

KEITHLEY

2306

The Keithley 2306 is a dual-channel precision battery/charger simulator designed specifically for testing portable, battery-operated devices such as cellular phones, IoT hardware, and RFIC power amplifiers. Featuring ultra-fast transient voltage response, variable output resistance (on Channel 1), and high-resolution pulse current measurements, the 2306 simulates a real battery's behavior under dynamic pulsed-load conditions while also providing an auxiliary charger simulator or power supply on its second channel.

SPECIFICATIONS

General

Interfaces	GPIB (IEEE-488.2)
Display	2-line × 16-character VFD (Vacuum Fluorescent Display)
Warm-Up Time	1 hour to rated accuracy
Recommended Calibration Cycle	1 year

Physical

Power Supply	100V / 120V / 220V / 240V AC (switch-selectable), 50/60 Hz, 150 VA max
Operating Temperature	0 to 50 °C °C
Dimensions (W×H×D)	213 mm × 89 mm × 411 mm mm
Weight	4.3 kg kg
Rack Mount Height	2U
Rack Mount Width	Half-rack

DC Output

Number of Channels	2
Channel 1 Purpose	Battery Simulator (optimised with variable output resistance)
Channel 2 Purpose	Charger Simulator or Power Supply
Voltage Output Range (Channel 1)	0 to 15 V DC
Current Output Range (Channel 1)	0 to 3 A (at up to 15 V), 0 to 5 A (at up to 9 V)
Voltage Output Range (Channel 2)	0 to 15 V DC
Current Output Range (Channel 2)	0 to 3 A (at up to 15 V), 0 to 5 A (at up to 9 V)
Maximum Output Power (per Channel)	45 W
Voltage Programming Accuracy	0.05% + 3 mV
Current Programming Accuracy	0.2% + 5 mA
Voltage Programming Resolution	1 mV
Current Programming Resolution	1.25 mA
Voltage Readback Accuracy	0.05% + 2 mV
Current Readback Accuracy (5 A Range)	0.2% + 200 μ A
Current Readback Accuracy (5 mA Range)	0.2% + 1 μ A
Voltage Readback Resolution	1 mV
Current Readback Resolution (5 A Range)	100 μ A
Current Readback Resolution (5 mA Range)	0.1 μ A
Load Regulation (Voltage)	0.01% + 2 mV
Line Regulation (Voltage)	0.01% + 0.5 mV
Load Regulation (Current)	0.01% + 1 mA
Line Regulation (Current)	0.01% + 0.5 mA
Ripple and Noise Voltage (p-p)	<3 mV p-p (typical, 20 Hz to 20 MHz)
Ripple and Noise Voltage (RMS)	<1 mV RMS (typical, 20 Hz to 20 MHz)

Battery Simulation & Variable Impedance

Variable Output Resistance Range (Channel 1)	0 to 1.00 Ω
Output Resistance Programming Resolution	1 m Ω
Output Resistance Programming Accuracy	1% + 10 m Ω
Continuous Sink Current Capacity (Channel 1)	3 A
Continuous Sink Current Capacity (Channel 2)	3 A

Transient Response & Dynamic Performance

Transient Voltage Recovery Time (to within 100mV)	<40 μ s (for 0.1 A to 3.0 A load change, High Bandwidth)
Transient Voltage Recovery Time (to within 75mV)	<40 μ s (for 0.1 A to 3.0 A load change, High Bandwidth)
Transient Response Bandwidth	High and Low (selectable to optimise for load lead inductance)

Pulse Current Measurement

Pulse Current Measurement Range	5 A
Pulse Current Measurement Resolution	100 μ A
Pulse Current Measurement Accuracy	0.2% + 200 μ A
Trigger Level Range	5 mA to 5 A (programmable)
Trigger Level Resolution	5 mA
Trigger Delay Range	0 to 100 ms (programmable in 10 μ s steps)
Integration Time Range (60Hz Line Frequency)	33.3 μ s to 833 ms (programmable in 33.3 μ s steps)
Integration Time Range (50Hz Line Frequency)	40 μ s to 1.0 s (programmable in 40 μ s steps)
Measurement Modes	Peak, Average, Valley, Pulse-Train
Measurement Buffer Capacity	2048 readings

Low-Current & Microamp Readback

DC Current Readback Ranges	5 A, 5 mA
Microamp Range Readback Resolution (5 mA Range)	0.1 μ A
Microamp Range Readback Accuracy (5 mA Range)	0.2% + 1 μ A

Protection and Safety

Overcurrent Protection (OCP) Range	Programmable current limit up to 5 A
Isolation Voltage (Output to Chassis)	125 V peak (any terminal to chassis)

Connectivity & Remote Interfaces

GPIO (IEEE-488) Interface	Standard, IEEE-488.2 compliant
Remote Sensing Terminals	Yes, Sense+ and Sense- terminals per channel
Programming Command Language	SCPI (Standard Commands for Programmable Instruments)

User Interface & Display

Display Resolution (Digits)	4.5 digits
Simultaneous Channel Display Capacity	Yes, dual-channel display mode shows voltage and current for both channels

Power & Utility Requirements

AC Input Frequency Range	50 Hz to 60 Hz
Maximum Power Consumption	190 VA
Line Fuse Specification (100-120V AC)	2.0 A slow-blow, 5x20mm
Line Fuse Specification (220-240V AC)	1.0 A slow-blow, 5x20mm

Physical and Environmental

Storage Temperature Range	-20 to 70 $^{\circ}$ C
Operating Humidity Limits	0% to 70% R.H. non-condensing (at up to 35 $^{\circ}$ C)
Cooling Mechanism	Internal forced air fan

DVM (Digital Voltmeter)

Digital Voltmeter (DVM) Range	-5 V to +30 V DC
Digital Voltmeter (DVM) Input Impedance	2 GΩ typical
Digital Voltmeter (DVM) Accuracy	±(0.05% + 2 mV) (1 Year, 23°C ± 5°C)
Digital Voltmeter (DVM) Resolution	1 mV
Digital Voltmeter (DVM) Temperature Coefficient	±(0.005% + 0.2 mV)/°C (0°C–18°C & 28°C–50°C)

Performance

Output Temperature Coefficient	±(0.15 × specification)/°C (0°C–18°C & 28°C–50°C)
Readback Temperature Coefficient	±(0.15 × specification)/°C (0°C–18°C & 28°C–50°C)
Variable Output Resistance Range (Channel 2)	Fixed (<0.01 Ω typical)

Remote Sensing

Remote Sense Maximum Lead Drop	1 V per lead
Remote Sense Voltage Error	Add 2 mV to voltage accuracy specification per 1 V drop in the positive lead

Measurement Capabilities

Minimum Pulse Width for Pulse Current Measurement	100 μs
Pulse Current High-Speed Integration Time Step	33.3 μs (at 60 Hz) / 40 μs (at 50 Hz)
Pulse Current Low-Speed Integration Time Step	33.3 μs (at 60 Hz) / 40 μs (at 50 Hz)

Protection

Overvoltage Protection (OVP) Programming Resolution	10 mV
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Connectivity

Rear Panel Output Connector Type	10-pin quick-disconnect terminal block
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Compliance

Safety Compliance Standards	UL-3111-1, CAN/CSA C22.2 No. 1010.1, EN 61010-1
EMC Compliance Standards	Conforms to European Union Directive 89/336/EEC (EN 55011, EN 50082-1)

Environmental

Vibration Standard Compliance	MIL-T-28800E Type III, Class 5
Operating Altitude Limit	Up to 2000 m (6562 ft) above sea level

TECHNOLOGY

Linear DC Power Supply / Simulator

APPLICATIONS

Battery and Charger Simulation for Mobile/IoT Device Testing

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