Paralleling for SiC MOSFETs, IGBTs & MOSFETs
Presented by Didier Balocco

When power becomes more than one device can handle, paralleling devices can be a solution. In this case, if devices are equal, the current will be split equally.
But what happens if there is a difference between devices?
How are device parameters affected by variations in the production process, small or large?
How are current and voltage split between devices?

Using corner models, answers to those questions can be obtained.
Detailed analysis of the switching sequence between devices can be performed.
This session will focus on those issues and will give you some insights.

Driver Solutions for SiC MOSFETs, IGBTs, MOSFETs & GaN HEMT
Presented by Jonathan Harper & Alessandro Maggioni

Starting with simple simulation results using **onsemi**'s physical models of the EliteSiC MOSFET family, we will demonstrate a number of topics related to drivers: interference of external circuits including the driver from fast dv/dt switching, the effect of high dv/dt on a half-bridge circuit, the principle of an active Miller clamp, benefits and drawbacks of using negative gate drive, benefit of using differential gate drive, how to assess the maximum dv/dt in a circuit, and desaturation detection.
We will then review two different application classes: power supplies and energy infrastructure, selecting the right type of driver in these two types of application.

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Selecting Efficient Passive Components in SiC Designs
Presented by Würth Elektronik

The presentation will focus on discussing different passive elements used in power converters and their advantage compared to different technologies available on the market, from flat wire inductors to litz and round wire and the importance of the low common mode transient immunity for driving SiC devices.

A deep dive into power factor correction chokes with the newest flat wire technology from Würth Elektronik will be presented along with the gate drive transformers used in auxiliary power supplies.

The importance of flat wire from low DC and AC resistance due to skin and proximity effect will be studied and an insight into lowering the EMC with proper gate driving circuit design and low inter-winding capacitance.

Elite Power Simulator
Presented by Didier Balocco

PLECS has become a very popular tool to quickly simulate system loops and performance. Compared to SPICE base simulations, it uses states and considers switching losses during the transition. It also gets those losses from tables, also called models.

onsemi has introduced a new tool to automatically generate PLECS models. In order to predict system performance, accurate PLECS models based on SPICE simulations are needed. The physical and scalable SPICE models created by **onsemi** are suitable for that purpose.

There's even more to consider when obtaining accurate results in the simulation chain including soft-switching, corner effect and parasitic elements in the switching loop. This session will go into detail on the various improvements in modeling & simulations brought by **onsemi** and PLECS.

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Intelligent Power Design of a Totem-pole PFC + LLC 3-kW EliteSiC Power Supply
Presented by Jonathan Harper & Alessandro Maggioni

Totem-pole PFC stages improve the efficiency and power density of AC power supplies by removing the bulky and lossy bridge rectifier. Further improvements in efficiency over all load conditions requires high performance intelligent power control of the totem-pole PFC stage, the LLC stage and the secondary side rectification circuit; the use of high performance SiC MOSFETs in the totem-pole and PFC stage; and the use of high-performance medium voltage MOSFETs in low inductance packaging.

We will review our 3-kW totem-pole PFC + LLC power supply design, highlighting specific design features which drive the efficiency of this solution higher without the need to use user-programmable DSP solutions.

FS7 IGBT and T10 LV+MV Silicon MOSFET Technology Overview
Presented by Didier Balocco

onsemi has introduced two new generations for silicon based MOSFETs and IGBTs. In this session, we will review the advantages and performance for Field Stop 7 IGBTs and T10 low/medium voltage MOSFETs and how they compare to the already excellent performance of prior generations.
We will also assess how the devices can be used in different applications.

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