

## ***ECCE 2018 Expo Brings Advanced Power Semiconductors, New Test Capabilities And Design Tool Innovations To Pacific Northwest***

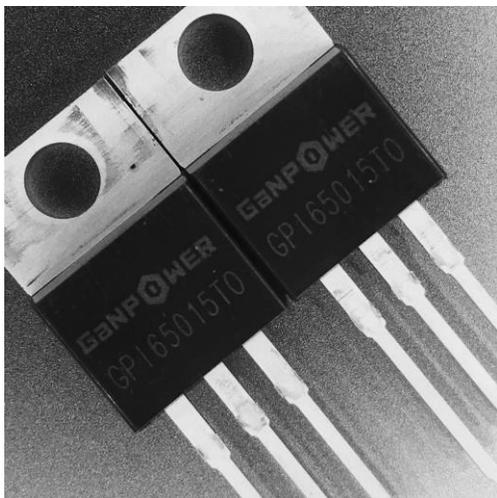
by David G. Morrison, Editor, [How2Power.com](#)

As it celebrates its tenth anniversary this fall, the [Energy Conversion Congress and Expo \(ECCE 2018\)](#) makes its first trip to the American northwest, with this year's conference taking place September 23-27 at the Oregon Convention Center in downtown Portland, Oregon. As participants from industry and academia take in the extensive conference highlighting developments in electrical and electromechanical energy conversion, they will also have an opportunity to discover and watch demos of an array of components, test instruments and design tools relevant to the design of power electronics and electrical machines. Along with the familiar company names (see the full list and floorplan [here](#)), this year's expo has some new exhibitors showcasing GaN and SiC semiconductors, test instruments and HIL design tools.

The exhibits will be open on Monday, September 24 from 4:30-7:30 pm and September 25 from 10:30 am to 5:00 pm. The conference offers a tiered pricing structure for [registration](#) that varies according to what you're attending and your IEEE affiliations. However, if you're just interested in browsing the exhibits, ECCE offers free expo passes on Tuesday. If you're within driving distance of the Oregon Convention Center, take advantage of this opportunity to speak with the experts from industry about your technical challenges in design and test of power electronics and electrical machines. When you tour the expo, please take a moment to visit with me in the [How2Power.com](#) exhibit in booth 303.

### ***Components***

In booth 301, [GaNPower International](#) will be showing its 650-V and 1200-V enhancement mode GaN HEMTs as well as some GaN-based power electronics solutions. The 650-V E-mode GaN HEMTs include power devices with current ratings of 7.5 A, 10 A, 15 A, 20 A and 30 A in TO-220, DFN and LGA packages. The GaN-based solutions include 65-W power adapters, an EV on-board charger, and dc-dc converters.



*GaNPower International's enhancement mode GaN HEMTs.*

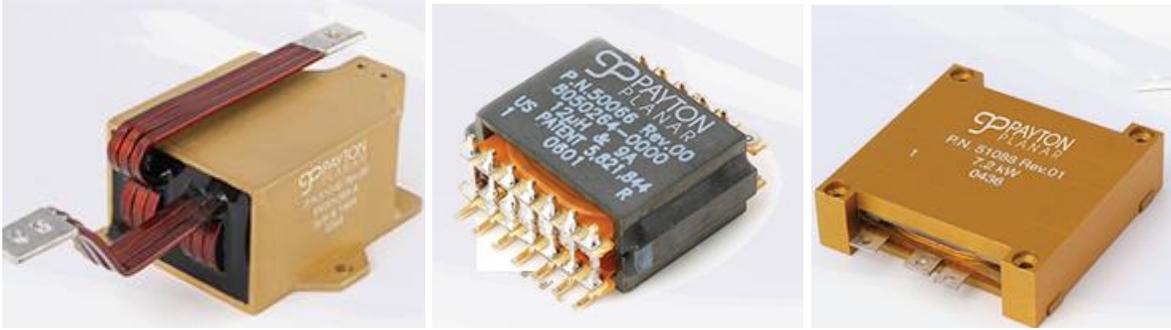


In booth 300, [Wolfspeed](#) will provide a static demo of a 60-kW interleaved boost converter, the CRD-60DD12N, which targets high voltage and high power density applications such as solar power generation.

This demo showcases the new C3MTM 1200-V 75-m $\Omega$  SiC MOSFET (C3M0075120K), which comes in the new low-inductance TO-247-4L package. This package reduces switching losses. This demo also features the new CGD15SG00D2 isolated discrete gate driver which is tailored to the drive requirements of the C3MTM MOSFETs.

This demo board is based on four 15-kW interleaved boost stages and each stage is using Cree's C3MTMCGD15SG00D2 isolated gate driver board and the C3MTM SiC MOSFETs. The demo board can accept 470 Vdc to 800 Vdc as an input and provide 850 Vdc output with a peak efficiency of 99.5% and a power density of 127 W/in<sup>3</sup>. Documentation for this demo includes a bill of materials (BOM), schematic, board layout and an application note.

Planar magnetics specialist [Payton](#) (booth #511) offers complete design and production capabilities for planar magnetics in the Americas, Asia, the Middle East and the U.K. At ECCE, Payton will be displaying a complete line of planar magnetics from a few watts to over 100 kW.



Examples of planar magnetic components developed by Payton.

[Proto Lam](#) is a manufacturer of stamped and laser cut electrical laminations supporting the research, prototype and limited production needs of machine producers and research centers worldwide. In booth 306, the company will highlight its manufacturing, engineering and materials expertise that customers can draw upon to develop and produce today's sophisticated electrical machines.

In booth 500, [HBM Test and Measurement](#) plans to introduce several innovative new products that aid in testing and analysis of motors and other devices. These include new features in the eDrive power analyzer, the MX809B amplifier module, and the T12HP and T40HS torque transducers. (The company notes that these products will also be shown at the Electric & Hybrid Vehicle Tech Expo and Automotive Testing Expo in Novi, MI, Sep 11-13 and Oct 23-25 respectively.)



HBM's eDrive power analyzer

Recently added automated rapid motor mapping and advanced analysis such as real-time space vector and dq0 transformation, torque ripple or any custom formula to the eDrive power analyzer reducing analysis time of electrical machines, inverters and drivetrains from days to seconds.

The advanced power analyzer and data acquisition system is designed specifically for dynamic electric drive train testing offering significant advantages over conventional power analyzers incorporating two components.

channels, as well as mechanical power up to 6 torque/speed signals all in a single-box solution offering typical power accuracy of 0.02%. The other component is a Data Acquisition System (DAQ) that synchronously records and measures multiple electrical signals, torque, speed, temperature, CAN bus, vibration and strain continuously or via controlled set-points in real time.

One of these is an Advanced Power Analyzer that measures electrical signals and power in real-time easily configurable up to 51 power



The company will also show the new MX809B amplifier module, which offers eight configurable thermocouple channels for K, J, T, B, E, N, R or S that can measure reliably and safely with up to 1000 V of isolation and transients up to 2400 V. The module can be used in conjunction with the eDrive power analyzer mentioned above or as a stand alone DAQ.

Every channel supports all customary thermocouples plus voltages up to  $\pm 5$  V. The module offers an innovative insulation concept to meet all safety requirements: Double-insulated measuring leads and standard thermo Mini connectors (IEC, ANSI) as well as a patented contact protection and a safety concept offering an insulating cap to prevent direct contact with hazardous live parts to ensure highly reliable

measurements. Typical applications include the testing and analysis of electric motors, generators, rectifiers or inverters, chargers, and in particular, energy storage systems, high-voltage batteries and fuel cells.

The new T12HP torque transducer offers exceptional precision and superior performance for dynamic measurements in test benches to increase efficiency and optimize functionality. The T12HP offers unprecedented precision, particularly in terms of temperature stability and guarantees highly precise results over the entire measurement range. The FlexRange function allows users to take a closer look at any partial range of the full nominal (rated) measurement range.

The T12HP meets market requirements for increasingly flexible and efficient test cycles in the development of ever more energy-efficient motors. Users can run more detailed analyses in any partial range from the full measurement range—as if looking through a magnifying glass. Unlike other technologies (“Dual Range”), different measurement tasks can be performed using a single characteristic curve.



The new T40HS high Speed torque transducer offers new measuring ranges starting as low as 100 Nm and high rotational speeds up to 45,000 rpm. Due to its small footprint design, high stiffness and lightweight titanium body, the T40HS provides a very high accuracy class of 0.05 and has a low moment of inertia.

It is ideal for testing propulsion systems, turbines, transmission test rigs, adjustable actuators or the efficiency of drive trains. The T40HS has been designed in accordance with the relevant European, US and Canadian standards. The product has been certified with the FCC, IC, and CE labels.

In booth 202, [Vitrek-High Voltage Test & Measurement](#), will show case a range of instruments including a power analyzer, hipot and electrical safety testers, a high voltage meter, and a high voltage switching system.



The PA900 Harmonic Power Analyzer is a easy-to-use, high performance power analyzer that delivers multi-channel, high-accuracy, wideband performance to tackle the toughest energy measurement applications. The company touts its reliability, accuracy and performance at an affordable price.

Also on display are the 95X & V7X series hipot & electrical safety testers. The 95X provides high output power with exceptional leakage current resolution and is available with a variety of output voltages. The V7X offers outstanding performance in a light weight, lower cost format. As with the power analyzer, the company notes its reliability, accuracy and performance at an affordable price.



The Vitrek 4700 precision high voltage meter offers high level accuracy, resolution and ease of use. The 4700 provides instant, direct ac and dc voltage measurement in a highly portable, compact and rugged bench top enclosure.

With its Vitrek 964I High Voltage Switching System, ease of use is a major benefit. Whether you have to hipot an 8 pin connector, a 64 conductor cable or an entire tray of SMD capacitors – the 964i can automatically route test points to your tester – so you don't have to.

## Design Tools

[Powersim](#), the developer of PSIM, will be exhibiting in booth #305, where they will showcase two products: The specially designed power electronics simulation software PSIM, and the DSP hardware platform PE-Expert4.

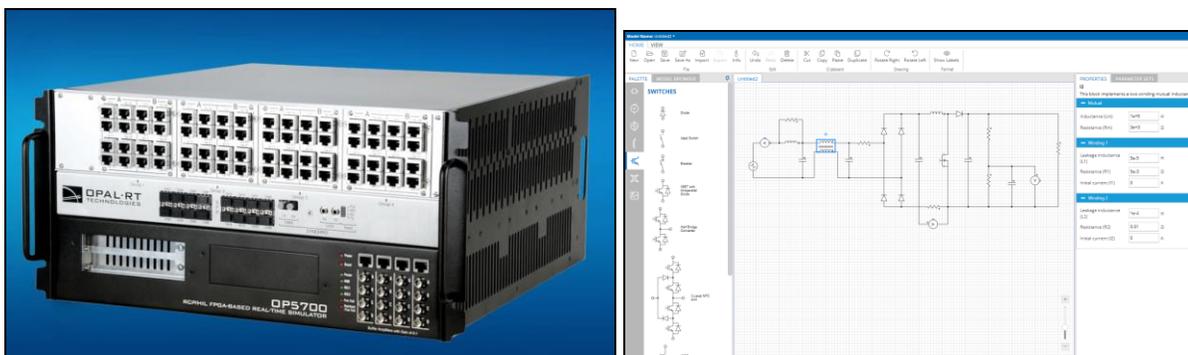
PSIM provides a complete set of functionalities to carry out design and simulation from device level to circuit and system level. With a built-in SPICE engine and support for LTspice, one can evaluate device behavior using SPICE models. Once the system is validated in simulation, PSIM can generate code automatically for TI DSP and for PE-Expert4 hardware platform for rapid control prototyping.

With up to 144 PWM outputs and the capability to switch at several hundred kHz, PE-Expert4 is a powerful control platform ideally suited for multi-level converters, dual active bridge (DAB), and any applications that require large number of switches or high frequency switching.

The company will be highlighting new features in the upcoming PSIM release, and present a live demo of how PSIM and PE-Expert4 work together to provide the fastest solution from concept to simulation and hardware implementation.

In booth 404, [OPAL-RT](#) will show its Power Electronics solver, eHS, on its most powerful FPGA- and CPU-based platform—now running following extensive R&D. Additionally, the company will show its new Schematic Editor, which brings dozens of usability and workflow improvements to users, reduces user reliance on third-party modeling packages, as well as being a sleek, intuitive and refined GUI in which to work.

The eHS implementation excels at power electronics simulations in areas of recent growth and interest such as micro-grids, photovoltaics and batteries, wind turbines, industrial drive systems and electric drive transportation—and all power electronics research. eHS x128 itself provides PWM frequencies inputs/outputs up to 200 kHz--the fastest power electronic solver in the industry, according to the vendor--and has the capacity to run, in real-time, up to 144 coupled switches per eHS core for maximum simulation fidelity, without adding artificial delays in real-time simulation. Constant parameter lines and frequency dependent lines are also supported, enabling some of the newer innovations, such as Traveling Wave Test Systems (TWTS).



OPAL-RT's OP5707 HIL simulator (left) and Schematic Editor (right).

In booth 610 will show [EGSTON Power Electronics](#) will show its Compiso Power-HIL (hardware-in the loop) System.

When testing power electronics for electric drives, energy storage or utility interfaces with simulation software, the process has to be supported by Hardware-in-the-Loop (HIL) systems based on electronic emulators. For such applications, EGSTON Power Electronics offers galvanically isolated, high-speed Power Electronic Test Benches based on P-HIL technology with a power range of 100 kVA up to 2 MVA.



Applications and emulation models run on real-time FPGA and standard HIL platforms that are an integrated part of the test system. The high-voltage bandwidth is 5 kHz at 440 Vrms and harmonics can be generated up to 15 kHz. That allows the EGSTON P-HIL system to be used as ac source/sink, dc source/sink, smart grid-, aerospace grid-, PV-module-, battery- or electric machine emulator and more, even at the same time.

This multipurpose test bench approach reduces the number of test devices that are needed in the lab radically. At the same time, it offers flexibility to have exactly the type of test bench needed by just selecting the mode that is needed in the software that is delivered with the system.

The EGSTON Compiso Power-HIL System is a customer specific turn-key solution which is based on modular blocks. It is connected to a 50- or 60-Hz low-voltage supply grid through a bidirectional converter and grid transformer which also provides galvanic isolation. Groups of 4 or 6 COMPISO digital amplifiers are connected to a DC-BUS. Voltage and current is measured at each amplifier output terminal. All measurements are available in the HIL real-time processor as inputs for the simulation models.

The amplifiers are shown as voltage or current source in the HIL architecture. The HIL drives the amplifiers through high-speed fiber optic links. The user is able to run its individual real-time model on the HIL. To guarantee a safe operation between the HIL and the amplifiers a high speed low latency SFP Interface is provided.

### **Other Products And Services**

In booth 302, [Mesago PCIM](#) will present information on its internationally recognized annual power electronics event. PCIM Europe is billed as the world's leading exhibition and conference for power electronics, intelligent motion, renewable energy, and energy management.

This is the place where representatives from the fields of research and industry come together, where trends and developments are presented to the public for the first time, and where the entire value chain is covered—the way from components to intelligent systems.

For PCIM Europe 2019, the [Call for Papers](#) is now open. Professionals from industry and academia have the opportunity to submit a paper on their latest research results, which will be presented as an oral or a poster presentation on-site. The final papers will be published in IEEEExplore, IET Inspec Direct, Compendex, Scopus and in the PCIM Europe proceedings.

Over the course of the PCIM Europe 2018, 506 exhibitors from 27 countries presented components and other products from every area of application in power electronics. A total of 11,602 trade visitors took in the innovations and trends that will be driving their business in the future. At the conference held alongside the exhibition, more than 800 participants learned more about the latest developments and research findings from the realms of science and industry in over 300 talks and poster presentations.