# Master-Thesis

Analysis of matchign transformers for high-frequency power amplifiers in the sub-terahertz frequency range

Whether for artificial intelligence, augmented reality or the Internet of Things - 5 billion people worldwide will be able to record their surroundings with smart devices in the coming year. Our mission is to develop innovative, mobile sensors and sensor systems. To do this, we use cutting-edge technologies at our department, such as those from the local semiconductor manufacturer Infineon. Our current research areas include next-generation communication (6G), radar systems (gesture control), imaging (body scanners), near-field sensor technology (cancer research) and spectroscopy (material recognition).
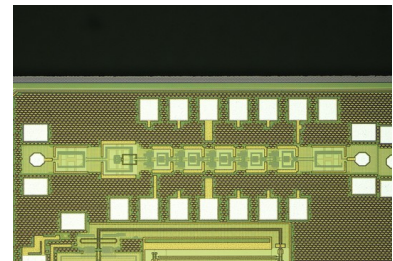
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In this work, the inter-stage matching of integrated, differential cascode-based high-frequency power amplifiers in the sub-terahertz frequency range is to be investigated with the aid of transformers. For this purpose, an equivalent circuit diagram is developed on the basis of a 3D-EM simulation of different transformers, which maps the transfer function of the passive structure in common and differential mode with sufficient accuracy. Based on this model, statements on the maximum bandwidth, output power, amplification, power consumption and their dependencies are to be made.

Requirements:
- Knowledge in CAD software
- Knowledge in Python or MATLAB
- Good English skills
- Knowledge in 3D EM simulation (Ansys HFSS)
- Knowldge in IC simulations (Cadence SpectreRF)

Occupational Outlook:

- Automotive-Radar
- Quality Control
- Signal processing

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