

Performance Enhancement by the In_{0.65}Ga_{0.35}As Pseudomorphic Channel
on the In_{0.5}Al_{0.5}As Metamorphic Buffer Layer

Lin, Cheng-Kuo; Wu, Jing-Chang; Wang, Wen-Kai; Chan, Yi-Jen; Wu,
Jenq-Shinn; Pan, Yung-Chung; Tsai, Chung-Chih; Lai, Jiun-Tsuen

Abstract

We have developed the 1- μ m gate-length devices of In Ga As pseudomorphic channel (PC) on the In Al As metamorphic buffer layer to improve the device performance, as compared with the In Ga As lattice matched ones. The dc maximum drain-to-source current and transconductance enhances from 340 to 490 mA/mm and from 450 to 670 mS/mm. The RF current gain cut-off frequency and maximum oscillation frequency increases from 22 to 31 GHz and from 42 to 58 GHz, respectively. The extrinsic total delay times are quantitatively investigated, and the effective velocity of electrons improves from 1.8×10^7 cm/s to 2.3×10^7 cm/s by this In Ga As PC.