Abstracts

A double lightly doped drain (D-LDD) structure H-MESFET for MMIC applications

Y. Yamane, K. Onodera, T. Nittono, K. Nishimura, K. Yamasaki and A. Kanda. "A double lightly doped drain (D-LDD) structure H-MESFET for MMIC applications." 1997 Transactions on Microwave Theory and Techniques 45.12 (Dec. 1997, Part II [T-MTT] (1997 Symposium Issue)): 2229-2233.

This paper proposes a new double lightly doped drain (D-LDD) structure for InGaP/InGaAs heterostructure MESFETs (H-MESFETs). A D-LDD H-MESFET has three kinds of low-resistant layers in the drain region, while a conventional LDD H-MESFET has two layers. This structure improves maximum stable gain (MSG) accompanied by R/sub d/ reduction with minimized gate-breakdown-voltage degradation and C/sub gd/ increase. A heuristic model is proposed to predict V/sub bgd/ from sheet resistance of implanted layers, and its validity is confirmed with experimental data. This model successfully predicted the tradeoff relation between V/sub bgd/ and parasitic resistance, and it has enough generality so that it can be applied to usual ion-implanted GaAs MESFETs. Consequently, a typical MSG at 50 GHz exhibits 8.9 dB in a MESFET and 7.7 dB S21 in an one-stage amplifier. The high-frequency circuit operation proves that this technology is one of the most promising for monolithic-microwave integrated-circuit (MMIC) applications.

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