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Autore	Gutierrez Inigo
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PN-junction Varactors; 2.2.1 Different Configurations of PN-junction Varactors; 2.3 Influence of Bias Voltage on the Behaviour of a PN-junction Varactor; 2.4 Influence of Geometric Parameters on the Behaviour of a PN-junction Varactor; 2.4.1 Influence in the Variation of the Number of Islands; 2.4.2 Influence of the Size of the Islands; 2.4.3 Influence of the Distance Between Islands; 2.4.4 Variation of the Size of the N Well
2.5 Influence of the Working Frequency on the Results2.5.1 Influence of the Frequency on the Quality of a Varactor; 2.5.2 Influence of the Frequency on the Capacitance of a Varactor; 2.6 Comparison Between the Different Types of PN-junction Varactors; 2.6.1 Comparison According to the Effective Silicon Area; 2.6.2 Comparison According to the Quality Factor; References; 3 MOS Varactors; 3.1 Operating Principles of an NMOS Varactor; 3.1.1 Operating Ranges of the NMOS Varactor; 3.1.2 Electrical Phenomena of an NMOS Varactor in Accumulation Mode
3.1.3 Electrical Phenomena of an NMOS Varactor in Depletion Mode3.2 NMOS Varactors; 3.2.1 Operating Ranges of the NMOS Varactor; 3.3 Influence of the Operating Mode on an NMOS Varactor; 3.4 Influence of Bias Voltage on the Behaviour of an NMOS Accumulation Varactor; 3.5 Influence of Geometric Parameters on the Behaviour of an NMOS Varactor; 3.5.1 Influence of the Variation of the Varactor Size; 3.5.2 Influence of the Varactor Gate Length on its Performance; 3.5.3 Influence of the Varactor Gate Width on its Performance; 3.6 Influence of the Working Frequency on the Results; References
4 Measurement Techniques for Integrated Varactors4.1 Test System; 4.2 Equipment Required for the On-Wafer Testing of Integrated Varactors; 4.2.1 Test Probes; 4.2.2 Connectivity; 4.3 Calibrating the Test System; 4.4 Test Structures; 4.4.1 Choosing the Test Structure Configuration; 4.4.2 Design of the Test Structures; 4.4.3 Effects Introduced by the Test Structures; 4.5 Test Structure DE-embedding Techniques; 4.5.1 Single-Short Structure; 4.5.2 Single-Open Structure; 4.5.3 Thru Structure; 4.6 Characterization of Integrated Varactors; 4.7 Test System Verification
4.7.1 Error Introduced by Positioning the Test Probes on the Pads

Sommario/riassunto

Varactors are passive semiconductor devices used in electronic circuits, as a voltage-controlled way of storing energy in order to boost the amount of electric charge produced. In the past, the use of low-cost fabrication processes such as complementary metal oxide semiconductor (CMOS) and silicon germanium (SiGe) were kept for integrated circuits working in frequency ranges below the GHz. Now, the increased working frequency of radio frequency integrated circuits (RF ICs) for communication devices, and the trend of system-on-chip technology, has pushed the requirements of varactors to the lim

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