

Proposal of a Double-Gate Split-Drain/Source MAGFET with Bulk Conduction in FD SOI Technology

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In this paper, the design and operation of a double-gate split-drain/source magnetic field-effect transistor (DG SDS MAGFET) compatible with fully depleted (FD) thin-film silicon-on-insulator (SOI) technology are described. Owing to bulk conduction and carrier-domain-based operation of a DG SDS MAGFET, a magnetic sensitivity of 58 T^{-1} in the mT range of magnetic fields is predicted from a three-dimensional sensor numerical simulation. This is almost two orders of magnitude higher than the magnetic sensitivity achieved with conventionally designed MAGFETs in FD SOI technology. In addition, the simulation results revealed that the DG SDS MAGFET can also operate as a bidirectional cross-switch controlled by a pulsed magnetic field with an amplitude above 30 mT.

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