

**Title:** Start-up circuit for low-power indoor light energy harvesting applications

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**Abstract:** A start-up circuit, used in a micro-power indoor light energy harvesting system, is described. This start-up circuit achieves two goals: first, to produce a reset signal, power-on-reset (POR), for the energy harvesting system, and secondly, to temporarily shunt the output of the photovoltaic (PV) cells, to the output node of the system, which is connected to a capacitor. This capacitor is charged to a suitable value, so that a voltage step-up converter starts operating, thus increasing the output voltage to a larger value than the one provided by the PV cells. A prototype of the circuit was manufactured in a 130 nm CMOS technology, occupying an area of only 0.019 mm<sup>2</sup>. Experimental results demonstrate the correct operation of the circuit, being able to correctly start-up the system, even when having an input as low as 390 mV using, in this case, an estimated energy of only 5.3 pJ to produce the start-up.

**KeyWords Plus:** Start-up circuit; Low-power indoor

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