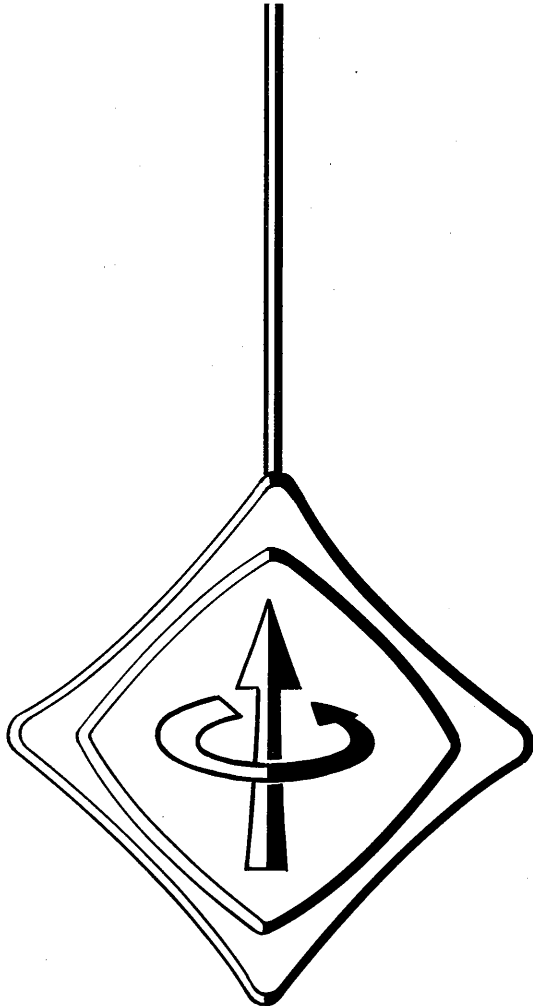

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reliability physics 1971

Las Vegas, Nevada, March 31-April 2, 1971

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Foreword

This Proceedings contains the papers presented at the ninth annual Reliability Physics Symposium which was held at the Stardust Hotel and Casino in Las Vegas on March 31 through April 2, 1971. This Symposium was co-sponsored by the IEEE Professional Groups on Electron Devices and Reliability.

The objectives of this conference are: (1) to bring into focus the problems of device and systems reliability that we are facing today, (2) to provide a forum in which the users, manufacturers and designers or modern electronic equipment can exchange their opinions, define important areas and give guidance to the scientific community as to the relative importance of the various problems, (3) to exchange information on fundamental physical and chemical processes which contribute to degradation, aging, and failure of electronic components and materials and (4) to review workable procedures and to train through workshops, engineers and scientists in the most efficient use of these procedures. This objective is in part reflected in the comprehensive technical program in which many timely topics of the reliability physics field are covered: silicon and GaP interfaces, memory and MOS reliability, reliability predictions, sealed chips, metallization, bonds, failure analysis techniques, safe accelerated test equipment, hybrids reliability, and design for reliability.

Some of these topics are old, some are new for this conference. Reoccuring topics that continue to be important are: silicon interfaces, metallization, failure analysis techniques and bonds. The use of the early morning workshops to teach and review, reliability predictions techniques and safe test equipment is an approach evaluated and found to be very effective. Other new topics of significant industrial concern are: memory and MOS reliability, GaP interfaces, and hybrid reliability.

The organization of the papers in these Proceedings parallels closely their order of presentation at the Symposium in the six sessions and two workshops. To highlight the keynote speaker, Dr. James Hillier, and invited speaker, Dr. Igor Aleksanyan, these papers begin these Proceedings. The few papers for which manuscripts were not available for publication are represented by abstracts only.

The program committee and sub committee, made up of highly competent and busy colleagues from industry, education and government, had a most difficult task of selecting, from the many abstracts submitted, a limited number of papers which they felt would be of most general usefulness to the audience and would comprise a balanced selection of material. The members of this committee have given of their time and energy to organize the 1971 Reliability Physics Symposium and to review the papers presented here. The excellent technical program, the outstanding success of the meeting attended in this recession year by almost 350 people, and the quality of the papers published in these Proceedings are a tribute to their effort.

O. D. Trapp
Chairman, Technical Program Committee

The Technical Program Committee, meeting in Palo Alto in December, 1970, selected an outstanding program for the 1971 Symposium. Present (from left to right) were: Jim Black, Motorola Semiconductor; Jim Early, Fairchild Research Labs; Andy Grove, Intel; Harold Nigh, Bell Telephone Labs; Bud Trapp (Technical Program Chairman), Fairchild Semiconductor; Dawon Kahng, Bell Telephone Labs; John Seacord, Sprague Electric; Arnie Lesk, Motorola Semiconductor; Bob Zettler, Fairchild Optoelectronics.

Planning the Symposium in Palo Alto are (front row, left to right): H. Lauffenburger, Publicity; K. H. Zaininger, General Chairman; O. D. Trapp, Technical Program Chairman; Jayne Partridge, Publicity Chairman; D. S. Peck, Vice General Chairman; J. Morris, Publication Chairman. (Back row, left to right): P. H. Eisenberg, Registration Chairman; D. W. Yoder, Publicity; L. Bucaria, Publicity.

Plan now to attend the *1972*

Reliability Physics Symposium

to be held

April 5, 6, 7, 1972

at the

Stardust Hotel, Las Vegas, Nevada

Table of Contents

Keynote Speaker: JAMES HILLIER

"Reliability Physics: A Response To Consumerism Crisis of Confidence" ix

Invited Guest Speaker: IGOR ALEKSANYAN

"Mechanical Properties of Thin Films and Failure in Microelectronics" xiv

SILICON AND GaP INTERFACES

Chairman: D. KAHNG

Co-organizers: D. KAHNG and G. WARFIELD

Charge Storage MNOS Transistors at Electric Fields Near Gate Insulator Breakdown
J. R. Cricchi and W. D. Reed, Jr. 1

A Mechanism of Evaluation in MAOS Systems
C. Jund, B. Kerwella and J. Grosvalet 9

Avalanche Currents in Planar Structures
J. F. Verwey 16

Degradation and Passivation of Light Emitting Diodes
R. L. Hartman, M. Kuhn and B. Schwartz 25

Charge Transfer Devices
G. E. Smith 29

Radiation-Induced Perturbations in Metal-Insulator-Semiconductor Structures
H. L. Hughes 33

MEMORY AND MOS RELIABILITY

Chairman and Organizer: A. S. GROVE

Reliable Systems Operation of Amorphous Semiconductor Memories
D. L. Nelson, R. R. Shanks, J. H. Helbers and K. E. Vanlandingham 40

Monolithic Main Memory — New Reliability and Serviceability Environment
D. H. Redfield, W. A. Sams and E. G. Brown 41

The Response of the Threshold Voltage of the Transistors in Simple MOS Circuits to Tests at Elevated Temperatures
F. H. Reynolds 46

Reliability Studies of MOS Si-Gate Arrays
D. J. Fitzgerald, G. H. Parker and P. Spiegel 57

Reliability of Al_2O_3-SiO_2 IGFET Integrated Circuits
G. T. Cheney, R. L. Freyman and A. A. Mammele 62

RELIABILITY OF MEMORY TECHNOLOGIES PANEL

Moderator and Organizer: W. Kauffman

Panel and Review 67

WORKSHOPS

Reliability Predictions from Accelerated Testing 69
D. S. Peck

Safe HTRB Accelerated - Test Equipment - NOW.

C. Zierdt 79
N. Jones 84
M. Stitch 86
W. Beecher 93

SEALED CHIPS AND METALLIZATION

Chairman and Organizer: J. M. Early

Durability and Stability of Various Insulating Films Against the High Temperature Water in an Autoclave
J. Sato, Y. Ban and K. Maeda 96
Effects of Humidity and Organic Coating on Surface Potential Propagation in Passivated Devices
T. A. Temofonte and J. R. Szedon 107
Design Limits When Using Gold-Aluminum Bonds
E. Philofsky 114
Variables Affecting Thermally Induced Surface Reconstruction in Aluminum Metal
E. Philofsky, K. Ravi, E. Hall and J. Black 120
Reduction of Electromigration — Induced Failure in Aluminum Metallization through Anodization
A. J. Learn and W. H. Shepherd 129
Aluminum-Aluminum Oxide Metallurgy for Enhanced Electromigration Resistance in Monolithic Circuits
S. M. Deshpande 135

ANALYSIS TECHNIQUES

Chairman and Organizer: I. A. LESK

Electromigration Damage in Al-Cu Thin Films
L. Berenbaum and R. Rosenberg 136

Factors Involved in the Scanning Electron Microscope Analysis of Glass Passivated Devices
A. J. Gonzales 142

The SEM As a Defect Analysis Tool for Semiconductor Memories
M. J. Alter and B. A. McDonald 149

An Investigation of Microplasma Noise in Zener Diodes With the SEM
C. J. Varker 155

High Current Transient Induced Junction Shorts
J. S. Smith 163

4.6 Thermal Excursion Can Cause Bond Problems
M. F. Nowakowski and F. Villella 172

HYBRID RELIABILITY

Chairman and Organizer: J. SEACORD

Studies of Bonding Mechanisms and Failure Modes in Thermocompression Bonds of Gold Plated Lead to Ti-Au Metallized Substrates
A. T. English and J. L. Hokanson 178

Evaluation of the Mechanical Integrity of Beam Lead Devices and Bonds using Thermomechanical Stress Waves
J. R. Adams and H. L. Floyd 187

Conductor Film Metallizations for Use in Tantalum Film Integrated Circuits
J. D. Speight, D. Gerstenberg and H. Basseches 195

Thermal Control for High Density Packaging
Mary L. Rauhe 204

Reliability Considerations in STD Development
J. P. Dietz 211

DESIGN FOR RELIABILITY

Chairman and Organizer: J. D. BRAUER

Applications Determine the Design, Materials, Processes and Package
Glen R. Madland 216

Anticipatory Test Monitors IC Suppliers Process Control
Gene Tholnnes 223

Acceleration Factors for Environmental Testing of Integrated Circuits
E. S. Anolick, S. Amendola and P. J. Levitz 228

BIOGRAPHIES 233

SYMPOSIUM PHOTOGRAPH 246