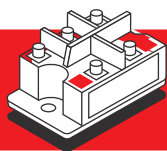


Competitive advantages

In the more than 90 years since its founding, the Sansha Electric Manufacturing Group has been following the principle of helping resolve social issues through the effective use of electricity. Accordingly, we have been providing products and services based on power and energy conversion technologies, control technologies and power semiconductor technologies. We have been honing our technologies by addressing the various issues confronting our customers while continuing years of investment in equipment and human resources. This has enabled us to establish unique strengths and competitive advantages. Maintaining these efforts lays a foundation for our technological capabilities and reliability. We will continue to build up our unique technological capabilities and continue to support the sustainable development of society with a focus on the effective use of electricity and energy.

Our competitive advantages

- 1 **Flexible and high-performance power supply solutions that integrate our core technologies**
We have integrated our three core technologies, specifically, our technologies in the areas of electricity and energy conversion, control and power semiconductors. This has enabled us to achieve high performance, high efficiency and energy conservation to provide power supply solutions that flexibly respond to decarbonization and the diverse needs of industry.
- 2 **Independent integrated structure for technological advantages and fast delivery**
All processes from the development of power semiconductors to their product design and manufacturing are completed internally. We have constructed a development and production system that achieves high reliability and efficiency and that paves the way toward stable quality and quick delivery.
- 3 **Product lineup that caters to multiple applications**
We supply highly reliable high-performance products that have applications in a wide range of fields, including power supplies for surface treatment and power conditioners for renewable energy. They support the evolution of industries.
- 4 **After-sales service structure supporting long-term operation**
Our maintenance and service structure has been in place since 1974 to support the entire product life cycle. It helps ensure the stable operation of infrastructure equipment and other equipment.



5th largest share
of the global market of thyristor and diode modules ^{*1}



1st largest share
of the domestic market of power supplies for surface treatment ^{*2}

^{*1} Source: Omdia, Annual Power Semiconductor Reports - 2023

^{*2} Source: Estimated by Sansha Electric Manufacturing Co., Ltd. on the basis of the Japan Plating Suppliers Association: 2023 Dynamic Statistics of Power Supply Sales

Example

An initiative with AIST

The Fukushima Renewable Energy Institute (FREA) of the National Institute of Advanced Industrial Science and Technology (AIST) has constructed and now operates large-scale grid connection trial equipment for the stable supply of electricity derived from renewable sources of energy to power transmission and distribution infrastructure. We have been consistently engaged in technological cooperation in the field of power conversion since we delivered a trial system for the verification of solar power generation systems to FREA in 2014. Based on this relationship that has existed for years, FREA again praised us for our technological strengths when it expanded its environment for evaluating large-capacity power conditioners. In FY2023, we newly developed a large-capacity power conditioner grid connection simulator power supply system and delivered it.

At that time, FREA expressed their appreciation for our strong power and energy conversion technologies that support high voltage and high currents, in addition to our high-precision control technologies that are able to reproduce the complicated behaviors of the power grid. This opened the way for detailed power supply simulations to meet testing needs that are increasingly diverse and advanced in line with the widespread introduction of renewable energy.

This record of delivery proves that our technological capabilities have been recognized as providing highly reliable solutions that support the next-generation energy society. We will continue to seek more advanced energy control based on power semiconductor technologies with a view toward helping realize a sustainable society.

Large-capacity power conditioner evaluation system

Delivered to: National Institute of Advanced Industrial Science and Technology's Fukushima Renewable Energy Institute (FREA)

Compared to the conventional system

Smaller size

Less than $\frac{1}{3}$

Higher power conversion efficiency

97%

▲
92%

Features and mechanism

Our SiC MOSFET power semiconductor device was introduced to achieve miniaturization, low power loss (with a conversion efficiency of 97%) and reduced power consumption through regeneration and power recovery. At the same time, we also developed a simulated direct current power supply. The use of the SiC MOSFETs enabled us to reduce the size of the product from the conventional 38 m² per 1 MW (1,000 kW) to 17 m² per 1.4 MW (1,400 kW). This means that it was miniaturized to less than one third the size of the conventional system. It also has a higher power conversion efficiency of 97%, compared to the conventional model's 92% efficiency.



The use of SiC MOSFETs made it possible to achieve a smaller-sized system with higher power conversion efficiency.