

Solutions for Nanotech Research and Development



KEITHLEY

A GREATER MEASURE OF CONFIDENCE

For nanotech R&D solutions, look to the leader in sensitive test and

Keithley has been building a reputation for low level measurement leadership since 1946. Today, a growing number of researchers in nanoelectronics, nano-optoelectronics, nanomaterials, and nanobiology depend on Keithley for the sensitive investigative tools and high productivity test instruments they need. Keithley instrumentation combines high measurement resolution and sensitivity with the low drift and low noise characteristics needed to make accurate observations of device or material behavior. Many feature built-in capabilities designed to reduce or eliminate the need for test system programming. Each one is engineered to ensure extended reliability and robust performance.



The **Model 4200-SCS Semiconductor Characterization System's** sub-femtoamp current measurement resolution and turnkey operation are ideal for researchers in fabrication facilities and labs developing nanodevices. Its built-in Windows® NT-based workstation and powerful Project Navigator software speed device test development, processing, and plotting. The point-and-click interface allows even researchers new to DC test and measurement to get results quickly and with confidence. As research programs mature and new testing needs evolve, the Model 4200-

SCS can change right along with them. Its flexible architecture makes it easy to add more source/measure channels (up to a total of eight) for testing multipin devices or testing multiple devices in parallel. The configuration utility simplifies adding external GPIB instruments or a prober. This system's combination of low current sensitivity, measurement flexibility, open architecture, and ease of use make it ideal for applications like I-V characterization of Single Electronic Transistors or other nanodevices and molecular electronics research.

measurement



The **Model 6430 Sub-Femtoamp Remote SourceMeter** combines voltage and current sourcing and measurement capabilities with sensitivity, noise, and input resistance specifications superior to electrometers. On its 1pA range, it can measure currents with just 0.4fA p-p noise for applications like characterizing the conductivity of polymers and single electron transistors (SETs).



Measuring nanovolts doesn't have to mean putting up with long integration periods. The **Model 2182 Nanovoltmeter** makes low voltage measurements fast and with low noise. Characterizing silicon nanowires or other highly conductive materials demands instruments that can characterize low resistances accurately. The Model 2182's built-in Delta Mode can coordinate measurements with a reversing current source (like the one in the **Model 2400**) to create an economical system for precision measurements of low resistance materials or devices.



For many nanomaterials and optoelectronics applications, the **Model 6485 Picoammeter** is ideal for measuring low currents quickly and accurately without breaking the lab's instrumentation budget. It can measure currents as low as 20fA with 10fA resolution. Less than 200 μ V voltage burden on the lowest ranges lets it measure low currents with high accuracy, even in circuits with very low source voltages. An analog output that's compatible with chart recorders and other plotters makes it easy to spot kinks or other anomalies in a device's output. The **Model 6487 Picoammeter/Voltage Source** offers the same capabilities as the Model 6485 and adds a 500V source for voltage sweeping and Alternating Voltage Resistance measurements.



The **Model 6517A Electrometer/Voltage Source** is packed with features that simplify making extremely low current (down to 100 attoamps) and high resistance (up to 10^{17} ohms) measurements. Researchers often choose the Model 6517A for characterizing new materials or devices because it can measure current, voltage, resistance, resistivity, and charge with high accuracy and sensitivity. In addition to a built-in \pm 1kV voltage source, the Model 6517A offers temperature and humidity monitoring functions that simplify characterizing devices under a range of environmental conditions. Optional plug-in scanner cards make it easy to monitor multiple signal sources.



The 7½-digit **Model 2010 Low Noise Autoranging Multimeter** gives researchers the precision they need for applications like low level contact resistance testing of connectors. This economical solution combines an extended ohms measurement range (for more precise measurements of low resistances) with a dry circuit test function to prevent punch-through damage to fragile films or oxides. A low power ohms measurement mode minimizes the device self-heating that would otherwise skew test results. The offset compensated ohms function eliminates thermal effects that can introduce errors in low resistance measurements. The Model 2010 also offers the measurement functions common to all Keithley multimeters, like support for characterizing materials or devices over a range of temperatures.



The **Model 2400 SourceMeter®** instrument is a compact, single-channel, DC parametric tester with the resolution and flexibility to handle a wide range of nanotech research applications. Its tightly coupled precision voltage and current sourcing and measurement capabilities have proven invaluable in new materials development and characterization.



Visit www.keithley.com for free, immediate access to more information on any of the products described. In our Document Center, you can download brochures, data sheets, application notes, white papers, specifications, and manuals. While on our site, you can even browse our library of example programs and software drivers, view an online demo of the Model 4200-SCS, or request a copy of the 5th edition of **Low Level Measurements**, our guide to precision DC current, voltage, and resistance measurements.

A greater measure of confidence

With more than a half-century of experience in helping people make demanding measurements, Keithley can offer its nanotechnology customers a greater measure of testing confidence on the production floor, in the QA lab, and in R&D. For more information on how Keithley test solutions can help you explore this new technology, call your local Keithley sales representative or visit our website.

Keithley's applications engineers are here to help.

For applications assistance, call us on our toll-free hotline at **1-888-KEITHLEY (534-8453)** from 8:00 am to 8:00 pm ET (U.S. only). For assistance beyond these hours, send our Applications Engineering Department a facsimile (440-248-6168) or an e-mail message (info@keithley.com) for a prompt response.

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