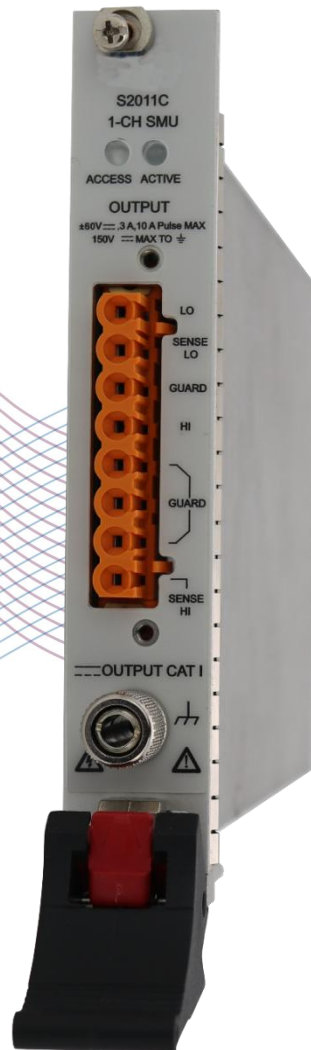


S2011C

Single-Channel PXIe Precision Source Meter

Version 1.5





Product Description

The S2011C Precision source meter is compact and cost-effective PXIe Source/Measure Unit (SMU) with the capability to source and measure both voltage and current. S2011C have Maximum ± 60 V, ± 3 A DC, ± 10 A pulsed and constant 20W power sourcing capability, supports conventional SMU SCPI commands for easy test code migration. Support Most of standards PXIe chassis, support multi-card synchronization, these features improve efficiency and lower the cost of ownership when integrating the SMUs into systems for production test.

Key Features

Feature	Benefit
Precision-fast Control (Adaptive PFC) system	Users can adjust the related parameters based on the load characteristics to obtain precision, and fast output characteristics
Integrated 4-quadrant sourcing and measuring capabilities	Easily and accurately measure current and voltage using a single Card without the need to manually change any connections
Measurement range: ± 60 V, ± 3 A (DC), ± 10 A (pulsed)	Easily LIV sweep test with dual Cards
Source and measurement resolution down to 100 fA and 100 nV	Can make low-level measurements using a low-cost High-density PXIe SMU that were previously only possible using a more expensive semiconductor device analyzer
Fast measurement	Up to 1M ADC sampling rate, NPLC and sampling rate optional setting
Free quick V/I control software	Can make measurements remotely from a PC without the need to program
Standard PXIe Module, Applicable to PXIe chassis	Easily expand to multi-channel and integration into rack and stack systems

Technical Specification

Specification conditions

Temperature :23 °C \pm 5 °C

Humidity :30% to 70% RH

Calibration period:1 Year

Measurement speed: 1PLC (power line cycle)

After 60 minutes warm-up, ambient temperature changes less than ± 3 °C

Voltage Programming and Measurement specifications

	Range	Programming resolution	Accuracy (1 Year) \pm (% reading+ offset)	Typical Noise(RMS) 0.1 Hz-10Hz
Voltage accuracy	± 60 V	10 μ V	0.02%+3 mV	200 μ V
	± 6 V	1 μ V	0.02%+0.3 mV	60 μ V
	± 0.6 V	100 nV	0.02%+50 μ V	20 μ V
Temperature coefficient	$\pm(0.15 \times \text{accuracy})/^{\circ}\text{C}$ (0°C-18°C,28°C-50°C)			
Settling time	<50us (typical)			
Overshoot	< $\pm 0.1\%$ (Typical.Normal.Step is 10 % to 90 % range, full range, resistive load)			
Noise 10Hz-20MHz	6V voltage source, 3A resistive load, <3mV RMS			



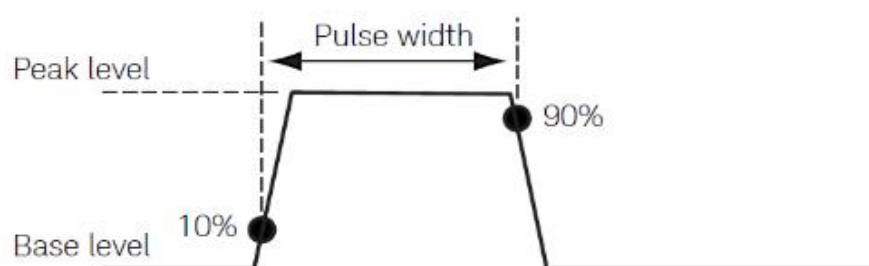
Current Programming and Measurement specifications

Current accuracy	Range	Programming resolution	Accuracy (1 Year) ± (% reading+ offset)	Typical Noise(RMS) 0.1 Hz-10Hz
	±10 A ¹	1 µA	0.03% + 2mA	20 µA
	±3 A	20 µA	0.05% + 5 mA	10 µA
	±1 A	100 nA	0.03% + 90 µA	3 µA
	±100 mA	10 nA	0.03% + 9 µA	200 nA
	±10 mA	1 nA	0.03% + 900 nA	20 nA
	±1 mA	100 pA	0.03% + 90 nA	2 nA
	±100 µA	10 pA	0.03% + 9 nA	200 pA
	±10 µA	1 pA	0.03% + 1 nA	30 pA
	±1 µA	100 fA	0.03% + 200 pA	5 pA
Temperature coefficient	±(0.15 × accuracy)/°C (0°C-18°C,28°C-50°C)			
Settling time	<100us (typical)			
Overshoot	<±0.1% (Typical.Normal.Step is 10 % to 90 % range, full range, resistive load)			

1, 10 A range is available only for pulse mode, accuracy specifications for 10 A range are typical.

Pulse source specifications (4W)

Minimum programmable pulse width	100µs
Pulse width programming resolution	1µs
Pulse width programming accuracy	±10µs
Pulse width jitter	2µs
Pulse width definition	The time from 10 % leading to 90 % trailing edge as follows



Item	Maximums	Maximum pulse width	Maximum duty cycle
1	0.4A/50V	DC,no limit	100%
2	1A/20V	DC,no limit	100%
3	3A/6.6V	DC,no limit	100%
4	10A/20V	1mS	5%
5	10A/50V	400uS	2%



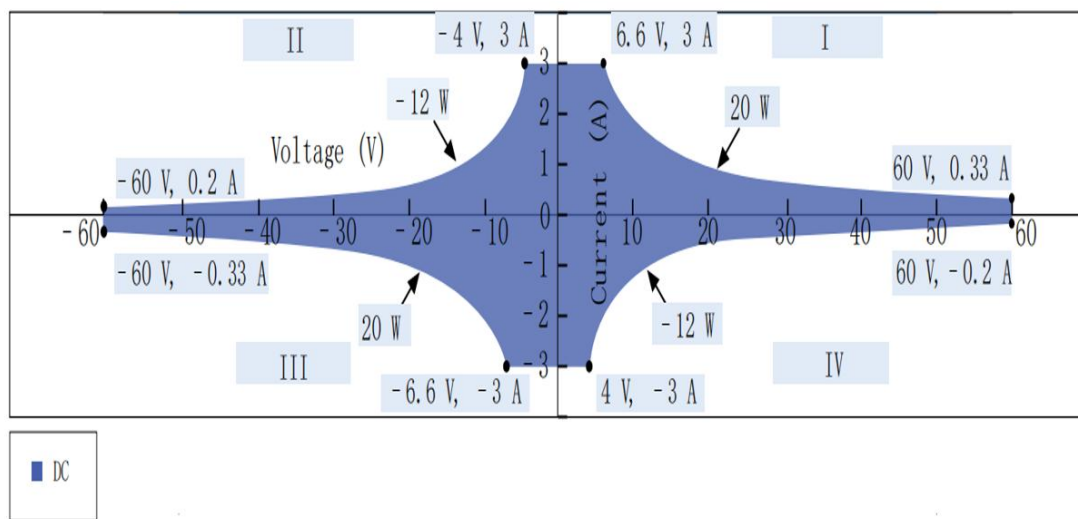
Typical Pulse Performance (4W)

Source	range	Typical rise time ¹	Typical Settling Time ²	Test load
Voltage	50 V	250µS	400µS	NO load
	5 V	40 µS	100 µS	NO load
Current	10A~100 µA	90 µS	250 µS	Full load
	10 µA	120 µS	300 µS	Full load
	1 µA	300 µS	600 µS	Full load

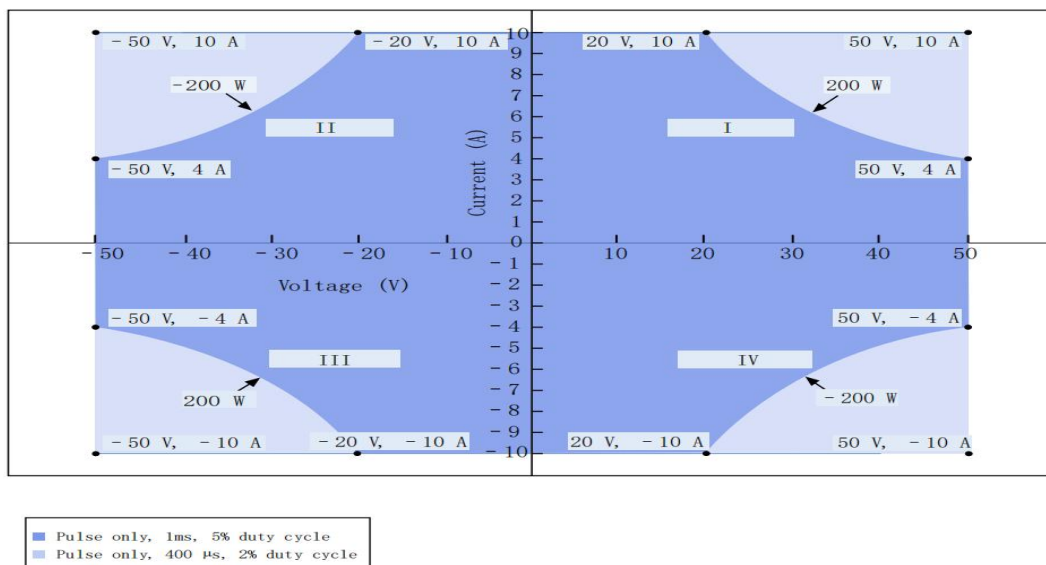
1, Leading edge, the time from 10 % leading to 90 % leading

2, The time required from Pulse out 0 to reach within 1 % of final value

DC I-V Out capability



Pulsed I-V Out capability





Typical output settling time

Source	Range	Output settling time			Condition
		Fast ^{1,2}	Normal ¹	Slow ¹	
Voltage	60V	<120 μ S	<300 μ S	<1ms	Time required to reach within 0.1 % of final value at open load condition. Step is 10 % to 90 % range
	6V	<30 μ S	<50 μ S	<300us	
	0.6V	<30 μ S	<50 μ S	<300us	
Current	3A~100uA	<50 μ S	<100 μ S	<0.8ms	Time required to reach within 0.1 % (0.3 % for 3 A range) of final value at short condition. Step is 10 % to 90 % range
	10uA	<100 μ S	<150 μ S	<0.8ms	
	1uA	<300 μ S	<400uS	<1ms	

1, Output transition speed: Fast, Normal, Slow.

2, Slow mode is recommended for overshoot sensitive equipment, Fast mode may have overshoot on output in some condition

Sampling rate and NPLC setting

Setting	Range
NPLC	0.00005PLC ~ 10PLC
Sampling Rate	5sps ~ 1Msps

Derating accuracy with PLC setting < 1 PLC

Add % of range using the following table for measurement with PLC < 1

PLC	Range						
	100mV	1V	10V to 70V	100nA to 1uA	10uA	100uA to 100mA	1A to 3A
0.1	0.02%	0.01%	0.01%	0.02%	0.01%	0.01%	0.01
0.01	0.3%	0.03%	0.02%	0.2%	0.04%	0.02%	0.02%
0.001	3.2%	0.4%	0.1%	2.5%	0.4%	0.03%	0.03%

Supplemental characteristics

Sensing Modes	2-wire or 4-wire (Remote-sensing) connections
Maximum sense lead resistance	1 k Ω for rated accuracy
Max voltage between High Force and High Sense	2V
Maximum output voltage in output connector	>range 105% (60V range >60.5V)
Sweep	Sweep step time: from 20uS to 16S, Max: 8K point
Auto range	Support, turn off output is recommended for overshoot sensitive equipment before range change
Source delay	Support, It is recommended that users set appropriate source delay to obtain higher accuracy
Over temperature protection	The output will be turned off (also disable operation) when the SMU internal temperature is detected higher than 85 degrees. When the temperature returns to less than 65 degrees, operation recover
Other abnormal protection	Power reset, recover operation or hardware damage



Environmental specifications

Environment	For use in indoor facilities
Operating	0 °C to +50 °C, 30 % to 70 % non-condensing
Storage	-30 °C to 70 °C, 10 % to 90 % non-condensing
Altitude	Operating: 0 m to 2000 m, Storage: 0 m to 4600 m
Power supply	90 V to 264 V, 47 Hz to 63 Hz, 250 VA maximum
Warm-up	1 hour

Ordering information

Output connector, quick reference, U disk (including PDF manuals, quick I/V Measurement Software and drivers)

Model number	
S2011C	Single Channel PXIe Precision Source Meter,



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*Product specifications and descriptions in this article can be changed without notice