



## Shaping the transition from Si-based power devices to SiC MOSFETs and GaN HEMTs

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### Abstract:

With an expected growth of SiC-device and module volumes to around 6 bn US\$ and GaN HEMTs to 2 bn US\$ in the next 5 years the transition from Si-based power devices to their corresponding Wide-bandgap technologies is now fully on its way. The advantages being created by wide bandgap devices on system level will outweigh their higher costs on device level.

These benefits are as diverse as the applications where wide bandgap power devices will be considered in the first place. SiC MOSFETs have started in the field of Photovoltaics by improving efficiency and size/weight of the PV inverter and are now penetrating the main inverter offering a range extension of up to 8%. GaN HEMTs first made an impact on chargers for mobile phones and laptops by enabling form factors up to now unachievable.

The presentation will start with an overview of key performance indicators of wide bandgap technologies in comparison to their silicon counterparts and their perspective along further generations. In a 2<sup>nd</sup> section we will discuss topologies and modulation schemes being required to reach the full system benefits of wide bandgap power devices. An outlook on future trends and applications will close the talk.

### Curriculum Vitae:



Dr. Gerald Deboy received the M.S. and Ph.D. degree in physics from the Technical University Munich in 1991 and 1996 respectively. He joined Siemens Corporate Research and Development in 1992 and the Semiconductor Division of Siemens in 1995, which became Infineon Technologies later on. His research interests were focused on the development of new device concepts for power electronics, especially the revolutionary COOLMOS™ technology. From 2004 onward he was heading the Technical marketing department for power semiconductors and ICs within the Infineon Technologies Austria AG. Since 2009 he is leading a business development group specializing on new fields for power electronics. He is a Sr. member of IEEE and has served as a member of the Technical Committee for Power Devices and Integrated Circuits within the Electron Device Society. He has authored and coauthored more than 100 papers in national and international journals including contributions to three student text books. He holds currently more than 100 granted international patents and has more applications pending.

EPE '22  
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September 5-9, 2022  
Hannover, Germany



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