Silicon Carbide technologies for high demanding power applications

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For several decades, the adoption of Silicon Carbide (SiC) as a wide band gap semiconductor in the microelectronic industry was limited due to technological issues such as low carrier mobility and inner defectivity, as well as preconceived notions about oxide structure robustness, lifetime reliability, operative degradation, and production yield.
Despite the fact that superior physical properties indicated SiC as a natural Si replacer in the power semiconductor field, it was not until the end of the last decade that ST, with a proactive approach, together with a visionary customer, demonstrated the advantages of introducing Silicon Carbide in demanding automotive applications such as traction inverter and on-board charger.
This was the starting point of an exciting journey that brought a revolution in power electronics. Efficiency is the key concept driving the transition from Si to SiC. Every stage of energy conversion, from energy generation to end-use application, needs to be optimized to improve efficiency, and can benefit from SiC adoption as a semiconductor including higher efficiency, higher power density, and higher temperature operation.
The next challenge for this journey is high-volume manufacturing capability to manage exponential demand growth, and ST is shaping manufacturing sites in Italy, Singapore, Morocco and China to maximize production and serve such impressive requests at their best. In the talk I will describe the technological competitive advantages of ST strategy in the SiC power field, including devices and packages, as well as product portfolio and marketing strategy.