

KEYSIGHT TECHNOLOGIES (AGILENT HP)

4155A

The Keysight Technologies (formerly HP / Agilent) 4155A is an industry-standard Semiconductor Parameter Analyzer designed for high-precision device characterization, parametric measurement, and analysis. Equipped with four built-in Medium-Power Source/Monitor Units (MPSMUs), two Voltage Source Units (VSUs), and two Voltage Monitor Units (VMUs), the 4155A offers an all-in-one solution for evaluating semiconductor materials, devices, and sub-micron processes.

SPECIFICATIONS

Hardware Configuration

Number of Medium-Power SMUs (MPSMUs)	4
Number of High-Power SMUs (HPSMUs)	0
Number of High-Resolution SMUs (HRSMUs)	0
Number of Voltage Source Units (VSUs)	2
Number of Voltage Monitor Units (VMUs)	2
Ground Unit (GNDU) Current Sinking Capability	1.6 A

SMU Source/Measure Specifications

MPSMU Maximum Voltage	± 100 V
MPSMU Maximum Current	± 100 mA
MPSMU Minimum Current Measurement Resolution	10 fA

Voltage Source (VSU) and Monitor (VMU) Specifications

VSU Output Voltage Range	± 20 V
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Sweep and Pulse Characteristics

Maximum Number of Sweep Steps	1001
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Sampling Measurement Functions

Minimum Sampling Interval	60 μ s
Maximum Number of Sampling Points	10001

System, I/O and Connectivity

Programming Commands/Language Support	HP Instrument BASIC (IBASIC)
Safety Interlock Connector	Yes

System Configuration

Expander Compatibility	Agilent / Keysight 41501A or 41501B SMU/Pulse Generator Expander
Maximum SMUs with Expander	6 (4 built-in MPSMUs + up to 2 extra SMUs via 41501A/B)
Maximum PGUs with Expander	2 (using 41501A/B)

Connectors

MPSMU Connector Type	Triaxial
GNDU Connector Type	Triaxial (Kelvin connection with Force and Sense)
VSU Connector Type	BNC
VMU Connector Type	BNC

Power Requirements

Power Consumption	450 VA (maximum)
Line Frequency	47 Hz to 63 Hz

Environmental

Warm-up Time	40 minutes
Storage Temperature Range	-20 °C to 60 °C
Storage Humidity Range	5% to 90% RH (non-condensing)
Operating Altitude	Up to 2,000 m (6,561 ft)
Storage Altitude	Up to 4,600 m (15,091 ft)

Safety & Control

Interlock Voltage Restriction	Output voltage limited to ±42 V maximum when the interlock terminal is open
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Measurement Capabilities

Stress Force Mode	Supported (for reliability testing)
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Voltage Monitor Unit (VMU)

VMU Single-Ended Measurement Ranges	±2 V, ±20 V
VMU Differential Measurement Ranges	±0.2 V, ±2 V

Measurement Performance

Integration Time (Medium)	1 PLC (16.7 ms @ 60 Hz, 20 ms @ 50 Hz)
Integration Time (Long)	16 PLC (268 ms @ 60 Hz, 320 ms @ 50 Hz)

Expansion Capabilities

Compatible Expander Model	HP 41501A / 41501B
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TECHNOLOGY

Semiconductor Parametric Testing

APPLICATIONS

Semiconductor Device Characterization and DC Parametric Analysis

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