AXV7680
High Voltage SMU

VXI Instruments
the test solutions provider

TECHNICAL DATA SHEET

PXI
VXI
LAN
cPCI
PXIe
GPIB
USB
RS232 485
external PCIe

Features

- **High Voltage Source with programmable Current Limits:** multiple ranges available, with output up to 10,000V and 200mA.
- **Versatile Current Measurement:** dynamic range from 200mA down to picoampere resolution for high precision measurement, especially valuable for detecting leakage currents in semiconductors.
- **Enhanced Testing Efficiency:** the bipolar MOSFET power amplifier with a programmable slew rate up to 1,000 V/ms enables efficient and precise testing of components.
- **High Power Capacity:** expanding testing capabilities with 200W DC power and pulsed power up to 750W, ideal for power-intensive applications.
- **Increased Accuracy with 6-Wire Technology:** integrated 6-wire technology improves measurement accuracy and accelerates test speeds.
- **Integrated Digitizer Circuitry:** operates simultaneously with all measurement units at up to 1 MS/s, enabling the device to function as an internal oscilloscope for detailed signal evaluation.
- **Comprehensive Diagnostics:** the integrated output matrix offers self-test capabilities, ensuring system integrity and making troubleshooting simpler and faster.
- **Safety Assurance:** the built-in short circuit protection safeguards all high-voltage outputs (FORCE, SENSE, GUARD) and monitor outputs.
- **Engineered for Fast Semiconductor Testing:** designed for high-speed, versatile, and precise testing of semiconductors.

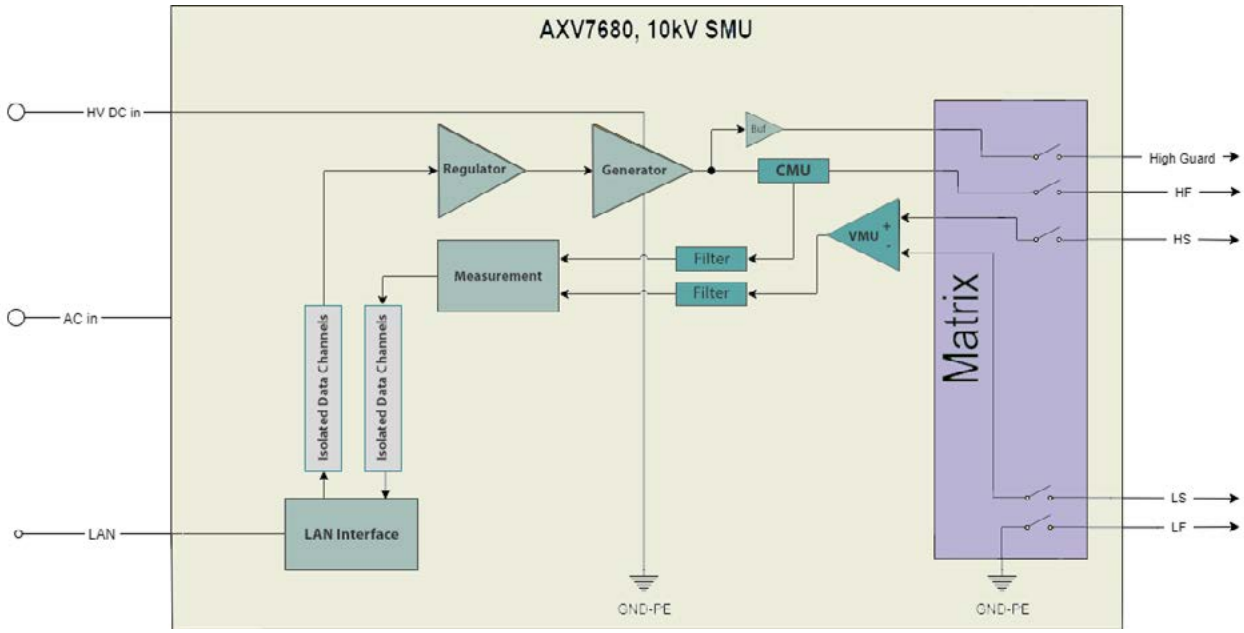
Product Information

The AXV7680 High Voltage SMU is engineered for fast semiconductor testing, providing versatile functionalities and exceptional precision. This advanced device operates as a voltage source with programmable current limits, maximizing test throughput with its sophisticated features.

The AXV7680 incorporates a bipolar MOSFET power amplifier with a programmable slew rate of up to 1,000 V/ms, facilitating fast and efficient testing. It offers multiple generator ranges up to 10.000V. A versatile current measurement dynamic can be achieved through its many, fast selectable current ranges. This setup enables the AXV7680 to get high current measurements from 200mA down to picoampere resolution in its most precise configuration. This comprehensive range of measurements ensures the device meets all high voltage semiconductor testing requirements with high accuracy, especially valuable for detecting leakage currents in semiconductors.
With 200W DC power and a pulsed power up to 750W, the device can handle power intense applications and expanding testing capabilities.

The integrated digitizer circuitry also works simultaneous with all measurement units of up to 1MS/s over their full range. This high sampling rate allows the AXV7680 to work as an internal oscilloscope, providing detailed evaluation of measured signals.
The device features integrated 6-wire technology to increase measurement accuracy and enables very fast test speed, providing reliable results much faster.

The device includes an integrated output matrix and self-test capability, ensuring system integrity and making troubleshooting simpler and faster.
To ensure the safety and integrity of testing, all high voltage outputs (FORCE, SENSE, GUARD) and monitor outputs are short circuit protected. The AXV7680 High Voltage SMU is a vital tool for professionals requiring precision, efficiency, and reliability in semiconductor testing, making it ideal for a wide range of high voltage applications.
Specifically designed for high-speed, versatile, and precise semiconductor testing, reducing testing time and increasing throughput for customers
These features provide customers with a robust, accurate, and efficient testing solution that supports advanced diagnostics and ensures safety, ultimately lowering testing time and improving productivity.



General	Specification	Comment
AC line voltage	80 ... 305V for main SMU 203 V ... 230 V for auxiliary Heinzinger PSU	
AC line frequency	47 Hz ... 63 Hz	
Power consumption	400W under full load	
AC line voltage fuse	2 x 2.5A medium or slow blowing fuse	
Operating temperature	20°C ... 26°C (Limited continuous output power when operated above 23°C.	
Operating altitude	< 2000 m	
Operation Environment	Device must only be operated in clean room environment, ISO 14644-1, Class ISO 7 or better.	
Relative humidity	Max 60%	
Storage temperature range	-25 ... 70°C	
Size	19'', 6HE, 84TE (inclusive external HV PSU) depth: 595mm without handles, 655mm with handles	

Voltage Source, Generator	Specification	Comment
Selectable Ranges	2.5kV, 5kV, 10kV[1]	
DC ACCURACY		
Range: 2.5kV	0.5% or better	
Range: 5kV	0.25 % or better	
Range: 10kV[1]	0.1% or better	
CONTINOUS OUTPUT CURRENT[2]		
Range: 2.5kV	max 80mA	
Range: 5kV	max 40mA	
Range: 10kV[1]	max 20mA	
PULSED OUTPUT CURRENT[2]		
Range: 2.5kV	max 200mA for 12ms[3]	
Range: 5kV	max 150mA for 8ms[3]	
Range: 10kV[1]	max 75mA for 8ms[3]	
Output Voltage Slewrate	100 V/ms ... 1000 V/ms	

[1] the 10kV range has an actual max value of 9000V. This will most likely change with later releases
[2] as long as power limitations does not apply, see manual section 8.4
[3] longer durations are possible with less programmed current

Programmable current limit, Generator	Specification
Selectable Ranges	100µA, 1mA, 10mA, 100mA, 200mA
OUTPUT CURRENT	
Range: 100µA	10µA ... 100µA
Range: 1mA	100µA ... 1mA
Range: 10mA	1mA ... 10mA
Range: 100mA	10mA ... 100mA
Range: 200mA	20mA ... 200mA
DC Accuracy[4]	0.5% or better
Current Limit Application Delay	max 1ms[5]

[4] for all ranges

[5] when going from voltage-limitation mode to current-limiting, there is a delay untill the current limiting regulator is fully active. In this time period the current is allowed to spike higher than normal.

Output Power	Specification
Continous Output Power[6]	200W
PULSE OUTPUT POWER	
Range: 2.5kV	500W[7]
Range: 5kV	750W
Range: 10kV	750W
Maximum energy per single pulse[8]	6J

[6] when operating at 23°C ambient temperature or below. If ambient temperature rises above 23°C continous output power shall be reduced to 150W after 10 minutes

[7] limited by max pulse current

[8] additional information see manual section 7.2, Maximum energy can only be achieved when output voltage is at its range maximum.

Voltage Measurement	Value
Resolution	24 Bit
Selectable Ranges	100V, 1kV, 10kV
Overrange	10% min
DC Accuracy[10]	0.1% typ. (full scale)
Selectable cut-off filter frequencys	100Hz, 1kHz, 10kHz, 100kHz, 1 GHz
Conversion Time for Single Measurements	4µs
Conversion Time for Intervall Measurements	1µs ... 100µs
Num Chached Points for Intervall Measurements	4 ... 1000

[9] specification tested and approved with averaging over 20ms. Filter was set to 1kHz.

Current Measurement	Specification
Resolution	24 Bit
Selectable Ranges	1µA, 10µA, 100µA, 1mA, 10mA, 100mA, 200mA
Overrange	10% min.
DC Accuracy [9]	0.5% min, 0.25% typ. (full scale)
Selectable cut-off filter frequencys	100Hz, 1kHz, 10kHz, 100kHz, 1GHz
Conversion Time for Single Measurements	4µs
Conversion Time for Intervall Measurements	1µs ... 100µs
Num Chached Points for Intervall Measurements	4 ... 1000
Selectable Series Resistors (See Note)	0 Ω, 100 Ω, 1 kΩ, 10 kΩ

Note:
If selecting a CMU series resistor, the voltage produced over the selected resistor MUST NOT be greater than 4V. Otherwise the voltage AND current measurements of CMU and VMU are invalid!

[10] specification tested and approved with averaging over 100ms. Filter was set to 1kHz.

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