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STMicroelectronics boosts EV performance and driving range with new silicon-carbide power modules

Hyundai Motor Company has chosen ST's highly efficient ACEPACK DRIVE power modules for multiple models of its E-GMP vehicle platform

Geneva, December 7, 2022 – STMicroelectronics (NYSE: STM), a global semiconductor leader serving customers across the spectrum of electronics applications, has released high-power modules for electric vehicles that boost performance and driving range. ST's new silicon-carbide (SiC) power modules have been selected for Hyundai's E-GMP electric-vehicle platform shared by KIA EV6 and several models.

Five new [SiC-MOSFET based power modules](#) provide flexible choices for vehicle makers, covering a selection of power ratings and support for operating voltages commonly used in electric vehicle (EV) traction applications. Housed in ST's ACEPACK DRIVE package optimized for traction applications, the power modules are reliable thanks to sintering technology, robust, and easy for manufacturers to integrate in EV drives. Internally, the main power semiconductors are ST's third-generation (Gen3) STPOWER SiC MOSFETs, which combine industry-leading figure of merit ($R_{DS(ON)} \times \text{die area}$) with very low switching energy and super performance in synchronous rectification.

"ST silicon carbide solutions are enabling major automotive OEMs to set the pace of electrification when developing future generations of EVs," said Marco Monti, President, Automotive and Discrete Group, STMicroelectronics. *"Our third-generation SiC technology ensures the greatest power density and energy efficiency, resulting in superior vehicle performance, range, and charge time."*

A leader in the automotive EV market, Hyundai Motor Company has chosen ST's [ACEPACK DRIVE SiC-MOSFET Gen3 based power modules](#) for its current-generation EV platform, called E-GMP. In particular, the modules will power the Kia EV6. *"ST's SiC-MOSFET based power modules are the right choice for our traction inverters, enabling longer range. The cooperation between our two companies has realized a significant step towards more sustainable electric vehicles, leveraging ST's continuous technological investment to be the leading semiconductor actor in the electrification revolution,"* said Mr. Sang-Cheol Shin, Inverter Engineering Design Team at Hyundai Motor Group.

As an industry leader in this technology, ST has already supplied [STPOWER SiC devices](#) for more than three million mass-produced passenger cars worldwide. Compared to conventional silicon power semiconductors, smaller SiC devices can handle higher operating voltages that allow faster charging and superior vehicle

dynamics. Energy efficiency is also increased, which boosts driving range, and reliability can be extended. SiC is gaining mass adoption in multiple EV systems such as the DC-DC converter, traction inverter, and on-board chargers (OBC) with bi-directional operation ready for vehicle-to-grid power transfer. ST's SiC strategy, as an integrated device manufacturer (IDM), ensures quality and security of supply to serve carmakers' strategies for electrification. With the recently announced fully integrated SiC substrate manufacturing facility in Catania, expected to start production in 2023, ST is moving quickly to support the rapid market transition towards e-mobility.

Technical Notes to Editors:

ST's [1200V ADP280120W3, ADP360120W3, ADP480120W3\(-L\)](#) are already in full production. The 750V ACEPACK DRIVE ADP46075W3 and ADP61075W3 will be in full production by March 2023. They enable a plug-and-play solution for traction inverters, compatible with direct liquid cooling, and featuring a pin-fin array for efficient heat dissipation. Specified up to a maximum junction temperature of 175°C, they provide long-lasting and reliable press-fit connections and dice sintered to substrate to ensure extended lifetime in automotive applications. ST will extend the product portfolio to include IGBT and diode-based ACEPACK DRIVE versions.

The modules feature active metal brazed (AMB) substrate technology, known for excellent thermal efficiency and mechanical strength, mounting a dedicated NTC for each substrate. They are also available with a choice of welded or screw-fit busbar, giving flexibility to address different mounting requirements. A long-busbar option further extends the flexibility by allowing the choice of a Hall sensor to monitor the motor current.

ST's latest-generation [ACEPACK DRIVE modules](#) are in production now. Please contact your local ST sales representative for pricing and sample requests.

About STMicroelectronics

At ST, we are 48,000 creators and makers of semiconductor technologies mastering the semiconductor supply chain with state-of-the-art manufacturing facilities. An integrated device manufacturer, we work with more than 200,000 customers and thousands of partners to design and build products, solutions, and ecosystems that address their challenges and opportunities, and the need to support a more sustainable world. Our technologies enable smarter mobility, more efficient power and energy management, and the wide-scale deployment of the Internet of Things and connectivity. ST is committed to becoming carbon neutral by 2027. Further information can be found at www.st.com.

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