Siglent Launches 8-Channel 1 GHz Bandwidth High-Resolution Oscilloscope

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The accelerating transformation across industries like automotive, renewable energy, and industrial automation is driven by the rise of advanced power electronics. High-efficiency inverters, the switch to wide-bandgap semiconductors, and tightly integrated control loops are pushing the limits of traditional test tools. As systems become more compact and capable, engineers must observe and correlate more signals across multiple domains with greater precision. Legacy oscilloscopes, designed for simpler tasks, often fall short. Today's development workflows demand multi-channel instruments that offer deep insight, high signal fidelity, and application-focused analysis to meet the growing complexity of next-generation power and control systems.

20th of June 2025: Siglent introduce the latest addition to its high-performance 12-bit oscilloscope portfolio: the SDS5000X HD and SDS5000L series. These new oscilloscopes offer up 8-channels, a bandwidth up to 1 GHz and mark a significant advancement in Siglent's multi-channel platform strategy. With high-speed sampling and deep memory architecture, the instruments are built to deliver reliable insight into complex signal environments. Combined with a comprehensive suite of analysis tools, the **SDS5000X HD** and **SDS5000L** are designed to meet the evolving demands of today's power electronics, embedded systems, and automated test applications.

Scalable and flexible Solutions

The **SDS5000X HD** models feature a large, intuitive usable touchscreen interface ideal for bench work and interactive debugging, while the **SDS5000L** rack-mount variants are optimized for integration into automated test systems, offering full remote control and space-saving design without a built-in display. These offerings give engineers the flexibility to choose the right tool for their workflow, whether it's in a hands-on R&D lab or a fully automated validation setup. The goal is to provide powerful, scalable solutions that grow with the complexity of modern test environments.

Advanced Performance for high requirements

The **SDS5000X HD** and **SDS5000L** series deliver the performance needed to tackle demanding measurement challenges. With sampling rates of up to 5 GSa/s, engineers can capture fast signal transitions with high precision. Each channel supports up to 500 Mpts of memory (with all channels active), enabling long-duration acquisitions at high resolution, which is ideal for analyzing protocol sequences. In quarter-channel mode, memory depth extends up to 2.5 Gpts per channel, supporting deep signal analysis over extended time spans. An effective number of bits (ENOB) of up to 8.2 at 1 GHz ensures excellent dynamic range and signal accuracy, even at full bandwidth. Combined with an impressively low noise floor of just 140 µVrms at 1 GHz, the new models offer clear, detailed signal visibility, which is crucial for accurate debugging in sensitive analog, power, and mixed-signal environments.

Multi-channel application-focused Analysis

An 8-channel oscilloscope enables comprehensive three-phase power analysis by allowing simultaneous connection to all voltage and current signals. This synchronized acquisition ensures accurate, real-time measurement of waveforms and key parameters across all phases. Engineers can directly observe and compare phase relationships to detect imbalances and verify system performance. With built-in FFT capabilities, the oscilloscope also supports detailed harmonic analysis of three-phase systems. Optional application software further extends functionality by providing vector diagram visualization for motor diagnostics, power quality evaluation, ripple measurement, and overall system efficiency analysis.

Beyond power analysis, modern electronic systems increasingly rely on multiple integrated chips and

modules, whose initialization and operation must be carefully coordinated to avoid undefined states. Power-up sequence testing verifies that signals from different circuit modules follow the correct timing, ensuring system stability and preventing issues such as data transmission errors in communication systems. As circuit complexity grows, so do the challenges of power-up testing. The SDS5000X HD addresses this by capturing the entire power-up process of all relevant signals in a single acquisition. This significantly reduces measurement time, improving efficiency, and minimizing errors associated with repeated tests. For complex designs featuring up to eight power rails, this one-shot measurement capability is a powerful tool for reliable validation.

Accurate Measurements for SiC and GaN Power Electronics

With the introduction of Siglent's latest 8-channel oscilloscopes and the new optically isolated differential probe series ODP6000B, a crucial gap in wide-bandgap (WBG) semiconductor testing is now filled. The SDS5000X HD delivers picosecond-level rise time performance, enabling precise capture of the fast-switching behavior characteristic of silicon carbide (SiC) and gallium nitride (GaN) devices. It provides detailed analysis of voltage and current transients during switching events, including overshoot, ringing, and other dynamic effects. These capabilities help engineers optimize circuit performance and ensure signal integrity in high-efficiency power designs. Complementing these capabilities, the ODP6000B probes are available with bandwidths of 500 MHz and 1 GHz and feature an exceptional common-mode rejection ratio (CMRR) of 160 dB at low frequencies, further enhancing the accuracy and noise immunity essential for advanced WBG device measurements.

Conclusion

With the launch of the SDS5000X HD and SDS5000L series, along with the optically isolated ODP6000B probes, Siglent delivers a powerful and scalable measurement solution tailored to the demands of modern power electronics and complex embedded systems. The combination of high channel count, excellent signal fidelity, deep memory, and versatile analysis capabilities enables precise insights into demanding applications—from three-phase power analysis and power-up sequence testing to high-speed characterization of wide-bandgap semiconductors. Whether in the lab or integrated into automated test setups, Siglent provides the tools to elevate efficiency, accuracy, and reliability in development workflows.

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