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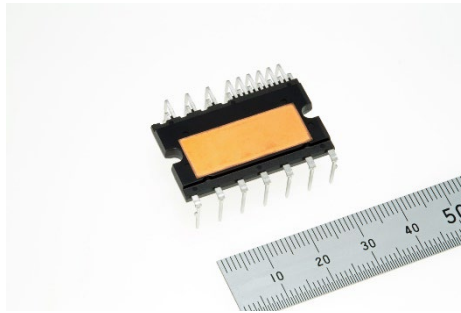
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## **Mitsubishi Electric to Ship Full-SiC and Hybrid-SiC SLIMDIP Samples**

*SLIMDIP series' first SiC modules offer high output and low power loss for energy-saving appliances*



Full SiC SLIMDIP (PSF15SG1G6)  
with same profile as Hybrid SiC SLIMDIP (PSH15SG1G6)

**TOKYO, April 15, 2025** – [Mitsubishi Electric Corporation](https://www.mitsubishielectric.com) (TOKYO: 6503) announced today that it will begin shipping samples of two new SLIMDIP series power semiconductor modules for room air conditioners and other home appliances, the Full SiC (silicon carbide) SLIMDIP (PSF15SG1G6) and the Hybrid SiC SLIMDIP (PSH15SG1G6), on April 22. Both modules, the first SiC versions in the company's SLIMDIP series of compact, terminal-optimized modules, achieve excellent output and power loss reduction for energy savings in small- to large-capacity appliances. They will be exhibited at Power Conversion Intelligent Motion (PCIM) Expo & Conference 2025 in Nuremberg, Germany from May 6 to 8, as well as trade shows in Japan, China and other countries.

Mitsubishi Electric's newly developed silicon carbide metal-oxide-semiconductor field-effect transistor (SiC-MOSFET) chip is incorporated into both new SLIMDIP packages. Compared to current silicon (Si)-based reverse-conducting insulated-gate bipolar transistor (RC-IGBT) SLIMDIP modules, these new SiC modules achieve higher output for larger-capacity appliances. Additionally, compared to the Si-based module, power loss is reduced by 79%<sup>1</sup> with the Full SiC SLIMDIP and by 47%<sup>1</sup> with the Hybrid SiC SLIMDIP for more energy-efficient appliances. With these two new modules as well as existing Si-based RC-IGBT SLIMDIP modules, the SLIMDIP series now offers three options for use in inverter boards of appliances such as room air conditioners, each one suited to specific electrical capacity and performance needs, but all offered in the same package to help reduce the burden of designing inverter substrates.

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<sup>1</sup> Based on Mitsubishi Electric simulations: Vcc=300V, fc=5kHz, PF=0.8, M=1, fo=60Hz, three-phase modulation.

## **Product Features**

### **1) Series' first SiC-MOSFET contributes to higher output for large-capacity inverters in appliances**

- A newly developed SiC-MOSFET chip optimized for the SLIMDIP package achieves higher output than current Si-based RC-IGBT SLIMDIP as the first SiC SLIMDIP power-semiconductor module for large-capacity appliances.

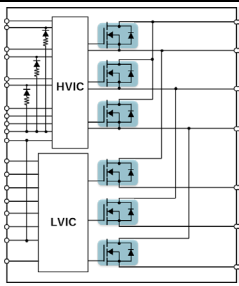
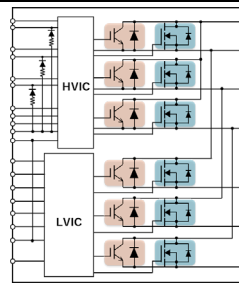
### **2) Full SiC SLIMDIP module reduces power loss by 79% for more energy-efficient appliances**

- The new SiC-MOSFET, adapted to the chip size and characteristics of the Full SiC SLIMDIP, reduces power loss by 79%<sup>1</sup> compared to current Si-based modules for more energy-efficient appliances. When used in the inverter circuit of an air conditioner compressor, it reduces annual power consumption by 80%<sup>2</sup>.

### **3) Hybrid SiC SLIMDIP module reduces power loss by 47% thanks to SiC-MOSFET and RC-IGBT**

- Integration of both a SiC-MOSFET and RC-IGBT into a single power semiconductor module, an industry first<sup>3</sup> for home appliances, enables the Hybrid SiC SLIMDIP to reduce power loss by 47%<sup>1</sup> compared to the current Si-based modules. When used in the inverter circuit of an air conditioner compressor, it reduces annual power consumption by 41%<sup>2</sup>.
- The Hybrid SiC SLIMDIP, which mounts and wires multiple elements in the SLIMDIP package, is the industry's first<sup>3</sup> home-appliance module to achieve parallel use of a SiC-MOSFET (low on-state voltage characteristics at low currents) and a Si RC-IGBT (high current conduction) in a drive IC.

## **Main Specifications**

Product	Full SiC SLIMDIP	Hybrid SiC SLIMDIP
Type	PSF15SG1G6	PSH15SG1G6
Built-in power chips	SiC MOSFET	SiC MOSFET+RC-IGBT
Rating voltage	600V	
Rating current	15A	
Connection	6in1	
Circuit diagram		
Isolation voltage	2,000Vrms	
Dimensions (WxDxH)	32.8x18.8x3.6mm	
Sample shipments	April 22, 2025	
Environmental awareness	Compliance with the RoHS <sup>4</sup> directive 2011/65/EU and (EU) 2015/863	

<sup>2</sup> Comparison with SLIMDIP-L. Assumes JIS C9612-based operating hours for four basic air-conditioner modes (rated cooling, intermediate cooling, rated heating and intermediate heating). Operating conditions estimated by Mitsubishi Electric.

<sup>3</sup> As of April 15, 2025, according to Mitsubishi Electric's research.

<sup>4</sup> Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment.

## **Background**

In order to achieve greater decarbonization, demand is growing for power semiconductors that efficiently convert power in appliances, such as inverters that control compressors and fans in air conditioners and washing machines. Energy-savings inverters for home appliances are being adopted worldwide, and in Japan, energy-saving regulations for appliances are being strengthened. Demand for more efficient power semiconductors that contribute to inverter efficiency are expected to continue growing.

Mitsubishi Electric commercialized its DIIPM intelligent power-semiconductor module with a transfer mold structure, which incorporated switching elements and control ICs for driving and protection, in 1997. In 2010, the company introduced the world's first SiC power semiconductor modules with the "Kirigamine" room air conditioner. In 2015, Mitsubishi Electric launched the SLIMDIP series of modules incorporating RC-IGBTs, about 30% smaller than the existing Super mini DIIPM Ver.6, for smaller and more energy-efficient appliances. In 2016, the company introduced its Full SiC Super mini DIIPM for further energy savings in home air conditioners.

Note: Parallel-drive and assembly technology incorporated in the Hybrid SiC SLIMDIP were developed in collaboration with the Program to Develop and Promote the Commercialization of Energy Conservation Technologies to Realize a Decarbonized Society, a project subsidized by Japan's New Energy and Industrial Technology Development Organization (NEDO).

## **Website**

[www.MitsubishiElectric.com/semiconductors/powerdevices/](http://www.MitsubishiElectric.com/semiconductors/powerdevices/)

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## **About Mitsubishi Electric Corporation**

With more than 100 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Mitsubishi Electric enriches society with technology in the spirit of its "Changes for the Better." The company recorded a revenue of 5,257.9 billion yen (U.S.\$ 34.8 billion\*) in the fiscal year ended March 31, 2024. For more information, please visit [www.MitsubishiElectric.com](http://www.MitsubishiElectric.com)

\*U.S. dollar amounts are translated from yen at the rate of ¥151=U.S.\$1, the approximate rate on the Tokyo Foreign Exchange Market on March 31, 2024