Industrial Group
Business Strategy Conference

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Head of Industrial Group
September 10, 2024

Canon
CANON INDUSTRIAL GROUP

Canon Group Businesses


Industrial


Printing

2023 Net Sales

4,181 Billion yen


Medical


Imaging

Industrial Group

Industrial

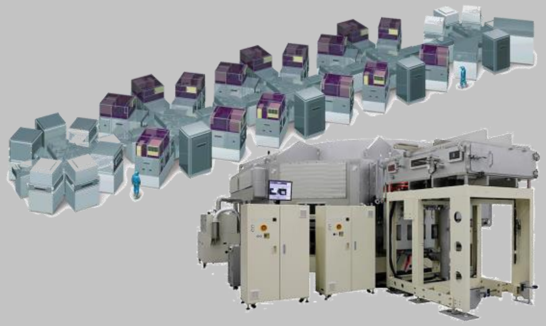
- **Optical Products Operations** (Utsunomiya, Ami)
- **Canon Tokki** (Niigata Pref.)
- **Canon ANELVA** (Kanagawa Pref)
- **Canon Machinery** (Shiga Pref.)
- **Other related companies and divisions**

Core Products

Semiconductor Lithography Equip.

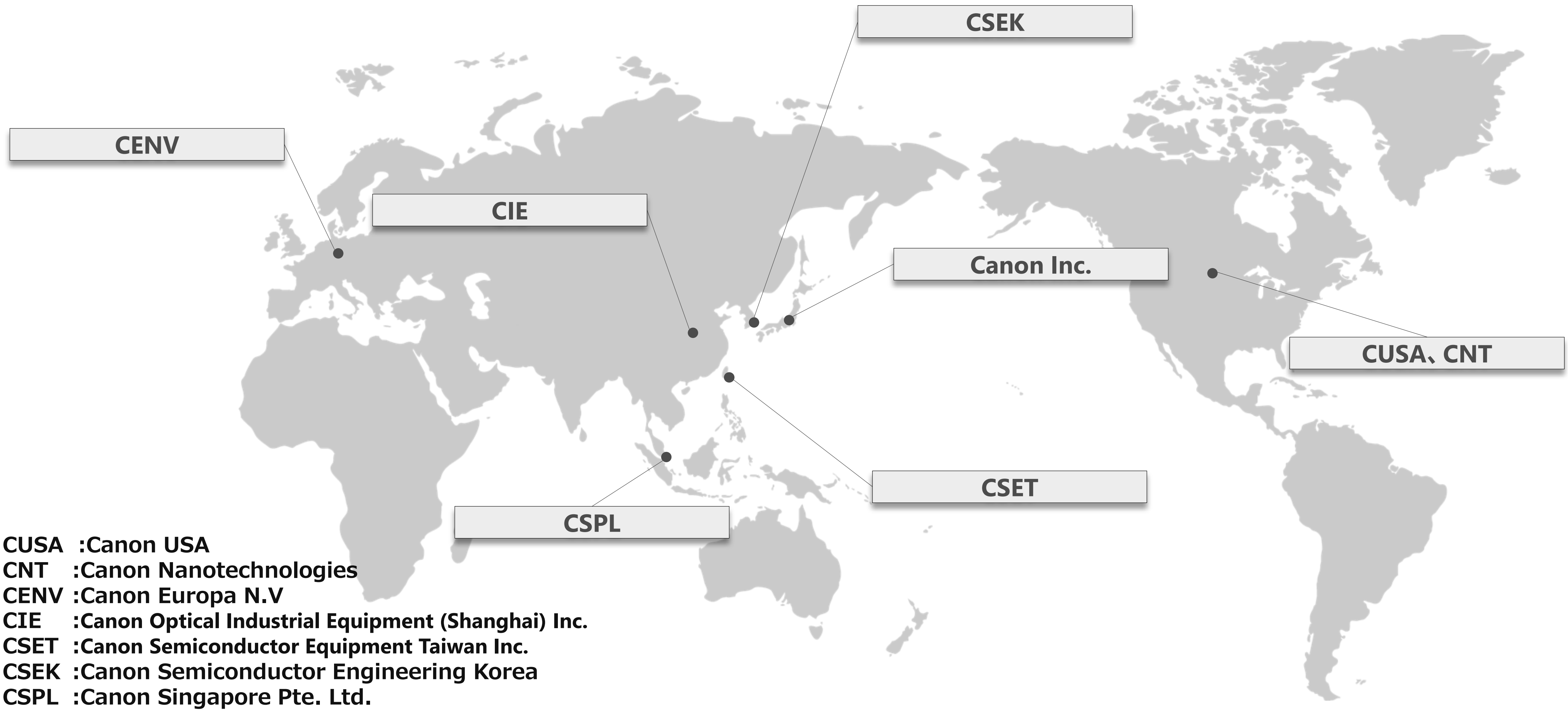
Semiconductor Mfg. Equip.

FPD Lithography Equip.



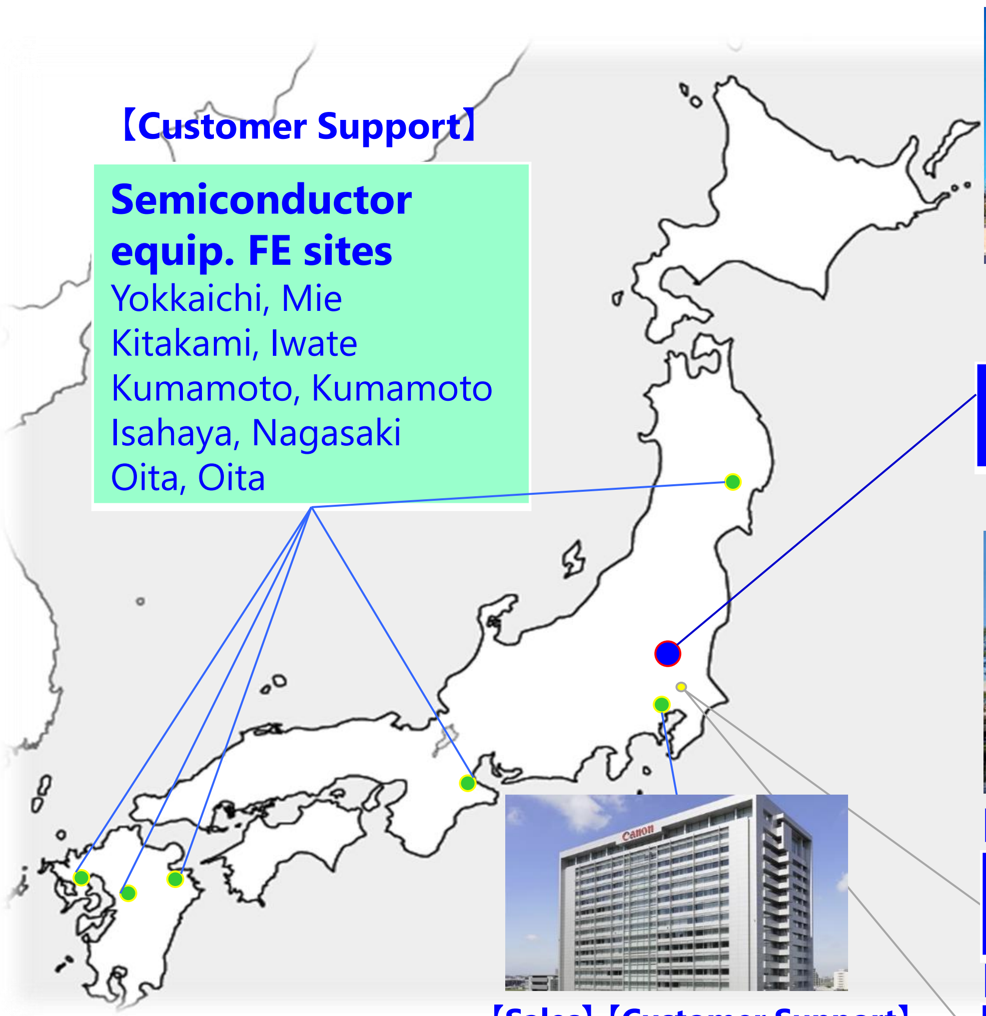
OLED Display Mfg. Equip.

Optical Products Operations W/W Sites



CUSA	:Canon USA
CNT	:Canon Nanotechnologies
CENV	:Canon Europa N.V
CIE	:Canon Optical Industrial Equipment (Shanghai) Inc.
CSET	:Canon Semiconductor Equipment Taiwan Inc.
CSEK	:Canon Semiconductor Engineering Korea
CSPL	:Canon Singapore Pte. Ltd.

Optical Products Operations
Sites in Japan and Major Products being Produced



【Customer Support】

Semiconductor equip. FE sites
Yokkaichi, Mie
Kitakami, Iwate
Kumamoto, Kumamoto
Isahaya, Nagasaki
Oita, Oita

【Sales】【Customer Support】

Shimomaruko HQ
Ota-ku, Tokyo

【Admin.】【Production】【R&D】
【Customer support】

Utsunomiya Office
Utsunomiya, Tochigi

① Lithography equip. production 【KrF】【NIL】【FPD】
② Processing & assembly of units
③ Industrial equip. & Mirror processing for astrology

FPA-6300ES6a
for Memory and Logic

Nanoimprint
Semiconductor Mfg. Equip.
FPA-1200NZ2C

MPAsp-H1003T
FPD
Lithography Equip.

【Production】

Ami Plant
Ami-machi, Ibaraki

【Production】

Canon Semiconductor Equipment

① Lithography equipment main body production【i-Line】
② Processing & assembling units for i-Line lithography equip.

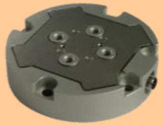
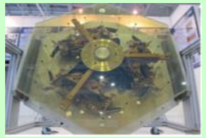
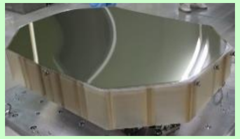
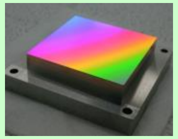
FPA-5550iZ2
for Memory and Logic

FPA-3030i5a
for IoT, Communication, and In-vehicle

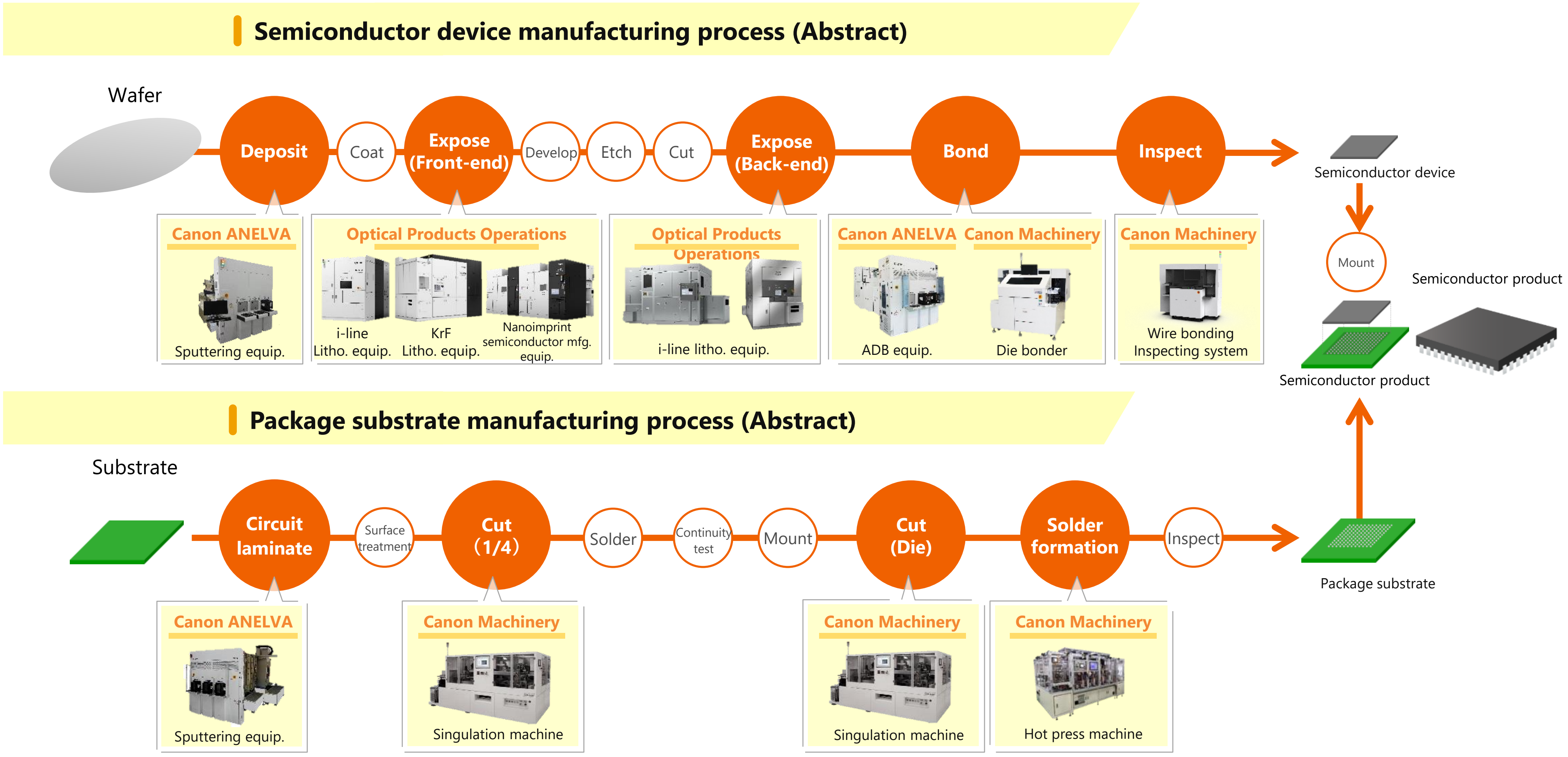
FPA-5520iV
for Back-end process

FPA-5550iX
for Image Sensors

Optical Products Operations - Products

	Products
Semiconductor Lithography Equipment	**i-line Lithography Equip.**  FPA-5520iV-LF  FPA-5550iZ2  FPA-3030i5a **KrF Lithography Equip.**  FPA-6300ES6a  FPA-6300ESW  FPA-3030EX6 **Nanoimprint Lithography**  FPA-1200NZ2C
Display Manufacturing Equip.	**G6 Lithography Equip.**  MPAsp-E813  MPAsp-E903T  MPAsp-E1003H **G8 Lithography Equip.**  MPAsp-H1003H
Measuring Devices	 Galvano Scanners  Laser Drilling Head  Non-contact Displacement Sensor  Plastic Sorting Equip.  Laser Rotary Encoder  Force and Torque Sensor
Astronomy	 Mirrors mounted on large telescopes  Mirrors mounted on satellites  Diffraction Lattice  Micro Mirrors

Semiconductor Business Industrial Group Products



Semiconductor device manufacturing process (Abstract)

Wafer

Deposit – Coat – **Expose (Front-end)** – Develop – Etch – Cut – **Expose (Back-end)** – **Bond** – **Inspect** → Semiconductor device

Canon ANELVA
Sputtering equip.

Optical Products Operations
i-line Litho. equip.
KrF Litho. equip.
Nanoimprint semiconductor mfg. equip.

Optical Products Operations
i-line litho. equip.

Canon ANELVA
ADB equip.

Canon Machinery
Die bonder

Canon Machinery
Wire bonding Inspecting system

Semiconductor device
Mount
Semiconductor product
Semiconductor product

Package substrate manufacturing process (Abstract)

Substrate

Circuit laminate – Surface treatment – **Cut (1/4)** – Solder – Continuity test – Mount – **Cut (Die)** – **Solder formation** – Inspect → Package substrate

Canon ANELVA
Sputtering equip.

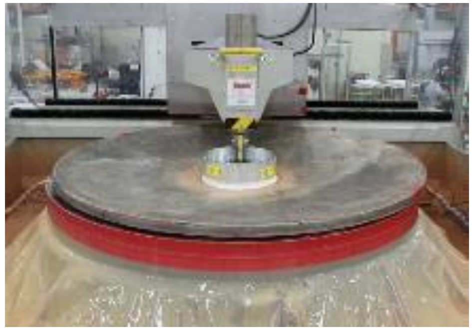
Canon Machinery
Singulation machine

Canon Machinery
Singulation machine

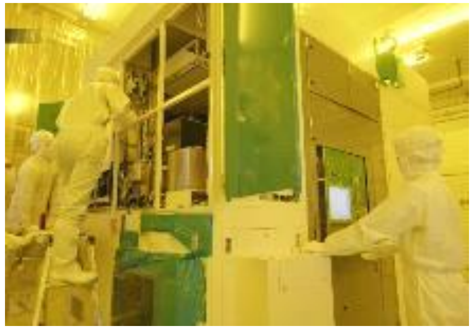
Canon Machinery
Hot press machine

Semiconductor Lithography Equip. Production Process

Lithography Equip. Production Process


① **Parts processing**


② **Unit assembly**

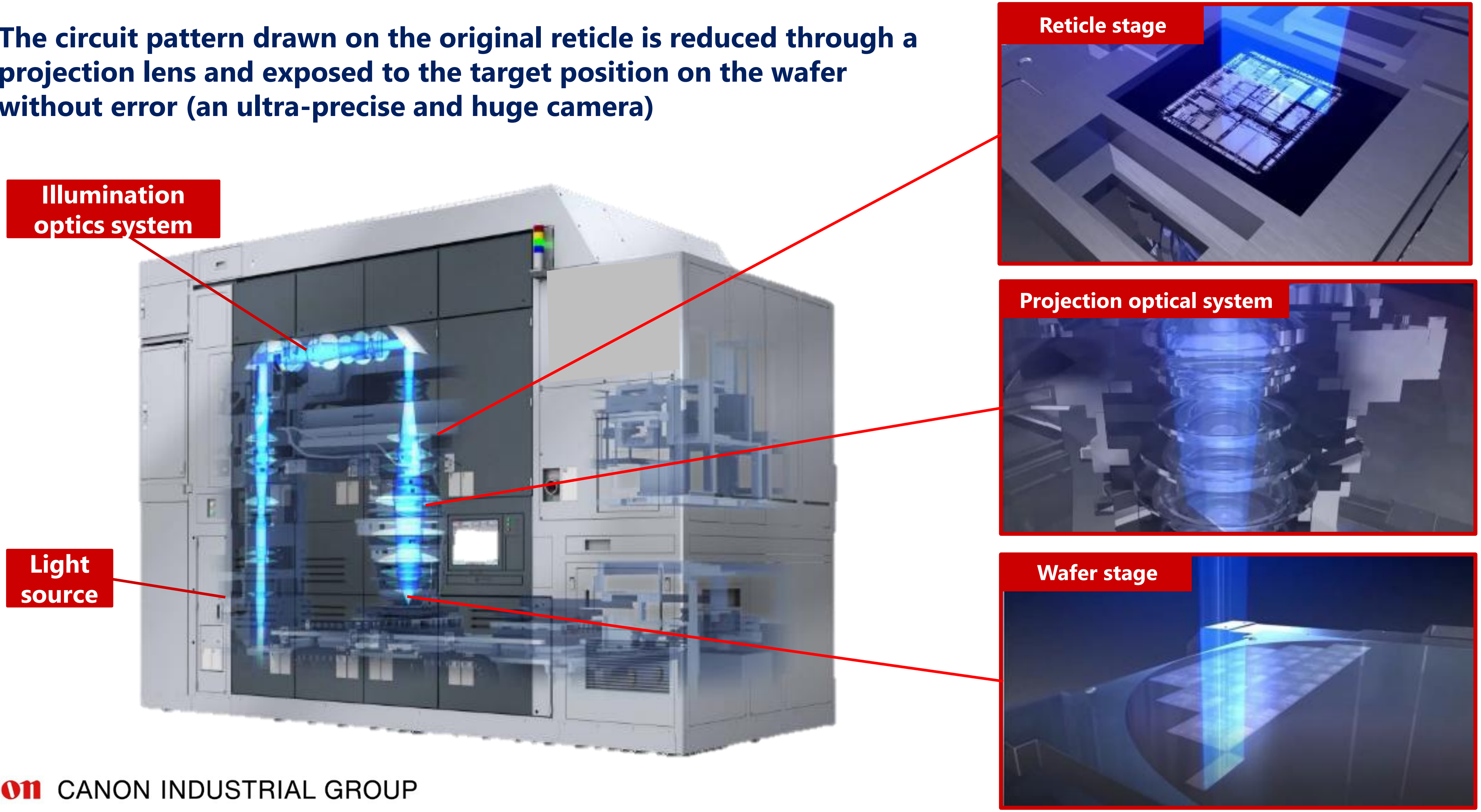

③ **Body assembly**


④ **Packing & Shipping**


⑤ **Installation**

Semiconductor Lithography Equip. Composition

The circuit pattern drawn on the original reticle is reduced through a projection lens and exposed to the target position on the wafer without error (an ultra-precise and huge camera)



Illumination optics system

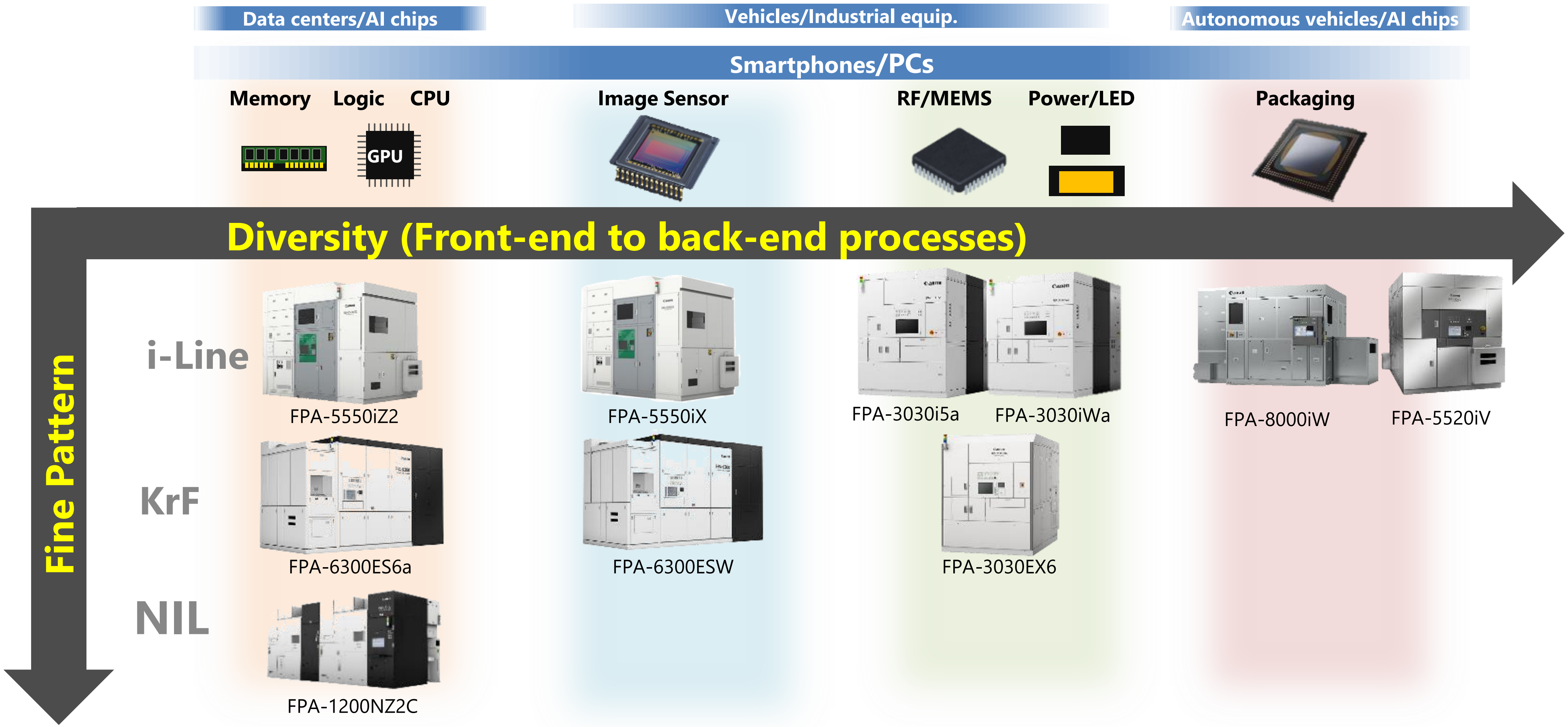
Light source

Reticle stage

Projection optical system

Wafer stage

Semiconductor Lithography Equip. Product Lineup



Data centers/AI chips

Vehicles/Industrial equip.

Autonomous vehicles/AI chips

Smartphones/PCs

Memory Logic CPU

Image Sensor

RF/MEMS Power/LED

Packaging

Diversity (Front-end to back-end processes)

Fine Pattern

i-Line

FPA-5550iZ2

FPA-5550iX

FPA-3030i5a

FPA-3030iWa

FPA-8000iW

FPA-5520iV

KrF

FPA-6300ES6a

FPA-6300ESW

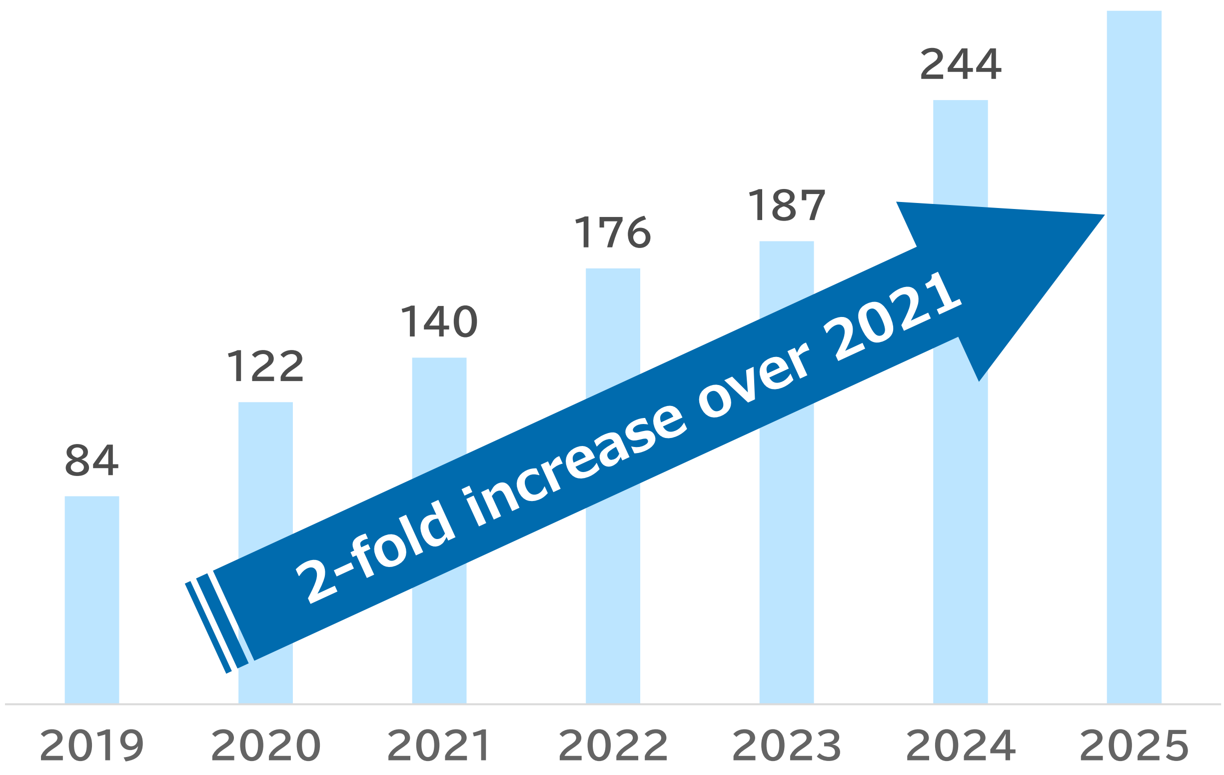
FPA-3030EX6

NIL

FPA-1200NZ2C

Enhance Production Capacity, Constructing New Facility

Semiconductor Lithography Equip. Unit Sales



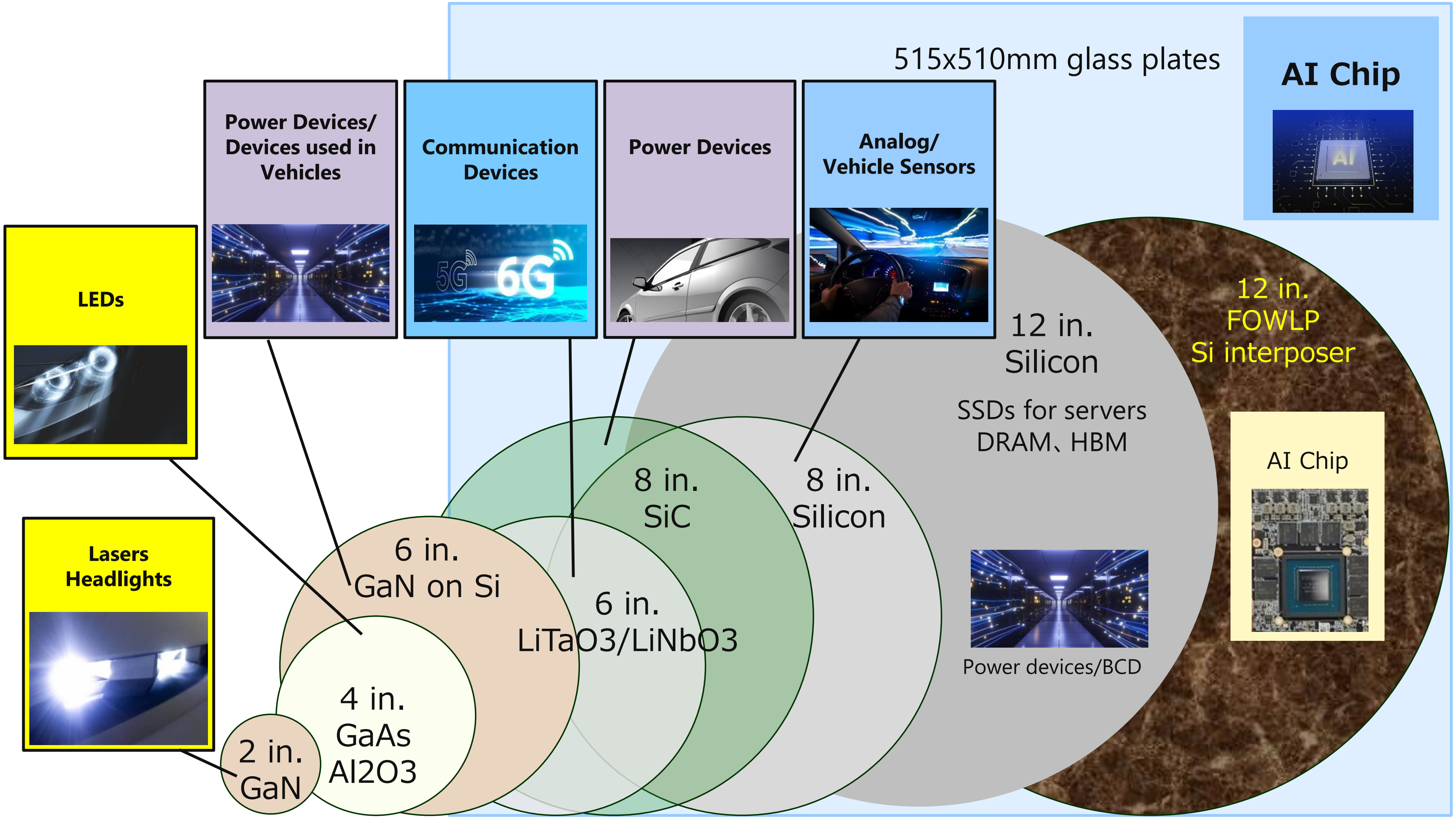
New factory (Concept)

Automation	On-site logistics, skilled work
Optimization	Centralized management of production information
Environmental response	Energy conservation (LED lighting, improved airtightness)

- ✓ Started construction of new factory in Dec. 2023. Becomes operational in 1H 2025 (Planned)
- ✓ Meet expanding market demand for semiconductors, significant increasing production capacity

i-Line Lithography Equip. (Front-end and Back-end Processes)

Diversity in plates: From 2 in. to 500mm



515x510mm glass plates

AI Chip

LEDs

Lasers Headlights

Power Devices/ Devices used in Vehicles

Communication Devices

Power Devices

Analog/ Vehicle Sensors

2 in.
GaN

4 in.
GaAs
Al2O3

6 in.
GaN on Si

6 in.
LiTaO3/LiNbO3

8 in.
SiC

8 in.
Silicon

12 in.
Silicon

SSDs for servers
DRAM、HBM

Power devices/BCD

12 in.
FOWLP
Si interposer

AI Chip

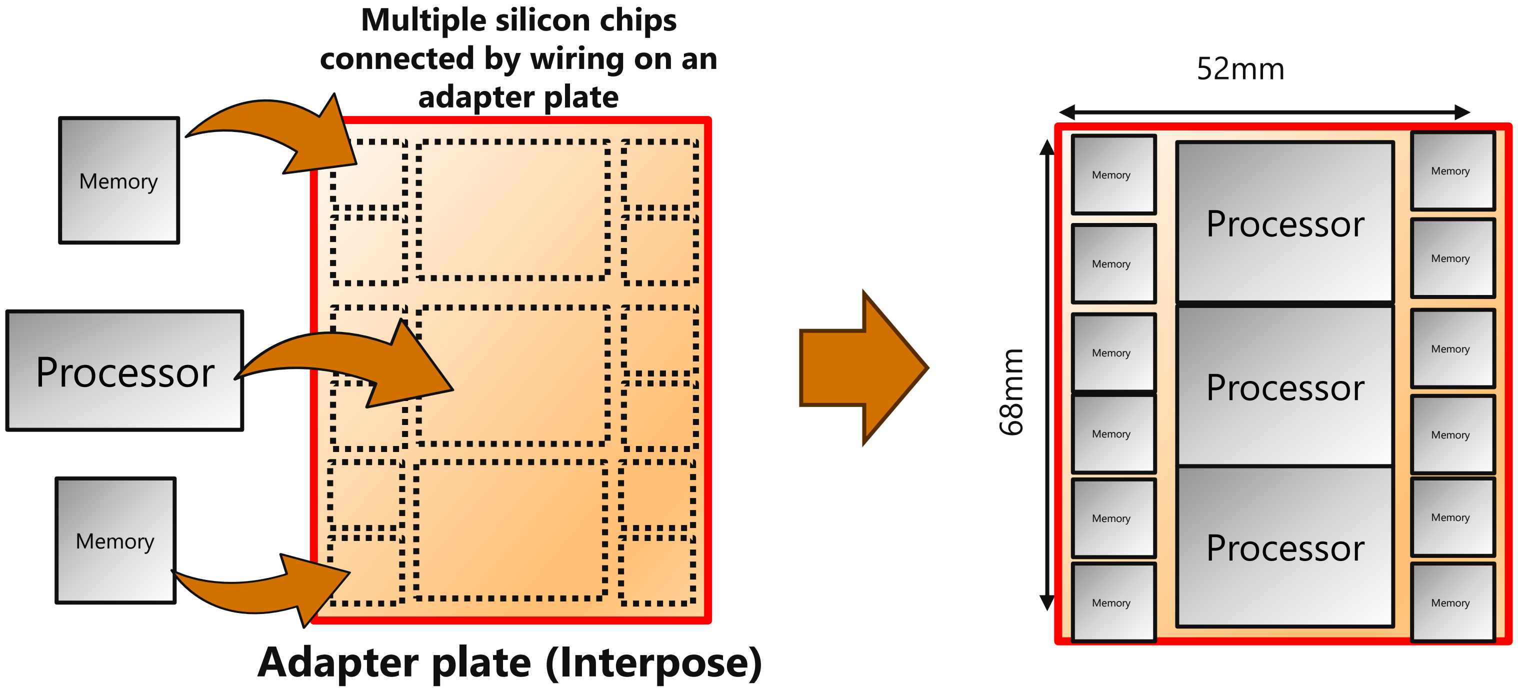
i-Line Lithography Equip. – Responding to Diverse Needs

Product	**Specifications**			**Diverse Needs**	**Characteristics**
	Resolution	**Exposure area**	**Plate size**		
Front-end process, **High resolution** **5550iZ2** 	**0.35um** **(NA0.57, 1/4x)**	**26x33mm**	**12inch**	**Memory** **CIS**	• **High resolution & overlay accuracy** • **High productivity – 250 or more wafers per hour**
Front-end process, **Large exposure area** **5550iX** 	**0.50um** **(NA0.37, 1/2x)**	**50x50mm**	**12inch**	**CIS** **AR/VR**	• **Large exposure area of 50mm and high resolution**
IoT devices, **Small plates** **3030i5a** 	**0.35um** **(NA0.45-0.63, 1/5x)**	**22x22mm**	**4～8inch**	**Power** **MEMS** **LED**	• **Backside alignment, warped plates and other features for plates that are 8 inches in size or smaller**
Advanced back-end process, **High depth of focus** **5520iV-LF2** 	**0.8um** **(NA0.24, 1/2x)**	**52x68mm**	**12inch**	**FOWLP** **AI Devices**	• **Suitable for advanced back-end process, high depth of focus, large exposure area, high resolution** • **Compatible with warped plates**
Advanced back-end process, **Square plates** **8000iW** 	**1.0µm** **(NA0.24, 1/2x)**	**55×55mm**	**500mm**	**AI Devices** **Interposer**	• **For large-size square plates** • **Large exposure area and high resolution**

Device (GPU) for Generative AI

FPA-5520iV LF

- **Exposure area: 52×68mm**
- **Resolution: 1µm**



- ✓ **High resolution and large exposure field suitable for AI devices**
- ✓ **12 years have passed since entering back-end process market. Strengths in understanding market needs and commercialization**

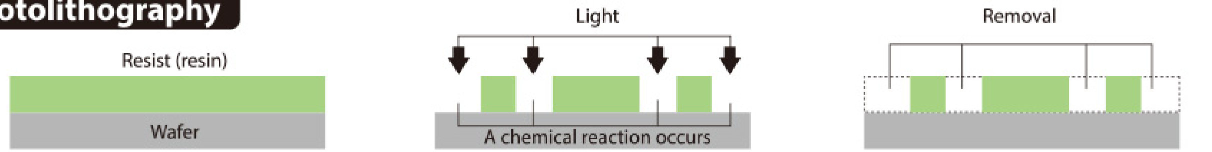
NIL : Nanoimprint Lithography

Nanoimprint Lithography (NIL)

FPA-1200NZ2C

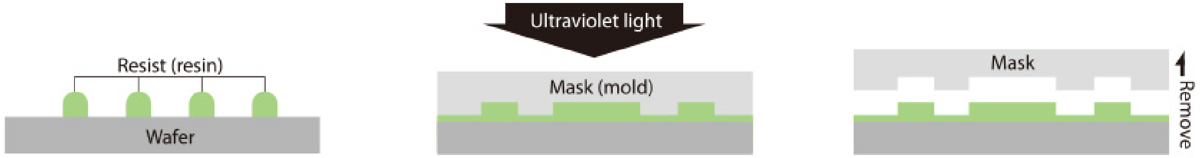
- ✓ **Circuit patterns formed using stamp principle (Shown below)**
- ✓ **World's first practical application for advanced semiconductor processes**
- ✓ **Simple manufacturing process (Low cost via low power consumption)**
- ✓ **Applicable to fine optical elements other than semiconductors**

Photolithography



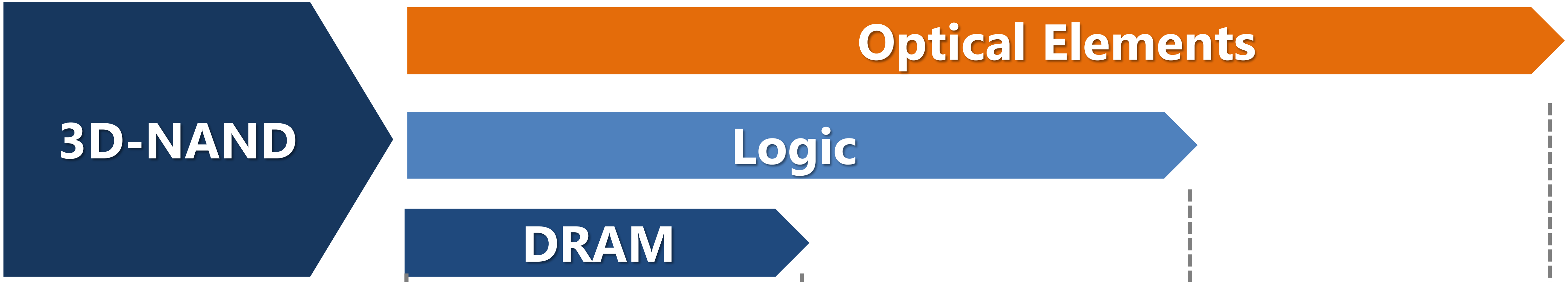
1. The resist (resin) for light exposure is coated on the wafer surface
2. A projection lens is used to reduce and project circuit patterns drawn on the reticle* onto the silicon wafer, causing a chemical reaction in the resist
3. After development, the resist that was exposed to light is removed to create a circuit pattern

Nanoimprint Lithography

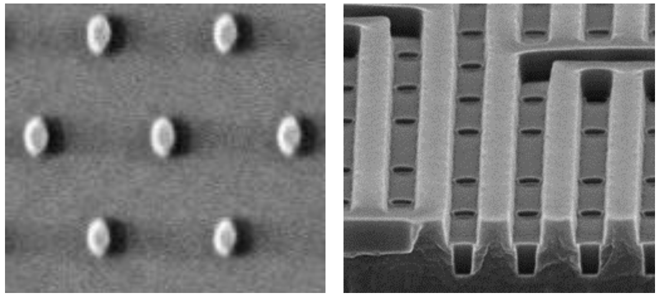


1. Inkjet technology is used to dispense droplets of liquid resin to the wafer surface in accordance with the circuit pattern
2. A mold, called a mask, has the circuit patterns. It is pressed like a stamp onto the resin that has been applied to the wafer surface
3. Ultraviolet light is used to solidify the resin and form the circuit patterns, after which the mask is removed from the resin

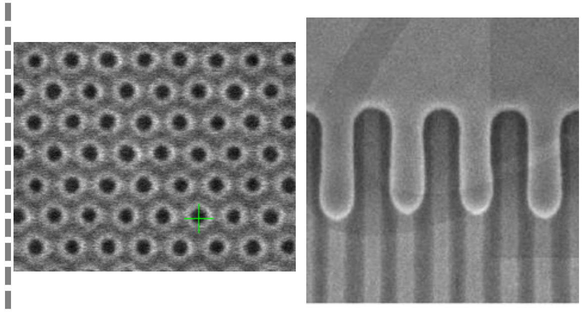
Application of NIL to Diverse Production Processes



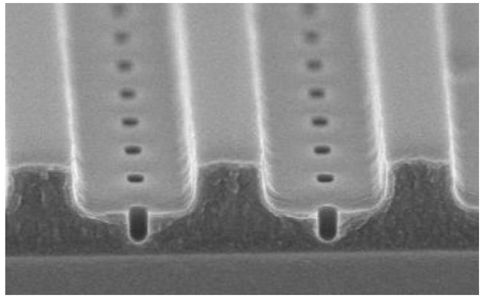
3D-NAND
Hole/Dual damascene



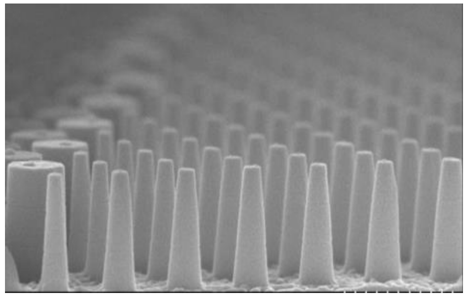
DRAM
Hole/ForkChop



Logic
BEOL



Meta Lens



✓ **Utilizing strengths & characteristics of NIL, promote application in various production processes**

Note: SEM images are supplied by Canon and collaborative companies