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Título: Power Microelectronics. Device And Process Technologies

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Precio: \$1190.00

Editorial:

Año: 2009

Tema:

Edición: 1^a

Sinopsis

ISBN: 9789812791009

This descriptive textbook provides an in-depth look at the theories and process technologies necessary for understanding modern power semiconductor devices, i.e. from the fundamentals of junction electrostatics, p-n junction devices, unipolar MOSFET, bipolar IGBT, and superjunction devices to their associated silicon wafer process technology. State-of-the-art devices based on current research and development are included in the book to widen the scope for future device generation. The detailed structure and performance merit of the devices are also presented, together with laboratory measurements and SEM photographs. Examples used in the book are based mainly on actual fabricated devices, with the process steps described in clear detail. This book is useful for senior-year undergraduate courses on power semiconductor or power electronic devices, as well as for graduate-level courses, especially those focusing on advanced device development and design aspects. Device designers and researchers will also find this book a good reference in their work.

Contents:

Introduction

Carrier Physics and Junction Electrostatics

Bipolar Junction Diode

Power Metal-Oxide-Semiconductor Field-Effect Transistor

Insulated-Gate Bipolar Transistor

Superjunction Structures

Fabrication and Modeling of Power Devices

Practical Case Studies in Power Devices