

E²SWITCH

Energy Efficient Tunnel FET Switches and Circuits

Grant Agreement No.: 619509

Funding Scheme: Collaborative project

Thematic Area: Energy efficient switch, tunnel FET, nanotechnology III-V, SiGe and Ge, low power integrated circuits, digital and analog/RF circuits, CMOS, simulation and modeling of nano-electronic devices & circuits

Project start date: 01/11/2013

Deliverable D7.5

Project Flyer

Nature¹: O

Dissemination level²: PU

Due date³: M06

Date of delivery: M09 (v1), M14 (v2)

Lead partner: SCIPROM

Contributing partner: EPFL

Authors SCIPROM

¹ R = Report, P = Prototype, D = Demonstrator, O = Other

² PU = Public, PP = Restricted to other programme participants (including the Commission Services), RE = Restricted to a group specified by the consortium (including the Commission Services), CO = Confidential, only for the members of the consortium (including the Commission Services)

³ Measured in months from the project start date (M01)

Revision history

Version	Date	Author	Comment
1.0	01.07.2014	Véronique Gobry, SCIPROM	Final Version
2.0	02.12.2014	Kirsten Leufgen, SCIPROM	Revised version after review, correction of table of contents

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Summary

This deliverable presents the E²SWITCH brochure.

The E²SWITCH brochure is conceived as an advertising tool. It will be distributed mostly through all partners at public events.

Its objective is to present the aims of the concept, its various applications and its benefits.

The flyer has been conceived and created by EPFL and SCIPROM in continuous contact with all partners. It will be printed in 500 copies and will be supplied to all partners, who will then distribute them to academia and industrial stakeholders.

1. Description

1.1 Overview

The flyer has been realized in DL format, which is the result of a three-folded A4 page, printed on both sides.

1.2 Closed

The closed flyer should attract the attention of potential customers. It is divided in three parts: the project's logo on top, a summary of the project on the middle and a diagram of the project at the bottom. The diagram illustrates the concept of the project and serves as bait for the text, which is concise yet precise and complete enough to understand the aim of the project.

The back of the flyer acknowledges the European funding, presents the partners of the project, and gives the contact point as well as the website address of the E²SWITCH Project.

1.3 Inside

The inside of the flyer is more technical and is aimed at a scientific public.

It describes the mission and vision of the project through more detailed explanations supported by technical figures. A brief overview of both the implementation and the theory are also presented. The whole design while based on the project logo visual identity colours, is very geometric, reminding electric circuits with virtual wires connecting the various text boxes and figures all along the brochure.

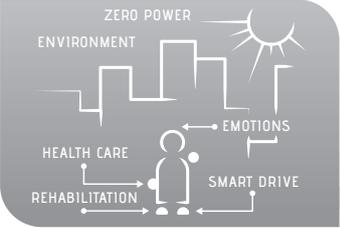
1.4 Usage

The flyer will be printed by offset printing in 500 copies. The partners will be then responsible of its distribution at related scientific conferences and other public events.

E²SWITCH

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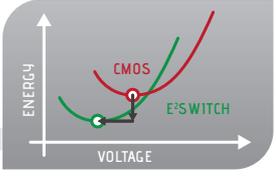
The consumption of electrical energy is steadily increasing and measures for power reduction will be required. Low-power devices are basic building blocks for any circuit. They must operate at the lowest achievable power consumption in stand-by mode as well as during operation. An extremely low supply voltage combined with negligible off-current are essential for reducing power consumption. We aim at > 10 times power reduction by the use of novel devices.



MISSION AND VISION

E²SWITCH focuses on Tunnel FET (TFETs) as most promising energy efficient device candidates able to reduce the voltage supply of integrated circuits (ICs) below 0.25V and make them significantly more energy efficient by exploiting strained SiGe/Ge and III-V platforms, with CMOS technological compatibility.

A full optimization and DC/AC benchmarking for complementary n- and p-type TFETs, integrated on the same fabrication platform, is proposed. Compact models are developed and implemented in Verilog A, for portability, to support the design of low power ICs with CMOS architectural compatibility for: (i) digital and (ii) analog/RF.



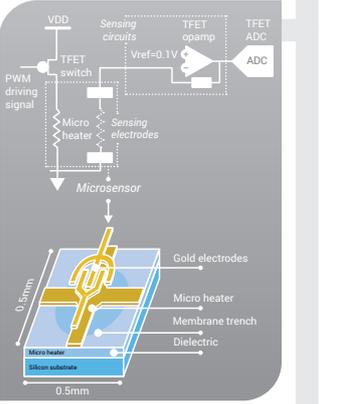
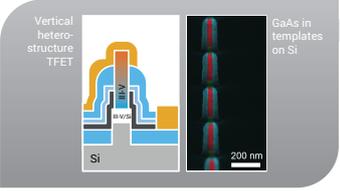
WWW.E2SWITCH.ORG
INFO@E2SWITCH.ORG

E²SWITCH is coordinated by Prof Adrian Ionescu EPFL - Switzerland

The E²SWITCH Consortium gathers nine organisations from a total of six different countries. Together they form a unique multidisciplinary network of universities, one large industrial partner, two research centres and one research-intensive SME, supported by a dedicated management SME.

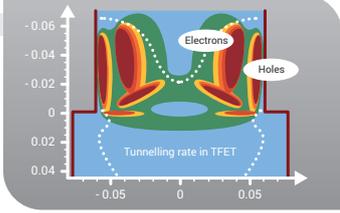
IMPLEMENTATION

III-V heterojunction TFETs and integration on a silicon platform using selective epitaxy in templates.

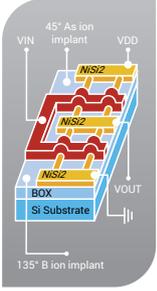


THEORY

Computer-aided design of TFETs by predictive multi-scale device simulation.



Investigation of complementary, scaled Si-based nanowire TFETs with wrapped high-k/metal gates targeting on currents >100 $\mu\text{A}/\mu\text{m}$ and minimum slopes <60 mV/dec.



MISSION AND VISION

Within the scope of the project our aim is to exploit TFET solution for energy efficient, ultra-low power and low voltage, System-On-Chip for portable sensing applications, such as smartphone and wearable sensors for health and well-being. Initially, we will be benchmarking simple TFET analog front end building blocks vs CMOS circuitry to determine optimal solution for driving micro-heaters and sensing circuits.

Mixed device/circuit simulations of basic building blocks of analog and digital systems.

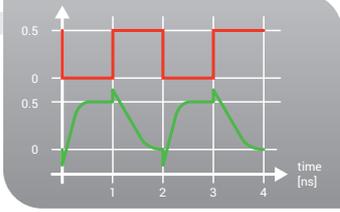


Figure 1. Mockup of the two sides of the E²SWITCH flyer.