Das Kleinsignalverhalten, die Stabilität und das Rauschen von Mikrowellen-Bipolartransistoren im S- und C-Band

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Das Kleinsignalverhalten, die Stabilität und
das Rauschen von Mikrowellen-Bipolartransistoren
im S- und C-Band

ABHANGLUNG

zur Erlangung
der Würde eines Doktors der technischen Wissenschaften
der
EIDGENÖSSISCHEN TECHNISCHEN HOCHSCHULE
ZÜRICH

vorgelegt von

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Summary

The small signal behavior, the stability and the noise behavior of microwave bipolar transistors are investigated in the frequency range from 2 to 8 GHz. 
In chapter 1 the small signal properties of a transistor (the scattering parameters and the four gain parameters) are presented.
A computer optimization method for the determination of the equivalent circuit elements of a microwave transistor is given in chapter 2. The scattering parameters are calculated from the equivalent circuit and compared with the measured values. The coincidence is satisfactory.

In chapter 3 the stability criteria in terms of scattering parameters are derived and the stability circles are represented for the transistor under consideration in the Smith Chart. Furthermore, the influence of some elements of the equivalent circuit on the stability factor is discussed.
In chapter 4 the method and test setup for noise measurements of the microwave transistors in question are described. The four fundamental noise parameters as a function of the bias conditions are presented.

The commonly known noise sources of transistors are introduced into the equivalent circuit, from which the noise parameters are then computed. The coincidence with the measured values is satisfactory. Finally, an approximative method for the determination of the noise parameters is given. This one is easy to apply.