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    | Sommario/riassunto | A GaAs low-noise amplifier (LNA) is designed with first-time success using a technique for HEMT modelling which divides the device into intrinsic gate fingers embedded in an analysable metal structure. The gate finger is characterised by de-embedding metallisation from a standard test structure. The device is then re-built, with any geometry or layout that the foundry allows, and modelled by electromagnetic (EM) analysis. This allows techniques such as asymmetric inductive source feedback in an LNA to be modelled without prior fabrication of custom test structures. The 7-13 GHz, self-biased LNA has state-of-the-art noise figure (NF) of 1.25 dB at mid-band, gain of 20.5 ± 0.1 dB with 10 dB input and output matches, 10 dBm P1dB, 14 dBm Psat and 22 dBm OIP3. Excellent agreement is achieved with simulation. In a 3x3 QFN package the measured NF is 1.36 dB and the gain is 20 dB. The first-time design success achieved here validates the modelling and parameter extraction technique. |