Contents

vii Conference Committee
ix Introduction

KEYNOTE SESSION

8327 03 Implications of triple patterning for 14nm node design and patterning (Keynote Paper) [8327-02]
K. Lucas, Synopsys, Inc. (United States); C. Cork, Synopsys, Inc. (France); B. Yu, Univ. of Texas (United States); G. Luk-Pat, B. Pointer, Synopsys, Inc. (United States); D. Z. Pan, The Univ. of Texas at Austin (United States)

8327 04 Yield enhancement with DFM (Keynote Paper) [8327-03]

DFDP: DESIGN FOR DOUBLE PATTERNING

8327 05 Layout optimization through robust pattern learning and prediction in SADP gridded designs [8327-04]
J.-Y. Wuu, Univ. of California, Santa Barbara (United States); M. Simmons, Mentor Graphics Corp. (United States); M. Marek-Sadowska, Univ. of California, Santa Barbara (United States)

8327 06 Self-aligned double patterning (SADP) compliant design flow [8327-05]
Y. Ma, GLOBALFOUNDRIES Inc. (United States); J. Sweis, Cadence Design Systems, Inc. (United States); H. Yoshida, Y. Wang, J. Kye, H. J. Levinson, GLOBALFOUNDRIES Inc. (United States)

8327 07 Design friendly double patterning [8327-06]
E. Yesilada, STMicroelectronics (France)

8327 08 Pattern matching for double patterning technology-compliant physical design flows [8327-07]
L. T.-N. Wang, V. Dai, L. Capodieci, GLOBALFOUNDRIES Inc. (United States)

DESIGN RULES AND ROUTING

8327 09 Design-of-experiments based design rule optimization [8327-08]
A. A. Kagalwalla, Univ. of California, Los Angeles (United States); S. Muddu, L. Capodieci, GLOBALFOUNDRIES Inc. (United States); C. Zelnik, Sagantec Inc. (United States); P. Gupta, Univ. of California, Los Angeles (United States)
8327 0A Fully integrated litho aware PnR design solution [8327-09]
C. Beylier, STMicroelectronics (France); C. Moyroud, Mentor Graphics Corp. (France); F. Bernard Granger, F. Robert, E. Yesilda, Y. Trouiller, J.-C. Marin, STMicroelectronics (France)

8327 0B Replacing design rules in the VLSI design cycle [8327-10]
P. Hurley, K. Kryszczuk, IBM Zürich Research Lab. (Switzerland)

8327 0C Smart double-cut via insertion flow with dynamic design-rules compliance for fast new technology adoption [8327-11]
A. Abdulghany, R. Fathy, Mentor Graphics Corp. (United States); L. Capodieci, P. Pathak, S. Madhavan, S. Malik, GLOBALFOUNDRIES Inc. (United States)

8327 0D Local loops for robust inter-layer routing at sub-20 nm nodes [8327-12]
W. Huang, D. Morris, Carnegie Mellon Univ. (United States); N. Lafferty, L. Liebmann, IBM Corp. (United States); K. Vaidyanathan, Carnegie Mellon Univ. (United States); K. Lai, IBM Corp. (United States); L. Pileggi, A. J. Strojwas, Carnegie Mellon Univ. (United States)

DESIGN IMPLEMENTATION AND VARIABILITY

8327 0E A primer of physical design for lithographers (Invited Paper) [8327-13]
C.-M. Yuan, Freescale Semiconductor, Inc. (United States)

8327 0F Analysis, quantification, and mitigation of electrical variability due to layout dependent effects in SOC designs [8327-14]
Y. Wang, M. Zwolinski, Univ. of Southampton (United Kingdom); A. Appleby, M. Scoones, S. Caldwell, T. Azam, Cambridge Silicon Radio Ltd. (United Kingdom); P. Hurat, Cadence Design Systems, Inc. (United States); C. Pitchford, Cadence Design Systems, Inc. (United Kingdom)

8327 0H Design level variability analysis and parametric yield improvement methodology [8327-16]
R. März, M. Keck, Intel GmbH (Germany)

8327 0I Analysis of layout-dependent context effects on timing and leakage in 28nm [8327-17]
P. McGuinness, Fastada (United States); P. Sharma, Freescale Semiconductor, Inc. (United States); P. Hurat, Cadence Design Systems, Inc. (United States)

8327 0J Variability aware compact model characterization for statistical circuit design optimization [8327-18]
Y. Qi, K. Qian, C. J. Spanos, Univ. of California, Berkeley (United States)

JOINT SESSION WITH CONFERENCE 8326

8327 0K Design and manufacturability tradeoffs in unidirectional and bidirectional standard cell layouts in 14nm node [8327-19]
K. Vaidyanathan, S. H. Ng, D. Morris, Carnegie Mellon Univ. (United States); N. Lafferty, L. Liebmann, IBM Corp. (United States); M. Bender, W. Huang, Carnegie Mellon Univ. (United States); K. Lai, IBM Corp. (United States); L. Pileggi, A. J. Strojwas, Carnegie Mellon Univ. (United States)
8327 0M A novel methodology for triple/multiple-patterning layout decomposition [8327-21]
R. S. Ghaida, Univ. of California, Los Angeles (United States); K. B. Agarwal, L. W. Liebmann, S. R. Nassif, IBM Corp. (United States); P. Gupta, Univ. of California, Los Angeles (United States)

8327 0N Overlay, decomposition and synthesis methodology for hybrid self-aligned triple and negative-tone double patterning [8327-22]
W. Kang, Y. Chen, Peking Univ. (China)

8327 0O Computational lithography work flows and design rule exploration automation [8327-23]
S. Sethi, W. Stanton, K. Lucas, J. Hiserote, Synopsys, Inc. (United States); D. Hur, R. Choi, SAMSUNG Electronics Co., Ltd. (Korea, Republic of)

SESSION 8 HOTSPOTS, CMP, AND FILL

8327 0P Thickness-aware LFD for the hotspot detection induced by topology [8327-24]

8327 0Q The complexity of fill at 28nm and beyond [8327-25]
N. Rodriguez, J. Yang, Advanced Micro Devices, Inc. (United States); B. Graupp, J. Wilson, E. Anikin, Mentor Graphics Corp. (United States)

8327 0S In-design process hotspot repair using pattern matching [8327-27]
D. Jang, N. Ha, J. Jeon, J.-H. Kang, S. W. Paek, H. Choi, K. S. Kim, SAMSUNG Electronics Co., Ltd. (Korea, Republic of); Y.-C. Lai, P. Hurat, W. Luo, Cadence Design Systems, Inc. (United States)

8327 0T Clean pattern matching for full chip verification [8327-28]
S. Nakamura, Toshiba Corp. (Japan); T. Matsunawa, Toshiba Corp. R&D Ctr. (Japan); C. Kodama, T. Uraaki, N. Furuta, Toshiba Corp. (Japan); S. Kagaya, Toshiba Microelectronics Corp. (Japan); S. Nojima, Toshiba Corp. R&D Ctr. (Japan); S. Miyamoto, Toshiba Corp. (Japan)

POSTER SESSION

8327 0U Framework for identifying recommended rules and DFM scoring model to improve manufacturability of sub-20nm layout design [8327-29]
P. Pathak, S. Madhavan, S. Malik, L. T.-N. Wang, L. Cappadeci, GLOBALFOUNDRIES Inc. (United States)

8327 0V Self-aligned double and quadruple patterning layout principle [8327-30]
K. Nakayama, C. Kodama, T. Kotani, Toshiba Corp. (Japan); S. Nojima, S. Mimoto, Toshiba Corp. R&D Ctr. (Japan); S. Miyamoto, Toshiba Corp. (Japan)

8327 0W In-design hierarchical DFM closure for DFM-clean IP [8327-31]
V. Tripathi, Freescale Semiconductor India (India); J. Subramanian, P. Sharma, Freescale Semiconductor, Inc. (United States); K.-H. Chen, B. Kasthuri, P. Hurat, L. Layton, Cadence Design Systems, Inc. (United States)
8327 0X Automated yield enhancements implementation on full 28nm chip: challenges and statistics [8327-32]
S. Malik, S. Madhavan, P. Pathak, L. Capodieci, GLOBALFOUNDRIES Inc. (United States); R. Fathy, A. Abdulghany, Mentor Graphics Corp. (United States)

8327 0Y A study of pattern variability for device performance [8327-33]

8327 0Z Intra-cell process variability and compact modeling of LWR effects: from self-aligned multiple patterning to multiple-gate MOSFETs [8327-34]
Y. Chen, W. Kang, Q. Cheng, Peking Univ. (China)

8327 10 Consideration of correlativity between litho and etching shape [8327-35]
R. Matsuoka, H. Millo, Hitachi High-Technologies Corp. (Japan); S. Shinoda, Y. Toyoda, Hitachi Research Lab., Hitachi Ltd. (Japan)

8327 11 Advanced techniques for design assembly and characterization for the 14nm node with LFD using a black box API [8327-36]
J. Opitz, A. Torres, Mentor Graphics Corp. (United States); I. Graur, IBM Corp. (United States); W. Manhawy, S. Kanodia, Mentor Graphics Corp. (United States); M. Shafee, S. Mohamed, A. Hassand, Mentor Graphics Corp. (Egypt); J. Bickford, IBM Corp. (United States)

8327 14 Fast optical proximity correction with timing optimization ready standard cells [8327-39]
Y. Qu, C. H. Heng, A. Tay, T. H. Lee, National Univ. of Singapore (Singapore)

8327 15 Electrical design for manufacturability and lithography and stress variability hotspot detection flows of 28nm [8327-40]
P. Hurat, Cadence Design Systems, Inc. (United States); J. Zhu, E. Teoh, GLOBALFOUNDRIES Singapore (Singapore)

8327 16 Yield impacting systematic defects search and management [8327-41]
J. Zhang, Q. Xu, X. Zhang, X. Zhao, J. Ning, Semiconductor Manufacturing International Corp. (China); G. Cheng, S. Chen, G. Zhang, Anchor Semiconductor, Inc. (China); A. Vikram, B. Su, Anchor Semiconductor, Inc. (United States)

8327 17 Model-based searching method to find the integrated critical failure on the wafer [8327-43]

8327 18 A scoring methodology for quantitatively evaluating the quality of double patterning technology-compliant layouts [8327-44]
L.-T.-N. Wang, S. Madhavan, S. Malik, P. Pathak, L. Capodieci, GLOBALFOUNDRIES Inc. (United States)

Author Index