# Fabrication and Characterization of Al.25Ga.75N/GaN High Electron Mobility Transistors with Indium Tin Oxide Gate


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**ABSTRACT**

AlGaN/GaN HEMTs are attractive devices for high power switching applications because of their high electron mobility and high breakdown characteristics. In this paper, we fabricate photo transistor by using ITO instead of gate metal. Therefore, the characteristics of the transparent by using ITO, the light source could through the interface of AlGaN/GaN and then obtained the electron-hole pair which has the duality of photodetector and transistor for HEMT. The light signals were be amplified by the photo-transistor instead of a conventional photodetector, and when the conventional photodetector is used, an amplifier is required to increase resolution. We characterized and compared HEMTs with ITO gates when not shining on light and shining on light. We characterized and compared HEMTs with ITO gate and Ni/Au gate as well. The results will be presented in the thesis. HFETs having ITO gates with a gate-with of 25 μm and a gate-length of 1 μm demonstrated the largest source-drain current (Ids) of 13.8 mA, and the largest transconductance of 113.6 mS/mm at a gate voltage of 0 V under without light.



Keywords : ITO gate fingers ; AlGaN/GaN HEMT ; Optical control of microwave devices ; Transparent-gate HEMT


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