

## **Switching dynamics of TiO<sub>2</sub> crossbar devices for resistance change memory**

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We have fabricated 50x50 nm<sup>2</sup> TiO<sub>2</sub> bipolar switches for resistance change memory circuits. We have measured the dynamical off-switching response of these devices by applying a time-sampled stress-test. The results of this test show that the device can be described by a single continuous state variable which fully characterizes the nonlinear conductivity as it switches. We further show evidence that the off-switching process is thermally activated by self-heating from the applied bias. We discuss these results in context of the memristive system as defined by Chua in 1976 and propose a phenomenological compact model for predicting the response of these devices to an arbitrary waveform.