Abstracts

Millimeter-wave FET modeling using on-wafer measurements and EM simulation

A. Cidronali, G. Collodi, A. Santarelli, G. Vannini and G. Manes. "Millimeter-wave FET modeling using on-wafer measurements and EM simulation." 2002 Transactions on Microwave Theory and Techniques 50.2 (Feb. 2002 [T-MTT]): 425-432.

Electron device modeling is a challenging task at millimeter-wave frequencies. In particular, conventional approaches based on lumped equivalent circuits become inappropriate to describe complex distributed and coupling effects, which may strongly affect the transistor performance. In this paper, an empirical distributed FET model is adopted that can be identified on the basis of conventional S-parameter measurements and electromagnetic simulations of the device layout. The consistency of the proposed approach is confirmed by robust scaling properties, which enable millimeter-wave small-signal S-parameters to be predicted as a function of the device periphery and number of gate fingers. Moreover, it is shown how the model identified on the basis of standard S-parameter measurements up to 50 GHz can be efficiently exploited in order to obtain reasonably accurate small-signal prediction up to 110 GHz. Extensive experimental validation is presented for 0.2-/spl mu/m pseudomorphic high electron-mobility transistors devices.

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