Abstracts

94-GHz pulsed silicon IMPATT oscillator modeling

S. Beaussart, O. Perrin, M.-R. Friscourt and C. Dalle. "94-GHz pulsed silicon IMPATT oscillator modeling." 1998 Transactions on Microwave Theory and Techniques 46.10 (Oct. 1998, Part I [T-MTT]): 1382-1390.

A new type of 94-GHz pulsed silicon impact avalanche and transit time (IMPATT) oscillator numerical modeling is described. It consists of a set of three models of increasing complexity; namely, a pure sine model, time-domain isothermal model, and time-domain electro-thermal model, which basically rely on a diode one-dimensional bipolar drift-diffusion model embedded in a time-domain circuit modeling. In this paper, they are first used to investigate the 94-GHz diode intrinsic operation and performance. Secondly, the load-impedance level has been optimized. In each case, the thermal behavior is especially considered. Thirdly, pulse-operation-simulation results are compared with experiments performed at Thomson CSF, Radars et Contre-Mesures, Elancourt, France. Finally, some improvements of the present modeling are discussed in Section VI.

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