Abstracts

Micropower CMOS RF components for distributed wireless sensors

T.-H. Lin, H. Sanchez, R. Rofougaran and W.J. Kaiser. "Micropower CMOS RF components for distributed wireless sensors." 1998 Radio Frequency Integrated Circuits (RFIC) Symposium 98. (1998 [RFIC]): 157-160.

A wide range of new applications have recently appeared for a low power, low cost, "embedded radio". These wireless interfaces for handheld mobile nodes and Wireless Integrated Network Sensors (WINS) must provide spread spectrum signaling for multi-user operation at 902-928 MHz. Conventional low power RF systems have been implemented in bipolar technology. However, cost considerations motivate the development of complete micropower CMOS RF circuits and systems operating at previously unexplored low power levels. Micropower CMOS VCO and mixer circuits, developed for these emerging narrow-band communication systems, are reported here. Design methods combining high-Q inductors and weak inversion MOSFET operation enable the lowest reported operating power for RF front end components including a mixer and voltage-controlled oscillator (VCO) operating at frequencies of 400-900 MHz. In addition, the VCO, by virtue of its high-Q inductive components, displays the lowest reported phase noise for 1 GHz CMOS VCO systems for any power dissipation.

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