Today’s datacom-and telecom-server systems commonly use either the DBA (distributed bus architecture) or the IBA (intermediate-bus architecture). The DBA backplane bus performs an ac-to-dc conversion—typically of 48V—with multiple lower-voltage, isolated POL (point-of-load) dc/dc converters. These isolated POL converters are efficient but require some extra board space and expense due to their isolating transformers.

An IBA approach has one isolating dc/dc converter that feeds into multiple lower-voltage nonisolated POL converters. By having just one isolating power-conversion stage, you gain space and eliminate the cost of the additional isolating transformers. One drawback of the IBA approach is that it has a lower overall system efficiency because of the double conversion that the intermediate isolated stage and the nonisolated converters require. In addition, this approach usually has higher distribution losses as power moves at lower voltages and thus higher currents with their attendant resistive losses.

In recent years, server-power subsystems have placed a premium on lower price and smaller footprint, driving the popularity of IBA systems. Rising energy prices and power-supply realestate costs are dictating a need for efficient, space-saving power subsystems, however.

To address these needs, Picor’s new Cool-Power platform of low-power dc/dc converters combines attributes of both DBA and IBA to achieve a high-efficiency power-conversion system in minimal space. The first member of the family, the PI3101, combines isolation, voltage transformation, and output regulation in a high-density, surface-mount PSIP (power-system-in-package) platform measuring 0.87×0.65×0.27 in. for applications in which board space, airflow, and height dimensions are critical.

The PI3101 operates over an input-voltage range of 36 to 75V dc and provides a regulated 3.3V output at an output current as high as 18A. The PI3101 can withstand input voltage transients as large as 100V for 100 msec and provides 2250V input-to-output isolation.

The Cool-Power platform uses the company’s PSIP to achieve a switching frequency of 900 kHz,
allowing for the use of passive components. The chip achieves as much as 87% efficiency with a power density of 400W/in.\textsuperscript{3}. The chip has no digital-communications capability, relying on traditional analog-programmable features, including ±10% output-voltage trimming, programmable softstart capability, remote on/off enable, and an accurate temperature-monitor function that provides an analog output voltage proportional to the internal temperature of the product. This monitor also serves as a fault alarm. The device sells for $29.97 (1000).

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