Abstracts

A Traveling-Wave High Electron Mobility Transistor

M.B. Anand, P.K. Ghosh, P.G. Kornreich and D.J. Nicholson. "A Traveling-Wave High Electron Mobility Transistor." 1993 Transactions on Microwave Theory and Techniques 41.4 (Apr. 1993 [T-MTT]): 624-631.

A traveling-wave high electron mobiligy transistor (THEMT) is proposed. The proposed device is unique in that it includes an integral distributed load resistor and that it uses a high electron mobility transistor as the active device. A rigorous analysis of the device is carried out, using a small-signal equivalent circuit model for an incremental secton of the device. Losses and reflected waves are not neglected, as has been done in other work. Treating the device as a 4-port network, closed-form expressions for S-parameters are derived, we believe for the first time. Theoretical calculations using equivalent circuit parameter values of a HEMT reported in the literature, show that the proposed device is capable of exponential increase in gain with device width. Power gain of more than 10 dB at 50 GHz and remarkably flat response in the frequency range 10 GHz to 100 GHz are shown to be achievable for a 1 mm wide device.

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