

Compact Highly Integrated X Band Power Amplifier Using

CMOS 60-GHz and E-band Power Amplifiers and Transmitters Physics of Semiconductor Devices Technical Abstract Bulletin 2 Meter Band Power Amplifier for the Usage of Amateur Radio A Ka-Band Wide-Bandgap Solid-State Power Amplifier Power Amplifiers for the S-, C-, X- and Ku-bands Technical Digest 1985 IEEE Transactions on Microwave Theory and Techniques 20 Watt Solid State X-Band Power Amplifier Western Aviation, Missiles, and Space Investigation Into Apollo 204 Accident General Motors Engineering Journal Linear Integrated Circuits and MOS Devices MILCOM '98 GaAs Technology and Its Impact on Circuits and Systems PTGSET Record Record of the International Space Electronics Symposium Aviation Week & Space Technology IEEE Proceedings of the Southeastcon Microwave Solid State Devices and Applications Dixian Zhao V. K. Jain Rishikunathan Satkunanathan National Aeronautics and Space Administration (NASA) Mladen Božanić W. Lockyear United States. Congress. House. Committee on Science and Astronautics. Subcommittee on NASA Oversight RCA Corporation. Solid State Division David Haigh D. V. Morgan CMOS 60-GHz and E-band Power Amplifiers and Transmitters Physics of Semiconductor Devices Technical Abstract Bulletin 2 Meter Band Power Amplifier for the Usage of Amateur Radio A Ka-Band Wide-Bandgap Solid-State Power Amplifier Power Amplifiers for the S-, C-, X- and Ku-bands Technical Digest 1985 IEEE Transactions on Microwave Theory and Techniques 20 Watt Solid State X-Band Power Amplifier Western Aviation, Missiles, and Space Investigation Into Apollo 204 Accident General Motors Engineering Journal Linear Integrated Circuits and MOS Devices MILCOM '98 GaAs Technology and Its Impact on Circuits and Systems PTGSET Record Record of the International Space Electronics Symposium Aviation Week & Space Technology IEEE Proceedings of the Southeastcon Microwave Solid State Devices and Applications Dixian Zhao V. K. Jain Rishikunathan Satkunanathan National Aeronautics and Space Administration (NASA) Mladen Božanić W. Lockyear United States. Congress. House. Committee on Science and Astronautics. Subcommittee on NASA Oversight RCA Corporation. Solid State Division David Haigh D. V. Morgan

this book focuses on the development of design techniques and methodologies for 60 ghz and e band power amplifiers and transmitters at device circuit and layout levels the authors show the recent development of millimeter wave design techniques especially of power amplifiers and transmitters and presents novel design concepts such as power transistor layout and 4 way parallel series power combiner that can enhance the output power and efficiency of power amplifiers in a compact silicon area five state of the art 60 ghz and e band designs with measured results are demonstrated to prove the effectiveness of the design concepts and hands on methodologies presented this book serves as a valuable reference for circuit designers to develop millimeter wave building blocks for future 5g applications

the purpose of this workshop is to spread the vast amount of information available on semiconductor physics to every possible field throughout the scientific community as a result the latest findings research and discoveries can be quickly disseminated this workshop provides all participating research groups with an excellent platform for interaction and collaboration with other members of their respective scientific community this workshop s technical sessions include various current and significant topics for applications and scientific developments including optoelectronics vlsi ulsi technology photovoltaics mems sensors device modeling and simulation high frequency power devices nanotechnology and emerging areas organic electronics displays and lighting many eminent scientists from various national and international organizations are actively participating with their latest research works and also equally supporting this mega event by joining the various organizing committees

motivated by recent advances in wide bandgap wbg gallium nitride gan semiconductor technology there is considerable interest in developing efficient solidstate power amplifiers sspas as an alternative to the traveling wave tube amplifier twta for space applications this article documents the results of a study to investigate power combining technology and ssipa architectures that can enable a 120 w 40 percent power added efficiency pae ssipa results of the study indicate that architectures based on at least three power combiner designs are likely to enable the target ssipa the proposed architectures can power combine 16 to 32 individual monolithic microwave integrated circuits mmics with 80 percent combining efficiency this corresponds to mmic requirements of 5 to 10 w output power and 48 percent pae for the three proposed architectures 1 detailed analysis and design of the power combiner

are presented the first architecture studied is based on a 16 way septum combiner that offers low loss and high isolation over the design band of 31 to 36 ghz analysis of a 2 way prototype septum combiner had an input match 25 db output match 30 db insertion loss 30 db over the design band a 16 way design based on cascading this combiner in a binary fashion is documented the second architecture is based on a 24 way waveguide radial combiner a prototype 24 way radial base was analyzed to have an input match 30 db under equal excitation of all input ports the match of the mode transducer that forms the output of a radial combiner was found to be 27 db the functional bandwidth of the radial base and mode transducer which together will form a radial combiner divider exceeded the design band the third architecture employs a 32 way parallel plate radial combiner simulation results indicated an input match 24 db output match 22 db insertion loss

this book provides a detailed review of power amplifiers including classes and topologies rarely covered in books and supplies sufficient information to allow the reader to design an entire amplifier system and not just the power amplification stage a central aim is to furnish readers with ideas on how to simplify the design process for a preferred power amplifier stage by introducing software based routines in a programming language of their choice the book is in two parts the first focusing on power amplifier theory and the second on eda concepts readers will gain enough knowledge of rf and microwave transmission theory principles of active and passive device design and manufacturing and power amplifier design concepts to allow them to quickly create their own programs which will help to accelerate the transceiver design process all circuit designers facing the challenge of designing an rf or microwave power amplifier for frequencies from 2 to 18 ghz will find this book to be a valuable asset

the original objective of this program was to develop a solid state amplifier capable of delivering 20 watts of power in the 7.9 to 8.4 ghz band with 14 db gain and a 20 db dynamic range per usa satcoma technical guidelines sca 2161 this included development of four and eight diode circular cavity combiners development of a hybrid coupled driver amplifier design of a dc power supply packaging and electrical and environmental testing of the final version of the amplifier two amplifiers were to be delivered at the end of the program during the course of the program the objectives were changed to build one amplifier with a nominal saturated output power of 10 watts but optimized for use at much lower power levels as a linear twt driver the specified maximum operating power level was changed to 1.5 watts over the 7.9 to 8.4 ghz band with 38 to 40

db gain and a 20 db dynamic range an intermodulation product specification of 30 dbc at 200 mw output was added the number of stages was increased to eight including two four diode cavity combiners and two hybrid coupled pairs of stages results of the amplifier development work are discussed including rf and dc circuitry and thermal design

this book captures the essence of developments of gallium arsenide technology from the research laboratory to the marketplace along with the dramatic increases in complexity from early single devices to ics of msi complexity for both analog and digital applications

includes a mid december issue called buyer guide edition

extended versions of the lectures from the 6th iee microwave summer school held at bodington hall university of leeds july 1980

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