



Contribution ID: 542

Type: **Poster Presentation**

AC/DC performance of a fully printed current switching silicon based transistor

Wednesday, 10 July 2013 17:40 (1 hour)

**Abstract content
 (Max 300 words)**

We present a novel, large area, fully printed nanoparticulate silicon based transistor which is produced by a simple screen printing process under ambient conditions without the need for post processing steps. It functions as a high voltage unit gain two-way current switch for both direct and alternating current. The uniqueness of our device is its principle of operation, which is distinct from those of conventional transistors which rely on electric field modulation or charge injection. Its mode of operation is based on activated transport of charge through the active silicon layer. In the new transistor, switching is achieved by applying a signal to the base which results in change of the direction of the current from between the collector and base to between the base and emitter. We demonstrate the operation of the device printed on flexible substrates using silver as the conductive layer and highly doped P-type nano-silicon as the active layer. It is further demonstrated that the operation of the transistor is independent of the dominant carrier type in the semiconductor and the nature of the junction between the semiconductor and the three contacts.

**Apply to be
 considered for a student
 award (Yes / No)?**

Yes

**Level for award
 (Hons, MSc,
 PhD)?**

PhD

**Main supervisor (name and email)
and his / her institution**

Prof David Britton (david.britton@uct.ac.za) and Prof. Margit Haring (Margit.Harting@uct.ac.za). University of Cape Town

**Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?**

YES

Primary author: Mr ZAMBOU, Serges (University of Cape Town)

Co-authors: Prof. BRITTON, David (University of Cape Town); Mr JONAH, Emmanuel (University of Cape Town); Prof. MARGIT, Harting (University of Cape Town); Mrs FLORENCE, Idowu (University of Cape Town); Mr BATSIRAI, Magunje (University of Cape Town); Dr NUSSL, Rudolph (University of Cape Town); Mr WALTON, Stanley Douglas (University of Cape Town)

Presenter: Mr ZAMBOU, Serges (University of Cape Town)

Session Classification: Poster2

Track Classification: Track F - Applied Physics