

ABSTRACT

MEMORY CELL HAVING AN ELECTRIC FIELD PROGRAMMABLE STORAGE ELEMENT, AND METHOD OF OPERATING SAME

Disclosed is a memory cell having an access transistor and an electric field programmable bi-stable element. The access transistor may be a (N-channel or P-channel) MOSFET transistor having a gate, source or drain region coupled to the electric field programmable bi-stable or multi-stable element (hereinafter collectively, "bi-stable element" unless expressly indicated otherwise). The access transistor facilitates selective and controllable programming and reading of the electric field programmable bi-stable element. Also disclosed is a plurality of memory cells, each having a unique, different and/or distinct electric field programmable bi-stable element and a common access transistor and a common access transistor. In yet another aspect, a differential memory cell having a plurality of memory cells configured to store complementary data states is disclosed. The differential memory cell includes first memory cell and second memory cell wherein the first memory cell maintains a complementary state relative to second memory cell. The first and second memory cells include a common access transistor and unique, different and/or distinct electric field programmable bi-stable element, or each includes an access transistor and an electric field programmable bi-stable element. Finally, a complementary memory cell having an N-channel type memory cell (an N-channel access transistor and an electric field programmable bi-stable element) and a P-channel type memory cell (a P-channel access transistor and an electric field programmable bi-stable element) is disclosed.