



IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES

JULY 1974

VOLUME MTT-22

NUMBER 7

A PUBLICATION OF THE IEEE MICROWAVE THEORY AND TECHNIQUES SOCIETY



PAPERS

Broad-Band Small-Signal Impedance Characterization of Silicon (Si) P ⁺ -N-N ⁺ IMPATT Diodes.....	<i>M. Ohtomo</i>	709
Radiation from Curved Dielectric Slabs and Fibers.....	<i>L. Lewin</i>	718
An Adjustable Quasi-Optical Bandpass Filter—Part I: Theory and Design Formulas.....	<i>A. A. M. Saleh</i>	728
An Adjustable Quasi-Optical Bandpass Filter—Part II: Practical Considerations.....	<i>A. A. M. Saleh</i>	734

SHORT PAPERS

Reduction of the Attenuation Constant of Microstrip.....	<i>I. J. Albrey and M. W. Gunn</i>	739
Waves Guided Between Open Parallel Concave Reflectors.....	<i>F. J. Tischer and J. R. Potukuchi</i>	742
Surface Wave on a Ferrite Magnetized Perpendicular to the Interface.....	<i>D. F. Vaslow</i>	743
RF Burnout of Ku-Band Mixer Diodes.....	<i>G. E. Morris and G. A. Hall</i>	745
Effect of Loss and Frequency Dispersion on the Performance of Microstrip Directional Couplers and Coupled Line Filters.....	<i>B. Rama Rao</i>	747

LETTERS

Modes and Losses of a Four-Mirror Ring Resonator.....	<i>P. F. Checcacci, R. Falciai, and A. M. Scheggi</i>	751
Dissipative Parameters in Ferrites and Insertion Losses in Stripline <i>Y</i> Circulators below Resonance.....	<i>G. Cattarin and R. Roveda</i>	752
Low-Loss Two-Dimensional GaAs Epitaxial Waveguides at 10.6- μ m Wavelength.....	<i>B. L. Sopori, W. S. C. Chang, and R. Vann</i>	754

CONTRIBUTORS.....	756
-------------------	-----



IEEE MICROWAVE THEORY AND TECHNIQUES SOCIETY

The Microwave Theory and Techniques Society is an organization, within the framework of the IEEE, of members with principal professional interest in the field of microwave theory and techniques. All members of the IEEE are eligible for membership in the Society and will receive this TRANSACTIONS upon payment of the annual Society membership fee of \$7.00. Affiliate membership is available upon payment of the annual affiliate fee of \$18.00. For information on joining write to the IEEE at the address below.

ADMINISTRATIVE COMMITTEE

R. A. RIVERS, <i>President</i>		H. W. COOPER, <i>Vice President</i>		H. STINEHELPER, <i>Secretary-Treasurer</i>	
S. F. ADAM	A. W. GUY	N. LIPETZ	G. P. RODRIGUE	J. J. TAUB	
J. L. ALLEN	G. I. HADDAD	S. OKWIT*	F. J. ROSENBAUM	D. F. WAIT	
R. W. BEATTY	J. B. HORTON*	H. G. OLTMAN	H. SOBOL	L. R. WHICKER	
A. CLAVIN*	R. M. KNOX	D. PARKER	R. A. SPARKS		

* *Ex officio (past chairmen)*

Honorary Life Members

A. C. BECK	W. W. MUMFORD	K. TOMIYASU
D. D. KING	T. S. SAAD	

National Lecturer

JOHN L. ALLEN

S-MTT Chapter Chairmen

Atlanta	H. A. ECKER	NY/Long Island	M. A. BALFOUR	St. Louis	J. A. ZIEGLER
Baltimore	L. K. STALEY	Los Angeles Council	D. E. KREINHEDER	San Diego	D. RUBIN
Boston	R. LEVY	Milwaukee	R. H. FARMER	San Francisco	D. E. MESSNER
Boulder-Denver	A. Y. RUMFELT	Montreal	T. M. CHAN	Schenectady	I. W. PENCE, JR.
Chicago	R. N. HARGIS	N. J. Coast	W. B. GLENDINNING	Seattle	A. RUDZITIS
Columbus	G. A. THIELE	North Jersey	S. ANGHEL	S. E. Michigan	N. A. MASNARI
Connecticut	M. GILDEN	Orange County	J. A. SANGUINET	Syracuse	A. T. ADAMS
Dallas	M. L. WALLACE	Orlando	E. E. ERICKSON	Tel Aviv	A. I. MADJAR
Fort Worth	S. D. COLEMAN	Ottawa	W. J. STEENAART	Tokyo, Japan	S. SATO
Houston	H. C. BOURNE, JR.	Philadelphia	J. E. MULHOLLAND	Tucson	E. P. PIERCE
Huntsville	O. C. WILLIAMS	Phoenix	T. A. DE MASSA	Washington, D. C.	B. E. SPIELMANN

IEEE TRANSACTIONS® ON MICROWAVE THEORY AND TECHNIQUES

Editor

F. J. ROSENBAUM

Associate Editors

H. G. OLTMAN
(*Institutional Listings*)

J. W. BANDLER
(*Computer Program
Descriptions*)

M. CAULTON
(*Special Issues*)

T. OKOSHI
(*Abstracts Editor—Asia*)

Address all manuscripts to the Editor, F. J. Rosenbaum, Dep. Elec. Eng., Washington Univ., St. Louis, Mo. 63130. Submission of three copies of manuscripts, including figures, will expedite the review.

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

Officers

JOHN J. GUARRERA, *President*
JOHN D. RYDER, *Vice President*
ARTHUR P. STERN, *Vice President, Regional Activities*
ROBERT F. COTELLESA, *Vice President, Technical Activities*

FRANK S. BARNES, *Vice President, Publication Activities*
SEYMOUR CAMBIAS, JR., *Secretary*
JOSEPH K. DILLARD, *Treasurer*

Headquarters Staff

DONALD G. FINK, *Executive Director*

ELWOOD K. GANNETT, *Director, Publishing Services*
WILLIAM J. KEYES, *Director, Administrative Services*
JOHN M. KINN, *Director, Educational Service*
CHARLES F. STEWART, JR., *Director, Member and Field Services*

BETTY J STILLMAN, *Executive Assistant to the Executive Director*
RICHARD M. EMERSON, *Director, Technical Services*
EDWIN D. MACDONALD, *Conference Services*
SAVA I. SHERR, *Standards*

Editorial Department

H. JAMES CARTER, *Manager, Editorial Services*
Senior Editors: NANCY B. BUDDE*, ANN H. BURGMEYER, CAROLYNE ELENOWITZ, GAIL S. FERENC, NELA RYBOWICZ
Associate Editors: CLARA FEGER, HELEN S. GOLDMAN, TRUMBULL ROGERS

* *Responsible for this Transactions*

IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES is published monthly by The Institute of Electrical and Electronics Engineers, Inc., 345 East 47 Street, New York, N. Y. 10017. Responsibility for the contents rests upon the authors and not upon the IEEE, the Society, or its members. This journal is available in either microfiche or printed form. Individual copies may be purchased at \$3.00 (first copy only) by IEEE members and \$6.00 per copy by nonmembers. Annual subscription price: IEEE members dues plus Society fee. Price for nonmembers available on request. Abstracting is permitted with mention of source. All rights, including translation, are reserved by the IEEE. Requests for republication permission should be addressed to the IEEE Editorial Department, 345 East 47 Street, New York, N. Y. 10017. Copyright © 1974 by The Institute of Electrical and Electronics Engineers, Inc. Printed in U.S.A. Second-class postage paid at New York, N. Y., and at additional mailing offices.