



High-Power-Gain, Bipolar Transistor Amplifier

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WARF: P05260US

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a silicon-based bipolar transistor and an associated configuration that provide improved power gain and efficiency at high frequencies.

Overview

Silicon is a relatively inexpensive material for making integrated power amplifiers for communications devices such as cell phones; however, these power amplifiers are generally limited to low power at high frequencies.

The Invention

UW-Madison researchers have developed a silicon-based bipolar transistor and an associated configuration that allow for maximum power performance at high frequencies. The transistor can be either a silicon bipolar junction transistor or a silicon-germanium heterojunction bipolar transistor. The invention uses a common-base amplifier design rather than a common-emitter design with easy and effective ballast-resistor-free control of current hogging to provide maximum power gain and efficiency at radio frequencies, including microwave frequencies.

Applications

- Wireless power transmissions, particularly for automotive collision avoidance, WLAN point-to-point security communications and cell phone applications

Key Benefits

- Provides improved power gain and efficiency at high frequencies
- Can be used with a variety of silicon transistor types
- Eliminates need for ballast resistors to improve power gain
- Exhibits significantly reduced sensitivity to heating
- Effectively uses the high breakdown voltage of a common-base transistor for improved mismatch ruggedness
- Maximizes the advantages of BiCMOS integration and make BiCMOS more competitive than III-V technologies

Additional Information

For More Information About the Inventors

- [Zhenqiang Ma](#)

Tech Fields

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