Keysight Technologies

Accelerate the development of Next Generation Non-Volatile Memory

Application Brief

For visualizing fast transient characterization of emerging NVM such as PCRAM, MRAM and RRAM

CX3300 Series Device Current Waveform Analyzer

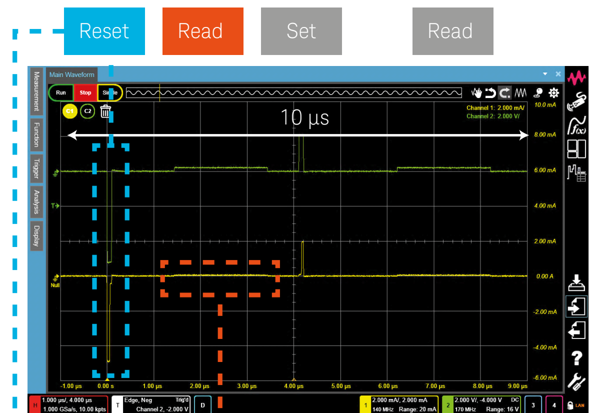
Key features:

- Maximum 200 MHz bandwidth with 1 GSa/s sampling rate
- 14/16 bit resolution and low noise sensing
- Measurement range from 100 pA to 100 A
- Max. 256 Mpts memory depth
- Familiar look & feel to an oscilloscope

Benefits:

- Clearly visualize the transient current waveform in a Set/Reset pulse less than 100 ns due to the wide bandwidth and wide dynamic range
- Quickly analyze the transient current response to applied voltage pulse on the intuitive and advanced GUI using various analysis functions
- Efficiently perform reliability tests by capturing 1 million cycles of Set/Reset/Read waveforms within a few seconds due to low noise floor and deep memory depth

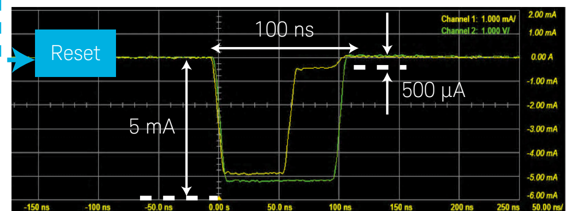
Example of transient current waveform in a 100 ns Reset pulse and 50 µA read current in a single measurement:



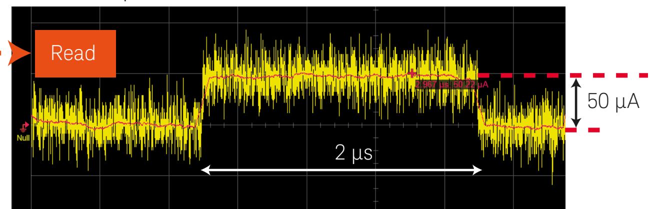
Applied pulse

Measured current

√ Analyze the transient current response to applied voltage pulse quickly.



√ Capture transient current waveform in a 100 ns Reset pulse.



Measured current

500 points smooth filtered waveform

√ Set/Reset/Read waveform in a single measurement.

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For basic IV characterization to CV, pulsed IV measurement and reliability testing for flash and emerging NVM on a single instrument

B1500A semiconductor device parametric analyzer

Key features:

- IV measurement ranges of 0.1 fA to 1 A and 0.5 µV to 200 V
- AC capacitance measurement from 1 kHz to 5 MHz
- Up to ± 40 V voltage pulse and arbitrary waveform generation
- Automatic resource switching between IV measurement and pulse generation
- Pulsed IV/Transient IV capability up to 200MSa/s without load line effect

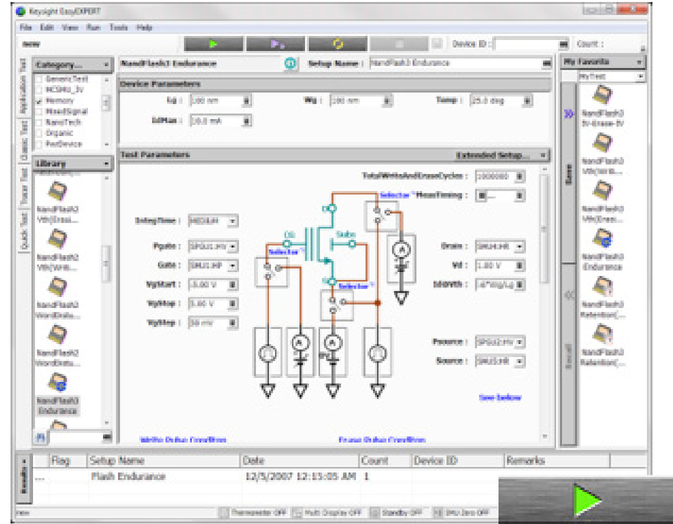
Benefits:

- Accurately measure the IV and CV curve, supporting automated parameter extraction
- Quickly and easily perform reliability test such as endurance and retention by automatically switching between pulse stress cycle and IV measurement
- Precisely perform advanced measurements such as NBTI/ PBTI, RTN (Random Telegraph Noise)) using pulsed IV/ transient IV capability

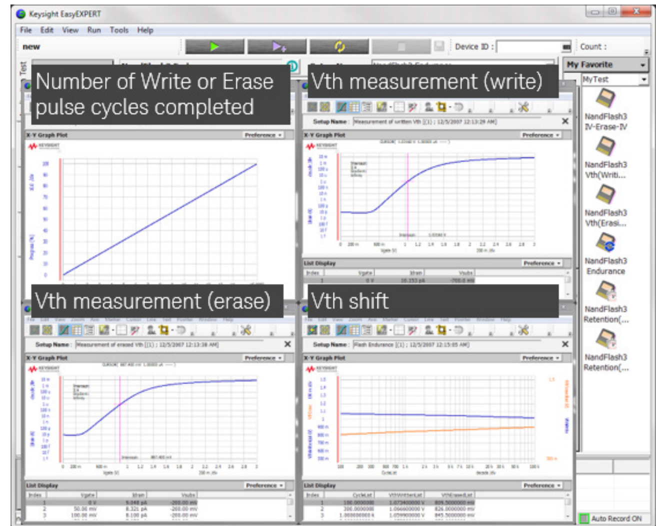
For more information:

- B1500A Semiconductor Device Parametric Analyzer: **www.keysight.com/find/b1500**
- CX3300 Device current waveform analyzer: **www.keysight.com/find/cx3300**

Example of flash memory endurance test using automated switch between pulse stress and IV measurement:



√ Ready-to-use application test for flash memory endurance test.



√ DC IV and pulse are switched automatically.
√ Vth shift is captured precisely.

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