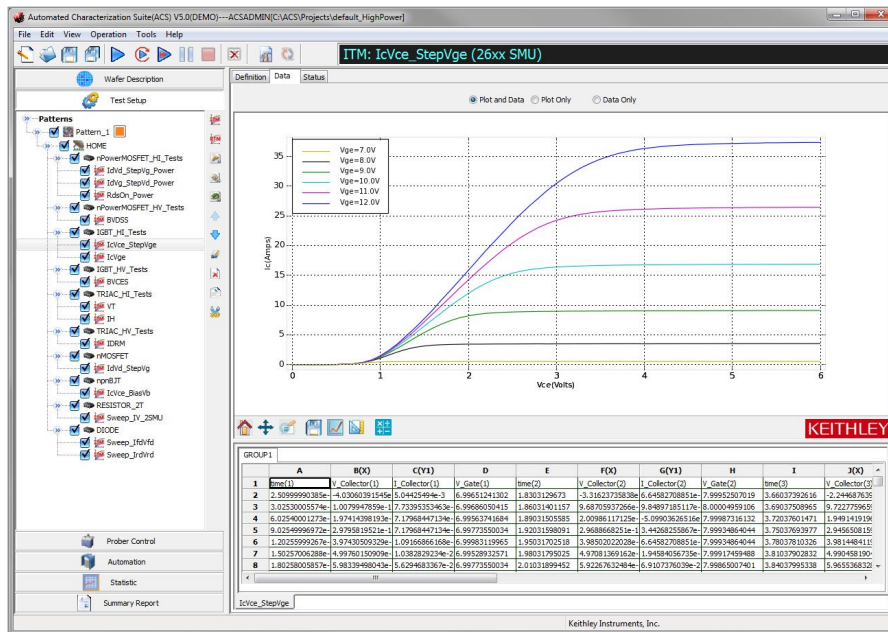




# ACS Automated Characterization Suite Software

## Datasheet



### One Powerful Software Solution—A Wide Range of Hardware Configurations

Keithley's Automated Characterization Suite (ACS) is a flexible, interactive software test environment designed for device characterization, parametric test, reliability test, and even simple functional tests. ACS supports a wide array of Keithley instrumentation and systems, hardware configurations, and test settings, from a few bench-top instruments for use in a QA lab to fully integrated and automated rack-based parametric testers.

ACS offers exceptional testing and analysis flexibility, plus its intuitive GUI helps novice users be productive almost immediately, regardless of their level of programming experience. The GUI simplifies configuring test instrumentation, making I-V measurements, getting results, and analyzing them quickly because no coding is required. Even if you're an infrequent user, you can go from creating a new test setup to characterizing new devices in a fraction of the time required by older test development approaches. Just as important, ACS

provides all the tools you need to set up tests, analyze data, and export your results—without ever leaving the ACS environment.

### Key Features

- Supports a wide array of instruments and probers
- Intuitive GUI simplifies I-V tests, analysis, and results from bench-top to fully automated parametric testers
- Develop and execute tests at the device, site, wafer, and cassette level
- Intuitive GUI for test plan development and interactive operation
- Interactive and real-time data plotting
- Highly portable test projects with minimal or no modifications
- Supports multiple SMUs for parallel testing
- Flexible, modular software accommodates evolving and mature test requirements
- Windows 10 compatible



# ACS: From Lab to Fab

**All Series 2600 SourceMeter®  
SMU Instruments<sup>1</sup>**

**All Series 4200  
Parameter  
Analyzers  
707B Switch  
Mainframe**

**S500  
Integrated  
Test System**

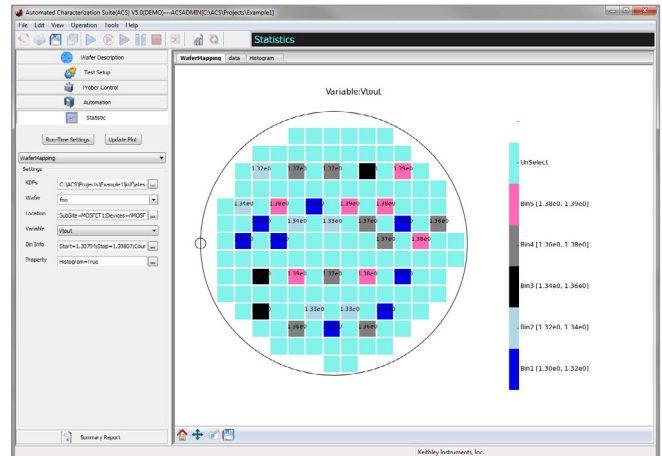
**S530  
Semiconductor  
Parametric  
Test System**

<sup>1</sup> Excludes 2604B, 2614B and 2634B

## Broad Range of Applications

ACS-based Integrated Test Systems are complete solutions for applications such as parametric die sort, high power semiconductor component characterization, and wafer level reliability testing. When paired with appropriate semi-automatic and fully-automatic probe stations, their hardware configurations and test project development can be easily optimized for specific tasks. ACS leverages the on-board test script processors in Series 2600 System SourceMeter SMU instruments into a multi-processor environment that's ideal for true parallel test in both single- and multi-site configurations. This multi-processor environment provides high parallel throughput while speeding and simplifying test project development. Multi-site testing capabilities are embedded throughout ACS from the wafer description utility to the test results output file or binning file, for example:

- Multi-site parallel testing brings the highest possible throughput for both parametric die sort and WLR applications
- Configurable for special applications like MEMS testing
- Easily customize test flows with user access points (UAPs) that execute scripts or call custom utilities



Wafer and binning map tools allow you to browse through the test results on either a wafer-by-wafer or site-by-site basis. You can also overlay traces from multiple sites to make quick comparisons.

## Applications

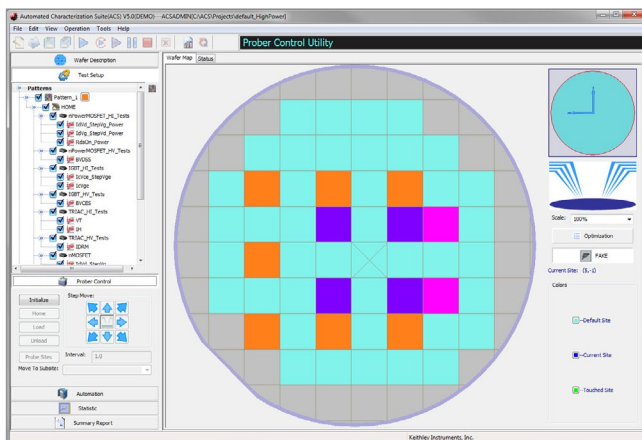
Compatible with emerging and mature testing needs for:

- Component characterization
- Device characterization
- Parametric test
- Reliability test
- Die sort

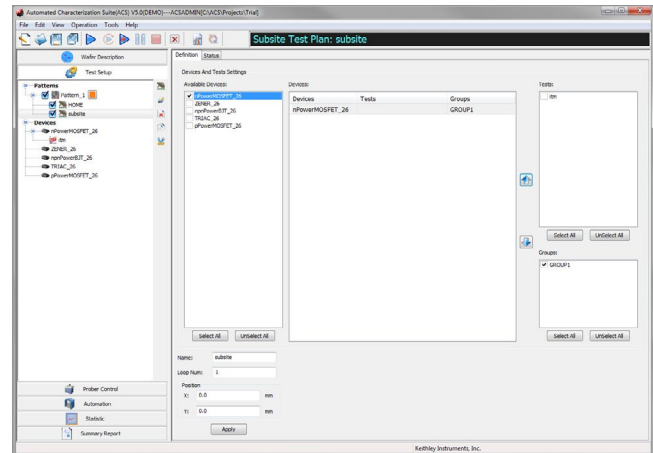
## Flexibility with Programming Preferences for Characterization Applications

There are many alternatives on the market for creating characterization applications, but ACS offers major advantages that competitive solutions can't match, such as a choice of three powerful project development options. With ACS, you can create the tests you need in the way that best suits your application's requirements and your own programming preferences.

- You say you're a researcher and you just need to make a quick test of common parameters and properties on a single device? We've packaged the same tests that our semiconductor customers use to verify their products into **easy-to-use applications libraries**. These libraries help you get the data you need to validate your work quickly so you can get back to your research sooner.
- Need more test development flexibility? Our **interactive test development GUI** lets you select bias and sweep conditions, acquire raw data, then use the built-in formulator tool to extract meaningful results—all without writing code.
- For the ultimate test development flexibility, modify one of the existing test scripts in our applications libraries using the **embedded script editing and debugging tools**.



Interactive probe station control speeds and simplifies test development and debugging by combining interactive testing with manual probe station control.



ACS lets you map devices and tests to sites and subsites, eliminating the need to duplicate each test for each subsite and reducing your test development time significantly.

## Automate Your Data Gathering Processes

Need the throughput advantages of a semi-automatic or fully automatic wafer probe station to get a lot of data fast? The wafer prober automation option for ACS makes it easy to interface a variety of popular probe stations into your test setup. This option includes a wafer description utility (for creating a virtual wafer to use in creating wafer-level sampling plans), real-time wafer maps with binning capabilities (for designating a device's disposition before it's packaged, in die sorting, etc.), a cassette sample plan utility (for designating which wafers are to be tested), and a post-test cassette and wafer review utility (for exploring and comparing test results from multiple wafers interactively).

Many of the tools and capabilities built into ACS enhance automated device characterization:

- Wafer- and cassette-level automation
- Limits file generation tool
- Test results binning, including interactive binning plot
- Test map—map device and tests to sites and subsites
- Interactive probe station control mode
- Real-time plotting
- Single or per-wafer Keithley data file
- SQLite™ database and binning file output options
- Lot summary report generator
- Integrated support for Keithley Series 2600 and Series 2650A High Power System SourceMeter® SMU instruments
- Integrated scripting editor and GUI builder
- Integrated support for C (with Series 4200 Parameter Analyzer only), Python, and Lua (for Series 2600<sup>1</sup>) programming languages

## Share Test Projects and Results

ACS offers a common set of key elements that work across a wide range of hardware configurations, which saves time and increases productivity. Systems perform consistently from one hardware implementation to another, so, for example, it's easy to transfer your knowledge of an ACS-based system used in single-device component characterization to another designed for wafer level testing.

Similarly, test projects and sequences you create for one Keithley ACS hardware configuration will run on compatible setups in other test settings with little or no modification. This portability across a range of configurations reduces the effort involved in transferring a new device from one lab or department to another and simplifies comparing results obtained in various test settings. This is possible because ACS employs common open-standard file interfaces for projects, wafer maps, output files, etc. as well as common test libraries and instrument drivers, which also means you can be confident of high results correlation whether your tests are run on a system with a single Series 2600 SMU instrument or a fully automated custom die sort tool with dozens of these instruments.

## Maximize the Productivity of Your Keithley Hardware

The tools in ACS simplify test development and maximize the speed of each Keithley instrument linked into the system. For example, ACS builds on the throughput advantages inherent in Keithley's newest family of high performance source measurement units, the Series 2600B System SourceMeter® SMU instruments. These advantages include:

- The on-board Test Script Processor (TSP®) technology in each instrument that allows each 2600<sup>1</sup> to operate independently of the ACS system's controller
- The TSP-Link® Technology high speed communications bus used to network multiple Series 2600<sup>1</sup> SMU instruments together
- True parallel test execution
- Precision timing

Together, ACS and Keithley TSP-based hardware offer the highest throughput in the industry to lower the cost of test without requiring you to spend time learning new programming concepts or languages before getting the data needed to accomplish your goals.

## Add More Hardware to Adapt to Changing Needs

High scalability and a flexible architecture simplify configuring an ACS system to match your specific testing requirements or to upgrade an existing system to handle new test needs as they evolve. Our wide range of source-measure and switching capabilities provides a solid foundation for configuring customized applications because ACS software can control virtually any instrument or peripheral with a standard hardware interface. For example, third-party LCR meters can be easily integrated into any ACS system and drivers are available for popular instruments. Also, ACS's integrated scripting environment can control any GPIB instrument the application may require, such as a hot chuck controller.

<sup>1</sup>Excludes 2604B, 2614B and 2634B

Many ACS systems are configured using one or more of Keithley's innovative Series 2600 System SourceMeter SMU instruments, which are optimized for precision sourcing and measurement synchronization to capture high speed events. These systems offer unmatched testing speed and accuracy because they provide an SMU-per-pin architecture. ACS system configurations can support any number from two to more than 40 SMU instruments in a single rack for true parallel characterization applications.

ACS also makes it easy to integrate other types of Keithley hardware into your system to meet specialized test requirements, such as:

- High channel count switching—707B Six-slot Switch Mainframe
- Combination of switching and measurement—Series 3700A Switch/Multimeters
- Higher resolution, lower current, or other capabilities such as C-V or pulse testing—Series 4200 Parameter Analyzer
- 40 V/50 A range (80 V/100 A when connecting two units) of 2651A or 3 kV/120 mA range of 2657A High Power System SourceMeter SMU instruments

## Related Products

For applications requiring wafer level testing, use ACS Integrated Test Systems or ACS Wafer Level Reliability Systems. These systems supply a wafer map, prober automation capabilities, and analysis options for yield monitoring as well as related statistical calculations for maximizing productivity in wafer level test environments.

## ACS V5.3 Pre-installation Software Requirements

### Minimum Configuration for a Computer

<b>Operating System</b>	Windows 7 × 86 (32-bit), or Windows 7 × 64 (64-bit), Windows 10 × 86 (32 bit), or Windows 10 × 64 (64 bit)
<b>CPU</b>	2 cores or higher, 1 gigahertz (GHz) or faster processor or System on a Chip (SoC)
<b>System Memory (RAM)</b>	1 gigabyte (GB) for 32-bit or 2 GB for 64-bit
<b>Hard Disk</b>	16 GB for 32-bit OS 32 GB for 64-bit OS
<b>Graphics Card</b>	DirectX 9 or later with WDDM 1.0 driver
<b>Screen Display</b>	1024 × 768, 32-bit True Color

### Recommended Configuration for a Computer

<b>Operating System</b>	Windows 10 × 86 (32 bit), or Windows 10 × 64 (64 bit)
<b>CPU</b>	4 cores or higher, at least 2 gigahertz (GHz) or faster processor
<b>System Memory (RAM)</b>	2 gigabyte (GB) for 32-bit or 4 GB for 64-bit
<b>Hard Disk</b>	32 GB for 32-bit OS 64 GB for 64-bit
<b>Graphics Card</b>	DirectX 9 or later with WDDM 1.0 driver
<b>Screen</b>	1280 × 1024, 32-bit True Color

## Ordering Information

<b>ACS</b>	Automated Characterization Suite Software
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