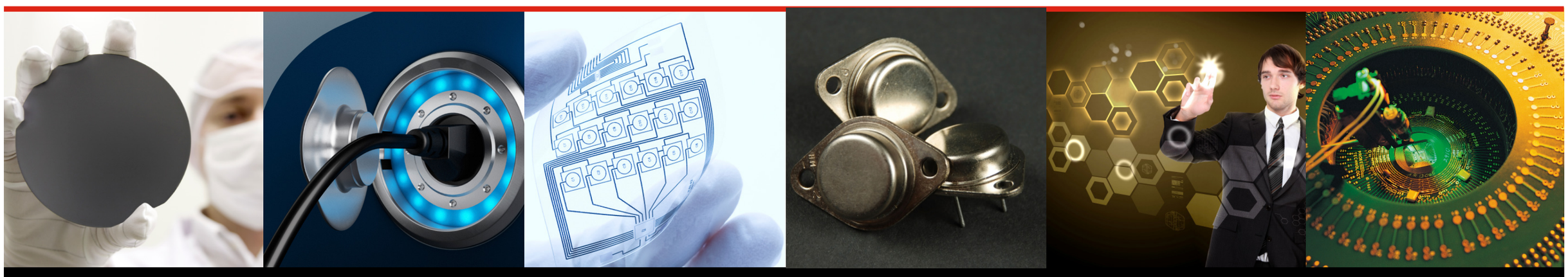


Maximize Speed and Throughput

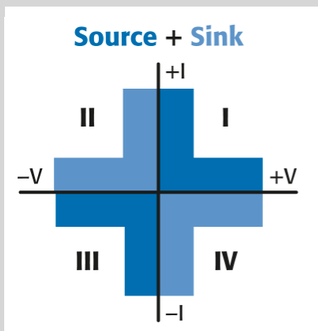
for Semiconductor Measurements Using Source Measure Units (SMUs)

Production Test Die Sort I Wafer Acceptance Test I Reliability I **Package Part** Extreme Measurements I Higher Breakdown Voltage I Lower Leakage Current I Lower On Resistance I Higher Power **Extreme Measurements** I Higher Breakdown Voltage I Lower Leakage Current I Lower On Resistance I Higher Power **New Processes/New Materials** SiC I GaN I Other…

Use a Four-Quadrant SMU Instrument Instead of a Power Supply and Digital Multimeter

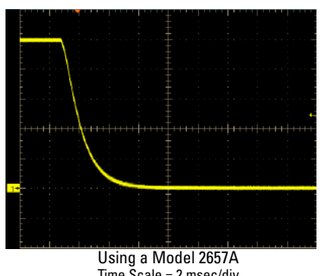
Many semiconductor and electronic device tests involve sourcing a voltage and measuring a current as quickly as possible. Overall test time is a function of charge time, measure time, and discharge time, as well as the time to setup and process the test.

Traditional power supplies can only source voltage or current and cannot sink. But, a four-quadrant SMU instrument can source and sink both voltage and current, while simultaneously measuring voltage, current, or resistance. The SMU instrument's four-quadrant operation speeds up the discharge time by automatically using sink mode to quickly absorb all the charge from the device under test (DUT) and cabling. In additon, by tightly integrating this source and measure capability into one instrument, the need for a separate digital multimeter (DMM) and power supply is eliminated. This improves test times, simplifies overall test system design, and increases usability.

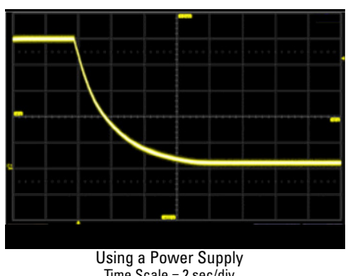


4 Quadrant SMU

2 Quadrant Power Supply



Using a Model 2657A
Time Scale = 2 msec/div
Total discharge time ~ 5 msec

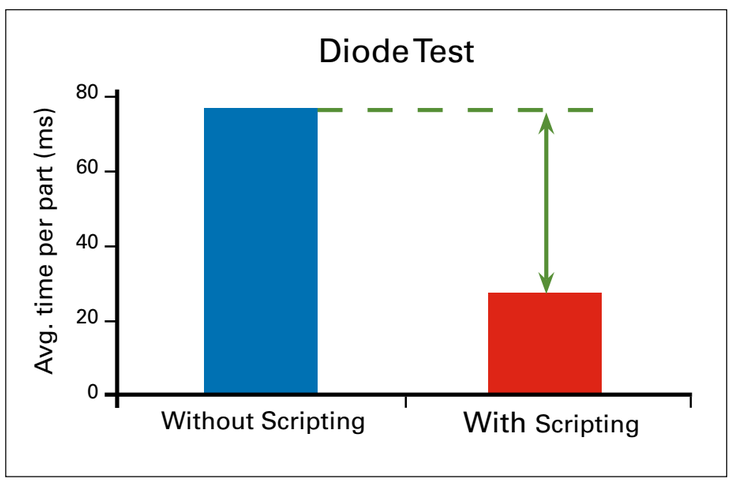


Using a Power Supply
Time Scale = 2 sec/div
Total discharge time > 6 sec

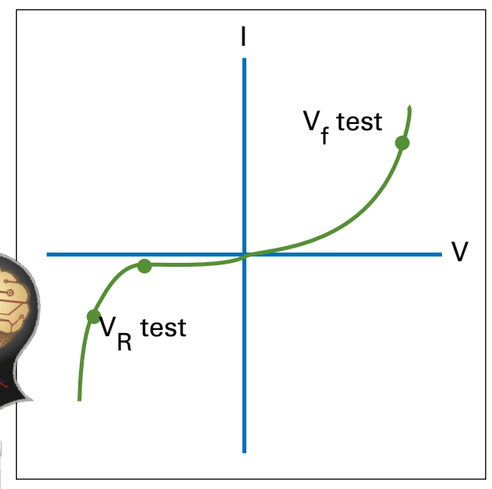
Use Embedded Test Scripts to Minimize Program Execution Time

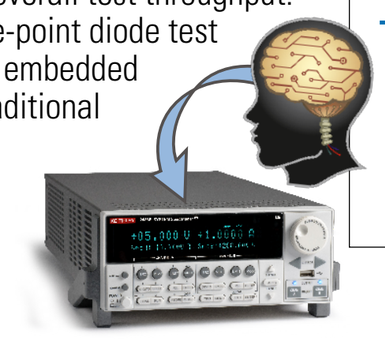
When a typical test program executes from a PC controller, it continually communicates back and forth with the test instrumentation. This communication time, whether it is over GPIB, LAN, USB, or some other protocol, is often one of the largest contributors to slower test times.

Embedded test scripts minimize this communication time by storing and then executing entire test programs directly from the instrument's non-volatile memory. All setup, decision-making, and data storage is now done from inside the instrument itself, independent of the PC.

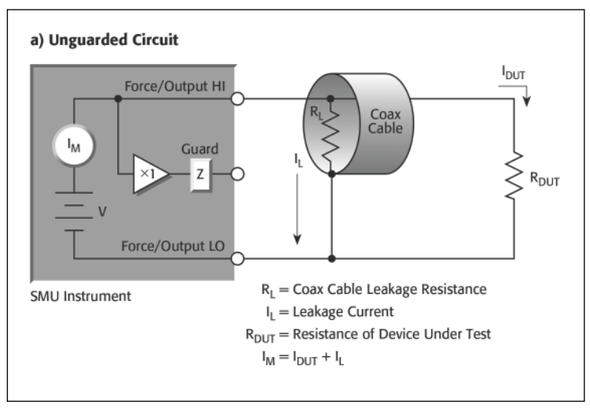


By using embedded test scripts, Keithley's Test Script Processor (TSP®) technology enables dramatic improvements in overall test throughput. For example, a typical three-point diode test runs over 60% faster using embedded test scripts compared to traditional programming techniques.

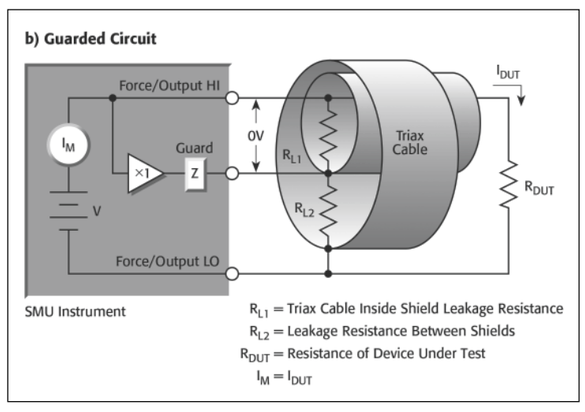




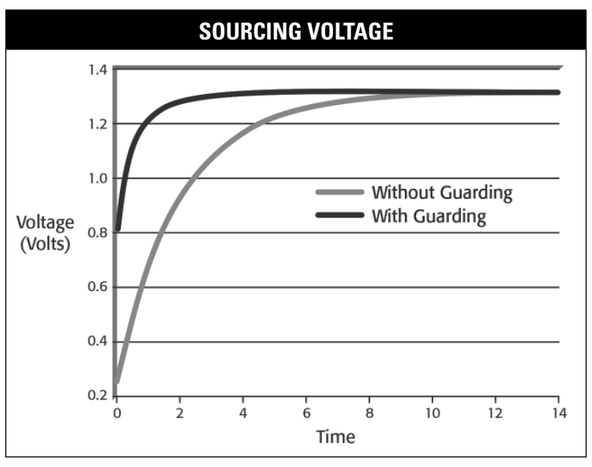
Use Triax Cabling Instead of Coax Cabling

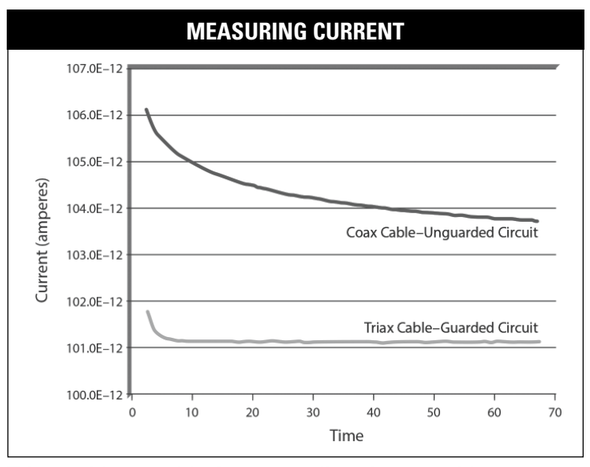


The coax cable's signal to lo resistance causes a parallel current path that slows down settling times and limits the low current resolution of the system.



The extra shield in the triax cable works with the driven guard in the SMU instrument to virtually eliminate the parallel current path. This enables faster settling times and better measurement resolution.





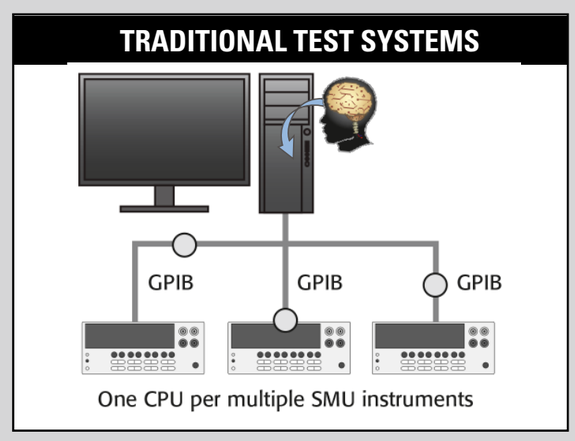
Triax cables enable faster settling times and better resolution when sourcing or measuring.

Test in Parallel with Distributed Control

Implementing parallel test techniques to test multiple devices at the same time maximizes parts tested per prober touch-down or handler index, thus boosting productivity and lowering the cost of test.

In a traditional test system, only one instrument at a time can execute a measurement or communicate with the PC controller. All other instruments in the system sit idle until it is their turn to communicate with the PC controller.

In a distributed test system, the embedded test script (TSP script) is distributed and synchronized across multiple instruments through TSP-Link® technology, a high-speed, SMU-to-SMU communication bus. There is one CPU per SMU instrument, and each SMU instrument works together as a coordinated system. Through the combination of TSP and TSP-Link technologies, measurements are performed in parallel.

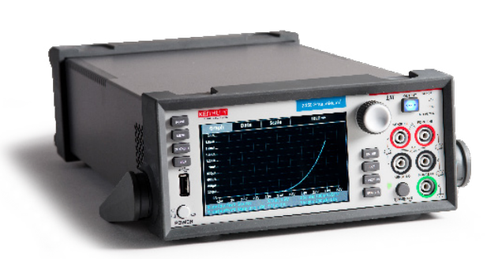


2600B System SourceMeter® SMU Instruments

- Dual- or single-channel models
- Test up to 200V and 10A pulse
- Sub-pA resolution
- TSP and TSP-Link technologies

2650A High Power System SourceMeter® SMU Instruments

- Test up to 3kV and 100A pulse with 200W output power
- 1µsec/point digitizer
- Sub-pA resolution
- TSP and TSP-Link technologies



2450 Advanced Touchscreen SourceMeter® SMU Instrument

- Industry-first 5-inch color capacitive touchscreen GUI
- Test up to 200V and 1A
- Sub-pA resolution
- TSP and TSP-Link technologies

2400 SourceMeter® SMU Instruments

- Test up to 1100V and 10A pulse
- Choose from over ten models
- pA resolution
- Entry-level price point

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