

Power conversion efficiency of AlGaAs/GaAs schottky diode for low-power on-chip rectenna device application

Abstract

A Schottky diode has been designed and fabricated on n-AlGaAs/GaAs high-electron-mobility-transistor (HEMT) structure. Current-voltage (I - V) measurements show good device rectification with a Schottky barrier height of 0.4349 eV for Ni/Au metallization. The differences of Schottky barrier height from theoretical value are due to the fabrication process and smaller contact area. The RF signals up to 1 GHz are well rectified by the fabricated Schottky diodes and stable DC output voltage is obtained. Power conversion efficiency up to 50% is obtained at 1 GHz with series connection between diode and load. The fabricated the n-AlGaAs/GaAs Schottky diode provide conduit for breakthrough designs for ultra-low power on-chip rectenna device technology to be integrated in nanosystems.