High VOLT Interactive

Where power supply design meets collaboration

Texas Instruments

Tuesday October 9, 2018 Time		
8 to 9 a.m.	Badge pick up. Coffee and light refreshments (Gateway Foyer)	
Room	Oak/Fir Ballroom	
9 to 9:45 a.m.	Welcome + Keynote: Ahmad Bahai – Senior VP, CTO	
9:45 to 10:30 a.m.	PCB layout guidelines for switch-mode power supplies	
10:30 to 11 a.m.	Break: Meet the Industry Experts	
Track/Room	Track 1 (Cedar)	Track 2 (Pine)
11 to 11:45 a.m.	Gate driver design: From the basics to the details	Design considerations for high power-density and high-efficiency adapters
11:45 a.m. to 1 p.m.	Lunch (Springs Restaurant 1st floor)	
12:30 to 1 p.m.	Demo Hall (Oak/Fir Ballroom)	
1 to 1:45 p.m.	Choosing the right PFC topology: 100W to several kW	Need isolation? High-voltage capacitive isolation technology review
1:45 to 2 p.m.	Break	
2 to 2:45 p.m.	Top 10 gate-driver pitfalls and how to address them	Maximizing efficiency of your LLC stage: Design, magnetics and component selection
2:45 to 3:15 p.m.	Break: Meet the Industry Experts	
3:15 to 4 p.m.	Have your cake and eat it too: Slash your standby power and system cost	Demystifying active-clamp flyback loop compensation
4 to 6 p.m.	Cocktail Reception (Gateway Foyer)	

Wednesday October 10, 2018 Time		
8:30 to 9 a.m.	Coffee and light refreshments (Gateway Foyer)	
Room	Oak/Fir Ballroom	
9 to 9:45 a.m.	High-voltage low-current portable DC-DC converter: Juan Rivas – Stanford University	
9:45 to 10:30 a.m.	Introduction to EMI in power supply designs: Sources, measurement and mitigation methods	
10:30 to 11 a.m.	Break: Meet the Industry Experts	
Track/Room	Track 1 (Cedar)	Track 2 (Pine)
11 to 11:45 a.m.	Resolving high-voltage gate-driver challenges in wide V_{IN}/V_{OUT} converters	Comparing phase-shift full-bridge and full-bridge LLC for high-power DC/DC conversion
11:45 a.m. to 12:45 p.m.	Lunch (Sprigs Restaurant 1st floor)	
12:45 to 1:30 p.m.	When can synchronous rectification increase efficiency?	How to protect SiC MOSFETs…The best ways!
1:30 to 1:45 p.m.	Break	
1:45 to 2:30 p.m.	Advanced gate drivers for HEV/EV traction inverters	Designing reliable and high-density power solutions with GaN
2:30 to 2:45 p.m.	Break	
Room	Oak/Fir Ballroom	
2:45 to 3:30 p.m.	Silicon,GaN and SiC: Which is right for your next design? (Panel)	
3:30 to 4 p.m.	Closing – Steve Lambouses, VP, High Voltage Power Raffle	

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Title	Abstract
Resolving high-voltage gate-driver challenges in wide VIN/VOUTconverters	Modern power supplies need to be robust, compact, and efficient, all at the same time. Designers need to use some of the niche topologies to achieve these difficult goals while staying within budget. This session discusses high-voltage gate drivers in conjunction with two topologies, full-bridge converter with full-bridge synchronous rectification, and negative-input synchronous buck boost. We will discuss challenges encountered in using high-voltage gate drivers in conjunction with these topologies and how to resolve them through experimental results of these implementations.
Maximizing efficiency of your LLC stage: Design, magnetics, and component selection	This discussion will look into the key factors affecting the efficiency of the LLC power stage. Specific focus will be provided on dimensioning the resonant tank, component selection and improving the efficiency of the LLC transformer. To close, we will look at some of the reference designs developed around our latest generation robust LLC controller.
Have your cake and eat it too: Slash your standby power and system cost	In this presentation, we will look at how to leverage the UCC28056 and UCC25630 controllers to achieve no load power performance less than 90mW while eliminating the additional flyback converter that is traditionally used to meet these requirements. These system benefits will be illustrated in the context of a 130W reference design.
When can synchronous rectification increase efficiency?	Synchronous rectification improves the efficiency of power supplies by replacing the rectifier diode with a more efficient FET. This presentation will explain what synchronous rectification is, and how to determine if it's right for you.
Gate Driver Design: From the basics to the details	This presentation will cover how to drive state-of-the-art power transistors and key design considerations. Topics will include: Parasitic influences, hard switching vs soft switching, non-linear junction capacitance (CRSS, COSS), common-mode transient immunity (CMTI), turn-off negative bias, separating power/ground noise, and trade-offs between different isolated DC/DC topologies for powering gate drivers.
Top 10 gate driver pitfalls and how to address them	Review common mistakes found in high-voltage gate drivers and how to address them. In this interactive session, we will present scope shots of problem waveforms and ask the audience to identify the issue, allowing you to learn the most common apps problems designers face, how to identify them, and fix them!
Design considerations for high power-density and high-efficiency adapters	This presentation will focus on how to design a top-notch high power-density and high-efficiency adapter, based on active clamp flyback with the UCC28780 controller – Demonstrating high light-load efficiency, low-standby power loss, and high-frequency transformer design. To close, we will look at a full 65W USB Type-C™ PD AC/DC adapter reference design to show the specific performance.
Demystifying active-clamp flyback loop compensation	The active clamp flyback is more complicated to compensate due to the resonant ZVS operation. This presentation demonstrates how to properly design the feedback loop to get the most out of your design.
Comparing phase-shift full-bridge and full-bridge LLC for high-power DC/DC conversion	The phase-shifted full-bridge (PSFB) and full-bridge LLC (FB LLC) topologies operate in very different ways and both have some desirable features. Both of these topologies are intended for high-power applications. The difficulty lies in deciding which of them is best for a given application. In this presentation learn more about the similarities and differences that may help you make this decision.
PCB layout guidelines for switch-mode power supplies	The purpose of this session is to introduce the concepts needed to successfully layout a PCB for a switch-mode power supply (SMPS).
Choosing the right PFC topology: 100W to several kW	The presentation will look at various widely used bridged and bridgeless PFC topologies from single-phase CrCM to interleaved CCM PFC to bridgeless CrCM/CCM PFC. We will go through the selection criteria for each of these topologies along with the trade-offs involved in terms of cost and performance. Specific reference designs and key results will be shared for the covered topologies.
Introduction to EMI in power supply designs: Sources, measurement and mitigation methods	Electromagnetic interference (EMI) is an essential part of power supply design. Some design practices can be implemented earlier to allow the system to pass EMI tests more easily. In this presentation, the source of EMI noise, EMI noise measurement setup and noise mitigation methods are discussed. Through this discussion, the power design engineer should obtain the basic concept of EMI noise and its solutions, including layout practice, the common mode and differential mode noise separation, as well as EMI filter design.
How to protect SiC MOSFETs… The best ways!	Compared to silicon IGBTs, SiC MOSFETs have much more stringent short-circuit protection requirements. This session describes the SiC MOSFET characteristics and their short-circuit behavior, the different types of short-circuit fault conditions, different short-circuit protection techniques, and how to implement quick and robust protection for SiC MOSFETs using discrete circuitry and integrated gate drivers.
Advanced gate drivers for HEV/EV traction inverters	In this session, learn about design considerations for isolated gate drivers in automotive traction inverter systems. We will illustrate system-level benefits of the key driver specifications and features, key features when choosing isolation technologies and advantages of TI's capacitive isolation technology as well as future isolated gate drive developments for automotive applications.
Need isolation? High-voltage capacitive isolation technology review	Safety isolation is a critical consideration in high-voltage systems. This presentation reviews the underlying technology of TI's capacitive-based galvanic isolation, qualification and production testing and its performance vs other technologies. In addition, components standards for opto, magnetic, and capacitive isolated devices are compared.
Designing reliable and high-density power solutions with GaN	GaN is enabling a new generation of power-conversion designs not possible before. These designs allow systems to reach unprecedented levels of power density and efficiency while delivering the reliability and the ruggedness that power engineers expect. This presentation is intended to help both novice and seasoned power designers to gain deeper insight into GaN technology, high-frequency design techniques, component selections, and how to optimize the density, efficiency, and reliability of a power supply design.

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