

# Precision PSMU

## S3026P

 [Datasheet](#) V1.3

Compliant with the PXIe standard, the S3026P delivers high-precision current pulses up to  $\pm 1.5$  A with a single-channel output. It features a fast rise time of less than 200 ns, a minimum current pulse width of 1  $\mu$ s, and a maximum sampling rate of 100 Msps.



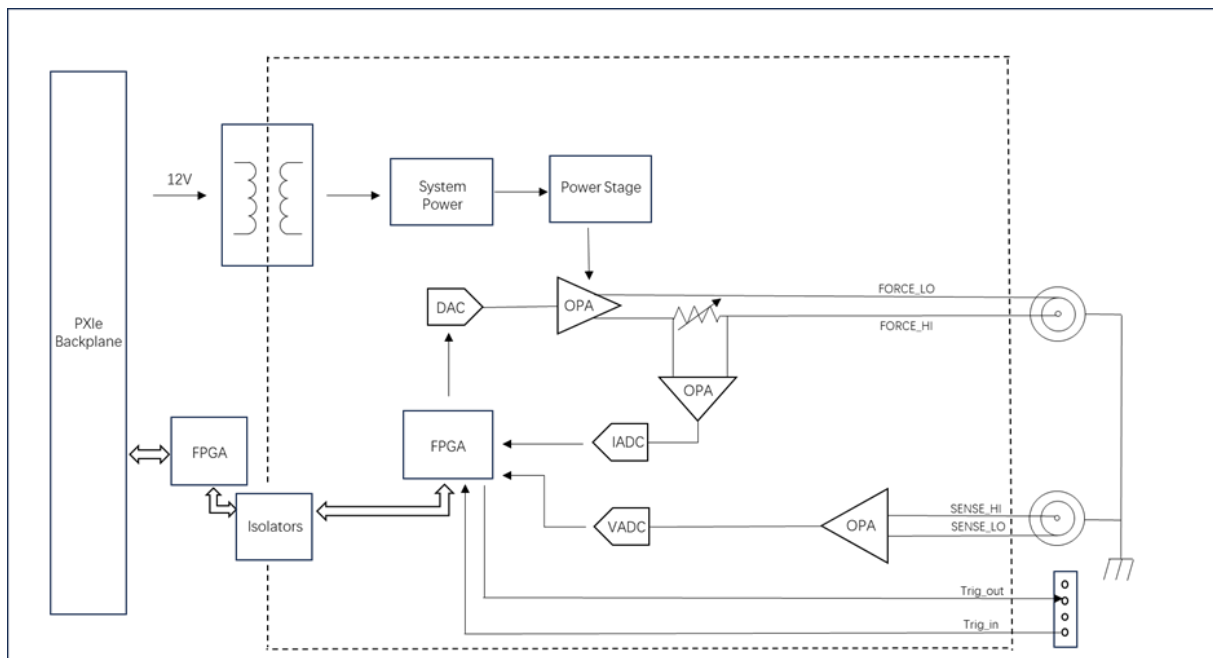
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# 1 Product Description

The Semight S3026P is a standard single-channel pulse current source/measure unit that delivers high-precision current pulses up to  $\pm 1.5$  A. It is compatible with mainstream PXIe chassis, supports conventional SCPI commands for software development, can be configured as either a master or slave to enable multi-module synchronization, and offers synchronized measurement of pulse current and voltage. It covers a wide range of applications, including semiconductor device testing, laser diode driving, material research, and EMC testing, providing a one-stop solution for current pulse applications across multiple fields.



S3026P Block Diagram



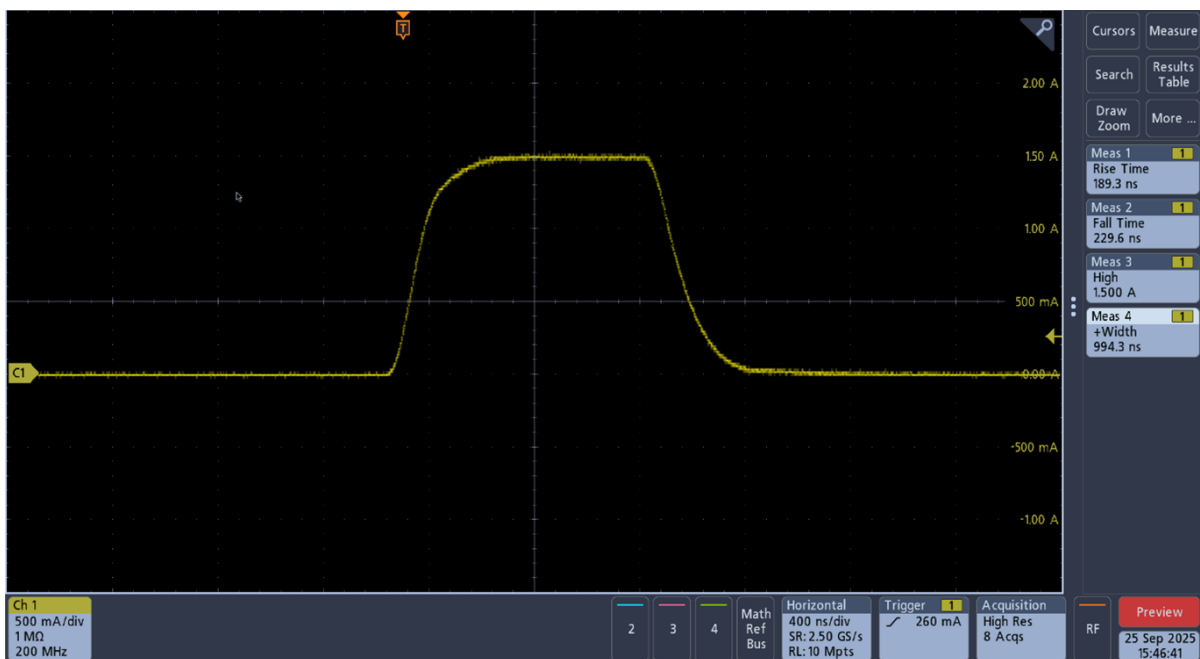
## 2 Features and Benefits

### Maximum Range

Supports pulse current output up to  $\pm 1.5$  A; the measurement unit provides measurement ranges of  $\pm 0.15$  A,  $\pm 0.75$  A, and  $\pm 1.5$  A, allowing users to select fixed ranges or auto-ranging as needed.

### Pulse Width and Rise Time

Achieves a rise time (10% to 90%) of less than 200 ns with the supplied 2 m standard cable, enabling a minimum current pulse width of 1  $\mu$ s.

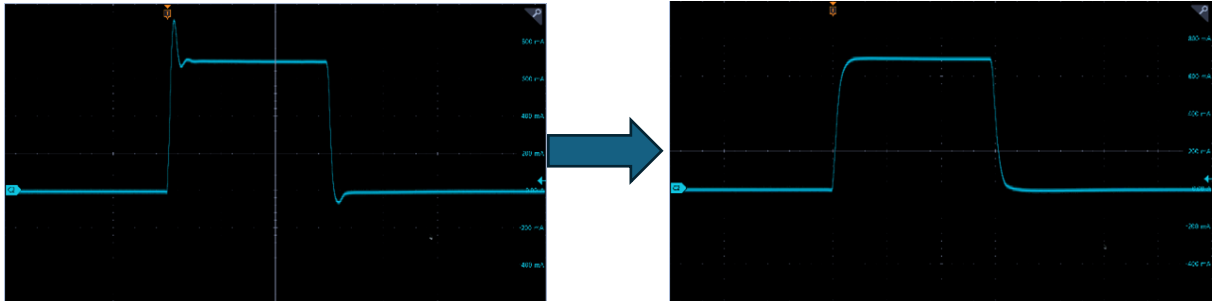


Typical Waveform



## Load Response Adjustment Function

Features a load response adjustment function, allowing users to adjust parameters based on load and line characteristics to optimize output waveform quality.

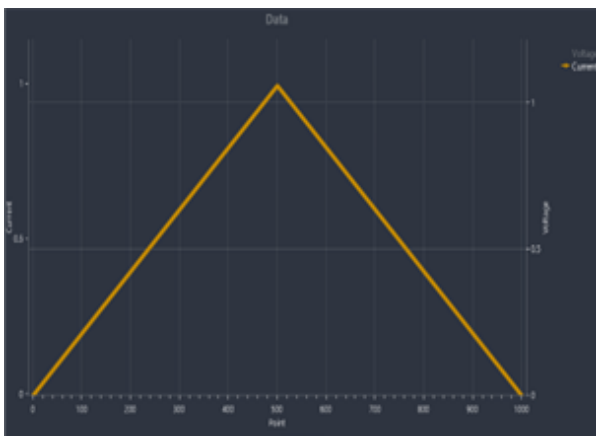


Before Adjustment

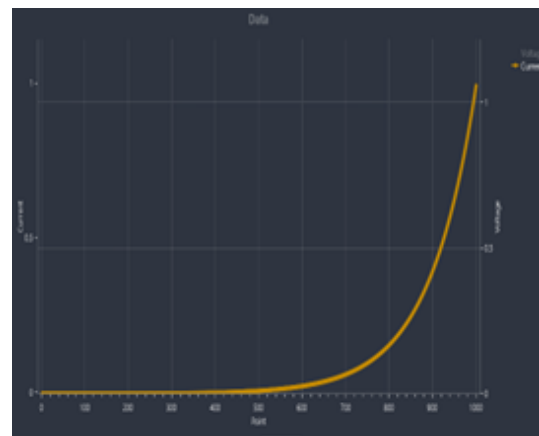
After Adjustment

## Sweep Mode

Supports single linear, double linear, constant, logarithmic, and list sweeps, with a maximum of 65535 points per sweep. It also supports infinite pulse and DC output modes. List sweep is flexibly configurable as needed.



Double Linear Sweep



Logarithmic Sweep



## High Sampling Rate

ADC sampling rate up to 100 Msps for fast test result readback; NPLC is configurable.

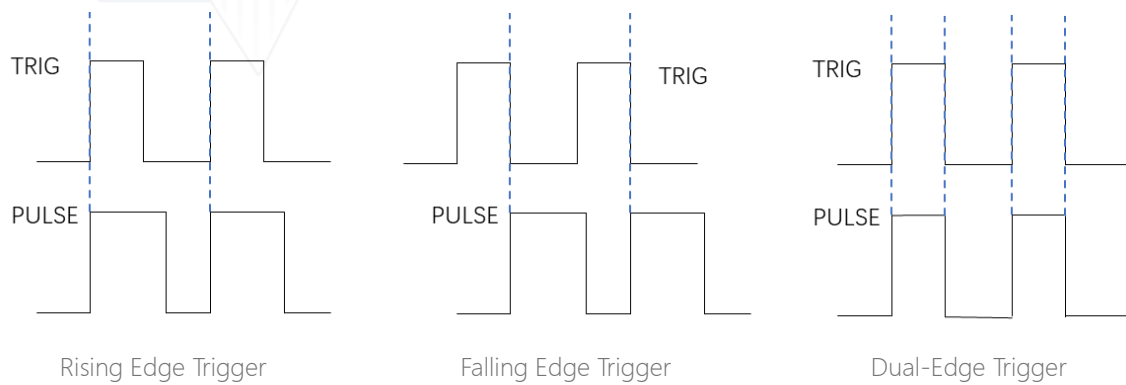
## Protection

- Over-temperature protection: Threshold is configurable (default 80 °C). The device shuts down at over temperature due to abnormal environment or configuration, then operation resumes after troubleshooting and confirming normal conditions.
- Over-current protection: The module LED turns red and the output turns off when current exceeds the set protection threshold.
- Over-voltage protection: The module LED turns red and the output turns off when load voltage exceeds the set protection threshold.

## Trigger

- Features built-in multi-channel PXIe triggers, as well as external trigger input (Trig\_in) and output (Trig\_out) channels. Users can select trigger channels as needed for multi-module synchronization.
- Three trigger modes are available for the slave unit: Rising Edge Trigger, Falling Edge Trigger, and Dual-Edge Trigger.
- The pulse width of the trigger output signal is user-configurable as needed.





## PC Configuration

- Intel Core i7 or higher
- 8 GB memory
- Semight driver required
- Windows 11 (64-bit) / Windows 10 (64-bit) / Windows 7 (64-bit)

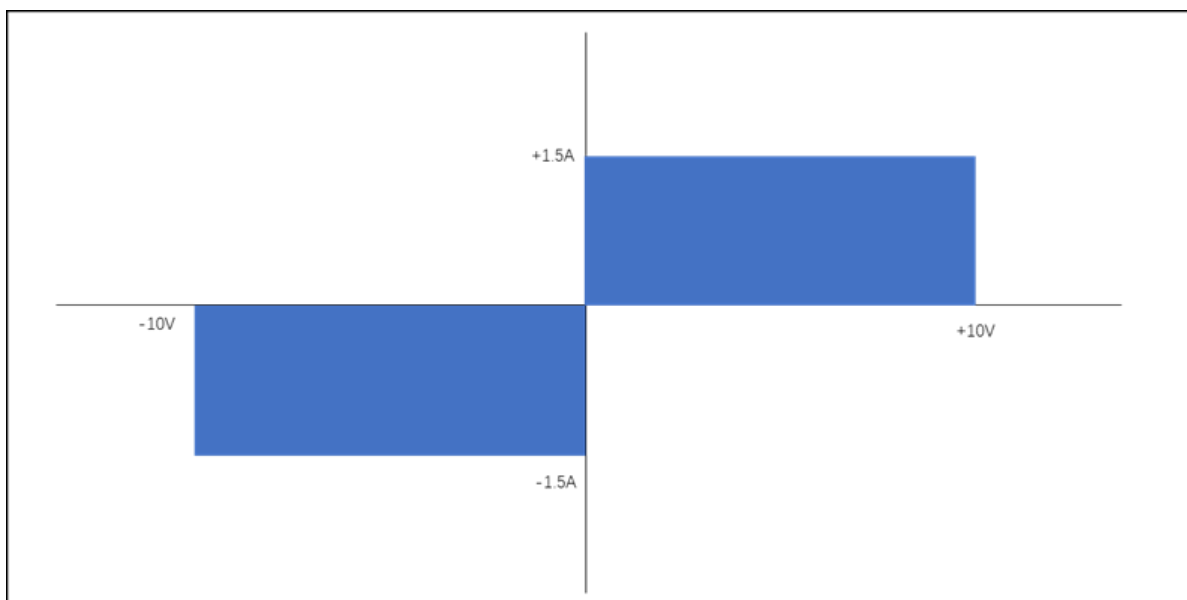


# 3 Specifications

Operating Conditions:

- Temperature: 23 °C ± 5 °C.
- After a 2-hour warm-up, ambient temperature change less than ±3 °C.
- Total inductance of output leads and DUT < 200 nH (at 100 kHz).
- Calibration period: 1 year.
- Measurement speed: 0.02 NPLC.
- PXIe chassis fan speed set to the highest setting.

## Current Output Capability



Pulse I-V Output Capability



## Pulse Current Source Specifications

Parameter	Specification			
	Range	Resolution	Accuracy (1 Year) ± (% reading + offset) <sup>[1]</sup>	Typical Noise <sup>[3]</sup> (RMS) 1 Hz to 10 MHz
Current Accuracy	±150 mA <sup>[2]</sup>	20 µA	0.1% + 0.2 mA	0.2 mA
	±750 mA	20 µA	0.1% + 0.3 mA	0.3 mA
	±1.5 A	40 µA	0.1% + 0.8 mA	0.4 mA
Maximum Load Voltage Drop	10 V			
Pulse Width Resolution	80 ns			
Maximum Pulse Width ( $T_{on-max}$ )	500 µs			
Minimum Pulse Width ( $T_{on-min}$ )	1 µs <sup>[4][5][6]</sup>			
Minimum Pulse Off-Time ( $T_{off-min}$ )	100 µs			
Pulse Width Accuracy	100 ns <sup>[4]</sup>			
Pulse Period Jitter	500 ns (typ.)			
Rise Time (10% to 90%)	< 400 ns <sup>[4][5][6]</sup>			
Pulse Overshoot	< 3% <sup>[4][5][6]</sup>			
Current Regulation	Line Regulation	0.05% of full scale		
	Load Regulation	±100 µA		



Parameter	Specification
Duty Cycle Limit <sup>[7]</sup>	$D \leq 50\%$ ; and satisfies: $D < 3 / [(V_{limit} - V_{load}) \times ( I_{set}  -  I_{bias} )]$
Maximum Pulse Points per Sweep	65535

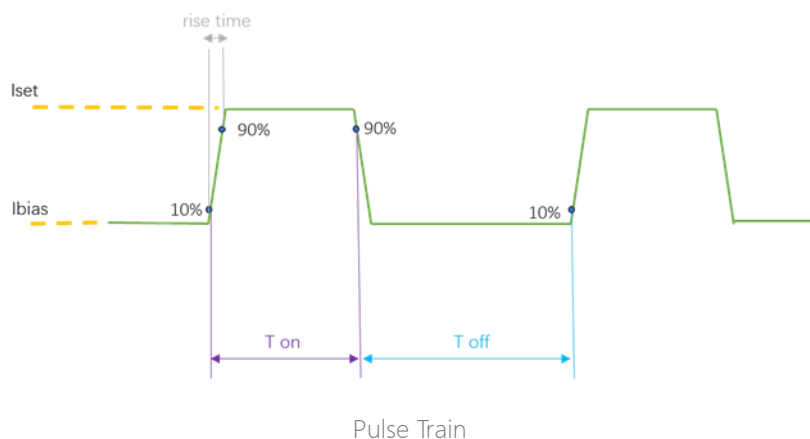
- [1] Test Conditions: Pulse width is set to the maximum pulse width (500  $\mu$ s). Current is measured using a high-precision ammeter with a measurement speed of 0.02 NPLC.
- [2] Internal switching; no user configuration required.
- [3] With a 10  $\Omega$  resistive load, voltage noise across the load is measured, and current noise is calculated via  $I = V / R$ .
- [4] Bias current > 1 mA. Pulse width is measured from 10% of rising edge to 90% of falling edge.
- [5] 0.5  $\Omega$  resistive load.
- [6] Total inductance of output leads and DUT < 200 nH (at 100 kHz).
- [7] Iset: Set current;  
Ibias: Bias current;  
D: Duty cycle;  
Vlimit: Source voltage setting, adjustable range 5 V to 40 V;  
Vload: Maximum load voltage drop.

Note: In current mode, the unit automatically monitors the loop condition. If an external open circuit is detected, the unit disables output and reports an error.

Example: Using a 1  $\Omega$  resistive load, with the sweep current range from 0 A to 1.5 A, the Vload is 1.5 V. With Ibias set to 0 A,  $D < 3 / [(V_{limit} - 1.5 \text{ V}) \times (1.5 \text{ A} - 0)]$ .

When Vlimit is set to 20 V:  $D < 10.8\%$ .

When Vlimit is set to 10 V:  $D < 23.5\%$ .



## Pulse Source Measurement Specifications

Parameter	Specification		
PULSE Voltage Measurement	Range	Resolution	Accuracy ± (% reading + offset)
	6 V	1 mV	0.1% + 22 mV
	10 V	10 mV	0.1% + 24 mV
PULSE Current Measurement	Range	Resolution	Accuracy ± (% reading + offset)
	150 mA	100 µA	0.1% + 1 mA
	750 mA	100 µA	0.1% + 3 mA
	1.5 A	1000 µA	0.1% + 7 mA
Sense Terminal Limits (PULSE Voltage Measurement)	Maximum voltage between HI and SENSE HI: ±1 V Maximum voltage between LO and SENSE LO: ±1 V		

## Sampling Rate and NPLC

NPLC	Sampling Rate <sup>[8]</sup>
0.0000005 to 10	5 sps to 100 Msps

[8] Asynchronous mode supports a maximum of 2048 consecutive data points.



## Bias Current Source Specifications

Parameter	Specification				
Current Accuracy	Range	Maximum Current	Resolution	Accuracy $\pm$ (% reading + offset)	Typical Noise <sup>[3]</sup> (RMS) 1 Hz to 10 MHz
	$\pm 0.15$ A	50 mA	20 $\mu$ A	0.1% + 0.2 mA	0.2 mA
	$\pm 0.75$ A		20 $\mu$ A		
	$\pm 1.5$ A		40 $\mu$ A	0.1% + 0.8 mA	0.4 mA

## Trigger Signal Specifications

Trigger Source	Trigger Function	Signal Level	Delay <sup>[9]</sup> (Typ. <sup>[10]</sup> )	Trigger Mode
PXI0-PXI7	Trig_IN <sup>[11]</sup>	/	500 ns	Rising Edge / Falling Edge / Dual-Edge
PXI0-PXI7	Trig_OUT <sup>[12]</sup>	/	300 ns	Rising Edge
DIO <sup>[13]</sup>	Trig_IN	5 V	500 ns	Rising Edge / Falling Edge / Dual-Edge
DIO	Trig_OUT	5 V	300 ns	Rising Edge

[9] Delay between trigger signal and current pulse.

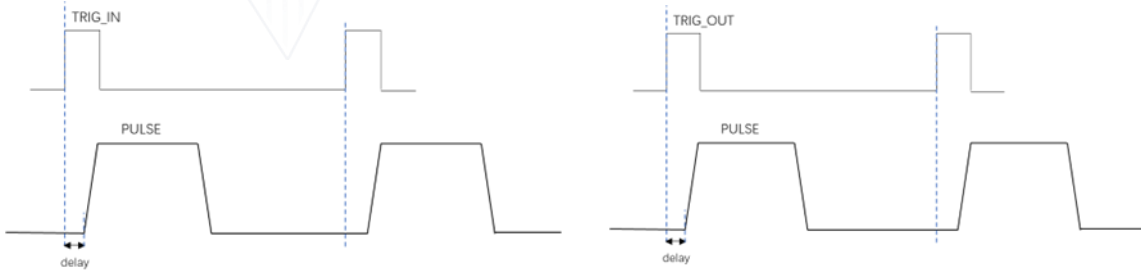
[10] Test conditions: Output current > 100 mA, bias current > 1 mA.

[11] Trigger signal input port (when configured as slave).

[12] Trigger signal output port (when configured as master).

[13] Maximum input voltage: 5 V, minimum input voltage: 0 V, maximum logic low voltage: 1.5 V, minimum logic high voltage: 3.5 V, maximum input/output current: 2 mA.





Trigger Delay Diagram

## Environmental Specifications

Item	Specification
Environment	For use in indoor facilities
Operating	0 °C to +50 °C, < 70% RH, non-condensing
Storage	-30 °C to 70 °C
Altitude	Operating: 0 m to 2000 m, Storage: 0 m to 4600 m
Warm-up	2 hours
Power Supply	Full Load: 12 V/3.5 A; 3.3 V/0.5 A; 5 V/0.2 A
Pollution Degree	2
Dimensions	210 x 130 x 41 mm
Weight	Net weight: 0.55 kg

\* Product dimensions and weight may vary depending on the selected options.

\* WARNING: Do not apply any external sources to the output terminals.



# 4 Ordering Information

Standard Factory Accessories: Installation Software USB Drive (Host PC software, product driver, PDF product datasheet, PDF user manual), DIO trigger signal interface terminal.

## Option List

Option Type	Model Number	Description
Standard	S3026P-T3	Supports minimum output pulse width of 3 $\mu$ s (rising edge > 400 ns)
High-Speed	S3026P-T1	Supports minimum output pulse width of 1 $\mu$ s
Accessories	TA-03015	Pulse source FORCE output cable, triaxial output cable, 2 m, 20 V, 2 A
	TA-03016	Pulse source SENSE connection cable, triaxial output cable, 2 m, 20 V, 2 A
Service	R3C	Factory Extended Warranty Service Plan – 36 months
	R5C	Factory Extended Warranty Service Plan – 60 months



# 5 Warranty

No.	Item	Content	Warranty Period
1	Main Unit	Free repair within warranty (except for ESD or human damage)	12 months
2	Calibration Interval	Factory calibrated or calibrated at the nearest Semight service center	12 months
3	Options	Consumables and accessories are not covered under warranty	



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\*Product specifications and descriptions herein are subject to change without notice.

