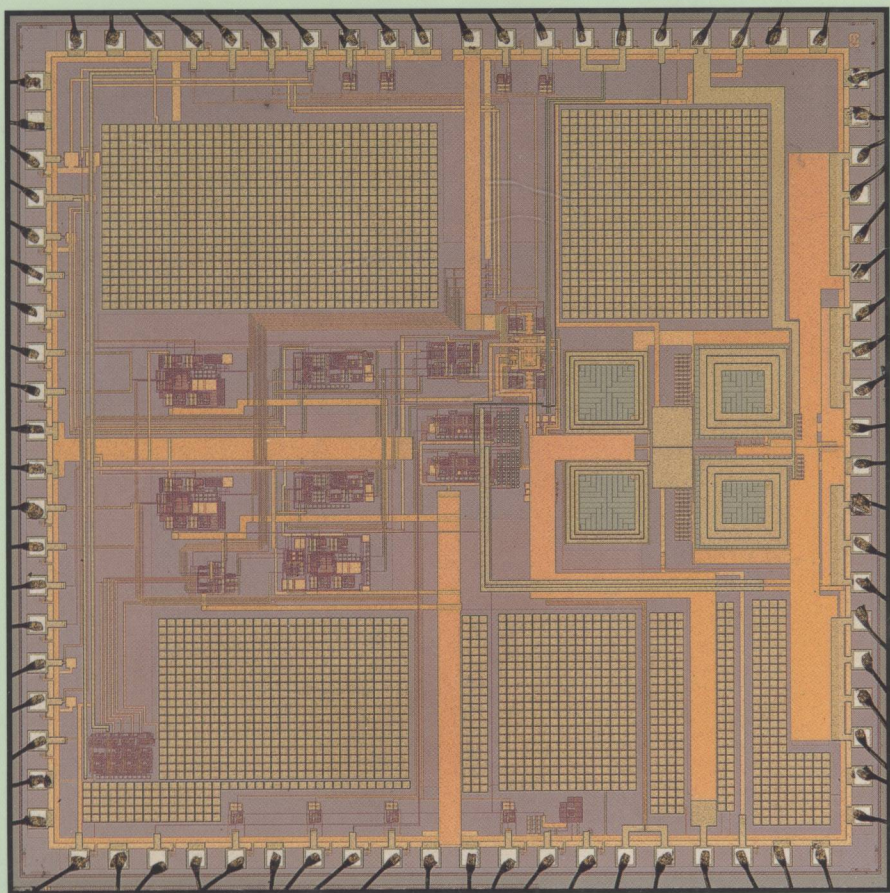


Feedback Linearization of RF Power Amplifiers



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Feedback Linearization of RF Power Amplifiers

To Mari

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Chapter 1

INTRODUCTION

Research activity in the area of radio-frequency (RF) circuit design has surged in the last decade in direct response to the enormous market demand for inexpensive, portable, high data rate wireless transceivers. Our expectations for such transceivers, such as cellular phones, rise as they become seemingly ubiquitous. Once, the simple fact of a fairly reliable wireless voice connection was sufficient and even exciting. Now, crystal-clear voice with no lapses in coverage is actively sought, together with the capability to act as a web portal and even a digital assistant. All of this must be accomplished by a device that is cheap enough to be virtually given away, small enough to justify the claim of portability, and frugal enough with power demands to last a long time on a single battery charge.

Cellular phones are just one example of a market that has spurred recent research activity. Wireless local-area networks (WLAN's) are another relatively new application of RF circuit techniques, as is the popular Global Positioning System (GPS). Meeting this demand for a kind of general connectivity involves a host of fascinating technical challenges. Among these, many are associated with the power amplifier, the system block that drives the antenna in any radio transmitter.

1.1 Motivation

If the objective is an inexpensive, portable, high-performance transceiver, the desirability of certain circuit characteristics is clear. A low-cost solution is likely to be one in which as many circuit blocks as possible are implemented on the same chip: the cost savings result from the simplified PC (printed circuit) board. An inexpensive IC (integrated circuit) process, such as CMOS, translates directly into a cost savings. Portability implies at least two things from a circuit standpoint: small size, which is another advantage of a highly integrated