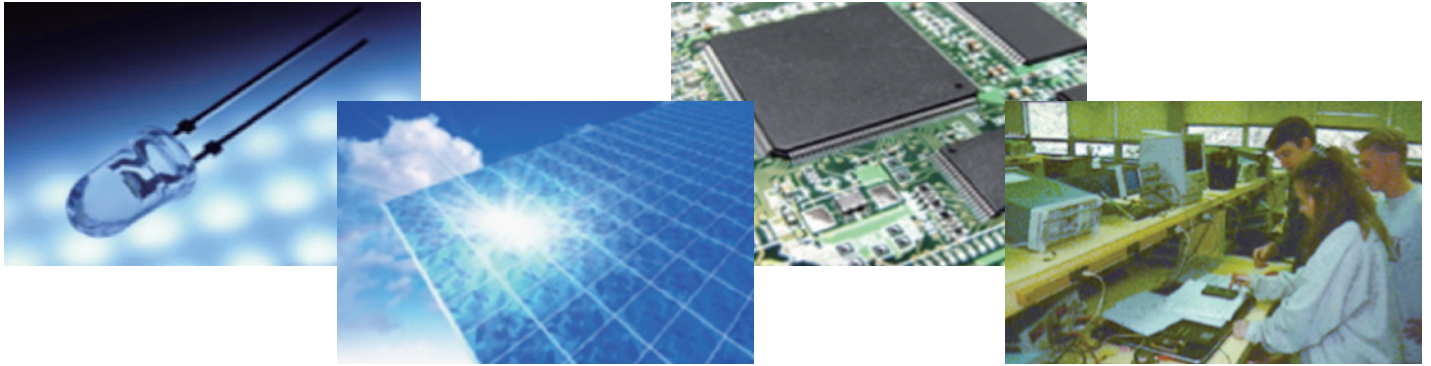


# Keysight Technologies

## Ultra Low Current Measurement Equipment

### Selection Guide

Keysight's stellar lineup of measurement equipment, from nanotechnology to high-power  
The best-suited equipment for your effective use



Nanoscale devices require both lower signal levels and lower power levels for proper operation. In order to characterize these devices and the semiconductor processes on which they are made, it is essential to be able to make accurate low-level current measurements. Keysight's multimeters, source/measure units (SMUs) and power analyzers provide subtle solutions to the needs. Poor choice of tools, however, is still a persistent problem, and an unwitting mistake in current measurement fails to yield anticipated results. This guide helps you make the right choice of ultra low current measurement equipment from our strong lineup to maximize the effects of the product.

#### Single-channel accurate low current measurement



34410A/11A 6½ Digit Digital Multimeter  
Industry-standard general bench-top digital multimeter  
Capable of measurements of currents from 100 pA to 3 A



3458A 8½ Digit Digital Multimeter  
Renowned as the best-in-industry digital multimeter  
High-resolution measurements of currents from 1 pA to 1 A  
Superior high-resolution 10 nV voltage measurements



4339B High-Resistance Meter  
Supports high-resistance measurements, 103 ohm to  $1.6 \times 10^{16}$  ohm  
Surface resistance and volume resistance measurements also available  
Capable of measurements of currents from 10 fA to 100  $\mu$ A

#### Prominent power evaluation



N6705B DC Power Analyzer  
All-in-one DC power analyzer housing the power source, digital multimeter, oscilloscope, arbitrary function generator and data logger

#### IV characterization SMU



U2322A/23A USB Modular Source/Measure Unit  
Cost-effective 3-channel SMU  
Capable of measurements of currents from 100 pA to 120 mA

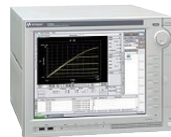


B2900A Series Precision Source/Measure Unit  
High-performance SMU with 1- or 2-channel configuration  
Capable of measurements of currents from 10 fA to 10 A  
Suitable for versatile application with the wide coverage of 210 V and 3 A DC/10 A pulse



B1500A Semiconductor Device Analyzer  
Single-box solution for current/voltage (IV), capacitance/ voltage (CV), pulse generation, fast IV, and time-domain measurements  
Supports current-voltage (IV) measurement to 0.1 fA and 0.5  $\mu$ V

#### Wide IV sourcing range, from high-power to low current characterization



B1505A Power Device Analyzer/ Curve Tracer  
All-in-one module type instrument designed for high power devices up to 10 kV/1500 A, performing a double function of curve tracer and semiconductor parameter analyzer

Ultra low current measurement equipment lineup				
Product model	B2901A/2A	B2911A/12A	B1500A	B1505A
Product name	Precision Source/ Measure Unit	Precision Source/ Measure Unit	Semiconductor Device Analyzer	Power Device Analyzer/ Curve Tracer
Product picture				
Measurement type	SMU	SMU	SMU	SMU
Voltage Force/Current Measure	✓	✓	✓	✓
Current measurement (floating)	✓	✓	–	–
Current measurement range	100 nA–10A	100 nA–10A	1 pA–1A	1 nA–1500A
Minimum current resolution	100 fA	10 fA	0.1 fA	10 fA
Minimum current measurement accuracy	+/- (0.06 % of rdg + 100 pA)	+/- (0.10 % of rdg + 50 pA)	+/- (0.9 % of rdg + 15 fA)	+/- (0.1 % of rdg + 300 fA + 1 fA x force voltage)
Number of channels	1 ch/2 ch	1 ch/2 ch	Expandable (10 slots)	Expandable (10 slots)

Product model	34410A/11A	3458A	4339B	N6705B (N6784A)	U2722A/23A
Product name	Digital Multimeter	8½ Digit Digital Multimeter	High-Resistance Meter	DC Power Analyzer	USB Modular Source/ Measure Unit
Product picture					
Measurement type	Ammeter	Ammeter	Ammeter	SMU	SMU
Voltage Force/Current Measure	–	–	✓	✓	✓
Current measurement (floating)	✓	✓	–	–	–
Current measurement range	100 µA–3A	100 nA–1A	100 pA–100 µA	10 µA–3A	1 µA–120 mA
Minimum current resolution	100 pA	1 pA	10 fA	100 pA	100 pA
Minimum current measurement accuracy	+/- (0.05 % of rdg + 0.025 % of range)	+/- (30 ppm of rdg + 400 ppm of range)	+/- ((2.57 + (6E -12/ measuring current source)) % of rdg)	+/- (0.025 % of rdg + 8 nA)	+/- (0.085 % of rdg + 0.85 nA)
Number of channels	1 ch	1 ch	1 ch	1 ch	3 ch

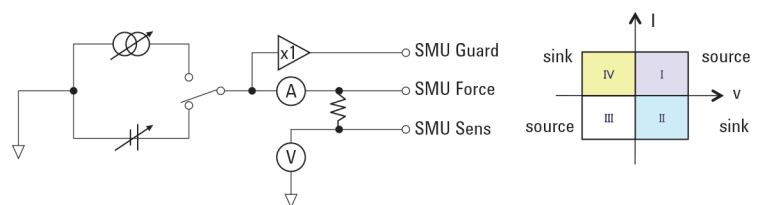
### Difference between source measure unit (SMU) and ammeter

Source Measure (or Monitor) Unit, referred to as SMU, is a DC power source that enables force and measurement of voltage and current. Key features include:

- High-accuracy, low-noise voltage and current output
- Ultra low current measurement capabilities
- 4-quadrant (at least 2-quadrant) measurement capabilities

An ammeter is only capable of measurements.

General SMU structure



For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: [www.keysight.com/find/contactus](http://www.keysight.com/find/contactus)