LAST POWER Project aims to develop advanced SiC and GaN semicon

Medical Design Technology

The aim of this 42-month European Nanoelectronics Initiative Advisory Council (ENIAC) project is to enable Europe with strategic independence in the field of wide band gap (WBG) semiconductors. This field is of major strategic importance as it comprises the development of highly energy-efficient systems for all applications that need power, from telecommunications to automotive, from consumer electronics to electrical household appliances, and from industrial applications to home automation.

Project coordinator, Group VP and R&D general manager for the industrial and multisegment sector at STMicroelectronics, **Salvatore Coffa** says, *“The power semiconductor market, which represents approximately 30 percent of the overall semiconductor market, is set to change significantly in response to the ever-increasing demand for more energy-efficient devices.*"

The European consortium aims to develop technology for the complete production chain for semiconductor devices built with SiC (Silicon Carbide) and heteroepitaxial GaN (Gallium Nitride on silicon wafers). These two semiconductor materials possess higher speed, current capability, breakdown voltage and thermal capability compared with conventional silicon technologies.

The project's overall objective is to develop a cost-effective and reliable integration of advanced SiC and GaN semiconductors in the European power microelectronics industry. This will be attained through five specific objectives: Growth of large area (150mm) SiC and high quality heteroepitaxial GaN on 150mm Si wafers, beyond the current worldwide state-of-the-art for substrates, epitaxy and surface preparation; development of new dedicated equipment for material growth, characterization and processing; processing of reliable and efficient SiC and GaN devices on 150mm wafers; demonstration of high-performance devices, with properties that cannot be obtained on silicon (including a 1200V/100A SiC MOSFET, SiC JFET capable of operating up to 250°C, and GaN HEMT devices for power switching); and to develop advanced packages for high-temperatures devices and improve device reliability.

The participants of the LAST POWER project include: STMicroelectronics S.r.l. (Italy) – as coordinator; LPE S.p.A. (Italy); Consiglio Nazionale delle Ricerche, Istituto per la Microelettronica e Microsistemi (Italy); Epitaxial Technology Center S.r.l. (Italy); Foundation for Research & Technology-Hellas (Greece); NOVASiC S.A. (France); Consorzio Catania Ricerche (Italy); Institute of High Pressure Physics UNIPRESS (Poland); Università della Calabria (Italy); SiCrystal AG (Germany); SEPS Technologies AB (Sweden); SenSiC AB (Sweden); Acreo AB (Sweden); and Aristotle University of Thessaloniki (Greece).

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