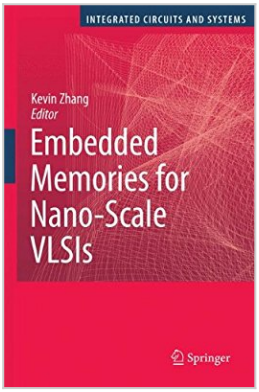

Embedded Memories for Nano-Scale VLSIs (Integrated Circuits and Systems)

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Kevin Zhang Advancement of semiconductor technology has driven the rapid growth of very large scale integrated (VLSI) systems for increasingly broad applications, incl- ing high-end and mobile computing, consumer electronics such as 3D gaming, multi-function or smart phone, and various set-top players and ubiquitous sensor and medical devices. To meet the increasing demand for higher performance and lower power consumption in many different system applications, it is often required to have a large amount of on-die or embedded memory to support the need of data bandwidth in a system. The varieties of embedded memory in a given system have alsobecome increasingly more complex, ranging fromstatictodynamic and volatile to nonvolatile. Among embedded memories, six-transistor (6T)-based static random access memory (SRAM) continues to play a pivotal role in nearly all VLSI systems due to its superior speed and full compatibility with logic process technology. But as the technology scaling continues, SRAM design is facing severe challenge in mainta- ing suf?cient cell stability margin under relentless area scaling. Meanwhile, rapid expansion in mobile application, including new emerging application in sensor and medical devices, requires far more aggressive voltage scaling to meet very str- gent power constraint. Many innovative circuit topologies and techniques have been extensively explored in recent years to address these challenges.

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Embedded Memories for Nano-Scale VLSIs (Integrated Circuits and Systems) From Springer Bibliography

- Sales Rank: #3004936 in Books
- Published on: 2009-05-08
- Original language: English
- Number of items: 1
- Dimensions: .90" h x 6.20" w x 9.10" l, 1.55 pounds
- Binding: Hardcover
- 400 pages

Editorial Review

From the Back Cover

Embedded Memories for Nano-Scale VLSIs provides a comprehensive and in-depth view on the state-of-the-art embedded memory technologies. The material covers key technology attributes and advanced design techniques in nano-scale VLSI design. It also discusses how to make decisions concerning the right design tradeoffs in real product development.

This book first provides an overview on the landscape and trend of embedded memory in various VLSI system designs, including high-performance microprocessor, low-power mobile handheld devices, micro-controllers, and various consumer electronics. It then shows an in-depth view on each different type of embedded memory technology, including high-speed SRAM, ultra-low-voltage and alternative SRAM, embedded DRAM, embedded nonvolatile memory, and emerging or so-called "universal" memories such as FeRAM and MRAM. Each topic includes coverage of the key technology attributes from a product application perspective, ranging from technology scaling challenges to advanced circuit techniques for achieving optimal design tradeoff in performance and power. VLSI systems are becoming increasingly dependent on on-die memory to provide adequate memory bandwidth for various applications and this book gives readers a broader view of this important field to help them to achieve their optimal design goals for different applications.

Embedded Memories for Nano-Scale VLSIs is a valuable reference for engineers and academics in the field.

Users Review

From reader reviews:

Natalie Hernandez:

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