



Insulated Gate Bipolar Transistor IGBT Theory and Design

By Vinod Kumar Khanna

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A comprehensive and "state-of-the-art" coverage of the design and fabrication of IGBT.

- All-in-one resource
- Explains the fundamentals of MOS and bipolar physics.
- Covers IGBT operation, device and process design, power modules, and new IGBT structures.

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Editorial Review

From the Back Cover

A comprehensive and state-of-the-art resource for the design and fabrication of IGBT

Semiconductor devices, particularly the insulated gate bipolar transistor (IGBT), form the heart of the power electronics industry and play a pivotal role in the regulation and distribution of energy in the world. Since its conception as a switching device, improvements and innovative design ideas have established IGBT as a rugged contender in the competitive electronics field.

Insulated Gate Bipolar Transistors (IGBT): Theory and Design covers basic theory and design aspects of IGBTs, including the selection of silicon, achieving targeted specifications through device and process design, and device packaging. After laying the groundwork in MOS and bipolar disciplines, the author constructs the foundation of power device physics necessary for clearly understanding the subject matter, including chapters on:

- Non-punchthrough, punchthrough, vertical double diffused MOSFET and trench-gate IGBTs; improved lateral and novel IGBT structures; and emerging technologies
- Steady-state and dynamic operation, and soft switching performance; safe operating area and reliability tests of IGBT
- IGBT physics, device and circuit models
- IGBT unit cell design and latching suppression techniques
- IGBT fabrication steps and process design
- IGBT power modules

Unique in focusing on IGBT in its entirety, this book will be an invaluable resource for engineering students and professionals alike.

About the Author

VINOD KUMAR KHANNA, PhD, is a senior scientist working in the solid-state devices division of Central Electronics Engineering Research Institute in Pilani, India. He has been extensively involved for more than twenty years in device, process design and fabrication of power semiconductor devices. He received his PhD in Physics from Kurukshetra University in 1988. A Fellow of the Institution of Electronics and Telecommunication Engineers and a lifetime member of several scientific and professional organizations, Dr. Khanna has published over thirty research papers in international journals and conference proceedings and written two previous books entitled, Handbook of Electrical & Electronics Engineering Fundamentals, and Digital Signal Processing, Telecommunications & Multimedia Technology.

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