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High Precision 65nm CMOS Rectifier for Energy Harvesting using Threshold Voltage Minimization in Telemedicine Embedded System

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Abstract : Telemedicine applications have very low voltage which required High Precision Rectifier Design with high Sensitivity to operate at minimum input Voltage. In this work, we targeted 0.2V input voltage using 65 nm CMOS rectifier for Energy Harvesting Telemedicine application. The proposed rectifier which designed at 2.4GHz using two-stage structure found to perform in a better case where minimum operation voltage is lower than previous published paper and the rectifier can work at a wide range of low input voltage amplitude. The Performance Summary of Full-wave fully gate cross-coupled rectifiers (FWFR) CMOS Rectifier at F = 2.4 GHz: The minimum and maximum output voltages generated using an input voltage amplitude of 2 V are 490.9 mV and 1.997 V, maximum VCE = 99.85 % and maximum PCE = 46.86 %. The Performance Summary of Differential drive CMOS rectifier with external bootstrapping circuit rectifier at F = 2.4 GHz: The minimum and maximum output voltages generated using an input voltage amplitude of 2V are 265.5 mV (0.265V) and 1.467 V respectively, maximum VCE = 93.9 % and maximum PCE= 15.8 %.

Keywords : energy harvesting, embedded system, IoT telemedicine system, threshold voltage minimization, differential drive cmos rectifier, full-wave fully gate cross-coupled rectifiers CMOS rectifier
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