Collaboration on SiC Power Stack Reference Design

E-mobility and renewable energy systems require power management solutions that drive performance and cost efficiencies in addition to speeding up development time. To keep pace with these requirements, Microchip Technology announced a collaboration with Mersen on their 150 kilovolt-ampere (kVA) three-phase silicon carbide Power Stack Reference Design. I had the chance to interview Perry Schugart, Technical Staff Engineer – Product Marketing at Microchip Technology, and Dr. Philippe Roussel, VP Strategic Marketing and Executive Expert at Mersen.

By Bodo Arlt, Publishing Editor, Bodo's Power Systems

Bodo: I have seen Microchip acquiring Microsemi and AgileSwitch to play in the power arena. Are there plans to include more than the power devices into the systems?

Perry Schugart

Perry: Microchip's great strength is in offering customers total systems solutions. As a leading global microcontroller provider, that means we can incorporate more of the power control circuit into systems based on products provided by Microchip. Microchip's company legacy provides important system solutions in that it addresses a critical piece of the power conversion system. Incorporating our controllers, we can support a customer's full inverter design.

Bodo: Mersen acquired Eldre and FTCAP on the way to provide systems. Are there plans to include the full drive, inverter and motor?

Philippe: It is true that Mersen is incrementally moving up in the value-chain, from stand-alone passive components to solutions. We aim at serving the power electronics market with sub- or full assemblies to facilitate our customer's development journey.

We want our customers to keep focusing exclusively on their core expertise being inverter topology and circuit design, whereas Mersen will take care of optimizing their systems in size, weight, efficiency, power density, kW/liter, $/kW and so on…

We have no intention to market our own Mersen-labelled inverters (to the exception of this Power Stack Reference Design), but we want to partner with our customers in a co-design spirit. In other words, to expand the cooperation overlap during the customer's design phase.

Dr. Philippe Roussel

Bodo: Are there plans beside bus bars, capacitors, fuses and cooling systems?

Philippe: Yes, there are! Our strategy is to expand our product portfolio towards additional key passive components. Naturally, magnetics, resistors or current sensors are on the short-list.

Mersen always grew by acquisitions and will continue to do so…

Bodo: The introduced Power Stack Reference Design should serve as a development tool for end customers, right?

Philippe: Yes, this is the exact purpose of this Power Stack Reference Design: to demonstrate that SiC technology can be deployed from end to end, from the semiconductor to the final system. We offer this development platform as well as customization and derating options (different geometry, voltage, current, switching frequency, cooling technique…) allowing our customers to experience SiC electronics and to fine-tune their own design.

Bodo: Are there any plans for design centers for example, to help engineers overcome the barriers using SiC?

Perry: We continue our collaboration with Mersen and are examining several potential options.

Philippe: Yes, there are several options on the table. It's been now a while that both teams are collaborating on various projects. Designing this Power Stack Reference Design was another great achievement. We now need to hear from the market before launching the next stage. More to come…

Bodo: What are the main target designs and markets of the Power Stack Reference Design?

Perry: It is Electric Vehicles (EVs), commercial transportation, renewable energy and storage systems. Microchip currently provides 700V, 1200V, and 1700V die, discrete, module, and SiC gate driver solutions. And we continue to develop SiC solutions beyond these voltage classes.

Philippe: Originally, we designed this inverter for a heavy-duty vehicle, based upon a real case-study. Since then, we have performed numerous adaptations to fit different applications such as DC-grid power management, Solid-State Transformer or EV charging station. In essence, we are agnostic regarding the application, and as we build on this Power Stack Reference Design with the support of Microchip, the possibilities are infinite!

Bodo: Thank you both for this informative update. I'll keep my eyes open for more to come!

www.microchip.com/SiC

www.mersen.com