



IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES

FEBRUARY 1972

VOLUME MTT-20

NUMBER 2

Published Monthly



PAPERS

Dissipative Parameters in Ferrites and Insertion Losses in Waveguide <i>Y</i> -Circulators Below Resonance.....	89
..... <i>R. Roveda, C. Borghese, and G. Cattarin</i>	
Analytical and Numerical Studies of the Relative Convergence Phenomenon Arising in the Solution of an Integral Equation by the Moment Method.....	96
..... <i>R. Mittra, T. Itoh, and T. S. Li</i>	
The Locating Reflectometer.....	105
..... <i>P. I. Somlo</i>	
Theory and Operation of a Reciprocal Faraday-Rotation Phase Shifter.....	112
..... <i>W. E. Hord, F. J. Rosenbaum, and J. A. Benet</i>	
Computer-Aided Determination of the Small-Signal Equivalent Network of a Bipolar Microwave Transistor.....	120
..... <i>K. Hartmann, W. Kotyczka, and M. J. O. Strutt</i>	
Cavity Perturbation Techniques for Measurement of the Microwave Conductivity and Dielectric Constant of a Bulk Semiconductor Material.....	126
..... <i>I. I. Eldumiati and G. I. Haddad</i>	
Traveling-Wave Coherent Light-Phase Modulator.....	132
..... <i>M. E. El-Shandwily and S. M. El-Dinary</i>	
Wave Sensitivities of Networks.....	138
..... <i>J. W. Bandler and R. E. Seviara</i>	
Attenuation Due to Ohmic Losses in Periodic Dipole and Slot Arrays.....	148
..... <i>N. Amitay and H. Zucker</i>	
Microwave Integrated Oscillators for Broad-Band High-Performance Receivers.....	155
..... <i>H. C. Okean, E. W. Sard, and R. H. Pflieger</i>	
Microwave Integrated Tunnel-Diode Amplifiers for Broad-Band High-Performance Receivers.....	165
..... <i>H. C. Okean and P. J. Meier</i>	

CORRESPONDENCE

Slot-Line Field Components.....	172
..... <i>S. B. Cohn</i>	
A Highly Stabilized K_a -Band Gunn Oscillator.....	174
..... <i>S. Nagano and S. Ohnaka</i>	
Broad-Band Parametric Amplifier Design.....	176
..... <i>G. R. Branner, E. R. Meyer, and P. O. Scheibe</i>	
Loss Calculations for Coupled Transmission-Line Structures.....	178
..... <i>V. K. Tripathi</i>	
Computer-Aided Renormalized Perturbation Method for the Inhomogeneously Loaded Waveguide.....	180
..... <i>T. Hidaka</i>	
Gunn-Effect Power Limiter.....	181
..... <i>C. S. Aitchison and R. Davies</i>	
Top-Wall and Branch-Waveguide Hybrids for Millimeter Wavelengths.....	182
..... <i>M. F. Bottjer and H. E. King</i>	
High-Efficiency High-Power TRAPATT Operation of a Single "Poor Man's" Diode.....	184
..... <i>E. D. Cohen</i>	
Application of Deschamps' Graphical Method to Measurements of the Scattering Coefficients of Multiport Waveguide Junctions.....	186
..... <i>C. T. M. Chang</i>	
Mode Chart for <i>E</i> -Plane Circulators.....	187
..... <i>J. Helszajn and M. McDermott</i>	
Phase Corrections for Weighted Acoustic Surface-Wave Dispersive Filters.....	188
..... <i>H. M. Gerard, G. W. Judd, and M. E. Pedinoff</i>	
An Accurate Junction Circulator Design Procedure.....	192
..... <i>S. J. Salay and H. J. Peppiatt</i>	
A Compact Subsidiary-Resonance Limiter.....	193
..... <i>J. L. Allen</i>	

CONTRIBUTORS.....	195
-------------------	-----

INFORMATION ON COMPUTER PROGRAM DESCRIPTIONS.....	200
---	-----



IEEE MICROWAVE THEORY AND TECHNIQUES GROUP

The Microwave Theory and Techniques Group 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 Group and will receive this TRANSACTIONS upon payment of the annual Group membership fee of \$6.00. Affiliate membership is available upon payment of the annual affiliate fee of \$16.00. For information on joining write to the IEEE at the address below.

ADMINISTRATIVE COMMITTEE

S. OKWIT, <i>Chairman</i>		A. CLAVIN, <i>Vice Chairman</i>		N. LIPETZ, <i>Secretary-Treasurer</i>	
F. R. ARAMS	R. V. GARVER	J. B. HORTON	R. A. RIVERS	S. W. ROSENTHAL	
R. W. BEATTY	G. I. HADDAD	M. C. HORTON	G. P. RODRIQUE	E. N. TORGOW	
J. H. BRYANT*	R. E. HENNING*	D. B. LEESON	F. J. ROSENBAUM	A. WEXLER	
H. W. COOPER		J. M. OSEPCCHUK		L. YOUNG*	

* *Ex officio (past chairmen)*

Honorary Life Members

A. C. BECK	A. G. CLAVIER	W. W. MUMFORD	G. C. SOUTHWORTH
------------	---------------	---------------	------------------

G-MT1 Chapters

Atlanta	T. J. LYON	Houston	H. C. BOURNE, JR.	Phoenix	M. D. SIRKIS
Baltimore	B. A. SICHELSTIEL	Huntsville	M. D. FAHEY	St. Louis	W. E. HORD
Boston	H. HOWE, JR.	Long Island	J. GOLDBERG	San Diego	D. G. KILLION
Buffalo		Los Angeles	N. PELNER	San Francisco	P. M. LATOURRETTE
Central N. C.	T. R. SCHILLER	Milwaukee	R. W. LADE	Schenectady	J. B. UNDERWOOD
Chicago	A. W. RUDGE	Montreal	E. F. MORRIS	Seattle	F. P. CARLSON
Columbus	R. T. COMPTON, JR.	N. J. Coast	R. W. BENJAMIN	S. E. Michigan	C. P. TRESSLETT
Connecticut	R. MASTROIANNI	New Hampshire	W. J. WILSON	Syracuse	B. L. BOWLER
Dallas	D. N. BOWYER	New York		Tokyo, Japan	S. OKAMURA
Denver	M. T. DECKER	North Jersey	K. C. O'BRIEN	Toronto	S. DIMITREWSKI
Florida-W. Coast	B. E. SIGMON	Orange Co.	D. K. WAINEO	Tucson	E. P. PIERCE
Foothills, Calif.	H. P. JOHNSON	Orlando	J. M. SCHUCHARDT	Washington, D.C.	C. E. EDWARD
		Philadelphia	W. H. SCHAEDELA		

IEEE TRANSACTIONS* ON MICROWAVE THEORY AND TECHNIQUES

Editor		Associate Editors	
F. J. ROSENBAUM	S. OKWIT (<i>Institutional Listings</i>)	F. G. R. WARREN (<i>Foreign Abstracts</i>)	J. W. BANDLER (<i>Computer Program Descriptions</i>)

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

JAMES H. MULLIGAN, JR., <i>President</i>	CLARENCE L. COATES, JR., <i>Vice President, Publication Activities</i>
ROBERT H. TANNER, <i>Vice President</i>	JOHN R. WHINNERY, <i>Secretary</i>
HAROLD CHESTNUT, <i>Vice President, Technical Activities</i>	RAYMOND W. SEARS, <i>Treasurer</i>

Headquarters Staff

DONALD G. FINK, <i>General Manager</i>	
JOHN L. CALLAHAN, <i>Staff Consultant</i>	CHARLES F. STEWART, JR., <i>Director, Member Services</i>
ELWOOD K. GANNETT, <i>Director, Editorial Services</i>	BETTY J. STILLMAN, <i>Administrative Assistant to the General Manager</i>
WILLIAM J. HILTY, <i>Director, Convention and Publishing Services</i>	RICHARD M. EMBERSON, <i>Director, Technical Services</i>
WILLIAM J. KEYES, <i>Director, Administrative Services</i>	EDWIN D. MACDONALD, <i>Conference Services</i>
JOHN M. KINN, <i>Director, Educational Services</i>	SAVA I. SHERR, <i>Standards</i>
LEON PODOLSKY, <i>Staff Consultant</i>	

Editorial Department

H. JAMES CARTER, <i>Managing Editor, Transactions</i>	
<i>Senior Editors:</i> ANDRÉE ABRAMOFF, ANN H. BURGMEYER, CAROLYNE ELENOWITZ, GAIL S. FERENC	
<i>Associate Editors:</i> NANCY B. BUDDE, HELEN S. GOLDMAN, MARY M. HALL, RUTH MELNICK	

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 Group, 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 Group 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 © 1972 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.