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U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards

Semiconductor Measurement Technology:

Spreading Resistance Symposium



STP 572

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Semiconductor Measurement Technology: **Spreading Resistance Symposium**

Proceedings of a Symposium
Held at the National Bureau of Standards
Gaithersburg, Maryland
June 13-14, 1974

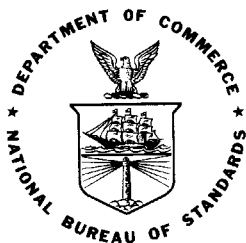
James R. Ehrstein, Editor

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PREFACE

This Symposium on Spreading Resistance measurements was held on June 13-14, 1974 at the National Bureau of Standards under the cosponsorship of this Bureau and Committee F-1 of the American Society for Testing and Materials. It consisted of three sessions as detailed in the Contents on pp. vi to viii.

The objective of the Symposium was to expose the state of the art with respect to the theory, practice and applications of the electrical spreading resistance measurement technique. This technique which has seen rapidly increasing interest and use over the last 10 or more years, has noteworthy versatility for profiling dopant concentrations over many orders of magnitude in multiple layer semiconductor structures. Nevertheless, the ever increasing demand on all measurement methods, caused by device fabrication utilizing active regions often less than 1 μm in thickness, taxes the theory, practice and successful application of all techniques, including the electrical spreading resistance.

It is hoped that this symposium, by illustrating the successful applications which have been made of the technique, and by indicating some of the areas where limitations have been found to exist, will encourage further effort by interested parties, to find solutions to those limitations.

Finally, by compiling a store of well documented measurement practice in one volume, it is hoped that the beginner in this technique will find rapid solutions to possible basic problems, so that he too may make rapid and successful use of this technique.

James R. Ehrstein
Editor

SPREADING RESISTANCE SYMPOSIUM

ABSTRACT

This Proceedings contains the information presented at the Spreading Resistance Symposium held at the National Bureau of Standards on June 13-14, 1974.

This Symposium covered the state of the art of the theory, practice and applications of the electrical spreading resistance measurement technique as applied to characterization of dopant density in semiconductor starting materials and semiconductor device structures. In addition to the presented papers, the transcripts of the discussion sessions which were held directly after the Theory, Practice and Applications sessions are also included. These transcripts, which were reviewed by the respective respondents for clarity, are essentially as presented at the symposium.

Key words: Dopant concentration, dopant profiles, metal-semiconductor contacts, resistivity, semiconductor surface preparation, silicon, spreading resistance.

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