Abstracts

Single Barrier Varactors for Submillimeter Wave Power Generation

S.M. Nilsen, H. Gronqvist, H. Hjelmgren, A. Rydberg and E.L. Kollberg. "Single Barrier Varactors for Submillimeter Wave Power Generation." 1993 Transactions on Microwave Theory and Techniques 41.4 (Apr. 1993 [T-MTT]): 572-580.

Theoretical work on Single Barrier Varactor (SBV) diodes indicates that the efficiency of a tripler with a SBV diode has a maximum for a considerably smaller capacitance variation than previously thought. SBV diodes based on GaAs, InGaAs and InAs have been fabricated, and their dc properties have been tested. Detailed modelling of the carrier transport properties of the SBV device is carried out in two steps. First, the semiconductor transport equations are solved simultaneously using a finite difference scheme in one dimension. Secondly, the calculated IV-, and CV characteristics are used by a multiplier simulator to calculate the optimum impedances, and output powers at the frequencies of interest. We have developed an analysis technique which complements the harmonic balance technique. Finally, simulations for a case study of a 750 GHz multiplier show that InAs diodes perform favorably compared to GaAs diodes.

❑ Return to main document.