

A Cutting-Edge Doherty Power Amplifier (DPA) for 5G Integration (#8162)

A redesigned DPA that overcomes the limitations of earlier models to process large amounts of data more efficiently

Researchers at Georgia Tech have developed a new silicon Doherty power amplifier with a novel design that improves performance for use with advanced fifth generation (5G) wireless technology. This new power amplifier boasts enhanced performance abilities, such as greater than 80% passive efficiency and 6-dB back-off over the entire system's load modulation. It has the ability for multi-way power combining through a distributed-active transformer that can handle transmissions of multiple gigabits per second. New aspects of this design also include watt-level broadband linearity as well as an inductive impedance inverter, both of which contribute to the device's improved performance on several levels across multiple main and auxiliary channels. Early demonstrations have resulted in the highest output and highest power average efficiency at back-off among DPAs of this kind.

Benefits/Advantages

- **Powerful:** Instantaneously completes N-way power combining and improved load modulation
- **Efficient:** Delivers output power and back-off efficiency that is superior to earlier designs
- **Compact:** Allows for a compact core area and reduced total chip size that is useful for its integration into different 5G technologies

Potential Commercial Applications

- Mobile networks and devices
- Radio networks
- Internet providers
- Electronics

Background/Context for This Invention

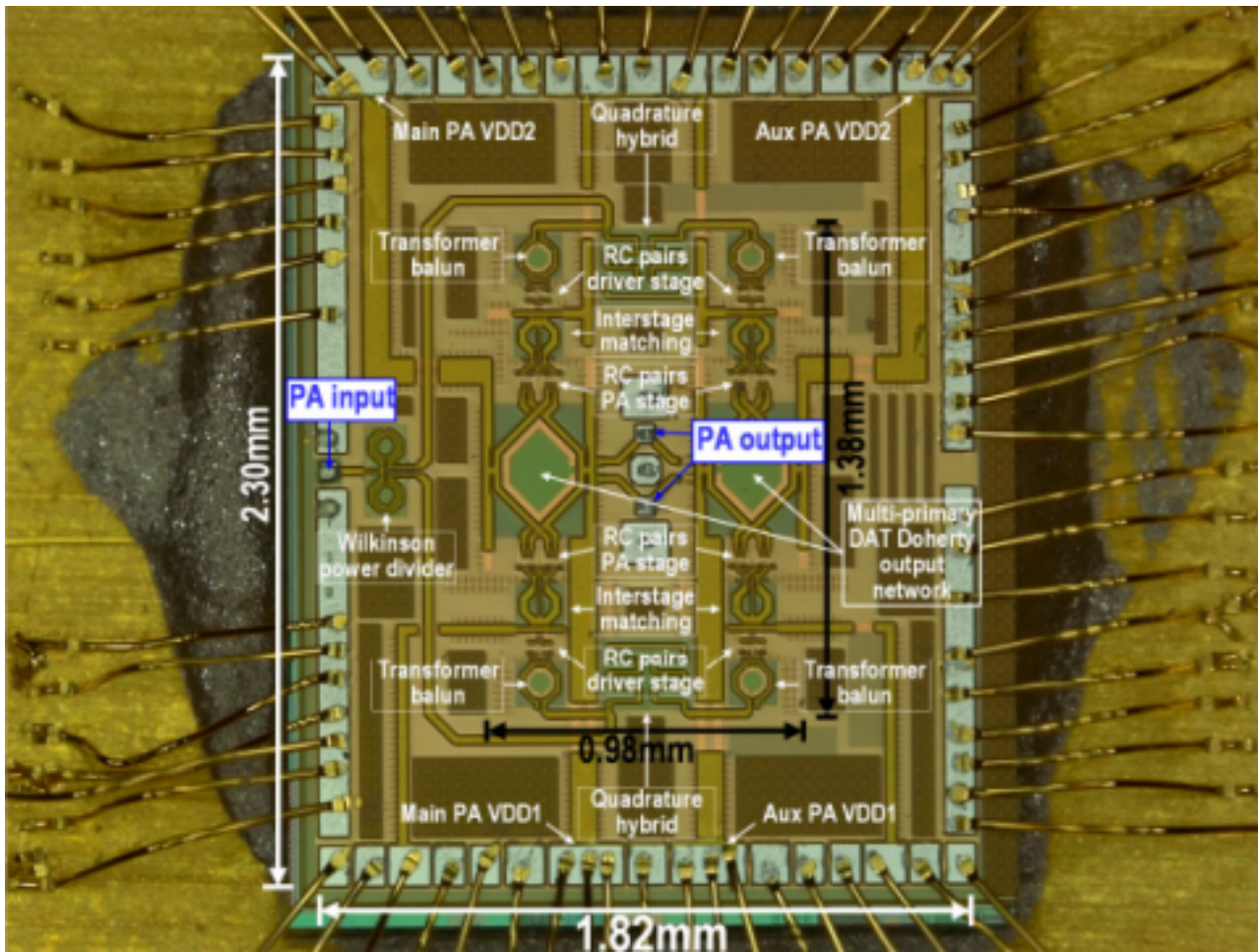
An increased demand for powerful, adaptable wireless technologies requires stronger electronic components that can integrate with 5G equipment. Specifically, a strong power amplifier plays a crucial role in any advanced wireless communication system by enabling information to be received and converted as efficiently as possible. Current silicon power amplifiers have struggled to reach the necessary linearity and power as well as effective baseband computational capabilities for high performance in 5G technologies. This novel design addresses the limitations of current silicon DPAs and has already demonstrated improvement in a radio base station's transmission and reception efficiencies.

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A diagram of Georgia Tech's compact and innovative DPA design.

For more information about this technology, please visit:

<https://industry.gatech.edu/technology/cutting-edge-doherty-power-amplifier-dpa-5g-integration>