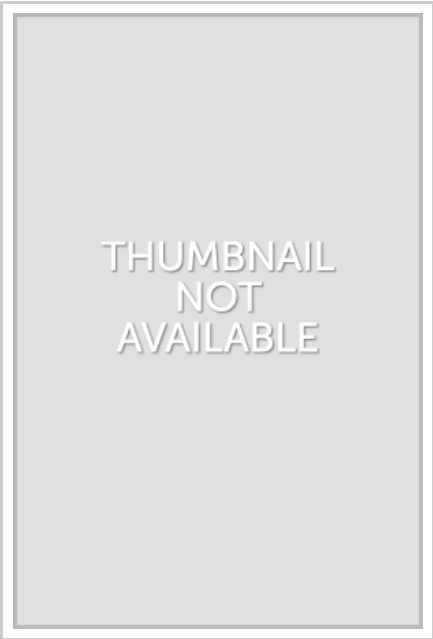


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Study of Bulk and Elementary Screw Dislocation Assisted Reverse Breakdown in Low-Voltage: Part 1: DC Properties

By Philip G. Neudeck

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 28 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.Given the high density (approx. 10(exp 4)sq cm) of elementary screw dislocations (Burgers vector 1c with no hollow core) in commercial SiC wafers and epilayers, all appreciable current (greater than 1 A) SiC power devices will likely contain elementary screw dislocations for the foreseeable future. It is therefore important to ascertain the electrical impact of these defects, particularly in high-field vertical power device topologies where SiC is expected to enable large performance improvements in solid-state high-power systems. This paper compares the DC-measured reverse-breakdown characteristics of low-voltage (less than 250 V) small-area (less than 5 x 10(exp -4)sq cm) 4H-SiC p()n diodes with and without elementary screw dislocations. Compared to screw dislocation-free devices, diodes containing elementary screw dislocations exhibited higher pre-breakdown reverse leakage currents, softer reverse breakdown I-V knees, and highly localized microplasmic breakdown current filaments. The observed localized 4H-SiC breakdown parallels microplasmic breakdowns observed in silicon and other semiconductors, in which space-charge effects limit current conduction through the local microplasma as reverse bias is increased. This item ships from La Vergne,TN. Paperback.

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