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عنوان مقاله:

تاثیر فشار و دما بر ترانزیستورهای اثر میدان با تحرک بالای الکترونی AlGaN/GaN

محل انتشار:

مجله ی اینترفیس ها، فیلم های نازک و سیستم های کم ابعاد, دوره 2, شماره 2 (سال: 1398)

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نویسنده:

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خلاصه مقاله:

In this paper, drain-source current, transconductance and cutoff frequency in AlGaN/GaN high electron mobility transistors have been investigated. In order to obtain parameters of exact AlGaN/GaN high electron mobility transistors such as electron density, the wave function, band gap, polarization charge, effective mass and dielectric constant, the hydrostatic pressure and temperature effects are taken into account. It has been found that the drain-source current decreases with increasing temperature and increases with increasing hydrostatic pressure. The increase in temperature is equivalent to a negative virtual gate and an increase in the hydrostatic pressure equivalent to the positive virtual gate voltage. Moreover, the temperature and hydrostatic pressure effective mass dependence in high electron mobility transistor structures are investigated, and it is observed that the increase of hydrostatic pressure decreases the effective mass and the wave function penetrated to the quantum barrier AlGaN. In general, the process of increasing and decreasing the cutoff frequency and transconductance is similar to the variations in the drain-source current. The calculated results are in good agreement with existing experimental data.

کلمات کلیدی:

temperature, pressure, effective mass, AlGaN/GaN HEMTs, cut-off frequency

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