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Description:

Simulation models and data sets for the manuscript titled: "A Data-Driven Verilog-A ReRAM Model".

Verilog-A Models: We include two different Verilog-A implementations of a ReRAM model that corresponds to the behavior of a physical TiO_2 -based sample manufactured in **Nano Group, ECS, University of Southampton**.

The model expressions along with details regarding the coding strategies used for the VA module implementation procedure are described in the corresponding paper, "**A Data-Driven Verilog-A ReRAM Model**" which is also included.

The first implementation is coded with the conventional approach where the simulator captures the model's dynamics by solving numerically its differential algebraic equation set ('numerical' VA model).

The second Verilog-A code uses an analytical solution under constant bias voltage application for capturing the time-evolution of the device's resistive state. It exploits that throughout the simulation and for the duration of each time-step used by the simulator, the voltage across the proposed voltage-controlled ReRAM model is fixed and thus does not require the integration of the model's state variable equation ('analytical' VA model).

Both models are ready for use and can be compiled in any electronics circuit simulator that supports Verilog-A models.

Model file titles:

- ReRAM_analytical.va
- ReRAM_numerical.va

Data Sets: The following files contain data plotted in the respective paper figures.

- **Figure 4:**
 - IV_measurements__TiOx.txt

- IV_model__TiOx.txt
- **Figure 5:**
 - DUT_1_Characterization__Parameter_Extraction.txt
- **Figure 6:**
 - DUT_2_Characterization__Parameter_Extraction.txt
- **Figure 7:**
 - DUT_2_Characterization__Alternative_Testing.txt
- **Figure 8:**
 - IV_measurements__TaOx.txt
 - IV_model__TaOx.txt
- **Figure 9:**
 - DUT_3__RESET_Characterization_Data.txt
 - DUT_3__RESET_Model_Fit.txt
 - DUT_3__RESET_VTEAM_Fit.txt
 - DUT_3__SET_Characterization_Data.txt
 - DUT_3__SET_Model_Fit.txt
 - DUT_3__SET_VTEAM_Fit.txt
- **Figure 10:**
 - DUT_4__RESET_Characterization_Data.txt
 - DUT_4__RESET_Model_Fit.txt
 - DUT_4__RESET_VTEAM_Fit.txt
 - DUT_4__SET_Characterization_Data.txt
 - DUT_4__SET_Model_Fit.txt
 - DUT_4__SET_VTEAM_Fit.txt
- **Figure 11:**
 - Analytical_Model__Current_Responses.txt
 - Analytical_Model__Resistive_Responses.txt
 - Numerical_Model__Current_Responses.txt
 - Numerical_Model__Resistive_Responses.txt
- **Figure 12:**
 - Crossbar_Simulation_Times.txt

Date and location of the collected data for the model implementation procedure:

February 2017; University of Southampton, U.K.

Date that the files were created:

December 2017.