ITECH IT8100A/E Series Enables High-Performance Power Supply EDDP Power Cycling Tests with Short-Time Overpower Function

EDDP testing for power supplies refers to a power cycling test method in which the Device Under Test (DUT) is subjected to controlled conditions that induce a measurable and specific degradation indicator, requiring a defined amount of total energy consumption. It is an accelerated aging test designed to evaluate the lifetime and reliability of power semiconductor modules under real operating conditions, such as frequent switching and dynamic load variations.

High-performance power supplies—such as server power supplies, telecommunications power supplies, and EV chargers—place extremely high reliability requirements on core power devices. Therefore, EDDP testing in these applications is not only a validation method, but also a key basis for design verification and component selection.

Why is EDDP testing especially important for high-performance power supplies?

The operating harshness of high-performance power supplies determines that their power devices must withstand extreme stress:

High power density: High heat dissipation pressure within a limited volume leads to higher junction temperatures and more severe temperature fluctuations in components.

Frequent load variations: Servers adjust power output based on computing load fluctuations, and EV chargers adjust power according to battery state. These all directly translate into power cycling stress on the devices.

In a real power system, load variation is the direct cause of power cycling stress in power devices. When the load increases, device current rises, losses increase, and junction temperature goes up; when the load decreases, junction temperature drops. This continuous, day-to-day and even second-by-second fluctuation is the “power cycling” imposed on devices in real applications. The severity of load variation directly determines the magnitude of EDDP stress. A power supply that must frequently respond to drastic load changes requires a very high EDDP capability in its internal power devices to ensure sufficient lifetime.

Therefore, for high-performance power supply products, most manufacturers conduct load variation testing on finished products to verify their reliability. The following is a testing requirement proposed by a power supply manufacturer:

1	30% Load 0.34ms	160% Load 0.4ms	Slope: 15–30 A/μs
2	20% Load 0.1ms	160% Load 0.1ms	Slope: 30 A/μs
3	70% Load 0.05ms	130% Load 0.05ms	Slope: 30 A/μs
4	0% Load 50ms	200% Load 50ms	Slope: 15–30 A/μs

To complete this type of testing, the electronic load must not only have a high current slew rate (current change speed), but also strong and stable overload capability.

Traditional electronic loads do offer overload capability, but after a single overload event they typically require a relatively long recovery time (around several minutes) before the next overload can be applied. This makes them unsuitable for cyclic testing requirements.

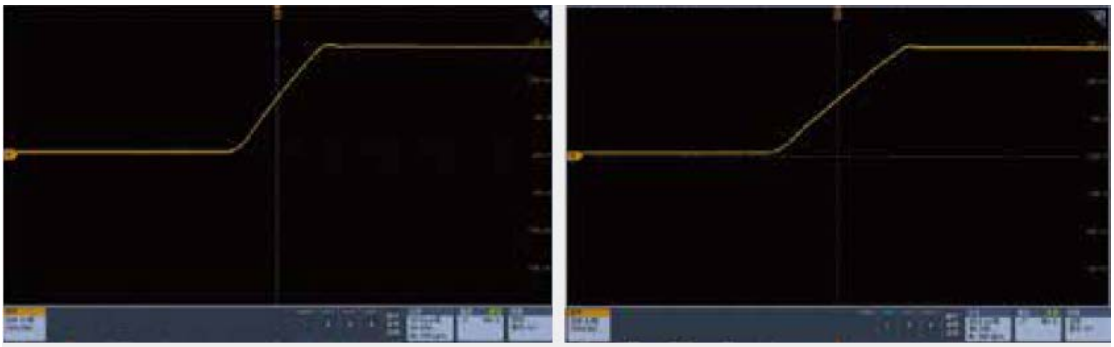
This type of overload capability is generally referred to as **instantaneous over-power capability**.

The new-generation high-speed, high-power DC electronic load IT8100A/E Series breaks through traditional limitations by delivering excellent over-power loading performance. It supports **1.5× short-duration over-power operation**, while the IT8100A supports up to **4× instantaneous over-power capability**.

"Short-duration over-power functionality" means that when the average power over a cycle remains within the rated range, the device can continuously operate under instantaneous over-power conditions. Operation at 1.5× over-power can be sustained for second-level durations and repeated continuously without shutdown or cooling interruptions.

This capability ensures that the series not only meets the performance requirements in high-power applications, but also reduces reliance on high-rated equipment. It makes "sizing based on peak power" a thing of the past, reducing test cost investment by more than 30% and providing users with a more economical and efficient solution.

In addition, the ITECH IT8100A/E series DC electronic loads provide dynamic loading capability up to 50 kHz, including dynamic current loading and dynamic resistance loading. The IT8100E 3U single-unit model offers a current slew rate of up to 45 A/μs, while the rack system can reach a maximum current slew rate of 150 A/μs. The minimum response time is 8 μs, meeting the requirements for high-speed transient response testing of power supplies.



30A/us 50A-1500A　　45A/us 50A-1500A

The ITECH IT8100A/E series represents a new generation of graphical programmable DC electronic loads. By integrating an advanced touchscreen design with an intuitive graphical user interface, it enables users to quickly and easily set parameters and edit waveforms, significantly improving operational convenience.

As a new benchmark in high power density loads, the IT8100A/E series achieves up to 7.2 kW power density (for 150 V models) within a compact 3U form factor. With optical fiber master-slave parallel technology, the maximum scalable power can reach up to 1.8 MW, meeting a wide range of high-voltage and high-current application requirements.

The ITECH IT8100A/E series high-power DC electronic load offers four voltage ranges: 60 V, 150 V, 600 V, and 1200 V, with a single-unit power range from 2 kW to 86.4 kW. Thanks to its high-speed current slew rate and rich functional modes—such as dynamic mode, automated testing, and both basic and advanced loading modes—the IT8100A/E delivers outstanding performance in complex applications including power modules, AI server power supplies, fuel cells, EV charging stations,

power electronics, and industrial motors. It provides strong support for R&D, validation, and production testing.

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