

Power Supply Design Seminar

Abstracts for each session are on the next page. View the 2026 seminar locations and [register online](#).

8:00 – 9:15 a.m.	Check-in and registration	
9:15–10:30 a.m.	Buck converter design basics	Introduction to digital power control
10:30–11:00 a.m.	Networking break	
11:00 a.m.–12:00 p.m.	Current and voltage sensing in power conversion applications	Planar transformer design tutorial
12:00–1:00 p.m.	Lunch	
1:00–2:00 p.m.	Switch-mode power converter compensation made easy	Dual active bridge topology overview
2:00–2:30 p.m.	Networking break	
2:30–3:30 p.m.	Constructing your power supply: Layout considerations	High power density flyback converter design basics using GaN technology
3:30 p.m.	Seminar ends	

Session time	Title and abstract
9:15–10:30 a.m.	<p>Buck converter design basics</p> <p>This session provides a practical introduction to the design and testing of buck converters. Buck converters are widely used in voltage step-down applications. After covering the basics of buck converter operation and control, we provide a thorough step-by-step of the design process for a buck converter. The design example covers design parameters, component selection, control loop compensation, circuit board layout, and hardware testing/results. The target audience of this session is those with little to no power electronics design experience.</p>
9:15–10:30 a.m.	<p>Introduction to digital power control</p> <p>This paper covers the fundamentals of microcontroller-based digital power control design. It explains the working principles of building blocks in digital power control like feedback sampling, compensators, and actuators. The essential parameters of each block are discussed along with its effects on control loop performance through a step-by-step design process of a voltage-mode controlled buck converter. This topic also explains feedback circuit design and considering the analog to digital converter along with its configurations with respect to the actuator i.e. digital pulse width modulation. Additionally, it covers the selection, implementation and compensation procedure for the digital compensator.</p>
11:00 a.m.–12:00 p.m.	<p>Current and voltage sensing in power conversion applications</p> <p>Voltage and current sensing are crucial in power conversion applications as they provide essential information for control loops, enabling controllers to maintain desired output levels. Integrated converters use internal sensing amplifiers, while high-power or isolated applications require external circuitry. This training covers various solutions, including discrete amplifiers, current-sense amplifiers, and delta-sigma isolated amplifiers and modulators. By the end of this session, you will understand the various technologies and which ones fit your application and the trade-offs between them which in turn will make your design decisions easier.</p>
11:00 a.m.–12:00 p.m.	<p>Planar transformer design tutorial</p> <p>This topic discusses the process for designing a planar transformer suitable for an intermediate bus converter (IBC) application. The principles covered will extend to other planar transformer applications and to transformer design in general. Key transformer design principles will be covered that include, electrical design requirements, size considerations, core selection, winding considerations, and loss predictions. A generalized flow chart will be provided for the transformer design process along with a detailed discussion of each step. Finally, the paper will conclude by examining the measured performance of a transformer designed using this process.</p>
1:00–2:00 p.m.	<p>Switch-mode power converter compensation made easy</p> <p>Engineers have been designing switch mode power converters for a long time, but if you're new to the design field, or you don't compensate converters all the time, it will require some research to do correctly. This presentation breaks down the procedure into a step-by-step process that engineers can follow to compensate a power converter. We explain the theory of compensation and why it's needed. This session examines power stages and shows how to determine where to place the poles and zeroes of the compensation network to compensate a power converter. Typical error amplifiers as well as transconductance amplifiers will be examined to show how each effect the control loop. A number of topologies and examples will be worked through, so that power engineers will have a quick reference that they can go to when they need to compensate a power converter.</p>
1:00–2:00 p.m.	<p>Dual active bridge topology overview</p> <p>The dual active bridge converter (DAB) is popular in high-performance bi-directional DC-DC converters with wide fast transient response, wide input/output range and high efficiency. This topic introduces the characteristics of the DAB converter, single phase shift DAB converter operation principles, multiple freedoms optimization process in DAB converter design, series resonant DAB (SR-DAB) converter features and its control methods. A SR-DAB converter design based on the energy storage systems (ESS) applications demonstrates the performance of the converter, which supports wide input/output range and has a high efficiency in full load range.</p>
2:30–3:30 p.m.	<p>Constructing your power supply: Layout considerations</p> <p>Laying out a power supply design is crucial for its proper operation; there are many issues to consider when translating a schematic into a physical product. This topic addresses methods to keep circuit parasitic components from degrading the operation of your designs. It discusses techniques to minimize the impact of parasitic inductance and capacitance of filter components and printed wire board (PWB) traces, together with a description of the impact that PWB trace resistance can have on power supply regulation and current capacity. A general overview of thermal design is also included as well as sample temperature rise calculations in a natural and forced-air environment. Finally, some practical examples of power stage and control device layouts are reviewed.</p>
2:30–3:30 p.m.	<p>High power density flyback converter design basics using GaN technology</p> <p>Flyback is the most popular topology for low-power AC/DC conversions due to its simplicity and low cost. With the development of power semiconductor technology, gallium nitride (GaN) devices can further improve flyback's performance through better conduction, switching losses, and simplicity in integration. This presentation demonstrates an improvement in the flyback performance when GaN is adopted. Design steps and tricks to further enhance the flyback converter's performance are also covered.</p>

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