Press Information

Power management products
TDK launches stackable µPOL modules providing up to 200 A combined for vertical power delivery

- µPOL module F1525 delivers 25 A each, up to 200 A when stacking multiple units, for a compact and low-height form factor in vertical power delivery designs
- Ultra-fast transient response, ultra-low DC ripple, and low spectral noise
- Integrates MOSFETs, inductors, and control in a thermally enhanced 3D structure with analog and digital interfaces

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TDK Corporation (TSE: 6762) expanded its µPOL family of non-isolated DC-DC power modules by adding the FS1525. This just 3.82 mm high point-of-load (PoL) converter delivers up to 25 A and is engineered to meet the demanding requirements of AI servers, edge computing, and data center systems. By stacking or paralleling several FS1525 modules, they can deliver 200 A combined in vertical power delivery designs. This is a novel approach in which the PoL converters are located directly under the FPGA/SoC or ASIC on the backside of the PCB.

Leveraging advanced 3D chip-embedded package technology, the FS1525 integrates all critical components—including controller, driver, MOSFETs, digital core, memory banks, bypass capacitors, and power inductor—into a single component with a footprint of 7.65 x 6.80 mm (L x W). The thermally enhanced architecture with a thermal impedance of 1.4 K/W delivers superior current performance, outperforming conventional solutions at high ambient temperatures while simplifying PCB routing and enabling high-density power architectures.

Supporting input voltages from 4.5 V to 16 V and an adjustable output range from 0.6 V to 1.8 V, the FS1525 is optimized for powering modern low-voltage AI processors, including the core voltage of 3-nm to 6-nm ASICs, and SERDES rails with sub-5mV peak-to-peak ripple. Its low spectral noise performance matches well with DSPs, imaging, and advanced Automated Test Equipment (ATE) applications. Being scalable up to 200 A and designed for vertical power delivery designs, the new µPOL enhances thermal performance and maximizes board space efficiency.

FS1525 has a fast transient response, low ripple, and true differential remote sensing to ensure accurate voltage regulation at the point of load. Digital programmability via I²C and PMBus enables real-time telemetry, adaptive tuning, and fault management for voltage, current, and temperature monitoring, critical for dynamic AI workloads. The module also offers analog V_{out} settings tailored to leading FPGA/SoCs and ASICs, supporting advanced features such as Altera's SmartVID for Agilex FPGA series.

The new µPOL module integrates seamlessly with modern computing form factors, including PCIe, VPX, SMARC, and 1U to 3U rack systems, providing high flexibility for system designers. It is already deployed in

proven designs for FPGA/SoCs such as Altera Agilex™, AMD Versal™ Edge, and AMD-Xilinx platforms, including Zynq UltraScale+ MPSoC and Versal ACAP, widely used in AI and machine learning applications.

As part of TDK's comprehensive µPOL portfolio spanning 1 A to 200 A, the FS1525 offers a unified system-level power solution. With plug-and-play simplicity and no external compensation required, it accelerates development cycles, reduces design complexity, and lowers overall system cost. More than a power module, the FS1525 represents a complete power ecosystem designed to drive the future of intelligent computing. Evaluation boards for 25 A and 50 A are in stock at DigiKey and Mouser. Stackable boards for 100 A and 200 A are available upon request.

Versal is a registered trademark of AMD
Agilex is a registered trademark of Altera

Design collateral for ease of design

- FS1525 Starter Design schematics and PCB layout at Ultra Librarian, URL: https://www.ultralibrarian.com/partners/tdk
- FS1525 SIMPLIS model and PDN libraries for top FPGAs/SoCs, URL: https://www.us.tdk.com/news_center/upol/index.php
- FS1525 Evaluation boards from 25A, 50A, 100A, and 200A

Main applications

- AI & edge computing
- Telecom and networking applications
- Data center computing
- Optical networks
- Medical imaging
- Power for AI chipsets, ASICs, FPGAs, SoCs
- Power density form factors: PCIe, 1U to 3U racks, VPX, SMARC, other

Main features and benefits

- Scalable up to 200 A and more with interleaved operation up to 16 MHz
- Active current sharing
- Plug and play: no external compensation required
- Wide input voltage range: 4.5 V to 16 V
- Output voltage range: 0.6 V to 1.8 V
- Continuous output current per module: 25 A
- Operating temperature: -40°C to +125°C
- Differential remote sensing for output voltage
- Pre-bias output
- Telemetry: V_{IN}, V_{OUT}, I_{OUT}, temperature, and faults
- MTP to store custom configuration
- Programmable via digital interface like I^2C or PMBus

About TDK Corporation
TDK Corporation (TSE:6762) is a global technology company and innovation leader in the electronics industry, based in Tokyo, Japan. With the tagline “In Everything, Better” TDK aims to realize a better future across all aspects of life, industry, and society. For over 90 years, TDK has shaped the world from within; from the pioneering ferrite cores to cassette tapes that defined an era, to powering the digital age with advanced components, sensors, and batteries, leading the way towards a more sustainable future. United by TDK Venture Spirit, a start-up mentality built on visions, courage and mutual trust, TDK’s passionate team members around the globe pursue better—for ourselves, customers, partners, and the world. Today, the state-of-the-art technologies of TDK are in everything, from industrial applications, energy systems, electric vehicles, to smartphones and gaming, at the core of modern life. TDK’s comprehensive, innovative-driven portfolio includes cutting-edge passive components, sensors and sensor systems, power supplies, lithium-ion and solid-state batteries, magnetic heads, AI and enterprise software solutions, and more—featuring numerous market-leading products. These are marketed under the product brands TDK, EPCOS, InvenSense, Micronas, Tronics, TDK-Lambda, TDK SensEI, and ATL. Positioning the AI ecosystem as a key strategic area, TDK leverages its global network across the automotive, information and communication technology, and industrial equipment sectors to expand its business in a wide range of fields. In fiscal 2025, TDK posted total sales of USD 14.4 billion and employed about 105,000 people worldwide.

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