

## Higher reproducibility of resistive switching of TiO<sub>2</sub> film based on TiN electrodes for nonvolatile memory application

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The characteristics and mechanism of bipolar resistive switching behavior of Pt/TiO<sub>2</sub>/TiN metal-insulator-metal structures were investigated for next-generation nonvolatile memory applications. The measurement of electrical characteristics is done with a Keithley 4200 semiconductor system and an Agilent 81110A pulse generator at room temperature. Stable bipolar resistive switching characteristics, including a large number of switching cycles and uniform distribution of operating voltage were achieved. In addition to those characteristics, long retention time ( $>10^4$  s) and high speed resistive switching ( $<50$  ns) were clearly confirmed. The improved switching behavior of the TiO<sub>2</sub> thin film based on the TiN electrode could be attributed to the oxygen reservoir effect of the TiN electrode which assists the formation and rupture of filamentary conducting paths near the interface region between the TiO<sub>2</sub> layer and the TiN electrode layer.