



Semiconductor Business Strategies for FY2025

Semiconductor Business Group

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1 Business Overview

Contributions to vehicle electrification, more compact power electronics, energy savings, and CO₂ emissions reductions

Automotive

(Domestic sales: 67% ; Overseas sales: 33%)*

Automotive modules



Main application

xEVs



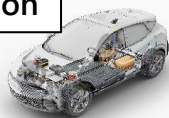
Inverters for drives, DC-DC converters, car air-conditioners

Automotive discrete



Main application

xEVs
Gasoline Vehicles



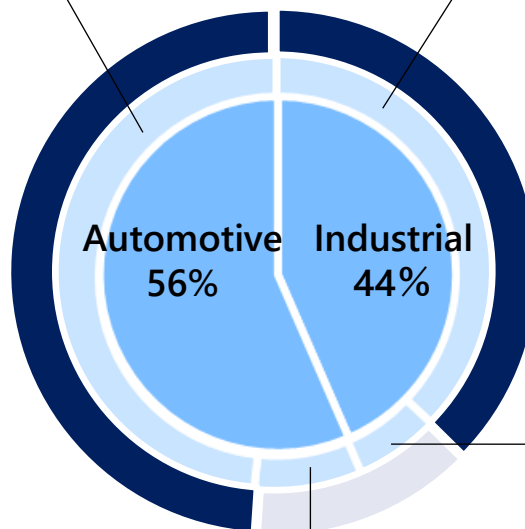
On-board chargers, engine control, brake control, steering control, etc.

Net sales (FY2024 results)

¥236.8 billion

(Domestic sales: 46% ; Overseas sales: 54%)*

Modules



Industrial

(Domestic sales: 19% ; Overseas sales: 81%)*

Industrial modules



Main application

FA (inverters, servos)

Air conditioners
(household/commercial)



Renewable PCs (wind power, solar power)

Industrial discrete, photoconductors



Main application



Flat-screen TVs Miniature UPSs Printers

Note: Percentages of total net sales figures represent FY2024 results and are calculated before deduction and adjustment for inter-segment sales.

No. 3 global market share for IGBT modules

- Chips with industry-low levels of loss (7th- and 8th-generation IGBTs)
- Forerunner in offering RC-IGBTs* with track record of deliveries to numerous domestic and overseas electrified vehicle manufacturers
- Commercialization of industry's most compact modules with application of low-loss chips and high-density mounting technologies

Trench SiC-MOSFETs employing cutting-edge technologies

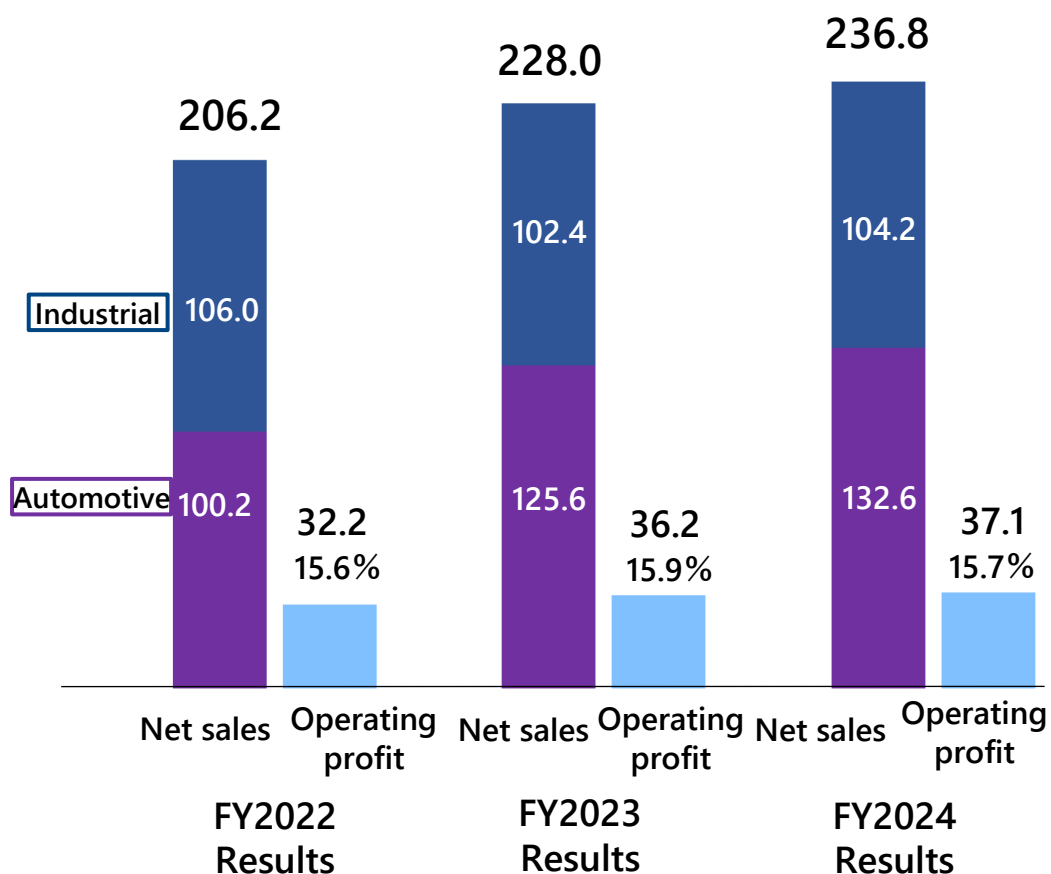
- Industry-leading on resistance performance
- Optimal designing for customer facilities made possible by low variability

Support for customers worldwide through global network of multiple production bases and design and sales centers

* Reverse Conducting-IGBT: Chips integrating both IGBT and FWD chips

2 Review of FY2024

Net Sales and Operating Profit by Subsegments (Billions of yen)



Successes

■ New product development

- Compact RC-IGBT modules for electrified vehicles
- Large-capacity IGBT modules for renewable energy applications (1.7kV, 2.3kV)

■ Expanded production of 8-inch Si device production (front-end)

- Augmentation of production capacity at Fuji Electric (Malaysia)
(Increase in ratio of 8-inch Si device production to 75%)

■ Commencement of full-fledged mass production of SiC devices

- Start of 6-inch SiC device mass production (front-end) at Fuji Electric Tsugaru Semiconductor (December 2024)

■ Approval for subsidies

- Approval for subsidiaries by Ministry of Economy, Trade and Industry for SiC device supply plan proposed jointly with DENSO (November 29, 2024)






Challenges

- Expansion of sales in growth fields (electrified vehicles, renewable energy)
- Acceleration of new product specification solicitation activities and approach toward new customers
- Augmentation of production capacity in line with SiC demand
- Development of competitive next-generation products

3 Management Plan for FY2025

Industrial: Strong market growth for renewable energy field amid delayed recovery in demand centered on factory automation

Automotive: Ongoing growth of overall electrified vehicle market, despite slowdown in growth of EVs

Business Fields	Market Trends (FY2025)		FY2024 to FY2025
Industrial	Factory automation	Performance and growth relatively unchanged from FY2024	
	New energy	Ongoing trend toward decarbonization anticipated to sustain firm growth	
	Consumers	Modest growth trend to be supported by subsidies for purchasing new home applications in China	
Automotive	xEVs	Increased sales of HEVs and PHEVs, regardless of sluggish growth for BEVs Double-digit growth despite slowdown in electrified vehicle growth rates when compared to prior market outlook	
	Gasoline vehicles	Ongoing decline in sales	

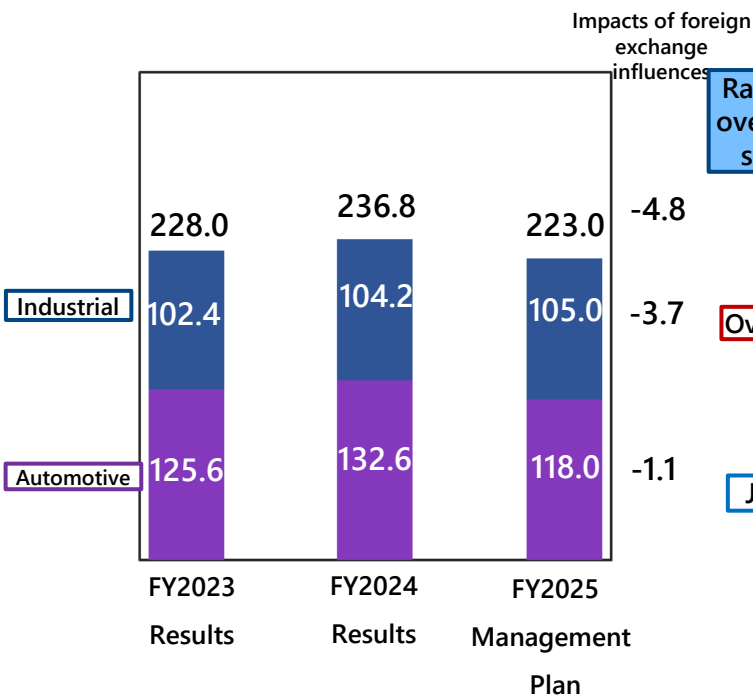
Business Policies

Accelerated efforts to solicit specifications and approach new customers centered on growth fields (electrified vehicles, renewable energy)

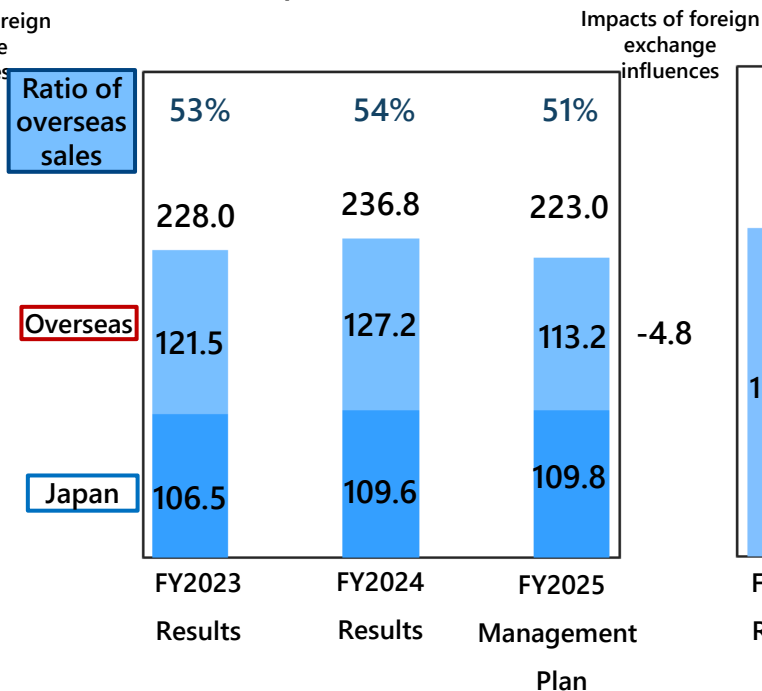
Augmentation of production capacity based on demand

Business Plan

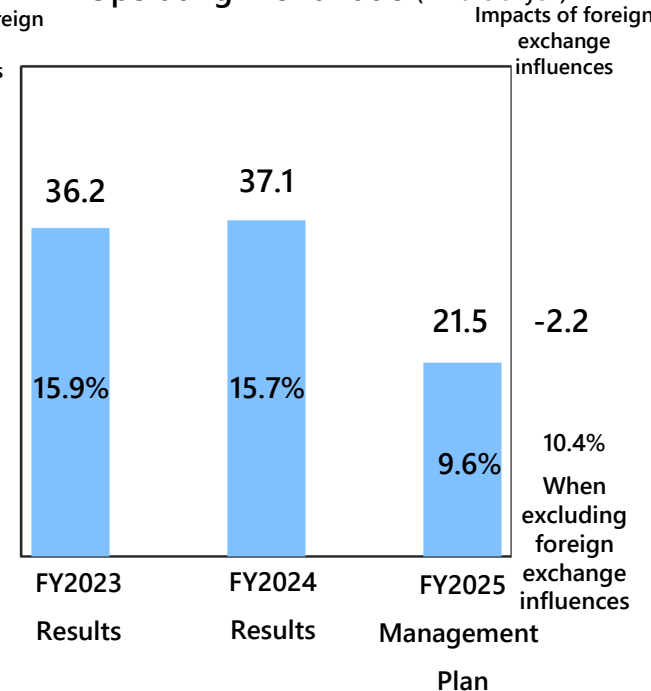
Net Sales by Subsegment (Billions of yen)



Net Sales in Japan / Overseas (Billions of yen)

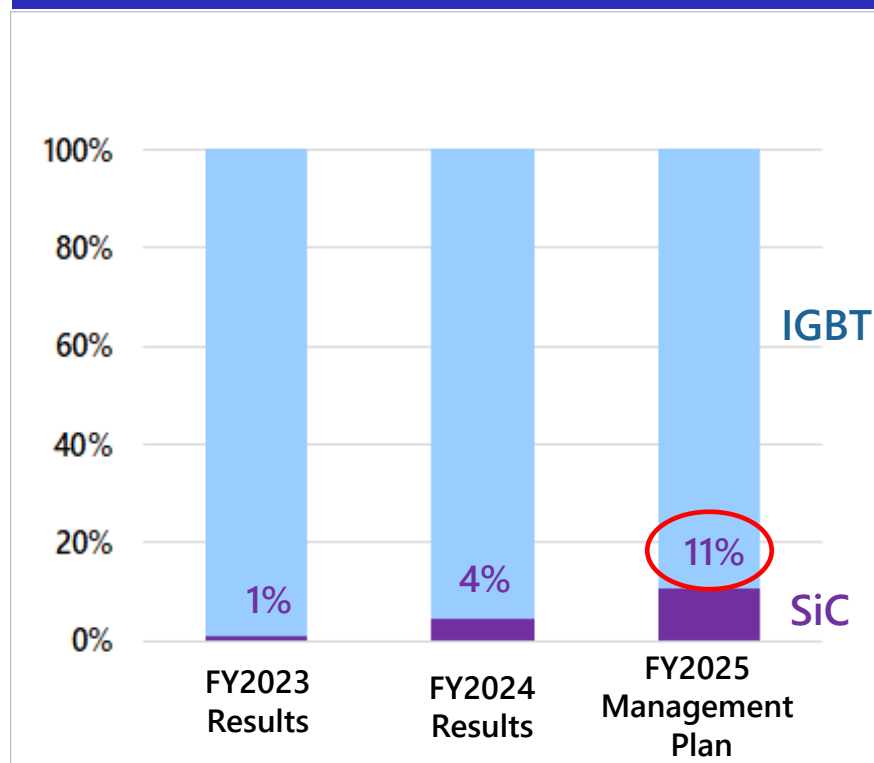


Operating Profit / Operating Profit Ratio (Billions of yen)

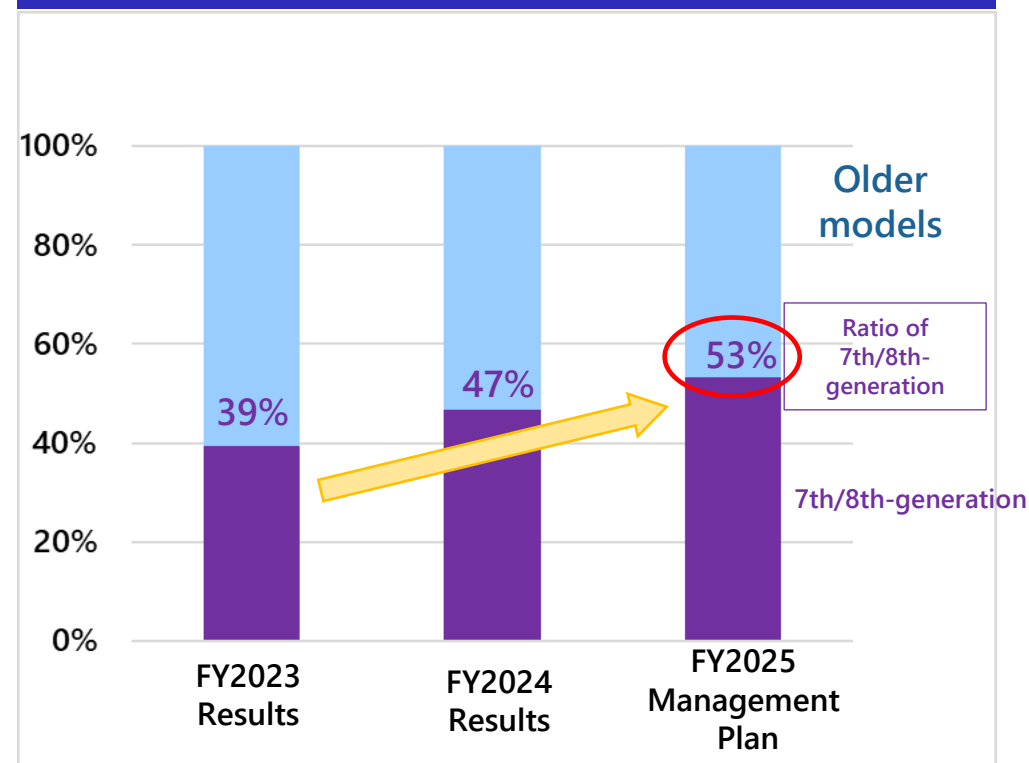


- Automotive modules: Steady increase in ratio of SiC devices (FY2024: 4% → FY2025: 11%)
- Industrial IGBT modules: Increases in ratios of sales of 7th- and 8th-generation modules (FY2024: 47% → FY2025: 53%)

Ratios of Sales of Automotive Modules

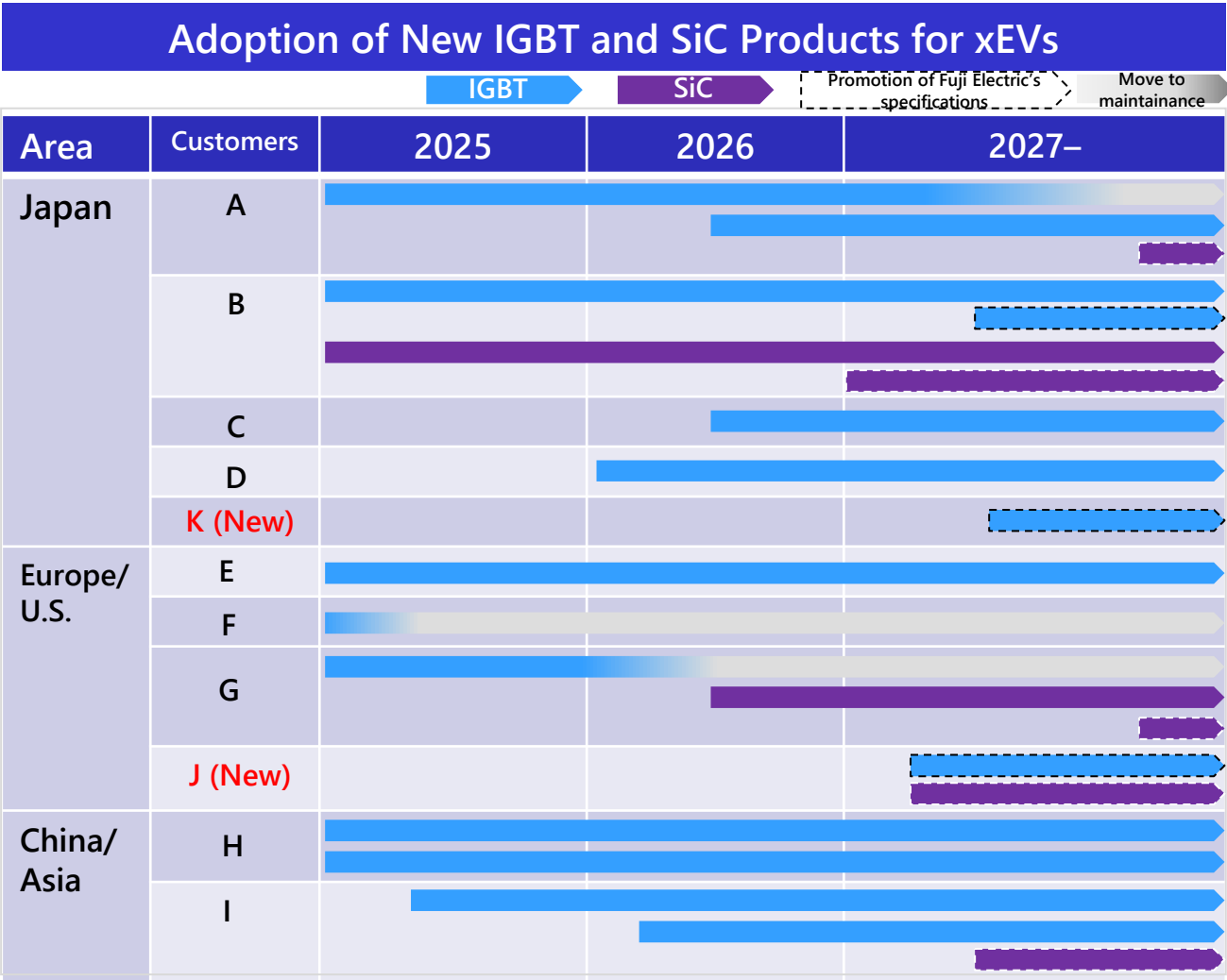


Ratios of Sales of Industrial IGBT Modules



- **Automotive field**
 - Growth in sales of SiC devices and acceleration of specification solicitation efforts
- **Industrial field**
 - Growth in sales centered on renewable energy market
- **Enhancement of manufacturing**
 - Front-end: Bolstering of SiC device production capacity and mass production of 8th-generation IGBTs based on demand
 - Back-end: Mass production of new compact automotive RC-IGBT modules
Preparation for mass production of new SiC modules
Augmentation of industrial IGBT module production capacity in response to demand growth
- **Development of competitive new products**
 - Accelerated development of 3rd-generation SiC-MOSFETs and 8th-generation IGBTs
 - Development and mass production of IGBTs and SiC modules for automotive and industrial (large-capacity) applications
 - Development of technologies for 8-inch SiC devices

- Acceleration of campaigns to encourage use of Fuji Electric’s specifications and engagement in new negotiations with new and existing customers



New Automotive Module Products

***1 Compact RC-IGBT modules**



***2 SiC modules**



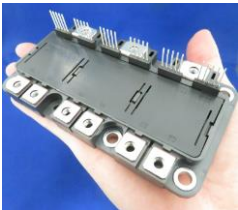
- Solicitation of specifications centered on compact IGBT and SiC modules and approach toward new customers
- Contribution to reductions in size and costs of customers' equipment

Compact RC-IGBT modules

- Compact, short packages (smartphone sized)
- Compatibility with three rated values through combinations of two types of cooling units

Comparison to Prior Models (Values translated to same rated value*1)

Size: 54% less area
Height: Down 50%
(Down 57% in terms of volume)



Dimensions: W136 x D70 x H14 mm

*1 Comparisons based on effective module output values converted to accommodate differences in current rate value between prior and new models

Inverter output	50kW	75kW	100kW
Module rate value (750V)	300A	450A	600A
Adopting Vehicles Types	Light vehicles		
			Compact vehicles
	Hybrid vehicles (generation)		

Launch timing

- 600A devices: Mass production commenced in April 2025
- 300A/450A devices: Mass production to be commenced in FY2026

SiC modules

- Three-dimensional wiring contributing to thinner, more compact modules
- Massive reduction in inductance*2 to capitalize on high-speed switching capabilities of SiC

Comparison to Prior Models

Size/width: Down 49% (volume basis)
Inductance: Down 80% (Ls24 → 5nH)



Dimensions: W167 x D111 x H16 mm

*2 Higher inductance results in higher switching losses and noise

Inverter output	330kW
Module rate value (1200V)	660A
Adopting Vehicles Types	Large vehicles
	Sports vehicles

- 600A devices: Mass production to be commenced in 3Q of FY2026

Automotive Semiconductors: Development of Next-Generation SiC Devices

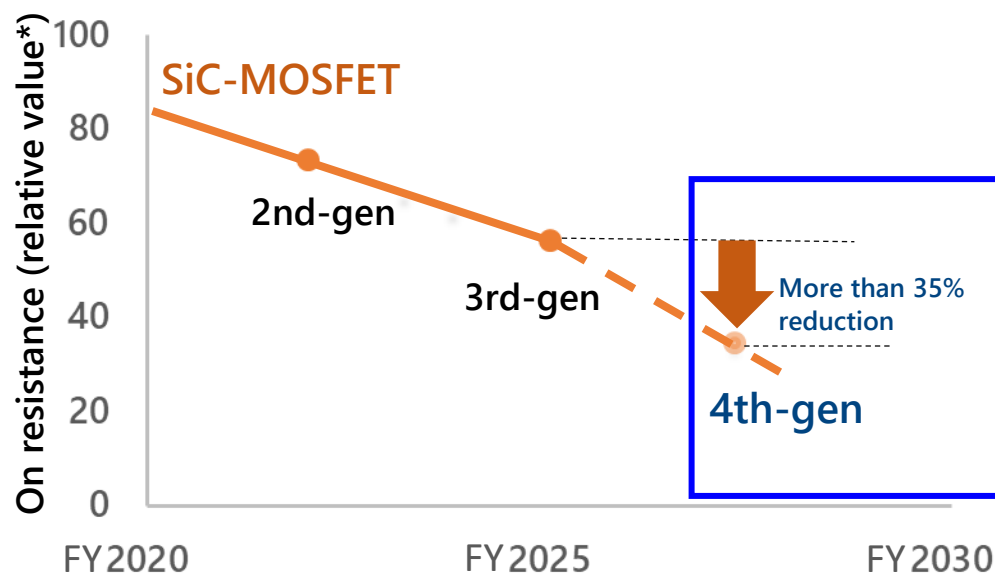
- Development of SiC-MOSFETs and SiC module technologies to contribute to more compact equipment

4th-Generation SiC-MOSFET Technology Development

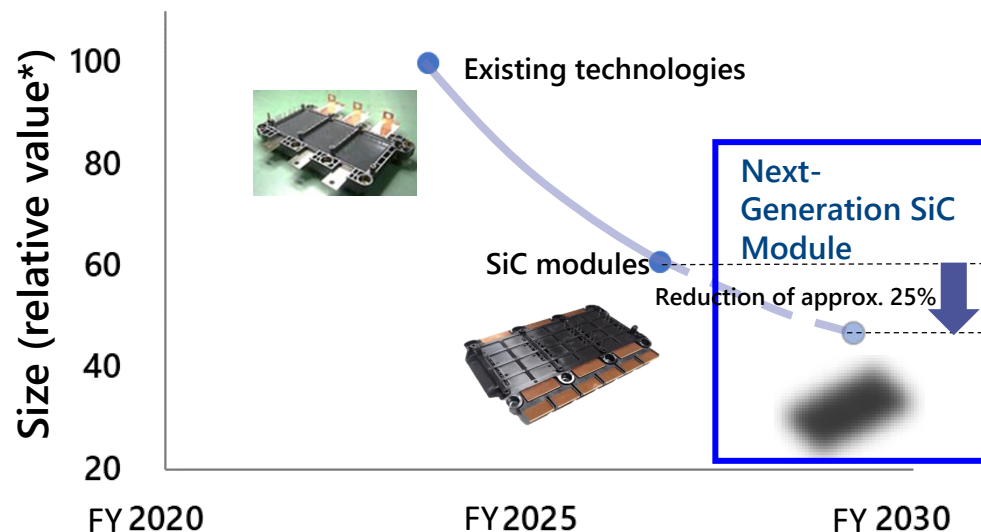
- Industry-low on resistance performance (reduction of more than 35% compared to 3rd-generation models)
- Unique three-dimensional structure

Next-Generation SiC Module Technology Development

- Industry-leading compact design (size reduction of more than 25% compared to prior SiC modules)
- Utilization of 4th-generation SiC-MOSFETs and new terminal structures



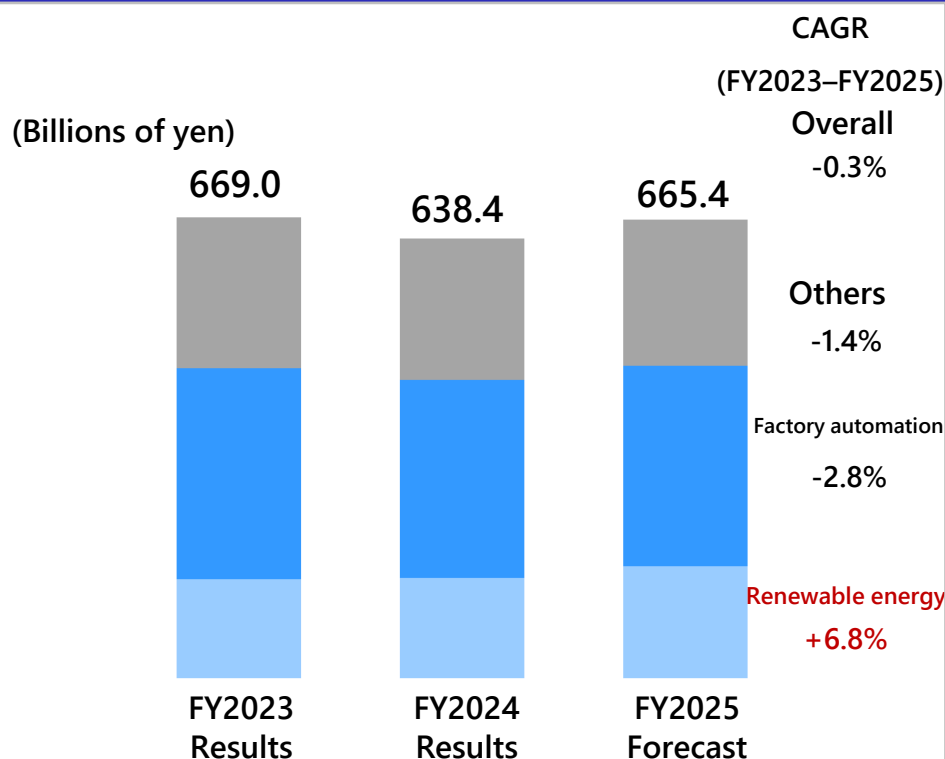
* Based on standardized value of 175 °C on resistance used for 1st-generation SiC-MOSFETs



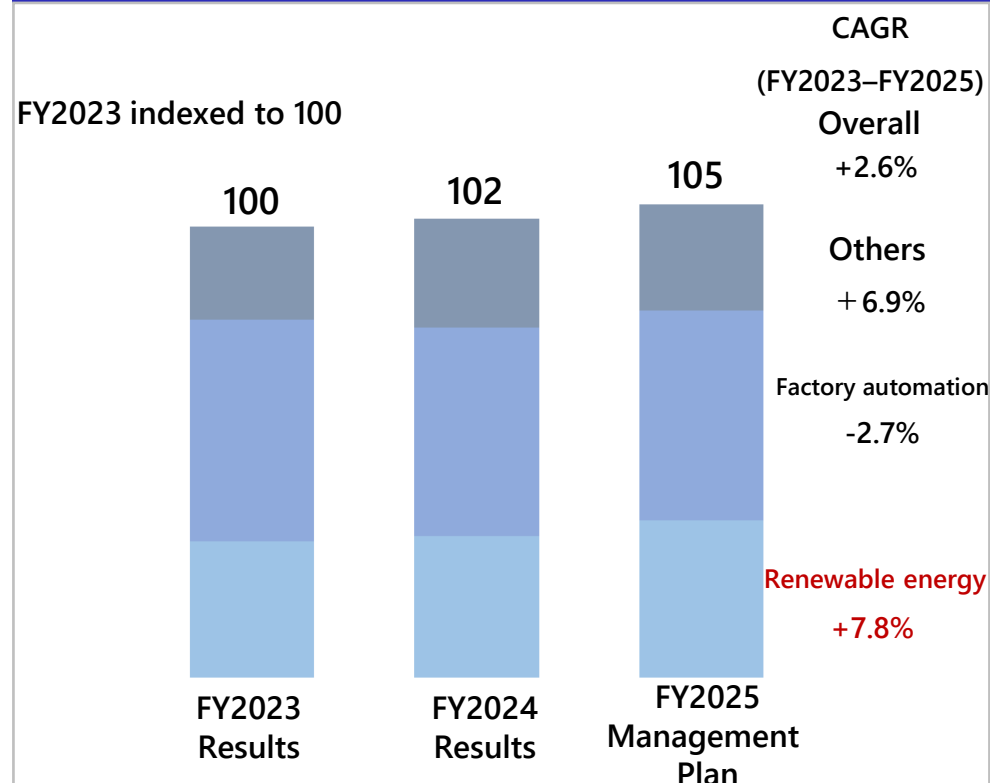
* Based on standardized value used for existing technologies

- Strong market growth for renewable energy field amid sluggish recovery in demand centered on factory automation
- Sales growth surpassing market growth driven by 7th-generation IGBTs sales to major renewable energy customers

Module Market Served by Fuji Electric



Industrial Module Sales



Note:

"Factory automation" refers to inverters, servos, numerically controlled machine tools, and industrial robots.

"Others" refers electric railway, power supply, air conditioning, consumers, and other products.

Source: Fuji Electric (estimates based on data from research institutions)

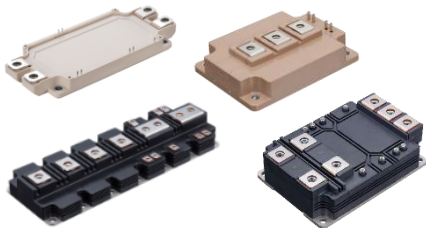
- Expansion of lineup of products accommodating voltages ranging from 1,200V to 2,300V and solicitation of Fuji Electric's specifications to renewable energy market
- Response to needs for high voltage resistance and high reliability required for increasing generation capacity and stabilizing power supplies

Renewable Energy Product Lineup

IGBT

Module
voltage
resistance

1,200V
1,700V



2,300V
(New product)

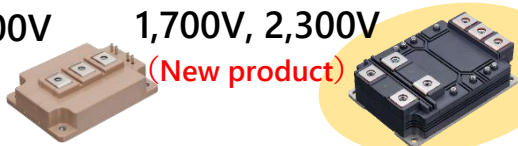


SiC

1,700V

1,700V, 2,300V

(New product)



New Large-Capacity Modules

- High reliability achieved by using ultrasonic wave terminal connection technology (temperature cycle resistance approx. 10 times higher than prior models)
- Low inductance for capitalizing on high-speed switching capabilities (reduction of 70% in comparison to prior models, L_s 42 → 12.5nH)



Large-Capacity Package
High Power next Core (HPnC)

Dimensions: W144 x D100 x H40 mm

Contributions to More Compact High-Voltage Systems (1,500V DC Capacity)

Circuit structure	3 level	2 level
Model rate capacity (voltage resistance)	1,700V	2,300V
Model number (per unit)	3	1
Mounting area	43,200 mm ² → 14,400 mm ² (66% size reduction)	

Launch
timing

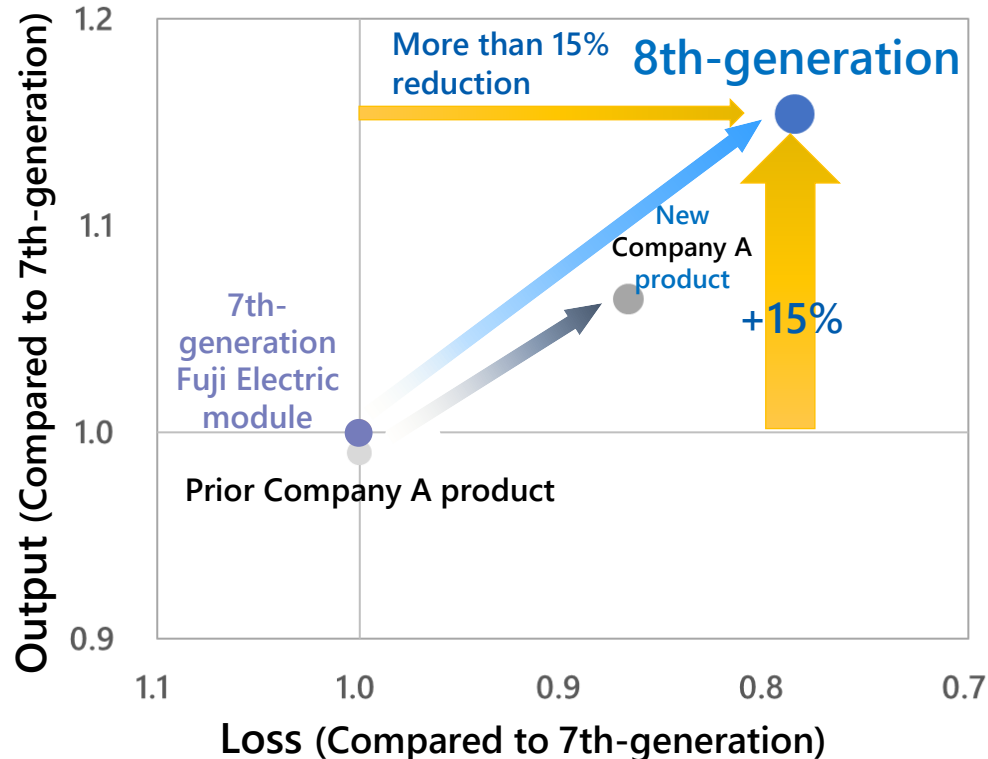
- IGBT modules: Mass production commenced in April 2025
- SiC models: Mass production to be commenced in 4Q of FY2026

Industrial Semiconductors: Development of Competitive New Products (8th-Generation IGBT Modules)

- Development of low-loss modules using 8th-generation IGBT technologies
- Competitiveness supported by performance improvements (loss reduction) and massive cost reductions

Loss–Output Comparisons

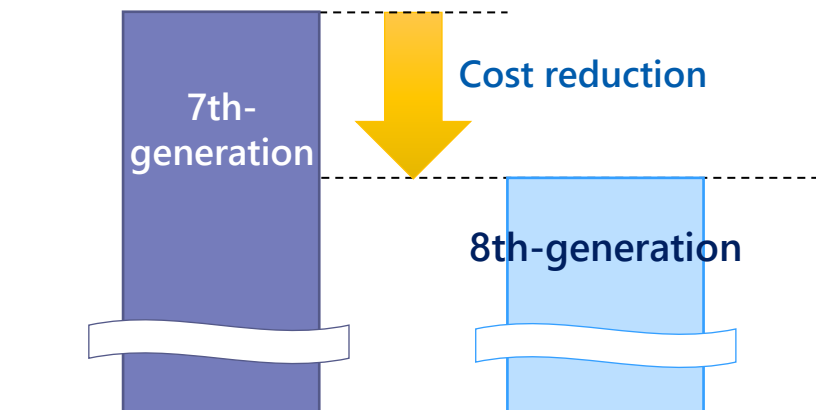
- Reduction in loss of more than 15% in comparison to 7th-generation Fuji Electric models contributing to high output density compared to rival offerings



Note: Performance of other's rival offerings are estimates by Fuji Electric.

Product Cost Comparison with Prior Offerings

Product Costs



Cost Reduction Measures

- More compact IGBT and FWD chips
- Shared design, standardization, and local procurement of structural components
 - Shared design of components with existing products
 - Application of products using manufacturers' standardized specifications
 - Local procurement

**Launch
timing**

• Mass production to commence
beginning in 4Q of FY2025

- Bolstering of SiC device production capacity and mass production of 8th-generation IGBTs based on demand



Japan (Matsumoto)

- Mother factory
- Mass production of 8th-generation IGBTs to begin in 4Q of FY2025
- Development of line for early production of 8-inch SiC devices



Japan (Yamanashi)

- 8-inch Si devices
- Automotive IGBTs



Japan (Tsugaru)

- Mass production underway for 6-inch SiC devices
Augmentation of production capacity planned in FY2025 (150% capacity increase compared to FY2024)



Malaysia

- 8-inch Si devices
- 7th-generation industrial IGBTs

- Start of mass production of new products and augmentation of production capacity based on demand growth



Japan (3 bases)

- Mother base for assembly products, manufacturing of products for domestic customers
 - : Start of production of new electrified vehicle products (April 2025)
 - : Start of production of 8th-generation IGBTs



Philippines

- Principal base for production of discrete and air-conditioner modules
 - : Start of production of new 7th-generation IGBT products (October 2025)



China (Shenzhen)

- Production base for industrial IGBT modules for Chinese market
 - : Augmentation of 7th-generation IGBT production capacity in response to demand growth (30% capacity increase compared to FY2024)

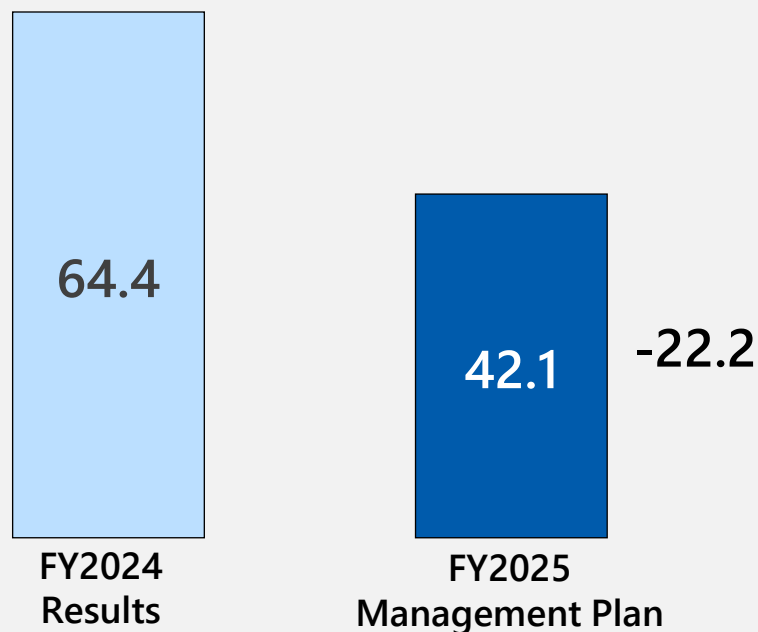


Malaysia

- Production base for industrial IGBT modules for U.S. and European market

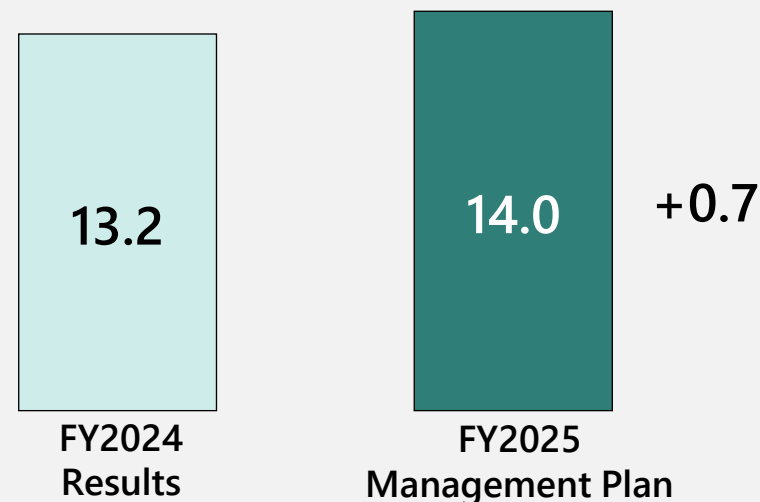
Capital Investment / Research and Development

Capital Investment (Billions of yen)



- Expansion of front-end production capacity (6-inch SiC devices)
- Expansion of back-end (automotive and industrial module) production capacity
- Development of line for early production of 8-inch SiC devices

Research and Development (Billions of yen)



- Development for new products (3rd-generation SiC-MOSFETs and 8th-generation IGBTs)
- Acceleration of 8-inch SiC device technology development

Note: The R&D expenditure figures above represent expenditures that have been allocated to segments based on theme and may therefore differ from figures contained in consolidated financial reports.

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