



INVESTIGATION OF ELECTROMAGNETIC HARVESTER WITH FLAT STRUCTURE AND LOW VOLTAGE RECTIFIER

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ABSTRACT

As electronics decrease in size, power consumption moves toward the level of energy found in environmental vibration sources, making energy harvesters more promising as renewable energy sources. Wearable and portable electronics considerable as main field for such research, because of requiring compact energy sources which can be exploited effectively. Depending on available volume and frequency range, different physical principles are used to convert mechanical energy to electrical. Harvesters using electromagnetic inductance produce higher power in low frequencies, therefore they were chosen for current research. It is shown that flat construction inductors have low occupied volume and it is possible to estimate shape of generated voltage pulses as well as produced power, considering inductor's shape, conductor and relation between size of magnet and inductor. Accordingly it is possible to find best fitting parameters of harvester for needed results in specific situation. Generated voltage level of harvesters in many occasions is low and fully dependent on effective transformation. To increase effectiveness, low voltage rectification system is under investigation. It utilizes field effect transistors, creating diode's equivalent with threshold voltage level under 100 mV.

Keywords: energy harvesters, electromagnetic harvester, low voltage rectification, efficiency, power management