MATERIAL SCIENCE SERVICE

汎銓科技 半導體產業高階製程領航者

www.msscorps.com

MSSCORPS. (6830)

2025 Q3 Operations & Performance

Form No: Q4-MA01 Ver.1.2

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- MSS does not undertake any obligation to publicly update any forward-looking statement to reflect events or circumstances after the date on which any such statement is made or to reflect the occurrence of unanticipated events.

From MSS perspective, the current "Analytical testing market"

- Four major growth drivers starting in 2026 Advanced manufacturing processes have entered the angstrom generation. MSS continues to invest heavily in technology, and its newly completed SAC-TEM Center has recently passed customer audit approval and will begin operations to contribute to revenue。
  MOR APT SAC TEM
- Silicon photonics metrology and positioning analysis is patented and its production capacity for robustness testing of RD silicon photonics devices is continuously expanding. In 2026, testing equipment for PD & QA will be launched for sale.
- The US AI major client in MSS's "AI Zone" continues to expand...。
- With the completion of global exhibitions in Taiwan, Mainland China, the United States, and Japan, the combined revenue of overseas subsidiaries has shown significant growth.

- The operations headquarters has expanded to include a dedicated "Silicon Photonics Testing and Positioning Analysis" area.
- Materials Analysis Headquarters + Zhubei Plant 2: Materials analysis for 2nm and below processes.
- Zhubei Plant 1 is now shared with customer as an "AI Research Zone."」
- Angstrom-Generation Materials Analysis - "SAC-TEM Center" is operational.
- MSS USA CORP.: Official service commences in September 2025.
- MSS Japan Co., Ltd.: Official service commences in September 2025.
- The Shenzhen branch completed its factory construction by the end of June 2025 and began official service in August.

Semiconductor equipment/materials research and development

Introduction of advanced process equipment

Phase 1
Equipment／Materials Path Finding

Phase 2
RD FAB Equipment/Materials Introduction and Validation

Phase 3
Taiwan mass production FAB implementation & unit-by-unit PRS check

	American equipment manufacturers	Japanese equipment manufacturers
R&D Center Path Finding • Equipment manufacturers (such as Txx, Lxx, etc.) develop Etch and other equipment in their respective R&D centers. • Define equipment parameters and specifications. • Define process capabilities (Process Window), and select matching materials.	Silicon Valley, USA (Research and Development Center)	The Greater Tokyo Bay area of Japan (Tokyo, Yokohama, Kawasaki, Tsukuba, etc.)
Client-side demo and parameter optimization • The prototype machine was moved closer to the client's location. • The client's R&D engineers operated it. • The client's parameters and materials were optimized. • Indicators such as throughput, yield, CD control, and surface roughness were compared to determine the machine/standard recipe.	Hsinchu (FAB Research and Development)	Hsinchu (FAB Research and Development)
Technology transfer to mass production • Replicate the same materials and process recipe. • For each newly introduced piece of equipment, a Process Release Spec (PRS) must be executed on a case-by-case basis. • Only after confirming that the equipment performs consistently with the R&D FAB benchmark equipment in key performance indicators (CD, profile, defects, throughput, etc.) will it be included in the formal mass production schedule.	Hsinchu/Tainan/Taichung (Mass Production FAB)	Hsinchu/Tainan/Taichung (Mass Production FAB)

Silicon Valley and Tokyo Bay TEM Demand

Introduction of advanced process equipment

Phase 1
Equipment／Materials Path Finding

Phase 2
RD FAB Equipment/Materials Introduction and Validation

Phase 3
Taiwan mass production FAB implementation & unit-by-unit PRS check

Overseas R&D Center Path Finding

- Primarily based in local R&D centers and academic institutions in Silicon Valley/Tokyo Bay, conducting exploratory experiments on new structures and materials.
- TEM/Materials Analysis Requirements: High (Continuous R&D in advanced manufacturing processes, pursuing better PPAC for new transistors).

Taiwan-developed FAB implementation and parameter optimization

- After equipment/materials are moved to Taiwan for FAB (Fabrication Automation) development, a large number of DOE (Design of Engineering)/Split Lots are used for systematic optimization of linewidth, profile, interface, and defects.
- TEM (Transformation and Analysis)/Materials Analysis Requirements: High (Advanced process development is always very fast).

Mass production FAB implementation and unit-by-unit PRS verification

- PRS import per unit, mass production anomaly analysis, new recipe/material update verification.
- TEM/material analysis requirements: peak demand during factory setup for mass production FAB.

American equipment manufacturers

Silicon Valley R&D Cluster

- Silicon Valley R&D Cluster. Focusing on etching, thin film, and CMP modules
- Establishing long-term partnerships with top local universities and research institutions
- Developing advanced structures and materials path finding and proof-of-concept
- With its R&D focus primarily in Silicon Valley, USA, the Taiwan branch mainly provides maintenance and application services
- MSS Silcon Valley Lab：
  - Directly handles the TEM needs of US equipment and materials manufacturers in Silicon Valley

- Allows overseas analysis to proceed without waiting for equipment to arrive in Taiwan

Japanese equipment manufacturers

Tokyo Bay R&D Cluster

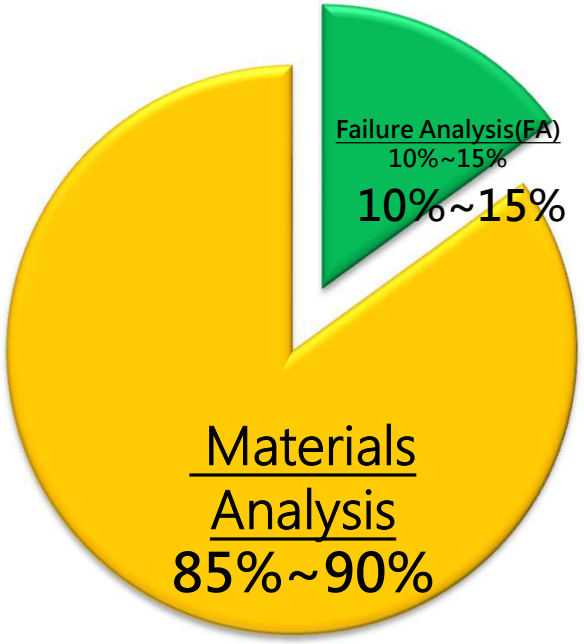
- Exposure, etching, metrology, cleaning equipment and packaging materials
- Concentrated in the greater Tokyo Bay area, including Tokyo, Yokohama, Kawasaki, and Tsukuba
- Kawasaki Laboratory's role:：
  - Serving Japanese equipment manufacturers, material suppliers, and advanced packaging-related companies
  - TEM demand is similar to the US Silicon Valley model, accumulating a large volume of front-end R&D analysis in JapanJapan's R&D and market share advantages in photoresist, advanced packaging equipment/materials, and testing equipment give Kawasaki Laboratory long-term growth potential
- Original appearance of the Kawasaki plant

Classification and growth potential of MSS' techniques

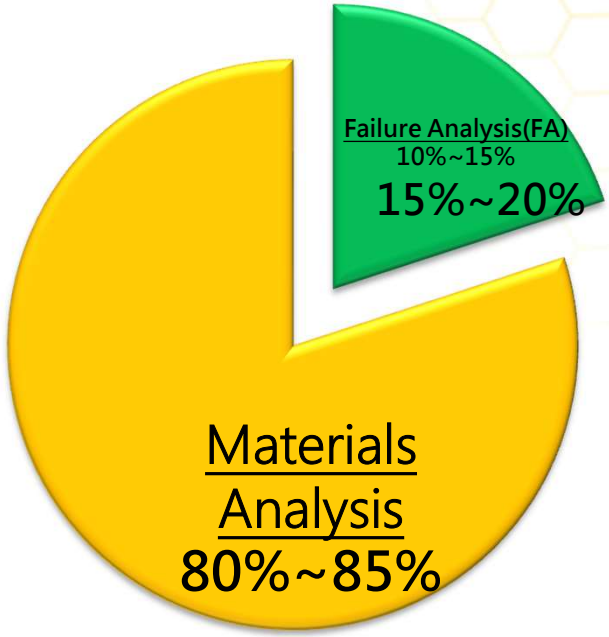
分類	屬別	技術名稱	MSS niche	Description	2024Q3 Revenue proportion	2025Q3 Revenue proportion	Expected growth in 2025-2026
Advanced processes (Angstrom era)	MA	PR protection technology	3rd generation EUV PR protection technology	Metal oxide PR	54.7%	53.5%	
	MA		Advanced EUV PR protection technology	EUV PR/etch structural analysis			
	MA		Selective deposition sample preparation technology	Special ALD deposition			
	MA	low-k protection technology	BEOL: low-k structure protection technology	AMAT announces black dimand materials			
	MA		BEOL: low-k damage analysis technology	Low-k composition analysis			
	MA		Novel 2D materials analysis method	Weak-bonding materials analysis			
	MA	Ultra-thin sample method	Ultra-thin sample protection method	2nm/A14 device structural analysis			
	MA		FEOL: GAA etch byproduct bonding state analysis	2nm/A14 device composition analysis			
	MA		MEOL: ALE etch byproduct comparison platform				
	MA		High aspect ratio structural TEM analysis technology	DRAM cell analysis			
	MA	Auto-measurement	Artificial intelligence for automatic measurement	Massive/reliable/accurate measurements			
Mature processes	MA	ML ball height/ML defect	Optical component analysis technology: ML ball height/ML defect	CIS	12.4%	8.6%	
	MA		Wearable device AR/VR product lens integration analysis	Meta Lens/Pancake Lens			
	MA	Compound Semiconductor	Epitaxial defect quantitative analysis technology	GaN on Si			
	MA		Carrier concentration distribution analysis in compound semiconductors	GaAs/InP/SiC			
	MA		Integrated stress analysis technology	PA amplification ability (diffraction pattern analysis)			
	MA	OLED	Ultra-low contrast imaging technology for layer structures	Polymer image analysis			
	MA	CCL/FCCL	Soft material slicing technology	Non-curtain effect/void			
	MA		General materials analysis (SEM/FIB CS/Reversed MA/SIMS)				
IC failure analysis	FA	Compound Semiconductor	High voltage and high temperature test (1000V, 300C)	GaN/SiC	10.0%	8.8%	
	FA		Ultrathin sample preparation technology for EFA	GaN/GaAs/SiC/3nm HPC InGaAs electrical measuren			
	FA	Circuit edit technology	Signal lead technology	Tapping wire to directly measure the single logic gate			
	FA		Backside signal lead technology				
	FA		Adding external multiple passive components technology	Advanced process IC			
	FA		Precise local RDL removal technology	Dedicated for WLCSP/FO IC			
	FA		Filpchip front side FIB technology	Flipchip IC			
	FA		General failure analysis (decap/delayer/electrical property/CRD/IC Reverse/SAT/3D Xray)				
Silicon photonics	MA	Silicon photonics structure	Large-area rapid cutting method for silicon photonics/Conductive preparation method for silicon photonics/Low-curtain effect cutting method for silicon photonics	Precise parallel lapping and PFIB to increase TEM capacity for silicon photonics	5.5%	7.9%	
	FA	Silicon photonics photoelectricity test	Light characteristics and attenuation detection for silicon photonics	On the silicon photonics testing platform, the emitted light enters the silicon photonics IC, coupling to the waveguide in the IC, and then passes through different functional components such as			
	FA		Optical path abnormality positioning, circuit break, light leakage detection for silicon photor				
	FA		12-inch silicon photonic photometric platform with fully automatic light scanning				
	MA	Advanced package	PFIB/hybrid metal bond/TSV分析技術	3D IC bond 對準&接面氧化物/TSV TEM			
	FA	FA for advanced process chips	3nm製程去層次技術/um to nm positioning, direct nano probe measurements on devices	通過3家科技公司在3nm產品上的驗證			
	FA	Advanced package	Large IC packaging and carrier board separation technology/THZ-TDR open /Thermal xyz fa	Patent protection/5um precise positioning			
Abroad	MA	特殊ALD 鍍膜/超薄試片技術	先進光阻保護/low-k結構保護/高深寬TEM 等技術		17.4%	21.2%	

Recent topics of interest to institutional investors: Changes in product portfolio

2024 Q1~Q3

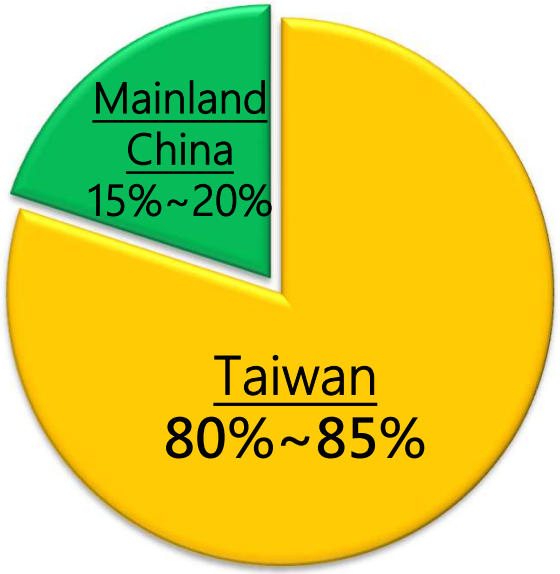


2025 Q1~Q3

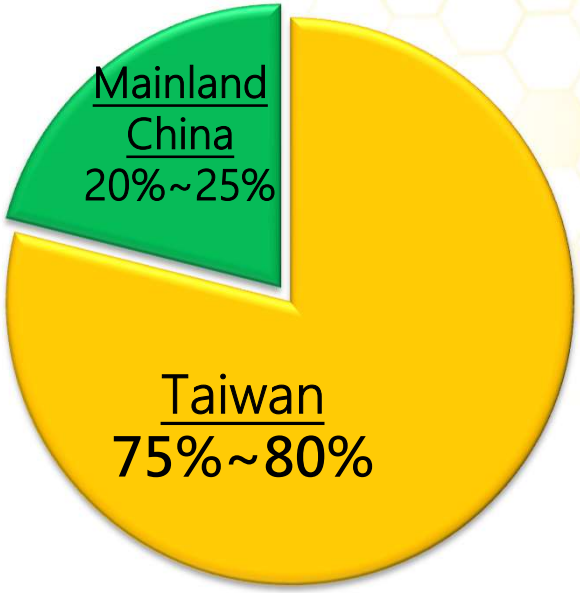


Recent topics of interest to institutional investors: Changes in market composition

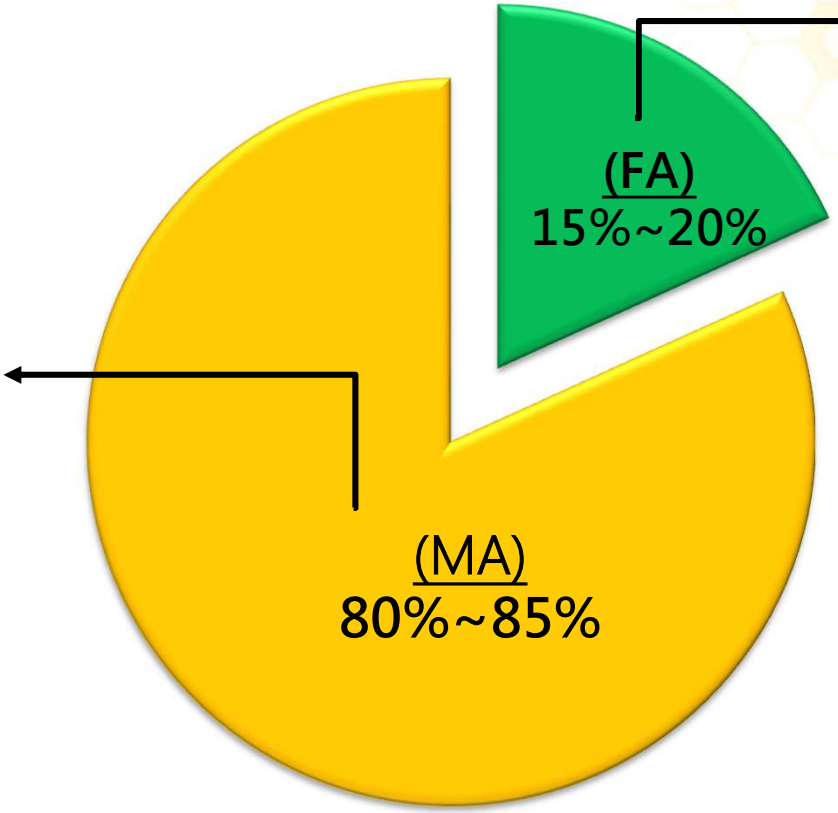
2024 Q1~Q3



2025 Q1~Q3



Product Portfolio-2025Q1~Q3



Delivery time: 1 day to 1 week
Performance Recognition:
Cases initiated and closed within the same month.
Monthly performance recognized

Delivery time: 12 hours to 3 days
Performance Recognition:
Cases initiated and closed within the same month.
Monthly performance recognized

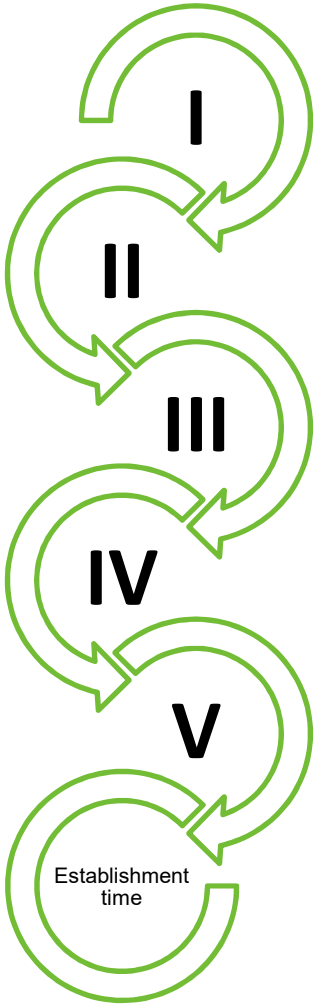
Recent topics of interest to legal entities: Changes in the number of employees

2024 VS 2025 Q3

Quarter	Q1	Q2	Q3	Q4
2024 annual headcount	605	615	630	650
2025 annual headcount	680	712	795	-

Appendix, Company Profile

Company Basic Information



MSSCORPS CO.,LTD.(MSS)

Establishment time : July 27, 2005

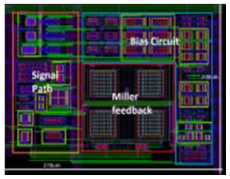
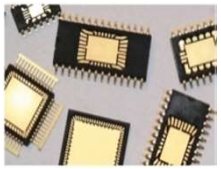
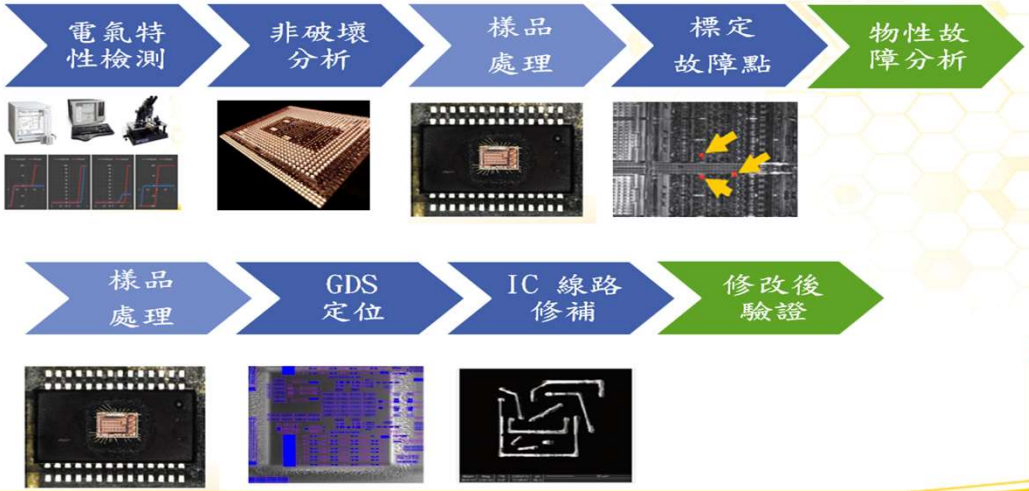
IPO time: 31 August, 2022

Founder: Gino Liu

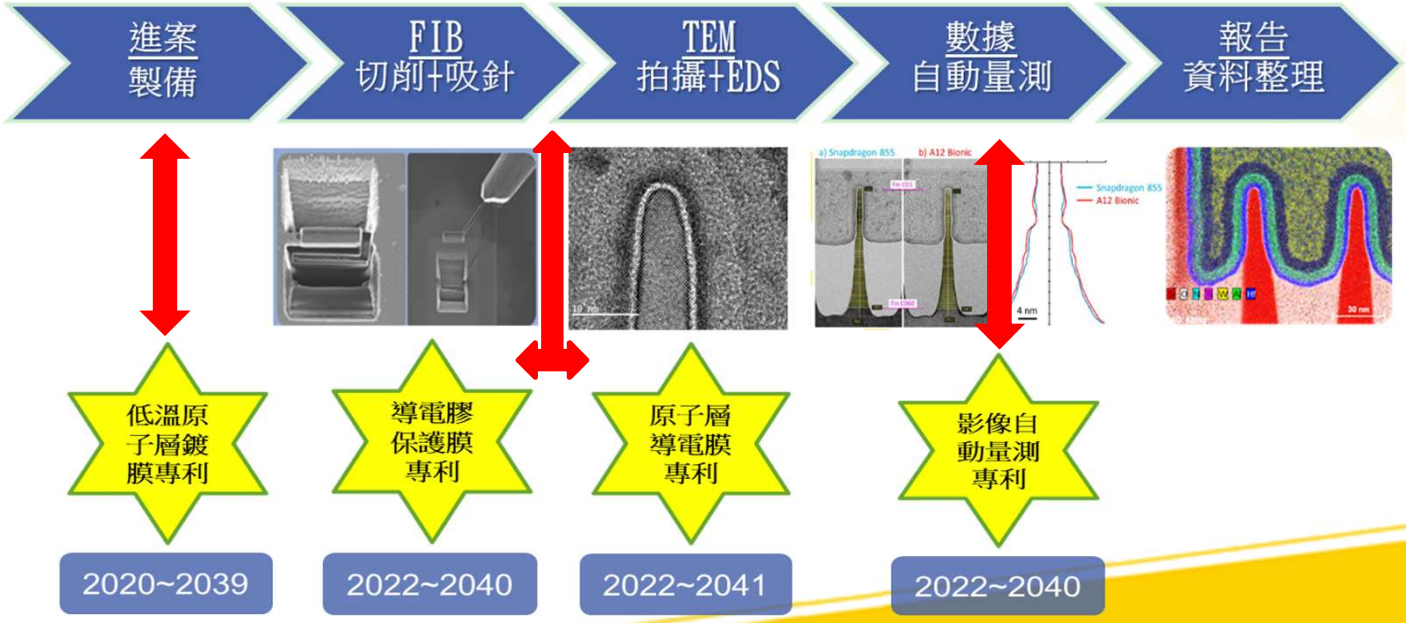
Capital: NT$518 million / 795 employees

Service items: Materials Analysis(MA)、Failure Analysis(FA)

The role of MSS in the semiconductor industry supply chain-FA

Positing	Content
Failure Analysis(FA) (IC product hospital)	IC Design/Photo mask  IC design debugging and finding the root cause of IC failures to bring customer products to market quickly. **1. IC circuit repair: Have the designer identify design errors and confirm the effectiveness of design changes.** 2.After IC mass production, for defective ICs, perform electrical testing/fault point identification/structural/ composition analysis. Packaging and testing / Carrier board / Flexible board / PCB, etc.  MSS’ s low-damage analysis technology has gained an absolute advantage in wafer foundry and is expanding into the downstream semiconductor industry. 1. Material diversity/hardness differences/thinner and thinner fabrication/weaker interlayer bonding 2. Development of a series of patented protective test pieces to reduce the effects of heat and electricity and avoid human-caused defects.
Failure Analysis(FA) Process	 

The role of MSS in the semiconductor industry supply chain-MA

Positioning	Content
: Materials Analysis(MA) (R&D leader)	 Providing transistor structure and composition analysis enables FAB to quickly achieve the following tasks: If MSS's technology stagnates or slows down, our clients' R&D schedules will be delayed! 1. Developing state-of-the-art processes, determining new equipment models/new materials/process parameters 2. Implementing mass production; newly built production line equipment must demonstrate consistency with the RD line 3. During mass production, continuously improving production line yield.
Wafer foundry/equipment/ materials	
: Materials Analysis(MA) Process	
Patent Name	低溫原子層鍍膜專利 導電膠保護膜專利 原子層導電膜專利 影像自動量測專利
Patent Period	2020~2039 2022~2040 2022~2041 2022~2040

Consolidated Income Statement

(NTD/Thousand Dollars)	2025 Q3	2024 Q3	
Labor income	1,586,453	1,462,654	8.46%
Gross profit	**347,013**	**409,983**	**(15.36%)**
Gross Profit Margin %	**22**	**28**	
Operating expenses	(316,831)	(287,439)	10.23%
Non-operating income and expenses	(30,055)	(27,300)	10.09%
Net profit before tax	127	95,244	
Income tax expense	(33,141)	(50,505)	
Net profit for this period	(33,014)	44,739	Turning from profit to loss
EPS(Dollars)	(0.64)	0.94	

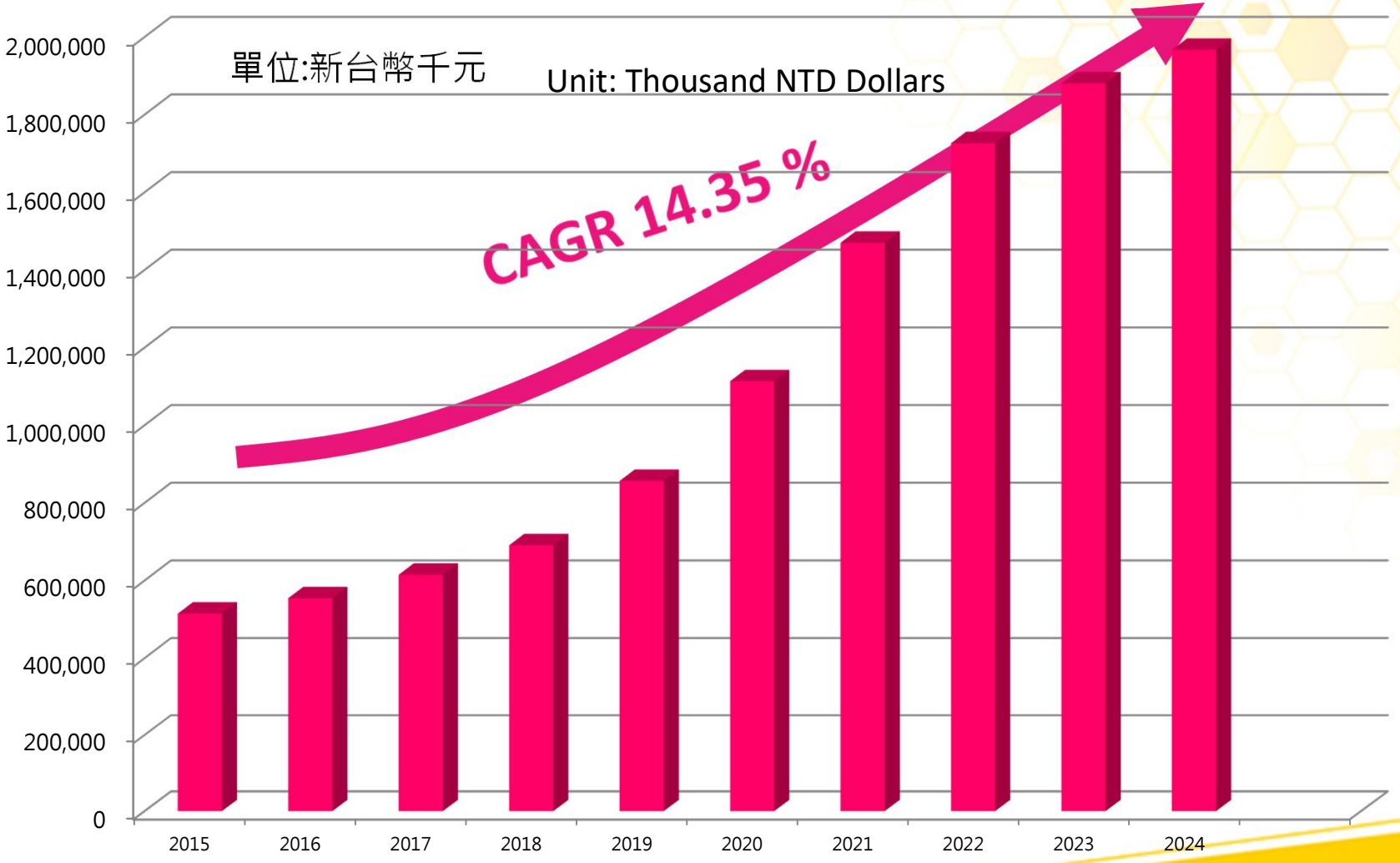
Consolidated Balance Sheet

(NTD/Thousand Dollars)	2025/09/30 Amount	%	2024/09/30 Amount	%
Cash and cash equivalents	890,465	15%	1,493,720	25%
Accounts Receivable	725,458	12%	711,255	12%
Prepayments and other current assets	224,604	4%	156,965	2%
Real estate, plant and equipment	3,509,878	59%	2,789,660	47%
Right-of-use assets and other non-current assets	622,805	10%	859,367	14%
Total Assets	**5,973,210**	**100%**	**6,010,967**	**100%**
Short-term borrowings and long-term borrowings due within one year	445,971	8%	190,710	3%
Accounts payable and other payables	310,354	5%	266,203	5%
Convertible corporate bonds maturing within one year	476,840	8%	-	-
Other current liabilities	158,618	2%	155,413	2%
Convertible bonds	-	-	465,047	8%
Long-term loans	1,316,707	22%	1,514,426	25%
Other non-current liabilities	277,414	5%	293,850	5%
Total Liabilities	**2,985,904**	**50%**	**2,885,649**	**48%**
Total Equity	**2,987,306**	**50%**	**3,125,318**	**52%**

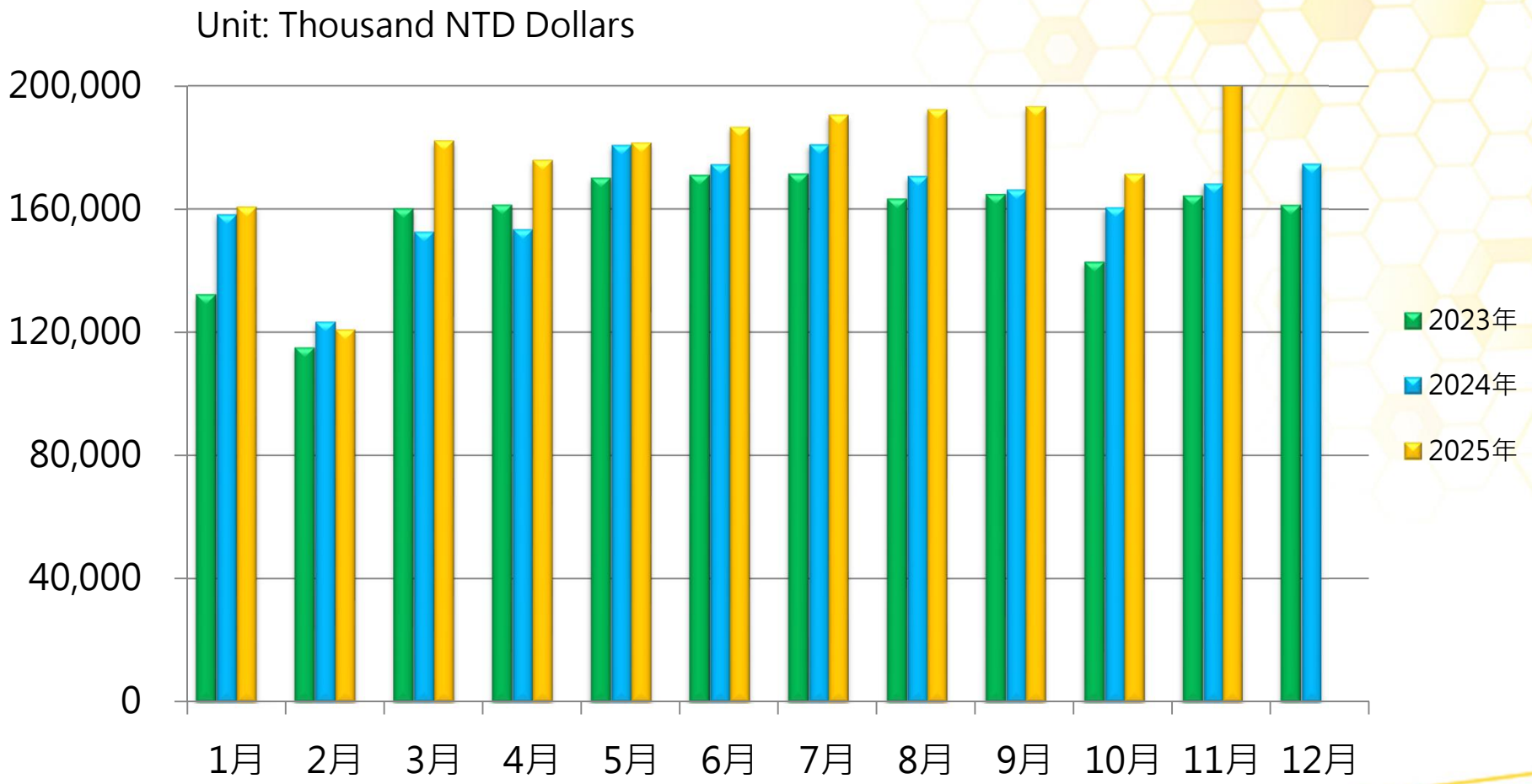
Consolidated Cash Flow Statement

(NTD/Thousand Dollars)	2025 Q3	2024 Q3
Beginning cash and cash equivalents	1,181,200	622,110
Cash flow from operating activities	526,623	481,531
Purchase of real estate, factory buildings and equipment	(887,576)	(1,252,307)
Borrowing long-term and short-term loans	359,000	1,366,000
Repayment of long-term and short-term loans	(168,480)	(587,595)
Issuance of convertible corporate bonds	-	551,380
Cash capital increase	-	600,000
Others	(120,302)	(287,399)
Cash and cash equivalents at the end of the period	890,465	1,493,720

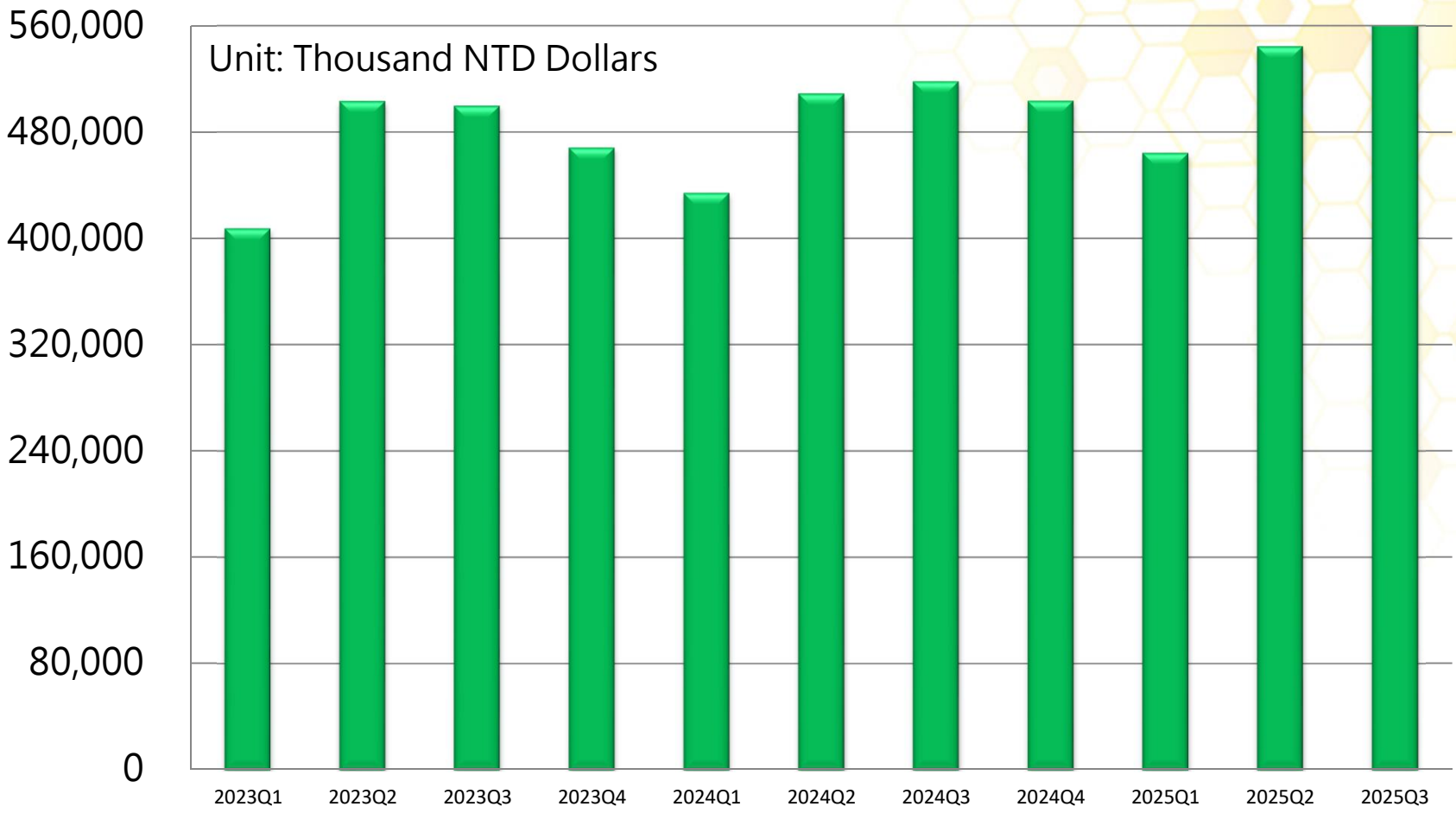
Revenue growth trend over the past decade



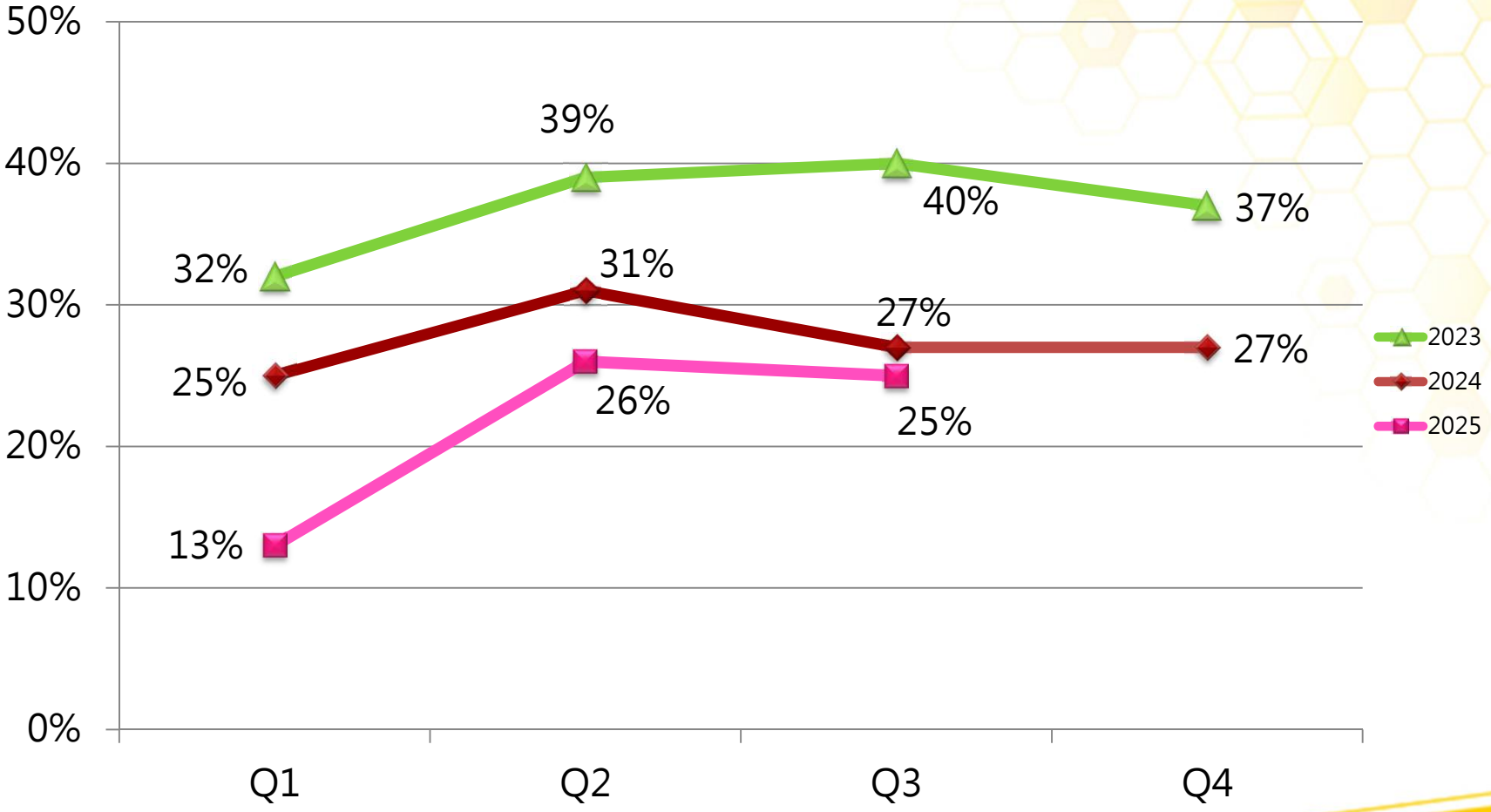
2023~2025 monthly revenue trends



2022~2025 Quarterly Revenue Trends

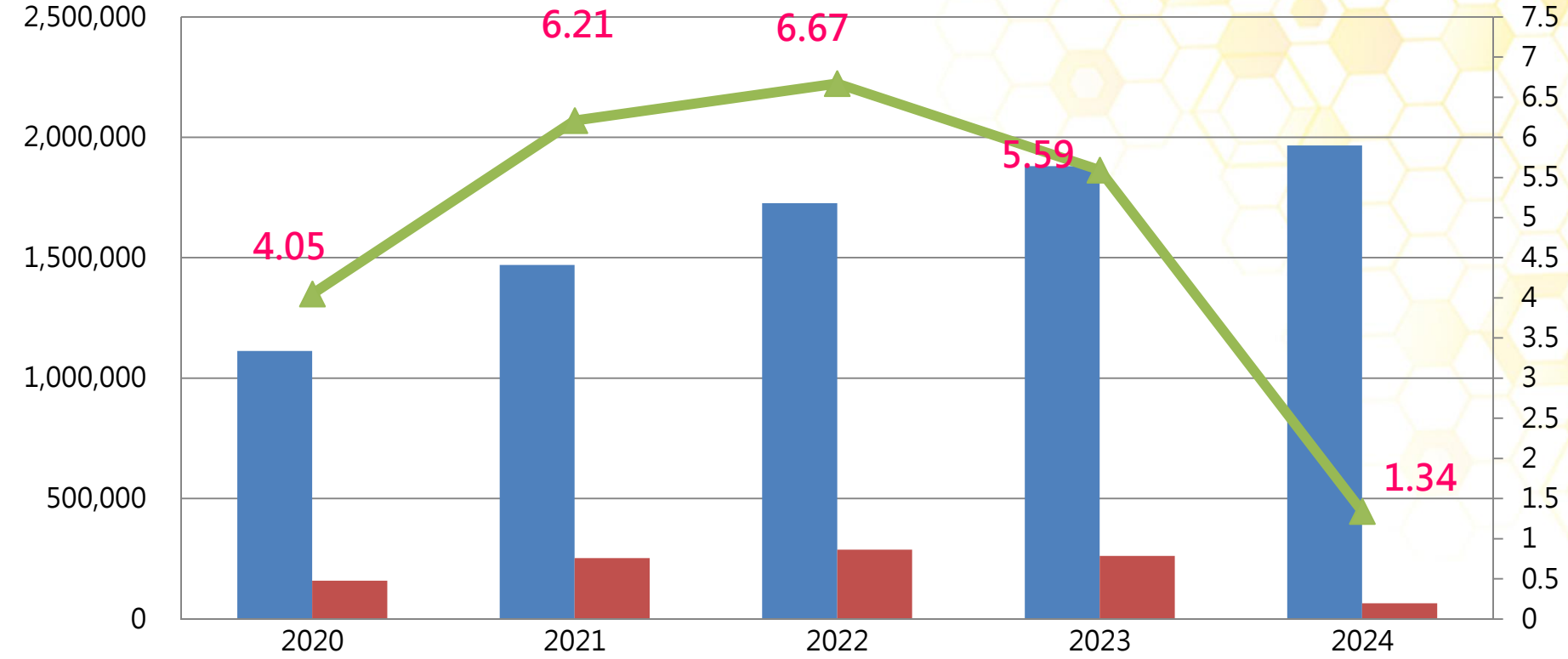


2023~2025Gross profit margin analysis for each quarter



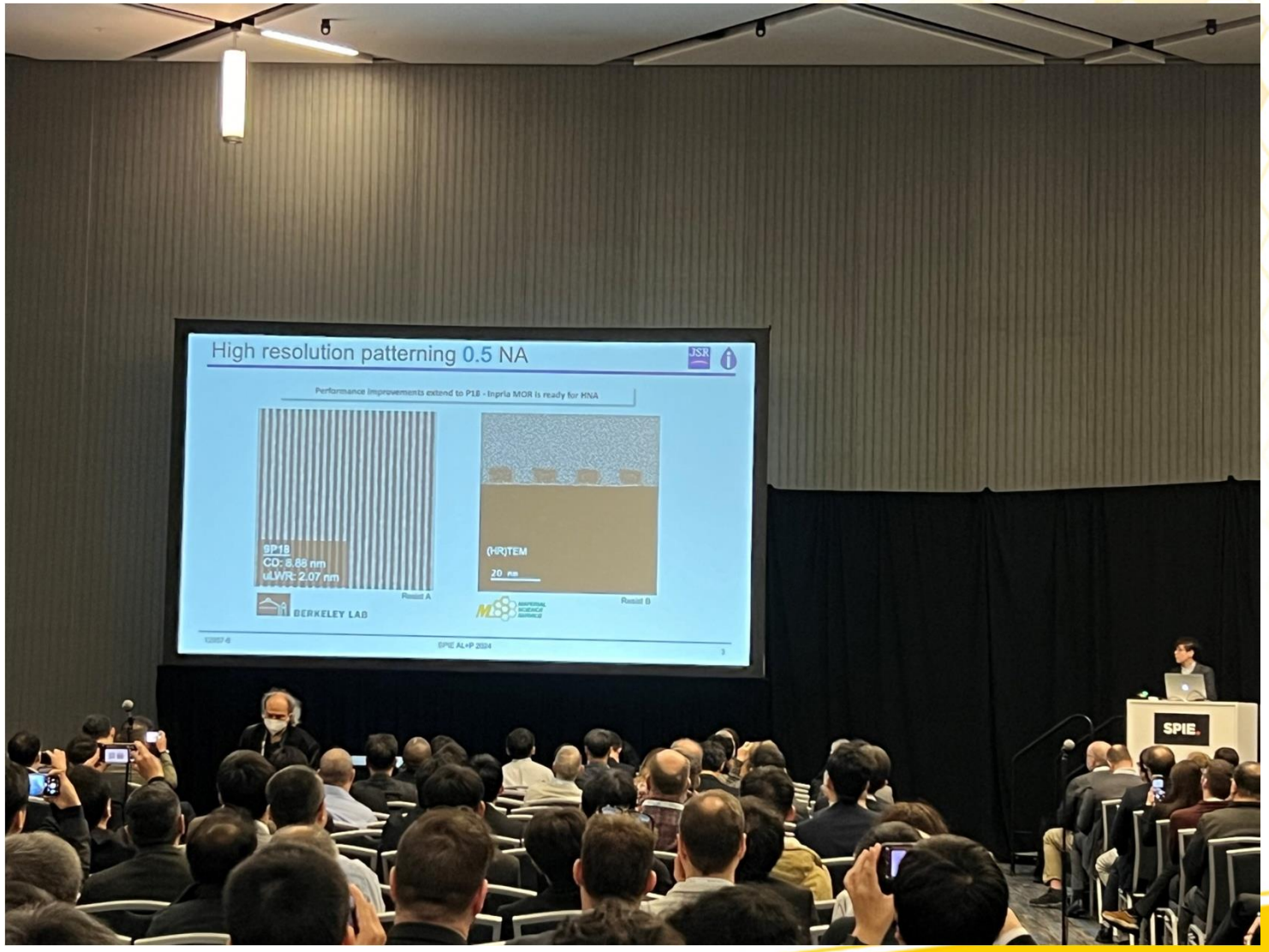
Recent five years' profit performance and dividend distribution

單位:新台幣千元/元　Unit: Thousand NTD Dollars



	2020	2021	2022	2023	2024
Revenue	1,113,184	1,469,881	1,726,427	1,880,575	1,966,669
Net profit	159,106	252,493	287,998	261,280	64,963
EPS	4.05	6.21	6.67	5.59	1.34
Dividend distribution	2.5	4.5	5.5	4.5	1

- Participating in the research and development of next-generation high NA EUV exposure machines using MOR (metal oxide) EUV photoresist.

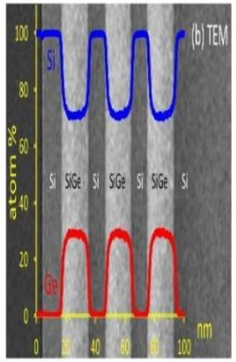


EDN TAIWAN

APT：原子級精度的先進製程材料分析技術

作者：汎銓科技

類別：設計揭密　2025-12-09　(0) 評論



原子針尖斷層影像儀(APT)具備原子級空間解析與高靈敏度化學分析能力，能精確重建三維原子分佈，以因應先進製程與埃米級材料分析挑戰...

隨著搭載台積電(TSMC) N3P製程應用處理器進入市場，智慧型手機、高效能運算(HPC)、人工智慧(AI)以及車用電子等領域對於先進半導體製程的需求持續升高。製程技術的每一世代演進，不僅使元件幾何尺寸持續縮小，也為材料分析在解析度與靈敏度方面帶來前所未有的技術挑戰。當電晶體結構邁向原子尺度、3D整合度持續提高，對材料的空間解析度與化學訊號偵測靈敏度，皆提出了較前一代更為嚴苛的規格要求。

汎銓美國MSS USA CORP矽谷實驗室團隊（汎銓提供）

事　由：臺灣發明專利核准領證通知
申 請 人：汎銓科技股份有限公司
專利名稱：光損偵測裝置
發 明 人：柳紀綸、周學良、李宗育
申請日期：2023/09/06
申請案號：112133805
本所編號：ITW230090

公告號	I870008 公開 202511717
公告日	2025/01/11
公報卷期	52-02
證書號	I870008
申請號	112133805 E
申請日	2023/09/06
公報IPC	***G01M 11/04***(2006.01)
當前IPC	***G01M 11/04***(2006.01)
申請人	汎銓科技股份有限公司 新竹市埔頂路27號1樓 (中華民國); MSSCORPS CO., LTD. 1F., NO.27, PUDING RD., EAST DIST., HSINCHU CITY 300047, TAIWAN (R.O.C.) (TW)
申請人標準名稱	汎銓科技股份有限公司; MSSCORPS CO LTD
當前專利權人	汎銓科技股份有限公司; MSSCORPS CO., LTD.
專利權人標準名稱	汎銓科技股份有限公司; MSSCORPS CO LTD
發明人	柳紀綸 (中華民國); LIU, CHI-LUN (TW); 周學良 (中華民國); CHOU, HSUEH-LIANG (TW); 李宗育 (中華民國) (TW)

事　由：臺灣發明專利核准領證通知
申 請 人：汎銓科技股份有限公司
專利名稱：光損偵測裝置
發 明 人：柳紀綸、周學良、李宗育
申請日期：2023/09/06
申請案號：112133805
本所編號：ITW230090

公告號	I870008 公開 202511717
公告日	2025/01/11
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申請日	2023/09/06
公報IPC	***G01M 11/04***(2006.01)
當前IPC	***G01M 11/04***(2006.01)
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勝利範圍

專利範圍

1.一種 光損偵測裝置，包含：一第一導光線材，具有一第一端與一第二端，其中該第一導光線材之該第一端連接一光產生器；一第二導光線材，具有一第三端與一第四端；一光偵二導光線材之該第四端；至少一個角度調整基座，其上設有該第一導光線材之該第二端與該第二導光線材之該第三端，其中該至少一個角度調整基座用以分別調整該第一導光線材之二導光線材之該第三端朝向一半導體導光晶片；以及一第一發射顯微鏡(Emission Microscopy)，其影像擷取面朝向該半導體導光晶片，在該光產生器產生光束時，該光束透過該第一半導體導光晶片，該半導體導光晶片引導該光束射向該第二導光線材，該光偵測器透過該第二導光線材接收該光束，以擷取其能量，且該第一發射顯微鏡擷取該光束從該半導體導光晶置；其中該第一發射顯微鏡包含影像感測器及其連接之金相顯微鏡(Metallographic microscope)。

2.如請求項1所述之 光損偵測裝置，其中該至少一個角度調整基座包含一第一角度調整基座與一第二角度調整基座，其上分別設有該第一導光線材之該第二端與該第二導光線材之該一角度調整基座與該第二角度調整基座用以分別調整該第一導光線材之該第二端與該第二導光線材之該第三端朝向該半導體導光晶片。

3.如請求項2所述之 光損偵測裝置，其中該第一角度調整基座與該第二角度調整基座為三維角度調整基座。

4.如請求項3所述之 光損偵測裝置，其中該三維角度調整基座為自動化三維角度調整基座。

5.如請求項4所述之 光損偵測裝置，更包含至少一個電腦主機，其電性連接該自動化三維角度調整基座，以藉此調整該第一導光線材之該第二端與該第二導光線材之該第三端之相對之角度。

6.如請求項5所述之 光損偵測裝置，其中該至少一個電腦主機電性連接該光產生器、該光偵測器與該第一發射顯微鏡，並用以計算該光束之射導該導光位置之光損能量。

7.如請求項1所述之 光損偵測裝置，其中該半導體導光晶片包含一矽覆絕緣(silicon on insulator, SOI)基板及設於其上的光波導、方向耦合器、馬赫—曾德爾(Mach-Zehnder)干涉儀、耦合器、邊緣耦合器、光調變器、光檢測器與第一個至少一個或其組合。

8.如請求項1所述之 光損偵測裝置，更包含一平台，其承載該半導體導光晶片。

9.如請求項1所述之 光損偵測裝置，其中該第一導光線材與該第二導光線材為光纖。

詳細說明

【技術領域】

本發明係關於一種偵測裝置，且特別關於一種 光損偵測裝置。

【先前技術】

在光纖工程中，常常需要量測光纖線路等待測物的光損失，藉由一種光功率計與穩定光源的組合來量測光損失，是較為常見的一種光損失量測方法。習知光損失量測系統包括部，其中當光源從待測物的一端送進光訊號，光功率計即在待測物另一端接收並且量測通過待測物的光訊號的剩餘光功率。接著，藉由控制部比較光源發出的初始光功率以及率，即可得出待測物的光傳輸損失。

然而，上述光損失量測系統是量測較高功率之光傳輸損失，有些半導體元件，例如矽光子積體電路在導光過程中產生的較低功率之光傳輸損失並未有裝置進行量測，矽光子積裝置進行偵測，矽光子積體電路是一種利用矽製程製造光子元件的積體電路技術。它將例如光纖、光放大器、光調變器等之光電子元件和例如電晶體、電容、電感等之電子元進而實現光和電之間的高效能轉換。

因此，本發明係在針對上述的困擾，提出一種 光損偵測裝置，以解決習知所產生的問題。

【發明內容】

本發明提供一種 光損偵測裝置，其偵測半導體導光晶片之導光通道之異常現象。

在本發明之一實施例中，一種 光損偵測裝置 包含一第一導光線材、一第二導光線材、一光偵測器、至少一個角度調整基座與一第一發射顯微鏡(Emission Microscopy)。第一一第二端，其中第一導光線材之第一端連接一光產生器，第二導光線材具有一第三端與一第四端，光偵測器連接第二導光線材之第四端，角度調整基座上設有第一導光線材之第三端，角度調整基座用以分別調整第一導光線材之第二端與第二導光線材之第三端朝向一半導體導光晶片，第一發射顯微鏡之影像擷取面朝向半導體導光晶片，在光產生器一導光線材射向半導體導光晶片，半導體導光晶片引導光束射向第二導光線材，光偵測器透過第二導光線材接收光束，以擷取其能量，且第一發射顯微鏡擷取光束從半導體導

Thank you for listening, and welcome your guidance.

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