6%
3	C	IDM	Germany	0.6	8.6%
4	F	IDM	Netherlands	0.5	6.4%
5	B	IDM	United States	0.4	5.1%
6	E	IDM	Switzerland	0.3	4.3%
7	I	IDM	United States	0.3	4.1%
8	L	IDM	Japan	0.2	3.0%
9	-	IDM	United States	0.2	2.9%
10	-	Fabless	China	0.2	2.8%
Others				1.7	24.0%
Total				7.1	100.0%

Note:

1. Revenue refers to sales reIsolated erated in China from Digital Isolated ICs products in 2024.

Source: Frost & Sullivan

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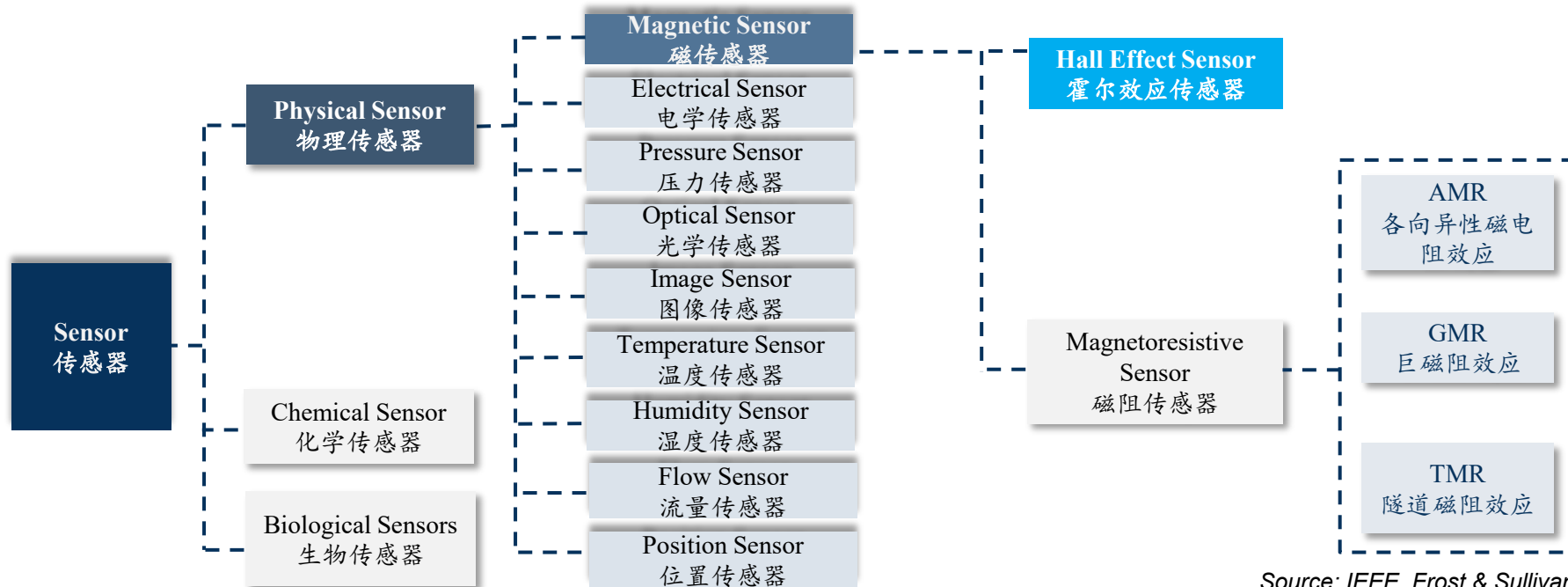
Appendix

Overview of the Global and Chinese Sensor Industry

Definition and Classification of Sensor

- Sensors can be classified into two forms: chip-level sensors and module-level sensors. A chip-level sensor is a sensor that integrates functional elements and circuits onto a single chip, such as pressure sensors, magnetic sensors, temperature sensors, humidity sensors, optical sensors, acoustic sensors, etc. A module-level sensor is a module that integrates multiple chip-level sensors or other components together to form a unit with specific functions, such as camera, radar, LiDAR, etc.
- A chip-level sensor can perceive, detect and respond to the external environment or the internal state change of the system. It can convert physical quantity, chemical quantity, biomass and other measured signals (e.g. temperature, pressure, light intensity, humidity, movement, etc.) into recognizable electrical signals or other forms of output signals (e.g. voltage, current, digital signals, etc.), in order to measure, record, transmit, or control.
- The core components of a chip-level sensor include the sensing element, integrated circuit, and packaging structure. Among these, signal conditioning chip, a type of analog IC, is a critical part of the sensor, as it processes the raw signals (such as microvolt-level voltages or resistance changes) from the sensing element and converts them into usable digital signals. In the case of magnetic sensors, the analog IC plays a pivotal role in achieving high precision and low power consumption. Through advanced integration and seamless collaboration between the analog IC and the sensing element, magnetic sensors have found widespread applications in automotive electronics, industrial automation, medical devices, consumer electronics, and many other fields.

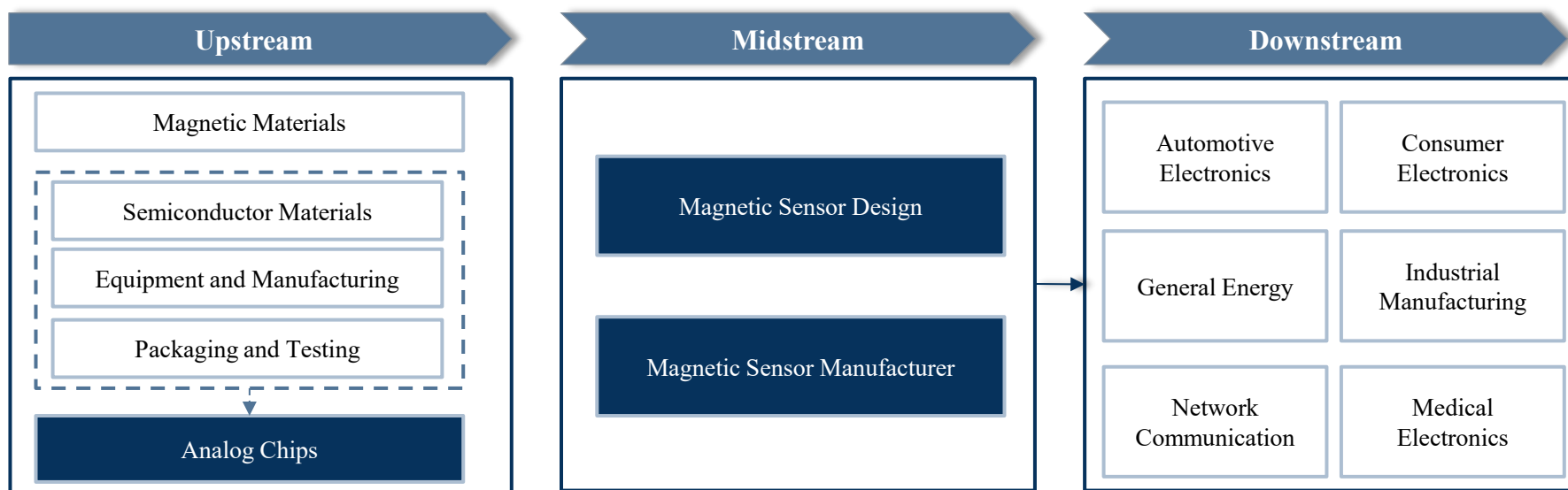
Classification of Sensor



Source: IEEE, Frost & Sullivan

Overview of the Global and Chinese Sensor Industry

Magnetic sensors Industry Chain



- The magnetic sensors industry chain involves a large number of different participants. The upstream of the magnetic sensors industry chain encompasses suppliers of magnetic materials and analog chips, in addition to semiconductor materials, equipment and manufacturing, packaging and testing, which are essential steps of producing analog midstream sensors as well as analog chips. As the core electronic component of sensors, analog chips enhance sensor accuracy and stability.
- The midstream consists of magnetic sensor design and manufacture, responsible for integrating upstream materials and chips to develop magnetic sensor products that meet various application demands. For magnetic sensor companies, owning proprietary analog chips reduces procurement costs, eliminates dependence on external suppliers, and optimizes production processes through internal coordination, thereby lowering overall manufacturing costs. In terms of independent R&D, mastering core component technology accelerates product iteration, allows flexible design of analog chip to match sensor needs and enables technical synergy, enhancing sensor performance and establishing differentiated competitive advantages.
- In the downstream segment, magnetic sensor can be applied in broad applications such as automotive electronics, consumer electronics, industrial manufacturing, network communications, medical electronics, and general energy sectors. The growing demand for magnetic sensors is being driven by emerging applications such as humanoid robots, drones, and autonomous driving.

Source: Public information, Frost & Sullivan

Overview of the Global and Chinese Sensor Industry

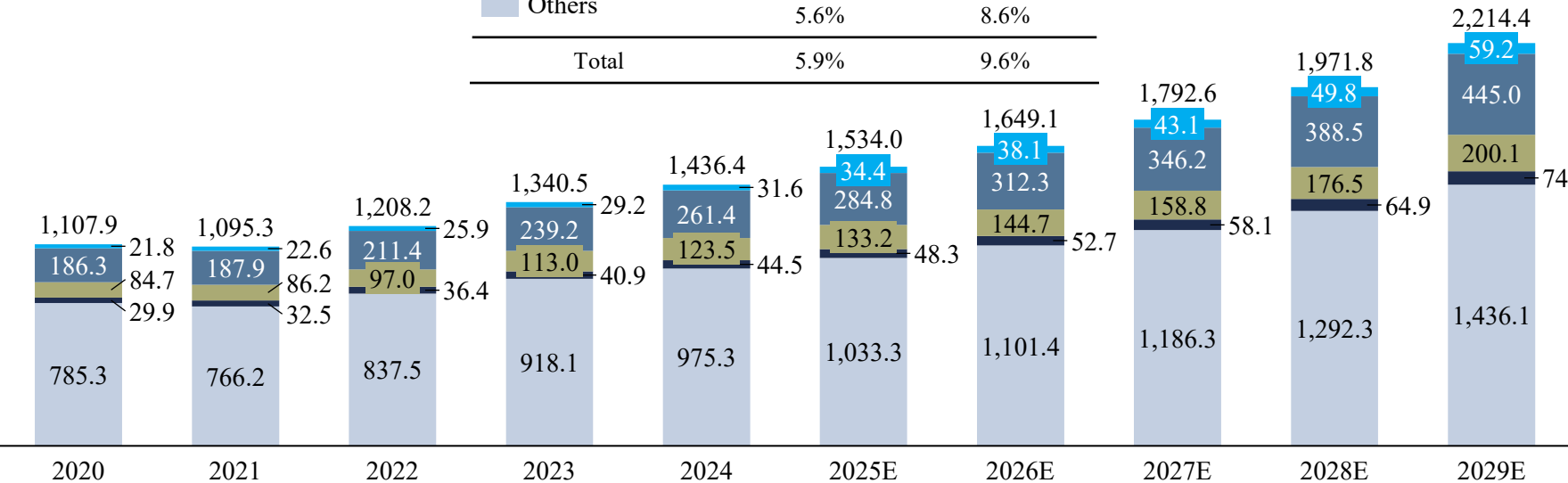
Global Sensor Market Size Analysis and Forecast, 2020-2029E

- In 2024, the global sensor market size reached RMB 1,436.4 billion, with magnetic sensors accounting for RMB 31.6 billion, pressure sensors for RMB 216.4 billion, temperature sensors for RMB 123.5 billion, and humidity sensors for RMB 44.5 billion. With the rising adoption of autonomous driving, industrial automation, and smart consumer electronics, the demand for magnetic sensors continues to grow, driven by their critical role in motor control, current sensing, and position tracking. The global sensor market is expected to grow steadily, reaching RMB 2,214.4 billion by 2029, with a CAGR of 9.6%.

Global Sensor Market Size, by Sale Revenue

	CAGR	2020-2024	2025E-2029E
Magnetic Sensor		9.8%	14.5%
Pressure Sensor		8.8%	11.8%
Temperature Sensor		9.9%	10.7%
Humidity Sensor		10.5%	11.3%
Others		5.6%	8.6%
Total		5.9%	9.6%

Unit: Billion RMB



Note: Others refer to physical sensors other than the common types such as motion sensors, distance sensors, and radio frequency sensors, as well as chemical sensors and biosensors.

Source: Yole, Frost & Sullivan

Overview of the Global and Chinese Sensor Industry

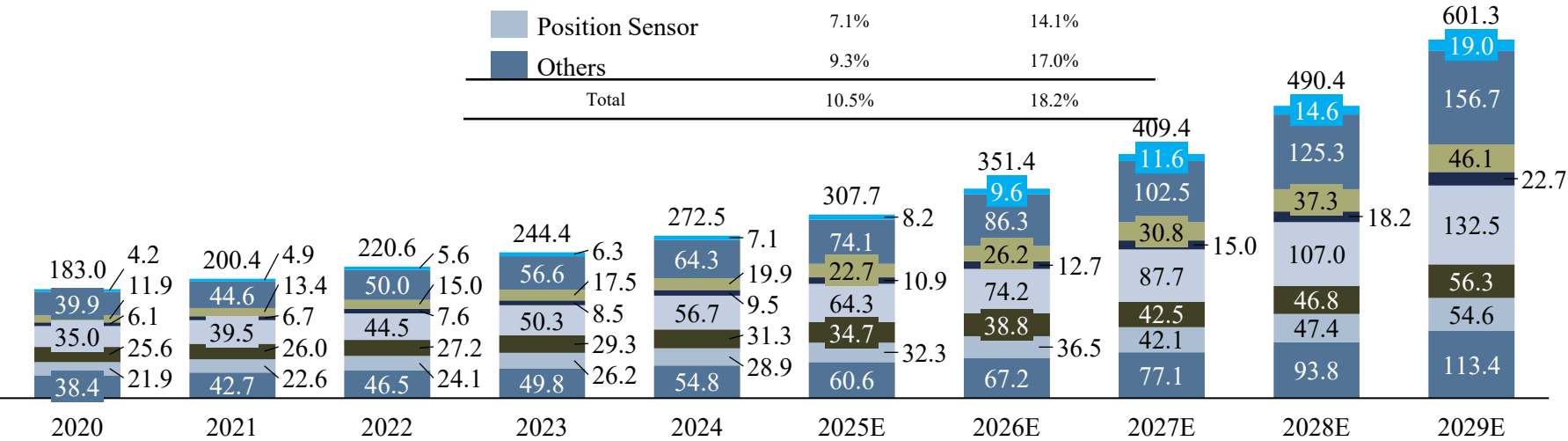
China Sensor Market Size Analysis and Forecast, 2020-2029E

- In 2024, the China sensor market size reached RMB 272.5 billion, with magnetic sensors accounting for RMB 7.1 billion, pressure sensors for RMB 64.3 billion, temperature sensors for RMB 19.9 billion, and humidity sensors for RMB 9.5 billion. With the development of new energy and intelligent vehicle, industrial automation, and smart consumer electronics, the demand for magnetic sensors continues to grow, driven by their critical role in motor control, current sensing, and position tracking. The China sensor market is expected to grow steadily, reaching RMB 601.3 billion by 2029, with a CAGR of 18.2% from 2025 to 2029. the market size of magnetic sensors is expected to increase to RMB 19.0 billion by 2029, representing the fastest growth rate among all sensor segments.
- Magnetic sensor can convert the magnitude and change of magnetic field into electrical signal, applied for detecting parameters such as position, speed, and direction. Magnetic sensors are widely used in various fields such as the automotive industry, industrial applications, consumer electronics, humanoid robots, and healthcare. Among them, benefiting from the trends of electrification and intelligence in the automotive industry, the automotive sector is the sub-field where magnetic sensors are most extensively applied. In 2024, the market size of magnetic sensors in the automotive field accounted for approximately 54.1% of the total market size of magnetic sensors.

China Chip-level Sensor Market Size, by Sale Revenue

	CAGR	2020-2024	2025E-2029E
Magnetic Sensor		13.6%	23.5%
Pressure Sensor		12.7%	20.6%
Temperature Sensor		13.8%	19.4%
Humidity Sensor		11.9%	20.0%
Image Sensor		12.8%	19.8%
Flow Sensor		5.2%	12.9%
Position Sensor		7.1%	14.1%
Others		9.3%	17.0%
Total		10.5%	18.2%

Unit: Billion RMB



Note: Others refer to physical sensors other than the common types such as motion sensors, distance sensors, and radio frequency sensors, as well as chemical sensors and biosensors.

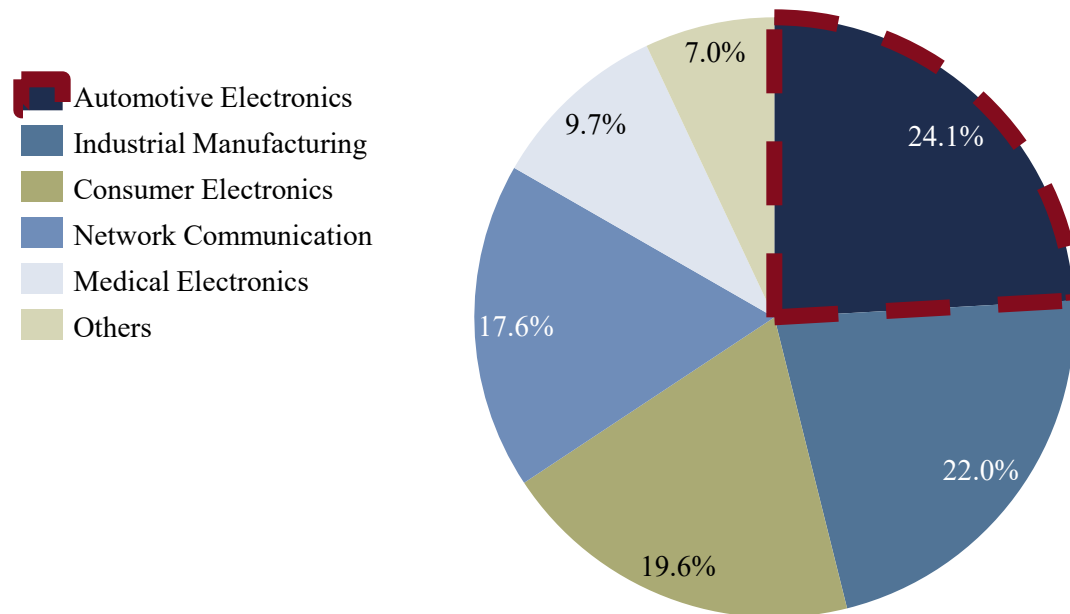
Source: Yole, SICA, Expert Interview, Frost & Sullivan

Overview of the Global and Chinese Sensor Industry

Global and China Sensor End Applications Distribution Analysis

- In 2024, sensors have been widely integrated across various sectors, including automotive electronics, industrial manufacturing, and consumer electronics, with automotive electronics accounting for 24.1%, ranking among the top end application fields. In recent years, the demand for sensors in automobiles has surged with the widespread adoption of new energy vehicles. The number of sensors used in new energy vehicles and autonomous vehicles is 2 to 4 times that of traditional fuel-powered vehicles, which are extensively applied in ADAS, autonomous driving, power systems, body control, and in-vehicle environment monitoring. With the expansion of the new energy vehicle market and the proliferation of intelligent driving technology, automotive electronics have become one of the most crucial application markets for sensors, with future market demand and technological advancements expected to continue driving industry growth.

Sensor End Applications Distribution, 2024



Source: Expert Interview, Frost & Sullivan

Overview of the Global and Chinese Sensor Industry

Market Drivers of the Global and Chinese Sensor Industry

Accelerated Advancement of the High-End Sensor Industry Under Policy Guidance

The Chinese government has actively introduced policies such as the Guiding Opinions on Promoting the Development of the Energy Electronics Industry 《关于推动能源电子产业发展的指导意见》), and the Industrial Structure Adjustment Guidance Catalogue (2024 Edition)(《产业结构调整指导目录（2024年本）》). These policies aim to promote the research, development, and application of miniaturized, low-power, highly integrated, and high-sensitivity sensing components, as well as advanced sensors capable of multidimensional information acquisition. The Industrial Structure Adjustment Guidance Catalogue (2024 Edition)(《产业结构调整指导目录（2024年本）》) includes sensor products in the encouraged category across six key sectors, including automotive and intelligent manufacturing. These measures further clarify the Chinese sensor industry's development direction, drive technological upgrades in sensors, and expand their application scenarios.

Strong Demand Supported by Traditional Application

The rapid expansion of China's magnetic sensor industry is primarily fueled by the increasing demand for domestic substitution. In the automotive electronics sector, the rise of new energy vehicles has driven the need for high-precision magnetic sensors, particularly for motor control and position detection applications. Meanwhile, industrial automation advancements have accelerated the adoption of domestically produced high-performance sensors, improving system stability and intelligence. Additionally, the development of smart grids necessitates a large-scale deployment of highly reliable magnetic sensors for current detection and power monitoring. With the growing emphasis on self-sufficiency, China's magnetic sensor market is experiencing rapid growth, accelerating technological breakthroughs and market penetration.

Surging Demand Driven by Emerging Field

The advancement of humanoid robotics necessitates high-precision motion control and real-time feedback, accelerating the adoption of magnetic sensors in high-performance encoders to ensure precise joint movement and stability. Simultaneously, eVTOL, electric vertical take-off and landing aircraft, demands enhanced anti-interference capabilities and environmental adaptability, optimizing navigation, attitude control, and power system stability. As a core component of encoders, magnetic sensors—characterized by high value and high technical barriers—are poised for unprecedented growth in these emerging fields.

Source: Frost & Sullivan

Overview of the Global and Chinese Sensor Industry

Market Trends of the Global and Chinese Sensor Industry



Emerging Industries Demand High-Precision, High-Interference-Resistant Magnetic Sensors for Complex Applications

The advancement of humanoid robotics necessitates high-precision motion control and real-time feedback, accelerating the adoption of magnetic sensors in high-performance encoders to ensure precise joint movement and stability. Simultaneously, drones and autonomous vehicles demand enhanced anti-interference capabilities and environmental adaptability, optimizing navigation, attitude control, and power system stability. As a core component of encoders, magnetic sensors—characterized by high value and high technical barriers—are poised for unprecedented growth in these emerging fields.



Expansion of Low-Power Magnetic Sensor Applications

Low-power magnetic sensors, offering ultra-low energy consumption, high sensitivity, and exceptional stability, demonstrate significant advantages in energy-constrained applications. In the renewable energy sector, solar inverters and energy storage systems require continuous 24-hour monitoring of current and magnetic field states. Low-power Hall-effect and TMR switch chips enable precise current detection while significantly reducing standby power consumption, ensuring sustained and efficient system operation.



Integration and Intelligence Evolution of Magnetic Sensors

Magnetic sensors are advancing toward higher integration and intelligence to meet the miniaturization demands of modern electronics. Integration involves the fusion of accelerometers, gyroscopes, and magnetic sensors into multi-functional modules, incorporating on-chip signal processing and microcontrollers to enhance response efficiency and reduce costs. Intelligent evolution leverages algorithms and machine learning for magnetic field analysis, intrusion detection, and adaptive calibration, enhancing measurement precision. The synergy of integration and intelligence enables magnetic sensors to play a critical role in high-precision, adaptive, and low-power applications, underpinning the evolution of modern electronic systems.

Source: Frost & Sullivan

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Appendix

Overview of Competitive Landscape of Sensor Market

Introduction To Enterprises In The Market Competitive Landscape

Code	Introduction
-	Suzhou NOVOSENSE Microelectronics Co., Ltd was established in 2013 and headquartered in Suzhou. Its main business is design, development and sales of analog and mixed signal chips, focusing on sensor, signal chain and power management. Its products are widely applied in such markets as automotive electronics, industrial automation, renewable energy, consumer electronics etc. The company was listed on the Shanghai STAR Market in 2022.
-	A private company founded in 2012, headquartered in Shanghai, mainly engaging in researching, developing, manufacturing and selling MEMS sensor chips and sensor systems.
-	A private company founded in 2010, headquartered in Suzhou, mainly engages in the research and development, production and sales of magnetic sensor chips, magnetic encoders and other products.
-	A private company founded in 2011, headquartered in Shanghai, mainly engages in the research, development, design and sales of analog and analog-digital hybrid integrated circuits.
-	A listed company founded in 2005, headquartered in Shanghai, mainly engages in the research, development and design, packaging, testing and sales of intelligent sensors and analog-digital hybrid chips.

Source: Company website, Frost & Sullivan

Overview of Competitive Landscape of Sensor Market

Introduction To Enterprises In The Market Competitive Landscape

Code	Introduction
O	A listed company founded in 1991, headquartered in the USA, mainly engaging in designing, developing, and marketing sensor and power integrated circuits. The company's business covers the global market. In 2024, the company generated \$1.0 billion of revenue.
C	A listed company founded in 1999, headquartered in Germany, mainly engaging in the development and manufacturing of power semiconductors, microcontrollers, sensors, and security ICs for automotive, industrial, and consumer electronics markets.
F	A listed company founded in 2006, headquartered in Netherlands, mainly engaging in the design and development of analog and digital integrated circuits for automotive, industrial, mobile, and communication infrastructure applications.
P	A private company founded in 1983, headquartered in Japan, mainly engaging in the development of analog and mixed-signal integrated circuits, magnetic sensors, and electronic devices for audio, industrial, and automotive applications. The company's business covers the global market.
R	A listed company founded in 1885, headquartered in the U.S., mainly engaging in developing aerospace systems, building technologies, and industrial automation equipment (e.g. Sensors, Process Control Systems, Safety & Productivity Solutions). The company's business covers the global market. In 2024, the company generated USD 38.5 billion of revenue.
Q	A private company founded in 1886, headquartered in Germany, mainly engaging in developing automotive technologies, industrial control systems, and IoT solutions (e.g. Advanced Driver-Assistance Systems, Sensors, Power Semiconductors, Smart Home Devices). The company's business covers the global market. In 2024, the company generated USD 99.0 billion of revenue.
-	A private company founded in 1938, headquartered in Japan, mainly engaging in the development and manufacturing of electronic components including passive components, magnetic sensors, power devices, and piezoelectric products for automotive, industrial, and consumer electronics.
U	A private company founded in 2015, headquartered in Japan, mainly engaging in the development of CMOS image sensors. The company's business covers the global market.

Source: Company website, Frost & Sullivan

Competitive Landscape of China Magnetic Sensor Industry

Ranking of Manufacturers in China Magnetic Sensor Market for Chinese Manufacturers, by sale revenue in 2024

- In 2024, the market size of chip-level magnetic sensors in China reached RMB7.1 billion. NOVOSENSE ranked 1st with the market share of 7.1% among Chinese companies. The following table presents the ranking of Chinese companies by revenue of magnetic sensors in 2024.

Ranking of Chinese Manufacturers in China Magnetic Sensor Market, by sale revenue, 2024

Ranking	Code	Region	Revenue (Billion RMB)	Market Share
1	-	China	0.5	7.1%
2	V	China	0.3	4.7%
3	W	China	0.3	4.2%
4	X	China	0.3	4.0%
5	Y	China	0.3	3.7%
Top 5 in total			1.7	23.6%

Note:

1. NOVOSENSE 's revenue in the ranking table consists of the full-year 2024 revenue from magnetic sensors of NOVOSENSE and Magntek. NOVOSENSE completed the acquisition of Magntek in October 2024.

Source: Expert interviews, Frost & Sullivan

Competitive Landscape of China Magnetic Sensor Industry

Ranking of Manufacturers in China Magnetic Sensor Market for Manufacturers, by sale revenue in 2024

- In 2024, the market size of chip-level magnetic sensors in China reached RMB7.1 billion. NOVOSENSE ranked 5th with the market share of 7.1% among manufacturers in China. The following table presents the ranking of manufacturers in China by revenue of magnetic sensors in 2024.

Ranking of Manufacturers in China Magnetic Sensor Market, by sale revenue, 2024

Ranking	Code	Region	Revenue (Billion RMB)	Market Share
1	O	United States	1.2	16.2%
2	C	Germany	1.1	15.7%
3	F	Netherlands	0.8	10.6%
4	P	Japan	0.6	7.8%
5	-	China	0.5	7.1%
Top 5 in total			4.1	57.3%

Note:
1. NOVOSENSE 's revenue in the ranking table consists of the full-year 2024 revenue from magnetic sensors of NOVOSENSE and Magntek. NOVOSENSE completed the acquisition of Magntek in October 2024.

Source: Expert interviews, Frost & Sullivan

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Overview of Global and China Semiconductor Market

Basic Definition and Classification of Semiconductor



Definition

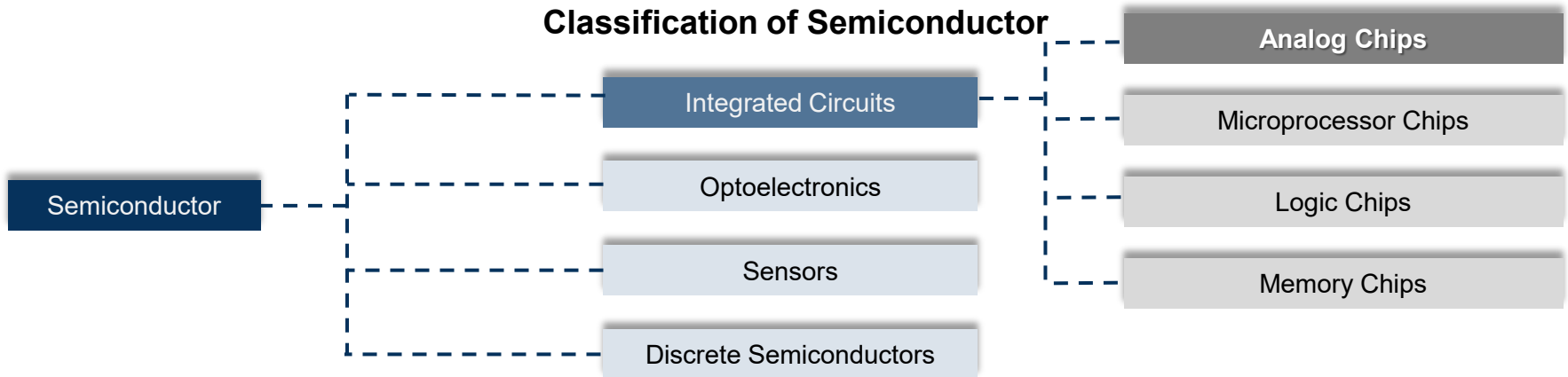
- Semiconductor is a material with electrical conductivity at room temperature which falls between that of a conductor and an insulator. Its conductivity depends on the number of charge carriers, primarily electrons and holes.



Classification

- Semiconductors can be generally classified into integrated circuits (ICs), discrete semiconductors, optoelectronics, and sensors based on their application function. The primary distinction between integrated circuits and the other three categories lies in integration density. Integration density refers to the number of transistors or circuit components that can be packed into a given chip area, affecting performance and efficiency. The number of transistors in an integrated circuit is significantly higher than that in discrete semiconductors, optoelectronics, and sensors, and the substrate materials also differ accordingly. Integrated circuits include analog chips, microprocessors chips, logic chips, and memory chips.

Classification of Semiconductor



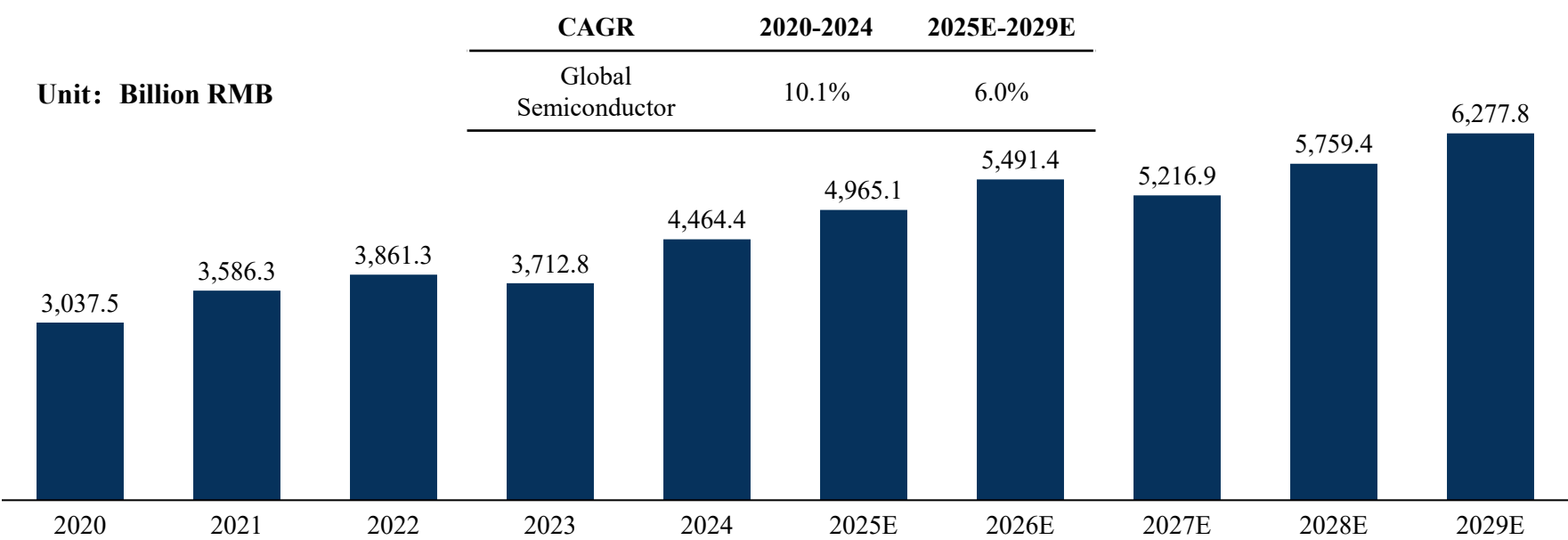
Source: CAS, Frost & Sullivan

Overview of Global and China Semiconductor Market

Global Semiconductor Market Size

- With the structural upgrade of consumer electronics and the increasing penetration of new energy vehicles, the global semiconductor market size reached RMB 3,037.5 billion in 2020 and continued to grow to RMB 3,861.3 billion in 2022. In 2023, it further declined to RMB 3,712.8 billion, before rebounding to RMB 4,464.4 billion in 2024. During the period from 2020-2024, the CAGR of the global semiconductor market was 10.1%. Before 2022, the semiconductor industry experienced a period of capacity expansion, which led to inventory buildup across various segments of the industry chain. In 2023, due to the overcapacity in earlier stages, sales were somewhat restricted, resulting in a temporary decline in market size. With the surging demand for artificial intelligence and high-performance computing, along with improving end-market demand and inventory normalization, the global semiconductor market has rebounded from its low point and entered the upward phase of the "silicon cycle." By 2029, the global semiconductor market size is expected to reach RMB 6,277.8 billion, with a compound annual growth rate of 6.0%. The semiconductor industry has historically experienced rapid fluctuations, including cyclical downturns due to constant and rapid technological changes, short product life cycles, and fluctuations in product supply and demand.

Global Semiconductor Market Size, 2020-2029E



Source: WSTS, Frost & Sullivan

Overview of Global and China Semiconductor Market

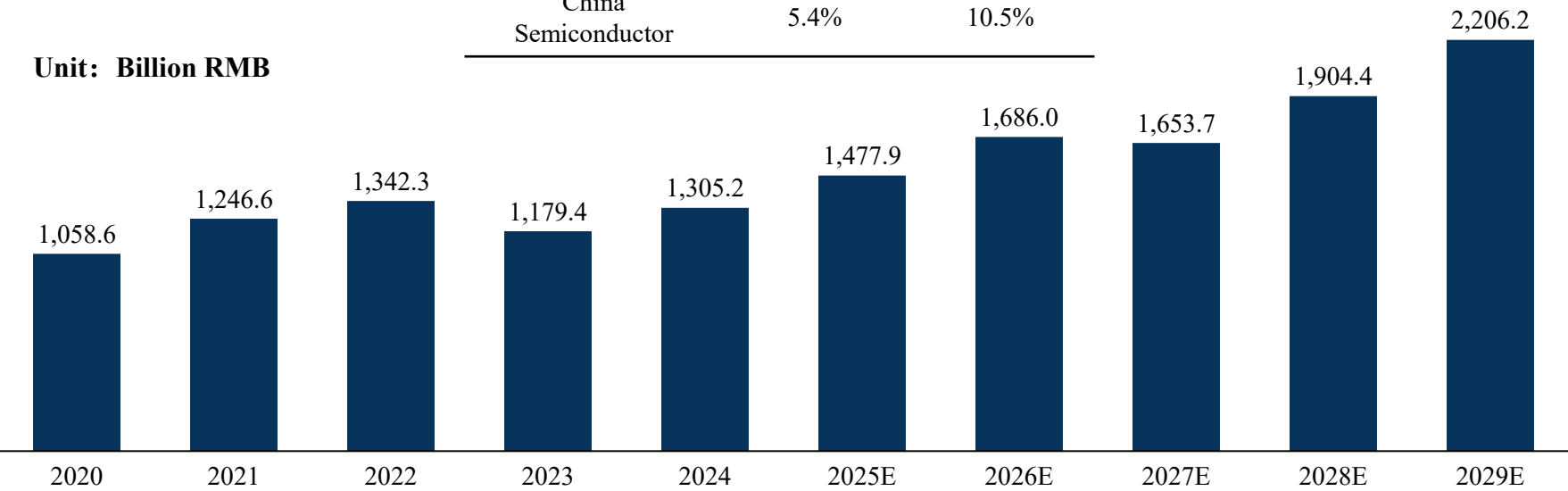
China Semiconductor Market Size

- In 2020, the size of the China semiconductor market was RMB1,058.6 billion. By 2022, it had risen to RMB1,342.3 billion, but then decreased to RMB1,179.4 billion in 2023. It reached to RMB1,305.2 billion in 2024. The China semiconductor market is experienced a CAGR of 5.4% from 2020 to 2024. Affected by the downturn in the global semiconductor market in 2023 and the sluggish demand for consumer electronics, the size of China semiconductor market experienced a certain degree of decline in 2023. With the development of emerging industries such as new energy vehicles, artificial intelligence large models, and the low-altitude economy, these fields will continue to drive significant demand for semiconductor products in China. It is expected that by 2029, the size of China semiconductor market will reach 2,206.2 RMB billion, with a CAGR of 10.5%.

China Semiconductor Market Size, 2020-2029E

CAGR	2020-2024	2025E-2029E
China Semiconductor	5.4%	10.5%

Unit: Billion RMB



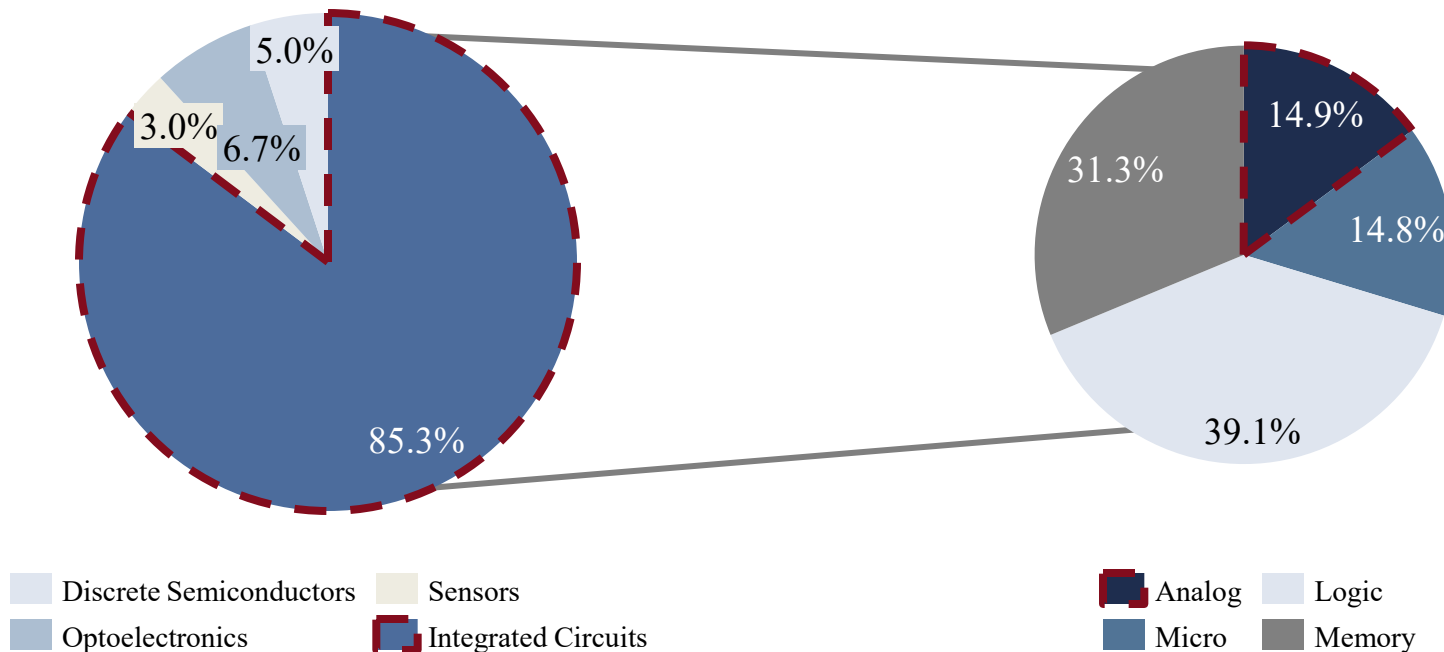
Source: WSTS, Frost & Sullivan

Overview of Global and China Semiconductor Market

Global Semiconductor Market Segmentation

- According to the World Semiconductor Trade Statistics (WSTS), the integrated circuit market is expected to reach RMB3,806.5 billion in 2024, making it the largest sub-sector within the semiconductor industry, accounting for approximately 85.3% of the total semiconductor market. In terms of product structure from WSTS, analog chips account for 14.9% of the integrated circuit.

Global Semiconductor Market Size Segmentation, 2024



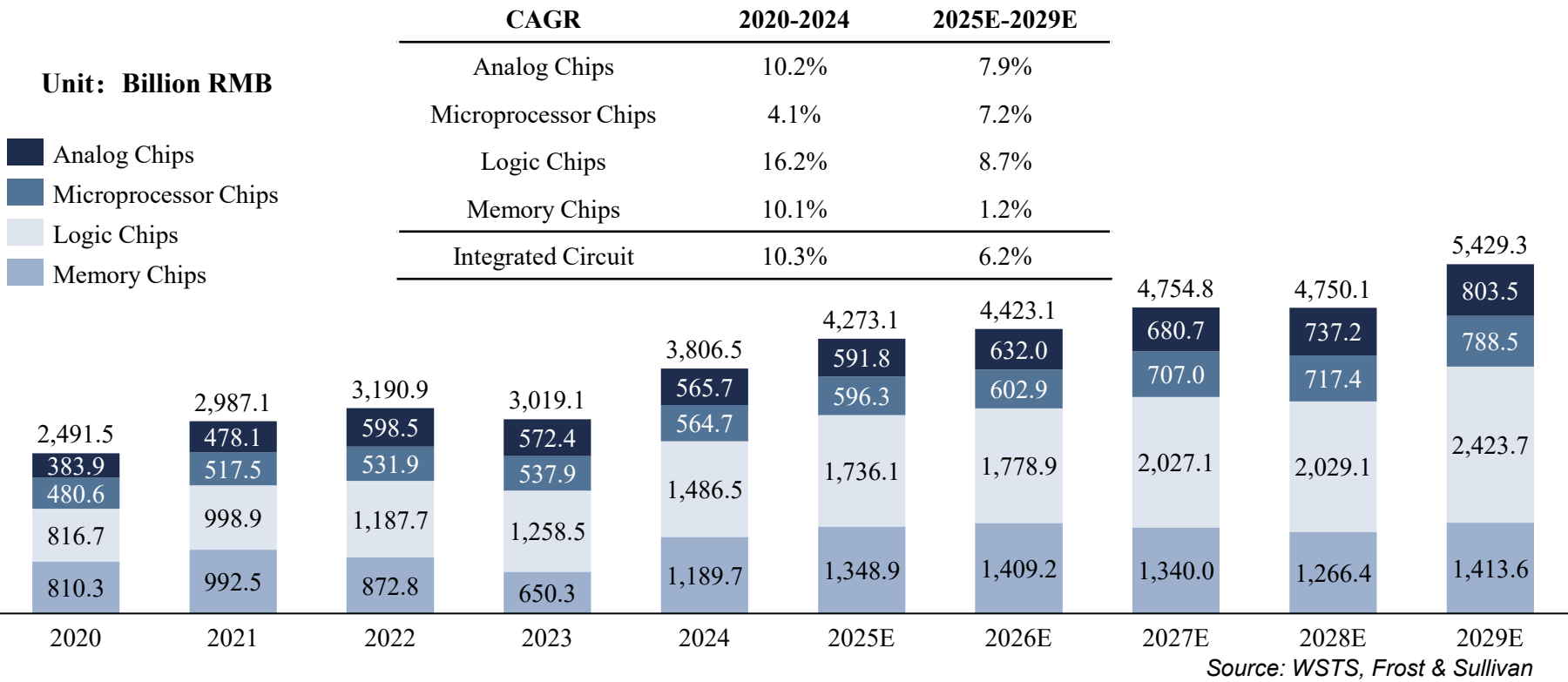
Source: WSTS, Frost & Sullivan

Overview of Global and China Semiconductor Market

Global Integrated Circuit Segments Market Size

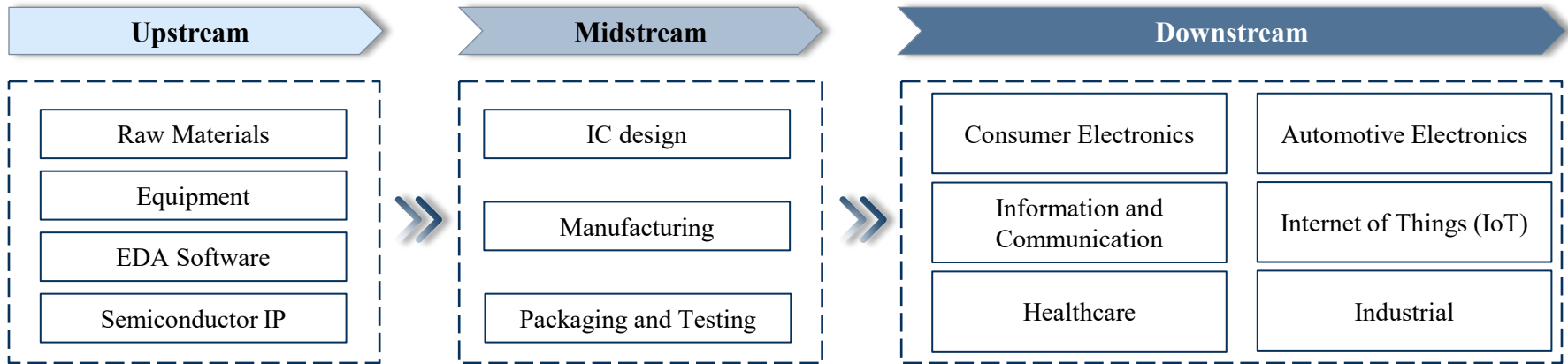
- The global integrated circuit market has shown a continuous growth trend from 2020 to 2029, with various segments expanding to different extents. In 2020, the global integrated circuit market size was RMB2,491.5 billion, and it is expected to grow to RMB3,806.5 billion by 2024 and reach RMB5,429.3 billion by 2029, with a CAGR of 10.3% from 2020 to 2024 and is projected to increase to 6.2% from 2025 to 2029. Among these segments, Analog Chips had a CAGR of 10.2% between 2020 and 2024, with a slight decrease to 7.9% from 2025 to 2029. However, its market size is still steadily growing, rising from RMB383.9 billion in 2020 to RMB565.7 billion in 2024 and reaching RMB 803.5 billion in 2029. With the development of IoT, automotive electronics, and 5G communication, the expansion of signal processing, sensor applications, and power management continues, driving growth in the demand for analog chips.

Global Integrated Circuit Segments Market Size, 2020-2029E



Overview of Global and China Semiconductor Market

Global Semiconductor Industry Chain



- The upstream segment provides the essential materials, equipment, design software, and semiconductor intellectual property (IP) required for chip production. This includes raw materials like silicon wafers, equipment such as lithography and etching machines, EDA (Electronic Design Automation) software for chip design, and semiconductor IP used in integrated circuits.
- The midstream segment focuses on IC design, manufacturing, and packaging & testing. IC design companies create chip architectures using EDA tools before sending them to manufacturing (foundries and IDMs), where semiconductor wafers are processed into chips. Once fabricated, chips undergo packaging and testing to ensure performance and reliability before entering into market. IDMs are companies that handle the entire semiconductor process, including design, manufacturing, packaging, and sales. Foundries are semiconductor manufacturers that specialize in producing chips designed by other companies without engaging in chip design themselves. Fabless companies focus solely on semiconductor design and outsource chip fabrication to foundries. Given that semiconductor R&D and production require deep coordination, fabless companies in the semiconductor industry typically maintain a long-term and in-depth partnership with only one foundry to ensure a stable supply of production capacity and continuous iteration of manufacturing technologies.
- The downstream segment involves various application industries that integrate semiconductors into end products, which including consumer electronics, automotive electronics, information and communication, the Internet of Things, healthcare and industrial industries.

Source: Public information, Frost & Sullivan

Overview of Global and China Semiconductor Market

Semiconductor Industry Feature Analysis

Semiconductor Industry Feature Analysis

Resource Intensity:

- Capital Barrier
- Talent and Technology
- Policy Support



Resource Intensity

- The semiconductor industry relies on substantial capital investment in research and development as well as the construction of production lines. With continuous iterations of cutting-edge technologies, there is a high demand for specialized technical talents, such as engineers. Policy support provide comprehensive assistance ranging from research and development subsidies to industrial planning.



Upstream-Downstream Cooperation

- Design and manufacturing companies must collaborate to address high-end chip production challenges. Manufacturers should also work closely with packaging and testing factories to adapt to advanced process integration. Cooperation with equipment and material suppliers drives industry innovation. The vertical division in semiconductors strengthens regional concentration and agglomeration.



Cyclical

- Global semiconductor sales show a ‘silicon cycle’ of 4-6 years. The production capacity expansion of semiconductor industry is quite slow, and the release of capacity often leads to a sharp price decline.

Source: Public information, Frost & Sullivan

Upstream-Downstream Cooperation:

- Design and Manufacturing
- Production and Packaging
- Equipment and Materials

Cyclical:

- “Silicon Cycle” of 4-6 years
- Long Production Expansion Cycle

Overview of Global and China Semiconductor Market

Semiconductor Industry Business Model

- The semiconductor industry primarily uses three business models: IDM, Fabless and Foundry. IDM companies manage design, manufacturing, packaging and testing products in-house, achieving efficiency and scale. It is suitable for large enterprises due to high investment and management costs. Examples include major international players like Samsung, SK Hynix and Micron Technology. Fabless focuses on design, R&D and outsourcing production. This model offers flexibility and low capital investment, making it ideal for smaller companies. However, it faces challenges in achieving process synergy and handling market risks. Foundry specializes in manufacturing chips for others, with a focus on efficiency but with large investment to maintain technology advancement. The specialized foundry capabilities and economies of scale of foundries have also provided strong support for Fabless, driving their rapid growth.

	IDM	Fabless	Foundry
Model Feature	➤ An integrated model of design, manufacturing, packaging and testing ➤ Most IC firms adopted it in the early days, while now only a few enterprises can maintain it	➤ Responsible for the circuit design and sales of chips ➤ Outsource production, testing and packaging	➤ Only responsible for manufacturing the chips
Model Advantages	➤ Optimization of design, manufacturing ➤ Experiment initially and promote new semiconductor technologies	➤ Light assets, small initial investment scale and less barrier of entrepreneurship ➤ Lower business running costs and relatively flexible finance transition	➤ Do not bear decision-making risks from downstream market research and product design defects
Model Disadvantages	➤ Large company scale and high managing costs ➤ High operating expenses and low capital return	➤ Unable to achieve process optimization compared with IDM, ➤ Have to bear various market risks compared with Foundry	➤ Large scale of investment and high cost to maintain its operation and production process ➤ Continuous investment to catch latest technology

Source: Expert Interview, Frost & Sullivan

Overview of Global and China Semiconductor Market

China Semiconductor Development Analysis

Stage 1: Initial Development (1980s-2000)

China's semiconductor industry dates back to the late 1980s. With the advancement of reform and opening-up, the country began introducing advanced technologies and establishing semiconductor companies. In 1986, China's first domestically produced integrated circuit (IC) chip was successfully manufactured in Shenyang. During this stage, China's semiconductor industry relied mainly on technology introduction and foreign partnerships, developing slowly with low output, and the domestic market was primarily dominated by imported chips.

Stage 2: Independent R&D and Industrialization (2000-2010)

After entering the 21st century, China began to increase investment in the semiconductor industry and gradually shifted from technology introduction to independent R&D. After 2000, the government introduced a series of policies to support domestic companies in semiconductor technological innovation and enhance manufacturing capabilities. Domestic companies such as Semiconductor Manufacturing International Corporation gradually emerged, and in 2004, they successfully entered the Hong Kong capital market, becoming the largest semiconductor foundry in China. During this period, China's semiconductor industry began to form a certain industrial chain, but it still heavily relied on foreign technologies.

Stage 3: Independent Innovation and International Competition (2010-Present)

In 2020, the U.S. passed sanctions against Chinese tech companies, severely impacting Chinese enterprises like Huawei and SMIC. The U.S.-China trade war has led the Chinese government to increase support for the semiconductor industry, especially in the design and manufacturing of integrated circuits, and it has introduced more proactive policies to promote technological breakthroughs and independent R&D by domestic companies. Government-supported chip manufacturers like SMIC have made progress, gradually breaking through 14nm process technologies despite facing technological and equipment limitations. In recent years, with the implementation of the "Made in China 2025" strategy, China's semiconductor industry has gradually shifted towards higher-end chip manufacturing, AI chips, and advanced packaging, gaining a more significant role in the global supply chain.

Source: Public information, Frost & Sullivan

Overview of Global and China Semiconductor Market

China Semiconductor Future Trends



Strengthening Domestic Policy Support, Semiconductor Industry Elevated to National Strategy

In recent years, as global competition in the semiconductor industry has become increasingly fierce, the Chinese government has continuously increased its policy support for the semiconductor industry, elevating it to a national strategic priority. To promote the research, development, and industrialization of domestically produced chips, the government has introduced a series of support policies, including financial investment, tax incentives, and research subsidies. In 2024, the government released policies such as the "Informationization Standards Construction Action Plan (2024–2027)" (《信息化标准建设行动计划（2024—2027年）》) and the "Semiconductor Industry Innovation and Development Plan (2023–2025)" (《半导体产业创新发展计划（2023–2025）》), which explicitly focus on advancing key technology standards for advanced computing chips and new memory chips. The policies also set the goal of increasing the self-sufficiency rate of domestically produced chips to over 70% by 2025. These policies not only clarify the objectives for localization but also provide policy support, research and development funding, and tax incentives for semiconductor companies.



Strengthening Upstream, Midstream, and Downstream Coordination, Key Products Continually Breakthrough, Full Industry Chain Begins to Take Shape

The coordination between the upstream, midstream, and downstream segments of China's semiconductor industry is gradually strengthening, and the industry chain is developing toward greater efficiency and collaboration. In the upstream raw materials and equipment sector, domestic companies are accelerating independent R&D while also introducing advanced technologies. In midstream, domestic chip design companies are continually making breakthroughs in chip design, gradually achieving localization of chip design, which further enhances the industry chain. With the rise of applications such as 5G, AI, and the Internet of Things (IoT), the demand for chips is continually increasing, promoting further advancements in domestic design and manufacturing capabilities.

Source: Frost & Sullivan

Overview of Global and China Semiconductor Market

Semiconductor Industry Policy and Regulation (1/2)

Industrial Policy	Issued Department	Issued Time	Key Information
Decision on Further Deepening Reform and Advancing Chinese-style Modernization 《关于进一步全面深化改革、推进中国式现代化的决定》	The Central Committee of the Communist Party of China 中共中央	2024.07	Promote full-chain advancement in technological breakthroughs and application of achievements in industries such as integrated circuits.
Implementation Opinions on Promoting Innovative Development of Future Industries 《关于推动未来产业创新发展的实施意见》	Ministry of Industry and Information Technology and other seven ministries 工业和信息化部等七部门	2024.01	Breakthroughs in key technologies and core devices such as brain-computer interface, neuromorphic chips, big data computing models, development of a number of easy-to-use and low-cost intelligent terminal products for future industries, accelerated breakthroughs in technologies such as 6G chips, cluster low-latency interconnected communications, heterogeneous resource management and the construction of ultra-large-scale intelligent computing centres to meet the needs of large-scale iterative training and application reasoning.
Guidelines for Establishing National Automotive-Grade Chip Standard System 《国家车规芯片标准体系建设指南》	Ministry of Industry and Information Technology 工业和信息化部	2024.01	Give full play to the leading role of standards in technological innovation, transformation of achievements, and overall competitiveness enhancement, etc., and be oriented to the needs of industrial innovation and development, fully integrating the development of automotive-grade chip technology, industrial development and market promotion, etc., to meet the needs of different industry applications.
Notice of the General Office of the Ministry of Industry and Information Technology on Promoting the Evolution of 5G Lightweight (RedCap) Technology and Application Innovation and Development 《工业和信息化部办公厅关于推进5G轻量化技术演进和应用创新发展的通知》	General Office of Ministry of Industry and Information Technology 工业和信息化部办公厅	2023.10	Promote the upstream and downstream of the industrial chain to promote the R&D and industrialisation of 5G RedCap chips, modules, terminals, gateways, instruments and other products to meet the application needs of different industries.
Action Programme for Stable Growth in the Electronic Information Manufacturing Industry 2023-2024 《电子信息制造业2023-2024年稳增长行动方案》	Ministry of Industry and Information Technology 工业和信息化部	2023.08	Enhance industrial innovation capacity, accelerate innovation breakthroughs in key areas such as integrated circuits, new displays, intelligent sensors and advanced computing, optimise industrial structure, promote industrial upgrading and enhance the resilience of the industrial chain supply chain.
Implementation Opinions of the Ministry of Industry and Information Technology and Other Six Ministries on Promoting IPv6 Technology Evolution and Application Innovation and Development 《工业和信息化部等六部门关于推动IPv6技术演进和应用创新发展的实施意见》	Ministry of Industry and Information Technology and other six ministries 工业和信息化部等六部门	2023.04	By the end of 2025, an industrial ecosystem centred on IPv6 evolution technologies will be initially formed, the R&D capabilities of network chips, module components, complete equipment, security systems, special software, etc. will be continuously enhanced, and mature IPv6+ technologies such as Segmented Routing (SRv6), network slicing, flow-following detection, application-aware networking (APN) and network intelligence will be realised in terms of products and on-the-ground applications.
Notice on the Consolidation of the Upturn and Improvement of the Trend to Strengthen and Revitalise the Industrial Economy 《关于巩固回升向好趋势加力振作工业经济的通知》	Ministry of Industry and Information Technology 工业和信息化部	2022.11	In-depth implementation of industrial foundation reconstruction project, strengthen the key raw materials, key software, core basic parts and components supply security and synergistic reserves, coordinate and promote the application promotion, technological research, production capacity enhancement and other works of automotive-grade chips, and further expand the space of rebounding and improving the industrial.

Source: Frost & Sullivan

Overview of Global and China Semiconductor Market

Semiconductor Industry Policy and Regulation (2/2)

Industrial Policy	Issued Department	Issued Time	Key Information
Guidelines for the construction of a national integrated big data system for government affairs 《全国一体化政务大数据体系建设指南》	State Council Office 国务院办公厅	2022.10	Upgrading the cloud resource support capacity of government big data in all regions and departments, promoting the integration and transformation of government data centers, improving the efficiency of the use and the level of their arithmetic power, accelerating the construction of a nationally integrated government big data system, constructing and perfecting the overall architecture of '1+32+N', and strengthening the construction of capacities for data-sharing, data governance, data analysis and so on.
Action Plan for Industrial Energy Efficiency Improvement 《工业能效提升行动计划》	Ministry of Industry and Information Technology and other six ministries 工业和信息化部等六部门	2022.06	Promote the application of products and technologies such as motor systems in scenarios such as mobile communication base stations, promote the application of electric air-conditioners and electrically-assisted heating devices in areas such as renewable energy vehicles, improve industrial energy efficiency, promote the application of energy-saving and carbon-reducing technologies, and accelerate the elimination of outdated production capacity.
'Fourteenth Five-Year Plan' for the Development of the Information and Communications Industry 《“十四五”信息通信行业发展规划》	Ministry of Industry and Information Technology 工业和信息化部	2021.11	Focusing on the digital development and application of industrial ecology, the company will strengthen industry chain collaboration and innovation, enrich the product categories of 5G chips, modules, terminals, gateways and meters, accelerate the research and development and industrialisation of industrial-grade 5G chips, modules, gateways and other products, push forward the 5G-IoT convergence and innovation, and promote the in-depth fusion of 5G technology with various industries to empower the digital transformation of the industry.
'Fourteenth Five-Year Plan' for the Development of Utilisation of Foreign Investment 《“十四五”利用外资发展规划》	National Development and Reform Commission and Ministry of Commerce 国家发展改革委和商务部	2021.01	Proposed to optimise domestic investment support policies for foreign-invested enterprises, encourage reinvestment of profits of foreign-invested enterprises, support foreign-invested enterprises to further improve the industrial chain supply chain through domestic investment, and expand foreign investment in integrated circuits, digital economy, new materials, biomedicine, high-end equipment and other industrial sectors.
'Fourteenth Five-Year Plan' for National Intellectual Property Protection and Utilisation 《“十四五”国家知识产权保护和运用规划》	State Council 国务院	2021.01	Promote high-quality creation of intellectual property rights, focus on innovation support policies in key areas, and strengthen the creation and reserve of independent intellectual property rights in artificial intelligence, quantum information, integrated circuits and basic software.
Notice on Import Tax Policies to Support the Development of Integrated Circuit Industry and Software Industry 《关于支持集成电路产业和软件产业发展进口税收政策的通知》	Ministry of Finance, General Administration of Customs, State Taxation Administration 财政部、海关总署、税务总局	2021.03	Notice clearly exempted from import duties in several cases, which involves the main semiconductor: integrated circuit with line width less than 65 nanometres of logic circuits, memory production enterprises to import self-use raw materials, consumables for production, integrated circuits with line width less than 0.5 microns of the compound integrated circuits and advanced packaging and testing enterprises to import self-use raw materials, consumables for production.
Outline of the Fourteenth Five-Year Plan for the National Economic and Social Development of the People's Republic of China and the Vision 2035 《中华人民共和国国民经济和社会发展第十四个五年规划和2035年远景目标纲要》	National People's Congress 全国人民代表大会	2021.03	Proposed to focus on high-end chips and other integrated circuit design, advanced processing technology and special processing breakthroughs, advanced memory technology upgrades, silicon carbide, gallium nitride and other broadband semiconductor development, and promote the development of packaging and testing and other industries.

Source: Frost & Sullivan

Overview of Global and China Analog IC Market

Products Metrics

- Digital Isolator Chips: NOVOSENSE digital isolator chips exhibit industry-leading CMTI performance, robust system-level ESD protection and advanced surge resilience. Certain products outperform those of international competitors in metrics such as CMTI, ESD protection and operating current;

Digital Isolator Chips Product Metrics

Company	Product	CMTI(min.)	ESD Protection	Current consumption per channel	Surge Resilience	Working Temperature
纳芯微 (NOVOSENSE)	NSi822x	>200kV/μs	Chip-level ESD HBM±8kV	1.5mA (1 Mbps)	>10kV	-40° C~125° C
Texas Instruments (德州仪器)	ISO6441	100kV/μs	system-level ESD HBM±2kV	2.325mA (1 Mbps)	>10kV	-40° C~125° C
Infineon (英飞凌)	4DIR2401H	100kV/μs	System level ESD HBM±2kV	6.4 mA (1 Mbps)	6kV	-40° C~125° C

Source: Company website, Frost & Sullivan

Overview of Global and China Analog IC Market

Products Metrics

- Sensor Signal Conditioning ASICs: Some of NOVOSENSE sensor signal conditioning ASICs outperform those of international competitors in metrics including ADC resolution, DAC resolution, overvoltage protection and calibration capabilities;

Sensor Signal Conditioning ASICs Product Metrics

Company	Product	Overpressure Protection	ADC	DAC	Calibration Capability
纳芯微 (NOVOSENSE)	NSA9260	-24V~28V	24 bits	16 bits	Compatible with both second-order temperature calibration and third-order nonlinear calibration.
Melexis (迈来芯)	MLX90328	-14V~18V	16 bits	12 bits	Supports both first-order temperature calibration and nonlinear calibration.
Melexis (迈来芯)	MLX90329	-14V~18V	16 bits	/	Compatible with both first-order temperature calibration and nonlinear calibration.
Renesas (瑞萨科技)	ZSC31050	-0.3V~6.5V	15 bits	11 bits	/
Renesas (瑞萨科技)	ZMD31015	-0.3V~6V	14 bits	12 bits	Compatible with both first-order temperature calibration and second-order nonlinear calibration, or either second-order temperature calibration or second-order nonlinear calibration.

Source: Company website, Frost & Sullivan

Overview of Global and China Analog IC Market

Products Metrics

- Magnetic Current Sensor Chips: NOVOSENSE magnetic current sensor chips, utilizing electromagnetic induction for current detection, feature high isolation levels, low noise and minimal offset. NOVOSENSE magnetic current sensor chips outperform those of international competitors in metrics such as a zero-point error of less than 5mV across all temperatures, less than 1.5% sensitivity error, 400kHz bandwidth, 1.5μs response time and configurable sensitivity ranges from 0.5mV/g to 30mV/g;

Magnetic Current Sensor Chips Product Metrics

Company	Product	Working Temperature	Zero Error	Sensitivity Error	Bandwidth	Response Time	Sensitivity	Supply Current	Creepage Distance	Noise density
纳芯微 (NOVOSENSE)	NSM2032	-40~150℃	-5mV~5mV	-1.5%~1.5%	400kHz	1.5μs	0.5mV/G~30mV/G	10mA	/	3mArms/√Hz
纳芯微 (NOVOSENSE)	NSM2112	-40~150℃	-10mV~10mV	-2%~2%	1MHz/2MHz	400ns/150ns	33mV/A	25mA	4mm	70μArms/√Hz
纳芯微 (NOVOSENSE)	NSM2019P	-40~150℃	-1mV~1mV	-1%~1%	320kHz	1.5μs	40mV/A	12mA	8.2mm	260μArms/√Hz
纳芯微 (NOVOSENSE)	NSM2115	-40~150℃	-5mV~5mV	-2%~2%	1MHz	400ns	33mV/A	25mA	8mm	70μArms/√Hz
Allegro (埃戈罗)	ACS732/733-LA	-40~125℃	-12mV~12mV	-1.5%~1.5%	1MHz	200ns	100mV/A	24/20mA	8mm	55μA/√Hz
Allegro (埃戈罗)	ACS37002-MA	-40~150℃	-4mV~4mV	-1%~1%	400kHz	1.1μs	9.9~200mV/A	13/12mA	8mm	350μA/√Hz
Pololu	CT433- HSWF50MR	-40~125℃	-3mV~3mV	-0.1%~0.1%	1MHz	300ns	100mV/A	6mA	7.8mm	9.5mArms/√Hz

Source: Company website, Frost & Sullivan

Overview of Global and China Analog IC Market

Products Metrics

- Integrated Pressure Sensor Chips: Some of NOVOSENSE integrated pressure sensor chips outperform those of international competitors in metrics such as overpressure protection, accuracy, response time and power consumption;

Integrated Pressure Sensor Chips Product Metrics

Company	Product	Overpressure Protection	Precision	Response Time	Power Consumption
纳芯微 (NOVOSENSE)	NSPAS1	-24V~28V	-1.0kpa~1.0kpa	0.8ms	3.1mA
Infineon (英飞凌)	KP215	-0.3V~16.5V	-1.4kpa~1.4kpa	<1ms	8mA
Infineon (英飞凌)	KP466	-0.3V~6.0V	-1.0kpa~1.0kpa	-	5mA
Infineon (英飞凌)	KP467	-0.3V~6.0V	-3.0kpa~3.0kpa	-	3.5mA
NXP (恩智浦)	MPX4080D	4.85V~5.35V	-3.0kpa~3.0kpa	-	7mA
NXP (恩智浦)	MPXA6115A	4.75V~5.25V	-1.5kpa~1.5kpa	1ms	6mA

Source: Company website, Frost & Sullivan

Overview of Global and China Analog IC Market

Products Metrics

- Isolated Gate Driver Chips: NOVOSENSE isolated gate driver chips demonstrate outstanding system interference resistance and robustness, outperforming those of international competitors in metrics such as drive withstand voltage, static current and analog sampling accuracy;

Isolated Gate Driver Chips Product Metrics

Company	Product	CMTI(min.)	Isolation Voltage	Output VCC/VDD max	Soft turn-off current	Peak pull-in current	电流 Static current	Typical transmission delay	Simulated sampling accuracy
纳芯微 (NOVOSENSE)	NSI67x0	> 150kV/μs	2121V	38V	400mA 900mA 可选	± 10A	1.5mA	90ns	1.60%
Texas Instruments (德州仪器)	UCC21738-Q1	> 150kV/μs	2121V	36V	900mA	± 10A	2mA	90ns	3%
Infineon (英飞凌)	1ED3120MC12H	≥ 200 kV/μs	1767V	40V	/	± 10A	1.1mA	90ns	/

Source: Company website, Frost & Sullivan

Overview of Global and China Analog IC Market

Products Metrics

- Automotive Tail Lamp LED Driver Chips: NOVOSENSE automotive tail lamp LED driver chips feature industry-leading channel coverage, current accuracy and error diagnostic protection capabilities;

Automotive Tail Lamp LED Driver Chips Product Metrics

Company	Product	Channel coverage	Input voltage range	Maximum constant current output	Quiescent current	Output current accuracy	Self-protection mechanism
纳芯微 (NOVOSENSE)	NSL21630/1	1、3、12	3.8-40V	100-450mA/CH	0.65mA	5%	Comprehensive diagnostic and protection functions: LED open-circuit, LED short-circuit and single LED short-circuit, over-temperature protection, etc.
Texas Instruments (德州仪器)	TPS92621-Q1	1、2、3、4、8	4.5-40V	70-600mA/CH	0.7mA	5%	Fault detection, fault diagnosis, LED open-circuit detection, LED ground short-circuit detection, etc.
Infineon (英飞凌)	TLD2252-2EP	1、2、3	5.5-40V	60-360mA/CH	1.5mA	7%	Fault management, reverse polarity protection, overload protection, etc.

Source: Company website, Frost & Sullivan

Overview of Global and China Analog IC Market

Product Metrics

- High-Side Driver Chips: NOVOSENSE high-side driver chips represent a milestone in the domestic market in China. These products leverage a fully domestic supply chain to deliver applications previously achievable only through specialized processes used by international competitors.

High-Side Driver Chips Product Metrics

Company	Product	RDS(on)(mΩ)	Number of channels	Self-protection mechanism
纳芯微 (NOVOSENSE)	NSE34xxx/NSE35xxx	8mΩ-140mΩ	1、2、4	Overcurrent/short-circuit protection, over-temperature protection, overvoltage protection, ground/power loss protection, reverse polarity protection, and open-circuit detection functions.
STMicroelectronics (意法半导体)	VN7/VN9	4mΩ-140mΩ	1、2、4	High energy tolerance, current limiting, self-protection, diagnostic functions, current sensing, and high clamping voltage.
Infineon (英飞凌)	BTS7Xxx	6 mΩ-300 mΩ	1、2、4	Undervoltage shutdown, overvoltage clamping, current protection, fault protection, and thermal protection.

Source: Company website, Frost & Sullivan

Overview of Global and China Analog IC Market

Price Analysis of Analog IC Products

- Due to the wide applications of analog chips in various fields such as automotive, industrial, communication and consumer electronics, and the diverse usage scenarios with specific requirements and specifications for each scenario, there are numerous types and models of analog chips available. The technological differences and performances between different models of analog chips can also vary significantly, resulting in a highly dispersed range of analog chip products. The table below outlines the industry average price ranges for key analog IC products NOVOSENSE is engaged in. The sensor market features a broad price range, and the specific pricing of a sensor is influenced by its performance specifications as well as applicable scenarios. The table below outlines the industry average price ranges for key sensor products NOVOSENSE is engaged in.

Industry Average Price of Typical Analog IC Products, Unit: RMB/unit

Category	Products	2020	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E
Signal Chain IC	Digital Isolator	2.0-4.0	3.2-4.2	2.0-3.0	1.5-2.5	1.2-2.2	1.1-2.1	1.3-2.3	1.4-2.4	1.6-2.6	1.7-2.7
	Isolated sampling	4.3-5.8	4.2-5.7	3.8-5.3	3.3-4.8	2.4-3.9	2.0-3.5	2.0-3.8	2.2-4.3	2.2-4.4	2.3-4.6
	Isolated Interface	2.4-3.9	2.6-4.2	2.3-3.9	2.2-3.8	2.1-3.4	2.1-3.3	2.2-3.5	2.2-3.6	2.3-3.8	2.4-3.7
Power Management IC	Isolated drive	3.6-4.7	3.0-4.5	2.2-3.8	1.8-3.5	1.6-3.3	1.4-3.2	1.5-3.7	1.6-3.3	1.7-4.0	1.9-4.2
	Linear LED drive	0.8-3.0	1.2-4.3	0.9-3.4	1.2-3.6	1.3-3.8	1.3-3.6	1.4-3.9	1.5-4.1	1.5-4.3	1.6-4.5
	LDO	0.5-1.3	0.6-1.5	0.6-1.6	0.6-1.7	0.5-1.5	0.5-1.6	0.4-1.7	0.5-1.8	0.5-1.9	0.5-1.9
Chip-level Sensor	Pressure Sensor	9.0-10.0	9.5-10.6	7.0-8.0	6.4-7.4	5.9-6.9	5.7-6.7	5.8-6.8	5.9-6.9	5.9-6.9	6.0-7.0
	Temperature & Humidity Sensor	0.4-1.3	0.5-1.4	0.4-1.3	0.4-1.3	0.3-1.0	0.3-1.0	0.3-1.0	0.4-1.1	0.4-1.1	0.4-1.1
	Magnetic Sensor	4.0-5.0	4.5-6.5	3.8-4.8	3.6-4.6	2.5-3.5	2.4-3.4	2.5-3.5	2.5-3.5	2.6-3.6	2.6-3.6

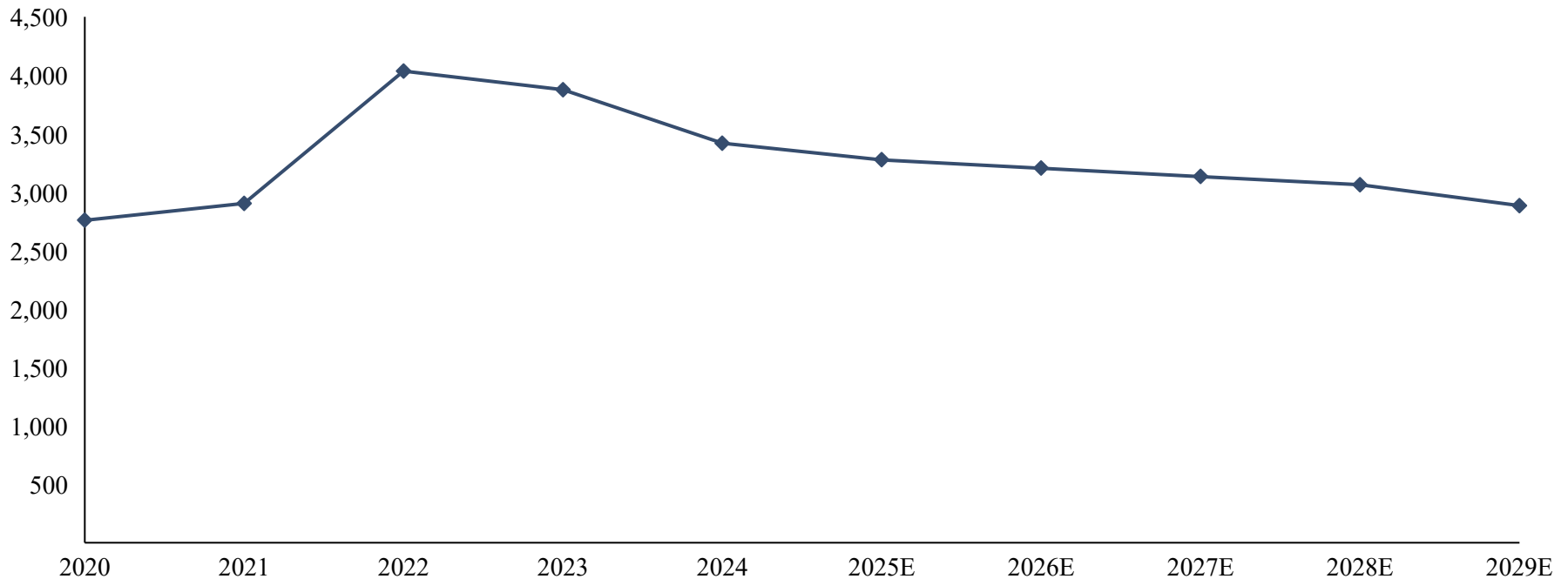
Source: Expert interviews, Frost & Sullivan

Overview of Global and China Analog IC Market

Cost of Analog IC and Sensor Product

- 8-inch silicon wafer constitute the primary cost item for analog chips and sensors. The prices of 8-inch silicon wafer rose from 2020 amid pandemic-driven demand and upstream constraints, peaking in 2022. Since then, prices have trended lower as input costs normalized and capacity additions intensified competition. Looking ahead, pricing is expected to stabilize around 2020 levels as supply-demand conditions rebalance.

Industry Average Price of 8-inch Silicon Wafer, Unit: RMB/piece



Source: Expert interviews, Frost & Sullivan

Appendix.A

1. According to Frost & Sullivan: In terms of revenue from analog chips in 2024, NOVOSENSE ranked fifth among Chinese analog chip companies in the Chinese analog chip market; As of December 31, 2024, among the top ten Chinese analog chip companies in terms of revenue in 2024, NOVOSENSE were the only company with substantial focus on all three categories: sensor products, signal chain chips, and power management chips; In terms of revenue from automotive analog chips in 2024, in the Chinese automotive analog chip market, NOVOSENSE ranked first among Chinese companies and second among all fabless companies, respectively; In terms of revenue from digital isolator chips in 2024, in the Chinese digital isolator chip market, NOVOSENSE ranked first among Chinese companies and second among all companies, respectively, with a market share of 15.6%. A digital isolator chip is a type of safety chip that ensures the secure transmission of signals between high and low voltage domains, and is a key category of signal chain chips; In terms of revenue from magnetic sensors in 2024, in the Chinese magnetic sensor market, NOVOSENSE ranked first among Chinese companies, with a market share of 7.1%. Driven by the growing demand in automotive and industrial control applications, magnetic sensors have become one of the fastest-growing sensor products in terms of sales volume.
2. According to Frost & Sullivan, the semiconductor industry has historically experienced rapid fluctuations, including cyclical downturns due to constant and rapid technological changes, short product life cycles, and fluctuations in product supply and demand.
3. According to Frost & Sullivan, the growth in demand for automotive chips is primarily driven by advancements in vehicle electrification and intelligence transformation: Vehicle Electrification: NOVOSENSE automotive-grade products are extensively used in electrification scenarios, including the battery systems, motor systems and electronic control systems, and thermal management. Vehicle Intelligence Transformation: NOVOSENSE products are gradually being applied in scenarios related to vehicle intelligence, including smart cockpits, autonomous driving, body control and intelligent lighting systems.
4. According to Frost & Sullivan, in terms of revenue from automotive analog chips in 2024, in the Chinese automotive analog chip market, NOVOSENSE ranked first among Chinese companies and second among all fabless companies, respectively; According to Frost & Sullivan, NOVOSENSE were one of the first Chinese analog chip companies to enter the automotive electronics sector and achieve large-scale production and shipment of products.
5. According to Frost & Sullivan, NOVOSENSE are one of the leading Chinese analog chip companies in terms of the number of automotive electronics product models; In 2024, NOVOSENSE product shipments in the automotive electronics sector amounted to approximately 363.5 million units, and NOVOSENSE revenue from the automotive electronics sector accounted for approximately 36.7% of NOVOSENSE total revenue. From 2022 to 2024, NOVOSENSE revenue from the automotive electronics sector achieved a CAGR of 36.4%.
6. According to Frost & Sullivan, the market size for automotive analog chips in China reached RMB37.1 billion in 2024 and is expected to grow to RMB85.8 billion by 2029. The automotive analog chip market in China also presents substantial growth potential in terms of domestic substitution.

Appendix.B

1. According to Frost & Sullivan, the domestic substitution trend in the analog chip market in China is steadily growing.
2. According to Frost & Sullivan, the automotive electronics sector is one of the largest, fastest-growing and most technically demanding application sectors of the analog chip market.
3. According to Frost & Sullivan, NOVOSENSE products have been used on a majority of the best-selling NEV models in China.
4. According to Frost & Sullivan, Chinese companies in the automotive value chain are playing a leading role in the global trend of automotive electrification and intelligence transformation, with their technologies and products at the forefront of the industry.
5. According to Frost & Sullivan, NOVOSENSE are one of the leading Chinese analog chip companies in terms of the number of automotive electronics product models.
6. According to Frost & Sullivan, in terms of revenue from automotive analog chips in 2024, in the Chinese automotive analog chip market, NOVOSENSE ranked first among Chinese companies and second among all fabless companies, respectively.
7. According to Frost & Sullivan, driven by the continued development of automotive electrification and intelligence transformation, the average value of analog chips per NEV in China was approximately RMB1.5 thousand to RMB2.8 thousand in 2024 and is expected to increase to RMB2.2 thousand to RMB4.0 thousand by 2029.
8. According to Frost & Sullivan, NOVOSENSE core products are comparable to, and, in certain cases, surpass, the products of international competitors in terms of metrics such as performance, power consumption and functional integration. Examples of NOVOSENSE product capabilities include: Digital Isolator Chips: NOVOSENSE digital isolator chips exhibit industry-leading CMTI performance, robust system-level ESD protection and advanced surge resilience. Certain products outperform those of international competitors in metrics such as CMTI, ESD protection and operating current; Sensor Signal Conditioning ASICs: Some of NOVOSENSE sensor signal conditioning ASICs outperform those of international competitors in metrics including ADC resolution, DAC resolution, overvoltage protection and calibration capabilities; Magnetic Current Sensor Chips: NOVOSENSE magnetic current sensor chips, utilizing electromagnetic induction for current detection, feature high isolation levels, low noise and minimal offset. NOVOSENSE magnetic current sensor chips outperform those of international competitors in metrics such as a zero-point error of less than 5mV across all temperatures, less than 1.5% sensitivity error, 400kHz bandwidth, 1.5μs response time and configurable sensitivity ranges from 0.5mV/g to 30mV/g; Integrated Pressure Sensor Chips: Some of NOVOSENSE integrated pressure sensor chips outperform those of international competitors in metrics such as overpressure protection, accuracy, response time and power consumption; Isolated Gate Driver Chips: NOVOSENSE isolated gate driver chips demonstrate outstanding system interference resistance and robustness, outperforming those of international competitors in metrics such as drive withstand voltage, static current and analog sampling accuracy;

Appendix.C

1. Automotive Tail Lamp LED Driver Chips: NOVOSENSE automotive tail lamp LED driver chips feature industry-leading channel coverage, current accuracy and error diagnostic protection capabilities; and High-Side Driver Chips: NOVOSENSE high-side driver chips feature industry-leading channel coverage, drain-source on resistance coverage and comprehensive protection mechanism. These products leverage a fully domestic supply chain to deliver applications previously achievable only through specialized processes used by international competitors.
2. According to Frost & Sullivan, NOVOSENSE are among the few analog chip companies in the industry with a complete product and process development team.
3. According to Frost & Sullivan, NOVOSENSE have established a quality control system that is more stringent than those adopted by many of NOVOSENSE domestic analog chip peers.
4. According to Frost & Sullivan, the industry standard for long-term reliability testing of automotive chips is 1,000 hours, whereas some of NOVOSENSE products are tested to a standard of 2,000 hours, doubling the industry standard.
5. According to Frost & Sullivan, a key trend in the analog IC industry is the functional integration, which involves consolidating various analog design components into a single chip to improve performance, reduce costs and accelerate product development cycles.
6. In the industrial sector, NOVOSENSE digital isolators are widely used in industrial control systems, where, due to their smaller size, higher integration, lower power consumption and faster communication speeds, they are gradually replacing traditional opto-isolators, according to Frost & Sullivan.
7. According to Frost & Sullivan, the fabless business model is consistent with the increasing trend of specialized division of labor within the semiconductor industry.
8. According to Frost & Sullivan, engagement of distributors for the sales of products are in line with the industry norm in the analog IC industry.
9. According to Frost & Sullivan, NOVOSENSE product return and exchange policy with NOVOSENSE distributors is in line with the industry norm.
10. According to Frost & Sullivan, it is in line with industry practice for chip design companies to rely on a limited number of foundry partners and chip testing and packaging suppliers to ensure consistently quality products and centralized management of manufacturing demands.
11. According to Frost & Sullivan, the analog IC industry remains dominated by leading international companies as a result of their longer industry experiences , extensive product portfolios and economies of scale.

Appendix.D

1. According to Frost & Sullivan, despite the competitive pressure, Chinese companies, including us, have demonstrated notable growth by delivering tailored products that address specific industry requirements and customer needs.
2. According to Frost & Sullivan, the localization rate of analog chip market in China grew from 11% in 2020 to 22% in 2024, and is expected to further grow in light of the favorable policy support.
3. According to Frost & Sullivan, a majority of publicly listed Chinese analog chip companies experienced decrease in gross profit margin, decrease in net profit or even net loss from 2022 to 2024; at the same time, certain leading international companies, as a result of their price reduction, also experienced decrease in gross profit margins or net profit margins from 2022 to 2024.
4. According to Frost & Sullivan, the global analog IC market increased from RMB383.9 billion in 2020 to RMB565.7 billion in 2024, with a CAGR of 10.2%. The market is expected to further grow from RMB565.7 billion in 2024 to RMB803.5 billion in 2029, with a CAGR of 7.3%. Driven by the robust market demand, China's analog IC market has achieved rapid expansion, with a market size of RMB195.3 billion in 2024, accounted for approximately 35% of the global market share.
5. According to Frost & Sullivan, benefiting from the booming development of new energy vehicles and the rapid growth in demand for automotive electronics, the market size of China's automotive Analog ICs reached RMB37.1 billion in 2024, and is expected to further increase to RMB85.8 billion by 2029, with a CAGR of 18.3%. China's sensor market is also growing rapidly with the development of new energy and intelligent vehicles, energy and industrial automation, and smart consumer electronics. In 2024, China's sensor market size reached RMB272.5 billion, with magnetic sensors accounting for RMB7.1 billion. Furthermore, China's sensor market is expected to reach RMB601.3 billion by 2029, with a CAGR of 17.1%, and the market size of magnetic sensors is expected to increase to RMB19.0 billion by 2029, representing the fastest growth rate among all sensor segments.
6. According to Frost & Sullivan, the analog IC industry is highly competitive, with foreign companies maintaining dominant positions as a result of their advanced technological expertise across semiconductor segments, extensive product portfolios and economies of scale.
7. According to Frost & Sullivan, in recent years, intensified price competition from leading global players has created challenges for the according to Frost & Sullivan, despite the competitive pressure, Chinese companies, including us, have demonstrated notable growth by delivering tailored products that address specific industry requirements and customer needs.
8. According to Frost & Sullivan, in recent years, intensified price competition from leading global players has created challenges for the business of domestic analog IC companies, requiring them to adjust our pricing and impacting their profitability.
9. In 2024, NOVOSENSE ranked 14th in terms of revenue of analog ICs in the Chinese market, being one of the top five domestic players in the same market, according to Frost & Sullivan.

Appendix.E

1. The industry in which NOVOSENSE operate is patent-intensive. Companies, including us, in this industry routinely seek patent protection for their product and solution designs.
2. As a result of the global semiconductor shortage and inflationary pressures, NOVOSENSE may in the future experience increases in the cost of NOVOSENSE products.
3. Chinese companies has become the key sources of R&D and innovation in many application sectors, such as the NEV sector.
4. Due to high technical barriers and stringent quality requirements, automotive electronics is a challenging yet high-growth potential application sector for analog chips.
5. Driven by the increasing automotive production and sales, as well as the trend of electrification and intelligence transformation, automotive electronics is one of the largest and fastest-growing application sectors for the analog chip market in China.
6. The quick development of AI and the requirement for computing power has also resulted in higher demand for analog chips, particularly for their capabilities of providing stable power supply for AI servers and data centers. At the same time, the increasing demand for advanced signal processing in industrial control applications is driving technological innovation and upgrade in analog chips, particularly in terms of high-precision signal processing, system stability and interference resistance.
7. These applications require analog chips with higher precision, greater reliability and lower power consumption, creating new growth opportunities.
8. Many of NOVOSENSE products, particularly digital isolators and magnetic sensors, lead the industry.
9. The trends of automotive electrification and intelligence transformation are driving sustained demand for analog chips and sensor products.
10. The increasing trend towards electrification and intelligence of vehicles are driving growth in the automotive-grade semiconductor market.
11. As electronic systems in the energy sector become increasingly complex, market demand is shifting from discrete component to integrated functions.
12. The analog IC industry is characterized by its extensive applications and diverse product portfolio, resulting in a competitive landscape with numerous market players.
13. In many of NOVOSENSE downstream application sectors, Chinese end customers have established a strong presence in global market, emerging as key drivers for industry development and product innovation.

Appendix.F

1. NOVOSENSE is a leading analog chip provider in China.
2. The overall growth of global and China's analog IC market is mainly driven by growing downstream industries, the escalating demand for high-efficiency solutions in AI infrastructure, power systems for new energy vehicles and smart devices.
3. Downstream market demand could be affected by number of factors including macroeconomic conditions, technological advancements and the evolving needs of end customers across various sectors. Furthermore, the analog IC industry is experiencing trends such as increasing domestic substitution, higher integration level and development towards more intelligent products.
4. Analog ICs are widely used across various industries. Below is an overview of the market conditions in the sectors where the Company's key downstream customers operate: In energy sector, driven by the expansion of new energy and supported by efficiency improvements and cost declines in wind and solar generation, China's renewable cumulative installed power capacity (mainly including installed solar power and wind power) rose from 534.4 GW in 2020 to 1407.4 GW in 2024, at a CAGR of 27.4%, lifting its share of China's cumulative installed power capacity (mainly including installed solar power, fossil fuel power, hydropower, wind power, nuclear power, and others) from 24.3% to 42.0%; it is projected to reach 3,536 GW by 2029, at a CAGR of 18.6%, accounting for 63.3% of China overall capacity.
5. In industrial sector, driven by the continuous development of industrial manufacturing, the China industrial electric drive solution market increased from RMB30.6 billion in 2020 to RMB37.0 billion in 2024, with a CAGR of 4.8%, and is expected to grow steadily to RMB 48.3 billion by 2029 at a CAGR of 5.5%. The growth momentum is primarily driven by ongoing industrial electrification and the demand for cleaner and more efficient solution.
6. Communications sector: Driven by both capacity upgrades and incremental deployments progressing in parallel, the number of 5G base stations in China increased from 0.7 million units in 2020 to 4.3 million units in 2024 at a CAGR of 56.0%, and is expected to reach 6.5 million units by 2029, with a CAGR of 8.2%.
7. Consumer electronics sector: From 2020 to 2024, China's major consumer electronics shipments experienced cyclical fluctuations followed by a gradual recovery. Total shipments rose from 535 million units in 2020 to 614.8 million units in 2021, primarily driven by surging demand for remote work and home entertainment during the pandemic, which boosted categories such as laptops, tablets, and televisions. In 2022, however, overall shipments declined to a cyclical low of approximately 516.8 million units, impacted by global inflationary pressures, economic uncertainty, and channel inventory adjustments. Beginning in 2024, with macroeconomic recovery and a rebound in end-user demand, the market stabilized and resumed growth, reaching 549.1 million units and is expected to reach 625.3 million units by 2029, with a CAGR of 2.5%.

Appendix.G

1. Automotive sector: China's new energy vehicle (NEV) market has experienced explosive growth in recent years. The sales volume surged from 1.3 million units in 2020 to 12.8 million units in 2024. The penetration rate of new energy vehicles in China has rapidly increased from 5.4% in 2020 to 40.9% in 2024. With the continuous advancement of automotive electrification, it is expected that by 2029, the penetration rate will exceed 75% and the sales volume will reach a CAGR of 11.1% from 2024 to 2029.
2. During the Track Record Period (2022-2024), the market size of China's temperature and humidity sensors market was RMB 22.6 billion, RMB 26.0 billion, RMB 29.4 billion. The market share of NOVOSENSE in China's temperature and humidity sensors market was 0.1%, 0.1%, 0.1%.
3. The destocking process were driven jointly by analog IC manufacturers and their downstream customers, aiming to reduce excess inventory accumulated during the pandemic period. As global logistics normalized, the efficiency of raw material procurement and product transportation improved, alleviating previous cost pressures, reducing the need for high inventory levels. Overseas leading companies adopted low-price strategies to compete with local Chinese firms, prompting the entire industry to accelerate inventory clearance to maintain market share. Key downstream sectors included consumer electronics, automotive electronics, energy and industrial automation. These downstream customers had stockpiled chips due to supply chain disruptions in early 2021 -2022, leading to high inventory levels; starting in second half of 2022, as demand slowed, they proactively reduced inventory to optimize cash flow and lower inventory holding costs.
4. By 2024, inventories of analog chip manufacturers had dropped to a low point in the middle of 2024, prompting manufacturers to actively expand production. Throughout this period, market competition remained one of the core variables influencing price trends. Particularly from 2023 to 2024, competition between overseas and domestic manufacturers further intensified, not only in terms of pricing but also across multiple other aspects including channel expansion, technical support, and customer responsiveness. Although price competitions did indeed lower the market prices of some products in the short term, as competition deepened, companies began to realize that relying solely on price cuts was unsustainable to build long-term competitiveness. Consequently, more and more companies shifted their focus towards product innovation, niche market exploration, and enhancing customer service capabilities.
5. The market-wide price competition for analog chips generally eased in the second half of 2025 and the price for sensor products, signal chain chips and power management chips have generally stabilized since July 2025, following a previous period of decline especially in 2023 and 2024, and the pricing trend of NOVOSENSE products is largely consistent with this overall market dynamic of stabilization.
6. In 2024, the market share of sensor products is approximately 64.5% for international companies and 35.5% for domestic players, with domestic companies' share demonstrating sustained growth. In 2024, the local use of China's chip-level sensor market accounted for 89.9%, with a scale of RMB245 billion. The export to overseas portion accounted for 10.1%, with a scale of RMB27.5 billion.
7. During the Track Record Period (2022-2024), the market size of China's total sensors market was RMB 220.6 billion, RMB 244.4 billion, RMB 272.5 billion. The market share of NOVOSENSE in China's total sensors market was 0.1%, 0.1%, 0.1%.

Appendix.H

1. During the Track Record Period (2022-2024), the market size of China's magnetic sensors market was RMB 5.6 billion, RMB 6.3 billion, RMB 7.1 billion. The market share of NOVOSENSE in China's magnetic sensors market was 1.1%, 1.9%, 7.1%.
2. During the Track Record Period (2022-2024), the market size of China's pressure sensors market was RMB 50 billion, RMB 56.6 billion, RMB 64.3 billion. The market share of NOVOSENSE in China's pressure sensors market was 0.05%, 0.05%, 0.1%.
3. In 2024, the market size of China's analog IC reached RMB195.3 billion, with the IDM model accounting for 76.4%, about RMB149.2 billion. In contrast, the fabless model held a smaller share, representing approximately RMB46.1 billion or 23.6% of the market share. In the future, more companies tend to choose the lower cost and more flexible fabless model. It is expected that by 2029, the market share of fabless companies will reach 27.4% or RMB91.5 billion.
4. In 2024, the local use of China's analog ICs accounted for 92.4%, with a scale of RMB180.4 billion. The export portion accounted for 7.6%, with a scale of RMB14.8 billion. It is expected that the export volume of analog chips in China will continue to increase in the future, with the export portion accounting for 11.8% and a total scale of RMB39.5 billion by 2029. In addition, in the local use market, the market share held by international manufacturers in 2024 reached 76.8%, while the market share of domestic manufacturers was 23.2%. It is expected that the market share of domestic manufacturers will reach 30.8% by 2029.
5. Since the second half of 2022, due to multiple factors such as the domestic and international economic downturn and the impact of the epidemic, people's willingness to consume has decreased, and China's analog IC market for consumer electronics has declined. In 2024, with the economic recovery and the disappearance of the impact of the epidemic, personal consumption demand has increased, and the consumer electronics market represented by smartphones, household appliances and personal computers is gradually recovering, promoting the recovery of China's analog IC market for consumer electronics.
6. The Chinese government has introduced a series of policies to support the development of analog chips. For example: (1) Several Policies to Promote the High-quality Development of Integrated Circuit Industry and Software Industry in the New Period (《新時期促進集成電路產業和軟件產業高質量發展的若干政策》) was released in 2020 to promote the domestic development of integrated circuits including analog IC; (2) The Guidelines for Establishing National Automotive-Grade Chip Standard System (《國家車規芯片標準體系建設指南》), released in 2024 by the Ministry of Industry and Information Technology, aims to strengthen the role of standards in advancing automotive-grade chip technology, industrial innovation, and market competitiveness to support diverse industry applications. These policies have proposed multiple tax incentives to reduce the tax burden on analog chip companies, encourage them to increase research and development investment, and encourage social capital participation. This will help analog chip companies obtain more financial support, and support will be provided through national key research and development plans, major national science and technology projects, etc. It will strengthen the construction of integrated circuit and software majors in universities, accelerate the establishment of first level disciplines in integrated circuits, and cultivate high-level talents with compound and practical abilities.

Appendix.I

1. Several Policies to Promote the High-quality Development of Integrated Circuit Industry and Software Industry in the New Period (《新時期促進集成電路產業和軟件產業高質量發展的若干政策》) indicated that, as an enterprise dedicated to the research and production of analog IC, NOVOSENSE can enjoy tax incentives, significantly reducing operating costs and releasing more funds for technology research and development and capacity expansion.
2. The Guidelines for Establishing National Automotive-Grade Chip Standard System (《國家車規芯片標準體系建設指南》) states that unified industry standards for automotive chip products should be established. NOVOSENSE will participate in or lead the formulation of these standards, transforming NOVOSENSE technological innovation achievements into industry benchmarks, thereby enhancing the overall technological level and international competitiveness of the industry, while also providing consumers with higher-quality products and services.
3. Notice on the Issuance of the “Automotive Industry Stable Growth Work Plan (2025–2026)” (《汽車行業穩增長工作方案(2025–2026年)》) by the Ministry of Industry and Information Technology and Seven Other Departments: The departments have emphasized the importance of the automotive industry, recognizing it as a key pillar of the national economy. They have outlined primary expected targets and formulated the Stable Growth Work Plan, focusing on technological innovation, industrial chain upgrading, green and low-carbon transformation, and market expansion. NOVOSENSE can leverage this policy to accelerate product upgrades and technological iteration, and capitalize on growing downstream application market demand to further expand business operations and increase market share.
4. The Guiding Opinions on Promoting the Development of the Energy Electronics Industry (《關於推動能源電子產業發展的指導意見》), issued by the Ministry of Industry and Information Technology(MIIT), explicitly emphasize strengthening research on miniaturized, high-performance, high-efficiency, and highly reliable sensor devices. Leveraging this policy, NOVOSENSE can further accelerate product upgrades and technological iterations. In addition, the establishment of testing, verification, and standardization systems promoted by the policy will help NOVOSENSE shorten product certification cycles, enhance market recognition, and thereby accelerate business expansion and market share growth.
5. The Catalogue for Guiding Industry Restructuring (2024 Edition) (《產業結構調整指導目錄(2024年本)》), issued by the National Development and Reform Commission (NDRC), lists sensors in fields such as automotive and intelligent manufacturing under the “Encouraged” category. It also explicitly states that for encouraged investment projects, “financial institutions are encouraged to provide credit support in accordance with market-oriented principles,” while other preferential policies will be implemented in accordance with relevant national regulations. As a sensor enterprise included in the encouraged category, NOVOSENSE will benefit from improved access to project approvals and financing support, which will facilitate capacity expansion and accelerate product portfolio upgrading.
6. During each year of the Track Record Period, the market share NOVOSENSE held in signal chain IC market was 1.7%, 1.1% and 1.4%, respectively; the market share NOVOSENSE held in power management IC market was 0.5%, 0.4% and 0.6%, respectively.

Appendix.J

1. The Chinese government has provided strong support to the integrated circuit industry, including measures such as capital investment, tax incentives, and the establishment of industrial parks. This helps domestic enterprises reduce production costs and enhance competitiveness. China is the world's largest electronic equipment manufacturing base, with a huge demand for analog ICs. Against the backdrop of increasing uncertainty in the global trade environment, domestic customers are more inclined to choose local suppliers for supply chain security considerations, which also provides more opportunities for Chinese analog IC companies.
2. During the Track Record Period (2022-2024) the market size of China's Energy and industrial automation analog IC market was RMB 42.7 billion, RMB 45.6 billion, RMB 50.7 billion. The market share of NOVOSENSE in China's Energy and industrial automation analog IC market was 2.5%, 1.4%, 1.6%.
3. During the Track Record Period (2022-2024), the market size of China's consumer electronics analog IC market was RMB 70.4 billion, RMB 66.2 billion, RMB 72.2 billion. The market share of NOVOSENSE in China's consumer electronics analog IC market was 0.2%, 0.2%, 0.3%.
4. Digital isolator chips serve a crucial role in transmitting signals between circuits operating at different voltage levels, ensuring electrical isolation to safeguard low-voltage systems from high-voltage environments. Utilizing advanced coupling techniques such as capacitive or inductive methods, these chips transmit digital signals across an isolation barrier without direct electrical connections, providing reliable data transfer. They excel in various applications including industrial automation, motor control, power supplies, and automotive electronics by offering high-speed transmission, robust noise immunity, and extended operational lifespans. Moreover, many digital isolators integrate additional functionalities like power delivery, signal conditioning, and interface protocols into a single chip, supporting more compact and efficient system designs. Their ability to enhance safety and performance makes them indispensable in modern electronics where reliable operation is paramount.
5. The market size of China's analog chip market in the energy and industrial automation field reached RMB 50.7 billion in 2024. With the rapid development of intelligent manufacturing and artificial intelligence servers, the market size of the analog chip market in the energy and industrial sectors is expected to reach RMB 103.8 billion in 2029. In 2024, the competitive landscape in China's energy and industrial analog chip market was relatively concentrated, with the top five companies accounting for a combined market share of 33.2%. Among them, leading U.S. and European companies such as Company B, Company A, and Company E occupy the top three positions, followed by Company D and Company G.
6. The market size of China's analog chip market in the consumer electronics field reached 72.2 billion RMB in 2024. The competitive landscape in the analog chip market in China's consumer electronics field is relatively scattered in 2024. It is expected that by 2029, the market size of China's analog chip market in the consumer electronics field will reach RMB 85.3 billion. There are a large number of participating players in the China's analog chips market, with the top five companies accounting for a combined market share of only 18.1%. American company A takes a leading position, but domestic Company H, Company J, and Company G also occupy a certain share, followed by Company D.
7. The price increase of analog chips began at the end of 2020 and continued until mid-2022. The main reasons for the rising prices of various analog chips were (i) the increased demand from downstream markets, as well as (ii) disruptions to the supply chain caused by the pandemic. These factors affected the demand-supply stability of the industry, including by raising raw material and product transportation costs, led to a substantial rise in wafer prices, which was passed on to analog chip design companies and their downstream customers.

Appendix.K

1. The potential for future overall analog chip product price increases is expected to largely depend on the introduction of new product categories—particularly those offering high performance, high integration, and high levels of customization. These higher-value-added and technically demanding products can help companies achieve differentiated competitive advantage while maintaining reasonable profit margins.
2. In 2024, the market share of sensor products is approximately 64.5% for international companies and 35.5% for domestic players, with domestic companies' share demonstrating sustained growth. In 2024, the local use of China's chip-level sensor market accounted for 89.9%, with a scale of RMB245 billion. The export to overseas portion accounted for 10.1%, with a scale of RMB27.5 billion. In terms of the revenue of chip-level sensor products in 2024, the top three participating companies in the market, namely companies U, Q and R, have a combined market share of 17.6%. During the Track Record Period, NOVOSENSE market share in China's overall chip-level sensor market was 0.1%, 0.1%, and 0.1%.
3. China's temperature and humidity sensor market exhibits a certain degree of concentration. In 2024, the market size reached RMB 29.4 billion, with the top five companies accounting for 45.8% of the market share. While the market has not yet become highly consolidated, leading American and European companies such as Company R and Company A still maintain a relatively dominant position. Nevertheless, as Chinese manufacturers achieve innovation breakthroughs in high-precision measurement algorithms and accelerate their global expansion by establishing overseas distribution channels, the structure of China's temperature and humidity sensor market is also poised for transformation.
4. From 2020 to 2024, the average price of pressure sensors in China showed a continuous downward trend. This was mainly driven by the acceleration of domestic substitution and expanded production capacity. As domestic production scaled up, manufacturing costs steadily declined. Meanwhile, strong bargaining power from customers in sectors like automotive and industrial automation further accelerated the price decline. In next few years, the growing demand for high-sensitivity, high-stability pressure sensors in new energy vehicles is expected to prompt leading companies to focus more on high-performance product segments and lift average prices through product mix optimization. Due to the large number of product types, diverse packaging forms, and varying precision requirements, the industry's average price exhibits a wide range. European and American manufacturers remain dominant in specialized high-pressure and high-temperature applications, with product prices generally 15%–25% higher than those of domestic suppliers.
5. Due to the increasing standardization and price transparency in China's temperature and humidity sensor market, industry prices gradually declined from 2020 to 2024. As large-scale applications in smart homes and other mass-consumption scenarios expanded, demand for low-cost, high-volume supply intensified. Temperature and humidity sensor integration trends further reduced the unit value of individual temperature and humidity sensors, heightening competition. By 2025, the average price of temperature and humidity sensors is expected to stabilize, as most manufacturers approach begin to adopt stable pricing strategies. Starting in 2026, the industry is expected to enter a phase of mild price recovery, with average prices gradually rising through 2029. Given the wide variety of applications and distinct product specifications, the price range remains broad. European and American manufacturers typically command an average premium of around 20% over domestic firms, leveraging their technological experience and reliability advantages.

Appendix.L

1. Driven by the impact of the pandemic and upstream raw material shortages, the average selling price of magnetic sensors in China had temporary increase during 2020–2021. From 2022, as domestic manufacturers achieved greater technological maturity in Hall and AMR sensors, the pace of localization accelerated, leading to a decline in market average prices. In 2023, with the increasing standardization of Hall and AMR sensor technologies and diminishing product differentiation, market competition intensified, resulting in a continued downward trend in average prices. This trend persisted into 2024, with the industry average price continuing to decline. By 2025, the industry average of magnetic sensors is expected to further decrease, although the rate of decline is expected to slow down. Fluctuation in upstream rare earth material costs may lead to occasional price increases. Emerging industries such as new energy vehicles and humanoid robotics are creating strong demand for high-sensitivity magnetic angle sensors. These trends will lead to significant application structure optimization, forming a new, value-driven supply-demand pattern in the industry. Given the coexistence of multiple sensing principles—from Hall and AMR to TMR and GMR—the performance and cost structures vary widely, resulting in a highly differentiated pricing landscape. International players continue to lead in automotive electronics and precision industrial applications, with product prices generally 10%–20% higher than those of domestic competitors.
2. From 2022 to 2024, as the pandemic came under effective control, the global supply chain gradually recovered, and the semiconductor industry underwent a destocking process. To cope with increasingly fierce competition, especially the competitive pressure from local Chinese companies, overseas leading companies adopted low-price strategies to compete with Chinese companies in an effort to maintain market share. This led to sustained intense market competition and put pressure on domestic companies, who also lowered their selling prices in order to maintain customer base and market share, resulting in reduced gross margins and net profit margins for domestic companies.
3. Digital isolator chips serve a crucial role in transmitting signals between circuits operating at different voltage levels, ensuring electrical isolation to safeguard low-voltage systems from high-voltage environments.
4. The average price of products from overseas manufacturers is consistent with the trend of changes in the average price of products from domestic manufacturers, and the prices of similar products from overseas manufacturers are usually about 20% higher than those from domestic manufacturers.
5. Looking ahead, analog chip industry prices are expected to stabilize or experience slow growth, supported by several key factors: Technology Innovation Enhancing Value: With sustained R&D investment by domestic analog chip companies, more products featuring proprietary intellectual property rights are entering the market. This has raised the overall technological sophistication and value of products, thereby supporting price increases.
6. Diversified Customer Demand Driving Growth in High-End Products: Rapid development in downstream applications such as new energy vehicles and industrial automation has created substantial demand for high-performance analog chips. These products typically command strong pricing power due to their advanced functionalities and critical roles in downstream applications.
7. Accelerated Domestic Substitution Shifting Bargaining Power: International trade and export control policy uncertainties have prompted downstream customers in China to prioritize supply chain security and thus increasingly prefer local suppliers. This trend has strengthened the negotiating position of domestic analog chip companies, contributing to a more favorable pricing environment for products offered by them.

Appendix.M

1. China's overall chip-level sensor market has long been structurally dominated by international companies. The sector is characterized by a broad array of product categories and players' specialization across distinct sensor types, resulting in a relatively fragmented and diversified competitive landscape. The market size of chip-level sensor products in China reached RMB272.5 billion in 2024. In terms of the revenue of chip-level sensor products in 2024, the top three participating companies in the market, namely companies U, Q and R, have a combined market share of 17.6%. During the Track Record Period, NOVOSENSE market share in China's overall chip-level sensor market was 0.1%, 0.1%, and 0.1%.
2. China's pressure sensor market has long been dominated by European and American companies. With ongoing technological advancements and expanding application scenarios, market competition has intensified, leading to a diversified and stratified landscape. Companies compete across dimensions such as accuracy, stability, cost, and response speed, driving the industry toward greater specialization and segmentation. In 2024, the total market size of China's pressure sensor sector reached RMB 64.3 billion, with the top five companies accounting for a combined market share of 40.7%. Among them, leading U.S. and European players such as Company Q and Company R hold a relatively strong position. However, as domestic manufacturers make continuous breakthroughs in precision control technologies for industrial and automotive-grade pressure sensors, the competitive landscape in China is expected to be reshaped.
3. According to Frost & Sullivan, in recent years, intensified price competition from leading international companies has created challenges for the business of Chinese companies, requiring them to adjust pricing and impacting their profitability.
4. According to Frost & Sullivan, the aggregate market share by Chinese companies in the automotive analog chip market in China remains at a relatively low level, leaving significant room for domestic substitution. In 2024, the aggregate market share by Chinese companies was approximately 5%, and it is expected to increase to 20% by 2029.