87. Title: RF CMOS Integrated Circuit: History, Current Status and Future Prospects

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Abstract: As great advancements have been made in CMOS process technology over the past 20 years, RF CMOS circuits operating in the microwave band have rapidly developed from component circuit levels to multiband/multimode transceiver levels. In the next ten years, it is highly likely that the following devices will be realized: (i) versatile transceivers such as those used in software-defined radios (SDR), cognitive radios (CR), and reconfigurable radios (RR); (ii) systems that operate in the millimeter-wave or terahertz-wave region and achieve high speed and large-capacity data transmission; and (iii) microminiaturized low-power RF communication systems that will be extensively used in our everyday lives. However, classical technology for designing analog RF circuits cannot be used to design circuits for the above mentioned devices since it can be applied only in the case of continuous voltage and continuous time signals; therefore, it is necessary to integrate the design of high-speed digital circuits, which is based on the use of discrete voltages and the discrete time domain, with analog design, in order to both achieve wideband operation and compensate for signal distortions as well as variations in process, power supply voltage, and temperature. Moreover, as it is thought that small integration of the antenna and the interface circuit is indispensable to achieve miniaturized micro RF communication systems, the construction of the integrated design environment with the Micro Electro Mechanical Systems (MEMS) device etc. of the different kind devices becomes more important. In this paper, the history and the current status of the development of RF CMOS circuits are reviewed, and the future status of RF CMOS circuits is predicted.