



61000A
Semiconductor Device Analyzer

Setup Name: Id-Vg Wg: 10.0 um

Priority: High Lg: 100 nm IdMax: 10.0 mA

Temp: 25.0 deg

Extended Setup

Drain: SMU1:HP Vd: 2.00 V

Secondary Sweep

Subs: SMU3:HR

VsubsStart: 0 V

VsubsStop: -1.00 V

VsubsStep: -200 mV

Source: SMU2:HP

Count: 0

Device ID: TR WQ5339

My Favorite Setup

Engineer #1

- C-V Sweep
- Id-Vg
- MPSMU 1nA Med
- Simple Vth
- Charge Pumping

Remarks

Count	Device ID	Remarks
1	TR WQY717	Good device
	TR WQ4023	
	TR WQ5339	

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SEMICONDUCTOR PARAMETRIC TEST, FLAT PANEL DISPLAY TEST

Parametric Tester	614
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Modular Source Monitor Unit Series	626
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Parametric Tester

614

4080 Series

4082A
4082F
4083A

- Accurate and reliable DC current and voltage measurement with 1 femtoamp and 0.1 microvolt measurement resolution capability
- Synchronous parallel test capability
- Optional asynchronous parallel test capability by the Virtual Multiple Testhead Technology
- An optional high-speed capacitance measurement unit (HSCMU) for high-throughput capacitance measurement
- Flash cell write/erase endurance testing via integrated high-voltage semiconductor pulse generator units (HV-SPGUs) with -40 V to +40 V (80 V peak-to-peak) output capability (4082F and 4083A)
- RF S-parameter measurement at up to 20 GHz with support for an optional 8 x 10 RF switching matrix (4083A only)
- Software compatibility to Agilent 4070 Series
- Support for low-cost Linux workstations
- Full compliance with SEMI factory automation standards E5 (SECS II), E30 (GEM), E87 (CMS), E39 (OSS), E40 (PMS), E90 (STS) and E94 (CJM)



New Wafer Fabs Face Increased Measurement Challenges

The parametric testing challenges facing new wafer fabs are intensifying, and they will continue to intensify into the future. The need to make accurate and reliable DC voltage and current measurements remains very important. However, parametric test has moved away from the realm of pure DC measurement and has branched out into many new directions. Parametric test now spans a variety of different types of measurements including parallel test, Flash cell testing, and RF S-parameter characterization. Wafer fabs running advanced processes require a more versatile and flexible platform to adequately meet this broad spectrum of parametric measurement challenges.

A Family of Solutions that Meets Both Basic and Advanced Measurement Needs

Building on the well-proven parametric test capabilities of the industry-standard Agilent 4070 Series, the Agilent 4080 Series of Parametric Testers are modular and expandable production test platforms with the capabilities to meet all of the parametric characterization challenges posed by the most advanced semiconductor processes. Besides having a flexible configuration at time of purchase, each 4080 platform also has the ability to easily add new testing capabilities if your measurement needs change. All members of the 4080 Series can also run existing 4070 test algorithms with little or no modification, which minimizes transition costs while ensuring that your new capital investment is protected for many years into the future. The 4080 Series consists of three products optimized for different market needs. The 4082A is focused on high-speed general-purpose parametric test; the 4082F is focused on parametric test of Flash memory processes; the 4083A is focused on the evaluation of high-speed semiconductor processes.

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4082A
4082F
4083A

	4082A Parametric Test System	4082F Flash Memory Cell Parametric Test System	4083A DC/RF Parametric Test System
Standard Resources			
MPSMU (up to 8)	10 fA and 2 μ V resolution 100 V and 100 mA maximum output	10 fA and 2 μ V resolution 100 V and 100 mA maximum output	10 fA and 2 μ V resolution 100 V and 100 mA maximum output
HPSMU (up to 2)	10 fA and 2 μ V resolution 200 V and 1 A maximum output	10 fA and 2 μ V resolution 200 V and 1 A maximum output	10 fA and 2 μ V resolution 200 V and 1 A maximum output
HRSMU (up to 2)*	1 fA and 2 μ V resolution 100 V and 100 mA maximum output	1 fA and 2 μ V resolution 100 V and 100 mA maximum output	1 fA and 2 μ V resolution 100 V and 100 mA maximum output
HV-SPGU (up to 5)	—	–40 V to +40 V output (80 V peak-to-peak) 20 ns transition times 2-level and 3-level pulses	–40 V to +40 V output (80 V peak-to-peak) 20 ns transition times 2-level and 3-level pulses
GNDU	1.6 A @0 V	1.6 A @0 V	1.6 A @0 V
Optional Integrated Resources			
3458A DVM	0.1 μ V resolution* 1 μ V resolution	0.1 μ V resolution* 1 μ V resolution	0.1 μ V resolution* 1 μ V resolution
HSCMU (up to 1)	1 fF to 100 nF measurement range 1 kHz to 2 MHz frequencies	1 fF to 100 nF measurement range 1 kHz to 2 MHz frequencies	1 fF to 100 nF measurement range 1 kHz to 2 MHz frequencies
E4980A LCR Meter	1 fF to 100 nF measurement range 1 kHz, 10 kHz, 100 kHz, and 1 MHz frequencies	1 fF to 100 nF measurement range 1 kHz, 10 kHz, 100 kHz, and 1 MHz frequencies	1 fF to 100 nF measurement range 1 kHz, 10 kHz, 100 kHz, and 1 MHz frequencies
E8362B PNA Network Analyzer	—	—	10 MHz to 20 GHz
DC Switching Matrix (12 to 48 output pins) Plus one pin for prober chuck connection		2 active-guarded shielded low-current paths (non-Kelvin)* 6 full Kelvin active guarded paths 8 auxiliary input ports 48 extended path inputs 48 full Kelvin active guarded outputs	
HF Switching Matrix	Configurable as one 3 x 48 or two 3 x 24 matrices Pulse switch	Configurable as one 3 x 48 or two 3 x 24 matrices Pulse switch	Configurable as one 3 x 48 or two 3 x 24 matrices Pulse switch
RF Switching Matrix	—	—	8 x 10 configuration 20 GHz bandwidth

* Requires ultra low-current matrix cards

Accessories

The Agilent 4080 Series testers are system products and do not have accessories as do instrument products. They must be configured in consultation with an Agilent sales professional specializing in these products.

Key Literature & Web Link

www.agilent.com/see/4080

Ordering Information

The Agilent 4080 Series testers are system products and must be configured in consultation with an Agilent sales professional specializing in these products.

Parametric Tester

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4070 Series

4072A
4073A
4072B
4073B
4075
4076

- **Standards-based family with broad feature-set – All members of the 4070 Series family provide complete DC parametric test capability, including Flash memory cell testing, capacitance versus voltage (CV) measurement and ring oscillator evaluation. Additionally, you can integrate all models into your SECS/GEM compatible 300 mm automated factory environment**
- **Laboratory test capabilities now available for production test – Until now, the precise current and voltage measurement resolution needed for advanced 65 nm processes have been available only in a laboratory environment. The Agilent 4070 Series enables you to measure sensitive device parameters during production test**
- **Improved throughput and lowered cost of test – In the Agilent 4070 Series, the high-speed capacitance measurement unit (CMU) is integrated into the test head, enabling you to make extremely fast capacitance measurements in the 1 KHz to 2 MHz frequency range**
- **Ultimate flexibility in testing ultra thin oxide structures – The Agilent 4070 Series supports both HFCV and RFCV techniques, which allows users to choose the best method to characterize CV behavior that fits both their process technology and production test needs**
- **Accurate testing for high-speed devices – The Agilent 4070 Series supports RF S-parameter measurement (PNA) to accurately characterize these types of high-speed devices**
- **Ultra short-pulsed measurement capability eliminates thermal effects – The Agilent 4070 Series provides ultra short-pulsed IV measurements down to 10 nanoseconds, which enables characterization of highly thermally sensitive devices such as silicon-on-insulator (SOI) transistors and/or charging effect sensitive high-k transistors**



With Moore's Law driving the evolution of ever-smaller transistor device structures, and new breakthroughs leading to ever-greater circuit densities, semiconductor manufacturers must perform a larger variety of parametric measurements, and also measure many parameters to greater levels of accuracy, in production. Agilent has responded to these challenges with the Agilent 4070 Series, which offers the widest range of solutions and price-performance points available today for production parametric test systems. The 4070 Series provides the DC and RF measurement capabilities needed to test the today's advanced process technologies.

Specifications

Product	DC Parametric Test	Flash Cell Testing	Ring Oscillator Evaluation	1 fA Current Measurement Resolution	High-Speed Capacitance Measurement (to 2 MHz)
4072A	S	A	A	N/A	N/A
4073A	S	A	A	S	N/A
4072B	S	A	A	N/A	S
4073B	S	A	A	S	S
4075	S	A	A	N/A	A
4076	S	A	A	S	A

S = Standard Feature A = Available Feature N/A = Not Available

In addition to the above, the Agilent 4075 and 4076 have the following features available as options:

- RF S-parameter/RFCV Measurement up to 20 GHz via integrated Agilent PNA
- High-frequency CV Measurement (up to 110 MHz) via integrated Agilent Impedance Analyzer
- Pulsed IV measurement down to 10 ns via integrated Agilent Pulse Generator and Agilent Oscilloscope

Accessories

The Agilent 4070 Series testers are system products and do not have accessories as do instrument products. They must be configured in consultation with an Agilent sales professional specializing in these products.

Key Literature & Web Link

The Agilent 4070 | 300 Total Parametric Measurement Solution, p/n 5988-3842EN

www.agilent.com/see/4070

Ordering Information

The Agilent 4070 Series testers are system products and must be configured in consultation with an Agilent sales professional specializing in these products.

- **Up to 40 SMU Channels for Array Structure Test** – In addition to the existing Agilent Parametric Tester measurement resources, the N9201A can provide up to 40 additional SMUs to support massive parametric testing of Array structures
- **Up to 32 bit Address Generation Function** – The N9201A has an address generation function capability (supporting address decoders, shift registers, etc.) for active array test structure testing
- **Concurrent parametric test capability** – The N9201A can work concurrently with an Agilent parametric test system. This permits the simultaneous use of both N9201A and Agilent parametric test system measurement resources



Parametric Tester for Fast Yield Ramp Up

The decreasing size on integrated circuits (90 nm and smaller) is driving the need for new parametric test capabilities. These capabilities must accommodate the advanced test structures developed for fast yield ramp up in process integration as well as process monitoring in semiconductor manufacturing.

High throughput measurement of high volume parametric data is required to shorten the time for ramping up the process yield. This is accomplished by statistically analyzing and correcting the cause of wide range of process performance variation across a 300 mm wafer. Advanced test structures, addressable array test structures that contain address decoder circuitry and a large number of test array elements with fewer probing pads and silicon area, have been developed by major semiconductor manufacturers for this purpose.

Providing Array Structure Parametric Test for Agilent Parametric Testers

The Agilent N9201A Parametric test Option offers high throughput parametric measuring capability for a variety of addressable array test structures (e.g. passive arrays, active arrays, etc.) with synchronized mixed operation of DC SMUs and digital outputs. Digital outputs (parallel, serial, or clock signals) are used for the address decoder that is built into addressable array test structures. This allows the selection of the specific array element to be measured. DC SMUs measure the DC voltage and current parameters of selected array elements.

A DC power source is used for applying the power supply voltage (V_{dd}) to the address decoder logic circuitry that is built in the addressable array test structures. The N9201A is able to provide maximum 48 signal lines. This is accomplished by combining DC SMUs, Digital outputs and a DC power source to the test structures through the test head of the 4072A/B, 4073A/B, 4075, and 4076 parametric tester and probe card.

Specifications

Measurement Functions

DC Current, DC Voltage, Digital Output

DC Measurement

Measurement Unit

High Speed MPSMU (Medium Power SMU)

8 SMUs (minimum), increment of one SMU channel up to 40 SMUs (maximum)

(Maximum total signal channels of SMUs, Digital outputs and DC power supply is 48)

Range of Operation: -42 V to 42 V

-200 mA to 200 mA

Minimum Resolution: 100 μ V, 5 pA

Maximum Voltage between Common and Ground: \pm 42 V

Ground Unit (GNDU) Specification

Output Voltage: 0 V \pm 100 μ V

Maximum sink current: 0.5 A

Output terminal/connection: Triaxial connector, Kelvin (remote sensing)

High Speed MPSMU Specification

Specified at the connector of equipment's front panel

Accessories

The N9201A Array Structure Parametric Test Option is a system product option and does not have accessories as do instrument products. It must be configured in consultation with an Agilent sales professional specializing in these products

Key Literature & Web Link

Agilent N9201A Array Structure Parametric Test Option Data Sheet, p/n 5989-5747EN

www.agilent.com/see/parametric

Ordering Information

The N9201A Array Structure Parametric Test Option is a system product option and must be configured in consultation with an Agilent sales professional specializing in these products.

Note: You must have a 4070 Series parametric test system (4072A/B, 4073A/B, 4075, or 4076) in order to use the N9201A.

- **Integrated switching matrix, probe card interface, and probe card:** Enables automation of wafer characterization without compromising the 1 fA measurement performance of the semiconductor parameter analyzer
- **B2200 and B2201 switching matrices have 8 triaxial and 6 coaxial inputs:** Allows utilization all of the measurement resources of the semiconductor parameter analyzer
- **Atto sense unit (ASU):** Easy to switch between CV and IV measurements; no need to physically change cabling or move to a different probe station; 100 attoamp (0.1 femtoamp) resolution
- **Complete, integrated solution:** Simpler, less expensive alternative that is optimized for use in wafer characterization environments



Integrated Parametric Measurement Solutions that Do Not Compromise Performance

Engineers and scientists working on current and future semiconductor process technologies frequently require an efficient means to characterize wafers with high accuracy in a low-volume test environment. The Agilent 41000 Series or integrated parametric analysis and characterization environment (iPACE) provides an effective solution to meet this challenge.

The 41000 Series solution solves the most common challenges facing parametric instrument users who require high-resolution 1 fA performance all the way to the interface of the probe card needle and the wafer. Four standard 41000 Series configurations come pre-racked and cabled. Two are positioner-based solutions and two include a new high-performance switching matrix with a new probe card interface. These integrated solutions eliminate the tedious and confusing job of racking, cabling, and verifying the performance of parametric instruments.

With the 41000 Series' advanced switching matrix users can perform 1 fA, low-volume capacitance versus voltage (CV) characterization and current versus voltage (IV) characterization of wafers in development lab environments. There is also support for full Kelvin measurements using 4 SMUs or CV measurements, using the same setup.

Advanced switching matrix and probe card technology enable Agilent to initially offer two probe card-based solutions, in 1 fA and 10 fA measurement performance versions. Each standard configuration also allows users to add a wide range of options. All versions of the 41000 Series can also support CV measurement using an optional capacitance meter (initially the Agilent E4980A, with others to be added later).

The Agilent 41000 Series offers a new solution that fills the gap between expensive production-level testers and the low performance, user-created instrument solutions.

1 fA Measurements through a Switching Matrix

The Agilent 41000 Series allows engineers and scientists doing wafer characterization in development lab environments to make highly accurate measurements through a switching matrix and probe card without any compromise in the performance of their semiconductor parameter analyzers. Resolution of 1 fA is maintained all the way to the interface of the probe card needle and the wafer.

The new B2200 and B2201 low-leakage switching matrices, which form the core of the 41000 Series solution, enable respective measurements of 1 fA and 10 fA to be made through them. When combined with the B2220 probe card interface and Agilent's advanced low-leakage probe card expertise, this unequalled measurement performance allows the full measurement potential of semiconductor parameter analyzers (4155C, 4156C, or E5270B) to be realized. This integration eliminates the arduous task of building a custom instrument solution and ensures that the performance standards of the parameter analyzer are maintained.

Support for CV and IV Measurements through Positioners

Prior to the introduction of the 41000 Series, switching between CV and IV measurements using positioners required manual disconnection and reconnection of the parameter analyzer cables and C meter cables. The 41000 Series' patented E5288A atto-sense and switch unit (for the E5270B parameter analyzer) and the B2200/B2201 switching matrices enable you to switch between CV and IV measurements simply by issuing a few software commands.

Support for Full Kelvin Measurements using 4 SMUs

The switching matrices have 14 inputs (8 triaxial and 6 coaxial). Each input corresponds to a unique internal path, which offers the highest level of flexibility by eliminating the need to multiplex inputs. The 8 triaxial inputs support full Kelvin measurements (force and sense) using 4 SMUs. Two dedicated coaxial inputs are available for CV measurements on the same setup while the 4 remaining coaxial inputs provide flexibility for future expansion. This level of automation dramatically increases test efficiency.

Support for CV Measurements with Built-in Compensation

Models 200, 300 and 400 of the 41000 Series use the B2200 and B2201 switching matrices, which have built-in compensation features for CV measurement data.

Specifications

Current Measurement Resolution (Model 100): 0.1 fA (100 aA)

Current Measurement Resolution (Model 200, 300): 1.0 fA

Current Measurement Resolution (Model 400): 10.0 fA

Voltage Measurement Resolution

(All 4155C and 4156C option-based Models): 0.2 μ V

Voltage Measurement Resolution

(All E5270B HRSMU and MPSMU option-based Models): 0.5 μ V

Probe Card I/F Pins: 24 or 48

Kelvin Channels: 0 to 4

C Measurement (Optional): 1 MHz (E4980A)

Options

41000 Model 100: Ultra-Precision (0.1 fA/0.5 μ V) CV/IV Measurement

41000 Model 200: Ultra-Precision (1 fA/0.5 μ V) CV/IV Measurement

- Analyzers option (4155C, 4156C and E5270B)

- E4980A C Meter (optional)

- PDU/EMO (optional)

41000 Model 300: 1 fA/0.5 μ V General Purpose CV/IV Measurement

- Analyzers option (4156C or E5270B) Model 400 only

- Probe Card I/F Pins (24 or 48)

- Kelvin channel numbers (0-8)

- E4980A C Meter (optional)

- PDU/EMO (optional)

41000 Model 400: 10 fA/0.5 μ V General Purpose CV/IV Measurement

- Analyzers option (4155C, 4156C or E5270B) Model 400 only

- Probe Card I/F Pins (24 or 48)

- Kelvin channel numbers (0-8)

- E4980A C Meter (optional)

- PDU/EMO (optional)

Accessories and Cables

All necessary accessories and cables are included with each model of the 41000.

Key Literature & Web Link

Measurement Solutions without Compromise Brochure,

p/n 5989-1434EN

Agilent 41000 Models 100, 200, 300 and 400 Integrated Parametric

Analysis and Characterization Environment (iPACE) Technical Overview,

p/n 5989-2319EN

Ordering Information

The Agilent 41000 has a complex configuration and should be configured in consultation with an Agilent sales professional familiar with these products.

4155C

- Set measurement and/or stress conditions
- Control measurement and/or stress execution
- Perform arithmetic calculations
- Display measured and calculated results on the LCD display
- Perform graphical analysis
- Store and recall measurement setups, and measurement and graphical display data
- Dump to printers or plotters for hardcopy output
- Perform measurement and analysis with built-in instrument BASIC
- Self test, Auto calibration



The 4155C Semiconductor Parameter Analyzer provides cost-effective, accurate laboratory bench top parameter analyzers for advanced device characterization. The low-current and low-voltage resolution and built-in quasi-static CV measurement capability of the 4155C provide a firm foundation for future expansion with other measurement instruments. The 41501B Expander can extend your capabilities to 1 A/200 V as well as supporting dual pulse generator units (PGUs) and a 1.6 A ground unit.

The 4155C offers all-in-one packaged solutions with Agilent's PC-based Parametric Analysis and Characterization Environment. Standard configurations include a parameter analyzer, Agilent Desktop EasyEXPERT Software, and a notebook PC controller with Windows XP™ Professional operating system. Desktop EasyEXPERT Software provides a new, more intuitive task-oriented approach to device evaluation.

Specifications

General Features

- Cost-effective, accurate laboratory bench top parameter analyzer
- 4 x Medium-power SMU, 2 x VSU and 2 x VMU
- Fill-in-the-blanks front panel operation
- Includes Desktop EasyEXPERT Software for PC-based GUI instrument control

Measurement Capabilities

- 10 femtoamp and 0.2 microvolt measurement resolution
- QSCV, Stress Mode, Knob-sweep, and Stand-by functions
- ± 200 Volts and ± 1 Amp High-Power SMU, Pulse Generator capabilities available by optional 41501B

Desktop EasyEXPERT Software Capabilities

- An innovative task oriented approach user interface
- Easy test automation with built-in semi-automatic prober drivers
- Test sequencing without programming via Quick Test mode
- A Classic Test mode to provide the look, feel, and terminology of the 4155/4156 interface
- Intuitive GUI-based switching matrix control for the B2200A, B2201A, and E5250A (optional)

SMU Measurement Range

Voltage: 2 μ V/200 V*

Current: 10 fA/1 A*

SMU Measurement Resolution

Voltage: 2 μ V

Current: 10 fA

SMU Measurement Accuracy

Voltage: 700 μ V

Current: 3 pA

SMU Pulse Width

500 μ s/100 ms

VMU

Resolution: 2 μ V

Accuracy: 200 μ V

VMU (differential)

Resolution: 0.2 μ V

Accuracy: 10 μ V

Dual High Voltage Pulse Generator

Voltage Range: ± 40 V

Output Current: ± 200 mA

Minimum Pulse Width: 1 μ s

Minimum Pulse Period: 2 μ s

Accessories and Cables

N1254A-100 Ground Unit to Kelvin Adapter

16442B Test Fixture

16494A-001/002 Triaxial Cable (1.5 meter/3 meter)

Key Literature & Web Link

Expand Your Parametric Test Horizons Brochure, p/n 5989-0932EN

Agilent 4155C Semiconductor Parameter Analyzer Data Sheet,

p/n 5988-9238EN

www.agilent.com/see/parametric

Ordering Information

You must specify either 1.5 m or 3.0 m length for the included accessory cables

You can delete the Windows-based PC controller by specifying option 020; however, the Desktop EasyEXPERT Software is still included with the product

The Agilent 41501B expander box can be ordered with the following options:

1 HPSMU, 2 MPSMUs, or no additional SMUs

2 PGUs or no PGUs

1.6 A ground unit (GNDU) – Standard with all 41501B units

* The 200 V and 1 A ranges are available when using the Agilent 41501B with the HPSMU option.

- Set measurement and/or stress conditions
- Control measurement and/or stress execution
- Perform arithmetic calculations
- Display measured and calculated results on the LCD display
- Perform graphical analysis
- Store and recall measurement setups, and measurement and graphical display data
- Dump to printers or plotters for hardcopy output
- Perform measurement and analysis with built-in instrument BASIC
- Self test, auto calibration



The 4156C Precision Semiconductor Parameter Analyzer provides highly accurate laboratory bench top parameter analyzers for advanced device characterization. The superior low-current and low-voltage resolution and built-in quasi-static CV measurement capability of the 4156C provide a firm foundation for future expansion with other measurement instruments. The 41501B Expander can extend your capabilities to 1 A/200 V as well as supporting dual pulse generator units (PGUs) and a 1.6 A ground unit.

The 4156C offers all-in-one packaged solutions with Agilent's PC-based Parametric Analysis and Characterization Environment. Standard configurations include a parameter analyzer, Agilent Desktop EasyEXPERT Software, and a notebook PC controller with Windows XP™ Professional operating system. Desktop EasyEXPERT Software provides a new, more intuitive task-oriented approach to device evaluation.

Specifications

General Features

- Highly accurate laboratory bench top parameter analyzer for advanced device characterization
- 4 x High-resolution SMU, 2 x VSU and 2 x VMU
- Fill-in-the-blanks front panel operation
- Includes Desktop EasyEXPERT Software for PC-based GUI instrument control

Measurement Capabilities

- 1 femtoamp and 0.2 microvolt measurement resolution
- Full Kelvin; force, sense and guard connection for each SMU
- QSCV, Stress Mode, Knob-sweep, Stand-by function
- ±200 Volts and ±1 Amp High-Power SMU, Pulse Generator capabilities available by optional 41501B

Desktop EasyEXPERT Software Capabilities

- An innovative task oriented approach user interface
- Easy test automation with built-in semi-automatic prober drivers
- Test sequencing without programming via Quick Test mode
- A Classic Test mode to provide the look, feel, and terminology of the 4155/4156 interface
- Intuitive GUI-based switching matrix control for the B2200A, B2201A, and E5250A (optional)

SMU Measurement Range

Voltage: 2 μ V/200 V*

Current: 1 fA/1 A*

SMU Measurement Resolution

Voltage: 2 μ V

Current: 1 fA

SMU Measurement Accuracy

Voltage: 200 μ V

Current: 20 fA

SMU Pulse Width

500 μ s/100 ms

VMU

Resolution: 2 μ V

Accuracy: 200 μ V

VMU (differential)

Resolution: 0.2 μ V

Accuracy: 10 μ V

Dual High Voltage Pulse Generator

Voltage Range: ±40 V

Output Current: ±200 mA

Minimum Pulse Width: 1 μ s

Minimum Pulse Period: 2 μ s

Accessories and Cables

N1254A-100 Ground Unit to Kelvin Adapter

16442B Test Fixture

16494A-001/002 Triaxial Cable (1.5 meter/3 meter)

Key Literature & Web Link

Expand Your Parametric Test Horizons Brochure, p/n 5989-0932EN

Agilent 4156C Semiconductor Parameter Analyzer Data Sheet,

p/n 5988-9238EN

www.agilent.com/see/parametric

Ordering Information

You must specify either 1.5 m or 3.0 m length for the included accessory cables

You can delete the Kelvin cables by specifying option 010; in this case you must order standard triaxial cables (16494A-001/002) as a separate line item if you need triaxial cables

You can delete the Windows-based PC controller by specifying option 020; however, the Desktop EasyEXPERT Software is still included with the product

The Agilent 41501B expander box can be ordered with the following options:

1 HPSMU, 2 MPSMUs, or no additional SMUs

2 PGUs or no PGUs

1.6 A ground unit (GNDU) – Standard with all 41501B units

* The 200 V and 1 A ranges are available when using the Agilent 41501B with the HPSMU option.

B1500A

- Superior IV measurement performance: 0.1 fA / 0.5 μ V measurement resolution
- Optional, integrated capacitance module supports CV measurements up to 5 MHz
- Over 180 pre-defined application tests to get you up and running quickly
- EasyEXPERT software provides an innovative, task-based approach to parametric test
- Optional positioner-based CV-IV switching solutions available with 0.5 μ V voltage measurement resolution and 10 fA, 1 fA or 0.1 fA current measurement resolution capability
- Easy test automation with built-in semiautomatic wafer prober drivers and test sequencing without programming via the Quick Test mode
- 10 ns pulsed IV solution is available for characterizing high-k gate dielectric and SOI (silicon-on-insulator) transistors
- A Classic Test mode is available to provide the look, feel, and terminology of the 4155/4156 interface while enhancing user interaction by taking full advantage of Microsoft Windows GUI features



The Agilent B1500A Semiconductor Device Analyzer is a modular instrument with a ten-slot configuration that supports both IV and CV measurements. Its familiar, MS Windows user interface supports Agilent's EasyEXPERT software, which provides a new, more intuitive task-oriented approach to device characterization. Because of its extremely low-current, low-voltage, and integrated capacitance measurement capabilities, the Agilent B1500A can be used for a wide range of semiconductor device characterization needs.

Specifications

Mainframe Characteristics

Available Slots: 10
Ground Unit Sink Capability: 4.2 A
USB Ports: 2 front and 2 rear
Instrument Control: GPIB
Networking: 100BASE-TX/10BASE-T LAN Port
External Trigger Inputs/Outputs:
 1 BNC trigger in; 1 BNC trigger out;
 8 programmable trigger in/out

Module Selection Guide

Module	HPSMU (B1510A)	MPSMU (B1511A)	HRSMU (B1517A)	ASU (E5288A)	MFCMU (B1520A)
Required Slots	2	1	1	—	1
Maximum Force Voltage	± 200 V	± 100 V	± 100 V	± 100 V	—
Maximum Force Current	± 1 A	± 100 mA	± 100 mA	± 100 mA	—
Voltage Measurement Resolution	2 μ V	0.5 μ V	0.5 μ V	0.5 μ V	—
Current Measurement Resolution	10 fA	10 fA	1 fA	0.1 fA	—
Min/Max Capacitance Measurement Frequency	—	—	—	—	1 kHz to 5 MHz
Maximum Capacitance dc Bias Capability	—	—	—	—	± 100 V*

* When used with the SCUU and SMUs.

HV-SPGU (B1525A)

Maximum Voltage Level: ± 40 V (80Vp-p)
Minimum Transition Time: 20 ns
Minimum Pulse Width: 12.5 ns
Other Functions: 3 level pulse, ALWG

Accessories

- N1254A-100** Ground Unit to Kelvin Adapter
- N1300-001/002** Capacitance Measurement Unit Cable (1.5 meter/3 meter)
- N1301A-100** SMU CMU Unify Unit
- N1301A-102** SCUU Cable (3 meter)
- 16444A-001** USB Keyboard
- 16444A-002** USB Mouse
- 16444A-003** Stylus
- 16442B** Test Fixture
- 16494A-001/002** Triaxial Cable (1.5 meter/3 meter)

Key Literature & Web Link

Making Every User a Parametric Test Expert, p/n 5989-5440EN

www.agilent.com/see/b1500a

Ordering Information

The B1500A does not have any automatic base configuration. All desired modules, accessories, and cables must be distinctly specified at the time of order.

Note: Since the B1500A is a modular product, you can add new modules to it at any time after initial purchase as long as you have open slots.

- **1 femtoamp resolution current measurement capability – Switching matrix does not degrade the measurement performance of the semiconductor parameter analyzer**
- **8 triaxial and 6 BNC inputs – Supports a 4-SMU, full-Kelvin configuration and a capacitance meter, with 4 BNC inputs remaining for future expansion**
- **14 concurrent internal paths – Enables you to use all 8 triaxial inputs and all 6 BNC inputs at the same time**
- **Capacitance measurement compensation feature – Corrects for the error introduced by the matrix's internal path lengths, allowing you to make accurate capacitance measurements through a switching matrix**
- **LED display and front panel control via keypad or optional light pen – Enables you to perform off-line debug of your measurement structures by giving a visual indication of the matrix relay status and by enabling you to change the relay status manually**
- **30 MHz bandwidth – You can use instruments such as pulse generators through the B2200A switch**



Unsurpassed Switching Matrix Performance

The B2200A fA leakage Switch Mainframe provides exceptional low-current leakage and capacitance measurement performance, without the limitations imposed by alternative solutions. The ability to support 1 fA measurements means that it does not detract from the high-performance of the semiconductor parameter analyzer. Inputs are sufficient to support a 4-SMU, full-Kelvin configuration. All 14 inputs correspond to unique internal paths, so all inputs can be used simultaneously. Unlike competing solutions, capacitance measurement results are not distorted by the inherent error introduced by each channel's varying path lengths; additionally, the system provides the parameters and algorithms necessary to compensate for such variances. Flexible use is provided by a modular structure that supports 12, 24, 36 or 48 output configurations. The 30 MHz bandwidth supports the use of instruments such as pulse generators. Flexible operator control is provided by the supplemental LED display and front panel control via keypad or optional light pen.

Keep Pace with the Performance of Semiconductor Parameter Analyzers

State-of-the-art semiconductor parameter analyzers have reached new levels of performance. With the ability to support 1 fA measurement resolution, the B2200A Switching Matrix keeps pace with the capabilities of your semiconductor parameter analyzer without any compromise in measurement performance.

Avoid Measurement Limitations of Multiplexing

Avoid delays and time-consuming manual switching with the B2200A's 14 internal measurement paths. Every input has its own unique internal path, enabling you to use all inputs simultaneously.

Accurate Capacitance Measurements

When measuring capacitance, the cable length, which includes the path through the matrix, has a significant impact on measurement results. When using the two BNC inputs that are optimized for capacitance measurement, the B2200A Switching Matrix Mainframe – unlike competitive solutions – corrects for the error introduced by the matrix's internal path lengths, supplying compensation parameters to enable undistorted measurement results.

Specifications

Number of Ports

- IV port: 8 Triaxial Ports (with Guard)
- AUX port: 6 BNC Ports (2 CV port)
- Output channel: Triaxial Ports (with Guard), x12, x24, x36, and x48 Configurations Available

Number of Slots: 4 slots for 48 mm height switch module

Max Current Rating

- IV port: 1.0 A
- AUX port: 0.5 A

Max Voltage Rating

- IV port (Other Ch): 200 V
- IV port (Common): 300 V
- AUX port (Other Ch): 100 V
- AUX port (Common): 100 V

Channel Isolation

- IV (triaxial) port: 1×10^{14} (ohm)
- AUX (coaxial) port: 1×10^9 (ohm)

Effective Current Measurement Resolution

IV (triaxial) port: 1 fA*

Offset Current (Supplemental)

IV port: 50 fA

IM Noise (RMS) (Supplemental)

IV port: 5 fA

Additional C Measurement Error (Supplemental): $\pm 1\% + 0.2$ pF

Bandwidth (at -3 dB): 30 MHz

Settling Time (Supplemental): 2.0 sec at 50 fA

Accessories and Cables

Agilent 16443A Light Pen for B2200A/B2201A

Agilent 16494A Triaxial Cable

Agilent 16493K Kelvin Triaxial Cable (for input port)

(Between 4155/56 series or E5270 series and B2200A/2201A input port)

Agilent 16494B Kelvin Triaxial Cable (for output port)

Agilent 16494F CMU Input Cable

Agilent 16493N GND Cable

(Between GND of E5270/41501 and B2200A/2201A)

Key Literature & Web Link

Solving the Most Difficult Switching Challenges Brochure, p/n 5989-5761EN

Agilent B2200A fA Leakage Switch Mainframe/Agilent B2201A

14-ch Low-Leakage Switch Mainframe Data Sheet, p/n 5989-1354EN

www.agilent.com/see/switch

Ordering Information

The B2200A switch does not come with any minimum number of matrix cards. You must specify from 1 – 4 of the B2210A matrix cards at the time of order. You can add additional B2210A matrix cards (up to 4 maximum per B2200A) at a later date.

The 16443A light pen is not required to control the matrix from its front panel.

* Typical measurement performance when using the B2200A with the 4156C, E5270B, or B1500A high-resolution SMU.

Low Leakage Switching Matrices

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14ch Low Leakage Switch Mainframe

B2201A

- **10 femtoamp resolution current measurement capability – Switching matrix does not degrade the measurement performance of the semiconductor parameter analyzer**
- **8 triaxial and 6 BNC inputs – Supports a 4-SMU, full-Kelvin configuration and a capacitance meter, with 4 BNC inputs remaining for future expansion**
- **14 concurrent internal paths – Enables you to use all 8 triaxial inputs and all 6 BNC inputs at the same time**
- **Capacitance measurement compensation feature – Corrects for the error introduced by the matrix's internal path lengths, allowing you to make accurate capacitance measurements through a switching matrix**
- **LED display and front panel control via keypad or optional light pen – Enables you to perform off-line debug of your measurement structures by giving a visual indication of the matrix relay status and by enabling you to change the relay status manually**
- **30 MHz bandwidth – You can use instruments such as pulse generators through the B2201A switch**



Excellent Switching Matrix Performance at an Affordable Price

The B2201A 14ch Low Leakage Switch Mainframe provides exceptional low-current leakage and capacitance measurement performance, without the limitations imposed by alternative solutions. The ability to support 10 fA measurements means that it does not detract significantly from the high-performance of the semiconductor parameter analyzer. This model is priced to provide cost-effective measurement performance for less demanding measurement situations. Inputs are sufficient to support a 4-SMU, full-Kelvin configuration. All 14 inputs correspond to unique internal paths, so all inputs can be used simultaneously. Unlike competitive solutions, capacitance measurement results are not distorted by the inherent error introduced by each channel's varying path lengths; additionally, the system provides the parameters and algorithms necessary to compensate for such variances. Flexible use is provided by a modular structure that supports 12, 24, 36 or 48 output configurations. The 30 MHz bandwidth supports the use of instruments such as pulse generators. Flexible operator control is provided by the supplemental LED display and front panel control via keypad or optional light pen.

Keep Pace with the Performance of Semiconductor Parameter Analyzers

State-of-the-art semiconductor parameter analyzers have reached new levels of performance. With the ability to support 10 fA measurement resolution, the B2201A Switching Matrix keeps pace with the potential of your semiconductor parameter analyzer without significant compromise in measurement performance.

Avoid Measurement Limitations of Multiplexing

Avoid delays and time-consuming manual switching with the B2201A's 14 internal measurement paths. Every input has its own internal path operating concurrently, therefore eliminating limitations caused by multiplexing inputs over shared paths.

Accurate Capacitance Measurements

Specifically with capacitance measurement, cable length, which includes the path through the matrix, has a significant impact on measurement results. When using the two BNC inputs that are optimized for capacitance measurement, the B2201A Switching Matrix Mainframe – unlike competitive solutions – corrects for the error introduced by the matrix's internal path lengths, supplying compensation parameters to enable undistorted measurement results.

Specifications

Number of Ports

- IV port: 8 Triaxial Ports (with Guard)
- AUX port: 6 BNC Ports (2 CV port)
- Output channel: Triaxial Ports (with Guard), x12, x24, x36, and x48 Configurations Available

Number of Slots: 4 slots for 48 mm height switch module

Max Current Rating

- IV port: 1.0 A
- AUX port: 0.5 A

Max Voltage Rating

- IV port (Other Ch): 200 V
- IV port (Common): 300 V
- AUX port (Other Ch): 100 V
- AUX port (Common): 100 V

Channel Isolation

- IV (triaxial) port: 5×10^{13} (ohm)
- AUX (coaxial) port: 1×10^9 (ohm)

Effective Current Measurement Resolution

IV (triaxial) port: 10 fA*

Offset Current (Supplemental)

IV port: 50 fA

IM Noise (RMS) (Supplemental)

IV port: 5 fA

Additional C Measurement Error (Supplemental): $\pm 1\% + 0.2$ pF

Bandwidth (at -3 dB): 30 MHz

Settling Time (Supplemental): 2.0 sec at 300 fA

Accessories and Cables

Agilent 16443A Light Pen for B2200A/B2201A

Agilent 16494A Triaxial Cable

Agilent 16493K Kelvin Triaxial Cable (for input port)

(Between 4155/56 series or E5270 series and B2200A/2201A input port)

Agilent 16494B Kelvin Triaxial Cable (for output port)

Agilent 16494F CMU Input Cable

Agilent 16493N GND Cable

(Between GND of E5270/41501 and B2200A/2201A)

Key Literature & Web Link

Solving the Most Difficult Switching Challenges Brochure, p/n 5989-5761EN

Agilent B2200A fA Leakage Switch Mainframe/Agilent B2201A

14-ch Low-Leakage Switch Mainframe Data Sheet, p/n 5989-1354EN

www.agilent.com/see/switch

Ordering Information

The B2201A switch does not come with any minimum number of matrix cards. You must specify from 1 – 4 of the B2211A matrix cards at the time of order. You can add additional B2211A matrix cards (up to 4 maximum per B2201A) at a later date.

The 16443A light pen is not required to control the matrix from its front panel.

* Typical measurement performance when using the B2201A with the 4156C, E5270B, or B1500A high-resolution SMU.

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The E5250A switch supports two different matrix card types:
10 x 12 Matrix Card (E5252A) for Non-Kelvin Parametric Measurements

- Sequential measurement of many devices on a test structure
- Ten inputs and 48 outputs provide flexibility and accuracy
- Two low-leakage inputs and four standard inputs for I-V measurements
- Two C-V path with accurate capacitance compensation
- Two auxiliary inputs for pulsed, differential voltage and other measurements

24 (8 x 3) Channel Multiplexer Card (E5255A) for Reliability Testing

- Up to 384-channel capability for efficient parallel test
- Permits the use of inexpensive power supplies for consistent stressing
- Provides protection against power surges to prevent device damage
- Supports cables compatible for use in a thermal chamber



The Agilent E5250A Low Leakage Switch supports non-Kelvin measurement on four SMUs, with six additional multiplexed inputs for other needs. Besides supporting traditional matrix functionality (Agilent E5252A cards), the E5250A also supports long-term reliability stress testing (Agilent E5255A cards). The E5250A can be configured with one to four output cards or either type. The E5250A also supports a *VXIplug&play* driver for easy programmatic control.

The E5250A and E5252A matrix card combine to form a basic non-Kelvin matrix solution. The E5252A card has 6 triaxial inputs and 4 BNC inputs, with 6 internal paths. The inputs to rows 5 and 6 consist of a 3-to-1 multiplexer. This configuration maintains cost-effectiveness without sacrificing essential CV-IV measurement performance.

The E5250A supports the E5255A multiplexer card for long-term reliability stress testing. The multiplexer card has 24 outputs, organized in groups of 8. Each card has one multilevel dc bias input for each set of eight channels, permitting the use of inexpensive power supplies for consistent stress. The E5250A accepts four of these cards, for a total of 96 outputs. Each channel can also have a user-selected protection resistor to limit the current surge after device breakdown or rupture. You can gang up to four E5250A mainframes together using the E5255A cards to create a system with 384-channel capability.

Specifications

Matrix Switch (Specification defined with the mainframe)

Max Current Rating

Port: 1.0 A

Max Voltage Rating

- Channel to ground: –200 V
- Channel to channel: –300 V

Close Channel Residual Resistance

- Low-leakage I-V port: –0.6 ohms
- General I-V port: –1.0 ohms
- C-V, HF port: –10E9 ohms

Channel Isolation

- Low-leakage I-V port: –10E13 ohms
- General I-V port: –10R12 ohms
- C-V, HF port: –10E9 ohms

24 Channel Multiplexer (Specification defined with the mainframe)

Max Current Rating

Port: 1.0 A

Max Voltage Rating

- Channel to ground: –200 V
- Channel to channel: –300 V

Close Channel Residual Resistance

- Low-leakage I-V port: –0.6 ohms
- General I-V port: –1.0 ohms
- C-V, HF port: –10E9 ohms

Channel Isolation

- Low-leakage I-V port: –10E13 ohms
- General I-V port: –10E12 ohms
- C-V, HF port: –10E9 ohms

Measurement Capabilities

- Effective current measurement resolution: 20 fA*
- Transient current settling time (10 V input step): <3.5 sec at 400 fA
- Bandwidth (at –3 dB, using E5252A cards): 10 MHz

Accessories and Cables

Agilent 16494A Triaxial Cable

Agilent 16494B Kelvin Triaxial Cable

Agilent 16494C Kelvin Triaxial Cable for 4142

Agilent 16494D 8 channel Shielded Coaxial Cable

Agilent 16495A Connector Plate w/12 Triaxial Interlock/GNDU

Agilent 16495B Connector Plate w/24 Triaxial Interlock/GNDU

Agilent 16495C Connector Plate w/68 channel SHLD connector

Agilent 16495D Connector Plate w/128 channel SHLD connector

Agilent 16495E Half Size Blank Plate

Key Literature & Web Link

Solving the Most Difficult Switching Challenges Brochure, p/n 5989-5761EN

Agilent E5250A Low Leakage Switch Mainframe Data Sheet, p/n 5964-2378E

www.agilent.com/see/switch

Ordering Information

The E5250A switch does not come with any minimum number of matrix cards. You must specify either the E5252A matrix cards or the E5255A multiplexer cards at the time of order. The mainframe holds up to four cards, and you can have both card types in the same mainframe.

* Typical measurement performance when using the E5250A with the 4156C, B1500A, or E5270B high-resolution SMU.

Modular Source Monitor Unit Series

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8-Slot High Speed Measurement Mainframe

E5260A

- Eight module slots – Flexibility now and expandability in the future
- SMUs that measure several times faster than 4142B SMUs – Faster test times and improved throughput, resulting in a lower cost-of-test
- Code compatible with the 4142B – Replace current 4142Bs with the E5260A and enjoy a large throughput improvement with only minimal test code modification
- 16 digital I/O lines for instrument triggering in addition to BNC trigger-in & trigger-out connectors – Sophisticated triggering schemes involving multiple instruments can easily be created
- All trigger signals are processed via hardware rather than firmware – Fastest possible trigger response from the instrument
- Front panel control – Can conveniently perform and report spot measurements via a simple front-panel interface, without programming. View other items of interest, such as error messages, valuable when debugging the instrument performance under automated control
- When 4 HPSMUs are installed then each HPSMU can output 1 A – No power restrictions; no need to think about mainframe power restrictions when developing applications
- 4.0 Amp Ground unit (GNDU) – Sink the current output of 4 HPSMUs without worrying about resistive ground rise issues



Fast Measurement that Lowers Cost-of-test

The fast measurement speed and modular nature of the E5260A makes it an ideal choice for high-speed production test. For technologically advanced devices of today and tomorrow, the Agilent E5260A lowers your cost-of-test with a high-speed parametric test solution for semiconductor, RFIC, and optical component testing. Based on well-proven Agilent 4070 Series system technology, the E5260A provides superior measurement throughput that is several times faster than earlier products such as the Agilent 4142B. The instrument is modular, which enables customization now and provides for future expansion as requirements change. A number of innovative design elements help to improve the efficiency of complex testing, such as expanded program memory to accelerate the measurement process, and 16 digital I/O lines for sophisticated triggering requirements. Moreover, historically encountered power limitations on the instrument mainframe (such as often occur with the 4142B) have been eliminated.

Modular Design Enables Customization Now and Provides for Future Expansion

The flexible, modular configuration has eight slots available for plug-in modules. Currently available source/monitor unit (SMU) types are a medium power SMU (MPSMU) – requiring one slot – and a high-power SMU (HPSMU) – requiring two slots. Easily expand into the E5260A from your current environment because commands developed on the 4142B can also run on the new system.

High Measurement Speed

The E5260A performs DC measurements of current and voltage through measurement speeds of SMUs that are 2 – 3 times faster than that of the Agilent 4142B.

Innovative Design Elements Support Complex Testing and Improve Efficiency

Program memory has been greatly enhanced, with storage capacity for up to 40,000 command lines, which accelerates the measurement process. A fast and flexible advanced triggering scheme, based upon 16 digital I/O lines, in addition to the BNC trigger-in & trigger-out connectors, is ideal for sophisticated triggering requirements. Also, trigger signals are routed through hardware rather than firmware, resulting in the fastest instrument response possible. To enable parallel testing, each SMU is equipped with its own analog-to-digital converter (ADC) therefore no bottlenecks. Engineers can perform and report spot measurements easily via a simple front-panel interface, without programming. In addition, you can use the same user interface to view other items of interest, such as error messages when debugging the instrument performance under automated control.

Designed to Withstand Heavyweight Power Demands

Alternative testing solutions may present power limitations, but not the E5260A. No matter which type or how many modules are installed into the E5260A mainframe, all installed modules can output maximum voltage or current at the same time. For example, if 4 HPSMUs are installed in the E5260A, then each HPSMU can output 1 Amp. A 4.0 Amp ground unit is resident in the instrument mainframe to ensure that you can sink the current output of these 4 HPSMUs without having to worry about resistive ground rise issues. In addition, each MPSMU can source and sink up to 200 mA each, which is twice the capability typically found in a MPSMU.

Specifications

Mainframe Characteristics

E5260A 8-Slot Precision Measurement Mainframe

- Available Slots: 8
- Ground Unit (GNDU) Sink Capability: 4.0 A
- Instrument Control: GPIB
- External Trigger Inputs/Outputs
 - 1 BNC Trigger In;
 - 1 BNC Trigger Out;
 - 8 Programmable Trigger In/Out

Available Modules

E5290A High Speed HPSMU

- Required Slots: 2
- Maximum Force Voltage: ± 200 V
- Maximum Force Current: ± 1 A
- Voltage Measurement Resolution: 100 μ V
- Current Measurement Resolution: 5 pA

E5291A High Speed MPSMU

- Required Slots: 1
- Maximum Force Voltage: ± 100 V
- Maximum Force Current: ± 200 mA
- Voltage Measurement Resolution: 100 μ V
- Current Measurement Resolution: 5 pA

Accessories and Cables

N1254A-100 Ground Unit to Kelvin Adapter

16442B Test Fixture

16494A-001/002 Triaxial Cable (1.5 meter/3 meter)

Key Literature & Web Link

Agilent E5260A 8 Slot High Speed Measurement Mainframe Data Sheet, p/n 5989-1356EN

www.agilent.com/see/parametric

Ordering Information

The E5260A does not have any base configuration. All desired modules, accessories, and cables must be specified at the time of order.

Note: Since the E5260A is a modular product, you can add new modules to it at any time after initial purchase as long as you have open slots.

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- **Two MPSMU configuration** – Cost effective solution provides just enough test capability
- **SMUs that measure several times faster than 4142B SMUs** – Faster test times and improved throughput, resulting in a lower cost-of-test
- **Code compatible with the 4142B** – Replace current 4142Bs with the E5262A and enjoy a large throughput improvement with only minimal test code modification
- **16 digital I/O lines for instrument triggering in addition to BNC trigger-in & trigger-out connectors** – Sophisticated triggering schemes involving multiple instruments can easily be created
- **All trigger signals are processed via hardware rather than firmware** – Fastest possible trigger response from the instrument
- **Front panel control** – Can conveniently perform and report spot measurements via a simple front-panel interface, without programming. View other items of interest, such as error messages, valuable when debugging the instrument performance under automated control



Fast Measurement that Lowers Cost-of-test

The fast measurement speed of the E5262A makes it an ideal choice for high-speed production test in situations requiring only one or two SMUs. Based on Agilent 4070 Series system technology, the Agilent E5262A lowers your cost-of-test with a high-speed parametric test solution for semiconductor, RFIC, and optical component testing. Two MPSMU modules and a ground unit are included in the E5262A, providing just enough test capability for many component-testing needs. The E5262A provides superior measurement throughput, several times faster than earlier products such as the Agilent 4142B. A number of innovative design elements help to improve the efficiency of complex testing, such as expanded program memory to accelerate the measurement process, and 16 digital I/O lines for sophisticated triggering requirements.

High Measurement Speed

The E5262A performs DC measurements of current and voltage and achieves measurement speeds that are 2 – 3 times faster than that of the Agilent 4142B. Easily migrate from your current 4142B test environment to the E5262A because programs developed for the 4142B can run on the E5262A with only minor modification.

Innovative Design Elements Support Complex Testing and Improve Efficiency

Program memory has been greatly enhanced, with storage capacity for up to 40,000 command lines, which accelerates the measurement process. A fast and flexible advanced triggering scheme, based upon 16 digital I/O lines, in addition to the BNC trigger-in & trigger-out connectors, is ideal for sophisticated triggering requirements. Also, trigger signals are routed through hardware rather than firmware, resulting in the fastest instrument response possible. To enable parallel testing, each SMU is equipped with its own analog-to-digital converter (ADC) therefore no bottlenecks. Engineers can perform and report spot measurements easily via a simple front-panel interface, without programming. In addition, you can use the same user interface to view other items of interest, such as error messages when debugging the instrument performance under automated control.

Cost-effective Solution for Simple Parametric Test Requirements

Many component measurements, such as laser diode and photo diode characterization, require only one or two source/monitor units. The configuration of the E5262A provides the ideal balance of functionality for such tasks at an affordable price.

Specifications

Mainframe Characteristics

E5262A 2-Channel (Medium Power, Medium Power) Source Monitor Unit

- Available Slots: Two channel (2X MPSMU) configuration
- Ground Unit (GNDU) Sink Capability: 2.2 A
- Instrument Control: GPIB
- External Trigger Inputs/Outputs:
 - 1 BNC Trigger In;
 - 1 BNC Trigger Out;
 - 8 Programmable Trigger In/Out

Included Module

High Speed MPSMU

- Maximum Force Voltage: ± 100 V
- Maximum Force Current: ± 200 mA
- Voltage Measurement Resolution: 100 μ V
- Current Measurement Resolution: 5 pA

Accessories and Cables

- N1254A-100** Ground Unit to Kelvin Adapter
- 16442B** Test Fixture
- 16494A-001/002** Triaxial Cable (1.5 meter/3 meter)

Key Literature & Web Link

Agilent E5262A 2 Channel (Medium Power, Medium Power) Source/Monitor Unit Data Sheet, p/n 5989-1357EN

www.agilent.com/see/parametric

Ordering Information

The E5262A is a fixed-configuration product; there are no options or required accessories.

Modular Source Monitor Unit Series

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2-Channel High Speed Source Monitor Unit

E5263A

- One HPSMU and one MPSMU configuration – Cost effective solution provides just enough test capability
- SMUs that measure several times faster than 4142B SMUs – Faster test times and improved throughput, resulting in a lower cost-of-test
- Code compatible with the 4142B – Replace current 4142Bs with the E5263A and enjoy a large throughput improvement with only minimal test code modification
- 16 digital I/O lines for instrument triggering in addition to BNC trigger-in & trigger-out connectors – Sophisticated triggering schemes involving multiple instruments can easily be created
- All trigger signals are processed via hardware rather than firmware – Fastest possible trigger response from the instrument
- Front panel control – Can conveniently perform and report spot measurements via a simple front-panel interface, without programming. View other items of interest, such as error messages, valuable when debugging the instrument performance under automated control



Fast Measurement that Lowers Cost-of-test

The fast measurement speed of the E5263A makes it an ideal choice for high-speed production test in situations requiring only one or two SMUs. Based on Agilent 4070 Series system technology, the Agilent E5263A lowers your cost-of-test with a high-speed parametric test solution for semiconductor, RFIC, and optical component testing. HPSMU and MPSMU modules and a ground unit are included in the E5263A, providing just enough test capability for many component-testing needs. The E5263A provides superior measurement throughput, several times faster than earlier products such as the Agilent 4142B. A number of innovative design elements help to improve the efficiency of complex testing, such as expanded program memory to accelerate the measurement process, and 16 digital I/O lines for sophisticated triggering requirements.

High Measurement Speed

The E5263A performs DC measurements of current and voltage and achieves measurement speeds that are 2 – 3 times faster than that of the Agilent 4142B. Easily migrate from your current 4142B test environment to the E5263A because programs developed for the 4142B can run on the E5263A with only minor modification.

Innovative Design Elements Support Complex Testing and Improve Efficiency

Program memory has been greatly enhanced, with storage capacity for up to 40,000 command lines, which accelerates the measurement process. A fast and flexible advanced triggering scheme, based upon 16 digital I/O lines, in addition to the BNC trigger-in & trigger-out connectors, is ideal for sophisticated triggering requirements. Also, trigger signals are routed through hardware rather than firmware, resulting in the fastest instrument response possible. To enable parallel testing, each SMU is equipped with its own analog-to-digital converter (ADC) therefore no bottlenecks. Engineers can perform and report spot measurements easily via a simple front-panel interface, without programming. In addition, you can use the same user interface to view other items of interest, such as error messages when debugging the instrument performance under automated control.

Cost-effective Solution for Simple Parametric Test Requirements

Many component measurements, such as laser diode and photo diode characterization, require only one or two source/monitor units. The configuration of the E5263A provides the ideal balance of functionality for such tasks at an affordable price.

Specifications

Mainframe Characteristics

E5263A 2-Channel (High Power, Medium Power) Source Monitor Unit

- Available Slots: Two channel (HPSMU and MPSMU) configuration
- Ground Unit (GNDU) Sink Capability: 2.2 A
- Instrument Control: GPIB
- External Trigger Inputs/Outputs
 - 1 BNC Trigger In;
 - 1 BNC Trigger Out;
 - 8 Programmable Trigger In/Out

Included Module

High Speed HPSMU

- Maximum Force Voltage: ± 200 V
- Maximum Force Current: ± 1 A
- Voltage Measurement Resolution: 100 μ V
- Current Measurement Resolution: 5 pA

High Speed MPSMU

- Maximum Force Voltage: ± 100 V
- Maximum Force Current: ± 200 mA
- Voltage Measurement Resolution: 100 μ V
- Current Measurement Resolution: 5 pA

Accessories and Cables

N1254A-100 Ground Unit to Kelvin Adapter

16442B Test Fixture

16494A-001/002 Triaxial Cable (1.5 meter/3 meter)

Key Literature & Web Link

Agilent E5263A 2 Channel (High Power, Medium Power) Source/Monitor Unit Data Sheet, p/n 5989-1357EN

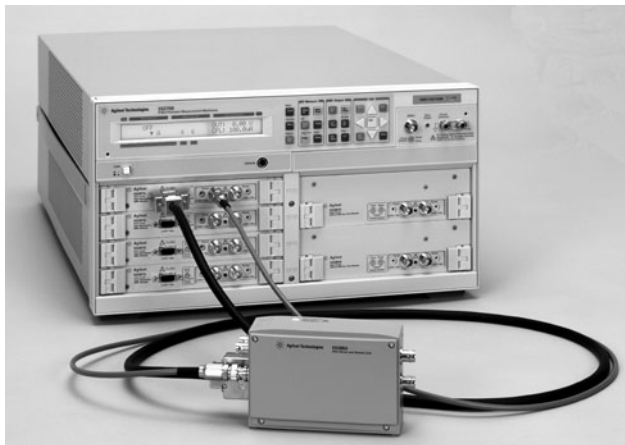
www.agilent.com/see/parametric

Ordering Information

The E5263A is a fixed-configuration product; there are no options or required accessories.

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- **No embedded controller in the instrument – Manage your instrument measurement resources separately from your controller and software resources, ensuring that your test investment does not become obsolete too quickly**
- **HRSMU has 1 femtoamp current measurement resolution – Can meet the measurement challenges posed by the vast majority of current and future devices, without the need for external preamplifiers**
- **HRSMU combines with optional atto sense and switch unit (ASU) to achieve 100 attoamp current measurement resolution – Stable 100 attoamp current resolution via remote sensing meets the most demanding ultra low current measurement requirements**
- **Switch between CV and IV measurements on positioners via software commands – No need to physically change cabling or move to a different probe station when changing from CV to IV measurement**
- **MPSMU and HRSMU can measure voltage with 0.5 microvolt resolution. Both SMUs also support new 0.5 V and 5 V measurement ranges – Enables you to perform very demanding component matching and metal line resistance voltage measurements with ease**
- **Includes industry-standard VXIplug&play driver – Ideal when you choose to use your own software, instead of Agilent-provided software. Improves programmer productivity by removing the need to learn detailed programming of the instrument**
- **TIS (Test Instruction Set) commands supported for both BASIC and C – Develop algorithms on an instrument that you can then easily transport into your 4070 Series-based production test environment**



Solves the Most Extreme Parametric Measurement Challenges

For engineers and scientists working on current and future semiconductor process technologies, the E5270B provides a solution that both meets their needs and lowers their cost of test. The wide variety of available modules and advanced measurement features provide a complete solution for parametric measurement and analysis. Both a VXIplug&play driver and TIS commands are provided as programming aids for customers who choose to use their own software instead of software provided by Agilent.

Unlike solutions that include both the system controller and measurement resources combined, the E5270B gives you the freedom to manage these resources separately, thereby avoiding the expensive problem of the system controller becoming obsolete years before other elements. The E5270B can be controlled from MS Windows-based, UNIX®-based, or even LINUX-based operating system environments. Because you can upgrade your system controller hardware or software without losing the use of your instrument, your investment is protected against unforeseeable technology shifts.

Ultra Low Current Measurement without Cumbersome External Preamplifiers

The E5270B HRSMU supplies 1-femtoamp measurement resolution without the need for cumbersome external preamplifiers, providing an extremely efficient solution for situations not requiring ultra low current measurement. This innate capability enables you to meet the measurement challenges posed by the vast majority of current and future devices. The HRSMU (and redesigned MPSMU) also provides voltage measurement resolution down to 0.5 microvolts. The HRSMU (as well as the redesigned MPSMU) also supports new 0.5 V and 5 V measurement ranges, which improve measurement accuracy for modern lower-voltage transistors. Advanced measurement features include multi-channel sweep mode with parallel test capability, linear/binary search, range management, and force value self-monitoring.

Flexibility to Provide Stable 100 Attoamp Measurements

The HRSMU accepts an optional atto sense and switch unit (ASU), which increases the low current measurement resolution to 100 attoamps. This is invaluable for certain extreme characterization needs such as memory cell leakage testing. In addition, the ASU allows you to make voltage measurements and force both voltage and current up to the limits of the HRSMU specification.

Switch Between CV and IV Measurement Without Wasting Time Swapping Cables

The ASU enables switching between 100 attoamp measurement and precise capacitance measurement without changing any cabling. The ASU includes two BNC inputs that are compatible with the outputs of a capacitance meter. Simple software commands enable you to switch between SMU based measurement (IV) and capacitance meter based measurement (CV) without having to change any cabling. You can also use the BNC inputs with other instruments such as a digital voltmeter (DVM) or a pulse generator unit (PGU). No matter what your configuration, the ASU provides better switching measurement performance than an external switching matrix, and offers improved ease of use.

Cost-effective Alternative that Takes Advantage of Your Own Testing Software

Agilent provides an industry-standard VXIplug&play driver, a high-level programming interface that saves time by allowing your programmers to avoid having to learn the detailed programming of the instrument. In addition, the TIS – test instruction set – interface enables code developed for the lab environment to be used in production. Specifically, TIS allows you to write algorithms for subsequent transfer to the Agilent 4070 production test environment.

E5270B

E5270B

Specifications

Mainframe Characteristics

E5270B 8-Slot Precision Measurement Mainframe

- Available Slots: 8
- Ground Unit (GNDU) Sink Capability: 4.0 A
- Instrument Control: GPIB
- External Trigger Inputs/Outputs
 - 1 BNC Trigger In;
 - 1 BNC Trigger Out;
 - 8 Programmable Trigger In/Out

Available Modules

E5280B HPSMU

- Required Slots: 2
- Maximum Force Voltage: ± 200 V
- Maximum Force Current: ± 1 A
- Voltage Measurement Resolution: 2 μ V
- Current Measurement Resolution: 10 fA

E5281B MPSMU

- Required Slots: 1
- Maximum Force Voltage: ± 100 V
- Maximum Force Current: ± 100 mA
- Voltage Measurement Resolution: 0.5 μ V
- Current Measurement Resolution: 10 fA

E5287A HRSMU

- Required Slots: 1
- Maximum Force Voltage: ± 100 V
- Maximum Force Current: ± 100 mA
- Voltage Measurement Resolution: 0.5 μ V
- Current Measurement Resolution: 1 fA

E5288A ASU

- Required Slots: N/A
- Maximum Force Voltage: ± 100 V
- Maximum Force Current: ± 100 mA
- Voltage Measurement Resolution: 0.5 μ V
- Current Measurement Resolution: 0.1 fA

Accessories and Cables

N1254A-100 Ground Unit to Kelvin Adapter

16442B Test Fixture

16494A-001/002 Triaxial Cable (1.5 meter/3 meter)

Key Literature & Web Link

Agilent E5270B 8-Slot Precision Measurement Mainframe Data Sheet,
p/n 5989-1355EN

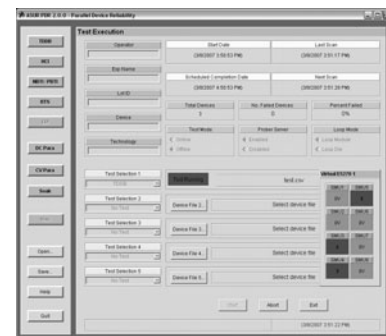
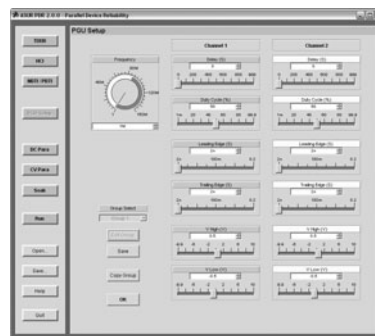
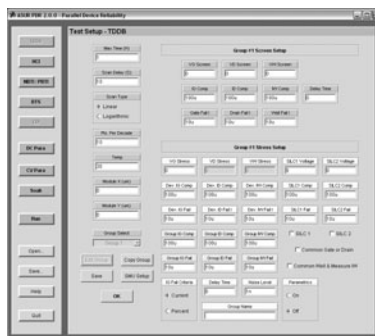
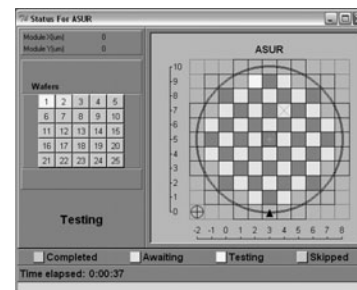
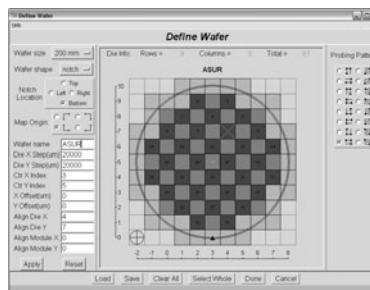
www.agilent.com/see/parametric

Ordering Information

The E5270B does not have any base configuration. All desired modules, accessories, and cables must be specified at the time of order.

Note: Since the E5270B is a modular product, you can add new modules to it at any time after initial purchase as long as you have open slots.

- Modular precision architecture and scalable test control
- Agilent WLR technology in its sixth generation
- Device topology independent non-relaxation measurement techniques
- Accelerated to long-term reliability testing
- Single-, multi-site and multi-die parallel test
- Per-pin, Quasi-per-pin or Group topologies switching or non-switching
- Kelvin, Pseudomorphic Kelvin and non-Kelvin wiring configurations
- Traditional methods and DSP based phenomena detection
- ASUR PDQ-WLR algorithm libraries and techniques for DC and AC reliability
- Automatic and semiautomatic 200 mm and 300 mm wafer prober support
- Test cells may include single to multiple instruments mainframes E5270B, B1500A, E5250A, B2200, 4294A, E4980A, 8114A, 81110A, etc.
- High pin-count parallel test with multiple stress groups
- Industry's only dedicated reliability analysis environment



ASUR PDR provides parallel, multi-site, on-wafer DC and AC (Pulsed) TDDDB, BTS, HCI, N|P BTI and EM accelerated to long-term reliability tests. Advanced features allow detection of novel effects found in modern materials such as high-k and low-k dielectrics, copper and transition silicide barrier metallization. In dielectric reliability ASUR PDR can use advanced adaptive scanning and specialized failure detection methods to zero in on relevant operating regimes and identify soft breakdowns. In its BTI module, ASUR PDR includes on-the-fly sub-millisecond measurements for proper detection and avoids relaxation effects in any supported topology.

ASUR PDR builds upon and extends the popular PDQ-WLR algorithms to cover reliability studies from accelerated to long-term allowing users to selectively test devices whether individually (per-pin), in sets (groups) or a combination of those (quasi-per-pin) at different stresses, polarities, etc. with no relaxation.

All test conditions are under full user control allowing a single test methodology to scale from accelerated to long-term reliability testing without the need for customized programming. Parametric test monitoring is user-defined with the same high degree of test condition control.

The modularity and scalability of ASUR PDR provides seamless expansion beyond first E5270/E5260 SMU mainframe and E5250/B2200 switching units where multiple mainframes can be used for high pin-count tests.

ASUR PDR will generate statistically significant results sufficient to perform lifetime extraction quickly even when performing long-term reliability testing, from days to weeks per test cycle.

All modules do not require programming and each having special value added features such as non-relaxation techniques, fast measurements, device conditioning, pre- and post-stress tests, compensation for over and under-shoot, memory programming, and on-the-fly techniques.

ASUR PDR architecture supports Kelvin, Pseudomorphic Kelvin and non-Kelvin wiring configurations for different operating regimes of devices, test techniques, instrumentation, etc.

Instrument pre-check is provided prior to committing long test runs and run-time status is provided in real-time. In addition, sophisticated real-time graphics are provided for accurate test monitoring and includes the support of automatic and semiautomatic 200 mm and 300 mm wafer probers.

ASUR PDR is part of the ASUR scalable set of solutions.

Specifications

DC Modules

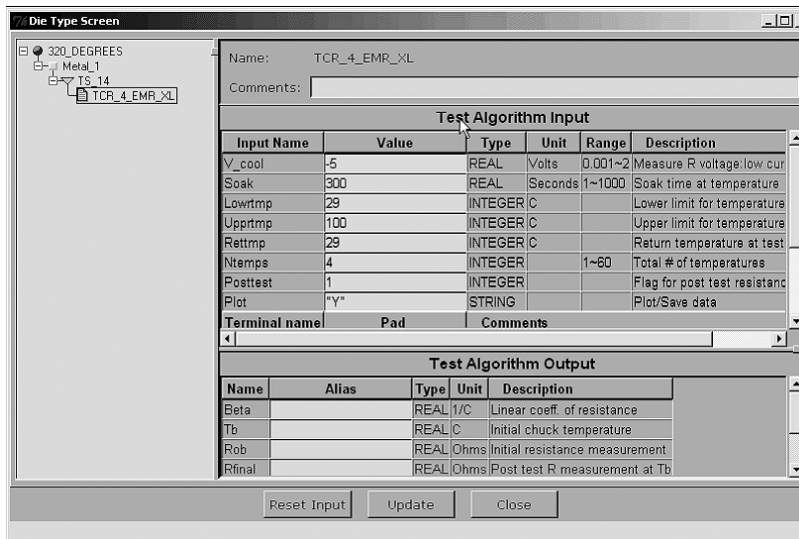
- Gate Oxide Integrity (GOI)
- Bias Temperature Stress (BTS)
- Hot Carrier Injection (HCI)
- Electromigration (EM)
- Bias Temperature Instability (N|P BTI), etc
- AC Modules
- AC Time Dependent Dielectric Breakdown (AC TDDDB)
- AC Bias Temperature Instability (AC BTI)
- AC Hot Carrier Injection (AC HCI)
- Double-Pulse AC (AC HCI and N|P BTI)

Agilent Instruments Supported

- Agilent B1500A, E5270B and E5260A Test Instruments
- Agilent E5250A, B2200 and B2201 Switch Matrix
- Agilent 81110A, 8114A Pulse Generators
- Agilent 4284A, E4980A LCR Meters
- Agilent 4294A Impedance Analyzer
- Agilent E5288A ASU, Atto-sense Unit
- Agilent 41000-400 to -100 Series Systems
- Agilent Power Supplies, etc

C1281A

- Single-site Device Reliability
- Popular PDQ-WLR subset built-in, ready for use
- Additional advanced nanometer era test libraries that include on-the-fly sub-millisecond BTI, pulsed BTI, RO, etc
- Interactive Measurement Tool (IMT) allows users build test algorithms without programming
- Create or reuse custom BASIC, C, built-in and IMT algorithms simultaneously
- Import/Export 4070/4062 SPECS algorithms
- Import/Export SPECS test plans
- Build and execute test plans independently
- Algorithm test mode
- Save and re-use test plan components at die, module and device level
- Test plan wizard is fast, intuitive and creates complex test plans in minutes
- Real-time graphics support
- Site constants supported as inputs for the most popular algorithms
- Adaptive testing – output from one algorithm can be input to another
- Test plan looping allows for HCI tests with user-defined algorithms
- Selectable data output formats
- Kelvin, Pseudomorphic Kelvin, and non-Kelvin wiring supported
- Per-pin and switched test architectures supported
- Automatic and semiautomatic 200 mm and 300 mm wafer prober support



ASUR SDR is a high-performance, low-cost, accelerated reliability and pre- and post-stress parametric for single-site device testing that incorporates the proven accelerated techniques of PDQ-WLR using instruments-based solutions. Methods are provided for reliability testing of gate oxides, hot carrier injection, BTI and electro migration. User interfaces are wizard-driven and easy to learn. User custom algorithms are supported via BASIC, C or automatically generated from the programless graphical Interactive Measurement Tool.

All interfaces in ASUR SDR are designed with the SPECS user in mind. The same test plan hierarchy is observed and simplified for the instrument environment. Users importing or designing their own custom algorithms have no need of GPIB-specific knowledge; the application program interface follows the standard TIS and the algorithm builders extend the user's capability to add templates for connectivity.

The Interactive Measurement Tool (IMT) is used to perform device or parameter exploration for rapid turnaround or as the basis for the industry's most advanced programless user-assisted custom algorithm builder.

The BASIC and C languages supported are fully source code compatible with that used by the Agilent system testers workstation.

A choice of data output formats are check-box selectable for PDQ-DB style for use with ASUR RDA or for test-plan level outputs showing linear output during test execution allowing for open transport to other data systems.

ASUR SDR provides the flexibility to standardize test cells and methodologies with different instruments. It is mission ready; same testing capabilities and structure as industry standard 4070 PDQ-WLR.

Instrument pre-check is provided prior to committing long test runs and run-time status is provided in real-time. In addition, sophisticated real-time graphics are provided for accurate test monitoring.

ASUR SDR is part of the ASUR scalable set of solutions.

Specifications

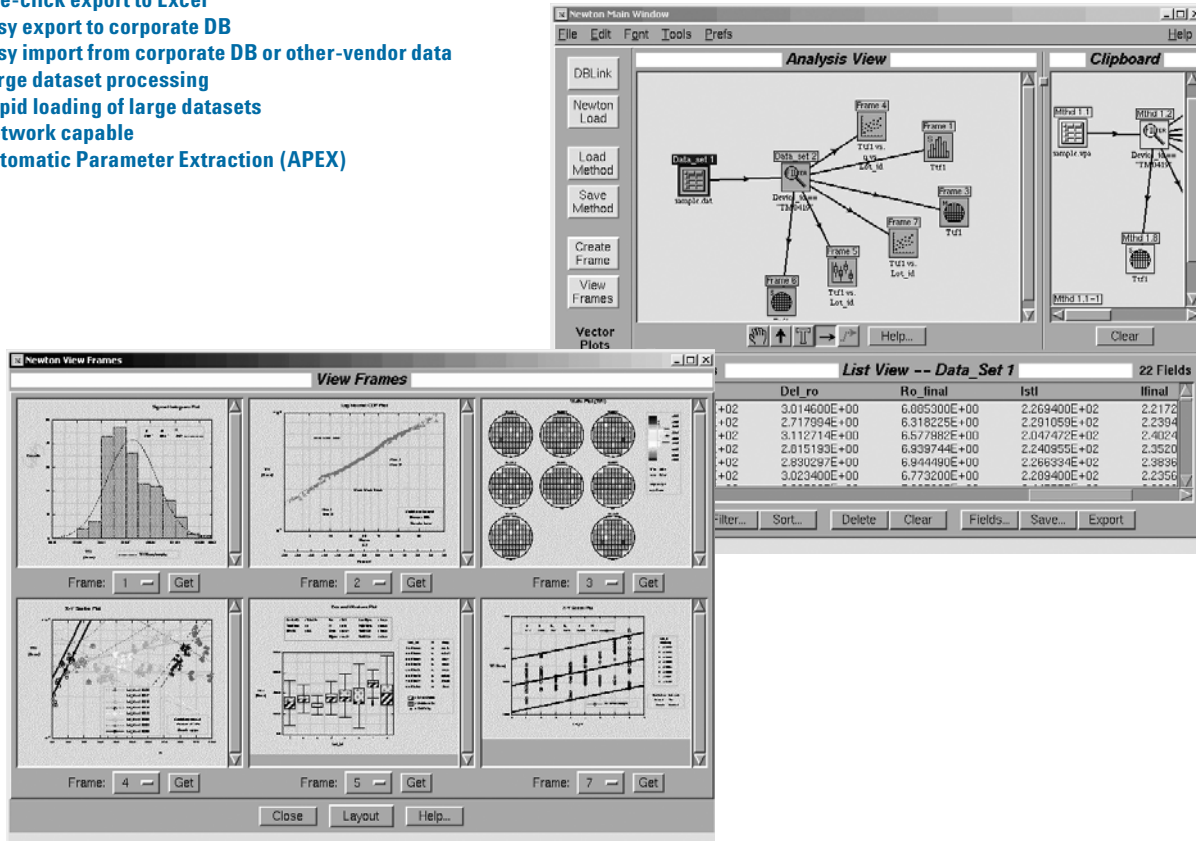
JEDEC Standard Reliability Test Algorithms Supported

- Gate Oxide Integrity (GOI)
- Bias Temperature Stress (BTS)
- Hot Carrier Injection (HCI)
- Bias Temperature Instability (BTI)
- Electromigration (EM)

Agilent Instruments Supported

- Agilent B1500A, E5270B and E5260A Test Instruments
- Agilent 4155/6 B/C
- Agilent E5250A, B2200 and B2201 Switch Matrix
- Agilent 81110A, 8114A Pulse Generators
- Agilent 4284A, 4980A LCR Meter
- Agilent 4294A Impedance Analyzer
- Agilent E5288A ASU, Atto-sense Unit
- Agilent 41000-400 to -100 Series Systems
- Agilent Spectrum Analyzer 4411B
- Agilent Power Supplies, Frequency Counters, etc

- Supports ASUR SDR and ASUR PDR data
- Popular semiconductor test analysis built in
- Site-configurable macro editor
- One-click export to Excel
- Easy export to corporate DB
- Easy import from corporate DB or other-vendor data
- Large dataset processing
- Rapid loading of large datasets
- Network capable
- Automatic Parameter Extraction (APEX)



Agilent ASUR RDA is post-test statistical and physical analysis software. It aids in the analysis of production, development or qualification test data taken by the Agilent ASUR test software.

ASUR RDA provides powerful, built-in EM, HCI and dielectric statistical distribution plotting and lifetime extraction. Advanced filtering, macro data manipulation and plotting capabilities are tailored for semiconductor reliability test and analysis. Filtering allows large datasets to be pared down to specific analysis datasets and tasks. Macros can be applied to both scalar and vector data over time. Plotting includes wafer mapping and reliability statistical plots. Data tunneling allows outliers and novel points to be traced back to specific wafer die locations, lots and tests facilitating process optimization and failure analysis based on reliability.

With a GUI interface and PDQ-WLR database links, access to the source of unusual or defective data is literally a mouse click away.

Click on the defective data and the source of this data (e.g. lot, wafer, site, date, operation, etc.) is displayed. If the I-V curve used to generate the data point is stored, one more mouse click will reveal this information. These features make ASUR RDA post-measurement analysis capability sophisticated and easy-to-use.

Agilent ASUR RDA provides standard statistical analysis graphical tools such as Log-Normal Cumulative Distribution Function (CDF) plots with Least Squares Fit (LSF). Since the operation is simple and GUI-based, complicated statistical analysis required for reliability can be done without much knowledge about the statistical theory. For example, the fit can be graphically changed to fit the main or defective population. Then, clicking on outlying data quickly identifies its source.

In addition to the statistical analysis tools, Agilent ASUR RDA provides physical reliability analysis capability. Physical reliability parameters are easily determined for the following:

- Hot-Carrier Degradation Lifetime extraction (Ib, 1/Vd and Ig model)
- Electromigration activation energy and lifetime extraction

In addition, a unique and easy-to-use graphical calculator provides advanced users with the capability to perform mathematical operations on any set of data variables. Frequently used functions can be stored and accessed as macros in the calculator window. This gives the user significant freedom in defining new acceleration models and extracting the parameters. Direct extraction to and import of spreadsheet data further enhances the customization.

Agilent ASUR RDA also supports trend charts for Statistical Process Control (SPC) in a production environment. Agilent ASUR RDA provides complete data manipulation capability including data merge (from different lots, tests, processes, etc.); data filter for filtering of useful/defect/bad data from the group; data sorting and data extraction with simple graphical operation.

Flat Panel Display Tester

634

ATS-620 Series Array Test System

88000

- **Sure defect detection capability with short TACT (Total Average Cycle Time)** – Through the use of up to four test heads, multiple gate activation, and up to 15,360 data channels using two test heads, the ATS-620 series can achieve the fastest throughput of the current generation of testers. This makes full testing an efficient and much less costly option for manufacturers
- **High test sensitivity improves process and product quality** – The ATS-620 series enables electrical testing of all array pixels covering transistor, capacitance, electrode, and bus lines, which prevents any defective pixels in the array process from flowing into the next phase. The tester automatically checks the TFT characteristics and the open/short status of the lines and pixels and then effectively analyzes the defect mode based upon the result of the check
- **Efficient process feedback and productivity improvement** – The ATS-620 series' full array test capability eliminates process defects, which leads to a large increase in process yield, improved manufacturing productivity and a significant reduction in cost



The Agilent 88000 ATS-620 series Array Test System, together with the complete line of Agilent 88000 Series Flat Panel Display (FPD) Test Systems, provides FPD manufacturers with a high-quality, low-cost production test solution for all key technologies in the rapidly growing FPD market. Agilent Technologies has expanded its test coverage into FPD test by providing FPD manufacturers with the Agilent 88000 ATS-620 series, providing both high sensitivity and short TACT.

An array tester can provide significant cost savings by detecting defects early in the process of manufacturing flat-panel displays. This produces downstream savings in parts and cell assembly cost. The Agilent 88000 ATS-620 series is a fast and proven solution for amorphous silicon (a-Si) TFT array testing of 7th and 8th generation FPD production lines.

The Agilent 88000 ATS-620 series tests TFT arrays of a-Si LCD panels based on TN, MVA and IPS, with wide coverage up to Q-HDTV. The ATS-620 series reduces manufacturing costs and improves process quality and yield by providing precise upstream defect detection in large and wide-size FPDs, while reducing TACT. Leveraging Agilent's extensive measurement expertise, the ATS-620 series also provides greater sensitivity than competitive solutions. This means the ATS-620 series can detect more performance inconsistencies, which helps to reduce scrap cost, improve quality, and boost yield.

Specifications

Primary Test Target

TFT arrays of a-Si LCD panels

Maximum Number of Test Heads

Four

Typical Evaluation Items

Line and Pixel area: Open, Short, Ion, Ioff, Vth, Cs, and Charge in pixel

Number of Channels

15,360 data and 3,072 gate

Multi-site Test

Up to 8 sites

Accessories

System Components

- Tester Rack (Main Frame)
 - Control Unit
 - AC Unit
 - Power Unit
 - Controller
- Test Head
- Master Controller
- System Software

Key Literature & Web Link

Agilent 88000 ATS-620 series Array Test System Product Overview, p/n 5989-5424EN

www.agilent.com/see/fpdtest

Ordering Information

The Agilent 88000 ATS-620 series testers are system products and must be configured in consultation with an Agilent sales professional specializing in these products.

Note: When ordering, please use product number N2455B.

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- **Fast full array test technology within allotted TACT (Total Average Cycle Time) – The Agilent 88000 HS-100 series is the only array tester that offers a full, rather than sample, testing solution for FPD manufacturers. In addition, customers have reported measurement times (TACT seconds/glass) that are 3 to 10 times faster than alternative solutions**
- **High testing sensitivity and exact defect detection – With greater sensitivity than competitive solutions or the human eye, the Agilent 88000 HS-100 series can detect more performance inconsistencies, or “mura”, which helps to boost yields, to reduce scrap cost and to improve quality assurance**
- **Provides the data needed for efficient process feedback and product cost reduction – The Agilent 88000 HS-100 series’ full array test improves product yield by eliminating defective parts from the process**
- **Adapts to new FPD technology, including AM-OLED, COG (Chip On Glass) and SOG (System On Glass) – The Agilent 88000 HS-100 series is the first solution to realize array test value and, therefore, the most suitable and most effective solution available for new FPD technologies, including various types of AM-OLEDs and SOG, with test consulting and continuous enhancements**
- **Total test solution – Tight collaboration with solution partners, such as FPD probe and probe unit suppliers, provides a highly integrated test environment**

The Agilent 88000 HS-100 series High Speed and Sensitivity Array Test System, together with the complete line of Agilent 88000 Series FPD Test Systems, provides FPD manufacturers with a high-quality, low-cost production test solution for all key technologies in the rapidly growing FPD market. The Agilent 88000 HS-100 series leverages Agilent’s knowledge and expertise in providing both ultra-precise measurement solutions for parametric testing and high-speed tester architectures for IC testing. Agilent Technologies has expanded its test coverage into FPD test by providing FPD manufacturers with the Agilent 88000 HS-100 series as a complement to our existing parametric test solutions.

For manufacturers of LTPS LCD and AM-OLED, the Agilent 88000 HS-100 series provides both high sensitivity and short TACT. Due to its broad application-fast go/no go testing for mass production, process management and a variety of other roles such as sorting, minute defect detection, reliability analysis and electrical test after LC filling/EL deposition in cell process – customers can expect to achieve post-process cost savings, expedited yield ramp-up, and stabilization of the production process.

Unlike current sample testing, the Agilent 88000 HS-100 series offers complete product testing, which reduces manufacturing costs while improving yield. To augment the HS-100 series, especially for COG LCD testing, the HS-101 series with an external multiplexer is available as a cost-effective solution. The full value of array testing is realized with the Agilent 88000 HS-100 series. With more data for process feedback and an exact segregation of scrap parts, the Agilent 88000 HS-100 series offers highly sensitive testing at lower cost.

The Agilent 88000 HS-100 series – a complete solution comprised of hardware, software and services – is the first solution to fully realize array test value and, therefore, the most suitable and most effective solution available.



Specifications

Primary Test Target

TFT arrays of LTPS LCD, HTPS LCD, AM-OLED, SOG, and COG panels

Typical Evaluation Items

- Pixel area: Open, Short, Ion, Ioff, Vth, OLED drive transistor
- Peripheral circuitry area: Open or short between lines, Shift register carry out

Current Measurement Range and Resolution

- Range: 20 μ A, 2 μ A, 200 nA, 20 nA
- Resolution: 5 nA, 500 pA, 50 pA, 5 pA

Charge Measurement Repeatability (Supplemental Characteristics)

$\sigma \leq 5$ fC (equivalent to 1 fF)

Number of Measurement Pins

Up to 2304 pins (2 test heads with multiplexer)

Multi Site Test

Up to 16

Accessories

System Components

- System Cabinet
- Test Head
- Pixel Measurement Card (PMC) [charge and current measurement, video signal setting]
- High Performance Channel Test Card (HPCTC) [peripheral circuit setting and evaluation]
- Device Power Supply to Panel (DPS)
- Multiplexer Unit (MUX) [MUX on testhead or external MUX]
- System Controller
- System Software, Abundant Test and Analysis Libraries

Key Literature & Web Link

Agilent 88000 HS-100 series High-Speed and Sensitivity Array Test System Product Overview, p/n 5989-1625EN

www.agilent.com/see/fpdtest

Ordering Information

The Agilent 88000 HS-100 series testers are system products and must be configured in consultation with an Agilent sales professional specializing in these products.

Note: When ordering, please use product number N2500A.