Test Equipment Solutions Datasheet

Test Equipment Solutions Ltd specialise in the second user sale, rental and distribution of quality test & measurement (T&M) equipment. We stock all major equipment types such as Spectrum Analyzers, Signal Generators, Oscilloscopes, Power Meters, Network Analyzers etc from all the major suppliers such as Keysight, Tektronix, Anritsu and Rohde & Schwarz.

We are focused at the professional end of the marketplace, primarily working with customers for whom high performance, quality and service are key, whilst realising the cost savings that second user equipment offers. We fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 1 year warranty. Our staff have extensive backgrounds in T&M which enables us to deliver industry-leading service and support. We endeavour to be customer focused in every way right down to the detail, such as offering free delivery on sales, presenting flexible technical + commercial solutions and supplying a loan unit during warranty repair, if available.

As well as the headline benefit of cost saving, second user offers shorter lead times, higher reliability and multivendor solutions. Rental, of course, is ideal for shorter term needs and offers fast delivery, flexibility, try-before-you-buy, zero capital expenditure, lower risk and off balance sheet accounting. Both second user and rental improve the key business measure of Return On Capital Employed.

We are based in at Oakley, Bedfordshire in the UK from where we supply test equipment worldwide. Our facility incorporates Sales, Support, Admin, Logistics and our own in-house Lab.

All products supplied by Test Equipment Solutions include:

- No-quibble parts & labour warranty (we provide transport for UK mainland addresses).
- Free loan equipment during warranty repair, if available.
- Full electrical, mechanical and safety refurbishment in our 40GHz in-house Lab.
- Certificate of Conformance (calibration available on request).
- Manuals and accessories required for normal operation.
- Free insured delivery to your UK mainland address (sales).
- Support from our team of seasoned Test & Measurement engineers.
- ISO9001 quality assurance.

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2600B System SourceMeter® SMU Instruments

Datasheet

KEITHLEY
A Tektronix Company

The Series 2600B System SourceMeter SMU Instruments are the industry's leading current/voltage source and measure solutions, and are built from Keithley's third generation SMU technology. The Series 2600B offers single- and dual-channel models that combine the capabilities of a precision power supply, true current source, 6½-digit DMM, arbitrary waveform generator, pulse generator, and electronic load – all into one tightly integrated instrument. The result is a powerful solution that significantly boosts productivity in applications ranging from bench-top I-V characterization through highly automated production test. Built-in web browser based software enables I-V testing through any computer from anywhere in the world. Or, use your Android smart device to perform plug & play I-V testing with fingertip control with the Keithley IVy application. For automated system applications, the Series 2600B's Test Script Processor (TSP®) runs complete test programs from inside the instrument for industry-best throughput. In larger, multi-channel applications, Keithley's TSP-Link® Technology works together with TSP Technology to enable high-speed, SMU-per-pin parallel testing. Because Series 2600B SourceMeter SMU Instruments have fully isolated channels that do not require a mainframe, they can be easily reconfigured and re-deployed as your test applications evolve.

Key Features

- Tightly integrated, 4-quadrant voltage/current source and measure instruments offer best in class performance with 6½-digit resolution
- Family of models offer industry's widest dynamic range: 10A pulse to 0.1fA and 200V to 100nV
- Built-in web browser based software enables remote control through any browser, on any computer, from anywhere in the world
- Compatibility with the Keithley IVy mobile app enables true plug & play I/V characterization and test through any Android device
- TSP (Test Script Processing) technology embeds complete test programs inside the instrument for best-in-class system-level throughput
- TSP-Link expansion technology for multi-channel parallel test without a mainframe
- Software emulation for Keithley's 2400 SourceMeter SMU Instrument
- USB 2.0, LXI-C, GPIB, RS-232, and digital I/O interfaces
- Free software drivers and development/debug tools
- Optional ACS-Basic semiconductor component characterization software

Perform Quick I-V Characterization with Android™ Devices

The Series 2600B is compatible with the Keithley IVy application that is the fastest and easiest way to perform current-voltage (I-V) characterization, troubleshoot your

Perform quick I-V characterization with fingertip control to gain insight into your DUT.

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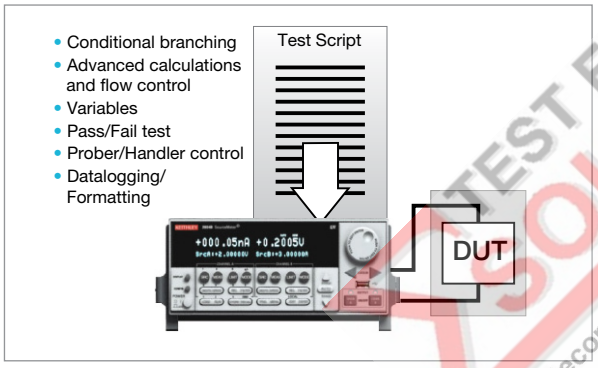
device under test (DUT), and share the measurement results with others. It allows you to visualize, interact with, and share measurement results without programming, while gaining a deeper understanding of your DUT. These unique capabilities boost productivity across a wide range of applications in R&D, education, QA/FA, and more.

Unmatched Throughput for Automated Test with TSP Technology

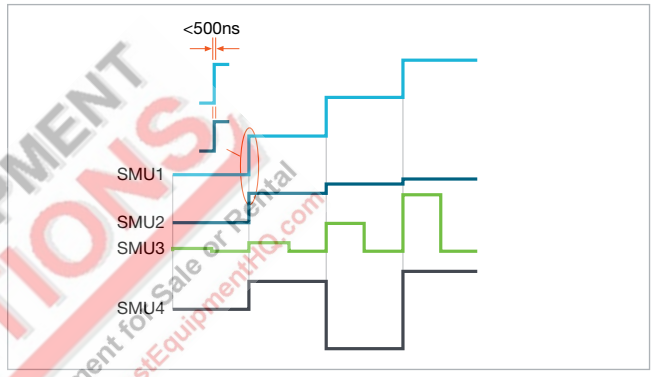
For test applications that demand the highest levels of automation and throughput, the 2600B's TSP technology delivers industry-best performance. TSP technology goes far beyond traditional test command sequencers — it fully embeds then executes complete test programs from within the SMU instrument itself. This virtually eliminates all the time-consuming bus communications to and from the PC controller, and thus dramatically improves overall test times.



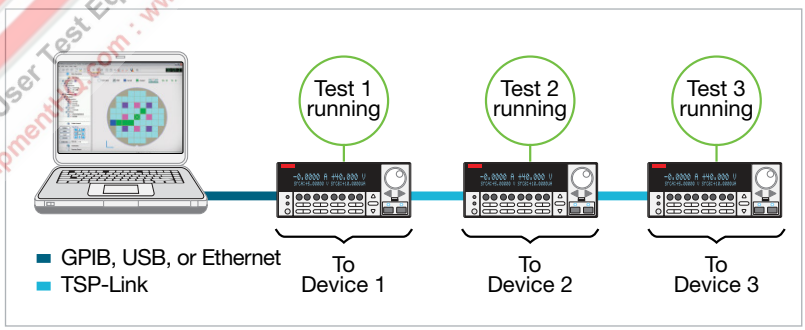
TSP technology executes complete test programs from the 2600B's non-volatile memory.

SMU-Per-Pin Parallel Testing with TSP-Link Technology

TSP-Link is a channel expansion bus that enables multiple Series 2600B's to be inter-connected and function as a single, tightly-synchronized, multi-channel system. The 2600B's TSP-Link Technology works together with its TSP technology to enable high-speed, SMU-per-pin parallel testing. Unlike other high-speed solutions such as large ATE systems, the 2600B achieves parallel test performance without the cost or burden of a mainframe. The TSP-Link based system also enables superior flexibility, allowing for quick and easy system re-configuration as test requirements change.



All channels in the TSP-Link system are synchronized to under 500ns.



SMU-Per-Pin Parallel Testing using TSP and TSP-Link improves test throughput and lowers the cost of test.

2400 Software Emulation

The Series 2600B is compatible with test code developed for Keithley's 2400 SourceMeter SMU instrument. This enables an easier upgrade from 2400-based test systems to Series 2600B, and can improve test speeds by as much as 80%. In addition, it provides a migration path from SCPI programming to Keithley's TSP technology, which when implemented can improve test times even more. For complete support of legacy test systems, the 2400's Source-Memory-List test sequencer is also fully supported in this mode.

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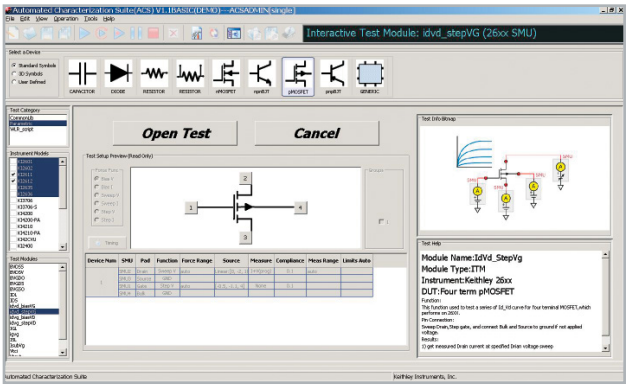
Third-generation SMU Instrument Design Ensures Faster Test Times

Based on the proven architecture of earlier Series 2600 instruments, the Series 2600B's SMU instrument design enhances test speed in several ways. For example, while earlier designs used a parallel current ranging topology, the Series 2600B uses a patented series ranging topology, which provides faster and smoother range changes and outputs that settle more quickly.

The Series 2600B SMU instrument design supports two modes of operation for use with a variety of loads. In normal mode, the SMU instrument provides high bandwidth performance for maximum throughput. In high capacitance (high-C) mode, the SMU instrument uses a slower bandwidth to provide robust performance with higher capacitive loads.



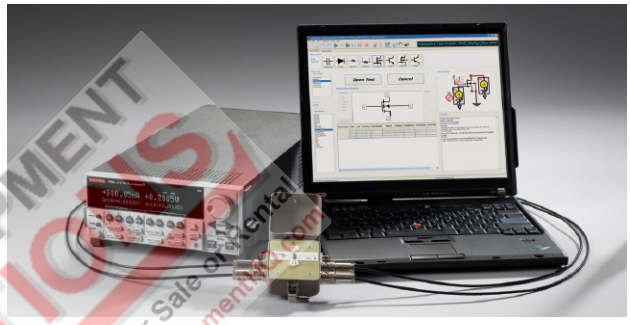
When you need to acquire data on a packaged part quickly, the wizard-based user interface of ACS Basic Edition makes it easy to find and run the test you want, like this common FET curve trace test.

Simplify Semiconductor Component Test, Verification, and Analysis

The optional ACS Basic Edition software maximizes the productivity of customers who perform packaged part characterization during development, quality verification, or failure analysis. Key features include:

- Rich set of easy-to-access test libraries
- Script editor for fast customization of existing tests
- Data tool for comparing results quickly
- Formulator tool that analyzes captured curves and provides a wide range of math functions

For more information about the ACS Basic Edition software, please refer to the ACS Basic Edition data sheet.



The flexible software architecture of ACS Basic Edition allows configuring systems with a wide range of controllers and test fixtures, as well as the exact number of SourceMeter SMU instruments the application requires.

Powerful Software Tools

In addition to compatibility with the Keithley IVy smart device app, embedded web browser based software, and optional ACS Basic Edition software, the free Test Script Builder software tool is provided to help users create, modify, debug, and store TSP test scripts. **Table 1** describes key features of Series 2600B software tools.

Feature/ Functionality	Keithley IVy Mobile App	Built-in Web Browser Based App	Test Script Builder (TSB)	ACS Basic Edition
Description	Quick I-V characterization tool for bench and lab users to visualize, interact and share measurement data via Android devices.	Built-in web browser based software for I-V characterization	Custom script writing tool for TSP instruments	Semiconductor characterization software for component test, verification, and analysis
Capability	Basic	General	Advanced	High Performance
Supported Hardware	Series 2600B	Series 2600B	Series 2600B, Series 3700	Series 2400, Series 2600B, 4200-SCS
Supported Buses	Not Applicable	LAN/LXI	GPIB, RS-232, LAN/LXI, USB	GPIB, LAN/LXI
Functionality	Visualize data in time mode, two terminal I-V mode and family of curves mode. Analyze collected data interactively with smart device's built-in capabilities. Share data instantly via mobile networks/Wi-Fi	Linear/Log Sweeps, Pulsing, Custom sweeps, Single point source-measures. **Note:** Uses new 2600B's new API's for precision timing and channel synchronization	Custom scripts with total flexibility, full featured debugger	Intuitive, wizard-based GUI, Rich set of test libraries, curve trace capability
Data Management	.csv and graphic data export	.csv export	User defined	Formulator tool with wide range of math functions
Installation	Free download from app stores	Not necessary. Embedded in the instrument.	Free Download or CD Install on PC.	Optional purchase

Table 1. Series 2600B software tools

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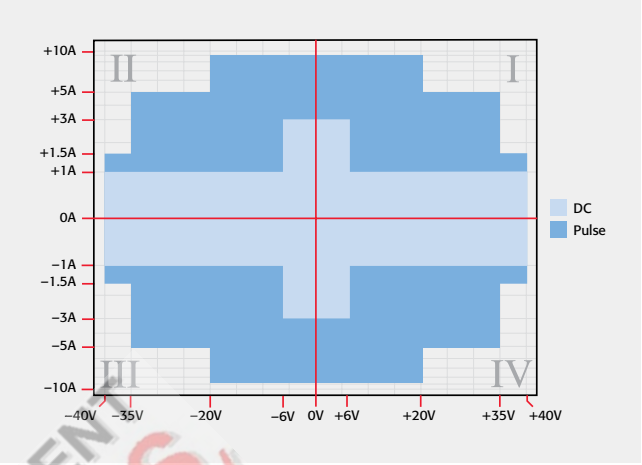
Three New Dual-Channel Bench-Top Models of Series 2600B Offer Industry-Best Value and Performance

For applications that do not require leading-edge system-level automation capabilities, Keithley has expanded the Series 2600B to include 3 new value-priced “bench-top” models – the 2604B, 2614B, and 2634B. These models offer similar performance to Models 2602B, 2612B, and 2636B, respectively, however do not include TSP-Link, Contact Check, and Digital I/O capabilities.

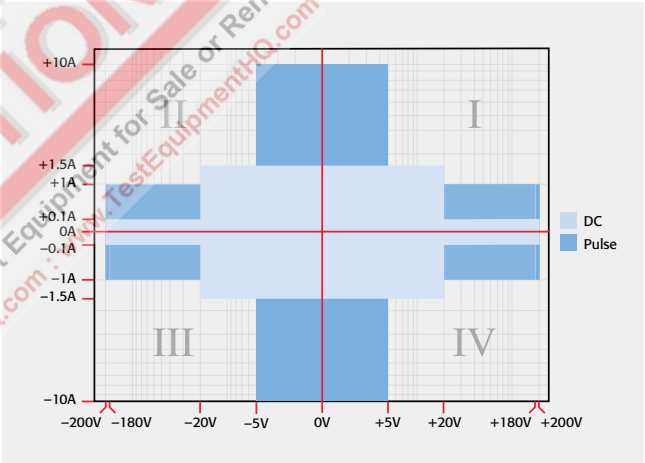
Complete Automated System Solutions

Keithley’s S500 Integrated Test Systems are highly configurable, instrument-based systems for semiconductor characterization at the device, wafer, or cassette level. Built on our proven Series 2600B System SourceMeter SMU instruments, our S500 Integrated Test Systems provide innovative measurement features and system flexibility, scalable to your needs. The unique measurement capability, combined with the powerful and flexible Automated Characterization Suite (ACS) software, provides a comprehensive range of applications and features not offered on other comparable systems on the market.

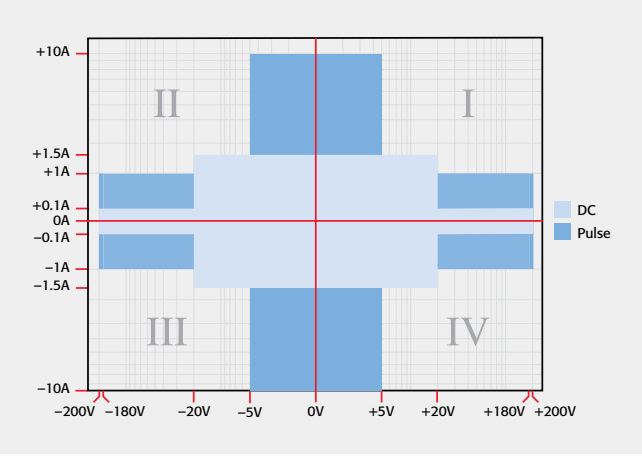
In the first and third quadrants, Series 2600B SMU instruments operate as a source, delivering power to a load. In the second and fourth quadrants, they operate as a sink, dissipating power internally.



Models 2601B, 2602B, and 2604B I-V capability.



Models 2611B, 2612B, and 2614B I-V capability.



Models 2634B, 2635B, and 2636B I-V capability.

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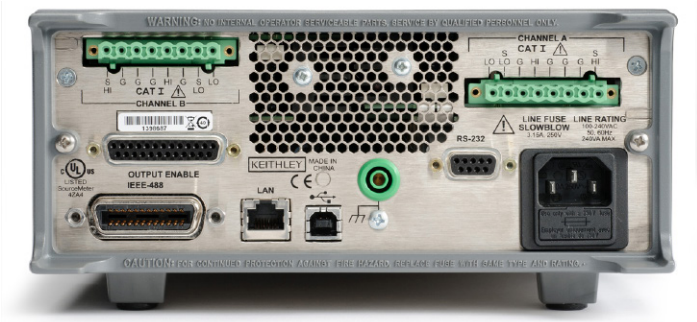
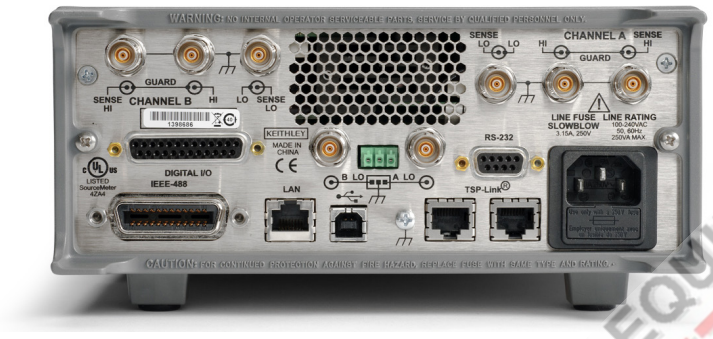


2604B/2614B rear panel (Single channels 2601B, 2611B, 2635B not shown)



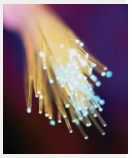
2636B rear panel

Typical Applications

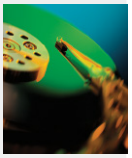
I-V functional test and characterization of a wide range of devices, including:

- Discrete and passive components
  - Two-leaded – Sensors, disk drive heads, metal oxide varistors (MOVs), diodes, zener diodes, sensors, capacitors, thermistors
  - Three-leaded – Small signal bipolar junction transistors (BJTs), field-effect transistors (FETs), and more

- Simple ICs – Optos, drivers, switches, sensors, converters, regulators



- Integrated devices – small scale integrated (SSI) and large scale integrated (LSI)
  - Analog ICs
  - Radio frequency integrated circuits (RFICs)
  - Application specific integrated circuits (ASICs)
  - System on a chip (SOC) devices



- Optoelectronic devices such as light-emitting diodes (LEDs), laser diodes, high brightness LEDs (HBLEDs), vertical cavity surface-emitting lasers (VCSELs), displays

- Wafer level reliability
  - NBTI, TDDB, HCI, electromigration

- Solar Cells
- Batteries
- And more...

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Specification Conditions (2601B, 2602B, 2604B)

This document contains specifications and supplemental information for the Models 2601B, 2602B, and 2604B System SourceMeter® SMU instruments. Specifications are the standards against which the Models 2601B, 2602B, and 2604B are tested. Upon leaving the factory, the 2601B, 2602B, and 2604B meet these specifications. Supplemental and typical values are non-warranted, apply at 23°C, and are provided solely as useful information.

Accuracy specifications are applicable for both normal and high capacitance modes.

The source and measurement accuracies are specified at the SourceMeter CHANNEL A (2601B, 2602B, and 2604B) or SourceMeter CHANNEL B (2602B and 2604B) terminals under the following conditions:

1. 23°C ± 5°C, <70% relative humidity
2. After 2 hour warm-up
3. Speed normal (1 NPLC)
4. A/D auto-zero enabled
5. Remote sense operation or properly zeroed local operation
6. Calibration period = 1 year

Source Specifications (2601B, 2602B, 2604B)

Voltage Source Specifications

Voltage Programming Accuracy[1]

Range	Programming Resolution	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + volts)	Typical Noise (peak-peak) 0.1Hz–10Hz
100 mV	5 µV	0.02% + 250 µV	20 µV
1 V	50 µV	0.02% + 400 µV	50 µV
6 V	50 µV	0.02% + 1.8 mV	100 µV
40 V	500 µV	0.02% + 12 mV	500 µV

Temperature Coefficient (0°–18°C and 28°–50°C)[2]
±(0.15 × accuracy specification)/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

Maximum Output Power and Source/Sink Limits[3]
40.4 W per channel maximum. ±40.4 V @ ±1.0 A, ±6.06 V @ ±3.0 A, four quadrant source or sink operation.

Voltage Regulation **Line:** 0.01% of range. **Load:** ±(0.01% of range + 100 µV).

Noise 10 Hz–20 MHz <20 mV peak-peak (typical), <3 mV RMS (typical), 6 V range.

Current Limit/Compliance[4] Bipolar current limit (compliance) set with single value. Minimum value is 10 nA. Accuracy same as current source.

Overshoot <±(0.1% + 10 mV) typical. Step size = 10% to 90% of range, resistive load, maximum current limit/compliance.

Guard Offset Voltage <4 mV typical. Current <10 mA.

NOTES

1. Add 50 µV to source accuracy specifications per volt of HI lead drop.
2. High Capacitance Mode accuracy is applicable at 23°C ±5°C only.
3. Full power source operation regardless of load to 30°C ambient. Above 30°C and/or power sink operation, refer to "Operating Boundaries" in the Series 2600B Reference Manual for additional power derating information.
4. For sink mode operation (quadrants II and IV), add 0.06% of limit range to the corresponding current limit accuracy specifications. Specifications apply with sink mode operation enabled.

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Current Source Specifications

Current Programming Accuracy

Range	Programming Resolution	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + amps)	Typical Noise (peak-peak) 0.1Hz–10Hz
100 nA	2 pA	0.06% + 100 pA	5 pA
1 µA	20 pA	0.03% + 800 pA	25 pA
10 µA	200 pA	0.03% + 5 nA	60 pA
100 µA	2 nA	0.03% + 60 nA	3 nA
1 mA	20 nA	0.03% + 300 nA	6 nA
10 mA	200 nA	0.03% + 6 µA	200 nA
100 mA	2 µA	0.03% + 30 µA	600 nA
1 A [1]	20 µA	0.05% + 1.8 mA	70 µA
3 A [1]	20 µA	0.06% + 4 mA	150 µA
10 A [1, 2]	200 µA	0.5% + 40 mA (typical)	

Temperature Coefficient (0°–18°C and 28°–50°C) [3]
±(0.15 × accuracy specification)/°C.

Maximum Output Power and Source/Sink Limits [4]
40.4 W per channel maximum. ±1.01 A @ ±40.0 V, ±3.03 A @ ±6.0 V, four quadrant source or sink operation.

Current Regulation
Line: 0.01% of range. **Load:** ±(0.01% of range + 100 pA).

Voltage Limit/Compliance [5]
Bipolar voltage limit (compliance) set with a single value. Minimum value is 10 mV. Accuracy is the same as voltage source.

Overshoot
<±0.1% typical (step size = 10% to 90% of range, resistive load; see Current Source Output Settling Time for additional test conditions).

NOTES

1. Full power source operation regardless of load to 30°C ambient. Above 30°C and/or power sink operation, refer to "Operating Boundaries" in the Series 2600B Reference Manual for additional power derating information.
2. 10 A range accessible only in pulse mode.
3. High Capacitance Mode accuracy is applicable at 23°C ±5°C only.
4. Full power source operation regardless of load to 30°C ambient. Above 30°C and/or power sink operation, refer to "Operating Boundaries" in the Series 2600B Reference Manual for additional power derating information.
5. For sink mode operation (quadrants II and IV), add 10% of compliance range and ±0.02% of limit setting to corresponding voltage source specification. For 100 mV range add an additional 60 mV of uncertainty.

Additional Source Specifications

Transient Response Time
<70 µs for the output to recover to within 0.1% for a 10% to 90% step change in load.

Voltage Source Output Settling Time
Time required to reach within 0.1% of final value after source level command is processed on a fixed range.

100 mV, 1 V Ranges	<50 µs typical.
6 V Range	<100 µs typical.
40 V Range [1]	<150 µs typical.

NOTES

1. Add 150 µs when measuring on the 1 A range.

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Current Source Output Settling Time	Time required to reach within 0.1% of final value after source level command is processed on a fixed range. Values below for $I_{out} \times R_{load}$ = 1 V unless noted.
3 A Range	<80 µs typical (current less than 2.5 A, R_{load} >2 Ω).
1 A–10 mA Ranges	<80 µs typical (R_{load} >6 Ω).
1 mA Range	<100 µs typical.
100 µA Range	<150 µs typical.
10 µA Range	<500 µs typical.
1 µA Range	<2.5 ms typical.
100 nA Range	<25 ms typical.
DC Floating Voltage	Output can be floated up to ±250 VDC from chassis ground.
Remote Sense Operating Range[1]	Maximum voltage between HI and SENSE HI = 3 V. Maximum voltage between LO and SENSE LO = 3 V.
Voltage Output Headroom	
40 V Range	Max. output voltage = 42 V – total voltage drop across source leads (maximum 1 Ω per source lead).
6 V Range	Max. output voltage = 8 V – total voltage drop across source leads (maximum 1 Ω per source lead).
Over Temperature Protection	Internally sensed temperature overload puts unit in standby mode.
Voltage Source Range Change Overshoot	<300 mV + 0.1% of larger range (typical). Overshoot into an 100 kΩ load, 20 MHz BW.
Current Source Range Change Overshoot	<5% of larger range + 300 mV/R_{load} (typical with source settling set to SETTLE_SMOOTH_100NA). See Current Source Output Settling Time for additional test conditions.

NOTES

1. Add 50 µV to source accuracy specifications per volt of HI lead drop.

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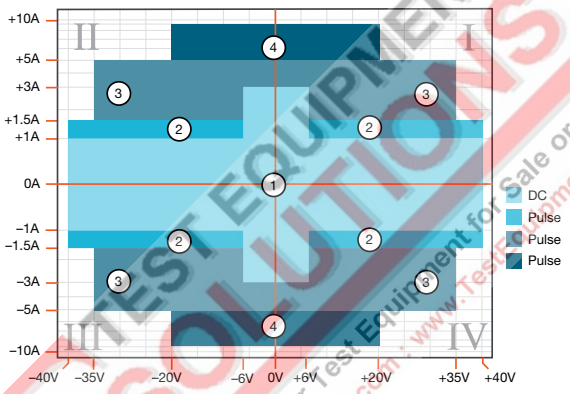
Pulse Specifications

Region	Maximum Current Limit	Maximum Pulse Width [1]	Maximum Duty Cycle [2]
1	1 A @ 40 V	DC, no limit	100%
1	3 A @ 6 V	DC, no limit	100%
2	1.5 A @ 40 V	100 ms	25%
3	5 A @ 35 V	4 ms	4%
4	10 A @ 20 V	1.8 ms	1%

Minimum Programmable Pulse Width [3, 4]	100 µs. **Note:** Minimum pulse width for settled source at a given I/V output and load can be longer than 100 µs.
Pulse Width Programming Resolution	1 µs.
Pulse Width Programming Accuracy [4]	±5 µs.
Pulse Width Jitter	2 µs (typical).
Quadrant Diagram	



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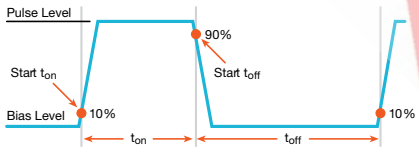
NOTES

1. Times measured from the start of pulse to the start off-time; see figure below.

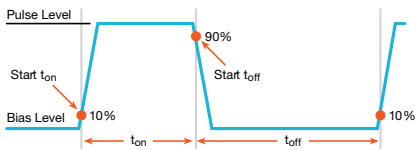


2. Thermally limited in sink mode (quadrants II and IV) and ambient temperatures above 30°C. See power equations in the reference manual for more information.
3. Typical performance for minimum settled pulse widths:

Source Value	Load	Source Settling (% of range)	Min. Pulse Width
6 V	2 Ω	0.2%	150 µs
20 V	2 Ω	1%	200 µs
35 V	7 Ω	0.5%	500 µs
40 V	27 Ω	0.1%	400 µs
1.5 A	27 Ω	0.1%	1.5 ms
3 A	2 Ω	0.2%	150 µs
5 A	7 Ω	0.5%	500 µs
10 A	2 Ω	0.5%	200 µs

Typical tests were performed using remote operation, 4W sense, and best, fixed measurement range. For more information on pulse scripts, see the Series 2600B Reference Manual.

4. Times measured from the start of pulse to the start off-time; see figure below.



Meter Specifications (2601B, 2602B, 2604B)

Voltage Measurement Accuracy [1, 2]

Range	Default Display Resolution [3]	Input Resistance	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + volts)
100 mV	100 nV	>10 GΩ	0.015% + 150 µV
1 V	1 µV	>10 GΩ	0.015% + 200 µV
6 V	10 µV	>10 GΩ	0.015% + 1 mV
40 V	10 µV	>10 GΩ	0.015% + 8 mV

Temperature Coefficient (0°–18°C and 28°–50°C) [4]

±(0.15 × accuracy specification)/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

Current Measurement Accuracy [2]

Range	Default Display Resolution [5]	Voltage Burden [6]	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + amps)
100 nA	100 fA	<1 mV	0.05% + 100 pA
1 µA	1 pA	<1 mV	0.025% + 500 pA
10 µA	10 pA	<1 mV	0.025% + 1.5 nA
100 µA	100 pA	<1 mV	0.02% + 25 nA
1 mA	1 nA	<1 mV	0.02% + 200 nA
10 mA	10 nA	<1 mV	0.02% + 2.5 µA
100 mA	100 nA	<1 mV	0.02% + 20 µA
1 A	1 µA	<1 mV	0.03% + 1.5 mA
3 A	1 µA	<1 mV	0.05% + 3.5 mA
10 A [7]	10 µA	<1 mV	0.4% + 25 mA (typical)

Current Measure Settling Time (time for measurement to settle after a V_{step}) [8]

Time required to reach within 0.1% of final value after source level command is processed on a fixed range. Values for V_{out} = 1 V unless noted.

Current Range	1 mA.
Settling Time	<100 µs (typical).

Temperature Coefficient (0°–18°C and 28°–50°C) [9]

±(0.15 × accuracy specification/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

NOTES

1. Add 50µV to source accuracy specifications per volt of HI lead drop.
2. e-rate accuracy specifications for NPLC setting <1 by increasing error term. Add appropriate % of range term using table below.

NPLC Setting	100 mV Range	1 V–40 V Ranges	100 nA Range	1 µA–100 mA Ranges	1 A–3 A Ranges
0.1	0.01%	0.01%	0.01%	0.01%	0.01%
0.01	0.08%	0.07%	0.1%	0.05%	0.05%
0.001	0.8 %	0.6 %	1%	0.5 %	1.1 %

3. Applies when in single channel display mode.
4. High Capacitance Mode accuracy is applicable for 23°C ±5°C only.
5. Applies when in single channel display mode.
6. Four-wire remote sense only with current meter mode selected. Voltage measure set to 100mV or 1V range only.
7. 10 A range accessible only in pulse mode.
8. Compliance equal to 100mA.
9. High Capacitance Mode accuracy is applicable for 23°C ±5°C only.

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Contact Check[1] (not available on Model 2604B)

Speed	Maximum Measurement Time To Memory For 60Hz (50Hz)	Accuracy (1 Year), 23°C ±5°C ±(%rdg. + ohms)
FAST	1 (1.2) ms	5% + 10 Ω
MEDIUM	4 (5) ms	5% + 1 Ω
SLOW	36 (42) ms	5% + 0.3 Ω

NOTES
1. Includes measurement of SENSE HI to HI and SENSE LO to LO contact resistances.

Additional Meter Specifications

Maximum Load Impedance	**Normal Mode:** 10 nF (typical). **High Capacitance Mode:** 50 µF (typical).
Common Mode Voltage	250 VDC.
Common Mode Isolation	>1 GΩ, <4500 pF.
Overrange	101% of source range, 102% of measure range.
Maximum Sense Lead Resistance	1 kΩ for rated accuracy.
Sense Input Impedance	>10 GΩ.

High Capacitance Mode[1, 2, 3]

Voltage Source Output Settling Time

Time required to reach 0.1% of final value after source level command is processed on a fixed range. Current limit = 1 A.

Voltage Source Range	Settling Time with C_{load} = 4.7 µF
100 mV	200 µs (typical)
1 V	200 µs (typical)
6 V	200 µs (typical)
40 V	7 ms (typical)

Current Measure Settling Time

Time required to reach 0.1% of final value after voltage source is stabilized on a fixed range. Values below for V_{out} = 1V unless noted.

Current Measure Range	Settling Time
3 A – 1 A	<120 µs (typical) (R_{load} > 2 Ω)
100 mA – 10 mA	<100 µs (typical)
1 mA	< 3 ms (typical)
100 µA	< 3 ms (typical)
10 µA	< 230 ms (typical)
1 µA	< 230 ms (typical)

Capacitor Leakage Performance Using HIGH-C Scripts[4]

Load = 5 µF||10 MΩ. **Test:** 5 V step and measure. 200 ms (typical) @ 50 nA.

NOTES
1. High Capacitance Mode specifications are for DC measurements only.
2. 100 nA range is not available in High Capacitance Mode.
3. High Capacitance Mode utilizes locked ranges. Auto Range is disabled.
4. Part of KI Factory scripts. See reference manual for details.

Mode Change Delay

100 µA Current Range and Above	Delay into High Capacitance Mode: 10 ms. Delay out of High Capacitance Mode: 10 ms.
1 µA and 10 µA Current Ranges	Delay into High Capacitance Mode: 230 ms. Delay out of High Capacitance Mode: 10 ms.

Voltmeter Input Impedance 10 GΩ in parallel with 3300 pF.

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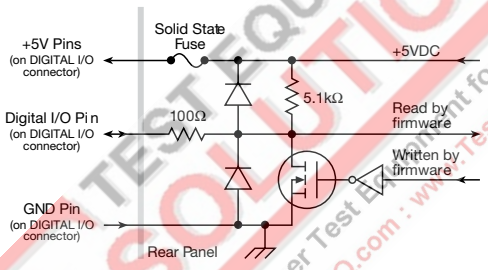
Noise, 10 Hz–20 MHz (6 V Range)	<30 mV peak-peak (typical).
Voltage Source Range Change Overshoot	<400 mV + 0.1% of larger range (typical). Overshoot into a 100 kΩ load, 20 MHz BW.

General (2601B, 2602B, 2604B)

IEEE-488	IEEE-488.1 compliant. Supports IEEE-488.2 common commands and status model topology.
USB Control (rear)	USB 2.0 device, TMC488 protocol.
RS-232	Baud rates from 300 bps to 115200 bps.
Ethernet	RJ-45 connector, LXI Class C, 10/100BT, no auto MDIX.
Expansion Interface	The TSP-Link expansion interface allows TSP enabled instruments to trigger and communicate with each other. (Not available on 2604B.)
Cable Type	Category 5e or higher LAN crossover cable.
Length	3 meters maximum between each TSP enabled instrument.
LXI Compliance	LXI Class C 1.4.
LXI Timing	**Total Output Trigger Response Time:** 245 µs min., 280 µs typ., (not specified) max. **Receive LAN[0-7] Event Delay:** Unknown. **Generate LAN[0-7] Event Delay:** Unknown.
Digital I/O Interface	(Not available on Model 2604B)



Connector	25-pin female D.
Input/Output Pins	14 open drain I/O bits.
Absolute Maximum Input Voltage	5.25 V.
Absolute Minimum Input Voltage	–0.25 V.
Maximum Logic Low Input Voltage	0.7 V, +850 µA max.
Minimum Logic High Input Voltage	2.1 V, +570 µA.
Maximum Source Current (flowing out of Digital I/O bit)	+960 µA.
Maximum Sink Current @ Maximum Logic Low Voltage (0.7V)	–5.0 mA.
Absolute Maximum Sink Current (flowing into Digital I/O pin)	–11 mA (not including 2604B).
5V Power Supply Pins	Limited to 250 mA total for all three pins, solid state fuse protected.
Output Enable	Active high input pulled down internally to ground with a 10 kΩ resistor; when the output enable input function has been activated, each SourceMeter channel will not turn on unless the output enable pin is driven to >2.1 V (nominal current = 2.1 V/10 kΩ = 210 µA).

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USB File System (Front)	**USB 2.0 Host:** Mass storage class device.
Power Supply	100 V to 250 VAC, 50–60 Hz (auto sensing), 240 VA max.
Cooling	Forced air. Side intake and rear exhaust. One side must be unobstructed when rack mounted.
EMC	Conforms to European Union Directive 2004/108/EEC, EN 61326-1.
Safety	Conforms to European Union Directive 73/23/EEC, EN 61010-1, and UL 61010-1.
Dimensions	89 mm high × 213 mm wide × 460 mm deep (3½ in × 8⅜ in × 17½ in). **Bench Configuration (with handle and feet):** 104mm high × 238mm wide × 460mm deep (4⅛ in × 9⅜ in × 17½ in).
Weight	**2601B:** 4.75 kg (10.4 lbs). **2602B, 2604B:** 5.50 kg (12.0 lbs).
Environment	For indoor use only.
Altitude	Maximum 2000 meters above sea level.
Operating	0°–50°C, 70% R.H. up to 35°C. Derate 3% R.H./°C, 35°–50°C.
Storage	–25°C to 65°C.

See pages 30 and 31 for measurement speeds and other specifications.

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Specification Conditions (2611B, 2612B, 2614B)

This document contains specifications and supplemental information for the 2611B, 2612B, and 2614B System SourceMeter® SMU instruments. Specifications are the standards against which the 2611B, 2612B, and 2614B are tested. Upon leaving the factory the 2611B, 2612B, and 2614B meet these specifications. Supplemental and typical values are non-warranted, apply at 23°C, and are provided solely as useful information.

Accuracy specifications are applicable for both normal and high capacitance modes.

The source and measurement accuracies are specified at the SourceMeter CHANNEL A (2611B, 2612B, and 2614B) or SourceMeter CHANNEL B (2612B, 2614B) terminals under the following conditions:

1. 23°C ± 5°C, <70% relative humidity
2. After 2 hour warm-up
3. Speed normal (1 NPLC)
4. A/D auto-zero enabled
5. Remote sense operation or properly zeroed local operation
6. Calibration period = 1 year

Source Specifications (2611B, 2612B, 2614B)

Voltage Source Specifications

Voltage Programming Accuracy[1]

Range	Programming Resolution	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + volts)	Typical Noise (peak-peak) 0.1Hz–10Hz
200 mV	5 µV	0.02% + 375 µV	20 µV
2 V	50 µV	0.02% + 600 µV	50 µV
20 V	500 µV	0.02% + 5 mV	300 µV
200 V	5 mV	0.02% + 50 mV	2 mV

Temperature Coefficient (0°–18°C and 28°–50°C)[2]
±(0.15 × accuracy specification)/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

Maximum Output Power and Source/Sink Limits[3]
30.3W per channel maximum. ±20.2 V @ ±1.5 A, ±202 V @ ±100 mA, four quadrant source or sink operation.

Voltage Regulation
Line: 0.01% of range. **Load:** ±(0.01% of range + 100 µV).

Noise 10 Hz–20 MHz
<20 mV peak-peak (typical), <3 mV RMS (typical), 20 V range.

Current Limit/Compliance[4]
Bipolar current limit (compliance) set with single value. Minimum value is 10 nA. Accuracy same as current source.

Overshoot
<±(0.1% + 10 mV) typical. Step size = 10% to 90% of range, resistive load, maximum current limit/compliance.

Guard Offset Voltage
<4 mV typical. Current <10 mA.

NOTES

1. Add 50 µV to source accuracy specifications per volt of HI lead drop.
2. High Capacitance Mode accuracy is applicable at 23°C ±5°C only.
3. Full power source operation regardless of load to 30°C ambient. Above 30°C and/or power sink operation, refer to "Operating Boundaries" in the Series 2600B Reference Manual for additional power derating information.
4. For sink mode operation (quadrants II and IV), add 0.06% of limit range to the corresponding current limit accuracy specifications. Specifications apply with sink mode operation enabled.

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Current Source Specifications

Current Programming Accuracy [1]

Range	Programming Resolution	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + amps)	Typical Noise (peak-peak) 0.1Hz–10Hz
100 nA	2 pA	0.06% + 100 pA	5 pA
1 µA	20 pA	0.03% + 800 pA	25 pA
10 µA	200 pA	0.03% + 5 nA	60 pA
100 µA	2 nA	0.03% + 60 nA	3 nA
1 mA	20 nA	0.03% + 300 nA	6 nA
10 mA	200 nA	0.03% + 6 µA	200 nA
100 mA	2 µA	0.03% + 30 µA	600 nA
1 A [2]	20 µA	0.05% + 1.8 mA	70 µA
1.5 A [2]	20 µA	0.06% + 4 mA	150 µA
10 A [2, 3]	200 µA	0.5% + 40 mA (typical)	

Temperature Coefficient (0°–18°C and 28°–50°C) [4]
±(0.15 × accuracy specification)/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

Maximum Output Power and Source/Sink Limits [5]
30.3 W per channel maximum. ±1.515 A @ ±20 V, ±101 mA @ ±200 V, four quadrant source or sink operation.

Current Regulation
Line: 0.01% of range. **Load:** ±(0.01% of range + 100 pA).

Voltage Limit/Compliance [6]
Bipolar voltage limit (compliance) set with a single value. Minimum value is 20 mV. Accuracy is the same as voltage source.

Overshoot
<±0.1% typical. Step size = 10% to 90% of range, resistive load; see Current Source Output Settling Time for additional test conditions).

Additional Source Specifications

Transient Response Time
<70 µs for the output to recover to within 0.1% for a 10% to 90% step change in load.

Voltage Source Output Settling Time
Time required to reach within 0.1% of final value after source level command is processed on a fixed range.

- **100 mV, 1 V Ranges** <50 µs typical.
- **6 V Range** <100 µs typical.
- **40 V Range** [6] <150 µs typical.

NOTES

1. Accuracy specifications do not include connector leakage. Derate accuracy by V_{out}/2E11 per °C when operating between 18°–28°C. Derate accuracy by V_{out}/2E11 + (0.15 · V_{out}/2E11) per °C when operating <18°C and >28°C.
2. Full power source operation regardless of load to 30°C ambient. Above 30°C and/or power sink operation, refer to "Operating Boundaries" in the Series 2600B Reference Manual for additional power derating information.
3. 10 A range accessible only in pulse mode.
4. High Capacitance Mode accuracy is applicable at 23°C ±5°C only.
5. Full power source operation regardless of load to 30°C ambient. Above 30°C and/or power sink operation, refer to "Operating Boundaries" in the Series 2600B Reference Manual for additional power derating information.
6. For sink mode operation (quadrants II and IV), add 10% of compliance range and ±0.02% of limit setting to corresponding voltage source specification. For 200 mV range add an additional 120 mV of uncertainty.

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Current Source Output Settling Time	Time required to reach within 0.1% of final value after source level command is processed on a fixed range. Values below for $I_{out} \times R_{load}$ = 1 V unless noted.
3 A Range	<80 µs typical (current less than 2.5 A, R_{load} >2 Ω).
1 A–10 mA Ranges	<80 µs typical (R_{load} >6 Ω).
1 mA Range	<100 µs typical.
100 µA Range	<150 µs typical.
10 µA Range	<500 µs typical.
1 µA Range	<2.5 ms typical.
100 nA Range	<25 ms typical.
DC Floating Voltage	Output can be floated up to ±250 VDC from chassis ground.
Remote Sense Operating Range [1]	Maximum voltage between HI and SENSE HI = 3 V. Maximum voltage between LO and SENSE LO = 3 V.
Voltage Output Headroom	
40 V Range	Max. output voltage = 42 V – total voltage drop across source leads (maximum 1 Ω per source lead).
6 V Range	Max. output voltage = 8 V – total voltage drop across source leads (maximum 1 Ω per source lead).
Over Temperature Protection	Internally sensed temperature overload puts unit in standby mode.
Voltage Source Range Change Overshoot	<300 mV + 0.1% of larger range (typical). Overshoot into an 100 kΩ load, 20 MHz BW.
Current Source Range Change Overshoot	<5% of larger range + 300 mV/R_{load} (typical with source settling set to SETTLE_SMOOTH_100NA). See Current Source Output Settling Time for additional test conditions.

NOTES

1. Add 50 µV to source accuracy specifications per volt of HI lead drop.

Pulse Specifications

Region	Maximum Current Limit	Maximum Pulse Width [1]	Maximum Duty Cycle [2]
1	100 mA @ 200 V	DC, no limit	100%
1	1.5 A @ 20 V	DC, no limit	100%
2	1 A @ 180 V	8.5 ms	1%
3 [3]	1 A @ 200 V	2.2 ms	1%
4	10 A @ 5 V	1 ms	2.2%

Minimum Programmable Pulse Width [4, 5]	100 µs. **Note:** Minimum pulse width for settled source at a given I/V output and load can be longer than 100 µs.
Pulse Width Programming Resolution	1 µs.
Pulse Width Programming Accuracy [5]	±5 µs.
Pulse Width Jitter	2 µs (typical).

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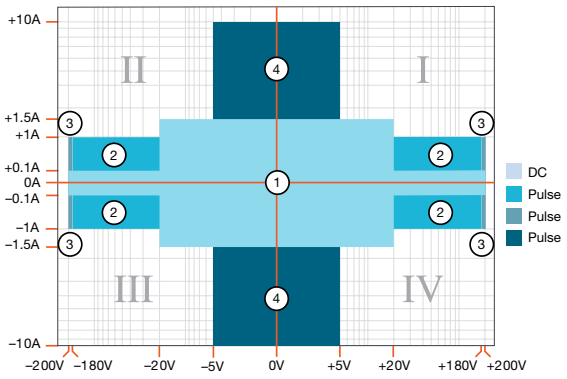
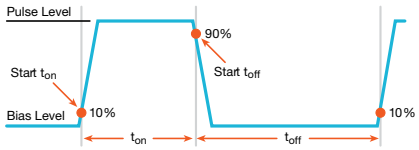
Quadrant Diagram



NOTES

1. Times measured from the start of pulse to the start off-time; see figure below.

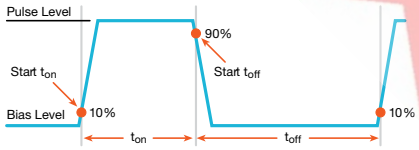


2. Thermally limited in sink mode (quadrants II and IV) and ambient temperatures above 30°C. See power equations in the reference manual for more information.
3. Voltage source operation with 1.5 A current limit.
4. Typical performance for minimum settled pulse widths:

Source Value	Load	Source Settling (% of range)	Min. Pulse Width
5 V	0.5 Ω	1%	300 µs
20 V	200 Ω	0.2%	200 µs
180 V	180 Ω	0.2%	5 ms
200 V (1.5 A Limit)	200 Ω	0.2%	1.5 ms
100 mA	200 Ω	1%	200 µs
1 A	200 Ω	1%	500 µs
1 A	180 Ω	0.2%	5 ms
10 A	0.5 Ω	0.5%	300 µs

Typical tests were performed using remote operation, 4W sense, and best, fixed measurement range. For more information on pulse scripts, see the Series 2600B Reference Manual.

5. Times measured from the start of pulse to the start off-time; see figure below.



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Meter Specifications (2611B, 2612B, 2614B)

Voltage Measurement Accuracy [1, 2]

Range	Default Display Resolution [3]	Input Resistance	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + volts)
200 mV	100 nV	>10 GΩ	0.015% + 225 µV
2 V	1 µV	>10 GΩ	0.02% + 350 µV
20 V	10 µV	>10 GΩ	0.015% + 5 mV
200 V	100 µV	>10 GΩ	0.015% + 50 mV

Temperature Coefficient (0°–18°C and 28°–50°C) [4]

±(0.15 × accuracy specification)/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

Current Measurement Accuracy [2, 5]

Range	Default Display Resolution [6]	Voltage Burden [7]	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + amps)
100 nA	100 fA	<1 mV	0.06% + 100 pA
1 µA	1 pA	<1 mV	0.025% + 500 pA
10 µA	10 pA	<1 mV	0.025% + 1.5 nA
100 µA	100 pA	<1 mV	0.02% + 25 nA
1 mA	1 nA	<1 mV	0.02% + 200 nA
10 mA	10 nA	<1 mV	0.02% + 2.5 µA
100 mA	100 nA	<1 mV	0.02% + 20 µA
1 A	1 µA	<1 mV	0.03% + 1.5 mA
1.5 A	1 µA	<1 mV	0.05% + 3.5 mA
10 A [8]	10 µA	<1 mV	0.4% + 25 mA (typical)

Current Measure Settling Time (time for measurement to settle after a V_{step}) [9]

Time required to reach within 0.1% of final value after source level command is processed on a fixed range. Values for V_{out} = 1 V unless noted.

Current Range	1 mA.
Settling Time	<100 µs (typical).

Temperature Coefficient (0°–18°C and 28°–50°C) [10]

±(0.15 × accuracy specification/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

Additional Meter Specifications

Maximum Load Impedance	**Normal Mode:** 10 nF (typical). **High Capacitance Mode:** 50 µF (typical).
Common Mode Voltage	250 VDC.
Common Mode Isolation	>1 GΩ, <4500 pF.
Overrange	101% of source range, 102% of measure range.
Maximum Sense Lead Resistance	1 kΩ for rated accuracy.
Sense Input Impedance	>10 GΩ.

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Contact Check [11] (not available on 2614B)

Speed	Maximum Measurement Time to Memory For 60 Hz (50 Hz)	Accuracy (1 Year), 23°C ±5°C ±(%rdg. + ohms)
FAST	1 (1.2) ms	5% + 10 Ω
MEDIUM	4 (5) ms	5% + 1 Ω
SLOW	36 (42) ms	5% + 0.3 Ω

NOTES

1. Add 50 µV to source accuracy specifications per volt of HI lead drop.
2. Derate accuracy specifications for NPLC setting <1 by increasing error term.
   Add appropriate % of range term using table below.

NPLC Setting	200 mV Range	2 V–200 V Ranges	100 nA Range	1 µA–100 mA Ranges	1 A–1.5 A Ranges
0.1	0.01%	0.01%	0.01%	0.01%	0.01%
0.01	0.08%	0.07%	0.1%	0.05%	0.05%
0.001	0.8%	0.6%	1%	0.5%	1.1%

3. Applies when in single channel display mode.
4. High Capacitance Mode accuracy is applicable for 23°C ±5°C only.
5. Accuracy specifications do not include connector leakage. De-rate accuracy by V_{out}/2E11 per °C when operating between 18°–28°C. Derate accuracy by V_{out}/2E11 + (0.15 · V_{out}/2E11) per °C when operating <18° and >28°C
6. Applies when in single channel display mode.
7. Four-wire remote sense only with current meter mode selected. Voltage measure set to 200 mV or 2 V range only.
8. 10 A range accessible only in pulse mode.
9. Compliance equal to 100 mA.
10. High Capacitance Mode accuracy is applicable for 23°C ±5°C only.
11. Includes measurement of SENSE HI to HI and SENSE LO to LO contact resistances.

High Capacitance Mode [1, 2, 3]

Voltage Source Output Settling Time

Time required to reach 0.1% of final value after source level command is processed on a fixed range. Current limit = 1 A.

Voltage Source Range	Settling Time with C_{load} = 4.7 µF
200 mV	600 µs (typical)
2 V	600 µs (typical)
20 V	1.5 µs (typical)
200 V	20 ms (typical)

Current Measure Settling Time

Time required to reach 0.1% of final value after voltage source is stabilized on a fixed range. Values below for V_{out} = 2 V unless noted.

Current Measure Range	Settling Time
1.5 A – 1 A	<120 µs (typical) (R_{load} > 6 Ω)
100 mA – 10 mA	<100 µs (typical)
1 mA	< 3 ms (typical)
100 µA	< 3 ms (typical)
10 µA	< 230 ms (typical)
1 µA	< 230 ms (typical)

Capacitor Leakage Performance Using HIGH-C Scripts [4]

Load = 5 µFll10 MΩ. **Test:** 5 V step and measure. 200 ms (typical) @ 50 nA.

NOTES

1. High Capacitance Mode specifications are for DC measurements only.
2. 100 nA range is not available in High Capacitance Mode.
3. High Capacitance Mode utilizes locked ranges. Auto Range is disabled.
4. Part of KI Factory scripts. See reference manual for details.

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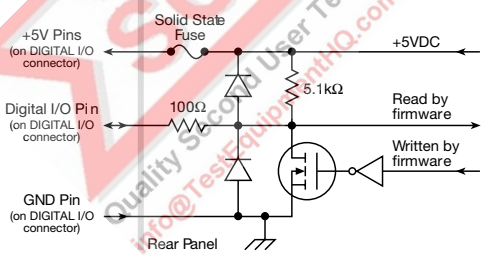
Mode Change Delay	
100 µA Current Range and Above	Delay into High Capacitance Mode: 10 ms. Delay out of High Capacitance Mode: 10 ms.
1 µA and 10 µA Current Ranges	Delay into High Capacitance Mode: 230 ms. Delay out of High Capacitance Mode: 10 ms.
Voltmeter Input Impedance	30 GΩ in parallel with 3300 pF.
Noise, 10 Hz–20 MHz (20 V Range)	<30 mV peak-peak (typical).
Voltage Source Range Change Overshoot (for 20 V range and below)	<400 mV + 0.1% of larger range (typical). Overshoot into a 200 kΩ load, 20 MHz BW.

General (2611B, 2612B, 2614B)

IEEE-488	IEEE-488.1 compliant. Supports IEEE-488.2 common commands and status model topology.
USB Control (rear)	USB 2.0 device, TMC488 protocol.
RS-232	Baud rates from 300 bps to 115200 bps.
Ethernet	RJ-45 connector, LXI Class C, 10/100BT, no auto MDIX.
Expansion Interface	The TSP-Link expansion interface allows TSP enabled instruments to trigger and communicate with each other. (Not available on 2614B.)
Cable Type	Category 5e or higher LAN crossover cable.
Length	3 meters maximum between each TSP enabled instrument.
LXI Compliance	LXI Class C 1.4.
LXI Timing	**Total Output Trigger Response Time:** 245 µs min., 280 µs typ., (not specified) max. **Receive LAN[0-7] Event Delay:** Unknown. **Generate LAN[0-7] Event Delay:** Unknown.
Digital I/O Interface	(Not available on Model 2614B)



Connector	25-pin female D.
Input/Output Pins	14 open drain I/O bits.
Absolute Maximum Input Voltage	5.25 V.
Absolute Minimum Input Voltage	–0.25 V.
Maximum Logic Low Input Voltage	0.7 V, +850 µA max.
Minimum Logic High Input Voltage	2.1 V, +570 µA.
Maximum Source Current (flowing out of Digital I/O bit)	+960 µA.
Maximum Sink Current @ Maximum Logic Low Voltage (0.7V)	–5.0 mA.

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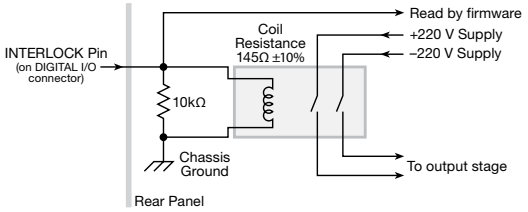
Absolute Maximum Sink Current (flowing into Digital I/O pin)	–11 mA.
5 V Power Supply Pins	Limited to 250 mA total for all three pins, solid state fuse protected.
Safety Interlock Pin	Active high input. >3.4 V @ 24 mA (absolute maximum of 6 V) must be externally applied to this pin to ensure 200 V operation. This signal is pulled down to chassis ground with a 10 kΩ resistor. 200 V operation will be blocked when the INTERLOCK signal is <0.4 V (absolute minimum –0.4 V). See figure below:



USB File System (Front)	**USB 2.0 Host:** Mass storage class device.
Power Supply	100 V to 250 VAC, 50–60 Hz (auto sensing), 240 VA max.
Cooling	Forced air. Side intake and rear exhaust. One side must be unobstructed when rack mounted.
EMC	Conforms to European Union Directive 2004/108/EEC, EN 61326-1.
Safety	Conforms to European Union Directive 73/23/EEC, EN 61010-1, and UL 61010-1.
Dimensions	89 mm high × 213 mm wide × 460 mm deep (3½ in × 8⅜ in × 17½ in). **Bench Configuration (with handle and feet):** 104mm high × 238mm wide × 460mm deep (4⅛ in × 9⅜ in × 17½ in).
Weight	**2611B:** 4.75 kg (10.4 lbs). **2612B, 2614B:** 5.50 kg (12.0 lbs).
Environment	For indoor use only.
Altitude	Maximum 2000 meters above sea level.
Operating	0°–50°C, 70% R.H. up to 35°C. Derate 3% R.H./°C, 35°–50°C.
Storage	–25°C to 65°C.

See pages 30 and 31 for measurement speeds and other specifications.

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Specification Conditions (2634B, 2635B, 2636B)

This document contains specifications and supplemental information for the 2634B, 2635B, and 2636B System SourceMeter® SMU instruments. Specifications are the standards against which the 2634B, 2635B, and 2636B are tested. Upon leaving the factory, the 2634B, 2635B, and 2636B meet these specifications. Supplemental and typical values are non-warranted, apply at 23°C, and are provided solely as useful information.

Accuracy specifications are applicable for both normal and high capacitance modes.

The source and measurement accuracies are specified at the SourceMeter CHANNEL A (2634B, 2635B, and 2636B) or SourceMeter CHANNEL B (2634B, 2636B) terminals under the following conditions:

1. 23°C ± 5°C, <70% relative humidity
2. After 2 hour warm-up
3. Speed normal (1 NPLC)
4. A/D auto-zero enabled
5. Remote sense operation or properly zeroed local operation
6. Calibration period = 1 year

Source Specifications (2634B, 2635B, 2636B)

Voltage Source Specifications

Voltage Programming Accuracy[1]

Range	Programming Resolution	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + volts)	Typical Noise (peak-peak) 0.1Hz–10Hz
200 mV	5 µV	0.02% + 375 µV	20 µV
2 V	50 µV	0.02% + 600 µV	50 µV
20 V	500 µV	0.02% + 5 mV	300 µV
200 V	5 mV	0.02% + 50 mV	2 mV

Temperature Coefficient (0°–18°C and 28°–50°C)[2]
±(0.15 × accuracy specification)/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

Maximum Output Power and Source/Sink Limits[3]
30.3W per channel maximum. ±20.2 V @ ±1.5 A, ±202 V @ ±100 mA, four quadrant source or sink operation.

Voltage Regulation
Line: 0.01% of range. **Load:** ±(0.01% of range + 100 µV).

Noise 10 Hz–20 MHz
<20 mV peak-peak (typical), <3 mV RMS (typical), 20 V range.

Current Limit/Compliance[4]
Bipolar current limit (compliance) set with single value. Minimum value is 100 pA. Accuracy is the same as current source.

Overshoot
<±(0.1% + 10 mV) typical. Step size = 10% to 90% of range, resistive load, maximum current limit/compliance.

Guard Offset Voltage
<4 mV typical. Current <10 mA.

NOTES

1. Add 50 µV to source accuracy specifications per volt of HI lead drop.
2. High Capacitance Mode accuracy is applicable at 23°C ±5°C only.
3. Full power source operation regardless of load to 30°C ambient. Above 30°C and/or power sink operation, refer to "Operating Boundaries" in the Series 2600B Reference Manual for additional power derating information.
4. For sink mode operation (quadrants II and IV), add 0.06% of limit range to the corresponding current limit accuracy specifications. Specifications apply with sink mode operation enabled.

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Current Source Specifications

Current Programming Accuracy

Range	Programming Resolution	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + amps)	Typical Noise (peak-peak) 0.1Hz–10Hz
1 nA	20 fA	0.15% + 2 pA	800 fA
10 nA	200 fA	0.15% + 5 pA	2 pA
100 nA	2 pA	0.06% + 50 pA	5 pA
1 µA	20 pA	0.03% + 700 pA	25 pA
10 µA	200 pA	0.03% + 5 nA	60 pA
100 µA	2 nA	0.03% + 60 nA	3 nA
1 mA	20 nA	0.03% + 300 nA	6 nA
10 mA	200 nA	0.03% + 6 µA	200 nA
100 mA	2 µA	0.03% + 30 µA	600 nA
1 A [1]	20 µA	0.05% + 1.8 mA	70 µA
1.5 A [1]	50 µA	0.06% + 4 mA	150 µA
10 A [1, 2]	200 µA	0.5 % + 40 mA (typical)	

Temperature Coefficient (0°–18°C and 28°–50°C) [3]
±(0.15 × accuracy specification)/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

Maximum Output Power and Source/Sink Limits [4]
30.3 W per channel maximum. ±1.515 A @ ±20 V, ±101 mA @ ±200 V, four quadrant source or sink operation.

Current Regulation
Line: 0.01% of range. **Load:** ±(0.01% of range + 100 pA).

Voltage Limit/Compliance [5]
Bipolar voltage limit (compliance) set with a single value. Minimum value is 20 mV. Accuracy is the same as voltage source.

Overshoot
<±0.1% typical. Step size = 10% to 90% of range, resistive load; see Current Source Output Settling Time for additional test conditions).

Additional Source Specifications

Transient Response Time
<70 µs for the output to recover to within 0.1% for a 10% to 90% step change in load.

Voltage Source Output Settling Time
Time required to reach within 0.1% of final value after source level command is processed on a fixed range.

Range	Settling Time
200 mV	<50 µs (typical)
2 V	<50 µs (typical)
20 V	<110 µs (typical)
200 V	<700 µs (typical)

NOTES

1. Full power source operation regardless of load to 30°C ambient. Above 30°C and/or power sink operation, refer to "Operating Boundaries" in the Series 2600B Reference Manual for additional power derating information.
2. 10 A range accessible only in pulse mode.
3. High Capacitance Mode accuracy is applicable at 23°C ±5°C only.
4. Full power source operation regardless of load to 30°C ambient. Above 30°C and/or power sink operation, refer to "Operating Boundaries" in the Series 2600B Reference Manual for additional power derating information.
5. For sink mode operation (quadrants II and IV), add 10% of compliance range and ±0.02% of limit setting to corresponding voltage source specification. For 200 mV range add an additional 120 mV of uncertainty.

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Current Source Output Settling Time

Time required to reach within 0.1% of final value after source level command is processed on a fixed range. Values below for $I_{out} \times R_{load}$ = 1 V unless noted.

Range	Settling Time
1.5 A – 1 A	<120 µs (typical) (R_{load} > 6Ω)
100 mA – 10 mA	<80 µs (typical)
1 mA	<100 µs (typical)
100 µA	<150 µs (typical)
10 µA	<500 µs (typical)
1 µA	<2 ms (typical)
100 nA	<20 ms (typical)
10 nA	<40 ms (typical)
1 nA	<150 ms (typical)

DC Floating Voltage

Output can be floated up to ±250 VDC from chassis ground.

Remote Sense Operating Range [1]

Maximum voltage between HI and SENSE HI = 3 V.
Maximum voltage between LO and SENSE LO = 3 V.

Voltage Output Headroom

200 V Range

Max. output voltage = 202.3 V – total voltage drop across source leads (maximum 1 Ω per source lead).

20 V Range

Max. output voltage = 23.3 V – total voltage drop across source leads (maximum 1 Ω per source lead).

Over Temperature Protection

Internally sensed temperature overload puts unit in standby mode.

Voltage Source Range Change Overshoot

<300 mV + 0.1% of larger range (typical). Overshoot into a 200 kΩ load, 20 MHz BW.

Current Source Range Change Overshoot

<5% of larger range + 300 mV/R_{load} (typical with source settling set to SETTLE_SMOOTH_100NA). See Current Source Output Settling Time for additional test conditions.

NOTES

1. Add 50 µV to source accuracy specifications per volt of HI lead drop.

Pulse Specifications

Region	Maximum Current Limit	Maximum Pulse Width [1]	Maximum Duty Cycle [2]
1	100 mA @ 200 V	DC, no limit	100%
1	1.5 A @ 20 V	DC, no limit	100%
2	1 A @ 180 V	8.5 ms	1%
3 [3]	1 A @ 200 V	2.2 ms	1%
4	10 A @ 5 V	1 ms	2.2%

Minimum Programmable Pulse Width [4, 5]

100 µs.
Note: Minimum pulse width for settled source at a given I/V output and load can be longer than 100 µs.

Pulse Width Programming Resolution

1 µs.

Pulse Width Programming Accuracy [5]

±5 µs.

Pulse Width Jitter

50 µs (typical).

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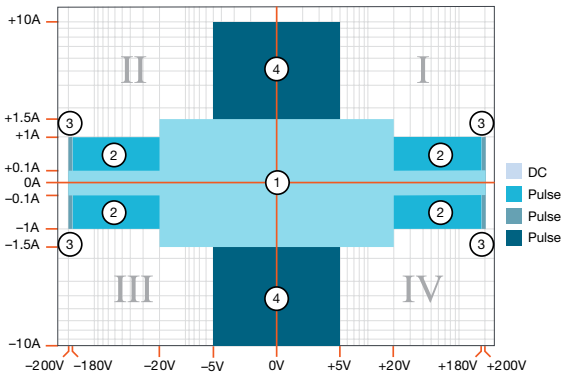
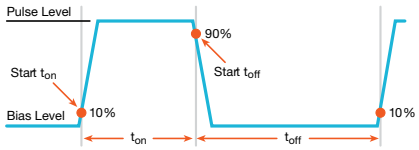
Quadrant Diagram



NOTES

1. Times measured from the start of pulse to the start off-time; see figure below.

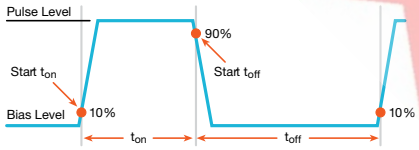


2. Thermally limited in sink mode (quadrants II and IV) and ambient temperatures above 30°C. See power equations in the reference manual for more information.
3. Voltage source operation with 1.5 A current limit.
4. Typical performance for minimum settled pulse widths:

Source Value	Load	Source Settling (% of range)	Min. Pulse Width
5 V	0.5 Ω	1%	300 µs
20 V	200 Ω	0.2%	200 µs
180 V	180 Ω	0.2%	5 ms
200 V (1.5 A Limit)	200 Ω	0.2%	1.5 ms
100 mA	200 Ω	1%	200 µs
1 A	200 Ω	1%	500 µs
1 A	180 Ω	0.2%	5 ms
10 A	0.5 Ω	0.5%	300 µs

Typical tests were performed using remote operation, 4W sense, and best, fixed measurement range. For more information on pulse scripts, see the Series 2600B Reference Manual.

5. Times measured from the start of pulse to the start off-time; see figure below.



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Meter Specifications (2634B, 2635B, 2636B)

Voltage Measurement Accuracy [1, 2]

Range	Default Display Resolution [3]	Input Resistance	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + volts)
200 mV	100 nV	>10^{14} Ω	0.015% + 225 µV
2 V	1 µV	>10^{14} Ω	0.02% + 350 µV
20 V	10 µV	>10^{14} Ω	0.015% + 5 mV
200 V	100 µV	>10^{14} Ω	0.015% + 50 mV

Temperature Coefficient (0°–18°C and 28°–50°C) [4]

±(0.15 × accuracy specification)/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

Current Measurement Accuracy [2]

Range	Default Display Resolution [5]	Voltage Burden [6]	Accuracy (1 Year), 23°C ±5°C ±(% rdg. + amps)
*100 pA [7, 8]	0.1 fA	<1 mV	0.15% + 120 fA
1 nA [7, 9]	1 fA	<1 mV	0.15% + 240 fA
10 nA	10 fA	<1 mV	0.15% + 3 pA
100 nA	100 fA	<1 mV	0.06% + 40 pA
1 µA	1 pA	<1 mV	0.025% + 400 pA
10 µA	10 pA	<1 mV	0.025% + 1.5 nA
100 µA	100 pA	<1 mV	0.02% + 25 nA
1 mA	1 nA	<1 mV	0.02% + 200 nA
10 mA	10 nA	<1 mV	0.02% + 2.5 µA
100 mA	100 nA	<1 mV	0.02% + 20 µA
1 A	1 µA	<1 mV	0.03% + 1.5 mA
1.5 A	1 µA	<1 mV	0.05% + 3.5 mA
10 A [10]	10 µA	<1 mV	0.4% + 25 mA

*100 pA range not available on Model 2634B.

Current Measure Settling Time (time for measurement to settle after a V_{step}) [11]

Time required to reach within 0.1% of final value after source level command is processed on a fixed range. Values for V_{out} = 2 V unless noted.

Current Range	1 mA.
Settling Time	<100 µs (typical).

Temperature Coefficient (0°–18°C and 28°–50°C) [12]

±(0.15 × accuracy specification/°C. Applicable for normal mode only. Not applicable for high capacitance mode.

NOTES

1. Add 50 µV to source accuracy specifications per volt of HI lead drop.
2. Derate accuracy specifications for NPLC setting <1 by increasing error term. Add appropriate % of range term using table below.

NPLC Setting	200 mV Range	2 V–200 V Ranges	100 nA Range	1 µA–100 mA Ranges	1 A–1.5 A Ranges
0.1	0.01%	0.01%	0.01%	0.01%	0.01%
0.01	0.08%	0.07%	0.1%	0.05%	0.05%
0.001	0.8%	0.6%	1%	0.5%	1.1%

3. Applies when in single channel display mode.
4. High Capacitance Mode accuracy is applicable for 23°C ±5°C only.
5. Applies when in single channel display mode.
6. Four-wire remote sense only with current meter mode selected. Voltage measure set to 200 mV or 2 V range only.
7. 10-NPLC, 11-Point Median Filter, <200 V range, measurements made within 1 hour after zeroing. 23°C ± 1°C
8. Under default specification conditions: ±(0.15% + 750 fA).
9. Under default specification conditions: ±(0.15% + 1 pA).
10. 10 A range accessible only in pulse mode.
11. Delay factor set to 1. Compliance equal to 100 mA.

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12. High Capacitance Mode accuracy is applicable for 23°C ±5°C only.

Additional Meter Specifications

Maximum Load Impedance	**Normal Mode:** 10 nF (typical). **High Capacitance Mode:** 50 µF (typical).
Common Mode Voltage	250 VDC.
Common Mode Isolation	>1 GΩ, <4500 pF.
Overrange	101% of source range, 102% of measure range.
Maximum Sense Lead Resistance	1 kΩ for rated accuracy.
Sense Input Impedance	$>10^{14}$Ω.

Contact Check [1] (not available on 2634B)

Speed	Maximum Measurement Time to Memory For 60 Hz (50 Hz)	Accuracy (1 Year), 23°C ±5°C ±(%rdg. + ohms)
FAST	1 (1.2) ms	5% + 10 Ω
MEDIUM	4 (5) ms	5% + 1 Ω
SLOW	36 (42) ms	5% + 0.3 Ω

High Capacitance Mode [2, 3, 4]

Voltage Source Output Settling Time

Time required to reach 0.1% of final value after source level command is processed on a fixed range. Current limit = 1 A.

Voltage Source Range	Settling Time with C_{load} = 4.7 µF
200 mV	600 µs (typical)
2 V	600 µs (typical)
20 V	1.5 µs (typical)
200 V	20 ms (typical)

Current Measure Settling Time

Time required to reach 0.1% of final value after voltage source is stabilized on a fixed range. Values below for V_{out} = 2 V unless noted.

Current Measure Range	Settling Time
1.5 A – 1 A	<120 µs (typical) (R_{load} > 6 Ω)
100 mA – 10 mA	<100 µs (typical)
1 mA	< 3 ms (typical)
100 µA	< 3 ms (typical)
10 µA	< 230 ms (typical)
1 µA	< 230 ms (typical)

Capacitor Leakage Performance Using HIGH-C Scripts [5]

Load = 5 µF||10 MΩ. **Test:** 5 V step and measure. 200 ms (typical) @ 50 nA.

NOTES

1. Includes measurement of SENSE HI to HI and SENSE LO to LO contact resistances.
2. High Capacitance Mode specifications are for DC measurements only.
3. 100 nA range is not available in High Capacitance Mode.
4. High Capacitance Mode utilizes locked ranges. Auto Range is disabled.
5. Part of KI Factory scripts. See reference manual for details.

Mode Change Delay

100 µA Current Range and Above	Delay into High Capacitance Mode: 10 ms. Delay out of High Capacitance Mode: 10 ms.
1 µA and 10 µA Current Ranges	Delay into High Capacitance Mode: 230 ms. Delay out of High Capacitance Mode: 10 ms.

Voltmeter Input Impedance 30 GΩ in parallel with 3300 pF.

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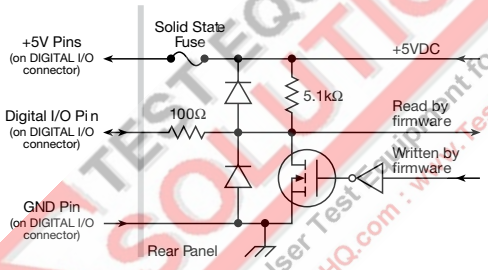
Noise, 10 Hz–20 MHz (20 V Range)	<30 mV peak-peak (typical).
Voltage Source Range Change Overshoot (for 20 V range and below)	<400 mV + 0.1% of larger range (typical). Overshoot into a 200 kΩ load, 20 MHz BW.

General (2634B, 2635B, 2636B)

IEEE-488	IEEE-488.1 compliant. Supports IEEE-488.2 common commands and status model topology.
USB Control (rear)	USB 2.0 device, TMC488 protocol.
RS-232	Baud rates from 300bps to 115200bps. Programmable number of data bits, parity type, and flow control (RTS/CTS hardware or none).
Ethernet	RJ-45 connector, LXI Class C, 10/100BT, no auto MDIX.
Expansion Interface	The TSP-Link expansion interface allows TSP enabled instruments to trigger and communicate with each other. (Not available on 2634B.)
Cable Type	Category 5e or higher LAN crossover cable.
Length	3 meters maximum between each TSP enabled instrument.
LXI Compliance	LXI Class C 1.4.
LXI Timing	**Total Output Trigger Response Time:** 245 µs min., 280 µs typ., (not specified) max. **Receive LAN[0-7] Event Delay:** Unknown. **Generate LAN[0-7] Event Delay:** Unknown.
Digital I/O Interface	(Not available on Model 2634B)



Connector	25-pin female D.
Input/Output Pins	14 open drain I/O bits.
Absolute Maximum Input Voltage	5.25 V.
Absolute Minimum Input Voltage	–0.25 V.
Maximum Logic Low Input Voltage	0.7 V, +850 µA max.
Minimum Logic High Input Voltage	2.1 V, +570 µA.
Maximum Source Current (flowing out of Digital I/O bit)	+960 µA.
Maximum Sink Current @ Maximum Logic Low Voltage (0.7V)	–5.0 mA.

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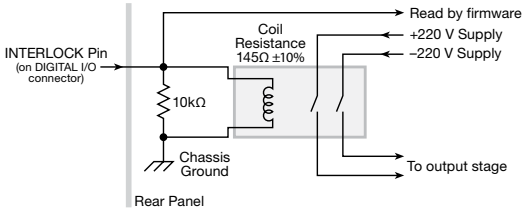
Absolute Maximum Sink Current (flowing into Digital I/O pin)	–11 mA.
5 V Power Supply Pins	Limited to 250 mA total for all three pins, solid state fuse protected.
Safety Interlock Pin	Active high input. >3.4 V @ 24 mA (absolute maximum of 6 V) must be externally applied to this pin to ensure 200 V operation. This signal is pulled down to chassis ground with a 10 kΩ resistor. 200 V operation will be blocked when the INTERLOCK signal is <0.4 V (absolute minimum –0.4 V). See figure below:



USB File System (Front)	**USB 2.0 Host:** Mass storage class device.
Power Supply	100 V to 250 VAC, 50–60 Hz (auto sensing), 240 VA max.
Cooling	Forced air. Side intake and rear exhaust. One side must be unobstructed when rack mounted.
EMC	Conforms to European Union Directive 2004/108/EEC, EN 61326-1.
Safety	Conforms to European Union Directive 73/23/EEC, EN 61010-1, and UL 61010-1.
Dimensions	89 mm high × 213 mm wide × 460 mm deep (3½ in × 8⅜ in × 17½ in). **Bench Configuration (with handle and feet):** 104mm high × 238mm wide × 460mm deep (4⅛ in × 9⅜ in × 17½ in).
Weight	**2635B:** 4.75 kg (10.4 lbs). **2634B, 2636B:** 5.50 kg (12.0 lbs).
Environment	For indoor use only.
Altitude	Maximum 2000 meters above sea level.
Operating	0°–50°C, 70% R.H. up to 35°C. Derate 3% R.H./°C, 35°–50°C.
Storage	–25°C to 65°C.

See pages 30 and 31 for measurement speeds and other specifications.

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Measurement Speed Specifications [1, 2, 3] (All Instruments)

Maximum Sweep Operation Rates (operations per second) for 60Hz (50Hz):

A/D Converter Speed	Trigger Origin	Measure To Memory Using User Scripts	Measure To GPIB Using User Scripts	Source Measure To Memory Using User Scripts	Source Measure To GPIB Using User Scripts	Source Measure To Memory Using Sweep API	Source Measure To GPIB Using Sweep API
0.001 NPLC	Internal	20000 (20000)	10500 (10500)	7000 (7000)	6200 (6200)	12000 (12000)	5900 (5900)
0.001 NPLC	Digital I/O	8100 (8100)	7100 (7100)	5500 (5500)	5100 (5100)	11200 (11200)	5700 (5700)
0.01 NPLC	Internal	5000 (4000)	4000 (3500)	3400 (3000)	3200 (2900)	4200 (3700)	3100 (2800)
0.01 NPLC	Digital I/O	3650 (3200)	3400 (3000)	3000 (2700)	2900 (2600)	4150 (3650)	3050 (2775)
0.1 NPLC	Internal	580 (490)	560 (475)	550 (465)	550 (460)	575 (480)	545 (460)
0.1 NPLC	Digital I/O	560 (470)	450 (460)	545 (460)	540 (450)	570 (480)	545 (460)
1.0 NPLC	Internal	59 (49)	59 (49)	59 (49)	59 (49)	59 (49)	59 (49)
1.0 NPLC	Digital I/O	58 (48)	58 (49)	59 (49)	59 (49)	59 (49)	59 (49)

Maximum Single Operation Rates (operations per second) for 60Hz (50Hz):

A/D Converter Speed	Trigger Origin	Measure To GPIB	Source Measure To GPIB	Source Measure Pass/Fail To GPIB
0.001 NPLC	Internal	1900 (1800)	1400 (1400)	1400 (1400)
0.01 NPLC	Internal	1450 (1400)	1200 (1100)	1100 (1100)
0.1 NPLC	Internal	450 (390)	425 (370)	425 (375)
1.0 NPLC	Internal	58 (48)	57 (48)	57 (48)

Maximum Measurement Range Change Rate
<150 µs for ranges >10 µA, typical. When changing to or from a range ≥1 A, maximum rate is <450 µs, typical.

Maximum Source Range Change Rate
<2.5 ms for ranges >10 µA, typical. When changing to or from a range ≥1 A, maximum rate is <5.2 ms, typical.

Maximum Source Function Change Rate
<1 ms, typical.

Command Processing Time Maximum time required for the output to begin to change following the receipt of the smux.source.levelv or smux.source.leveli command. <1 ms typical.

NOTES

1. Tests performed with a 2602B, 2612B, or 2636B on Channel A using the following equipment: PC Hardware (Pentium® 4 2.4 GHz, 512 MB RAM, National Instruments PCI-GPIB). Driver (NI-486.2 Version 2.2 PCI-GPIB). Software (Microsoft® Windows® 2000, Microsoft Visual Studio 2005, VISA version 4.1).
2. Exclude current measurement ranges less than 1 mA.
3. 2635B/2636B with default measurement delays and filters disabled.

Triggering and Synchronization Specifications [1]

Triggering

Trigger in to Trigger Out 0.5 µs, typical.

Trigger in to Source Change [2] 10 µs, typical.

Trigger Timer Accuracy ±2 µs, typical.

Source Change [2] After LXI Trigger
280 µs, typical.

Synchronization
Single-Node Synchronized Source Change [2]: <0.5 µs, typical.
Multi-Node Synchronized Source Change [2]: <0.5 µs, typical.

NOTES

1. TSP-Link not available on 2604B, 2614B, and 2634B.
2. Fixed source range, with no polarity change.

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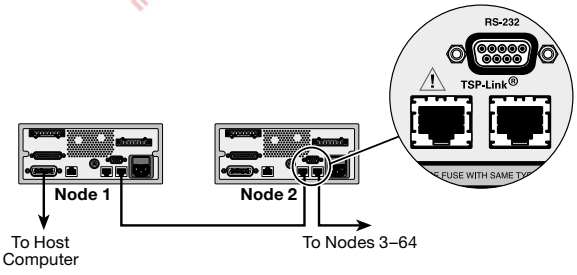
Supplemental Information (All Instruments)

Front Panel Interface		Two-line vacuum fluorescent display (VFD) with keypad and rotary knob.
	Display	Show error messages and user defined messages. Display source and limit settings. Show current and voltage measurements. View measurements stored in dedicated reading buffers.
	Keypad Operations	Change host interface settings. Save and restore instrument setups. Load and run factory and user defined test scripts (i.e. sequences) that prompt for input and send results to the display. Store measurements into dedicated reading buffers.
Programming		Embedded Test Script Processor (TSP) accessible from any host interface. Responds to individual instrument control commands. Responds to high speed test scripts comprised of instrument control commands and Test Script Language (TSL) statements (e.g. branching, looping, math, etc.). Able to execute high speed test scripts stored in memory without host intervention.
	Minimum Memory Available	16 MB (approximately 250,000 lines of TSL code).
	Test Script Builder	Integrated development environment for building, running, and managing TSP scripts. Includes an instrument console for communicating with any TSP enabled instrument in an interactive manner. Requires: VISA (NI-VISA included on CD) Pentium III 800MHz or faster personal computer Microsoft .NET Framework (included on CD) Microsoft Windows 98, NT, 2000, or XP Keithley I/O Layer (included on CD)
	Software Interface	TSP Express (embedded), Direct GPIB/VISA, READ/WRITE for VB, VC/C++, LabVIEW, LabWindows/CVI, etc.
Reading Buffers		Dedicated storage area(s) reserved for measurement data. Reading buffers are arrays of measurement elements. Each element can hold the following items: Measurement Source setting (at the time the measurement was taken) Measurement Status Range information Timestamp
		Two reading buffers are reserved for each SourceMeter channel. Reading buffers can be filled using the front panel STORE key and retrieved using the RECALL key or host interface. **Buffer Size, with timestamp and source setting:** >60,000 samples. **Buffer Size, without timestamp and source setting:** >140,000 samples.
System Expansion		The TSP-Link expansion interface allows TSP enabled instruments to trigger and communicate with each other. Not applicable for 2604B, 2614B, and 2634B. See figure below:



Each SourceMeter SMU instrument has two TSP-Link connectors to facilitate chaining instruments together.

Once SourceMeter SMU instruments are interconnected via TSP-Link, a computer can access all of the resources of each SourceMeter SMU instrument via the host interface of any SourceMeter SMU instrument.

A maximum of 32 TSP-Link nodes can be interconnected. Each SourceMeter SMU instrument consumes one TSP-Link node.

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TIMER	Free running 47-bit counter with 1 MHz clock input. Reset each time instrument powers up. Rolls over every 4 years.
Timestamp	TIMER value automatically saved when each measurement is triggered.
Resolution	1 µs.
Accuracy	±100 ppm.

Supplied Accessories (All Instruments)

Operators and Programming Manuals	
2600-ALG-2	Low Noise Triax Cable with Alligator Clips, 2m (6.6 ft.) (two supplied with 2634B and 2636B, one with 2635B)
2600-Kit	Screw Terminal Connector Kit (2601B, 2602B, 2604B, 2611B, 2612B, 2614B)
2600B-800A	Series 2400 Emulation Script for Series 2600B (supplied on USB memory stick)
7709-308A	Digital I/O Connector
CA-180-3A	TSP-Link/Ethernet Cable (two per unit)
TSP Express Software Tool	(embedded)
Test Script Builder Software	(supplied on CD)
LabVIEW Driver	(supplied on CD)
ACS Basic Edition Software	(optional)

Available Accessories (All Instruments)

Software

ACS-BASIC	Component Characterization Software

Rack Mount Kits

4299-1	Single Rack Mount Kit with front and rear support
4299-2	Dual Rack Mount Kit with front and rear support
4299-5	1U Vent Panel

Cables and Connectors

2600-BAN	Banana Test Leads/Adapter Cable. For a single 2601B/2602B/2604B/2611B/2612B/2614B SMU instrument channel
2600-KIT	Extra screw terminal connector, strain relief, and cover for a single SourceMeter channel (one supplied with 2601B and 2611B, two with 2602B, 2604B, 2612B, 2614B)
2600-FIX-TRIAX	Phoenix-to-Triax Adapter for 2 wire sensing
2600-TRIAX	Phoenix-to-Triax Adapter for 4 wire sensing
7078-TRX-*	3-Slot, Low Noise Triax Cable, 0.3m–6.1m. For use with 2600-TRIAX Adapter
7078-TRX-GND	3-Slot male triax to BNC adapter (guard removed)
7709-308A	Digital I/O Connector (model specific)
8606	High Performance Modular Probe Kit. For use with 2600B-BAN

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GPIB Interfaces and Cables

7007-1	Double Shielded GPIB Cable, 1 m (3.3 ft.)
7007-2	Double Shielded GPIB Cable, 2 m (6.6 ft.)
KPCI-488LPA	IEEE-488 Interface/Controller for the PCI Bus

Digital I/O, Trigger Link, and TSP-Link

2600-TLINK	Digital I/O to TLINK Adapter Cable, 1 m
CA-126-1A	Digital I/O and Trigger Cable, 1.5 m
CA-180-3A	CAT5 Crossover Cable for TSP-Link and direct Ethernet connection (two supplied)

Test Fixtures

8101-PIV	DC, Pulse I-V and C-V Component Test Fixture
8101-4TRX	4 Pin Transistor Fixture
LR8028	Component Test Fixture – Optimized for device testing at up to 200 V/1 A

Switching

Series 3700A	DMM/Switch Systems
707B	Semiconductor Switching Matrix Mainframe

Calibration and Verification

2600-STD-RES	Calibration Standard 1 GΩ Resistor for 2634B, 2635B, and 2636B

Available Services (All Instruments)

Extended Warranties

26xxB-EW	1 Year Factory Warranty extended to 2 years
26xxB-3Y-EW	1 Year Factory Warranty extended to 3 years
26xxB-5Y-EW	1 Year Factory Warranty extended to 5 years

Calibration Contracts

C/26xxB-3Y-STD	3 Calibrations within 3 years
C/26xxB-5Y-STD	5 Calibrations within 5 years
C/26xxB-3Y-DATA	3 Calibrations within 3 years and includes calibration data before and after adjustment
C/26xxB-5Y-DATA	5 Calibrations within 5 years and includes calibration data before and after adjustment
C/26xxB-3Y-17025	3 IS0-17025 accredited calibrations within 3 years
C/26xxB-5Y-17025	5 IS0-17025 accredited calibrations within 5 years

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Ordering Information (All Instruments)

2601B	Single-channel System SourceMeter SMU Instrument (3 A DC, 10 A Pulse)
2602B	Dual-channel System SourceMeter SMU Instrument (3 A DC, 10 A Pulse)
2604B	Dual-channel System SourceMeter SMU Instrument (3 A DC, 10 A Pulse, Benchtop Version)
2611B	Single-channel System SourceMeter SMU Instrument (200 V, 10 A Pulse)
2612B	Dual-channel System SourceMeter SMU Instrument (200 V, 10 A Pulse)
2614B	Dual-channel System SourceMeter SMU Instrument (200 V, 10 A Pulse, Benchtop Version)
2634B	Dual-channel System SourceMeter SMU Instrument (1 fA, 10 A Pulse, Benchtop Version)
2635B	Single-channel System SourceMeter SMU Instrument (0.1 fA, 10 A Pulse)
2636B	Dual-channel System SourceMeter SMU Instrument (0.1 fA, 10 A Pulse)

Warranty Information

Warranty Summary	This section summarizes the warranties of the Series 2600B. For complete warranty information, refer to the Series 2600B Reference Manual. Any portion of the product that is not manufactured by Keithley is not covered by this warranty and Keithley will have no duty to enforce any other manufacturer's warranties.
Hardware Warranty	Keithley Instruments, Inc. warrants the Keithley manufactured portion of the hardware for a period of one year from defects in materials or workmanship; provided that such defect has not been caused by use of the Keithley hardware which is not in accordance with the hardware instructions. The warranty does not apply upon any modification of Keithley hardware made by the customer or operation of the hardware outside the environmental specifications.
Software Warranty	Keithley warrants for the Keithley produced portion of the software or firmware will conform in all material respects with the published specifications for a period of ninety (90) days; provided the software is used on the product for which it is intended in accordance with the software instructions. Keithley does not warrant that operation of the software will be uninterrupted or error-free, or that the software will be adequate for the customer's intended application. The warranty does not apply upon any modification of the software made by the customer.

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