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ABSTRACT OF THE DISCLOSURE

A magnetic material is used for the gate of a MOSFET, and tunnel junctions are formed between a magnetic electrode and the gate electrode, and between a nonmagnetic electrode and the gate electrode. The magnetic gate electrode is biased through the two tunnel junctions, and the drain current of the MOSFET changes with a change in an external magnetic field, according to the tunneling magnetoresistance effect. Thus, the MOSFET can be used as a magnetic sensor, as the reading element in a read/write head, or in a magnetic memory cell of a magnetic random access memory.

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