

Interview on Power Supply Technology

with Doug Bailey, VP Marketing, Power Integrations

By Bodo Arlt, Editor BPSD

Bodo Arlt:

What end markets will drive power supply technology?

Doug Bailey:

Most major consumer product categories are becoming subject to regulations that require them to manage power use to minimize standby power losses and maximize operational efficiency. I believe that the need for good power management will be driven in the short term by external chargers, set-top boxes, other AV equipment, PCs, printers, and LCD monitors. Future drivers will include appliances and anything else requiring an active standby rather than a hard on/off switch. Power Integrations is well-positioned to meet this requirement because our product line is efficient down to very low power levels – we can provide 75 percent of the input power to the output when the power budget is 1 W for standby in say, a printer or STB. Our ON/OFF control scheme means that we can react quickly to provide full power during wake-up and avoid overshoot.

Bodo Arlt: What does Power Integrations bring to these end markets besides its range of IC solutions?

Doug Bailey:

Our technology and inventions are not limited to implementations in silicon. We have developed novel techniques for transformer shields to reduce EMI and we have numerous application circuit inventions that we share with customers via our website at www.powerint.com/ip.htm.

Bodo Arlt:

What technologies and innovations does PI have a leadership position?

Doug Bailey:

We're seeing much more of a market need for power supplies that have high efficiency across the entire load range. Partly this is because many standards require efficiency measurements at 25 percent, 50 percent, 75 percent and 100 percent load, but also because many applications with a standby power budget really like to have as much power available as possible for that budgeted figure. For example, a STB is allocated 1W in standby by the California Energy Commission (CEC). That's fine for the ON/OFF switch only, but if the unit needs to light a vacuum fluorescent display with a clock, watch for signals from a remote, or poll its networking connection, then having 750mW available from a power supply that is efficient across the load range is pretty handy.

Another differentiating technology is performance at peak power ranges. If a power supply is designed to operate at maximum power at all times, but its application requires maximum power for only a very short period of time, then the supply is likely to have an over-designed transformer, MOSFET, and output diode, and maybe a few other components, too. We designed the PeakSwitch specifically to address the needs of designs in which peak power is required infrequently and for short periods. The printer paper-advance function

**Douglas Bailey, Vice President, Marketing,
Power Integrations**



Mr. Bailey joined Power Integrations in November 2004 as vice president of marketing. Prior to joining PI, Mr. Bailey served as vice president of marketing at ChipX, a structured ASIC company. His earlier experience includes Business Management and Marketing Consultant for Sapiential Prime, Inc., Director of Sales and Business Unit Manager for 8x8, Inc., application engineering management for IIT, Inc. and design engineering roles with LSI Logic, Inmos, Ltd. and Marconi. Mr. Bailey holds a B.Eng. from the University of Birmingham with a concentration in microelectronics and microwave devices

illustrates the application very well, but there are many other examples.

Bodo Arlt: Is it more in silicon, or is it part of packaging technology?

Doug Bailey:

Power Integrations has some basic and very fundamental silicon technology that enables our devices to be highly effective in their monolithic form. However, I'd say that most of our recent innovations have been achieved by adding features and improving operating and standby efficiency.

Bodo Arlt: What makes Power Integration different from traditional IC suppliers?

Doug Bailey:

I might disagree somewhat that Power Integrations is non-traditional. TOPSwitch celebrated its 10th anniversary last year, and the device and spin-off versions have shipped in the hundreds of millions of units. Using Power Integrations is definitely a tradition among power supply designers.

That said, we are different from other companies. Few of our competitors follow the fabless model, and in power semiconductors, owning your own fab was pretty much de rigeur until PI showed how successful a fabless model could be. Also, we are a very focused company. We only make power supply chips, and fully one-third of our employees are dedicated to supporting customers with their power supply designs. To my knowledge, no other power semiconductor company offers this level of support commitment to its customers.

Bodo Arlt: How much is Power Integrations involved in the end-customer applications?

Doug Bailey:

This depends on the needs of the customer. We have a substantial FAE force, and they touch as many designs as they can to help customers get to production quickly and easily. Even so, we have far more customers than even our team can address personally, and so we have developed the PI Expert software tool to fill the need. PI Expert is not just a fancy spreadsheet, it's actually an expert system that optimizes a power supply design in the same way that an engineer does – iteratively. Also, it has a number of our patented transformer design techniques built in – it's rather like having access to an expert FAE 24/7.

We also maintain an online "Ask a PI Engineer" capability which is a direct channel to corporate applications engineering support. Sometimes only an answer from an engineer with detailed internal understanding of the product can resolve a particularly difficult problem. We like to ensure that everyone who uses a PI product is successful and the technical support channel is a key to ensuring that none of our customers is struggling and unable to get help that they need.

Finally, and this is particularly exciting, we have just launched a transformer winding service. The toughest part of building a power supply is getting a custom transformer designed and prototyped. Our Rapid Transformer Sampling Service is aimed at helping engineers to be successful even if they have never wound a transformer before.

Bodo Arlt: How much is Power Integrations involved in motion applications using the advantage of IGBTs?

Doug Bailey:

PI does not have any IGBTs or chips that drive them. However, we are aware that the motor control market is growing rapidly because our LinkSwitch-TN non-isolated integrated switcher is used as the bias supply for motor control systems. Many appliances don't need isolation and the bias supplies need only a few hundred milliamps of current – a perfect application for our family of low-cost offline bucks.

Bodo Arlt:

Do we expect more monolithic solutions?

Doug Bailey:

Absolutely. As the name Power Integrations implies, we believe in integrating as much onto a single piece of silicon as possible. Integration simplifies the power supply substantially because it enables us to include thermal protection and SOA protection for the MOSFET, almost all of the feedback loop circuitry and the start-up circuitry into one die. This obviously saves the customer money by eliminating components – but there are non-obvious benefits, too. Reducing the component count increases production line throughput, reduces purchasing and component inventory headaches, increases reliability by eliminating sources of failure, and makes the board smaller, which can often save costs or add flexibility in the enclosure.

Bodo Arlt:

Do we expect to see more high-voltage IC technology in the line voltage range?

Doug Bailey:

PI's bread and butter is our high voltage technology and all of our products include it. The lowest voltage product that we currently make is a 200V device used for DC/DC conversion and for PoE. It turns out that PoE only really needs a 150V MOSFET, but our customers appreciate the extra safety margin.

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Bodo Arlt: Who are your competitors you believe will stimulate the race for leadership?

Doug Bailey:

I'd rather not make personal predictions regarding our competitors. However, generally, I believe those who innovate and who provide the best customer support will have the best chance of influencing customer designs.

Bodo Arlt: Are you ready for 2007?

Doug Bailey:

Yes. We see 2007 as being another solid growth year for PI. We introduced a number of new products in 2006 that have been designed into major applications and expect to see substantial revenue being generated from these introductions in 2007. We have more new products coming that customers can look forward to building into their designs. Energy efficiency and meeting the new regulatory challenges at reasonable cost continue to be drivers for product development, and we are looking forward to working to convert more inefficient linears to highly efficient switchers over the coming months.

Bodo Arlt: Thank you, Doug, for the time and we look forward to a successful future for power management.

Doug Bailey:

Thank-you Bodo. Congratulations on the launch of your new magazine, it's a great read.

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