Industrial Processes Business Briefing for Sell-Side Analysts

Note: This document has been translated from the Japanese original into English with the assistance of generative AI and is provided for reference purposes only. In the event of any discrepancy between this English translation and the Japanese original, the Japanese original shall prevail.

Investor Relations Office

Ushio Inc.

June 30, 2026

USHIO

Applying Light to Life

Forward-Looking Statements

The outlook for our future business performance described in this document is a forecast made by the Company based on information currently available. Accordingly, please be aware that actual results may differ significantly from the future outlook described herein due to changes in various factors.

Use of This Material

Responses to Questions

We may refrain from answering questions regarding this document if they fall under the following categories.
- Questions regarding specific details about particular customers or business partners
- Questions regarding prices, unit prices, sales terms, and other matters that may directly affect operating activities

Common agenda for each section

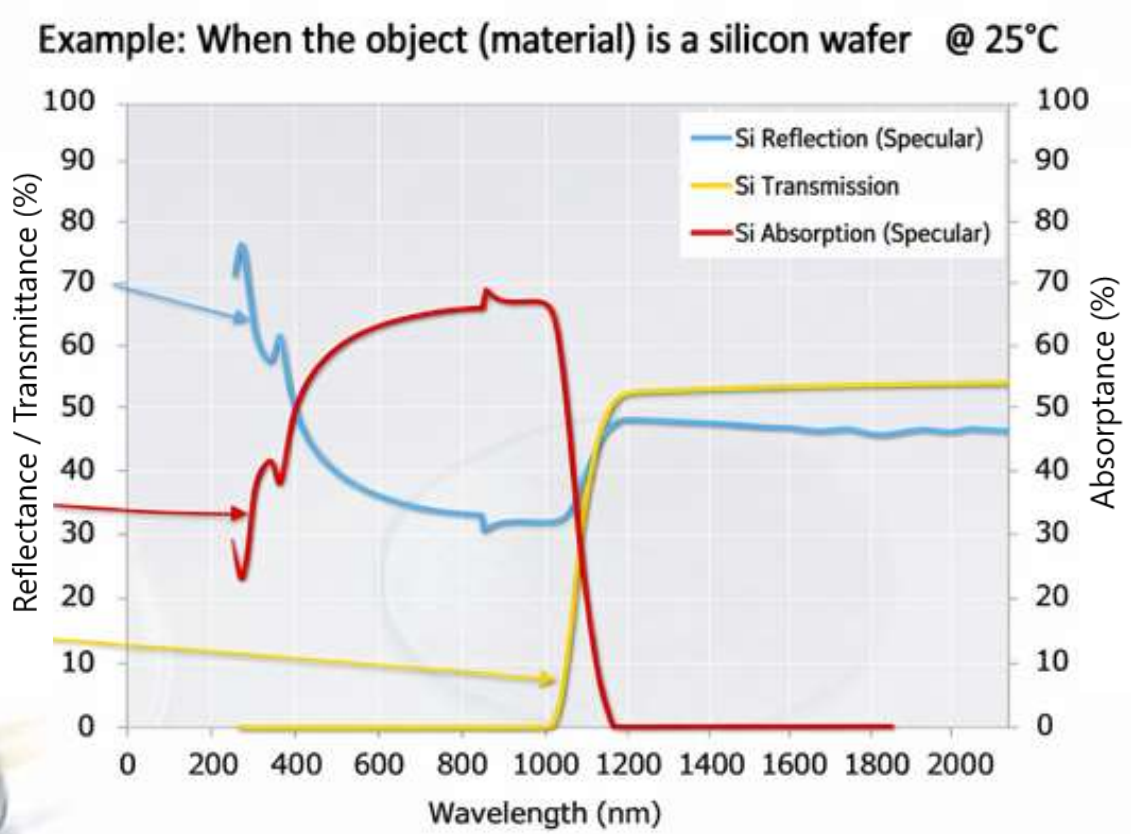
- Product overview
- Technology overview and features
- Technology applications
- Development roadmap
- Business potential

*However, content may vary depending on the nature of each product.

1. Light Source Business

- Thermal Process
  (Halogen Lamp Heaters, Flash Irradiation Units)
- Excimer Lamps
- UV Lamps (High-pressure UV lamps)

What is Radiant Heating?



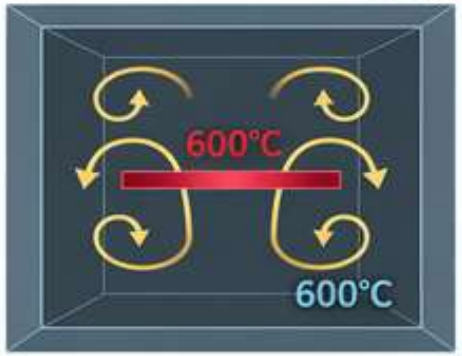
The object is heated by absorbing light.

* This image was generated by AI based on internal materials

Advantages of Radiant Heating Products over Competitive Technologies

Electric furnace

Convection



Issues

× Takes time for the temperature to stabilize and for it to cool down.

× Cannot heat only selected areas.

Radiant heating

Solution

◎ Rapid heating.

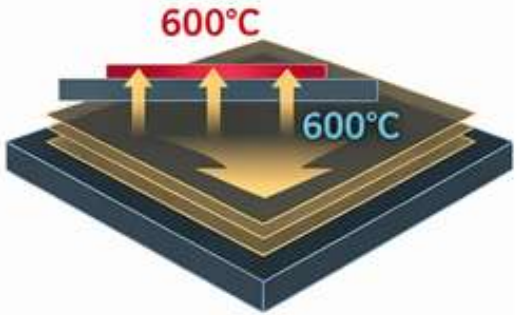
◎ Instant turn-off is possible.

◎ Can heat selected areas.

◎ Non-contact
= Clean heating is possible.

Hot plate

Conduction



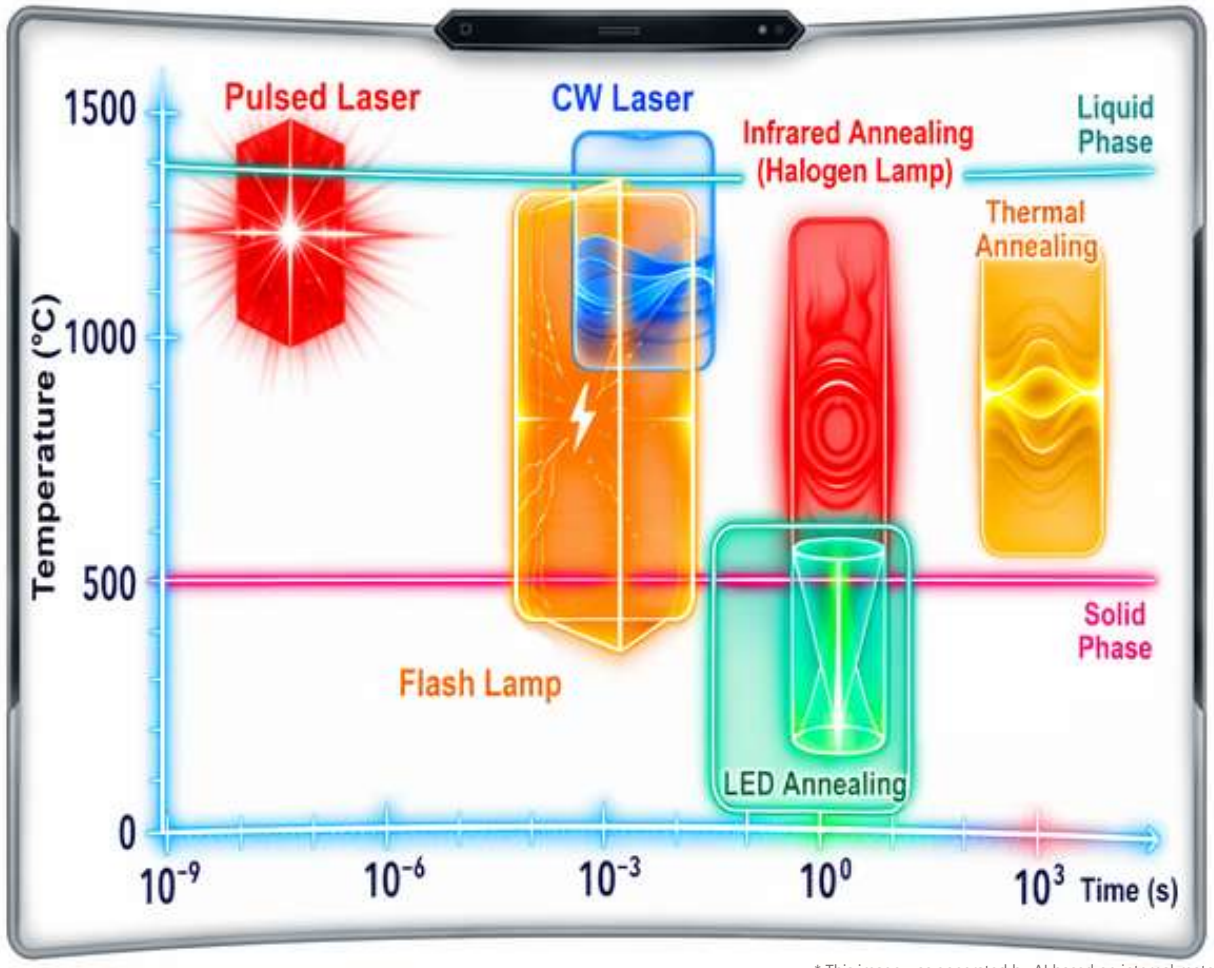
Issues

× Takes time for the temperature to be transmitted.

× Causes dirt and scratches due to contact with the product.

* This image was generated by AI based on internal materials

Main Lineup of Radiant Heating Products



* This image was generated by AI based on internal materials

Halogen lamps, flash lamps, and light emitting diodes (LEDs) are developed based on light radiant heating technology, one of our core technologies.

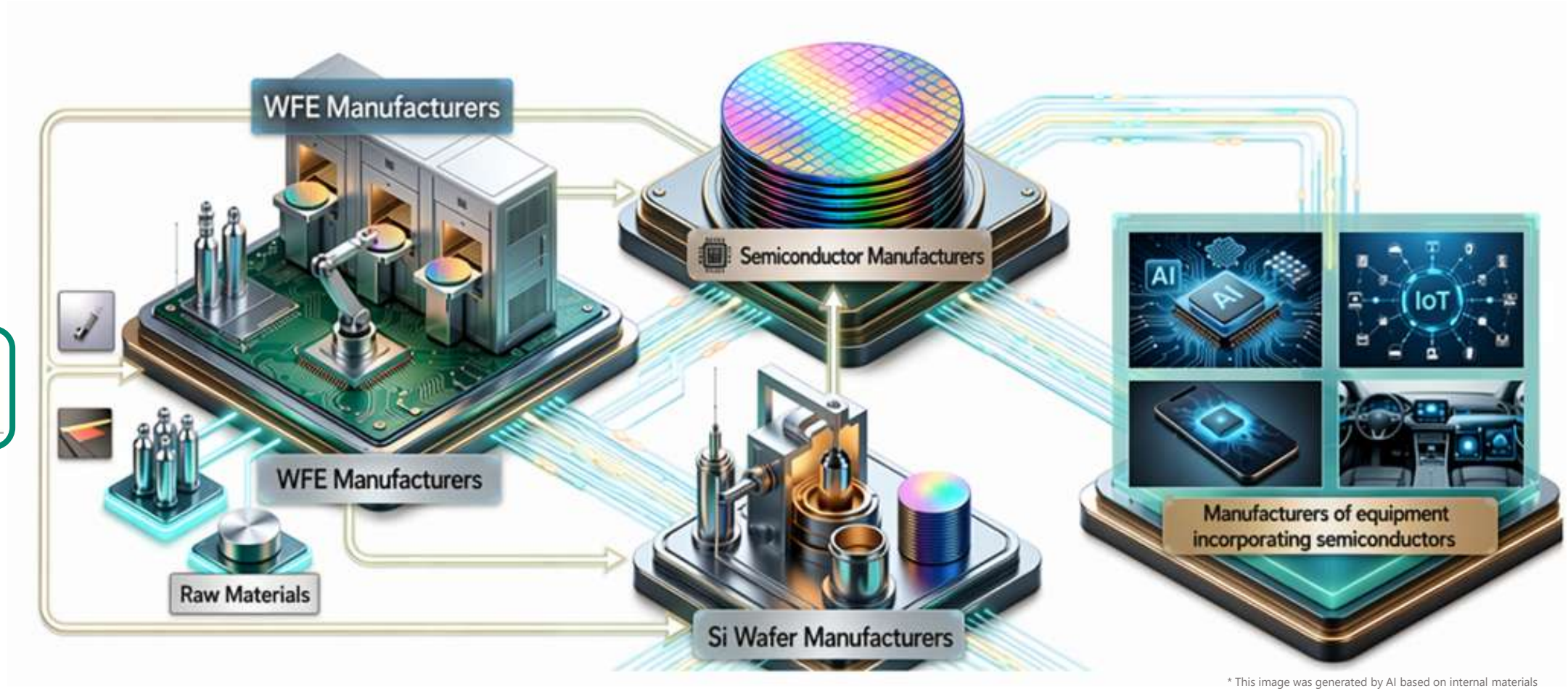
* This image was generated by AI based on internal materials

Main Applications for Radiant Heating Products

* This image was generated by AI based on internal materials

Since the successful development of Japan's first halogen lamp in 1966, our products have been widely used in various fields including semiconductors

Relationship between the Semiconductor Field and Ushio's Radiant Heating Products



* This image was generated by AI based on internal materials

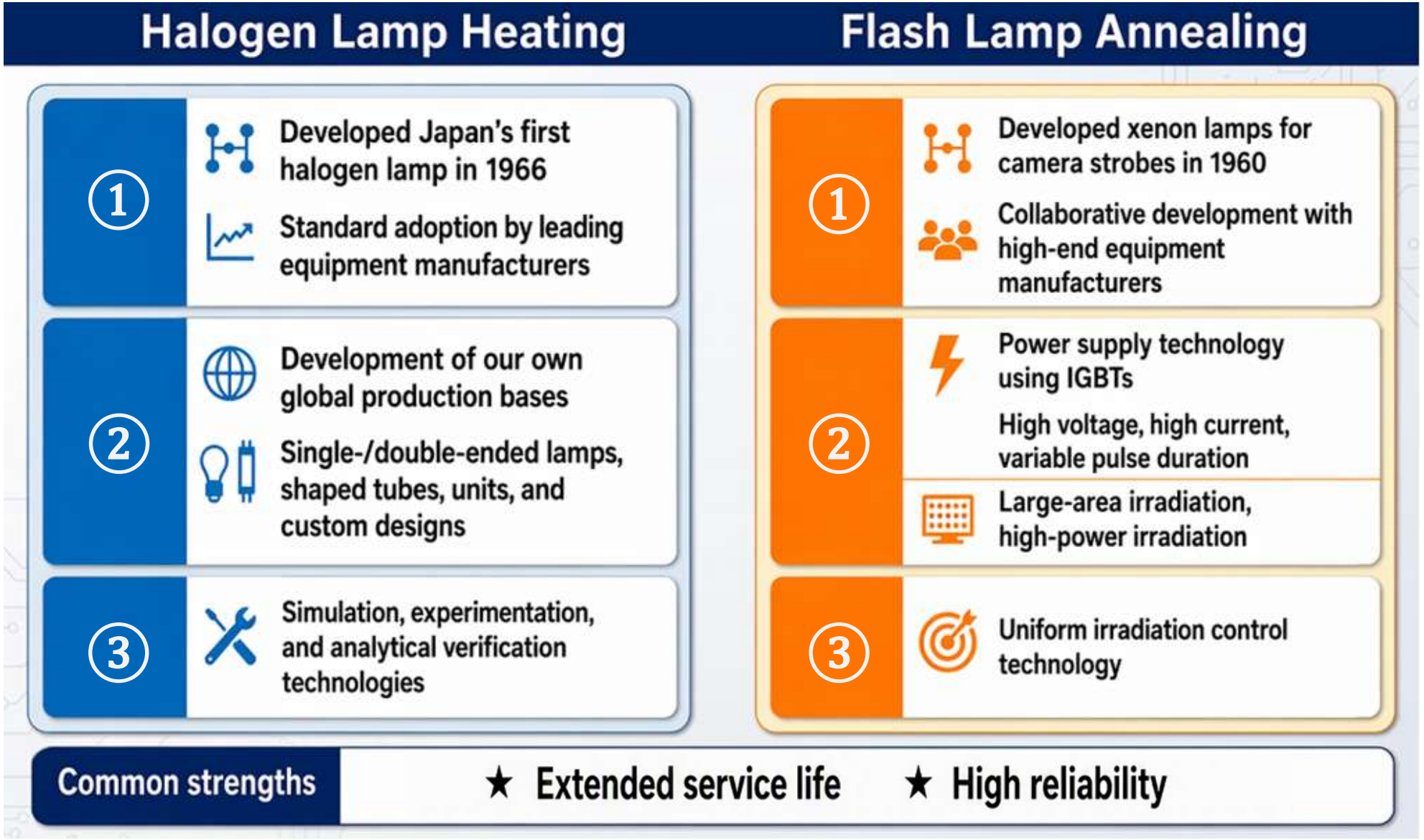
In the semiconductor manufacturing field, we supply primarily to WFE manufacturers, as well as Si wafer manufacturers and semiconductor manufacturers

Ushio's Radiant Heating Products Used in Semiconductor Manufacturing Processes

* This image was generated by AI based on internal materials

In the semiconductor device manufacturing field, Ushio's products are used across a wide range of front-end and middle-end processes

Strengths of Ushio's Radiant Heating Products



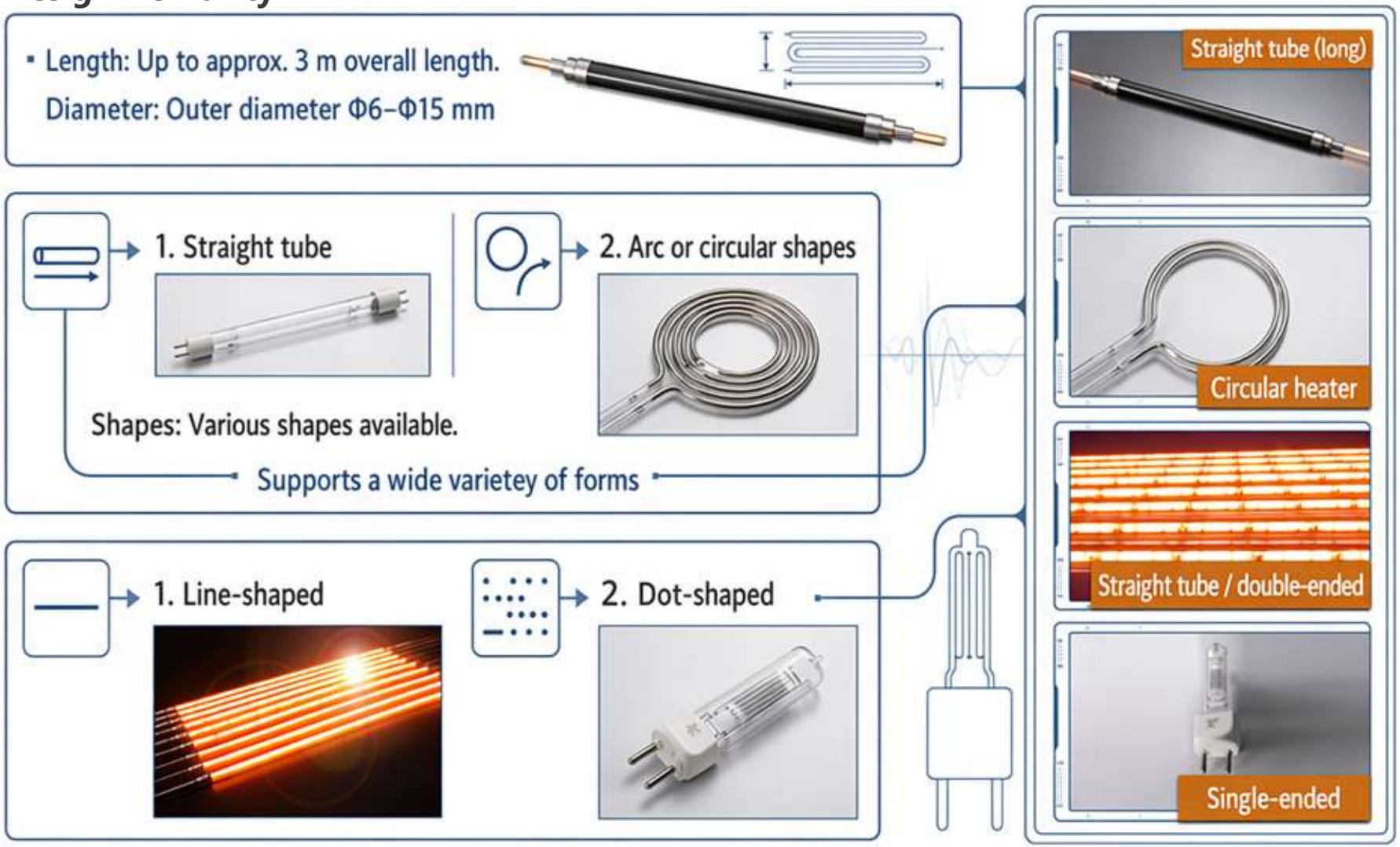
* This image was generated by AI based on internal materials

- Applied to Various Applications

	Epitaxial Growth	PVD	CVD/ALD	Dry Etching/Ashing	RTP/Oxidation	Cleaning/Wet Etching	Ion Implantation
Lamp Type (Shape)							
Examples of Applications in Equipment	- Epitaxial growth chamber - Preheat chamber - H_2 bake chamber - HCl cleaning chamber - Spot heater for backside heating	- Deposition chamber - Preheat chamber - Bakeout chamber - Degassing chamber - Reflow chamber	- Preheat chamber - Deposition chamber	- ESC temperature control unit - Downflow ashing chamber - After-corrosion removal chamber - Atomic layer etching chamber	- RTA chamber - RTO chamber	- Ultrapure water heating device - Inline chemical heating device - IPA drying chamber - Immersion heater for chemical bath	- Preheat and heating chamber
Examples of Applicable Processes	- Blanket growth of epi-wafers - Channel formation below 90nm - PMOS S/D formation below 40nm - NMOS S/D formation below 20nm	- Aluminum interconnect layer formation - Copper seed layer formation - Cobalt layer formation - TiN/TaN layer formation	- Dielectric thin film formation - Metal thin film formation - Polysilicon thin film formation	- Aluminum (metal) etching - Silicon etching - Dielectric etching - Dry strip of resist	- Metal annealing - Post-ion implantation annealing - Ultra-shallow junction activation - Ultra-thin oxide film formation	- Resist removal with high-temperature H_2SO_4 - SiN etching with high-temperature H_3PO_4 - Particle cleaning with high-temperature NH_4OH - Metal contamination cleaning with high-temperature HCl	- Crystal defect reduction in SiC - Polytype suppression in SiC

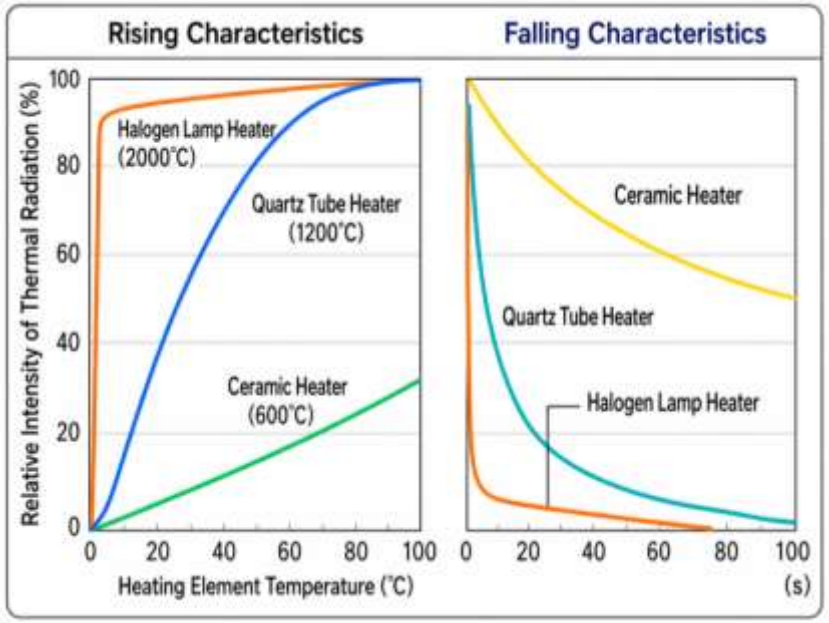
Leveraging the features of non-contact and rapid heating/cooling, we are expanding our presence across the entire semiconductor front-end process

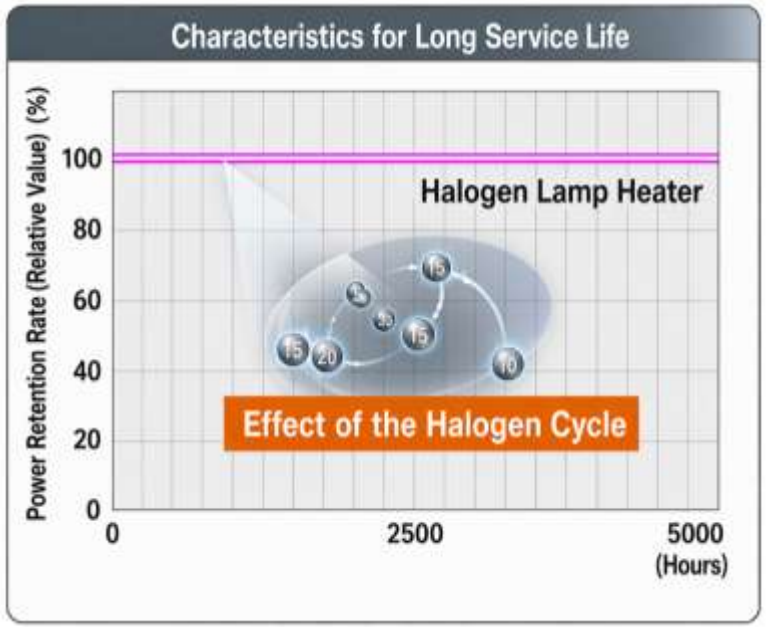
- High Design Flexibility

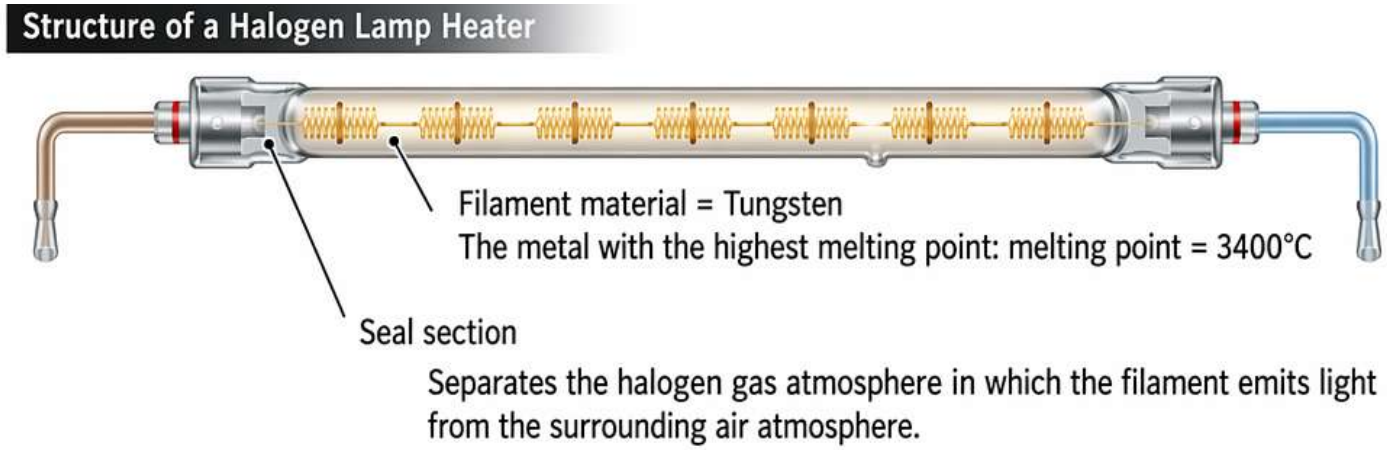


* This image was generated by AI based on internal materials

- Advantages over Other Infrared Heaters

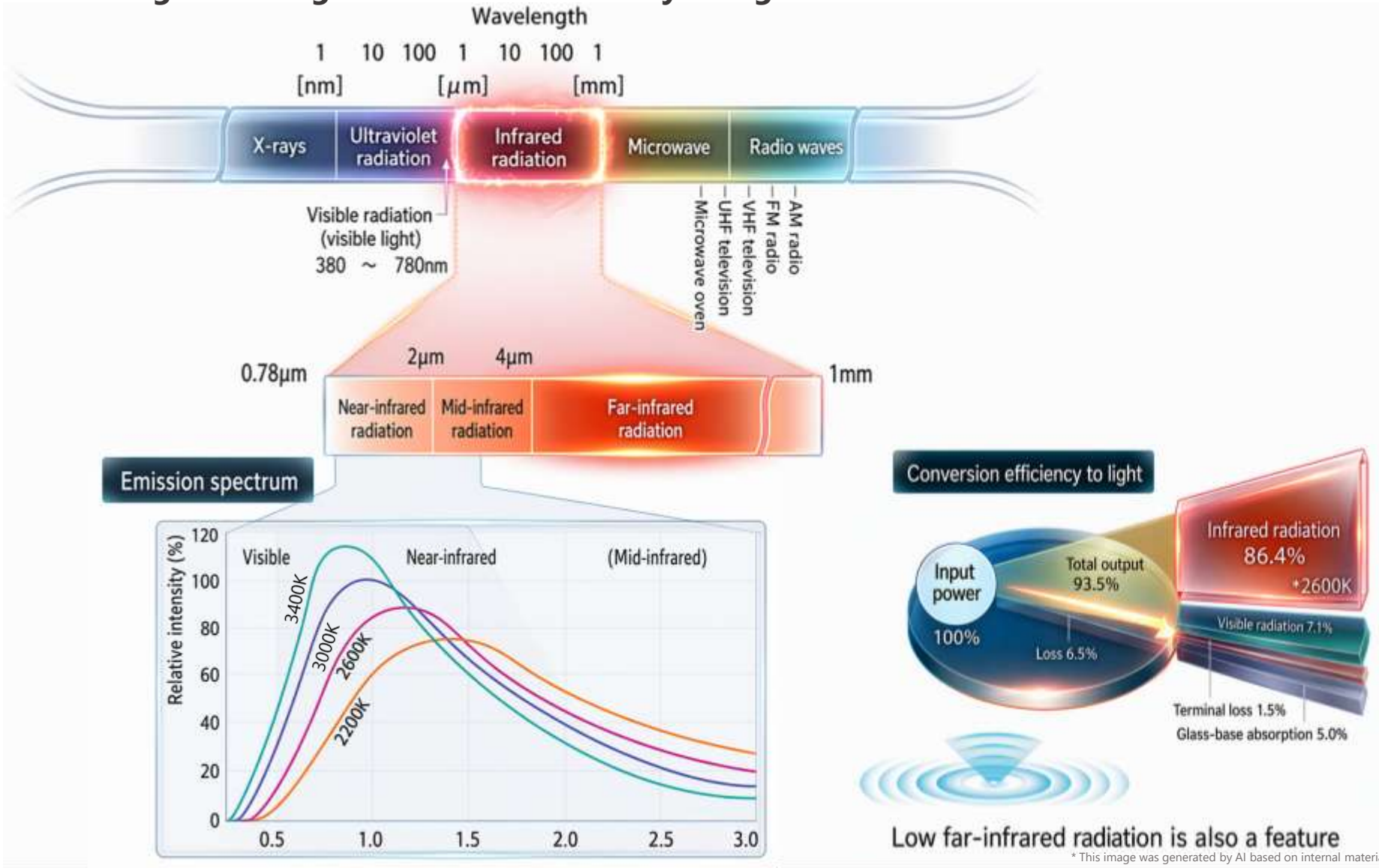






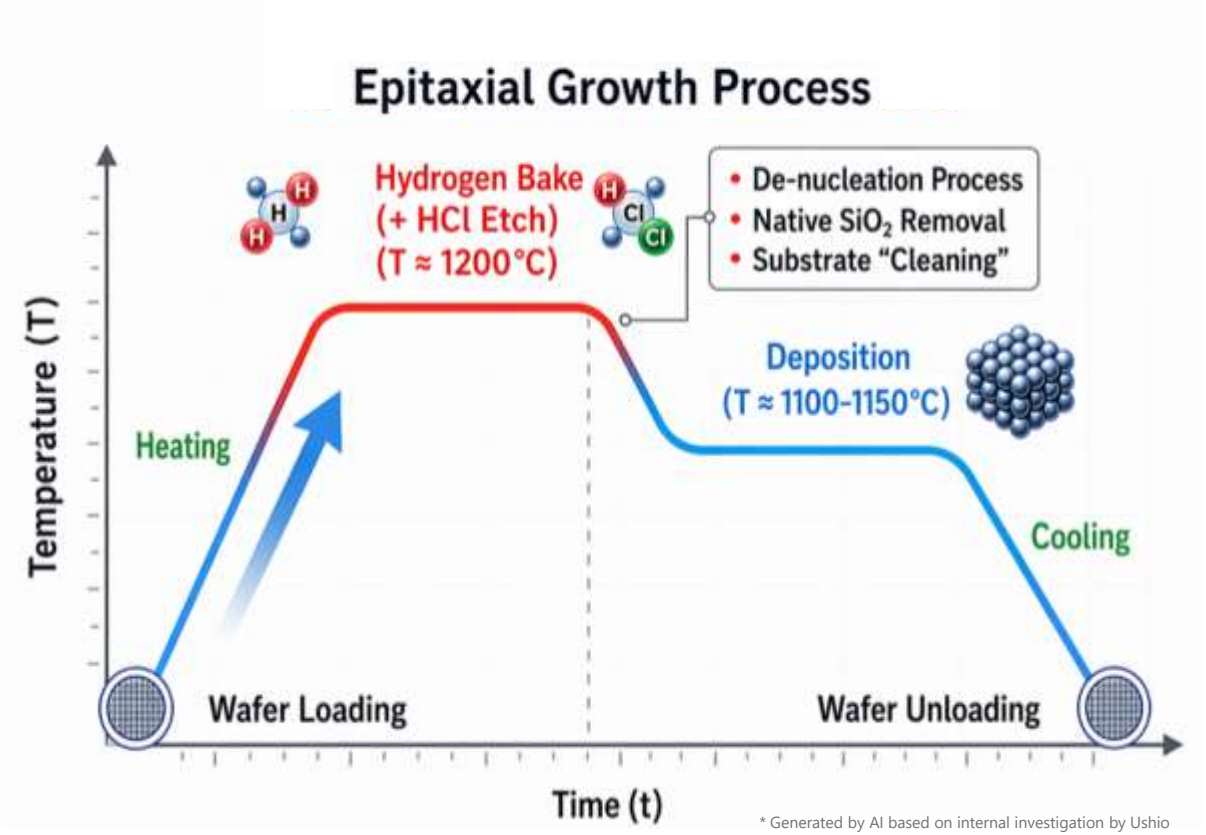
* This image was generated by AI based on internal materials

- Emission Wavelength and High Conversion Efficiency to Light



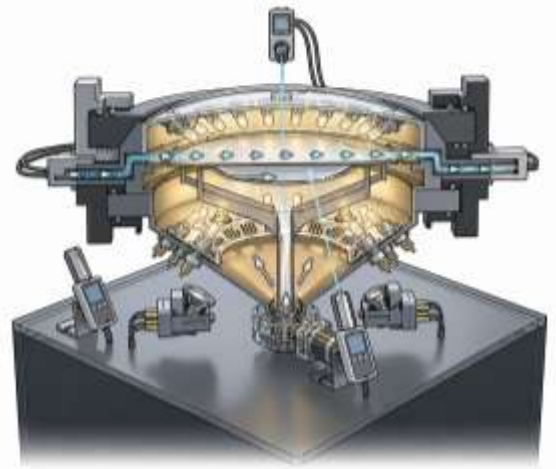
* This image was generated by AI based on internal materials

■ Image of Halogen Lamp Heater Use in Semiconductor Silicon Epitaxial Growth Equipment

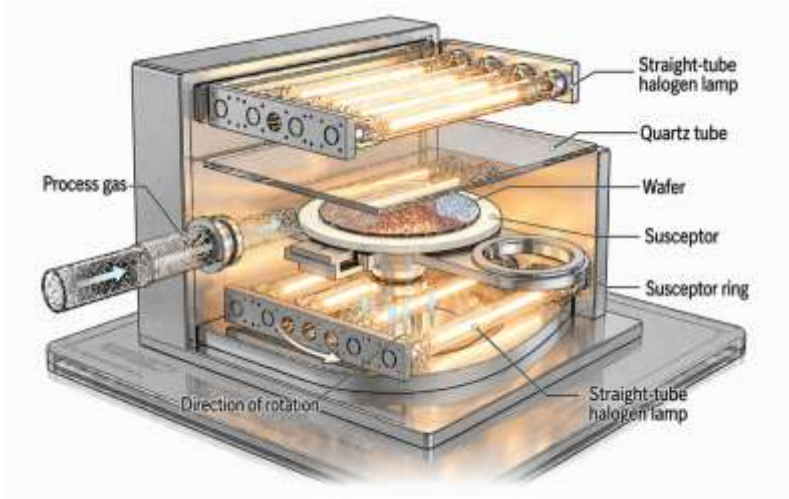


* Generated by AI based on internal investigation by Ushio

Semiconductor silicon epitaxial growth has steps that require rapid heating and rapid cooling, and halogen lamp heaters are the optimal radiant heat source to achieve them



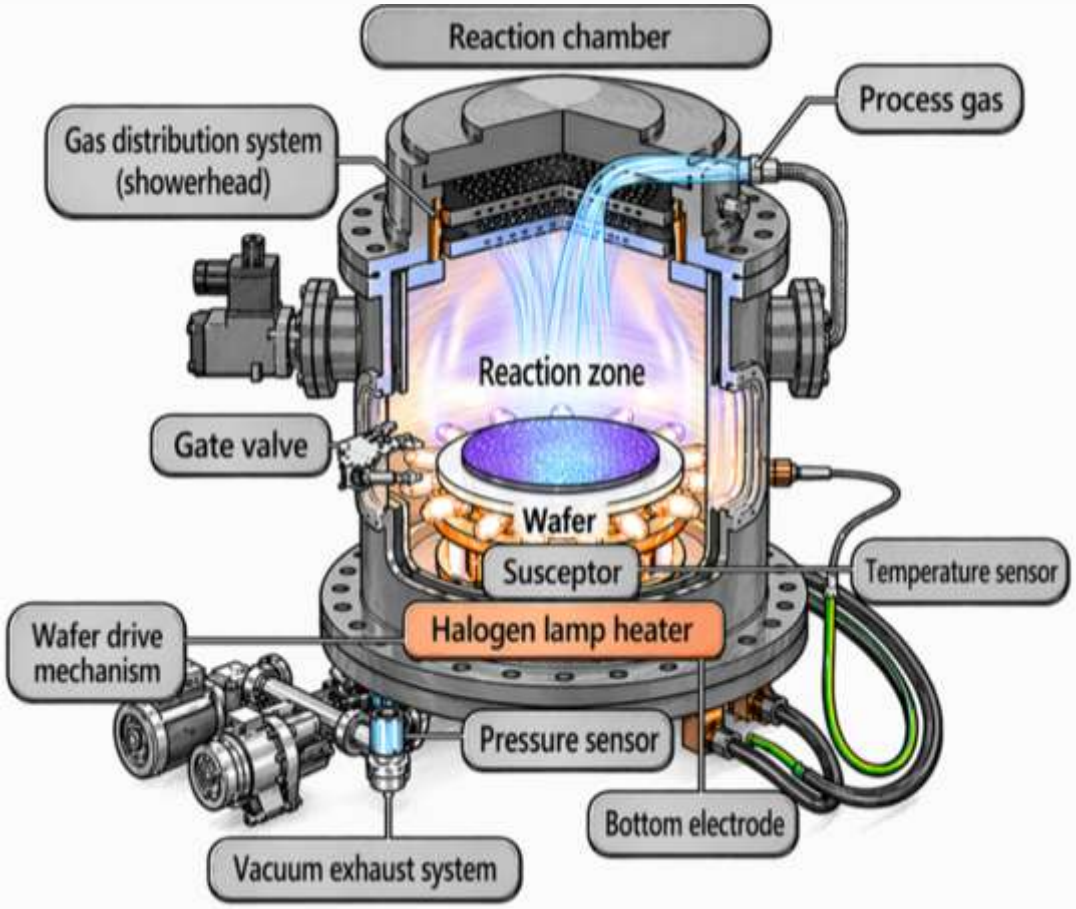
* This image was generated by AI



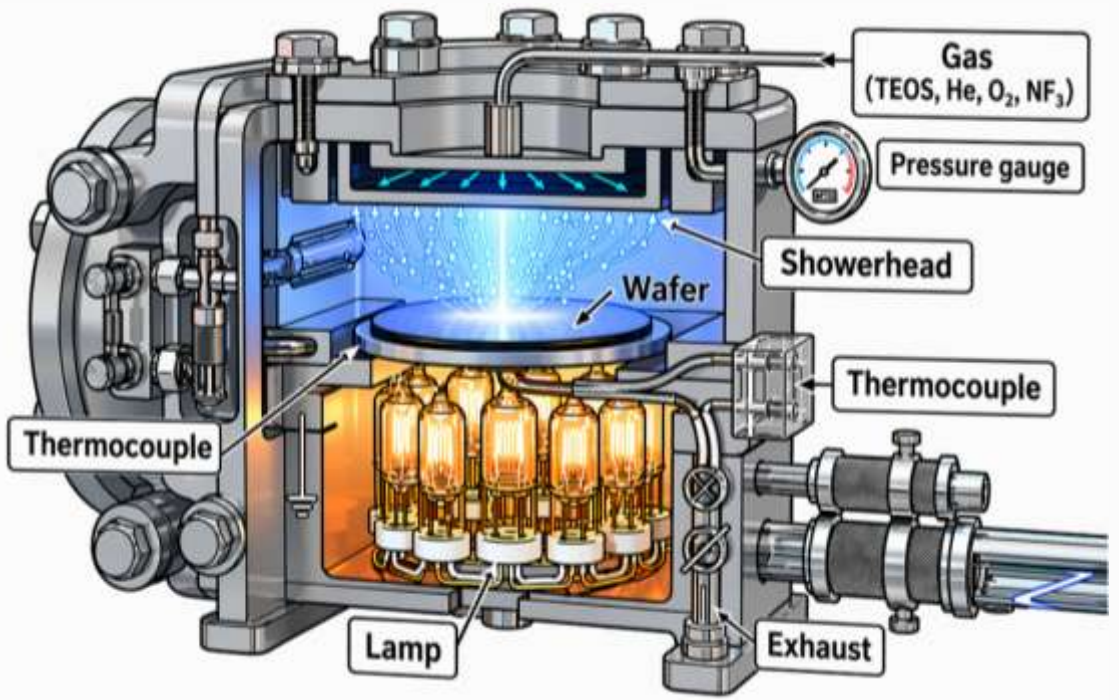
* This image was generated by AI

Usage Example of Halogen Lamp Heater Products (2)

■ Image of Halogen Lamp Heater Use in Semiconductor PECVD Equipment



* This image was generated by AI

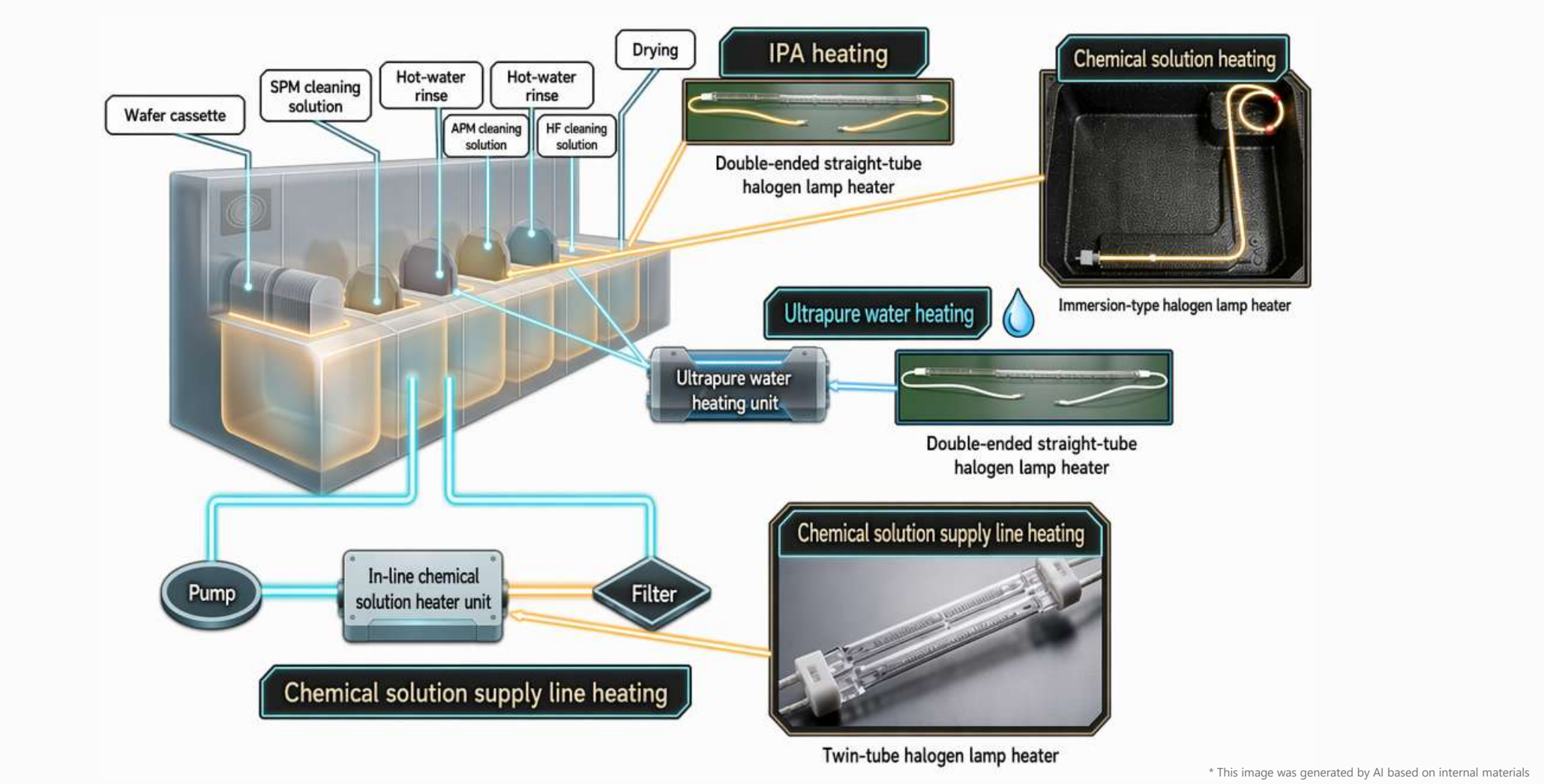


* This image was generated by AI

Halogen lamp heaters, characterized by rapid heating and rapid cooling, suppress power loss and contribute to minimizing the thermal impact on semiconductor devices

Usage Example of Halogen Lamp Heater Products (3)

■ Image of Halogen Lamp Heater Use in Semiconductor Wafer Cleaning Equipment



To rapidly heat large volumes of liquid, halogen lamp heaters with features designed to suppress light loss are required

Applications for Flash Lamp Annealing Irradiation Units

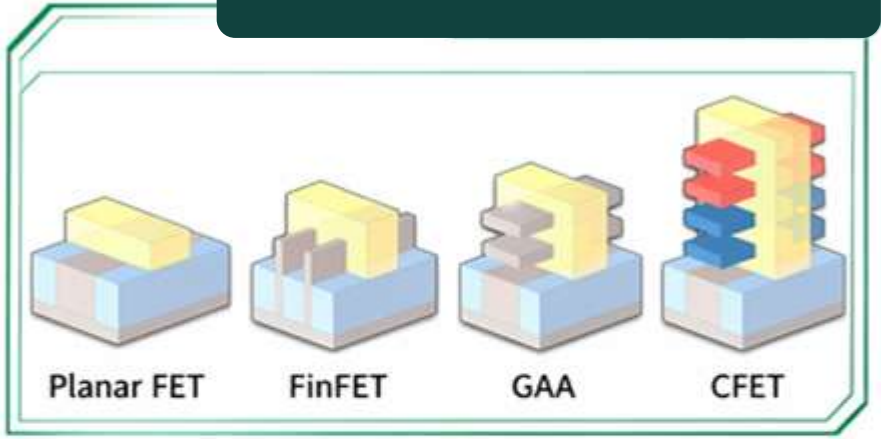
USHIO

- Flash Lamp Irradiation Unit: Ultimate instantaneous annealing technology in 1/1000 second

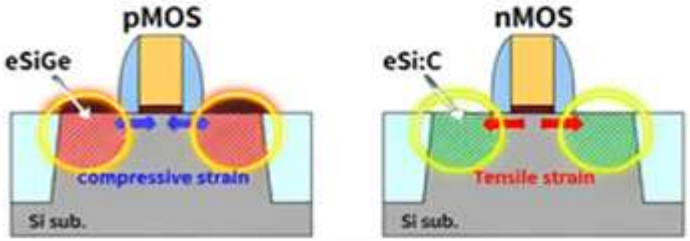
Application example in advanced semiconductor manufacturing (FEOL)

Partner equipment manufacturer

Semiconductor Manufacturers

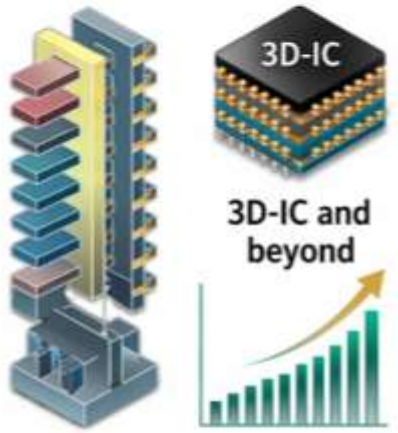


Key processes such as activation annealing after NMOS/PMOS S/D layer formation



Future Roadmap

Future prospects: Contributing to further miniaturization



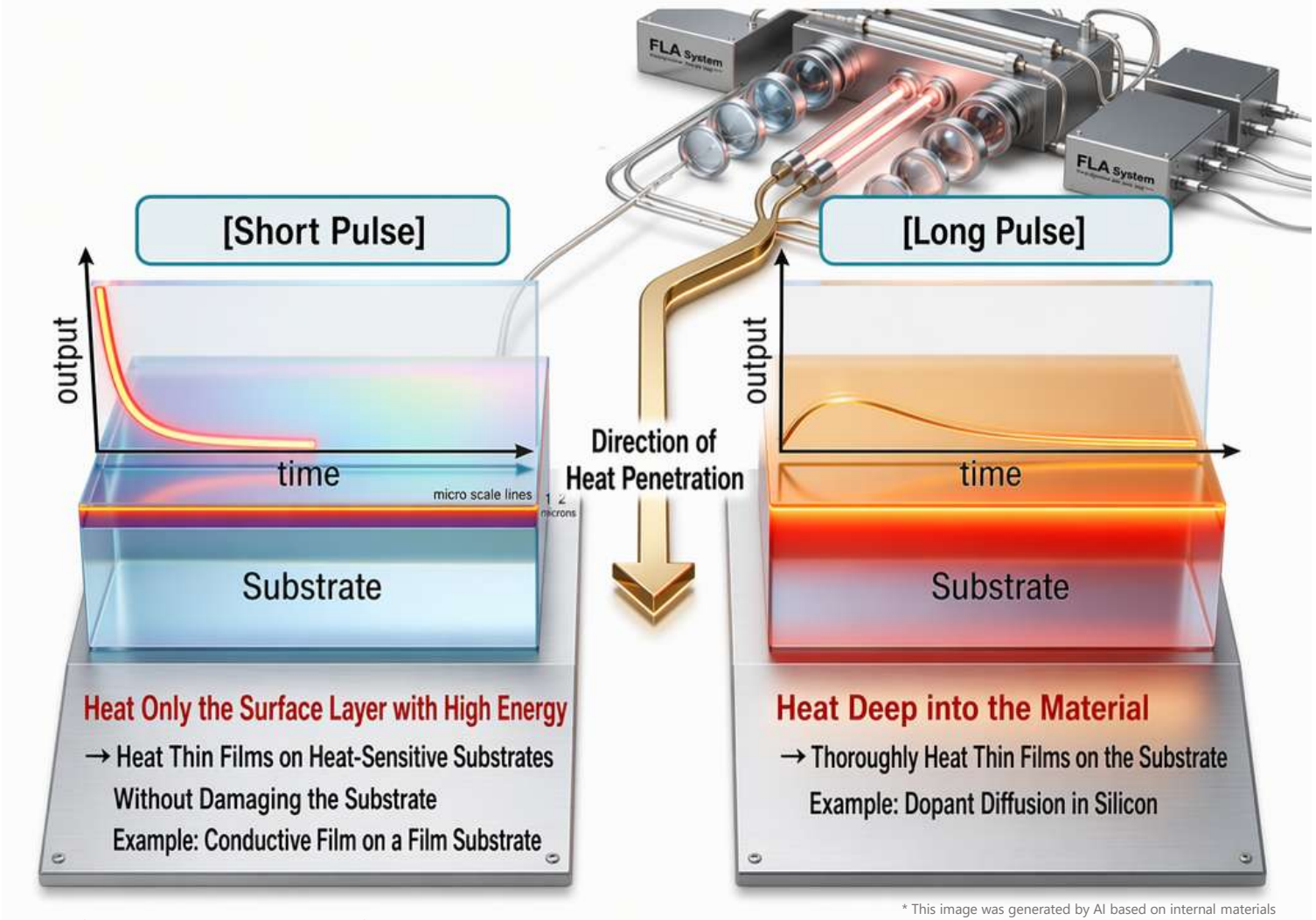
Opportunities to expand applications:

As further miniaturization (ultra-high-density processes beyond CEDT, 3D-IC stacking, etc.) progresses, our flash annealing technology is expected to have opportunities to expand its application range to more critical processes.

* This image was generated by AI based on internal materials

Advantages of Equipment with Flash Lamp Annealing Irradiation Units over Competing Technologies

■ **Multiple pulse irradiation is also possible**



* This image was generated by AI based on internal materials

Leveraging the characteristics of multi-wavelength flash lamps, it is possible to deliver heat tailored to each process involved in manufacturing increasingly complex semiconductor devices

USHIO

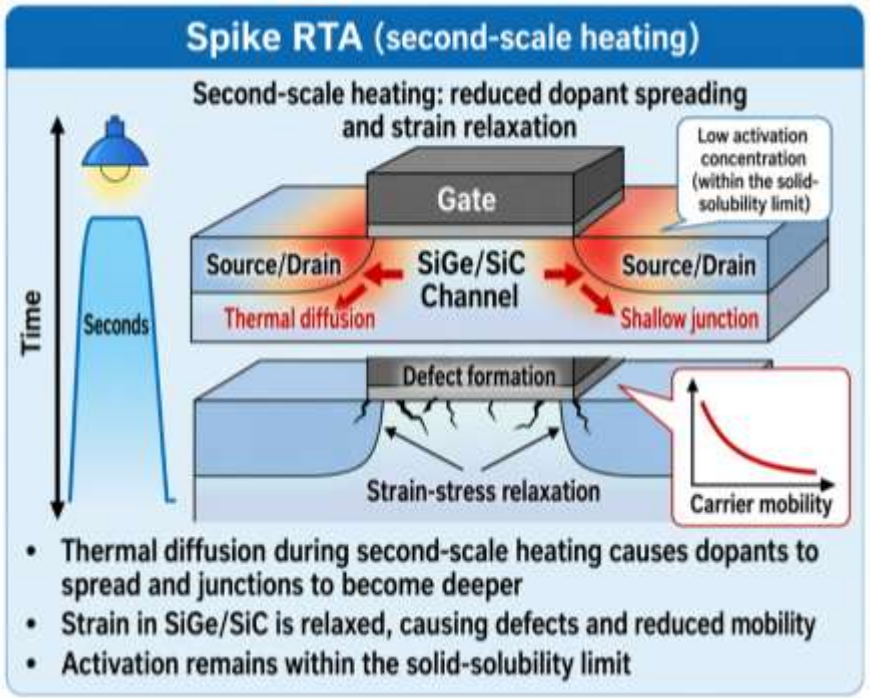
Cost Efficiency Comparison of Next-Generation Semiconductor Manufacturing Processes: FLA vs. Spike RTA (Power Consumption Comparison)

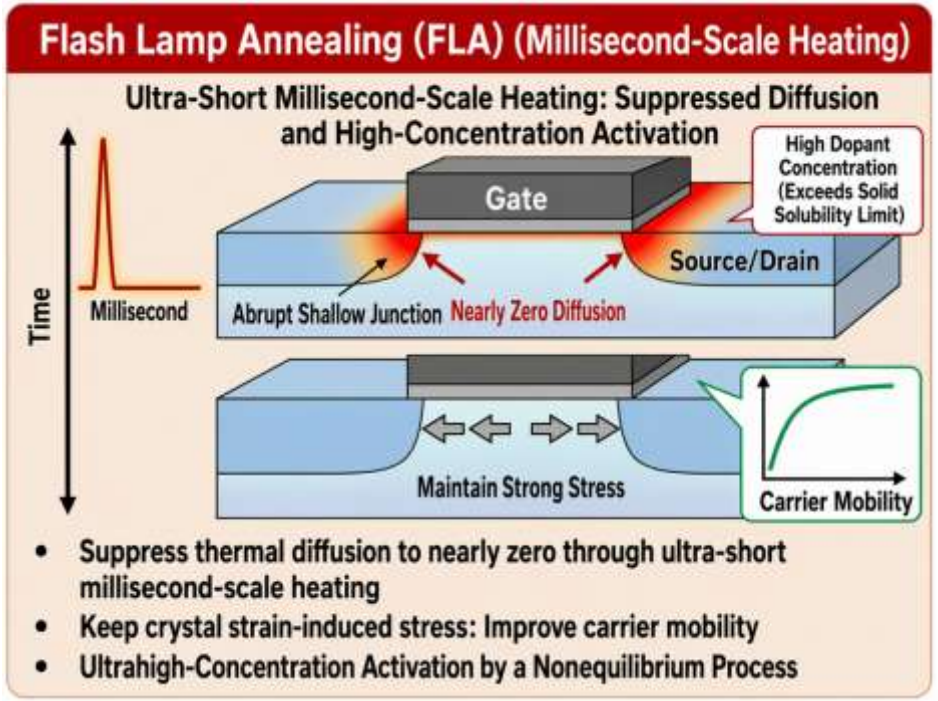
	Spike RTA Equipment (Halogen Lamp)	FLA Equipment (Flash Lamp)
Equipment power consumption	100%	Approx. 10%
Lamp rating (per lamp)	100%	Approx. 1%
Average lamp measurement power consumption	100%	Approx. 3%
Average equipment power consumption	100%	Approx. 30%
Power consumption per wafer	100%	Approx. 50%

Notes: 1) Comparison based on Spike RTA at 100%.
2) Calculated using a throughput of 60 wafers/hr for Spike RTA and 30 wafers/hr for FLA.
3) Calculated under conditions most unfavorable to FLA and most favorable to Spike RTA.

* This image was generated by AI based on internal materials

Advantages of Equipment with Flash Lamp Annealing Irradiation Units over Competing Technologies



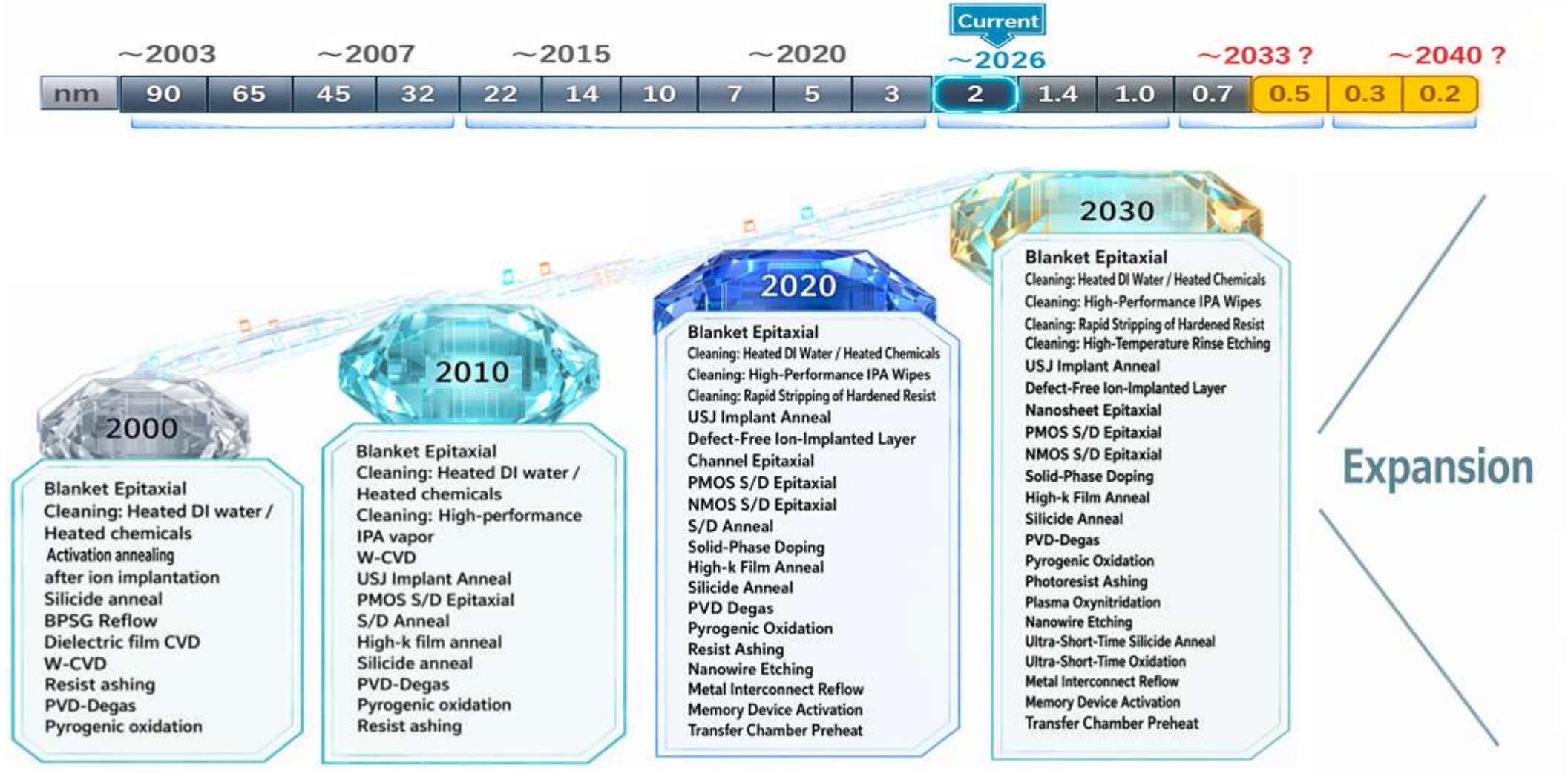


Comparison of Physical Mechanisms and Characteristics

Item	Spike RTA	FLA (Flash Lamp)
Heating time	Seconds (up to ~20 s)	Milliseconds (up to ~10 ms)
Thermal diffusion	Diffusion laterally and in depth	Virtually no diffusion
Activation concentration	Solid-solubility-limit level	Ultra-high concentration (exceeding the solid solubility limit)
Strain relaxation	Relaxes, making defects more likely to occur	Maintained, improving mobility
Applications	Conventional planar devices; thick junctions	Advanced FinFET / GAA S/D

* This image was generated by AI based on internal materials

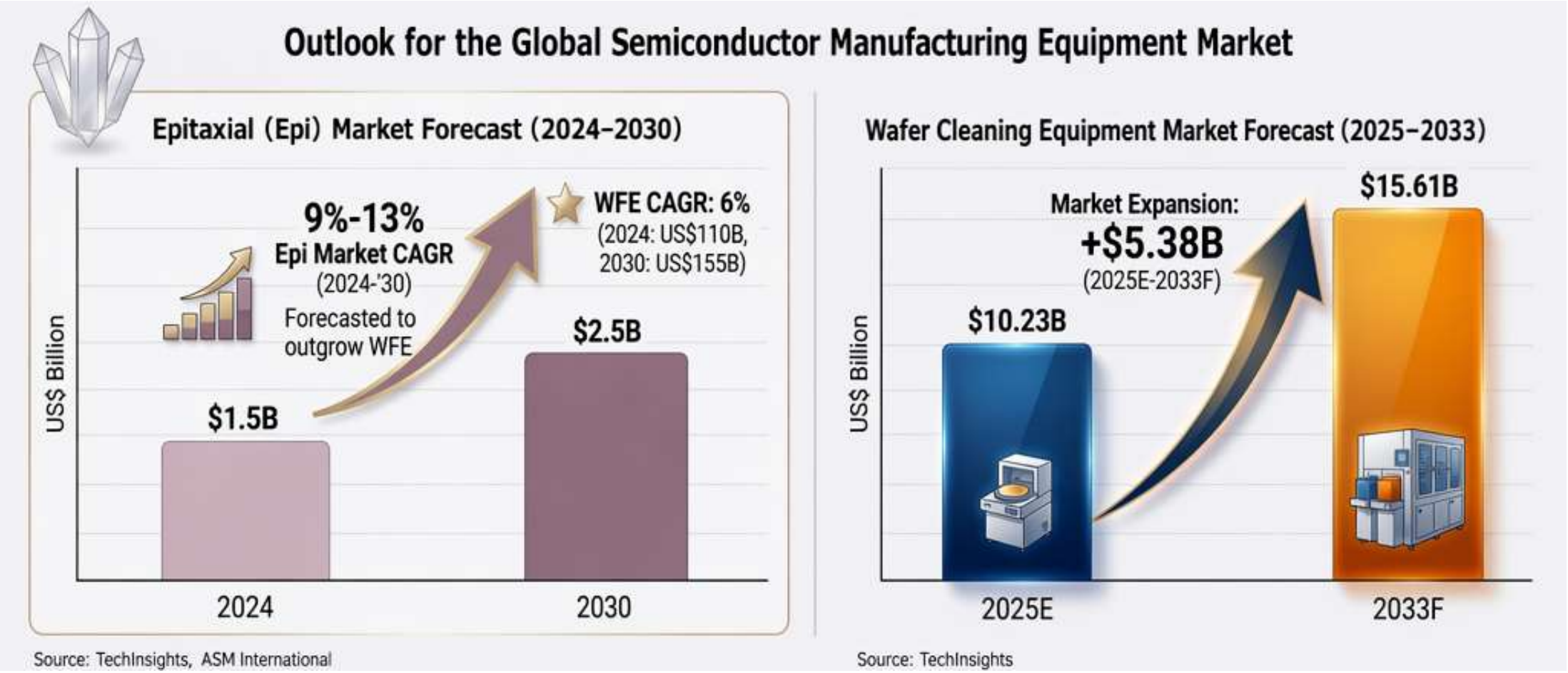
Future Potential of Radiant Heating Products



* This image was generated by AI based on internal materials

As advances in semiconductor manufacturing technology and miniaturization requirements drive three-dimensionalization and increasing complexity, demand for radiant hating will continue to accelerate

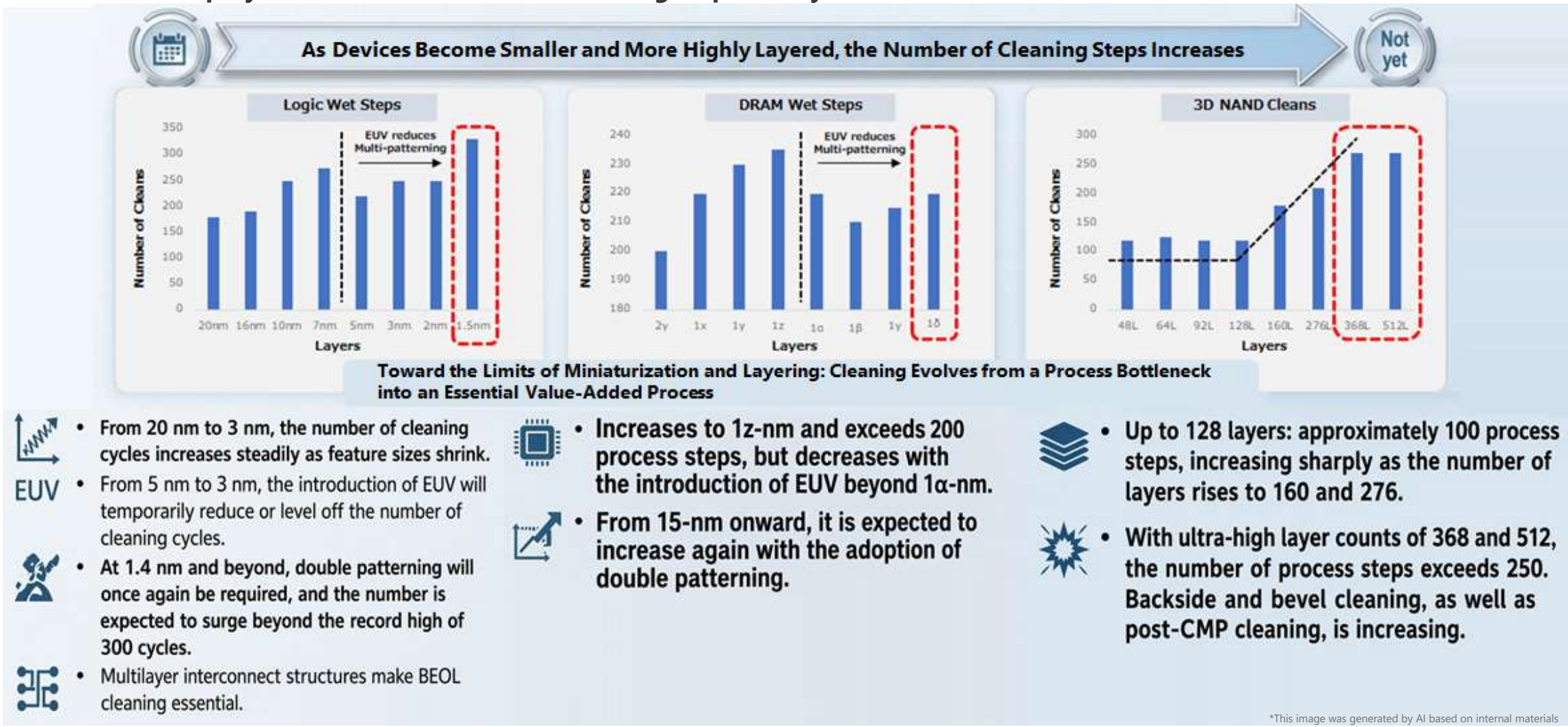
■ **Market growth forecasts for semiconductor silicon epitaxial growth equipment and wafer cleaning equipment, both expected to grow**



* This image was generated by AI based on internal materials

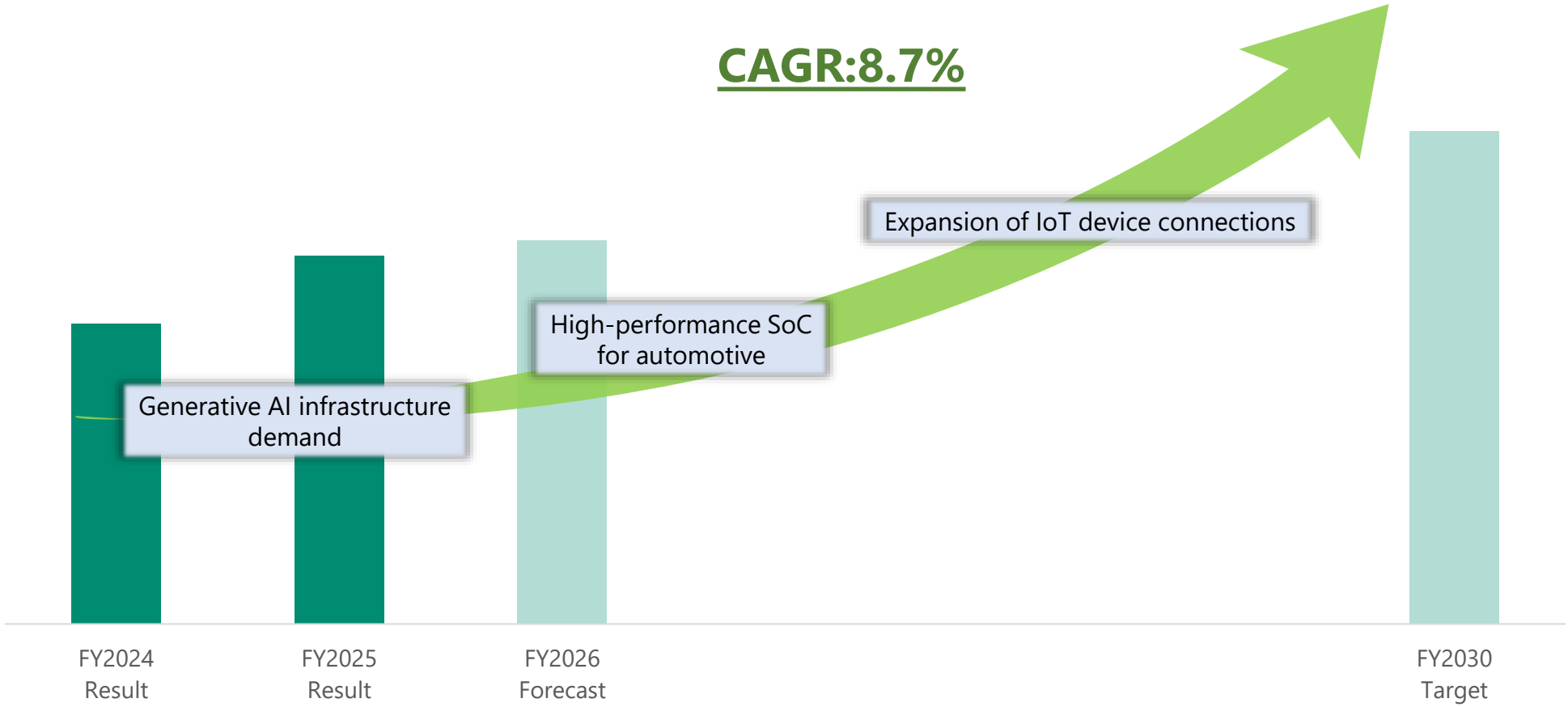
Si epitaxial and wafer cleaning, the main applications for halogen lamp heaters, will continue to expand significantly

■ Trends and future projections for the number of cleaning steps in major semiconductor devices



Wafer cleaning, in particular, is expected to continue expanding significantly in the logic semiconductor and memory sectors, especially NAND

Net sales expansion linked to growth in the semiconductor market including generative AI, automotive field, and IoT



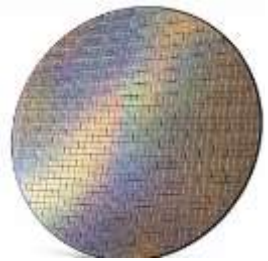
1. Light Source Business

- Thermal Process
  (Halogen Lamp Heaters, Flash Irradiation Units)
- Excimer Lamps
- UV Lamps (High-pressure UV lamp)

A business handling **excimer irradiation units and equipment** that emits UV light at a short wavelength of **172nm**
Deployed across multiple industrial applications, **achieving both stable revenue and growth**

Light irradiation unit

Light irradiation equipment



Semiconductors

FPD

Business domain

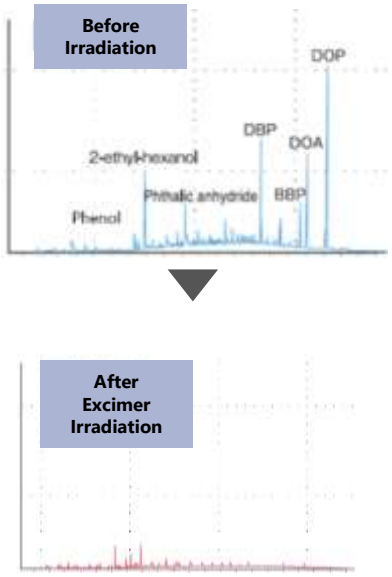
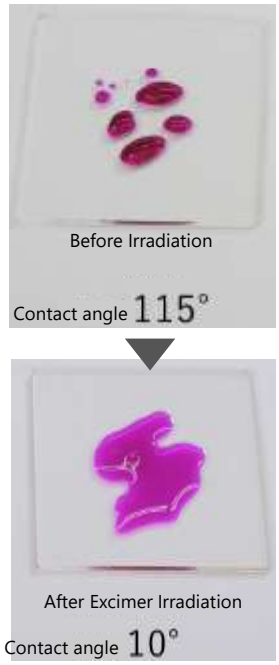
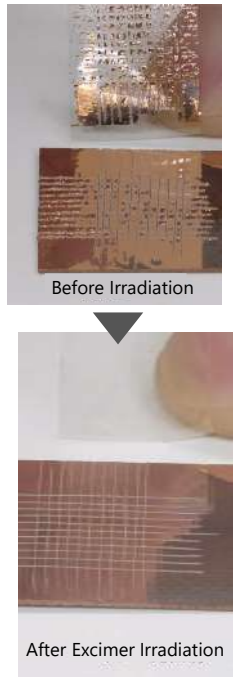
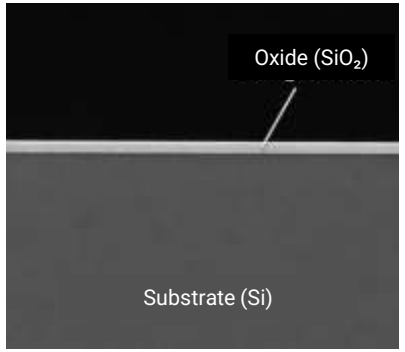
Building materials

Semiconductors packaging

Functional films

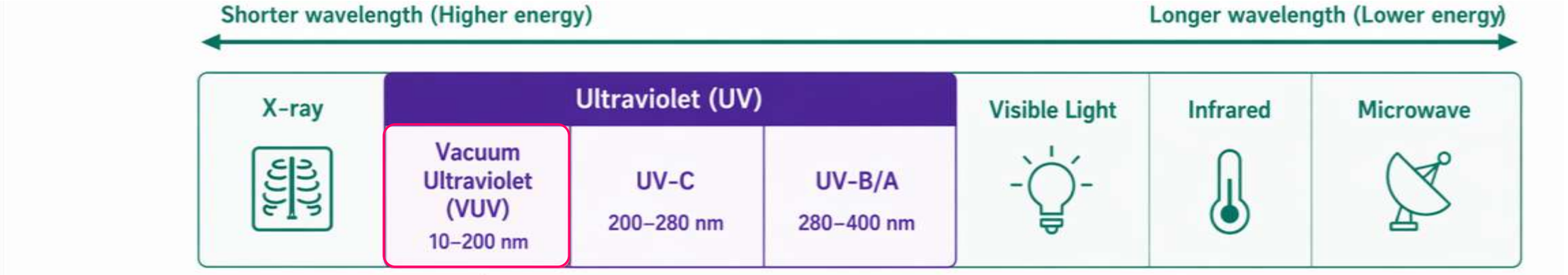
In addition to **FPD (flat panel display)**, an existing area,
we are focusing on **semiconductors and semiconductor packaging** as growth areas

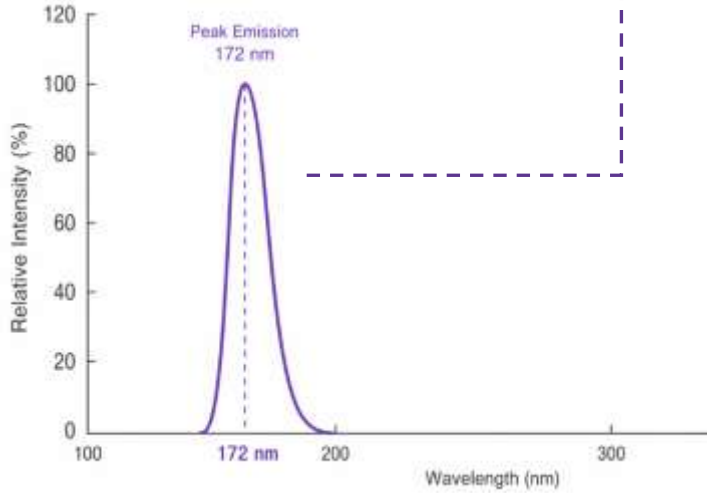
Business Overview (Functions/Effects)

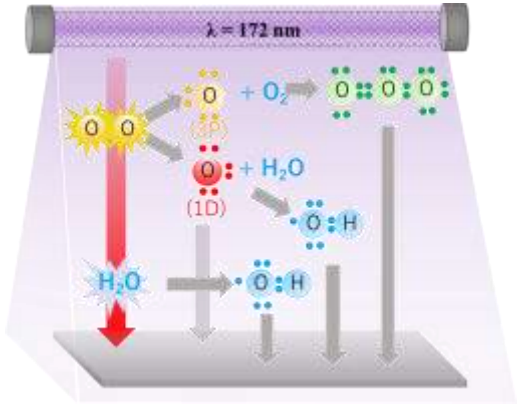
Effects	Organic contamination decomposition	Matting	Hydrophilization	Adhesion strength improvement	Oxidation/reduction treatment
Figure					
Application examples	Yield improvement by dry cleaning	Creation of premium appearance Improved stain resistance/texture	Pre-deposition treatment to prevent liquid repellency	Prevention of delamination by adhesion enhancement (adhesives and plating)	Oxidation/reduction of semiconductor materials (Si, metal materials, etc.)

By optimizing processing conditions according to the materials,
we can address challenges across various manufacturing processes.

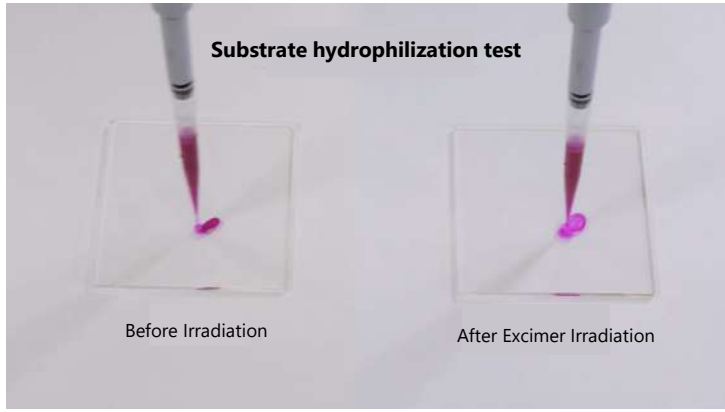
Business Overview (Chemical Reaction Mechanism)







Leveraging high-energy light
to excite the substrate and processing gas



Example: Improvement of substrate surface wettability

Various surface treatments are possible through "powerful 172nm UV light" + "radicals generated by UV"

In 1993, **Ushio achieved the world's first commercial release of excimer lamps**

Aligned with **FPD** market expansion, larger-scale production, and higher throughput, Ushio launched large-area planar lamps, providing market-leading competitiveness.

Cumulative shipments: **Over 6,000 units**

Market share in the FPD field: **Over 90%***

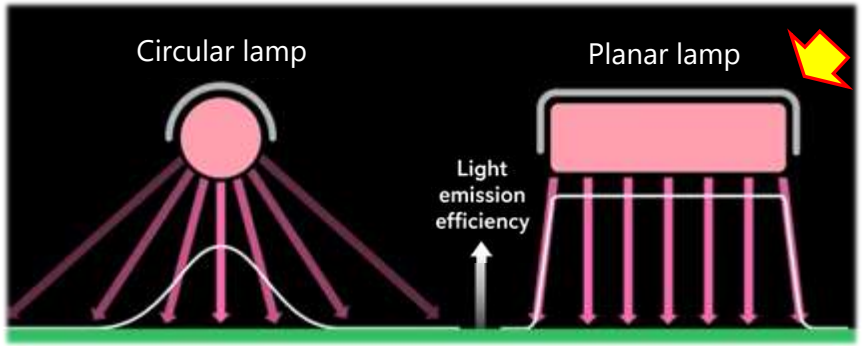
* As of March 31, 2026 (Ushio's internal research)

Multiple large-scale investments in the current FPD market have already been secured with Ushio's equipment.
Back orders are building up through FY2027.

Technologies Supporting Top Market Share

Long-length lamp capable of processing 3-meter-wide areas

High Power/ Long Service life - at the same time

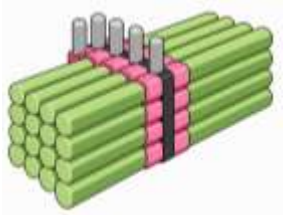


Adopting the flat structure maximizes efficiency per lamp

Expanding into the semiconductor and semiconductor packaging markets by leveraging light source technologies cultivated in the FPD field

Initiatives in the Semiconductors Market (More Moore)

Increasing Complexity of Semiconductor Device Structures

Expected mass production timing	2024	2025	2026	2027	2028	2029	2030	and beyond
Transistor structure @ Logic		→		→		→		
Cell structure @DRAM		→		→				

*Images of transistor structure and cell structure are AI-generated conceptual images

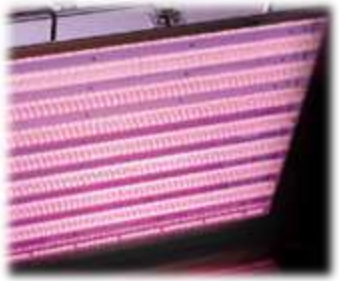
- Adopted in advanced logic device and DRAM manufacturing processes. Orders and shipments of our light sources are also increasing due to memory shortages and increased capital investment
- Demand for modification and treatment is increasing in response to trends toward miniaturization, thin film and high stacking. We anticipate an increase in applicable processing layers going forward, with continued growth expected beyond 2027
- Working alongside equipment manufacturers from the earliest stages of process development. Comprehensive support from light source optimization to OEM design specialized for semiconductors

[Business Partners] Semiconductors manufacturing equipment manufacturers

*Conceptual image of light source mounting (generated by AI)

Initiatives in the Semiconductor Market (More than Moore)

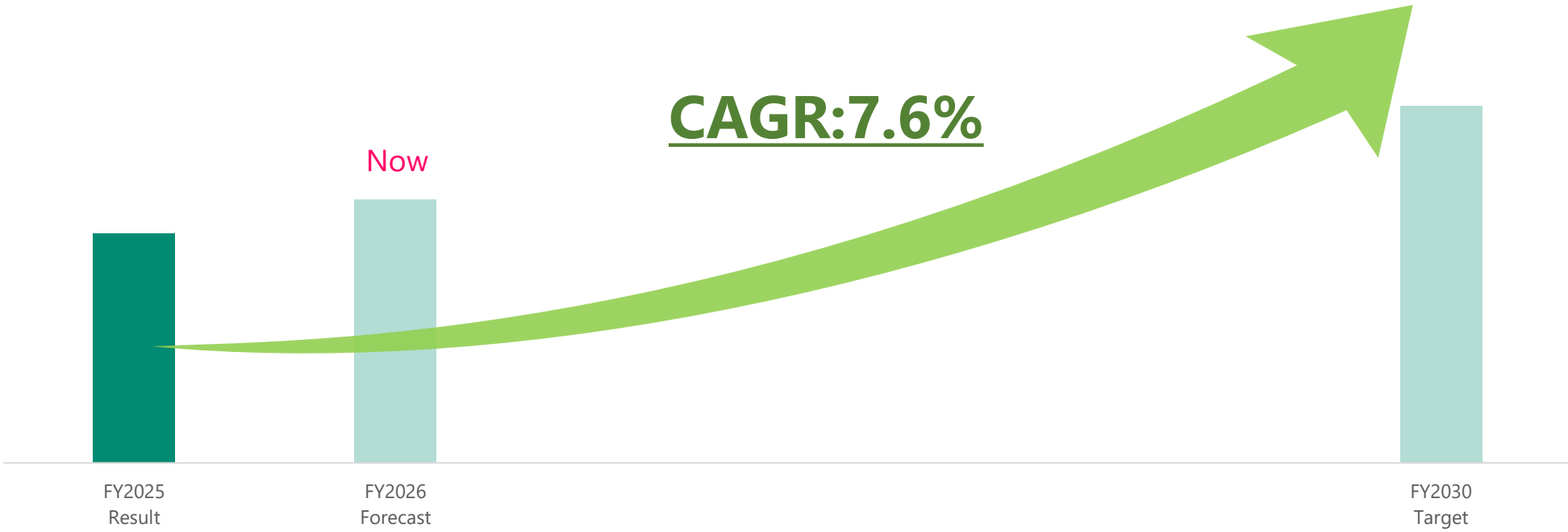
Enhancing semiconductor value by integrating heterogeneous functions, not relying solely on front-end miniaturization
-> Key enabler: “wafer/chip bonding" and "miniaturization and low dielectric constant of package interconnects for chiplet mounting"

Front - End of 3D	Advanced-PKG
  [Business Partners] Semiconductors manufacturing equipment manufacturers	  [Business Partners] Semiconductor package substrate manufacturers
To increase integration density per chip and shorten transmission distance, wafer-to-wafer and chip-to-wafer bonding is essential Using excimer lamps before the bonding process enables simple, low-damage surface cleaning and activation	"Miniaturization and low dielectric constant" and "Larger Packaging size" Addressing these trends requires large-scale vacuum deposition equipment Using excimer lamps, interconnect formation is enabled by conventional manufacturing processes, reducing investment costs

Continuing joint evaluation with device manufacturers, substrate manufacturers, and material and equipment manufacturers (adoption expected within 2-3 years)

Business Potential

Maintaining high market share in the FPD market and a stable revenue base through replacement lamps
Sales of irradiation units for advanced semiconductors and increase in adopted processing layers, driven by DRAM shortages
Medium to long-term demand expansion through the development of new process and new application



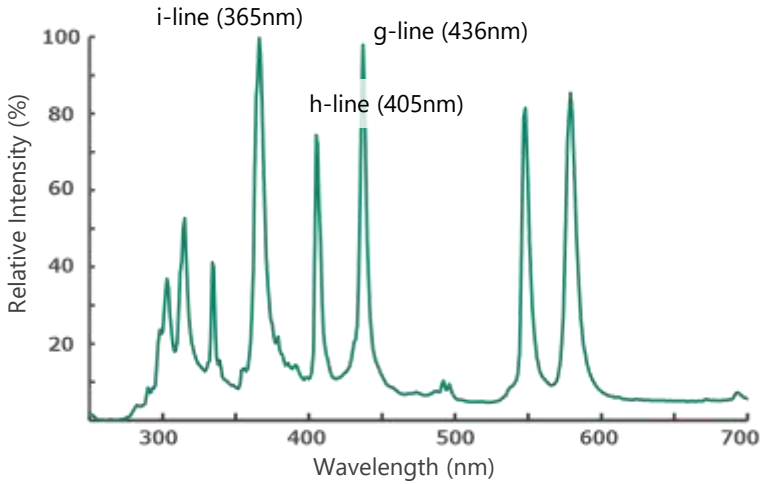
As a stable, growing business, sales will expand 1.5-fold by 2030

1. Light Source Business

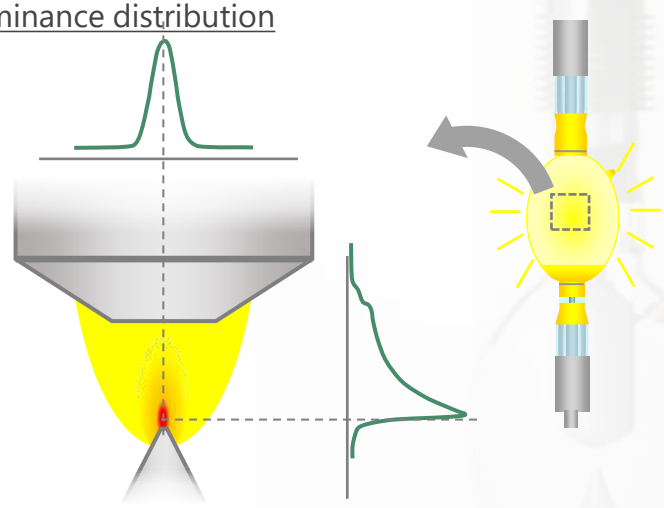
- Thermal Process
  (Halogen Lamp Heaters, Flash Irradiation Units)
- Excimer Lamps
- UV Lamps (High-pressure UV lamp)

The High-pressure UV lamp is **a light source close to a point light source** that strongly emits **ultraviolet light**.

Spectral distribution



Luminance distribution



Due to these two features, they are mainly used as **light sources for lithography** in manufacturing processes for semiconductors and flat panel displays (FPD).

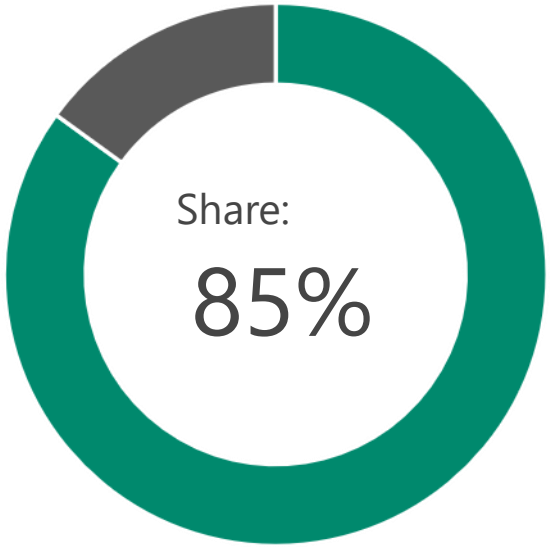
High-pressure UV lamp

Lithography equipment

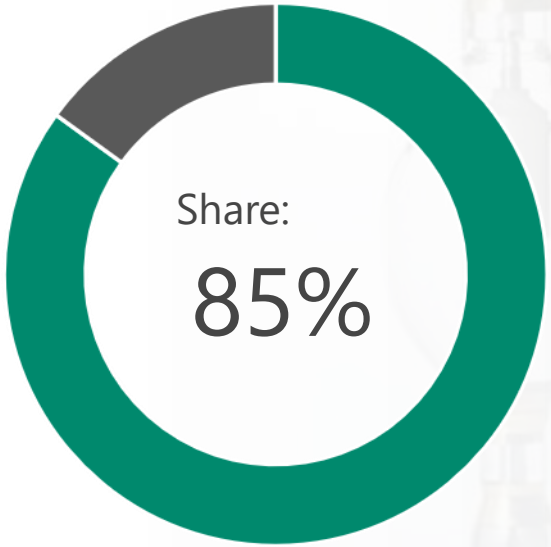
Semiconductors/FPD/Printed circuit boards(PCB), etc.

Worldwide Share

UV lamp for semiconductors lithography

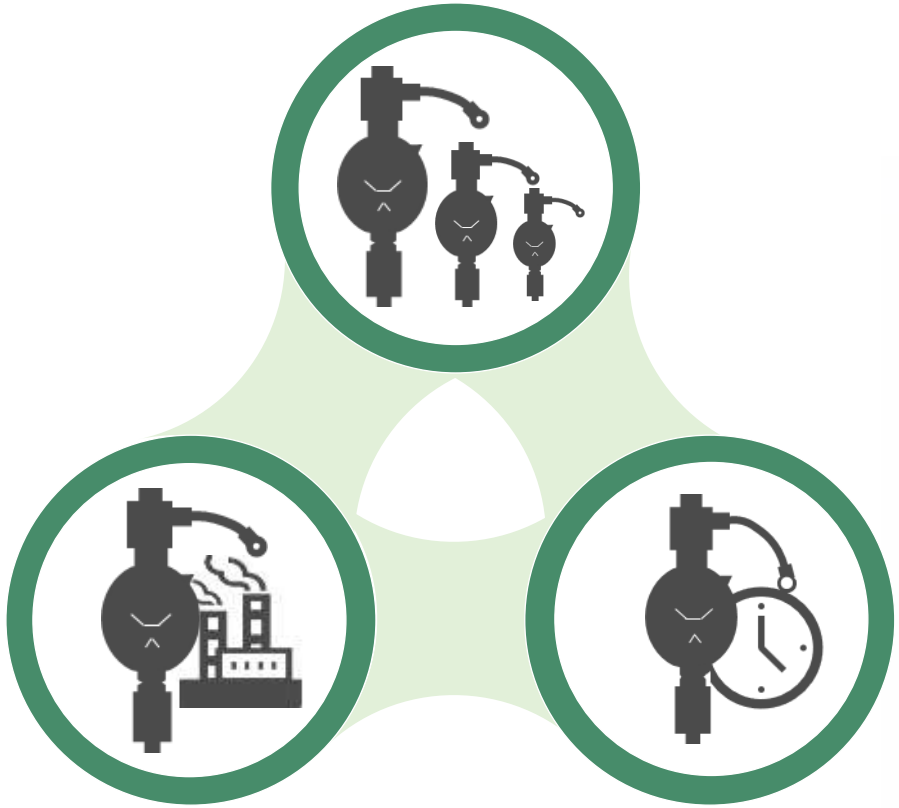


UV lamp for LCD lithography



*Internal investigation as of March 31, 2026
*Including Ushio INE GmbH

Product lineup tailored to lithography equipment



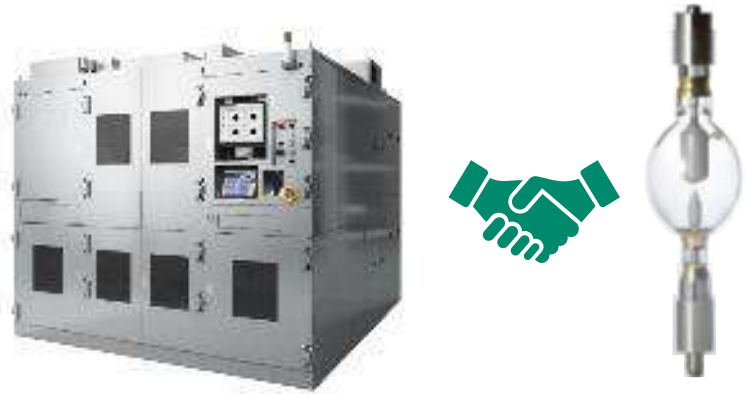
Manufacturing capabilities

Proprietary technology
(Lamp performance enhancement)

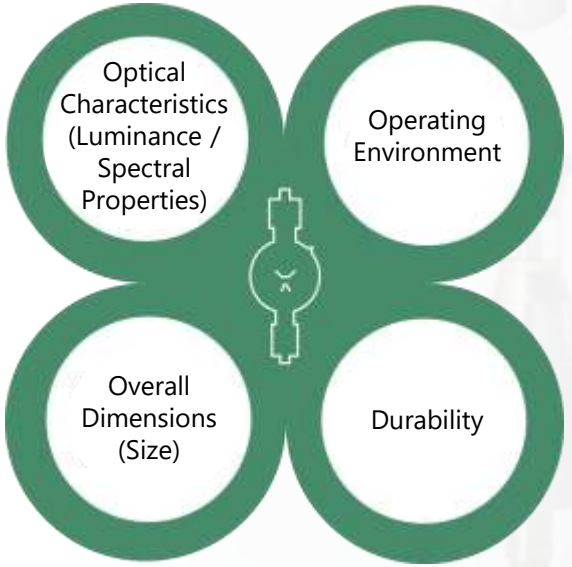
Product lineup tailored to lithography equipment

High-pressure UV lamps can deliver optimal performance **when customized** to meet the specifications required by lithography equipment.
For many years, we have worked jointly with numerous equipment manufacturers to develop and improve high-pressure UV lamp.
As a result, we offer **a product lineup that is widely compatible** with various lithography equipment (lamp-type) in the market.

Through **strong relationships** with equipment manufacturers, we maintain a framework that enables us to continuously adapt to their evolving requirements.

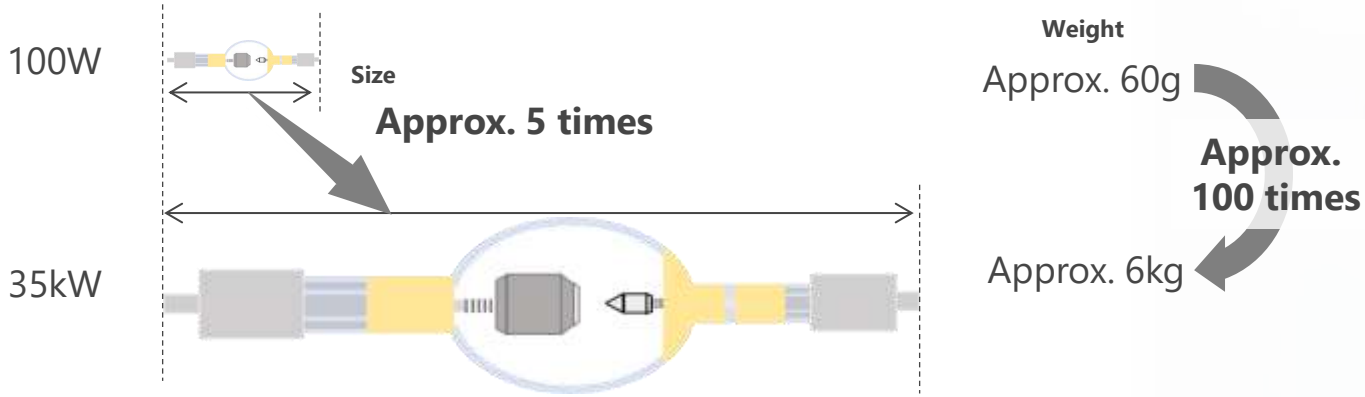


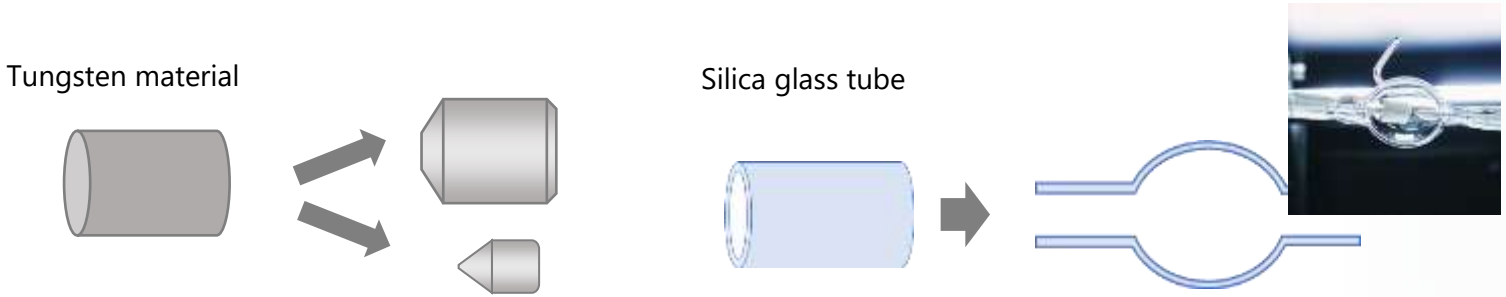
Four Key Points for Compatibility with Lithography Equipment



Manufacturing capabilities

We began manufacturing UV lamps for lithography **in 1965** and now offer a wide range of products **from 100W to 35kW.**
Our accumulated manufacturing expertise enables precision processing of difficult-to-process materials such as **tungsten** and **silica glass**, achieving stable production of **high-quality products.**





Tungsten (W)
Has the highest melting point and high hardness among metals.
Melting point: approx. 3400°C / Specific gravity: 19.3g/cm3

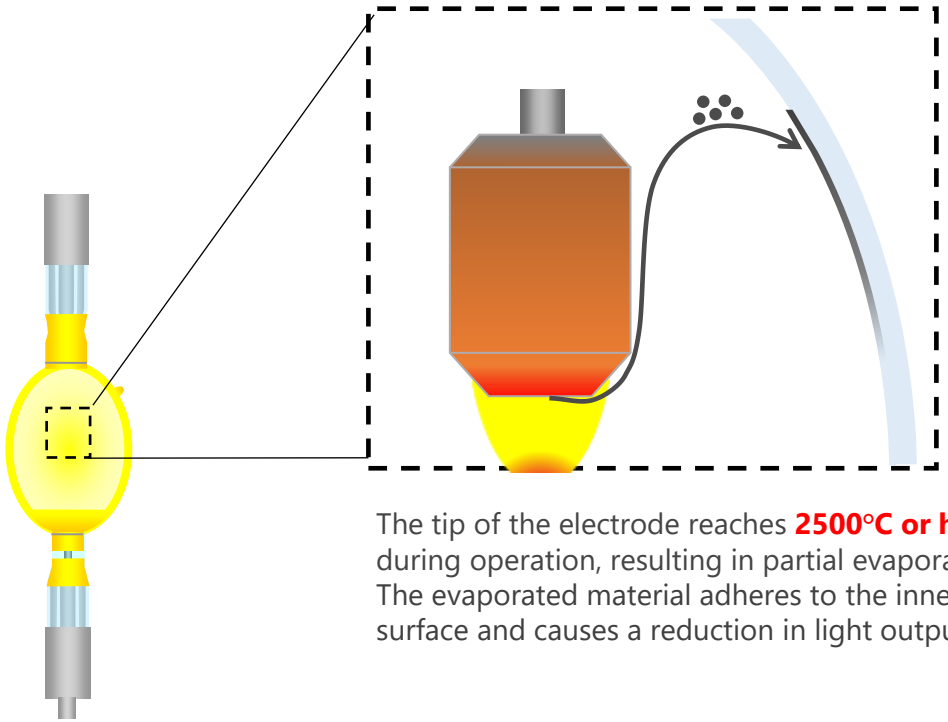
Silica glass (SiO2)
Compared with ordinary glass, contains fewer impurities and offers higher light transmittance and heat resistance.
Softening point: approx. 1650°C

Proprietary technology

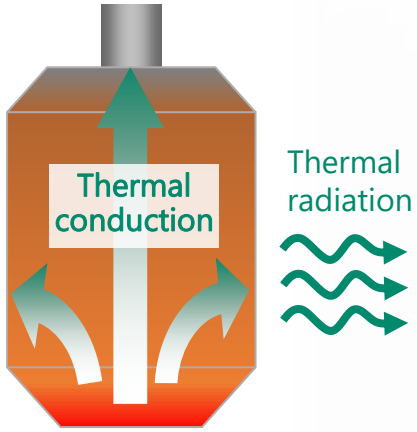
Patents held: 87 (Applications filed in the last 5 years: 21)

Example: Service Life Extension Technology

Our proprietary technology that controls **thermal radiation and thermal conduction** suppresses the reduction in light output, one of the factors affecting service life.
Technology to further improve thermal radiation and thermal conduction is currently under ongoing development.



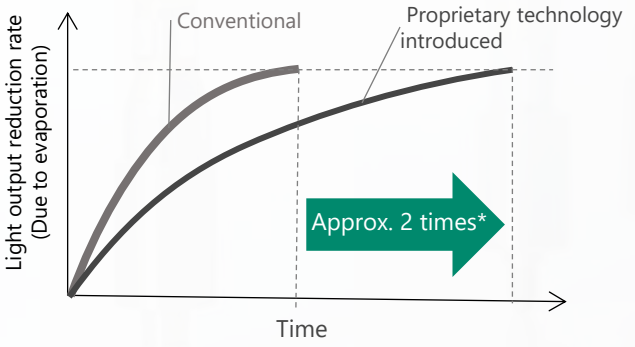
The tip of the electrode reaches **2500°C or higher** during operation, resulting in partial evaporation. The evaporated material adheres to the inner surface and causes a reduction in light output.



Thermal conduction: transports heat to the rear end
Thermal radiation: releases heat outward

Electrode temperature reduction is necessary to suppress evaporation

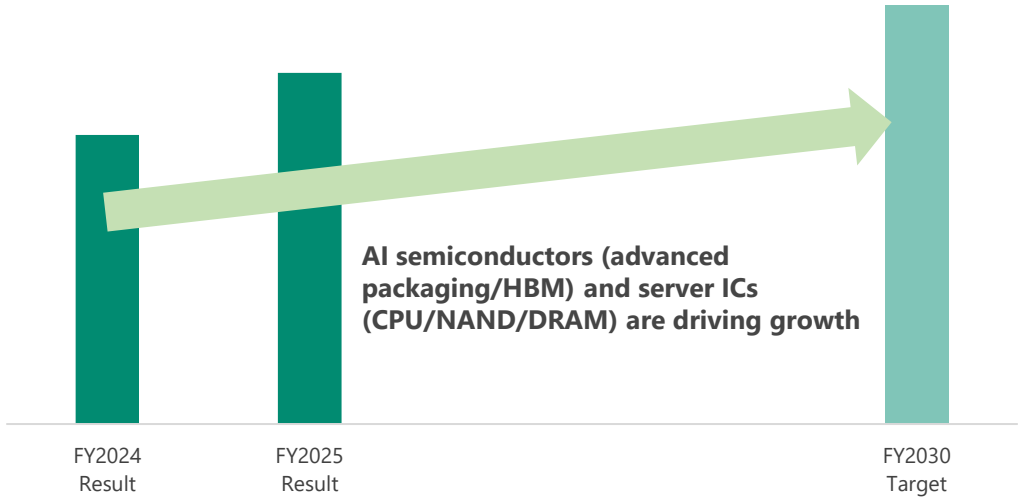
Improvement of both thermal conduction and thermal radiation results in temperature reduction of 100°C or more*



*This effect is one example. Actual effects vary by product

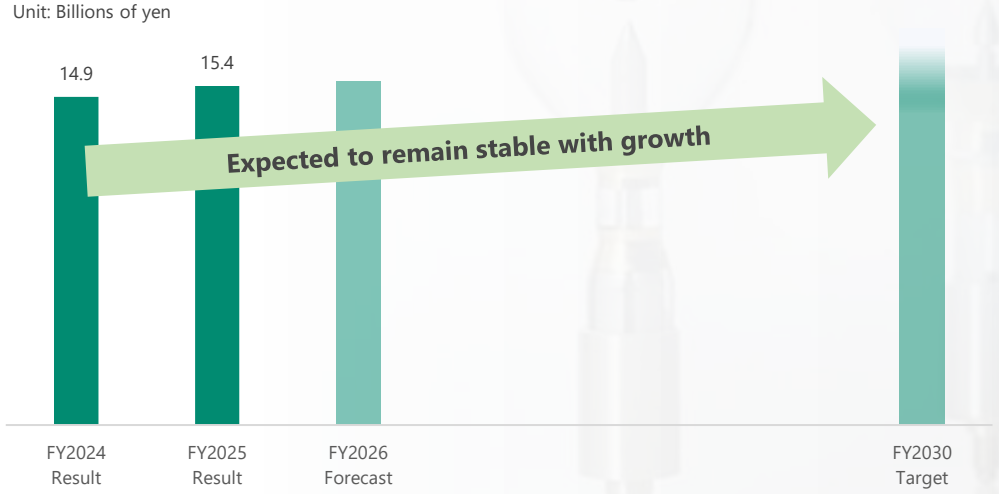
- New shipment volume of semiconductors i-line lithography equipment is expected to increase gradually, and we will maintain relationships with equipment manufacturers and continue to capture these new investments and demand.
- Continue to secure stable earnings through productivity improvement and cost reduction
- Through the OSRAM business acquisition, improve profitability through efficiency in procurement and production, and create value through technological synergies

Shipment Volume of Semiconductor i-line Lithography Equipment (lamp-type)



Source: Ushio internal research (2025)

Lithography Lamp Sales trend



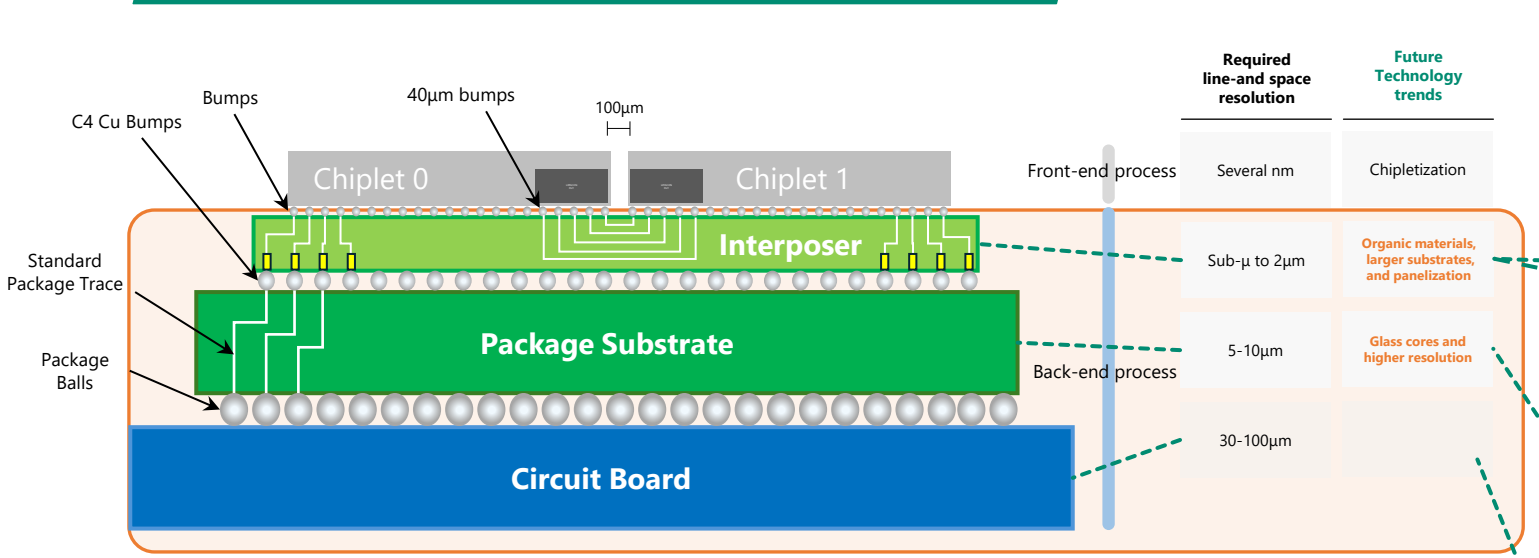
*Products of Ushio INE GmbH are not included.

2. Lithography Equipment Business

- Industry and Technology Trends in Advanced Packaging
- Stepper for Semiconductor Substrates (UX-5 Series)
- Direct Imaging (DI) Lithography Equipment (INPREX Series)
- Digital Lithography System (DLT System)

Lineup of Lithography Equipment for Advanced Packaging

Advanced Packaging Structure Diagram



	Required line-and space resolution	Future Technology trends
Front-end process	Several nm	Chipletization
	Sub-μ to 2μm	Organic materials, larger substrates, and panelization
Back-end process	5-10μm	Glass cores and higher resolution
	30-100μm	

Resolution (L/S)	Direct Imaging	Stepper
<1μm	Digital Lithography System (DLT System) (with Applied Materials) 	UX-59113
5μm		Stepper (Ushio) 
>10μm	DI Lithography Equipment (ADTEC Engineering) 	

AUCC Division, Ushio Inc. : DLT System (collaboration with Applied Materials)

Photolithography Division, Ushio Inc. : Stepper (UX-5 Series)

ADTEC Engineering Co., Ltd. : DI lithography equipment (IP Series)

● Strengths of Maskless DI (DLT System, DI Lithography Equipment)

(1) Flexibility in product layout

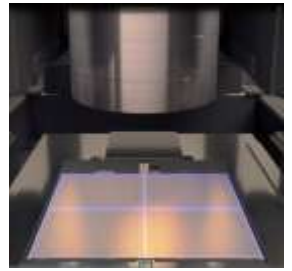
=> While steppers require product placement and allocation according to the shot size, maskless DI offers greater flexibility in product layout across a 500mm substrate.

(2) Easy adaptation to high-mix production and prototyping through maskless operation, offering greater flexibility and lower running costs.

(3) Improved overlay accuracy

=> Scaling-based alignment enables compensation for organic substrate warpage and misalignment of underlying-layer patterns.

● Strengths of Stepper (UX-5)



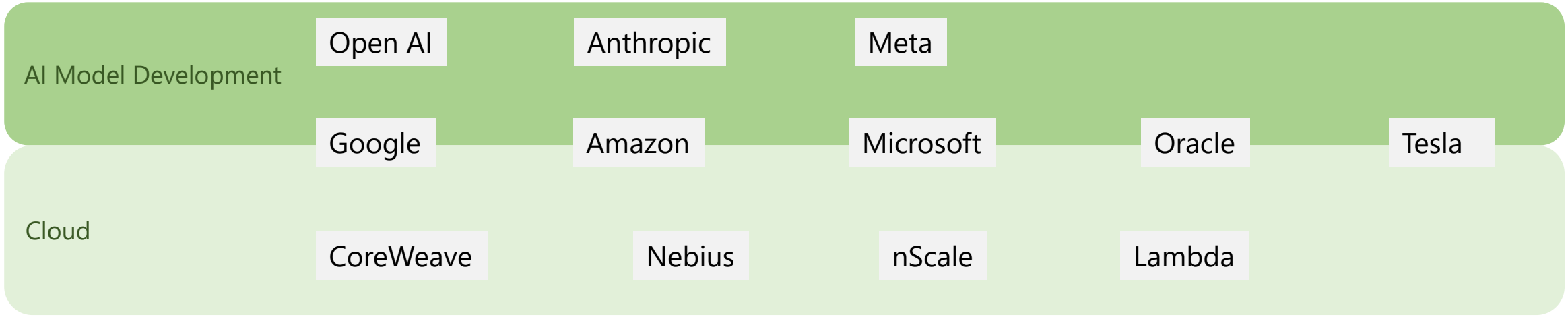
(1) Assured wiring quality through mask lithography

=> Wiring quality unique to projection lithography using mask-pattern transfer.

(2) Simple configuration with high productivity and stable mass production

=> High throughput suitable for mass production. Its simple configuration enables rapid transition to mass production, with a proven track record in substrate applications.

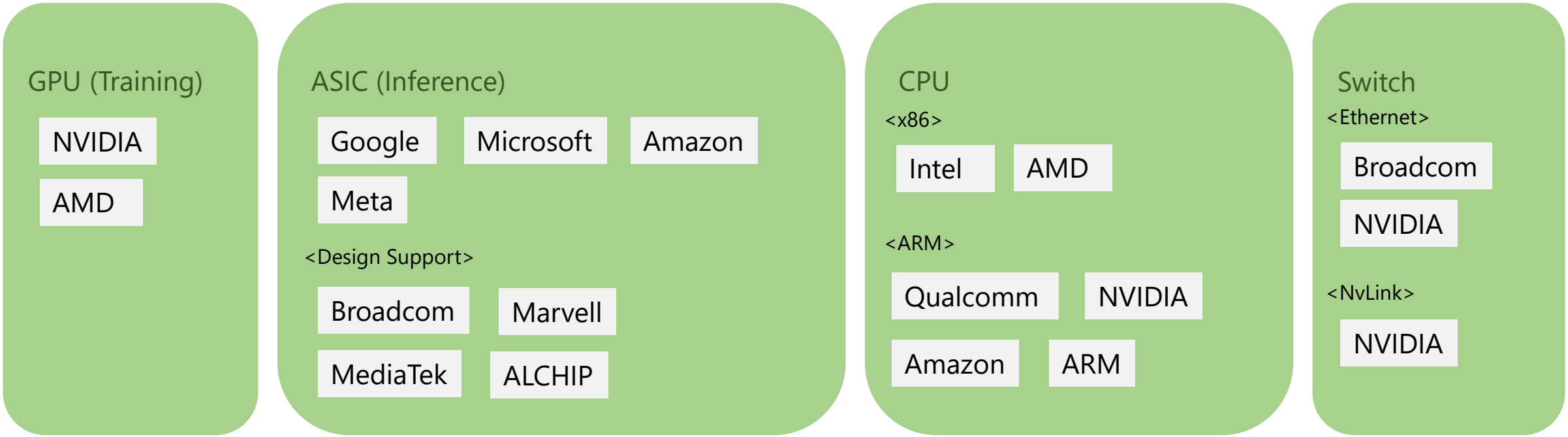
Industry Trends: AI Data Center Investment



*Created based on internal research

- ✓ Massive investments are being made in AI model development as securing computing resources directly impacts competitiveness
- ✓ NVIDIA, AMD, and others have joined the above companies, creating a structure where even competitors mutually support each other financially through chip purchases, computing-capacity supply and procurement, and equity investments
- ✓ Each company requires large quantities of the latest AI servers and AI semiconductors

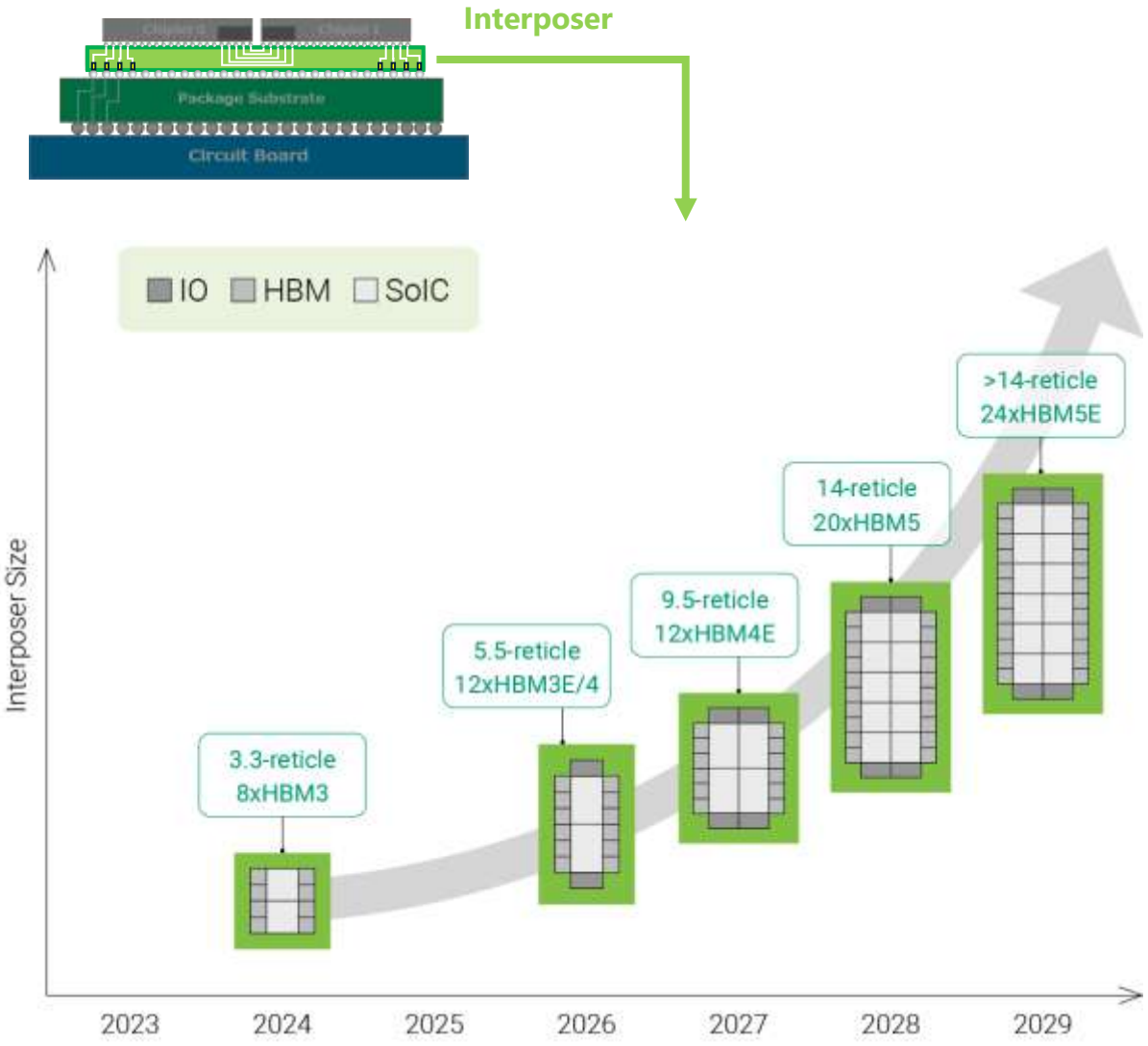
Industry Trends: Logic Semiconductors for AI Servers



*Created based on internal research

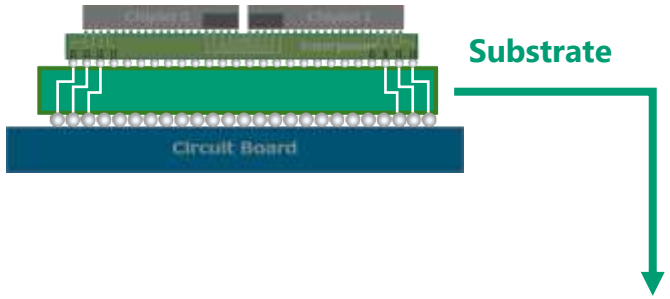
- ✓ Shift from GPU-intensive training to inference is driving tech companies to develop in-house ASICs
- ✓ Shift toward agentic AI is increasing CPU volumes and the number of market players
- ✓ As server clustering advances, CPO adoption in switch ICs for inter-server communication is accelerating

Technology Trend: Interposer

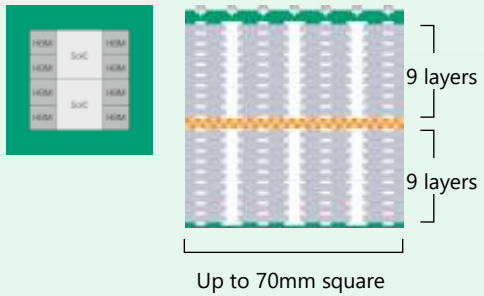
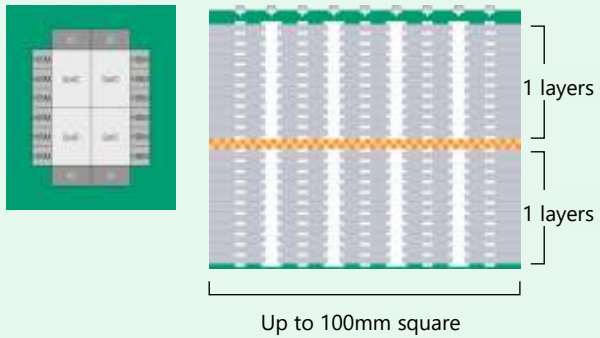
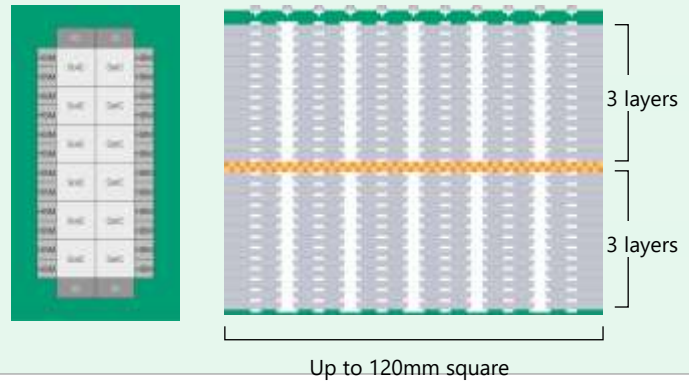


- ✓ Increase in the number of logic dies and HBM units is expanding the interposer area (reticle size), leading to greater adoption of panel-level packaging (PLP).
- ✓ Architectures that embed silicon bridges for fine-pitch wiring are becoming mainstream (e.g., CoWoS-L and EMIB-T).
- ✓ Amid capacity constraints in TSMC's CoWoS production, Intel's EMIB-T is emerging as one of the alternatives to address the RDL shortage

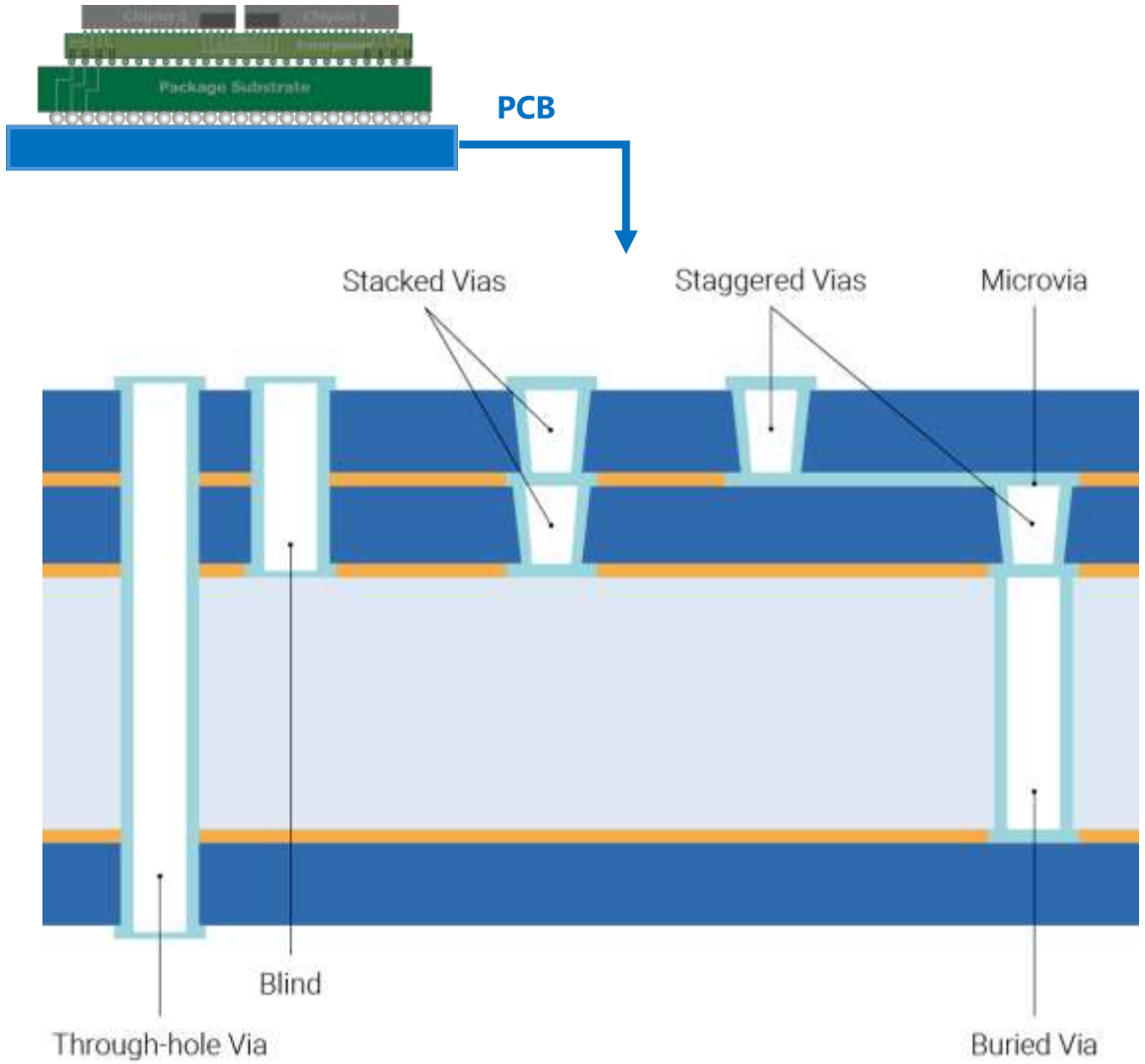
Technology Trend: Substrate



- ✓ Expansion of interposer (reticle) size and the integration of CPO optical engines are driving larger, more highly multilayered packages.
  To improve power efficiency, components are increasingly being embedded in core substrates and other package substrates
- ✓ Adoption of glass-core substrates is also being explored to mitigate warpage and improve performance.

	～2025	2026, 27～	～2030
Reticle size	～×3.5	×5～	×9.5<
PKG size/layer count	Up to 80mm square, 9 layers per side	Up to 100mm square, 10 layers per side	Over 120mm square, over 13 layers per side
CPO adoption		Between racks	Between PKGs, between dies
Core material	Organic	Organic	Organic, glass
Configuration image			

Technology Trend: Printed Circuit Boards (PCB)



- ✓ As AI server power consumption increases, demand is growing for higher-density interconnects enabled by the modified semi-additive process (mSAP), driving further multilayering.
- ✓ As production substrates become larger, they become heavier and thicker, requiring corresponding adaptations to the equipment

Summary: Increasing Demand for Advanced Packaging and Lithography Equipment for AI Servers

USHIO

Increasing Demand for AI Semiconductors and Packaging

(1) Competition among AI model developers to secure computing resources and diversification of semiconductor suppliers

(2) Increase in the number of logic semiconductor players, product variety, and volumes

(3) In addition to growing demand for CoWoS, evaluation of EMIB-T and other options is also gaining momentum

Increasing Demand for Lithography Equipment

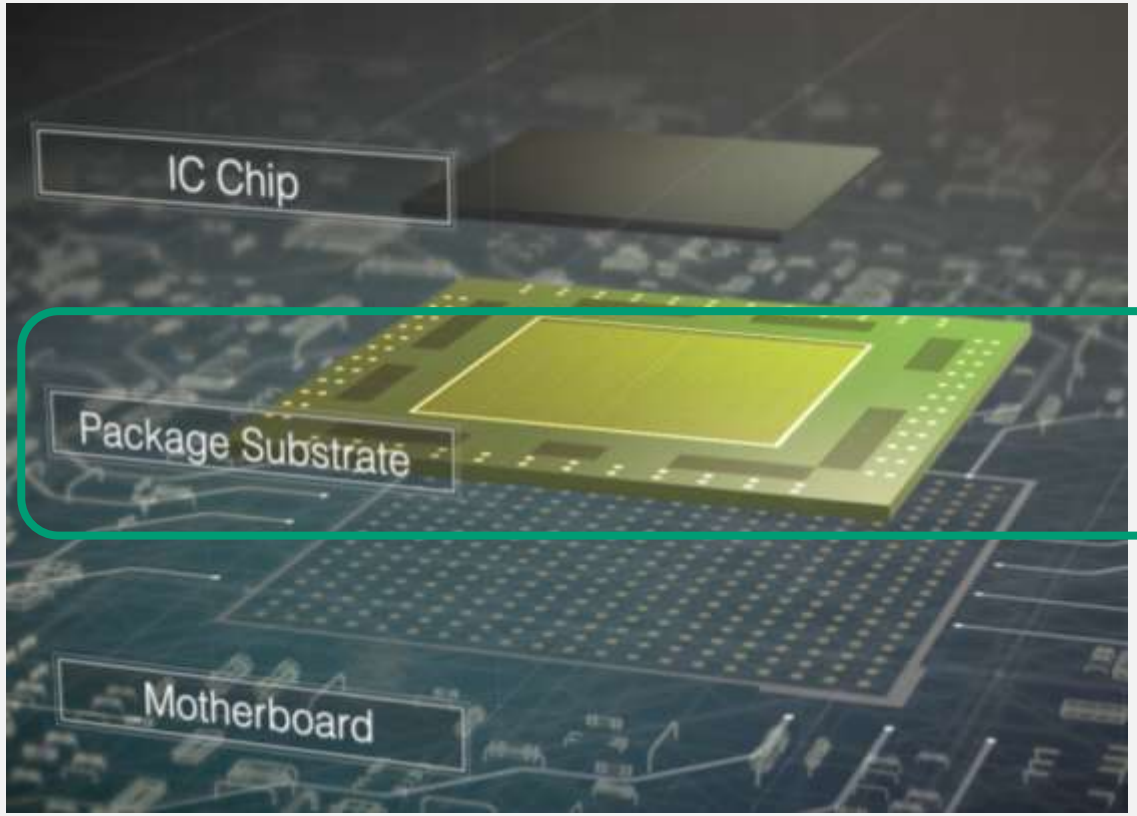
(1) Reduction in the number of units per production substrate due to larger package sizes

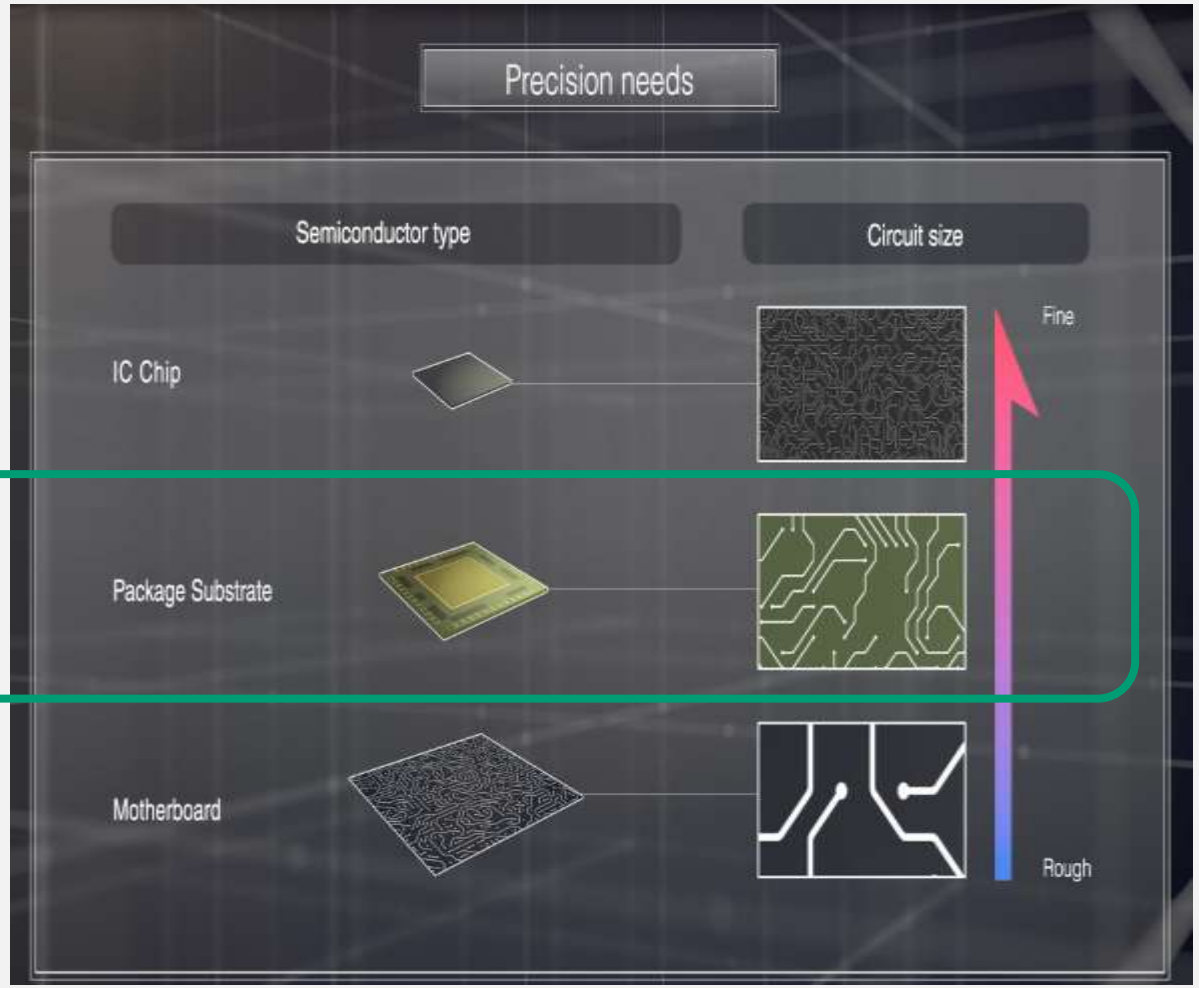
(2) Reduction in the number of units produced per hour due to an increase in the number of lithography layers

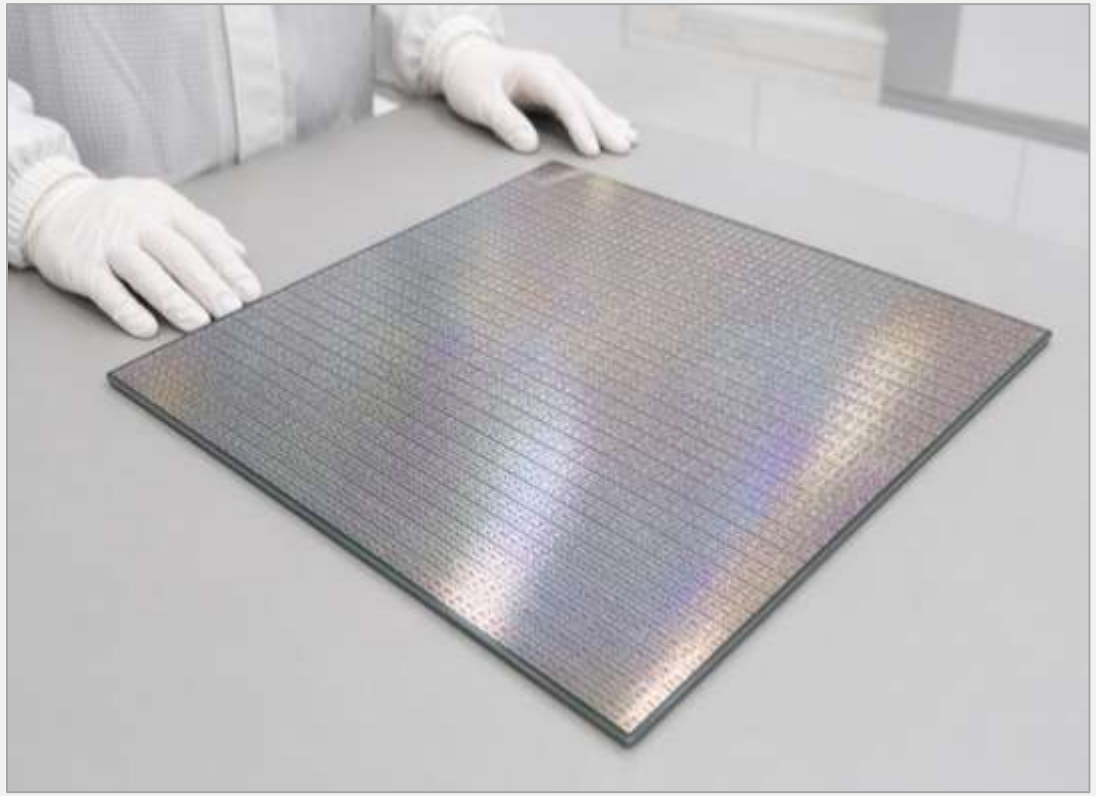
(3) Adoption of higher-end equipment models in anticipation of future needs

2. Lithography Equipment Business

- Industry and Technology Trends in Advanced Packaging
- Stepper for Semiconductor Substrates (UX-5 Series)
- Direct Imaging (DI) Lithography Equipment (INPREX Series)
- Digital Lithography System (DLT System)





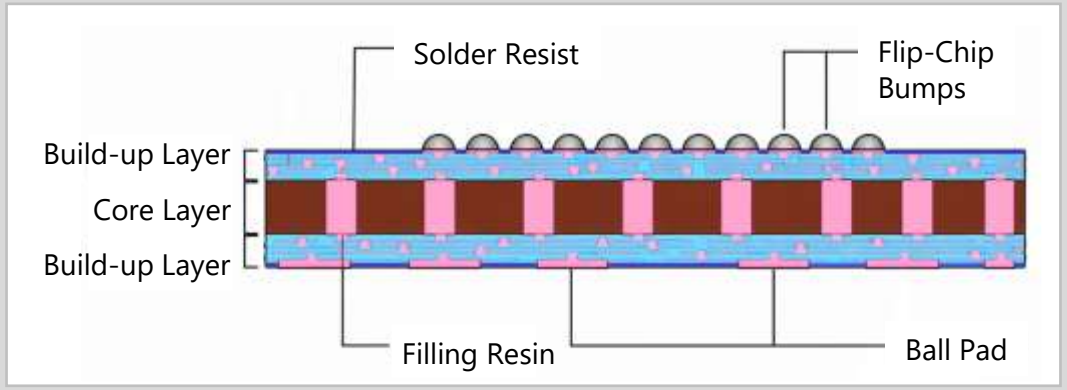


*This image is AI-generated

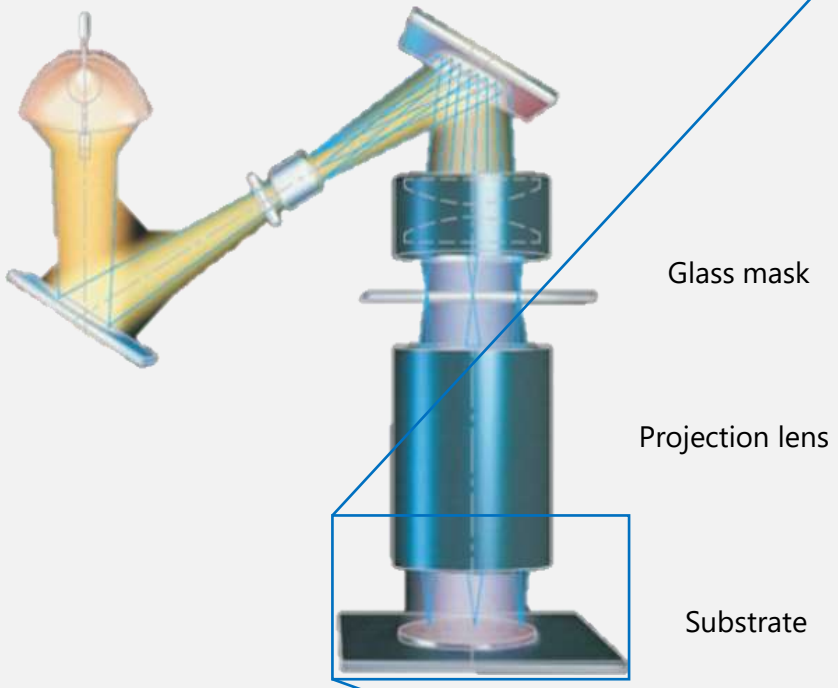
Full panel 510 x 515mm substrate

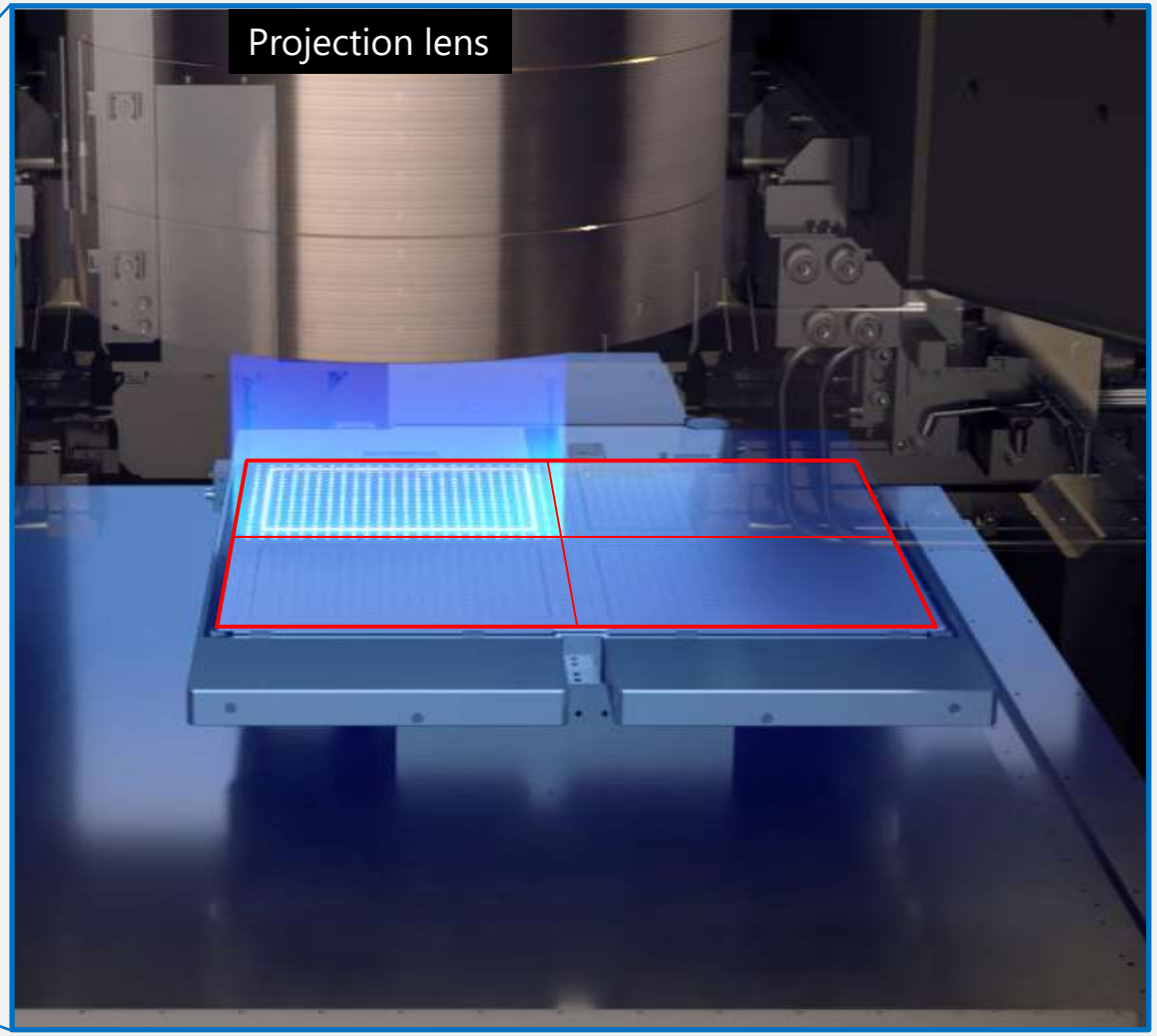
Packaging size: up to 120mm square

FC-BGA Structure (Cross-sectional Diagram)

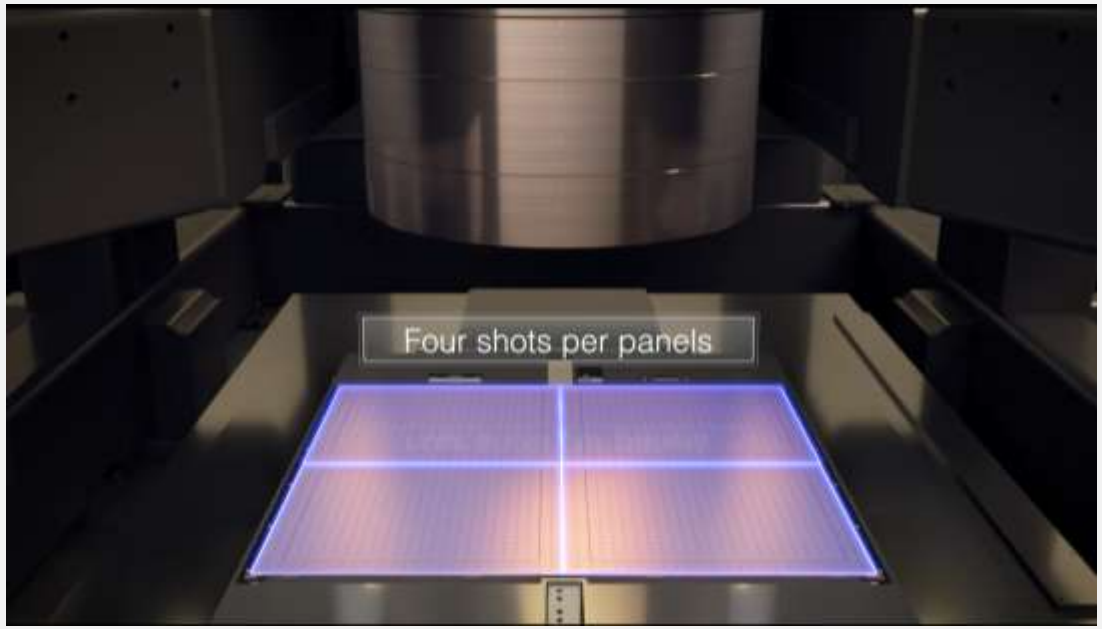


Substrate Cross-sectional Diagram

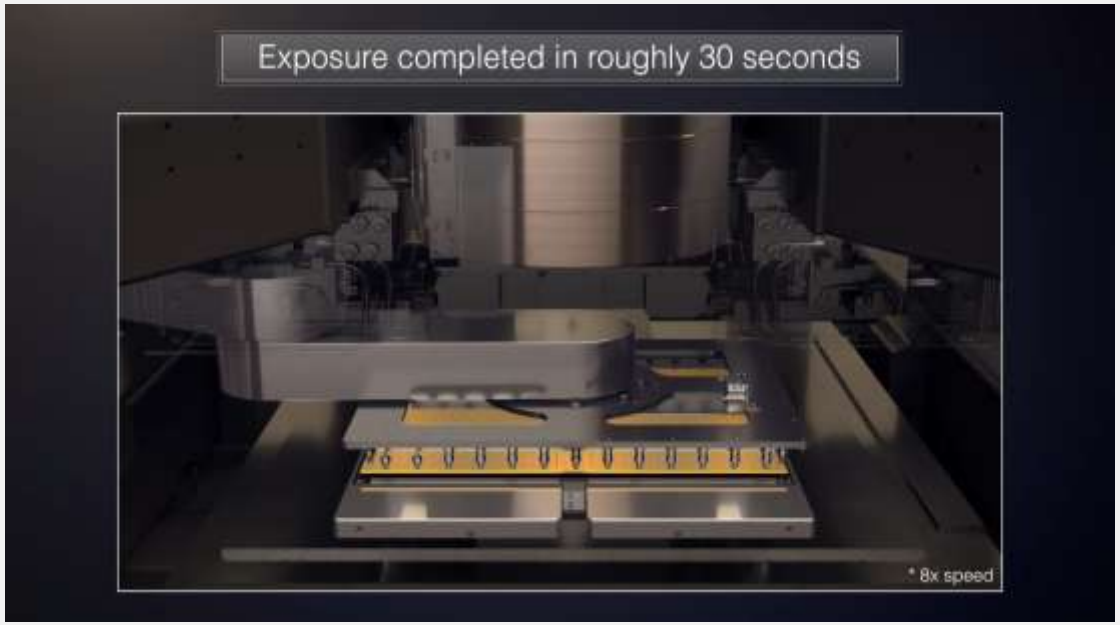




High productivity (achieving high throughput through 250mm square/shot lens lithography)

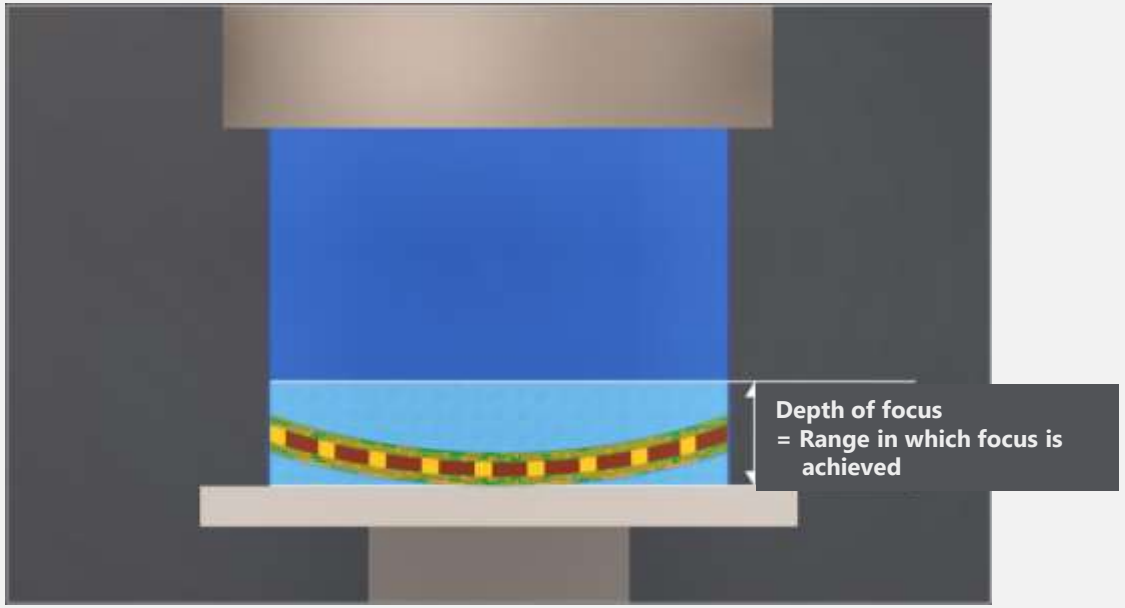


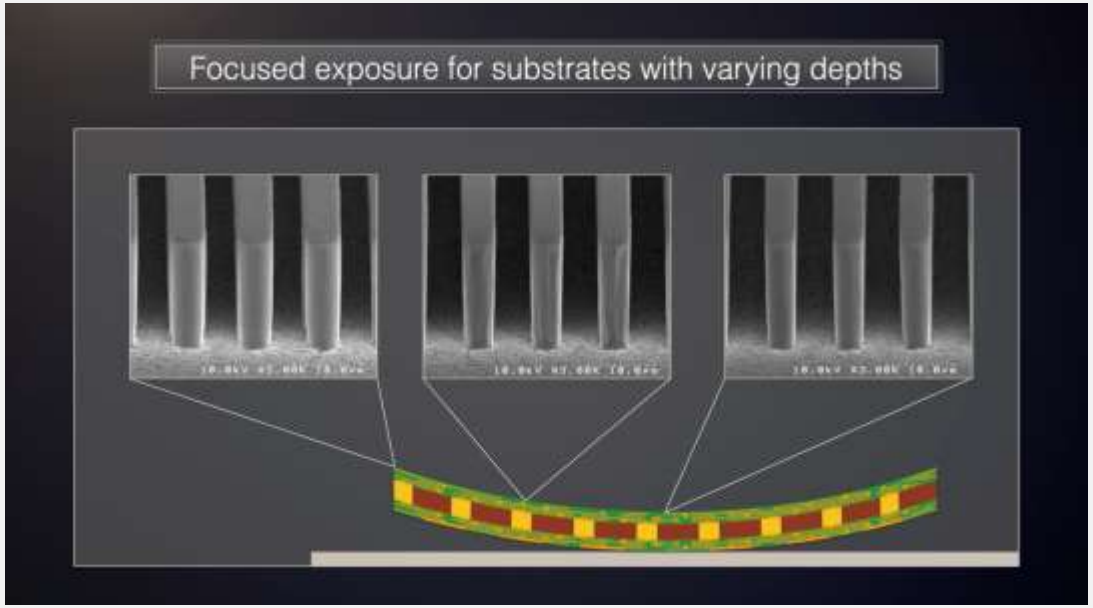
4-shot lithography with large-field projection lens



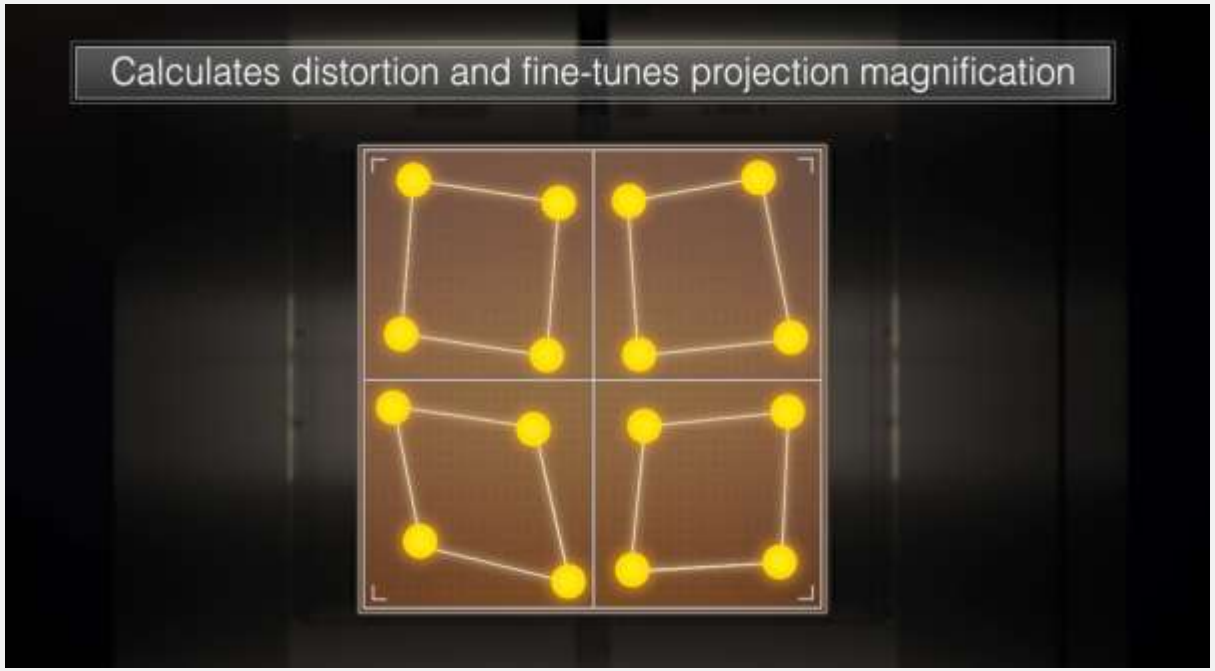
Balancing precision with panel handling technology and speed 30sec/panel = 120PPH

High yield (accommodating substrate warpage and thickness variations with a large depth of focus)





High yield (accommodating substrate distortion through lens magnification adjustment)



Multilayer Printed circuit boards(PCB) for FC-BGA
= Distortion occurs in X-Y directions

The projection lens enables magnification adjustment to match substrate expansion and contraction

AI Evolution and Expansion of Substrate Demand (UX-5 Series)

	General-purpose Data Centers 18～23	AI Data Centers ～26
Mounted logic	CPU	GPU, ASIC, Switch, CPU
Roadmap design	CPU developers	- CPU developers - GPU developers - ASIC developers (hyperscalers)
PKG configuration	FC-BGA	- FC-BGA - Interposer + Substrate - Glass core substrate
Material and process trends	Stable production	- Large package size, thick and heavy substrates - Glass substrate compatibility

AI Evolution: GPU-Based Training → ASIC-Driven Inference → CPU-Intensive Agentic AI

Increase in mounted logic and players

Reduced package count per substrate due to larger package sizes and increased layer counts

- ✓ As AI adoption expands across society, substrate applications and demand are growing in areas such as edge servers and autonomous vehicles, driving a shift toward high-mix, high-volume production.
- ✓ Manufacturing equipment is required to enable a rapid transition to mass production, stable production, and high productivity, making the UX-5 Series a compelling option.

Technology Development Roadmap (UX-5 Series)

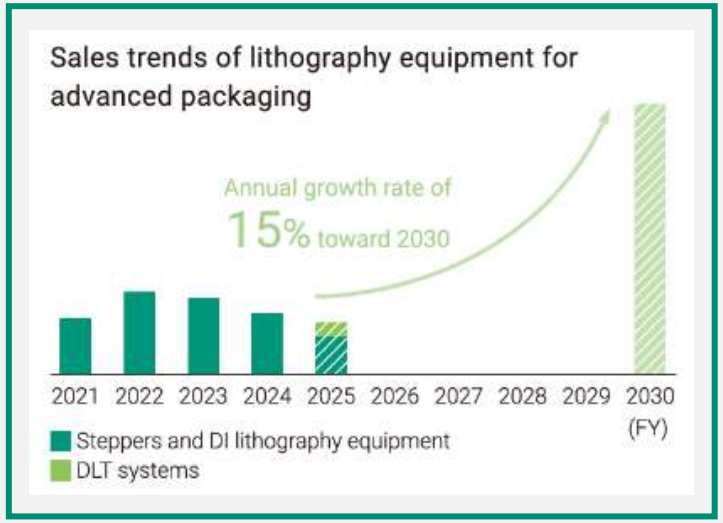
Ushio Lithography	4shots Stepper for 510*515 Substrate			Developing Stepper for Interposer
Tool line up	**UX-5894**	**UX-5881SC**	**UX-58112SC/SE**	**UX-59113**
Work substrate	**Organic**	**Organic**	**Organic/Glass**	**Organic/Glass**
Optical Resolution [umL/S]	5	16	3	1.5
Shot size [mm2]	□250	□250	□250	≧□100
# of shots / panel	4	4	4	16

- ✓ In addition to a model of the 4-shot stepper equipped with a 250mm-square projection lens for organic substrate, another model that supports glass substrates with 3μm resolution has been introduced and has already been adopted in the field
- ✓ A stitch-free stepper for interposer and RLD applications, capable of an exposure area of with ≥100mm square per shot, is currently under development, with release scheduled for December 2026.

Business Potential and Risks (UX-5 Series)

<Business Potential>

- Stepper shipments are expected to substantially exceed the previous peak levels recorded in FY2022–FY2023 from FY2027 onward. Increasing adoption of high-mix, high-volume production is driving greater demand for steppers.
- As AI adoption advances across society, demand is expected to expand further, driven by technological advances in areas such as edge AI servers and glass-core substrates for Physical AI.



<Main Risks and Countermeasures>

- For certain package sizes, such as 130-160mm square, the number of shots required by a stepper increases, resulting in longer takt times
  ⇒ Add a function to improve takt time when the number of shots increases, thereby maintaining high productivity
- Requests for flexible equipment selection depending on the prototyping and production process
  ⇒ Propose ADTEC Engineering's direct imaging lithography equipment as part of the Group's product lineup

Strong substrate demand and growing customer requirements and needs are creating a significant business opportunity for the Ushio Group, which offers a full product lineup.

2. Lithography Equipment Business

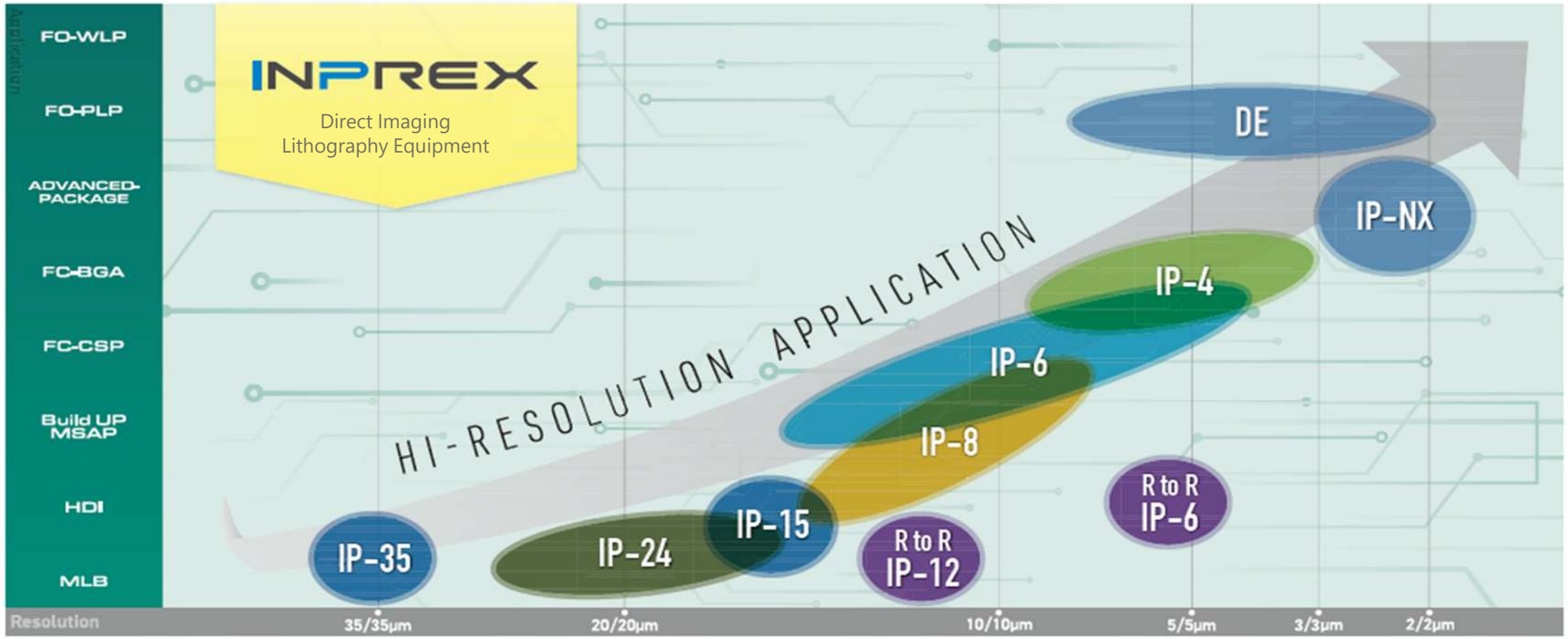
- Industry and Technology Trends in Advanced Packaging
- Stepper for Semiconductor Substrates (UX-5 Series)
- Direct Imaging (DI) Lithography Equipment (INPREX Series)
- Digital Lithography System (DLT System)

ADTEC Engineering Co., Ltd.

Manufacturing base: Nagaoka Division, Niigata Prefecture (4 factories)

Direct Imaging Exposure System

Product Overview



FO-WLP

● DE

● DE

ADVANCED PKG

● IP-NW

PKG

● IP-4 SW ● IP-6 SW

Large Panel for MLB

● IP-35 L1000H

MLB

● IP-35 1000H

● IP-24 SW

Large Panel for HDI

● IP-15 LSW

HDI

● IP-15 SW

Roll to Roll

● IP-6 UHR ● IP-12 UHR

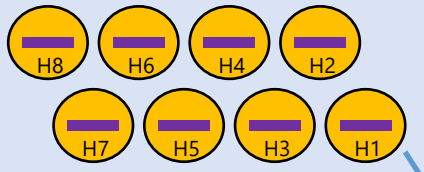
MSAP

● IP-6 LSW ● IP-8 SW

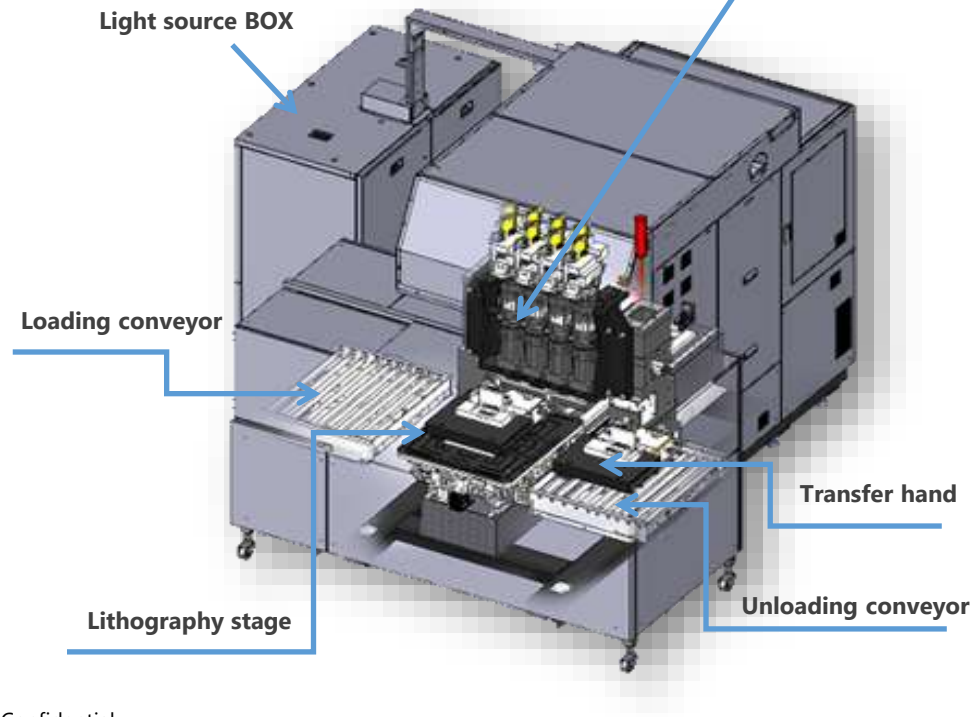
Equipment configuration: By combining LD + DMD + MLA with proprietary technology, uniform and stable lithography is possible across the entire substrate surface.

LD (Laser Diode)

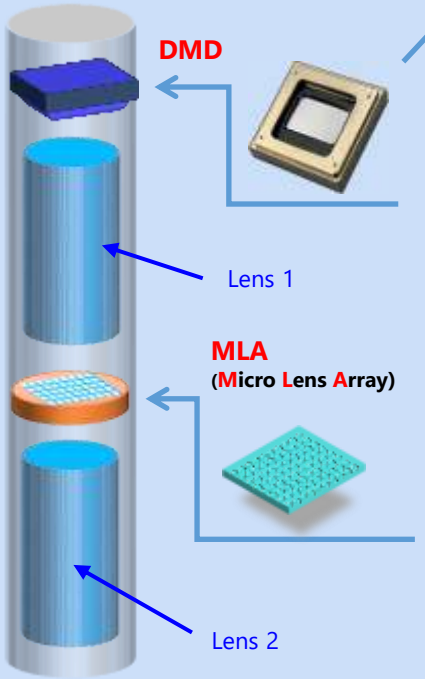
Lithography head layout: Staggered arrangement



The number of HEADs varies depending on the model.



Lithography head configuration



What is a Digital Micromirror Device?

It is a MEMS device developed by Texas Instruments in the United States, and is a type of display element with numerous micromirrors arranged on a flat surface.
Micromirrors with sides of approximately 14μm are tilted by electrostatic attraction, and the angle of light is controlled by turning them ON/OFF.

Size comparison between hair and micromirror

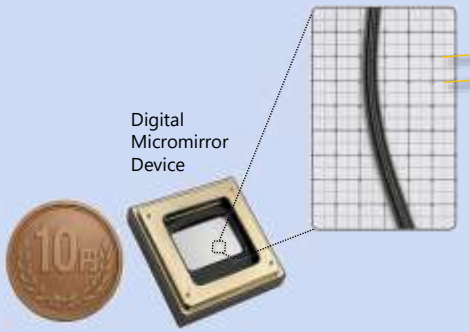
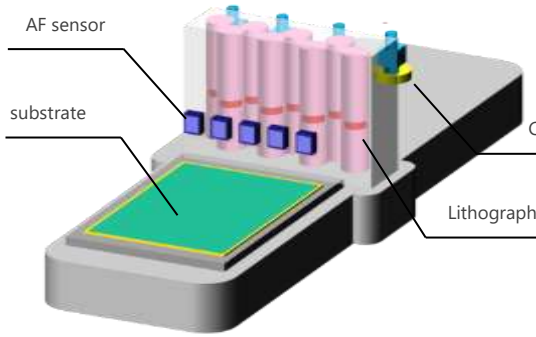


Image of Digital Micromirror Device operating principle

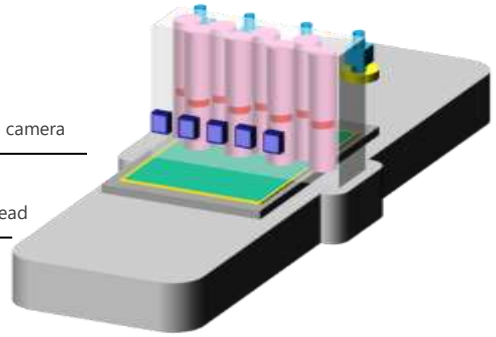
*Image generated by AI

One-time scan method: One-time scanning is achieved by arranging lithography heads in a line across the substrate width.
Even for large size, seamless large-area batch lithography is possible.

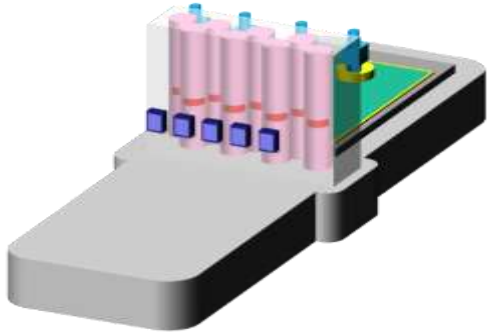
1. Substrate set



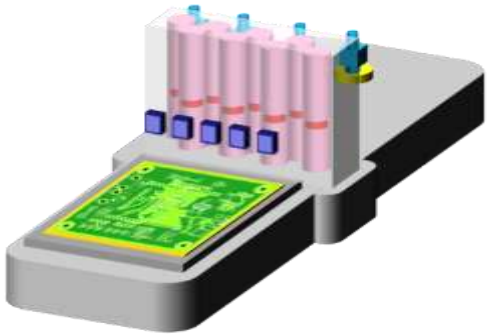
2. Alignment measurement



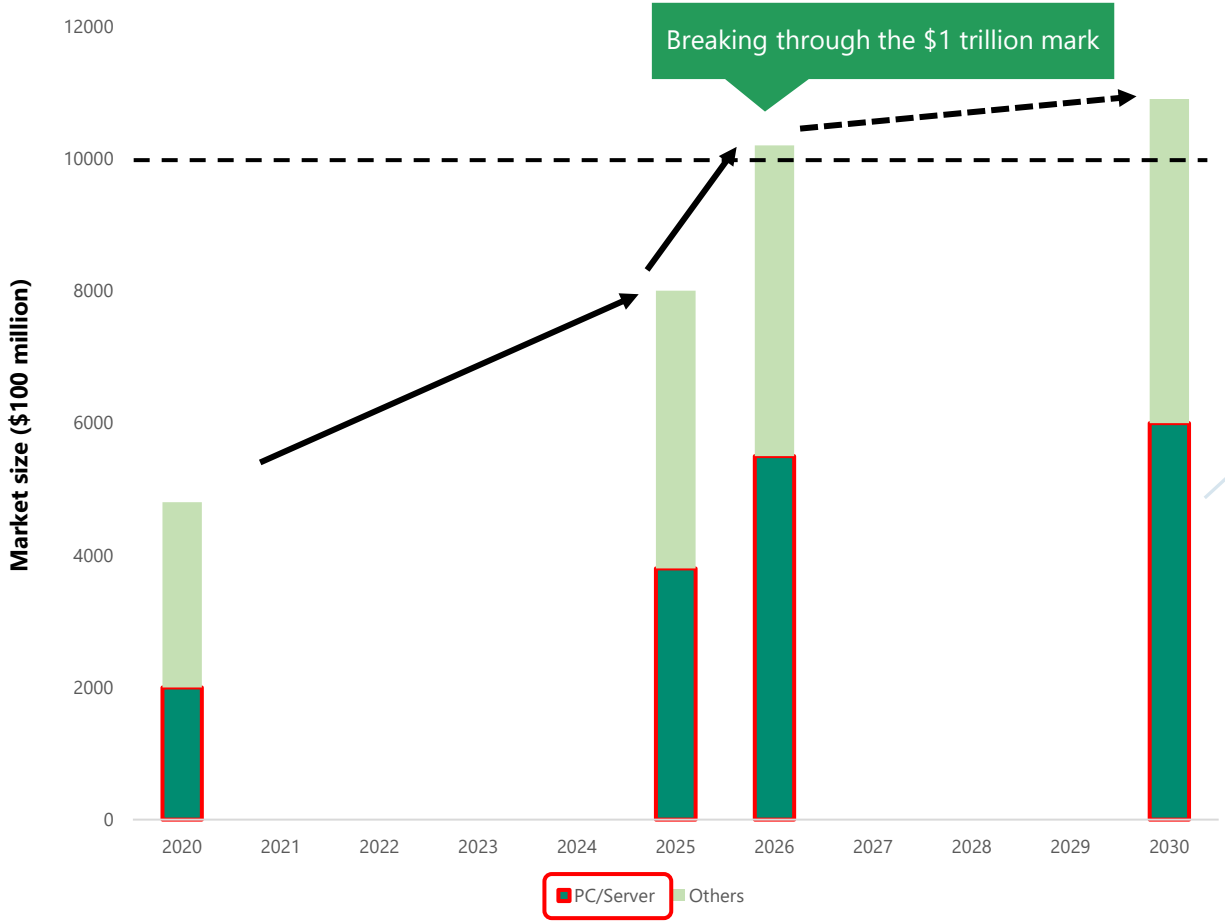
3. High-speed data processing



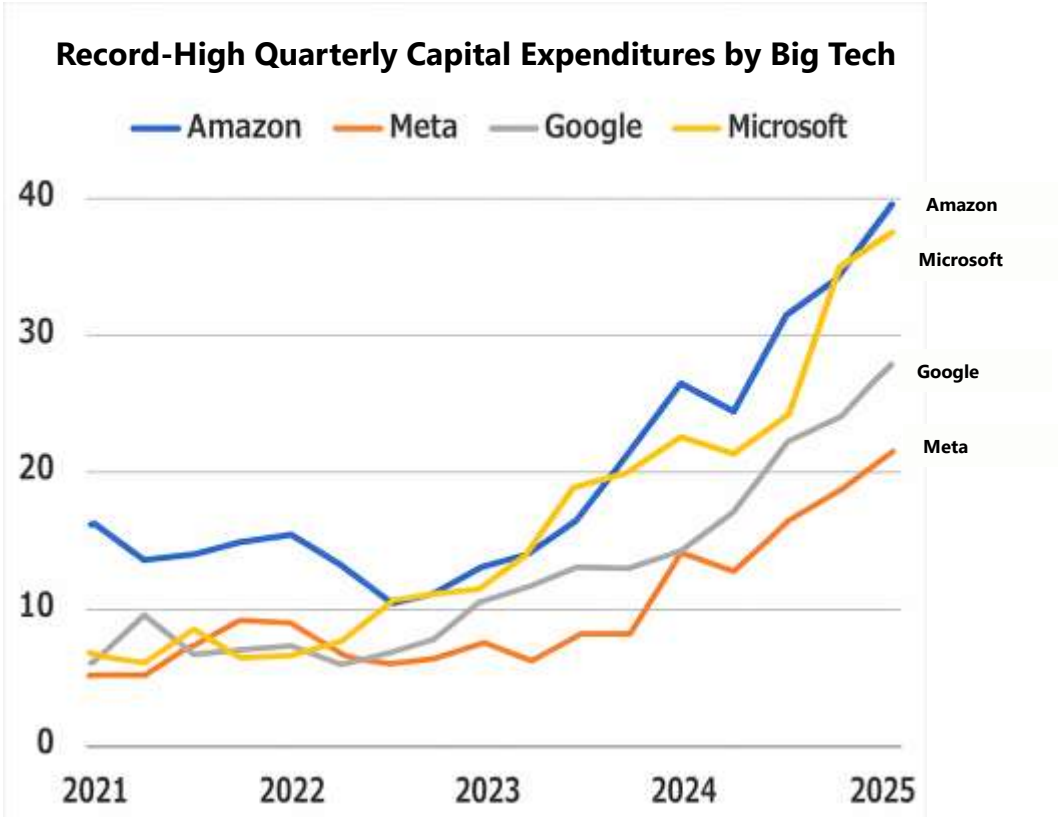
4. Direct Lithography



The global semiconductor market is expected to reach $1 trillion in 2026, driven by strong demand for AI servers and price increases resulting from memory shortages. Investment in AI servers by U.S. Big Tech companies has reached approximately ¥75 trillion annually.

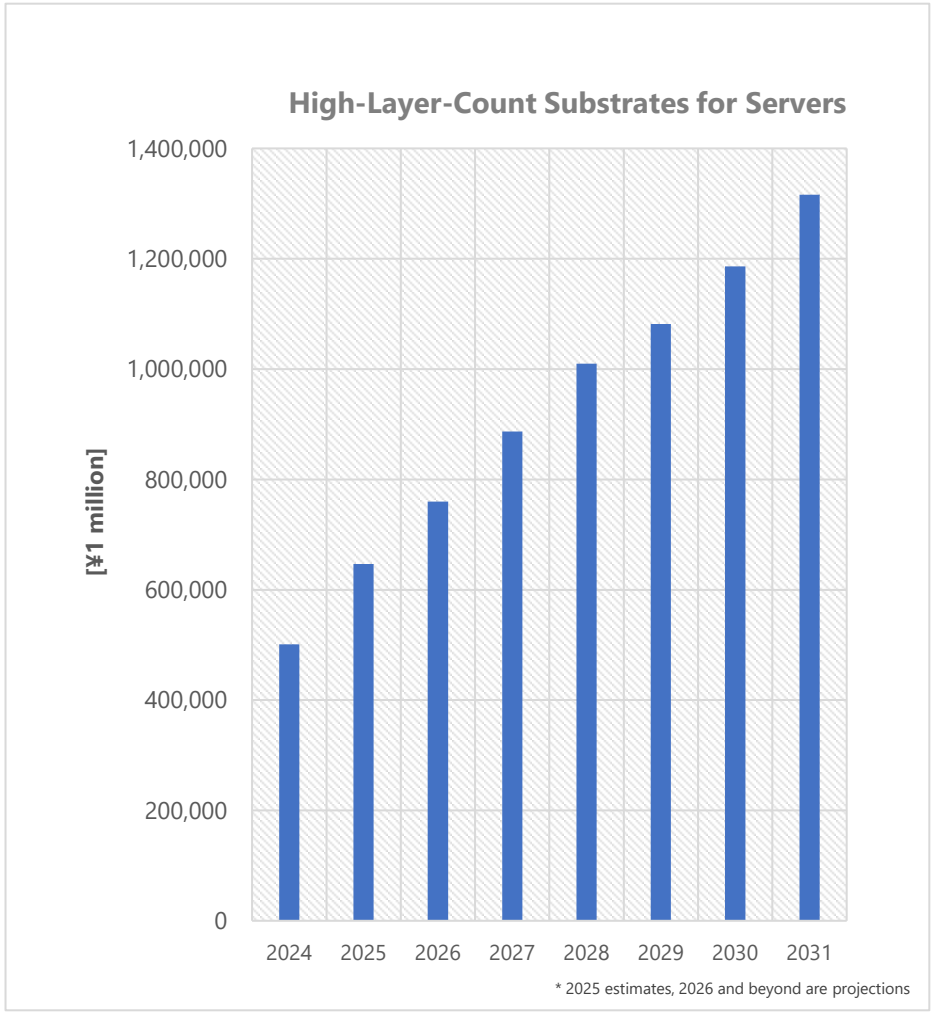


*Graph created based on internal research



*Source: Created in-house based on Bloomberg research reports

We quickly captured market requirements for AI servers and succeeded in commercializing products capable of handling large size and thick/heavy substrates faster than anyone else. Establishing the de facto standard in this field.



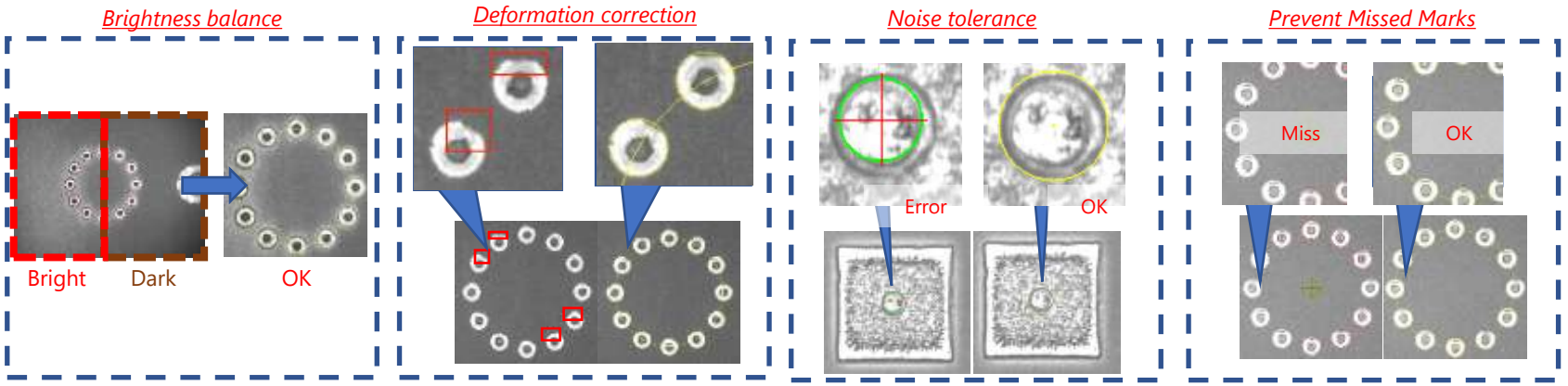
Source: Fuji Chimera Research Institute "2025 Data Center/AI Key Device Market Survey"

The main reasons AI server substrates are becoming larger and heavier are the need to support large-scale data processing for generative AI, which requires significant increases in the number and size of semiconductors (such as GPUs) mounted on them, as well as the addition of extensive power-delivery circuitry and cooling mechanisms to ensure stable operation. Additionally, to enable the high-speed transmission of massive amounts of data with low latency, multiple wiring layers are used within the substrate. Multilayering is also extended to the core, which forms the foundation of the substrate, to mitigate warpage and stabilize power integrity. These factors significantly increase the weight of each substrate.

Utilization of AI in image processing

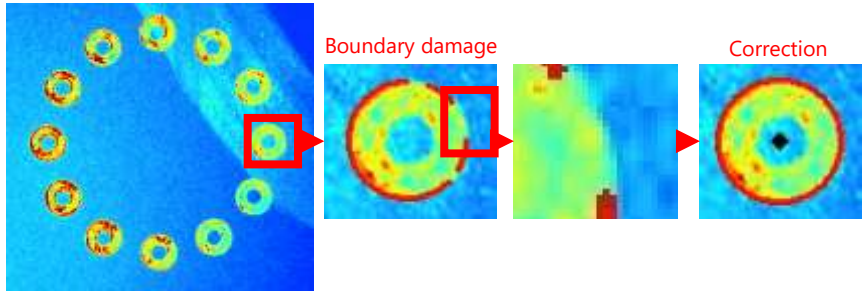
By incorporating a new alignment system using AI+FPGA into the DI lithography equipment system, we aim to achieve high-precision and high-speed alignment mark recognition.

- **Image processing**
  - ✓ Brightness balance
  - ✓ Alignment mark deformation correction
  - ✓ Noise tolerance
  - ✓ Alignment mark miss prevention



- **Alignment mark correction by AI**
  - ✓ AI-based (MobileNet) feature extraction
  - ✓ Keypoint analysis in heatmaps
  - ✓ Regression analysis for mark contour correction

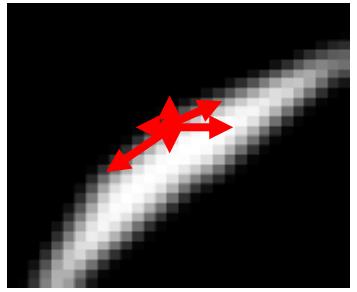
CNN (Convolutional Neural Network)-based keypoint regression analysis



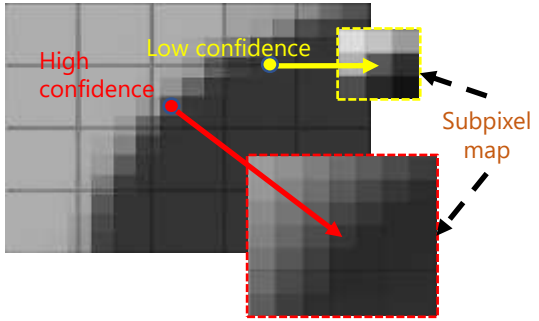
- **High-speed image processing with FPGA**

  Achieved the following with FPGA IP
  - ✓ Blob detection
  - ✓ Pattern matching
  - ✓ Filter-like pixel-level processing

Blob detection - Weighted trace (FPGA IP)



Pattern matching - Adaptive subpixel mapping (FPGA IP)



Business Potential

Among the world's substrate manufacturers, there are a total of 159 companies with production value exceeding US$ 100 million in 2024.
Their total production value is US$85,116 million.

Ranking	CY2024 Production Value (US$ million)		Our DI Installation Track Record As of May 31, 2026	
TOP 1 ~ 25	48,228	57%	21 Company	84%
TOP 26 ~ 50	16,466	19%	13 Company	52%
TOP 51 ~ 75	8,055	9%	12 Company	48%
TOP 76 ~ 100	4,680	5%	3 Company	12%
TOP 101 ~ 125	3,669	4%	4 Company	16%
TOP 126 ~ 150	3,080	4%	3 Company	12%
TOP 151 ~ 159	938	1%	0 Company	0%
Total for 159 Companies	85,116	100%	56 Companies	35%

*Source: N.T. Information Ltd

- Our DI Installations: 56 companies out of the top 159 companies.
- No Installation to date: 103 companies (→ Target potential customers)

Additionally, while there are said to be over 1,000 substrate manufacturers of various sizes worldwide, including these top 159 companies, we conduct sales activities for customers at approximately 600 factories. To date, we have installed over 1,000 DI lithography equipment at 98 companies (230 factories).

These customers, as well as customers that have not yet adopted DI equipment (target prospective customers), are expected to switch from contact-type lithography equipment to DI lithography equipment in the future. Additionally, driven by the strong AI-related market, capital investment is expected to remain robust.

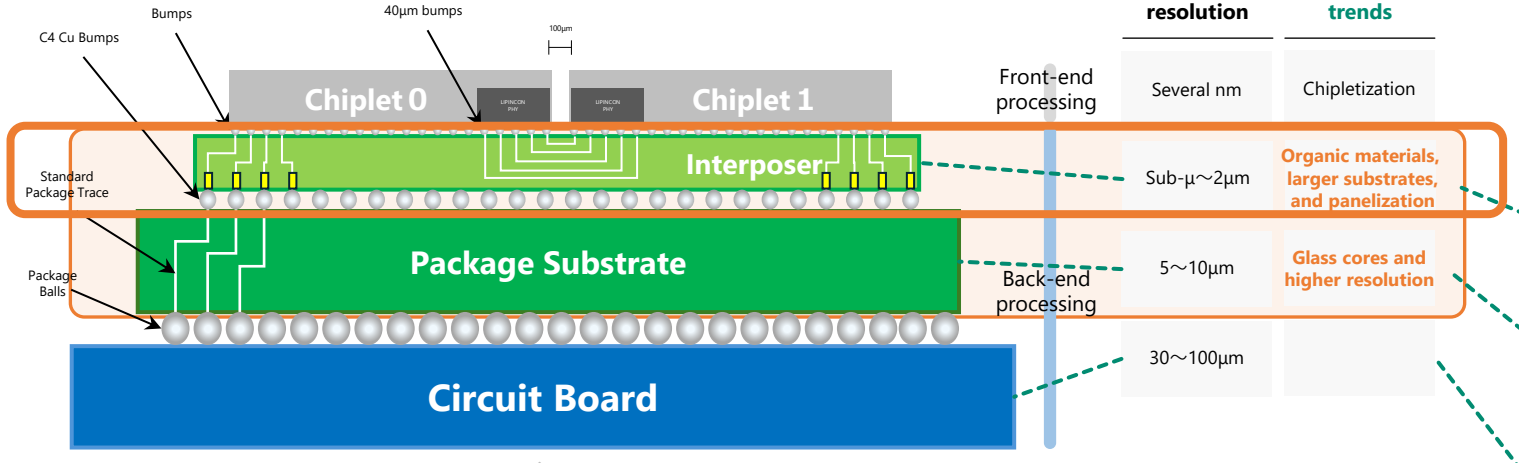
To address this, in addition to improving the performance of various existing lineups that support a wide range of substrate applications as introduced earlier, we plan to meet customer requests and expectations by launching new models currently under development.

2. Lithography Equipment Business

- Industry and Technology Trends in Advanced Packaging
- Stepper for Semiconductor Substrates (UX-5 Series)
- Direct Imaging (DI) Lithography Equipment (INPREX Series)
- Digital Lithography System (DLT System)

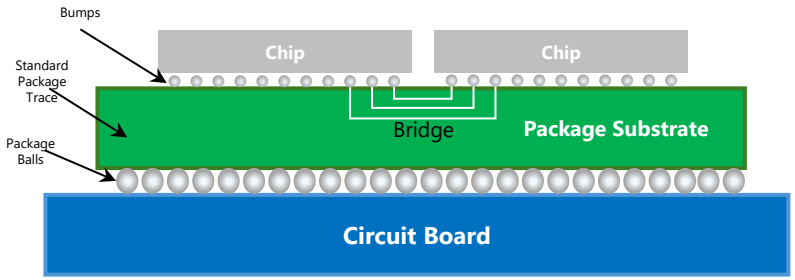
Digital Lithography System (DLT System) for Advanced Packaging

Advanced packaging structure needed for generative AI

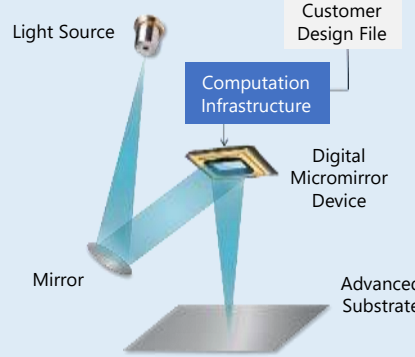


	Required line-and space resolution	Future technology trends
Front-end processing	Several nm	Chipletization
	Sub-μ~2μm	Organic materials, larger substrates, and panelization
Back-end processing	5~10μm	Glass cores and higher resolution
	30~100μm	

Reference: Conventional advanced packaging



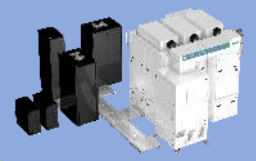
DLT system



Features
- Can transfer patterns directly onto substrates without photomasks
- No field size limitations

Specifications
- Resolution: 1μm to 5μm
- Overlay: ±0.35μm
- Maximum substrate size: 510mm×515mm

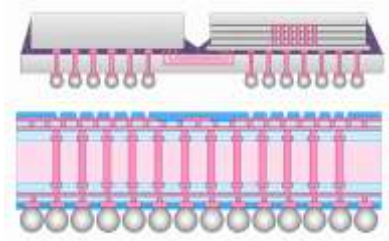
Ushio's lithography equipment lineup

Line-and-space resolution	Direct Imaging	Stepper
<1μm	**DLT system** (with Applied Materials) 	**Stepper** (Ushio) 
5μm	**DI lithography equipment** (ADTEC Engineering) 	
>10μm		

Trends in Advanced Packaging: (1) Higher Density

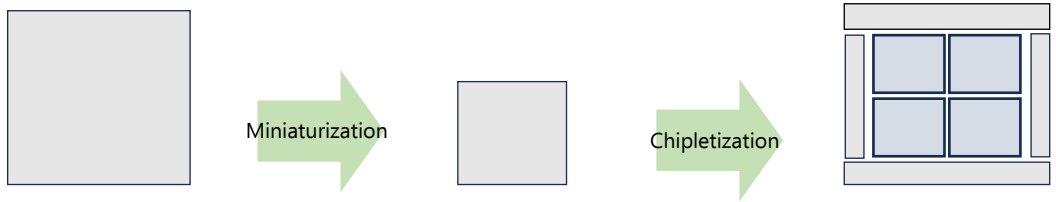
Trend

Miniaturization of Monolithic Device

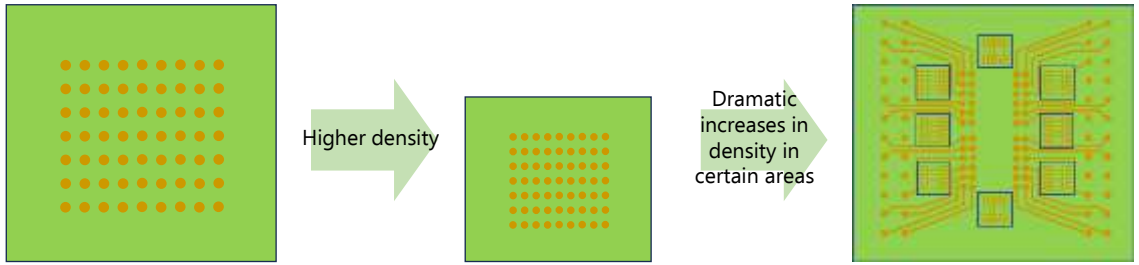


Heterogeneous Integration
Increased capacity for inter-device communication
(Logic-Logic/Logic-Memory)

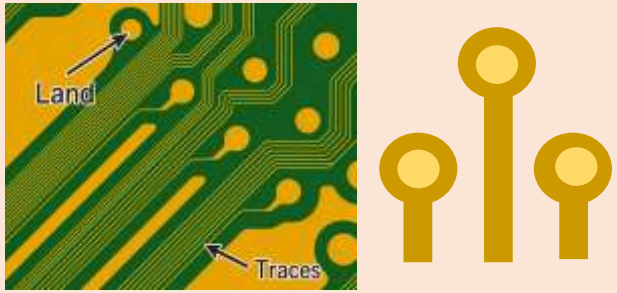
Device



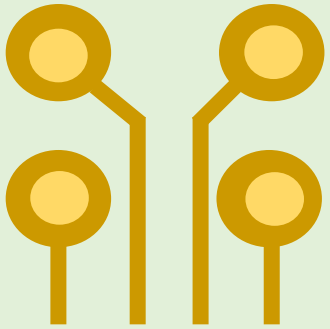
Substrate



Methods for higher density

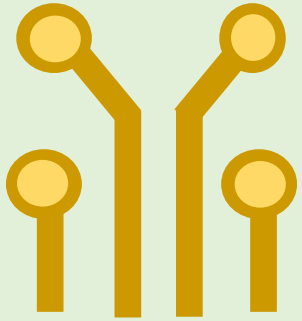


(1) Wiring miniaturization



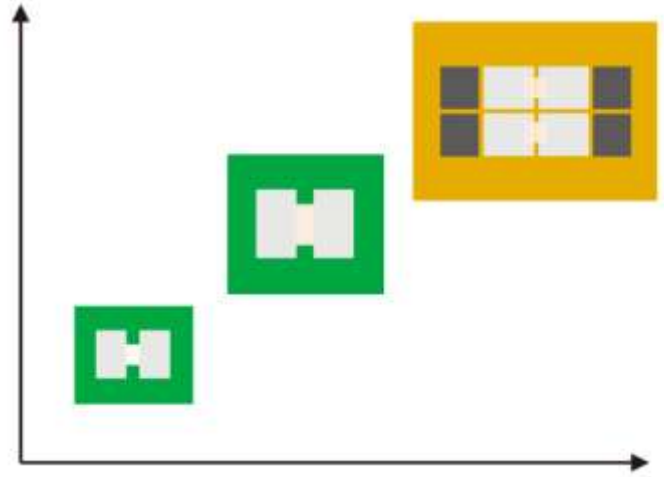
High resolution performance

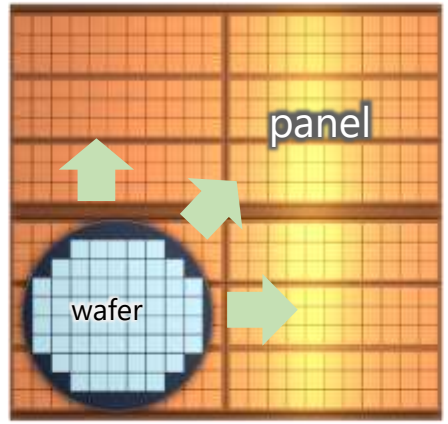
(2) Via/land diameter reduction



High overlay performance

Trends in Advanced Packaging: (2) Larger Package Sizes and Panel-Level Packaging

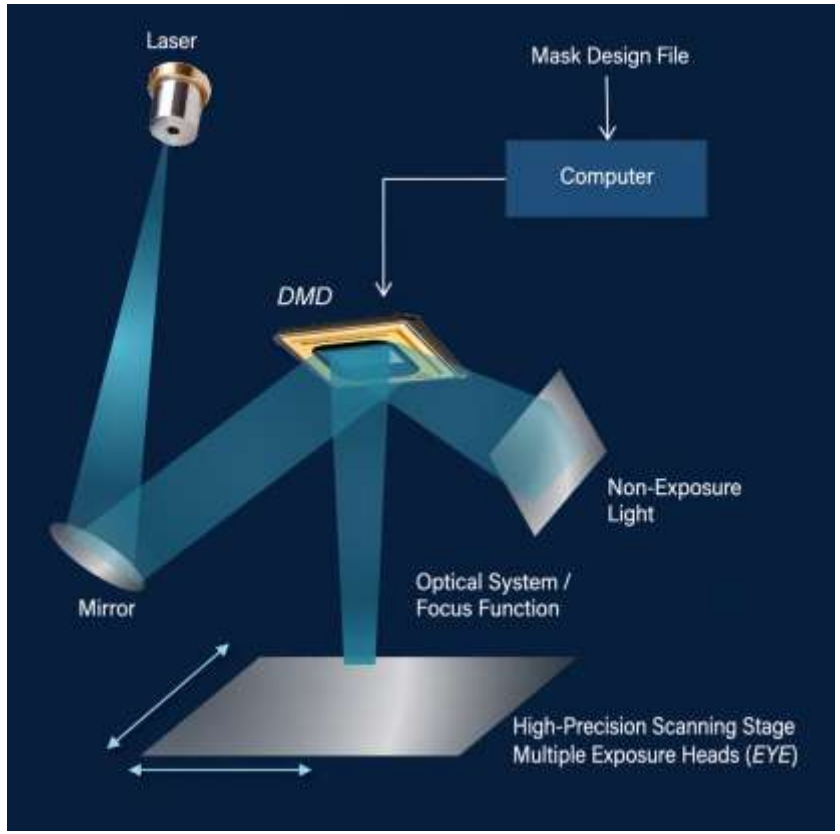


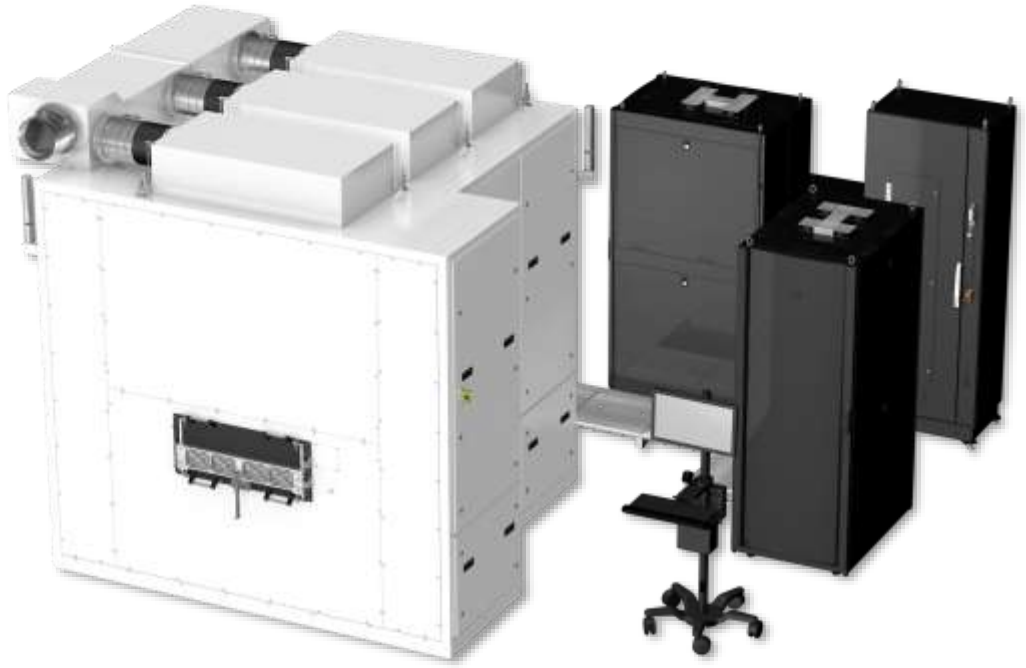


Larger Packaging Sizes
- Integration of more functions into a single package
- Greater diversity in package sizes

Panel-Level Packaging
- Increasing the number of packages per panel, especially at larger sizes
- Meeting growing demand through full-panel processing

DLT System



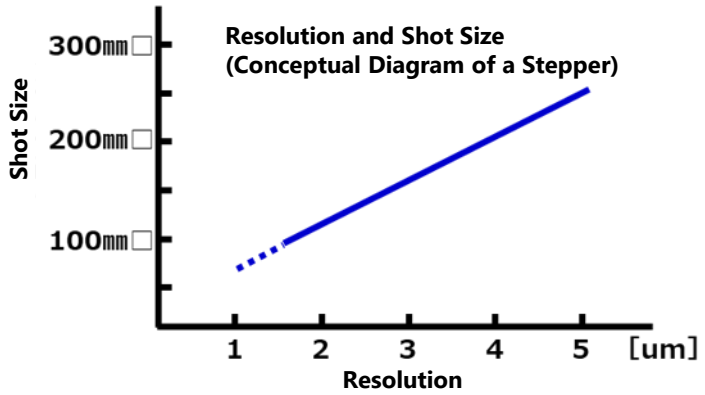


- Fine-Pitch Interconnect Formation
  Direct imaging system designed for mass production of <1µm L/S
- Overlay Accuracy
  Digital correction function to accommodate changes on the substrate side

Specification item	Specification value
Resolution (L/S)	Selectable from 1µm, 2µm, 4µm
Overlay	±0.35µm, ±0.5µm
Material	300mm wf, 515*510mm pnl, etc.

Fine-Pitch Interconnect Formation by DLT System

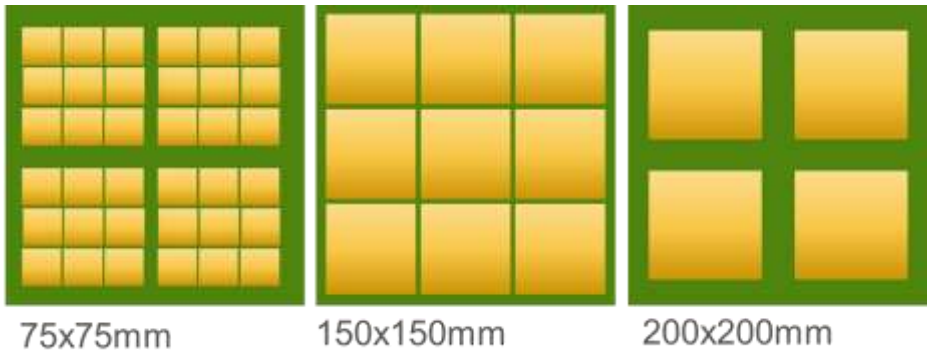
✓ Maintaining high resolution as package sizes increase



*Created based on Ushio research

➢ Maskless lithography achieves high-resolution performance without being constrained by exposure area or packaging size

Packaging size illustration

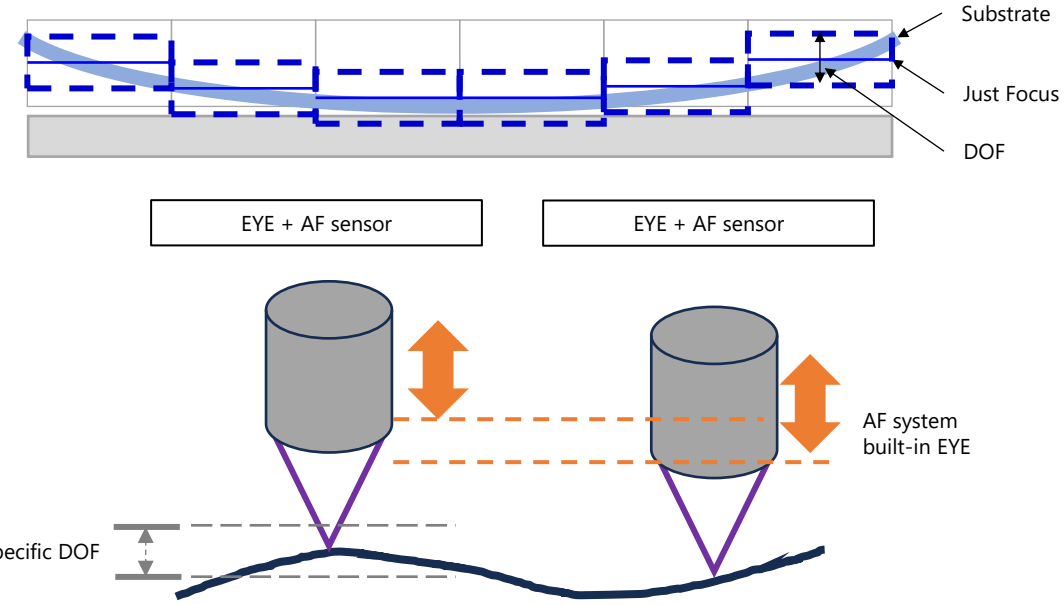


✓ Maintaining full-panel processing and high-resolution patterning with a narrow depth of focus (DOF)

- Resolution performance = k1 × (Wavelength/NA)
- Depth of focus = k2 × (Wavelength/NA^2)

➢ Autofocus for each EYE (lithography head), combined with scanning exposure, accommodates substrate waviness

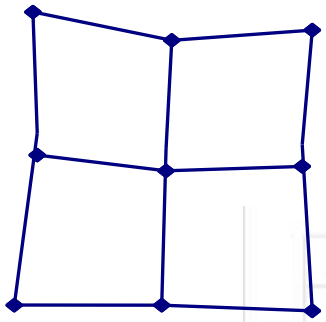
Substrate waviness illustration

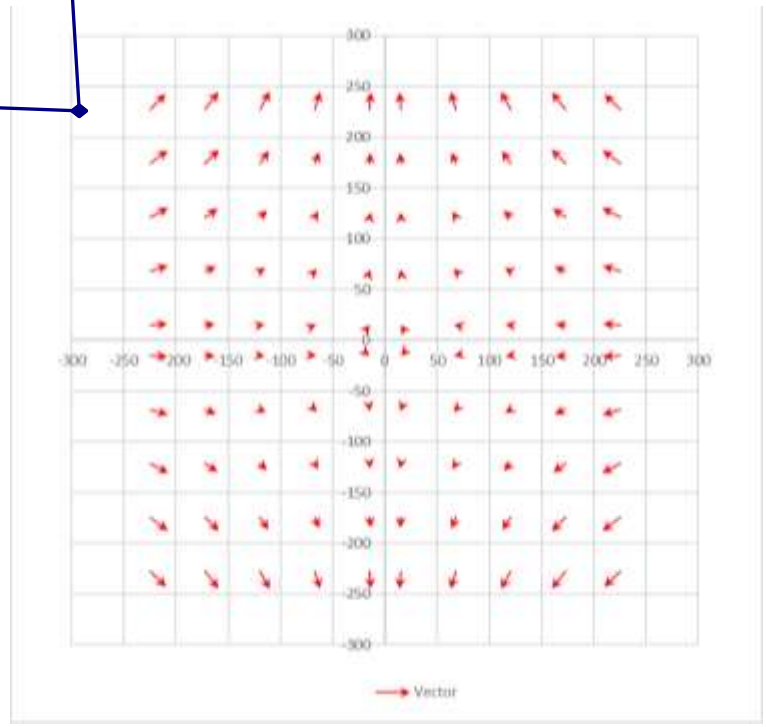


High-Overlay-Accuracy Lithography Using DLT System

✓ Non-uniform displacement of alignment targets

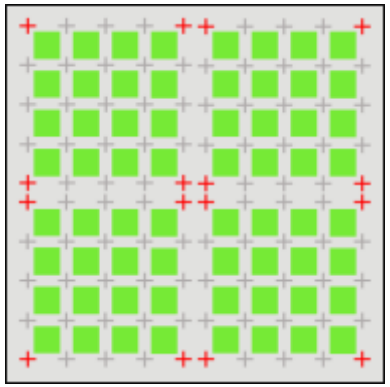
(Illustration)

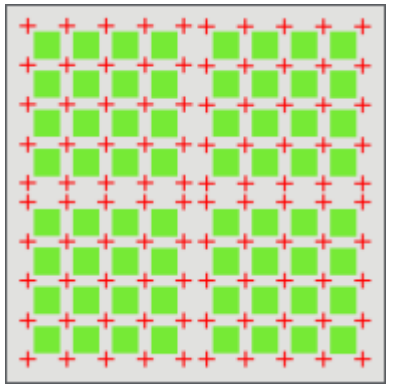




➢ Digital alignment compensates for this displacement, enabling higher overlay accuracy

Schematic diagram of alignment marks and actual product placement on substrate

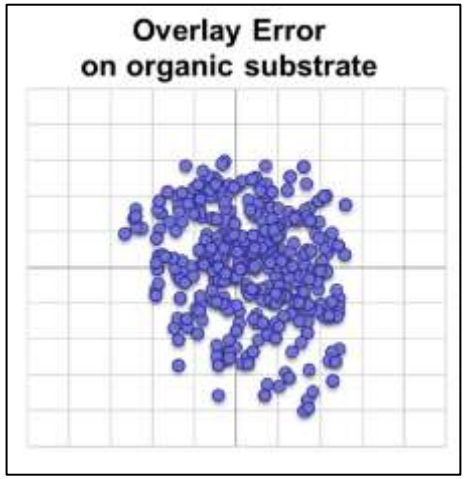


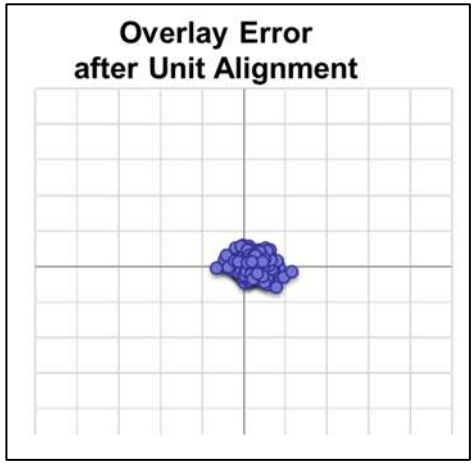


Actual product

Alignment mark position

Example of lithography results illustration





- As package substrates become denser, demand is growing for finer patterning (higher resolution and greater overlay accuracy)

- Growing need to directly connect logic and memory, as well as logic dies, is accelerating demand for finer interconnects.

- Digital Lithography Technology addresses the following challenges and contributes to the advancement of packaging technology:
  - Maintaining high resolution while accommodating substrate waviness
  - Enabling high-resolution patterning even as package sizes increase
  - Addressing the challenges associated with diverse high-precision alignment requirements through digital exposure

3. Photonics Solutions (PHS) Business

Photonics Solutions (PHS)

Creating and providing value with customers in order to contribute to society's advancement through photonics technology

For semiconductor manufacturing equipment
Integration with laser cinemas and AR/VR
Gene sequencing and medical examinations/ testing in ophthalmology and internal medicine

- Providing solutions to worldwide customers in numerous fields
- Focusing on **semiconductor-related fields expected to see significant growth going forward, particularly inspection and measurement applications**

Product Lineup

Device product lineup with wide wavelength and output options

Module product lineup with added functions to laser diode (LD) and light emitting diode (LED)

Wavelength stabilization and narrowbanding

High-brightness white light generation

Fiber output

Photonics Technology
(Optics + Mechanical/Thermal + Electrical/Control)

Output stabilization

Wavelength combining

Beam shaping

Proprietary Technology

High-brightness white light generation technology

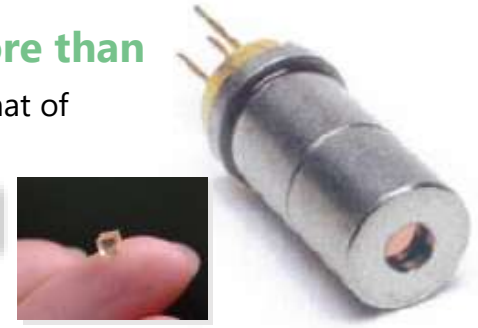
LD combined with proprietary phosphors generate white light with **five times the luminance** of LEDs.

LD Packaging with built-in temperature controller
Achieves stable operation through **precise temperature control**

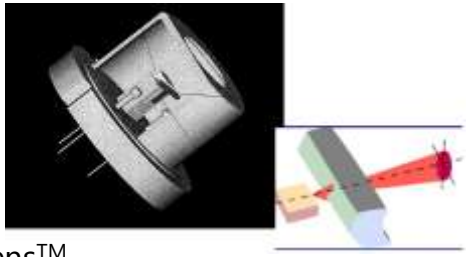
LD packaging with built-in TEC

Built-in micro-diffraction grating.
Wavelength stability more than 100 times greater than that of conventional LDs

VBG wavelength-stabilized LD



LD equipped with µLens™



Equipped with micro optical element µLens™
Increases fiber coupling efficiency by **up to 30%**

Customization

Customizing proprietary light source technology to requirements and **delivering optimal light**. Contributing to performance improvement in customers' various applications

Light Output
Illuminance, stability, fiber coupling efficiency, etc.

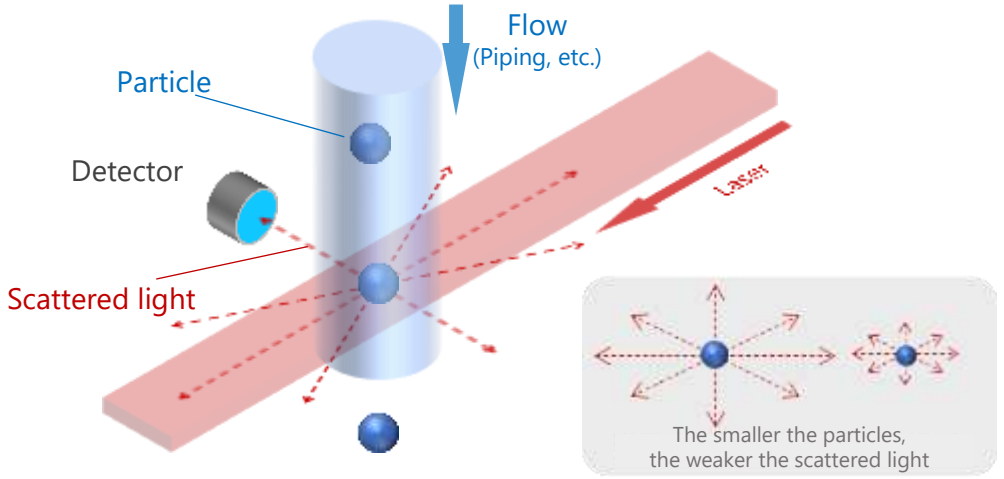
Wavelength
Wavelength accuracy, stability, wavelength width, etc.

Spatial Distribution
Illuminance distribution, angular distribution, beam shape, etc.

Product and Technology Application (Semiconductor-related Measurement) (1)

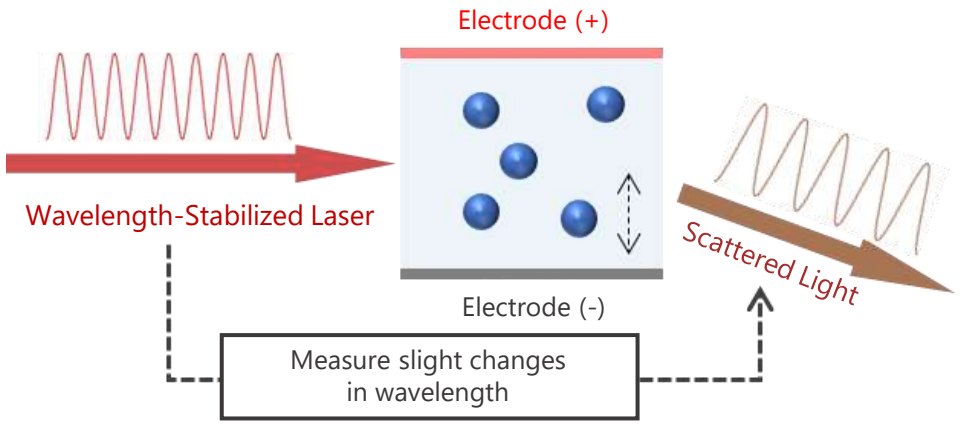
Measurement of ultrafine particles during process

With the miniaturization of semiconductors, monitoring of ultrafine particles in equipment and liquids (pure water and chemicals) has become increasingly important. Fine particles are measured by laser light scattering, but smaller particles produce weaker scattering. **Ushio's lasers, which offer high intensity (high luminous flux density), ideal beam profiles, and high stability,** contribute to accurate measurements.



Management and analysis of chemicals, etc.

Laser light is used to analyze CMP slurry dispersion and reattachment after cleaning and rinsing. Aggregation and dispersion are analyzed based on slight changes in wavelength of light scattered by the particles. **Ushio's laser light, with extremely high wavelength stability**, is used.



LD Packaging with built-in temperature controller
Achieves stable operation through **precise temperature control**

LD packaging with built-in TEC

Built-in micro-diffraction grating. **Wavelength stability more than 100 times greater** than that of conventional LDs

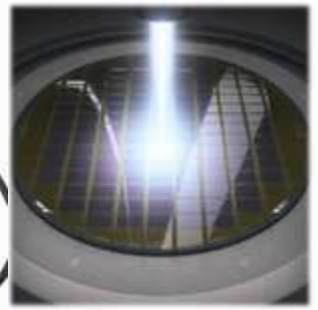
VBG wavelength-stabilized LD

Product and Technology Application (Semiconductor-related Measurement) (2)

Optical inspection with higher definition and higher throughput

Optical inspection (image inspection) is used in all industries, including semiconductors. Stronger and more stable light is needed for high-definition and high-throughput inspection. **Powerful fiber light sources and high-illuminance lighting, enabled by high-brightness white-light sources with 5 times the luminance of LEDs,** are advancing optical inspection.

High-intensity fiber light source



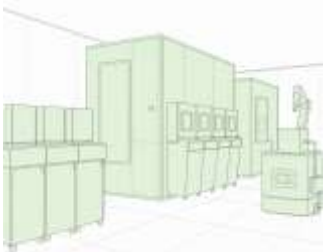
High-illuminance lighting

Mounted in optical inspection equipment, etc.

Contamination management in clean rooms, equipment, etc.

The management and control of minute contamination has become an important issue not only in semiconductor manufacturing processes. Light scattering is used to identify contamination sources and elucidate contamination-generation mechanisms. Lasers are commonly used, but their applications are limited from a safety management perspective. **Ushio's high-brightness white light, which offers high intensity (luminous flux density) while being eye-safe,** is used for the observation and management of ultrafine particles.

Contamination visualization light source system



<Usage Example>
Contamination management in clean rooms, equipment chambers, etc.

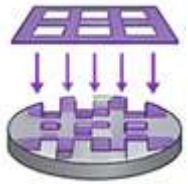
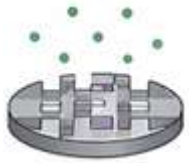
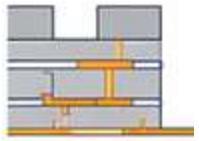
LD combined with proprietary phosphors generate white light with **five times the luminance** of LEDs.

High-brightness white light generation technology

High-brightness white light source module

Requirements and Responses for Measurement Applications Related to Semiconductor Manufacturing

*This image is AI-generated

Process	Film deposition	Lithography	Etching	Cleaning	CMP/Polishing	Wiring	Dicing	Mounting	Molding	Final inspection
										
Main inspection targets	Film thickness/ Refractive index	Alignment/OL	Defects/ Dimensions	Residue	Surface/ Steps	Defects/ Dimensions	Cut surface/ Chipping	Mounting position	Burrs/ Cracks	Appearance
Main optical methods	**Ellipsometry/ Reflection rate**	**Diffraction/Scattering images**	**Diffraction/ Scattering images**	**Diffraction/ Scattering images**	**Ellipsometry/ Scattering**	**Optical inspection**	**Optical inspection**	**Optical inspection**	**Optical inspection**	**Optical inspection**

Ultrafine Particle and Contamination Control

- **In equipment/ chemicals**
- **In clean room**

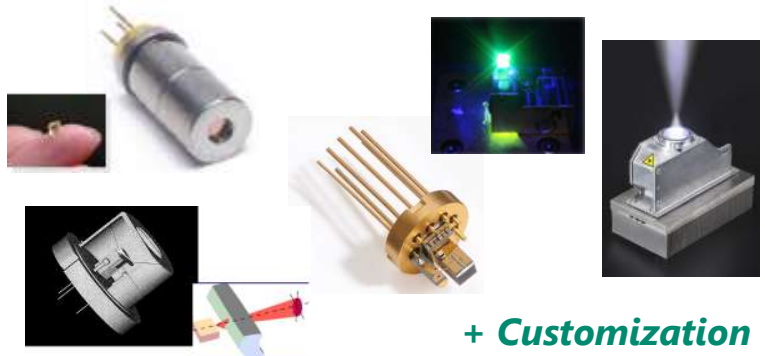
Trends in Measurement Requirements

- Faster optical inspection, smaller detection targets
- Faster interference and spectroscopic methods using lasers
- Detection and measurement of smaller contamination and particles

Trends in Light Source Requirements

- Higher illuminance lighting
- More stable light sources (wavelength, output, etc.)
- Efficient light delivery and shaped beams
- Light source that can be used safely

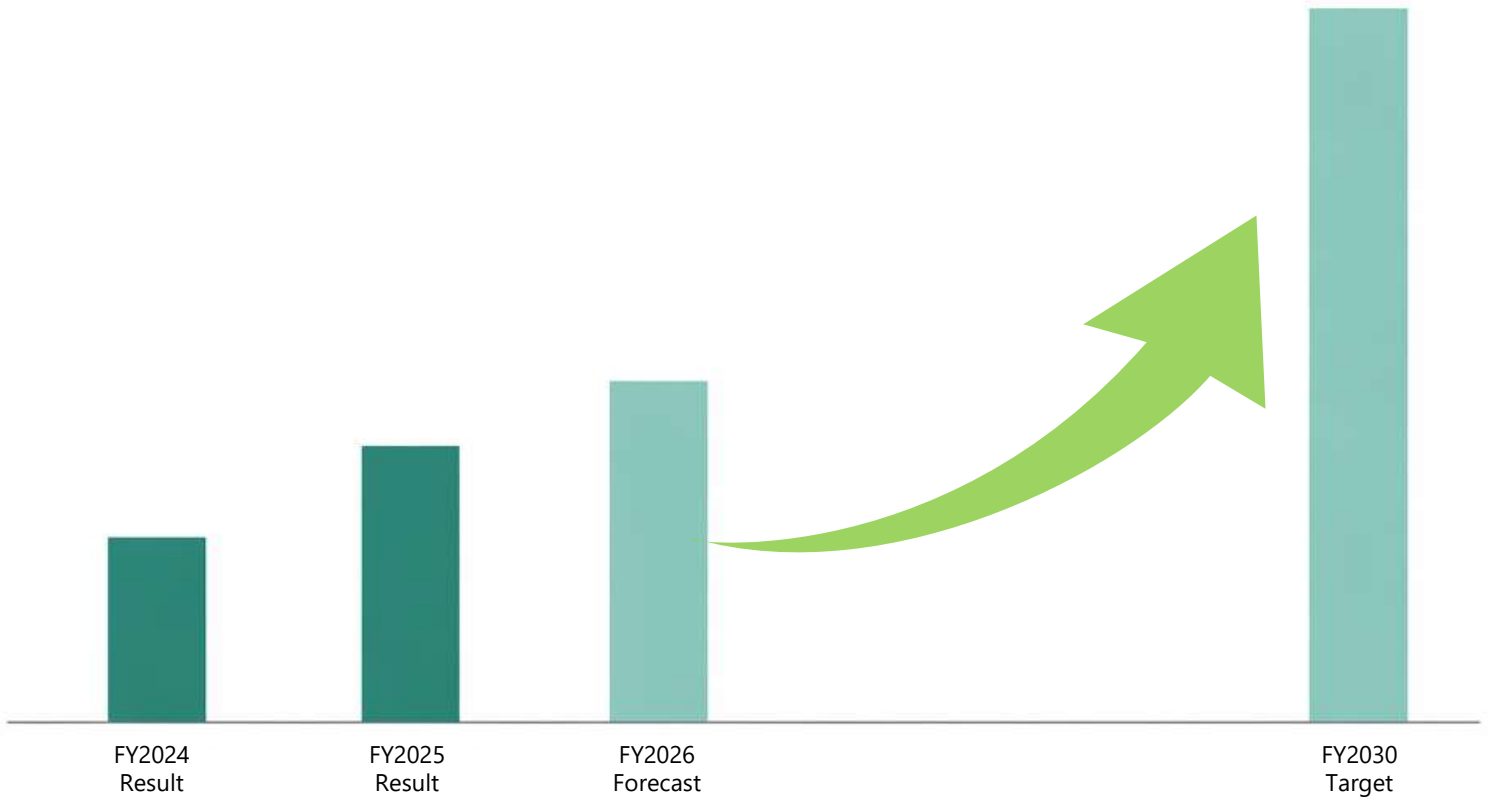
Product Lineup that Meets Requirements



Business Potential

- We plan to achieve significant growth in the semiconductor measurement and inspection business.
- By meeting increasingly sophisticated measurement and inspection needs through value-added functionality and customization, we aim to further expand our business opportunities.

Reference: Projected sales trend in growth fields



Semiconductor measurement and inspection (Growth driver)

- Optical inspection (Image inspection)
- Particle measurement
- Contamination management
- Interferometric measurement and others

+

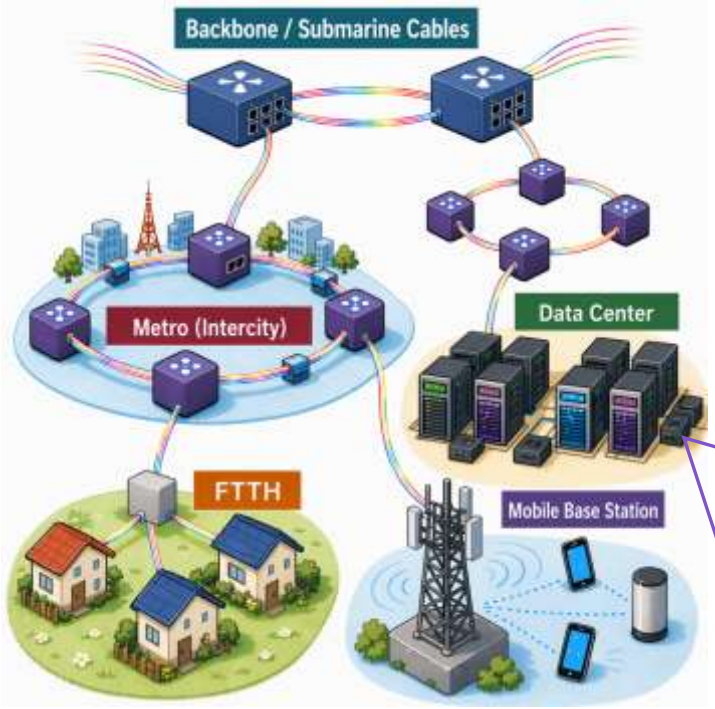
Others (Biomedical equipment, etc.)

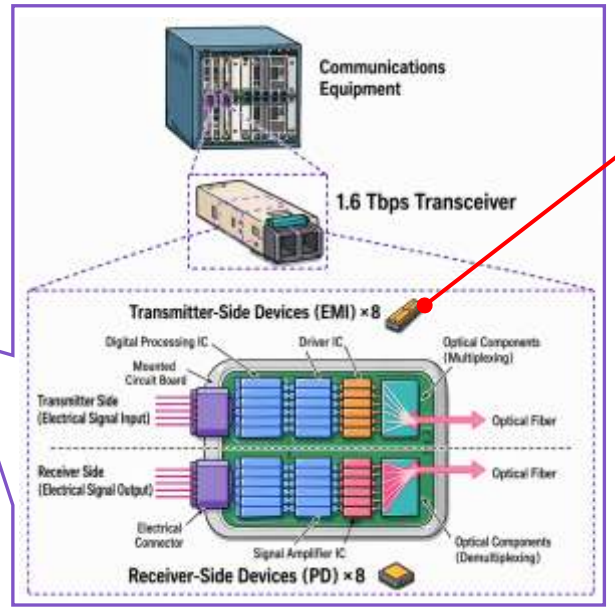
4. New Business Projects

- Photonics-Electronics Convergence Initiatives
- Light Sources for Semiconductor Inspection
- PFAS Decomposition Using Light

Introduction

With growing demand for generative AI, the computational workload for LLM (large language model) training continues to increase.
AI data centers are being built one after another, and optical transceivers for inter-server communication are in particularly short supply.

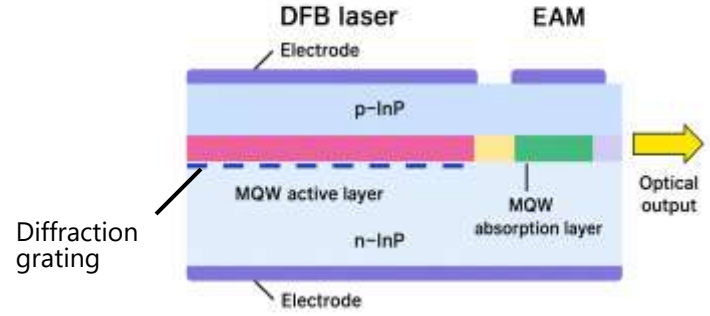




*This image is AI-generated

DFB laser (distributed-feedback lasers) and EML chips incorporating electro-absorption modulators (EA modulators) are used in transmitter-side devices.

EML Chip Structure

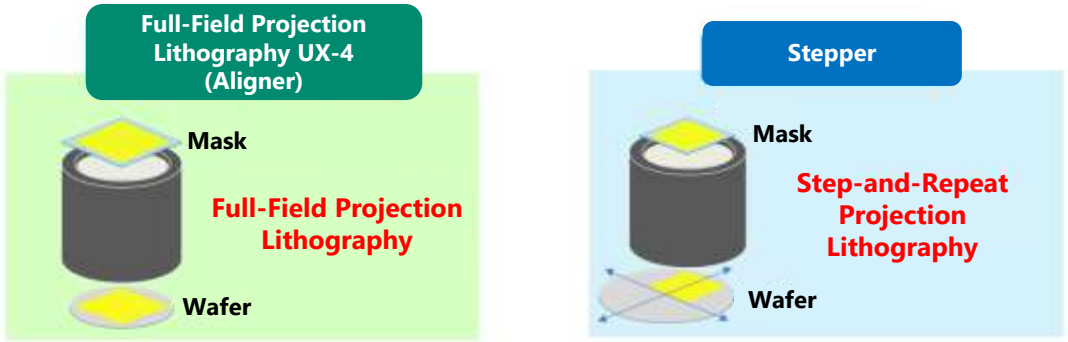


UX-4 is used in the manufacturing process for EML laser devices, and **interference lithography** may be applicable to the formation of diffraction gratings in the DFB laser section.

In the future, optical transceivers are expected to be increasingly replaced by CPO (co-packaged optics), but demand for laser light sources (DFB lasers) is expected to increase because they remain essential.

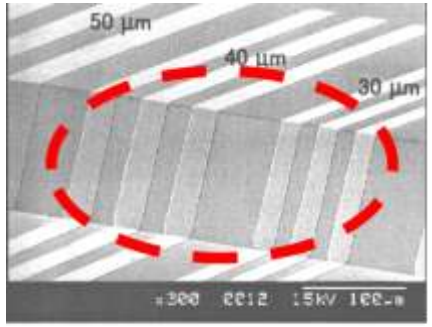
● UX-4 Series

- High productivity

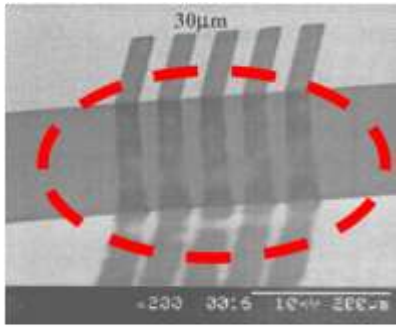


**Thick photoresists often require a high exposure dose.
The UX-4 enables exposure with higher productivity than steppers using the step-and-repeat exposure method.**

- Deep depth of focus



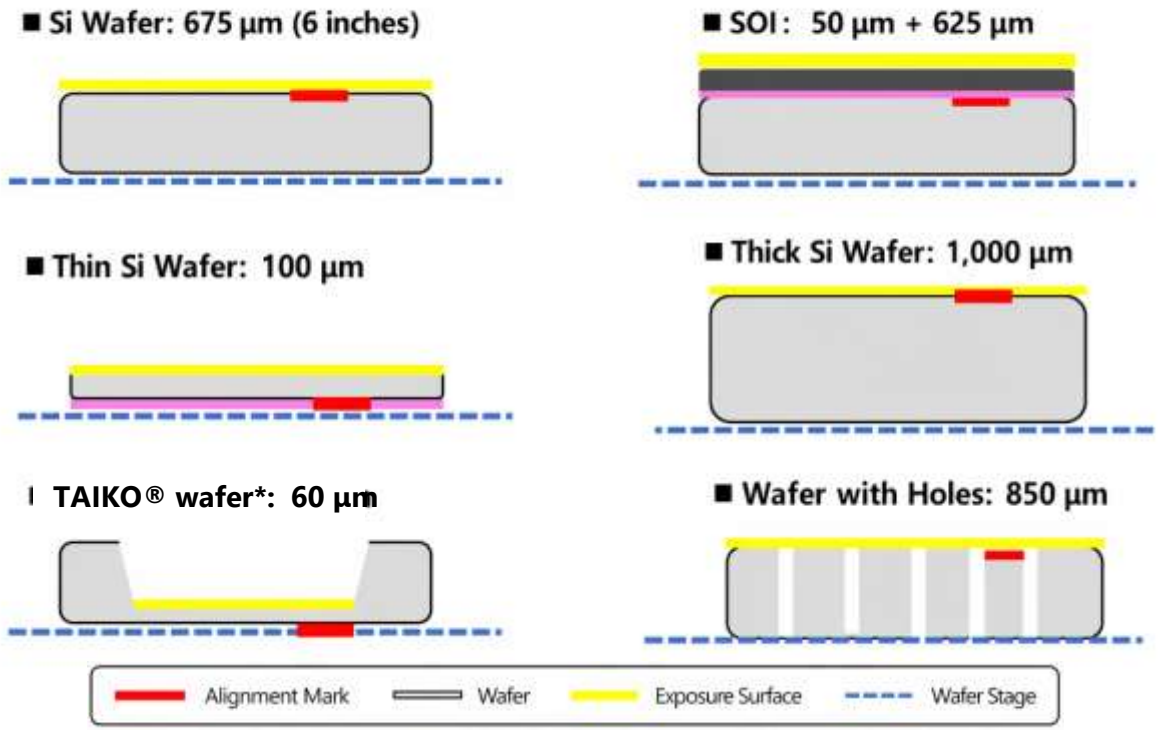
Projection Lithography



Proximity Lithography

Stable pattern formation even on stepped structures

- Compatible with various wafers

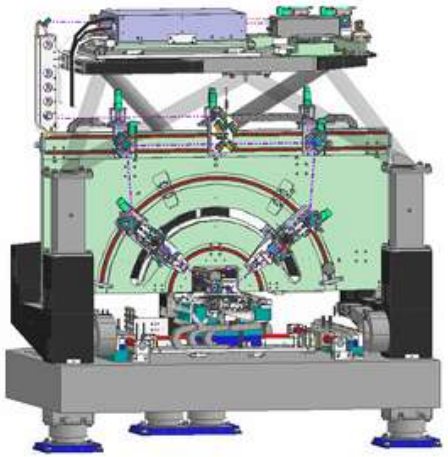


Compatible with wafers for various applications

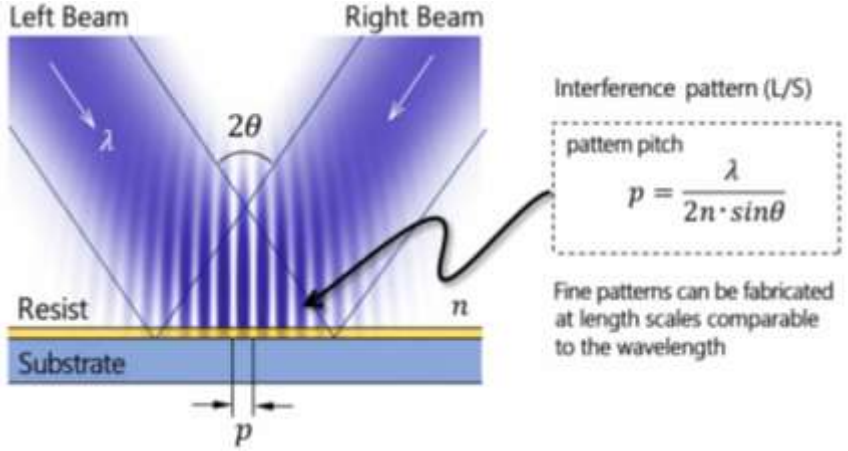
*'TAIKO' is a registered trademark of DISCO Corporation in Japan and other countries.
"Registered Trademark No. 5297658" "Registered Trademark No. 6874049"

● Interference lithography equipment (Under development)

- Equipment exterior diagram



- Principle



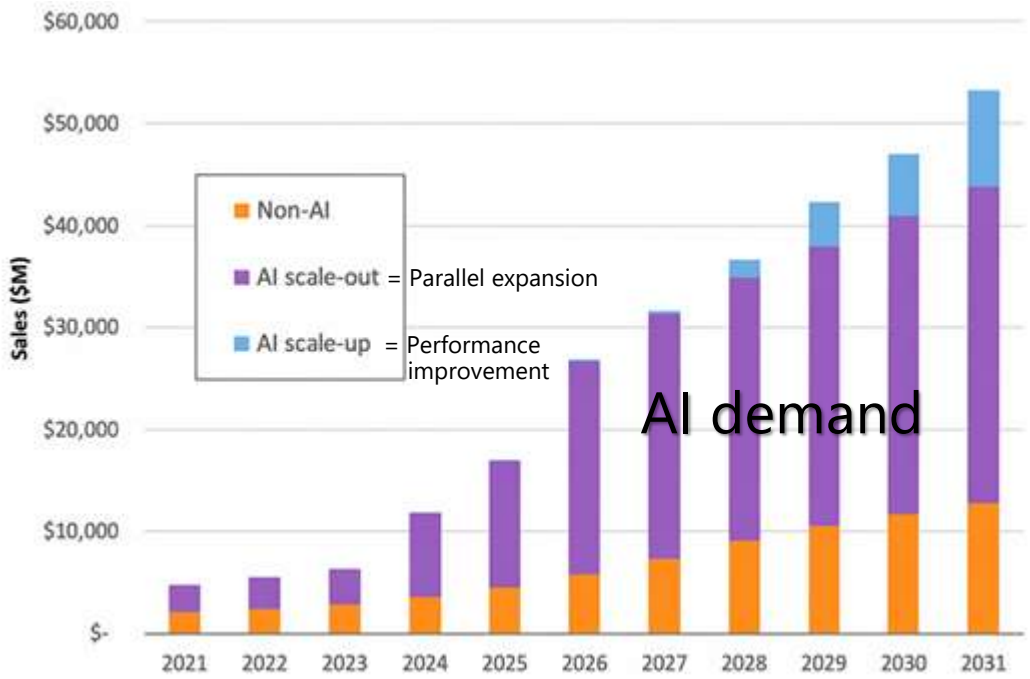
- Comparison of exposure processes for DFB laser diffraction gratings

	Item	Interference lithography	EB (Electron Beam) *Current method
Current pressing issues →	Takt time	○ 4w/h	× 0.1w/h
	Resolution	○ >150nm	○ >150nm
Future challenges as requirements for wavelength accuracy become more stringent →	Pitch accuracy	○ 0.01nm	△ Approx. <1 nm

Achieving both high-pitch accuracy and high throughput

○: Meets requirement / △: Partially meets / ×: Does not meet

Market Environment and Target Customer Segment



Source: Created by Ushio based on Lightcounting's optical transceiver and Co-Packaged Optics (100Gbps and above) Net sales forecast (Jan. 2026)

Sales Forecasts for Optical Transceivers and CPOs (100Gbps and above) (as of Jan. 2026)

Demand is increasing due to the generative AI boom

Ranking	Company Name	Headquarters Country	Manufacturing Sites
1	Lumentum	United States	US/JP/UK
2	Coherent	United States	US
3	Mitsubishi Electric	Japan	JP
4	Source Photonics	United States	US
5	Broadcom	United States	US
6	Sumitomo Electric	Japan	JP
7	Applied Optoelectronics	United States	US
8	NTT Electronics	Japan	JP

Source: Created based on 2025 in-house survey

Among them, the top two companies, Coherent and Lumentum, have received $2 billion investment from NVIDIA

- UX-4 series

Development has been completed, and the product is now commercially available.

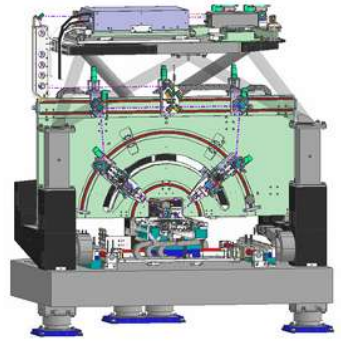
(Reference) News Release
Orders Now Open for the New Product “UX-45114SC” of the UX-4 Series, Full Field Projection Aligner for Wafers

- Interference lithography equipment (Under development)

Product commercialization is under consideration toward sales in 2027.

(Reference) News Release

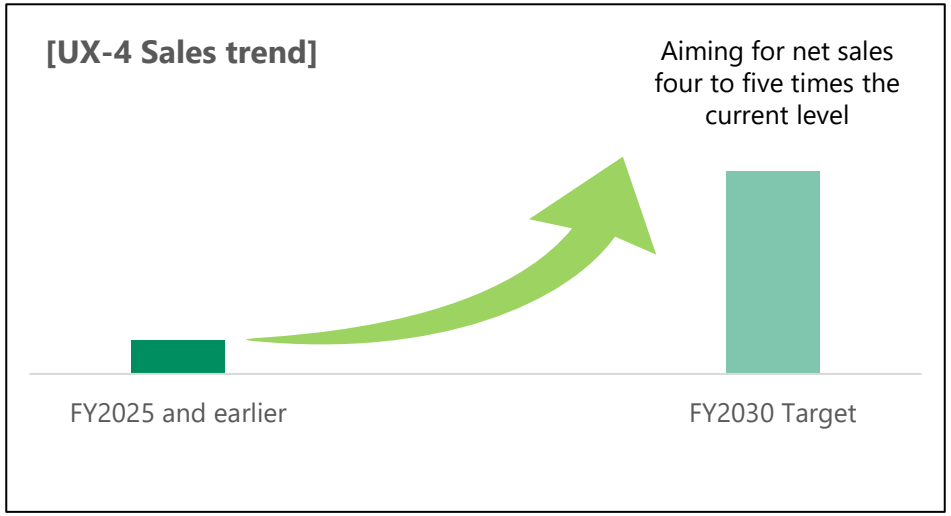
Responding to Photoelectronic Fusion - Ushio Develops New Interference Lithography Equipment with Pitch Compensation Optics and Phase Shift Formation Function



Business Potential: **Driven by generative AI demand, steady growth is expected**.

- UX-4

  In addition to EML lasers, demand is also expected to increase for receiver-side photodiodes, crystal oscillators, and power semiconductors used in AI data centers and related facilities.



- Interference lithography

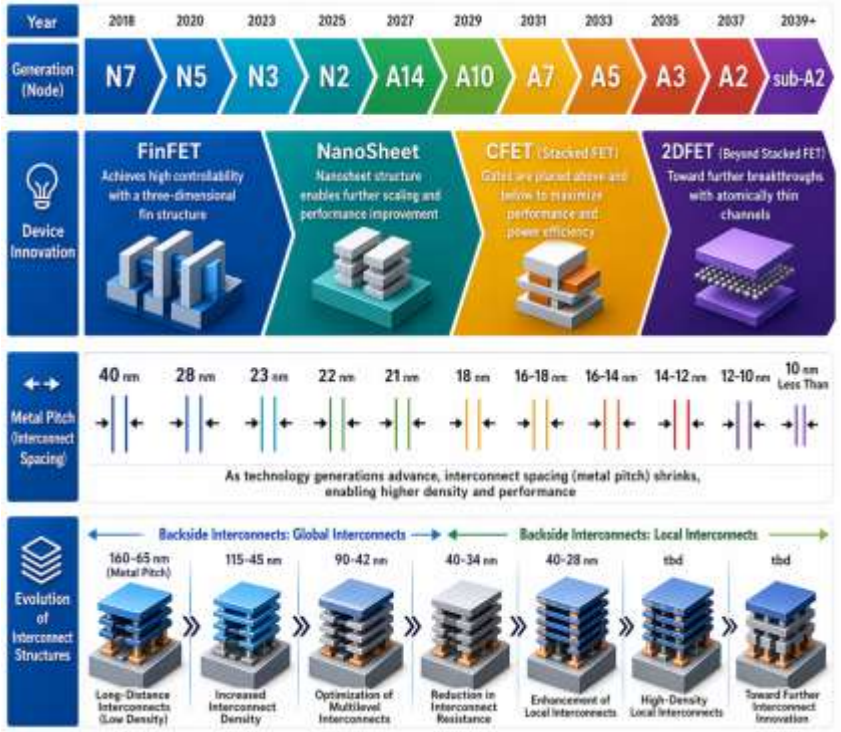
  Regarding interference lithography, development is currently underway, and laser manufacturers are conducting device evaluations. Future applications are expected to expand to waveguides for AR devices.
  However, as demand is already increasing rapidly, the key will be whether the technology's superiority is recognized through these evaluations and whether it can enter mass production at the appropriate time.

4. New Business Projects

- Photonics-Electronics Convergence Initiatives
- Light Sources for Semiconductor Inspection
- PFAS Decomposition Using Light

Semiconductor Market Direction and Need for Inspection

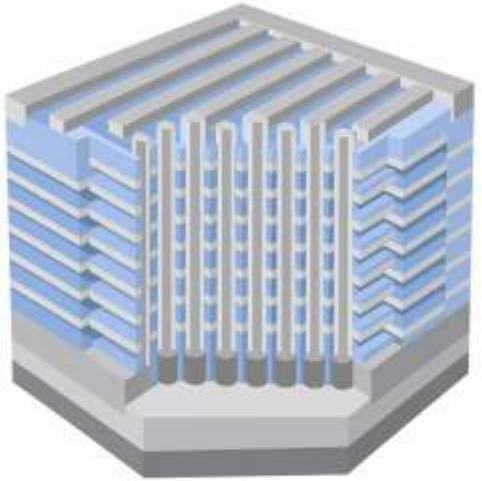
Advanced Logic Device Roadmap



*This image is AI-generated based on Ushio's research

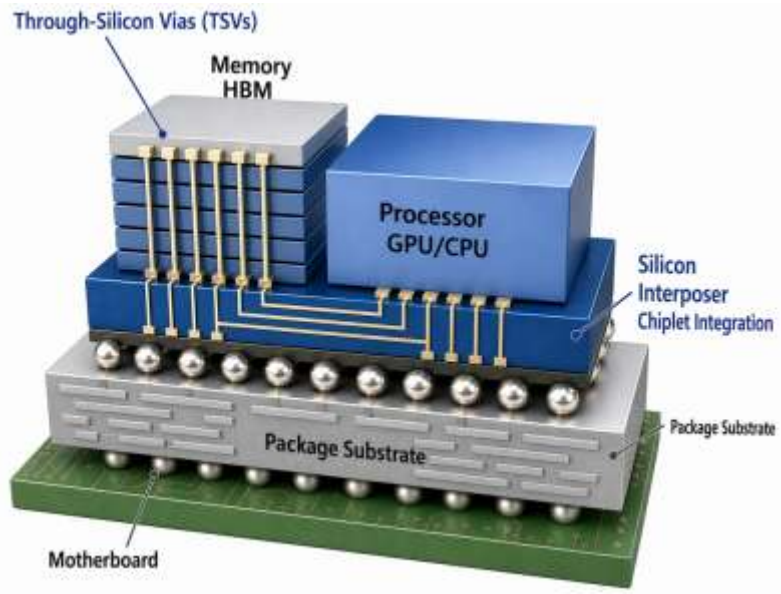
With the combination of EUV and multi-patterning, pattern edge roughness and shape variations become apparent.
Precise defect management is essential, including defect inspection of unpatterned wafers and frequent monitoring of processes and equipment.

3D NAND



3D Flash Memory

With high-aspect-ratio structures exceeding 200 layers, nondestructive metrology capable of probing deep into the structure becomes essential.

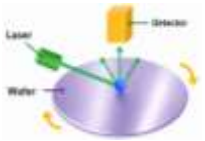


*This image is AI-generated

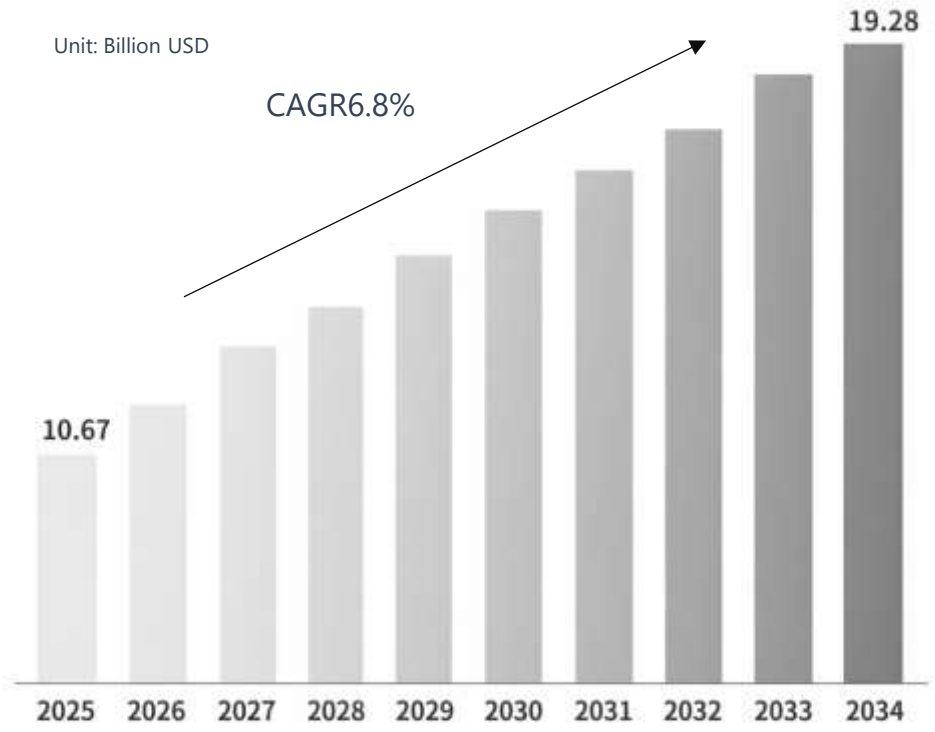
With the proliferation of 2.5D/3D packaging of HBM and logic for AI accelerators (such as CoWoS) and chiplet structures, the quality of fine-pitch joints such as TSVs (through-silicon vias) and μ-bumps affects system performance and yield.

Inline X-ray and optical inspection are seeing rapid growth.

Technology and Product Overview, Uniqueness, and Development Status

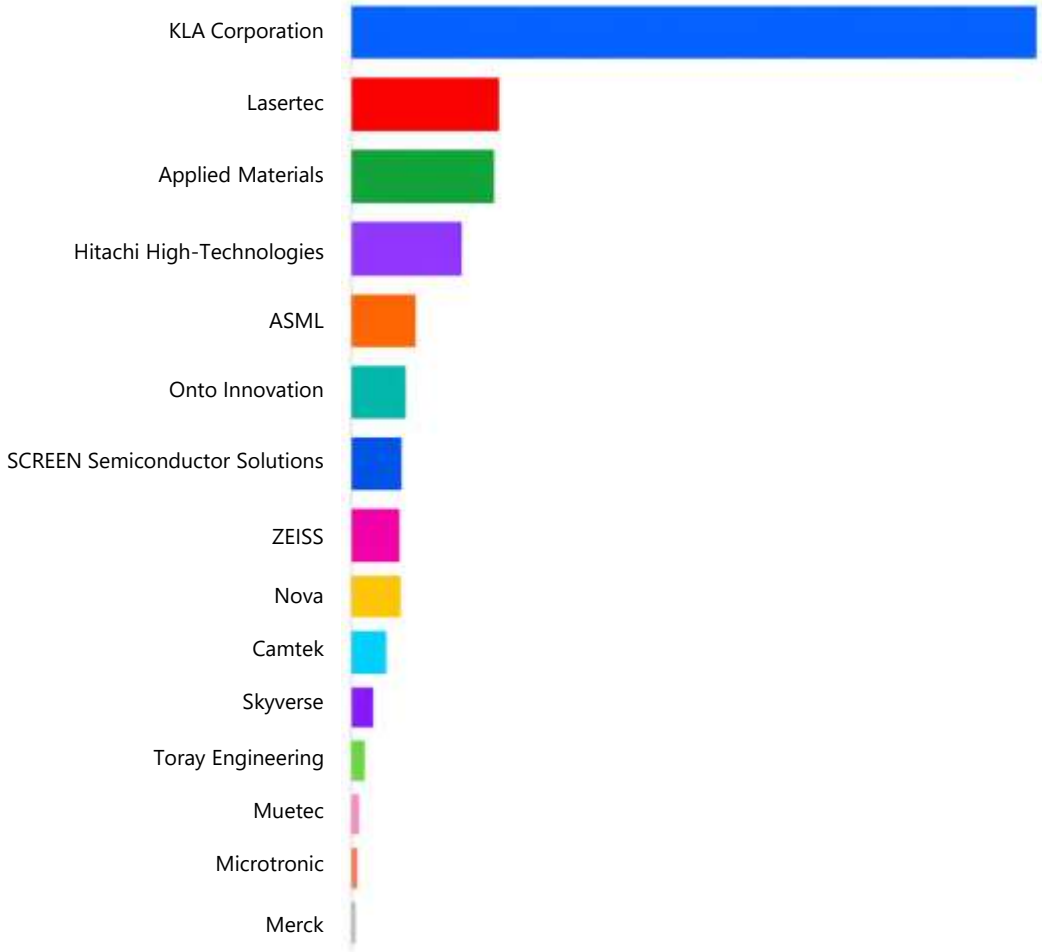
	High-brightness X-ray/ EUV light source (Laser Produced Plasma) **Under development**	Time-stretch spectroscopy technology **Under development**
Appearance Image	 "Photo courtesy: TNO"	
Features	- Irradiating liquid metal with high-intensity laser - Emitting EUV and X-rays with wavelengths of 20 nm or less - Suppressing debris generated from metal plasma	- High-speed measurement (microseconds to milliseconds per measurement) - Non-destructive and non-contact
Application	- Mask and wafer inspection	 - Scatterometry (3D structure analysis, overlay analysis)  - Detecting scattered light from particles and defects *Created by Ushio using AI based on Semi journal
Development status	- In discussions with inspection equipment manufacturers	- Exploring applications in the semiconductor inspection market

Business Potential (Market Environment and Target Customer Segment)



*Source: Created by Ushio based on semiconductor inspection equipment market forecast data through 2033 from Business Research INSIGHTS

Semiconductor inspection equipment market size



*Source: Created by Ushio based on the ranking and market share of the top 15 companies in the global semiconductor metrology and inspection market from LP Information

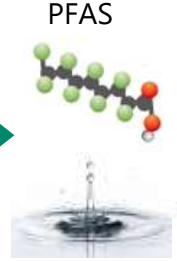
Global major manufacturers and rankings

4. New Business Projects

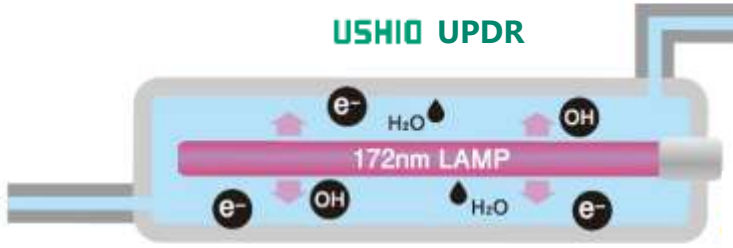
- Photonics-Electronics Convergence Initiatives
- Light Sources for Semiconductor Inspection
- PFAS Decomposition Using Light

Water containing PFAS is becoming subject to regulation, but no detoxification technology has yet been established worldwide. Ushio will provide a detoxification solution utilizing optical technology.

PFAS

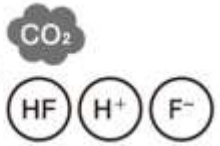


USHIO UPDR



UshioPfasDecompositionReactor

Inorganic substances



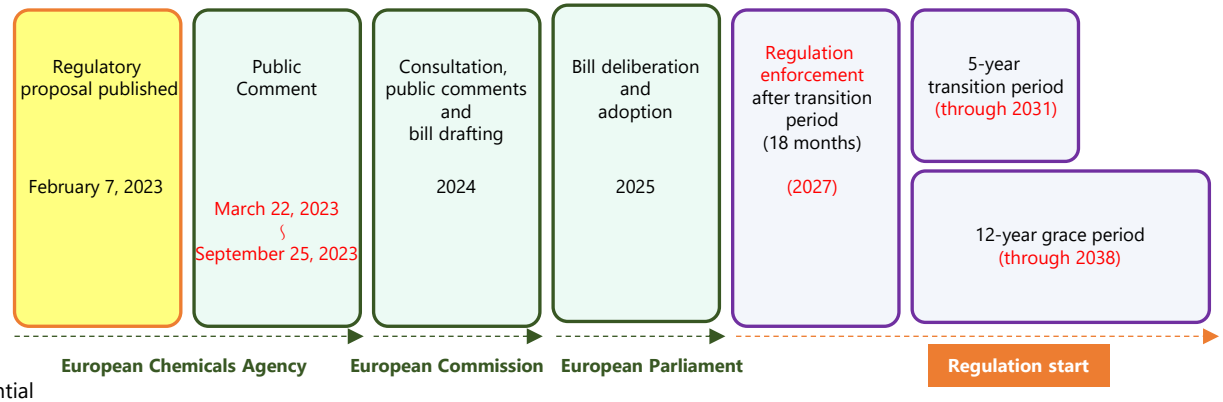
Aqueous HF solution

Detoxify

Fluorite

By adding $Ca(OH)_2$, fluoride is converted to calcium fluoride

Following PFOA, PFOS, and PFHxS, all fluorinated compounds are also being considered for regulation.



Using VUV light with high decomposition capability, PFAS, a persistent substance, is directly decomposed.

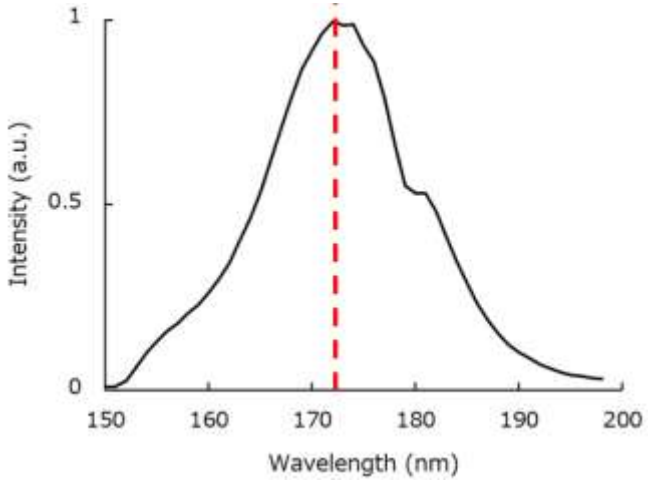
Applying Excimer Lamp Technology

Excimer lamps

The world's first lamp commercialized by Ushio Inc.
Applied to LCD substrate cleaning processes and semiconductor manufacturing processes, this lamp has an established track record of commercial use.

Worldwide share
90%

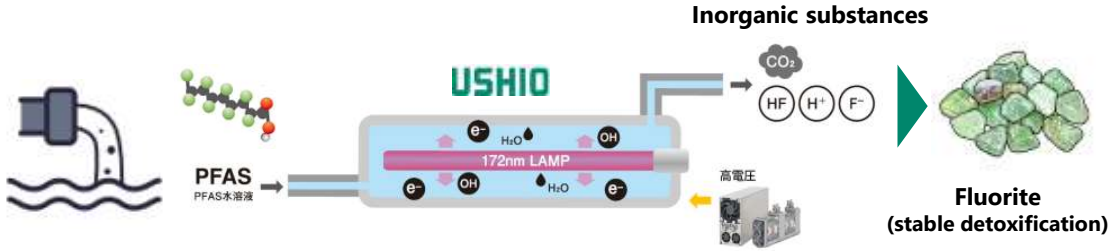
Share based on internal investigation
(As of March 31, 2026)



Center wavelength: 172nm

Features

Direct decomposition using light, hydrated electrons, and OH radicals (a one-of-a-kind technology for light-based decomposition).
At room temperature and pressure, no fuel or additives are required, and short-chain molecules can also be decomposed.
Enables on-site detoxification, unlike existing treatment technologies such as activated carbon.



Background

PFAS is a key industrial material, but it is increasingly becoming subject to regulation. PFAS decomposition technology has not yet been fully established, and amid growing public attention, countermeasures are urgently needed in this market.

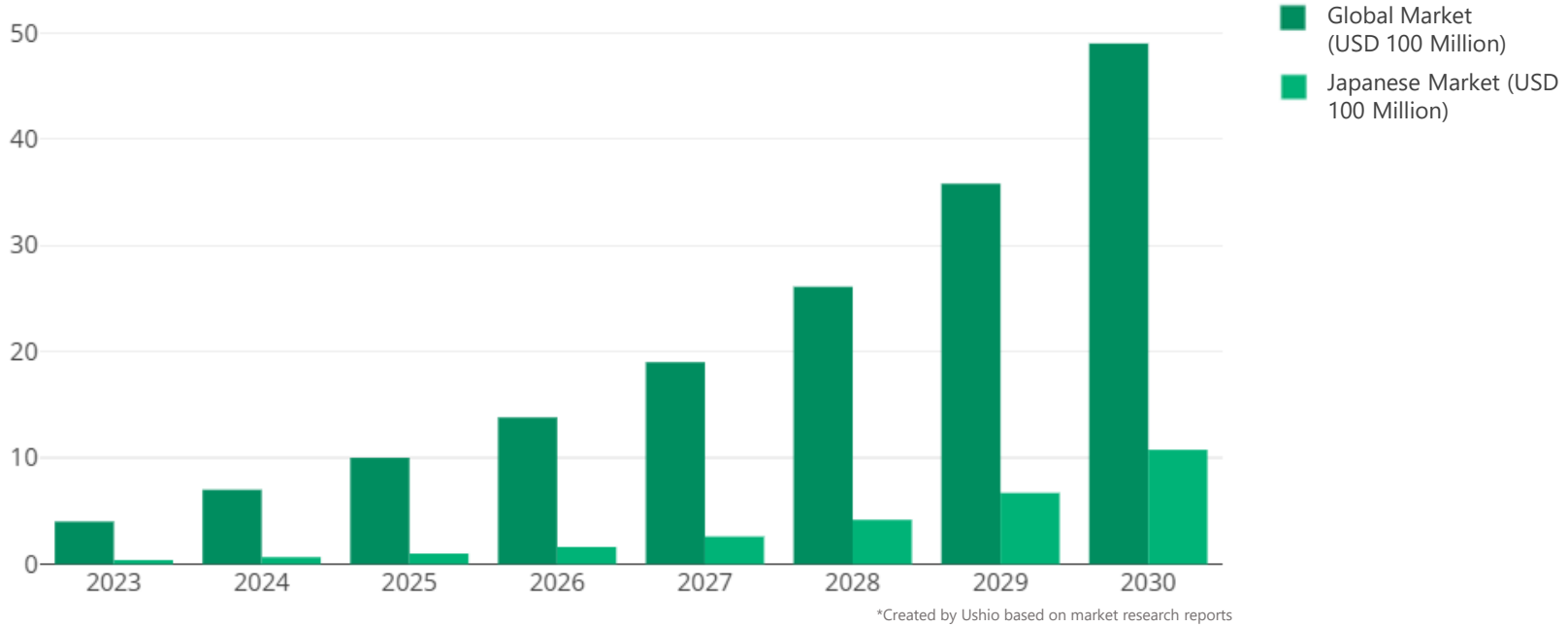
Examples of markets with challenges in PFAS countermeasures

Drinking water market

Industrial wastewater market

Soil contamination market

PFAS Treatment Market Size Forecast (Global and Japanese Markets), 2023–2030



*Created by Ushio based on market research reports

Main information source examples (reference)

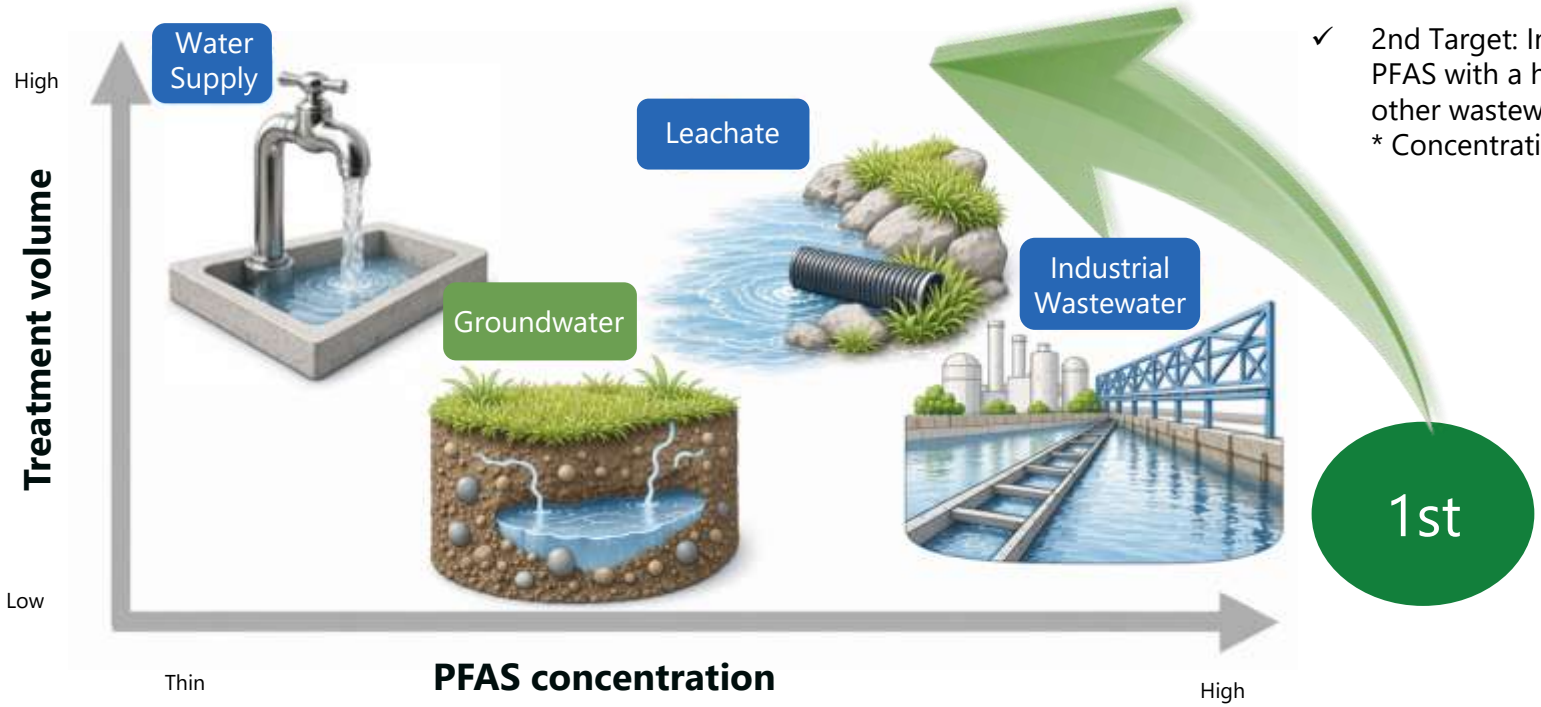
•Market research reports

- Grand View Research, "PFAS Water Treatment Market Size, Share & Trends Analysis Report"
- MarketsandMarkets, "PFAS Remediation Market - Global Forecast to 2025"
- Allied Market Research, "PFAS Treatment Market by Technology and Application"

Development and Commercialization Schedule

Fiscal year 2025: Conducting demonstration tests
Fiscal year 2026: Completion of standard reactor development
Fiscal year 2027: Shipment of first unit
Fiscal year 2028: Mass production

Future Plans

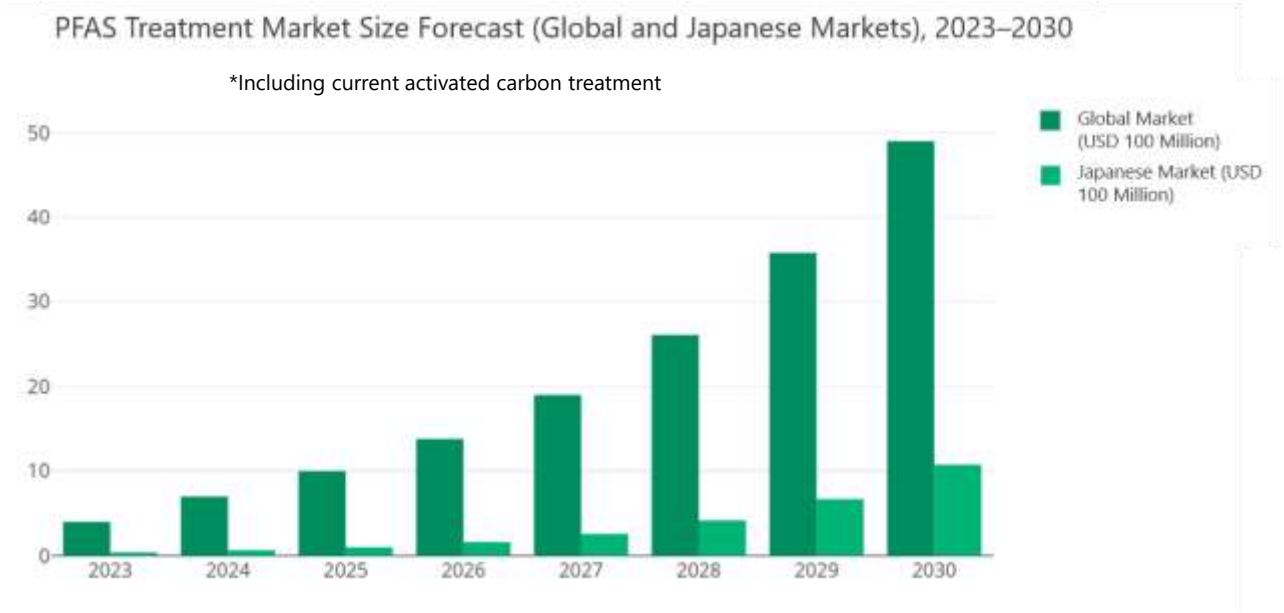


*This image is AI-generated

- ✓ 1st Target: Industrial wastewater containing high-concentration PFAS with a low treatment volume
  * No concentration required
- ✓ 2nd Target: Industrial wastewater containing low-concentration PFAS with a high treatment volume, followed by leachate and other wastewater
  * Concentration required

Business Potential

- The PFAS treatment market is expected to expand toward 2030, driven by stricter regulations in various countries and other factors
- The key question is whether our decomposition and detoxification technology using light will be needed as an alternative to current adsorption treatment using activated carbon
- We are planning to enter the Japanese market first
- We will then expand with the global market in mind



*Created by Ushio based on market research reports

Business Risks

- Needs and market size are expected to fluctuate depending on future PFAS regulatory developments
- Constraints on treatment cost and emergence of competing technologies could also pose risks

5. Summary

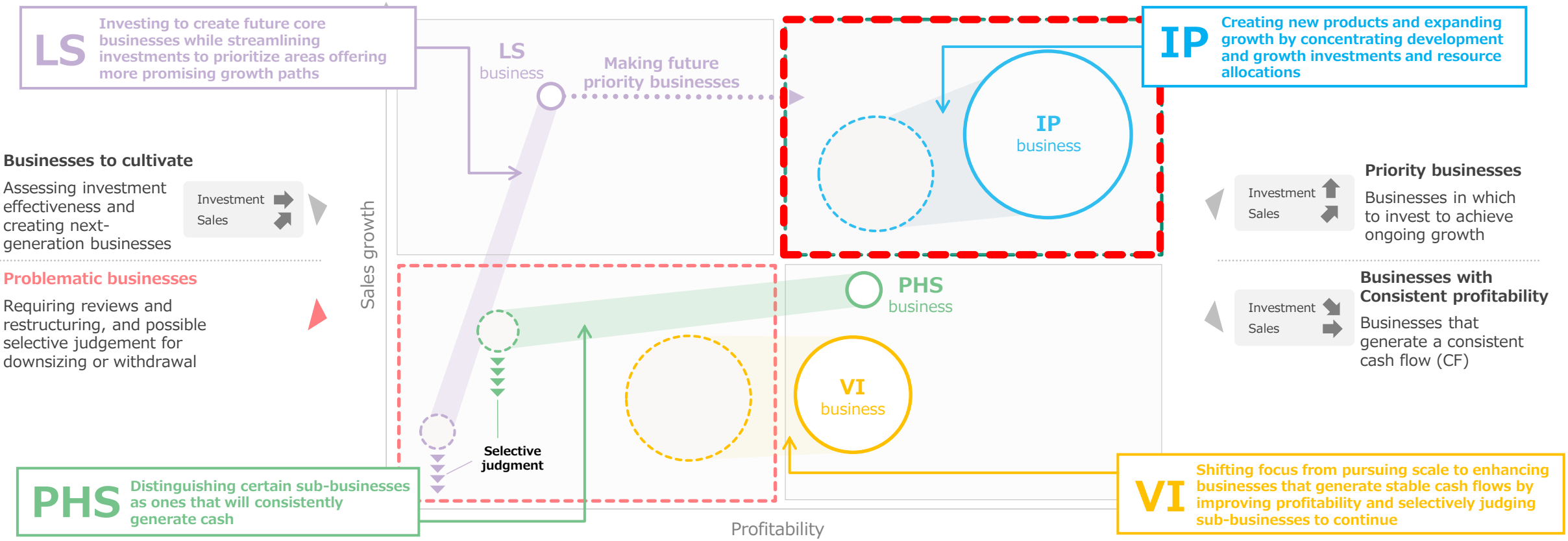
Revamp Our Business Portfolio

... Current ... Target state for 2030

USHIO

Expanding investment to encourage grow as a priority area | Cultivate by selectively judging areas in which to invest | Achieving consistent profitability by bolstering unprofitable businesses

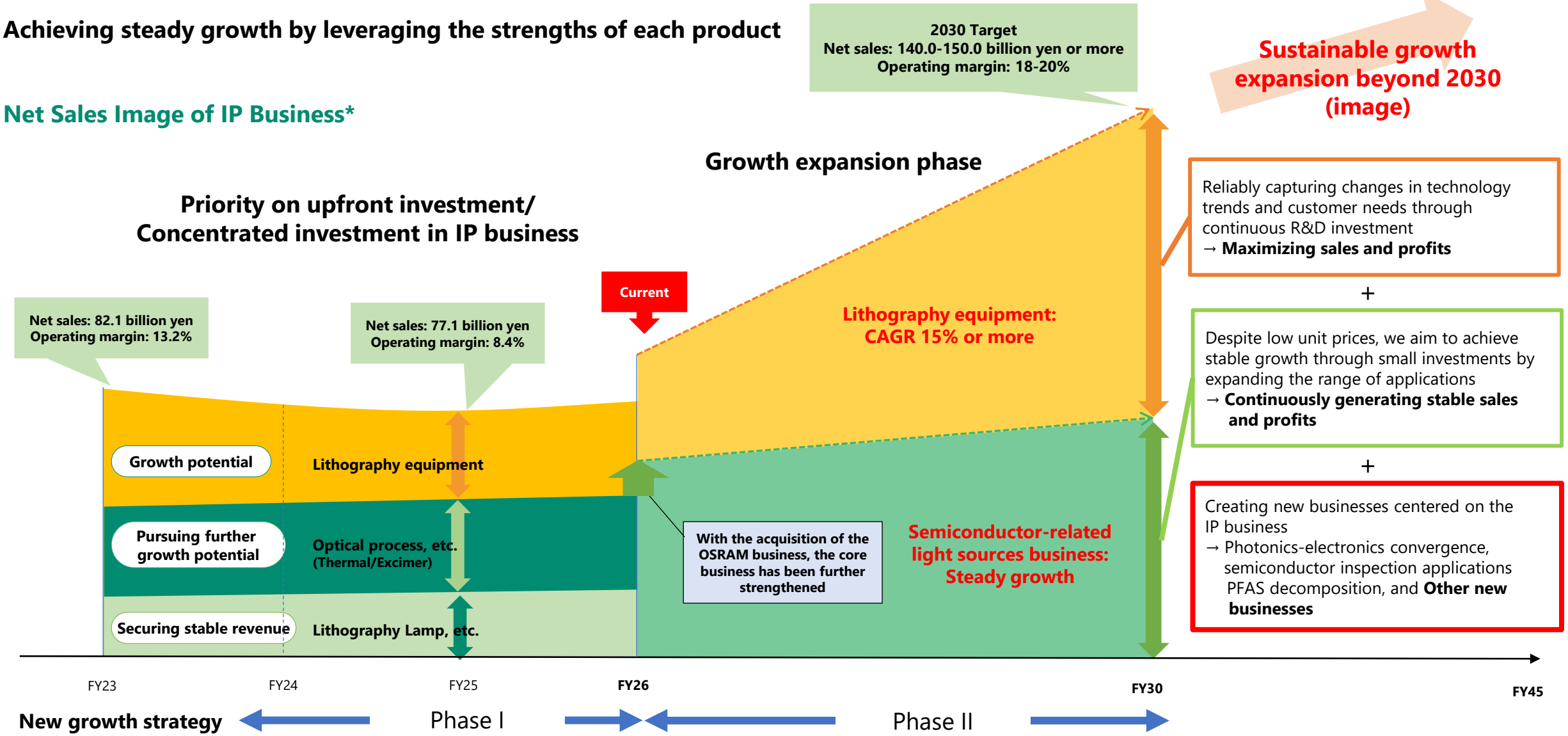
Industrial Processes (IP) | **Life Sciences (LS)** | **Visual Imaging (VI)** | **Photonics Solutions (PHS)**



IP Business Expansion (Future Growth Image)

Achieving steady growth by leveraging the strengths of each product

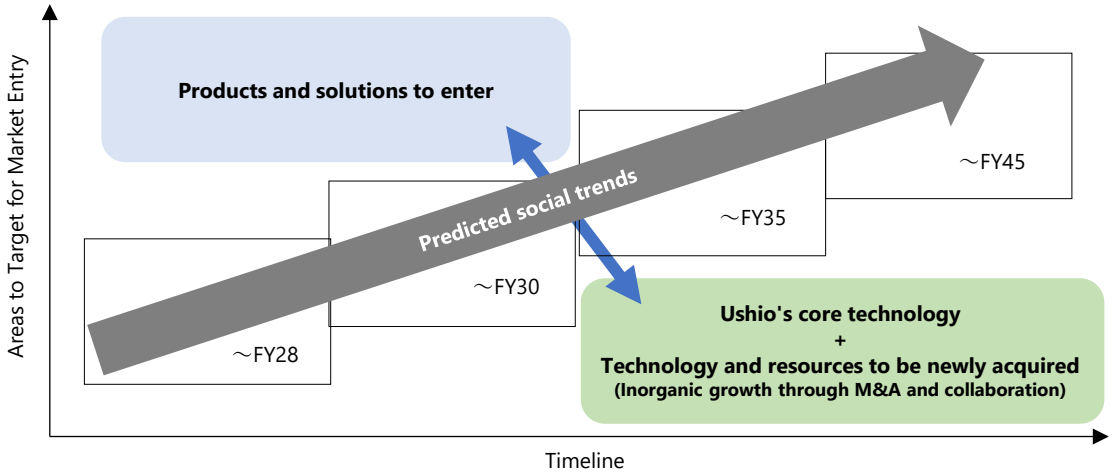
Net Sales Image of IP Business*



Strengthening activities to create new business ideas leveraging market-in approach and Ushio's core competencies

Creating a **company-wide roadmap** with a view to sustainable growth beyond 2030

[Company-wide roadmap image]



[Short to medium term]

Product Strategy
(Business Division)

[Ushio core competencies + New technologies]

[Medium to long term]

Business strategy
(Marketing Division)

Technology strategy
(Corporate Technology Division)

Company-wide roadmap

Major challenges facing society

(1) Slowdown of Moore's Law (toward More Moore and More-than-Moore)

(2) Sustainability
- Energy efficiency (projected increases in power consumption are reaching unsustainable levels)
- Environmental measures (PFAS, Hg, etc.)

Areas Ushio believes it can address (under consideration)

Evolution of middle-end processes (heterogeneous integration)
- Hybrid bonding process
- Photonics-electronics convergence
- Establishing inspection methods and other issues are emerging as new challenges

Incorporation into the product roadmap

<Contact for inquiries regarding this document>

Ushio Inc.

IR Office

(03)5657-1007

ir@ushio.co.jp

https://www.ushio.co.jp/jp/ir