Abstracts

A Uniplanar 90-GHz Schottky-Diode Millimeter-Wave Receiver

G.P. Gauthier, W.Y. Ali-Ahmad, T.P. Budka, D.F. Filipovic and G.M. Rebeiz. "A Uniplanar 90-GHz Schottky-Diode Millimeter-Wave Receiver." 1995 Transactions on Microwave Theory and Techniques 43.7 (Jul. 1995, Part II [T-MTT] (Special Issue on Emerging Commercial and Consumer Circuits, Systems, and Their Applications)): 1669-1672.

A 90-GHz Schottky-diode receiver based on a double-slot antenna fed by a coplanar-waveguide (CPW) transmission line is presented. The double-slot antenna is placed on an extended hemispherical high-resistivity silicon substrate lens, The uniplanar receiver results in a 9.3 ± 0.3 dB measured SSB conversion loss at 88-90 GHz including antenna and IF circuit losses and a 1-dB loss due to the use of a nonoptimal matching cap layer at the silicon lens-air interface. The calculated conversion loss agrees very well with the RF measurements. The uniplanar double-slot antenna receiver is very small, less than 1.1 x 4 mm including the RF/IF filter, and is compatible with monolithic two-and three-terminal devices on GaAs substrates. The application areas are in millimeter-wave receivers for automotive systems, communication systems, and radiometric linear imaging arrays.

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