Abstracts

Fabrication of 200 to 2700 GHz multiplier devices using GaAs and metal membranes

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Multiplier device fabrication techniques have been developed to enable robust implementation of monolithic circuits well into the THz frequency range. To minimize the dielectric loading of the waveguides, some circuits are realized entirely on a 3 /spl mu/m thick GaAs membrane with metal beamleads acting as RF probes and DC contact points. Other designs retain some thicker GaAs as a support and handling structure, allowing a membrane of bare metal or thin GaAs to be suspended across an input or output waveguide. Extensive use is made of selective etches, both reactive ion (RIE) and wet chemical, to maintain critical dimensions. Electron beam (e-beam) lithography provides the small contact areas required at the highest frequencies. Planar multiplier circuits for 200 GHz to 2700 GHz have been demonstrated using a variety of metal and GaAs membrane configurations made available by these fabrication techniques.

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