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Title:DC and RF performance of an $\text{In}_{0.1}\text{Ga}_{0.9}\text{N}/\text{InN}$ high electron mobility transistor

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Abstract:This paper reports on a theoretical analysis of DC and RF performances of a novel $\text{In}_{0.1}\text{Ga}_{0.9}\text{N}/\text{InN}$ HEMT. A very high cut-off frequency and attractive DC characteristics have been predicted. A simple analytical model is used to explain the DC characteristics. The cut-off frequency which has been found more than 0.6 THz for a gate length of 0.1 μm is explained with low-field mobility. The maximum drain current and transconductance have been found around 1000 mA/mm and 625 mS/mm, respectively. Similar analysis have been performed for the conventional AlGaIn/GaN HEMT and compared with the proposed InGaIn/InN HEMT. The predicted results are found to be in good agreement with previously published results. The calculated results show that InN-based HEMT has very high cut-off frequency and transconductance when compared with the conventional GaN-based HEMT for the same gate length. © 2011 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.