InnoScience (Suzhou)

HK$38.60 - OUTPERFORM

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China
Technology

Reuters	2577.HK
Bloomberg	2577 HK
Priced on 24 April 2025	HS CEI @ 8,056.9
12M hi/lo	HK$64.90/31.90
12M price target	HK$44.80
±% potential	+16%
Shares in issue	880.8m
Free float (est.)	2.5%
Market cap	US$4.4bn
3M ADV	US$4.6m
Foreign s'holding	41.7%

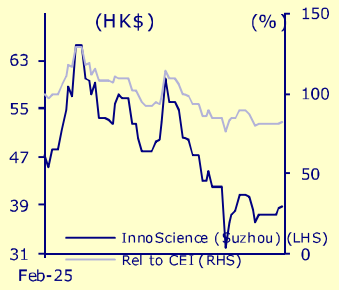
Major shareholders
LUO Weiwei 24.6%

Blended ESG Score (%)*	
Overall	61.4
Country average	53.8
GEM sector average	60.8

*Click to visit company page on clsa.com for details

Stock performance (%)

	1M	3M	12M
Absolute	(28.8)	na	na
Relative	(21.8)	na	na
Abs (US$)	(28.7)	na	na



Source: Bloomberg. Trading from Feb-25.

Watt's future

Global No.1 GaN company with fast progress in NEVs and AI servers

Penetration of gallium nitride (GaN) may rapidly increase from 0.5% of power semiconductors in 2023 to 10.1% in 28E to TAM of Rmb50bn. InnoScience is the largest GaN player globally with pioneering technology. It cooperates with leading power IDMs. It has made fast progress in NEVs, AI servers and other non-consumer electronics applications, which contributed 37% of revenue in 2024. We initiate coverage at an HK$44.80 target price and Outperform rating.

Rising GaN demand

Compared to silicon, GaN enhances energy conversion efficiency and allows for smaller device size. Frost & Sullivan (F&S) estimates GaN's TAM to increase to Rmb50bn in 2028, driven by increased penetration in new energy vehicles (NEVs), AI, datacentres, humanoid robots, new energy power generation and power grids. We attribute GaN's penetration to improved mass production, especially for industrial/automotive-grade products, and enhanced price-performance ratio.

InnoScience is the largest GaN player globally with leading technology

InnoScience is the largest GaN player globally with 34% market share in 2023 as per F&S. It has a strong R&D team, provided the latest Gen3 GaN technology and is also the first company to mass produce 8" GaN-on-Si wafers. It recently won a patent dispute vs Efficient Power Conversion (fourth-largest GaN player), which shows InnoScience's strong R&D ability. STMicroelectronics hold 1.4% share on capacity collaboration with InnoScience, which proves InnoScience's lead in GaN.

Company's GaN product has seen fast adoption in automotive and AI servers

InnoScience achieved design-ins in autos from a number of domestic and foreign automotive OEMs. For AI servers, InnoScience mass-produced and delivered chips for server power supplies to multiple global manufacturers and is actively promoting the application of GaN chips in GPU DC power conversion. For 2024, we estimate 10% of total revenue came from automotive and AI server sales.

Global GaN leader; initiate at HK$44.80 target price and Outperform rating

We forecast a 76% revenue Cagr over 2024-28CL to Rmb8.0bn by 28CL, driven by increasing demand from autos and AI servers, supported by capacity expansion. We value InnoScience based on 6.0x 28CL PS, a discount from its major peer SICC. Our TP is HK$44.80. We initiate at Outperform. Key risks include slower-than-expected GaN penetration and supply landscape shift amid US tariffs. Lock-up periods for pre-IPO investors will end on 30 Jun 2025 and 30 Dec 2025.

Financials

Year to 31 December	23A	24A	25CL	26CL	27CL
Revenue (Rmbm)	593	828	1,307	2,507	5,042
Net profit (Rmbm)	(1,102)	(1,046)	(782)	(260)	602
EPS (fen)	(137.6)	(118.9)	(89.0)	(29.6)	68.5
EPS growth (% YoY)	nm	nm	nm	nm	nm
PE (x)	nm	nm	nm	nm	52.0
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0
FCF yield (%)	(3.2)	(1.6)	(1.7)	(4.5)	(3.7)
P/Sales (x)	48.1	37.8	24.0	12.5	6.2
ROE (%)	(44.8)	(42.4)	(30.3)	(12.6)	27.0
Net debt/equity (%)	87.9	13.4	48.8	135.6	157.0

Source: www.clsa.com

Initiating coverage

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For important disclosures please refer to page 36.

evalu@tor The Global Equities Database

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Great Solid Meh

Financials at a glance

Year to 31 December	2023A	2024A	2025CL	(% YoY)	2026CL	2027CL
Profit & Loss (Rmbm)						
Revenue	**593**	**828**	**1,307**	*57.8*	**2,507**	**5,042**
Cogs (ex-D&A)	(430)	(484)	(631)		(1,047)	(2,110)
Gross Profit (ex-D&A)	**163**	**345**	**676**	*96.2*	**1,460**	**2,932**
SG&A and other expenses	(686)	(872)	(876)		(990)	(1,180)
Op Ebitda	**(523)**	**(527)**	**(200)**		**470**	**1,752**
Depreciation/amortisation	(525)	(506)	(525)		(625)	(746)
Op Ebit	**(1,048)**	**(1,034)**	**(725)**		**(156)**	**1,006**
Net interest inc/(exp)	(119)	(84)	(113)		(160)	(206)
Other non-Op items	65	72	55	*(23.9)*	55	55
Profit before tax	**(1,102)**	**(1,045)**	**(782)**		**(260)**	**854**
Taxation	0	0	-		-	(252)
Profit after tax	**(1,102)**	**(1,046)**	**(782)**		**(260)**	**602**
Minority interest	0	0	0		0	0
Net profit	**(1,102)**	**(1,046)**	**(782)**		**(260)**	**602**
Adjusted profit	**(1,102)**	**(1,046)**	**(782)**		**(260)**	**602**
Cashflow (Rmbm)	**2023A**	**2024A**	**2025CL**	**(% YoY)**	**2026CL**	**2027CL**
Operating profit	**(1,048)**	**(1,034)**	**(725)**		**(156)**	**1,006**
Depreciation/amortisation	525	506	525	*3.7*	625	746
Working capital changes	(216)	(159)	54		(364)	(769)
Other items	146	351	55	*(84.3)*	55	(197)
Net operating cashflow	**(594)**	**(336)**	**(91)**		**161**	**786**
Capital expenditure	(331)	(172)	(455)		(1,557)	(1,947)
Free cashflow	**(925)**	**(508)**	**(546)**		**(1,396)**	**(1,161)**
M&A/Others	670	43	0		0	0
Net investing cashflow	**338**	**(129)**	**(455)**		**(1,557)**	**(1,947)**
Increase in loans	(298)	(522)	(113)		(160)	(206)
Dividends	0	0	0		0	0
Net equity raised/other	171	2,183	667	*(69.4)*	1,060	1,060
Net financing cashflow	**(127)**	**1,662**	**554**	***(66.6)***	**900**	**854**
Incr/(decr) in net cash	(382)	1,196	8	*(99.3)*	(496)	(308)
Exch rate movements	0	0	0		0	0
Balance sheet (Rmbm)	**2023A**	**2024A**	**2025CL**	**(% YoY)**	**2026CL**	**2027CL**
Cash & equivalents	329	1,525	1,533	*0.5*	1,037	730
Accounts receivable	337	484	564	*16.5*	982	1,876
Other current assets	446	451	425	*(5.6)*	512	770
Fixed assets	3,061	2,742	2,744	*0.1*	3,747	4,967
Investments	-	-	-		-	-
Intangible assets	273	198	126	*(36.2)*	54	36
Other non-current assets	146	148	148	*0*	148	148
Total assets	**4,591**	**5,547**	**5,540**	***(0.1)***	**6,481**	**8,525**
Short-term debt	508	522	550	*5.3*	600	650
Accounts payable	410	462	540	*16.8*	681	1,064
Other current liabs	8	11	20	*79.3*	30	40
Long-term debt/CBs	1,546	1,401	2,051	*46.4*	3,051	4,051
Provisions/other LT liabs	155	179	190	*6.3*	190	190
Shareholder funds	1,964	2,971	2,189	*(26.3)*	1,928	2,530
Minorities/other equity	0	0	0		0	0
Total liabs & equity	**4,591**	**5,547**	**5,540**	***(0.1)***	**6,481**	**8,525**
Ratio analysis	**2023A**	**2024A**	**2025CL**	**(% YoY)**	**2026CL**	**2027CL**
Revenue growth (% YoY)	335.3	39.8	57.8		91.8	101.1
Ebitda margin (%)	(88.3)	(63.7)	(15.3)		18.7	34.7
Ebit margin (%)	(176.8)	(124.8)	(55.4)		(6.2)	19.9
Net profit growth (%)	nm	nm	nm		nm	nm
Op cashflow growth (% YoY)	nm	nm	nm		nm	388.1
Capex/sales (%)	55.9	20.7	34.8		62.1	38.6
Net debt/equity (%)	87.9	13.4	48.8		135.6	157.0
Net debt/Ebitda (x)	(3.3)	(0.8)	(5.3)		5.6	2.3
ROE (%)	(44.8)	(42.4)	(30.3)		(12.6)	27.0
ROIC (%)	(25.4)	(28.0)	(20.7)		(3.8)	12.4

Source: www.clsa.com

Rising GaN demand

GaN is providing an increasing proportion of power semiconductor sales

InnoScience is an integrated device manufacturer (IDM) specialising in GaN power semiconductors, with 33.7% market share as of 2023 as per Frost & Sullivan. Due to GaN's wide bandgap, high electron mobility and high switching frequency, we expect rising demand for the technology to result in GaN accounting for a higher proportion of power semiconductors.

GaN is replacing traditional silicon due to superior performance

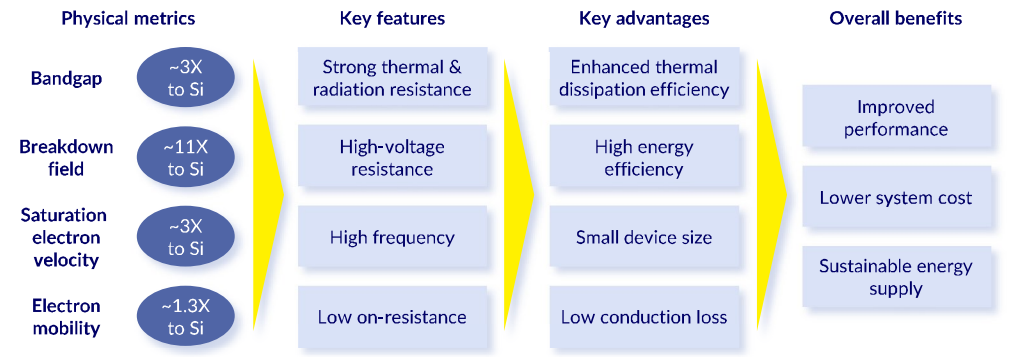
With the rapid growth of electrification, the technology and performance of traditional silicon semiconductors are gradually reaching their limits. As a result, they will soon be unable to meet the demands of emerging applications such as EVs, fast charging for consumer electronics, power management and datacentres. However, GaN demonstrates superior performance compared to silicon in these applications due to a wide bandgap, high electron mobility, high switching frequency, low on-resistance and better resistance to high voltage and temperature.

GaN chips can effectively reduce energy loss, enhance energy conversion efficiency, lower system costs and allow for smaller device size. Industry developments and pain points related to using traditional silicon materials for various downstream applications are driving a shift to GaN as a replacement in power semiconductors. Consequently, GaN power semiconductors have significant growth potential.

GaN reduces energy loss, enhances energy efficiency, lowers costs and allows for smaller device size

Figure 1

Key features and advantages of GaN



Source: Frost & Sullivan, CLSA

GaN should outpace overall and power semiconductor market

Global GaN power semiconductor market size reached Rmb1.8bn in 2023

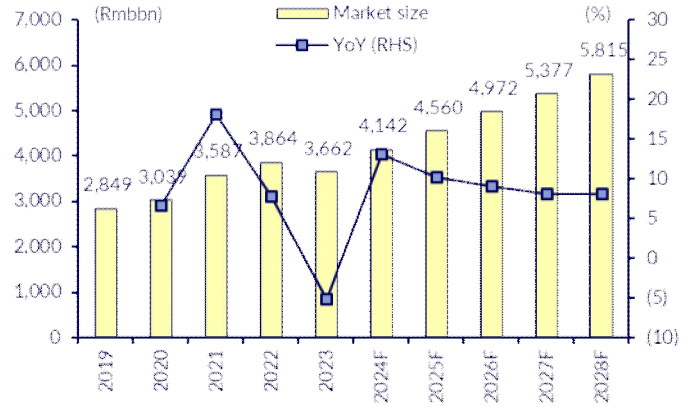
In 2023, the global market size for GaN power semiconductor was Rmb1.8bn by revenue, with a 0.5% market penetration rate in power semiconductors as per Frost & Sullivan. With GaN replacing traditional silicon materials, we expect the global GaN power semiconductor market to reach Rmb50.1bn by 2028 and raise its share of the global power semiconductor market to 10.1%.

Semiconductor market should return to fast growth starting in 2024

According to World Semiconductor Trade Statistics (WTST) and Frost & Sullivan (F&S), the worldwide semiconductor market increased from Rmb2,849.0bn in 2019 to Rmb3,661.7bn in 2023, a 6.5% Cagr, and should increase from Rmb4,142.1bn in 2024 to Rmb5,815.3bn in 2028F, an 8.9% Cagr. While the global economic downturn in 2023 led to stockpiling among downstream companies and a short-term decline in consumer demand, we expect the semiconductor market returned to rapid growth starting in 2024.

Figure 2

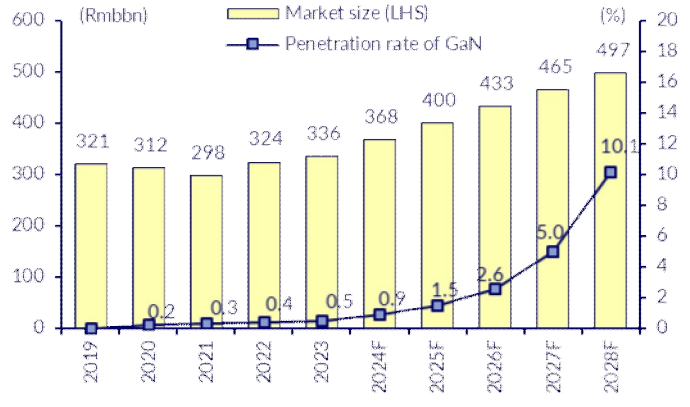
Market size of semiconductor market by sales value



Source: CLSA, WSTS, Frost & Sullivan

Figure 3

Market size of power semiconductor market by sales value



Source: CLSA, Frost & Sullivan

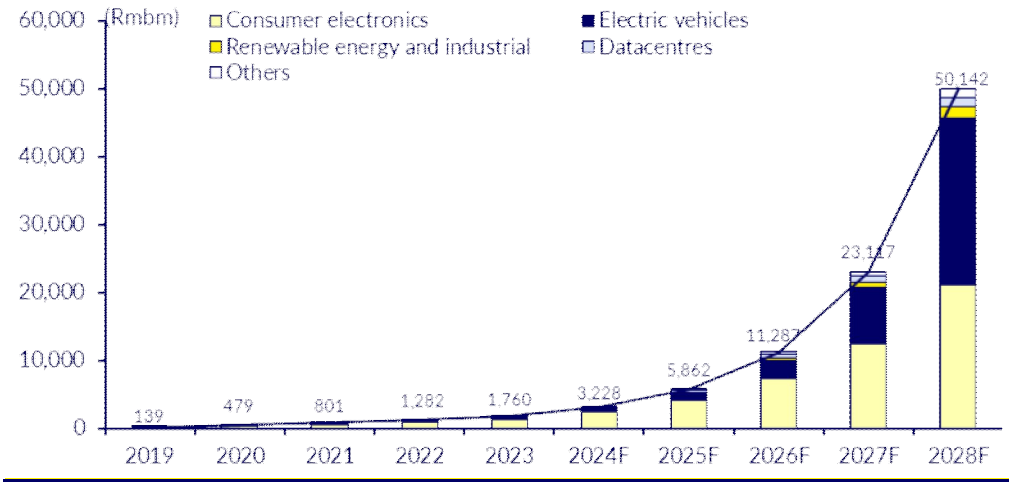
Power semiconductors are essential to power conversion and circuit control

Power semiconductors are essential components of power conversion and circuit control in electronic devices. They are primarily used in voltage and frequency conversion and DC-to-AC conversion. According to Frost & Sullivan, the worldwide market size for power semiconductors by revenue increased from Rmb320.6bn in 2019 to Rmb335.7bn in 2023, a 1.2% Cagr. The market research firm expects the market size to further expand from Rmb368.0bn in 2024 to Rmb496.8bn in 2028, representing a 7.8% Cagr, driven by downstream market developments in EVs, datacentres, new energy power generation and power grids.

EVs, consumer electronics, datacentres and renewable energy are growth drivers

Figure 4

Market size of GaN power semiconductor market

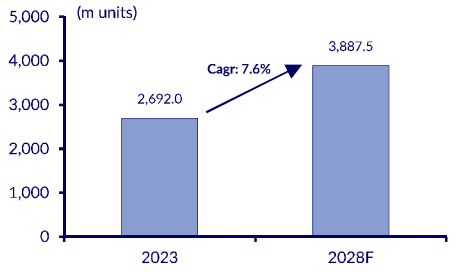


Source: CLSA, Frost & Sullivan

GaN power semis to grow faster than overall semis and power semis markets

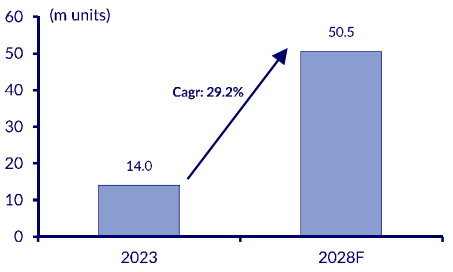
We expect GaN power semiconductor market growth to outperform both the overall semiconductor and the power semiconductor markets. Per Frost & Sullivan, the global GaN power semiconductor market rose from Rmb139.4m in 2019 to Rmb1,759.5m in 2023, an 88.5% Cagr. F&S expect this market to expand from Rmb3,227.7m in 2024 to Rmb50,141.9m in 2028, representing a Cagr of 98.5%.

Figure 5
Consumer electronics: Global sales volume



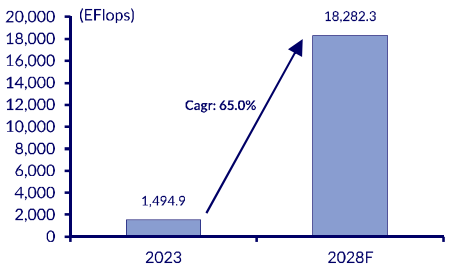
Source: Frost & Sullivan, CLSA

Figure 6
EVs: Global sales volume



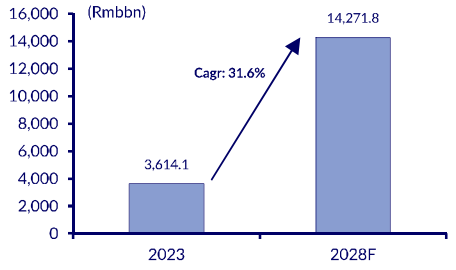
Source: Frost & Sullivan, CLSA

Figure 7
Global computing power capacity



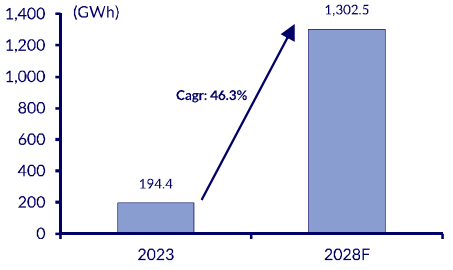
Source: Frost & Sullivan, CLSA

Figure 8
Global AI sector market size by revenue



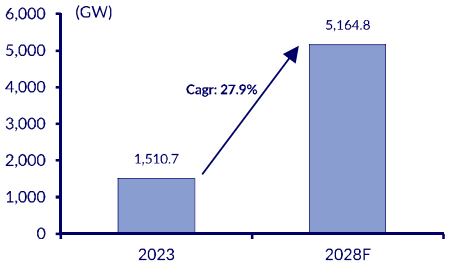
Source: Frost & Sullivan, CLSA

Figure 9
Global energy storage installed capacity



Source: Frost & Sullivan, CLSA

Figure 10
Global photovoltaic installed capacity



Source: Frost & Sullivan, CLSA

Consumer electronics and EVs are the two largest application scenarios

Within the GaN power semiconductor market, consumer electronics and EVs are the two largest application scenarios in the forecast period. In consumer electronics, F&S says the GaN market expanded from Rmb85.0m in 2019 to Rmb1,412.0m in 2023, a 101.9% Cagr. Benefitting from fast chargers and adapters, the two main growth drivers, F&S expects the consumer electronics GaN power semiconductor market to significantly increase from Rmb2,466.3m in 2024 to Rmb21,133.3m in 2028, a 71.1% Cagr.

EV GaN power semi market could grow at a 216% Cagr over 2024-28

EVs are an important application scenario driving GaN demand. In EVs, the GaN market rose from Rmb0.4m in 2019 to Rmb69.4m in 2023, a 266.0% Cagr, per F&S. With longer driving ranges, increasing battery capacity, decreasing price, more mature and convenient charging infrastructure and stronger environmental consciousness among consumers, global sales volume for EVs should increase to 50.5 million units by 2028F, a 29.2% Cagr over 2023-28F, according to Frost & Sullivan. F&S expects the market size for GaN power semiconductors in EVs, benefitting from rising penetration rates and growing value per vehicle, to increase from Rmb245.9m in 2024 to Rmb24,636.5m in 2028F, a Cagr of 216.4%.

Global GaN leader with pioneering technology

The largest GaN player

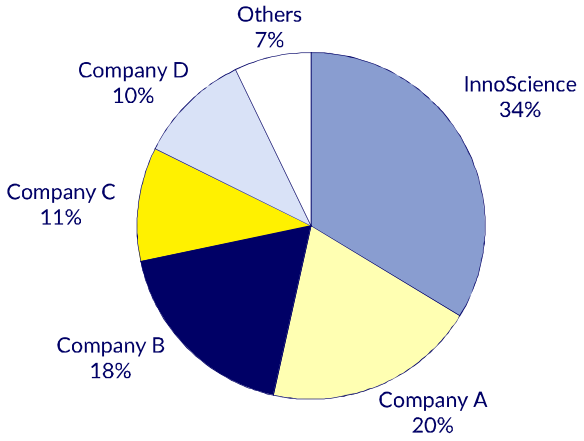
InnoScience enjoyed 33.7% market share in 2023

With Rmb592.7m in revenue from GaN power semiconductors, InnoScience is the No.1 ranked company in this category as of 2023, with 33.7% market share, per F&S. Combined market share among the top five companies was 92.8% in 2023.

InnoScience was No.1 by revenue as of 2023

Figure 11

Top-five GaN power semiconductor companies by revenue, 2023



Source: CLSA, Frost & Sullivan

Production capacity reached 13k wafers per month as of December 2024

InnoScience also leads the global GaN power semiconductor market in production capacity. As of end-2024, production capacity was 13k wpm (wafers per month) and the company shipped 660m units of discrete chips in 2024. The product yield rate, which is above 95%, is also higher than the sector average of between 90% and 95%.

We expect InnoScience to expand production capacity of its 8" GaN wafers to 75k wpm as of end-2028 in response to the growing demand in the end markets that adopt the company's products.

Strong competitive edge

Strong R&D team

InnoScience's leadership team has extensive experience in advanced materials and semiconductor technology.

Founder and chairperson Dr. Weiwei Luo is a world-class scientist and entrepreneur with extensive experience. Prior to founding InnoScience, Dr. Luo was engaged in scientific research, project management and entrepreneurship for years. Dr. Luo is also currently the director of Stark Semiconductor, which is primarily engaged in the research and development of display and micro-screen technology. Dr. Luo holds the position of executive deputy director at the Power Supply Technology Committee of the China Advanced Semiconductor Industry Innovation Alliance. Dr. Luo received a doctorate degree in applied mathematics from Massey University in New Zealand.

CEO Dr. Jingang Wu has extensive experience in semiconductor technology development. Prior to joining InnoScience, Dr. Wu worked at SMIC from 2001 to July 2021 with his last position as the R&D vice president. Dr. Wu received a doctorate degree in physical chemistry from the Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences.

The company had an R&D team of 304 employees as of 30 June 2024. Many of them are semiconductor industry veterans with expertise in technology and material innovation. Its R&D team contributed to 319 patents and 430 patent applications as of 30 June 2024, covering areas such as chip design, device structuring, wafer manufacturing, packaging and reliability testing.

Leading technology

InnoScience has strong patents and tech support

InnoScience has strong patent and technology support backing its discrete chips products. Its flagship line of bi-directional GaN chips, V-GaN series, is distinguished by its bidirectional conductivity, allowing one V-GaN chip to replace two silicon MOSFETS, leading to better space saving and heat-generation control.

In 2024, InnoScience developed its new third-generation high- and low-voltage process technology platform, as well as new device platforms for automotive-grade, bidirectional conduction and encapsulated ICs. The new process technology platform will expand product voltage range, optimise device performance and enhance product frequency. The third-generation process technology platform significantly improves wafer output efficiency compared to the existing mass-produced process platform, increasing chip output per wafer by over 30%.

In April 2025, InnoScience announced that its higher-voltage GaN product at 1,200V has entered mass production for medium- to high-power supply applications. In the next phase, company believes its 1,200V products will be applied in NEVs, AI datacentres etc.

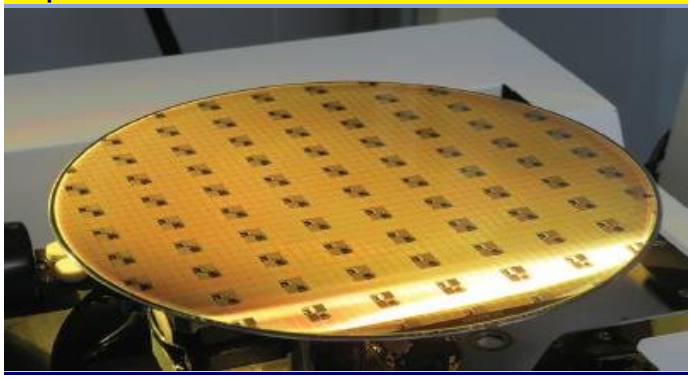
First to supply 8" GaN at scale

InnoScience the first to achieve mass production of 8" GaN-on-Si wafers

According to Frost & Sullivan, InnoScience is the first company in the world to achieve mass production of 8" GaN-on-Si wafers. The company's 8" GaN-on-Si wafers offer larger effective area, enhanced production efficiency and reduced costs, with die per wafer increasing 80% and single chip cost decreasing 30% compared to conventional 6" wafers.

Figure 12

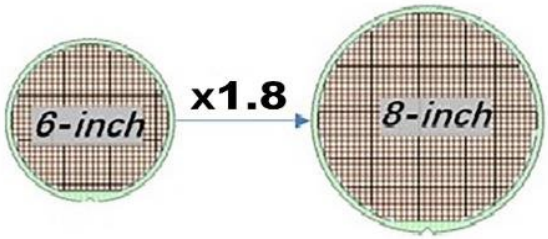
Sample of 8" GaN-on-Si wafer



Source: Company

Figure 13

8" wafer with 80% more die per wafer than 6"



Source: Company website

IDM model is a key competitive edge

InnoScience won patent dispute vs EPC

InnoScience announced on 19 March 2025 that it achieved victory in the patent dispute initiated by Efficient Power Conversion (EPC) by securing a final decision from the US Patent and Trademark Office (USPTO).

EPC had initially filed a lawsuit against InnoScience in May 2023 claiming infringement of four patents; two of the claims were later withdrawn, and a third was found not to be infringed. The International Trade Commission (ITC) had previously determined that some claims of the '294 patent were valid and infringed, a ruling InnoScience disagreed with and appealed on 31 January 2025.

The USPTO's ruling suggests that the ITC's determination regarding the '294 patent is flawed, supporting InnoScience's position that EPC's claims are baseless.

Cooperation with overseas leading IDMs

STMicroelectronics acted as one of the cornerstone investors during InnoScience's IPO and acquired approximately 1.43% of the company's share capital.

On 31 March 2025, STMicroelectronics (ST) and InnoScience announced an agreement on GaN technology development and manufacturing, leveraging the strengths of each company to enhance GaN power solutions and supply chain resilience. The agreement allows InnoScience to utilise ST's front-end manufacturing capacity outside China for its GaN wafers, while ST can leverage InnoScience's front-end manufacturing capacity in China for its own GaN wafers.

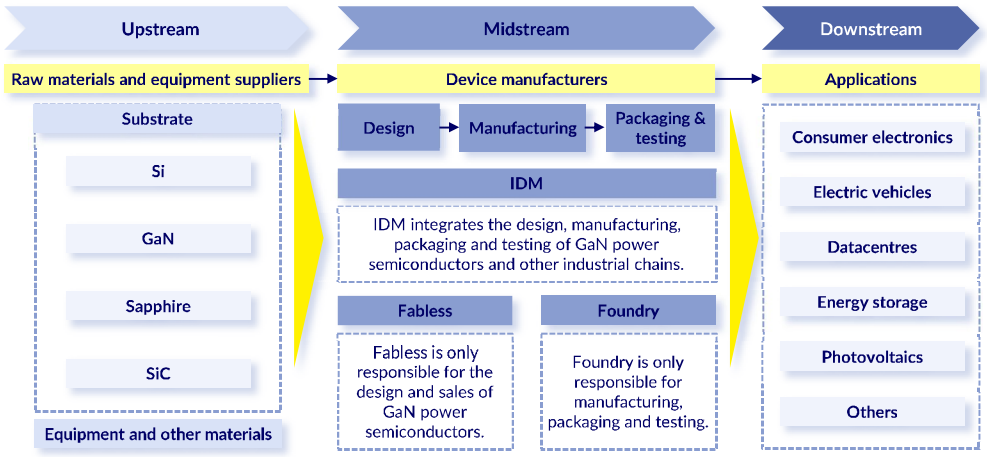
IDM business model is an advantage

We believe the integrated device manufacturer (IDM) model is a key competitive advantage. Both InnoScience and competitor Infineon Technologies follow this model in the GaN power semiconductor sector. Although it requires significant capital and technology investment, benefits include synergies between the design and manufacturing process, capacity and supply security, cost advantages from production at scale and continual process and technology upgrades.

Synergies between the design and manufacturing processes are a benefit

Figure 14

Value chain analysis of GaN power semiconductor industry



Source: CLSA, Frost & Sullivan

InnoScience's IDM model has several advantages:

Stable delivery

- InnoScience's 8" GaN wafer production base is the only one of its kind capable of mass production. Combined with in-house control over design and manufacturing, the company can meet bulk delivery demand and ensure supply chain stability.

Design and manufacturing coordination, including custom designs

- The IDM model allows the R&D and manufacturing areas to collaborate, facilitating efficient design and coordination throughout the product development and delivery process. InnoScience leverages this control to standardise major products, meet diverse customer needs and quickly scale up production. It also enables the company to respond to specialised customer requirements, customise designs and bring viable projects into production, resulting in shorter product delivery cycles.

Operational cost advantage

- Compared to the fabless model, the IDM model provides in-house control of the entire process from design to manufacturing and testing, leading to a more refined process, better cost management and efficient scaling. In contrast, fabless firms need to repeatedly verify their design with clients, which are subject to foundry processing fees, thereby allowing InnoScience to adopt more competitive pricing.

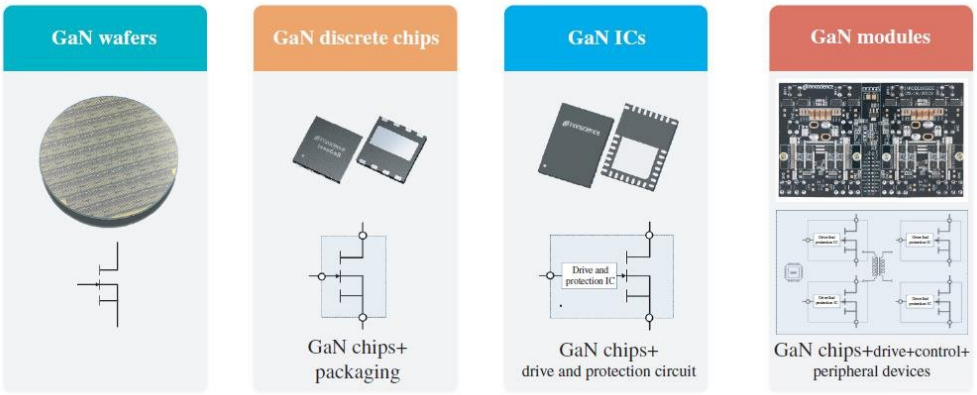
Multiple product forms to meet diverse customers' needs

InnoScience offers various GaN products in forms to meet diverse customers' needs, including discrete chips and ICs (44% of total revenue in 2024), wafers (34%), and modules (22%).

InnoScience offers GaN wafers, discrete chips, ICs, and modules

Figure 15

GaN product types

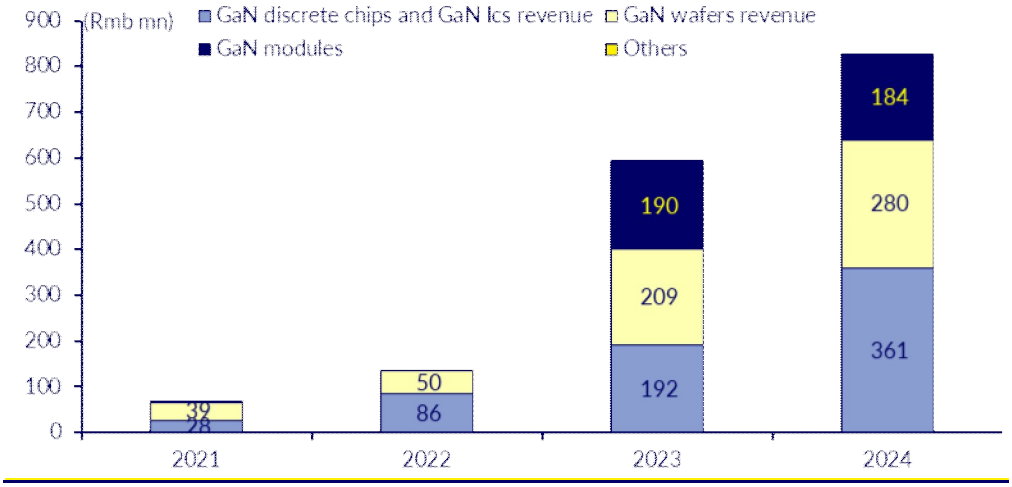


Source: Company

Tree product types: Discrete chips & ICs, wafers and modules

Figure 16

Revenue by product type



Source: CLSA, company

GaN discrete chips are used to manage power activation and deactivation

GaN discrete chips are power electronic components that are engineered to manage power activation and deactivation processes. Applications in automotive electronics include 80V/100V automotive-grade GaN discrete chips for LiDAR and 100V GaN discrete chips for EV power systems.

All InnoScience's discrete chip products are available for sale in **wafer form**. The company can supply wafers to cater to specific customer requirements for chip selection and integrated design. The company's 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.

GaN ICs integrate GaN discrete chips with drive and protection circuits in a single device package, offering a more comprehensive and compact solution. In consumer electronics, major applications are 650V/700V GaN ICs for mobile phone chargers and laptop power adapters and 650V/700V GaN ICs for small household appliances. Renewable energy and industrial applications are mainly 500V GaN ICs for motor drivers and controls.

GaN modules serve as complete power-conversion solutions

GaN modules serve as complete power-conversion solutions that integrate GaN discrete chips, drive and protection circuits and passive components such as inductors and capacitors to convert the input power into one or more stable output voltages. The entire package is in a single module. Applications include GaN power supply modules for lithium-ion battery formation and grading equipment.

Fast GaN adoption in automotive and AI servers

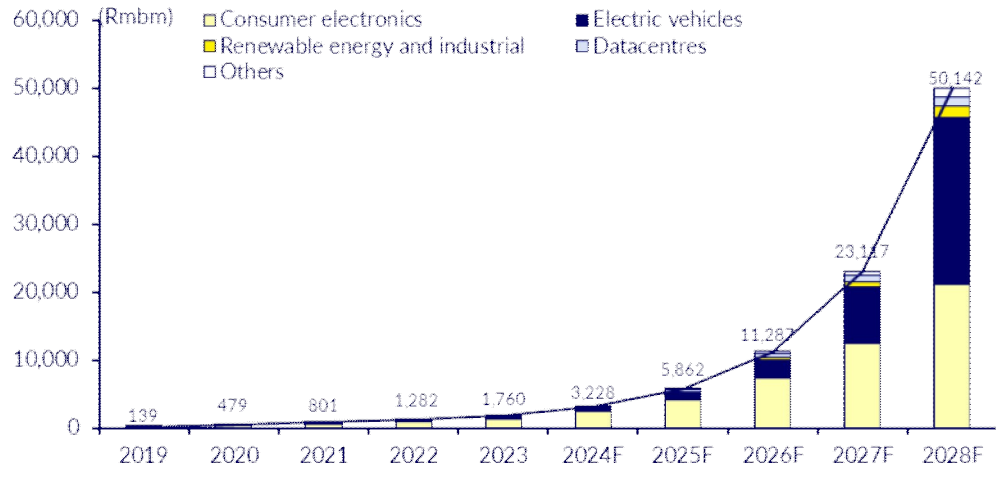
GaN's adoption in various industries

Electronics, renewable energy, industrial, automotive and datacentres

The emergence of renewable energy and compute-intensive applications has led to demand for more efficient and economical power semiconductor products. The GaN products that the company designs, develops and manufactures provide solutions for a broad range of application areas, including consumer electronics, renewable energy and industrial applications, automotive electronics and datacentres.

Figure 17

Market size of GaN power semiconductor market



Source: CLSA, company

Electric vehicles and datacentres are by far the largest components

GaN can reduce size of consumer electronic products

GaN products in the consumer products category encompass mobile phones, laptops, e-bikes, e-scooters and small household appliances. Due to unique characteristics such as high frequency, high efficiency, fast switching speed and low on-resistance per unit area, GaN enhances performance and efficiency and reduces the size of various consumer electronics products. According to Frost & Sullivan, the global market for GaN power semiconductors for consumer electronics increased from Rmb85.0m in 2019 to Rmb1,412.0m in 2023, with a Cagr of 101.9%. F&S expects market size to further increase from Rmb2,466.3m in 2024 to Rmb21,133.3m in 2028F, with a Cagr of 71.1%, and it thinks fast-charging and other power adapters for mobile phones and laptops are likely to be the main drivers.

Figure 18

Key GaN products used in consumer electronics

Application area	InnoScience's GaN products	Characteristics
Mobile phone chargers and laptop power adapters	650V/700V GaN discrete chips and GaN ICs	InnoScience's GaN products are suitable for powering various compact and portable electronic devices, including smartphones, tablets, LCD displays and laptops. GaN's characteristics, including high frequency, fast switching speed, low switching losses and high efficiency, align with increasing demand for higher power and power density in mobile phone chargers, especially in the rapidly expanding fast-charging sector. As a result, InnoScience's GaN products enable the production of more compact, efficient and portable power adapters.
Over-voltage protection (OVP) chips	40V/100V bidirectional GaN discrete chips	An OVP chip safeguards the primary systems of mobile phones, laptops and other consumer electronic products by shutting down the power supply when the input voltage exceeds a predetermined level. With consumer electronics charging power continuing to increase, OVP circuits have become essential. InnoScience's flagship V-GaN chips streamline OVP circuits by replacing two silicon MOSFETs with one V-GaN chip. This improves performance and reduces both cost and circuit size, which is crucial for circuit boards applied in products with stringent space constraints, such as mobile phones.
E-bikes/E-scooters	650V/700V GaN discrete chips	GaN discrete chips excel in operating with reduced switching and conduction losses, enhancing power conversion efficiency and overall charging performance. They also feature a fanless design, which minimises size and enhances water resistance. Moreover, the deployment of GaN discrete chips can more than double the power supply's switching frequency and allow a reduction in the size of peripheral components by over 40%, leading to a more streamlined and lightweight charger design. Many high-end e-bikes today are equipped with GaN chargers, which offer rapid-charging capabilities, compact design and portability.
Small household appliances	650V/700V GaN discrete chips and GaN ICs	InnoScience's GaN products offer efficient power conversion and motor drive solutions and are becoming increasingly prevalent in small household appliances. For example, GaN ICs in electric hair dryers provide greater power within a compact space, delivering over 30% more power than traditional silicon MOSFET solutions.

Source: CLSA, company

GaN also has wide range applications in renewables

Renewable energy and industrial applications related GaN products are applied in areas including lithium-ion battery formation and grading equipment, battery management systems, LED lighting, photovoltaic and energy storage systems and motor drivers and controls. According to Frost & Sullivan, the global market of GaN power semiconductors for renewable energy and industrial applications rose steadily from Rmb29.6m in 2019 to Rmb89.0m in 2023, with a Cagr of 31.6%, and is likely to further increase from Rmb192.9m in 2024 to Rmb1,577.0m in 2028F, with a Cagr of 69.1%.

Figure 19

Key GaN products used in renewable energy and industrial applications

Application area	InnoScience's GaN products	Characteristics
Lithium-ion battery formation and grading equipment	All-GaN power supply modules for battery formation and grading equipment	Formation and grading equipment, critical in the lithium-ion battery production process for activation and testing, necessitates extensive use of high-power bidirectional power conversion modules. This equipment is used for one of the most energy-intensive stages in the production process, consuming a substantial portion of energy. Leveraging the high-frequency and high-efficiency features of its GaN products, InnoScience enhanced the efficiency and power density of these power supply modules. Such improvements not only boost the overall productivity of battery production lines, considerably reducing hardware costs, but also significantly reduces electricity consumption.
Battery management systems	100V/150V bidirectional GaN discrete chips	Battery management systems are essential for the safe operation of energy storage and EVs battery packs, preventing damage and malfunctions while ensuring reliable charging and discharging. They often feature a battery protection unit that isolates the battery when required. GaN discrete chips, due to their lack of body diodes compared with MOSFETs, allow for the replacement of two silicon NMOS transistors in conventional battery protection units with a single V-GaN chip. As a result, InnoScience's flagship V-GaN chips save on costs and improve the overall efficiency of the battery management systems by reducing transmission loss by over 45%. In addition, when compared with silicon-based solutions, V-GaN chips can further reduce board area occupied by over 33%, resulting in a cost-efficient system design.
LED lighting	650V/700V GaN discrete chips	Amid a global shift to sustainable and eco-friendly practices, the LED lighting industry is witnessing accelerated expansion. LED applications now extend beyond conventional lighting uses to emerging areas such as intelligent and horticultural lighting. GaN products enable LED drivers to achieve reduced switching losses and driver sizes, while increasing efficiency and switching frequency, leading to more compact and thinner solutions.
Photovoltaic and energy storage systems	40V/100V/650V/700V GaN discrete chips and GaN single-phase micro inverters	Green energy solutions, particularly photovoltaics, are widely adopted to reduce carbon emissions and foster sustainable development. To ensure consistent power supply, these systems must be integrated with energy storage solutions for night-time use. InnoScience's GaN products, characterized by their low static and dynamic losses, low parasitic capacitance, fast switching speed and support for high frequency, significantly improve the efficiency of photovoltaic systems while reducing their costs by shrinking the size of the systems. When applied to photovoltaic micro inverters, InnoScience's GaN products reduce energy transition loss by over 30%, their sizes by over 20%, while reducing product costs. InnoScience's GaN products also enable energy storage systems to operate with minimal energy transmission loss and maximise energy conversion efficiency. When applied to bidirectional DC-DC converters for energy storage systems, InnoScience's GaN products can substantially reduce energy transition loss.
Motor drivers and controls	100V GaN discrete chips and 500V GaN ICs	Motor drivers and controls are essential power sources for a wide range of applications, including consumer electronics, household appliances, industrial production and robotics. InnoScience's GaN solutions enhance these systems by improving their performance, reliability and efficiency, reducing the size and weight of motor drivers and controls and lowering their costs.

Source: CLSA, company

Auto-related products are mainly 48V power systems and LiDAR systems

Automotive electronics-related products mainly apply to 48V power systems and LiDAR systems. The company is developing high-voltage GaN products applied to on-board chargers. GaN's characteristics, such as low parasitic capacitance, low power losses, fast switching speed and high switching frequency, can enhance the efficiency of on-board chargers.

According to Frost & Sullivan, the global market for GaN power semiconductors for EVs increased from Rmb0.4m in 2019 to Rmb69.4m in 2023, with a Cagr of 266.0%. The market size is likely to further increase from Rmb245.9m in 2024 to Rmb24,636.5m in 2028F, with a Cagr of 216.4%, per F&S, and EVs are likely to be the key driver for this growth.

Figure 20

Key GaN products used in automotive electronics

Application area	InnoScience's GaN products	Characteristics
LiDAR	80V/100V automotive-grade GaN discrete chips	The incorporation of GaN products into LiDAR systems is becoming increasingly popular, particularly in applications requiring high performance and reliability, including autonomous vehicles, drones and other remote sensing devices. LiDAR systems collect, interpret and analyse information related to object, distance and motion, facilitating efficient and safe automation in various settings, including autonomous driving. InnoScience's GaN products can be used in laser drivers in LiDAR systems. InnoScience's advanced GaN transistors outperform conventional technology by delivering higher currents and narrower pulse widths, which facilitate extended measurement ranges and superior resolution. In the LiDAR systems for autonomous vehicles, the high power and rapid response offered by GaN products empower the vehicles to detect and identify nearby objects and obstacles instantaneously. This boosts the vehicles' reaction time, facilitating more efficient vehicle safety monitoring and an improved autonomous driving experience.
EV power systems	100V GaN discrete chips	Vehicles today are incorporating an increasing number of interactive features, necessitating a more robust power distribution system. To accommodate this, the automotive industry is shifting to more-efficient power systems, which require the adoption of efficient, compact and lightweight converters. InnoScience's GaN products, with their switching characteristics and high-frequency capabilities, facilitate the development of these smaller, lighter converters while also improving efficiency by minimising losses associated with inductance.

Source: CLSA, company

GaN fulfills datacentres' power utilisation efficiency requirements

Datacentres' growing requirements for power utilisation efficiency due to increasing electricity consumption provide opportunities for GaN. InnoScience's GaN products can reduce the size and increase the efficiency of traditional multi-stage power conversion, thus obviating the need for multi-stage converters. The high-frequency and low-conduction loss characteristics of GaN also enhance the power conversion efficiency in datacentres and minimise heat dissipation losses.

Rapid growth in GaN power semi market for datacentres

According to Frost & Sullivan, the global market for GaN power semiconductors for datacentres increased rapidly from Rmb8.2m in 2019 to Rmb70.0m in 2023, with a Cagr of 70.9%, and is likely to further increase from Rmb136.2m in 2024 to Rmb1,462.0m in 2028F, with a Cagr of 81.0%.

InnoScience obtained many design-ins/wins in autos and servers

In automotive electronics, InnoScience achieved design-ins from a number of domestic and foreign automotive OEMs and deepened cooperation with large global manufacturers to develop automotive-grade GaN chips in 2024. Shipments of automotive-grade chips increased by 986.7% YoY in 2024.

In the AI and datacentre area, InnoScience has mass-produced and delivered chips for server power supplies to multiple global manufacturers and is actively promoting the application of GaN chips in GPU DC power conversion. The company has

launched 650V and 100V GaN power devices, which can be applied to server power supplies and high-power-density power supplies for 48V to 12V conversion on motherboards in datacentres.

The company's shipment of server power supply chips in 2024 continued to grow with the mass production of GaN products for 48V and 12V applications. Shipments of AI and datacentre chips increased by 669.8% YoY in 2024.

Financial forecasts

We expect InnoScience's revenue to deliver a 76% Cagr over 2024-28CL to Rmb8.0bn in 28CL, driven by rapidly growing demand from auto and AI server clients, supported by expansion in production capacity.

By product, in 2024 GaN ciscrete chips and ICs, GaN wafers and GaN modules accounted for 44%, 34% and 22% of total revenue, respectively. In the long term, discrete chips and ICs and wafers may be the main product forms.

Figure 21

Revenue by product type

(Rmbm)	2021	2022	2023	2024	2025CL	2026CL	2027CL	2028CL
GaN discrete chips and ICs	28	86	192	361	523	1,178	2,470	4,005
GaN wafers	39	50	209	280	497	1,023	2,218	3,613
GaN modules	-	-	190	184	284	301	348	385
Others	1	-	2	3	4	5	5	8
Total	**68**	**136**	**593**	**828**	**1,307**	**2,507**	**5,042**	**8,010**
Mix								
GaN discrete chips and ICs	41%	63%	32%	44%	40%	47%	49%	50%
GaN wafers	58%	37%	35%	34%	38%	41%	44%	45%
GaN modules	0%	0%	32%	22%	22%	12%	7%	5%
Others	2%	0%	0%	0%	0%	0%	0%	0%
YoY								
GaN discrete chips and ICs		210%	123%	88%	45%	125%	110%	62%
GaN wafers		27%	317%	34%	77%	106%	117%	63%
GaN modules				(3%)	54%	6%	16%	11%
Others				108%	21%	28%	1%	59%
Total		100%	335%	40%	58%	92%	101%	59%

Source: CLSA, company

Capacity expansion to 75,000 wafers per month

We expect the company to expand production capacity of its 8" GaN wafer from 13k wafers per month as of December 2024 to 75k wafers per month as of December 2028 in response to growing demand in end markets. After the completion of this capacity expansion, we expect the company's annual revenue to reach Rmb8.0bn in 2028CL.

Figure 22

Production capacity forecast

	2021	2022	2023	2024	2025CL	2026CL	2027CL	2028CL
Year-end monthly production capacity (k wpm)								
Suzhou production base	0.5	3.0	6.0	9.0	19.0	31.0	58.0	70.0
Zhuhai production base	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0
Total	4.5	7.0	10.0	13.0	24.0	36.0	63.0	75.0
Utilisation rate								
Suzhou production base	92.0%	79.8%	86.0%	70.0%	77.5%	85.0%	85.0%	90.0%
Zhuhai production base	60.6%	60.2%	56.5%	70.0%	77.5%	90.0%	90.0%	90.0%
Total	72.3%	69.8%	71.8%	70.0%	77.5%	85.8%	85.4%	90.0%

Source: CLSA, company

Gross loss is due to nature of IDM model

Gross profit margin should turn around in 2025CL

InnoScience experienced losses from 2021 to 2023. Gross losses rose from Rmb181.5m in 2021 to Rmb394.1m in 202, and the decreased to Rmb362.1m in 2023. According to the company, the gross loss in 2021 was due to limited sales during the initial R&D phase. The further increase in 2022 was attributed to the commencement of mass production of products in April 2022, before the company started realising economies of scale. With the continuous expansion of production capacity and improvement in production capacity utilisation rate, the gross profit margin (GPM) improved from -289.4% in 2022 to -61.1% in 2023.

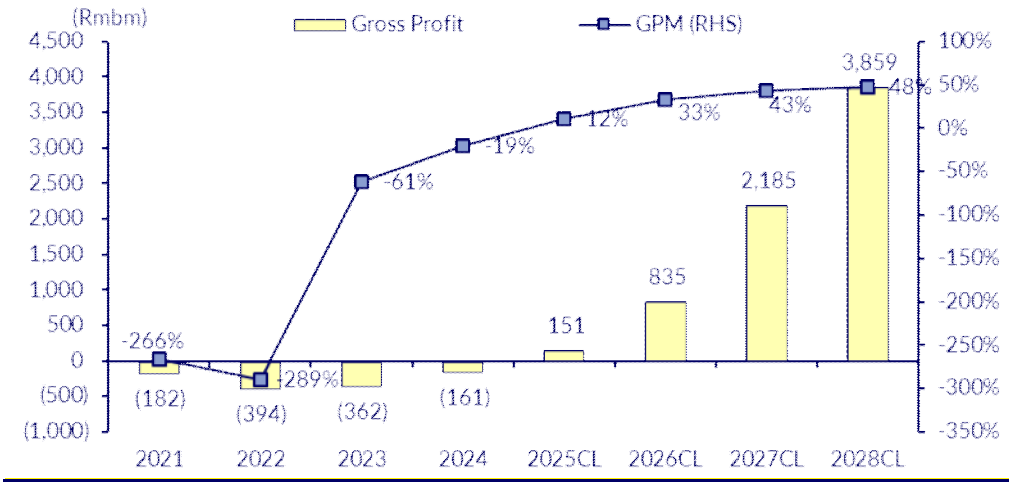
GPM should turn around in 2025CL

Given growing market demand for GaN power semiconductor products and benefits from economies of scale, along with improving utilisation rates, we expect the company's GPM to turn around in 2025CL and continue to get better over the next five years. We believe GPM will reach 48% after the company completes its production capacity expansion and reaches a mature state in 2028.

We expect GPM to reach 48% in 2028

Figure 23

InnoScience's gross profit and GPM



Source: CLSA, company

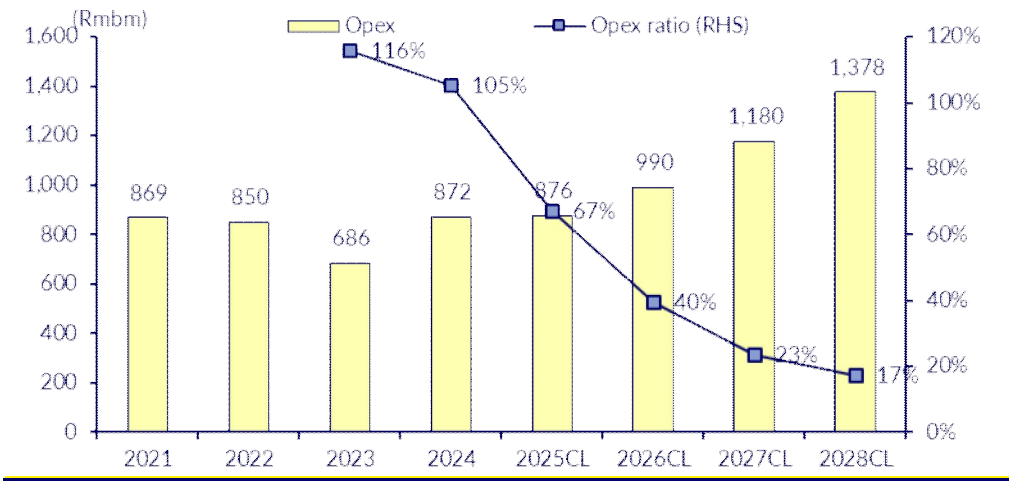
Below 20% opex ratio in mature state by 2028CL

In the long run, as economies of scale grow, we anticipate selling expense, administrative expense and R&D costs to decrease as a percentage of revenue. Thus, we estimate overall opex ratio to be about 17% when the company reaches a mature state in 2028CL.

We estimate 17% opex ratio in 2028CL

Figure 24

InnoScience's operating expenses and opex ratio



Source: CLSA, company

Better operating leverage, higher penetration rates to drive NPM improvement

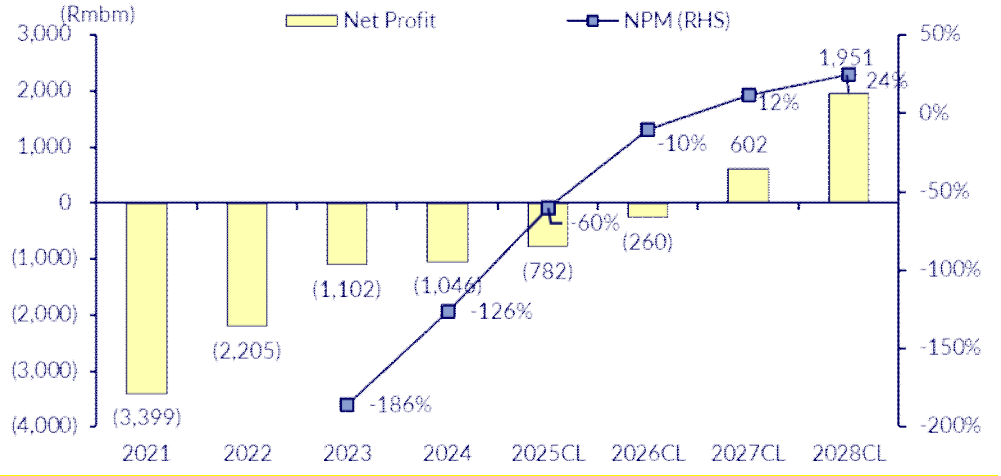
Net profit margin to turn around in 2027CL

We anticipate a turnaround in InnoScience's full-year NPM in 2027CL, followed by a continued improvement in the long term. Several factors will contribute, including better operating leverage, a rising penetration rate for GaN power semiconductors in downstream applications, higher marketing efficiency and a more prudent capex plan after the completion of the company's production capacity expansion in 2028.

NPM should turn around for full year in 2027CL

Figure 25

InnoScience's net profit margin



Source: CLSA, company

Figure 26

Annual earnings summary

(Rmbm)	2021	2022	2023	2024	2025CL	2026CL	2027CL	2028CL
Revenue	**68**	**136**	**593**	**828**	**1,307**	**2,507**	**5,042**	**8,010**
YoY		100%	335%	40%	58%	92%	101%	59%
COGS	(250)	(530)	(955)	(990)	(1,156)	(1,672)	(2,856)	(4,152)
Gross profit	**(182)**	**(394)**	**(362)**	**(161)**	**151**	**835**	**2,185**	**3,859**
Gross profit margin	(266%)	(289%)	(61%)	(19%)	12%	33%	43%	48%
YoY						451%	162%	77%
Selling expenses	(28)	(69)	(90)	(98)	(105)	(113)	(121)	(136)
Admin	(179)	(199)	(247)	(451)	(353)	(351)	(353)	(360)
R&D	(662)	(581)	(349)	(323)	(418)	(527)	(706)	(881)
Operating expenses	(869)	(850)	(686)	(872)	(876)	(990)	(1,180)	(1,378)
Opex ratio	(1274%)	(624%)	(116%)	(105%)	(67%)	(40%)	(23%)	(17%)
Operating income	**(1,051)**	**(1,244)**	**(1,048)**	**(1,034)**	**(725)**	**(156)**	**1,006**	**2,481**
Operating profit margin	(1540%)	(913%)	(177%)	(125%)	(55%)	(6%)	20%	31%
Finance cost	(2,392)	(1,030)	(119)	(84)	(113)	(160)	(206)	(184)
Gain/(loss) on disposal	(0)	(1)	9	-	-	-	-	-
Gain/(loss) from change in FV	0	29	6	-	-	-	-	-
Other income	44	41	50	72	55	55	55	55
Non-operating income	(2,349)	(962)	(54)	(12)	(58)	(105)	(151)	(129)
Pre-tax income	(3,399)	(2,205)	(1,102)	(1,045)	(782)	(260)	854	2,352
Income tax	0	(0)	(0)	(0)	0	0	(252)	(401)
Profit after tax	(3,399)	(2,205)	(1,102)	(1,046)	(782)	(260)	602	1,951
Net profit	**(3,399)**	**(2,205)**	**(1,102)**	**(1,046)**	**(782)**	**(260)**	**602**	**1,951**
Net profit margin	(4983%)	(1620%)	(186%)	(126%)	(60%)	(10%)	12%	24%
YoY								
Revenue		100%	335%	40%	58%	92%	101%	59%
Gross profit		117%	(8%)	(55%)	(194%)	451%	162%	77%
Operating profit		18%	(16%)	(1%)	(30%)	(79%)	(746%)	147%
Net profit		(35%)	(50%)	(5%)	(25%)	(67%)	(331%)	224%
Margin								
Gross margin	(266%)	(289%)	(61%)	(19%)	12%	33%	43%	48%
Operating margin	(1540%)	(913%)	(177%)	(125%)	(55%)	(6%)	20%	31%
Net margin	(4983%)	(1620%)	(186%)	(126%)	(60%)	(10%)	12%	24%

Source: CLSA, company

Negative operating cashflow from 2021-24 due to heavy losses

Solid cash position and balance sheet after turning profitable

The company's operating cashflow was all negative during 2021-2024 given heavy losses. We expect operating cashflow to turn positive in 2026CL, driven mainly by improving profitability.

High capex in 2026-27CL

From 2025-28, we expect high capex due to the expansion of production capacity, particularly in 2026 and 2027, with capex of Rmb1.6bn and Rmb1.9bn, respectively. This is due to the pace of production capacity expansion. We expect monthly production capacity to increase from 13k wpm as of 2024 to 75k as of 28CL. We expect total capex of Rmb4.8bn over 2024-28.

Figure 27

Cashflow statement

(Rmbm)	2021	2022	2023	2024	2025CL	2026CL	2027CL	2028CL
Profit before tax	(3,399)	(2,205)	(1,102)	(1,045)	(782)	(260)	854	2,352
Depreciation of PPE	184	382	445	426	448	548	723	854
Amortization of intangible assets	72	77	80	81	77	77	23	23
Total working capital change	103	(298)	(216)	(159)	54	(364)	(769)	(869)
Tax	0	(0)	(0)	(0)	0	0	(252)	(401)
Others	85	79	81	279	0	0	0	0
Cash from operating activities	**(562)**	**(936)**	**(594)**	**(336)**	**(91)**	**161**	**786**	**2,145**
Capex	(1,121)	(465)	(331)	(172)	(455)	(1,557)	(1,947)	(691)
Investments	(1,000)	370	644	22	0	0	0	0
Others	6	1	25	21	0	0	0	0
Cash from investing activities	**(2,115)**	**(94)**	**338**	**(129)**	**(455)**	**(1,557)**	**(1,947)**	**(691)**
Lease rentals paid	(7)	(10)	(10)	(11)	0	0	0	0
Proceeds from loans and borrowings	492	788	266	393	667	1,060	1,060	(500)
Proceeds from equity funding	0	0	20	641	0	0	0	0
Others	3,340	(318)	(403)	639	(113)	(160)	(206)	(184)
Cash from financing activities	**3,825**	**460**	**(127)**	**1,662**	**554**	**900**	**854**	**(684)**
Beginning cash	132	1,279	711	329	1,525	1,533	1,037	730
Net increase/(decrease) in cash	1,148	(570)	(382)	1,196	8	(496)	(308)	770
Changes due to forex impact	(1)	2	0	(0)	0	0	0	0
End cash	1,279	711	329	1,525	1,533	1,037	730	1,499

Source: CLSA, company

Book value to be solid beginning in 2024

We expect the company's book value to be solid beginning in 2024 given the improving profitability. Loans and borrowings may continue increasing to provide funding for the production capacity expansion at Suzhou production base.

Figure 28

Balance sheet statement

(Rmbm)	2021	2022	2023	2024	2025CL	2026CL	2027CL	2028CL
Cash and cash equivalents	1,279	711	329	1,525	1,533	1,037	730	1,499
Pledged bank deposits	18	25	9	6	6	6	6	6
Inventory	82	382	417	444	419	506	764	1,011
Trade and other receivables	225	150	337	484	564	982	1,876	2,880
Financial assets	1,000	659	20	-	-	-	-	-
Total current assets	**2,603**	**1,927**	**1,112**	**2,460**	**2,523**	**2,532**	**3,376**	**5,396**
PPE	3,371	3,260	3,061	2,742	2,744	3,747	4,967	4,798
ROU	81	92	85	117	117	117	117	117
Intangible assets	402	345	273	198	126	54	36	17
Others	164	70	61	31	31	31	31	31
Total assets	**6,622**	**5,695**	**4,591**	**5,547**	**5,540**	**6,481**	**8,525**	**10,359**
Trade and other payables	838	566	410	462	540	681	1,064	1,446
Loans and borrowings	722	438	508	522	550	600	650	650
Lease liabilities	6	7	8	11	20	30	40	40
Total current liabilities	**1,566**	**1,011**	**926**	**996**	**1,110**	**1,311**	**1,754**	**2,136**
Loans and borrowings	1,228	1,632	1,546	1,401	2,051	3,051	4,051	3,551
Lease liabilities	23	35	29	59	40	40	40	40
Deferred income	52	56	126	119	150	150	150	150
Financial instruments issued to investors	7,878	-	-	-	-	-	-	-
Total liabilities	**10,747**	**2,735**	**2,627**	**2,576**	**3,351**	**4,553**	**5,995**	**5,877**
Paid-in capital	3,952	4,046	-	-	-	-	-	-
Share capital	-	-	801	879	879	879	879	879
Reserves	(8,077)	(1,086)	1,163	2,092	2,092	2,092	2,092	2,092
Retained earnings	-	-	-	-	(782)	(1,043)	(441)	1,511
Total equity	**(4,125)**	**2,960**	**1,964**	**2,971**	**2,189**	**1,928**	**2,530**	**4,482**

Source: CLSA, company

Initiate at HK$44.80 and Outperform rating

We use P/S valuation because the company is not yet profitable

We use P/S valuation methodology because the company is not yet profitable. We believe the key driver for InnoScience's growth is its orders; the company has secured orders with major customers.

Valuation based on 28CL sales

We value InnoScience based on a peer group comparison of P/S multiples using the company's 2028CL sales, the year the company should complete its capex expansion in Suzhou production base and reach a large enough scale of business to have solid operating leverage.

Our peer-group valuations include both domestic and overseas competitors. While SICC and Wolfspeed are pure third-generation semiconductor companies, the main businesses for the rest of the peer group are traditional power semiconductor or analog semiconductor firms.

Company's closet domestic peer is SICC

- **SICC** is a China-based firm mainly engaged in the research and development of semiconductor materials. The company's main businesses are the research and development, production and sales of wide-gap semiconductor substrate materials such as silicon carbide substrates. Its main products include semi-insulating type and conductivity type silicon carbide substrates. The products are mainly used in fifth-generation communications (5G), electric vehicles, new energy, national defence and other fields.

- **CR Micro** is a semiconductor company based in China. The company operates a full industrial chain that includes chip design, wafer manufacturing and packaging and testing. Its products cover power semiconductors, smart sensors and intelligent control, providing customers with rich semiconductor products and system solutions. The firm distributes its products in both domestic and overseas markets.

- **Yangjie Electronic** is a semiconductor spare components firm based in China. The company's business includes research & development, manufacturing and sales of semiconductor spare components, including discrete device chips, power diodes, bridge rectifiers and others. Its products consist of bridge rectifiers; diodes, including high efficiency, super-fast, fast-recovery, general-purpose, Schottky, Zener and small signal-switching diodes; transient voltage suppressors; as well as power modules. Yangjie's products are mainly applied to photovoltaics, LED lighting, automobile electronics, power supplies and others. The company operates in domestic and overseas markets.

- **NCE Power** is a China-based company engaged in the research, development, design and sales of MOSFET, IGBT and other semiconductor chips and power devices. The company's products include chips and power devices. Its products are used in consumer electronics, automotive electronics, industrial electronics, new energy vehicles, charging piles, smart equipment manufacturing, internet of things and photovoltaic new energy. The firm conducts its businesses within China and overseas.

- **Infineon** is a German-based designer, developer and manufacturer of semiconductors and related system solutions. The company operates four divisions: Automotive, Green Industrial Power, Power & Sensor Systems and Connected Secure Systems. Automotive designs, develops, manufactures and markets semiconductors to support automotive applications like electromobility, automated driving, connectivity and advanced security. Industrial Power Control provides products, solutions and services for energy generation, transmission, storage, and use. Power & Sensor Systems provides semiconductors and power and connectivity devices like chargers, servers, mainboards, power tools, and lighting systems.

Most peers are traditional power semis or analog semis

- **STMicro** is a semiconductor company based in Switzerland. It designs, develops, manufactures and markets a range of products, including discrete and standard commodity components, and application-specific integrated circuits (ASICs) for analog, digital and mixed-signal applications. The company's segments include the Automotive and Discrete Group (ADG), Analog, MEMS and Sensors Group (AMS), and Microcontrollers and Digital ICs Group (MDG). The ADG segment comprises all dedicated automotive ICs, and discrete and power transistor products. The AMS segment includes low-power analog ICs for all markets, smart power products; touch screen controllers, low power connectivity solutions for IoT and power conversion products, among others.

SICC and Wolfspeed focus on third-generation semis

- **Wolfspeed** is an innovator of wide bandgap semiconductors, focussed on silicon carbide materials and devices for power applications. The company's product families include power devices and silicon carbide and gallium nitride (GaN) materials. Its products are targeted for various applications such as electric vehicles, fast charging and renewable energy and storage. Its silicon carbide materials products consist of silicon carbide bare wafers, epitaxial wafers and GaN epitaxial layers on silicon carbide wafers. Its silicon carbide materials target customers who use them to manufacture products for radio frequency, power and other applications. Its power device products consist of silicon carbide Schottky diodes, MOSFETs and power modules.

- **ON Semiconductor** provides intelligent power and sensing solutions. Its segments include the Power Solutions Group (PSG), the Analog & Mixed-Signal Group (AMG), and the Intelligent Sensing Group (ISG). PSG offers a range of analog, discrete, module and integrated semiconductor products that perform multiple application functions, including power switching, power conversion, and signal conditioning. AMG designs and develops analog, mixed-signal, power management ICs and sensor interface devices for a range of end-users in the automotive, industrial, compute and mobile end-markets. ISG designs and develops complementary metal oxide semiconductor (CMOS) image sensors, image signal processors and single photon detectors.

- **NXP Semiconductors** provides high-performance mixed-signal analog-digital (mixed A/D) and standard product solutions. Its product solutions are used in a range of end-market applications, including automotive, personal security and identification, industrial and IoT, wireless and wireline infrastructure, mobile communications, multi-market industrial, consumer and computing. It engages with global original equipment manufacturers (OEMs). The company sells

products in all geographic regions and countries: China, USA, Japan, Malaysia, South Korea, Germany, the Netherlands and others.

Texas Instrument has a wide-ranging business in power and analog semis

- **Texas Instruments** designs, manufactures, tests and sells analog and embedded processing chips for industrial, automotive, personal electronics, communications equipment and enterprise systems markets. The company's segments include Analog and Embedded Processing. The Analog segment includes product lines such as Power and Signal Chain. Power includes products that help customers manage power in electronic systems. Signal Chain includes products that sense, condition and measure real-world signals to allow information to be transferred or converted for further processing and control. The Embedded Processing segment includes microcontrollers, digital signal processors (DSPs) and applications processors.

Figure 29

Peer comparisons

Ticker	Company	Mkt Cap	PS (x)			PE (x)		
		(US$m)	23	24F	25F	23	24F	25F
Domestic power semi								
688234 CH	SICC	3,488	19.8	14.3	10.3	na	109	65
688396 CH	CR Micro	8,424	6.0	5.9	5.3	32	60	40
600460 CH	Silan Micro	5,516	4.3	3.7	3.1	na	273	53
300373 CH	Yangjie Electric	3,423	4.5	4.1	3.5	25	24	19
605111 CH	NCE Power	1,816	8.8	7.2	5.8	32	26	21
Average			**8.7**	**7.0**	**5.6**	**30**	**98**	**40**
Overseas power semi								
IFX US	Infineon	39,492	2.4	2.5	2.5	13	16	11
STM FP	ST Micro	18,599	1.1	1.4	1.6	4	11	24
WOLF US	Wolfspeed	334	0.4	0.4	0.4	na	na	na
ON US	ON semi	15,033	1.8	2.1	2.5	6	8	12
NXPI US	NXP	43,254	3.3	3.4	3.6	11	12	13
TXN US	Texas Instruments	137,379	7.8	8.9	8.1	21	29	27
Average			**2.8**	**3.1**	**3.1**	**11**	**15**	**17**
Overall average			**5.7**	**5.1**	**4.4**	**20**	**57**	**29**

Source: CLSA, Refinitiv

Multiple based on SICC's forward P/S with an A-H share discount

We base our target P/S multiple on the valuation of InnoScience's closest peer, SICC, a Chinese company focussed purely on third-generation semiconductors with a 10.3x 2025 P/S. Given the A-H premium, we set our target P/S at 6.0x, about 41% below SICC's 10.3x valuation. The A-H premium can range from largely flat to as much as 200% (or even more), depending on the company-specific characteristics, with the Hang Seng Stock Connect China AH Premium Index currently at about 41%.

We expect InnoScience's growth stage in 2028 to be similar to SICC's in 2025

SICC mainly focusses on SiC (silicon carbide) while InnoScience focuses on GaN (gallium nitride), which are two different types of third-generation semiconductors. The commercialisation of SiC started earlier than GaN. In addition, SICC's net profit turned positive in 2024, and InnoScience's net profit will likely turn positive in 2027, according to our estimates. Thus, we expect InnoScience to enter into a

stable growth stage in 2028 after the completion of its production capacity expansion in Suzhou production base, similar to SICC's growth stage around 2025.

Target P/S is 41% lower than SICC's 25E P/S

Given InnoScience's rare value proposition as a third-generation semiconductor leader, and GaN's rapid growth due to increasing demand and policy support for the semiconductor industry in China, we think it is reasonable for InnoScience to approach the multiples of A-share-listed SICC. Hence we set our target P/S for InnoScience at 6.0x, 41% lower than SICC's.

TP of HK$44.8

We apply 6.0x P/S to our 28CL sales estimate and discount it back. We assume InnoScience's cost of equity is 13.8%, based on a 4% risk-free rate, 7% equity risk premium and 1.4 beta, equalling the average historical beta (per Bloomberg) of comparable companies. The resulting target price based on this calculation is HK$44.80. We therefore initiate coverage of InnoScience with Outperform rating.

Beta of 1.4 equals average historical beta of peers

Figure 30

Beta of peers

Company	Beta	Company	Beta
SICC	1.49	ST Micro	1.36
CR Micro	1.16	Wolfspeed	2.06
Yangjie Electronic	1.04	ON Semi	1.25
NCE Power	1.45	NXP	1.35
Infineon	1.65	Texas Instruments	1.18
		Average	**1.40**

Source: CLSA, Bloomberg

We use a 13.8% cost of equity

Figure 31

Cost of equity calculation

Risk-free rate (%)	4
Equity risk premium (%)	7
Beta	1.4
Cost of equity (%) (rounded)	**13.8**

Source: CLSA

Figure 32

P/S valuation

28CL revenue per share (Rmb)	8.0
Rmb/HK$	0.94
P/S multiples (x)	6.0
Discount rate (%)	13.8
Target price (HK$)	44.8

Source: CLSA

Key risks

US tariffs may impact GaN chips price as GaN capacity is mostly outside of the US. We see GaN adoption as sensitive to price, as clients will consider its price-to-performance ratio when comparing to traditional silicon-based power

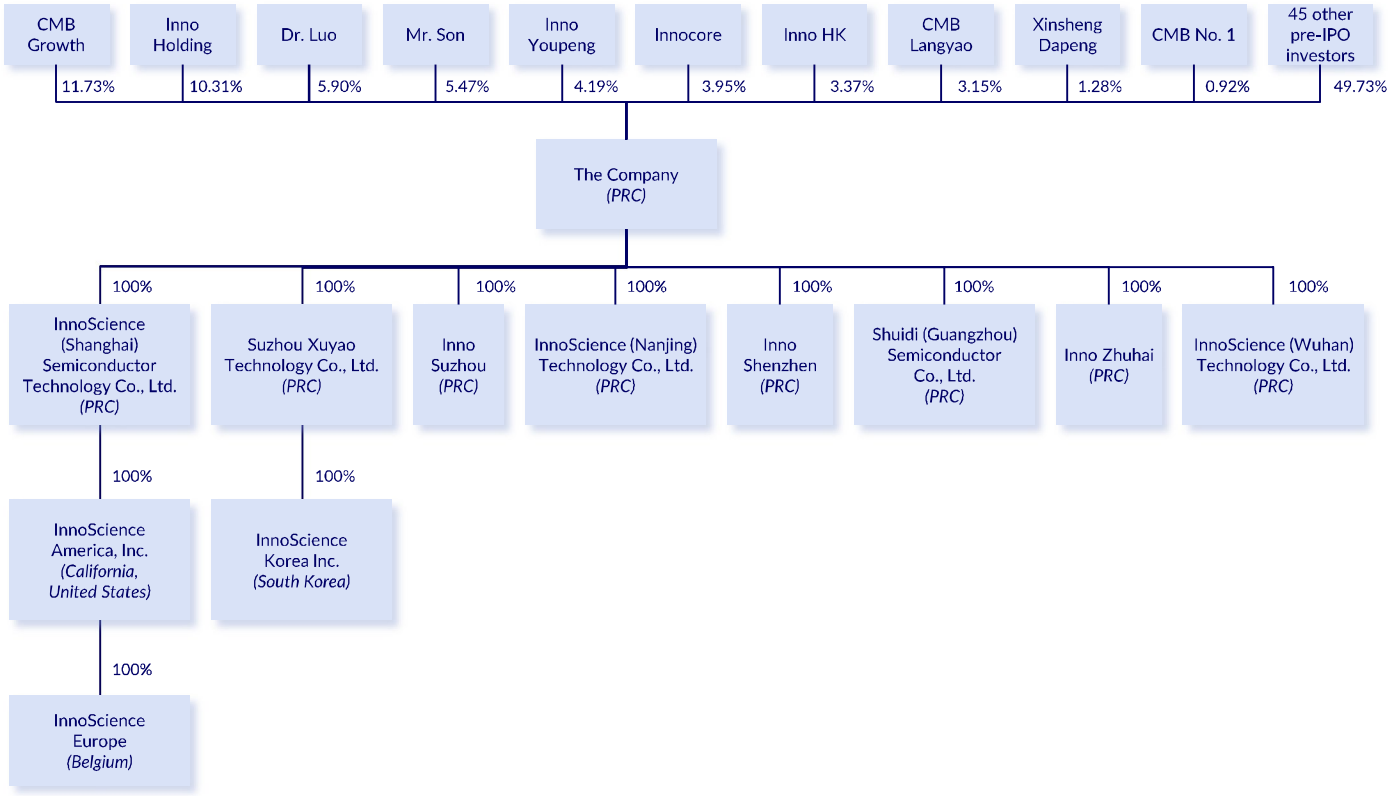
semiconductors. Tariffs may also impact the global supply landscape. This may risk InnoScience's market share in GaN if foundries/IDMs choose to expand capacity in the US.

Competition may also intensify from both domestic and overseas players, as the GaN industry reaches the fast-growing stage, especially in NEVs and AI servers. Other players may see the growth opportunity and come to compete. However, we think this can be mitigated by high entry barriers around the GaN industry, which requires R&D personnel, IP, ability to provide tailor-made product, mass production experience etc.

In addition, there are two lock-up periods which may end on 30 Jun 2025 and 30 Dec 2025, respectively. By end 30 Jun 2025, 146m shares will unlock (17% of total 881m shares) from controlling shareholder and cornerstone investors. By end 30 Dec 2025, another 323m shares will unlock (37%) from other pre-IPO investors. This may lead to volatility in share price.

Appendix 1: Shareholding structure

Shareholding structure



Source: CLSA, company

Appendix 2: Company history

Company history

Year	Milestone
Dec 2015	Inno Zhuhai, currently a wholly-owned subsidiary of the company, was established in the PRC.
Jul 2017	InnoScience was established.
Dec 2017	Zhuhai manufacturing plant completed construction and commenced production.
Aug 2020	Cumulative shipment achieved 1 million in terms of equivalent GaN discrete chips.
Aug 2021	Cumulative shipment achieved 10 million in terms of equivalent GaN discrete chips.
Oct 2021	Suzhou manufacturing plant completed construction and commenced production.
Oct 2022	Cumulative shipment achieved 100 million in terms of equivalent GaN discrete chips.
Dec 2023	Production capacity achieved 10,000 wafers per month, and cumulative shipment exceeded 500 million in terms of equivalent GaN discrete chips.

Source: CLSA, company

Appendix 3: Management team

Senior Management

Name	Position	Role and responsibility
Dr. WU Jingang (吳金剛)	CEO, Executive Director	Responsible for overall business development and operation of the group
Mr. ZHONG Shan (鍾山)	CFO, Executive Director	Responsible for financial management, investment and financing of the group
Mr. NI Jinghua (倪景華)	Deputy general manager	Responsible for R&D of the group
Mr. LI Xinhua (李新華)	Deputy general manager	Responsible for manufacturing of the group
Mr. CHEN Yulin (陳鈺林)	Deputy general manager	Responsible for product operations of the group

Source: CLSA, Company

Executive Directors

Name	Position	Role and responsibility
Dr. Weiwei Luo	Founder, Chairperson, Executive Director	Responsible for overall business development and strategic planning of the group, and serving as the chairperson of the Nomination Committee and a member of the Remuneration Committee
Mr. Jay Hyung Son	Executive Director	Responsible for business development of the group
Dr. WU Jingang (吳金剛)	CEO, Executive Director	Responsible for overall business development and operation of the group
Mr. ZHONG Shan (鍾山)	CFO, Executive Director	Responsible for financial management, investment, and financing of the group

Source: CLSA, company

Investment thesis

We forecast a 76% revenue Cagr over 2024-28CL to hit Rmb8.0bn in 2028CL, driven by rapidly growing demand from auto and AI server clients and further production capacity expansion. We forecast net margin turning positive in 2027CL benefitting from better operating leverage.

Catalysts

Mass production or receiving orders for 1) auto OEM's OBC, especially the global leading NEV OEMs; or 2) AI servers' AC/DC or DC/DC applications. Update on dispute against Infineon. The end of lockup periods, around 30 June 2025 and 30 Dec 2025.

Valuation details

We apply 6.0x P/S to our 2028 sales estimate and discount it back. Our target P/S is 41% lower than SICC's 25E P/S, considering A-H premium. We assume InnoScience's cost of equity is 13.8%, based on a 4% risk-free rate, 7% equity risk premium, and 1.4 beta, equalling the average historical beta of peers.

Investment risks

US tariffs may impact GaN price and accordingly impact GaN penetration; US tariffs may also impact global GaN supply landscape given the deglobalisation trend. Also, competition may intensify, but can be mitigated by high entry barriers. In addition, there are two lock-up periods, which may end on 30 June 2025 and 30 Dec 2025 respectively.

Figure 33

Earnings and balance-sheet risk scores (lower the better)

	Score	Comments
Earnings-quality flags		
Capex indiscipline	1	Continued capex expansion
Cash burn	1	Negative OCF in near term but should improve with enhancing profitability
Rising non-core or intangibles	0	
Rising working capital	0	
Poor cash conversion	0	
Earnings-quality risk score (EQRS)	2/5	
Balance-sheet-quality flags		
Cash burn	1	Negative OCF in near term but should improve with enhancing profitability
Excessive leverage	0	
Frequent fundraising	0	
Liquidity concerns	1	Negative Ebitda near term but should improve with enhancing profitability
Operational stress	1	Negative ROE in near term but should improve with enhancing profitability
Balance-sheet-quality risk score (BQRS)	3/5	

Source: CLSA

InnoScience (Suzhou) (2577 HK) - Sustainability

Summary

InnoScience is a China-based company engaged in the production and sale of GaN-on-Si semiconductor products. The company was listed on the H-share market at the end of 2024, so it has relatively less public information available compared to other listed peers. However, the company outperforms the market average and sector average across governance and environmental pillars. It scores lower than the market average and sector average in social areas. There are areas where the company can improve to achieve higher scores. For example, the company can develop a more quantifiable and clearer emissions control plan or KPIs, as well as improve water usage and waste management practices that investors can track.

Key engagement topics

- As a high-tech company, are there any patent infringement issues?
- What is the influence of US semiconductor export controls on InnoScience?
- Are there any clear plans in place for emission control? For example, when does the company plan to achieve carbon neutrality?

Corporate governance

InnoScience demonstrates better corporate governance compared to its peers. Compared to other semiconductor companies, InnoScience has a higher percentage of foreign shareholders and fewer government or state-owned shareholders; therefore, the company may encounter less government interference than its peers during operation. We also observe a diversified board composition at InnoScience, with a varied gender and nationality structure. Additionally, we did not find any evidence of conflicts of interest on the board or among senior management in the past five years.

Environmental

The company outperforms its peers in the environmental area. It has policies on waste management and raw materials use, as well as a supply chain-related environmental policy and it conducts audits of supply chain companies. However, we see areas where the company can improve, including increasing disclosure about mid- to long-term environmental goals, such as targets to reduce water use and greenhouse gas emissions.

Social

The company scored below the market and sector averages in the social pillar. It has limited disclosure compared to its peers, as our ESG data vendor cannot find much information about supply chain health and safety issues or actions to support the employment of underprivileged groups. However, we observed the company's social welfare efforts during factory visits in 2024, where we noted that the company has sessions at the factory for workers to take rest. We also expect the company to improve its social-related disclosures in the future.

Overall ESG scores

Corporate governance scores (50%)

Environmental scores (25%)

Social scores (25%)

Criteria	Score	Market avg	Sector avg	Market rank	Sector rank	Past one year trend	Past three year trend
Governance (total)	**81.8**	**66.6**	**73.6**	**20**	**42**	**-**	**-**
ACGA market score	43.7	-	-	-	-	-	-
Discipline	100.0	58.5	73.2	14	15	-	-
Transparency	80.0	69.8	71.3	88	80	-	-
Independence	50.0	60.9	57.2	169	142	-	-
Responsibility	100.0	72.1	83.7	106	135	-	-
Fairness	100.0	84.3	90.9	138	147	-	-
Environmental (total)	**49.6**	**41.2**	**43.5**	**62**	**71**	**-**	**-**
Biodiversity	0.0	15.3	12.2	217	194	-	-
Climate change	39.2	41.5	38.8	138	96	-	-
Pollution & Resources	100.0	54.9	61.5	33	54	-	-
Supply chain - E	50.0	31.4	42.9	81	115	-	-
Water	33.3	36.8	34.1	187	130	-	-
Qualitative analyst score - E	75.0	75.2	71.5	124	110	-	-
Social (total)	**32.3**	**40.5**	**49.1**	**137**	**151**	**-**	**-**
Health & Safety	50.0	26.6	28.3	21	22	-	-
Human rights	0.0	13.4	31.3	217	194	-	-
Labour standards	36.4	43.4	46.8	157	143	-	-
Supply chain - S	0.0	41.7	66.3	217	194	-	-
Qualitative analyst score - S	75.0	81.8	72.6	158	121	-	-
Total score	**61.4**	**53.7**	**59.9**	**44**	**98**	**-**	**-**

Note: We launched our enhanced ESG scoring in Nov 2023. Past three year trends will be available in Nov 2026

Detailed financials

Profit & Loss (Rmbm)

Year to 31 December	2021A	2022A	2023A	2024A	2025CL	2026CL	2027CL
Revenue	**68**	**136**	**593**	**828**	**1,307**	**2,507**	**5,042**
Cogs (ex-D&A)	6	(71)	(430)	(484)	(631)	(1,047)	(2,110)
Gross Profit (ex-D&A)	**75**	**65**	**163**	**345**	**676**	**1,460**	**2,932**
Research & development costs	(662)	(581)	(349)	(323)	(418)	(527)	(706)
Selling & marketing expenses	(28)	(69)	(90)	(98)	(105)	(113)	(121)
Other SG&A	(179)	(199)	(247)	(451)	(353)	(351)	(353)
Other Op Expenses ex-D&A	-	-	0	-	-	-	-
Op Ebitda	**(795)**	**(785)**	**(523)**	**(527)**	**(200)**	**470**	**1,752**
Depreciation/amortisation	(256)	(459)	(525)	(506)	(525)	(625)	(746)
Op Ebit	**(1,051)**	**(1,244)**	**(1,048)**	**(1,034)**	**(725)**	**(156)**	**1,006**
Interest income	4	1	4	3	3	3	3
Interest expense	(2,396)	(1,031)	(123)	(87)	(116)	(163)	(210)
Net interest inc/(exp)	(2,392)	(1,030)	(119)	(84)	(113)	(160)	(206)
Associates/investments	0	29	6	-	-	-	-
Forex/other income	-	-	-	-	-	-	-
Asset sales/other cash items	43	39	59	72	55	55	55
Provisions/other non-cash items	-	-	-	-	-	-	-
Asset revaluation/Exceptional items	-	-	-	-	-	-	-
Profit before tax	**(3,399)**	**(2,205)**	**(1,102)**	**(1,045)**	**(782)**	**(260)**	**854**
Taxation	-	0	0	0	-	-	(252)
Profit after tax	**(3,399)**	**(2,205)**	**(1,102)**	**(1,046)**	**(782)**	**(260)**	**602**
Preference dividends	-	-	-	-	-	-	-
Profit for period	**(3,399)**	**(2,205)**	**(1,102)**	**(1,046)**	**(782)**	**(260)**	**602**
Minority interest	0	0	0	0	0	0	0
Net profit	**(3,399)**	**(2,205)**	**(1,102)**	**(1,046)**	**(782)**	**(260)**	**602**
Extraordinaries/others	0	0	0	0	0	0	0
Profit avail to ordinary shares	(3,399)	(2,205)	(1,102)	(1,046)	(782)	(260)	602
Dividends	0	0	0	0	0	0	0
Retained profit	(3,399)	(2,205)	(1,102)	(1,046)	(782)	(260)	602
Adjusted profit	**(3,399)**	**(2,205)**	**(1,102)**	**(1,046)**	**(782)**	**(260)**	**602**
EPS (fen)	(86.0)	(54.5)	(137.6)	(118.9)	(89.0)	(29.6)	68.5
Adj EPS [pre excep] (fen)	(86.0)	(54.5)	(137.6)	(118.9)	(89.0)	(29.6)	68.5
Core EPS (fen)	(86.0)	(54.5)	(137.6)	(118.9)	(89.0)	(29.6)	68.5
DPS (fen)	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Profit & loss ratios

Year to 31 December	2021A	2022A	2023A	2024A	2025CL	2026CL	2027CL
Growth (%)							
Revenue growth (% YoY)	-	99.6	335.3	39.8	57.8	91.8	101.1
Ebitda growth (% YoY)	-	nm	nm	nm	nm	nm	272.9
Ebit growth (% YoY)	-	nm	nm	nm	nm	nm	nm
Net profit growth (%)	-	nm	nm	nm	nm	nm	nm
EPS growth (% YoY)	nm	nm	nm	nm	nm	nm	nm
Adj EPS growth (% YoY)	nm	nm	nm	nm	nm	nm	nm
DPS growth (% YoY)	-	-	-	-	-	-	-
Core EPS growth (% YoY)	nm	nm	nm	nm	nm	nm	nm
Margins (%)							
Gross margin (%)	109.5	47.7	27.4	41.6	51.7	58.2	58.1
Ebitda margin (%)	(1,164.7)	(576.3)	(88.3)	(63.7)	(15.3)	18.7	34.7
Ebit margin (%)	(1,540.4)	(913.4)	(176.8)	(124.8)	(55.4)	(6.2)	19.9
Net profit margin (%)	(4,983.3)	(1,619.6)	(185.9)	(126.2)	(59.8)	(10.4)	11.9
Core profit margin	(4,983.3)	(1,619.6)	(185.9)	(126.2)	(59.8)	(10.4)	11.9
Op cashflow margin	(824.1)	(687.6)	(100.2)	(40.6)	(7.0)	6.4	15.6
Returns (%)							
ROE (%)	nm	nm	(44.8)	(42.4)	(30.3)	(12.6)	27.0
ROA (%)	(15.9)	(20.2)	(20.4)	(20.4)	(13.1)	(2.6)	9.4
ROIC (%)	-	(27.9)	(25.4)	(28.0)	(20.7)	(3.8)	12.4
ROCE (%)	30.4	(287.1)	(26.2)	(29.3)	(21.9)	(4.0)	18.2
Other key ratios (%)							
Effective tax rate (%)	0.0	0.0	0.0	0.0	0.0	0.0	29.5
Ebitda/net int exp (x)	(0.3)	(0.8)	(4.4)	(6.3)	(1.8)	2.9	8.5
Exceptional or extraord. inc/PBT (%)	-	-	-	-	-	-	-
Dividend payout (%)	-	-	-	-	-	-	0.0

Source: www.clsa.com

evalu@tor The Global Equities Database

Balance sheet (Rmbm)

Year to 31 December	2021A	2022A	2023A	2024A	2025CL	2026CL	2027CL
Cash & equivalents	1,279	711	329	1,525	1,533	1,037	730
Accounts receivable	225	150	337	484	564	982	1,876
Inventories	82	382	417	444	419	506	764
Other current assets	1,018	684	29	6	6	6	6
Current assets	**2,603**	**1,927**	**1,112**	**2,460**	**2,523**	**2,532**	**3,376**
Fixed assets	3,371	3,260	3,061	2,742	2,744	3,747	4,967
Investments	-	-	-	-	-	-	-
Goodwill	0	0	0	0	0	0	0
Other intangible assets	402	345	273	198	126	54	36
Other non-current assets	245	162	146	148	148	148	148
Total assets	**6,622**	**5,695**	**4,591**	**5,547**	**5,540**	**6,481**	**8,525**
Short term loans/OD	722	438	508	522	550	600	650
Accounts payable	838	566	410	462	540	681	1,064
Accrued expenses	-	-	-	-	-	-	-
Taxes payable	0	0	0	0	0	0	0
Other current liabs	6	7	8	11	20	30	40
Current liabilities	**1,566**	**1,011**	**926**	**996**	**1,110**	**1,311**	**1,754**
Long-term debt/leases/other	1,228	1,632	1,546	1,401	2,051	3,051	4,051
Convertible bonds	-	-	-	-	-	-	-
Provisions/other LT liabs	7,953	91	155	179	190	190	190
Total liabilities	**10,747**	**2,735**	**2,627**	**2,576**	**3,351**	**4,553**	**5,995**
Share capital	3,952	4,046	801	879	879	879	879
Retained earnings	0	0	0	0	(782)	(1,043)	(441)
Reserves/others	(8,077)	(1,086)	1,163	2,092	2,092	2,092	2,092
Shareholder funds	**(4,125)**	**2,960**	**1,964**	**2,971**	**2,189**	**1,928**	**2,530**
Minorities/other equity	0	0	0	0	0	0	0
Total equity	**(4,125)**	**2,960**	**1,964**	**2,971**	**2,189**	**1,928**	**2,530**
Total liabs & equity	**6,622**	**5,695**	**4,591**	**5,547**	**5,540**	**6,481**	**8,525**
Total debt	1,950	2,071	2,055	1,924	2,601	3,651	4,701
Net debt	672	1,360	1,726	399	1,069	2,614	3,972
Adjusted EV	127,196	135,882	30,256	31,724	32,393	33,939	35,297
BVPS (fen)	(104.4)	73.2	245.3	337.9	248.9	219.3	287.8

Balance sheet ratios

Year to 31 December	2021A	2022A	2023A	2024A	2025CL	2026CL	2027CL
Key ratios							
Current ratio (x)	1.7	1.9	1.2	2.5	2.3	1.9	1.9
Growth in total assets (% YoY)	-	(14.0)	(19.4)	20.8	(0.1)	17.0	31.5
Growth in capital employed (% YoY)	-	nm	(14.6)	(8.7)	(3.3)	39.5	43.1
Net debt to operating cashflow (x)	(1.2)	(1.5)	(2.9)	(1.2)	(11.7)	16.2	5.1
Gross debt to operating cashflow (x)	(3.5)	(2.2)	(3.5)	(5.7)	(28.5)	22.7	6.0
Gross debt to Ebitda (x)	(2.5)	(2.6)	(3.9)	(3.6)	(13.0)	7.8	2.7
Net debt/Ebitda (x)	(0.8)	(1.7)	(3.3)	(0.8)	(5.3)	5.6	2.3
Gearing							
Net debt/equity (%)	(16.3)	45.9	87.9	13.4	48.8	135.6	157.0
Gross debt/equity (%)	(47.3)	70.0	104.6	64.8	118.9	189.4	185.8
Interest cover (x)	(0.4)	(1.2)	(8.5)	(11.8)	(6.2)	(0.9)	4.8
Debt cover (x)	(0.3)	(0.5)	(0.3)	(0.2)	0.0	0.0	0.2
Net cash per share (fen)	(17.0)	(33.6)	(215.5)	(45.4)	(121.5)	(297.4)	(451.8)
Working capital analysis							
Inventory days	119.8	159.7	152.7	158.8	136.3	100.9	81.2
Debtor days	1,203.5	503.0	150.1	180.9	146.4	112.6	103.4
Creditor days	1,224.4	483.0	186.5	160.8	158.2	133.3	111.5
Working capital/Sales (%)	705.3	472.7	61.5	55.7	32.9	31.2	30.6
Capital employed analysis							
Sales/Capital employed (%)	(2.0)	3.2	16.1	24.6	40.1	55.2	77.5
EV/Capital employed (%)	(3,682.9)	3,145.4	820.0	941.4	994.5	747.1	542.8
Working capital/Capital employed (%)	(13.9)	14.9	9.9	13.7	13.2	17.2	23.7
Fixed capital/Capital employed (%)	(97.6)	75.5	83.0	81.4	84.2	82.5	76.4
Other ratios (%)							
PB (x)	(30.7)	45.4	14.5	10.5	14.3	16.2	12.4
EV/Ebitda (x)	(160.1)	(173.2)	(57.8)	(60.1)	(162.1)	72.2	20.1
EV/OCF (x)	(226.3)	(145.1)	(51.0)	(94.3)	(354.9)	210.8	44.9
EV/FCF (x)	(75.6)	(97.0)	(32.7)	(62.4)	(59.3)	(24.3)	(30.4)
EV/Sales (x)	1,864.6	997.9	51.0	38.3	24.8	13.5	7.0
Capex/depreciation (%)	609.0	121.5	74.4	40.4	101.5	284.0	269.3

Source: www.clsa.com

evalu@tor The Global Equities Database

Cashflow (Rmbm)

Year to 31 December	2021A	2022A	2023A	2024A	2025CL	2026CL	2027CL
Operating profit	(1,051)	(1,244)	(1,048)	(1,034)	(725)	(156)	1,006
Operating adjustments	(2,349)	(962)	(54)	(12)	(58)	(105)	(151)
Depreciation/amortisation	256	459	525	506	525	625	746
Working capital changes	103	(298)	(216)	(159)	54	(364)	(769)
Interest paid / other financial expenses	2,392	1,030	119	84	113	160	206
Tax paid	0	0	0	0	0	0	(252)
Other non-cash operating items	85	79	81	279	0	0	0
Net operating cashflow	(562)	(936)	(594)	(336)	(91)	161	786
Capital expenditure	(1,121)	(465)	(331)	(172)	(455)	(1,557)	(1,947)
Free cashflow	(1,683)	(1,401)	(925)	(508)	(546)	(1,396)	(1,161)
Acq/inv/disposals	(994)	371	670	39	-	-	-
Int, invt & associate div	-	-	-	4	-	-	-
Net investing cashflow	(2,115)	(94)	338	(129)	(455)	(1,557)	(1,947)
Increase in loans	(76)	(665)	(298)	(522)	(113)	(160)	(206)
Dividends	0	0	0	0	0	0	0
Net equity raised/others	3,901	1,125	171	2,183	667	1,060	1,060
Net financing cashflow	3,825	460	(127)	1,662	554	900	854
Incr/(decr) in net cash	1,148	(570)	(382)	1,196	8	(496)	(308)
Exch rate movements	(1)	2	0	0	0	0	0
Opening cash	132	1,279	711	329	1,525	1,533	1,037
Closing cash	1,279	711	329	1,525	1,533	1,037	730
OCF PS (fen)	(14.2)	(23.1)	(74.1)	(38.3)	(10.4)	18.3	89.4
FCF PS (fen)	(42.6)	(34.6)	(115.5)	(57.8)	(62.1)	(158.8)	(132.1)

Cashflow ratio analysis

Year to 31 December	2021A	2022A	2023A	2024A	2025CL	2026CL	2027CL
Growth (%)							
Op cashflow growth (% YoY)	-	nm	nm	nm	nm	nm	388.1
FCF growth (% YoY)	-	-	-	-	-	-	-
Capex growth (%)	-	(58.6)	(28.7)	(48.2)	164.9	242.2	25.0
Other key ratios (%)							
Capex/sales (%)	1,643.7	341.2	55.9	20.7	34.8	62.1	38.6
Capex/op cashflow (%)	(199.5)	(49.6)	(55.8)	(51.1)	(498.5)	967.2	247.8
Operating cashflow payout ratio (%)	-	-	-	-	-	0.0	0.0
Cashflow payout ratio (%)	-	-	-	-	-	0.0	0.0
Free cashflow payout ratio (%)	-	-	-	-	-	-	-

DuPont analysis

Year to 31 December	2021A	2022A	2023A	2024A	2025CL	2026CL	2027CL
Ebit margin (%)	(1,540.4)	(913.4)	(176.8)	(124.8)	(55.4)	(6.2)	19.9
Asset turnover (x)	0.0	0.0	0.1	0.2	0.2	0.4	0.7
Interest burden (x)	3.2	1.8	1.1	1.0	1.1	1.7	0.8
Tax burden (x)	1.0	1.0	1.0	1.0	1.0	1.0	0.7
Return on assets (%)	(15.9)	(20.2)	(20.4)	(20.4)	(13.1)	(2.6)	9.4
Leverage (x)	(1.6)	(10.6)	2.1	2.1	2.1	2.9	3.4
ROE (%)	nm	nm	(44.8)	(42.4)	(30.3)	(12.6)	27.0

EVA® analysis

Year to 31 December	2021A	2022A	2023A	2024A	2025CL	2026CL	2027CL
Ebit adj for tax	(1,051)	(1,244)	(1,048)	(1,034)	(725)	(156)	709
Average invested capital	4,500	4,455	4,128	3,697	3,498	4,090	5,712
ROIC (%)	-	(27.9)	(25.4)	(28.0)	(20.7)	(3.8)	12.4
Cost of equity (%)	12.4	12.4	12.4	12.4	12.4	12.4	12.4
Cost of debt (adj for tax)	2.5	2.5	2.5	2.5	2.5	2.5	1.8
Weighted average cost of capital (%)	10.8	10.8	10.8	10.8	10.8	10.8	10.6
EVA/IC (%)	0.0	(38.7)	(36.1)	(38.7)	(31.5)	(14.6)	1.8
EVA (Rmbm)	-	(1,723)	(1,492)	(1,431)	(1,101)	(595)	102

Source: www.clsa.com

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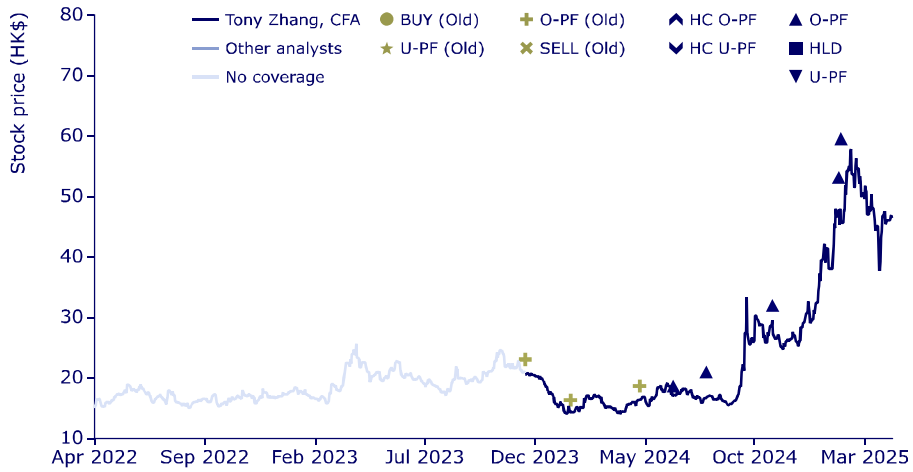

Date	Rec	Target	Date	Rec	Target
13 Feb 2025	O-PF	59.50	28 Jun 2024	O-PF	18.60
10 Feb 2025	O-PF	53.10	13 May 2024	O-PF	18.60
11 Nov 2024	O-PF	31.90	08 Feb 2024	O-PF	16.30
12 Aug 2024	O-PF	20.90	08 Dec 2023	O-PF	23.00

Note: At 6pm (HKT) on 28 June 2024, we changed our ratings to Outperform (O-PF), Hold (HLD) and Underperform (U-PF); and on 16 December 2024, we added the ratings: High-Conviction Outperform (HC O-PF) and High-Conviction Underperform (HC U-PF). Please see Key to CLSA/CLST investment rankings below for details. Source: CLSA

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