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Design, Modelling and Application of the IGBT

By Kuang Sheng

VDM Verlag Okt 2010, 2010. Taschenbuch. Book Condition: Neu. 227x154x15 mm. Neuware - Power semiconductor devices are critical components within power electronics technology. In this thesis, physical operating mechanisms of conventional IGBT structures are analyzed, designed and optimized. Conductivity modulation is studied in detail. A new composite model possessing fast computational speed and reasonable accuracy is proposed. Effects of the two-dimensional IGBT structure on its electrical characteristics are analyzed. A model accounting for these effects is proposed, verified and found to be useful in both device structure design and circuit simulation. In addition, IGBT models in the literature are reviewed, classified, analyzed and compared. IGBT modelling requirements, problems and trends are discussed. The thesis also studied IGBT application problems including off-state negative gate bias requirements and the usage of turn-on snubbers. Electrical/thermal/failure behavioural differences between PT IGBTs and NPT IGBTs are studied. 196 pp. Englisch.



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