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89 GHz zero-bias Schottky detector for direct detection radiometry in European satellite programme MetOp-SG

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Abstract

An 89 GHz waveguide coupled direct detector based on a low-barrier Schottky diode is presented. The main focus is to reduce white and $1/f$ noise to achieve high signal-to-noise ratio values above 35 dB. The design also addresses the Schottky barrier height deviation over temperature and its compensation within the RF circuit. The fabricated detector is characterised and compared with simulation results, proving a high accuracy level of the design and fabrication process, as well as good knowledge of the applied Schottky diode. The results prove the suitability of the detector to be considered for the second European meteorological operational satellite programme (MetOp-SG).