EFFICIENT CAPACITANCE SENSING FOR WIRELESS HEALTH MONITORING SYSTEMS

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Abstract

This paper presents a low power capacitance to voltage converter (CVC) circuit using two differential amplifier circuits, two Schottky rectifier diodes constructed in a symmetrical manner and combined with instrumentation amplifier circuits. The differential capacitance to voltage simulation work has been realized with inexpensive discrete components. Energy from a combination of solar, vibration and heat sources is expected to charge the capacitance circuit. A constant DC voltage of 3 V has been used to power the CVC circuit in this work. Simulation has shown that the converter circuit consumes 3.9 mW of total power, and operates at 40 kHz using a 400 mV excitation signal. The circuit is able to detect changes of capacitance from 4 - 12.5 pF using a reference capacitance of 5 pF. A sensitivity of 0.132 mV for 1 fF capacitance change has been observed in the circuit. Using discrete components with same component values as in previous work, this circuit has shown more sensitivity in capacitance detection with less power consumption.

Keywords

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