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Ultra-Fast IVR Enables >4-A/mm² Current Density For Next-Gen AI Processors

[Endura Technologies'](#) ET21324X is a highly efficient high-current-density multiphase stepdown voltage regulator. Leveraging the company's dc-dc switching architecture, this integrated voltage regulator (IVR) is a 32-phase stepdown regulator that delivers 150-A continuous output current and 220-A instantaneous current within a 35-mm² die. This regulator is offered as a fully integrated module (standing less than 1-mm high) with all inductors and capacitors in package, but is also being offered in die form.

Optimized for 150-MHz switching per phase in the packaged version, its switching frequency can be adjusted from 40 MHz to 150 MHz when using the die version. With its ultra high bandwidth, it can respond to transient load changes in nanoseconds, essentially minimizing voltage droop. Load transient response is >10 A/ns with less than 30-mV voltage droop and a recovery time of <200 ns.

The ET21324X can be configured for single, dual or quad output, generating a 0.3-V to 1.4-V output while operating from a 1.8-V input. The 150-A continuous and 220-A peak output current ratings can be extended by paralleling multiple IVRs. With seven or eight devices, 1000-A output can be obtained says Davood Yazdani, CPO at Endura Technologies. But for still higher current delivery, up to 61 devices can be paralleled.

The ET21324X uses Endura Technologies' proprietary BDDC control architecture to deliver ultra-fast transient response and high-power density (>4 A/mm²). With its support for multi-domain configurations (up to four outputs as noted above), ultra-high bandwidth and ultra-high current density, the ET21324X is offered as an excellent solution for AI processors, CPUs, GPUs, ASICs, and FPGAs applications. Other features include ultra-fast dynamic voltage scaling (>1 V/200 ns) and compliance with AVSBus Rev 1.4 and 2.0.

"Our customers are building increasingly complex AI systems that demand power solutions capable of keeping pace with modern compute platforms," said Yazdani. "The ET21324X provides the bandwidth, current capability, and dynamic behavior required to support these next-generation designs. Its low voltage droop, fast transient response, high scalability, and fine-grained voltage control give system architects the flexibility to maximize performance per watt."

"Power delivery is becoming one of the defining challenges in advanced compute design," said Massih Tayebi, CEO and board member of Endura Technologies. "IVRs like the ET21324X are no longer optional, they are essential to unlocking the full potential of AI and high-performance computing. Our technology represents a fundamental shift in how power is delivered and managed, enabling next-generation AI architectures to reach their full potential."

For more information about Endura Technologies and the ET21324X, visit the company's [website](#). A datasheet is available under NDA.