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| 1. | Record Nr. | UNINA9910366590603321 |
| | Titolo | High-Frequency GaN Electronic Devices / / edited by Patrick Fay, Debdeep Jena, Paul Maki |
| | Pubbl/distr/stampa | Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020 |
| | ISBN | 3-030-20208-9 |
| | Edizione | [1st ed. 2020.] |
| | Descrizione fisica | 1 online resource (308 pages) |
| | Disciplina | 621.3815<br>537.6223 |
| | Soggetti | Electronic circuits<br>Electronics<br>Microelectronics<br>Circuits and Systems<br>Electronic Circuits and Devices<br>Electronics and Microelectronics, Instrumentation |
| | Lingua di pubblicazione | Inglese |
| | Formato | Materiale a stampa |
| | Livello bibliografico | Monografia |
| | Nota di bibliografia | Includes bibliographical references and index. |
| | Nota di contenuto | Chapter 1. Introduction -- Chapter 2.High Power High Frequency Transistors: A Materials Perspective -- Chapter 3. Isotope Engineering of GaN for Boosting Transistor Speeds -- Chapter 4. Linearity Aspects of High Power Amplification in GaN Transistors -- Chapter 5. III-Nitride Tunneling Hot Electron Transfer Amplifier (THETA) -- Chapter 6. Plasma-Wave Propagation in GaN and Its Applications -- Chapter 7. Numerical Simulation of Distributed Electromagnetic and Plasma-wave Effect Devices -- Chapter 8.Resonant Tunneling Transport in Polar III-Nitride Heterostructures -- Chapter 9.Fabrication and Characterization of GaN/AlN Resonant Tunneling Diodes -- Chapter 10.Non-Contact Metrology for mm-wave and THz Electronics. |
| | Sommario/riassunto | This book brings together recent research by scientists and device engineers working on both aggressively-scaled conventional transistors as well as unconventional high-frequency device concepts in the III-N material system. Device concepts for mm-wave to THz operation based on deeply-scaled HEMTs, as well as distributed device designs based |

on plasma-wave propagation in polarization-induced 2DEG channels, tunneling, and hot-carrier injection are discussed in detail. In addition, advances in the underlying materials science that enable these demonstrations, and advancements in metrology that permit the accurate characterization and evaluation of these emerging device concepts are also included. Targeting readers looking to push the envelope in GaN-based electronics device research, this book provides a current, comprehensive treatment of device concepts and physical phenomenology suitable for applying GaN and related materials to emerging ultra-high-frequency applications. Offers readers an integrated treatment of the state of the art in both conventional (i.e., HEMT) scaling as well as unconventional device architectures suitable for amplification and signal generation in the mm-wave and THz regime using GaN-based devices, written by authors that are active and widely-known experts in the field; Discusses both conventional scaled HEMTs (into the deep mm-wave) as well as unconventional approaches to address the mm-wave and THz regimes; Provides “vertically integrated” coverage, including materials science that enables these recent advances, as well as device physics & design, and metrology techniques; Includes fundamental physics, as well as numerical simulations and experimental realizations.