

Preface

The presented special edition is dedicated to advances in the characteristics analysis and device design of silicon carbide (SiC) power electronics, highlighting the relation between semiconductor properties, structure peculiarities of the finished devices, and their functional performance optimisation. The contributions examine a wide range of devices, including SiC thyristors, trench MOSFET structures, PiN diodes, Schottky diodes, etc.

Key functional aspects such as breakdown voltage, drain voltage behaviour, channel mobility, and junction termination extension are analysed, alongside innovations in the design of bidirectional power switches, as well as practical aspects of using TCAD modelling for device simulation and optimisation.

By combining technological advances, modern design methodologies, and performance evaluation techniques, this special edition provides a comprehensive overview of state-of-the-art approaches in developing the next generation of SiC-based power devices.