Table of Contents

Preface iii

Chapter 1
Devices Modeling, Scalability, and Reliability 3

(Invited) Downscaling Issues in Polycrystalline Silicon TFTs
G. Fortunato, M. Cuscunà, P. Gaucci, L. Maiolo, L. Mariucci, A. Pecora, and A. Valletta

(Invited) The Silicon Nanowire Accumulation-Mode MOSFETs
J. Wu, P. Garg, and S. Fonash 23

(Invited) Stabilities of TFTs under Bias-Stress
J. Jang, M. Mativenga, and J. Choi 31

(Invited) Reliability of Polycrystalline Silicon Thin-Film Transistors on the Glass Substrate
S. Choi and M. Han 41

The AC-Bias Stability of Short Channel a-Si:H TFT
S. Park, S. Lee, J. Woo, J. Yoo, and M. Han 51

Enhanced Performance and Thermal Stability of a-Si:H TFTs
A. Indluru and T. L. Alford 57

The Influence of Electromechanical Stress on the Stability of Nanocrystalline Silicon Thin Film Transistors Made on Colorless Polyimide Foil
I. Chiu, J. Huang, Y. Chen, I. Cheng, J. Chen, and M. Lee 65

The 1/f Noise Performance for TFTs Fabricated in Three TFT Technologies:
Monocrystalline Silicon on Glass, Low Temperature Polysilicon on Glass, and Silicon on Insulator
Reduction of Hot Carrier Effects in Corning Silicon-on-Glass TFTs

High Field Induced Stress Suppression of GIDL Effects in Accumulation-Mode P-Channel TFTs
A. McCabe, R. G. Manley, J. Couillard, C. Kosik Williams, and K. Hirschman

Capacitance Model for Thin-Film Transistors with Interface Traps
H. Tsuji, Y. Kamakura, and K. Taniguchi

A Charge Based Compact Modeling Technique for Monocrystalline TFTs on Glass
C. J. Nassar, T. J. Tredwell, C. Kosik Williams, J. Revelli, and R. J. Bowman

Chapter 2
Materials

(Invited) A New Insulator for Thin-Film Transistor Backplanes and for Flexible Passivation Layers
L. Han, K. Song, S. Wagner, and P. Mandlik

Characterization of Silicon-on-Glass Substrates Using Variable Angle Spectroscopic Ellipsometry
R. D. Reitmann, J. Couillard, and K. Hirschman

Protection Layer Effects on the Device Performance of Oxide/Organic Hybrid TFTs

Chapter 3
Si-based TFTs

(Invited) Nano-Inkjet and Its Application to Metal-Induced Crystallization of a-Si for Poly-Si TFTs
T. Asano and Y. Ishida

Reducing Ni Residues of Metal Induced Crystallization Poly-Si with a Simple Chemical Oxide Layer
M. Lai and Y. S. Wu
Using Fluorine-Ion Implanted a-Si Layer to Reduce Ni Contamination and Passivate the Defects in NILC Poly-Si
   C. Chen and Y. S. Wu

Improved Electrical Performance of NILC Poly-Si TFTs Manufactured Using H2SO4 and HCl Solution
   Y. Chen, Y. Chao, and Y. S. Wu

Improved Performance of NILC Poly-Si Nanowire TFTs by Using Ni-Gettering
   B. Wang, T. Yang, Y. S. Wu, C. Su, and H. Lin

Electrical Characteristics of a Reduced-Gate Structure Polycrystalline Silicon Thin Film Transistor Using Field-Aided Lateral Crystallization
   J. You, K. Lee, D. Choi, and Y. Kim

(Invited) Polycrystalline Silicon Thin Film Transistors
   T. Sameshima

High Performance and Reliability of Poly-Si TFTs Using Nickel Drive-In Induced Lateral Crystallization
   Y. S. Wu and C. Chang

Characterization and Reliability of Gate-All-Around Poly-Si TFTs with Multinanowire Channels
   H. Liu, S. Chioti, C. Hung, and F. Wang

(Invited) Nanocrystalline Silicon Thin Film Transistors
   M. R. Rad, G. R. Chaji, C. Lee, D. Striakhilev, A. Sazonov, and A. Nathan

High Performance Micro-Crystalline Silicon TFT Using Indirect Thermal Crystallization Technique
   B. Choi, K. Kim, J. Bae, S. Lee, H. Lee, S. Kim, K. Park, C. Kim, Y. Hwang, and I. Chung

Electrical and Mechanical Behaviors of Microcrystalline TFTs Deposited on PEN
   S. Janfaoui, K. Kandoussi, C. Simon, N. Coulon, S. Crand, and T. Mohammed-Brahim

Schottky Diode Based on Microcrystalline Silicon Deposited at 165°C for RFID Application
Chapter 4
Organic TFTs

(Invited) Inkjet-Patterned, Organic Complementary Circuits Integrated with Polymer Mechanical Sensors
T. Ng, J. Daniel, S. Garner, B. Krusor, B. Russo, and A. Arias

Influence of Bank Structure on the Film Morphology and Electrical Properties of Ink-Jet Printed TIPS Pentacene Thin-Film Transistors
Y. Kim, M. Oh, S. Park, and M. Han

(Invited) Electrical and Environmental Stability of Organic Transistors
J. Bedolla, J. Northrup, D. Belaineh, V. Wagner, and D. Knipp

Flow Rate’s Influence on Low Temperature Silicon Oxide Deposited by Atmospheric Pressure Plasma Jet for Organic Thin Film Transistor Application
K. Chang, S. Huang, and C. Cheng

Improved Performance of Pentacene OTFT with HfLaO Gate Dielectric by Annealing in NH₃
L. Deng, P. Lai, J. Xu, H. Choi, W. Chen, and C. Che

Chapter 5
Metal Oxide TFTs

Low Temperature, High-Performance, Solution-Processed Indium Oxide Based Thin Film Transistors
S. Han, G. Herman, and C. Chang

Low Temperature Solution-Processed Zinc Tin Oxide Thin Film Transistor with O₂ Plasma Treatment
J. Lee, Y. Kim, Y. Lee, S. Cho, Y. Kim, J. Kwon, and M. Han

Solution-Processed Oxide Thin-Film Transistor with Spin-Coated Zinc Tin Oxide Active Layer and Indium Zinc Oxide Source/Drain Electrodes
Y. Kim, J. Lee, Y. Lee, S. Cho, Y. Kim, and M. Han

Solution-Processed Oxide Thin Film Transistors with Indium Zinc Tin Oxide Semiconductor: Nitrogen Effect
B. Kim, H. Kim, S. Jung, T. Yoon, Y. Kim, and H. Lee
The Electrical Properties of Atomic Layer Deposition of ZnO:N Thin Film Transistors by Ultraviolet Exposure

J. Kim, S. Lim, and H. Kim

The Stability of Oxide TFTs under Electrical Gate Bias and Monochromatic Light Illumination

S. Lee, S. Kim, Y. Lee, S. Park, J. Kwon, and M. Han

The Effect of Light Illumination on Transfer Curve and Stability of Amorphous Hf-In-ZnO Thin Film Transistors


The Effect of Illumination on the Negative Bias Temperature Instability in Zinc Tin Oxide Thin Film Transistors

U. Kim, J. Kim, H. Oh, Y. Chung, and C. Hwang

Study of the Effect of Electrical Stress on ZnO TFTs

L. Su, H. Lin, S. Wang, Y. Yeh, C. Cheng, L. Peng, and J. Huang

Improved Thermal Stability of Indium Zinc Oxide TFTs by Low Temperature Post Annealing

A. Indluru and T. L. Alford

Characteristics of Zinc Oxide Thin Film Transistors Fabricated by Location-Controlled Hydrothermal Method


Chapter 6
Memories

(Invited) Mechanism and Performance of Floating-Gate a-Si:H TFT Nonvolatile Memory Devices

Y. Kuo

High Retention-Time Nonvolatile Amorphous Silicon TFT Memory for Static Active Matrix OLED Display without Pixel Refresh

Y. Huang, B. Hekmatshoar, S. Wagner, and J. Sturm

Amorphous Oxide Semiconductor Memory Using High-k Charge Trap Layer

S. Rha, J. Jung, J. Kim, U. Kim, Y. Chung, H. Jung, S. Lee, and C. Hwang
Chapter 7
Advanced Applications

(Invited) Towards EPC Compatible Plastic RFID Tags
K. Myny, S. Steudel, P. Vicca, S. Smout, M. Beenhakkers, N. van Aerle, F. Furthner,
B. van der Putten, A. Tripathi, G. Gelinck, J. Genoe, W. Dehaene, and P. Heremans

Low Voltage Driven CMOS Circuits Based on Silicon on Glass
M. Choi, J. Choi, S. Park, W. Choi, M. Mativenga, J. Jin, R. Mruthyunjaya,
T. J. Tredwell, E. Mozdy, and C. Kosik Williams

The Application of Organic Electrochemical Transistors in Biosensors
F. Van, P. Lin, and H. Chan

(Invited) Poly-Si TFT Based Technologies and Circuits for Multipurpose Sensors
O. Bonnaud and T. Mohammed-Brahim

Polysilicon Source-Gated Transistors for Mixed-Signal Systems-on-Panel

Author Index