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Isolated Oscilloscope Probes Offer Smaller Size And More Capabilities

Tektronix's second-generation IsoVu isolated oscilloscope probes, the TIVP series, significantly advance the capabilities of these innovative probes, which were first introduced in 2016.* These second-generation probes are said to extend the applications for isolated probe technology to the entire power system design market with a smaller size, improved ease of use, and enhanced electrical performance (Fig. 1).

Making accurate measurements on high-speed ungrounded systems can be nearly impossible using traditional differential probes. Engineers working with wide-bandgap technologies such as SiC and GaN face difficult challenges to accurately measure and characterize devices due to the higher frequencies and switching speeds involved. By galvanically isolating the probe from the oscilloscope, IsoVu probes have completely changed how power researchers and designers make wide-bandgap power measurements, according to Tektronix.

"When first introduced, the IsoVu probes represented a true breakthrough for our customers because they could gain actual insight into the performance of the high side of their half-bridge designs, eliminating a significant blind spot," said Suchi Srinivasan, general manager of Tektronix mainstream solutions. "With this second generation of IsoVU, we are making this cutting edge isolated measurement technology accessible to a broader range of customers for such tasks as product level R&D, validation and EMI troubleshooting."

Like the first generation, the IsoVu Gen 2 probes use patented electro-optical technologies to capture signals and power the probes without the need for an electrical connection to the oscilloscope. Compared to traditional high voltage differential probes, IsoVu probes are said to offer a unique combination of high bandwidth, dynamic range and best-in-class common-mode rejection ratio (CMRR) over the probe's full bandwidth.

In contrast, non-isolated probes' CMRR ratings derate quickly as frequency increases, making higher frequency measurements impossible. The use of optical cables also allows for long cable lengths and makes the probes largely immune to EMI.

Upgrades and enhancements offered by IsoVu Gen 2 probes include

- Smaller size. At about one-fifth the size of the first generation, the TIVP series probes make it easier to access hard to reach measurement points that were previously inaccessible. Additionally, the separate controller box has been condensed and is now self-contained inside the probe's compensation box (Fig. 2).
- Lower cost. While the first generation IsoVu probes were priced around $17,000 per probe, the Gen 2 probes are priced at about $9000 per probe. According to Chris Loberg, director of marketing at Tektronix, both the size and cost reductions were achieved through improvements in the probes' laser driver and power amp.
- Improved sensitivity. The new probes are more sensitive, with less noise at ± 50-V measurements for greater visibility and voltage sensitivity in wide-bandgap measurements.
- Greater accuracy. The new probes offer enhanced accuracy in a number of areas including improved dc accuracy, enhanced gain accuracy over the full input range and improved temperature drift correction. These enhancements enable deeper characterization of wide-bandgap designs for increased energy efficiency.
- Less tip swapping. With wider dynamic range at the sensor head, fewer tips are required to cover the same voltage range as IsoVu Gen 1. This shortens the time needed to perform device testing, eliminates potential errors when swapping tips, and lowers the cost for customers that needed to purchase multiple tips on IsoVu Gen 1.

"IsoVu technology has been critical in our support of customers adopting our power conversion technology in their designs." says Cam Pham, Global Automotive field application engineer leader, Wolfspeed, a Cree Company. "With its galvanic isolation capability, IsoVu technology enables us and customers to accurately characterize high side events with confidence"

The TIVP series probes are now available worldwide in bandwidths ranging from 200 MHz to 1 GHz and are priced from $9,000. For more information, see the IsoVu Isolated Probes page.

*For background on the first-generation IsoVu probes, see "1-GHz Optically Isolated Measurement System Offers 120 dB CMRR Up To 100 MHz" in the April 2016 issue of How2Power Today.

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Fig. 1. Like the first generation, the IsoVu Gen 2 probes use patented electro-optical technologies to capture signals and power the probes without the need for an electrical connection to the oscilloscope. They offer a unique combination of high bandwidth, dynamic range and CMRR over the probe's full bandwidth. But these second-gen IsoVu probes also offer greater robustness, higher bandwidth, smaller size and lower cost than their predecessors.

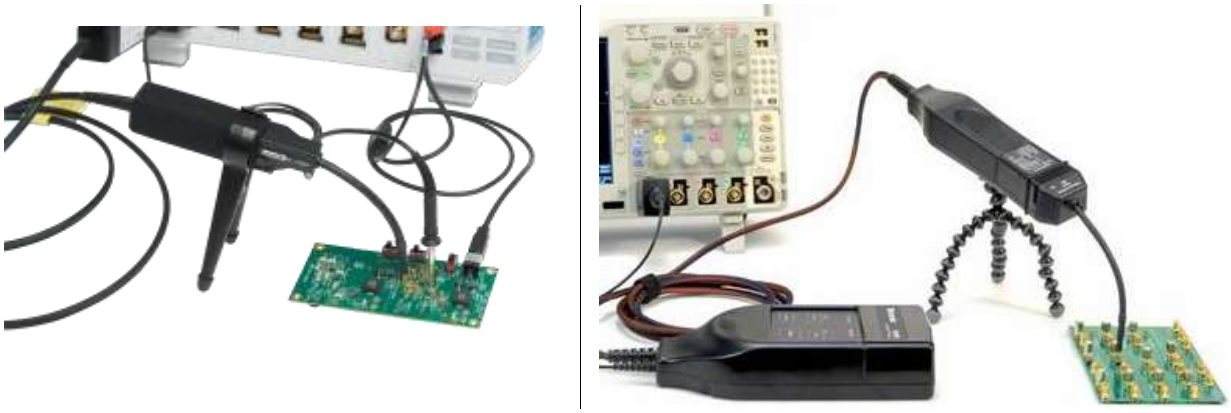

Fig. 2. Comparing the IsoVu Gen 2 (photo on left) with the original IsoVu probes (photo on right). Although these images are not quite scaled the same, the change in form factors is apparent. The probe itself is smaller and the large controller box resting on the bench has been eliminated, with its function contained within the probe's compensation box, which plugs into the oscilloscope. The compensation box is partially obscured in the image shown here but is fully visible in Fig. 1.