

BaTeLab (2149 HK)

Key domestic analog patterned wafer player well positioned to have multiple years of growth ahead

BaTeLab is one of the leading analog IC patterned wafer providers in China, focusing on the industrial-grade market. The company has developed the only full-stack design platform in China, integrating EDA, IP and design. We favor BaTeLab on 1) its unique position in the market (three differentiations from peers), 2) robust growth in revenue (38.0% 2023-26E CAGR, CMBIGM estimate) and the ability to maintain its margins (GPM/NPM at ~54%/23% in 2024/25E), 3) attractive valuation (the company currently trades at 10.3x 2024E P/E and 7.2x 2025E P/E, compared to 30.8x 2024E P/E of its HK-listed peers). **Initiate with BUY and TP at HK\$49.8.**

■ **BaTeLab is one of the leading analog IC patterned wafer providers in China.** According to Frost & Sullivan (F&S), the company was the largest provider of analog IC patterned wafers in China by revenue in 2022, accounting for 1.7% of the total market. In terms of revenue, BaTeLab is only 0.4%/0.5% the size of the market's global leaders (suppliers of finished analog ICs), Texas Instruments (TXN US, NR) and Analog Devices (ADI US, NR) in 2023. BaTeLab mainly leverages resources from its partners to grow in the patterned wafer market at the current stage. The benefits are apparent: 1) it has achieved high revenue growth (73.6% 2020-2023 CAGR), 2) lowered operating cost (SG&A expenses only accounted for 7% of total revenue in 2023 vs. avg. 14% for its domestic and overseas peers), and 3) maintained a high margin (GPM was stable at 55%-57% during 2020-23).

■ **BaTeLab focuses on the industrial-grade market, a long-tail market with high growth potential, diversified demands and relatively less intensified competition than consumer-grade market.** According to F&S, the TAM of industrial-grade analog IC market in China is expected to grow at a 9.5% 2024E-27E CAGR, reaching RMB242bn by 2027E, benefiting from the trends of intelligent automation and digital transformation in industrial applications. BaTeLab ranked No.5 in China with 0.4% market share in 2022, with the industry leader commanding a mere 0.8% market share in a highly fragmented market. We believe the market share will be consolidated towards the leaders.

■ **BaTeLab operates a full-stack analog IC design platform, empowered by proprietary EDA software tools and reusable IP library (over 400 IP modules).** This helps it 1) ensure efficiency in IC design and wafer delivery, 2) mitigate the impacts from geopolitical challenges, and 3) achieve cost advantage.

■ **We initiate coverage on BaTeLab (2149 HK) with BUY and TP at HK\$49.8,** based on 19x 2024E P/E (1-year historical avg. forward P/E of its HK-listed semi peers). Its share currently trades at 10.3x 2024E P/E, which is attractive in our view, for investors investing in H-share China semi names. We expect BaTeLab's revenue to grow 40% YoY in 2024E, while its peers' avg. revenue is estimated to grow only 1.6%, per Bloomberg consensus. Potential risks: 1) volatile economic conditions; 2) change in relationship with its core customers or suppliers; and 3) slower-than-expected introduction of new product categories.

Earnings Summary

(YE 31 Dec)	FY22A	FY23A	FY24E	FY25E	FY26E
Revenue (RMBmn)	353	464	650	896	1,220
YoY growth (%)	65.7	31.6	40.2	37.8	36.1
Gross margin (%)	56.5	55.4	53.8	54.3	54.3
Operating profit (RMBmn)	98.5	113.4	154.4	220.0	314.2
YoY growth (%)	61.8	15.2	36.1	42.5	42.8
Net profit (RMBmn)	95.3	109.2	146.3	210.5	305.2
YoY growth (%)	67.2	14.6	34.0	43.9	45.0
P/E (x)	11.9	10.4	10.3	7.2	5.0
ROE (%)	27.4	17.7	16.1	19.3	22.6

Source: Company data, Bloomberg, CMBIGM estimates

BUY (Initiate)

Target Price **HK\$49.80**
Up/Downside **97.6%**
Current Price **HK\$25.20**

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Stock Data

Mkt Cap (HK\$ mn)	1,512.0
Avg 3 mths t/o (HK\$ mn)	0.2
52w High/Low (HK\$)	NA/NA
Total Issued Shares (mn)	60.0

Source: FactSet

Shareholding Structure

Li Zhen	53.5%
Zhang Guangping	39.5%

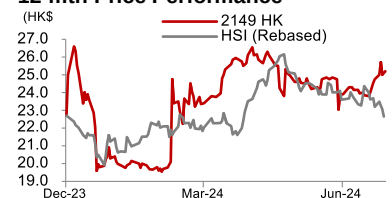
Source: HKEx

Share Performance

	Absolute	Relative
1-mth	5.4%	12.1%
3-mth	-3.4%	0.1%
6-mth	24.1%	16.3%

Source: FactSet

12-mth Price Performance



Source: FactSet

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Investment thesis

BaTeLab is one of the leading analog IC patterned wafer providers in China with a prominent market position. The company focuses on the industrial-grade analog IC patterned wafers market, which has significant potential and attractive margins that can support the company's long-term growth.

BaTeLab currently offers over 400 types of diversified industrial-grade analog IC patterned wafer products under power management category and the signal chain category. We expect the number of available products to grow quickly during 2023-26E (at a 23.4% CAGR). According to Frost & Sullivan, the majority of chips made from the company's analog IC patterned wafers can achieve performance metrics comparable to those of leading international manufacturers.

We favor BaTeLab for 1) its unique position in the market (three differentiators from peers), 2) robust growth in revenue (38.0% 2023-26E CAGR, by our estimate) and the ability to maintain its margins (GPM/NPM at ~54%/23% in 2024/25E, by our estimate), and 3) its attractive valuation (current share trades at 10.3x 2024E P/E and 7.2x 2025E P/E, vs. 30.8x 2024E P/E of its HK-listed peers).

BaTeLab's business model is unique with three key characteristics summarized below.

- **BaTeLab is one of the leading analog IC patterned wafer providers in China with a prominent market position.**

According to Frost & Sullivan (F&S), the company was the largest provider of analog IC patterned wafers in China by revenue in 2022, accounting for 1.7% of the total market. As an analog IC patterned wafer provider, BaTeLab works closely with distributors. The company has partnered with Arrow (ARW US, NR) and another local distributor. The company's revenue generated from these two largest distributors represented 82.3% of total revenue in 1H23.

We do not think the high revenue contribution from the distributor channel is a concern. In fact, we believe BaTeLab's business strategy to start from the patterned wafer market and collaborate with distributors is smart. In terms of total revenue, BaTeLab is only 0.4%/0.5% the size of the market's global leaders (Texas Instruments (TXN US, NR) and Analog Devices (ADI US, NR)). Before growing into a large company that can directly compete with global leaders, we think it is a good strategy to **leverage resources from the partners and reducing operating costs**. BaTeLab's SG&A cost only accounted for 7% of total revenue in 2023 vs. 10%/11%/11%/15% for TI (TXN US)/ADI (ADI US)/SG-Micro (300661 CH)/3Peak (688536 CH).

The benefit of partnering with distributors is apparent, which has boosted the company's earnings growth in recent years. BaTeLab's revenue grew at a 73.6% CAGR during 2020-2023, and we project the company's revenue to grow at a 37% CAGR during 2024E-2026E. Meanwhile, its net profit margin was 23.5% in 2023, much higher than its domestic peers (SG-Micro and 3Peak: 10.7% and -3.2% NPM in 2023).

- **BaTeLab focuses on the industrial-grade analog IC patterned wafers market, a long-tail market with substantial growth potential, diversified demands and relatively less intensified competition than consumer-grade market.**

According to Frost & Sullivan, **the TAM of industrial-grade analog ICs in China was RMB159bn in 2022 and is expected to grow at a CAGR of 8.8% to RMB242bn by 2027**, benefiting from the trend of intelligent automation and digital transformation in industrial applications.

This market is relatively fragmented, characterized by a number of market players and the top five in aggregate having just 5.0% market share in China in 2022, per F&S data. Among all fabless companies in China's the industrial grade analog IC market, **BaTeLab ranked the fifth in terms of revenue in 2022, with approximately 0.5% market share.** As the market demand continues to grow (driven by industrial automation, new energy transition and policy support), we believe **the market will be consolidated toward a few core players with significant capabilities, including BaTeLab.** Meanwhile, the company is seeing increasing market opportunities in auto segment that presents **less competition**

compared to consumer electronics segment. Therefore, we expect the company's GPM and NPM to stay at around 54%/23% from 2024E-2026E.

■ **BaTeLab operates a full-stack and high-efficiency analog IC design platform, empowered by proprietary EDA software tools and reusable IP library.**

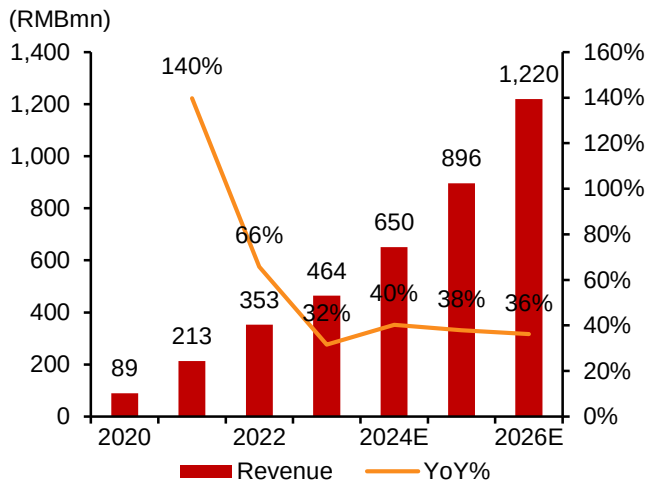
Unlike most of the IC design companies in China who rely on imported EDA software tools and commercial IP modules designed by third parties, **BaTeLab has developed the only full-stack design platform in China integrating the entire analog IC design chain, including EDA, IP and design.**

The benefits of full-stack design platform: 1) ensuring the company's efficiency in IC design and high-performance patterned wafer delivery, 2) helping mitigate the impacts from a challenging geopolitical environment, and 3) achieving a cost advantage. BaTeLab's R&D cost only accounted for 25.7% of total revenue in 2023 vs. 28%/51% for SG-Micro/3Peak. Looking forward, we expect the company's expense ratio will continue to fall, with new equipment (with proceeds from IPO) to lower R&D spending while improving customization in chip design.

We initiate coverage on BaTeLab (2149 HK) with a BUY rating and TP at HK\$49.8, based on 19x 2024E P/E. **We think the company is attractive for investors investing in China semiconductor names listed in Hong Kong stock market,** considering the following: 1) BaTeLab is a pure-play semiconductor company with robust revenue growth (40.2%/37.8% YoY growth in 2024/25E, per CMBIGM estimate) and high-but-stable profitability (we estimate its NPM to be 22.5%/23.5% in 2024/25E); 2) the company is well-positioned in a less competitive yet important industrial-grade analog IC market, with less exposure to price wars but great growth potential during market share accumulations; 3) there are many favorable policies in China that support semiconductor localization, industrial automation and new energy transition, which should increase the demand for industrial and auto analog IC products; and 4) BaTeLab's valuation is attractive. Its share currently trades at 10.3x 2024E P/E, while the HK-listed semiconductor peers are trading at an average 30.8x 2024E P/E. However, their average revenue growth in 2024E is only 1.6% based on Bloomberg consensus.

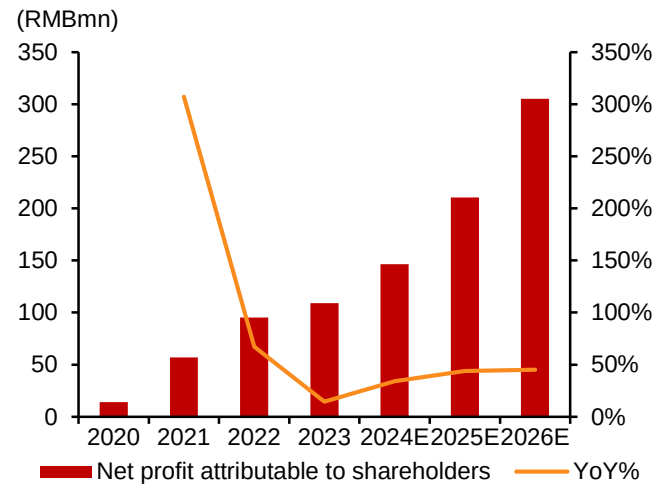
Focus Charts

Figure 1: Revenue and growth (2022-2026E)



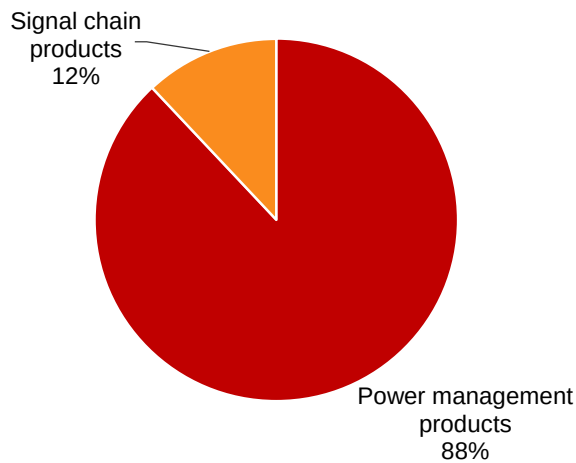
Source: Company data, CMBIGM estimates

Figure 2: Net profit and growth (2022-2026E)



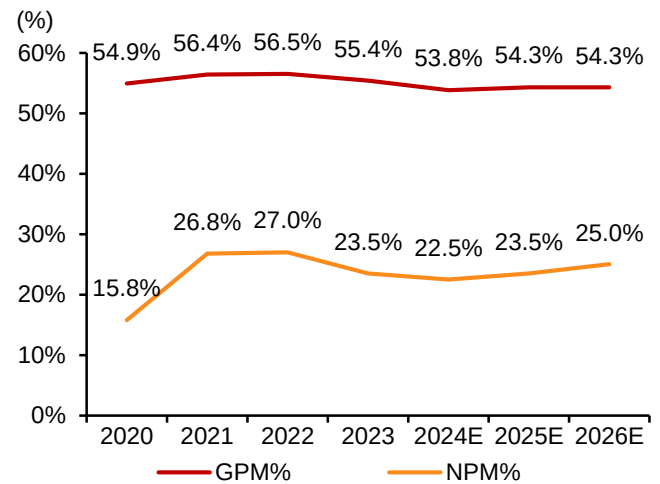
Source: Company data, CMBIGM estimates

Figure 3: Revenue breakdown by segment (2023)



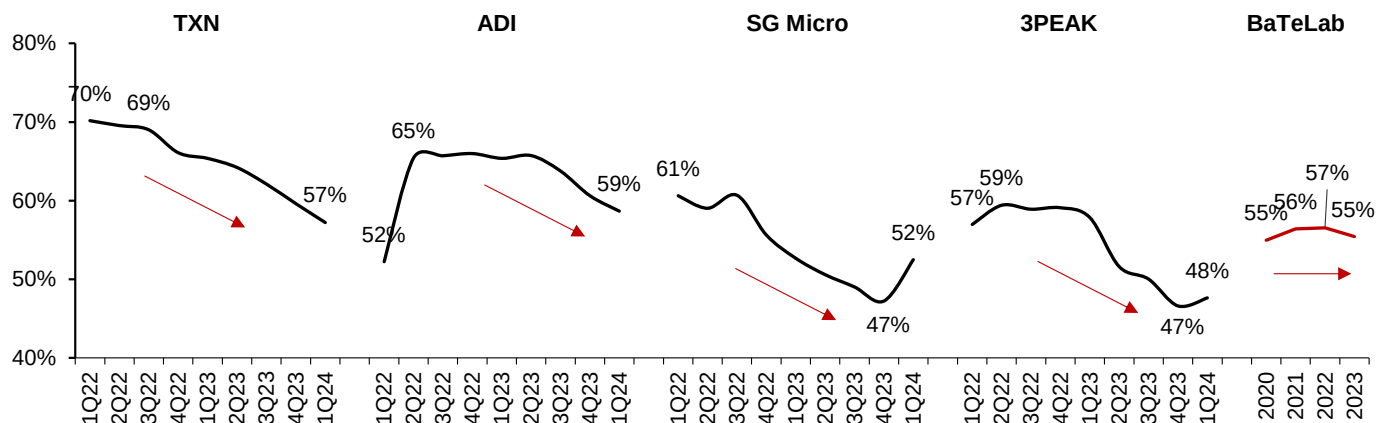
Source: Company data, CMBIGM

Figure 4: NPM is projected to gradually improve on cost optimization



Source: Company data, CMBIGM estimates

Figure 5: BaTeLab's GPM is stable, while major overseas and domestic peers experienced margin declines



Source: Company filings, Bloomberg, CMBIGM

BaTeLab is one of the leading industrial-grade analog IC patterned wafer providers in China, with three key characteristics

BaTeLab is one of the leading analog IC patterned wafer providers in China with a prominent market position. The company focuses on the industrial-grade analog IC patterned wafers market, which has significant potential and high margins that can support the company's long-term growth, in our view. BaTeLab has developed the only full-stack design platform in China integrating the entire analog IC design chain, including EDA, IP and design.

BaTeLab was established in Suzhou in Nov 2010 and was primarily engaged in the design and sales of IC products. In 2011, BaTeLab released its proprietary EDA software "BT EDA1.0" and started using its own EDA platform to provide IC design services. In 2018, the company iteratively upgraded the EDA software and started exploring the patterned wafer business. It had expanded its product offering from 100 different analog IC products in 2019 to more than 400 product models by the end of 2023.

Figure 6: Business milestones

2010	2011	2013	2018	2019	2020	2021	2022	2023
Established in Suzhou in Nov 2010 and was primarily engaged in design and sales of IC products.	Released the proprietary EDA software BT EDA1.0 and started using its own EDA platform to provide IC design services.	Started focusing on providing finished analog IC products and began to lay out a comprehensive product line.	Iteratively upgraded its EDA software and started exploring the patterned wafer business.	Independently developed ~100 different analog IC products in 2019	Upgraded EDA software to BT EDA 3.0.	Built up an IP library with over 300 IP modules.	Expanded its product offering to include IP licensing in 2022.	By the end of 2023, BaTeLab has more than 400 product models, and accumulated more than 400 IP modules. On 28 Dec 2023, BaTeLab successfully listed on the Main board of the HKEX.

Source: Company data, CMBIGM

On 28 Dec 2023, the company was successfully listed on the Main Board of the HKEX. **We believe BaTeLab is an attractive target for investors investing in China semiconductor universe in the Hong Kong market:** **1)** a pure-play semiconductor company with robust revenue growth (40.2%/37.8% YoY growth in 2024/25E) and high-but-stable profitability (we estimate NPM to be 22.8%/23.2% in 2024/25E); **2)** well positioned in a less competitive yet important industrial-grade analog IC market, with less exposure to price wars but substantial growth potential during market share accumulations; **3)** a key beneficiary of semiconductor localization, industrial automation and new energy transition trends in China; and **4)** attractive valuation.

From a business perspective, we like BaTeLab given its three key characteristics that distinguish itself from other competitors:

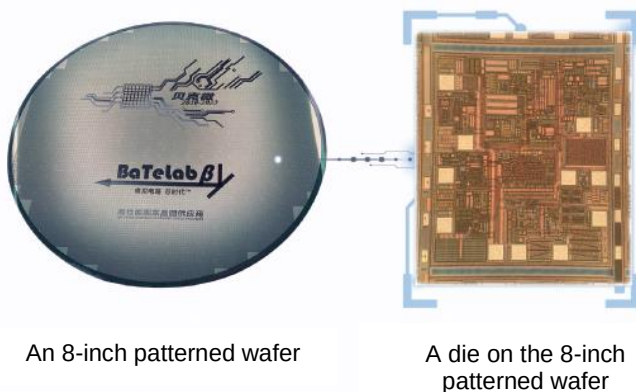
- BaTeLab is one of the leading analog IC patterned wafer providers in China with a prominent market position.
- BaTeLab focuses on the industrial-grade analog IC patterned wafers market, a long-tail market with high growth potential, diversified demands and relatively less intensified competition than consumer-grade markets.
- BaTeLab operates a full-stack and high-efficiency analog IC design platform, empowered by proprietary EDA software tools and reusable IP library.

A key analog IC patterned wafer provider with a prominent market position

BaTeLab offers analog IC patterned wafers to clients

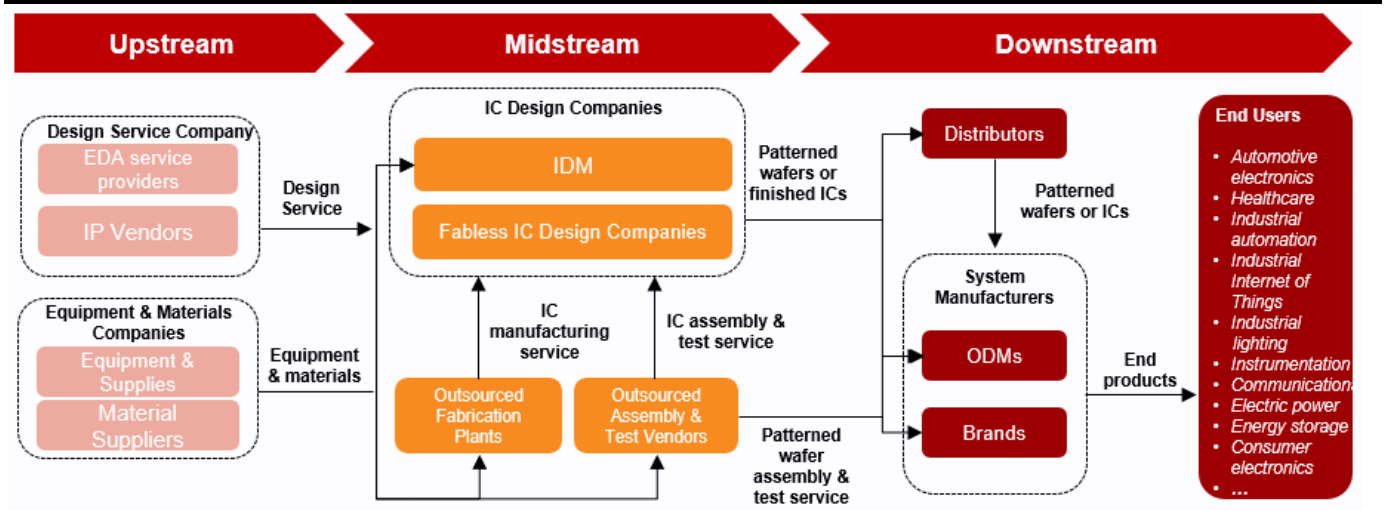
The company differentiates itself from traditional IC design companies by offering **analog IC patterned wafers with completed built-on circuits**, which can then be fabricated into individual IC chips after standard and straightforward packaging and testing steps performed by the downstream customers at their discretion or using the company's available packaging and testing solutions.

Figure 7: BaTeLab's product illustration – patterned wafer



Source: Company data, CMBIGM

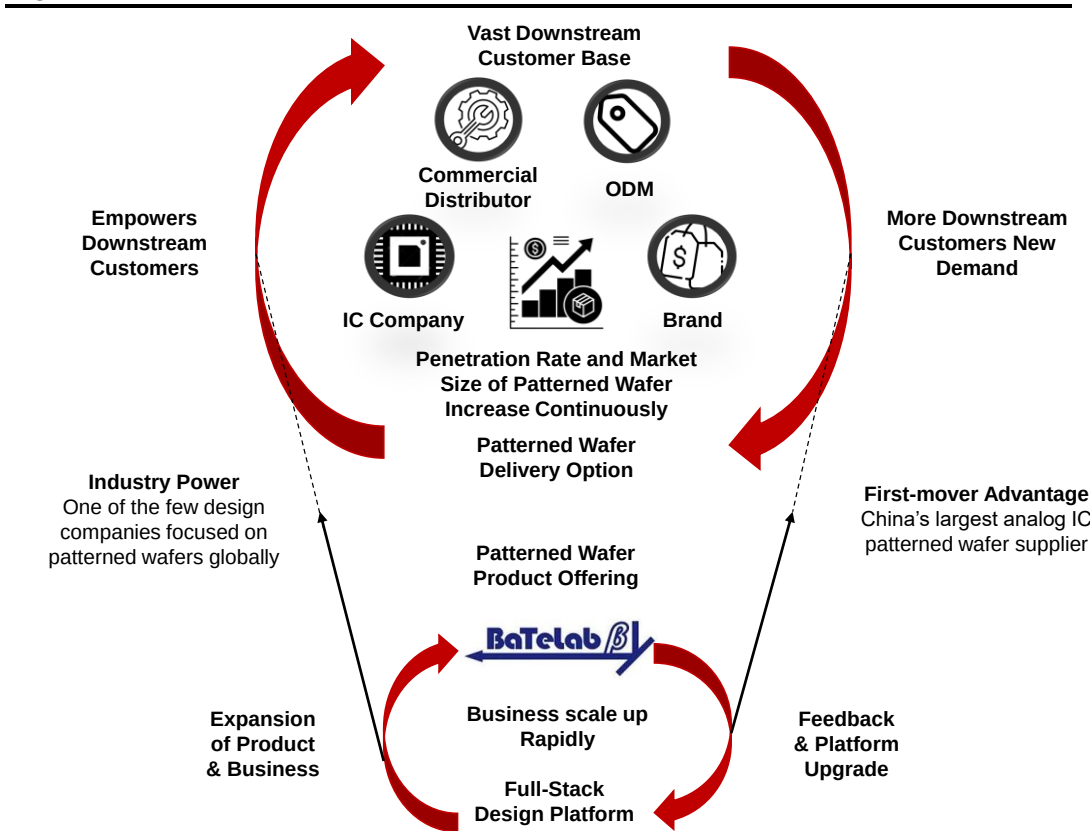
By delivery form, the IC market in China can be categorized into **patterned wafers and finished ICs**. **Patterned wafer** suppliers offer flexibility to downstream customers compared to traditional IC design companies providing finished ICs. **Patterned wafers** are shipped directly to downstream customers after the design and manufacturing processes, eliminating the need for assembly and testing. These downstream customers mainly include IC design companies or system manufacturers who then send the patterned wafers to OSAT (Outsourced Semiconductor Assembly and Test) vendors for assembly and testing, for the production of finished IC products.

Figure 8: Value chain of the IC industry in China

Source: Company data, CMBIGM

The benefits of providing analog IC patterned wafers

The company's patterned wafers empower downstream customers, including chip design companies, commercial distributors, brand-name manufacturers, and ODMs, with flexible, fast, and cost-effective development and manufacturing of high-performance industrial-grade IC chips. By catering to the granular division of labor in the IC industry, the company has established itself as a crucial player in meeting the market demands for patterned wafers.

Figure 9: BaTeLab's business model

Source: Company data, CMBIGM

The emerging analog IC patterned wafer market enables domestic IC design companies to maintain efficient operations and lower R&D costs and helps effectively meet the flexible packaging demand and increasing demand driven by intelligent and electric trends.

Patterned wafers effectively meet flexible packaging demand. The evolution of packaging technology has led to the widespread adoption of advanced techniques such as System-in-Package (SiP) and Chip-on-Board (CoB). In contrast to traditional methods that involve pin connections, SiP and CoB are primarily implemented on wafers. Downstream customers who embrace these packaging techniques can avoid redundant component packaging and reduce production costs by procuring patterned wafers. Additionally, these advanced packaging methods offer enhanced control over the IC manufacturing process, resulting in improved quality and consistency of the final IC products, and hence the demand for patterned wafers is on the rise.

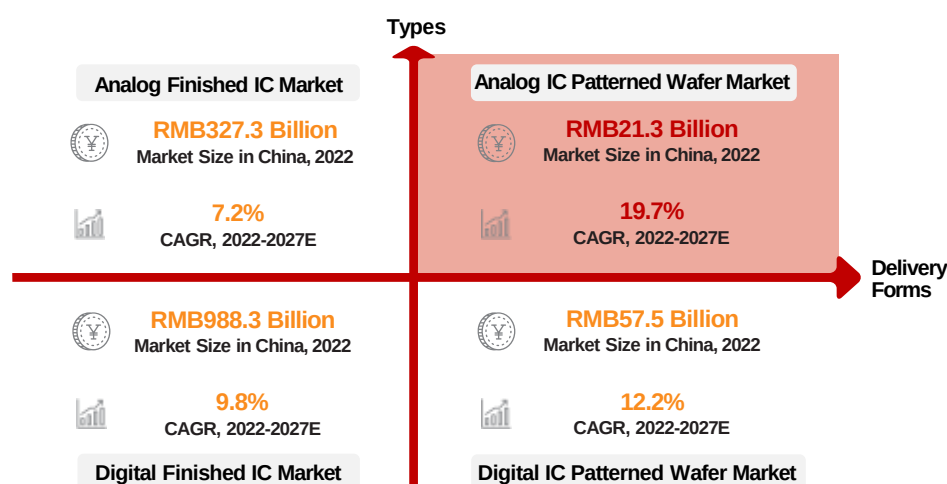
Also, intelligent and electric trends have been boosting the analog IC patterned wafer market. With increasing demand in emerging application fields such as the Internet of Things, artificial intelligence, electric vehicles, cloud computing and 5G communication, we expect the analog IC patterned wafer industry to maintain high momentum in the medium and long run. Specifically, the rising application of automotive electrification and increasing demand for industrial energy conservation are expected to lead the upgrading of analog IC patterned wafers per F&S. The ongoing transition towards electrification and intelligence in the automotive industry is expanding applications of analog ICs in this field, subsequently increasing their value per vehicle. As new energy vehicles continue to gain popularity and industries undergo digital transformation, we believe the analog patterned wafer market is likely to experience an upward trend.

China analog IC patterned wafer market to grow at 19.7% 2022-27E CAGR on surging demand

Demand for analog IC patterned wafers has been growing due to the increasing challenges in the delivery of analog IC products. **1) Application scenarios are diverse**, with 63k types of analog IC products for industrial grade, and ~80% of the total sales in the market are attributed to a large number of individual products each of whose sales accounts for no more than 0.02% of the total market size, according to F&S, indicating **an immense demand from long-tail application scenarios**. Few IC design companies are capable of providing integrated solutions for these scattered individual products in a cost-effective manner. **2) R&D is costly**, given the interactions of integrated circuit elements are complex and the design of analog IC relies heavily on experience and know-how. For example, the average R&D expenditure required to develop a new type of industrial-grade analog IC in China was approximately RMB5.5mn in 2022, according to F&S. **3) Development cycle is prolonged**, as it requires intensive communication and cooperation with foundries from design to tape-out and eventually to mass production. The average development cycle for a new type of industrial-grade analog IC in China was 13-14 months in 2022. **4) Economies of scale is difficult to achieve**, especially for products with small volume requirements, due to the long-tail nature of the analog IC market. The traditional packaged chip delivery form for analog IC products results in wasteful repackaging costs for downstream participants.

This has driven up the growth of analog IC patterned wafer market sales. The growth CAGR of this market is expected to greatly exceed that of other markets (finished IC or digital IC patterned wafer market). Per F&S, this market could grow at a CAGR of 19.7% from 2022 to 2027E and will grow at a CAGR of 19.9% during 2024E-27E which could significantly surpass the development pace of the other three sub-markets (i.e., analog finished IC market, digital finished IC market, and digital IC patterned wafer market) in the IC industry in China.

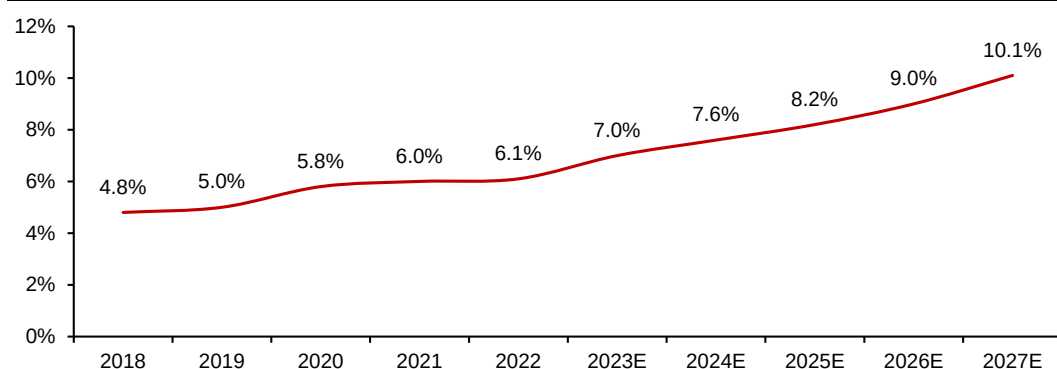
Figure 10: Analog IC patterned wafer market to have the highest sub-market growth (2022-27E CAGR of 19.7%)



Source: Company data, Frost & Sullivan, CMBIGM

Consequently, the market penetration of the analog IC patterned wafers is projected to increase as well. It was 4.8% in 2018 and is expected to reach 10.1% in 2027E, according to F&S.

Figure 11: The penetration of the analog IC patterned wafer market in the overall analog IC market in China will continue to increase, per F&S



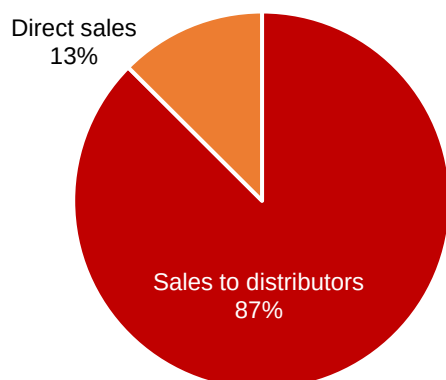
Source: Company data, Frost & Sullivan, CMBIGM

BaTeLab's business strategy offers robust revenue growth potential and the capability to maintain high margin

As an analog IC patterned wafer provider, BaTeLab works closely with distributors.

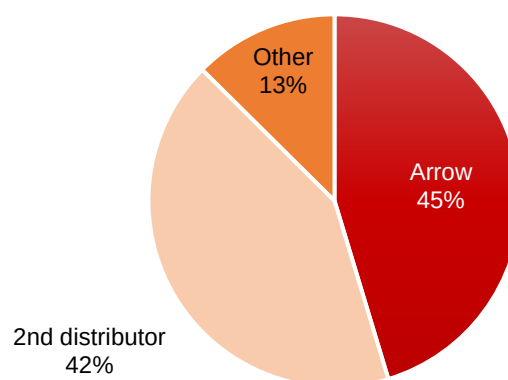
The company has partnered with Arrow (a global leading IC distributor) and another local distributor. Its revenue generated from these two largest distributors represented 87% of total revenue in 2023.

Figure 12: Sales to distributors vs. direct sales (2023)



Source: Company data, CMBIGM

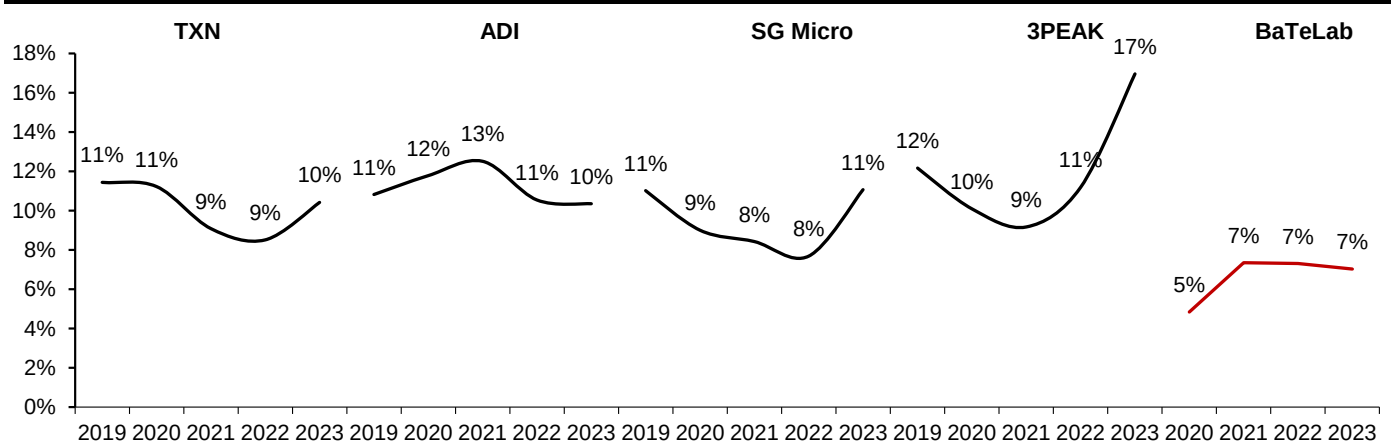
Figure 13: Revenue breakdown by segment (2023)



Source: Company data, CMBIGM

We do not think the high revenue contribution from the distributor channel is a concern. In fact, we believe BaTeLab's business strategy to start from the patterned wafer market through collaboration with distributors is a positive. In terms of total revenue, BaTeLab is only 0.4%~0.5% the size of its global peers (Texas Instruments and Analog Devices). Before growing into a large company that can directly compete with global leaders, we think it is a good strategy to leverage resources from the partners and reduce operating costs. BaTeLab's SG&A cost only accounted for 7% of total revenue in 2023 vs. 10%/10%/11%/17% for TI (TXN US)/ADI (ADI US)/SG-Micro (300661 CH)/3Peak (688536 CH). As for the analog leader, Texas Instruments, the Company also has high proportion of sales from distributor channels in previous years. TI's sales from distributors accounted for 65% in 2018/19 and gradually lowered to 25% in 2023.

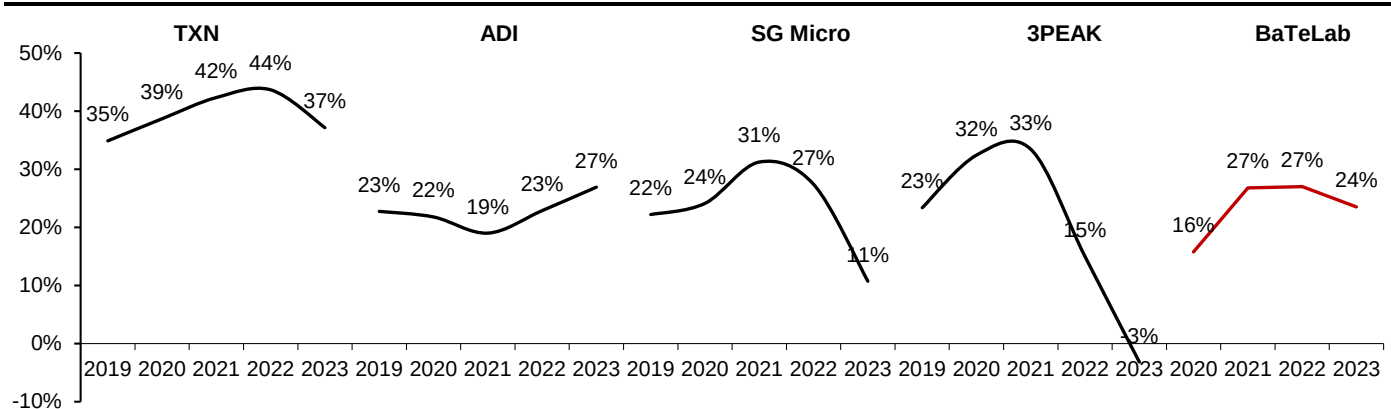
Figure 14: BaTeLab's SG&A expense is ~7% of total revenue vs. 10%+ for its major overseas and domestic peers



Source: Company filings, Bloomberg, CMBIGM

The benefit from partnering with distributors is apparent. BaTeLab's revenue grew at a 73.6% CAGR during 2020-2023, and we project the company's revenue to grow at a 37% CAGR during 2024E-2026E. Meanwhile, the company's net profit margin was stable at around 23% in 2023, much higher than its domestic peers (SG-Micro and 3Peak: 10.7% and -3.7% NPM in 2023).

Figure 15: BaTeLab's NPM is ~23% vs. ~18% for its major overseas and domestic peers



Source: Company filings, Bloomberg, CMBIGM

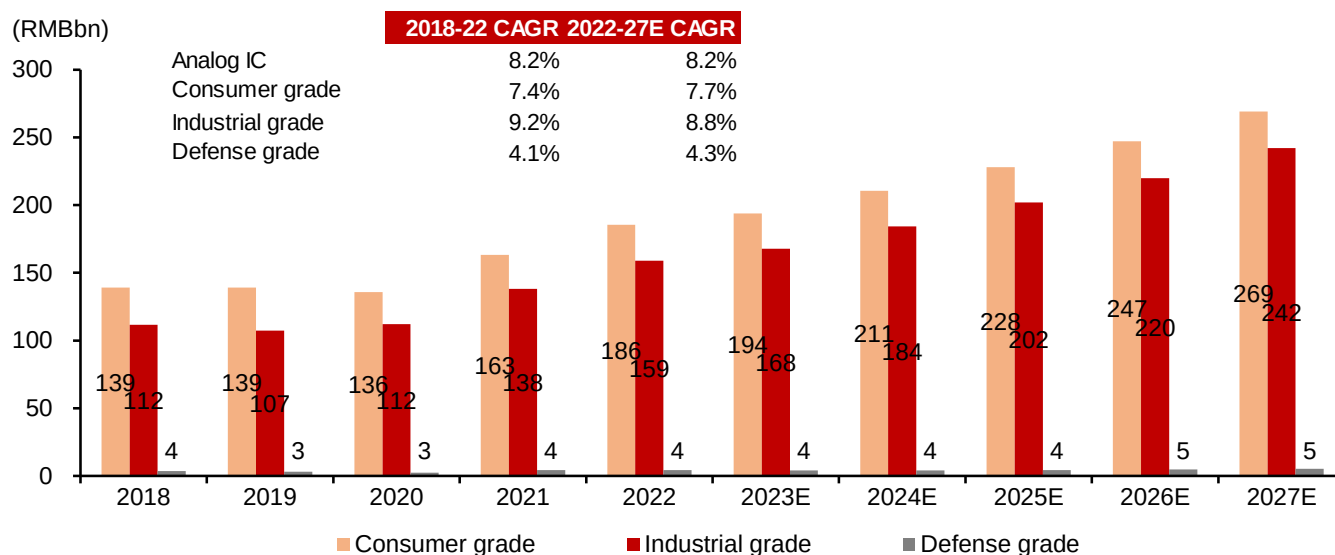
Focus on the long-tail industrial-grade market, with high growth potential, diversified demands and relatively less intensified competition

The industrial-grade analog IC patterned wafer market is projected to grow at 9.5% 2024E-2027E GAGR

Industrial-grade ICs find applications in specific sectors such as automotive electronics, healthcare, industrial automation, industrial Internet of Things (IoT), industrial lighting, instrumentation, communications, electric power, energy storage, and high-end consumer electronics. These sectors demand high performance, durability, and stability, especially under challenging conditions.

As the trend of intelligent automation and digital transformation continues to drive industrial applications, there is an increase in demand for industrial-grade analog ICs. Per F&S, the market size of industrial-grade analog ICs in China is expected to reach RMB184.3bn in 2024E and RMB242.2bn in 2027E with a CAGR of 9.5%.

Figure 16: Market size of industrial-grade analog ICs in China is expected to grow at a 2022-27E CAGR of 8.8%



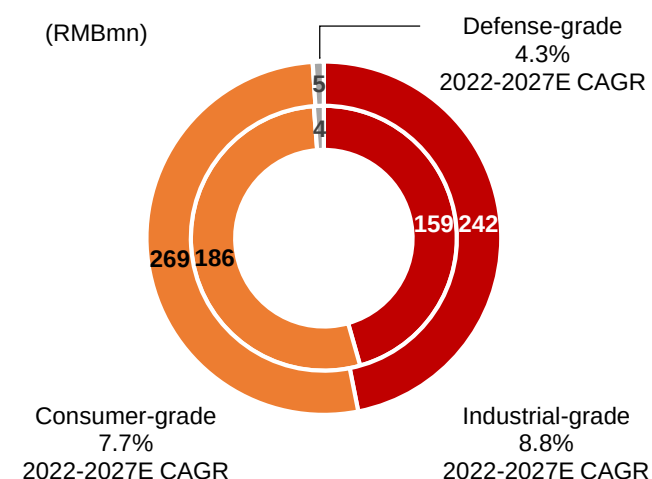
Source: Company data, Frost & Sullivan, CMBIGM

The long-tail industrial-grade analog IC patterned wafer market is highly fragmented

According to F&S, there are over 63k types of industrial-grade analog IC products, due to widely diverse application scenarios. Approximately 80% of the total sales in the market are attributed to a large number of individual products each of whose sales accounts for no more than 0.02% of the total market size, indicating **an immense demand from long-tail application scenarios**. However, few IC design companies are capable of providing integrated solutions for these scattered individual products in a cost-effective manner.

As a result, the industrial-grade analog IC market in China exhibits a high level of fragmentation, characterized by many market players and the top five in aggregate accounting for just 5.9% market share in China in 2022. Among all fabless companies in China's industrial grade analog IC market, BaTeLab ranked the fifth in terms of revenue in 2022, with approximately 0.5% market share.

Figure 17: Industrial-grade analog IC sales to grow at the highest 2022-27E CAGR of 8.8%



Source: Frost & Sullivan, company data, CMBIGM

Figure 18: Top 5 fabless companies in the fragmented industrial-grade analog IC market in China

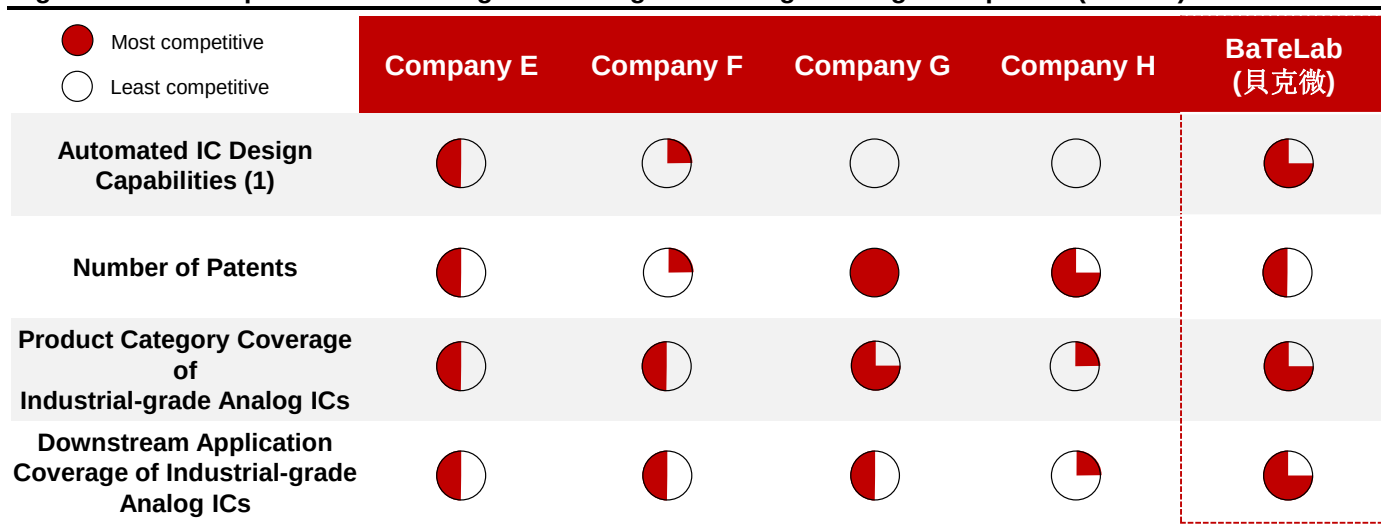
Ranking	Market player (fabless model)	2022 revenue (RMBmn)	Market share (%)
1	Company E	1,148.3	1.7
2	Company F	1,089.1	1.6
3	Company G	916.8	1.4
4	Company H	451.2	0.7
5	BaTeLab	352.5	0.5

Source: Frost & Sullivan, company data, CMBIGM

Market share will be consolidated toward a few core players with significant capabilities, including BaTeLab

BaTeLab has an evident competitive edge in technical capabilities among leading industrial-grade analog IC design companies in China, particularly its in-depth expertise in automated IC design, comprehensive product category coverage, and extensive downstream application coverage. We believe these make the company well-positioned for market share gains.

Figure 19: Core capabilities of leading industrial-grade analog IC design companies (fabless) in China



Source: Frost & Sullivan, CMBIGM

Note: Automated IC design capabilities typically include capabilities that can realize efficient standardized design of analog IC products, such as EDA software and IP modules

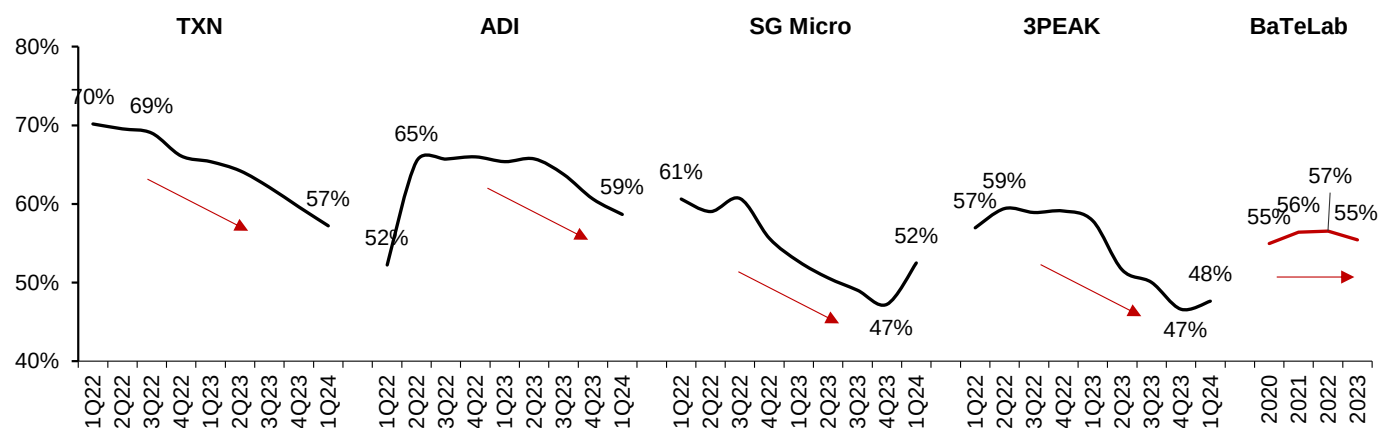
As the market demand continues to grow (driven by industrial automation, new energy transition and policy support), **we believe the market share will be consolidated toward a few core players with significant capabilities, including BaTeLab.** Small-scale patterned wafer providers may struggle to meet the growing and increasingly diverse demands from downstream customers. This situation gives leading players in the market significant first-mover advantages, and as a result, we estimate their market share may further expand.

BaTeLab is likely to maintain its high margin in the industrial market, where competition is less intense than consumer electronics market

In 2023, over half of BaTeLab's revenue is generated from industrial market, including industrial automation, energy storage, etc. Meanwhile, BaTeLab is exploring opportunities in the auto market. Certain of BaTeLab's products have successfully passed the AEC-Q100 certification, a critical standard in the automotive industry designed to ensure ICs can endure harsh environments. The company is gradually preparing for volume production of those products for leading domestic automotive brands. This is another end market with broad market opportunities and high profitability.

The company is well positioned in a less competitive yet important industrial-grade analog IC market, with less exposure to price wars but high growth potential during market share accumulations. Texas Instruments (TXN US) started a price war in 2022, targeting the analog products for the consumer electronics market. As a result, Texas Instruments' GPM slid from 70% in 1Q22 to 57% in 1Q24. This has negatively affected its peers in China as well. Both SG Micro (300661 CH) and 3Peak (688536 CH)'s GPM decreased significantly during the same period too.

Figure 20: BaTeLab's GPM is stable, while major overseas and domestic peers experienced margin declines



Source: Company filings, Bloomberg, CMBIGM estimates

We think BaTeLab will be able to maintain its high margin on the industrial market, where the competition is less intense than consumer electronics market. Looking forward, we expect the company's GPM and NPM to stay at 53-55%/22-24% in 2024E-2026E.

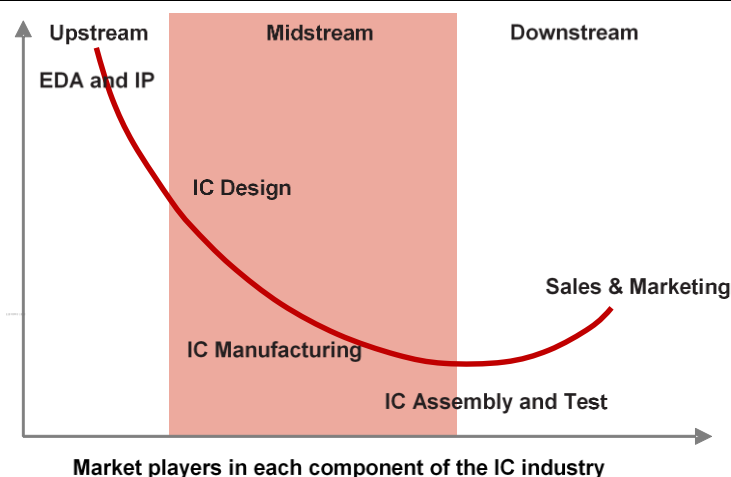
BaTeLab has developed the only full-stack design platform in China integrating the entire analog IC design chain, including EDA, IP and design

Achieved technical breakthroughs in EDA software and IP module design, with high economic value in the IC industry

IC design plays a critical role in the value chain as it directly affects IC product performance, leading to higher profitability for fabless companies compared to other players. They focus on design and outsource manufacturing to leverage specialized capabilities, reducing costs and promoting innovation. Therefore, **IC design is a component with high economic value in the IC industry.**

Due to the complexity of IC design, **EDA software** plays a vital role through enabling electronic computer-aided design and simulation of layout. Additionally, **IP modules** can be incorporated into the layout to achieve specific functions. These components **serve as cornerstones for IC design companies.**

Figure 21: EDA and IP serve as cornerstones to IC design, which is a component with high economic value in the IC industry



Source: Frost & Sullivan, CMBIGM

EDA: underpins IC design by providing essential support. The significance of EDA tools lies within their inherent ability to ensure design precision, optimize product performance, and expedite both IC design cycles and product testing and verification phases.

In recent years, the IC design process has undergone a notable transformation, driven by significant advancements in artificial intelligence (AI) and related technologies. Through the adoption of intelligent and automated EDA software, IC design engineers can now achieve their objectives with heightened efficiency and enhanced precision.

It is worth noting that while the digital EDA market has witnessed rapid development, the analog EDA market has been expanding relatively slowly, presenting additional avenues for potential growth. Consequently, in the absence of prompt and personalized support from third-party EDA vendors, the integration of self-developed EDA tools becomes imperative to swiftly adapt to changes in downstream customers' demands.

IP: an integral component of IC design. By integrating multiple IP modules into complex ICs, design engineers can avoid redundant work, effectively shortening design cycles, and increasing IC design success rates. Additionally, different IP modules with diverse functionalities, specifically tailored to manufacturing processes, enable IC design

companies to align their designs with foundries' processes, resulting in products with optimized performance, reliability, and efficiency.

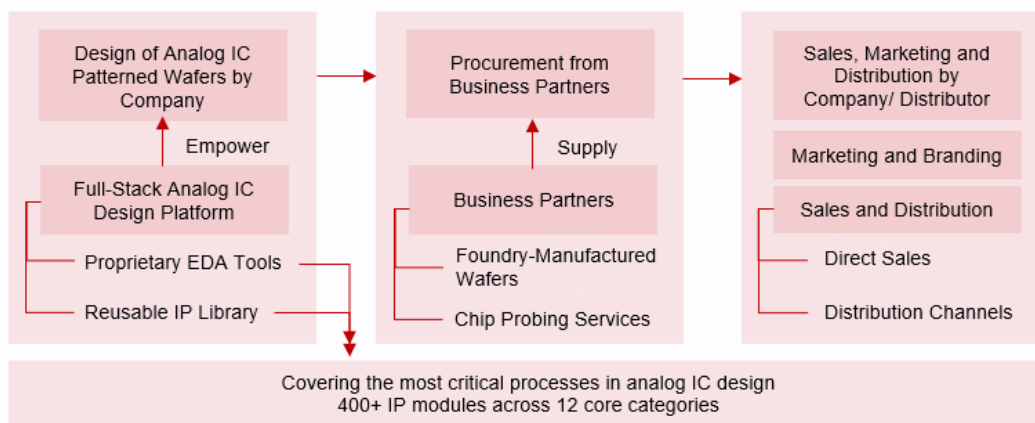
In the long term, the development of essential and foundational IP technologies becomes pivotal in achieving cost-effective, standardized IC design. A diverse and comprehensive IP portfolio empowers IC design companies through enhancing their design capabilities, providing downstream customers with an expanded array of choices and bolstering their competitive position in the market.

BaTeLab has built the only full-stack analog IC design platform in China integrating the entire analog IC design chain, including EDA, IP and design. This provides the company with a one-stop solution of analog IC design, enabling its effective product development and standardized high-performance patterned wafer delivery, as well as ensuring the competitive advantages in the industry. The platform has achieved technical breakthroughs in both EDA software and IP module design, empowering efficient standardized design of analog IC products.

Currently, BaTeLab has accumulated more than 400 IP modules covering 12 core functions of analog IC design and applicable to nine core process technologies. It has also expanded its product offering to include IP licensing.

With the continuous evolution and growing significance of EDA and IP, IC design companies, particularly those equipped with self-developed EDA tools and extensive IP modules, will garner significant value and recognition in the industry, in our view.

Figure 22: EDA and IP serve as cornerstones to IC design, which is a component with high economic value in the IC industry



Source: Frost & Sullivan, CMBIGM

The benefits of the full-stack design platform

BaTeLab has established China's first and only full-stack analog IC design platform, which serves as a comprehensive one-stop solution for analog IC design. This platform has enabled the company to achieve effective product development and streamline the delivery of standardized, high-performance patterned wafers. The platform is equipped with cutting-edge technology in both EDA software and IP module design, facilitating efficient and standardized design processes for its analog IC products.

Relying on its own EDA software, **BaTeLab has accumulated more than 400 IP modules covering 12 core functions of analog IC design** and applicable to nine core process technologies. It has also expanded its product offering to include IP licensing.

The benefits of the full-stack design platform are significant: 1) ensuring company's efficiency in IC design and high-performance patterned wafer delivery, 2) helping mitigate the impacts from challenging geopolitical environment, and 3) achieving a cost advantage.

Design efficiency leads to strong competitive edges. In the highly fragmented market of analog IC patterned wafers, design efficiency plays a crucial role for market players to sustain their competitive advantages. For IC design companies, achieving self-sufficiency and control over core technologies, such as EDA and IP, is essential to enhance design efficiency and establish a strong competitive edge. By deepening their technical expertise and mastery, these companies make low-cost and standardized IC design feasible, thereby effectively catering to a diverse range of user requirements.

Geopolitical tensions have driven major economies worldwide to pursue supply chain independence, leading to significant investments to strengthen domestic chip fabrication and design capabilities. Per F&S, the self-sufficiency rate of analog ICs in China was merely 13% in 2022, indicating a significant opportunity for domestic semiconductor players.

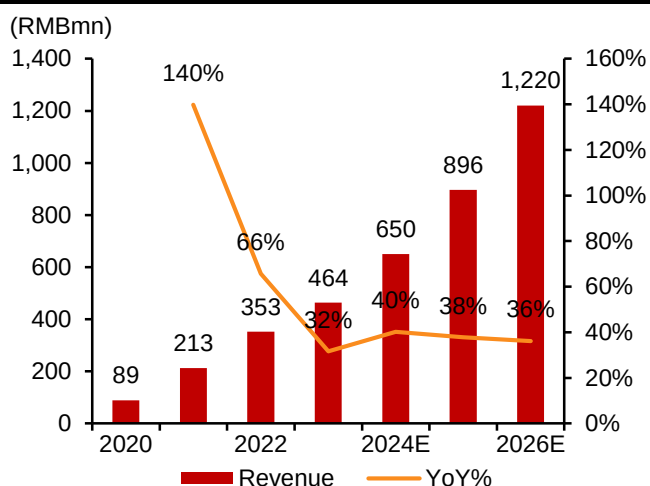
Financial analysis

Rapid business expansion with 38.0% 2023-26E revenue CAGR, while maintaining profitability and operational efficiency

Leveraging its robust platform and extensive product offerings, BaTeLab has achieved rapid business expansion in China's analog IC industry while maintaining profitability and operational efficiency. Its revenue grew significantly from RMB89mn in 2020 to RMB464mn in 2023, indicating an impressive CAGR of 74%. We estimate its revenue to continue its robust growth at a 38% 2023-26E CAGR, reaching RMB1,220mn by 2026E.

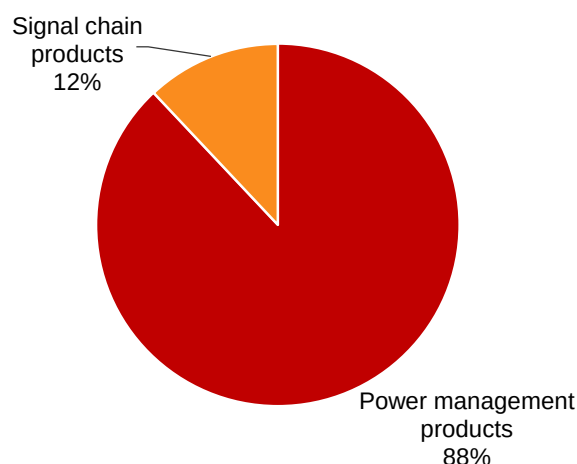
The company's core offerings are divided into power management products, which accounted for 88% of total revenue in 2023, and signal chain products, which made up the remaining 12%. The power management category encompasses switching regulators, multi-channel ICs, power management ICs (PMICs), linear regulators, and battery management ICs. Signal chain products predominantly comprise linear products.

Figure 23: Revenue grew at a 74% 2020-23 CAGR to RMB464mn in 2023 and is expected to continue its robust growth at a 38.0% 2023-26E CAGR



Source: Company data, CMBIGM estimates

Figure 24: Revenue breakdown by segment (2023): power management products accounted for the majority of sales (88%)



Source: Company data, CMBIGM estimates

The company currently has more than 400 product models, which can widely empower various application areas such as automotive electronics, healthcare, industrial automation, industrial Internet of Things, industrial lighting, instrumentation, communications, power, energy storage and consumer electronics.

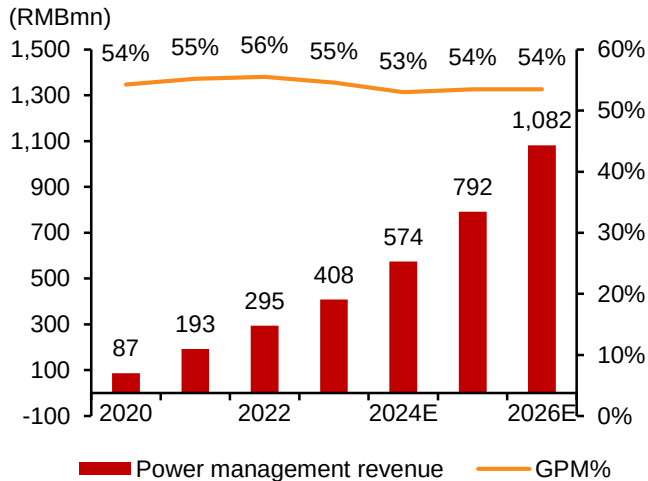
Relying on its own EDA software, BaTeLab has accumulated more than 400 IP modules covering 12 core functions of analog IC design and applicable to nine core process technologies. It has also expanded its product offering to include IP licensing.

Looking forward, the company aims to launch more new products in the upcoming years, which will be instrumental in driving BaTeLab's revenue growth. BaTeLab has seen remarkable growth in its product offerings, totalling 8, 45, 157 and more than 400 new analog IC patterned wafer products during 2020-2023. We forecast its number of new products offering will be 100-120 annually, exceeding 750 by the end of 2026E.

By segment, the GPM for power management products remained stable at 54%-56% during 2020-2023. The GPM for signal chain products contracted from 90.7% in 2020 to 68.3% in 2021, mainly due to increasing types of product offerings at the initial stage, from one type in 2020 to 32 types in 2022. The GPM for signal chain products remained stable at 61%-62% in 2022/23.

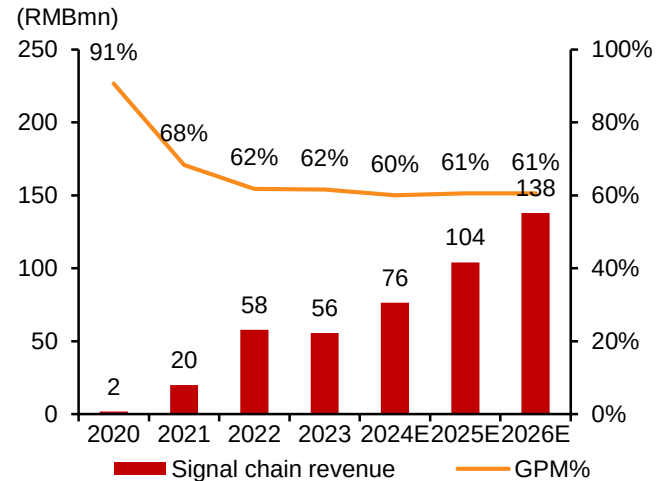
Given that the industrial-grade analog IC patterned wafer market is less competitive (long-tail), BaTeLab managed to maintain its overall gross margin at 55%-57% during the past three years. **We believe BaTeLab should be able to maintain its gross margin at the current level (53.8%/54.3% projected for 2024E/25E)**, given the company is still growing its product offerings with a large number of high-margin product categories remaining unexplored (BaTeLab's products covers 400 types vs. 63k types of industrial grade analog IC products in the market).

Figure 25: we expect power management's GPM to be stable, given the industrial-grade market is long-tail and has relatively lower risk to price wars



Source: Company data, CMBIGM estimates

Figure 26: Signal chain's GPM declined in 2020/21 as products ramped up at the initial stage, and remained stable afterwards

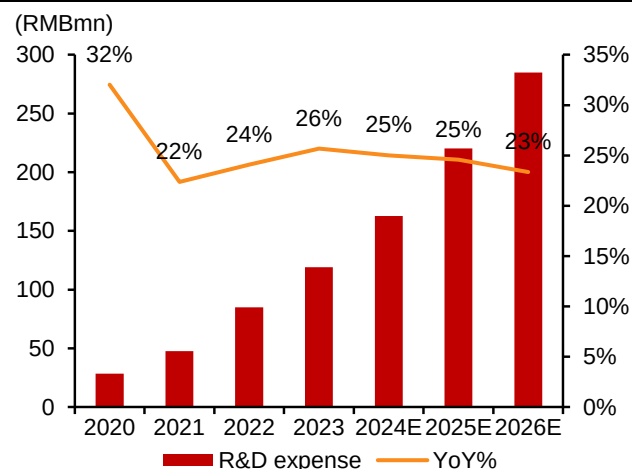


Source: Company data, CMBIGM estimates

The company's operating expenses accounted for 36.9%, 29.7%, 31.4% and 32.7% of its total revenue during 2020-2023. Among them, R&D expenses were the largest, making up 86.9%, 75.3%, 76.7% and 78.5% of the company's total Opex in 2020-2023. **We think BaTeLab has achieved R&D cost advantages compared with its peers, thanks to its full-stack design platform (EDA, IP and design).** BaTeLab's R&D cost accounted for 26% of total revenue in 2023 vs. 28%/51% for SG-Micro/3Peak, but is able to develop new products quickly (from eight products in 2020 to over 400 in 2023).

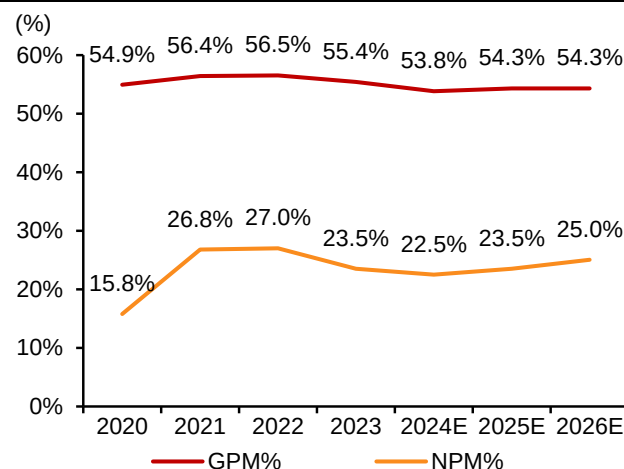
Looking forward, we expect the company's expense ratio will continue to fall, with new equipment (with proceeds from IPO) to lower R&D spending while improving customization in chip design. SG&A expenses accounted for 7.0% of revenue in 2023. We expect the ratio will also decrease on cost optimization. We anticipate its Opex to revenue ratio to remain at 29-32% level. OPM is projected to gradually increase from 23.7% in 2024E to 25.8% in 2026E.

Figure 27: BaTeLab's R&D expense to revenue ratio was 25.7% in 2023 and is expected to gradually decline



Source: Company data, CMBIGM estimates

Figure 28: NPM is projected to be 22.5% in 2024 and gradually improve to 23.5% and 25.0% in 2025/26E, driven by cost optimization



Source: Company data, CMBIGM estimates

As for the bottom line, BaTeLab's net profit saw substantial growth, increasing to RMB109mn in 2023, from a low base of RMB14mn in 2020. NPM was 23.5% in 2023. We forecast the company's net margin will be 22.5% in 2024 and gradually improve to 23.5% and 25.0% in 2025/26E, driven by cost optimization. **This implies net profit to grow at a 40.9% 2023-26E CAGR.**

Figure 29: BaTeLab's revenue breakdown by segment (2022-2026E)

(RMB mn)	2022A	2023A	2024E	2025E	2026E
Power management IC revenue	294.8	408.3	574.0	792.2	1,082.1
yoy%	52.8%	38.5%	40.6%	38.0%	36.6%
%	83.6%	88.0%	88.3%	88.4%	88.7%
Signal chain revenue	57.7	55.6	76.3	104.1	137.9
yoy%	191.3%	-3.7%	37.3%	36.3%	32.5%
%	16.4%	12.0%	11.7%	11.6%	11.3%
Total sales	352.5	463.9	650.4	896.2	1,220.0
yoy%	65.7%	31.6%	40.2%	37.8%	36.1%
Cost of sales	-153	-207	-300	-409	-558
Gross profit	199	257	350	487	662
YoY%	66.1%	29.0%	36.1%	39.1%	36.1%
GPM%	56.5%	55.4%	53.8%	54.3%	54.3%
Other income and net gain	10	8	10	10	10
YoY%	139.6%	-17.4%	20.6%	1.1%	-1.0%
Operating expense	-111	-152	-205	-277	-358
YoY%	74.9%	37.2%	35.3%	34.7%	29.4%
% rev.	-31.4%	-32.7%	-31.6%	-30.9%	-29.3%
Operating income	98	113	154	220	314
YoY%	61.8%	15.2%	36.1%	42.5%	42.8%
OPM%	27.9%	24.5%	23.7%	24.5%	25.8%
Net profit attributable to shareholders	95	109	146	210	305
YoY%	67.2%	14.6%	34.0%	43.9%	45.0%
NPM%	27.0%	23.5%	22.5%	23.5%	25.0%

Source: Company data, CMBIGM estimates

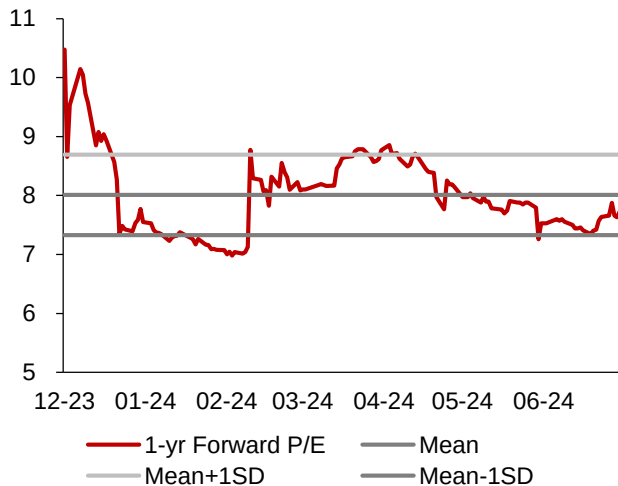
Valuation and risks

We initiate coverage on BaTeLab (2149 HK) with BUY and TP at HK\$49.8, based on 19x 2024E P/E (HKD/CNY: 0.93), which is the 1-year historical average forward P/E of its semiconductor peers listed on the HK stock market.

We think the company is an attractive target for investors investing in China semiconductor universe in the Hong Kong market. 1) BaTeLab is a pure-play semiconductor company with robust revenue growth (40.2%/37.8% YoY growth in 2024/25E) and high-but-stable profitability (NPM is estimated to be 22.5%/23.5% in 2024/25E). 2) The company is well positioned in a less competitive yet important industrial-grade analog IC market, with less exposure to price wars but substantial growth potential during market share accumulations. 3) There are many favorable policies in China that support semiconductor localization, industrial automation and new energy transition, which will increase the demand for industrial and auto analog IC products. 4) BaTeLab's valuation is attractive.

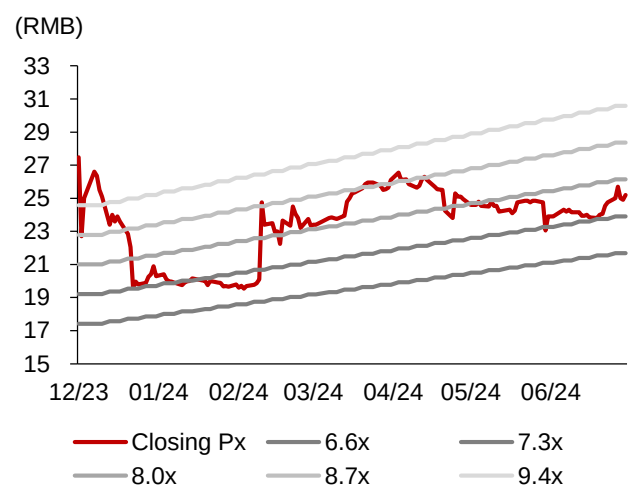
Its share currently trades at 10.3x 2024E P/E, which is attractive in our view. The semiconductor peers are trading at an average 30.8x 2024E P/E. However, their average revenue growth in 2024E/25E are only 1.6% and 21.4% based on Bloomberg consensus vs. 40.2%/37.8% for BaTeLab.

Figure 30: 1-year forward P/E band



Source: Company data, Bloomberg, CMBIGM estimates

Figure 31: P/E band



Source: Company data, Bloomberg, CMBIGM estimates

Potential risks: 1) BaTeLab may experience declines in demand if the economic conditions in China become more volatile; 2) any change in its relationship with its core customers or suppliers may negatively affect the company's performance and profitability; and 3) slower-than-expected introduction of new product categories may affect the company's performance as this is one of the key growth drivers.

Figure 32: Peers' valuation

Figure 32.1 Peers' Valuation										
		Last price	Mkt Cap	P/E (x)		Fwd. historical P/E (x)		EPS (US\$)		Rev. YoY Growth%
Company	Ticker	(LC)	(US\$mn)	FY24E	FY25E	1-year	2-year	FY24E	FY25E	FY24E
A-share semi peers										
SMIC-A	688981 CH	48.70	26,240	166.6	85.4	25.5	21.3	0.04	0.08	14.4
Willsemi	603501 CH	103.00	17,376	40.1	28.0	37.2	32.8	0.36	0.51	23.9
SG Micro	300661 CH	77.40	5,150	79.5	51.8	45.0	42.5	0.14	0.21	21.1
Silan Micro	600460 CH	20.22	4,638	52.6	37.8	35.7	34	0.05	0.07	16.7
Rockchip	603893 CH	61.98	3,540	70.5	40.9	55.2	46.5	0.12	0.21	23.2
3PEAK	688536 CH	84.93	1,547	72.5	34.7	38.6	50.2	0.16	0.34	26.7
Novosense	688052 CH	95.60	1,927	NA	162.5	67.0	NA	-0.14	0.08	39.7
Awinic	688798 CH	46.56	1,510	67.4	32.7	78.9	66	0.10	0.20	20.9
Southchip	688484 CH	31.80	1,881	35.3	26.0	41.0	NA	0.13	0.17	33.5
Sino Wealth	300327 CH	18.57	922	34.1	21.3	25.3	25.4	0.08	0.13	18.3
Peers Avg.				68.7	52.1	44.9	39.8	0.1	0.2	23.8
Peers Median				67.4	36.3	39.8	38.3	0.1	0.2	22.1
Overseas peers										
Texas Instru.	TXN US	197.15	180,007	38.0	30.8	26.8	24	5.18	6.41	-10.0
Analog Devices	ADI US	220.92	109,624	35.2	27.2	25.5	21.4	6.28	8.12	-24.2
Peers Avg.				36.6	29.0	26.2	22.7	5.7	7.3	15.5
Peers Median				36.6	29.0	26.2	22.7	5.7	7.3	(17.1)
H-share semi peers										
SMIC-H	981 HK	16.66	26,241	42.0	23.8	25.5	21.3	0.05	0.09	15.0
Huahong Semi	1347 HK	20.20	5,526	32.2	18.0	22.3	16.3	0.08	0.14	-9.8
Fudan Micro	1385 HK	11.38	2,737	12.5	10.8	9.9	14.2	0.12	0.14	10.2
ASMPT	522 HK	78.70	4,192	36.5	16.0	19.5	16	0.28	0.63	-9.0
Peers Avg.				30.8	17.2	19.3	17.0	0.1	0.3	1.6
Peers Median				34.4	17.0	20.9	16.2	0.1	0.1	0.6

Source: Bloomberg, CMBIGM

Note: earnings forecasts all from Bloomberg consensus; data as of July 26, 2024

Financial Summary

INCOME STATEMENT	2021A	2022A	2023A	2024E	2025E	2026E
YE 31 Dec (RMBmn)						
Revenue	213	353	464	650	896	1,220
Cost of goods sold	(93)	(153)	(207)	(300)	(409)	(558)
Gross profit	120	199	257	350	487	662
Operating expenses	(59)	(101)	(144)	(196)	(267)	(348)
Admin expense	(14)	(22)	(26)	(34)	(46)	(60)
R&D expense	(48)	(85)	(119)	(163)	(220)	(285)
Others	2	6	2	1	(1)	(4)
Operating profit	61	98	113	154	220	314
Interest expense	(4)	(2)	(4)	(6)	(6)	(4)
Other income/expense	0	0	0	0	0	0
Pre-tax profit	57	97	109	149	214	310
Income tax	0	(2)	0	(2)	(3)	(5)
After tax profit	57	95	109	146	210	305
Minority interest	0	0	0	0	0	0
Net profit	57	95	109	146	210	305

BALANCE SHEET	2021A	2022A	2023A	2024E	2025E	2026E
YE 31 Dec (RMBmn)						
Current assets	311	530	1,166	1,349	1,616	2,027
Cash & equivalents	147	163	551	563	622	746
Account receivables	32	67	69	91	130	191
Inventories	56	76	218	300	362	463
Prepayment	76	203	261	341	439	549
Other current assets	0	21	67	53	63	78
Non-current assets	45	66	105	130	160	172
PP&E	7	59	62	115	143	151
Right-of-use assets	5	3	7	7	8	10
Intangibles	0	0	0	1	1	1
Other non-current assets	33	3	35	7	8	10
Total assets	356	596	1,271	1,478	1,776	2,199
Current liabilities	51	195	427	483	567	682
Short-term borrowings	31	96	172	179	189	196
Account payables	19	96	249	295	367	473
Lease liabilities	2	4	7	9	11	13
Other non-current liabilities	4	5	6	11	13	17
Total liabilities	55	200	433	494	581	699
Share capital	45	45	60	60	60	60
Other reserves	256	351	778	925	1,135	1,440
Total shareholders equity	301	396	838	985	1,195	1,500
Minority interest	0	0	0	0	0	0
Total equity and liabilities	356	596	1,271	1,478	1,776	2,199

CASH FLOW	2021A	2022A	2023A	2024E	2025E	2026E
YE 31 Dec (RMBmn)						
Operating						
Profit before taxation	57	97	109	149	214	310
Depreciation & amortization	3	3	6	8	12	15
Change in working capital	(53)	(110)	(52)	(138)	(125)	(167)
Others	3	(22)	(33)	46	(10)	(18)
Net cash from operations	9	(31)	30	65	91	139
Investing						
Capital expenditure	(36)	(19)	(44)	(62)	(40)	(24)
Net proceeds from disposal of short-term investments	106	464	30	0	0	0
Others	(50)	(461)	(28)	2	1	1
Net cash from investing	20	(15)	(42)	(60)	(40)	(23)
Financing						
Net cash from financing	105	63	401	7	7	7
Net change in cash						
Cash at the beginning of the year	13	147	163	551	563	622
Exchange difference	0	0	(1)	0	0	0
Others	133	16	389	12	59	123
Cash at the end of the year	147	163	551	563	622	746

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

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