

Just discovered you need to characterize non-volatile memory (NVM) devices?

Organic electronics such as OLED or OPVC devices?

Need to make more pulsed or ultra-fast I-V measurements in parallel?

No problem—we've got you covered.

The parameter analysis experts at Keithley have bundled all the latest enhancements to the industry's most popular semiconductor parametric analyzer, the Model 4200-SCS Semiconductor Characterization System, into one powerful upgrade. The new Keithley Test Environment Interactive (KTEI) V8.2 software combines NVM test libraries and sample projects with a new method of making capacitance-voltage (C-V) measurements using a patent-pending very low frequency technique. It also supports system configurations with more ultra-fast current-voltage (I-V) test modules than any competitive solution, so you can test even more devices in parallel, increasing your test throughput and reducing time to market.

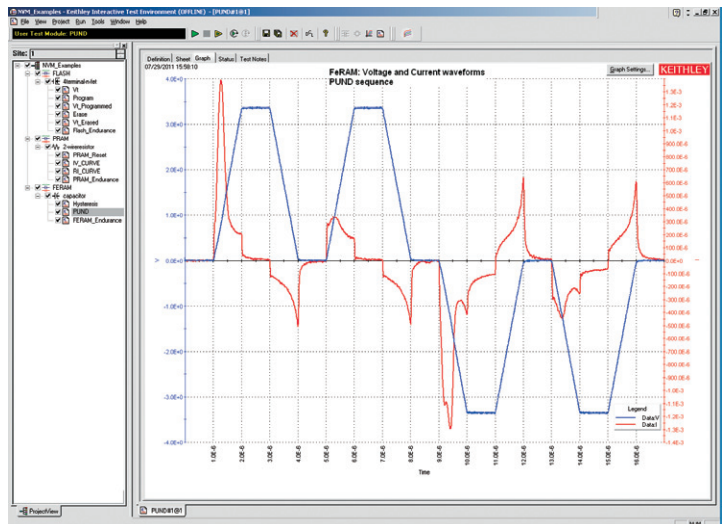
New Non-Volatile Memory Test Libraries

The KTEI V8.2 upgrade expands the Model 4200-SCS's capabilities for testing all types of non-volatile memory devices and materials:

- Flash
- Phase change memory (PRAM or PC-RAM)
- Ferro-electric memory (FeRAM)
- Resistive memory (RRAM or ReRAM)
- Magneto-resistive memory (MRAM)
- Other NVM types

The new NVM test libraries take advantage of the high speed capabilities of the Model 4225-PMU Ultra-Fast I-V Module and the Model 4225-RPM Remote Amplifier/Switch Module, two of the latest additions to the Model 4200-SCS's growing line of optional instrumentation. They support precise sourcing of ultra-fast pulses, as well as accurate measurements of the transient signals produced during testing. Together, they let you perform all the typical characterization routines NVM testing requires with no need for external sense resistors, capacitors, or extra test hardware. Sample projects are included for several memory types to provide the

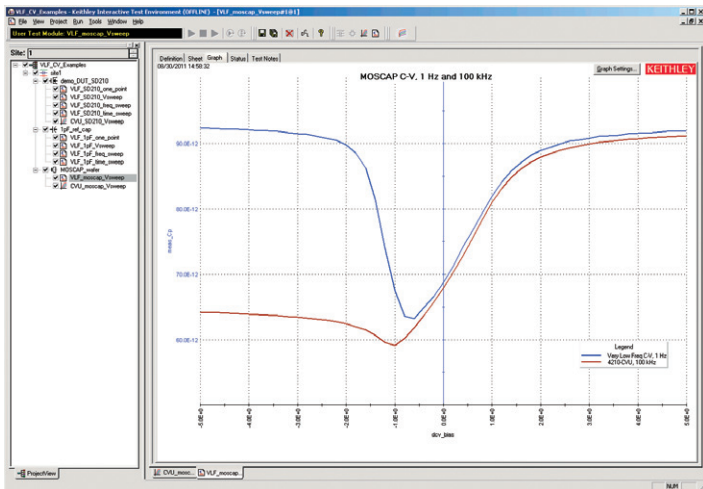
flexibility you need to set up and execute tests quickly, as well as to analyze the data. You can easily modify the examples provided for use with most emerging memory technologies.



The Model 4225-PMU measures voltage and current simultaneously at high speeds over a wide dynamic range. Each Model 4225-PMU module can be equipped with up to two optional Model 4225-RPM Remote Amplifier/Switches, which move the measurement circuitry of the Model 4225-PMU module closer to the DUT to minimize the effects of stray capacitance while providing additional low current measurement ranges. The Model 4225-RPM also provides fast automatic switching between the 4225-PMU and the system's capacitance-voltage (C-V) and DC source-measure units, so you can choose the most appropriate instrument for a particular measurement task without re-cabling.

Very Low Frequency C-V Measurements

Semiconductor R&D typically requires a combination of quasistatic (ramp rate) and high frequency techniques for measuring the capacitance of device structures. However, when applied to devices with too much current flow or leakage, quasistatic C-V has some limitations; for example, parallel resistance cannot be extracted effectively and the results can be quite noisy. A variety of device technologies now require AC-based capacitance characterization at very low frequencies—much lower than the minimum frequency of multi-frequency C-V meters or LCRs. Measuring small capacitances at low frequencies translates to extremely high impedance values, which AC-based measurement instruments often cannot characterize accurately. KTEI V8.2 includes a new patent-pending technique for making very low frequency capacitance-voltage (VLF C-V) measurements that allows measuring device capacitance and resistance at frequencies from 10Hz down to 10mHz.



KTEI V8.2 supports a new very low frequency C-V (VLF C-V) technique that takes advantage of the very low current measurement capability of the system's DC source measurement units (Model 4200-SMU) and low current remote pre-amplifier (Model 4200-PA). It can measure AC impedances from 10mHz to 10Hz with no additional hardware. It's well suited for both MOS device applications and emerging technologies like organic electronics, including organic LEDs (OLEDs), organic FETs (OFETs), and organic photovoltaic cells (OPVCs), thin film transistors (TFTs), and microelectromechanical systems (MEMS).

VERY LOW FREQUENCY C-V (VLF C-V)	
Maximum Units per Chassis:	Requires two SMUs (either Model 4200-SMU or 4210-SMU) and two Model 4200-PA Remote Preamplifiers. Any two SMUs/PAs can be used for a VLF C-V measurement.
Measurement Parameters:	Cp-Gp, Cp-D, Cs-Rs, Cs-D, R-jX, Z-Theta, DCV, frequency, timestamp.
Frequency Range:	10mHz to 10Hz.
Measurement Range:	1pF to 10nF.
Typical Resolution:	3.5 digits, minimum typical 10fF.
AC Signal:	10mv to 3V RMS.
DC Bias:	±20V on the High terminal, minus the AC signal, 1µA maximum.

Specifications are subject to change without notice.

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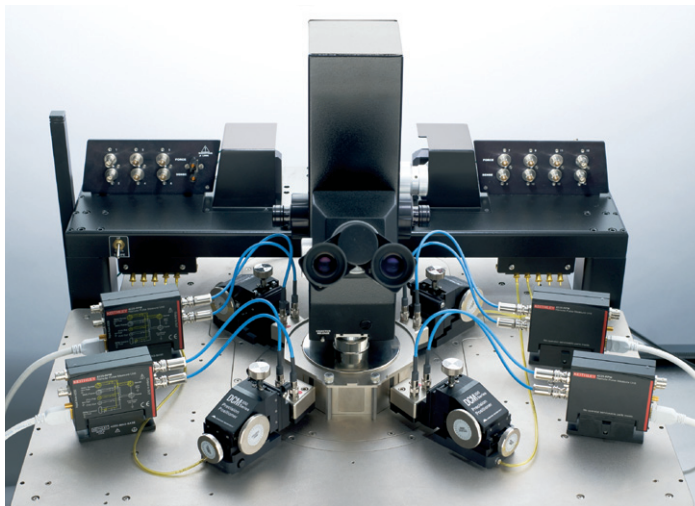


A GREATER MEASURE OF CONFIDENCE

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Extended Support for Ultra-Fast I-V Hardware

Now you can have up to six Model 4225-PMU modules installed in your system's nine-slot chassis. Each module gives you two channels of voltage pulse sourcing (with pulse widths ranging from 60 nanoseconds to DC) and simultaneous current and voltage measurement at acquisition rates of up to 200 megasamples/second (MS/s). This supports system configurations with up to 12 simultaneous ultra-fast I-V channels. As new devices move out of the technology development lab toward production, KTEI V8.2 lets your Model 4200-SCS characterize devices more quickly and supports higher test throughput by testing multiple devices in parallel.



KTEI V8.2 supports Model 4200-SCS system configurations with more ultra-fast current-voltage (I-V) test modules than any competitive solution, so you can test even more devices in parallel, increasing test throughput and reducing time to market. The configuration shown here includes multiple Model 4225-RPM Remote Amplifier/Switch modules with an analytical probe station.

Committed to Protecting Your Test Equipment Investment

Keithley has continually enhanced the Model 4200-SCS's hardware and software ever since its introduction. Our commitment to ongoing system innovation ensures a cost-effective upgrade path, so you'll never have to buy a new parametric analyzer because your old one is obsolete. The Model 4200-SCS is engineered to keep up with the industry's changing test needs, stretching your capital investment further and improving your ROI. As with all Model 4200-SCS software upgrades, Keithley offers a migration path from all previous versions of the system. There's no need to rewrite old tests or projects. Most 4200-SCS systems can be upgraded to KTEI V8.2 simply by loading the software on the free CD available from your sales representative. Any additional instrumentation and other chassis upgrades required can be installed at a factory service depot.

Ready to learn more?

For further details on the Model 4200-SCS's capabilities, download a free copy of our brochure on the system: <http://www.keithley.com/data/asset=4660> or contact your nearest Keithley semiconductor characterization expert.