Abstracts

Transit-Time Effects in the Noise of Schottky-Barrier Diodes

M. Trippe, G. Bosman and A. Van der Ziel. "Transit-Time Effects in the Noise of Schottky-Barrier Diodes." 1986 Transactions on Microwave Theory and Techniques 34.11 (Nov. 1986 [T-MTT]): 1183-1192.

Room-temperature noise measurements at 2.2, 12, and 97.5 GHz were performed on commercial silicon Schottky-barrier diodes and are shown to agree with the model presented in this work. This model is an extension of earlier work by van der Ziel on infrared detection in Schottky-barrier diodes. In the theoretical analysis, the electrons participating in the charge-transport process across the barrier are subdivided into four groups based on their initial velocity. The contribution of each group to the device conductance, susceptance, and current spectral intensity was incorporated including the effects of the transit time. By taking each of these effects into account, an accurate model which applies over a wide range of bias and frequency has been developed. Although the emphasis of this model has been on the high-frequency performance, the model also gives the correct results in the low-frequency limit.

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