

AT-PMU

16 Channel High Performance Parametric Measurement Unit

AT-PMU is a high performance and high parallelism I-V source/measure instrument for use as either bench-top I-V characterization tool or as a building block for complex semiconductor device characterization.

AT-PMU features a high parallelism architecture with integrated switch matrix combined with high sampling rate and high precision measurement units that make this instrument an unrival test solution for parallel test execution.

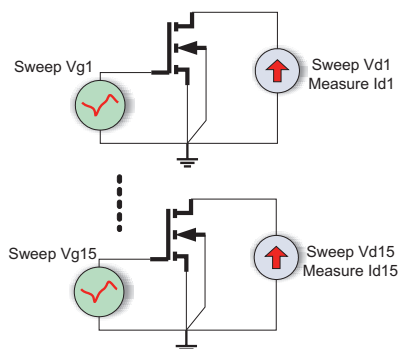
QUICK AND EASY LAB USE

For lab or bench-top use AT-PMU offers a high performance complete I-V measurement solution with unrival ease-of-use, precision and speed.

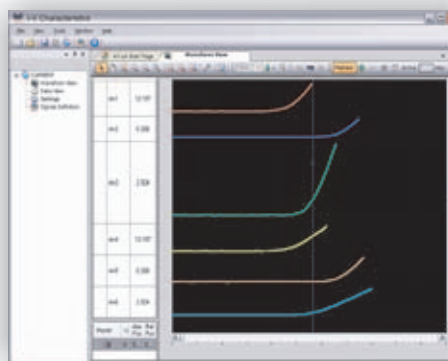
Thanks to the high parallelism (2 or 8 I-V Measurement Units) and to the integrated switch matrix up to 16 I-V characteristics can be quickly evaluated without rewiring.

The high sampling rate (65MSamples/s) together with the programmable hardware averaging provides the user with the possibility to tune between measurement speed and precision. Thanks to its low parasitic architecture AT-PMU provides 10x to 100x better measurement precision than competitors provided the same measurement time or 10x to 100x faster measurement time than competitors provided the same precision.

A intuitive graphical user interface provides a quick setup and advanced tests for device characterization applications. The data can be viewed in graphical or tabular formats and can be readily exported in a .csv file.



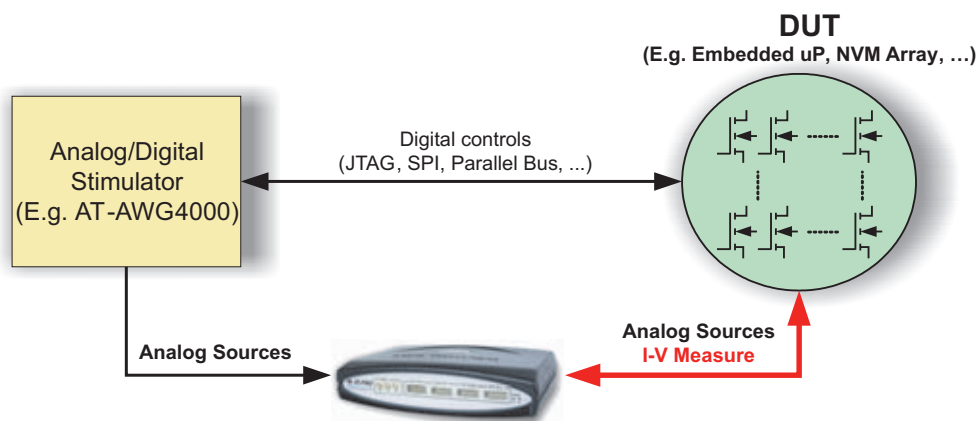
16x



COMPLEX TEST SYSTEM USE

The peculiarity of the AT-PMU is its tight integration with external instruments to make a complete test system aimed at complex semiconductor device characterization.

Thanks to the flexibility of its integrated Switch Matrix the AT-PMU can quickly place each of its I/O pins in series or in parallel with external instruments without the need of rewiring. This way its high performance source/measurement resources can be shared among all channels.



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High measurement throughputs can be sustained thanks to the high sampling rate (65MSample/s) and to the two possible data storage and transfer strategies: the "on the go" and the "oscilloscope like" strategies.

In the "on the go" strategy a 2KSample dual port memory is used to store new measurement bursts at the same time while the already stored measurements can be transferred to a mass storage device. A continuous acquisition process can be sustained through the high speed USB 2.0 connection to the PC.

In the "oscilloscope like" strategy a huge 1MSample single port memory can store with continuity large measurement amounts. The memory is read back at once when the acquisition process is stopped.

For system level applications .Net C++ libraries and LabVIEW VIs allow easy but efficient instrument control and tight integration with external instruments to execute complete test programs.

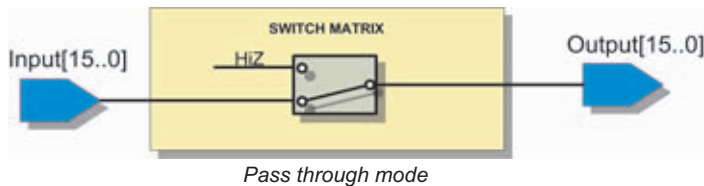
UNMATCHED SPEED AND FLEXIBILITY

The AT-PMU instrument is equipped with:

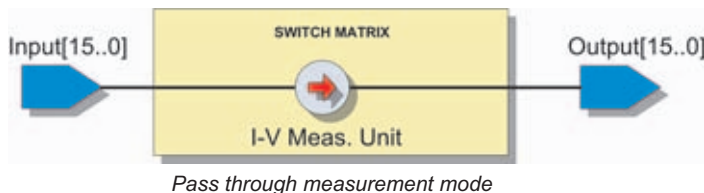
- 16 Inputs -16 Outputs Switch Matrix
- 2 or 8 parallel I-V Measurement Units
- 2 parallel Voltage Sources and 2 parallel Current Sources

The Switch Matrix

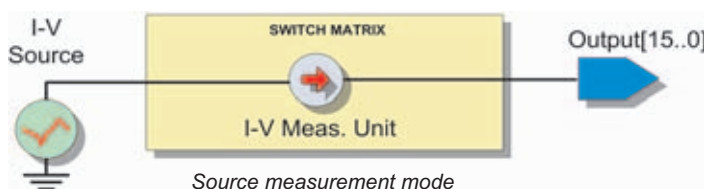
The Switch Matrix has a high bandwidth (200Mhz) and a low parasitic architecture which can be per pin configured to work in three different operating modes:



Pass through mode: the output pin is directly connected to its relative input or it can be placed in HiZ



Pass through measurement mode: the output pin is connected to its relative input through an I-V Measurement Unit. The current or voltage at the output pin can be measured. Any voltage or current source can be externally applied at the input pin.



Source measurement mode: the output pin is connected to an internal Voltage or Current Source through an I-V Measurement Unit. The current or voltage at the output pin can be measured. The input pin is left unconnected.

Thanks to the very fast switch time (<150ns) between the pin operating modes the 2 or 8 available I-V Measurement Unit can be time shared among all of the 16 I/O without introducing important throughput limitation.

The I-V measurement unit

Each instrument is equipped with 2 or 8 parallel I-V Measurement Units that can be shared among all the 16 I/O channels. Each I-V MU provides:

- 12 Bit or 14 Bit resolution
- 65 MSamples/s max sampling frequency
- 2 Ksample Dual Port memory for "on the go" measurements
- 1 MSample Single Port memory for "oscilloscope like" measurements
- Programmable hardware averaging
- Programmable sampling frequency
- Voltage or current measurement mode
- 2 current full scales: $\pm 100\mu\text{A}$ and $\pm 500\mu\text{A}$
- 2 voltage full scales $\pm 1.2\text{V}$ and $\pm 12\text{V}$
- Single shot or append trigger modes
- Programmable measurement burst length

The Voltage/Current sources

Each instrument has 2 parallel Voltage Sources and 2 parallel Current Sources that can be shared among all channels. These sources provides:

- 16 Bit resolution
- $\pm 10\text{V}$ voltage range
- 2 current full scales: $\pm 50\mu\text{A}$, $\pm 500\mu\text{A}$
- Fast update rate: > 1Msps
- Fast settling time: 10 μs to 0.003%

SINCHRONIZATION AND PARALLEL TEST CAPABILITIES

Thanks to the AT-XSS bus up to 8 AT-PMU instruments can be connected in master-slave configuration providing so up to 128 I/O and 64 parallel Measurement Units.

Tight timing synchronization is ensured by the AT-XSS synchronous trigger lines.