Abstracts

Radiation Considerations in the Design of Linear Microwave Transistor Amplifiers for Space Applications

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It has been shown recently that a number of different types of microwave transistors used in linear microwave amplifiers designed for space applications are radiation sensitive. Since the transistor h/sub FE/ is the most radiation sensitive parameter, microwave performance of amplifiers intended for long space missions may degrade prematurely due to changes in transistor bias conditions. A description of the various factors affecting the overall radiation sensitivity of linear microwave amplifiers is given and is followed by experimental results of ground radiation testing on a L-band and a S-band preamplifier. Calculations based on the expected radiation dose levels in space show that neglecting the effects of radiation in amplifier design could lead to mission lives in the order of weeks instead of years. As a result of the experience gained with component and amplifier characterization, an approach to radiation hardening of microwave integrated-circuit transistor amplifiers is presented.

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