

Master-Thesis

Implementation and Characterization of a Baseband Amplifier using Metal-Oxide (a-IGZO) Thin Film Transistors

The era of IOT and wearable devices is upon us. The modern industrial and consumer communication systems requires low power, low noise and cost efficient devices that can connect with one another over radio frequency. For that purpose we are designing a RF communication system with our in-house (LFEB, University of Wuppertal) fabricated amorphous Indium Gallium Zinc Oxide (a-IGZO) thin film transistors (TFTs). In order to read and decode the received signal we must incorporate a baseband amplifier between the RF receiver and the Analog to Digital Converter. The amplifier must present high gain and low noise contribution of its own.



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The main objective of this thesis is to design a voltage amplifier using AIMSPICE-15 (used for amorphous devices) compact model for our in-house fabricated TFTs. Your task would be to design the baseband amplifier from scratch using the given model. This would require extensive literature survey and cadence simulation. The design would be followed by layout of the complete amplifier including the passive components and sending it to our project partner at the Institute of Electronic Devices (LFEB), University of Wuppertal for fabrication. After the fabrication, you would characterize it in our laboratory.

Conditions:

- Knowledge of Field-Effect-Transistors (CMOS)
- Experience with Cadence Design and Simulation
- Basic knowledge of RF Communication System

After completion of the thesis, there are good job prospects in the following areas:

- Wireless Communication
- RF Circuit Designing
- Digital/Analog Measurements and Characterization

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