Invitation to:
WBG Power Center seminar with Martin Wattenberg,
Friday 27/01, 10.00 (web)

Efficiently Paralleling GaN-Transistors for High-Current and High-Frequency Applications Using a Butterfly Layout

Abstract:
This seminar presents a scalable design for paralleling up to 8 GaN transistors per switch in a three-phase motor drive. To minimize the layout related issues, a fully symmetrical “butterfly”-layout is presented. Intrinsic benefits of using Schottky Gate (SG) HEMTs in a paralleled design are discussed and layout recommendation for 2, 4 and 8 devices in parallel are given.
Experimental results on a three-phase prototype with 8 chips per switch are discussed. Due to the use of Gallium-Nitride (GaN) transistors the design can operate at a frequency of 50 kHz and above without significant loss penalty. The high switching frequency enables to shrink the size of the DC-link capacitor to an overall size of 72 by 132 mm with a height of as low as 4 mm depending on the chosen cooling solution resulting in an overall volume of 0.1 liter. The measured peak efficiency of over 99.3% enables small heatsink size and high output power with minimal airflow.

About Martin Wattenberg

Dr. Martin Wattenberg received the Bachelor and Master degree from Bremen University in Mechatronics and Reutlingen University in Electrical Engineering in 2012 and 2014 respectively. From 2014 to 2020 he has been involved in the research and development of energy storage systems with a strong focus on bidirectional DC/DC conversion, battery charging and management technology as well as layout optimization for compact GaN motor drives. In 2021 he graduated with a Ph.D. from the technical university TU Dortmund.
In 2020 he joined in Infineon Technologies Austria as a System Application Engineer for gallium nitride where he covers high frequency DC/DC conversion as well as single- and poly- phase motor drive systems.