Abstracts

FET Model Taking Into Account Wave Characteristics of the Active Region and Input Circuits

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The new wave model for the field effect transistor (FET) is suggested. Each element of FET layout, including input circuits, is associated with element of equivalent circuit. FET input region includes two parts: variable cross-section microstrip and coplanar lines and a T-junction. Detailed investigation of the influence of input circuits on FET characteristics has been performed. Approximation of transfer characteristics of input region by these of idealized T-junction results in substantial distortion of FET transfer coefficient |(S/sub N/)21|. Feedback region between gate input line and FET output is responsible for noticeable decrease in maximum available gain (MAG) value for gate width W < 60 μm and for appearance of gentle maximum in dependence MAG(W) for the W/2 values of about several dozens microns. It has been shown that dependencies of MAG on gate width and frequency change qualitatively when the gate resistance per unit length passes a certain value. This value is estimated. The loads at the ends of gate and drain electrodes can affect resonantly the value of MAG for submicrometer gate FET.

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