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VX INSTRUMENTS

NEXT-LEVEL TESTING FOR NEXT-GEN POWER SEMICONDUCTORS





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From electric cars to solar inverters, power semiconductors are the silent workhorses behind a wide range of modern systems, managing high voltages and fast switching with precision. As these components grow more advanced, so do the demands of testing them at scale.

Manufacturers need platforms that can accurately perform high power semiconductor tests, validate critical electrical characteristics like breakdown voltage and leakage current and handle high-voltage, high-current conditions—reliably, repeatably and with minimal downtime.

VX Instruments has stepped forward to meet that demand.

Backed by decades of engineering expertise, it has introduced STS8760NEO, a standardized static parameter test platform that can handle the increasing complexity of modern power semiconductors. By merging high-speed, high-voltage testing

with a modular PXI-based architecture, it gives manufacturers the flexibility to streamline their test environments while sustaining top-tier performance.

It's more than a launch—it's a milestone in VX Instruments' legacy of testing excellence.

What started in 1989 as a precision engineering firm has steadily transformed into a global force in semiconductor testing. In its early days, VX Instruments (VXI) focused on building advanced measurement tools for industrial clients. But as test demands intensified, the company started building custom, end-to-end systems in close partnership with leading semiconductor manufacturers. Though rarely visible to the broader market, these highly customized solutions shaped VXI's deep understanding of real-world validation challenges. Today, with more than 500 VXI-powered systems deployed across the globe, that legacy is no longer operating behind the scenes, it's setting the stage for what comes next.

STS8760NEO distills everything VXI has learned into a scalable platform. It delivers fast, accurate results across various devices and configurations. Its open interface enables seamless integration with DUT-specific resistor networks, temperature sensors and third-party tools. Designed

for flexibility and built for the future, it reflects a commitment to advancing the next generation of high-power semiconductor testing.

“For more than two decades, we were the go-to team working in the background for the market leader for High-Power Semiconductors, solving tough problems in custom setups,” says Christian Degenhart, CEO and CTO of VX Instruments. “With STS8760NEO, we’re putting that experience to work for a broader market, delivering the speed, flexibility and performance manufacturers need.”

Traditional Automated Test Equipment (ATE) systems are often rigid, monolithic setups engineered for fixed use cases. Scaling them across new devices or adapting them to evolving test demands means retooling the entire system—an approach that’s slow, expensive and inflexible. In today’s semiconductor industry, where devices change fast, and test conditions vary dramatically, this approach is no longer viable. VX Instruments reimaged the test platform from the ground up to overcome these constraints and put modularity at the core.

A Modular Test Platform That Covers the Entire Lifecycle

Power semiconductors vary drastically in size, structure and electrical demand, depending on their stage in the production cycle. Conventional ATE systems are often not equipped to seamlessly handle the wide span of requirements, from the ultra-low leakage detection needed in wafer-level probing to the high-current stress conditions required during final module testing.

VX Instruments engineered its hardware around a modular, 19-inch, slot-mounted architecture to meet the evolving requirements across the semiconductor test lifecycle. High-voltage SMUs, pulsed current sources and matrix-switching modules can be added, swapped, or reconfigured as needed. This modularity supports seamless transitions between diverse test scenarios, from fragile SiC dies to high-power IGBT modules used in EVs and industrial drives.

This modular foundation is powered by an Ethernet-based internal structure, streamlining reconfiguration and maintenance while ensuring the system remains adaptable as testing needs evolve. It supports flexible setups that maximize both uptime and long-term operational efficiency.

Adding another layer of versatility, VX Instruments employs a uniform interface for applications and adapters, allowing components to be easily exchanged to meet shifting requirements and diverse product types. This hardware flexibility is matched by software adaptability through GT-Studio, VXI’s core operating environment. Designed as an open, plugin-ready platform, GT-Studio allows users to create a fully integrated and expandable test ecosystem, leveraging in-house tools or third-party software.

Setting STS8760NEO apart is how seamlessly it blends modular design with intelligent scalability. The system can ramp up instrumentation for high-parallelism wafer testing, simultaneously measuring up to 16 devices in tight cleanroom environments. Conversely, it can scale down by connecting multiple handlers to a single tester, minimizing the footprint and capital expenditure. This scalability enables a single STS8760NEO to transition between R&D

and production fluidly, adapt to high-mix product lines and evolve with changing test demands, without requiring major retooling.

The result is a test system that accelerates cycles, strengthens data correlation across the product lifecycle and lowers the test cost without compromising precision. It delivers lab-grade accuracy at an industrial scale while maintaining the agility needed to thrive in high-throughput environments.



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“Our architecture gives customers extremely short test times and precise, reliable results,” says Alexander Loibl, Product Manager Static Tester Platform at VXI.

To further enhance throughput and cost-efficiency, the system supports multi-station asynchronous operation, enabling a single STS8760NEO to manage several test stations concurrently. This configuration minimizes capital investment and maximizes output by sharing components where required. It also accelerates adaptation to new DUTs and evolving test strategies, significantly reducing time-to-market while delivering best-in-class performance.

Purpose-Built for the Demands of Next-Generation Devices

With requirements advancing toward higher voltages, tighter tolerances and faster switching speeds, STS8760NEO supports testing up to 3000V and 2400A out of the box. It’s already been upgraded to deliver up to 10kV for high-voltage modules used in trains and large-scale wind installations. The current pulse width is configurable from 100 microseconds to one millisecond up to 2400A, and voltage slew rates up to 1,000 V/ms set the benchmark in test speed for high voltage testing.

To meet these next-generation demands with precision, the system incorporates a zero-leakage measurement architecture, 6-wire sensing, and picoamp-level current detection, ideal for testing wide-bandgap semiconductors where leakage sensitivity is non-negotiable. Short pulse lengths, down to 100 microseconds, complement this by reducing thermal stress on the device and enabling faster and more accurate testing under real-world conditions.

Further enhancing its utility, STS8760NEO comes preloaded with the VXI Semiconductor Test Method Library (VXI-STML). This software suite includes standard test routines like RDS(ON), GS-Leakage and DS-Breakdown, and customizable options such as gate charge analysis and preconditioning. The system covers a broad spectrum of static and dynamic parameters, including static resistance, forward voltage, reverse current, threshold voltage and breakdown voltage. It also adheres to global testing standards such as JEDEC and IEC-60747-X, ensuring repeatable and compliant results.

Fast-Track Integration for Complex Test Environments

Technical features are only half the story. STS8760NEO’s strength also lies in how easily it integrates into modern and legacy production environments. VXI provides intuitive test sequencing software and an open API for seamless automation and data logging. Whether upgrading outdated test infrastructure or deploying STS8760NEO at scale for new product lines, manufacturers get a platform that reduces setup time and enhances long-term test strategy with minimal disruption.

STS8760NEO made a measurable impact for a global semiconductor leader that needed to replace its outdated 6.5kV tester. It was a daunting task given that the system was over 15 years old and tightly embedded in a customized production line. Extended downtime wasn’t an option, but neither was sticking with a discontinued platform that couldn’t meet future voltage and precision demands.

VX Instruments responded with speed and specificity. It enhanced the STS8760NEO with a custom high-voltage module capable of 10kV and engineered a dedicated matrix solution that could handle both 10kV and 2400A in a single system, while providing nanoampere accuracy at top speed. This rare high voltage and high current combination is critical for production environments targeting next-generation silicon carbide modules and higher voltage classes. But the solution went far beyond hardware. VXI helped the customer retrofit the system into their existing handler setup without redesigning the test floor. The modular architecture allowed for precise integration with minimal changes, preserving established workflows while significantly boosting testing capability.

Despite the complexity, the entire transition was completed in just 10 days. In an industry where equipment qualification can take months, completing a rapid swap and restart sets a new benchmark. Production paused only briefly before the new tester was installed, and operations resumed with a fully qualified system that exceeded



expectations. The upgrade delivered long-term advantages by enhancing measurement precision and minimizing the need for ongoing maintenance.


“Bringing high voltage and high current together in a single platform isn’t easy, but it’s what our customer needed, and we made it happen,” says Loibl.

Backed by Engineering Depth, Built to Scale Globally

At the core of VX Instruments’ success is a highly focused engineering team that blends technical depth with application-driven insight. With 20 engineers dedicated to hardware and instrumentation and a separate group focused exclusively on test applications, its hybrid model bridges design precision and real-world integration. This structure enables the development of technologically advanced systems that are practical for deployment in complex production environments. The dedication to engineering excellence is matched by a philosophy that prioritizes long-term trust and reliability. Every system is built to perform consistently and evolve alongside changing test requirements.

Despite its growing global presence, VX Instruments remains a family-owned business grounded in trust and collaboration. Manufacturers value its technology, responsiveness and willingness to engage as a true partner.

With its recent move into a new headquarters, VX Instruments has taken a major step forward in its growth journey—creating room for production ramp-up and team scaling. More than a facility upgrade, the move reflects a deeper commitment to fostering a dynamic and high-quality work environment for its employees.

Combining engineering precision with a deep understanding of real-world semiconductor testing demands, VX Instruments continues to define what reliability and innovation look like in practice. 



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