1. Record Nr. UNINA9910454177003321

Autore	Miura-Mattausch Mitiko <1949->
Titolo	The physics and modeling of MOSFETS [[electronic resource]] : surface-potential model HiSIM / / Mitiko Miura-Mattausch, Hans Jurgen Mattausch, Tatsuya Ezaki
Pubbl/distr/stampa	Singapore ; ; Hackensack, NJ, : World Scientific, c2008
ISBN	1-281-96089-6 9786611960896 981-281-205-9
Descrizione fisica	1 online resource (378 p.)
Collana	International series on advances in solid state electronics and technology
Altri autori (Persone)	MattauschHans Jurgen EzakiTatsuya
Disciplina	621.3815/284015118
Soggetti	Metal oxide semiconductor field-effect transistors Metal oxide semiconductor field-effect transistors - Mathematical models Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	1. Semiconductor device physics. 1.1. Band structure concept. 1.2. Carrier density and fermi level in semiconductors. 1.3. P-N junction. 1.4. Device simulation. 1.5. Summary of equations and symbols presented in chapter 1 for semiconductor device physics -- 2. Basic compact surface-potential model of the MOSFET. 2.1. Compact modeling concept. 2.2. Device structure parameters of the MOSFET. 2.3. Surface potentials. 2.4. Charge densities. 2.5. Drain current. 2.6. Summary of equations and model parameters presented in chapter 2 for basic compact surface-potential model of the MOSFET -- 3. Advanced MOSFET phenomena modeling. 3.1. Threshold voltage shift. 3.2. Depletion effect of the poly-si gate. 3.3. Quantum-mechanical effects. 3.4. Mobility model. 3.5. Channel-length modulation. 3.6. Narrow-channel effects. 3.7. Effects of the length of the diffused source/drain contacts in Shallow-Trench Isolation (STI) technologies. 3.8. Temperature dependences. 3.9. Conservation of symmetry at V [symbol] = 0. 3.10. Harmonic distortions. 3.11. Summary of equations

and model parameters appearing in chapter 3 for advanced MOSFET phenomena modeling -- 4. Capacitances. 4.1. Intrinsic capacitances. 4.2. Overlap capacitances. 4.3. Longitudinal (lateral) -field-induced capacitance. 4.4. Fringing capacitance. 4.5. Summary of equations and model parameters appearing in chapter 4 for capacitances -- 5. Leakage currents and junction diode. 5.1. Leakage currents. 5.2. Bulk/source and bulk/drain junction models. 5.3. Summary of equations and model parameters appeared in chapter 5 for leakage currents and junction diode -- 6. Modeling of phenomena important for RF applications. 6.1. Noise models. 6.2. Non-Quasi-Static (NQS) model. 6.3. External MOS transistor resistances. 6.4. Summary of equations and model parameters appeared in chapter 6 for modeling of phenomena important for RF applications -- 7. Summary of HiSIM's model equations, parameters, and parameter-extraction method. 7.1. Model equations of HiSIM. 7.2. Model flags and exclusion of modeled effects. 7.3. Model parameters and their meaning. 7.4. Default values of the model parameter. 7.5. Parameter extraction method.

Sommario/riassunto

This volume provides a timely description of the latest compact MOS transistor models for circuit simulation. The first generation BSIM3 and BSIM4 models that have dominated circuit simulation in the last decade are no longer capable of characterizing all the important features of modern sub-100nm MOS transistors. This book discusses the second generation MOS transistor models that are now in urgent demand and being brought into the initial phase of manufacturing applications. It considers how the models are to include the complete drift-diffusion theory using the surface potential variable in the MOS transistor channel in order to give one characterization equation.