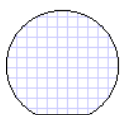


Review of Silicon Devices and Process Integration  
By Badih El-Kareh  
Christopher L. Henderson  
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The constantly evolving nature of semiconductor devices requires the engineers and scientists who work in the field to stay abreast of changes. While many fundamental properties remain fixed, device scaling and new materials impact those fundamental principles. Many of us who have worked in the semiconductor industry for decades regularly turn to seminal works like *Physics of Semiconductor Devices* by Simon Sze, *Silicon Processing for the VLSI Era*, by Stanley Wolf, or *VLSI Fabrication Principles*, by Sorab Ghandhi. However, once a book is published, it immediately begins to lag the latest technology developments.

*Silicon Devices and Process Integration* (***Silicon Devices and Process Integration: Deep Submicron and Nano-Scale Technologies***, Springer Science and Business Media, LLC) is the latest offering by Badih El-Kareh in an attempt to close the gap. Dr. El-Kareh's deep knowledge of semiconductor process integration serves him well in this book. It provides more process integration detail than Sze, without going into the extensive depth of Doering's massive volume. It also provides more semiconductor physics background than Wolf's series. The book provides a fresh look at semiconductor processing from the standpoint of semiconductor physics. Over the years, the industry has followed paths to improve transistor performance and reduce undesired effects. El-Kareh explains in detail how processing decisions relate to transistor and interconnect performance. A key advantage of this book is it's single author. El-Kareh provides more cohesive and defined coverage of the topic than books that are a compendium of individual contributors. Another key advantage is his treatment of newer technologies like short channel effects, mobility enhancement techniques, High-K dielectrics, metal gates, and three-dimensional transistors. The book also provides important details on bipolar and analog devices., including treatments of noise and transistor matching. This book also works well as a graduate-level textbook. El-Kareh includes a number of problems at the end of each chapter as well as extensive references. The semiconductor physics may too detailed to be tackled as a senior-level course. The book is too extensive to be tackled as a single semester course. It works better as a text for a full-year course. This book is also designed for the serious student. If you're expecting an easy read with lots of pictures, then you will be disappointed. El-Kareh does not shy away from the mathematics needed to explain the concepts. He also spends significant time developing concepts like carrier concentration, carrier transport, and junction characteristics. Those willing to dig deep will emerge with an improved understanding and a deeper appreciation of the complexities of the semiconductor industry.



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