

Contributing to the Expansion of Renewable Energy Systems with High-Capacity IGBT Modules

To realize a decarbonized society, the use of renewable energy sources such as wind and solar power needs to expand. To support the needed expansion, Fuji Electric has launched the high-capacity IGBT module “HPnC” utilizing our 7th generation X series IGBT technology. The HPnC IGBT module provides increased output power, reduced size and weight, and supports lower power generation costs in power converters for wind power and power conditioning system (PCS) for solar power. The HPnC IGBT module can also be applied to optimize traction converters.

- **Increased output current and reduced power loss**

Compared to conventional products, the output current is increased by approximately 33%, and power loss is reduced by approximately 12%.

This contributes to higher-capacity of power conversion equipment and higher power generation efficiency.

- **Easier parallel connections**

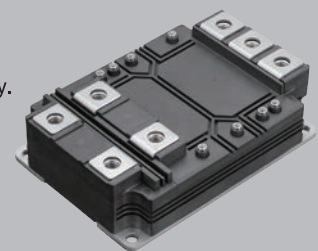
The optimized terminal arrangement reduces interference.

This simplifies parallel connection and allows power conversion equipment to handle higher currents.

- **Compatible with 1500V DC inverter systems**

Expanded product lineup with 2300V rated IGBT module

1500V DC systems lead to reduction in cost for equipment and peripheral components.



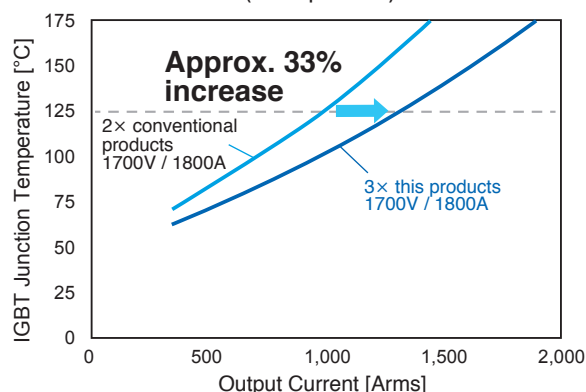
Application examples:
Wind power generation,
solar power generation, railways, etc.



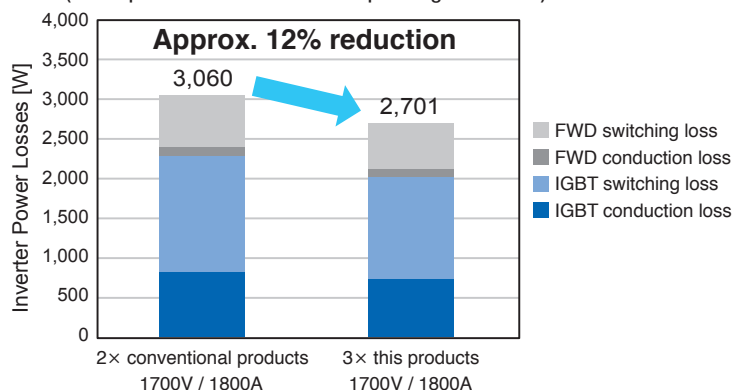
1. Increased output current and reduced power loss

The internal structure has been optimized compared to conventional products with the same rated voltage of 1700V, thereby expanding the chip mounting area and improving the current density. As a result, with the same footprint area, output current can be increased by approximately 33% at IGBT junction temperature $T_{vj} = 125^{\circ}\text{C}$, and inverter power loss is approximately 12% lower under standard operating conditions. This contributes to increasing the capacity of power conversion equipment and improving power generation efficiency.

Comparison of output current and IGBT junction temperature
(1700V products)

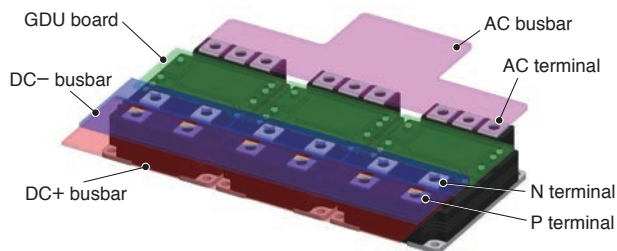


Inverter loss comparison
(1700V products under standard operating conditions)



2. Easier parallel connections

The optimized terminal arrangement of this product reduces interference when connected in parallel. This simplifies parallel connections and allow power conversion equipment to handle higher currents.



3. Compatible with 1500V DC inverter systems

We have expanded our product lineup with a 2300V rated IGBT module that is compatible with 1500V DC inverter systems. When the 2300V module is used in 1500V DC solar power generation systems, the number of solar panels in series connection can be increased by 150% compared to 1000V DC systems. This allows the system to reduce the number of power conversion equipment, transformers, and cables, resulting in cost savings for equipment and peripheral components.

Configuration examples of solar power generation systems	DC1000V (with conventional product)	DC1500V (with this product)
Solar panels	6	6
Number of solar panels in series connection	2	3 150%
Power conversion equipment	3	2 67%
Transformers	3	2 67%

Product Series 1700V / 2300V

Series Type	Package	Size [mm]	Base plate	Application	I_c		
					1200A	1500A	1800A
X Series HPnC	M297	99.5 × 144	MgSiC	Railroads	1700V*		
	M298		Cu	Wind / Solar Powers	2300V	1700V	

*Under development

⚠ Safety Precautions

- * Before using this product, read the "Instruction Manual" and "Specifications" carefully, and consult with the retailer from which you purchased this product as necessary to use this product correctly.
- * The product must be handled by a technician with the appropriate skills.

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