TOYODA GOSEI

News Release

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Toyoda Gosei Develops Horizontal GaN Power Device of World-Class High-Voltage, High-Speed Operation

New technology contributes to next-generation low energy use devices

Kiyosu, Japan, June 20, 2023: Toyoda Gosei Co., Ltd. and Powdec K.K. have jointly developed[1] a high-performance horizontal GaN power device that will lead to improved performance in the power converters used in solar power generation and other equipment.

Power devices are widely used in power control for industrial machinery, automobiles, home appliances and more. Today, as society moves toward carbon neutrality, the commercialization and spread of next-generation power devices that can reduce power loss during control holds great promise. Among these devices, GaN power devices feature high-speed operation, but higher breakdown voltage for higher power operation has been an issue in wider application.

World-class power of 800V and On/Off operation of one millionth of a second was confirmed[2] using a module equipped with an originally designed GaN power device[3] under development by Toyoda Gosei and Powdec. This demonstration of a power device that offers both high-voltage and high-speed operation is promising for reduced power loss in solar power generation and other benefits. The companies are aiming to assure stable continuous operation and durable quality for early commercialization.

[1] With support from the Ministry of the Environment's "Project to Accelerate the Social Implementation and Spread of Components and Materials for Innovative CO_2 Reductions."

[2] High performance with both high-voltage operation (800V) and high-speed operation (On/Off operation of one millionth of a second) is among the highest in the world (as of the end of May, 2023 in a survey by Toyoda Gosei)

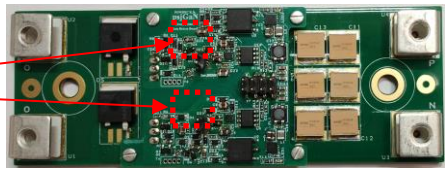
[3] Polarization Super Junction GaN power transistor. It features high breakdown voltage of ≥1500 V.

GaN power device

Used in areas shown with dotted lines

(Height 6mm× Width 4mm)

Drive circuit board equipped with GaN power device



On/off operation of 1/1,000,000 second with power of 24kW (800V × 30A) confirmed

Toyoda Gosei's area of development

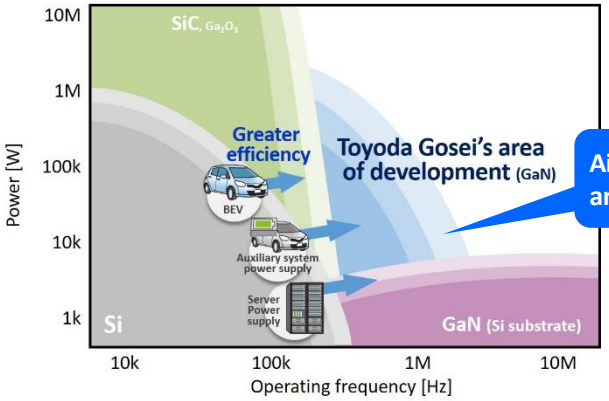


Figure prepared by Toyoda Gosei with reference to "Introduction: GaN power semiconductor applications," Journal of the Institute of Electrical Engineers of Japan, Vol. 139-2, p. 76–79