

# **2021 IEEE International Test Conference in Asia (ITC-Asia 2021)**

**Shanghai, China  
18-20 August 2021**



**IEEE Catalog Number: CFP21UWH-POD  
ISBN: 978-1-6654-1335-0**

**Copyright © 2021 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:	CFP21UWH-POD
ISBN (Print-On-Demand):	978-1-6654-1335-0
ISBN (Online):	978-1-6654-1334-3
ISSN:	2768-0681

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## TABLE OF CONTENTS

Fault Modeling and Testing of Spiking Neural Network Chips .....	1
<i>Yi-Zhan Hsieh, Hsiao-Yin Tseng, I-Wei Chiu, James Chien Mo Li</i>	
The ANN Based Modeling Attack and Security Enhancement of the Double-Layer PUF .....	7
<i>Xiaole Cui, Yongliang Chen, Wenqiang Ye, Xiaoxin Cui</i>	
Developing Formal Models for Measuring Fault Effects Using Functional EDA Tools .....	13
<i>Wei Hu, Jing Tan, Lingjuan Wu, Yu Tai, Liang Hong</i>	
Use Machine Learning Based Smart Sampling to Improve System Level Testing Efficiency .....	19
<i>Chenwei Liu, Jie Ou</i>	
Identification of Counter Registers Through Full Scan Chain .....	25
<i>Qidong Wang, Aijiao Cui, Gang Qu</i>	
Automatic Test Program Generation for Transition Delay Faults in Pipelined Processors .....	30
<i>Kai-Hsun Chen, Bo-Yi Yang, Jia-Ruei Liang, Hung-Lin Chen, Jiun-Lang Huang</i>	
Scalable Parallel Static Learning .....	36
<i>Xiaoze Lin, Liyang Lai, Huawei Li</i>	
TAIWAN Online: Test AI with AN Codes Online for Automotive Chips.....	42
<i>Cheng-Di Tsai, Hsiao-Wen Fu, Ting-Yu Chen, Tsung-Chu Huang</i>	
Integrated Scratch Marker for Wafer Defect Diagnosis .....	48
<i>Katherine Shu-Min Li, Leon Li-Yang Chen, Peter Yi-Yu Liao, Syng-Jyan Wang, Andrew Yi-Ann Huang, Ken Chau-Cheung Cheng</i>	
An Optimized DFT Technology Based on Machine Learning .....	52
<i>Han Yang, Zeyu Zhao, Zhikuang Cai</i>	
A Low-Cost Quadruple-Node-Upset Self-Recoverable Latch Design .....	56
<i>Shuo Cai, Caicai Xie, Yan Wen, Weizheng Wang</i>	
Kelvin Bridge Structure Based TSV Test for Weak Faults .....	61
<i>Chang Hao, Huang Zhengfeng, Ni Tianming</i>	
A N:1 Single-Channel TDMA Fault-Tolerant Technique for TSVs in 3D-ICs.....	67
<i>Huaguo Liang, Danqing Li, Zhao Yang, Tianming Ni, Zhengfeng Huang, Cuiyun Jiang</i>	
Rigorous Test Flow for PLL to Identify Weak Devices .....	72
<i>Yi-Hsuan Lee, Shi-Yu Huang</i>	
AMSER-FF: Area-Minimized Soft-Error-Recoverable Flip-Flop for Radiation Hardening.....	78
<i>John Z.-L. Tang, Dave Y.-W. Lin, Ralf E.-H. Yee, Charles H.-P. Wen</i>	
An SRAM Test Quality Improvement Method for Automotive Chips .....	84
<i>Tuanhui Xu, Junlin Huang, Mingen Bu, Zhe Jiang</i>	
Testing and Fault-Localization Solutions for Monolithic 3D Ics .....	88
<i>Arjun Chaudhuri, Krishnendu Chakrabarty</i>	

Parallel DICE Cells and Dual-Level CEs Based 3-Node-Upset Tolerant Latch Design for Highly Robust Computing.....	94
<i>Aibin Yan, Zijie Zhai, Lele Wang, Jixiang Zhang, Ningning Cui, Tianming Ni, Xiaoqing Wen</i>	
High-Speed Measurement of Piezoelectric MEMS Equivalent Circuit Parameters by Swept-Sine and PRBS Signals.....	99
<i>Mitsuo Matsumoto, Masayuki Kawabata, Yukio Kawanabe</i>	
A Duty-Cycle Monitor Supporting a Wide Frequency Range of Clock Signal.....	105
<i>Chen-Lin Tsai, Wei-Hao Chen, Shi-Yu Huang</i>	
Reliability Evaluation of Approximate Arithmetic Circuits Based on Signal Probability .....	111
<i>Zhen Wang, Guofa Zhang, Jing Ye, Jianhui Jiang</i>	
Automotive Test and Reliability.....	117
<i>Yu Huang, David Francis, Yervant Zorian, Nilanjan Mukherjee</i>	
Diagnosis and Yield Learning .....	118
<i>Yu Huang, Wu-Tung Cheng, Ruifeng Guo, Sameer Chillarige</i>	
The Advancement of 1149.10 .....	119
<i>Yu Huang, Haitao Fu, Bin Deng, Ed Seng, Marc Hutner, J-F Cote, Geir Eide</i>	

**Author Index**