KEYSIGHT TECHNOLOGIES (AGILENT HP)

4145B

The Keysight (Agilent HP) 4145B is a fully automatic, high-performance semiconductor parameter analyzer designed for the DC characterization and analysis of semiconductor devices. It features four built-in Source/Monitor Units (SMUs), two Voltage Source Units (VSUs), and two Voltage Monitor Units (VMUs), with a built-in interactive graphics CRT display and a 3.5-inch flexible-disc drive.

SPECIFICATIONS

General

Interfaces	GPIB (HP-IB)
Display	16 cm (6.25 in) diagonal CRT, electrostatic focus/deflection, post accelerated, aluminized P-31 phosphor, 2048 x 2048 resolution
Warm-up Time	40 minutes
Self-Test Capability	Built-in automatic self-test and diagnostics

Physical

Power Supply	100/120/220 V AC +/-10%, 240 V AC -10% +5%, 48 to 66 Hz, 280 VA max
Operating Temperature	10 to 40 °C °C
Dimensions (W×H×D)	426 mm x 235 mm x 612 mm mm
Weight	27 kg kg

System Configuration & Channels

Total Measurement Channels	8 channels
Source/Monitor Units (SMU)	4 channels
Voltage Source Units (VSU)	2 channels
Voltage Monitor Units (VMU)	2 channels
Maximum Withstand Voltage	100 V
Maximum Voltage between Common and GND	Less than +/-42 V

SMU Specifications

SMU Modes of Operation	Voltage source/current monitor (V), current source/voltage monitor (I), common (COM)
SMU Sweep Waveforms	Linear or logarithmic sweep, constant
SMU 20V Range Max Voltage	+/-20 V
SMU 20V Range Resolution	1 mV
SMU 20V Range Max Current	100 mA
SMU 40V Range Max Voltage	+/-40 V
SMU 40V Range Resolution	2 mV
SMU 40V Range Max Current	50 mA
SMU 100V Range Max Voltage	+/-100 V
SMU 100V Range Resolution	5 mV
SMU 100V Range Max Current	20 mA
SMU Current Range	+/-1000 pA to +/-100 mA
SMU Current Ranging Mode	Automatic ranging
Maximum SMU Output Power	2 W per SMU

Display & Analysis Functions

Display Modes	GRAPHICS, LIST, MATRIX, SCHMOO, and TIME DOMAIN
Cursor Types	LONG and SHORT (two intersecting perpendicular lines)
Cursor Coordinates Display	X, Y1, and Y2 coordinates digitally displayed on CRT
Analysis Tools	Overlay graph comparison, auto retrieve function, marker movement on a plotted curve, interpolation
Softkey Functions	AUTO SCALE, STORE, RECALL, CURSOR, MARKER, vertical and horizontal ZOOM, LINE (two), GRAD, 1/GRAD, X intercept, Y intercept, INTERPOLATE
User-Defined Functions	Up to two USER FUNCTIONs defined as arithmetic expressions
Arithmetic Operators Supported	Arithmetic operators, common and natural log, Napierian constant, exponentiation, absolute, scientific notation, differential calculation
Keyboard Operation	Arithmetic expressions executed via EXECUTE key
Stored Physical Constants	Three permanently stored physical constants (7-digit internal accuracy, 5-digit display)

Storage & Interfaces

Internal Storage Media	3.5-inch micro flexible-disc drive
Floppy Disc Format	Double-sided, double-density, 630K bytes

Accessories

Included Shielded Test Fixture	HP 16058A
Included DUT Boards	8 interchangeable boards (diodes, 3/4-terminal transistors, 8/10/12-pin devices, 18/24-pin DIP ICs)

Voltage Source Units (VSU)

VSU Output Voltage Range	±20.00 V
VSU Output Voltage Resolution	2 mV
VSU Maximum Output Current	100 mA

Voltage Monitor Units (VMU)

VMU Input Voltage Ranges	±2 V, ±20 V
VMU Maximum Resolution	20 µV (on ±2 V range)
VMU Input Impedance	≥10 GΩ

Pulse Generator Units (PGU)

PGU Quantity	0

Source/Monitor Units (SMU)

SMU Minimum Current Measurement Resolution	1 pA (on 1 nA range)

Power Requirements

Line Voltage	90-110 V / 104-126 V / 194-236 V / 208-250 V (switchable)
Line Frequency	48 Hz to 66 Hz
Power Consumption	280 VA maximum

Measurement Configuration

Integration Times	Short (~2.1 ms at 60 Hz, 2.5 ms at 50 Hz), Medium (1 PLC), Long (16 PLC)
Hold Time Range	0 to 650.0 s
Hold Time Resolution	100 ms
Hold Time Accuracy	±(0.1% + 10 ms)
Delay Time Range	0 to 6.500 s
Delay Time Resolution	1 ms
Delay Time Accuracy	±(0.1% + 100 µs)
Step Delay Time Range	0 to 6.500 s
Step Delay Time Resolution	1 ms
Step Delay Time Accuracy	±(0.1% + 100 µs)
Maximum Sweep Steps	1001 steps (linear sweep), 1 to 11 decades (log sweep)

TECHNOLOGY

Semiconductor Parametric Testing

APPLICATIONS

DC evaluation of semiconductor devices, materials, IC design validation, and process control