



## Micro- and Nanoelectronics: Emerging Device Challenges and Solutions (Devices, Circuits, and Systems)

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**Micro- and Nanoelectronics: Emerging Device Challenges and Solutions** presents a comprehensive overview of the current state of the art of micro- and nanoelectronics, covering the field from fundamental science and material properties to novel ways of making nanodevices. Containing contributions from experts in both industry and academia, this cutting-edge text:

- Discusses emerging silicon devices for CMOS technologies, fully depleted device architectures, characteristics, and scaling
- Explains the specifics of silicon compound devices (SiGe, SiC) and their unique properties
- Explores various options for post-CMOS nanoelectronics, such as spintronic devices and nanoionic switches
- Describes the latest developments in carbon nanotubes, iii-v devices structures, and more

Micro- and Nanoelectronics: Emerging Device Challenges and Solutions provides an excellent representation of a complex engineering field, examining emerging materials and device architecture alternatives with the potential to shape the future of nanotechnology.

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**Micro- and Nanoelectronics: Emerging Device Challenges and Solutions (Devices, Circuits, and Systems) From CRC Press Bibliography**

- Sales Rank: #3884312 in Books
- Published on: 2014-10-29
- Original language: English
- Number of items: 1
- Dimensions: 9.20" h x 1.10" w x 6.20" l, .0 pounds
- Binding: Hardcover
- 383 pages

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#### Review

"... looks at the challenges of today 's microelectronics and discusses potential paths into the nano-electronic world. It focuses on solutions developed in response to scaling problems with current silicon technologies, and new approaches, and is a combination of papers from world-leading organizations and articles specifically written for it. ... Section III, *Post-CMOS Device Concepts*, addresses options for future directions in micro- and nano-electronics. An introductory chapter provides a good review of the possible paths for microelectronic device development. ... Richly illustrated with graphs, figures, images, and data, this book is intended for researchers working on emerging scaling topics, engineers developing advanced semiconductor technologies, and graduate students wanting to learn about the barriers and future opportunities in the micro- and nano-electronics industry."

?John J. Shea, from *IEEE Electrical Insulation Magazine*, September/October 2015 - Vol. 31, No. 5

"The topic selection is very good, it covers a wide range of advanced technologies, which are either already introduced or currently in the intense development phases. Contributors are well-known in their fields and in a position to provide state-of-the-art overview of the corresponding topics."

?Gennadi Bersuker, Sematech, USA

"This is a timely, well planned, book that covers all the relevant challenges that the industrial and academic electron device research communities have recently overcome, and are nowadays facing to ensure the successful continuation of CMOS technology downscaling and electronic systems evolution toward ultra-high density and ultra-low power."

?Luca Selmi, DIEGM, University of Udine, Italy

#### About the Author

**Tomasz Brozek** is a technical fellow at PDF Solutions, San Jose, California, USA, where he is responsible for advanced silicon technology characterization, diagnostic methods development, and early yield ramp of integrated circuits. He holds an MS EE and a Ph.D in physics. His doctorate research at the Institute of Semiconductor Physics in Kiev, Ukraine focused on radiation effects and degradation in microelectronic MOS systems. Previously he taught and conducted research at Warsaw University of Technology, Poland and the University of California, Los Angeles, USA, and worked at Motorola R&D organizations in Texas and Arizona, USA.

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