Abstract Submitted for the MAR10 Meeting of The American Physical Society

Single-wall carbon nanotube diode AC-DC power converter GOVIND MALLICK, MARK GRIEP, SHASHI KARNA, US Army Research Laboratory, PULICKEL AJAYAN, Rice University — Increasing demand for low power consumption in electronics combined with continued miniaturization of electronic device components in today's analogue/digital circuits have reduced the supply voltage to sub-one volt levels. The supply voltage to integrated circuit devices are provided by AC-DC converters, which converts high frequency ac voltage to a conditioned dc output voltage at a given power level The low-voltage AC-DC converters generally consist of a diode rectifier, which consists of several diodes, an inductor and capacitor. The critical feature of the AC-DC diode converter is its high rectification, which allows large current to flow only in one direction or for one phase of the AC input. In this paper we report the observation of AC-DC half-wave conversion in the range of 1-1000 Hz by single-wall carbon nanotube diode rectifiers, which show a high degree of rectification ( $\sim 10^5$ ). The conversion factor remains constant over the tested frequency range of 1-200 Hz, but decreases slightly between 200-1000 Hz.

> Govind Mallick US Army Research Laboratory

Date submitted: 22 Nov 2009

Electronic form version 1.4