Title: A DC-DC Step-Up mu-Power Converter for Energy Harvesting Applications, Using Maximum Power PointTracking, Based on Fractional Open Circuit Voltage

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Abstract: A DC-DC step-up micro power converter for solar energy harvesting applications is presented. The circuit is based on a switched-capacitorvoltage tripler architecture with MOSFET capacitors, which results in an, area approximately eight times smaller than using MiM capacitors for the 0.131mu m CMOS technology. In order to compensate for the loss of efficiency, due to the larger parasitic capacitances, a charge reutilization scheme is employed. The circuit is self-clocked, using a phase controller designed specifically to work with an amorphous silicon solar cell, in order to obtain themaximum available power from the cell. This will be done by tracking its maximum power point (MPPT) using the fractional open circuit voltage method. Electrical simulations of the circuit, together with an equivalent electrical model of an amorphous silicon solar cell, show that the circuit can deliver apower of 1132 mu W to the load, corresponding to a maximum efficiency of 66.81%.

Author Keywords: Electronics; CMOS Circuits; Energy Harvesting; Power Management Circuits; Maximum Power Point Tracking; Amorphous Silicon Solar Cell

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