

Top Five Products And Demos Seen at APEC 2015

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An industry event as big and bustling as the Applied Power Electronics Conference (APEC) presents the attendee with access to vast amounts of technical information. There are many more presentations than one person can attend, and possibly more booths than one can visit during the three sessions when the exhibition is open. Nevertheless, attending this conference year after year—as many attendees do—left me with definite impressions of what might be new, different, or simply receiving more attention at this year's event.

Like many editors, I spend much of my time at APEC in meetings with vendors. So their announcements and presentations at the show definitely color my perceptions of what's new. My perceptions are also influenced by conversations with the friends and colleagues with whom I stop to chat on the way to and from various meetings and presentations. In addition, the higher level talks given in the plenary and rap sessions also make an impression along with my observations of what topics are being addressed in the various sessions.

That said, here are some of my takeaways from APEC 2015.

There seemed to be more GaN power products, demos, and news of industry partnerships to manufacture and sell these products. And more SiC demos and news about applications and market adoption. The demos were impressive both in terms of the performance they were touting and as signs of continued progress in the commercialization of wide-bandgap technologies. As Kevin Parmenter observes in his rap session wrap up article in this issue, SiC appears to be more established in terms of commercialization—the exhibitor demos seem to support this idea.

I was also impressed by the introduction of a few point-of-load converters (POLs) with very high power/current density. The inclusion of full digital control on these and other dc-dc converter products was almost an aside, yet that is clearly a sign that digital control is now mainstream for high-performance power converters. Similarly, PMBus capabilities are starting to look like standard fare on dc-dc products and this year may have been something of a coming out party for PMBus as the subject also received special attention in an industry session.

With those impressions in mind, here are my top five picks for most interesting products and demos seen at APEC 2015. These products are not only interesting in terms of their performance, but as possible bellwethers of ongoing industry trends.

1. Efficient Power Conversion's EPC9115 500-W Eighth-Brick Demonstration Design



Leveraging the performance of eGaN FETs, EPC demonstrated a fully regulated eighth-brick dc-dc converter rated for 500-W output. It's not just that the power density and efficiency are exceptional—after all, as my colleague Ashok Bindra has pointed out, Vicor has already introduced a 500-W eighth brick bus converter some time ago (although a bus converter is unregulated, which aids efficiency.) However, achieving such high power density using a conventional, hard-switched topology is certainly laudable and suggests that brick vendors will have strong incentives to adopt GaN power devices. For more details see the EPC [announcement](#).

2. Cree's SiC-Module-Based 50-kW String PV Inverter



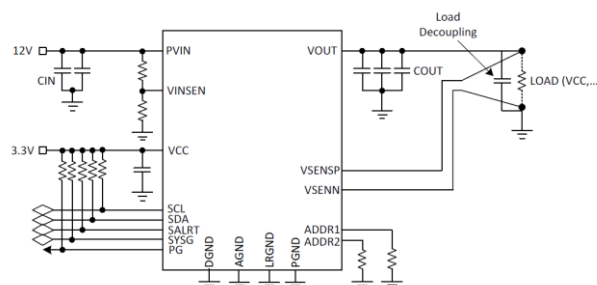
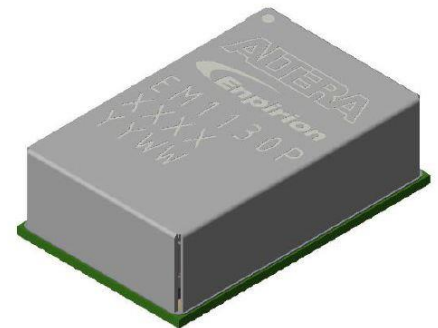
At their booth, Cree showed several interesting demos of products using their SiC devices. But the most interesting one to me was the 50-kW string PV inverter. According to the company, a conventional design of this inverter based on IGBTs weighs 173 kg (381 lbs). In contrast, a version developed using their SiC modules weighs just 33 kg (72 lbs), which vastly alters installation requirements including the cost of installation. For more details, see the Cree [announcement](#).

Comparison of Cree's SiC-based string inverter with IGBT-based design

	IGBT-based design	Cree's SiC-module based design
Full-power MPPT voltage range	480-850 Vdc	450-800 Vdc
Operating voltage range	200-850 Vdc	400-1000 Vdc
No. Indep. MPPT input	1	2
Nominal output power	50 kW	50 kW
CEC efficiency	97.5%	n/a
Peak efficiency	98.3%	99.05%
Power factor	>0.99	>0.99
Output voltage	480 V ac	480 Vac
Operating temp. range	-30°C to +60°C (derated >45°C)	-30°C to +60°C (no derating)
Cooling	Forced air	Forced air
Weight	173 kg	33 kg
Isolation transformer	No	No
Volume (m ³)	0.41	0.09

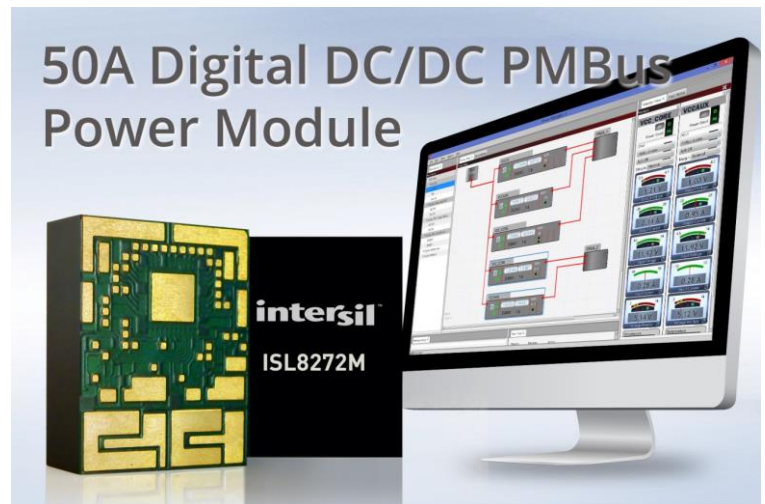
3. Altera's Enpirion EM1130A 30-A Point-Of-Load Converter

Intended to power next-generation FPGAs, the EM1130 PowerSoC is a fully integrated 30-A point-of-load regulator in a tiny 11-mm x 17-mm x 5-mm package. The company calls this device "the industry's most integrated and dense 30-A solution." Four of these devices can be paralleled to deliver 120 A. Besides its very small size, it also represents a significant step up in current for the Enpirion line of POLs. This POL features digital control and supports PMBus. For more details, see the Altera [announcement](#).

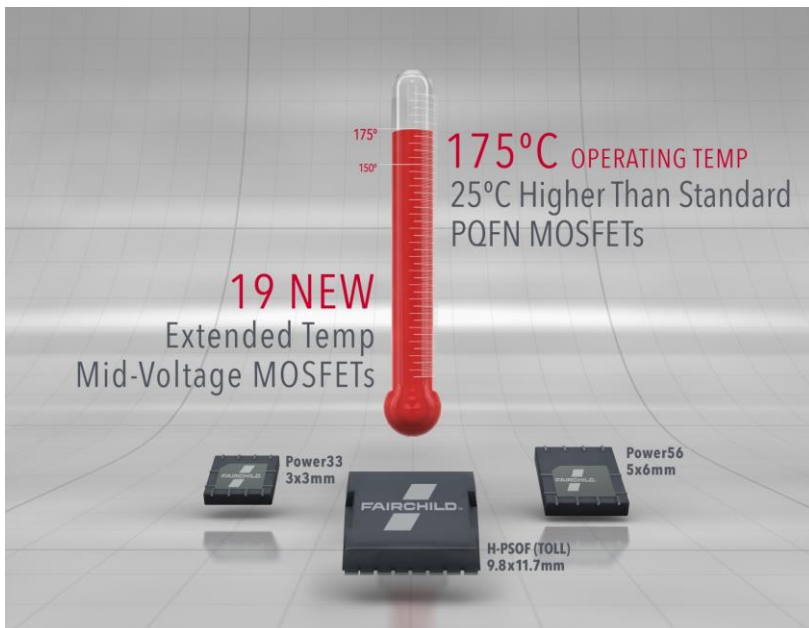


4. Intersil's ISL8272M 50-A Point-Of-Load Converter

Intersil's ISL8272M is a fully encapsulated point-of-load regulator that delivers an impressive 50 A in an 18-mm x 23-mm x 7.5-mm HDA package. Not quite as dense as the Altera/Enpirion POL, but the ISL8272M is very small for a 50-A POL and can deliver up to 200 A when four are paralleled. Again, this is a digitally controlled converter that supports PMBus. For more details, see the Intersil [announcement](#).



5. Fairchild's New Extended Temperature Mid-Voltage MOSFETs Rated at 175° C



Moving away from the wide-bandgap and POL regulator news, Fairchild Semiconductor's expanded line of extended temperature (ET) mid-voltage MOSFETs rated for 175°C also seems noteworthy. It's not that these are the first parts with this rating, as similar types of devices have been available from various vendors for several years. But this introduction of 19 new MOSFETs ranging from 30-V to 150-V-BVDSS may suggest an important semiconductor industry trend to meet application requirements for both higher power density and operation in higher ambient environments. For more details, see the Fairchild Semiconductor [announcement](#).

Beyond these particular product introductions and demos, there were numerous SiC- and GaN-related announcements that contributed to the feeling that both technologies are coming to the fore.

Here are a sampling of the recent wide-bandgap-related headlines:

- "GaN Systems' gallium nitride power semiconductors now with topside cooling for simpler PCB design—GaNPX packaging enables use of conventional heat dissipation techniques";
- "Transphorm and ON Semiconductor Announce the Start of Production of Co-Branded GaN Power Devices—Transphorm's high-voltage EZ-GaN now being adopted into consumer computing applications";

- "Transphorm Announces Industry's First 600-V GaN Transistor in a TO-247 Package Low R(on) Quiet Tab TPH3205WS enables up to 3-kW high-efficiency inverter designs and titanium class power supplies without the need to parallel transistors.";
- "Infineon Unveils Portfolio of Energy-Efficient Enhancement Mode and Cascode configuration GaN-on-Silicon Platforms at APEC 2015";
- "Efficient Power Conversion (EPC) Expands Family of Plug and Play DrGaNPLUS Evaluation Boards – High Power Converters in a Small Footprint";

There were also many other interesting product announcements and demos at APEC, and many signs of other important technology trends beyond those discussed above. Look for more news about these and other products in upcoming issues of the How2Power Today newsletter.

And for other points of view about what was new and interesting at APEC 2015, see the following articles.

- [APEC 2015: A wrap-up and a look toward next year.](#)" a blog by Texas Instruments' Dave Freeman. Dave writes about the conference side of APEC.
- "[APEC 2015 Slideshow: Day one of open exhibits](#)" and "[APEC 2015 Slideshow: Day two of open exhibits](#)" by EDN's Steve Taranovich;
- "[APEC Opens with a Blizzard of Product Disclosures](#)" a blog by Electronic Design's Don Tuite.

Both Steve's and Don's articles offer further views on the new and interesting products introduced at APEC 2015.