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Authors:Mateos, Javier (1); González, Toms (1)
Author affiliation:(1) Departamento de Física Aplicada, Universidad de Salamanca, 37008 Salamanca, Spain
Corresponding author:Mateos, J.(javierm@usal.es)
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Abstract:In this work, we explore high frequency collective phenomena present in InGaAs HEMTs which lead to a peak in the current noise spectrum and enhance their DC response to THz signals, thus originating a resonance in the rectification of AC signals. These phenomena have been evidenced in recent experiments, in which THz detection as a result of plasma wave resonances has been demonstrated. In this paper, by means of Monte Carlo simulations, the noise spectra and the AC-DC rectification properties of the devices have been calculated and linked to the properties of the plasma oscillations within two distinct parts of the source-gate region: the capped and the recessed sections of the channel. © 2011-2012 IEEE.
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