Memristor is the newly discovered fourth circuit element. The other familiar three circuit elements are resistor, capacitor and inductor. In 1971, Leon Chua reasoned that there should be a fourth circuit element on the ground of symmetry that gives a relationship between flux and charge. He named it memory resistor, abbreviated as memristor. The first experimental manufacture of this fourth element was published in May 2008 by HP researchers team led by Stanley Williams. Afterwards, researchers have been exploring memristor and its possible applications. Thus, this report studies and presents the general theory of memristor, classification of memristor, the I-V characteristics, the non volatility memory, the switching mechanism for bipolar switching in TiO2, the mathematical models of memristor including the various window functions; and also potential applications of memristor. Meanwhile, where necessary simulation are carried out using Cadence Virtuoso design tool and VerilogA for modelling the memristor for simulation purpose.

References
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