Technology Computer Aided Design: Simulation for VLSI MOSFET

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Responding to recent developments and a growing VLSI circuit manufacturing market, **Technology Computer Aided Design: Simulation for VLSI MOSFET** examines advanced MOSFET processes and devices through TCAD numerical simulations. The book provides a balanced summary of TCAD and MOSFET basic concepts, equations, physics, and new technologies related to TCAD and MOSFET. A firm grasp of these concepts allows for the design of better models, thus streamlining the design process, saving time and money. This book places emphasis on the importance of modeling and simulations of VLSI MOS transistors and TCAD software. Providing background concepts involved in the TCAD simulation of MOSFET devices, it presents concepts in a simplified manner, frequently using comparisons to everyday-life experiences. The book then explains concepts in depth, with required mathematics and program code. This book also details the classical semiconductor physics for understanding the principle of operations for VLSI MOS transistors, illustrates recent developments in the area of MOSFET and other electronic devices, and analyzes the evolution of the role of modeling and simulation of MOSFET. It also provides exposure to the two most commercially popular TCAD simulation tools Silvaco and Sentaurus.

• Emphasizes the need for TCAD simulation to be included within VLSI design flow for nano-scale integrated circuits
• Introduces the advantages of TCAD simulations for device and process technology characterization
• Presents the fundamental physics and mathematics incorporated in the TCAD tools
• Includes popular commercial TCAD simulation tools (Silvaco and Sentaurus)
• Provides characterization of performances of VLSI MOSFETs through TCAD tools
• Offers familiarization to compact modeling for VLSI circuit simulation

R&D cost and time for electronic product development is drastically reduced by taking advantage of TCAD tools, making it indispensable for modern VLSI device technologies. They provide a means to characterize the MOS transistors and improve the VLSI circuit simulation procedure. The comprehensive information and systematic approach to design, characterization, fabrication, and computation of VLSI MOS transistor through TCAD tools presented in this book provides a thorough foundation for the development of models that simplify the design verification process and make it cost effective.

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