### 2022 36th Symposium on **Microelectronics Technology (SBMICRO 2022)**

**Virtual Conference** 22 – 26 August 2022



IEEE Catalog Number: CFP22SBO-POD **ISBN:** 

978-1-6654-8715-3

### Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

*Copyright and Reprint Permissions*: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

### \*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

| IEEE Catalog Number:    | CFP22SBO-POD      |
|-------------------------|-------------------|
| ISBN (Print-On-Demand): | 978-1-6654-8715-3 |
| ISBN (Online):          | 978-1-6654-8714-6 |

#### Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



### List of contents

#### **Circuit/Device Interaction**

Experimental behavior of Line-TFET applied to Low-Dropout Voltage Regulator...1

Wenita Silva, Paula Agopian, Joao A. Martino

Uniaxially strained silicon influence on Two-stage Operational Transconductance Amplifiers designed with SOI FinFET's...5

Arllen Ribeiro, Gustavo de Araujo, Joao Martino, Paula Agopian

Temperature influence on Operational Transconductance Amplifier designed with triple gate TFET...9

Raphael Camargo, Joao Martino, Paula Agopian

Junctionless Nanowire Transistor for Analog Applications: Cascode Current Mirror Configuration...13

Andre Balbino Shibutani, Rodrigo Doria, Renan Trevisoli

An Analytical Gate Delay Variability Model for Low-Power and Low-Voltage Applications...17

Caroline Pinheiro Garcia, Thiago Both

Impact of using octogonal layout style in planar power MOSFETS...21

Gabriel Silva, Salvador Gimenez

Total Ionizing Dose (X-Ray) Effects on the Mismaching of the Analog MOSFETs layouted with Different Layout Sytles...25

Vinicius Vono Peruzzi, Gabriel Augusto Silva, Salvador Pinillos Gimenez



Gas monitoring system with a Quantum Bragg Mirror Detector (QBMD)...29

David Souza

#### **Photovoltaics and Optoelectronics**

Pedestal architecture to manufacture TeO2-ZnO waveguides for the development of photonic devices to operate in the infrared region...33

Filipe de oliveira pereira Delboni, Daniel Kendji Kumada, Marco Isaías Alayo Chávez, Luciana Kassab

Porous silicon photonic crystals: Inflence of the etch-stop on the optical response...37 Jackelyne Medina Villanueva, Adhimar Flavio Oliveira, Danilo Roque Huanca

First-principles Study of the Electronic and Optical Properties of SnO2 Under Strain Effects...41 A Benyahia, Faycal Djeffal, Z Dibi, Hichem Ferhati

Parameter Extraction Methodology of 1D2R PV Cell Electrical Model for Indoor Applications...45 Vitoria Monteiro, Luis Felipe Machado Dutra, Paulo César Comassetto de Aguirre, Lucas Compassi-Severo, Alessandro Girardi

III-V solar cells transferred to flexible substrates based on Cu...49 Beatriz Vargas Rocha, Martiane de Oliveira Silva, Luciana Dornelas Pinto, Patrlcia Lustoza de Souza

EIS capacitor sensor, with TiO2 dielectric, applied in the evaluation of phosphate in wastewater...53 Huziel Ramos Souto, Fernando Cesar Rufino, Renato Massaroto Beraldo, Sergio Henrique Fernandes, José Alexandre Diniz



#### **Device Characterization, Modeling and Simulation**

Fabrication and Electrical Characterization of ISFET for H2O2 sensing....57 Pedro Duarte, Ricardo Rangel, Daniel Ramos, Leonardo Yojo, Carlos Augusto Bergfeld Mori, Katia Sasaki, Paula Agopian, Joao Martino

Nanowire TFET with different Source Compositions applied to Low-Dropout Voltage Regulator...61 Rodrigo Tolêdo, Joao Martino, Paula Agopian

Standard MOS Diodes Composed by SOI UTBB Transistors...65 Fernando Costa, Renan Trevisoli, Carlos Eduardo Capovilla, Rodrigo Doria

Al Source-Drain Schottky contact enabling Ntype (Back Enhanced) BESOI MOSFET...69 Henrique Lanfredi Carvalho, Ricardo Rangel, Katia Sasaki, Joao A. Martino, Leonardo Yojo, Paula Agopian

Experimental Comparison of Junctionless and Inversion-Mode Nanowire MOSFETs Electrical Properties at High Temperatures...73

Rhaycen Rodrigues Prates, Marcelo Pavanello

Analysis of Variability in Transconductance and Mobility of Nanowire Transistors...77 Lucas Mota Barbosa da Silva, Michelly de Souza, Marcelo Pavanello

Modeling Quantum Confinement in Multi-Gate Transistors with Effective Potential...81 Caroline Soares, Pranay K. R. Baikadi, Gilson Wirth, Alan Rossetto, Marcelo Pavanello, Dragica Vasileska



Monte Carlo Analysis of a Fractional-Order MOS Capacitor using Fractal Tree Implementation...85 Lucas Almir Fernandes, Marco Isaías Alayo Chávez, Joao Martino

Impact of Temperature Effects in the Zero Temperature Coefficient of the Ellipsoidal MOSFET...89 Marcos Paulo Braga de Lima, Marco Aurélio Pinhel Peixoto, Marcello Marcelino Correia, Egon Galembeck, Salvador Gimenez, Luciano Camillo

Influence of multiple conduction channels on MISHEMT's intrinsic voltage gain...93 Bruno Canales, Paula Agopian

Experimental Analysis of MISHEMT Multiple Conductions from 200K to 450K...97 Welder Perina, Joao A. Martino, Paula Agopian

#### **Novel Materials and Devices**

Capping of InAs quantum dots by migration enhanced epitaxy...101 Victor Curbelo, Ahmad Alzeidan, Alain, ré Quivy

Dual-color detection using two quasi-bound states in the continuum in an InGaAs/InAlAs superlattice...105

Pedro Henrique Pereira, Germano Maioli Penello, Vitor Bento Sousa, Rudy Massami Kawabata, Mauricio Pamplona Pires, Patricia Lustoza de Souza

Electrochemical electrodes based on laser Induced Graphene on PECVD a-SiC:H and Polyimide...108 Deissy Johanna Feria Garnica, Aline Pinto, Marcelo N.P. Carreño, Mauro Bertotti, Inés Pereyra



Development of the prism-coupler model for the design of a biosensor based on SPR technology for fast diagnostics...112

Angela Mazzeo, Gustavo Paganini Canal, Marco Isaías Alayo Chávez

#### NEMS, MEMS, Packaging and Processing

The Delamination Caused by Flux Residue in System-in-Package Devices...116 Andrei Alaferdov, Ricardo Yoshioka, Carolina C.P. Nunes, Matheus Dias Sousa, Valdeci Carvalho, Igor Fernandes Namba, Claudemir Coral

On the importance of atom probe tomography for the development of new nanoscale devices...120 Thales Borrely, Alain Quivy, Tao-Yu Huang, Yu-Chen Yang, Rachel S. Goldman

A method for deposition rate estimation on a low-cost home-built DC sputter system...124 *Giuseppe Cirino, Henrique Pinto, Renato G. Jasinevicius* 

Characterization of TiO2 deposited by ALD for SiC MOS capacitor application...128 Rodrigo Reigota César, Renato Beraldo, Ednan Joanni, Melissa Mederos, Ricardo Cotrin Teixeira, Renato Minamisawa, José Alexandre Diniz

MEM Relay For the Internet of Things Applications...132 Ren Li, Hossein Fariborzi

Elaboration of Graded Band-Gap a-SiC Thin-Film Using RF Magnetron Sputtering Technique...136 Faycal Djeffal, A Bendjerad, A Benhaya, Hichem Ferhati



Structural and Electrical Properties of a-Si Schottky Diode based on ZnO Top Layer and Ag Intermidiate Ultrathin-Films...140

K Kacha, Faycal Djeffal, A Bendjerad, Hichem Ferhati, A Benhaya

Characterization of silicon thin films obtained by MicroHeater MEMS based-micro LPCVD technique...144

Ricardo Aparecido Rodrigues de Oliveira, Daniel Dias da Purificação, Inês Pereyra Alvarez, Marcelo Nelson Paez Carreño

