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# Ericsson's digitally controlled voltage regulator greatly outperforms analogue based solutions

**Compared to traditional voltage regulators based on analogue control, Ericsson Power Modules' BMR450 uses a highly integrated digital PWM controller. This makes it possible to increase current density while decreasing footprint, and to reduce component count by 50%. Further, thanks to embedded dynamic and adaptive controls, it is possible to reduce power consumption by adjusting critical parameters to match load conditions, resulting in higher efficiency throughout the whole range of operation.**

The BMR450 is a digitally controlled, non-isolated voltage regulator rated at 20A. It has a high current density of 7.38A/$cm^3$ (120A/$in^3$). For a similar in/out performance, an analogue voltage regulator would offer a much-reduced figure of 2.37A/$cm^3$ (43A/$in^3$). Indeed, a higher current density and lower footprint are two important factors for designers when considering board space to accommodate other vital components of their core application. Smaller voltage regulators are easier to locate close to FPGAs, DSPs and other processors, reducing power losses and parasitic inductance issues.

The product is aimed at (but not limited to) the new generation of information and communication technology equipment where systems' architects are optimizing board designs for optimized control and reduced power consumption. The most important application areas are wireless and fixed networks - optical network equipment – data server and data storage but also in a broad range of industrial applications from medical to process control, and even in automotive applications.

Factors driving the demand for this type of product are energy saving and system flexibility, and the possibility to optimize energy management in order to reduce global energy consumption. Also, improving ways of monitoring load conditions and parameters through the power supply without having to add complex circuitries.

Compared to existing products, Ericsson's BMR450 offers an unprecedented level of monitoring functions (read-back data) through the open standard interface, PMBus. For designers and system architects, having access through PMBus to strategic information such as load current, load status, temperature, voltage deviations, and many other parameters make it possible to monitor down to core functions level, without adding external components or circuitry.

Besides cost saving and simplicity resulting from less external components and embedded control, system architects now have the possibility to monitor, through the power delivered to each voltage regulator, how low level functions perform.

The BMR450 features a wide input voltage range from 4.5V to 14V making it easier to operate under most of the common intermediate bus voltages i.e. 5V, 8V, and 12V. The output voltage range is adjustable from 0.7V – 5V, with an output current of 20A providing up to 100W of power. Offering high efficiency - typically 96.8% at half load, 5Vin, 3.3Vout – the BMR450 has a very small package size of 25.65 x 12.9 x 8.2mm (1.01 x 0.51 x 0.323in).

Another important benefit of having a digital controller is the possibility for customers to buy tailor-made preset modules that perfectly fit their applications' requirement e.g. ramp-up time, output voltage, alarms, etc. The BMR450 also features a complete range of standard functions such as remote on/off, over-temperature protection, output over-current/over-voltage protection, input

under-voltage protection, and remote control monitoring that can be used for redundancy control. It has a high MTBF of 5 million hours.

The BMR450 has a unique serial number that relates to its chipset. This offers an unprecedented level of traceability, as well as simplifying on-board part identification when performing board diagnostics during the full lifetime of the final equipment.

Technologies employed by the BMR450 include digital PWM associated with the most recent components such as ultra low resistance MOSFETs, new ferrites, but also PCB layout optimization. In this respect the BMR450 introduces a brand new layout concept, Digital Point of Load interconnect (DiPOL connect), reducing power losses within the unit and in interconnections to end-users' boards.

Ericsson Power Modules is a leading company that has conducted fundamental research in a new technology - so called 'digital power' - and contributed to the elaboration of the open standard PMBus. Ericsson's BMR453 was the industry first dc/dc converter to use the full benefits of digital power and PMBus. The addition of its first voltage regulator, the BMR450, will result in an unprecedented amount of benefits for its customers and its customers' customers. These products added to its MicroTCA power modules will contribute to reduce energy consumption, which is an important concern for all of us.

An evaluation kit is available to help designers evaluate the modules. It comprises evaluation board, operating manual, a CD containing a graphic user interface (GUI), and cables.

**Notes to editors:**

Ericsson's standard multimedia content is available at the broadcast room:

www.ericsson.com/broadcast_room

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*For more information, visit www.ericsson.com or www.ericsson.mobi.*

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**About Ericsson Power Modules**

Ericsson Power Modules is a supplier of world-class DC/DC power modules for distributed power architectures. With its global design, development, manufacturing and sales network Ericsson Power Modules is a leading supplier of power solutions to meet the customer demand for high performance.