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ProblemsReferences; 3 Bipolar Transistor; 3.1 Bipolar Technologies; 3.2 Transistor Operation; 3.2.1 Current-Voltage Relationship; 3.2.2 Transistor under Reverse Biased Condition; 3.2.3 Voltage Saturation; 3.2.4 Temperature Behavior; 3.2.5 Breakdown Behavior; 3.3 Second-Order Effects; 3.3.1 High Current Effects; 3.3.2 Base-Width Modulation; 3.3.3 Current Crowding; 3.4 Alternative Transistor Structures; 3.5 Modeling the Bipolar Transistor; 3.5.1 Transistor Model for CAD Applications; 3.5.2 Transistor Model for Static Calculations; 3.5.3 Transistor Model for Small-Signal Calculations
3.5.4 Transit Time DeterminationProblems; References; Further Reading; 4 MOS Transistor; 4.1 CMOS Technology; 4.2 The MOS Structure; 4.2.1 Characteristic of the MOS Structure; 4.2.2 Capacitance Behavior of the MOS Structure; 4.2.3 Flat-Band Voltage; 4.3 Equations of the MOS Structure; 4.3.1 Charge Equations of the MOS Structure; 4.3.2 Surface Voltage at Strong Inversion; 4.3.3 Threshold Voltage and Body Effect; 4.4 MOS Transistor; 4.4.1 Current-Voltage Characteristic at Strong Inversion; 4.4.2 Improved Transistor Equation; 4.4.3 Current-Voltage Characteristic at Weak Inversion
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5 Basic Digital CMOS Circuits

Sommario/riassunto

The development of large-scale integrated systems on a chip has had a dramatic effect on circuit design methodology. Recent years have seen an escalation of interest in systems level integration (system-on-a-chip) and the development of low power, high chip density circuits and systems. Kurt Hoffmann sets out to address a wide range of issues relating to the design and integration of integrated circuit components and provides readers with the methodology by which simple equations for the estimation of transistor geometries and circuit behaviour can be deduced. The broad coverage of this uniq