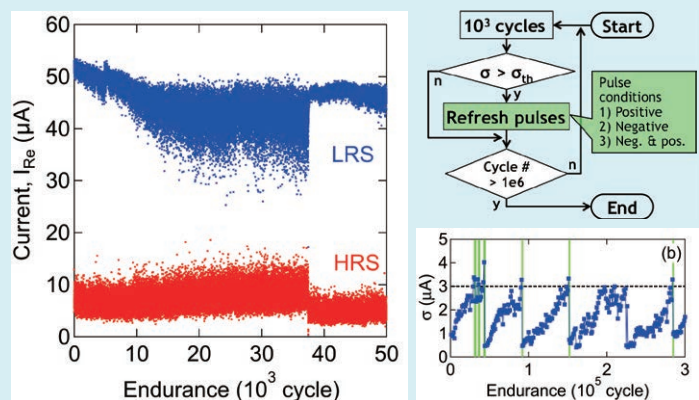
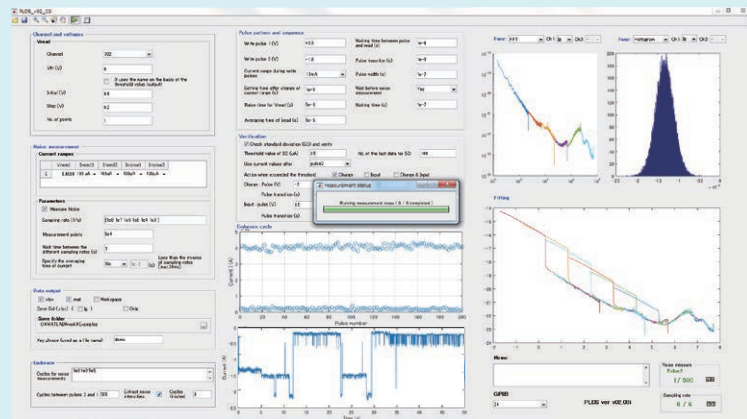


Measurement Software for Analog/Noise Properties ~ AI Device (Memristor, ReRAM) and MOSFET ~

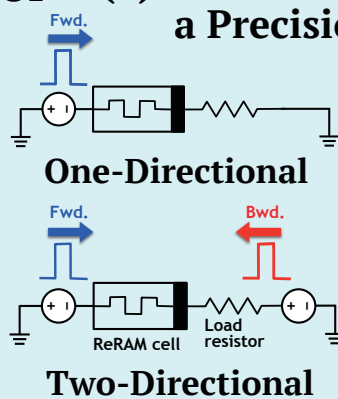
(1) Memristor Switching and Verify



Endurance data, a possible test sequence, and the effect of verification [1]

In addition to a conventional endurance test, it allows you to obtain noise properties and to perform verification simultaneously in a single measurement.

(2) Memristor Analog Control (a) One-Directional Pulse Input

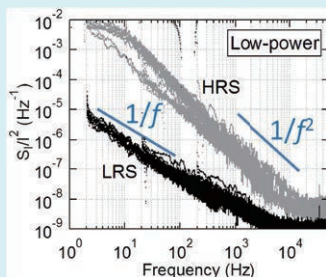
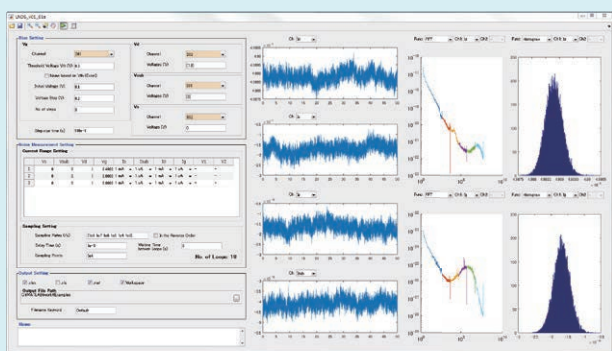


(b) Two-Directional Pulse Input with a Precision Time Lag in 10 ns Order

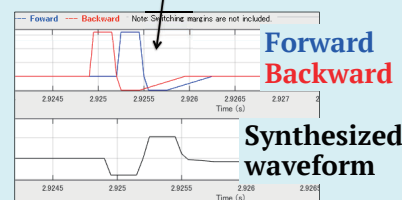


The waveform can be altered gradually by changing pulse voltages or widths. An external current compliance unit is also available (optional).

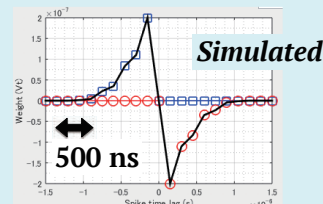
(3) 1/f Noise Measurement (MOSFET[2]/ReRAM[3])



Low-frequency noise property in LR/HR states



Timing control between forward/backward pulses



Suitable tool for STDP learning function

We provide varieties of electrical measurement software mainly by taking the great advantages of fast IV measurement units. Customization of functions/setups is also available. Please contact us for any inquiry.

➤ Example of System Components

- ✓ Keysight Technologies B1500A Semiconductor Device Analyzer
- ✓ Keysight Technologies B1530A Waveform Generator/ Fast IV Unit (WGFMU)
- ✓ MATLAB Runtime, Visual Studio

**Device Lab Inc.,
Tsukuba, Japan**

Homepage: www.devicelab.co.jp
Email: contact@devicelab.co.jp

Related Technical Papers

[1] K. Ohmori et al., "Reduction of Cycle-to-Cycle Variability in ReRAM by Filamentary Refresh", 2017 VLSI Symposia. [2] W. Feng et al., "Fundamental origin of excellent low-noise property in 3D Si-MOSFETs", 2011 IEDM. [3] W. Feng et al., "Investigation of switching mechanism in HfO_x-ReRAM under low power and conventional operation modes", Scientific Reports 6 39510 (2016).