

課題番号 : F-13-IT-0028
 利用形態 : 共同研究
 利用課題名 (日本語) : WバンドMMIC 応用に向けた $\text{In}_x\text{Ga}_{1-x}\text{As}$ メタモルフィック HEMTs の研究
 Program Title (English) : Study of $\text{In}_x\text{Ga}_{1-x}\text{As}$ Metamorphic HEMTs for W-band MMIC Applications
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1. 概要 (Summary)

The purpose of this research is to develop high frequency HEMT with good breakdown voltage for both power amplifier (PA) and low noise amplifier (LNA) applications. Optimized channel indium content, S-D spacing, gate-recess depth, and gate sinking was used to achieve V_{BD} over 5 V without large g_m degradation.

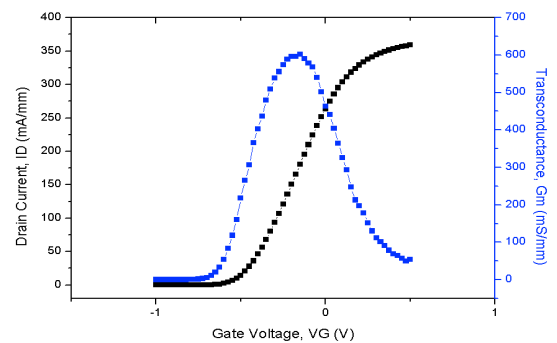


Fig. 2 Transfer characteristics.

2. 実験 (Experimental)

The $0.09 \times 20 \mu\text{m}^2$ devices with $\text{In}_{0.52}\text{Ga}_{0.48}\text{As}$ channel and L_{SD} of $3 \mu\text{m}$ were fabricated following typical HEMT process; fine gates exposures were obtained by e-beam lithography (JBX-6300 at Tokyo Tech).

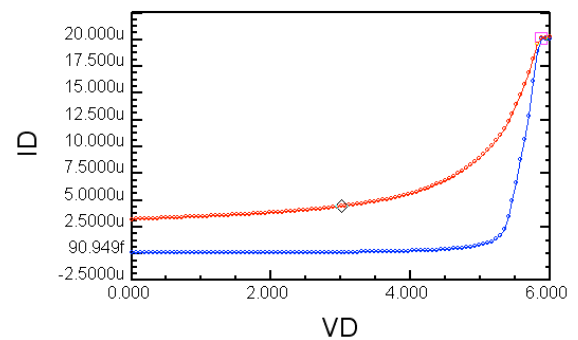


Fig. 3 Breakdown behavior.

3. 結果と考察 (Results and Discussion)

The device exhibits $I_{dss} = 281 \text{ mA/mm}$ and peak $g_m = 604 \text{ mS/mm}$ at $V_{DS} = 0.7 \text{ V}$. The device also exhibits high V_{BD} of 5.88 V . This result is able to meet the requirements for both PA and LNA application.

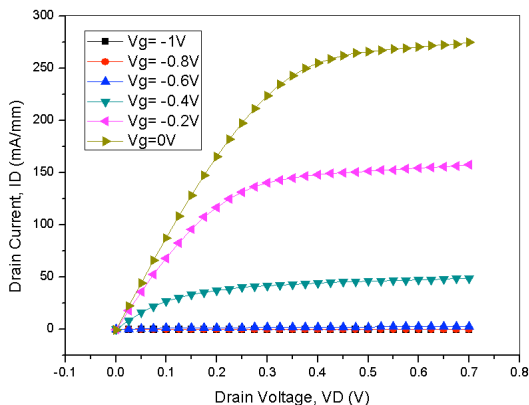


Fig. 1 Output characteristics.

4. その他・特記事項 (Others)

共同研究者等 (Coauthor) :
 Y. Miyamoto, Tokyo Tech
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5. 論文・学会発表 (Publication/Presentation)

None

6. 関連特許 (Patent)

None