



Next-gen Power Semiconductors: AIXTRON is a Partner in the EU Research Project "UltimateGaN"

Consortium develops energy-saving chips for renewable energy, electric mobility and CO₂ reduction

Herzogenrath/Germany, 19 June, 2019 – AIXTRON SE (FSE: AIXA), a worldwide leading provider of deposition equipment to the semiconductor industry, is a partner in the European research project "UltimateGaN" (Research for GaN technologies, devices and applications to address the challenges of the futureGaN roadmap). In addition to AIXTRON, 25 other companies and institutions from nine countries have come together to research the next generation of energy-saving chips based on the semiconductor material gallium nitride (GaN) over the next three years. The aim is to make these power semiconductors available for a wide range of applications at globally competitive costs. The project thus makes an important contribution to greater energy efficiency and CO₂ reduction.

With a volume of 48 million euros, UltimateGaN is one of the largest current European research projects in the field of semiconductor development. The financing is made up of investments by industry, subsidies from the individual participating countries and the ECSEL Joint Undertaking (Electronic Components and Systems for European Leadership).

Efficient use of energy for climate protection

The worldwide demand for energy is increasing - more and more applications of daily life are being digitized and electric vehicles are increasingly entering the mass market. Energy-saving chips made of new materials such as gallium nitride play a decisive role in converting electricity much more efficiently than before. This saves energy and minimizes the CO₂ footprint.

"Energy efficiency is one of the world's most important factors in reducing the usage of limited energy resources. By developing intelligent technologies, we are making a key contribution to the global challenge of climate change. New materials and efficient chip solutions play a key role here. With this research project, we are creating the conditions for making innovative energy-saving chips available for many future-oriented everyday applications," says Dr. Felix Grawert, President of AIXTRON SE.

For further information please contact

Corporate Communications
AIXTRON SE, Dornkaulstr. 2, 52134 Herzogenrath, Germany
PHONE +49 (2407) 9030-444 FAX +49 (2407) 9030-445
E-MAIL info@aixtron.com WEB www.aixtron.com

"Gallium nitride semiconductor devices are revolutionizing energy use on many levels," explains Prof. Dr. Michael Heuken, Vice President Research & Development at AIXTRON SE. "The research project opens up an enormous global market potential. It enables better performance and efficiency in a wide range of applications and significantly improves user comfort. Efficient operation of servers and data centers, fast and wireless charging of smartphones, data exchange between machines in real time, or lightning-fast video streaming become reality."

UltimateGaN - smaller, energy-efficient chips at marketable costs

The objective of UltimateGaN is to develop innovative power and high-frequency electronics from gallium nitride. AIXTRON is contributing its expertise as a supplier to the semiconductor industry and in the production of gallium nitride to the research project: The production of high-quality wafers using MOCVD (Metalorganic Chemical Vapor Deposition) technology, from which the chips for further research are cut in the next production step, is carried out on AIXTRON equipment at the Infineon plant in Villach (Austria).

In terms of materials and processes, research is now going one step further to develop the next generation of these highly efficient energy-saving chips for the mass market: The focus is on further miniaturization and the provision of these chips in high quality and at globally competitive costs. The unique material structure of GaN enables higher current densities to be achieved, which allows smaller and lighter designs that switch the current much more efficiently and can transmit higher data rates more quickly. The result is a significant reduction in energy consumption: current losses are reduced by up to 50%.

Profit from renewable energy, e-mobility and faster data transfer

Many applications in which low energy consumption, compact designs and faster data exchange are key will benefit from the use of these energy-saving chips. Energy efficiency of high-performance servers and other IT infrastructure devices will gain a further boost with the research project: the power dissipation will be significantly reduced by the higher switching efficiency of gallium nitride (GaN) power devices. This reduces electricity consumption and CO₂ emissions. The new 5G mobile communication standard and ultra-fast video loading are also supported, for example, as is real-time traffic flow control for autonomous driving or, in the context of Industry 4.0, easy communication between machines.

"With the UltimateGaN project, the project partners are making a significant contribution to the achievement of global climate goals and the next generation of wireless technology," said Dr. Felix Grawert, President of AIXTRON SE.

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Research focuses along the entire value chain

When seeking to miniaturize of GaN chips, the small and compact design as well as the complex technology required for the connections and casings present special challenges. High current densities, the effect of electrical fields, and material stresses and stabilities must be taken into account. As a result, the research will take a holistic approach with the entire value chain in focus – from process development, design, assembly and packaging technologies to integrated system solutions. The consortium of partners from academia and business is therefore equally broadly based.

About UltimateGaN

Europe united – 26 partners from nine countries researching together. **Austria:** Austria Technologie & Systemtechnik AG, Infineon Technologies Austria AG, Fronius International GmbH, CTR Carinthian Tech Research AG, Graz University of Technology | **Belgium:** IMEC | **Germany:** AIXTRON SE, Infineon Technologies AG, Siltronic AG, Max-Planck-Institut für Eisenforschung GmbH, Fraunhofer Society for the Promotion of Applied Research e.V., Chemnitz University of Technology, NaMLab GmbH | **Italy:** Università degli studi di Padova, Infineon Technologies Italia, Università di Milano Bicocca | **Norway:** Eltek AS | **Slovakia:** Slovak University of Technology in Bratislava, Nano Design SRO | **Switzerland:** Ecole Polytechnique Fédérale de Lausanne EPFL, Attolight SA | **Spain:** IKERLAN, For Optimal Renewable Energy, LEAR | **Sweden:** RISE Research Institutes of Sweden AB, SweGaN AB

The project has received funding from the ECSEL Joint Undertaking (JU) under grant agreement No 826392. The JU receives support from the European Union's **Horizon 2020** research and innovation programme and Austria, Belgium, Germany, Italy, Slovakia, Spain, Sweden, Norway, Switzerland.

For further information on UltimateGaN please visit: www.ultimategan.eu.

About AIXTRON

AIXTRON SE is a leading provider of deposition equipment to the semiconductor industry. The Company was founded in 1983 and is headquartered in Herzogenrath (near Aachen), Germany, with subsidiaries and sales offices in Asia, United States and in Europe. AIXTRON's technology solutions are used by a diverse range of customers worldwide to build advanced components for electronic and opto-electronic applications based on compound or organic semiconductor materials. Such components are used in a broad range of innovative applications, technologies and industries. These include Laser and LED applications, display technologies, data transmission, SiC and GaN power management and conversion, communication, signaling and lighting as well as a range of other leading-edge technologies.

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For further information on AIXTRON (FSE: AIXA, ISIN DE000A0WMPJ6) please visit our website at: www.aixtron.com.

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in the relevant forward-looking statement. This could result from a variety of factors, such as actual customer orders received by AIXTRON, the level of demand for deposition technology in the market, the timing of final acceptance of products by customers, the condition of financial markets and access to financing for AIXTRON, general conditions in the market for deposition plants and macroeconomic conditions, cancellations, rescheduling or delays in product shipments, production capacity constraints, extended sales and qualification cycles, difficulties in the production process, the general development in the semi-conductor industry, increased competition, fluctuations in exchange rates, availability of public funding, fluctuations and/or changes in interest rates, delays in developing and marketing new products, a deterioration of the general economic situation and any other factors discussed in any reports or other announcements, in particular in the chapter Risks in the Annual Report, filed by AIXTRON. Any forward-looking statements contained in this document are based on current expectations and projections of the executive board based on information available the date hereof. AIXTRON undertakes no obligation to revise or update any forward-looking statements as a result of new information, future events or otherwise, unless expressly required to do so by law.

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