

SEMICONDUCTOR MEASUREMENT INSTRUMENTS

Semiconductor Parameter Analyzer

HP 4155A, 4156A

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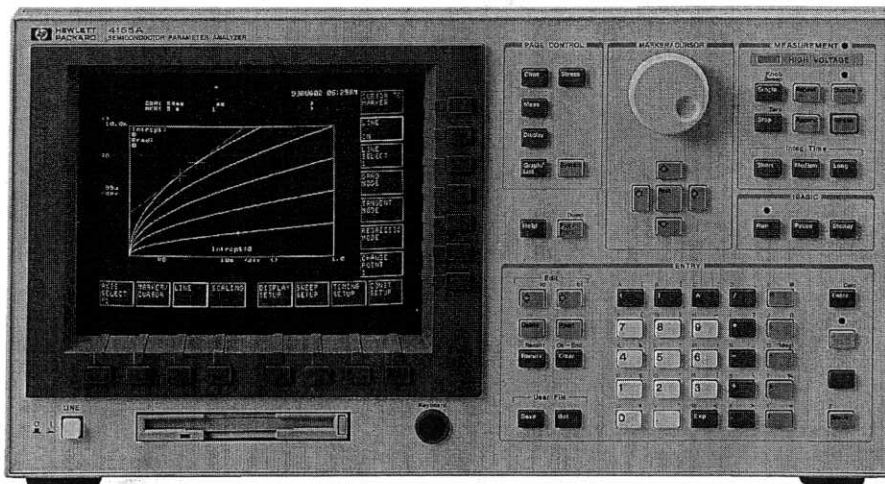
Whether you are looking for a low-cost bench-top instrument or an automated test system, HP can meet your semiconductor test needs with its Just-Enough-Test line of semiconductor measurement instruments. This instrument family provides versatile coverage of application needs in process development, device characterization, process monitoring, reliability testing, failure analysis, and incoming inspection. The low leakage switching matrix, various useful accessories, and Windows-based interactive characterization software allow the instruments to be configured flexibly from a one-box solution to an integrated, automated system.

Product	Applications								
	Basic I-V	Low Current	Ultra Low Current	High Voltage & Current	Pulsed Meas.	Time Domain Meas.	C-V & C-t	Multi-freq. Meas.	Quasi-Static C-V
HP 4156A	V	V			V	V			
HP 4156A	V	V	V		V	V			
HP 4142B	V	V		V	V				
HP 4140B	V	V	V						V
HP 4280A							V		
HP 4284A								V	

HP Semiconductor Measurement Instruments for Applications

- High-resolution/accuracy and wide range. I: 1 fA to 1 A (20 fA offset accuracy), V: 1 μ V to 200 V
- Fully automated I-V sweep measurements with dc or pulse mode, expandable up to 6 SMUs.
- Synchronized stress/measure function, two high-voltage pulse generator units (± 40 V).

- Time domain measurement: 60 μ s - variable intervals, up to 10,001 points.
- Easy to use: knob-sweep similar to curve tracer, automatic analysis functions.
- Automation: built-in HP Instrument BASIC, trigger I/O capability.



HP 4155A

HP 4155A Semiconductor Parameter Analyzer HP 4156A Precision Semiconductor Parameter Analyzer

The HP 4155A and HP 4156A are the next generation in precision semiconductor parameter analyzers. You get the best digital sweep parameter analyzer plus a reliability tester, powerful failure analysis tool, and automated incoming inspection station, all rolled into a single instrument.

This new family was explicitly designed to provide unprecedented accuracy and functionality for evaluating your sub-micron geometry devices. With one flexible instrument, you can improve your semiconductor quality starting from material evaluation and device characterization all the way through final packaged part inspection and field failure analysis.

Choose the Right Solution

The HP 4155A/56A offer four built-in source/monitor units (SMUs), two voltage source units (VSUs), and two voltage monitor units (VMUs). The HP 4155A is best suited for basic semiconductor applications with its non-kelvin connections, 10 fA/1 μ V resolution, and 100 mA/100 V measurement range. For critical low-level characterization, the HP 4156A extends current resolution to 1 fA and accuracy to 20 fA. The HP 4156A utilizes full kelvin remote sensing on each SMU.

At any time, you can add the HP 41501A SMU and Pulse Generator Expander, which is supplied with a 0 V/1.6 A Ground Unit. The expander accepts two 100 mA/100 V SMUs or one 1 A/200 V SMU, and two specially synchronized 40 V/200 mA/1 μ s pulse generators.

Setup and Measurement

HP 4155/56A can perform staircase and pulse sweep measurement, and sampling (time domain) measurement using many measurement units, including units in the HP 41501A, without changing connections. Moreover you can easily perform stress-measure cycling test for reliability evaluation such as hot carrier injection and flash EEPROM test.

Setup and measurement are made by setting up pages and filling in the blanks from front panel keys, keyboard, or HP-IB (SCPI commands). You can also instantly measure and find setup conditions by using knob sweep capability, which is similar to curve tracer operation.

Display and Analysis

The measurement and analysis results are displayed on the color CRT, and you can superimpose stored graphics from four graphic memories for comparison. A number of powerful graphical analysis tools make it easy to analyze and extract many parameters such as hfe and Vth.

Once you find the parameter extraction conditions, you can automatically get the parameter by using the automatic analysis function.

Output and Storage

Setup, measurement, and analysis data can be output via HP-IB or serial interface to a color plotter and printer. You can also save the data onto a 3-inch disk in MS-DOS or LIF format. Graphic (HP-GL or PCL) output file allows you to transfer graphics to desktop publishing software.

Repeating and Automating Tests

The HP Instrument BASIC controller built into the HP 4155/56A can construct an automatic measurement system using external instruments without a controller. HP 4155/56A can be synchronized with external instruments by the versatile trigger I/O functions.

