Contents

Section 1: Test and Defect Tolerance for Crossbar-Based Architectures
M. Tehranipoor .................................................. 1

Chapter 1: Defect-Tolerant Logic with Nanoscale Crossbar Circuits
T. Hogg and G. Snider ........................................... 5

Chapter 2: Built-in Self-Test and Defect Tolerance in Molecular Electronics-Based Nanofabrics
Z. Wang and K. Chakrabarty ................................. 33

Chapter 3: Test and Defect Tolerance for Reconfigurable Nanoscale Devices
M. Tehranipoor and R. Rad .................................... 63

Chapter 4: A Built-In Self-Test and Diagnosis Strategy for Chemically-Assembled Electronic Nanotechnology
J.G. Brown and R.D. (Shawn) Blanton ..................... 95

Chapter 5: Defect Tolerance in Crossbar Array Nano-Architectures
M.B. Tahoori ..................................................... 121

Section 2: Test and Defect Tolerance for QCA Circuits
M. Tehranipoor .................................................. 153

Chapter 6: Reversible and Testable Circuits for Molecular QCA Design
X. Ma, J. Huang, C. Metra, and F. Lombardi .............. 157
Chapter 7: Cellular Array-Based Delay-Insensitive Asynchronous Circuits Design and Test for Nanocomputing Systems
J. Di and P.K. Lala ........................................... 203

Chapter 8: QCA Circuits for Robust Coplanar Crossing
S. Bhanja, M. Ottavi, S. Pontarelli, and F. Lombardi ............. 227

Chapter 9: Reliability and Defect Tolerance in Metallic Quantum-Dot Cellular Automata
M. Liu and C.S. Lent ............................................ 251

Section 3: Testing Microfluidic Biochips
M. Tehranipoor .................................................. 265

Chapter 10: Test Planning and Test Resource Optimization for Droplet-Based Microfluidic Systems
F. Su, S. Ozev, and K. Chakrabarty ................................ 267

Chapter 11: Testing and Diagnosis of Realistic Defects in Digital Microfluidic Biochips
F. Su, W. Hwang, A. Mukherjee, and K. Chakrabarty ............. 287

Section 4: Reliability for Nanotechnology Devices
M. Tehranipoor .................................................. 313

Chapter 12: Designing Nanoscale Logic Circuits Based on Principles of Markov Random Fields
K. Nepal, R.I. Bahar, J. Mundy, W.R. Patterson, and A. Zaslavsky ... 315

Chapter 13: Towards Nanoelectronics Processor Architectures
W. Rao, A. Orailoglu, and R. Karri ................................ 339

Chapter 14: Design and Analysis of Fault-Tolerant Molecular Computing Systems
D. Bhaduri, S.K. Shukla, H. Quinn, P. Graham, and M. Gokhale ...... 373

Index .......................................................... 399
Emerging Nanotechnologies
Test, Defect Tolerance, and Reliability
Tehranipoor, M. (Ed.)
2008, XII, 408 p. 200 illus., Hardcover
ISBN: 978-0-387-74746-0