Abstracts

A 100-Element Planar Schottky Diode Grid Mixer

J.B. Hacker, R.M. Weikle, II, M. Kim, M.P. De Lisio and D.B. Rutledge. "A 100-Element Planar Schottky Diode Grid Mixer." 1992 Transactions on Microwave Theory and Techniques 40.3 (Mar. 1992 [T-MTT]): 557-562.

In this work we present a Schottky diode grid mixer suitable for mixing or detecting quasi-optical signals. The mixer is a planar bow-tie grid structure periodically loaded with diodes. A simple transmission line model is used to predict the reflection coefficient of the grid to a normally incident plane wave. The grid mixer power handling and dynamic range scales as the number of devices in the grid. A 10 GHz 100-element grid mixer has shown an improvement in dynamic range of 16.3 to 19.8 dB over an equivalent single-diode mixer. The conversion loss and noise figure of the grid are equal to that of a conventional mixer. The quasi-optical coupling of the input signals makes the grid mixer suitable for millimeter-wave and submillimeter-wave applications by eliminating waveguide sidewall losses and machining difficulties. The planar property of the grid potentially allows thousands of devices to be integrated monolithically.

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