2020 International EOS/ESD Symposium on Design and **System (IEDS 2020)**

Chengdu, China 23 – 25 June 2021



IEEE Catalog Number: CFP20X16-POD ISBN:

978-1-7281-9708-1

Copyright © 2020, EOS/ESD Association Inc. 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:
 CFP20X16-POD

 ISBN (Print-On-Demand):
 978-1-7281-9708-1

 ISBN (Online):
 978-1-58537-328-4

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



TABLE OF CONTENTS

A1: Advanced CMOS, ESD Modeling and Simulation

A1.3 (PUB. 1) Design of a New Low Voltage Triggered Silicon Controlled Rectifier (SCR) for ESD Applications...1

Wenqiang Song, University of Electronic Science and Technology of China, NuVolta Technologies, Inc.; Feibo Du, Peking University Shenzhen Graduate School; Fei Hou, Jizhi Liu, Zhiwei Liu, NuVolta Technologies, Inc.; Xiaozong Huang, Institute of Electronic and Information Engineering of UESTC; Juin J. Liou University of Electronic Science and Technology of China

A1.4 (PUB. 2) Study of ESD Device Modeling Based on Neural Network...5

Yize Wang, Yunhao Li, Yuan Wang, Peking University

A2: Advanced CMOS, ESD Modeling and Simulation

A2.1 (PUB. 22) Design and Optimization of Diode Triggered Silicon Controlled Rectifier in FinFET Technology...9

Meng Miao, You Li, Wei Liang, Robert Gauthier, GLOBALFOUNDRIES

A2.2 (PUB. 3) Investigation on Fabrication-Induced High-Leakage Issue of an Overdrive ESD Power Clamp in Advanced FinFET Technology...13

Guangyi Lu, Lihui Wang, Ling Wang, Xin Gao, Mei Li, HiSilicon Technologies Co., LTD.

A2.3 (PUB. 4) ESD Diode Devices Simulation and Analysis in a FinFET Technology...18

Yunhao Li, Yize Wang, Yuan Wang, Peking University

A3: Advanced CMOS, ESD Modeling and Simulation

A3.3 (PUB. 6) A Novel Area-Efficient ESD Power Clamp with Enhanced Noise Immunity...22

Xiaoyun Li, Lihui Wang, Guangyi Lu, Xin Gao, Mei Li, Hisilicon Technologies Co., LTD

A3.4 (PUB. 7) Experimental Investigation of ESD Protection for a 22-nm FD-SOI Process...27

Xiaotian Chen, Yize Wang, Yuan Wang, Peking University

A3.5 (PUB. 8) A Modified RC and Diode Co-Triggered ESD Clamp Circuit...32

Zhaonian Yang, Yibo Zhang, Pan Mao, Xi'an University of Technology

A3.6 (PUB. 9) ESD Pulse Width Effect on RC-Triggered NMOS With Power On or Off...36

Xinyu Zhu, Fangjun Yu, Hongyu Shen, Zekun Xu, Shurong Dong, Zhejiang University

B1: ESD Protection in Bipolar, RF and High-voltage Applications

B1.2 (PUB. 10) Design Optimization of High Voltage NPN ESD Protection Device in 130 nm Power SOI Technology...39

Raunak Kumar, Jie (Jack) Zeng, Kyong Jin Hwang, Robert Gauthier, Jr., GLOBALFOUNDRIES

B1.3 (PUB. 11) Optimization of GGMMOS Devices for High-Voltage ESD Protection in BCDLite Technology...44

Prantik Mahajan, Raunak Kumar, Robert Gauthier, Kyong Jin Hwang, GLOBALFOUNDRIES

B1.4 (PUB. 12) DDSCR Device Structure Fabricated on 0.5 µm CMOS Process...50

Xiangliang Jin, Yang Wang, Hunan Normal University

B2: ESD Protection in Bipolar, RF and High-Voltage Applications

B2.1 (PUB. 13) Optimization of NPN ESD Protection Device for Improved Failure Current...55

Jie (Jack) Zeng, Raunak Kumar, Tsung-Che Tsai, Sevashanmugam Marimuthu, Robert Gauthier, Jr., GLOBALFOUNDRIES

B2.2 (PUB. 14) Optimized Local I/O ESD Protection for SerDes in Advanced SOI, BiCMOS, and FinFET Technology...60

Johan Van der Borght, Ilse Backers, Olivier Marichal, Bart Keppens, Koen Verhaege, Sofics Co-copyrighted by Sofics and EOS/ESD Association, Inc.

B2.5 (PUB. 16) Verification of an Equivalent Circuit Model for LDMOS-SCR Based on 0.5 $\,\mu m$ CMOS Process...71

Zeyu Zhong, Xiangliang Jin, Hunan Normal University

D1: System Level ESD

D1.5 (PUB. 20) Pulse Frequency Effects on Probability of ESD Soft Failures for a Specific Camera Subsystem...75

Yanlin Nie, Qiupei Huang, Zhiwei Liu, Jizhi Liu, University of Electronic Science and Technology of China; Xiang Li, Xiaofei Xie, Huawei Technologies Co., LTD.; David Pommerenke, Graz University of Technology

E1: ESD Manufacturing and Factory Control

E1.3 (PUB. 23) EOS/ESD Manufacturing Mitigation Review...79

L.H. Koh, K.Y. Loh, Everfeed Technology Pte Ltd; Bernard Chin, Qorvo International Pte Ltd.