**News Release**

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**Renesas Unveils New-Generation Si IGBTs for Electric Vehicle Inverters**

*New Power Product to Be Manufactured at Renesas’ Newly Established 300mm Kofu Factory*

**Düsseldorf/TOKYO, Japan, August 30, 2022 ―** Renesas Electronics Corporation (TSE: 6723), a premier supplier of advanced semiconductor solutions, announced the development of a new generation of Si-IGBTs (Silicon Insulated Gate Bipolar Transistors) which will be offered in a small footprint while providing low power losses. Aimed at next generation electric vehicle (EVs) inverters, AE5-generation IGBTs will be mass produced starting in the first half of 2023 on Renesas’ 200- and 300-mm wafer lines at the company’s factory in Naka, Japan. Additionally, Renesas will ramp up production starting in the first half of 2024 at its new power semiconductor [300-mm wafer fab in Kofu](https://www.renesas.com/about/press-room/renesas-invest-and-restart-operation-kofu-factory-300mm-wafer-fab-dedicated-power-semiconductors), Japan to meet the growing demand for power semiconductor products.

The silicon based AE5 process for IGBTs achieve a 10% reduction in power losses compared to the current-generation AE4 products, a power savings that will help EV developers save battery power and increase driving range. In addition, the new products are approximately 10% smaller while maintaining high robustness. The new Renesas devices achieve the industry’s highest level of performance for IGBTs by optimally balancing low power loss and robustness trade offs. Moreover, the new IGBTs significantly improve performance and safety as modules by minimizing parameter variations among the IGBTs and providing stability when operating IGBTs in parallel. These features provide engineers greater flexibility to design smaller inverters that achieve high performance.

“Demand for automotive power semiconductors is rapidly growing, as EVs become more widely available," said **Katsuya Konishi, Vice President of Renesas' Power System Business Division**. “Renesas' IGBTs provide highly reliable, robust power solutions that build on our experience in manufacturing automotive-grade power products for the last seven years. With the latest devices soon to be in mass production, we are providing optimal features and cost performance for mid-range EV inverters that are expected to grow rapidly in the future."

**Key Features of the New-Generation IGBT (AE5)**

* Four products targeting 400-800V inverters: 750V withstand voltage (220A and 300A) and 1200V withstand voltage (150A and 200A)
* Steady performance throughout the operating junction temperature (Tj) range from -40°C to 175°C
* Industry's highest performance level with an on-voltage Vce (saturation voltage) of 1.3V, a key value for minimizing power loss
* 10% higher current density compared to conventional products and small chip size (100mm2/300A) optimized for low power losses and high input resistance
* Stable parallel operation by reducing parameter variations to VGE(off) to ±0.5V
* Maintains reverse bias safe operating area (RBSOA) with a maximum Ic current pulse of 600A at 175°C junction temperatures, and a highly robust short circuit withstand time of 4µs at 400V.
* 50% reduction in the temperature dependence of gate resistance (Rg). This minimizes switching losses at high temperatures, spike voltage at low temperatures and short circuit withstand time, supporting high performance designs.
* Available as a bare die (wafer)
* Enables a reduction in inverter power losses, improving power efficiency by up to 6% compared to the current AE4 process at the same current density, allowing EVs to drive longer distances and use fewer batteries.

**Inverter Solution for EVs**

In EVs, the motors that power vehicles are controlled by inverters. Switching devices such as IGBTs are critical in minimizing power consumption for EVs, as inverters convert DC power to the AC power that electric vehicle motors require. To assist developers, Renesas offers the [xEV Inverter Reference Solution](https://www.renesas.com/us/en/application/automotive/electrified-drivetrain-xev/xev-inverter-reference-solution), a working hardware reference design that combines an IGBT, microcontroller, power management IC (PMIC), gate driver IC, and fast recovery diode (FRD). Renesas also offers the [xEV Inverter Kit](https://www.renesas.com/us/en/products/microcontrollers-microprocessors/rh850-automotive-mcus/pr-inv06500780-fb-xev-inverter-kit), which is a hardware implementation of the reference design. In addition, Renesas provides a motor parameter calibration tool and the [xEV Inverter Application Model and Software](https://www.renesas.com/software-tool/xev-inverter-application-model-software), which combines an application model and sample software for controlling the motor. These tools and support programs from Renesas are designed to help customers simplify their software development efforts. Renesas plans to add the new-generation IGBTs to these hardware and software development kits to enable even better power efficiency and performance in a smaller footprint.

**Availability**

Samples of the 750-withstand voltage version with 300A are available from Renesas today. Additional versions are planned for future release. More information about the new IGBTs can be found here:

<https://www.renesas.com/products/automotive-products/automotive-power-devices/automotive-igbt-0>.

A blog article about the new product is also available on the website: [The next generation IGBT/AE5 offers high efficiency and ease of use](https://www.renesas.com/us/en/blogs/next-generation-igbtae5-offers-high-efficiency-and-ease-use).

**About Renesas Electronics Corporation**

Renesas Electronics Corporation ([TSE: 6723](http://www.jpx.co.jp/english/)) empowers a safer, smarter and more sustainable future where technology helps make our lives easier. A leading [global](https://www.renesas.com/about/company/profile/global.html) provider of microcontrollers, Renesas combines our expertise in embedded processing, analog, power and connectivity to deliver complete semiconductor solutions. These Winning Combinations accelerate time to market for automotive, industrial, infrastructure and IoT applications, enabling billions of connected, intelligent devices that enhance the way people work and live. Learn more at [renesas.com](http://www.renesas.com/). Follow us on [LinkedIn](https://www.linkedin.com/company/renesas/), [Facebook](https://www.facebook.com/RenesasElectronics/), [Twitter](https://twitter.com/renesasglobal), [YouTube](https://www.youtube.com/user/RenesasPresents) and [Instagram](https://www.instagram.com/renesas_global/).

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