Simple and Efficient Failure Analysis Using the B1505A Power Device Analyzer/Curve Tracer

Wide voltage and current range (3000 V/20 A) and Windows PC-based single-box design greatly improve failure analysis efficiency

Introduction

In conventional failure analysis an electrical characterization is performed to determine the failure mode (such as functional failures, DC leakage failures, etc.). Curve tracers have been one of the most common tools used for DC electrical characterization because they offer easy performance checking and they cover a wide range of voltages and currents. However, all major suppliers have stopped making curve tracers and there are currently no substitute products available.

After performing electrical characterization during failure analysis, it is important to be able to report the results to internal departments or to the customer. Current tools only possess slow speed floppy disk drives or require users to take pictures of the display using a digital camera. This makes data collection and reporting very inconvenient as well as consuming large amounts of time.

Finally, having a proper test fixture solution is extremely important, both to insure safety (due to the high voltages and currents used) and to support the wide variety of device types that must be evaluated for failure analysis. This is not supported by currently available tools.

B1505A Features and Benefits

The Agilent B1505A Power Device Analyzer/Curve Tracer solves the above issues with the following features.

Wide voltage and current range

The B1505A is the only single box solution available today with the capability to characterize devices from the sub-picoamp level up to 3000 volts and 20 amps. The B1505A has separate modules that support high-current and high-voltage, and its ten-slot modular construction lets you configure the B1505A exactly the way you want. You also have ample room for expansion if your measurement needs change in the future.

Quick measurement via the curve tracer mode

The B1505A software environment allows users to check device characteristics and detect device faults with the easy convenience of a curve tracer. Just like on a curve tracer, the B1505A supports rotary knob control of the independent sweep variable for intuitive and real-time evaluation of parameters such as breakdown voltage. Unlike conventional curve tracers, device parameters can be automatically analyzed using the auto-analysis function and displayed on the screen when the measurement is done.

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Reporting capability

The B1505A, which uses the same PC-based EasyEXPERT software as Agilent's popular B1500A Semiconductor Device Analyzer, allows users to get measurement results quickly and easily. The measurement setup information and data can be automatically stored to the B1505A's built-in hard disk drive, and transferred to USB memory sticks as well as other portable storage devices. This makes it easy to share data with other departments and to save data for future reference. It is also easy to print graphical measurement data and to copy and paste it into reports when the analysis results are summarized.

Release information

- Orderable: May 1, 2009

Technical Information

Key features

- Device characterization at 3000 volts and 20 amps in a single instrument
- Sub picoamp level measurement capability at high voltage
- 50 microsecond current pulse width at high current
- Capacitance-Voltage (CV) measurement with up to 3000 V bias
- Quick device check enabled by curve tracer mode
- Easy operation and data management functions with PC-based EasyEXPERT software
- On-wafer testing and prober control
- Standard test fixture with interlock ensures a safe measurement environment

Preliminary specifications

- HVSMU:
  - Maximum voltage/current: 1500 V/8 mA; 3000 V/4 mA (DC and Pulsed)
  - Pulse width: 500 µs to 2 s
  - Pulse period: 5 ms to 5 s
  - Leakage measurement: less than one picoamp
  - Measurement: 10 fA to 8 mA, 1 mV to 3000 V
  - Maximum of one HVSMU module per mainframe;
- HCSMU:
  - Maximum current/voltage: 20 A/20 V (Pulsed) 1 A /40 V (DC)
  - Pulse width: 50 µs – 1 ms
  - Measurement: 10 pA to 20 A, 200 nV to 40 V
  - Maximum of two HCSMU modules per mainframe
- Supported modules: HPSMU/HCSMU/HVSMU/MFCMU/GNDU
- Software: EasyEXPERT 4.0 (includes curve tracer mode and application tests for power device characterization)

Reference information

Please refer to product note *Agilent B1505A Power Device Analyzer/Curve Tracer* (P/N: 5989-9966EN)

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Revised: October 1, 2008

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Printed in USA, November 21, 2008
5989-9962EN

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