



The Computer Engineering Research Center
Mixed-Signal/RF Integrated Circuits Seminar Series

A 4 μ A-Quiescent-Current Dual-Mode Buck Converter IC for Cellular Phone Applications

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Abstract

This talk describes a dual-mode digitally controlled buck converter IC for cellular phone applications. An architecture employing internal power management is introduced to ensure voltage compatibility between a single-cell lithium-ion battery voltage and a low-voltage integrated circuit technology. Special purpose analog and digital interface elements are developed. These include a ring-oscillator-based A/D converter, which is nearly entirely synthesizable, is robust against switching noise, and has flexible resolution control, and a very low power ring-oscillator-multiplexer-based digital pulse-width modulation (PWM) generation module. The chip, which includes an output power stage rated for 400 mA, occupies an active area 2 mm² in 0.25- μ m CMOS. Very high efficiencies are achieved over a load range of 0.1-400 mA. Measured quiescent current in PFM mode is 4 μ A.

Biography

Jinwen Xiao was born in Jinan, China. She received the B.S. degree in electrical engineering from Tsinghua University, Beijing, China, in 1997, and the Ph.D. degree in electrical engineering and computer sciences from the University of California, Berkeley, in 2003. From September 2003 to April 2004, she was a Design Engineer with National Semiconductor. In April 2004, she joined Silicon Laboratories, Austin, TX, where she is currently a Design Engineer. Her research interest is in the field of digital control of power converters, with applications to microprocessor voltage regulators and portable devices. She is also interested in sigma-delta modulator designs. Dr. Xiao was the recipient of a 2000 Outstanding Student Designer Award from Analog Devices, Inc.

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