Abstract

Wide Band Gap (WBG) Power Devices are driving power electronics conversion towards nearly lossless operation and enabling a high degree of compactness, which allows integration into a continuously expanding range of applications. The use of high switching frequencies, made possible by these new devices, has the potential to redefine the role of power electronics beyond traditional power conversion. In the future, power electronics may enable both energy conversion and communication within the same system, paving the way for applications in computing as well. High switching frequencies allow for greater integration of passive components, but also create new demands for specialized packaging solutions. As a result, both WBG and ultra-wide band gap technologies impact not only the functionality of power electronics in terms of communication and computation but also drive and require higher levels of integration. Interestingly, these trends are leading to increased use of MEMS technologies, which are well suited for integrating passive components and sensors, complementing the capabilities of active power devices. The lecture will give an overview of such developments showing how WBG power devices and MEMS have the potential to redefine power electronics.