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Wide dynamic range rectifier circuit with varactor tuning technique

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Abstract

This paper proposes and demonstrates a wide dynamic range rectifier with varactor tuning technique. The proposed rectifier employs the tunable device in the input matching circuit, which works to change the impedance matching depending on the input power, resulting in the wide dynamic range operation. The capacity of the varactor as a tuning device changes, as increasing the input power. That adaptively can change the matching circuit to realize the maximum RF-DC conversion efficiency. The proposed prototype rectifier MMIC was fabricated by a commercial 0.25 μ m GaAs pHEMT process and confirmed the effectiveness of the proposed circuit configuration. The fabricated rectifier MMIC achieves the maximum RF-DC conversion efficiency of 36% at 4.8GHz and 26dBm input power due to the improvement of the matching condition.

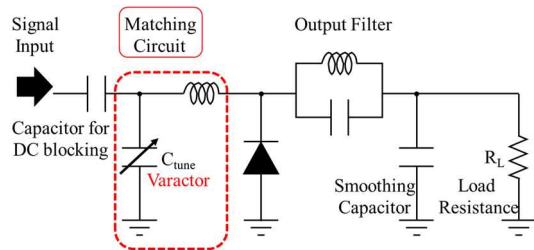


Fig. 1 Configuration of proposed wide dynamic range rectifier.

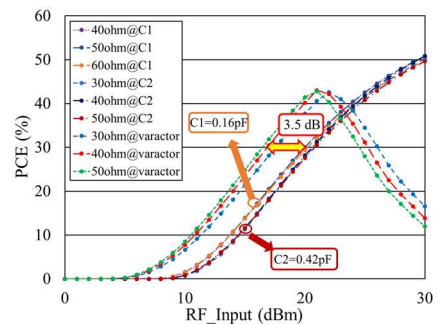


Fig. 2 Rectifier efficiency versus input RF power.

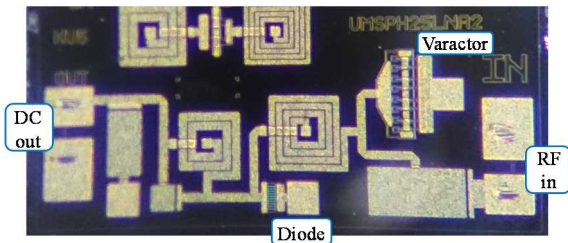


Fig.3 Photograph of fabricated proposed rectifier MMIC.

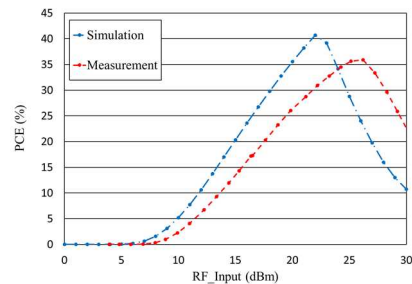


Fig.4 Measured rectifier efficiency.

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