Abstracts

Conversion gain and fluctuation noise of phonon-cooled hot-electron bolometers in hot-spot regime

H.F. Merkel, P. Khosropanah, D. Wilms Floet, P.A. Yagoubov and E.L. Kollberg. "Conversion gain and fluctuation noise of phonon-cooled hot-electron bolometers in hot-spot regime." 2000 Transactions on Microwave Theory and Techniques 48.4 (Apr. 2000, Part II [T-MTT] (Special Issue on Terahertz Electronics)): 690-699.

In this paper, a one-dimensional heat balance model for the hot-spot length of phonon-cooled hot-electron bolometer is set up and solved for the electron temperature profile along the bolometer bridge. A self-consistent theoretical method is presented to obtain the hot-spot length profile as a function of RF and bias heating power. This result is used to predict current-voltage characteristics. For a known hot-spot length profile, a small-signal model with different heating efficiencies for RP and bias heating is derived in the vicinity of an operating point. This small-signal model allows the conversion gain and fluctuation noise contribution to be calculated.

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