APEC 2017: first impressions and observations

Steve Taranovich - March 29, 2017

The IEEE Applied Power Electronics Conference (APEC) is an annual gathering of electronics professionals from all areas of design and development. Not everyone is a power expert, but all attendees have an interest to learn about power supply design. Attendees range from power supply design experts who want to learn about the latest innovations in power technology to engineers who are not power experts but need to design power solutions for their system.

This year the APEC conference was held in sunny Tampa, Florida at the Tampa Convention Center.

Engineers freely exchange technical insights and knowledge here as well as seeing what is new in power design, plus what their competitors might be doing. While walking the exhibition floor and attending the various conferences and tech presentations, we all get a preview of what is to come in 2017 in the power design arena. We see trends in the industry as well as new and emerging companies with innovative ideas.
My first observation came while I attended Google’s 48V power architecture presentation by Shuai Jiang, Google Senior DC-DC Architect for Data Centers and Xin Li, Google Technical Lead Manager for the Power Team.

During Monday’s Opening Plenary Session, Google’s Shuai Jiang explained the Google Data Center 48V to rack architecture which they are promoting for Cloud Data Servers.

Jiang discussed not only powering the processors at 1V and below, but also the other needs for taking the 48V down to 12V for the disks, PCIE, and power for non-core memory rails. Maxim Integrated has a good example of an architecture solution for these 12V needs.

Some of my other observations at this year’s APEC are that we are full speed ahead with 48V to point-of-load (POL) for these data centers. At this year’s APEC conference these solutions abound.

Another of my discoveries was that, although suppliers are still touting how good their IC and power element solutions are, this year there seems to be many more applications front and center showing the use of those devices.
Sometimes we can’t see the forest for the trees; we focus so much on the GaN power element itself and its specifications that we forget all the applications that are enabled because of this amazing technology. I was given a tour through GaN Systems’ booth by CEO Jim Witham who showed me why their company is called GaN Systems. Let me list just some examples of system designs at this year’s APEC using the GaN Systems power elements: Peregrine’s half-bridge Class-D amplifier (shown above), the Gill Electronics “Airfuel” wireless PTU (shown below), Linear Technology’s high frequency power supply evaluation board with the LTC3895 synchronous step-down DC/DC controller, Skycorp’s 32kW motor drive circuit, Analog Devices’ three-phase GaN inverter for motor drives, CEA/LETI 1 MHz LED driver, and Sharp’s 650V, or 30A, GaN HEMT half-bridge, to name a few.
Secondly, there are some new/emerging companies/solutions as there are every year, but many of these that I encountered show some real promise. See the following examples, which I will elaborate on in another post soon.

I visited with Navitas Semiconductor’s CEO, Gene Oliver, who came through on a promise he made to me at last year’s APEC when one month ago, Navitas Semiconductor managed to put together a monolithically integrated half-bridge, the NV6250, in a 6×8mm QFN package, containing dual GaN drivers and dual 650V, 560mohm GaN power FETs with GaN logic, bootstrap circuit, and extensive protection features using their proprietary 'AllGaN' process design kit (PDK). This innovation will enable 10-100× higher switching frequency than existing silicon circuits. Extraneous parasitics are greatly reduced thereby allowing these much higher frequency capabilities. Stay tuned for more innovations by this company.
D3 Semiconductor’s strategy with its +FET technology is to create one of the best Super Junction MOSFETs while offering customers configurability of the Architected +FET to have derivatives produced quickly to meet their specific needs in a design, but not at a high premium. Their operations strategy is flexible and new designs can be ready for reticle generation within a few hours.

Versatile Power’s unique new Bench XR series power supply design is an all-digital power supply with sense wire monitoring capability that uses the two standard output wires; no separate pair of remote sense wires needed. This company can provide customers with custom OEM designs or field proven standard products.

Stay tuned for more of these and other power solutions from APEC.

Steve Taranovich is a senior technical editor at EDN with 41 years of experience in the electronics industry.
Also see:

- Data center next generation power supply solutions for improved efficiency
- 48V direct-conversion dramatically improves data-center energy efficiency
- Power MOSFET Basics: Understanding Superjunction Technology
- GaN as a power element