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Compact and Sensitive Millimetre Wave Detectors Based on Low Barrier Schottky Diodes on Impedance Matched Planar Antennas

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Abstract

Compact and highly responsive millimeter wave planar Schottky detectors are proposed for uni-planar and low-cost fabrication. For optimum power transfer, the zero-bias Schottky diodes are impedance matched by the antenna design itself, with an established meander dipole and a new folded dipole type. In particular, up to 200GHz, the folded dipole exhibits a single responsivity peak, notably beneficial for communications. The realized detectors exhibit an outstanding system RF voltage responsivity of up to 16005mV/mW at 87.8GHz without lenses or pre amplification. In addition, an excellent NEP level is demonstrated by the detectors with 0.39pW/√Hz