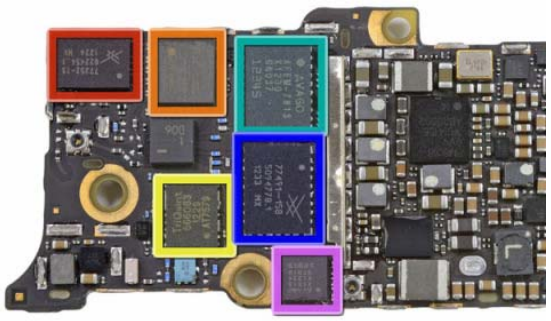
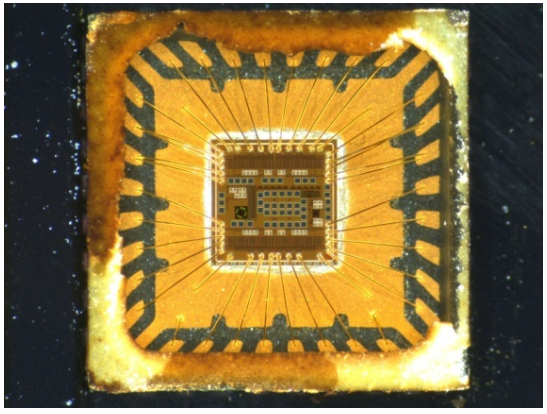
Master Thesis

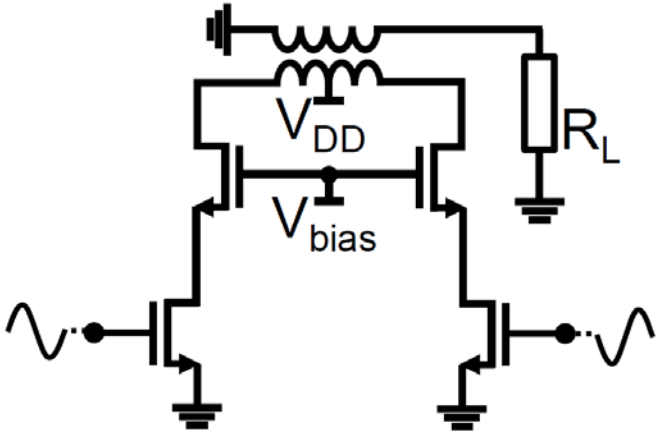
Broadband & Efficient class-O/class-V RF power amplfier with 30 dbm outputpower in 130 nm CMOS technology



Iphone5 PCB. Power Amplifiers marked with coloured boundry



(Die photograph of Power Amplifier ~HFE tapeout Feb 2015)



Simplified schematic of standard common source Power Amplifier

Background:

The wireless market has experienced a remarkable development and growth since the introduction of the first modern mobile phone systems, with a steady increase in the number of subscribers, new application areas, and higher data rates. As mobile phones and wireless connectivity have become consumer mass markets, the prime goal of the IC manufacturers is to provide low-cost solutions. The power amplifier (PA) is a key building block in all RF transmitters. To lower the costs and allow full integration of a complete radio System-on-Chip (SoC), it is desirable to integrate the entire transceiver and the PA in a single CMOS chip. While digital circuits benefit from the technology scaling, it is becoming harder to meet the stringent requirements on linearity, output power, bandwidth, and efficiency at lower supply voltages in traditional PA architectures.

Tasks:

For this work, we will use state of the art PA cores developed by HFE (i.e., class-O and/or class-V cores) to design and investigate a broad band RF Power amplifier. The target frequency range is from 1GHz-3GHz , which covers most of the standard LTE standards. The goal of the thesis work will be to investigate the limitations provided by the technology and circuit topology and to come up with novel solution(s) and techniques to achieve 30 dBm linear output power while maintaining wide bandwidth and maximum possible efficiency. The total duration of the thesis will be six months and the student will get to have hands-on experience on state of the art industrial experience on Cadence Design Envronment tools.

Further information on this and other topics could be delivered by email, telephone or discussion.

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