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 \*支援課題名 (日本語) : III-V 族相補型回路のためのダブルヘテロ接合 p 型 QWFET  
 \*Program Title (in English) : Study of Double Heterojunction p-channel QWFET for III-V Complementary Circuit Applications  
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※概要 (Summary) :

The purpose of this research is to develop III-V p-channel QWDET for future complementary circuit applications. Fabricated devices were evaluated by DC and RF characteristics.

※実験 (Experimental) :

Two different epitaxial structures were tried. First one is InGaSb/AlSb channel on GaAs substrate. The other structure is In<sub>0.77</sub>Ga<sub>0.23</sub>As channel on InP substrate. By E-beam exposure (JBX-6300 at Tokyo Tech), fine gates were fabricated.

※結果と考察 (Results and Discussion) :

DC performance of InGaSb/AlSb channel was I<sub>D</sub> of 86.2 mA/um @V<sub>D</sub>=-2V and V<sub>G</sub>=-1V when gate length was 80 nm. As RF performance of InGaSb/AlSb channel, f<sub>T</sub> of 15.8 GHz and f<sub>max</sub> of 29.2 GHz were confirmed when gate length was 80 nm. V<sub>DS</sub> dependence of f<sub>T</sub> is shown in Fig.1. No drastic dependence on V<sub>DS</sub> was observed.

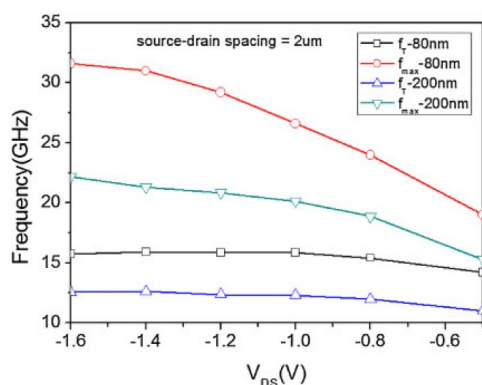


Fig.1 Drain voltage dependence of RF performance in InGaSb/AlSb channel

As DC performance of In<sub>0.77</sub>Ga<sub>0.23</sub>As channel, I<sub>D</sub> is 34.5 mA/um @V<sub>D</sub>=-1V and V<sub>G</sub>=0V when gate length was 100nm. RF performances of In<sub>0.77</sub>Ga<sub>0.23</sub>As channel were f<sub>T</sub> of 3.22 GHz and f<sub>max</sub> of 6.6 GHz when gate length was 100 nm as shown in Fig.2.

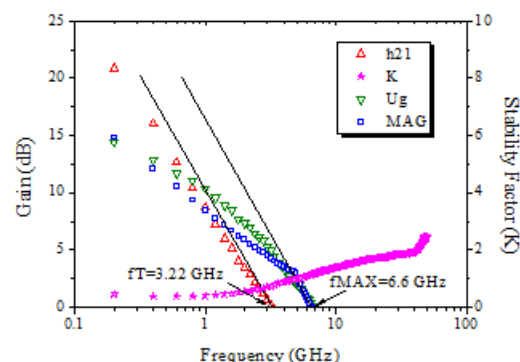


Fig.2 RF performance of In<sub>0.77</sub>Ga<sub>0.23</sub>As channel

※その他・特記事項 (Others) :

N/A

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論文・学会発表

(Publication/Presentation) :

C.-H. Yu, et al, Jpn. J. Appl. Phys. vol.52, no.2, 020203 (2013)

関連特許 (Patent) :

None