



Comprehensive Nonlinear Modelling of Dispersive Heterstructure Field Effect Transistors and their MMIC Applications

By Ingmar Kallfass

Cuvillier Verlag Jun 2006, 2006. Taschenbuch. Book Condition: Neu. 210x146x15 mm. Neuware - A custom HFET model was developed and applied in the design of several MMIC applications. The model is expressly dedicated to microwave circuit design. Its analytical nonlinear equations provide a compromise between physical interpretability, numerical efficiency and global validity. As an essential part of the overall model, the COBRA expression features a highly efficient and accurate description of complex HFET drain current characteristics. A modification was introduced to include the reduction of drain current due to the self-heating effect as well as for improved description of gain compression. A new approach to frequency dispersion modelling extends the model's validity range from the microwave- down to the low-frequency and DC regimes. The proposed dispersion model relies on conventional device characterisation techniques and standard parameter extraction procedures. The inclusion of multiple dispersion time constants and exponentially decaying step responses accurately reflects the physical nature of individual dispersion effects, providing a correct description of transitions between dispersion regimes both in the time- and frequency domain. As a consequence, the model allows for accurate assessment of dynamic (gain, matching, intermodulation etc.), static (e.g....

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