

1. Record Nr.	UNINA9910139511403321
Autore	De Salvo Barbara
Titolo	Silicon non-volatile memories [[electronic resource] ] : paths of innovation / / Barbara De Salvo
Pubbl/distr/stampa	London, UK, : ISTE Hoboken, NJ, USA, : J. Wiley, 2009
ISBN	1-282-69013-2 9786612690136 0-470-61181-2 0-470-61039-5
Descrizione fisica	1 online resource (248 p.)
Collana	ISTE ; ; v.144
Disciplina	621.381 621.39/732
Soggetti	Semiconductor storage devices Flash memories (Computers) Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Revision of author's thesis (Ph. D.)--Joseph Fourier University of Grenoble, 2007.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Silicon Non-Volatile Memories; Table of Contents; Preface; Chapter 1. Introduction; Chapter 2. Semiconductor Industry Overview; 2.1. The cyclical semiconductor market; 2.2. The leading IC companies; 2.3. The world IC market distribution; 2.4. Semiconductor sales by IC devices; 2.5. The semiconductor memory market; 2.6. The impressive price decline of IC circuits; 2.7. Moore's Law, the ITRS and their economic impacts; 2.8. Exponential growth of manufacturing and R&D costs; 2.9. The structural evolution of the semiconductor industry; 2.10. Consolidation of the semiconductor memory sector 2.11. Conclusions2.12. References; Chapter 3. Research on Advanced Charge Storage Memories; 3.1. Key features of Flash technology; 3.2. Flash technology scaling; 3.3. Innovative paths in silicon NVM technologies; 3.4. Research on advanced charge storage memories; 3.4.1. Silicon nanocrystal memories; 3.4.2. Silicon nanocrystal memories with high-k IPDs; 3.4.3. Hybrid silicon nanocrystal/SiN

memories with high-k IPDs; 3.4.4. Silicon nanocrystal double layer memories with high-k IPDs; 3.4.5. Metal nano-dots coupled with organic templates; 3.4.6. High-k IPD-based memories 3.4.7. High-k/metal gate stacks for "TANOS" memories 3.4.8. FinFlash devices; 3.4.9. Molecular charge-based memories; 3.4.10. Effects of the few electron phenomena; 3.5. Conclusions; 3.6. References; Chapter 4. Future Paths of Innovation; 4.1. 3D integration of charge-storage memories; 4.2. Alternative technologies; 4.2.1. Ferro RAMs; 4.2.2. Magnetic RAMs; 4.2.3. Phase-change RAMs; 4.2.4. Conductive bridging RAMs; 4.2.5. Oxide resistive RAMs; 4.2.6. New crossbar architectures; 4.3. Conclusion; 4.4. References; Chapter 5. Conclusions; 5.1. References; Index

---

## Sommario/riassunto

This book provides a comprehensive overview of the different technological approaches currently being studied to fulfill future memory requirements. Two main research paths are identified and discussed. Different "evolutionary paths" based on new materials and new transistor structures are investigated to extend classical floating gate technology to the 32 nm node. "Disruptive paths" are also covered, addressing 22 nm and smaller IC generations. Finally, the main factors at the origin of these phenomena are identified and analyzed, providing pointers on future research activities and developme

---