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## Au metallization, oxide formation of

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- 91152 Application of Infrared Microscopy for Bond Pad Damage Detection

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90244 Effect of Mold Compound Components on Moisture-Induced Degradation of Gold-Aluminum Bonds in Epoxy Encapsulated Devices

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90252 Temperature-Cycling Acceleration Factors For Aluminum Metallization Failure in VLSI Applications

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- 93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices

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#### Autoclave, effect of solder reflow on corrosion failures

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97296 A Novel Methodology for Reliability Studies in Fully Depleted SOI MOSFETs

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95365 An Increase of the Electromigration Reliability of Ohmic Contacts by Enhancing Backflow Effects

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## Barrel cracking of the PTHs

97129 Reliability of High Aspect Ratio Plated Through Holes (PTH) for Advanced Printed Circuit Board (PCB) Packages

# Barrel reliability is governed by several key factors which includeCu/Ni plating thickness, PCB thickness and stackup, Cu plating layer material properties and filled via vs non-filled via

97129 Reliability of High Aspect Ratio Plated Through Holes (PTH) for Advanced Printed Circuit Board (PCB) Packages

## Barrier - TiW

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85068 Predicting the Data Retention Lifetime of a Lithium Carbon Mono-Fluoride Battery Connected to a ZEROPOWER RAM

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## Bayer layer, TiN, role of in preferred orientation of Al interconnects

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91097 Formation of Texture Controlled Aluminum and its Migration Performance in Al-Si/TiN Stacked Structure

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- 92081 Mismatch Drift: A Reliability Issue for Analog MOS Circuits
- 91193 Anomalous Current Gain Degradation in Bipolar Transistors

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88150 Reliability Prediction of MOS Devices: Experiments and Model for Charge Build Up and Annealing

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90045 A New Techique For Imaging The Logic State of Passivated Conductors: Biased Resistive Contrast Imaging

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- 92095 Low Frequency 1/f Noise and Current Gain Degradation in BiCMOS n-p-n Transistors
- 92076 Hot-Electron-Induced Input Offset Voltage Degradation in CMOS Differential Amplifiers
- 91193 Anomalous Current Gain Degradation in Bipolar Transistors

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94017 HC Reliability of 0.5um BiCMOS Transistors: Dependence on Link Base Slot Depth and the Design Implications for Reliability and Performance

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89220 Characterization of Electromigration Under Bidirectional (BC) and Pulsed Unidirectional (PDC) Currents

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- 90164 Hot-Carrier Reliability of Bipolar Transistors

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- 93122 Current Gain Increase of n-p-n Transistors by Electromigration of Atomic Hydrogen in Emitter Polysilicon
- 85206 A Cause and Cure of H/fe Instability in Shallow Juncation Bipolar Microwave Transistors

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#### BIR, core elements

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## 93364 Reliability of 0.1 µm InP HEMTs

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#### 93364 Reliability of 0.1 µm InP HEMTs

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- Black's relation, numerical simulations of current density exponent
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#### Bond degradation

93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages

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- 93147 Bias Temperature Reliability of n+ and p+ Polysilicon Gated n-MOSFETs and p-MOSFETs
- 86183 Hot-Electron Trapping and Generic Reliability of p+ Polysilicon/SiO2/Si Structures for Fine-Line CMOS Technology

## Boron penetration enhances charge trapping the oxide and interface generation at the SiSO2 interface under F-N stress

97287 Impact of Boron Penetration on Gate Oxide Reliability and Device Lifetime in p+-poly PMOSFETs

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97287 Impact of Boron Penetration on Gate Oxide Reliability and Device Lifetime in p+-poly PMOSFETs

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97164 Investigation of Oxide Charge Trapping and Detrapping in a n-MOSFET

95297 Boron Compounds as a Dominant Source of Alpha Particles in Semiconductor Devices

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95205 Enhancement and Degradation of Drain Current in Pseudomorphic AlGaAs/InGaAs HEMT's Induced by Hot-Electrons

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94286 Photon Emission Study of ESD Protection Devices under Second Breakdown Conditions

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93280 Correlation Between Negative Bulk Oxide Charge and Breakdown, Modeling, and New Criteria for Dielectric Quality Evaluation

## Breakdown Energy of Metal (BEM) stepped current electromigration test

85108 Breakdown Energy of Metal (BEM)--A New Technique For Monitoring Metallization Reliability at Wafer Level [OPA]

## Breakdown prediction, breakdown charge (QBD)

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93007 Hole Injection Oxide Breakdown Model for Very Low Voltage Lifetime Extrapolation

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96327 Hydrogen Passivation of Boron Acceptors and Breakdown Voltage Instability in N+/P Surface Avalance Diodes

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## **BRS** tests

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- 95311 Design Rules for Reliable Surface-Micromachined Sensors

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- 93280 Correlation Between Negative Bulk Oxide Charge and Breakdown, Modeling, and New Criteria for Dielectric Quality Evaluation

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95024 Impact of Shallow Trench Isolation on Reliability of Buried and Surface Channel sub-µm PFET [OPA]

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97346 Latch-up Characterization of High Energy Ion Implanted New CMOS Twin Wells that comprised the BILL (Buried Implanted Layer for Lateral Isolation) and B.L./C.L. (Buried Layer/Connecting Layer) Structure

## Buried Implanted Layer for Lateral Isolation (BILLI) structures

97346 Latch-up Characterization of High Energy Ion Implanted New CMOS Twin Wells that comprised the BILL (Buried Implanted Layer for Lateral Isolation) and B.L./C.L. (Buried Layer/Connecting Layer) Structure

## Buried layer/connecting layer (BL/CL)

97346 Latch-up Characterization of High Energy Ion Implanted New CMOS Twin Wells that comprised the BILL (Buried Implanted Layer for Lateral Isolation) and B.L./C.L. (Buried Layer/Connecting Layer) Structure

## Buried Layer/Connecting Layer (BL/CL) structures

97346 Latch-up Characterization of High Energy Ion Implanted New CMOS Twin Wells that comprised the BILL (Buried Implanted Layer for Lateral Isolation) and B.L./C.L. (Buried Layer/Connecting Layer) Structure

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## Burn-in at 140 °C for 1 hr.

91264 Development of a Burn-in Time Reduction Algorithm Using the Principles of Acceleration Factors

## **Burn-in experiment with MCM**

91271 Burn-in Effectiveness - Theory and Measurement

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85198 Thermal Fatigue Damage in Pb - In Solder Interconnections

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92190 New Thin Plastic Package Crack Mechanism Induced by Hot IC Die

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92309 Acoustic Evaluation of Electronic Plastic Packages

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88109 A New Soft-Error Phenomenon in VLSIs The alpha-particle-induced source/drain penetration (ALPEN) effect

#### Calculation of plasma process-induced trap site density

97178 Impacts of Plasma Process-Induced Damage on Ultra-Thin Gate Oxide Reliability

#### Calibration of thermoreflectance coefficient

97320 Short-Timescale Thermal Mapping of Interconnects

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97320 Short-Timescale Thermal Mapping of Interconnects

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- 93293 Process Induced Oxide Damage and Its Implications to Device Reliability of Submicron Transistors
- 93255 Evaluation of Modern Gate Oxide Technologies to Process Charging
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#### Capacitor, MOS, trench

93013 A Mechanism for Gate Oxide Damage in Nonuniform Plasma

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91171 Effects of Carbon on Charge Loss in EPROM Structures

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## Case study with 50% burn-in rejects due to sodium

91260 Can Burn-In Screen Wearout Mechanisms? Reliability Modeling of Defective Subpopulations - A Case Study

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96258 Failure Analysis of Cathode Filament Formation in Multilayer PWBs Using Combined Electron Spin Resonance and Micro-FTIR Techniques

#### Cathodic reduction sites.

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95177 Categorizing Light Output Degradation Failures In Light Emitting Diodes(LEDs) Using The Relationship Between Defect Revealing...

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96188 A Degradation Monitor for the Light Output of LEDs based on Cathodoluminescence Signals and Junction Ideality Factor

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97206 Via Delamination - A Novel Electromigration Failure Mechanism - Via Delamination

## CCD camera, as emission detector

93178 Energy Resolved Emission Microscope

## CCG imaging on MCM interconnections

96332 Novel MCM Interconnection Analysis Using Capacitive Charge Generation (CCG)

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86206 Input ESD Protection Networks for Fineline NMOS-Effects of Stressing Waveform and Circuit Layout

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86172 Radial Dependency of Reliability Defects on Silicon Wafers

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86164 Impact of Ceramic Packaging Anneal on Reliability of Al Interconnects

## Ceramic leaded chip carriers, CLCC

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## Ceramic package, short circuit by reduction of sealing glass

93103 Investigation of Short Circuit Caused by Reduction of PbO Sealing Glass Used for VLSI Package

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97124 Flip Chip Underfill Reliability of CSP During IR Reflow Soldering

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92356 A Novel Via Failure Mechanism in Al-Cu/Ti Double Level Metal System

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96274 Stress in High Rate Deposited Silicon Dioxide Films for MCM Applications

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96311 A New Purely-Experimental Method for Extracting the Spatial Distribution of Hot-Carrier-Induced Interface States and Trapped Charges in MOSFETs

#### Changes in polysilicon resistivity

90276 Reliability Study on Polycrystalline Silicon Thin Film Resistors Used in LSIs Under Thermal and Electrical Stress

#### Channel electric field, misunderstanding

94052 Characterization of Hot-Carrier Effects in Thin-Film Fully-Depleted SOI MOSFETs

#### Channel Hot Carrier (CHC) mechanism

97282 NBTI - Channel Hot Carrier Effects in Advanced Submicron PFET Technologies

## Channel hot electron (CHE) injection

97097 Characterization of Bitline Stress Effects on Flash Cell After Program/Erase Cycle

#### Channel hot-carrier reliability

88001 The Effect of Channel Hot Carrier Stressing on Gate Oxide Integrity in MOSFET

## Channel implant doses for submicron MOSFETs

91306 Doping Profile Design for Substrate Hot-Carrier Reliability in Deep Submicron Field Effect Transistors

## Channel length dependence

- 97312 New Understanding of LDD CMOS Hot-Carrier Degradation and Device Lifetime at Cryogenic Temperatures
- 97169 Accelerated Gate-Oxide Breakdown in Mixed Voltage I/O Circuits

## Channel piezo resistance effect (CPE)

94029 Analysis of Externally Imposed Mechanical Stress Effects on the Hot-Carrier-Induced Degradation of MOSFETs

## Characterization, bonding window

92251 The Bond Shear Test: An Application for the Reduction of Common Causes of Gold Ball Bond Process Variation

#### Charge burts from energetic ions

96007 Comparison of Charge Collection from Energetic Ions Typical of Neutron-Recoil Events with Charge Collection from Alpha Particle Strikes

## Charge collection electrode, EEPROM transistors

94334 Characterization of Wafer Charging Mechanisms and Oxide Survival Prediction Methodology

## Charge collection multiplier test structures for oxide quality, use of

91337 Detecting Oxide Quality Problems Using JT Testing

## Charge collection, bipolar mechanism

88102 Alpha-Particle-Induced Soft-Error Mechanism in Semi-Insulating GaAsSubstrate

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90125 Distribution Phenomena of Charged Defects and Neutral Electron Traps in Process-Induced Radiation-Damaged IGFETS With Gate Insulators Grown at 1000C and 800C

## Charge Device Model

87181 Theoretical and Experimental Study of Subsurface Burnout and ESD in GaAs FETs and HEMTs

## Charge Device Model (CDM), ESD model

92258 Characterization of Dynamic Spatial Conduction Patterns on ESD Protection Circuitry by Photon-Counting Imaging Method

## Charge Induced Scanning Microscope Evaluation and Testing (CISMET)

91239 Using Scanned Electron Beams for Testing Microstructure Isolation and Continuity

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- 91175 Threshold Voltage Instability and Charge Retention in Nonvolatile Memory Cell with Nitride/Oxide Double-Layered Inter-poly Dielectric
- 90154 Charge Loss Associated with Program Disturb Stresses In EPROMs
- 90145 A Model for EPROM Intrinsic Charge Loss Through Oxide-Nitride-Oxide (ONO) Interpoly Dielectric

## Charge loss experiments

97104 Hot Carrier Self Convergent Programming Method for Multi-Level Flash Cell Memory

## Charge loss in DRAMS

90265 Tem Analysis of Failed Bits and Improvement of Data Retention Properties in Megabit-Drams

## Charge loss in EPROMS

91171 Effects of Carbon on Charge Loss in EPROM Structures

## Charge loss mechanisms in (EPROM) products, description of

90012 Building Reliability Into EPROMs

## Charge loss reliability.

88158 Reliability Performance of ETOX Based Flash Memories

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- 95266 On the Degradation Features of Poly-Emitter n-p-n BJTs After Hot-Carrier Injection
- 95051 A New Method Using Charge Pumping Measurements to Improve the Lifetime Determination of Deep Submicron NMOS Transistors

## Charge pumping measurements

97118 Device Degradation Due to Stud Bumping Above the MOSFET Region and the Effect of Annealing on the Degradation

## Charge pumping technique, N-channel MOS

88008 A New Procedure for Lifetime Prediction of N-Channel Mos-Transistors Using the Charge Pumping Technique

## Charge redistribution effects on hot-carrier failures

## **Charge retention**

- 92068 Substrate-Injection-Induced Program Disturb -- New Reliability Consideration for Flash-EPROM Arrays
- 91183 A New Failure Mechanism Related to Grain Growth in DRAMs
- 91175 Threshold Voltage Instability and Charge Retention in Nonvolatile Memory Cell with Nitride/Oxide Double-Layered Inter-poly Dielectric
- 91171 Effects of Carbon on Charge Loss in EPROM Structures

## Charge retention of ONO Oxides

91175 Threshold Voltage Instability and Charge Retention in Nonvolatile Memory Cell with Nitride/Oxide Double-Layered Inter-poly Dielectric

## Charge trapping

- 96084 A new Physics-Based Model for Time-Dependent-Dielectric-Breakdown [BPA]
- 91193 Anomalous Current Gain Degradation in Bipolar Transistors
- 91188 Effect of Emitter-Base Reverse Bias Stress on High Frequency Parameters of Bipolar Transistors
- 90288 Carbon Doping Effects on Hot Electron Trapping
- 90276 Reliability Study on Polycrystalline Silicon Thin Film Resistors Used in LSIs Under Thermal and Electrical Stress
- 90270 Correlation of Total Gate Current Fluence With PMOS Degradation
- 90259 Extended Data Retention Characteristics After More Than 10 Write and Erase Cycles In EEPROMs
- 88096 Reliability of Discrete MODFETs: Life Testing, Radiation Effects, and ESD
- 87093 The Effects of Processing on Eeprom Reliability

## Charge trapping and detrapping in gate oxide have been recognized as a major reliability concern in flash EEPROM and CMOS technologies

97164 Investigation of Oxide Charge Trapping and Detrapping in a n-MOSFET

## **Charge Trapping Centers**

95012 Reduced Poly Si TFT Threshold Voltage Instability by High-Temperature Hydrogenation of a Si-Like Spin Centers

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90170 Reduction of Signal Voltage of Dram Cell Induced by Discharge of Trapped Charges in NANO-METER Thick Dual Dielectric Film

## Charge-induced scanning microscope

91239 Using Scanned Electron Beams for Testing Microstructure Isolation and Continuity

## Charge-induced voltage alteration (CIVA)

92288 Rapid Localization of IC Open Conductors Using Charge-Induced Voltage Alteration (CIVA)

## Charge-to-breakdown with a constant-current injection threshold voltage shift

97178 Impacts of Plasma Process-Induced Damage on Ultra-Thin Gate Oxide Reliability

## Charge-trap generation to charge-to-breakdown

94136 Modeling Ultrathin Dielectric Breakdown on Correlation of Charge Trap-Generation to Charge-to Breakdown

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95260 Degraded CMOS Hot-Carrier Life Time-Role of Plasma Etching Induced Charging Damage and Edge Damage

## Charging and ionizing radiation

97072 Effects of Focused Ion Beam (FIB) Irradiation on MOS Transistors

## Charging damage

95260 Degraded CMOS Hot-Carrier Life Time-Role of Plasma Etching Induced Charging Damage and Edge Damage

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87118 Gated-Pulse Stroboscopy for Passivated Device Imaging

## Charging of the region receiving FIB exposure was observed directly

97072 Effects of Focused Ion Beam (FIB) Irradiation on MOS Transistors

#### Charging/discharging properties of traps

95131 Properties of High Voltage Stress Generated TBPS in Thin Silicon Oxides [OPA]

## CHARM-2 measurement technique

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95271 Device Reliability and Optimization on Halo MOSFETs

## CHC is mainly responsible for the channel mobility degradation in the channel lengths

97282 NBTI - Channel Hot Carrier Effects in Advanced Submicron PFET Technologies

## Chemical vapor

87111 A New VLSI Diagnosis Technique: Focused Ion Beam Assisted Multi-level Circuit Probing

## CHF3

92315 Reactive Ion Etching for Failure Analysis Applications

## Chip cracking, effect of surface roughness

89131 The Impact of Wafer Back Surface Finish on Chip Strength

## Circuit degradation analysis

94274 iProbe-d: a Hot-Carrier and Oxide Reliability Simulator

## Circuit design methodology for hot electron reliability

91107 Improving Hot-Electron Reliability Through Circuit Analysis and Design

## Circuit failure mechanism is correctly predicted by simulation

97333 Study of a CMOS I/O Protection Circuit Using Circuit-level Simulation

97333 Study of a CMOS I/O Protection Circuit Using Circuit-level Simulation

## **Circuit isolation**

91167 The Role of Focused Ion Beams in Physical Failure Analysis

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97333 Study of a CMOS I/O Protection Circuit Using Circuit-level Simulation

#### Circuit level simulator for ESD and EOS

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## Circuit level simulator iETSIM

97333 Study of a CMOS I/O Protection Circuit Using Circuit-level Simulation

#### **Circuit reliability simulators**

96289 Unified Model for n-Channel Hot-Carrier Degradation Under Different Degradation Mechanisms

#### Circuit structure vs voltage level

95072 Hot-Carrier-Induced Circuit Degradation In Actual DRAM

## Circuit-level simulation can be used to predict the HBM-ESD protection level

97333 Study of a CMOS I/O Protection Circuit Using Circuit-level Simulation

#### Circuit-level simulation used to predict HBM-ESD protection level

97333 Study of a CMOS I/O Protection Circuit Using Circuit-level Simulation

#### Circuit-speed degradation (hot-carrier induced)

92016 Simulation of CMOS Circuit Degradation Due to Hot-Carrier Effects

#### Circular layout of protection devices

87169 A Circular Output Protection Device Using Bipolar Action

Clarification of factors in rapid degradation of LDs under accelerated hish stress aging test

97268 Rapid Degradation of InGaAsP/InP Laser Diode due to Copper Contamination

#### CLCC, Alloy 42 J-leads

87250 Thermal Fatigue Reliability of SMT Packages and Interconnections

## Cluster beam deposited AI metallization

89207 Electromigration of Ionized Cluster Beam Deposited Aluminum Metallizations

## Clustering gate oxide to polysilicon

97007 Gate Stack Reliability Improvements Using Controlled Ambient Processing

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- 96233 Process and Design for ESD Robustness in Deep Submicron CMOS Technology
- 92085 Pipeline Defects in CMOS MOSFET Devices Caused by SWAMI Isolation
- 92081 Mismatch Drift: A Reliability Issue for Analog MOS Circuits
- 92076 Hot-Electron-Induced Input Offset Voltage Degradation in CMOS Differential Amplifiers
- 90270 Correlation of Total Gate Current Fluence With PMOS Degradation
- 87238 Thin-Film Cracking and Wire Ball Shear in Plastic Dips Due to Temperature Cycle and Thermal Shock

#### CMOS analog comparator circuit

94410 Enhancing Reliability of CMOS Devices Using Electrical Techniques and Electron Spin Resonance Spectroscopy

#### CMOS buried channel vs surface channel

87195 Structure and Frequency Dependence of Hot-Carrier-Induced Degradation In CMOS VLSI

#### CMOS device reliability, temperature dependence

86175 Temperature Dependence of CMOS Device Reliability

## CMOS device reliability,trade-offs with performance

86175 Temperature Dependence of CMOS Device Reliability

## CMOS failure analysis technique

90045 A New Techique For Imaging The Logic State of Passivated Conductors: Biased Resistive Contrast Imaging

#### CMOS I/O protection circuit

97333 Study of a CMOS I/O Protection Circuit Using Circuit-level Simulation

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94309 Mechanism for the n-field Device Failure in Double Level Metal CMOS Device

## CMOS latchup stripe-type structures

97339 A Compact Model of Holding Voltage for Latch-Up in Epitaxial CMOS

## CMOS MOSFETs, sub-quarter-micron

93053 AC Hot-Carrier Degradation in a Voltage Controlled Oscillator

## CMOS output buffers

87174 ESD Phenomena and Protection Issues in CMOS Output Buffers [OPA]

## CMOS reliability, impact of hot-carriers on multi-gate PMOS transistors

88026 Failure in CMOS Circuits Induced by Hot Carriers in Multi-gate Transistors

## CMOS twin-tub technology

87195 Structure and Frequency Dependence of Hot-Carrier-Induced Degradation In CMOS VLSI

## CMOS VLSI circuits

95065 Fast Timing Simulation for Submicron Hot-Carrier Degradation

## CMOS, 1 micrometer

86115 A Study of CMOS Latch-up by Laser Scanning and Voltage Contrast Techniques

## Coble creep

86253 Thermo-Mechanical Cycling Behavior of AL Thin-Film Metallization

## Coble creep of Al

85142 The Influence of Stress on Aluminum Conductor Life

## **Coefficient of Thermal Expansion (CTE)**

91160 Correlation of Surface Mount Plastic Package Reliability Testing to Nondestructive Inspection by Scanning Acoustic Microscopy

## Coefficient of Thermal Expansion (CTE), adhesive die attach

93204 Thermal Cycling Reliability of Die Bonding Adhesives

## Coffin-Manson model for plastic IC thin film fatique failures

91022 Fail Rate Model for Thin Film Cracking in Plastic ICs

## Coffin-Manson model for polysilicon cracking in plastic IC temperature cycling

91022 Fail Rate Model for Thin Film Cracking in Plastic ICs

Coffin-Manson model for thin film cracking in plastic IC temperature cycling

91022 Fail Rate Model for Thin Film Cracking in Plastic ICs

#### Coffin-Manson theory, applied to surface mount solder interconnects

92151 Using FEA to Develop a MIL-HDBK-217 SMT Model

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95030 Reliability Improvement in High Aspect Ratio Contacts and Vias Filled with Blanket Tungsten CVD Film

#### Column failure in DRAM

85180 New Filler-Induced Failure Mechanism in Plastic Encapsulated VLSI Dynamic MOS Memories

## Combined effect of differeent degradation mechanism

96289 Unified Model for n-Channel Hot-Carrier Degradation Under Different Degradation Mechanisms

## Combining the Coffin-Manson formula with a lognormal distribution

97110 Temperature Cycling & Thermal Shock Failure Rate Modeling

#### Compact disks

91250 Application of The Atomic Force Microscope to Integrated Circuit Reliability and Failure Analysis

## Compact model can serve as the scaling law for the holding voltage down to IV

97339 A Compact Model of Holding Voltage for Latch-Up in Epitaxial CMOS

## Compact, closed form expression for holding voltage is produced

97339 A Compact Model of Holding Voltage for Latch-Up in Epitaxial CMOS

## Comparative electromigration of W and Al vias

92338 Comparison of Electromigration Reliability of Tungsten and Aluminum Vias under DC and Time-Varying Current Stressing

## Comparison machine vision

92281 Built-In Real-Time Reliability Automation (BIRRA)

## Comparison of dielectric wearout in N2O and O2-grown oxides

91323 Comparison of Dielectric Wear-out Between Oxides Grown in O2 and N2O

## Comparison of MOSCAP and MOSFET characterization of thin oxides

91316 Improved Performance and Reliability of MOSFETs with Thin Gate Oxides Grown at High Temperature

## Comparison of thermal models for the SWEAT electromigration test structures

90037 Simulation and Testing of Temperature Distribution and Resistance Versus Power for Sweat and Related Joule-Heated Metal-on- Insulator Structures

## **Competing Weibull distributions**

96044 On the Field Dependence of Intrinsic and Extrinsic Time-Dependent Dielectric Breakdown

## Complexity trends in VLSI devices

90002 Evolution of VLSI Reliability Engineering

## Component failure rates, effect of memory size

87085 Reliability Comparison of Flotox and Textured-Polysilicon E2Proms [OPA]

## Composite solder

93209 The Dependence of the Activation Energies of Intermetallic Formation on the Composition of Composite Sn/Pb Solders

## Compressing stress

91183 A New Failure Mechanism Related to Grain Growth in DRAMs

## **Compressive stress**

91160 Correlation of Surface Mount Plastic Package Reliability Testing to Nondestructive Inspection by Scanning Acoustic Microscopy

## Computer simulation of charge collection in GaAs MESFETs

93357 Examination of the SEU Sensitivity of GaAs MESFETs via 2-D Computer Simulation and Picosecond Charge Collection Experiments

## Computer simulation of overstress process of AI bond wires

89141 Electrical Overstress of Nonencapsulated Aluminum Bond Wires

## Computer software program

91142 ICFAX, An Integrated Circuit Failure Analysis Expert System

## Computerized IC fault location

87107 Computer Guided Logic IC Fault Location

## Conduction in Ag filled epoxy

85164 Electrical Reliability of Silver Filled Epoxies for Die Attach

## Conductive anodic filament enhancement

96267 Conductive Anodic Filament Enhancement in the Presence of Certain Polyglycol-Containing Fluxes

## Conductor open circuit detection and localization

92288 Rapid Localization of IC Open Conductors Using Charge-Induced Voltage Alteration (CIVA)

## Conductors terminated at both ends by contacts/vias

96164 Modeling of Electromigration Failure Distributions of Al Alloy Contacts and Vias in Submicron IC Technologies

## Confocal microscope

91250 Application of The Atomic Force Microscope to Integrated Circuit Reliability and Failure Analysis

## Considering all effects present in the FDSOI MOSFET

97296 A Novel Methodology for Reliability Studies in Fully Depleted SOI MOSFETs

## **Constant current lifetests**

87136 Pulsed Current Electromigration Failure Model

## **Constant stress**

96067 A New Oxide Degradation Mechanism for Stresses in the Fowler-Nordheim Tunneling Regime

## Constitutive equation

95353 A New Analysis of Stress Relaxation Phenomenon for Stress Migration Tolerance Estimation

## Contact and via failure under short-duration, high current pulses has been characterized for the first time

97216 Characterization of Contact and Via Failure under Short Duration High Pulsed Current Stress

## Contact angle, relationship to Au-Si die reliability

85173 Use of Wetting Angle Measurements in Reliability Evaluations of Au-Si Eutectic Die Attach

## Contact annealing effects on GaAs refractory gate Metallizations

90087 Reliability Aspects of Thermally Stable LaB6-Au Schottky Contacts to GaAs

## Contact breakdown mechanism

97216 Characterization of Contact and Via Failure under Short Duration High Pulsed Current Stress

## Contact electromigration -Al on tungsten

90111 Reliability Simulator For Interconnect and Intermetallic Contact Electromigration

## Contact electromigration model for intermetallic contacts

90111 Reliability Simulator For Interconnect and Intermetallic Contact Electromigration

## Contact electromigration study of AI/Tantalum silicide contacts

86030 Electromigration in Aluminum to Tantalum Silicide Contacts

## Contact failure of interconnect vias, mechanism

89053 A New Reliability Problem Associated With Ar ION Sputter Cleaning of Interconnect VIAS

## Contact open failure

93334 Reliability Improvement in Blanket Tungsten CVD Contact Filling Process for High Aspect Ratio Contact

## Contact resistance, change

88230 High Reliable Al-Si Alloy/Si Contacts by Rapid Thermal Sintering

## **Contact spiking**

88119 Detection of Junction Spiking and its Induced Latch-up By Emission Microscopy [OPA]

## Contact-barrier metallurgy

88173 Effects of Annealing Temperature on Electromigration Performance of Multilayer Metallization Systems

## Contact/via failure thresholds

97216 Characterization of Contact and Via Failure under Short Duration High Pulsed Current Stress

## Contacts

## 95030 Reliability Improvement in High Aspect Ratio Contacts and Vias Filled with Blanket Tungsten CVD Film

## Contacts, blanket tungsten, comparison of silane and H-reduction nucleation

93375 Surface Related Failure Mechanisms in Polyimide Passivated L-Band MMICs

#### Contacts, blanket tungsten, corrosion of Si interface during filling

93375 Surface Related Failure Mechanisms in Polyimide Passivated L-Band MMICs

#### Contacts, blanket tungsten, H annealing process to suppress open failure

93375 Surface Related Failure Mechanisms in Polyimide Passivated L-Band MMICs

#### Contacts, blanket tungsten, H reduction CVD W process to suppress open failure

93375 Surface Related Failure Mechanisms in Polyimide Passivated L-Band MMICs

#### Contacts, blanket tungsten, open failure SEM observations of

93375 Surface Related Failure Mechanisms in Polyimide Passivated L-Band MMICs

#### Contacts, blanket tungsten, open failure, activation energy of

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#### Contacts, blanket tungsten, reliability vs thermal stressing

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#### Contacts, filling by blanket tungsten, CVD process

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#### Contacts, silicide, TiSi2

88071 Plastic Packaging Stress Induced Failure in TiW/Al-Si Metal to Silicide Contacts

#### Contacts, submicron, high aspect ratio

93375 Surface Related Failure Mechanisms in Polyimide Passivated L-Band MMICs

#### Contaminant ingression

93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices

## Contamination, human

85228 The Identification and Elimination of Human Contamination in the Manufacture of IC's [OPA]

#### Continuity testing

91239 Using Scanned Electron Beams for Testing Microstructure Isolation and Continuity

#### Continuous improvement

92001 Design of Experiments: a Tool for Continuous Process Improvement

## Continuous Time Random Walk (CTRW) model

94410 Enhancing Reliability of CMOS Devices Using Electrical Techniques and Electron Spin Resonance Spectroscopy

## Continuous wavelength spectroscoptic capability

96360 A High-Sensitivity Photo-Emission Microscope System with Continuous Wavelength Spectroscopic Capability

## Controlled collapse chip interconnects (C4's), effect of thermal cycling

85198 Thermal Fatigue Damage in Pb - In Solder Interconnections

## Cooperation of hot electrons and holes in dielectric breakdown in SiO2

97156 Evidence of Electron-Hole Cooperation in SiO2 Dielectric Breakdown

## Copper migration

94087 Effect of Contamination on Copper Migration in TAB Tape Structures

#### Copper thickness effect

97129 Reliability of High Aspect Ratio Plated Through Holes (PTH) for Advanced Printed Circuit Board (PCB) Packages

## Corner

95024 Impact of Shallow Trench Isolation on Reliability of Buried and Surface Channel sub-µm PFET [OPA]

## Correlating barrier degradation and diffusion

91234 Mapping Evaluation of Inhomogeneously Degraded Au/Pt/Ti Contact to GaAs

## Correlation between electrical resistance ratio and electromigration lifetime MTTF

90119 The Electrical Resistance Ratio (RR) As a Thin Film Metal Monitor [BPA]

#### Correlation of RR to median-grain-radius for sputtered thin films

90119 The Electrical Resistance Ratio (RR) As a Thin Film Metal Monitor [BPA]

Correlations can be established with both "time-zero" electrical signature, and wearout lifetime

97044 Correlations Between Initial Via Resistance and Reliablity Performance

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- 93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages
- 93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices
- 91152 Application of Infrared Microscopy for Bond Pad Damage Detection
- 87042 Novel Failure Mechanism and Anomalous Acceleration Factor on a Beam-Lead IC
- 87028 The Microstructure of Ball Bond Corrosion Failures

## **Corrosion analysis**

86099 Infrared Microscopy as Applied to Failure Analysis of P-DIP Devices

## Corrosion behavior of AI and AI alloy films on CVD tungsten

93327 Corrosion Behavior of Thin-Film Metallizations on CVD W and Sputtered W-Ti Barrier Layers

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85153 Micro-Corrosion of Al-Cu Bonding Pads

## Corrosion of AI bonding pad

85192 Moisture Resistance Degradation of Plastic LSIs by Reflow Soldering

## **Corrosion of AI interconnect**

85159 A Paradoxical Relationship Between Width/Spacing of Aluminum Electrodes and Aluminum Corrosion

## **Corrosion of Al lines**

85148 Moisture Resistance of Polyimide Multilevel Interconnect LSI'S

## **Corrosion of bond Pads**

85153 Micro-Corrosion of Al-Cu Bonding Pads

## Corrosion process, time-lapsed video monitoring

87034 Corrosion of Aluminum Metallization Through Flawed Polymer Passivation Layers: In-Situ Microscopy

## Corrosion reliability model for cyclic THB test

91012 Optimal Acceleration of Cyclic THB Tests for Plastic Packaged Devices

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92239 Corrosion Susceptibility of Thin-Film Metallizations

#### Corrosion resistance - Al alloy metallization

85159 A Paradoxical Relationship Between Width/Spacing of Aluminum Electrodes and Aluminum Corrosion

## Corrosion tendency in metallization

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## Corrosion testing, CMOS DRAM

89114 Hast Applications: Acceleration Factors and Result For VLSI Components [OPA]

## Corrosion testing, CMOS SRAM

89114 Hast Applications: Acceleration Factors and Result For VLSI Components [OPA]

## Corrosion testing, NMOS EPROM

89114 Hast Applications: Acceleration Factors and Result For VLSI Components [OPA]

## Corrosion, Al

- 88050 A Wafer-Level Corrosion Susceptibility Test for Multilayered Metallization
- 87034 Corrosion of Aluminum Metallization Through Flawed Polymer Passivation Layers: In-Situ Microscopy
- 87022 Moisture Resistance of Borophosphosilicate Glass Films

## Corrosion, Al/alloy metallization, chlorine-induced

91102 Corrosion Susceptibility Testing of Al-Cu and Al-Cu-Si Films

## Corrosion, Al/alloy metallization, detrimental effect of Cu

91102 Corrosion Susceptibility Testing of Al-Cu and Al-Cu-Si Films

## Corrosion, Al/alloy metallization, native oxide, quality vs. alloy

91102 Corrosion Susceptibility Testing of Al-Cu and Al-Cu-Si Films

## Corrosion, Al/alloy metallization, suppression by annealing

91102 Corrosion Susceptibility Testing of Al-Cu and Al-Cu-Si Films Corrosion, Al/alloy metallization, suppression by Si alloying 91102 Corrosion Susceptibility Testing of Al-Cu and Al-Cu-Si Films

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91102 Corrosion Susceptibility Testing of Al-Cu and Al-Cu-Si Films

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91102 Corrosion Susceptibility Testing of Al-Cu and Al-Cu-Si Films

#### Corrosion, Al/alloy metallizations, effects of barrier layers

93372 Reliability of InGaAs/InP Photodiodes Passivated with Polyimide

## Corrosion, as a result of flux ingress during preconditioning

92169 The Impact of Delamination on Stress-Induced and Contamination-Related Failure in Surface Mount ICs

## Corrosion, as a result to a packaged reliability test chip

92177 Comparison of Delamination Effects between Temperature Cycling Test and Highly Accelerated Stress Test in Plastic Packaged Devices

#### Corrosion, effect of solder reflow

85192 Moisture Resistance Degradation of Plastic LSIs by Reflow Soldering

## Corrosion, effect on metallization resistance

88050 A Wafer-Level Corrosion Susceptibility Test for Multilayered Metallization

#### Corrosion, galvanic series for thin film metallizations

93372 Reliability of InGaAs/InP Photodiodes Passivated with Polyimide

#### Corrosion, metallization, failure distributions, data for different alloys

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91102 Corrosion Susceptibility Testing of Al-Cu and Al-Cu-Si Films

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## Corrosion, metallizations effects of surface roughness of barrier layers on

93372 Reliability of InGaAs/InP Photodiodes Passivated with Polyimide

#### Corrosion, metallizations, DC polarization measurement technique

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93372 Reliability of InGaAs/InP Photodiodes Passivated with Polyimide

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93372 Reliability of InGaAs/InP Photodiodes Passivated with Polyimide Corrosion, oxide-layer defects

92239 Corrosion Susceptibility of Thin-Film Metallizations

## Corrosion, relative rates of, for Al/alloys on barrier layers

93372 Reliability of InGaAs/InP Photodiodes Passivated with Polyimide

## Corrosion, SEM observations of corrosion sites

91102 Corrosion Susceptibility Testing of Al-Cu and Al-Cu-Si Films

## Corrosion, wafer level test structure

88050 A Wafer-Level Corrosion Susceptibility Test for Multilayered Metallization

## Corrosive Si attack by OH ions

93028 Reaction of DI Water and Silicon and its Effect on Gate Oxide Integrity

## Cosmic ray neutron induced soft errors

96001 Cosmic Ray Neutron-Induced Upsets as a Major Contributor to the Soft Error Rate of Current and Future Generation DRAMs

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95297 Boron Compounds as a Dominant Source of Alpha Particles in Semiconductor Devices

## Cosmic rays, flux calculation

94012 Accurate, Predictive Modeling of Soft Error Rate Due to Cosmic Rays and Chip Alpha Radiation

## Cost-per-bit has increased decreased logarithmically

97001 Emerging Role of Semiconductor Process Equipment to Overcome Device Failure Mechanisms

## Coulomb-Mohr Theory, theory of brittle fracture applied to plastic packaging

85184 Computer Aided Stress Modeling for Optimizing Plastic Package Reliability [OPA]

## Coupled model

96289 Unified Model for n-Channel Hot-Carrier Degradation Under Different Degradation Mechanisms

## Coupling between front and back interfaces is the dominant mechanism

97296 A Novel Methodology for Reliability Studies in Fully Depleted SOI MOSFETs

## Cr/AI-4 at% Cu

88216 Kinetic Study of Electromigration Failure in Cr/Al-Cu Thin Film Conductors Covered with Polymide and the Problem of the Stress Dependant Activation Energy

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93236 A Criterion for Predicting Delamination in Plastic IC Packages

## Cracking and interfacial delamination

94079 Ambient Moisture Characterization of Thin Small Outline Packages (TSOPs)

## Cracking in plastic packages (popcorn)

85192 Moisture Resistance Degradation of Plastic LSIs by Reflow Soldering

## Cracking, Hot IC die induced cracking in plastic package

92190 New Thin Plastic Package Crack Mechanism Induced by Hot IC Die

## Cracking, SMT package moisture-induced

- 93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages
- 93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's
- 93236 A Criterion for Predicting Delamination in Plastic IC Packages
- 93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices
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97216 Characterization of Contact and Via Failure under Short Duration High Pulsed Current Stress

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97216 Characterization of Contact and Via Failure under Short Duration High Pulsed Current Stress

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- 92157 Moisture Sensitivity Characterization of Plastic Surface Mount Devices Using Scanning Acoustic Microscopy

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93209 The Dependence of the Activation Energies of Intermetallic Formation on the Composition of Composite Sn/Pb Solders

## Cu Tin, intermetallic formation, transmission electron microscopy

93209 The Dependence of the Activation Energies of Intermetallic Formation on the Composition of Composite Sn/Pb Solders

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93209 The Dependence of the Activation Energies of Intermetallic Formation on the Composition of Composite Sn/Pb Solders

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93168 Internal Current Probing of Integrated Circuits Using Magnetic Force Microscopy [OPA]

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94001 Building Reliability into a High Performance 4-Level Metallization System

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92281 Built-In Real-Time Reliability Automation (BIRRA)

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## 90012 Building Reliability Into EPROMs

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DDD drain with 5E14@60 phosphorus implant after side-wall spacer etch-design of choice-advanced CMOS processes

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96214 Degradation Mechanism in Carbon-Doped GaAs Minority-Carrier Injection Devices

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90106 Current Density Dependence of Electromigration t50 Enchancement Due To Pulsed Operation

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86132 Reliability Investigation of 1 Micron Depletion Mode IC MESFETS

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95205 Enhancement and Degradation of Drain Current in Pseudomorphic AIGaAs/InGaAs HEMT's Induced by Hot-Electrons

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92373 Influence of Grain Size on Defect-Related Early Failures in VLSI Interconnects

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91260 Can Burn-In Screen Wearout Mechanisms? Reliability Modeling of Defective Subpopulations - A Case Study

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- 92076 Hot-Electron-Induced Input Offset Voltage Degradation in CMOS Differential Amplifiers
- 89059 Analysis of Aluminum Gallium Arsenide Laser Diodes Failing Due to Nonradiative Regions Behind the Facets

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97034 Maximum Safe Reverse Emitter Voltage in Bipolar Transistors for Reliable 10 Year Operation

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97276 Life Tests and Failure Mechanisms of GaN/AlGaN/InGaN Light Emitting Diodes

## Degradation Enhancement Model based on water diffusion-newly proposed

95292 Water Diffusion Model for the Enhancement of Hot-Carrier Induced Degradation due to SiN Passivation in Submicron MOSFETs

## Degradation is increased with increasing amounts of hydrogen in the SiN film

97307 Enhancement of Hot-Carrier Induced Degradation UnderLow Gate Voltage Stress due to Hydrogen for NMOSFETs with SiN Films

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92344 A New Mechanism for Degradation of Al-Si-Cu/TiN/Ti Contacted p-n Junction

## Degradation mode is considered to be caused by hydrogen diffusion from SiN into the gate oxide during high temperature annealing such as BPSG reflow

97307 Enhancement of Hot-Carrier Induced Degradation UnderLow Gate Voltage Stress due to Hydrogen for NMOSFETs with SiN Films

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97300 Key Hot-Carrier Degradation Model Calibration and Verification Issues for Accurate AC Circuit-Level Reliability Simulation

## Degradation models of the LD parameters

96195 Degradation Models and Lifetime Projection of InGaAs/InP MQW-DFB Laser Diodes for High-Speed Optical Communication Systems

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96188 A Degradation Monitor for the Light Output of LEDs based on Cathodoluminescence Signals and Junction Ideality Factor

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95051 A New Method Using Charge Pumping Measurements to Improve the Lifetime Determination of Deep Submicron NMOS Transistors

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86125 Gradual Degradation of GaAs FETs Under Normal Operation

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97268 Rapid Degradation of InGaAsP/InP Laser Diode due to Copper Contamination

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97282 NBTI - Channel Hot Carrier Effects in Advanced Submicron PFET Technologies

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97082 Degradation in (Ba,Sr)TiO3 Thin films under DC and Dynamic Stress Conditions

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97082 Degradation in (Ba,Sr)TiO3 Thin films under DC and Dynamic Stress Conditions

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97276 Life Tests and Failure Mechanisms of GaN/AlGaN/InGaN Light Emitting Diodes

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91183 A New Failure Mechanism Related to Grain Growth in DRAMs

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- 95107 Anomalous Thermal Conductivity in Regions of Non-uniform Die Attach Integrity
- 91160 Correlation of Surface Mount Plastic Package Reliability Testing to Nondestructive Inspection by Scanning Acoustic Microscopy

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96267 Conductive Anodic Filament Enhancement in the Presence of Certain Polyglycol-Containing Fluxes

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- 93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's
- 93236 A Criterion for Predicting Delamination in Plastic IC Packages
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- 92157 Moisture Sensitivity Characterization of Plastic Surface Mount Devices Using Scanning Acoustic Microscopy

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- 92320 Selective Removal of Dielectrics from Integrated Circuits for Electron Beam Probing
- 92315 Reactive Ion Etching for Failure Analysis Applications

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93103 Investigation of Short Circuit Caused by Reduction of PbO Sealing Glass Used for VLSI Package

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95359 Deoxidization of Water Desorbed from APCVD TEOS-O3 SiO2 by Titanium Cap Layer

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93317 Dependence of Electromigration Lifetime on the Square of Current Density

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93317 Dependence of Electromigration Lifetime on the Square of Current Density

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97017 Impact of Passivation Film Deposition and Post Annealing on the Reliability of Flash Memories

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87154 Kinetics of Contact Wearout for Silicided (TiSi2) and Non-SilicidedContacts

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96274 Stress in High Rate Deposited Silicon Dioxide Films for MCM Applications

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87111 A New VLSI Diagnosis Technique: Focused Ion Beam Assisted Multi-level Circuit Probing

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97066 Focused Ion Beam Induced Insulator Deposition at Decreased Beam Current Density

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97066 Focused Ion Beam Induced Insulator Deposition at Decreased Beam Current Density

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94425 In-Depth Resolution of Integrated Circuits via X-ray Based Line Modified Asymmetric Crystal Topography

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94108 Mechanical Properties and Adhesion Measurements of Films used in Advanced Packages

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95311 Design Rules for Reliable Surface-Micromachined Sensors

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96237 Characterization of VLSI Circuit Interconnect Heating and Failure Under ESD Conditions

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- 92315 Reactive Ion Etching for Failure Analysis Applications
- 92001 Design of Experiments: a Tool for Continuous Process Improvement

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91277 SWEAT Structure Design and Test Procedure Criteria Based upon TEARS Characterization and Spatial Distribution of Failures in Iterated Structures

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87111 A New VLSI Diagnosis Technique: Focused Ion Beam Assisted Multi-level Circuit Probing

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93094 Failure Mechanisms of Thin Silicon Tantalum Integrated Circuit (STIC) Resistors on Multi-Chip Module (MCM)

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97141 Characterization of Flip Chip Interconnect Failure Modes Using High Frequency Acoustic Micro Imaging with Correlative Analysis

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90200 Direct Measurement of Stress-Induced Void Growth by Thermal Wave Modulated Optical Reflectance Imaging [OPA]

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97057 Using IDDQ Drift Testing to Detect Hydrogen in MOS Devices

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96355 High Temperature IDDQ Drift Testing for Detection of Sodium and Potassium

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- 92276 Building-In Reliability: Soft Errors -- A Case Study
- 92268 Reliability Defect Detection and Screen during Processing -- Theory and Implementation

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97082 Degradation in (Ba,Sr)TiO3 Thin films under DC and Dynamic Stress Conditions

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95205 Enhancement and Degradation of Drain Current in Pseudomorphic AIGaAs/InGaAs HEMT's Induced by Hot-Electrons

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94001 Building Reliability into a High Performance 4-Level Metallization System

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97312 New Understanding of LDD CMOS Hot-Carrier Degradation and Device Lifetime at Cryogenic Temperatures

## Deviator stress

95353 A New Analysis of Stress Relaxation Phenomenon for Stress Migration Tolerance Estimation

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97300 Key Hot-Carrier Degradation Model Calibration and Verification Issues for Accurate AC Circuit-Level Reliability Simulation

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97261 Reliability and Alleviation of Premature On-State Avalanche Breakdown in Deep Submicron Power PHEMT's Device degradation is completely eliminated by terminating the dangling bonds with hydrogen atoms

97118 Device Degradation Due to Stud Bumping Above the MOSFET Region and the Effect of Annealing on the Degradation

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97007 Gate Stack Reliability Improvements Using Controlled Ambient Processing

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97282 NBTI - Channel Hot Carrier Effects in Advanced Submicron PFET Technologies

## Device simulator, 3-D

87207 Key Factors in Reducing Soft Errors in Mega-Bit Drams---Funneling and Scalability---

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91118 AC Hot-Carrier Effects in Scaled MOS Devices

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97287 Impact of Boron Penetration on Gate Oxide Reliability and Device Lifetime in p+-poly PMOSFETs

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93028 Reaction of DI Water and Silicon and its Effect on Gate Oxide Integrity

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- 86109 Fault Contrast: A New Voltage Contrast VLSI Diagnosis Technique
- 86087 A Practical VLSI Characterization and Failure Analysis System for the IC User [OPA]

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95107 Anomalous Thermal Conductivity in Regions of Non-uniform Die Attach Integrity

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85173 Use of Wetting Angle Measurements in Reliability Evaluations of Au-Si Eutectic Die Attach

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85173 Use of Wetting Angle Measurements in Reliability Evaluations of Au-Si Eutectic Die Attach

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85173 Use of Wetting Angle Measurements in Reliability Evaluations of Au-Si Eutectic Die Attach

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85164 Electrical Reliability of Silver Filled Epoxies for Die Attach

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#### Die attach, scanning electron microscopy (SEM) of Ag-filled epoxies

85164 Electrical Reliability of Silver Filled Epoxies for Die Attach

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89137 A Reliability Study of Au-Sn Eutectic Bonding with GaAs Dice

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91167 The Role of Focused Ion Beams in Physical Failure Analysis

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- 96113 Excess Current Induced by Hot-Hole Injection and F-N Stress in Thin SiO2 Films
- 94225 Relation Between Stress-Induced Leakage Current & Dielectric Breakdown in SiN-Based Antifuses

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97156 Evidence of Electron-Hole Cooperation in SiO2 Dielectric Breakdown

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94136 Modeling Ultrathin Dielectric Breakdown on Correlation of Charge Trap-Generation to Charge-to Breakdown

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94136 Modeling Ultrathin Dielectric Breakdown on Correlation of Charge Trap-Generation to Charge-to Breakdown

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94136 Modeling Ultrathin Dielectric Breakdown on Correlation of Charge Trap-Generation to Charge-to Breakdown

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94136 Modeling Ultrathin Dielectric Breakdown on Correlation of Charge Trap-Generation to Charge-to Breakdown

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94136 Modeling Ultrathin Dielectric Breakdown on Correlation of Charge Trap-Generation to Charge-to Breakdown

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97082 Degradation in (Ba,Sr)TiO3 Thin films under DC and Dynamic Stress Conditions

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88131 Statistical Modeling of Silicon Dioxide Reliability [BPA]

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93209 The Dependence of the Activation Energies of Intermetallic Formation on the Composition of Composite Sn/Pb Solders

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93209 The Dependence of the Activation Energies of Intermetallic Formation on the Composition of Composite Sn/Pb Solders

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- 90231 Electrical Conduction and Breakdown in SOL-GEL Derived PZT Thin Films
- 89163 Reliability Aspects of Laser Programmable Redundancy: Infrared vs. Green, Polysilicon vs. Silicide [OPA]
- 89158 Long Term Reliability of SiO2/SiN/SiO2 Thin Layer Insulator Formed in 9 um Deep Trench on High Boron Concentrated Silicon
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93199 Laser Stimulated Electron-Beam Prober for 15ps Resolution Internal Waveform Measurements of a 5 Gb/s ECL Circuit

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88126 A Test Methodology to Monitor and Predict Early Life Reliability Failure Mechanisms

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94470 High-Voltage Electron-Beam-Induced-Current Imaging of Microdefects in Laser Diodes and MESFETs

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87085 Reliability Comparison of Flotox and Textured-Polysilicon E2Proms [OPA]

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97190 Oxide Breakdown Mechanism and Quantum Physical Chemistry for Time-Dependent Dielectric Breakdown

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97201 Effect of Texture on Electromigration of CVD Copper

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<sup>94178</sup> Improvement in the Electromigration Lifetime Using Hyper-Textured Aluminum Formed on Amorphous Tantalum-Aluminum Underlayer

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97221 Effect of Al-W Intermetallic Compounds on Electromigration in Al/CVD-W Interconnects

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97287 Impact of Boron Penetration on Gate Oxide Reliability and Device Lifetime in p+-poly PMOSFETs

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93304 The Effects of Temperature and Microstructure on the Components of Electromigration Mass Transport

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90119 The Electrical Resistance Ratio (RR) As a Thin Film Metal Monitor [BPA]

#### Electrical resistance ratio as a thin film metal monitor

90119 The Electrical Resistance Ratio (RR) As a Thin Film Metal Monitor [BPA]

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90119 The Electrical Resistance Ratio (RR) As a Thin Film Metal Monitor [BPA]

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90276 Reliability Study on Polycrystalline Silicon Thin Film Resistors Used in LSIs Under Thermal and Electrical Stress

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97248 Current-Gain Long-Term Instability of AlGaAs/GaAs HBT: Physical Mechanism and SPICE Simulation

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- 95036 ON-State, Programming and OFF-State Reliability of Metal-to-Metal Antifuse Based 10 nm-Thick SiNx Film For 3.3 V Operation

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- 88203 A Comparison Between Noise Measurements and Conventional Electromigration Reliability Testing
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97211 Recent Problems in Electromigration Testing

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88179 Effective Kinetic Variations with Stress Duration for Multilayered Metallizations

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87154 Kinetics of Contact Wearout for Silicided (TiSi2) and Non-SilicidedContacts

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92366 Electromigration Lifetime as a Function of Line Length and Step Number

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## Electron beam, pulsed photocathode

93199 Laser Stimulated Electron-Beam Prober for 15ps Resolution Internal Waveform Measurements of a 5 Gb/s ECL Circuit

#### Electron beam-induced voltage (EBIV) analysis

97276 Life Tests and Failure Mechanisms of GaN/AlGaN/InGaN Light Emitting Diodes

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## Electron conduction, thin oxide (SiO2), Fowler-Nordheim (FN) tunneling

93007 Hole Injection Oxide Breakdown Model for Very Low Voltage Lifetime Extrapolation

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93013 A Mechanism for Gate Oxide Damage in Nonuniform Plasma

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85164 Electrical Reliability of Silver Filled Epoxies for Die Attach

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93133 Process Reliability Development for Nonvolatile Memories

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#### ESD protection & silicided diffusions,

86199 ESD Protection Reliability in 1 M CMOS Technologies

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86199 ESD Protection Reliability in 1 M CMOS Technologies

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93161 Prediction of ESD Robustness of a Process Using 2-D Device Simulations

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86206 Input ESD Protection Networks for Fineline NMOS-Effects of Stressing Waveform and Circuit Layout

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93184 Automatic Memory Failure Analysis Using an Expert System in Conjunction with a Memory Tester/Analyzer

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## Exponential dependence of delamination growth with thermal cycles

93108 3D Finite Element Simulation of the Delamination Behaviour of a PLCC Package in the Temperature Cycle Test

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94466 Reliability of Laser Diode Modules in Temperature-Uncontrolled Environment

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92373 Influence of Grain Size on Defect-Related Early Failures in VLSI Interconnects

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- 92085 Pipeline Defects in CMOS MOSFET Devices Caused by SWAMI Isolation
- 91250 Application of The Atomic Force Microscope to Integrated Circuit Reliability and Failure Analysis
- 91183 A New Failure Mechanism Related to Grain Growth in DRAMs
- 91167 The Role of Focused Ion Beams in Physical Failure Analysis
- 91152 Application of Infrared Microscopy for Bond Pad Damage Detection
- 89059 Analysis of Aluminum Gallium Arsenide Laser Diodes Failing Due to Nonradiative Regions Behind the Facets

#### Failure analysis by SEM

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93345 Analysis of Parametric Drift of a MESFET-Based GaAs MMIC Due to 125°C Storage

#### Failure analysis of passivated CMOS devices

90045 A New Techique For Imaging The Logic State of Passivated Conductors: Biased Resistive Contrast Imaging

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#### Failure analysis of Vias

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- 86109 Fault Contrast: A New Voltage Contrast VLSI Diagnosis Technique

- 86102 A Study of Gold Ball Bond Intermetallic Formation in PEDs Using Infra-Red Microscopy
- 86099 Infrared Microscopy as Applied to Failure Analysis of P-DIP Devices
- 86095 Localization of Defects in Gate Oxides by Means of Tunneling Current Microscopy
- 86087 A Practical VLSI Characterization and Failure Analysis System for the IC User [OPA]

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- 94388 Novel Failure Analysis Techniques Using Photon Probing with a Scanning Optical Microscope [BPA]
- 91142 ICFAX, An Integrated Circuit Failure Analysis Expert System
- 87118 Gated-Pulse Stroboscopy for Passivated Device Imaging
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- 89043 New Applications of Focused ION Beam Techique to Failure Analysis and Process Monitoring of VLSI
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90061 Use of Advanced Analytical Techniques for VLSI Failure Analysis

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90061 Use of Advanced Analytical Techniques for VLSI Failure Analysis

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90061 Use of Advanced Analytical Techniques for VLSI Failure Analysis

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97206 Via Delamination - A Novel Electromigration Failure Mechanism - Via Delamination

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93018 Gate Dielectric Integrity and Reliability in 0.5µm CMOS Technology

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#### Failure analysis, computer-based techniques

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#### Failure analysis, DRAM

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#### Failure analysis, IC

- 93199 Laser Stimulated Electron-Beam Prober for 15ps Resolution Internal Waveform Measurements of a 5 Gb/s ECL Circuit
- 93178 Energy Resolved Emission Microscope
- 93168 Internal Current Probing of Integrated Circuits Using Magnetic Force Microscopy [OPA]

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86099 Infrared Microscopy as Applied to Failure Analysis of P-DIP Devices

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87145 Electromigration Testing of Ti/Al-Si Metallization for Integrated Circuits

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96164 Modeling of Electromigration Failure Distributions of Al Alloy Contacts and Vias in Submicron IC Technologies

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87154 Kinetics of Contact Wearout for Silicided (TiSi2) and Non-SilicidedContacts

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- 92344 A New Mechanism for Degradation of Al-Si-Cu/TiN/Ti Contacted p-n Junction
- 91142 ICFAX, An Integrated Circuit Failure Analysis Expert System

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90061 Use of Advanced Analytical Techniques for VLSI Failure Analysis

## Failure mechanism in tungsten filled via

93340 Via Hole-Related Simultaneous Stress-Induced Extrusion and Void Formation in Al Interconnects

## Failure mechanism specific operational knowledge base

93081 Integration of Physical Reliability Knowledge Into the Design of VLSI-Circuits

## Failure mechanism, dislocation network, edge effect

86120 Failure Analysis and Failure Mechanisms of High Voltage(530V) GatedDiode Crosspoint Arrays

## Failure mechanism, latch-up

86115 A Study of CMOS Latch-up by Laser Scanning and Voltage Contrast Techniques

## Failure mechanisms and potential equipment based solutions

97001 Emerging Role of Semiconductor Process Equipment to Overcome Device Failure Mechanisms

## Failure mechanizm of TiN barrier layer

95371 Modeling Electromigration Failures in TiN/AI alloy/TiN Multilayered Interconnects and TiN Thin Films

## Failure Mode Analysis (FMA)

- 93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices
- 93184 Automatic Memory Failure Analysis Using an Expert System in Conjunction with a Memory Tester/Analyzer

## Failure mode, bit line mode, cell mode

86235 Soft Error Rate Reduction in Dynamic Memory with Trench Capacitor Cell

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92356 A Novel Via Failure Mechanism in Al-Cu/Ti Double Level Metal System

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86109 Fault Contrast: A New Voltage Contrast VLSI Diagnosis Technique

## Failure mode, thermal stress

92356 A Novel Via Failure Mechanism in Al-Cu/Ti Double Level Metal System

## Failure mode, vias (AI-Cu/Ti)

92356 A Novel Via Failure Mechanism in Al-Cu/Ti Double Level Metal System

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88059 A New Bond Failure Wire Crater in Surface Mount Device

Failure modes in silicided NMOS devices

87174 ESD Phenomena and Protection Issues in CMOS Output Buffers [OPA]

## Failure modes of power GaAs FETS

86150 Power GaAs FET RF Life Test Using Temperature-Compensated Electrical Stressing

## Failure modes, thin film cracking, wire ball shear

87238 Thin-Film Cracking and Wire Ball Shear in Plastic Dips Due to Temperature Cycle and Thermal Shock

## Failure of field isolation

94309 Mechanism for the n-field Device Failure in Double Level Metal CMOS Device

## Failure patterns, Gate corner, Gate, Gate center

86120 Failure Analysis and Failure Mechanisms of High Voltage(530V) GatedDiode Crosspoint Arrays

## Failure prevention in submicron contacts

93334 Reliability Improvement in Blanket Tungsten CVD Contact Filling Process for High Aspect Ratio Contact

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93001 A Lifetime Projection Method Using Series Model and Acceleration Factors for TDDB Failures of Thin Gate Oxides

## Failure rate model for cyclic THB test

91012 Optimal Acceleration of Cyclic THB Tests for Plastic Packaged Devices

#### Failure technique, laser scanning

86115 A Study of CMOS Latch-up by Laser Scanning and Voltage Contrast Techniques

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87140 The Effect of Metal Film Topography and Lithography on Grain Size Distributions and on Electomigration Performance

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93334 Reliability Improvement in Blanket Tungsten CVD Contact Filling Process for High Aspect Ratio Contact

## Failures in high aspect ratio contacts

93334 Reliability Improvement in Blanket Tungsten CVD Contact Filling Process for High Aspect Ratio Contact

## Failures in submicron contacts with aspect ratio of 2

93334 Reliability Improvement in Blanket Tungsten CVD Contact Filling Process for High Aspect Ratio Contact

## Fast (sub-nanosecond) transient stress of NMOSFETs

91129 Increase Hot-Carrier Degradation of n-MOSFETs under Very Fast Transient Stressing

#### Fast electromigration test (< 15 seconds)

85100 Wafer Level Electromigration Tests for Production Monitoring

## Fast electromigration test (< 60 seconds)

85108 Breakdown Energy of Metal (BEM)--A New Technique For Monitoring Metallization Reliability at Wafer Level [OPA]

#### Fast Fourier Transform (FTT) technique

97136 A Study of Separation of Superimposed Ultrasonic Pulse Echo Signals for Semiconductor Failure Analysis using Scanning Acoustic Tomography (S.A.T.)

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95266 On the Degradation Features of Poly-Emitter n-p-n BJTs After Hot-Carrier Injection

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90290 hFE Instability and 1/f Noise in Bipolar Transistors

#### Fast surface charging effects

96332 Novel MCM Interconnection Analysis Using Capacitive Charge Generation (CCG)

## Fast turn-on, >2000V/µs, due to small gate resistance (4.7 ohm)

94420 dv\dt Induced Latching Failure in 1200V\400A Halfbridge IGBT Modules

## Fast turn-on, high dv/dt, triggered latching failures

94420 dv\dt Induced Latching Failure in 1200V\400A Halfbridge IGBT Modules

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93204 Thermal Cycling Reliability of Die Bonding Adhesives

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95097 Polyimide Fatigue Induced Chip Surface Damage in DRAM's Lead-On-Chip (LOC) Packages

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## **Guided fault location**

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## Holding voltage for latchup in epitaxial CMOS

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- 95024 Impact of Shallow Trench Isolation on Reliability of Buried and Surface Channel sub-µm PFET [OPA]
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#### Hot-carrier degradation, n-MOSFET's

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## IDDQ drift and sodium

96355 High Temperature IDDQ Drift Testing for Detection of Sodium and Potassium

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97057 Using IDDQ Drift Testing to Detect Hydrogen in MOS Devices

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- 94388 Novel Failure Analysis Techniques Using Photon Probing with a Scanning Optical Microscope [BPA]
- 91250 Application of The Atomic Force Microscope to Integrated Circuit Reliability and Failure Analysis

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- 95205 Enhancement and Degradation of Drain Current in Pseudomorphic AIGaAs/InGaAs HEMT's Induced by Hot-Electrons

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95303 Accurate Measurement of Small Charges Collected on Junctions from Alpha Particle Strikes Using an Accelerator-Produced Microbeam

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## Insulator surface roughness

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91142 ICFAX, An Integrated Circuit Failure Analysis Expert System

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#### Interface diffusion vs grain boundary diffusion

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- 92095 Low Frequency 1/f Noise and Current Gain Degradation in BiCMOS n-p-n Transistors
- 91193 Anomalous Current Gain Degradation in Bipolar Transistors
- 90290 hFE Instability and 1/f Noise in Bipolar Transistors

- 90288 Carbon Doping Effects on Hot Electron Trapping
- 90259 Extended Data Retention Characteristics After More Than 10 Write and Erase Cycles In EEPROMs
- 90150 Drain-Avalanche Induced Hole Injection and Generation of Interface Traps in Thin Oxide MOS Devices

# Interface traps induced by stud bumping are apparently eliminated by both N2 and H2 annealing $% \left( {\left( {{{\rm{D}}_{\rm{B}}} \right)_{\rm{B}}} \right)$

97118 Device Degradation Due to Stud Bumping Above the MOSFET Region and the Effect of Annealing on the Degradation

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- 94101 The Effect of Polyimide Surface Morphology and Chemistry on Package Cracking Induced by Interfacial Delamination
- 93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages

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91030 A Reliability Model for Interlayer Dielectric Cracking During Temperature Cycling

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90051 Internal Friction: A Fast Technique For Electromigration Failure Analysis

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## Internal moisture in IC packages, an A.C. conductance technique

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## Internal moisture in IC packages, the influence of DC bias

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## Internal moisture in IC packages, comparison of non-destructive techniques

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91167 The Role of Focused Ion Beams in Physical Failure Analysis

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92258 Characterization of Dynamic Spatial Conduction Patterns on ESD Protection Circuitry by Photon-Counting Imaging Method

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87250 Thermal Fatigue Reliability of SMT Packages and Interconnections

## JEDEC ramp voltage and JT test comparison

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- 92344 A New Mechanism for Degradation of Al-Si-Cu/TiN/Ti Contacted p-n Junction
- 92102 Defect-Free Shallow p-n Junction by Point-Defect Engineering
- 90265 Tem Analysis of Failed Bits and Improvement of Data Retention Properties in Megabit-Drams

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96332 Novel MCM Interconnection Analysis Using Capacitive Charge Generation (CCG)

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90087 Reliability Aspects of Thermally Stable LaB6-Au Schottky Contacts to GaAs

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86115 A Study of CMOS Latch-up by Laser Scanning and Voltage Contrast Techniques

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86220 SEM Studies of Time Evolution and Sensitivity of Latch-up in CMOS ICs

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86220 SEM Studies of Time Evolution and Sensitivity of Latch-up in CMOS ICs

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## Latch-up, effect of carrier trapping

89110 Hot-Carrier-Induced Latchup and Trapping/Detrapping Phenomena

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89110 Hot-Carrier-Induced Latchup and Trapping/Detrapping Phenomena

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95249 New Latchup Failure Mechanism Induced by an Elevated Via Resistance on Multilayer CMOS Technology

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97346 Latch-up Characterization of High Energy Ion Implanted New CMOS Twin Wells that comprised the BILL (Buried Implanted Layer for Lateral Isolation) and B.L./C.L. (Buried Layer/Connecting Layer) Structure

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94280 Designing Latchup Robustness in a 0.35um Technology

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94280 Designing Latchup Robustness in a 0.35um Technology

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91224 ESD-Related Latent Failures of InGaAsP/InP Laser Diodes for Telecommunication Equipment

## Lateral and vertical NPN devices for ESD

87174 ESD Phenomena and Protection Issues in CMOS Output Buffers [OPA]

#### Lateral heat flow

92232 Finite Element Analysis of a SWEAT Structure with a 3-D, Nonlinear, Coupled Thermal-Electric Model

#### Lateral material migration in GaAs FETs

85045 XPS Analysis of GaAs--Surface Quality Affecting Interelectrode Material Migration

#### Lateral p-i-n diode behavior

97339 A Compact Model of Holding Voltage for Latch-Up in Epitaxial CMOS

## Lateral SCR devices

91327 Proximity Effects of "Unused" Output Buffers on ESD Performance

#### Latex calibration spheres

86019 A Novel Method for Measuring Nonuniformities in Metallization Temperatures of an Operating Integrated Circuit

#### LATID

95254 Analysis and Optimisation of the Hot-Carrier Degradation Performance of 0.35-µm Fully Overlapped LDD Devices

#### Lattice diffusion and grain boundary diffusion around 400°C

90209 Observation of Stress-Induced Voiding With an Ultra-High Voltage Electron Microscope

## Lattice distortions

#### LD degradation

97272 An Empirical Lifetime Projection Method for Laser Diode Degradation

#### LDD

- 92102 Defect-Free Shallow p-n Junction by Point-Defect Engineering
- 92085 Pipeline Defects in CMOS MOSFET Devices Caused by SWAMI Isolation
- 90265 Tem Analysis of Failed Bits and Improvement of Data Retention Properties in Megabit-Drams

#### Lead frame

- 93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages
- 93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages

## Lead frame delamination

- 93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices
- 91160 Correlation of Surface Mount Plastic Package Reliability Testing to Nondestructive Inspection by Scanning Acoustic Microscopy

## Lead frame dimples

93236 A Criterion for Predicting Delamination in Plastic IC Packages

#### Lead frame finger short

93103 Investigation of Short Circuit Caused by Reduction of PbO Sealing Glass Used for VLSI Package

#### Lead frame material influence on ball bond shear failure

87238 Thin-Film Cracking and Wire Ball Shear in Plastic Dips Due to Temperature Cycle and Thermal Shock

#### Lead frame thermal cycle test

87238 Thin-Film Cracking and Wire Ball Shear in Plastic Dips Due to Temperature Cycle and Thermal Shock

## Lead frame thermal shock test

87238 Thin-Film Cracking and Wire Ball Shear in Plastic Dips Due to Temperature Cycle and Thermal Shock

#### Lead frame, Ag spot

93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices

#### Lead frame, alloy 42

- 93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's
- 93236 A Criterion for Predicting Delamination in Plastic IC Packages

## Lead frame, comparison of Cu and alloy 42 with respect to package stress

85184 Computer Aided Stress Modeling for Optimizing Plastic Package Reliability [OPA]

#### Lead frame, Cu

- 93236 A Criterion for Predicting Delamination in Plastic IC Packages
- 93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices

#### Lead frame, Cu, alloy 42

87238 Thin-Film Cracking and Wire Ball Shear in Plastic Dips Due to Temperature Cycle and Thermal Shock

#### Lead-on-chip packages

95097 Polyimide Fatigue Induced Chip Surface Damage in DRAM's Lead-On-Chip (LOC) Packages

#### Lead-tin (PbSn) eutectic solder fatigue

87250 Thermal Fatigue Reliability of SMT Packages and Interconnections

#### Lead-to-lead leakage

93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices

<sup>92217</sup> Dislocation-based Mechanisms in Electromigration

## Leak checking, helium method

85065 A Helium Leak Detector for Small Components

## Leak tests, combining fine and gross

85065 A Helium Leak Detector for Small Components

## Leakage

- 95042 Model for the Leakage Instability in Unprogrammed Amorphous Silicon Antifuse Devices
- 90132 Reliability Study of Thin Inter-poly Dielectrics for Non-Volatile Memory Application

## Leakage by thermally-assisted tunneling through locally-reduced barriers (0.9V)

87066 A New Failure Mode of Very Thin (<50A) Thermal SiO2 Films

## Leakage current

- 95056 Mechanism of the Leakage Current Induced by ac-Stress in Thin Tunnel Oxides for EEPROMs
- 89152 Angled Implant Fully Overlapped LDD (AI-FOLD) NFETs for Performance and Reliability

## Leakage current increase in P-N junctions under local mechanical stress

86051 The Effect of Long-Term Stress on Filler-Induced Failure in High Density RAMs

## Leakage currents and the effects of electrical stress on TiO2

97090 Electrical Reliability of Metal-Organic Chemical Vapor Deposited High Permitivity TiO2 Dielectric Metal=Oxide-Semiconductor Field Effect Transistors

## Leakage currents at passivation/GaAs interface

92327 Reliability Study of GaAs MMIC Amplifier

## Leakage currents in MOSFETs

97049 New Screening Concept for Deep-Submicron CMOS VLSIs using Temperature Characteristics of Leakage Currents in MOS Device

## Leakage junction

90259 Extended Data Retention Characteristics After More Than 10 Write and Erase Cycles In EEPROMs

## Leakage mechanisms

92344 A New Mechanism for Degradation of Al-Si-Cu/TiN/Ti Contacted p-n Junction

## Leakage versus stress time during high-voltage stress

97025 Characterization and Modeling of a Highly Reliable Metal-to-Metal Antifuse for High-Performance and High-Density Field-Programmable Gate Arrays

## LED characteristic changes from high current stress testing

95191 Degradation of Blue AlGaN/InGaN/GaN LEDs Subjected to High Current Pulses

## LED output power degradation

94454 Injection-Enhanced Defect Reactions in III-V Light Emitting Diodes

Length and width of an unshunted Al(Si) line affects the electromigration lifetime through the grain structure

## 97211 Recent Problems in Electromigration Testing

## Lens-holder cracking in laser diodes modules

94466 Reliability of Laser Diode Modules in Temperature-Uncontrolled Environment

## Level 5 object

91142 ICFAX, An Integrated Circuit Failure Analysis Expert System

## Life test of power GaAs FETS

86150 Power GaAs FET RF Life Test Using Temperature-Compensated Electrical Stressing

## Life test summary table

97276 Life Tests and Failure Mechanisms of GaN/AlGaN/InGaN Light Emitting Diodes

## Life tests on GaAs FETs

86132 Reliability Investigation of 1 Micron Depletion Mode IC MESFETS

## Life time of GaAs FETs

86125 Gradual Degradation of GaAs FETs Under Normal Operation

## Lifetest stressing of via chain units

97044 Correlations Between Initial Via Resistance and Reliablity Performance

## Lifetime prediction

- 92095 Low Frequency 1/f Noise and Current Gain Degradation in BiCMOS n-p-n Transistors
- 92081 Mismatch Drift: A Reliability Issue for Analog MOS Circuits
- 92076 Hot-Electron-Induced Input Offset Voltage Degradation in CMOS Differential Amplifiers
- 91193 Anomalous Current Gain Degradation in Bipolar Transistors
- 90276 Reliability Study on Polycrystalline Silicon Thin Film Resistors Used in LSIs Under Thermal and Electrical Stress
- 90265 Tem Analysis of Failed Bits and Improvement of Data Retention Properties in Megabit-Drams
- 90259 Extended Data Retention Characteristics After More Than 10 Write and Erase Cycles In EEPROMs
- 90231 Electrical Conduction and Breakdown in SOL-GEL Derived PZT Thin Films

## Lifetime prediction, thermal oxide (SiO2)

93001 A Lifetime Projection Method Using Series Model and Acceleration Factors for TDDB Failures of Thin Gate Oxides

## Lifetime projection by accelerated stress

87191 Self-Limiting Behavior of Hot Carrier Degradation and its Implication on the Validity of Lifetime Extraction by Accelerated Stress

## Lifetimes of AI conductor lines

89193 Stress-Driven Diffusive Voiding of Aluminum Conductor Lines

## Lifted ball bonds

93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages

## Light emission due to hot-carriers

92127 Rapid Degradation of WSi Self-Aligned Gate GaAs MESFET by Hot-Carrier Effect

## Light Induced Voltage Alteration (LIVA)

94388 Novel Failure Analysis Techniques Using Photon Probing with a Scanning Optical Microscope [BPA]

## Light output degradation of LEDs

96188 A Degradation Monitor for the Light Output of LEDs based on Cathodoluminescence Signals and Junction Ideality Factor

## Limitations of quasi-static analysis of inverter circuit lifetime

91112 A Comparison of Inverter-Type Circuit Lifetime and Quasi-Static Analysis of n-MOSFET Lifetime

## Line geometry

96131 Stress Relaxation and Microstructural Change in Passivated Al(Cu) Lines During Isothermal Annealing

## Line modified asymmetric crystal topography (LM-ACT)

94425 In-Depth Resolution of Integrated Circuits via X-ray Based Line Modified Asymmetric Crystal Topography

## Line resistance fluctuation mechanism in refractory metal/AI sandwich metal. sys., role of: current density/oven temp./passivation layer

87145 Electromigration Testing of Ti/Al-Si Metallization for Integrated Circuits

#### Line width dependence

85159 A Paradoxical Relationship Between Width/Spacing of Aluminum Electrodes and Aluminum Corrosion

## Line width dependent electromigration lifetime

86001 The Distribution of Electromigration Failures

## Line-width dependence of the multilayered structure

95371 Modeling Electromigration Failures in TiN/AI alloy/TiN Multilayered Interconnects and TiN Thin Films

## Linear dependence of yield reliability

93087 Reliability, Yield and Quality Correlation For A Particular Failure Mechanism

## Linear elastic fracture mechanics (LEFM)

93236 A Criterion for Predicting Delamination in Plastic IC Packages

## Linear region peak transconductance degradation

97178 Impacts of Plasma Process-Induced Damage on Ultra-Thin Gate Oxide Reliability

## Linewidth dependence

95342 Effect of Al Alloy and Stacked Film Composition on Linewidth Dependence of Electromigration Lifetime

## Link length delamination

97211 Recent Problems in Electromigration Testing

## Link length/void location

97211 Recent Problems in Electromigration Testing

#### Liquid crystal analysis for ESD

88019 Internal Chip ESD Phenomena Beyond the Protection Circuit

## Local defects: spot vs. point

92281 Built-In Real-Time Reliability Automation (BIRRA)

#### Local heating during ESD

87169 A Circular Output Protection Device Using Bipolar Action

#### Local temperatures

92361 Three-Dimensional Simulations of Temperature and Current Density Distribution in a Via Structure

#### Localization, tunneling current microscopy

86095 Localization of Defects in Gate Oxides by Means of Tunneling Current Microscopy

## Localized joule heating

91245 Direct Measurement of Localized Joule Heating in Silicon Devices by Means of Newly Developed High Resolution IR Microscopy

## Log extreme value electromigration distribution

86001 The Distribution of Electromigration Failures

## Log normal distribution of lifetime

90100 "Are Electromigration Failures Lognormally Distributed?"

## Log normal electromigration lifetime distribution

86001 The Distribution of Electromigration Failures

#### Logarithmic extreme value distribution of lifetime

90100 "Are Electromigration Failures Lognormally Distributed?"

#### Logic state imaging of passivated conductors

90045 A New Techique For Imaging The Logic State of Passivated Conductors: Biased Resistive Contrast Imaging

## Logic state mapping

94388 Novel Failure Analysis Techniques Using Photon Probing with a Scanning Optical Microscope [BPA]

## Long term TDDB (time dependent dielectric breakdown) test results

97190 Oxide Breakdown Mechanism and Quantum Physical Chemistry for Time-Dependent Dielectric Breakdown

## Longitudinal grain boundaries

92373 Influence of Grain Size on Defect-Related Early Failures in VLSI Interconnects

#### Loss of echo at back surface versus interface scan

97141 Characterization of Flip Chip Interconnect Failure Modes Using High Frequency Acoustic Micro Imaging with Correlative Analysis

## Low bonding parameters

93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages

#### Low capitance load

96227 Design and Layout of a High ESD Performance NPN Structure for Submicron BiCMOS/Bipolar Circuits

#### Low dielectric constant materials

96156 Reliability and Electrical Properties of New Low Dielectric Constant Interlevel Dielectrics for High Performance ULSI Interconnect

#### Low field leakage

87066 A New Failure Mode of Very Thin (<50A) Thermal SiO2 Films

#### Low frequency power spectrum

92228 Statistical Distribution of 1/f 2 Noise in Thin Metal Films under Accelerated Electromigration Test Conditions

#### Low frequency transconductance as diagnostic tool

92327 Reliability Study of GaAs MMIC Amplifier

#### Low leakage polysilicon oxide, process dependence.

85032 Low Leakage Current Polysilicon Oxide Grown by Two-Step Oxidation

#### Low Level Leakage Current (LLLC)

95131 Properties of High Voltage Stress Generated TBPS in Thin Silicon Oxides [OPA]

#### Low loop wire bonding

93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's

#### Low primary electron beam energies

96332 Novel MCM Interconnection Analysis Using Capacitive Charge Generation (CCG)

#### Low strain reversible traps

96274 Stress in High Rate Deposited Silicon Dioxide Films for MCM Applications

## Low stress W/E pulses

96117 Trapped Hole Enhanced Stress Induced Leakage Currents in NAND EEPROM Tunnel Oxides

## Low stress additives (flexibilizers)

97149 Towards a Nondestructive Procedure for Component Level Characterization of Molding Compounds

## Low temperature effects such as freeze-out are shown to have important contributions to the hot-carrier behavior at low temperatures

97312 New Understanding of LDD CMOS Hot-Carrier Degradation and Device Lifetime at Cryogenic Temperatures

#### Low temperature electrical characteristics

96294 The Effects of Reverse-Bias Emitter-Base Stress on the Cryogenic Operation of Advanced UHV/CVD Si- and SiGe-base Bipolar Transistors

## Low Thermal Budgets

95156 Suppressed Process-Induced Damage in N2O-annealed SiO2 Gate Dielectrics

#### Low trigger voltage

96227 Design and Layout of a High ESD Performance NPN Structure for Submicron BiCMOS/Bipolar Circuits

## Low-cycle strain-controlled fatigue

87250 Thermal Fatigue Reliability of SMT Packages and Interconnections

## Low-temperature standby-current (LTSC)screening technique that measures the IDDS at a low temperature to get a sufficient threshold current margin for the pass/fail criterion

97049 New Screening Concept for Deep-Submicron CMOS VLSIs using Temperature Characteristics of Leakage Currents in MOS Device

## Lower electromigration lifetime

96237 Characterization of VLSI Circuit Interconnect Heating and Failure Under ESD Conditions

## Lumped thermal model

96172 iTEM: A Chip-Level Electromigration Reliability Diagnosis Tool Using Electrothermal Timing Simulation

#### Machine Model (MM), ESD model

92258 Characterization of Dynamic Spatial Conduction Patterns on ESD Protection Circuitry by Photon-Counting Imaging Method

## Magnetic field and hall effect sensors

85060 The Integrated Time and Stress Measurement Device Concept

#### Magnetic Force Microscopy

93168 Internal Current Probing of Integrated Circuits Using Magnetic Force Microscopy [OPA]

#### Maieutic management

94023 Toward the Maieutic Management of Business Systems

#### Management in the microelectronics industry

94023 Toward the Maieutic Management of Business Systems

#### Managing interaction in a hierarchical organization

94023 Toward the Maieutic Management of Business Systems

## Margin testing

90237 Analysis of Thin Film Ferroelectric Aging

#### Markov method

93081 Integration of Physical Reliability Knowledge Into the Design of VLSI-Circuits

#### Mask edge defects

94383 Impact of Structure Enhanced Defects Multiplication on Junction Leakage

#### Mass transport kinetics

96131 Stress Relaxation and Microstructural Change in Passivated Al(Cu) Lines During Isothermal Annealing

## Mass transport model, in conjunction with environmental, thermal, and mechanical stresses was proposed to explain this failure mechanism

97206 Via Delamination - A Novel Electromigration Failure Mechanism - Via Delamination

#### Matched transistor

92081	Mismatch Drift: A Relia	cility Issue for	Analog MOS Circuits
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#### Material deposition

91167 The Role of Focused Ion Beams in Physical Failure Analysis

#### Material interfaces

93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages

## Material removal

91167 The Role of Focused Ion Beams in Physical Failure Analysis

#### Mavericks, misprocessed

92268 Reliability Defect Detection and Screen during Processing -- Theory and Implementation

## Maximum creep strains: at component-solder and pad solder

94458 Thermomechanical Reliability Assessment in SM- and COB-Technology by Combined Experimental and Finite Element Method

## Maximum likelihood estimators

88192 Statistics For Electromigration Testing [OPA]

## **MCM** interconnection

96332 Novel MCM Interconnection Analysis Using Capacitive Charge Generation (CCG)

## Meantime to failure (MTF) of AI and other metals

87126 Electromigration of Bias-Sputtered Al and Comparison with Others

## Measure temperature distributions

96342 Failure Analysis of Sub-Micrometer Devices and Structures by Scanning Thermal Microscopy

## Measured capacitance-voltage characteristics for three diferent values of oxide thickness

97184 Determination of Ultra-Thin Oxide Voltage and Thickness for Dual-Gate Poly FET Structures

## Measured gate threshold voltage shifts and de-coupled front and back gate threshold voltage shifts by accumulating the opposite shift

97296 A Novel Methodology for Reliability Studies in Fully Depleted SOI MOSFETs

#### Measurement capability

92251 The Bond Shear Test: An Application for the Reduction of Common Causes of Gold Ball Bond Process Variation

## Measurement capability, shear system

92251 The Bond Shear Test: An Application for the Reduction of Common Causes of Gold Ball Bond Process Variation

## Measurement of resistance ratio to monitor metal films

90119 The Electrical Resistance Ratio (RR) As a Thin Film Metal Monitor [BPA]

## Measurement system wiring inductance effect on ac hcs determination

91118 AC Hot-Carrier Effects in Scaled MOS Devices

## Measurement technique for energy spectrum of oxide traps

91310 Oxide Field and Temperature Dependences of Gate Oxide Degradation by Substrate Hot Electron Injection

## Measurement: lattice defect kinetics

86253 Thermo-Mechanical Cycling Behavior of AL Thin-Film Metallization

#### Measurements of flat coupons

97149 Towards a Nondestructive Procedure for Component Level Characterization of Molding Compounds

# Measurements of the gate voltage were made in situ using the electrical biasing capability of the FIB system to observe charging effects of the ion beam under a variely of conditions

97072 Effects of Focused Ion Beam (FIB) Irradiation on MOS Transistors

## Measurements, electrical in-process, related to reliability defects

- 92276 Building-In Reliability: Soft Errors -- A Case Study
- 92268 Reliability Defect Detection and Screen during Processing -- Theory and Implementation

#### Measurements: dc polarization

92239 Corrosion Susceptibility of Thin-Film Metallizations

## Measurements: impedance spectroscopy

92239 Corrosion Susceptibility of Thin-Film Metallizations

## Measuring localized joule heating

91245 Direct Measurement of Localized Joule Heating in Silicon Devices by Means of Newly Developed High Resolution IR Microscopy

#### Measuring spatial variation in temperature using latex SEM calibration spheres

86019 A Novel Method for Measuring Nonuniformities in Metallization Temperatures of an Operating Integrated Circuit

#### Mechanical cross-sectioning

93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages

## Mechanical damage detection

91152 Application of Infrared Microscopy for Bond Pad Damage Detection

#### Mechanical life test

95311 Design Rules for Reliable Surface-Micromachined Sensors

#### Mechanical properties

95097 Polyimide Fatigue Induced Chip Surface Damage in DRAM's Lead-On-Chip (LOC) Packages

## Mechanical properties of thin films

94108 Mechanical Properties and Adhesion Measurements of Films used in Advanced Packages

## Mechanical shock testing

95311 Design Rules for Reliable Surface-Micromachined Sensors

#### **Mechanical stress**

93204 Thermal Cycling Reliability of Die Bonding Adhesives

## Mechanical stress by p-SiN layer degradation of TDDB

87060 Effect of p-SiN Passivation Layer on Time-Dependent Dielectric Breakdown in SiO2

#### Mechanical stress gradiant changes due to vacancy migration

92205 Relaxation Phenomenon During Electromigration Under Pulsed Current

#### Mechanical stress study on hot carrier-induced degradations of MOSFETs

94029 Analysis of Externally Imposed Mechanical Stress Effects on the Hot-Carrier-Induced Degradation of MOSFETs

#### Mechanical stress, tensile compared with compressive

94029 Analysis of Externally Imposed Mechanical Stress Effects on the Hot-Carrier-Induced Degradation of MOSFETs

#### Mechanical, thermal, and electrical stresses

96084 A new Physics-Based Model for Time-Dependent-Dielectric-Breakdown [BPA]

#### Mechanism of degradation due to Cu contamination

97268 Rapid Degradation of InGaAsP/InP Laser Diode due to Copper Contamination

#### Mechanism study

85074 A Study of Resistance Variations During Electromigration

#### Mechanisms

90145 A Model for EPROM Intrinsic Charge Loss Through Oxide-Nitride-Oxide (ONO) Interpoly Dielectric

## Mechanisms of channel hot electron degradation and gate induced drain leakage

91316 Improved Performance and Reliability of MOSFETs with Thin Gate Oxides Grown at High Temperature

## Median energy to fail

85108 Breakdown Energy of Metal (BEM)--A New Technique For Monitoring Metallization Reliability at Wafer Level [OPA]

## Median time to failure, relationship to current

86030 Electromigration in Aluminum to Tantalum Silicide Contacts

#### Median time-to-failure, current stressing

87136 Pulsed Current Electromigration Failure Model

## Median-time-to-fail versus I/V of unprogrammed antifuses

97025 Characterization and Modeling of a Highly Reliable Metal-to-Metal Antifuse for High-Performance and High-Density Field-Programmable Gate Arrays

#### Memories, nonvolatile

91175 Threshold Voltage Instability and Charge Retention in Nonvolatile Memory Cell with Nitride/Oxide Double-Layered Inter-poly Dielectric

## Memory Cell-traps in tunnel oxide with an ONO Film as inter-poly insulator film passivated by hydrogen

95018 Improving Program/Erase Endurance by Controlling the Inter-poly Process in Flash Memory

## Memory device failure analysis - expert system

93184 Automatic Memory Failure Analysis Using an Expert System in Conjunction with a Memory Tester/Analyzer

#### Memory device failures - Pareto ranking

93184 Automatic Memory Failure Analysis Using an Expert System in Conjunction with a Memory Tester/Analyzer

#### Memory device failures - trend monitoring

93184 Automatic Memory Failure Analysis Using an Expert System in Conjunction with a Memory Tester/Analyzer

## MEMS

95311 Design Rules for Reliable Surface-Micromachined Sensors

#### Mercury light irradiation of PECVD SiN film

86012 Stress Dependent Activation Energy

## Mercury porosimetry, characterization of pores and elastic properities in plastic packages

92198 Mercury Porosimetry Investigation of Plastic, Integrated Circuit Packages

#### Mercury porosimetry, theory of

92198 Mercury Porosimetry Investigation of Plastic, Integrated Circuit Packages

## Mercury porosimetry, used to measure external package cracks and voids

92198 Mercury Porosimetry Investigation of Plastic, Integrated Circuit Packages

#### MESFET

89065 Aging Effects in GaAs Schottky Barrier Diodes

## **MESFET** gate sinking/diffusion

94434 Reliability of a GaAs MMIC Process Based on 0.5 um Au/Pd/Ti Gate MESFETs

## **MESFET Lifetest/MTTF**

94434 Reliability of a GaAs MMIC Process Based on 0.5 um Au/Pd/Ti Gate MESFETs

## MESFET wearout mechanisms

94434 Reliability of a GaAs MMIC Process Based on 0.5 um Au/Pd/Ti Gate MESFETs

## MESFET, FLM7785-4e,flk022WG

87097 Reliability of High Frequency High Power GaAs MESFETs

## Mesoplasma breakdown

86120 Failure Analysis and Failure Mechanisms of High Voltage(530V) GatedDiode Crosspoint Arrays

## Metal bridging in high power GaAs FETS

86144 High Power Pulse Reliability of GaAs Power FETs

## Metal comb/serpentine structure

90072 Electrical Measurements of Moisture Penetration Through Passivation

## Metal contacts

90276 Reliability Study on Polycrystalline Silicon Thin Film Resistors Used in LSIs Under Thermal and Electrical Stress

## Metal defect size to grain size ratio

92373 Influence of Grain Size on Defect-Related Early Failures in VLSI Interconnects

## Metal deposition

91167 The Role of Focused Ion Beams in Physical Failure Analysis

## Metal film topography and lithography

87140 The Effect of Metal Film Topography and Lithography on Grain Size Distributions and on Electomigration Performance

## Metal grains

91250 Application of The Atomic Force Microscope to Integrated Circuit Reliability and Failure Analysis

## Metal interdiffusion

- 86144 High Power Pulse Reliability of GaAs Power FETs
- 86138 Field and Temperature Dependent Life-Time Limiting Effects of Metal-GaAs Interfaces of Device Structures Studied by XPS and Electrical Measurements

## Metal layer resistivity

96156 Reliability and Electrical Properties of New Low Dielectric Constant Interlevel Dielectrics for High Performance ULSI Interconnect

## Metal line reliability

## Metal melt filaments

87174 ESD Phenomena and Protection Issues in CMOS Output Buffers [OPA]

## Metal pitch trends in VLSI devices

90002 Evolution of VLSI Reliability Engineering

## Metal quality - power density

85100 Wafer Level Electromigration Tests for Production Monitoring

## Metal shifting

93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's

## Metal sputter target

96148 Short Loop Monitoring of Metal Stepcoverage by Simple Electrical Measurements

## Metal stepcoverage monitoring method

96148 Short Loop Monitoring of Metal Stepcoverage by Simple Electrical Measurements

## Metal stress and open failures under passivation

90221 Measurement of Three Dimensional Stress and Modeling of Stress Induced Migration Failure in Aluminum Interconnects

## Metal void effects on electromigration

85126 Stress Induced Voids in Aluminum Interconnects During IC Processing [OPA]

## Metal void, stress induced

86164 Impact of Ceramic Packaging Anneal on Reliability of Al Interconnects

## Metal voids, subsurface imaging using a SEM to detect

90061 Use of Advanced Analytical Techniques for VLSI Failure Analysis

## Metal volume reduction in range 250-450°C

92356 A Novel Via Failure Mechanism in Al-Cu/Ti Double Level Metal System

## Metal-organic chemical vapor deposition of titanium tetrakisisopropoxide

97090 Electrical Reliability of Metal-Organic Chemical Vapor Deposited High Permitivity TiO2 Dielectric Metal=Oxide-Semiconductor Field Effect Transistors

## Metal-to-metal antifuse

97025 Characterization and Modeling of a Highly Reliable Metal-to-Metal Antifuse for High-Performance and High-Density Field-Programmable Gate Arrays

## Metalization, diff. between single AI Si metal & sandwiched Ti/AI-Si metal: stress behavior & fail. analysis

87145 Electromigration Testing of Ti/Al-Si Metallization for Integrated Circuits

## Metallization

- 92356 A Novel Via Failure Mechanism in Al-Cu/Ti Double Level Metal System
- 92349 Three Kinds of Via Electromigration Failure Modes in Multilevel Interconnections
- 92338 Comparison of Electromigration Reliability of Tungsten and Aluminum Vias under DC and Time-Varying Current Stressing
- 92247 A Test Chip for Automatic Reliability Measurements of Interconnect Vias
- 92232 Finite Element Analysis of a SWEAT Structure with a 3-D, Nonlinear, Coupled Thermal-Electric Model
- 92228 Statistical Distribution of 1/f 2 Noise in Thin Metal Films under Accelerated Electromigration Test Conditions
- 92217 Dislocation-based Mechanisms in Electromigration
- 92211 Increase in Electromigration Resistance by Enhancing Backflow Effect
- 92205 Relaxation Phenomenon During Electromigration Under Pulsed Current

## Metallization annealing temperature and SOG relationship to voids

90216 Effects of Residual Water in Spin-on-Glass Layer on Void Formation For Multilevel Interconnections

## Metallization contacts for high temperature stability

87181 Theoretical and Experimental Study of Subsurface Burnout and ESD in GaAs FETs and HEMTs

## Metallization design rule currents , thermal limits

89220 Characterization of Electromigration Under Bidirectional (BC) and Pulsed Unidirectional (PDC) Currents

## Metallization interconnect reliability overestimation

89229 The Electromigration Damage Response Time and Implications for DC and Pulsed Characterizations

## Metallization oxide-layer capacitance

92239 Corrosion Susceptibility of Thin-Film Metallizations

## Metallization oxide-layer resistance

<sup>96156</sup> Reliability and Electrical Properties of New Low Dielectric Constant Interlevel Dielectrics for High Performance ULSI Interconnect

#### 92239 Corrosion Susceptibility of Thin-Film Metallizations

#### Metallization stress voiding

89193 Stress-Driven Diffusive Voiding of Aluminum Conductor Lines

#### Metallization surface and interface free energy

90194 A Newly Developed Model For Stress Induced Slit-Like Voiding

#### Metallization test line temperature maintained at 277°C

89229 The Electromigration Damage Response Time and Implications for DC and Pulsed Characterizations

## Method that increases the yield of FIB-deposited SiO2 films per incident ion by decreasing the current density of the ion beam

97066 Focused Ion Beam Induced Insulator Deposition at Decreased Beam Current Density

#### Method which enables a self-consistent computation of the maximum safe reverse emitter-base stress voltage that may be applied to bipolar transistors

97034 Maximum Safe Reverse Emitter Voltage in Bipolar Transistors for Reliable 10 Year Operation

#### Methods to alleviate the premature on-state avalanche breakdown

97261 Reliability and Alleviation of Premature On-State Avalanche Breakdown in Deep Submicron Power PHEMT's

#### Metrology and CD modeling

97001 Emerging Role of Semiconductor Process Equipment to Overcome Device Failure Mechanisms

#### MFTIR spectroscopy

97066 Focused Ion Beam Induced Insulator Deposition at Decreased Beam Current Density

## Micro machining

95311 Design Rules for Reliable Surface-Micromachined Sensors

#### Micro moire' technique

94458 Thermomechanical Reliability Assessment in SM- and COB-Technology by Combined Experimental and Finite Element Method

#### **Micro-electromechanical Sensor**

95311 Design Rules for Reliable Surface-Micromachined Sensors

#### Micro-machining and metal deposition with FIB

87111 A New VLSI Diagnosis Technique: Focused Ion Beam Assisted Multi-level Circuit Probing

#### Micro-roughness of Si and gate oxide quality

93028 Reaction of DI Water and Silicon and its Effect on Gate Oxide Integrity

#### Micro-sectioning with focused ion beam (FIB)

89043 New Applications of Focused ION Beam Techique to Failure Analysis and Process Monitoring of VLSI

## Micro-size FTIR

96258 Failure Analysis of Cathode Filament Formation in Multilayer PWBs Using Combined Electron Spin Resonance and Micro-FTIR Techniques

#### **Micromechanics measurements**

92217 Dislocation-based Mechanisms in Electromigration

#### Microplasma breakdown

86120 Failure Analysis and Failure Mechanisms of High Voltage(530V) GatedDiode Crosspoint Arrays

#### Microprobe sharpening technique

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95254 Analysis and Optimisation of the Hot-Carrier Degradation Performance of 0.35-µm Fully Overlapped LDD Devices

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93022 Effects of Iron Contamination on Thin Oxide Breakdown and Reliability Characteristics

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93013 A Mechanism for Gate Oxide Damage in Nonuniform Plasma

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93013 A Mechanism for Gate Oxide Damage in Nonuniform Plasma

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93272 Thickness and Other Effects on Oxide and Interface Damage by Plasma Processing

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96067 A New Oxide Degradation Mechanism for Stresses in the Fowler-Nordheim Tunneling Regime

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93280 Correlation Between Negative Bulk Oxide Charge and Breakdown, Modeling, and New Criteria for Dielectric Quality Evaluation

#### Oxide breakdown analysis

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#### Oxide breakdown correlated to positive charges at high injection levels

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#### Oxide breakdown correlation with negative bulk charge

93280 Correlation Between Negative Bulk Oxide Charge and Breakdown, Modeling, and New Criteria for Dielectric Quality Evaluation

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93285 A Model Relating Wearout Induced Physical Changes in Thin Oxides to the Statistical Description of Breakdown

#### Oxide breakdown qualitative model

93280 Correlation Between Negative Bulk Oxide Charge and Breakdown, Modeling, and New Criteria for Dielectric Quality Evaluation

## Oxide breakdown-investigating the cause

95142 The Relation between Oxide Degradation and Oxide Breakdown

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95244 Relation Between Etch Pit Pair and Pipeline Defects in CMOS Device

## Oxide damage, thermal SiO2, plasma induced

93293 Process Induced Oxide Damage and Its Implications to Device Reliability of Submicron Transistors

## Oxide damage, thermal SiO2, process induced

93293 Process Induced Oxide Damage and Its Implications to Device Reliability of Submicron Transistors

## Oxide defect density errors with large area test capacitors

93272 Thickness and Other Effects on Oxide and Interface Damage by Plasma Processing

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93190 A New Low-Voltage Contrast Mechanism to Image Local Defects in Very Thin Silicon Dioxide Films: True Oxide Electron Beam Induced Current

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93190 A New Low-Voltage Contrast Mechanism to Image Local Defects in Very Thin Silicon Dioxide Films: True Oxide Electron Beam Induced Current

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93190 A New Low-Voltage Contrast Mechanism to Image Local Defects in Very Thin Silicon Dioxide Films: True Oxide Electron Beam Induced Current

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93280 Correlation Between Negative Bulk Oxide Charge and Breakdown, Modeling, and New Criteria for Dielectric Quality Evaluation

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97164 Investigation of Oxide Charge Trapping and Detrapping in a n-MOSFET

## **Oxide impurities**

95200 Reliability Assessment of Multiple Quantum Well Avalanche Photodiodes

## Oxide leakage

91183 A New Failure Mechanism Related to Grain Growth in DRAMs

## Oxide passivation

87093 The Effects of Processing on Eeprom Reliability

## Oxide phonons coupling

94368 Long Term Charge Loss in EPROMs with ONO Interpoly Dielectric

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93262 Differentiating Impacts of Hole Trapping vs. Interface States on TDDB Reduction in Thin Oxide Gated Diode Structures

## Oxide quality criteria

93280 Correlation Between Negative Bulk Oxide Charge and Breakdown, Modeling, and New Criteria for Dielectric Quality Evaluation

## Oxide quality, floating gate, control gate, bake stressing in EPROMs

90012 Building Reliability Into EPROMs

#### Oxide quality, H-radical improvement

94161 Highly-Reliable Ultra-Thin Oxide Formation Using Hydrogen-Radical-Balanced Steam Oxidation Technology

## Oxide reliability, thermal SiO2, process effects

93293 Process Induced Oxide Damage and Its Implications to Device Reliability of Submicron Transistors

## Oxide reliability, thermal SiO2, Al gate, iron (Fe) contamination effect

93022 Effects of Iron Contamination on Thin Oxide Breakdown and Reliability Characteristics

## Oxide reliability, thermal SiO2, plasma process charging effects

93272 Thickness and Other Effects on Oxide and Interface Damage by Plasma Processing

## Oxide reliability, thermal SiO2, Si gate, surface roughness effect

93028 Reaction of DI Water and Silicon and its Effect on Gate Oxide Integrity

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90259 Extended Data Retention Characteristics After More Than 10 Write and Erase Cycles In EEPROMs

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91331 Two Dimensionally Inhomogeneous Structure at Gate Electrode/Gate Insulator Interface Causing Fowler-Nordheim Current Deviation in Nonvolatile Memory

## Oxide Temperature Dependent Leakage Current

95149 Gate Oxide Breakdown Model in M0S Transistors

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97184 Determination of Ultra-Thin Oxide Voltage and Thickness for Dual-Gate Poly FET Structures

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96093 Limitations on Oxide Thicknesses in Flash EEPROM Applications

## Oxide trap creation during hot-carrier stress

91129 Increase Hot-Carrier Degradation of n-MOSFETs under Very Fast Transient Stressing

## Oxide trap generation inside thin oxides during high voltage stressing

95131 Properties of High Voltage Stress Generated TBPS in Thin Silicon Oxides [OPA]

## Oxide trap growth rates by hot electron stress and hot hole stress were measured

97292 A New Technique to Measure an Oxide Trap Density in a Hot Carrier Stressed n-MOSFET

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95131 Properties of High Voltage Stress Generated TBPS in Thin Silicon Oxides [OPA]

## Oxide traps-spatial location and energy distribution

95131 Properties of High Voltage Stress Generated TBPS in Thin Silicon Oxides [OPA]

## Oxide voltage and surface potentals in n+poly+Si and p-Si substrate as a function of gate bias

97184 Determination of Ultra-Thin Oxide Voltage and Thickness for Dual-Gate Poly FET Structures

## Oxide voltage versus gate voltage

97184 Determination of Ultra-Thin Oxide Voltage and Thickness for Dual-Gate Poly FET Structures

## Oxide weak spots

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## Oxide wear-out, predicted

94334 Characterization of Wafer Charging Mechanisms and Oxide Survival Prediction Methodology

## Oxide Wearout

95131 Properties of High Voltage Stress Generated TBPS in Thin Silicon Oxides [OPA]

## Oxide wearout model and characterization

93285 A Model Relating Wearout Induced Physical Changes in Thin Oxides to the Statistical Description of Breakdown

## Oxide, floating gate

91171 Effects of Carbon on Charge Loss in EPROM Structures

## Oxide, interpoly

91171 Effects of Carbon on Charge Loss in EPROM Structures

## Oxide, weak spot conduction

94167 Stress-induced Low-Level Leakage Mechanism in Ultrathin Silicon Dioxide Films Caused by Neutral Oxide Trap Generation

## Oxide,(SiO2) breakdown, current density-time (Jt) measurement

93255 Evaluation of Modern Gate Oxide Technologies to Process Charging

## **Oxide-layer thickness**

92239 Corrosion Susceptibility of Thin-Film Metallizations

## Oxide-silicon interface charge trapping effects; time constants

91133 Proof and Quantification of Dynamic Effects in Hot-Carrier-Induced Degradation Under Pulsed Operation Conditions

## Oxide/nitride passivation

87093 The Effects of Processing on Eeprom Reliability

## Oxide/silicon nitride/oxide composite films on rugged polysilicon vs. films on smooth polysilicon

92042 Charge Trapping/Detrapping and Dielectric Breakdown in SiO2/Si3N4/SiO2 Stacked Layers on Rugged Poly-Si under Dynamic Stress

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91171 Effects of Carbon on Charge Loss in EPROM Structures

## Oxides, NO

91175 Threshold Voltage Instability and Charge Retention in Nonvolatile Memory Cell with Nitride/Oxide Double-Layered Inter-poly Dielectric

## Oxides, stressed, reliability

86230 Behavior of SiO2 Under High Electric Field/Current Stress Conditions

## Oxygen content, influence on barrier stability

90087 Reliability Aspects of Thermally Stable LaB6-Au Schottky Contacts to GaAs

## Oxygen effects on refractory gate metals for GaAs MESFETs

90087 Reliability Aspects of Thermally Stable LaB6-Au Schottky Contacts to GaAs

## Oxynitride films failure mechanism

90072 Electrical Measurements of Moisture Penetration Through Passivation

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95156 Suppressed Process-Induced Damage in N2O-annealed SiO2 Gate Dielectrics

## P+ injected latchup

97346 Latch-up Characterization of High Energy Ion Implanted New CMOS Twin Wells that comprised the BILL (Buried Implanted Layer for Lateral Isolation) and B.L./C.L. (Buried Layer/Connecting Layer) Structure

## p+ polysilicon, effect on oxide trapping

- 93147 Bias Temperature Reliability of n+ and p+ Polysilicon Gated n-MOSFETs and p-MOSFETs
- 86183 Hot-Electron Trapping and Generic Reliability of p+ Polysilicon/SiO2/Si Structures for Fine-Line CMOS Technology

## P+poly-PMOSFETs and N+poly-NMOSFETs were fabricated

97174 The Effects of Nitrogen Implant into Gate Electrode on the Characteristics of Dual-Gate MOSFETs with Ultra-Thin Oxide and Oxynitrides

## p-DBR degradation

96211 Degradation Mechanisms of Vertical Cavity Surface Emitting Lasers

## P-DIP

86099 Infrared Microscopy as Applied to Failure Analysis of P-DIP Devices

## P-doping effect

91183 A New Failure Mechanism Related to Grain Growth in DRAMs

## P-doping effects

92085 Pipeline Defects in CMOS MOSFET Devices Caused by SWAMI Isolation

## p-n junction failure modes

87077 On the Validity of ESD Threshold Data Obtained Using Commericial Human-Body Model Simulators

## p-n junction, Ti diffusion

92344 A New Mechanism for Degradation of Al-Si-Cu/TiN/Ti Contacted p-n Junction

## p-n junction, Ti-Si contact interface

92344 A New Mechanism for Degradation of Al-Si-Cu/TiN/Ti Contacted p-n Junction

## p-n junction,time-dependent degradation

92344 A New Mechanism for Degradation of Al-Si-Cu/TiN/Ti Contacted p-n Junction

## P/E endurance of flash memories

95018 Improving Program/Erase Endurance by Controlling the Inter-poly Process in Flash Memory

## P/type epitaxial layer /p+ substrate

97339 A Compact Model of Holding Voltage for Latch-Up in Epitaxial CMOS

## Package

87042 Novel Failure Mechanism and Anomalous Acceleration Factor on a Beam-Lead IC

## Package contamination investigation using SIMS

90061 Use of Advanced Analytical Techniques for VLSI Failure Analysis

## Package cracking

- 95085 Critical Parameters for Achieving Optimum Reflow Profiles for Package Preconditioning
- 95076 Effects of Mold Compound Material Properties on Solder Reflow Package Cracking
- 94101 The Effect of Polyimide Surface Morphology and Chemistry on Package Cracking Induced by Interfacial Delamination
- 91160 Correlation of Surface Mount Plastic Package Reliability Testing to Nondestructive Inspection by Scanning Acoustic Microscopy

## Package cracking during reflow soldering

94114 Simplified and Practical Estimation of Package Cracking During the Reflow Soldering Process

## Package cracking mechanism

97124 Flip Chip Underfill Reliability of CSP During IR Reflow Soldering

## Package delamination

95085 Critical Parameters for Achieving Optimum Reflow Profiles for Package Preconditioning

## Package design

93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages

## Package development, integrity, reliability

93236 A Criterion for Predicting Delamination in Plastic IC Packages

## Package influence on die wearout

87224 A Novel Thermal Expansion Matched Heatspreader For Plastic Encapsulation of Silicon Chips

## Package integrity

- 95107 Anomalous Thermal Conductivity in Regions of Non-uniform Die Attach Integrity
- 93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's

## Package leakage, detection of

85065 A Helium Leak Detector for Small Components

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- 93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages
- 93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's
- 93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages
- 93204 Thermal Cycling Reliability of Die Bonding Adhesives
- 91160 Correlation of Surface Mount Plastic Package Reliability Testing to Nondestructive Inspection by Scanning Acoustic Microscopy

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94114 Simplified and Practical Estimation of Package Cracking During the Reflow Soldering Process

## Package-related metallization shift

89127 On-Chip Measurement of Package-Related Metal Shift Using an Integrated Silicon Sensor

## Packaged die fracture reliability

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#### Packaged transistor experiments

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91160 Correlation of Surface Mount Plastic Package Reliability Testing to Nondestructive Inspection by Scanning Acoustic Microscopy

#### Parameters, ball bonding thermosonic

92251 The Bond Shear Test: An Application for the Reduction of Common Causes of Gold Ball Bond Process Variation

## Parasitic

95024 Impact of Shallow Trench Isolation on Reliability of Buried and Surface Channel sub-µm PFET [OPA]

#### Parasitic base-emitter diode

- 88019 Internal Chip ESD Phenomena Beyond the Protection Circuit
- 87174 ESD Phenomena and Protection Issues in CMOS Output Buffers [OPA]

## Parasitic bipolar action

- 96327 Hydrogen Passivation of Boron Acceptors and Breakdown Voltage Instability in N+/P Surface Avalance Diodes
- 96027 Suppressing the Parasitic Bipolar Action of Ultra-Thin SOI MOSFETs Using Back Side Bias Temperature Treatment

## Parasitic bipolar NMOS transistor

90081 Discrimination of Paraxitic Bipolar Operating Modes in ICs With Emission Microscopy

## Parasitic bipolar operating modes, determination using emission microscopy

90081 Discrimination of Paraxitic Bipolar Operating Modes in ICs With Emission Microscopy

## Parasitic bipolar protection for ESD

87169 A Circular Output Protection Device Using Bipolar Action

## Parasitic bipolar transistors

87169 A Circular Output Protection Device Using Bipolar Action

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95223 Recent Technology of Particle Detection on Patterned Wafer

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96131 Stress Relaxation and Microstructural Change in Passivated Al(Cu) Lines During Isothermal Annealing

## Passivation (undoped oxides, p-doped oxide (PSG), oxynitride, & their sandwiches) EM effects

85115 Passivation Material and Thickness Effects on the MTTF of Al-Si Metallization

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95318 An Accelerated Sodium Resistance Test for IC Passivation Films

## Passivation cracking and AI metal line shifts due to temperature cycling

90252 Temperature-Cycling Acceleration Factors For Aluminum Metallization Failure in VLSI Applications

## Passivation cracking and AI metal shifting temperature cycle acceleration factors

90252 Temperature-Cycling Acceleration Factors For Aluminum Metallization Failure in VLSI Applications

#### Passivation cracking, as a result of temperature cycling

92177 Comparison of Delamination Effects between Temperature Cycling Test and Highly Accelerated Stress Test in Plastic Packaged Devices

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95318 An Accelerated Sodium Resistance Test for IC Passivation Films

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95200 Reliability Assessment of Multiple Quantum Well Avalanche Photodiodes

## Passivation effects, low temperature SiN, thermal stress reduction in Al interconnects

91084 Suppression of Migration in Al Conductors by Lowering Deposition Temperature in Plasma CVD SiN Passivation

#### Passivation of boron acceptors in hydrogen

96327 Hydrogen Passivation of Boron Acceptors and Breakdown Voltage Instability in N+/P Surface Avalance Diodes

## Passivation planarization, spin-on-glass

89122 Improved EPROM Moisture Performance Using Spin-On-Glass (SOG) For Passivation Planarization

## Passivation polyimide

88216 Kinetic Study of Electromigration Failure in Cr/Al-Cu Thin Film Conductors Covered with Polymide and the Problem of the Stress Dependant Activation Energy

## Passivation related stress

92349 Three Kinds of Via Electromigration Failure Modes in Multilevel Interconnections

## Passivation role in EM electromigration study

87136 Pulsed Current Electromigration Failure Model

#### Passivation, affect on degradation

92127 Rapid Degradation of WSi Self-Aligned Gate GaAs MESFET by Hot-Carrier Effect

#### Passivation, electrical measurements of moisture penetration through

90072 Electrical Measurements of Moisture Penetration Through Passivation

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91239 Using Scanned Electron Beams for Testing Microstructure Isolation and Continuity

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95223 Recent Technology of Particle Detection on Patterned Wafer

#### Pb-In solder

85198 Thermal Fatigue Damage in Pb - In Solder Interconnections

PCB, printed circuit boards, material influence on thermal fatigue of solder interconnects

92151 Using FEA to Develop a MIL-HDBK-217 SMT Model

PCT, pressure cooker test (autoclave), failures from investigated with mercury porosimetry

92198 Mercury Porosimetry Investigation of Plastic, Integrated Circuit Packages

#### PDSITE

92068 Substrate-Injection-Induced Program Disturb -- New Reliability Consideration for Flash-EPROM Arrays

#### Peak power density, correlation to ESD performance

93161 Prediction of ESD Robustness of a Process Using 2-D Device Simulations

#### Peck moisture-related failures

93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages

## Peck's model for humidity testing

94072 THB Reliability Models and Life Prediction for Intermittently-Powered Non-Hermetic Components

#### PECVD amorphous silicon

94378 Reliability Mechanism of the Unprogrammed Amorphous Silicon Antifuse

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89152 Angled Implant Fully Overlapped LDD (AI-FOLD) NFETs for Performance and Reliability

#### Performance and reliability, InP HEMTs

93364 Reliability of 0.1 µm InP HEMTs

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95266 On the Degradation Features of Poly-Emitter n-p-n BJTs After Hot-Carrier Injection

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88192 Statistics For Electromigration Testing [OPA]

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87229 Analysis of a Silver Substrate, Gold-Silicon Preform, Die Attach System

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95205 Enhancement and Degradation of Drain Current in Pseudomorphic AlGaAs/InGaAs HEMT's Induced by Hot-Electrons

#### Phosphoric acid, AER

92276 Building-In Reliability: Soft Errors -- A Case Study

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91183 A New Failure Mechanism Related to Grain Growth in DRAMs

#### Photo Emission Microscopy

93178 Energy Resolved Emission Microscope

#### Photo luminescence (PL) applied to laser diodes

93380 A SOM Approach to the Failure Physics of Optoelectronic Devices

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90288 Carbon Doping Effects on Hot Electron Trapping

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93199 Laser Stimulated Electron-Beam Prober for 15ps Resolution Internal Waveform Measurements of a 5 Gb/s ECL Circuit

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93199 Laser Stimulated Electron-Beam Prober for 15ps Resolution Internal Waveform Measurements of a 5 Gb/s ECL Circuit

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- 95200 Reliability Assessment of Multiple Quantum Well Avalanche Photodiodes
- 93372 Reliability of InGaAs/InP Photodiodes Passivated with Polyimide

#### Photoemission microscopy, use to evaluate Schottky contacts

91234 Mapping Evaluation of Inhomogeneously Degraded Au/Pt/Ti Contact to GaAs

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91142 ICFAX, An Integrated Circuit Failure Analysis Expert System

#### Photomasks

91250 Application of The Atomic Force Microscope to Integrated Circuit Reliability and Failure Analysis

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97325 Study of the 3D Phenomenon During ESD Stresses In Deep Submicron Technologies Using a Photon Emission Tool

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94388 Novel Failure Analysis Techniques Using Photon Probing with a Scanning Optical Microscope [BPA]

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## Plastic parts, humidity testing correlation model

86044 Comprehensive Model for Humidity Testing Correlation

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## Polyimide chemistry

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- 93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices
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## Prediction, delamination in plastic packages

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#### Probe sharpening technique

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97184 Determination of Ultra-Thin Oxide Voltage and Thickness for Dual-Gate Poly FET Structures

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- 95303 Accurate Measurement of Small Charges Collected on Junctions from Alpha Particle Strikes Using an Accelerator-Produced Microbeam
- 95297 Boron Compounds as a Dominant Source of Alpha Particles in Semiconductor Devices

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94344 Simulating Total-Dose Radiation Effects on Circuit Behavior

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97090 Electrical Reliability of Metal-Organic Chemical Vapor Deposited High Permitivity TiO2 Dielectric Metal=Oxide-Semiconductor Field Effect Transistors

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92299 Imaging VLSI Cross-Sections by Atomic Force Microscopy

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94114 Simplified and Practical Estimation of Package Cracking During the Reflow Soldering Process

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87140 The Effect of Metal Film Topography and Lithography on Grain Size Distributions and on Electomigration Performance

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89053 A New Reliability Problem Associated With Ar ION Sputter Cleaning of Interconnect VIAS

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89163 Reliability Aspects of Laser Programmable Redundancy: Infrared vs. Green, Polysilicon vs. Silicide [OPA]

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90025 Improvement of Electromigration Resistance of Layered Aluminum Conductors

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91152 Application of Infrared Microscopy for Bond Pad Damage Detection

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95085 Critical Parameters for Achieving Optimum Reflow Profiles for Package Preconditioning

#### **Reflow temperature**

95085 Critical Parameters for Achieving Optimum Reflow Profiles for Package Preconditioning

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90087 Reliability Aspects of Thermally Stable LaB6-Au Schottky Contacts to GaAs

#### Relationship between grain size and the type of distribution

90100 "Are Electromigration Failures Lognormally Distributed?"

## Relationship between lifetime and gate voltage during hot-carrier stress for various NMOSFETs with A-type SiN films and a B-type SiN film

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97307 Enhancement of Hot-Carrier Induced Degradation UnderLow Gate Voltage Stress due to Hydrogen for NMOSFETs with SiN Films

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97307 Enhancement of Hot-Carrier Induced Degradation UnderLow Gate Voltage Stress due to Hydrogen for NMOSFETs with SiN Films

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97253 Screening for Early and Rapid Degradation in GaAs/AlGaAs HBTs

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- 95112 Evaluation of a Plastic Encapsulated Package Using a Scalable Thermal Mechanical Test Chip
- 95048 Impact of Velocity Saturation Region on nMOSFET's Hot-Carrier Reliability at Elevated Temperatures
- 90276 Reliability Study on Polycrystalline Silicon Thin Film Resistors Used in LSIs Under Thermal and Electrical Stress
- 90237 Analysis of Thin Film Ferroelectric Aging

#### Reliability implication of on-state breakdown

97261 Reliability and Alleviation of Premature On-State Avalanche Breakdown in Deep Submicron Power PHEMT's

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## Reliability critical area

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Reliability fallout due to process integration, monitoring, manufacturing control

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91012 Optimal Acceleration of Cyclic THB Tests for Plastic Packaged Devices

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90002 Evolution of VLSI Reliability Engineering

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97282 NBTI - Channel Hot Carrier Effects in Advanced Submicron PFET Technologies

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89059 Analysis of Aluminum Gallium Arsenide Laser Diodes Failing Due to Nonradiative Regions Behind the Facets

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#### Reliability of flip chip CSP (Chip Scale Package)

97124 Flip Chip Underfill Reliability of CSP During IR Reflow Soldering

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95371 Modeling Electromigration Failures in TiN/AI alloy/TiN Multilayered Interconnects and TiN Thin Films

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- 89158 Long Term Reliability of SiO2/SiN/SiO2 Thin Layer Insulator Formed in 9 um Deep Trench on High Boron Concentrated Silicon
- 86215 Reliability of Trench Capacitors for VLSI Memories

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- 93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices
- 92177 Comparison of Delamination Effects between Temperature Cycling Test and Highly Accelerated Stress Test in Plastic Packaged Devices
- 92169 The Impact of Delamination on Stress-Induced and Contamination-Related Failure in Surface Mount ICs

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93057 Novel Self-Stressing Test Structures for Realistic High-Frequency Reliability Characterization [BPA]

## Reliability test structures, high frequency reliability characterization with DC test system

93057 Novel Self-Stressing Test Structures for Realistic High-Frequency Reliability Characterization [BPA]

#### Reliability test structures, hot-carrier induced degradation

93057 Novel Self-Stressing Test Structures for Realistic High-Frequency Reliability Characterization [BPA]

#### Reliability test structures, model for DC-controlled high frequency oscillator

93057 Novel Self-Stressing Test Structures for Realistic High-Frequency Reliability Characterization [BPA]

#### Reliability test structures, oxide breakdown

93057 Novel Self-Stressing Test Structures for Realistic High-Frequency Reliability Characterization [BPA]

## Reliability test structures, temperature sensor and heater

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## Reliability test structures, use on-chip frequency source for high frequency stressing

93057 Novel Self-Stressing Test Structures for Realistic High-Frequency Reliability Characterization [BPA]

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## Reliability tools, BERT, spice simulation

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## Resistance, AC wheatstone bridge network used

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## Resistance, linear increase with time

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95177 Categorizing Light Output Degradation Failures In Light Emitting Diodes(LEDs) Using The Relationship Between Defect Revealing...

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- 92107 Bipolar Reliability Optimization through Surface Compensation of Base Profile
- 92095 Low Frequency 1/f Noise and Current Gain Degradation in BiCMOS n-p-n Transistors

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91193 Anomalous Current Gain Degradation in Bipolar Transistors

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97049 New Screening Concept for Deep-Submicron CMOS VLSIs using Temperature Characteristics of Leakage Currents in MOS Device

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96294 The Effects of Reverse-Bias Emitter-Base Stress on the Cryogenic Operation of Advanced UHV/CVD Si- and SiGe-base Bipolar Transistors

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86144 High Power Pulse Reliability of GaAs Power FETs

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97261 Reliability and Alleviation of Premature On-State Avalanche Breakdown in Deep Submicron Power PHEMT's

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## RH, 125°C/85%, HAST test

93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's

## RH, 35°C/75%, 85°C/30%, 85°C/65%, 85°C/85%, tests

93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's

## RH, 85°C/30%, test

93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages

## RH, 85°C/40%, 85°C/65%, 85°C/85% test

93236 A Criterion for Predicting Delamination in Plastic IC Packages

## RH, 85°C/60%, 85°C/85%

93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices

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92107 Bipolar Reliability Optimization through Surface Compensation of Base Profile

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95048 Impact of Velocity Saturation Region on nMOSFET's Hot-Carrier Reliability at Elevated Temperatures

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90281 Thermal Breakdown of VLSI by ESD Pulses

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86030 Electromigration in Aluminum to Tantalum Silicide Contacts

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- 93147 Bias Temperature Reliability of n+ and p+ Polysilicon Gated n-MOSFETs and p-MOSFETs
- 86183 Hot-Electron Trapping and Generic Reliability of p+ Polysilicon/SiO2/Si Structures for Fine-Line CMOS Technology

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89122 Improved EPROM Moisture Performance Using Spin-On-Glass (SOG) For Passivation Planarization

## Role of silicon and copper as migrating species is different

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90031 Electromigration Performance of CVD-W/AL-ALLOY Multilayered Metallization

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97169 Accelerated Gate-Oxide Breakdown in Mixed Voltage I/O Circuits

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97346 Latch-up Characterization of High Energy Ion Implanted New CMOS Twin Wells that comprised the BILL (Buried Implanted Layer for Lateral Isolation) and B.L./C.L. (Buried Layer/Connecting Layer) Structure

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## SAS-OBIRCH

96346 New Laser Beam Heating Methods Applicable to Fault Localization and Defect Detection in Actual VLSI Devices

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- 93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's
- 92309 Acoustic Evaluation of Electronic Plastic Packages
- 91160 Correlation of Surface Mount Plastic Package Reliability Testing to Nondestructive Inspection by Scanning Acoustic Microscopy

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- 93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices
- 92190 New Thin Plastic Package Crack Mechanism Induced by Hot IC Die
- 92177 Comparison of Delamination Effects between Temperature Cycling Test and Highly Accelerated Stress Test in Plastic Packaged Devices
- 92169 The Impact of Delamination on Stress-Induced and Contamination-Related Failure in Surface Mount ICs
- 92157 Moisture Sensitivity Characterization of Plastic Surface Mount Devices Using Scanning Acoustic Microscopy

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- 92177 Comparison of Delamination Effects between Temperature Cycling Test and Highly Accelerated Stress Test in Plastic Packaged Devices
- 92169 The Impact of Delamination on Stress-Induced and Contamination-Related Failure in Surface Mount ICs
- 92157 Moisture Sensitivity Characterization of Plastic Surface Mount Devices Using Scanning Acoustic Microscopy

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## Scanning Optical Microscope (SOM)

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- 95234 OBIC Analysis of Stressed Polysilicon Resistors
- 94388 Novel Failure Analysis Techniques Using Photon Probing with a Scanning Optical Microscope [BPA]

## Scanning optical microscopy applied to laser diodes

93380 A SOM Approach to the Failure Physics of Optoelectronic Devices

## Scanning Probe Microscopy (SPM)

92299 Imaging VLSI Cross-Sections by Atomic Force Microscopy

91250 Application of The Atomic Force Microscope to Integrated Circuit Reliability and Failure Analysis

## Scanning thermal microscopy

96342 Failure Analysis of Sub-Micrometer Devices and Structures by Scanning Thermal Microscopy

## Scanning Tunneling Microscope (STM)

91250 Application of The Atomic Force Microscope to Integrated Circuit Reliability and Failure Analysis

## Scanning tunneling microscope, probe TIPS for

90069 An Improved Probe Sharpening Techique

## Scanning, entire wafer

92281 Built-In Real-Time Reliability Automation (BIRRA)

#### Scattering loss measurements of calibration specimens

97149 Towards a Nondestructive Procedure for Component Level Characterization of Molding Compounds

## Schottky barrier

95042 Model for the Leakage Instability in Unprogrammed Amorphous Silicon Antifuse Devices

## Schottky barrier instabilities

91206 Reliability Aspects of AlGaAs/GaAs HEMTs

## Schottky gate degradation, improvements with lanthanum hexaboride

90087 Reliability Aspects of Thermally Stable LaB6-Au Schottky Contacts to GaAs

### Schultz reflection method

97201 Effect of Texture on Electromigration of CVD Copper

## SCR latch-up

88119 Detection of Junction Spiking and its Induced Latch-up By Emission Microscopy [OPA]

## SCR model

97333 Study of a CMOS I/O Protection Circuit Using Circuit-level Simulation

## Screening deep-submicron CMOS LSIs with low threshold voltage MOSFETs

97049 New Screening Concept for Deep-Submicron CMOS VLSIs using Temperature Characteristics of Leakage Currents in MOS Device

#### Screening effectiveness of VLSI devices

90002 Evolution of VLSI Reliability Engineering

#### Screening limitations

#### 93077 The Role of Field Performance Information in Building in Reliability

#### Screening methodology

93077 The Role of Field Performance Information in Building in Reliability

#### Screening, reliability

92276 Building-In Reliability: Soft Errors -- A Case Study

92268 Reliability Defect Detection and Screen during Processing -- Theory and Implementation

## Scrub-in, oxidizing temperatures

88076 Gold-Silicon Fiber Shorts in VLSI Devices

## Se Ag plating impurity caused die attach failure

91008 The Influence of Selenium Deposited on Silver Plating on Adhesive Strength of Die-Attachment

## Se Ag plating impurity caused epoxy adhesive strength reduction

91008 The Influence of Selenium Deposited on Silver Plating on Adhesive Strength of Die-Attachment

## Se Ag plating impurity caused epoxy resin bleedout

91008 The Influence of Selenium Deposited on Silver Plating on Adhesive Strength of Die-Attachment

## Se Ag plating impurity caused epoxy shear strength reduction

91008 The Influence of Selenium Deposited on Silver Plating on Adhesive Strength of Die-Attachment

## Se rich leadframe plating caused die attach failure

91008 The Influence of Selenium Deposited on Silver Plating on Adhesive Strength of Die-Attachment

## Se rich leadframe plating caused epoxy resin bleedout

91008 The Influence of Selenium Deposited on Silver Plating on Adhesive Strength of Die-Attachment

## Se rich leadframe plating caused sheer strength reduction

91008 The Influence of Selenium Deposited on Silver Plating on Adhesive Strength of Die-Attachment

## Se rich plating surface caused die attach failure

91008 The Influence of Selenium Deposited on Silver Plating on Adhesive Strength of Die-Attachment

## Se rich plating surface caused epoxy adhesive strength reduction

91008 The Influence of Selenium Deposited on Silver Plating on Adhesive Strength of Die-Attachment

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## Se rich plating surface caused epoxy sheer strength reduction

91008 The Influence of Selenium Deposited on Silver Plating on Adhesive Strength of Die-Attachment

## Sealing glass reduction by reaction with molybdenum

93103 Investigation of Short Circuit Caused by Reduction of PbO Sealing Glass Used for VLSI Package

## Sealing glass, lead oxide (PbO) sealing glass short circuit

93103 Investigation of Short Circuit Caused by Reduction of PbO Sealing Glass Used for VLSI Package

## Second breakdown trigger current, correlation to ESD performance

93161 Prediction of ESD Robustness of a Process Using 2-D Device Simulations

## Secondary breakdown photo emission

94286 Photon Emission Study of ESD Protection Devices under Second Breakdown Conditions

## Secondary electrons (SEs)

91239 Using Scanned Electron Beams for Testing Microstructure Isolation and Continuity

## Secondary Ion Mas Spectroscopy (SIMS) and Spreading Resistance Profilometry (SRP)

97007 Gate Stack Reliability Improvements Using Controlled Ambient Processing

## Secondary physical mechanisms

97300 Key Hot-Carrier Degradation Model Calibration and Verification Issues for Accurate AC Circuit-Level Reliability Simulation

## Self convergent progamming method (SCP)

97104 Hot Carrier Self Convergent Programming Method for Multi-Level Flash Cell Memory

## Self heating effects

92361 Three-Dimensional Simulations of Temperature and Current Density Distribution in a Via Structure

## SEM

91250 Application of The Atomic Force Microscope to Integrated Circuit Reliability and Failure Analysis

#### SEM cross section

92356 A Novel Via Failure Mechanism in Al-Cu/Ti Double Level Metal System

## SEM Imaging

95223 Recent Technology of Particle Detection on Patterned Wafer

## SEM technique

- 92304 Analysis of Silicide Process Defects by Non-Contact Electron-Beam Charging
- 92288 Rapid Localization of IC Open Conductors Using Charge-Induced Voltage Alteration (CIVA)

## SEM voltage contrast

93190 A New Low-Voltage Contrast Mechanism to Image Local Defects in Very Thin Silicon Dioxide Films: True Oxide Electron Beam Induced Current

## Semi-custom logic ICs

87107 Computer Guided Logic IC Fault Location

## Semi-insulating GaAs substrate

88102 Alpha-Particle-Induced Soft-Error Mechanism in Semi-Insulating GaAsSubstrate

## Sensitivity of degradation to drain and substrate current modeling errors is examined

97300 Key Hot-Carrier Degradation Model Calibration and Verification Issues for Accurate AC Circuit-Level Reliability Simulation

# Separate the reflected signal from the bottom of the die from the superimposed signal and to determine the condition of the die attach and thermal conductivity of thin semiconductor devices

97136 A Study of Separation of Superimposed Ultrasonic Pulse Echo Signals for Semiconductor Failure Analysis using Scanning Acoustic Tomography (S.A.T.)

## Separate the reflected signal from the die bottom from the superimposed signal

97136 A Study of Separation of Superimposed Ultrasonic Pulse Echo Signals for Semiconductor Failure Analysis using Scanning Acoustic Tomography (S.A.T.)

## Sequence of gate patterning followed by nitrogen implantation results in nitrogen implantation into ghe source / drain

97174 The Effects of Nitrogen Implant into Gate Electrode on the Characteristics of Dual-Gate MOSFETs with Ultra-Thin Oxide and Oxynitrides

## Sequential test of stress-induced migration & electromigration

94252 Electromigration after Stress-Induced Migration Test in Quarter-Micron Al Interconnects

## Sequential Tunneling Mechanism

95162 A Hot-Carrier Induced Low-Level Leakage Current in Thin Silicon Dioxide Films

## Series of oxide charge detrapping and subthreshold current measurement phases was performed

97292 A New Technique to Measure an Oxide Trap Density in a Hot Carrier Stressed n-MOSFET

## SEU in GaAs MESFETs, enhanced charge collection

93357 Examination of the SEU Sensitivity of GaAs MESFETs via 2-D Computer Simulation and Picosecond Charge Collection Experiments

#### Several types of via defect-induced degradation behaviors

97044 Correlations Between Initial Via Resistance and Reliablity Performance

## SF6

92315 Reactive Ion Etching for Failure Analysis Applications

#### Shallow junction

92102 Defect-Free Shallow p-n Junction by Point-Defect Engineering

#### Shallow trench isolation

95024 Impact of Shallow Trench Isolation on Reliability of Buried and Surface Channel sub-µm PFET [OPA]

## Shallow Trench Isolation (STI) isolation technology

97346 Latch-up Characterization of High Energy Ion Implanted New CMOS Twin Wells that comprised the BILL (Buried Implanted Layer for Lateral Isolation) and B.L./C.L. (Buried Layer/Connecting Layer) Structure

#### Shear displacement

91160 Correlation of Surface Mount Plastic Package Reliability Testing to Nondestructive Inspection by Scanning Acoustic Microscopy

#### Shear modulus, stress

93236 A Criterion for Predicting Delamination in Plastic IC Packages

## Shear strength, Au ball bond

92251 The Bond Shear Test: An Application for the Reduction of Common Causes of Gold Ball Bond Process Variation

## Shear stress, plastic deformation

88071 Plastic Packaging Stress Induced Failure in TiW/AI-Si Metal to Silicide Contacts

## Shear test ball bond

92251 The Bond Shear Test: An Application for the Reduction of Common Causes of Gold Ball Bond Process Variation

### Shear tests

97124 Flip Chip Underfill Reliability of CSP During IR Reflow Soldering

## Sheet resistance

97174 The Effects of Nitrogen Implant into Gate Electrode on the Characteristics of Dual-Gate MOSFETs with Ultra-Thin Oxide and Oxynitrides

## Sheet resistance effect of annealing temperature

88173 Effects of Annealing Temperature on Electromigration Performance of Multilayer Metallization Systems

## Sheet resistance of the AI/W lines without W oxide at the interface

97221 Effect of Al-W Intermetallic Compounds on Electromigration in Al/CVD-W Interconnects

## SHH injection technique

97156 Evidence of Electron-Hole Cooperation in SiO2 Dielectric Breakdown

## Shift of the maximum transconductance (Gmax) is mostly controlled by the CHC damage through hot hole injection

97282 NBTI - Channel Hot Carrier Effects in Advanced Submicron PFET Technologies

## Short-timescale spatial mapping of temperature fileds in unpassivated interconnects

97320 Short-Timescale Thermal Mapping of Interconnects

#### Shortcoming of quasi-static model for ac lifetime estimation

91129 Increase Hot-Carrier Degradation of n-MOSFETs under Very Fast Transient Stressing

#### Shortloop equipment monitoring

96148 Short Loop Monitoring of Metal Stepcoverage by Simple Electrical Measurements

#### Shunt layers/vias and contacts

97211 Recent Problems in Electromigration Testing

## Si accumulation in the contact window

87154 Kinetics of Contact Wearout for Silicided (TiSi2) and Non-SilicidedContacts

## Si damage

91152 Application of Infrared Microscopy for Bond Pad Damage Detection

## Si flaws

87216 Measurement of Silicon Strength as Affected By Wafer Back Processing

#### Si Nitride/GaAs surface preparation, Effects on Metal migration on GaAs

87102 Interelectrode Metal Migration on GaAs

#### Si Nodule size effect on electromigration

85138 Si Nodule Formation in Al-Si Metallization

#### Si nodule, formation

88230 High Reliable Al-Si Alloy/Si Contacts by Rapid Thermal Sintering

#### Si nodules

91152 Application of Infrared Microscopy for Bond Pad Damage Detection

#### Si nodules, stress induced

86164 Impact of Ceramic Packaging Anneal on Reliability of Al Interconnects

#### Si precipitates

86102 A Study of Gold Ball Bond Intermetallic Formation in PEDs Using Infra-Red Microscopy

#### Si protuberance

91183 A New Failure Mechanism Related to Grain Growth in DRAMs

#### Si rich inter-metal oxides

92011 Internal Passivation for Suppression of Device Instabilities Induced by Backend Processes

#### Si strength, wafer back processing

87216 Measurement of Silicon Strength as Affected By Wafer Back Processing

#### Si surface flaws, methods of reducing

89131 The Impact of Wafer Back Surface Finish on Chip Strength

#### Si surface flaws, stress concentration sites

89131 The Impact of Wafer Back Surface Finish on Chip Strength

#### Si surface micro-roughness, HF treated, deionized (DI) water effect

93028 Reaction of DI Water and Silicon and its Effect on Gate Oxide Integrity

#### Si Tantalum integrated circuit (STIC) resistors, failure mechanisms

93094 Failure Mechanisms of Thin Silicon Tantalum Integrated Circuit (STIC) Resistors on Multi-Chip Module (MCM)

#### Si wafer, method for permanently identifying individual DIE

86172 Radial Dependency of Reliability Defects on Silicon Wafers

#### Si wafer, radial dependency on reliability defects

86172 Radial Dependency of Reliability Defects on Silicon Wafers

#### Si wafer-back processing fractures

87216 Measurement of Silicon Strength as Affected By Wafer Back Processing

#### Si- and SiGe-base bipolar transistors

96294 The Effects of Reverse-Bias Emitter-Base Stress on the Cryogenic Operation of Advanced UHV/CVD Si- and SiGe-base Bipolar Transistors

## Si-carbon/graphite composite heat spreader

87224 A Novel Thermal Expansion Matched Heatspreader For Plastic Encapsulation of Silicon Chips

#### Si-SiO2 interface

94232 The Effect of Plasma-Induced Oxide and Interface Degradation on Hot-Carrier Reliability

#### Si/SiO2 interface, hole & electron traps creation

86230 Behavior of SiO2 Under High Electric Field/Current Stress Conditions

#### Si3N4 deposited using LPCVD

87050 Highly Reliable Trench Capacitor With Sio2/Si3N4/Sio2 Stacked Film

#### Si3N4 film as a implantation mask vs SiO2

91255 Formation of a Defect-Free Junction Layer by Controlling Defects Due to As+ Implantation

#### SiC heat conductivity

87224 A Novel Thermal Expansion Matched Heatspreader For Plastic Encapsulation of Silicon Chips

SiC. high power, temperature applications, reliability analysis, automotive, aircraft engine applications

94351 High Temperature Stressing of SiC JFETs at 300 °C

#### Sidegating and backgating in GaAs FETs

92049 Long-term Effects of Sidegating on GaAs MESFETs

## Sidewall

95024 Impact of Shallow Trench Isolation on Reliability of Buried and Surface Channel sub-µm PFET [OPA]

## SIEC components

96100 A Quantitative Analysis of Stress Induced Excess Current (SIEC) in SiO2 Films

#### Sigma variations due to defect/grain size ratio

92373 Influence of Grain Size on Defect-Related Early Failures in VLSI Interconnects

## Signal asymmetry effect on electromigration

89220 Characterization of Electromigration Under Bidirectional (BC) and Pulsed Unidirectional (PDC) Currents

#### Signal generation

96366 Nanoscopic EBIC Technique in a Hybrid SEM/SFM system

## Signal loss

90237 Analysis of Thin Film Ferroelectric Aging

#### Significant shifts in transistor parameters

97072 Effects of Focused Ion Beam (FIB) Irradiation on MOS Transistors

#### Significant shifts in transistor parameterss

97072 Effects of Focused Ion Beam (FIB) Irradiation on MOS Transistors

#### Silane-based PECVD oxide vs. TEOS-based oxide

92122 Impact of Inter-Metal-Oxide Deposition Condition on NMOS and PMOS Transistor Hot-Carrier Effect

#### SILC

- 96093 Limitations on Oxide Thicknesses in Flash EEPROM Applications
- 96012 The Effect of the Floating Gate/Tunnel SiO2 Interface on FLASH Memory Data Retention

#### Silicide

89163 Reliability Aspects of Laser Programmable Redundancy: Infrared vs. Green, Polysilicon vs. Silicide [OPA]

#### Silicide nitride induced thickfield threshold voltage instability

92011 Internal Passivation for Suppression of Device Instabilities Induced by Backend Processes

#### Silicide-block option feasible in Building-in EOS/ESD reliability in a process

95276 Building-in ESD/EOS Reliability for Sub-halfmicron CMOS Processes

#### Silicon carbide (SiC), emerging technology

94351 High Temperature Stressing of SiC JFETs at 300 °C

#### Silicon dioxide breakdown anode hole injection model

93007 Hole Injection Oxide Breakdown Model for Very Low Voltage Lifetime Extrapolation

#### Silicon dioxide breakdown quantitative model

93007 Hole Injection Oxide Breakdown Model for Very Low Voltage Lifetime Extrapolation

#### Silicon dioxide cracking

87238 Thin-Film Cracking and Wire Ball Shear in Plastic Dips Due to Temperature Cycle and Thermal Shock

#### Silicon dioxide delamination

87238 Thin-Film Cracking and Wire Ball Shear in Plastic Dips Due to Temperature Cycle and Thermal Shock

#### Silicon dioxide etching

92315 Reactive Ion Etching for Failure Analysis Applications

#### Silicon dioxide films

96274 Stress in High Rate Deposited Silicon Dioxide Films for MCM Applications

#### Silicon dioxide reliability, statistical modeling

88131 Statistical Modeling of Silicon Dioxide Reliability [BPA]

#### Silicon nitride (Si3N4) based gate dielectric

85018 A 100 Å Thick Stacked SiO2/Si3N4/SiO2 Dielectric Layer for Memory Capacitor

#### Silicon nitride cantilever

91250 Application of The Atomic Force Microscope to Integrated Circuit Reliability and Failure Analysis

#### Silicon nitride passivation caused the problem

92112 Post-Stress Interface Trap Generation: A New Hot-Carrier-Induced Degradation Phenomeon in Passivated n-Channel MOSFETs

## Silicon nitride thin film in ONO capacitors

92031 The Effect of Surface Roughness of Si3N4 Films on TDDB Characteristics of ONO Films

#### Silicon nodules - size

85138 Si Nodule Formation in Al-Si Metallization

#### Silicon nodules- creep caused by TC mismatch

85142 The Influence of Stress on Aluminum Conductor Life

#### Silicon On Insulator (SOI)

- 91245 Direct Measurement of Localized Joule Heating in Silicon Devices by Means of Newly Developed High Resolution IR Microscopy
- 91239 Using Scanned Electron Beams for Testing Microstructure Isolation and Continuity

#### Silicon-hydrogen bond

95042 Model for the Leakage Instability in Unprogrammed Amorphous Silicon Antifuse Devices

#### SIMOX, MOSFETs, buried-channel (BC), ultra-thin (50nm)

94057 Hot-Carrier--Induced Degradation in Ultra-Thin, Fully-Depleted, Deep-Submicron nMOS & pMOS SOI Transistors

#### SIMOX, nMOS, surface-channel (SC), FD, ultra-thin (50nm)

94057 Hot-Carrier--Induced Degradation in Ultra-Thin, Fully-Depleted, Deep-Submicron nMOS & pMOS SOI Transistors

#### Simple electrical measurements

96148 Short Loop Monitoring of Metal Stepcoverage by Simple Electrical Measurements

## SIMS and EDX analysis

96012 The Effect of the Floating Gate/Tunnel SiO2 Interface on FLASH Memory Data Retention

## Simulation

90164 Hot-Carrier Reliability of Bipolar Transistors

#### Simulation to estimate reliability not mature

95001 TRENDS FOR DEEP SUBMICRON VLSI AND THEIR IMPLICATIONS FOR RELIABILITY

#### Simulations, electrothermal

93161 Prediction of ESD Robustness of a Process Using 2-D Device Simulations

#### Simulations, ESD events

93161 Prediction of ESD Robustness of a Process Using 2-D Device Simulations

## Simulator

95303 Accurate Measurement of Small Charges Collected on Junctions from Alpha Particle Strikes Using an Accelerator-Produced Microbeam

#### SiN and/or AI film, FTIR and SIMS characterization

86024 Suppression of Stress Induced Aluminum Void Formation

#### SiN anti-fuse

94225 Relation Between Stress-Induced Leakage Current & Dielectric Breakdown in SiN-Based Antifuses

## Single crystal AI, interconnects

93071 New Method of Making Al Single Crystal Interconnections on Amorphous Insulators

## Single event upset (SEU) effects, GaAs MESFETs

93357 Examination of the SEU Sensitivity of GaAs MESFETs via 2-D Computer Simulation and Picosecond Charge Collection Experiments

## Single failure mode dominates

96203 Reliability Study of 850nm VCSELs for Data Communications

## Single finger NMOS

97325 Study of the 3D Phenomenon During ESD Stresses In Deep Submicron Technologies Using a Photon Emission Tool

## Single transistor floating-gate memory cell reliability

88158 Reliability Performance of ETOX Based Flash Memories

#### SiNx

95036 ON-State, Programming and OFF-State Reliability of Metal-to-Metal Antifuse Based 10 nm-Thick SiNx Film For 3.3 V Operation

#### SiO2 gate oxide reliability

85024 A Quantitative Physical Model for Time-Dependent Breakdown in SiO2

#### Slit like voids

92356 A Novel Via Failure Mechanism in Al-Cu/Ti Double Level Metal System

#### Slit voids in Al interconnect during storage test

94252 Electromigration after Stress-Induced Migration Test in Quarter-Micron Al Interconnects

## Slit voids, nucleation at stress voids during electromigration

93297 Electromigration in Stress-Voided Al Alloy Conductors

#### Slit-like void mechanism

90194 A Newly Developed Model For Stress Induced Slit-Like Voiding

#### SM life

95353 A New Analysis of Stress Relaxation Phenomenon for Stress Migration Tolerance Estimation

## Small outline devices (SOIC, SOJ) moisture sensitivity

92182 X-ray Analysis of Package Cracking During Reflow Soldering

#### SMC, PLCC with Cu J-leads, 68 pins

87250 Thermal Fatigue Reliability of SMT Packages and Interconnections

## SMC, such as 68/84 PLCC & 100 QFP, concerns with package cracking, & wire bond failures

88083 Moisture Induced Package Cracking in Plastic Encapsulated Surface Mont Components During Solder Reflow Process

#### SMD

88234 Fatigue of Soft-Solder Contacts at Surface-Mounted Devices

#### 88090 Analysis of Package Cracking During Reflow Soldering Process

## SMD AI solder corrosion

87212 Improvement of Moisture Resistance by ION-Exchange Process

#### SMD moisture resistance

87212 Improvement of Moisture Resistance by ION-Exchange Process

### SMD pad Al corrosion failure

87212 Improvement of Moisture Resistance by ION-Exchange Process

## SMD, SOP, QFP

88059 A New Bond Failure Wire Crater in Surface Mount Device

#### Snapback

96327 Hydrogen Passivation of Boron Acceptors and Breakdown Voltage Instability in N+/P Surface Avalance Diodes

## Snapback stress for in-process monitor of oxide damages, improving reliability of finished n-MOSFET's

92116 An In-Process Monitor for n-Channel MOSFET Hot-Carrier Lifetimes

#### Sodium Bicarbonate

95318 An Accelerated Sodium Resistance Test for IC Passivation Films

## Sodium contamination, EPROM reliability failure model

88167 The Impact of an External Sodium Diffusion Source on the Reliability of MOS Circuitry

## Sodium Elimination

94249 Built-In Reliability through Sodium Elimination

#### Sodium Levels 5E18cm^-3 around metal layers

94249 Built-In Reliability through Sodium Elimination

#### Sodium Levels measured with SIMS

94249 Built-In Reliability through Sodium Elimination

#### Soft breakdown

92344 A New Mechanism for Degradation of Al-Si-Cu/TiN/Ti Contacted p-n Junction

#### Soft error Montecarlo model, SEMM, Computer program

94012 Accurate, Predictive Modeling of Soft Error Rate Due to Cosmic Rays and Chip Alpha Radiation

#### Soft Error Rate (SER)

- 95303 Accurate Measurement of Small Charges Collected on Junctions from Alpha Particle Strikes Using an Accelerator-Produced Microbeam
- 95297 Boron Compounds as a Dominant Source of Alpha Particles in Semiconductor Devices
- 92276 Building-In Reliability: Soft Errors -- A Case Study

#### Soft error rate (SER) testing

86235 Soft Error Rate Reduction in Dynamic Memory with Trench Capacitor Cell

#### Soft error rate (SER), probability calculation

94012 Accurate, Predictive Modeling of Soft Error Rate Due to Cosmic Rays and Chip Alpha Radiation

#### Soft error rates for trench capacitor DRAMS

86215 Reliability of Trench Capacitors for VLSI Memories

#### Soft error, charge collection mechanism

88102 Alpha-Particle-Induced Soft-Error Mechanism in Semi-Insulating GaAsSubstrate

## Soft errors

86235 Soft Error Rate Reduction in Dynamic Memory with Trench Capacitor Cell

## Soft errors, cell vs. bitline sensitivity

93150 Soft-Error Study of DRAMs Using Nuclear Microprobe

#### Soft errors, effect of retrograde wells

93150 Soft-Error Study of DRAMs Using Nuclear Microprobe

#### Soft errors, improvement with buried layer

93156 Soft-Error-Rate Improvement in Advanced BiCMOS SRAMs

## Soft errors, improvement with triple well

93156 Soft-Error-Rate Improvement in Advanced BiCMOS SRAMs

#### Soft errors, local sensitivity to

93150 Soft-Error Study of DRAMs Using Nuclear Microprobe

#### Soft errors, observation with nuclear microprobe

93150 Soft-Error Study of DRAMs Using Nuclear Microprobe

## Soft solders

93204 Thermal Cycling Reliability of Die Bonding Adhesives

## Soft-error immunity

92003 The Evaluation of 16-Mbit Memory Chips with Built-in Reliability

#### Soft-error, simulation system

94339 CMOS-SRAM Soft-Error Simulation System

#### Soft-soldered contacts, fatigue

88234 Fatigue of Soft-Solder Contacts at Surface-Mounted Devices

#### Software programs

91142 ICFAX, An Integrated Circuit Failure Analysis Expert System

#### Software, IC failure analysis aids, FASTData, FASTHelp, FASTAdvice

94325 The Advent of Failure Analysis Software Technology

## SOG planarization

94399 A New Mechanism of Pipeline Defect Formation in CMOS Devices

#### SOI CMOS output buffers, ESD protection

- 94292 Comparison of ESD Protection Capability of SOI and BULK CMOS Output Buffers
- SOI difficulties in handling negative ESD

94292 Comparison of ESD Protection Capability of SOI and BULK CMOS Output Buffers

## SOI MOSFET

96027 Suppressing the Parasitic Bipolar Action of Ultra-Thin SOI MOSFETs Using Back Side Bias Temperature Treatment

## SOI MOSFET, drain structure design help using gate current measurement

94052 Characterization of Hot-Carrier Effects in Thin-Film Fully-Depleted SOI MOSFETs

## SOI MOSFETs, fully depleted, hot-carrier effects

94052 Characterization of Hot-Carrier Effects in Thin-Film Fully-Depleted SOI MOSFETs

## SOI nMOSFETs, fully depleted thin-film

93053 AC Hot-Carrier Degradation in a Voltage Controlled Oscillator

## SOI, MOSFET, fully depleted, ultra-thin, hot-carrier immunity, fair

94057 Hot-Carrier--Induced Degradation in Ultra-Thin, Fully-Depleted, Deep-Submicron nMOS & pMOS SOI Transistors

## SOJ, 28 pin

93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices

## SOL-GEL deposition

90231 Electrical Conduction and Breakdown in SOL-GEL Derived PZT Thin Films

## Sol-gel ferroelectrics

94238 Novel Methods for the Reliability Testing of Ferroelectric DRAM Storage Capacitors

#### Solder (vapor phase) reflow, component temperatures 215 - 260°C

88083 Moisture Induced Package Cracking in Plastic Encapsulated Surface Mont Components During Solder Reflow Process

#### Solder (vapor phase) reflow, package cracking, wire bond failure

88083 Moisture Induced Package Cracking in Plastic Encapsulated Surface Mont Components During Solder Reflow Process

#### Solder alloy, 63wt% Sn- 37wt% Pb

87250 Thermal Fatigue Reliability of SMT Packages and Interconnections

#### Solder ball array carriers

93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages

## Solder bump

85198 Thermal Fatigue Damage in Pb - In Solder Interconnections

## Solder joint

95093 Modeling the Effect of Oxygen on the Fatigue Lifetime of Solder Joints

#### Solder joint reliability

94458 Thermomechanical Reliability Assessment in SM- and COB-Technology by Combined Experimental and Finite Element Method

## Solder joint reliability, effect of tin/Cu intermetallics

93209 The Dependence of the Activation Energies of Intermetallic Formation on the Composition of Composite Sn/Pb Solders

#### Solder joint, excessive vibration

88226 A Review of IC Fabrication Design and Assembly Defects Manifested as Field Failures in Air Force Avionic Equipment

#### Solder joints, surface mount technology

93209 The Dependence of the Activation Energies of Intermetallic Formation on the Composition of Composite Sn/Pb Solders

#### Solder plate hardness

94108 Mechanical Properties and Adhesion Measurements of Films used in Advanced Packages

#### Solder reflow

95085 Critical Parameters for Achieving Optimum Reflow Profiles for Package Preconditioning

#### Solder reflow, effect on integrated circuit reliability

- 92182 X-ray Analysis of Package Cracking During Reflow Soldering
- 92169 The Impact of Delamination on Stress-Induced and Contamination-Related Failure in Surface Mount ICs
- 92157 Moisture Sensitivity Characterization of Plastic Surface Mount Devices Using Scanning Acoustic Microscopy
- 85192 Moisture Resistance Degradation of Plastic LSIs by Reflow Soldering

#### Solder reflow, effect on package cracking

85192 Moisture Resistance Degradation of Plastic LSIs by Reflow Soldering

#### Solder reflow, package cracking

88090 Analysis of Package Cracking During Reflow Soldering Process

#### Solder relaxation

95093 Modeling the Effect of Oxygen on the Fatigue Lifetime of Solder Joints

#### Solder, empirical model of thermal fatigue

85198 Thermal Fatigue Damage in Pb - In Solder Interconnections

#### Solder, layer damage failure mechanism

86079 A Layer Damage Model For Calculating Thermal Fatigue Lifetime of Power Devices

#### Solder, role of crack nucleation and growth kinetics in thermal fatigue

85198 Thermal Fatigue Damage in Pb - In Solder Interconnections

## Solder, role of Cu intermetallics in thermal fatigue

85198 Thermal Fatigue Damage in Pb - In Solder Interconnections

#### Solder, SnPb40, microstructure, strain

88234 Fatigue of Soft-Solder Contacts at Surface-Mounted Devices

#### Solder, thermal fatigue of Pb-In solder interconnects

85198 Thermal Fatigue Damage in Pb - In Solder Interconnections

## Solder, Tin(63)/Lead(37)

93209 The Dependence of the Activation Energies of Intermetallic Formation on the Composition of Composite Sn/Pb Solders

## Solder, ultimate shear strain

93204 Thermal Cycling Reliability of Die Bonding Adhesives

## Solder-Reflow induced damage prediction by preconditioning

94079 Ambient Moisture Characterization of Thin Small Outline Packages (TSOPs)

## Soldermask delamination

93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages

#### SOM, failure analysis of AlGaAs/GaAs laser diodes

93380 A SOM Approach to the Failure Physics of Optoelectronic Devices

#### SOM, III-V material analysis

93380 A SOM Approach to the Failure Physics of Optoelectronic Devices

#### SOM, OBIC and PL, analysis of laser diodes

93380 A SOM Approach to the Failure Physics of Optoelectronic Devices

#### Source and drain resistance changes

91206 Reliability Aspects of AlGaAs/GaAs HEMTs

#### Source resistance

96233 Process and Design for ESD Robustness in Deep Submicron CMOS Technology

#### Space charge limited current

95042 Model for the Leakage Instability in Unprogrammed Amorphous Silicon Antifuse Devices

### Space dependence on AI corrosion

85159 A Paradoxical Relationship Between Width/Spacing of Aluminum Electrodes and Aluminum Corrosion

#### Spatial distribution

96311 A New Purely-Experimental Method for Extracting the Spatial Distribution of Hot-Carrier-Induced Interface States and Trapped Charges in MOSFETs

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#### Ti:W/AI-1%Si

- 88179 Effective Kinetic Variations with Stress Duration for Multilayered Metallizations
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- 96084 A new Physics-Based Model for Time-Dependent-Dielectric-Breakdown [BPA]

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94072 THB Reliability Models and Life Prediction for Intermittently-Powered Non-Hermetic Components

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- 97333 Study of a CMOS I/O Protection Circuit Using Circuit-level Simulation
- 97333 Study of a CMOS I/O Protection Circuit Using Circuit-level Simulation

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- 92081 Mismatch Drift: A Reliability Issue for Analog MOS Circuits

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94079 Ambient Moisture Characterization of Thin Small Outline Packages (TSOPs)

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- Vias, influence of high temperature anneal on reliability of Al lines with vias
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- 92304 Analysis of Silicide Process Defects by Non-Contact Electron-Beam Charging
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- 86087 A Practical VLSI Characterization and Failure Analysis System for the IC User [OPA]

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92356 A Novel Via Failure Mechanism in Al-Cu/Ti Double Level Metal System

### Wafer charging mechanisms, potential and current sensors

94334 Characterization of Wafer Charging Mechanisms and Oxide Survival Prediction Methodology

#### Wafer fab

96017 Relation Between Yield and Reliability of Integrated Circuits: Experimental Results and Application to Continuous Early Failure Rate Reduction Programs [OPA]

#### Wafer Inspection

95223 Recent Technology of Particle Detection on Patterned Wafer

## Wafer lapping, grinding and etching influence on die cracking reliability

87216 Measurement of Silicon Strength as Affected By Wafer Back Processing

#### Wafer level reliability testing

97057 Using IDDQ Drift Testing to Detect Hydrogen in MOS Devices

#### Wafer lots and package devices

96203 Reliability Study of 850nm VCSELs for Data Communications

#### Wafer sort, probe

93087 Reliability, Yield and Quality Correlation For A Particular Failure Mechanism

## Wafer-level EOS (pulsed) testing correlates with package-level HBM-ESD measurements for nMos transistors

95276 Building-in ESD/EOS Reliability for Sub-halfmicron CMOS Processes

## Wafer-level metal electromigration, J-Ramp, J-constant method

91298 Wafer-Level Jramp & J-Constant Electromigration Testing of Conventional & Sweat Patterns Assisted by a Thermal & Electrical Simulator

#### Wafer-level pulsed electromigration probe station

89229 The Electromigration Damage Response Time and Implications for DC and Pulsed Characterizations

#### Wafer-level reliability (WLR)

92276 Building-In Reliability: Soft Errors -- A Case Study

#### Wafer-probe system, HP4145 Semiconductor Parameter Analyzer

94034 Characterization of Hot-Carrier-Induced Degradation in p-Channel MOSFETs by Total Injected Charge Techniques

#### Water desorbed from the film

95359 Deoxidization of Water Desorbed from APCVD TEOS-O3 SiO2 by Titanium Cap Layer

## Water emission from Spin-On-Glass (SOG)

94399 A New Mechanism of Pipeline Defect Formation in CMOS Devices

#### Water related species contained in dielectric layers

94359 The Impact of Intermetal Dielectric Layer and High Temperature Bake Test on the Reliability of Nonvolatile Memory Devices

#### Water solube flux

93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices

### Water-outgassing generated gaseous pressure under metallization

90216 Effects of Residual Water in Spin-on-Glass Layer on Void Formation For Multilevel Interconnections

#### Water-related electron trap model

97017 Impact of Passivation Film Deposition and Post Annealing on the Reliability of Flash Memories

#### Waveform measurement technique

87077 On the Validity of ESD Threshold Data Obtained Using Commericial Human-Body Model Simulators

#### Waveform measurement, E-beam Probe

93199 Laser Stimulated Electron-Beam Prober for 15ps Resolution Internal Waveform Measurements of a 5 Gb/s ECL Circuit

## Waveform measurement, high resolution

93199 Laser Stimulated Electron-Beam Prober for 15ps Resolution Internal Waveform Measurements of a 5 Gb/s ECL Circuit

#### Wearout

92268 Reliability Defect Detection and Screen during Processing -- Theory and Implementation

#### Wearout and breakdown, thermal SiO2 Interface quality states

93280 Correlation Between Negative Bulk Oxide Charge and Breakdown, Modeling, and New Criteria for Dielectric Quality Evaluation

#### Wearout and breakdown, thermal SiO2,

93285 A Model Relating Wearout Induced Physical Changes in Thin Oxides to the Statistical Description of Breakdown

## Wearout and breakdown, thermal SiO2, bulk charge effects

93280 Correlation Between Negative Bulk Oxide Charge and Breakdown, Modeling, and New Criteria for Dielectric Quality Evaluation

#### Wearout of trench capacitors

86215 Reliability of Trench Capacitors for VLSI Memories

#### Wearout performance can also be affected by process-induced defects

97044 Correlations Between Initial Via Resistance and Reliablity Performance

#### Wedge shaped voids

92356 A Novel Via Failure Mechanism in Al-Cu/Ti Double Level Metal System

#### Weibull distribution

93227 Accelerated Life Performance Of Moisture Damaged Plastic Surface Mount Devices

#### Weibull distribution shape parameter, application

92366 Electromigration Lifetime as a Function of Line Length and Step Number

#### Weibull distribution, applied to thermal cycle fatigue of surface mounted devices

92151 Using FEA to Develop a MIL-HDBK-217 SMT Model

#### WF6

95030 Reliability Improvement in High Aspect Ratio Contacts and Vias Filled with Blanket Tungsten CVD Film

#### Whisker growth

92217 Dislocation-based Mechanisms in Electromigration

#### Width dependence on AI corrosion

85159 A Paradoxical Relationship Between Width/Spacing of Aluminum Electrodes and Aluminum Corrosion

#### Window geometry and deposition method

86030 Electromigration in Aluminum to Tantalum Silicide Contacts

#### Wire bond cratering/cracking caused by Si nodules in bond pad

86055 A Bond Failure Mechanism

#### Wire bond degradation

- 93244 Thin Type Packaging: An Effective Way to Improve the Popcorn Resistance of Plastic-Packaged IC's
- 91160 Correlation of Surface Mount Plastic Package Reliability Testing to Nondestructive Inspection by Scanning Acoustic Microscopy

#### Wire bond degradation with polyimide passivated die in plastic packages

93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages

### Wire bond failures in plastic encapsulated DIPS

86055 A Bond Failure Mechanism

#### Wire bond failures the affect of plastic molding process

86055 A Bond Failure Mechanism

#### Wire bond fatigue

93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages

#### Wire bond pad chipout temperature cycle acceleration factors

90252 Temperature-Cycling Acceleration Factors For Aluminum Metallization Failure in VLSI Applications

#### Wire bond pad chipout temperature cycle reliability model

90252 Temperature-Cycling Acceleration Factors For Aluminum Metallization Failure in VLSI Applications

#### Wire bond, Au

- 88040 Effects of High Thermal Stability Mold Material on the Gold-Alumiinum Bond Reliability in Epoxy Encapsulated VLSI Devices
- 87028 The Microstructure of Ball Bond Corrosion Failures

#### Wire bond, Au ball bond reliability in plastic packages

93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages

#### Wire bond, delamination-induced Au ball bond degradation

- 92177 Comparison of Delamination Effects between Temperature Cycling Test and Highly Accelerated Stress Test in Plastic Packaged Devices
- 92169 The Impact of Delamination on Stress-Induced and Contamination-Related Failure in Surface Mount ICs

### Wire bond, effect of mold compound and die coating on pull and shear

92169 The Impact of Delamination on Stress-Induced and Contamination-Related Failure in Surface Mount ICs

#### Wire bond, failure due to temperature cycling

92177 Comparison of Delamination Effects between Temperature Cycling Test and Highly Accelerated Stress Test in Plastic Packaged Devices

## Wire bond, moisture-induced Au ball bond degradation

- 93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages
- 92177 Comparison of Delamination Effects between Temperature Cycling Test and Highly Accelerated Stress Test in Plastic Packaged Devices
- 92169 The Impact of Delamination on Stress-Induced and Contamination-Related Failure in Surface Mount ICs

#### Wire bond, off pad bonding effect on reliability

93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages

#### Wire bonding

93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages

### Wire bonding analysis

- 86102 A Study of Gold Ball Bond Intermetallic Formation in PEDs Using Infra-Red Microscopy
- 86099 Infrared Microscopy as Applied to Failure Analysis of P-DIP Devices

## Wire breaks

93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages

## Wire pull

91152 Application of Infrared Microscopy for Bond Pad Damage Detection

#### Wire pull testing

93217 Moisture-Induced Gold Ball Bond Degradation of Polyimide-Passivated Devices in Plastic Packages

## Wire-bus-wire resistor failure

87238 Thin-Film Cracking and Wire Ball Shear in Plastic Dips Due to Temperature Cycle and Thermal Shock

## With high energy ion implant processes, junction leakage current and GOI (gate Oxide Integrity) are a concern

97346 Latch-up Characterization of High Energy Ion Implanted New CMOS Twin Wells that comprised the BILL (Buried Implanted Layer for Lateral Isolation) and B.L./C.L. (Buried Layer/Connecting Layer) Structure

#### Without degrading PHEMTs, DC and RC performance

97261 Reliability and Alleviation of Premature On-State Avalanche Breakdown in Deep Submicron Power PHEMT's

## Work Function Difference (WFD)

95217 DRAM Failure Analysis with the Force Based Scanning Kelvin Probe

## Worst-case gate voltage stress condition for LDD nMOSFETs is a strong function of the channel length, drain voltage and operating temperature

97312 New Understanding of LDD CMOS Hot-Carrier Degradation and Device Lifetime at Cryogenic Temperatures

## Write endurance

90259 Extended Data Retention Characteristics After More Than 10 Write and Erase Cycles In EEPROMs

#### Write-erase window closure

97104 Hot Carrier Self Convergent Programming Method for Multi-Level Flash Cell Memory

#### Write/erase endurance

90259 Extended Data Retention Characteristics After More Than 10 Write and Erase Cycles In EEPROMs

## WSi metallization voids

92349 Three Kinds of Via Electromigration Failure Modes in Multilevel Interconnections

95036 ON-State, Programming and OFF-State Reliability of Metal-to-Metal Antifuse Based 10 nm-Thick SiNx Film For 3.3 V Operation

#### X-ray analysis

93250 Novel Failure Modes with Overmolded Printed Circuit Board-based Surface Mount Packages

## X-ray analysis, effect of die attach adhesive on plastic SMT package delamination/cracking

92182 X-ray Analysis of Package Cracking During Reflow Soldering

#### X-ray analysis, moisture sensitivity characterization of SMT packages

92182 X-ray Analysis of Package Cracking During Reflow Soldering

#### X-ray diffraction topography

94425 In-Depth Resolution of Integrated Circuits via X-ray Based Line Modified Asymmetric Crystal Topography

#### X-ray diffractometry to measure residual stress in aluminum

90221 Measurement of Three Dimensional Stress and Modeling of Stress Induced Migration Failure in Aluminum Interconnects

#### X-ray photoelectron spectroscopy, XPS, of contacts to GaAs

86138 Field and Temperature Dependent Life-Time Limiting Effects of Metal-GaAs Interfaces of Device Structures Studied by XPS and Electrical Measurements

### X-ray stress analysis

94458 Thermomechanical Reliability Assessment in SM- and COB-Technology by Combined Experimental and Finite Element Method

#### X-ray stress, measurements of AI interconnects

91077 Effects of Line Size on Thermal Stress in Aluminum Conductors

#### XPS analysis of surface treated GaAs FETs

85045 XPS Analysis of GaAs--Surface Quality Affecting Interelectrode Material Migration

#### Yield

92281 Built-In Real-Time Reliability Automation (BIRRA)

#### Yield analysis

92304 Analysis of Silicide Process Defects by Non-Contact Electron-Beam Charging

### Yield and reliability

96017 Relation Between Yield and Reliability of Integrated Circuits: Experimental Results and Application to Continuous Early Failure Rate Reduction Programs [OPA]

## Yield defect density

96017 Relation Between Yield and Reliability of Integrated Circuits: Experimental Results and Application to Continuous Early Failure Rate Reduction Programs [OPA]

#### Yield management

92268 Reliability Defect Detection and Screen during Processing -- Theory and Implementation

## Yield models

- 92276 Building-In Reliability: Soft Errors -- A Case Study
- 92268 Reliability Defect Detection and Screen during Processing -- Theory and Implementation

## Yield-reliability correlation

92003 The Evaluation of 16-Mbit Memory Chips with Built-in Reliability

## Yield-reliability relationship

93087 Reliability, Yield and Quality Correlation For A Particular Failure Mechanism

#### Zero crossing effect

92016 Simulation of CMOS Circuit Degradation Due to Hot-Carrier Effects

#### Zero stress temperature

93236 A Criterion for Predicting Delamination in Plastic IC Packages