Abstracts

Reliability of InP-Based HBT IC Technology for High-Speed, Low-Power Applications (Dec. 1995, Part II [T-MTT])

M. Hafizi, W.E. Stanchina, F. Williams, Jr. and J.F. Jensen. "Reliability of InP-Based HBT IC Technology for High-Speed, Low-Power Applications (Dec. 1995, Part II [T-MTT])." 1995 Transactions on Microwave Theory and Techniques 43.12 (Dec. 1995, Part II [T-MTT] (1995 Symposium Issue)): 3047-3053.

We report on the reliability of an InP-based AIInAs/ GaInAs heterojunction bipolar transistor technology which has applications in very high-speed and low power integrated circuits. We have performed extensive accelerated lifetest experiments under different dc bias conditions and different ambient temperatures. For high-performance devices we predict mean-time-to-failures in excess of 10/sup 7/ hours at 125° C junction temperatures. We have also investigated the effects of hydrogen on HBT device characteristics which is particularly important for integrated circuits in hermetically sealed packages, We show that the transistor performance is not sensitive to a 4% hydrogen ambient. For integrated circuits requiring precision thin-film resistors we performed lifetest experiments on tantalum-nitride resistors used in our IC process. We show that these thin-film resistors are very stable and exhibit mean-time-to-failures exceeding that of discrete transistors.

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