

Digital Voltage Regulator Minimizes Space, Energy Usage



Ericsson added a new vertical-mount variant to its recently announced 40-A output BMR464 Series of 3E second-generation digital point-of-load (POL) voltage regulators. The new BMR464-SIP (BMR4642002) uses single in-line packaging (SIP) to provide a device footprint of <math><2.5\text{ cm}^2\text{ (}0.39\text{in}^2)</math>, making the new device appropriate for space-critical applications. The new regulator can also be configured and monitored via the standard PMbus communication protocol and Ericsson's graphical user interface, making this the first PMbus-compliant 40-A point-of-load SIP device available on the market, according to the company, to offer the ability to fully optimize power management in high board-density applications. The primary end-use applications are network routers, data storage and AdvancedTCA (Advanced Telecommunications Computing Architecture) boards.

The device's measurements of 33.00 x 7.6 x 18.1mm make the product suitable for those high-density boards that require a small footprint and height below 20mm, guaranteeing a safe and comfortable fit when assembled in 1-inch rack systems.

In addition to the small footprint of 2.5cm², a corresponding key feature of the 40A- and 132W-output regulator is a market-leading power density of almost 53W/cm². The regulator accepts input voltages from 4.5V to 14V and has an output voltage range of 0.6V to 3.3V with typical efficiency of 97.2% at 5V_{in}, 3.3V_{out} and 50% load.

"The increasingly functionality being crammed on system boards these days has driven the development of products such as the BMR464-SIP," said Patrick Le Fèvre, Marketing and Communication Director of Ericsson Power Modules. "We believe this industry first, a PMbus-compliant 40A/132W SIP voltage regulator with a footprint of only 2.5cm², will help designers meet demands in space-critical applications that are featuring progressively higher board densities."

The BMR464-SIP is based on Ericsson's leading-edge digital-core controller combined with the latest MOSFET technology and built-in energy-optimization algorithms that not only contribute to significantly reducing energy consumption

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and power dissipation, but also deliver an impressive amount of features and level of flexibility.

The design concept underlying the company's second-generation 3E POL devices makes it possible for systems designers to reduce energy consumption to the necessary minimum for system operation. Like the other BMR464, the new BMR464-SIP regulator offers unprecedented functionality enabling full monitoring and dynamic controlling of the power delivered to processors, FPGAs, ASICs and other components, ensuring minimum energy consumption under all operating conditions.

A synchronization feature allows several regulators to be locked to a common switching frequency to eliminate beat frequencies. This reduces EMI filtering complexity and the number of external components needed. Additionally, phase spreading reduces input capacitance requirements, and hence losses, because the peak current drawn from the input supply is spread over the whole switching cycle.

A current-sharing rail can be configured enabling 100% utilization of the output of each device and also, during periods of light loading, one or more phases can be disabled eliminating the associated current drain and switching losses. This process is handled automatically using a PMBus command. Efficiency is further enhanced with adaptive diode emulation that turns off the low-side MOSFET gate drive in the synchronous rectification circuit at low load currents.

The BMR464-SIP also features comprehensive circuit protection. Signaling is provided for remote control, power good, current sharing, voltage tracking, voltage margining and remote sense. Voltage setting is done via pin strapping or the PMBus.

The vertical-mount BMR464-SIP uses two through-hole connectors: one for low-power signals and the second for power. Each power pin (VIN, VOUT and GND) has been doubled, reducing power losses and improving thermal conduction.

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