Abstracts

Single-Interface and Quantum-Well Heterostructure MISFET's

R.A. Kiehl. "Single-Interface and Quantum-Well Heterostructure MISFET's." 1989 Transactions on Microwave Theory and Techniques 37.9 (Sep. 1989 [T-MTT] (Special Issue on FET Structures Modeling and Circuit Applications)): 1304-1314.

The physical operation of heterostructure metal-insulator-semiconductor field-effect transistors (H-MISFET's) is described and compared with that of more familiar heterostucture FET's. Undoped, doped-channel, and quantum-well MISFET's based on AlGaAs/GaAs heterostructures are examined. Focus is placed on quantum-well MISFET's, which differ most from more conventional devices. Results of experiments and simulations are presented to examine the physical mechanisms related to charge-control, gate leakage, device geometry, short-channel effects, buffer leakage, and electron trapping in the devices, and the advantages of other III-V materials systems are discussed. Finally, the potential advantages of H-MISFET's for circuit applications are discussed.

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