

Greater Reliability Testing Confidence from Lab to Fab

Wafer Level Reliability Test Solutions



Keithley Instruments has long been an industry leader in both overall parametric test technology and wafer level reliability (WLR) testing.

Several generations of Keithley's parametric test solutions have offered WLR test algorithm libraries as options. That gives us decades of experience in creating integrated hardware and software solutions for emerging test needs in device characterization, semiconductor parametric test, and electrical parametric process monitoring. Plus, our years of working with WLR users at every technology node have given us an in-depth understanding of the changing needs associated with reliability testing.



Key Applications

- **Device Reliability**
 - Hot Carrier Injection (HCI)
 - Negative Bias Temperature Instability (NBTI)
 - Positive Bias Temperature Instability (PBTI)
 - Ultra-Fast BTI
- **Gate Oxide Integrity**
 - Time Dependent Dielectric Breakdown (TDDB)
 - Voltage Ramp (VRAMP)
 - Current Ramp (JRAMP)
 - High voltage GOI
- **Metal Interconnect**
 - Isothermal Electro-migration (EM)
 - Poly Heater Constant Current
 - Interlayer Dielectric Time Dependent Dielectric Breakdown (ILD TDDB)

To learn more about WLR solutions, please visit tek.com/keithley-semiconductor-test-systems

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Keithley WLR Solutions

ULTRA-FAST BTI SOLUTIONS	SMU PER PIN PARALLEL SOLUTION	CUSTOMIZED SOLUTION
<p>BTI test is a fast phenomenon that requires ultra-fast and sensitive measurements for accurate characterization.</p>	<p>Most reliability tests require a lot of time. ACS WLR SMU-per-pin systems provide high-throughput, parallel device capability for WLR.</p>	<p>Configure your system to optimize your WLR testing.</p>
		
<p>4200A-SCS Parameter Analyzer</p> <ul style="list-style-type: none"> Remote pulse pre-amplifiers: 4225-RPM Remote Amplifier/Switches Transistor VT characterization in less than 1 μs using ID-VD sweep method NBTI Electro-migration Hot Carrier Injection TDDB VRAMP, JRAMP Sub-site cycling with AC or DC stressing Includes reliability projects 	<p>SMU-per-pin System</p> <ul style="list-style-type: none"> SMU Series 2600B-based system Proprietary TSP-Link[®] technology to enable fast testing More than 40 SMUs in a single rack True parallel test for multiple devices 	<p>Customized System Includes:</p> <ul style="list-style-type: none"> 4200A-SCS Parameter Analyzer – SMU, PMU, CVU, PGU Series 2600B Series – High speed SMU 707B Switch Matrix Mainframe – Precision matrix cards 7174A, 7530 2450, 2460 Source Measure Units 3706 Switch Matrix
 <p>4200A-BTI-A Ultra-Fast Solution</p> <ul style="list-style-type: none"> ACS Software with wafer mapping on-the-fly Ultra-fast BTI test module BTI degradation characterized 30 nano-seconds after stress 		

Key Specifications

ACS WLR

- Supports high power device Vds Ramp and HTRB test
- Fully-automated capabilities to test individual wafers or an entire cassette
- Software for flexible test setup and parallel testing
- Reliability test module (RTM) complies with JEDEC standard test methodologies
- Supports creation of customized test module/procedures

4200A-SCS Parameter Analyzer

- Lab grade semiconductor parameter analyzer
- Optional 4200-BTI-A Package
- 200 V, 1 A max – Source Measure Unit (SMU) Instrument
- Ultra-low current measurement: 10 nA current resolution - Preamp
- Ultra-fast measurement during pulse: 5 nsec time resolution for measurement - pulse measure unit (PMU)
- 1 kHz to 10 MHz multi-frequency – capacitance-voltage measurement unit (CVU)

Series 2600B High-Speed SMU Instrument

- 3 kV max
- 10 A max pulse mode / 3 A max DC
- TSP-Link Technology – Synchronize between SMUs / Multiple SMUs function as one instrument

707B/7174A/7530 High Speed and Low Current Matrix

- Low leakage (<100 fA offset on all signal paths)
- High speed (<4 msec switching time)
- 200 V, 2 A carry signal
- 8x12 configuration per card
- Max 6 matrix cards – up to 72 pins

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