

1. Record Nr.	UNINA9910830003503321
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Titolo	Junctionless Field-Effect Transistors : Design, Modeling, and Simulation // Shubham Sahay, Mamidala Jagadesh Kumar
Pubbl/distr/stampa	Hoboken, New Jersey : , : John Wiley & Sons Inc., , [2019] [Piscataway, New Jersey] : , : IEEE Xplore, , [2019]
ISBN	1-119-52352-4 1-119-52354-0 1-119-52351-6
Descrizione fisica	1 online resource
Collana	IEEE Press series on microelectronic systems
Disciplina	621.3815/284
Soggetti	Metal semiconductor field-effect transistors
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Preface xi -- 1 Introduction to Field-Effect Transistors 1 -- 1.1 Transistor Action 2 -- 1.2 Metal-Oxide-Semiconductor Field-Effect Transistors 4 -- 1.3 MOSFET Circuits: The Need for Complementary MOS 9 -- 1.4 The Need for CMOS Scaling 11 -- 1.5 Moore's Law 13 -- 1.6 Koomey's Law 13 -- 1.7 Challenges in Scaling the MOSFET 13 -- 1.8 Conclusion 23 -- References 23 -- 2 Emerging FET Architectures 27 -- 2.1 Tunnel FETs 28 -- 2.2 Impact Ionization MOSFET 34 -- 2.3 Bipolar I-MOS 39 -- 2.4 Negative Capacitance FETs 41 -- 2.5 Two-Dimensional FETs 46 -- 2.6 Nanowire FETs 49 -- 2.7 Nanotube FETs 51 -- 2.8 Conclusion 57 -- References 58 -- 3 Fundamentals of Junctionless Field-Effect Transistors 67 -- 3.1 Device Structure 69 -- 3.2 Operation 70 -- 3.3 Design Parameters 80 -- 3.4 Parameters that Affect the Performance 82 -- 3.5 Beyond Silicon JLFETS: Other Materials 100 -- 3.6 Challenges 103 -- 3.7 Conclusion 110 -- References 111 -- 4 Device Architectures to Mitigate Challenges in Junctionless Field-Effect Transistors 125 -- 4.1 Junctionless Accumulation-Mode Field-Effect Transistors 126 -- 4.2 Realizing Efficient Volume Depletion 129 -- 4.3 SOI JLFET with a High- κ Dielectric Box 131 -- 4.4 Bulk Planar JLFET 137 -- 4.5 JLFET with a Nonuniform Doping 140 -- 4.6 JLFET with a Step Doping Profile 144 -- 4.7 Multigate JLFET 149 -- 4.8 JLFET with a High- κ Spacer

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Sommario/riassunto

A comprehensive one-volume reference on current JLFET methods, techniques, and research Advancements in transistor technology have driven the modern smart-device revolution-many cell phones, watches, home appliances, and numerous other devices of everyday usage now surpass the performance of the room-filling supercomputers of the past. Electronic devices are continuing to become more mobile, powerful, and versatile in this era of internet-of-things (IoT) due in large part to the scaling of metal-oxide semiconductor field-effect transistors (MOSFETs). Incessant scaling of the conventional MOSFETs to cater to consumer needs without incurring performance degradation requires costly and complex fabrication process owing to the presence of metallurgical junctions. Unlike conventional MOSFETs, junctionless field-effect transistors (JLFETs) contain no metallurgical junctions, so they are simpler to process and less costly to manufacture. JLFETs utilize a gated semiconductor film to control its resistance and the

current flowing through it. Junctionless Field-Effect Transistors: Design, Modeling, and Simulation is an inclusive, one-stop reference on the study and research on JLFETs. This timely book covers the fundamental physics underlying JLFET operation, emerging architectures, modeling and simulation methods, comparative analyses of JLFET performance metrics, and several other interesting facts related to JLFETs. A calibrated simulation framework, including guidance on SentaurusTCAD software, enables researchers to investigate JLFETs, develop new architectures, and improve performance. This valuable resource:

- Addresses the design and architecture challenges faced by JLFET as a replacement for MOSFET
- Examines various approaches for analytical and compact modeling of JLFETs in circuit design and simulation
- Explains how to use Technology Computer-Aided Design software (TCAD) to produce numerical simulations of JLFETs
- Suggests research directions and potential applications of JLFETs

Junctionless Field-Effect Transistors: Design, Modeling, and Simulation is an essential resource for CMOS device design researchers and advanced students in the field of physics and semiconductor devices.
