

Characterisation of low-barrier Schottky diodes for millimeter wave mixer applications

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Abstract

This paper presents the characterization measurements and simulations performed with ACST InGaAs low-barrier Schottky diodes for millimeter wave mixing applications. While these low-barrier Schottky diodes have been successfully used for millimeter wave detector design, their performance when acting as mixers has not been tested yet. This paper shows the performance for this type of diodes in a fundamental mixing configuration with evaluation of conversion loss and noise temperature. A fundamental mixer test-jig is used as the measurement platform with low-loss E-H impedance tuners for RF and LO signal matching. In addition to the measurements, 3D HFSS and ADS circuit simulations are also performed and results are presented. Conversion loss of less than 5 dB is obtained for 0.1 mW LO power in mixer operation at 181-183 GHz.