

KEITHLEY

# 2601B

The Keithley 2601B is a high-performance, single-channel System SourceMeter Source Measure Unit (SMU) designed to tightly integrate precision power sourcing and highly accurate measurement capabilities. Belonging to Keithley's industry-standard Series 2600B family, it features a dual-line vacuum fluorescent display, a fast sweep rate up to 20,000 readings per second, and embedded Test Script Processor (TSP) technology to automate complex test sequences directly on the instrument.

## SPECIFICATIONS

### General

|            |                                                                                   |
|------------|-----------------------------------------------------------------------------------|
| Interfaces | GPIB, LAN (LXI Class C), USB 2.0 (Type B), RS-232, TSP-Link, Digital I/O (25-pin) |
| Display    | Dual-line Vacuum Fluorescent Display (VFD)                                        |

### Physical

|                       |                                                   |
|-----------------------|---------------------------------------------------|
| Power Supply          | 100 V to 240 V AC, 50 Hz to 60 Hz, 240 VA maximum |
| Operating Temperature | 0 °C to 50 °C °C                                  |
| Dimensions (W×H×D)    | 213 mm × 89 mm × 460 mm mm                        |
| Weight                | 4.75 kg                                           |

## Source Specifications

|                                       |                                                                                              |
|---------------------------------------|----------------------------------------------------------------------------------------------|
| Number of SMU Channels                | 1                                                                                            |
| Maximum Output Power                  | 40 W (DC), 200 W (Pulse)                                                                     |
| Maximum DC Voltage                    | 40 V                                                                                         |
| Maximum DC Current                    | 3 A @ 6 V, 1 A @ 40 V                                                                        |
| Maximum Pulse Current                 | 10 A @ 20 V                                                                                  |
| Voltage Source Ranges                 | 100 mV, 1 V, 6 V, 40 V                                                                       |
| Current Source Ranges                 | 100 nA, 1 $\mu$ A, 10 $\mu$ A, 100 $\mu$ A, 1 mA, 10 mA, 100 mA, 1 A, 3 A, 10 A (Pulse only) |
| Voltage Source Programming Resolution | 5 $\mu$ V (100 mV range), 50 $\mu$ V (1 V range), 500 $\mu$ V (6 V range), 2 mV (40 V range) |
| Voltage Programming Accuracy          | $\pm(0.02\% + 12 \text{ mV})$ on 40 V range                                                  |
| Current Programming Accuracy          | $\pm(0.05\% + 1.8 \text{ mA})$ on 1 A range                                                  |
| Voltage Compliance Range              | 101 mV to 40.4 V                                                                             |
| Current Compliance Range              | 101 nA to 3.03 A                                                                             |
| Voltage Source Load Regulation        | 0.01% of range + 1 mV (0% to 100% load change)                                               |
| Voltage Source Line Regulation        | 0.01% of range (10% line change)                                                             |
| Current Source Load Regulation        | 0.01% of range + 100 pA (100 nA to 1 A ranges, 0% to 100% load change)                       |
| Current Source Line Regulation        | 0.01% of range (10% line change)                                                             |
| Transient Response Time               | < 110 $\mu$ s (to recover to within 0.1% of limit for a 10% to 90% load change)              |
| Voltage Source Settling Time          | < 50 $\mu$ s typical (to within 0.1% of final value, 6 V range, 100 mA load)                 |
| Current Source Settling Time          | < 80 $\mu$ s typical (to within 0.1% of final value, 1 mA range, 10 V compliance)            |
| Voltage Source Overshoot              | < 0.1% typical (full scale step, resistive load)                                             |
| Current Source Overshoot              | < 0.1% typical (full scale step, resistive load, 10 $\mu$ A to 3 A ranges)                   |

## Measurement Specifications

|                                        |                                                                                              |
|----------------------------------------|----------------------------------------------------------------------------------------------|
| Voltage Measurement Ranges             | 100 mV, 1 V, 6 V, 40 V                                                                       |
| Current Measurement Ranges             | 100 nA, 1 $\mu$ A, 10 $\mu$ A, 100 $\mu$ A, 1 mA, 10 mA, 100 mA, 1 A, 3 A, 10 A (Pulse only) |
| Voltage Measurement Accuracy           | $\pm(0.015\% + 8 \text{ mV})$ on 40 V range                                                  |
| Current Measurement Accuracy           | $\pm(0.03\% + 1.5 \text{ mA})$ on 1 A range                                                  |
| Maximum Voltage Measurement Resolution | 100 nV                                                                                       |
| Maximum Current Measurement Resolution | 100 fA                                                                                       |
| Input Impedance                        | >10 G $\Omega$ (on <6 V ranges)                                                              |
| Sensing Method                         | 2-wire, 4-wire (Remote Sense)                                                                |

## Pulse Characteristics

|                          |                     |
|--------------------------|---------------------|
| Minimum Pulse Width      | 100 $\mu$ s         |
| Maximum Pulse Duty Cycle | 10% (at 10 A range) |

## Dynamic and Sweep Performance

|                         |                                        |
|-------------------------|----------------------------------------|
| Maximum Sweep Rate      | 20,000 readings per second (to memory) |
| Reading Buffer Capacity | >140,000 readings                      |

## Connectivity and Interfaces

|                                |                                                 |
|--------------------------------|-------------------------------------------------|
| LXI Compliance                 | LXI Core 2011                                   |
| Digital I/O Port Configuration | 25-pin D-sub, 14 configurable digital I/O lines |
| TSP-Link                       | Yes, for multi-channel expansion                |

## Software and Programming

|                      |                                                    |
|----------------------|----------------------------------------------------|
| Command Set Support  | TSP (Test Script Processor), SCPI (2400 emulation) |
| Programming Language | Lua (embedded in TSP)                              |

## Power and Environmental

|                           |                                                            |
|---------------------------|------------------------------------------------------------|
| Operating Humidity Range  | 0 °C to 35 °C, 70% R.H.; 35 °C to 50 °C, derate 3% R.H./°C |
| Storage Temperature Range | -25 °C to 65 °C                                            |
| Warm-Up Time              | 2 hours                                                    |

## Physical and Safety

|                      |              |
|----------------------|--------------|
| Form Factor          | 2U half-rack |
| Calibration Interval | 1 year       |

## Electrical Specifications

|                               |                                                    |
|-------------------------------|----------------------------------------------------|
| Maximum Common Mode Voltage   | 250 V DC (LO to chassis)                           |
| Maximum Sense Lead Impedance  | 3 V max voltage drop per lead to maintain accuracy |
| Sense Input Impedance         | > 10 G $\Omega$                                    |
| Guard Offset Voltage          | < 300 $\mu$ V                                      |
| Source Over-range Capability  | 101% of source range                               |
| Measure Over-range Capability | 102% of measurement range                          |

## A/D Converter

|                            |                     |
|----------------------------|---------------------|
| ADC Integration Time Range | 0.001 PLC to 10 PLC |
|----------------------------|---------------------|

## Power Requirements

|                           |                                             |
|---------------------------|---------------------------------------------|
| Maximum Power Consumption | 240 VA                                      |
| Line Frequency Range      | 50 Hz / 60 Hz (auto-sensing)                |
| Line Voltage Range        | 100 V to 240 V AC ( $\pm$ 10% auto-sensing) |

## General & Mechanical

|                |                            |
|----------------|----------------------------|
| Cooling Method | Forced air, variable speed |
|----------------|----------------------------|

Compliance & Safety

|                          |                                                                |
|--------------------------|----------------------------------------------------------------|
| Product Safety Standards | UL 61010-1:2004, CAN/CSA C22.2 No. 61010-1-04, EN 61010-1:2001 |
| EMC Compliance           | Conforms to European Union Directive 2004/108/EEC, EN 61326-1  |

System Performance

|                                 |                                                   |
|---------------------------------|---------------------------------------------------|
| Maximum Single Reading Rate     | 20,000 readings/s (to internal memory, 0.001 PLC) |
| Trigger Latency                 | < 4 μs                                            |
| Trigger Jitter                  | < 0.5 μs                                          |
| Common Mode Isolation Impedance | > 1 GΩ, < 450 pF typical                          |

Interfaces & Connectivity

|                                |                                                                                       |
|--------------------------------|---------------------------------------------------------------------------------------|
| USB Interface Type             | USB 2.0 High Speed (Type-B port for device control, Type-A port for USB flash drives) |
| Ethernet Port Details          | RJ-45 connector, 10Base-T/100Base-TX                                                  |
| TSP-Link Interface Details     | Dual RJ-45 connectors for multi-chassis system expansion (up to 32 nodes)             |
| Internal 5V Power Supply Limit | 500 mA maximum cumulative limit                                                       |

TECHNOLOGY

Source Measure Unit (SMU)

APPLICATIONS

Precision DC/Pulse I-V characterization, semiconductor test, component testing, and production automation

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