

SELECTED TOPICS IN ADVANCED ELECTRONICS

Edited by
Khalid A. S. Al-Khateeb



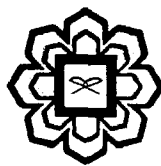
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CHAPTER 4

USING MEMS IN CLASS D AMPLIFIERS FOR STANDARD GSM CARRIER

By

Khalid A. S. Al-Khateeb

Electrical and Computer Engineering Department
Faculty of Engineering
International Islamic University Malaysia
Gombak, Selangor, Malaysia

Synopsis

The equivalent circuit of MEMS capacitive switches can be used to analyze a class D power amplifier, operated by a power supply of 3.7V. The system is intended for GSM audio frequency to produce an output power of (0.5-1.0) mW at a load output impedance of (8-10) Ω . The system gain must be greater than 33dBm and the estimated loss (0.5-1) dB.

A model for the power amplifier using MEMS passive devices has been developed. The model helps to determine the design parameters that affect the performance and reliability of the system that operate an RF transceiver. The optimization of the amplifier and the MEMS capacitor switching devices and how to integrate the system, will also be discussed. The design and the equivalent circuit were simulated using a PSpice model.

1. Introduction

There are many industrial applications, where it is necessary to develop a model for an amplifier, in which MEMS capacitive switches are used. The present task should satisfy the specifications required by Global System for Mobile Telecommunication (GSM) and identify the important parameters for the design and implementation of such circuits. Other objectives include developing standard design procedures and ways to examine the various parameters viz. efficiency, gain, and noise figure by using suitable software and simulation techniques. The development includes mathematical formulation and suggests appropriate manufacturing methods. Furthermore, it should indicate how to integrate the