

Electronic Devices

We aim to expand our business by expediting efforts to increase our production capacity for power semiconductors for electrified vehicles.

Toru Housen
Managing Executive Officer
Corporate General Manager,
Electronic Devices Business Group



Business Areas

- Power semiconductors
Industrial field, Automotive field
- Magnetic disks

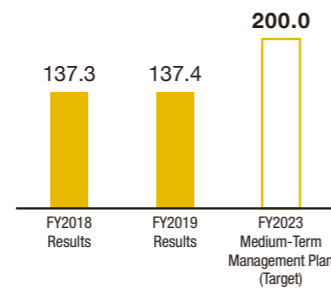
Supplied to

- Power semiconductors
Industry:
Inverters, Machine tools, Air conditioners,
Solar and wind power, Electric railways
Automobile:
Motor drives for electrified vehicles
(EVs, HEVs, etc.),
Engine control, Brake control
- Magnetic disks
HDD (Data center, PCs)

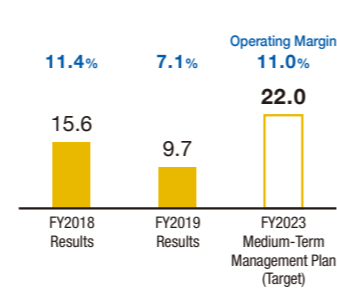
Strengths

- Power semiconductors**
- Proprietary devices that greatly improve power conversion efficiency
- Packaging technologies that achieve high levels of heat dissipation and reliability
- Product development capabilities of IGBT modules that contribute to increasing the efficiency, miniaturization, and reliability of power electronics

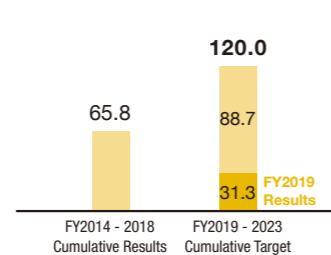
Net Sales
(Billions of yen)



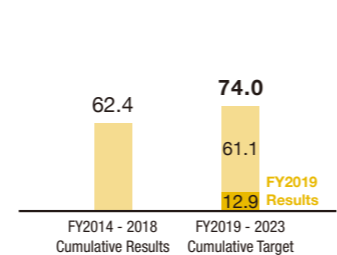
Operating Income
(Billions of yen)



Plant and Equipment Investment
(Billions of yen)



R&D Expenditures
(Billions of yen)



Medium-Term Management Plan Policy

Against the backdrop of steady global demand for electrified vehicles (xEVs) and proliferation of renewable energy, we will focus on automobiles (xEVs) and power

semiconductors for industrial use. To this end, we will invest aggressively to increase production capacity and boost sales and profits.

Awareness of Market Needs and Business Opportunities

Power semiconductors help save energy thanks to their high levels of conversion efficiency and power control. Demand for these devices in various fields and applications is rising due to various factors. These include increases in energy consumption due to economic growth and technological progress, growing investments in automation in the manufacturing sector, and environmental regulations aimed at preventing global warming.

In the automotive field, the shift from gasoline-powered vehicles to xEVs is gaining momentum in various

countries around the world, and demand for power semiconductors is expected to grow, including for inverters used to drive xEV motors.

In the industrial field, there is an ongoing shift to renewable energy sources, such as wind and solar, due to rising demand for clean energy. We also expect companies to continue investing in automation to solve labor shortages and improve productivity, and the demand for machine tools and robots will increase as a result.

Major Initiatives in Fiscal 2019–2020

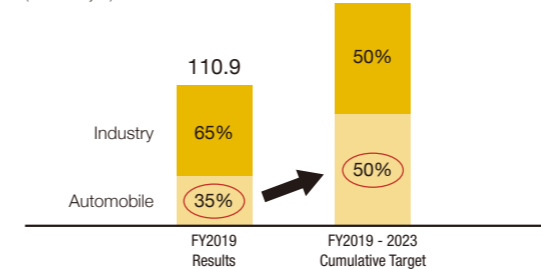
Expanding sales of power semiconductors for xEVs

In fiscal 2019, we started mass production of 4th-generation direct liquid cooling modules that feature lower losses and higher cooling performance than before. We posted a significant year-on-year increase in sales of automotive products, which accounted for 35% of total power semiconductor sales, up from 29% in fiscal 2018.

In 2020, global production of automobiles, especially gasoline-powered vehicles, will remain on a downtrend due to shutdowns of overseas factories stemming from the COVID-19 pandemic. Nevertheless, we expect demand for xEVs to grow in the medium and long terms as environmental regulations tighten.

Our aim is to expand sales of power semiconductors for xEVs by consistently providing high-quality products.

Sales by Fields
(Billions of yen)



Accelerating increases in production capacity

To address rapidly increasing demand for power semiconductors for xEVs, we are investing actively to boost production of 8-inch wafer production equipment. In fiscal 2020, we will continue investing to raise production while strengthening the assembly process capacity of our production bases in Japan and overseas.

Expanding sales of large-capacity IGBT modules for the renewable energy and electric railway markets

In fiscal 2019, we launched sales of 7th-generation IGBT modules (large-capacity series) equipped with 7th-generation IGBT chips that reduce losses by around 30% compared with existing chips. We are selling these modules, which boast high levels of heat dissipation and reliability, mainly to the renewable energy and electric railway markets.

In these markets, devices are increasing in capacity and decreasing in size while generating lower losses. Emphasizing the features of our products, we have expanded sales to manufacturers of wind and solar power generation equipment.

In fiscal 2020, we will continue increasing sales to the robust renewable energy market, while capturing new orders from the electric railway market with the aim of further increasing our market share in the industrial field.

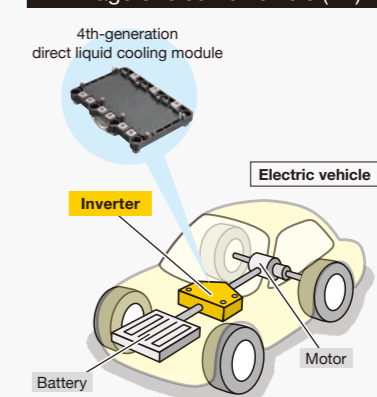
Close Up!

Helping xEVs reduce the environmental impact and improve driving distance

In the xEV field, the focus is on reducing environmental impact and improving driving distance, which requires components that are smaller, lighter, and more efficient than ever before.

To address these requirements, in fiscal 2019 we started mass production of a 4th-generation direct liquid cooling module featuring improved heat dissipation performance compared with conventional products. This module, which is fitted with RC-IGBTs* for better compactness and lower losses, is for use in motor drive inverters that are indispensable for xEVs.

Image of electric vehicle (EV)



*RC-IGBT: Acronym for "reverse conducting insulated gate bipolar transistor." An RC-IGBT arranges two types of semiconductors with differing functions—IGBTs and freewheeling diodes (FWDs)—alternately in a straight line on a single chip. This permits much greater miniaturization compared with arranging the IGBTs and FWDs on two separate chips.