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Special Issue Reprint

Miniaturized Transistors, Volume II

www.mdpi.com/books/reprint/5663

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ISBN 978-3-0365-4169-3 (Hardback)
ISBN 978-3-0365-4170-9 (PDF)

In this book, we aim to address the ever-advancing progress in microelectronic device scaling. Complementary Metal-Oxide-Semiconductor (CMOS) devices continue to endure miniaturization, irrespective of the seeming physical limitations, helped by advancing fabrication techniques. We observe that miniaturization does not always refer to the latest technology node for digital transistors. Rather, by applying novel materials and device geometries, a significant reduction in the size of microelectronic devices for a broad set of applications can be achieved. The achievements made in the scaling of devices for applications beyond digital logic (e.g., high power, optoelectronics, and sensors) are taking the forefront in microelectronic miniaturization. Furthermore, all these achievements are assisted by improvements in the simulation and modeling of the involved materials and device structures. In particular, process and device technology computer-aided design (TCAD) has become indispensable in the design cycle of novel devices and technologies.

It is our sincere hope that the results provided in this Special Issue prove useful to scientists and engineers who find themselves at the forefront of this rapidly evolving and broadening field. Now, more than ever, it is essential to look for solutions to find the next disrupting technologies which will allow for transistor miniaturization well beyond silicon's physical limits and the current state-of-the-art. This requires a broad attack, including studies of novel and innovative designs as well as emerging materials which are becoming more application-specific than ever before.



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