

**IMMEDIATE RELEASE**

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**DENSO and Kyoto University Startup FLOSFIA will Develop Next-Gen Power Semiconductor Device for Electrified Vehicles**

- DENSO also joins FLOSFIA series C funding round, investing in critical technology for the future of electrified vehicles –**

**KARIYA (Japan)** — [DENSO Corporation](#), one of the world's largest automotive suppliers, and [FLOSFIA Inc.](#), a tech startup spun from Kyoto University, are partnering to develop a next-generation power semiconductor device expected to reduce the energy loss, cost, size and weight of inverters used in electrified vehicles (EVs). Through the joint development project, the two companies aim to improve the efficiency of EV power control units, a key to drive widespread EV use, and usher in a future of safer, more sustainable mobility.

In addition to the joint development partnership, DENSO has acquired new shares issued by FLOSFIA in its Series C funding round.

Professor Shizuo Fujita at Kyoto University pioneered the application of corundum structured gallium oxide ( $\alpha\text{-Ga}_2\text{O}_3$ ) for use in semiconductors.  $\alpha\text{-Ga}_2\text{O}_3$  semiconductors provide superior performance to other semiconductors on the market. These semiconductors have a wide bandgap of 5.3 eV and high electric breakdown field strength, meaning they can better withstand high voltage applications.  $\alpha\text{-Ga}_2\text{O}_3$  will replace today's current silicon (Si) and silicon carbide (SiC) power semiconductors and help further develop the technologies that make tomorrow's electrified vehicles a reality.

Originally established at Kyoto University in 2011, FLOSFIA is a world leader in R&D and commercializing  $\alpha\text{-Ga}_2\text{O}_3$ . Aligning with its vision to create the future of mobility through Connected, Automated Drive, and Electrification technologies, DENSO became interested in FLOSFIA's technology. The two will further research and develop technology in high-voltage products for hybrid and electric vehicles, including semiconductors.

Since 2007, DENSO has provided power control units (PCUs) for hybrid and electric vehicles. PCUs use an inverter to control the power supplied from the battery to the motor generator. To

use electric energy more efficiently, energy losses during the DC to AC conversion by the inverter must be reduced, and so DENSO is conducting R&D on low-loss power semiconductors.

Financial terms of the investment were not disclosed.

### **About DENSO in North America**

DENSO is a leading global automotive supplier of advanced technology, systems and components in the areas of thermal, powertrain control, electronics and information and safety. With its North American headquarters located in Southfield, Michigan, DENSO employs more than 23,000 people at 28 consolidated subsidiaries and four affiliates across the North American region. Of these, 25 are manufacturing facilities located in the United States, Canada and Mexico. In the United States alone, DENSO employs more than 17,000 people in Alabama, Arkansas, California, Iowa, Georgia, Kentucky, Michigan, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee and Texas. DENSO's North American consolidated sales totaled US\$9.6 billion for the fiscal year ending March 31, 2017. For more information, go to [www.denso.com/us-ca/en](http://www.denso.com/us-ca/en). Connect with DENSO on Facebook at [www.facebook.com/DENSOinNorthAmerica](https://www.facebook.com/DENSOinNorthAmerica).

### **About DENSO Corporation**

DENSO Corp., headquartered in Kariya, Aichi prefecture, Japan, is a leading global automotive supplier of advanced technology, systems and components in the areas of thermal, powertrain control, electronics and information and safety. Its customers include all the world's major carmakers. Worldwide, the company has more than 200 subsidiaries and affiliates in 38 countries and regions (including Japan) and employs more than 150,000 people. Consolidated global sales for the fiscal year ending March 31, 2017, totaled US\$40.4 billion. Last fiscal year, DENSO spent 9.0 percent of its global consolidated sales on research and development. DENSO common stock is traded on the Tokyo and Nagoya stock exchanges. For more information, go to [www.denso.com](http://www.denso.com), or visit our media website at [www.denso.com/global/en/news/media-center/](http://www.denso.com/global/en/news/media-center/)

### **About FLOSFIA Inc.**

FLOSFIA Inc., headquartered in Kyoto, Kyoto prefecture, Japan, is a spin-off from a research of Kyoto University, specializing in film-formation by mist chemical vapor deposition (CVD). Making use of physical properties of gallium oxide ( $\text{Ga}_2\text{O}_3$ ), FLOSFIA has devoted to development of low-loss power devices. FLOSFIA succeeded in a development of a Schottky Barrier Diode (SBD) with the lowest specific on-resistance of any SBDs currently available on the market (through an internal investigation), realizing technologies linked to power loss reduction that is reduced up to 90 percent less than before. Flosfia will now develop its own production lines with a view to launching commercial production in 2018. FLOSFIA produces a variety of thin films, enhancing MISTDRY™ technology, achieving commercialization of power devices, and realizing application of its technology to electrode materials, oxide compounds with functional properties for electronic devices, plating and polymers. For more information, go to <http://www.floSFIA.com/>