

## All-In-One Semiconductor Parameter Analyzer

### Introduction

FS-Pro is an All-In-One Semiconductor Parameter Analyzer, effectively integrating high precision IV, CV, pulse IV, transient IV sampling, arbitrary linear waveform generation and measurement, high-speed time-domain signal acquisition and low-frequency noise test capability in a compact machine. Almost all the low frequency device characteristics can be measured in FS-Pro. Powerful testing and analysis functionality greatly accelerates device research and process evaluation. FS-Pro can be used in conjunction with the Primarius low frequency noise measurement system 9812 that significantly improves noise testing efficiency and throughput. It also supports parallel measurement, which improves the measurement efficiency significantly.

FS-Pro adopts PXI modular architecture to maintain compact size and ensure future extensibility, support multi-channel parallel testing to further improve the testing efficiency. System built-in professional testing software LabExpress provides users with rich test presets and powerful functions to realize a user-friendly plug and play experience.

FS-Pro has a wide range of applications for semiconductor devices, LED materials, two-dimensional materials, nano-materials, and novel devices.

FS-Pro has received widespread customer adoption and industry-wide recognition due to its comprehensive testing functionality. The system has been adopted not only by leading design companies, foundries and IDMs, but also many world-class universities and academic research institutions.

### Applications

- Opto-electronic device and MEMS measurement
- Advanced materials and device measurement
- Non-destructive measurement and inspection
- Ultra-low frequency noise measurement
- Device reliability test
- Device ultrashort pulse test



FS-Pro Illustration with PX500 Controller & Modular Chassis

### Key Advantages

- **All-In-One**
  - High precision IV, CV, pulse IV and transient IV sampling and 1/f noise test all parameters in one box
  - Provide complete low-frequency parametric characterization without switching cables or probe connections
- **Wide range and high precision**
  - High-speed sampling time-domain signal acquisition and arbitrary linear waveform generation
- **Modular architecture**
  - Modular architecture enabling test configuration flexibility and extensibility
- **Easy to use**
  - Build-in LabExpress software offers an intuitive GUI and supports powerful measurement and analysis functions, it can generate any voltage synchronously and follow the waveform without complicated programming
- **Functions as 9812DX's internal SMU module**
  - Seamlessly integrated with 9812D/DX system and NoiseProPlus software, boosting noise testing speed

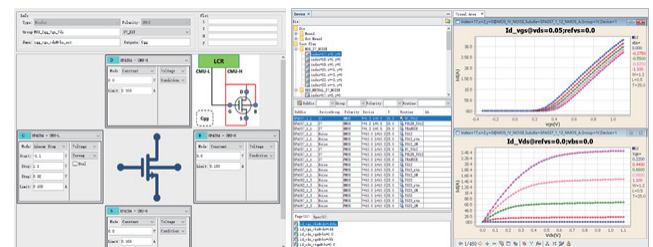
## All-In-One Semiconductor Parameter Analyzer

### Hardware Specifications

- DC IV**
  - Bias range  $\pm 200V/1A$ , 4 quadrants operation
  - Minimum current accuracy 30fA, voltage accuracy 30uV
  - Maximum output power 20W
- CV**
  - Build-in CV: DC bias range  $\pm 200V$ , maximum bandwidth 10kHz, measurement range 20fF~1mF
  - External LCR: DC bias range  $\pm 40V$ , maximum bandwidth 20Hz~10MHz, measurement range 10fF~10mF
- Pulse IV**
  - Bias range  $\pm 200V/3A$ , maximum output power 480W
  - Minimum current measurement accuracy 5pA
  - Voltage measurement accuracy 30uV, minimum pulse width 50us
- Transient IV Sampling**
  - Arbitrary waveform output
  - Maximum sample rate 1.8MS/s, minimum time step 10us
- 1/f Noise**
  - Standard 100kHz bandwidth, supporting RTN
  - Minimum frequency resolution 1mHz, measuring down to  $2e-28A^2/Hz$  and  $<10s/bias$
  - DUT minimum impedance: 500 $\Omega$
- High precision & fast waveform generation/measurement kit**
  - 2-channel, SMA interface
  - Fast IV test:  $\pm 10V$  voltage, maximum current 10mA
  - SMU direct connection: Voltage input  $\pm 25V$ , maximum current 100mA
  - Sampling rate 100msa/s, minimum recommended pulse width 130ns

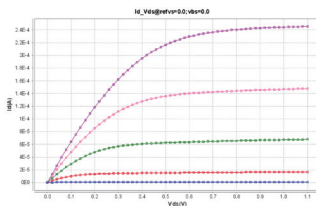
### Software Specifications

- LabExpress offers an intuitive GUI and supports powerful measurement and analysis functions.
- Complete DC IV, pulse IV, transient IV sampling, CV, and 1/f noise measurement functions.
- Supports stress measurement, and HCI, BTI, TDDDB, GOI (V-Ramp, J-Ramp) reliability test.
- Built-in device types: MOSFET, BJT, diode, resistor, capacitor; features a multitude of measurement presets for the user to perform testing efficiently and easily.
- Data analysis features such as curve conversion and plotting enable device characterization analysis to be done in a short amount of time.
- Supports multiple data output formats for further analysis: Data can be loaded into modeling software such as BSIMProPlus and MeQLab for model extraction.
- Professional version of LabExpress supports to control a semi-auto probe station, switching matrix for wafer mapping and testing automation. The parallel testing functionality improves testing efficiency significantly.

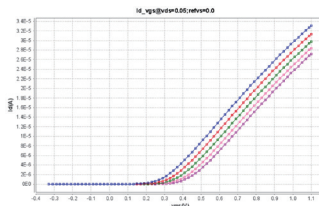


### Application Examples

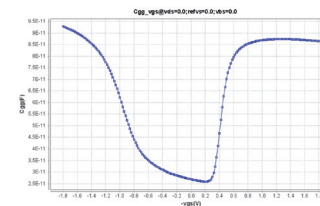
I-V Measurement



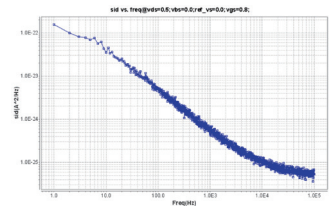
I-V Measurement



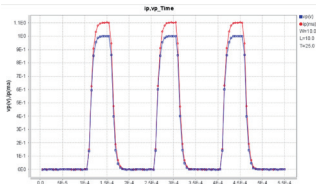
C-V Measurement



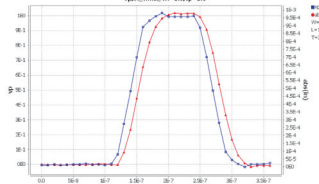
1/f Noise Measurement



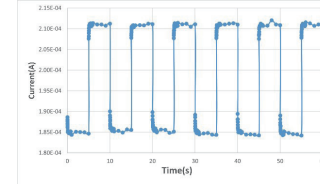
IVT Measurement



130ns Pulse



BTI Measurement



PUND Measurement

