POWER
YOUR IDEAS!

8th Power Analysis & Design Symposium

Advanced Characterization, Simulation and
Troubleshooting of Electronic Power Systems

Symposium: April 4th, 2019 / 08:30 - 17:00
Open Lab: April 3rd, 2019 / 15:00 - 19:00
in Eching (near Munich), Germany

With lectures, practical examples and demonstrations
presented by international experts from:

Fraunhofer Institut, KEMET Electronics,
K&K Prime Engineering, Magment, Microchip Technology,
Würth Elektronik and OMICRON Lab

Register until:
March 19th, 2019

www.omicron-lab.com/event

OMICRON LAB

Facts

Participants

- Power electronics design engineers working on analog and digital power supplies who want to ensure optimum system performance.
- Electronic engineers who need to assess the quality and stability of a power supply they are using or planning to buy.

Free Participation

The participation in our symposium is free of charge and will include lunch and refreshments during breaks.

Venue

The Symposium and the Open Lab take place at:
Bürgerhaus Eching
Roßbergerstraße 6
85386 Eching (near Munich)
Germany

Accommodation & Travel Information

All details for recommended accommodations and travel information can be found on our web page:
www.omicron-lab.com/event

Your Contact

OMICRON Lab
Oberes Ried 1
6833 Klaus, Austria
Ms. Kathi Dunst
Phone: +43 59495 2503
katharina.dunst@omicron-lab.com

April 3rd - Pre-evening Open Lab:

Join our Open Lab after your daily work is done. We will have several measurement benches ready for you, where we can measure loop stability, PSRR, output impedance and more... So, come whenever you want, have a beer, bring your power supplies and do some great measurements with us.

The Lab will be open on April 3rd from 15:00 - 19:00.

April 4th - Preliminary Agenda:

08:30 - 09:00	Registration
09:00 - 09:15	Welcome & introduction
09:15 - 10:15	Lectures
10:15 - 10:45	Break & exhibition
10:45 - 12:15	Lectures
12:15 - 13:45	Lunch & exhibition
13:45 - 15:15	Lectures
15:15 - 15:45	Break & exhibition
15:45 - 16:30	Lectures
16:30 - 17:00	Discussion & closing

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Topics

Solving control challenges in tightly coupled, cascaded multistage GaN Converters
by Andreas Reiter - Microchip Technology

Data centers are one of the biggest consumers of electrical energy today and also one of the fastest growing sectors. The implied challenges this industry is facing ranges from the impact on global warming, the challenges of building new power plants and infrastructure down to basic, economic aspects of how to run server farms competitively. The biggest information supplies like Google or Facebook are therefore working very closely with system vendors like HP, EMC/Dell and component vendors like Intel to push the envelope in solving the trade-off between energy efficiency and performance. The latest push for system optimization is to increase the internal server bus voltage from 12 V to 48 V to save losses between AC/DC or high voltage DC/DC front-end converters and the CPU blade and volume units. One of the greatest technical challenges to solve, are the CPU voltage regulator modules (VRM) directly converting 48 V down to 1 V while still being able to meet the quite tough transient response requirements. Although these requirements are extreme and may only affect a small range of applications today, partial aspects are also relevant for many other applications like automotive 48 V rail applications, telecommunication or lighting systems. In this presentation, a non-isolated low-cost converter architecture is introduced where an intelligent, digital control approach is used to operate two tightly coupled, GaN-based buck converter stages meeting the major design targets of achieving highest efficiencies and a wide dynamic range, at the same time.

The 10µF Story
by Axel Schmidt - KEMET

10uF capacitors are available in different Technologies as MLCC and Tantalum and Polymer, Aluminum and Film as well as in different form factors. How do the developer choose the right solution in terms electrical and mechanical aspects. The presentation show the differences between the technologies, the impact of the formfactor to an application and cover the difference in electrical performance e.g. Capacitance and ESR under application conditions like temperature and humidity. In addition the difference in life time calculation based on physical models and various aspects like DC-Bias and mechanical flex-cracks complete the investigation.

Investigation of Stability Issues in DC Microgrids based on Measurement Verification
by Leopold Ott - Fraunhofer Institut (IISB)

Over the past years, DC microgrids for stationary and mobile applications with system voltages in the range of 400 V acquired growing attention in the field of scientific and industrial research since they offer an energy- and cost-efficient way to interconnect local energy resources and complex electronic loads. Despite their undisputed advantages, new technical challenges arise among which system stability under all operating conditions is of crucial importance for uninterruptible service. The aim of the talk therefore is to explore possible stability issues in a typical DC microgrid architecture that are linked to the control loop setup of its power source converters and the amount and distribution of energy storage elements connected to the DC supply bus. The obtained results can also be easily transferred to power delivery networks on printed circuit boards as they possess the same physical properties despite their reduced size and system voltages. Furthermore, two different measurement methods for the verification and optimization of small-signal stability and transient behavior are presented. Advantages and disadvantages of the respective solutions are discussed based on selected setups.

Practical interference suppression on a living and functional object through proper PCB design and filter definition
by Günther Klenner - K&K & Frank Puhane - Würth Elektronik

The process for creating a switch mode power supply (DC/DC) is usually always the same. First the requirements for the circuit are defined, then the matching IC and the additional passive components are searched. Due to the constantly increasing lack of time, the EMC in the first approach is often neglected, since the EMC (ideally) has no influence on the functionality. There are now many layout recommendations in the data sheet, but whether these are always targeted and suitable for the respective application is usually only visible during an EMC test which is normally performed at the end of the development process. This workshop and presentation on the practical interference suppression on a proper PCB design and filter definition will show here a concrete example of how a layout and components affect the EMC and how to use a specific and well-thought-out approach to the EMC of the application can influence and comply. Likewise, attention should be drawn to the influence and correct use of the passive components.

Optimizing casted wireless power transfer slabs using FEM simulation and VNA measurements.
by Mauricio Esguerra - Magment

Electrification has the wind in its sails for energy availability reasons as well as for protecting the environment. This context fosters the development of electrical vehicles (EVs), and is particularly enticing when it comes to reducing air pollution in the cities. Yet the question of the range arises. Not only do we lack charging infrastructures, but batteries performance within affordable costs is also limited. Charging EVs more frequently at stops in town such as parking lots, traffic lights or stop signs or while the car is in motion with inductive wireless power transfer is becoming the preferred technology, also because it supports autonomous driving. Magnetizable concretes on the other hand is a new magnetic material class that offers a perfect fit to this application as transmitter coil both from a cost and a performance perspective. Despite its low magnetic permeability of µ=40, the shaping freedom allows for an optimized coupling between the transmitter and the pickup coils at the bottom of the vehicle. The simulated shapes with FEM were tested with Bode100 and validated for the application. Based on this, circular and double-D coil optimum designs have been found which conform with international standards to ensure interoperability. MAGMENT started the production of casted inductive charging slabs to drive this charging technology to industrial maturity.

Impedance measurements under DC bias
by Florian Hämmerle - OMICRON Lab

Several passive components used in power electronics applications exhibit non-linearities. These non-linear effects however, do normally not show up in small signal AC measurements. A possibility to reveal the non-linearities is to use a higher AC signal level or a DC bias offset. This offset can be a voltage or current offset. This talk focuses on the use of the Bode 100 for DC biased measurements. Application examples and tips for practical test setups will be presented.

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