

ABSTRACT:

The Schottky diodes enjoined with coplanar waveguides are investigated for applications in on-chip rectenna device application without insertion of a matching circuit. The design, fabrication, DC characteristics and RF-to-DC conversion of the AlGaAs/GaAs HEMT Schottky diode is presented. The RF signals are well converted by the fabricated Schottky diodes with cut-off frequency up to 25 GHz estimated in direct injection experiments. The mW output power can be achieved by optimizing the material structure and ohmic metals so that lower series resistance is realized. Proper circuitry also should lead to maximum power conversion, for example the ground lines of the system are connected to the same point. Direct integration of the planar dipole antenna to the Schottky diode via coplanar waveguide transmission line may allow omission of any matching impedance circuit. The outcomes of these results provide conduit for breakthrough designs for ultra-low power on-chip rectenna device technology to be integrated in nanosystems.