A Smart Systems Approach to Enterprise Power

By Tim Phillips, Vice President, Enterprise Power Business Unit, International Rectifier, El Segundo, Calif.

Advantage of industry-leading MOSFET technology and advanced packaging. Optimized drivers co-designed with these MOSFETs deliver benchmark efficiency over heavy and light loads to eliminate up to 6% of server power loss with increased density over time.

Advanced power systems have an even greater impact on the power dissipation of the load. High power loads in the system, such as microprocessors, have a very unpredictable power profile due to rapid changes in required performance and function. Under severe requirements, these loads can exceed their thermal limits and require thermal throttling to allow the silicon and package to cool before starting back up. This stop-start thermal and power cycle is an enormous waste of energy and performance.

By using advanced power stages, accurate and dynamic power monitoring, and high-performance power controllers, optimized power-management systems can save up to 25% of server and data center power dissipation over the next three years, allowing data center equipment vendors to meet their performance objectives and enable a new generation of high-performance, cost-effective products that meet the insatiable needs of an ever-changing media environment.

New smart power-management system solutions involve the co-design of critical components of the power supplies integrated into the platform strategy. Key elements include highly efficient and dense power stages; advanced responsive power controllers; digital interfaces for programmability and diagnostics; accurate power monitors; system controllers; and sequencing.

Advanced power stages reduce power loss in power supplies by up to one-third compared to traditional designs. New products take advantage of industry-leading MOSFET technology and advanced packaging. Optimized drivers co-designed with these MOSFETs deliver benchmark efficiency over heavy and light loads to eliminate up to 6% of server power loss with increased density over time.

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A holistic approach to system power management eliminates thermal throttling. By dynamically monitoring instantaneous power, recording its trends over time and understanding the thermal impedance of the load, the power system can accurately predict thermals in the system at any point. The power system can then alter the load’s electrical characteristics to limit its power and establish the correct cooling conditions in advance through energy-efficient variable-speed motion control. This can eliminate up to 20% of server total power dissipation.

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