

The GaAs MMIC Reliability Assurance Program

S. Kayali
Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive, MS 303-230
Pasadena, Ca 91109
Telephone (818) 354-6830 FAX (818) 393-4559

G. Ponchak
NASA Lewis Research Center
21000 Brookpark Road, MS 54-5
Cleveland, Ohio 44135
Telephone (216) 433-3504 FAX (216) 433-8705

R. Shaw
Sharon Microwave Corporation
1120 NASA Road 1
Houston, Texas 77058
Telephone (713) 333-1950 FAX (713) 333-1954

Abstract

Increasingly, satellites or constellations of satellites are becoming a more important portion of the world's communication systems as well as NASA and other government agencies' space missions. GaAs MMICs present a very promising and viable solution to the higher complexity and size restrictions of new space programs. Specifically, MMICs will be used in solid-state power amplifiers, low-noise amplifiers, and phased-array antennas. During the next decade, MMICs will form the foundation for many mission-specific systems used throughout the commercial space industry, the NASA community, and other federal agencies. One of the obstacles that has been identified is the lack of a standard space-qualification procedure. Currently, each user has to negotiate with the manufacturer on the specific qualification procedure for each application. This individualized approach is both time consuming and costly.

JPL, NASA Lewis Research Center, and NASA Johnson Space Center have collaborated with the GaAs MMIC users, manufacturers, other U.S. government agencies, and international space agencies to develop the "GaAs MMIC Reliability Assurance Guideline For Space Applications." This guideline is intended to be a source book for developing a qualification plan for the production and use of GaAs MMICs in space applications. It addresses the practical application of reliability assurance techniques used in the semiconductor industry to yield a cost-effective product that will deliver an expected history of reliability.

This paper will describe the content and intended application of the guide and address the technical and organizational issues encountered during the development period. The paper will also discuss the future direction and issues pertaining to the guideline's use and acceptance in the GaAs industry.