InnoScience (2577 HK)

Global integrated GaN leader with significant growth potential

InnoScience is a leader in the global GaN power semiconductor industry, ranking first with market share of 33.7% in 2023, per Frost & Sullivan (F&S). The Company designs, develops and manufactures different types of GaN products, including discrete chips, ICs, wafers and modules. Their products are widely used in various end markets, such as consumer electronics, renewable energy, industrial applications, automotive electronics and data centers. InnoScience is the first worldwide to achieve mass production of 8-inch GaN-on-Si wafers, and now operates two 8-inch GaN-on-Si wafer fabs with a combined capacity of 13kwpm by the end of 2024. Riding the tailwind of GaN application penetration and market expansion (98.5% 2024-28E CAGR per F&S), we expect the Company's revenue to grow at 55.2% 2024-27E CAGR and achieve margin improvement driven by the economies of scale in production (GPM/NPM to break even in 2025/27E). **Initiate at BUY with TP at HK$49.**

- **The global GaN power semiconductor industry is expected to grow at 98.5% 2024-28E CAGR, per F&S.** The market expanded rapidly at a CAGR of 88.5% from RMB139mn in 2019 to RMB1.8bn in 2023, and is expected to reach RMB50.1bn in 2028E (98.5% 2024-28E CAGR), per F&S. Key growth drivers include 1) rising demand for higher energy efficiency in compute intensive applications, 2) material upgrade incentive to reduce costs and achieve miniaturization needs, and 3) favorable policies.
- **The GaN power semiconductor market is highly consolidated,** with the top three GaN power semiconductor companies taking up 72% of share accumulatively. As a key representative of IDM business model and a pure-play GaN power semiconductor player, **InnoScience ranked first with market share of 33.7% in 2023, per F&S.**
- **InnoScience holds an unique position within the GaN industry by leveraging several strengths:** 1) mass-production capability with the largest capacity and first-mover advantage to capture growing opportunities, 2) IDM model tailored to industry needs with high market entry barriers, 3) a market leader in 8-inch GaN-on-Si technologies (the only company globally providing product R&D covering 15V to 1,200V and developed the flagship V-GaN series), 4) achievement of industrial-scale commercialization with cost benefits and a yield rate exceeding 95%. The mass production technologies led to an 80% increase in die per wafer and a 30% reduction in single chip costs compared to 6-inch GaN-on-Si wafers, 5) owing an experienced team.
- **Initiate at BUY with TP at HK$49 based on 30x 2030E P/E** (peers' 5-yr avg., WACC: 12.0%, RMB/HKD: 1.07) as we expect the Company to achieve stable operations by that time. We project the company's revenue to grow at 55.2% 2024-27E CAGR, driven by capacity expansion and higher ASP of new products with accelerating penetration of GaN in downstream applications. We expect its GP/NP to break even in 2025E/27E on economies of scale. The company has recently disclosed its self-developed 1,200V GaN product with zero reverse recovery charge, and it is now in mass production for medium-to-high power supplies. The product will be applicable in sectors like NEVs and data centers while bringing energy efficiency.
- **Key risks include:** 1) weak demand or lower-than-expected penetration of GaN solutions in new applications, 2) geopolitical risks and supply chain disruptions, etc.

BUY (Initiate)

Target Price	**HK$49.00**
Up/Downside	**28.9%**
Current Price	**HK$38.00**

China Semiconductors

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Stock Data

Mkt Cap (HK$ mn)	32,766.4
Avg 3 mths t/o (HK$ mn)	34.4
52w High/Low (HK$)	NA/NA
Total Issued Shares (mn)	491.3

Source: FactSet

Shareholding Structure

LUO	24.6%
CM BANK	13.4%

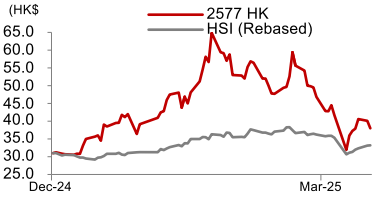
Source: HKEx

Share Performance

	Absolute	Relative
1-mth	-20.3%	-11.1%
3-mth	10.1%	-1.0%
6-mth	NM	NM

Source: FactSet

12-mth Price Performance



Source: FactSet

Earnings Summary

(YE 31 Dec)	FY23A	FY24A	FY25E	FY26E	FY27E
Revenue (RMB mn)	593	828	1,336	2,055	3,098
YoY growth (%)	335.3	39.8	61.3	53.8	50.8
Gross margin (%)	(61.1)	(19.5)	10.6	21.7	29.8
Net profit (RMB mn)	(1,101.9)	(1,045.7)	(746.3)	(503.4)	27.7
EPS (Reported) (RMB cents)	na	na	na	na	3.00
P/E (x)	na	na	na	na	895.8
ROE (%)	(44.8)	(42.4)	(27.9)	(23.2)	1.4

Source: Company data, Bloomberg, CMBIGM estimates

Contents

Industry Overview

GaN emerges as a revolutionary material, outperforming silicon in key areas

Semiconductor materials can be categorized into three generations: 1) silicon, 2) GaAs, 3) SiC and GaN. The three generations play a pivotal role in various applications given their distinct characteristics and advantages.

Figure 1: Comparisons of the three generations of semiconductor materials

Category	Key features	First-gen	Second-gen	Third-gen	
		Si	GaAs	GaN	SiC
Bandgap (eV)	Thermal resistance, voltage resistance, radiation resistance	1.12	1.4	3.39	3.26
Breakdown field (MV/cm)	Voltage resistance	0.3	0.4	3.3	2.8
Saturation electron velocity (10^7 cm/s)	Switching frequency	1.0	2.1	2.7	2.0
Electron mobility ($cm^2/V•s$)	On-resistance	1,500	8,500	2,000	800
Main applications		Logic, memory chips, etc.	Consumer electronics, communication base stations, laser radar, display screens, etc.	Consumer electronics, EVs, data centers, energy storage, photovoltaics, 5G communication, other industrial sectors, etc.	EVs, photovoltaics, rail transportation, 5G communication, other industrial sectors, etc.

Source: Company data, F&S, CMBIGM

While silicon remains a traditional choice of power semi solutions, its limitations in both frequency and voltage are becoming a bottleneck. The modern world runs on electricity, and the key to efficient power delivery lies in power semiconductors. As industries embrace advancements like artificial intelligence (AI) and rapid electrification, the need for more efficient and cost-effective power solutions is paramount. This is why GaN and SiC come in.

Gallium nitride boasts several advantages over silicon that translate to significant benefits for power electronics. These advantages include a) high frequency, faster switching and smaller components; b) high electron mobility, which means electrons move more efficiently with less energy loss; c) strong radiation resistance, making it ideal for harsh environments; low on-resistance, which translates to less energy wasted as heat; and d) no reverse recovery loss, which further improves efficiency.

The combination of these properties may create GaN power semiconductor chips with superior capabilities. Its wide bandgap allows higher voltages, while superior electron mobility translates to faster current flow and switching speeds. They can reduce energy losses in power conversion, boost overall power efficiency, lower system costs due to smaller components, and allow significantly smaller devices compared to traditional silicon-based solutions. Notably, GaN handles high voltages and temperatures exceptionally well.

Figure 2: Key features and advantages of GaN

Physical Metrics	GaN vs. Si	Key features	Key advantages	Overall benefits
Bandgap	~ 3x to Si	Strong thermal & radiation resistance	Enhanced thermal dissipation efficiency	Improved performance, lower system costs, sustainable energy supply
Breakdown field	~ 11x to Si	High-voltage resistance	High energy efficiency	
Saturation electron velocity	~ 3x to Si	High frequency	Small device size	
Electron mobility	~ 1.3x to Si	Low on-resistance	Low conduction loss	

Source: Company data, F&S, CMBIGM

GaN is positioned as a game-changer across industries

Power semiconductors are essential components for power conversion and circuit control in electronic devices, enabling functions like voltage and frequency adjustments, as well as DC-to-AC conversions.

Driven by growing demand in sectors such as electric vehicles, data centers, renewable energy, and power grids, the global power semiconductor market expanded from RMB321bn in 2019 to RMB336bn in 2023, registering a 2019-23 CAGR of 1.2%, per F&S. The market **is projected to further grow to RMB496.8bn by 2028E, representing a 2024E-28E CAGR of 7.8%, per F&S.**

GaN power semiconductors, characterized by high frequency, high voltage tolerance, strong radiation resistance, and low on-resistance, are positioned as a game-changer across industries, from consumer electronics and electric vehicles to renewable energy, industrial applications, and data centers, effectively meeting the ever-growing demand for high frequency and high power.

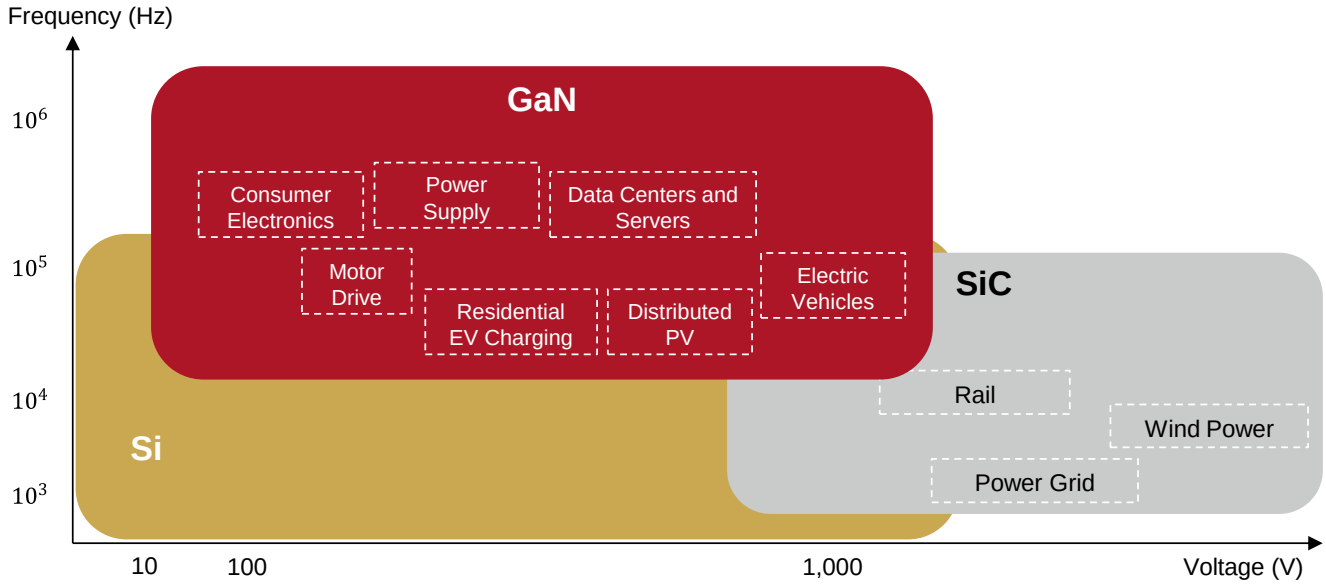
Figure 3: GaN's impacts across markets

Sub-markets	Common applications	GaN's impacts
Consumer electronics	Fast chargers and adapters for smartphones, laptops, etc.	GaN brings faster charging, lighter devices, and support for demanding applications. For example, USB-PD (Power Delivery) chargers are 70% smaller, or phone motherboards have a 75% reduction in size. In smartphone motherboards, GaN can reduce board area by 75% and reduce peak power device loss by 40-50%.
Renewable energy/ industrial applications	Microinverters, DC-DC converters and battery energy storage systems, motor drivers, industrial LiDAR, UPS, inverters, etc.	GaN promotes safer, more economical, and sustainable solar power and energy storage systems. GaN-based photovoltaic (PV) inverters are crucial for rooftop and residential distributed PV power generation, reducing the volume of inductors in inverters and power optimizers. GaN can improve energy utilization efficiency by around 30%, decrease solar power station size by 30%, and lower system costs by 20%.
Automotive electronics	OBC, DC-DC converters, traction inverters, LiDAR drivers, wireless charging, amplifiers, etc.	GaN simplifies design, reduces energy loss during power conversion, and shrinks power modules by 70%, paving the way for lighter, more efficient EVs.
Data centers	Power supply units, intermediate bus converts (IBCs), etc.	High-frequency GaN power devices reduce inductor volume, making space for GPU peripherals to meet high power demands. GaN server power supplies can increase data center server output power by 50% and save 30% in energy.

Source: Company data, Frost & Sullivan, CMBIGM

Silicon is widely used with lower tolerance in both frequency and voltage. GaN has significant advantages in high-frequency application scenarios, while SiC has been applied more in high-voltage scenarios. **We expect the third generation of semiconductors is poised for significant market penetration, due to their distinct characteristics compared to the traditional Si technology.**

Figure 4: Theoretical power semiconductor application comparisons among Si, GaN and SiC



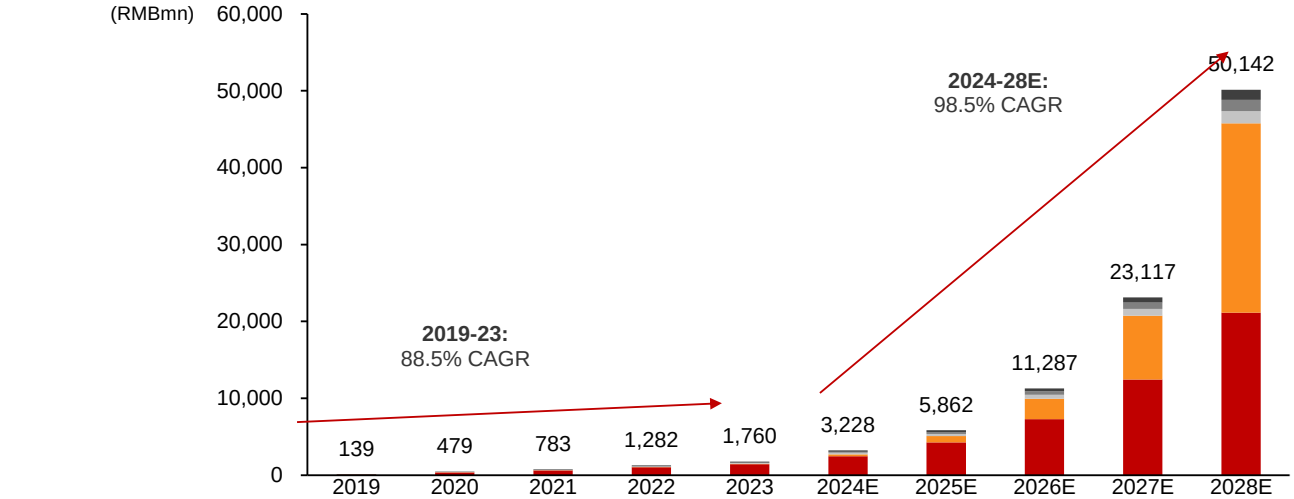
Source: Company data, Frost & Sullivan, CMBIGM

TAM of GaN is projected to grow at 99% 2024E-28E CAGR

The global GaN power semiconductor market surged from RMB139.4mn in 2019 to RMB1,760mn in 2023, exhibiting a remarkable 2019-23 CAGR of 88.5%, per F&S. **GaN market is projected to expand from RMB3.2bn in 2024 to staggering RMB50.1bn by 2028E, representing a 2024-28E CAGR of 98.5%.**

Key growth drivers include 1) rising demand for higher energy efficiency in compute intensive applications, 2) material upgrade incentive to reduce costs and achieve miniaturization needs, and 3) favorable government policies, (e.g., preferential tax treatment, government grants, etc.)

Figure 5: Global market size of GaN power semiconductor market (by sales), 2019-2028E



	2019	2020	2021	2022	2023	2024E	2025E	2026E	2027E	2028E
Others	16	37	58	106	119	186	246	378	670	1,333
Data centers	8	18	29	47	70	136	254	465	832	1,462
Renewable energy/ industrial	30	54	55	74	89	193	284	492	864	1,577
Electric vehicles	0	6	16	38	69	246	829	2,661	8,318	24,637
Consumer electronics	85	364	624	1,018	1,412	2,466	4,249	7,291	12,433	21,133
GaN TAM	139	479	783	1,282	1,760	3,228	5,862	11,287	23,117	50,142

Source: Company data, Frost & Sullivan, CMBIGM

■ **Rising demand for higher energy efficiency in compute intensive applications.**

The growing emphasis on energy efficiency and environmental sustainability is driving demand for innovative solutions to reduce energy consumption, especially in light of the surge in power-intensive applications like cloud computing and cryptocurrency. **GaN's exceptional properties**, including high frequency and efficiency, **make it a prime candidate for addressing these challenges.**

GaN power devices are increasingly adopted across various applications, from consumer electronics to emerging sectors like EVs, data centers, AI, energy storage, and photovoltaics. By enabling smaller, more efficient electronic devices, GaN is revolutionizing various industries, from consumer electronics with faster and cooler chargers to electric vehicles with extended ranges and reduced cooling needs.

■ **Material upgrade incentive to reduce costs and achieve miniaturization needs.**

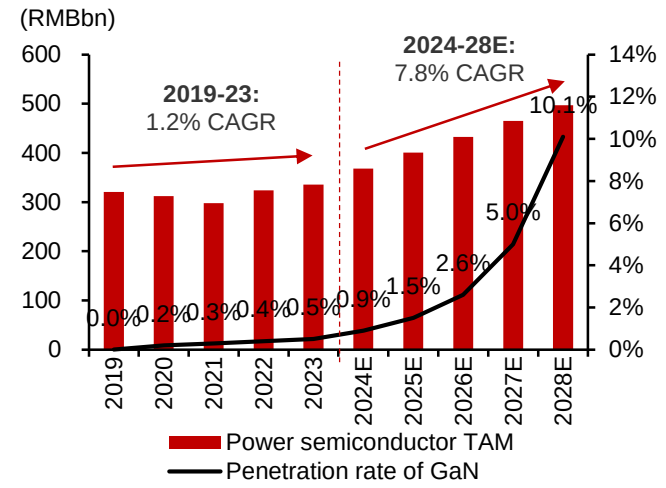
GaN is expected to accelerate its penetration in power semiconductors on cost-effectiveness. While silicon currently holds a cost advantage as the first-generation semiconductor material, GaN power devices offer superior energy efficiency, leading to smaller, more energy-efficient, and ultimately less costly overall solutions. As GaN production technology advances and scales up, manufacturing costs will decrease, further narrowing the price gap with silicon. Additionally, GaN's high reliability reduces maintenance and replacement needs, lowering long-term costs for consumers. These factors combined are driving the cost competitiveness of GaN power semiconductors and fueling the industry's growth.

■ **Favourable government policies worldwide.**

Per F&S, governments worldwide are increasingly recognizing the strategic importance of the semiconductor industry, particularly for advanced materials like GaN. Initiatives such as China's "Implementation Opinions on Improving Manufacturing Reliability," the EU's "European Chips Act," and Japan's "Semiconductor Aid Law" provide substantial support for the development of the GaN power semiconductor industry.

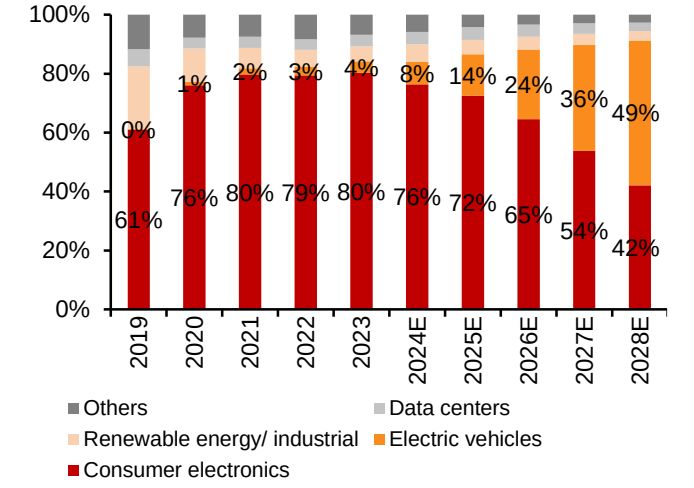
Driven by these factors, we believe GaN will gain traction in the following years. While comprising only 0.5% of the overall power semiconductor market in 2023, GaN is expected to account for 10.1% of the power semiconductor market by 2028E, per F&S. In the power semiconductor discrete chip segment, GaN's share is projected to surge from 1.4% in 2023 to 24.9% in 2028E, per F&S.

Figure 6: Penetration of GaN to accelerate



Source: Company data, Frost & Sullivan, CMBIGM

Figure 7: GaN TAM breakdown by applications

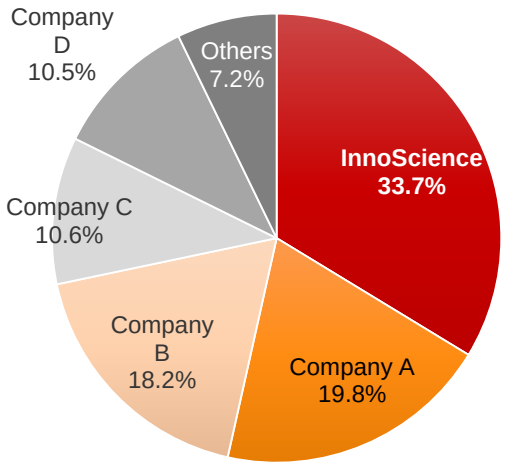


Source: Company data, Frost & Sullivan, CMBIGM

Competitive landscape: A consolidated market, InnoScience ranked first with 33.7% market share

The GaN power semiconductor market is highly consolidated. According to F&S, the top five GaN power semiconductor companies held a combined market share of 92.8% in terms of revenue in 2023. InnoScience ranked first with 33.7% market share.

Figure 8: InnoScience ranked first among all GaN power semiconductor companies with 33.7% market share in 2023



Source: Company data, Frost & Sullivan, CMBIGM

Figure 9: The top five GaN power semiconductor companies held a combined market share of 92.8% in terms of revenue in 2023

Rank#	Company	Country	Business model	Share % (2023)
1	**InnoScience**	**China**	**IDM**	**33.7%**
2	Company A	US	Fabless	19.8%
3	Company B	US	Fabless	18.2%
4	Company C	US	Fabless	10.6%
5	Company D	Germany	IDM	10.5%
	Others			7.2%
	Total			**100.0%**

Source: Company data, Frost & Sullivan, CMBIGM

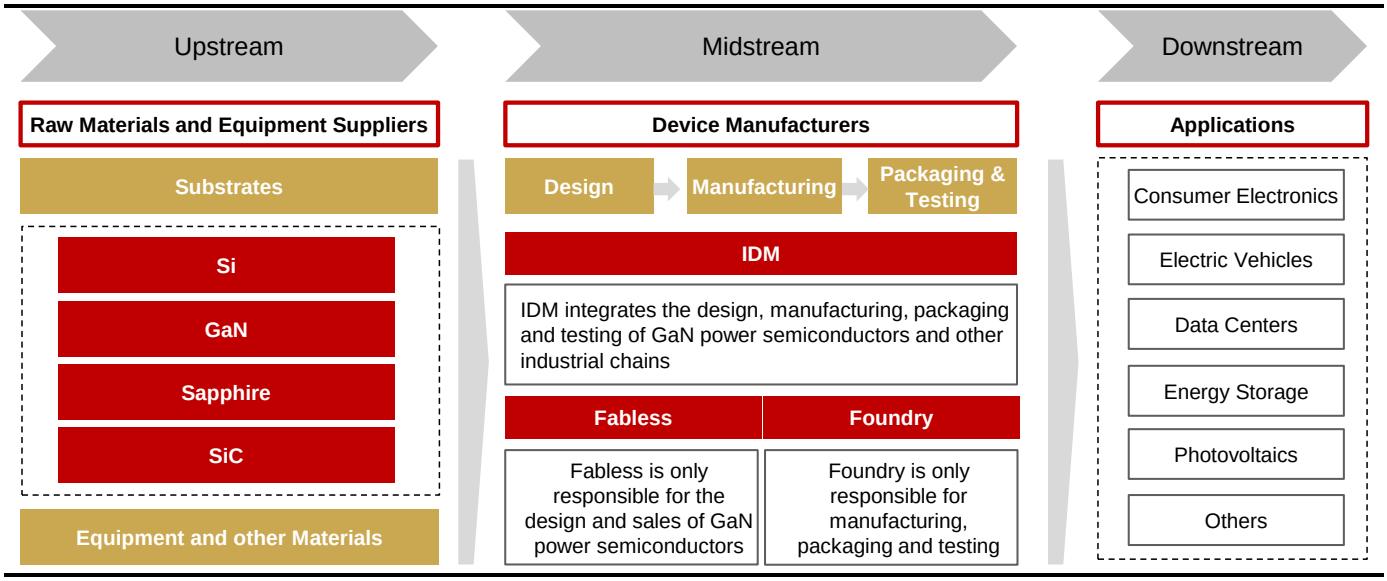
GaN power semiconductor companies can be categorized into IDM and fabless companies. Representative IDM companies include InnoScience and Company D, while notable fabless companies include Company A, Company B, and Company C.

Compared to the fabless model, the IDM model requires substantial capital investments and technological expertise but offers significant advantages such as synergies between design and manufacturing, capacity and supply security, cost benefits from scale production, and continuous process and technology upgrades. As a result, **existing IDMs in the industry have first-mover advantages and long-term competitiveness.**

The IDM model offers distinct advantages over fabless and foundry models in the GaN power semiconductor industry:

- **Synergies between design and manufacturing process**: IDMs possess unique ability to optimize both design and manufacturing process simultaneously. Such integration leads to improved efficiency, faster time-to-market, and the ability to address design and process limitations effectively.
- **Capacity and supply chain resilience**: IDMs maintain greater control over production capacity and supply chain stability. This is particularly beneficial in industries with cyclical demand and global supply chain disruptions. Unlike fabless relying on foundries, IDMs can swiftly adapt to market fluctuations.
- **Cost advantages in industrial-scale production**: IDMs often achieve economies of scale in GaN power semiconductor production, leading to cost advantages compared to fabless companies outsourcing manufacturing.
- **Technological innovation**: With in-house design and manufacturing expertise, IDMs can drive continuous process and technological advancements. This fosters a culture of innovation and enables quicker responses to customer demands.

Figure 10: Value chain analysis of GaN power semiconductor industry



Source: Company data, Frost & Sullivan, CMBIGM

IDM is the leading business model. To enhance competitiveness and secure supply stability, the GaN power semiconductor industry is shifting towards the IDM model. By integrating design and production, IDMs can optimize processes, provide tailored solutions, and ensure a stable supply chain. This trend is evident in recent industry acquisitions, and **we anticipate that the IDM model will dominate the future GaN landscape, offering early movers a significant competitive edge.**

GaN power semiconductor companies can also be classified into pure-play third-generation power semiconductor companies and non-pure-play third-generation power semiconductor companies. Pure-play third-generation power semiconductor companies include InnoScience, Company B, and Company C. These companies focus solely on developing third-generation semiconductor technologies without an existing silicon-based semiconductor business, avoiding conflicts in resource allocation with other business departments. This allows them to **develop their GaN power semiconductor business independently, free from the constraints of their original silicon-based semiconductor technological processes.**

As a key representative of IDM business model in GaN power semiconductor market, InnoScience quickly captured a meaningful market share of 33.7% during the past few years after its establishment in 2017. Benefiting from the pure-play GaN power semiconductor player, **InnoScience also leads the market in terms of GaN production capacity.** By 2024, the Company had achieved a monthly production capacity of 13kwpm, providing a strong foundation for future growth. Furthermore, the Company boasts a superior product yield rate of over 95%, surpassing the industry average of 90%-95%. **The combination of high production capacity and yield rate solidify the Company's dominance in the GaN power semiconductor market.**

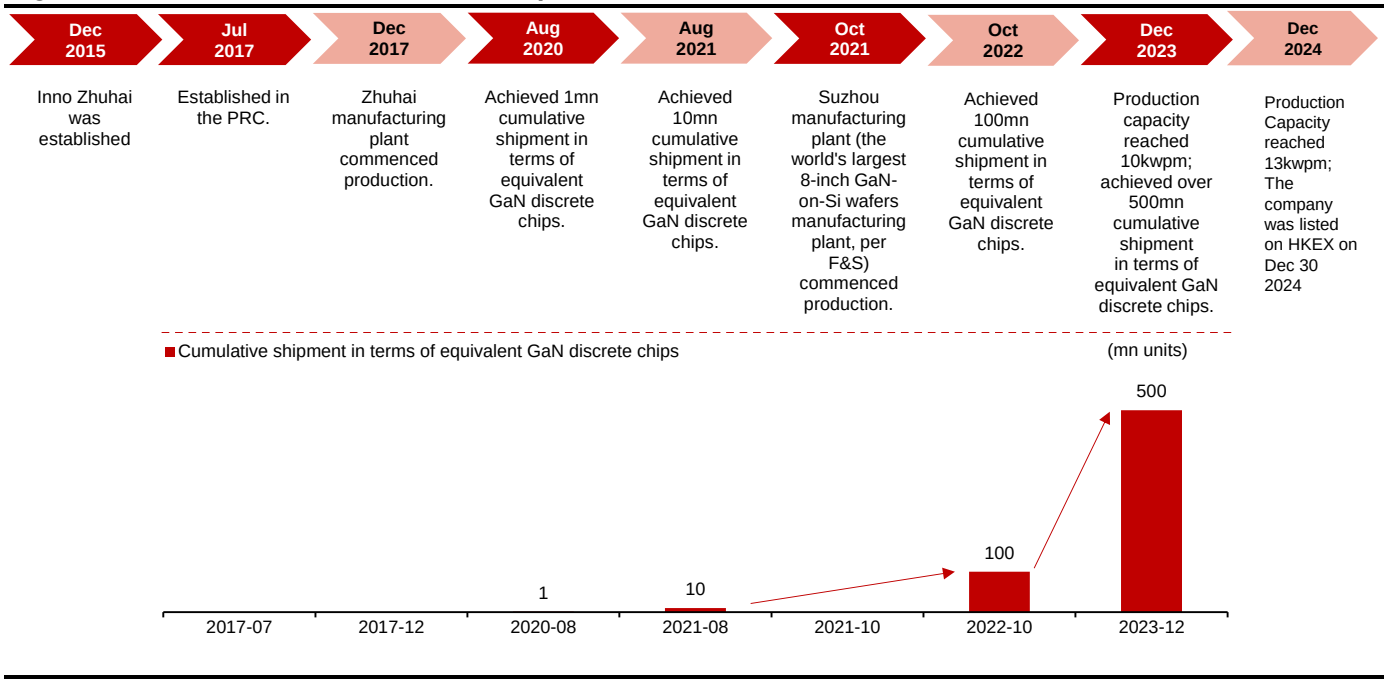
Company Overview

A leader in the global power semiconductor revolution

Established in 2017, InnoScience has become a global leader in GaN power semiconductor products. The Company designs, develops and manufactures different types of GaN products, including discrete chips, ICs, wafers and modules. Their products are widely used in various end markets, such as consumer electronics, renewable energy and industrial applications, automotive electronics and data centers.

On 30 December 2024, InnoScience went public on the main board of HKEX, raising c.HK$1.4bn at an offer price of HK$30.86.

Figure 11: InnoScience's business development milestones



Source: Company data, Frost & Sullivan, CMBIGM

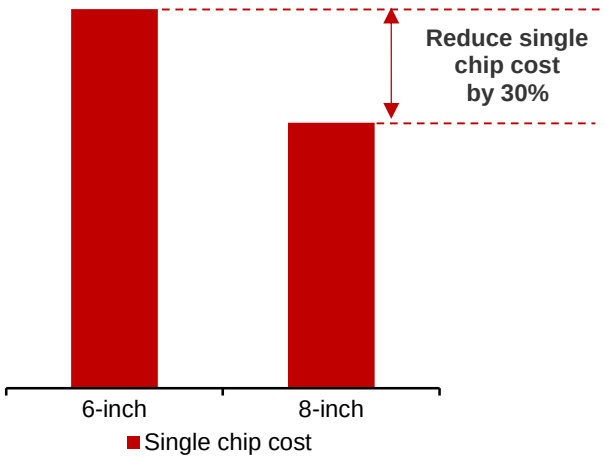
As of the Latest Practicable Date, **the Company has achieved a few milestones.**

- **InnoScience is the world's first company to achieve mass production of 8-inch GaN-on-Si wafers.**

Transition from 6-inch to 8-inch is not merely an upgrade. The mass production requires the development of new processes and techniques, including epitaxy, planarization and etching processes. The Company also re-purposed the manufacturing equipment to be fully compatible for the 8-inch GaN wafers.

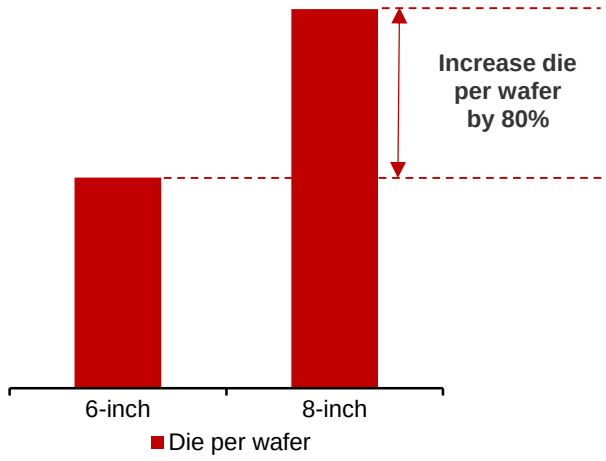
By achieving mass production of 8-inch GaN-on-Si wafers (die per wafer up by 80% vs. 6-inch GaN-on-Si wafers), InnoScience reduced production costs remarkably with single chip cost down 30%, facilitating the commercialization of the GaN products.

Figure 12: Single chip cost was down by 30% on 8-inch GaN-on-Si wafers (vs. 6-inch)



Source: Company data, Frost & Sullivan, CMBIGM

Figure 13: Die per wafer by 80% on 8-inch GaN-on-Si wafers (vs. 6-inch)

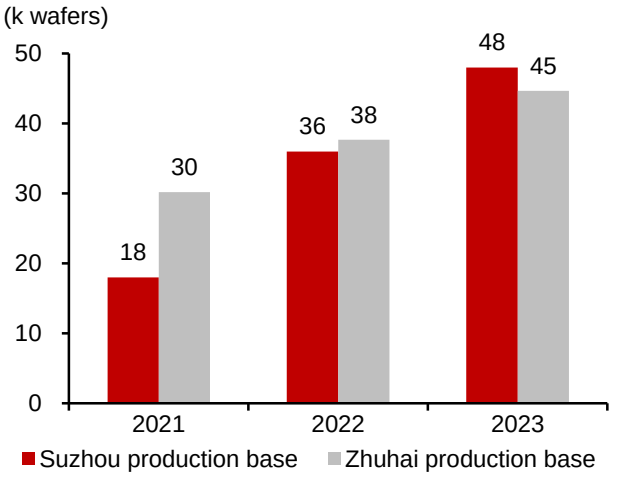


Source: Company data, Frost & Sullivan, CMBIGM

- **InnoScience houses the world's largest GaN power semiconductor production base, with a production capacity of 13kwpm by end-2024.**

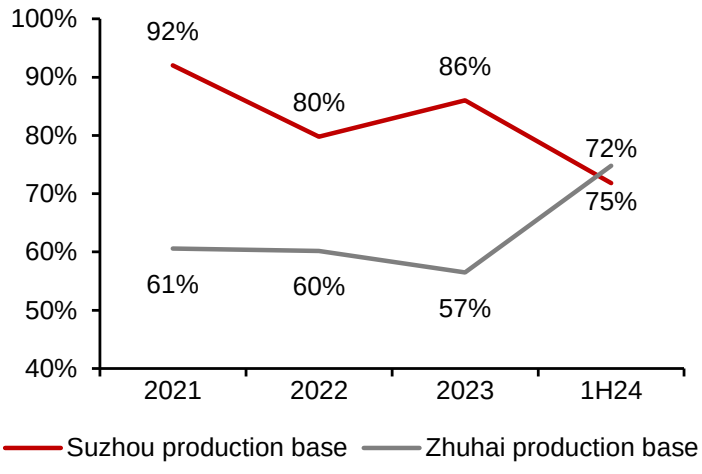
The Company has two production bases in Suzhou and Zhuhai. **The IDM model provides a few competitive advantages**, such as enabling InnoScience to 1) meet the tailored needs of industry with design and process coordination, 2) ensure supply chain stability with in-house control over design and manufacturing processes, 3) achieve better cost control by internal fabrication and further enhance ASP competitiveness, 4) maintain first-mover advantage as it could take up to nine years to reach full-scale production for new entrants.

Figure 14: InnoScience's historical production capacity by base (2021-2023)



Source: Company data, Frost & Sullivan, CMBIGM

Figure 15: InnoScience's historical utilization rate by base (2021-1H24)



Source: Company data, Frost & Sullivan, CMBIGM

- **The Company is the only one offering a full product R&D with voltage spectrum of GaN-on-Si semiconductor products on industrial scale**, per F&S.

The Company designs, develops, and manufactures high-performance and reliable GaN discrete chips for various applications across low-, medium-, and high-voltage ranges in different packaging options.

InnoScience plans to continue innovating in the development of 900-1,200V high-voltage products and 15-30V low-voltage products. **Their product coverage includes consumer grade and industrial grade applications, and is progressing towards automotive grade.**

Figure 16: Application areas of InnoScience's products

Sub-markets	Application areas	GaN products
Consumer electronics	Mobile phone chargers and laptop power adapters, etc.	650V/700V GaN discrete chips and GaN ICs
	Over-voltage protection (OVP) chips, etc.	40V/100V bi-directional GaN discrete chips
	E-bikes and E-scooters, etc.	650V/700V GaN discrete chips
	Small household appliances, etc.	650V/700V GaN discrete chips and GaN ICs
Renewable energy/ industrial applications	Lithium-ion battery formation/ grading equipment, etc.	All-GaN power supply modules for battery formation and grading equipment
	Battery management systems, etc.	100V/150V bi-directional GaN discrete chips
	LED lighting, etc.	650V/700V GaN discrete chips
	Photovoltaic and energy storage systems, etc.	40V/100V/650V/700V GaN discrete chips
	Motor drivers and controls, etc.	100V GaN discrete chips, 500V GaN ICs
Automotive electronics	LiDAR, etc.	80V/100V auto-grade GaN discrete chips
	EV's power systems, etc.	100V GaN discrete chips
Data center	The Company's GaN products boost the efficiency and compactness of racks used for data center power conversion.	

Source: Company data, Frost & Sullivan, CMBIGM

- **The Company holds a technology leadership position in GaN power semiconductor industry**

Packaging is a key technological factor of the performance of power semiconductor products. For InnoScience, their advanced packaging ensures that GaN products achieve optical performance by fully capitalizing on their high-frequency and high-power density characteristics.

For example, proprietary high heat dissipation packaging technology, designed for GaN High-Electron-Mobility Transistors (HEMTs), addresses the challenges posed by their compact size and high-power density, creating a distinctive and highly effective heat dissipation solution. The Company's flagship line of bi-directional GaN chip, V-GaN series, can replace two silicon MOSFETs, which effectively reduces heat generation issues and achieves chip miniaturization needs. As of 30 June 2024, InnoScience held 319 patents, including 274 invention patents, 45 utility model patents, and 430 patent applications.

- **InnoScience obtained market share of 33.7% in the GaN power semiconductor industry in 2023**

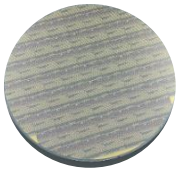
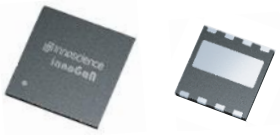
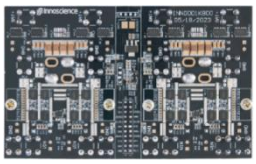
The Company's GaN products gained recognition from customers across various application areas, resulting in strong revenue growth of 195% CAGR during 2021 and 2023. The Company shipped 660mn chips in 2024, exceeding the cumulative total of all previous years according to the mgmt.

According to F&S, **InnoScience ranked No.1 globally among GaN power semiconductor peers in 2023,** with market share of 1) 33.7% in terms of revenue or 2) 42.4% in terms of equivalent GaN discrete chip shipment.

InnoScience offers various types of GaN products, including discrete chips, ICs, wafers and modules

The Company offers various types of GaN products along the industry value chain, including GaN wafers, discrete chips, integrated circuits (ICs) and modules.

Figure 17: InnoScience's products and solutions

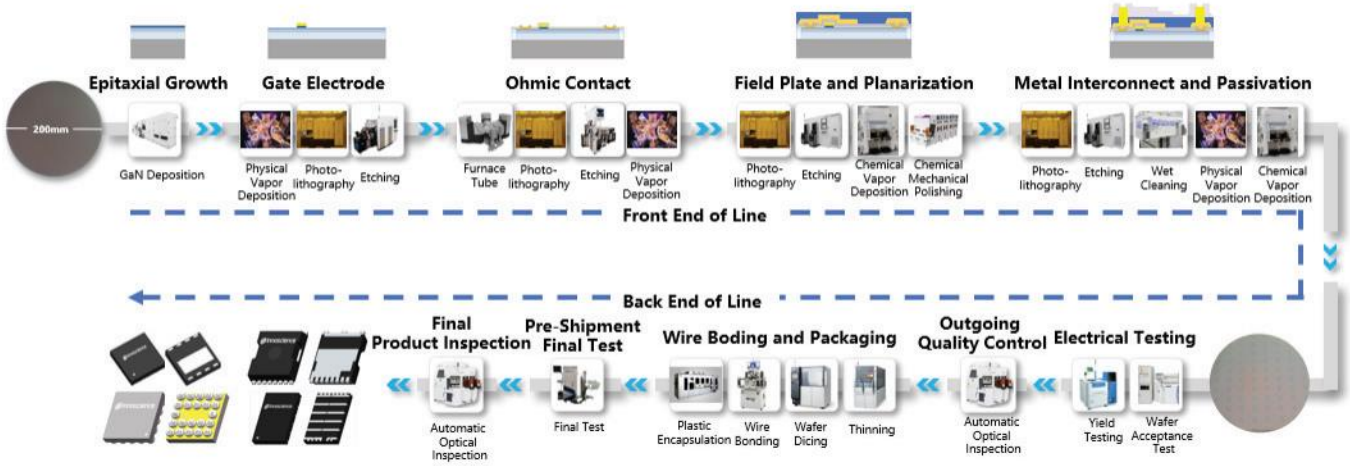
Products	2023 revenue (% total sales)	Characteristics
GaN wafers 	RMB209mn (35%)	**InnoScience's GaN wafers are delivered in un-diced and un-packaged form, providing customers with the flexibility of wafer dicing and IC packaging based on their own product designs.** All the discrete chip products are available for sale in wafer form. The Company also offers wafer epitaxial growth processing. **The Company is the first and only company globally to achieve mass production of 8-inch GaN-on-Si wafers, with 13kwpm production capacity as of 2024YE.** By achieving the mass production of 8-inch GaN-on-Si wafers (die per wafer up by 80% vs. 6-inch GaN-on-Si wafers), **InnoScience is able to lower single chip cost by 30%**, facilitating the commercialization of GaN products.
GaN discrete chips (GaN chips+packaging)  **and GaN ICs** (GaN chips+drive and protection circuit) 	RMB192mn (32%)	**InnoScience designs, develops and manufactures GaN discrete chips across low-, medium- and high-voltage ranges in different packaging options.** Their product R&D covers 15V to 1,200V. **From wafer to chips, the individual dies are separated from the wafer and then packaged.** - **Discrete chips are single, standalone components** that require additional circuitry for operation. **GaN discrete chips** are used to manage power flow and are often combined with other components to create functional electronic systems. - **GaN ICs integrate GaN discrete chips with the necessary drive and protection circuitry onto a single chip**, providing a more compact and efficient solution. The Company has developed **V-GaN series, a flagship line of bi-directional GaN chips that can be applied in various sectors** (i.e., consumer electronics and industrial applications). The V-GaN series, distinguished by **its bi-directional conductivity, allows one V-GaN chip to replace two silicon MOSFETs.** During 2021/22/23, the Company sold 23/58/164 types of GaN discrete chips, respectively. **The cumulative shipments exceeded 850mn as of 30 June 2024 in terms of equivalent GaN discrete chips.**
GaN modules (GaN chips+drive+control+ peripheral devices) 	RMB190mn (32%)	**GaN modules are designed for more complex power conversion applications, integrating chips, circuitry, and passive components into a single package** to efficiently convert input power into the desired output voltage. **The Company has introduced a wide range of GaN modules**, including GaN power supply modules for lithium-battery forming and grading equipment. **These GaN modules significantly enhance power density and operational efficiency.** For example, adopting GaN in photovoltaic microinverters can double or triple their frequency, while cut system loss by ~30% compared to traditional silicon-based modules. In addition, it also reduces the size of microinverters by ~30% and lower cost by ~20%.

Source: Company data, Frost & Sullivan, CMBIGM

InnoScience employs a vertically integrated production model for GaN chips, by controlling the entire production process (front-end-of-line processing and back-end-of-line processing). From chip design to packaging, the Company can optimize each stage for maximum efficiency and product quality.

The Company's advanced manufacturing facilities are essential for enhancing product quality and cost competitiveness. Equipment includes MOCVD epitaxial growth machines, thin-film deposition tools, lithography machines, etching equipment, ion implanters, and CMP tools, all integrated into the production processes to ensure efficient and high-quality manufacturing. As of 31 December 2021, 2022, 2023, and 1H24, the Company had 54/34/13/3 equipment suppliers, respectively.

Figure 18: InnoScience's production process chart



Source: Company data, Frost & Sullivan, CMBIGM

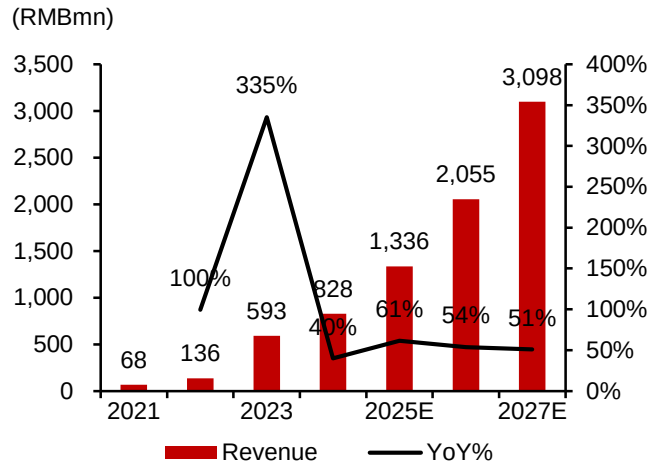
Financial Analysis

InnoScience's revenue grew from RMB68mn in 2021 to RMB828mn in 2024 (130% growth CAGR). **By products,** 41% of the total revenue in 2021 came from **GaN discrete chips and ICs**, while 58% came from **GaN wafers**. The contributions of these two types of products changed to 44%/34% in 2024, while GaN modules contributed to the other ~1/4 of sales.

Key revenue growth drivers include 1) capacity expansion, 2) customers base expansion (new GaN module sales from Customer G), and 3) increasing penetration of GaN products with greater coverage of application areas. The Company houses the world's largest GaN power semiconductor production base in Suzhou and Zhuhai, with a production capacity of 13kwpm as of end-FY24. **Their cumulative shipment of GaN chips exceeded 1.2bn by end-FY24, per mgmt.**

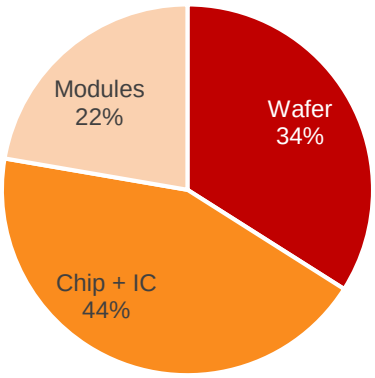
We forecast InnoScience's revenue to grow to RMB3.1bn in 2027E at 55.2% 2024-27E CAGR. We project the Company's capacity to increase to expand to 20k+ wfpm by end-FY25, with utilization rate steadily increasing from ~70% by end-2024 to ~80% by 2025E.

Figure 19: InnoScience's revenue to grow at 55.2% 2024-27E CAGR



Source: Company data, Frost & Sullivan, CMBIGM estimates

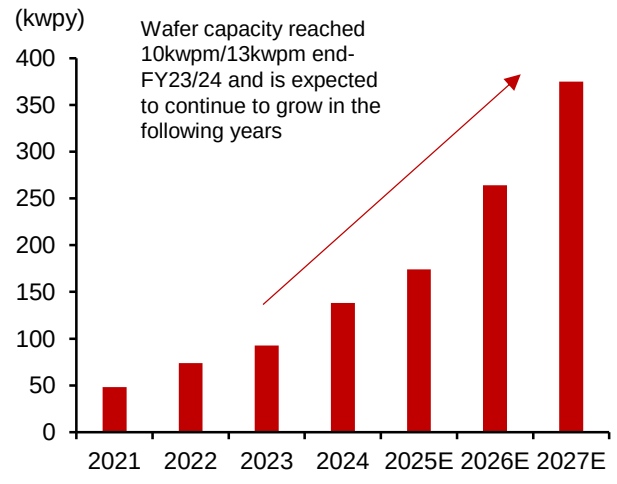
Figure 20: InnoScience's revenue breakdown (2024)



Source: Company data, Frost & Sullivan, CMBIGM

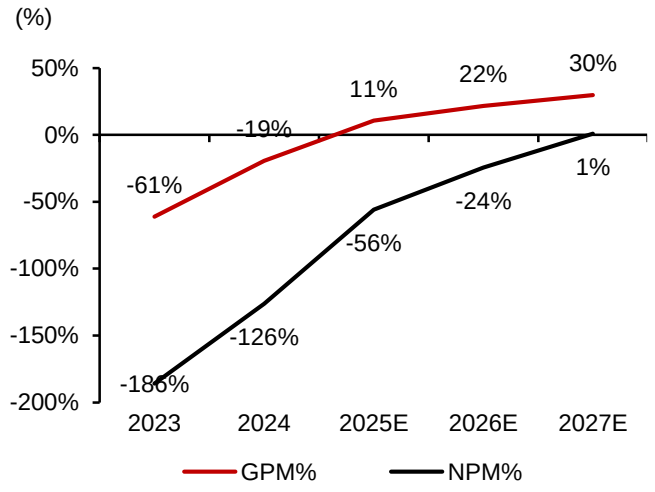
As the business grows, economies of scale will lead to improvements in margins. Driven by significant revenue growth, we expect the impact of depreciation to dilute. We estimate gross profit to reach RMB142mn in 2025E, implying 10.6% gross margin. We expect operating leverage to improve during the next few years backed by cost optimization, and expect its net profit margin to improve due to economies of scale and cost optimization and turn positive in 2027E.

Figure 21: Capacity expansion to be the key revenue growth driver



Source: Company data, Frost & Sullivan, CMBIGM estimates

Figure 22: InnoScience's GP/NP to break even in 2025/27 on economies of scale and cost optimization



Source: Company data, Frost & Sullivan, CMBIGM estimates

Figure 23: InnoScience's segment analysis

Revenue breakdown	2021	2022	2023	2024	2025E	2026E	2027E
(RMB'000)							
Segments							
Wafer	**39,412**	**50,036**	**208,666**	**280,499**	**387,739**	**617,798**	**927,833**
YoY%		*27.0%*	*317.0%*	*34.4%*	*38.2%*	*59.3%*	*50.2%*
%	*57.8%*	*36.7%*	*35.2%*	*33.9%*	*29.0%*	*30.1%*	*29.9%*
Chip + IC	**27,769**	**86,138**	**192,066**	**360,761**	**629,655**	**1,285,666**	**2,163,333**
YoY%		*210.2%*	*123.0%*	*87.8%*	*74.5%*	*104.2%*	*68.3%*
%	*40.7%*	*63.3%*	*32.4%*	*43.5%*	*47.1%*	*62.6%*	*69.8%*
Modules	**0**	**0**	**190,420**	**183,946**	**314,480**	**145,806**	**0**
YoY%				*-3.4%*	*71.0%*	*-53.6%*	*-100.0%*
%	*0.0%*	*0.0%*	*32.1%*	*22.2%*	*23.5%*	*7.1%*	*0.0%*
Others	**1,034**	**0**	**1,565**	**3,253**	**4,388**	**5,727**	**7,093**
YoY%		*-100.0%*		*107.9%*	*34.9%*	*30.5%*	*23.9%*
%	*1.5%*	*0.0%*	*0.3%*	*0.4%*	*0.3%*	*0.3%*	*0.2%*
Total revenue	**68,215**	**136,174**	**592,717**	**828,459**	**1,336,263**	**2,054,997**	**3,098,259**
YoY%		*99.6%*	*335.3%*	*39.8%*	*61.3%*	*53.8%*	*50.8%*
Key metrics							
S&M expenses	**(28,434)**	**(69,317)**	**(90,097)**	**(97,905)**	**(104,465)**	**(113,025)**	**(117,734)**
YoY%		*143.8%*	*30.0%*	*8.7%*	*6.7%*	*8.2%*	*4.2%*
% rev.	*-41.7%*	*-50.9%*	*-15.2%*	*-11.8%*	*-7.8%*	*-5.5%*	*-3.8%*
Admin expense	**(179,097)**	**(199,231)**	**(247,068)**	**(451,160)**	**(433,721)**	**(430,681)**	**(339,499)**
YoY%		*11.2%*	*24.0%*	*82.6%*	*-3.9%*	*-0.7%*	*-21.2%*
% rev.	*-262.5%*	*-146.3%*	*-41.7%*	*-54.5%*	*-32.5%*	*-21.0%*	*-11.0%*
R&D expense	**(661,699)**	**(581,092)**	**(348,749)**	**(323,028)**	**(347,314)**	**(390,449)**	**(402,774)**
YoY%		*-12.2%*	*-40.0%*	*-7.4%*	*7.5%*	*12.4%*	*3.2%*
% rev.	*-970.0%*	*-426.7%*	*-58.8%*	*-39.0%*	*-26.0%*	*-19.0%*	*-13.0%*
NP attri. to shareholders	**(3,399,342)**	**(2,205,476)**	**(1,101,946)**	**(1,045,677)**	**(746,266)**	**(503,361)**	**27,715**
YoY%		*-35.1%*	*-50.0%*	*-5.1%*	*-28.6%*	*-32.5%*	*-105.5%*
NPM%	*-4983.3%*	*-1619.6%*	*-185.9%*	*-126.2%*	*-55.8%*	*-24.5%*	*0.9%*

NP (non-HKFRS)	**(1,112,645)**	**(1,325,928)**	**(1,066,499)**	**(927,796)**	**(646,020)**	**(463,214)**	**31,803**
YoY%		*19.2%*	*-19.6%*	*-13.0%*	*-30.4%*	*-28.3%*	*-106.9%*
NPM%	*-1631.1%*	*-973.7%*	*-179.9%*	*-112.0%*	*-48.3%*	*-22.5%*	*1.0%*

Source: Company data, CMBIGM estimates.

Valuation and comparable universe

Target price of HK$49 per share based on 30x 2030E P/E

We believe the Company is on track to achieve stable operations (e.g., consistent product iterations and upgrades, stable margins, high utilization rate, etc.) by 2030E, at which point a valuation multiple of 30x P/E would be justifiable (peers' avg 5-yr historical P/E is 29.6x). This derives a total equity value of RMB37.6bn when we discount it back to FY25E, with WACC at 12.0% and RMB/HKD at 1.07. We expect the company's net profit to reach breakeven in 2027E, with revenue growing at 48.2% CAGR during 2024-30E, and net profit at 330.3% 2027-30E CAGR.

Figure 24: InnoScience's valuation

Valuation	2023	2024	2025E	2026E	2027E	2028E	2029E	2030E
(RMBmn)								
Key metrics								
Revenue	**593**	**828**	**1,336**	**2,055**	**3,098**	**4,758**	**6,736**	**8,784**
YoY%	*335.3%*	*39.8%*	*61.3%*	*53.8%*	*50.8%*	*53.6%*	*41.6%*	*30.4%*
Gross profit	**(362)**	**(161)**	**142**	**447**	**922**	**1,625**	**2,564**	**3,456**
YoY%	*-8.1%*	*-55.4%*	*-187.9%*	*215.1%*	*106.3%*	*76.3%*	*57.8%*	*34.8%*
GPM%	*-61.1%*	*-19.5%*	*10.6%*	*21.7%*	*29.8%*	***34.2%***	***38.1%***	*39.3%*
Net profit attri. to shareholders	**(1,102)**	**(1,046)**	**(746)**	**(503)**	**28**	**623**	**1,434**	**2,209**
YoY%	*-50.0%*	*-5.1%*	*-28.6%*	*-32.5%*	*-105.5%*	*2147.6%*	*130.2%*	*54.0%*
NPM%	*-185.9%*	*-126.2%*	*-55.8%*	*-24.5%*	*0.9%*	***13.1%***	***21.3%***	*25.1%*
P/E (x)								**30.0x**
WACC								**12.0%**
RMB/HKD								**1.07**
Equity value			**37,601**					**66,266**
Shares o/s (mn)			819					
TP (HK$)			**49**					

Source: Company data, CMBIGM estimates

We select domestic foundries such as SMIC and Hua Hong Semiconductor for comparison, as InnoScience adopts a similar hybrid business model (IDM + pure-play foundry), aligning closely with these leading local wafer fabrication players.

Figure 25: Peers comparison

Company	Ticker	Mkt Cap US$(mn)	Price (LC)	P/E (x) FY25E	FY26E	Avg. 5-yr P/E
SMIC	981 HK	61,409	44.10	54.7	44.9	32.3
HUA HONG SEMI	1347 HK	8,776	30.20	46.8	30.9	26.9
			Average	***50.8***	***37.9***	***29.6***

Source: Bloomberg consensus Note: Data as of 11 April 2025

Potential Risks

- **The Company heavily relies on protecting its intellectual property rights but faces significant risks from potential infringement claims by third parties.** Defending its IP can be costly and may divert management resources, especially in foreign jurisdictions, with no guarantee of always securing new rights or preventing unauthorized use. It may also inadvertently infringe on others' IP rights, leading to legal disputes that could disrupt operations, require ceasing product sales, paying damages, or redesigning products. During the Track Record Period, the Company was involved in three early-stage IP litigation matters. While it expects favorable outcomes based on legal counsel advice, adverse rulings could significantly harm its business, invalidate its patents, or impose additional liabilities, adversely affecting its financial condition and results of operations.
- **The Company may not maintain the past growth trajectory.** The Company has experienced rapid revenue growth with a CAGR of 195% from 2021-2023, but acknowledges the uncertainty in maintaining this rate. As a company in the early stage of development, it may face typical challenges of rapidly evolving industries, including accurate future projections and effective growth management. The focus is on expanding business, increasing market penetration, and developing new products. However, growth may strain resources and incur significant costs, potentially impacting profitability. Efficient management is crucial to maintaining investor confidence and market value.
- **The Company may not be able to keep inventory at a healthy level.** Effective inventory management is critical for the company, which had inventories of RMB82.0mn, RMB382.1mn, and RMB416.8mn in 2021, 2022, and 2023, respectively. The company's business model relies on accurate demand forecasts to manage raw materials, semi-finished products, and finished products. Mismanagement may lead to lose in sales or high inventory-related expenses, negatively affecting financial results. Factors like market conditions, new product launches, and supplier relationships may affect inventory levels. Inefficiencies may result in increased costs, inventory obsolescence, and write-offs, harming profitability and financial health.
- **Risks in raw material supply chain.** The Company relies on third-party suppliers for key materials in GaN product manufacturing, such as monocrystalline silicon substrates and special gases. Material costs were RMB23.6mn, RMB27.2mn, and RMB67.7mn in 2021, 2022, and 2023, respectively. Price volatility and supply shortages can disrupt production, increase costs, and delay product deliveries. Although the company has not faced significant supply issues recently, future price fluctuations or shortages could impair operations and market acceptance of its products. Effective management of supply chain risks is crucial to maintaining production stability.
- **Future capital needs and risks.** The Company may need to raise additional capital to fund operations, which could be challenging to secure on favorable terms. If raised through equity offerings, existing shareholders' ownership could be diluted, potentially including terms unfavorable to them. Debt financing could impose restrictive covenants on business actions. Failing to secure necessary capital could negatively impact the company's financial condition and ability to execute business strategies.
- **Credit risks from trade receivables.** The Company faces credit risks from its trade receivables, which amounted to RMB224.9mn, RMB150.4mn, and RMB337.0mn as of 31 December 2021, 2022, and 2023, respectively. Customers generally have a credit period of 30 to 90 days, but timely collection is not guaranteed. Despite improved trade receivables turnover days from 201.4 in 2021 to 132.5 in 2023, any failure to collect these receivables could adversely affect the company’s financial condition, liquidity, and business prospects.
- **Impact of international policies and export controls.** The Company's business and financial condition could be adversely affected by international export controls, economic sanctions, and trade-related measures. Recent US-China trade tensions have introduced high tariffs on high-tech goods, semiconductors, and electronics, which may escalate if no agreement is reached. The company primarily serves customers in Asia and Europe, but future sanctions or expanded export controls could affect sales and operations. Additionally, restrictions on customers' export sales of their

end products could reduce demand for the company's products, affecting its business and financial health.

Appendix

Figure 26: InnoScience's executive directors profile

Name	Title	Background
Dr. Weiwei Luo	Founder, Chairperson of the Board, Executive Director	Dr. Luo was appointed as Director and Chairperson in July 2017, and Executive Director since 21 May 2024. He oversees overall business development and strategic planning, and holds positions in subsidiaries including Inno Suzhou and Inno Shenzhen. Dr. Luo is a world-class scientist and entrepreneur with extensive experience, being the Director of Star Key Semiconductor Co., Ltd. She received a doctorate degree in applied mathematics from Massey University, New Zealand.
Mr. Jay Hyung Son	Executive Director	Mr. Son has been the Director since July 2017, and Executive Director since 21 May 2024. He is responsible for business development. Prior to serving as a director, Mr. Son was the general manager in Inno Suzhou (Oct 2017-Oct 2023). He has extensive leadership experience in semiconductors. Mr. Son obtained a Bachelor's degree in science from the University of California, Berkeley (1987).
Dr. Wu Jingang	Executive Director, Chief Executive Officer	Dr. Wu has been the Director since January 2023, and Executive Director since 21 May 2024. He manages overall business development and operations. Prior to joining the company, he was the R&D Vice President at Semiconductor Manufacturing International Corporation (2001 - July 2021). Dr. Wu held a Doctorate degree in physical chemistry from Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences (1994).
Mr. Zhong Shan	Executive Director, Chief Financial Officer	Mr. Zhong has been the Director since July 2017, and Executive Director since 21 May 2024. He handles financial management, investment, and financing. Prior to joining the company, he worked in Joincare Pharmaceutical Group (2001-2017). He has been the independent non-executive director at Smoore International Holdings Limited since June 2020. Mr. Zhong obtained his Bachelor degree in applied chemistry from Huaqiao University (1993). He has been the ACCA member since 1999.

Source: Company data, F&S

Financial Summary

INCOME STATEMENT	2022A	2023A	2024A	2025E	2026E	2027E
YE 31 Dec (RMB mn)						
Revenue	**136**	**593**	**828**	**1,336**	**2,055**	**3,098**
Cost of goods sold	(530)	(955)	(990)	(1,194)	(1,608)	(2,176)
Gross profit	**(394)**	**(362)**	**(161)**	**142**	**447**	**922**
Operating expenses	**(782)**	**(621)**	**(800)**	**(802)**	**(854)**	**(774)**
Selling expense	(69)	(90)	(98)	(104)	(113)	(118)
Admin expense	(199)	(247)	(451)	(434)	(431)	(339)
R&D expense	(581)	(349)	(323)	(347)	(390)	(403)
Others	68	65	72	84	80	86
Operating profit	**(1,176)**	**(983)**	**(961)**	**(660)**	**(407)**	**148**
Other expense	(132)	(119)	(84)	(86)	(96)	(120)
Other gains/(losses)	(898)	0	0	0	0	0
Pre-tax profit	**(2,205)**	**(1,102)**	**(1,045)**	**(746)**	**(503)**	**28**
Income tax	(0)	(0)	(0)	0	0	0
After tax profit	**(2,205)**	**(1,102)**	**(1,046)**	**(746)**	**(503)**	**28**
Minority interest	0	0	0	0	0	0
Net profit	**(2,205)**	**(1,102)**	**(1,046)**	**(746)**	**(503)**	**28**

BALANCE SHEET	2022A	2023A	2024A	2025E	2026E	2027E
YE 31 Dec (RMB mn)						
Current assets	**1,927**	**1,112**	**2,460**	**2,120**	**2,287**	**2,798**
Cash & equivalents	711	329	1,525	1,171	1,256	1,637
Receivables	150	337	484	503	539	614
Inventories	382	417	444	439	486	540
ST bank deposits	25	9	6	6	6	6
Financial assets at FVTPL	659	20	0	0	0	0
Other current assets	0	0	0	0	0	0
Non-current assets	**3,768**	**3,480**	**3,087**	**3,233**	**3,412**	**3,700**
PP&E	3,260	3,061	2,742	3,054	3,306	3,661
Right-of-use assets	92	85	117	114	110	106
Intangibles	345	273	198	35	(35)	(98)
Other non-current assets	70	61	31	31	31	31
Total assets	**5,695**	**4,591**	**5,547**	**5,353**	**5,699**	**6,497**
Current liabilities	**1,011**	**926**	**996**	**1,416**	**1,850**	**2,300**
Short-term borrowings	438	508	522	952	1,360	1,743
Payables	566	410	462	454	480	545
Lease liabilities	7	8	11	10	10	11
Non-current liabilities	**1,724**	**1,701**	**1,580**	**1,562**	**1,888**	**2,154**
Long-term borrowings	1,632	1,546	1,401	1,392	1,710	1,949
Deferred income	56	126	119	115	123	140
Other non-current liabilities	35	29	59	55	55	65
Total liabilities	**2,735**	**2,627**	**2,576**	**2,978**	**3,737**	**4,454**
Share capital	0	801	879	879	879	879
Capital surplus	4,046	0	0	0	0	0
Other reserves	(1,086)	1,163	2,092	1,496	1,083	1,164
Total shareholders equity	**2,960**	**1,964**	**2,971**	**2,375**	**1,962**	**2,044**
Minority interest	0	0	0	0	0	0
Total equity and liabilities	**5,695**	**4,591**	**5,547**	**5,353**	**5,699**	**6,497**

CASH FLOW	2022A	2023A	2024A	2025E	2026E	2027E
YE 31 Dec (RMB mn)						
Operating						
Profit before taxation	**(2,205)**	**(1,102)**	**(1,045)**	**(746)**	**(503)**	**28**
Depreciation & amortization	470	534	516	624	771	936
Tax paid	(0)	(0)	(0)	0	0	0
Change in working capital	(298)	(216)	(159)	(202)	(265)	(317)
Others	1,097	190	353	382	366	403
Net cash from operations	**(936)**	**(594)**	**(336)**	**57**	**369**	**1,049**
Investing						
Capital expenditure	(465)	(331)	(172)	(778)	(959)	(1,234)
Acquisition of subsidiaries/ investments	(5,100)	(1,493)	113	0	0	0
Net proceeds from disposal of short-term investments	5,470	2,138	360	0	0	0
Others	1	25	(430)	39	46	53
Net cash from investing	**(94)**	**338**	**(129)**	**(739)**	**(913)**	**(1,181)**
Financing						
Net borrowings	123	(32)	(129)	420	726	623
Proceeds from share issues	0	20	641	0	0	0
Share repurchases	0	0	0	0	0	0
Others	337	(115)	1,150	(92)	(96)	(109)
Net cash from financing	**460**	**(127)**	**1,662**	**328**	**629**	**514**
Net change in cash						
Cash at the beginning of the year	1,279	711	329	1,525	1,171	1,256
Exchange difference	2	0	(0)	0	0	0
Others	(570)	(382)	1,196	(354)	85	382
Cash at the end of the year	**711**	**329**	**1,525**	**1,171**	**1,256**	**1,637**

GROWTH	2022A	2023A	2024A	2025E	2026E	2027E
YE 31 Dec						
Revenue	99.6%	335.3%	39.8%	61.3%	53.8%	50.8%
Gross profit	na	na	na	na	215.1%	106.3%

PROFITABILITY	2022A	2023A	2024A	2025E	2026E	2027E
YE 31 Dec						
Gross profit margin	(289.4%)	(61.1%)	(19.5%)	10.6%	21.7%	29.8%
Operating margin	(863.4%)	(165.8%)	(116.0%)	(49.4%)	(19.8%)	4.8%
Return on equity (ROE)	na	(44.8%)	(42.4%)	(27.9%)	(23.2%)	1.4%

GEARING/LIQUIDITY/ACTIVITIES	2022A	2023A	2024A	2025E	2026E	2027E
YE 31 Dec						
Current ratio (x)	1.9	1.2	2.5	1.5	1.2	1.2

VALUATION	2022A	2023A	2024A	2025E	2026E	2027E
YE 31 Dec						
P/E	na	na	na	na	na	895.8

Source: Company data, CMBIGM estimates. Note: The calculation of net cash includes financial assets.

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