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A High-Efficiency Low Power Rectifier for Wireless Power Transfer

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ABSTRACT

With the number of implantable devices that utilize electronics increasing, there is an increasing need to find alternative ways of powering them. Currently, surgery is required to replace a battery for these devices; however, with advancements in Wireless Power Transfer (WPT) methods, the need for further surgeries will become negated. This paper explores the ability of WPT as an alternative powering method by investigating rectifier Power Conversion Efficiency (PCE). The rectifier converts high frequency waves to Direct Current (DC) energy that can provide usable power to devices requiring electrical power. It is targeted for low power applications centered around a 233 MHz fundamental frequency, and the rectification circuit was designed and simulated in Advanced Design Systems (ADS) following the shunt diode circuit topology. The rectifier has a measured peak efficiency of 59.4% at -3 dBm and displays efficiencies above 40% from -22 dBm up until diode breakdown. This device will provide a constant DC power source for use in powering devices wirelessly at low power.

KEYWORDS

Rectifier, wireless power transfer (WPT), low power, high efficiency