

Abstracts

Low-frequency noise characteristics of self-aligned AlGaAs/GaAs HBTs with a noise corner frequency below 3 kHz (1997 Vol. I [MWSYM])

Jin-Ho Shin, Jiyoung Kim, Yujin Chung, Joonwoo Lee, Kyu Hwan Ahn and Bumman Kim. "Low-frequency noise characteristics of self-aligned AlGaAs/GaAs HBTs with a noise corner frequency below 3 kHz (1997 Vol. I [MWSYM])." 1997 MTT-S International Microwave Symposium Digest 1. (1997 Vol. I [MWSYM]): 133-136.

We have investigated the surface recombination and its $1/f$ noise properties of AlGaAs/GaAs HBT's as a function of the emitter-base structure and the surface passivation condition. It is found that the surface recombination $1/f$ noise can be significantly reduced by the heterojunction launcher of the abrupt junction with 30% Al mole fraction emitter. The depleted AlGaAs ledge surface passivation further suppresses the surface recombination currents. Consequently, we have achieved a very low $1/f$ noise corner frequency of 2.8 kHz at the collector current density of 10 kA/cm². The dominant noise source of the HBT is not a surface recombination current, but a bulk current noise. This is the lowest $1/f$ noise corner frequency among the III-V compound semiconductor devices, and comparable to those of low-noise Si BJTs.

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