Abstracts

Etched-silicon micromachined W-band waveguides and horn antennas

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Micromachining of silicon is broadly proposed for the fabrication of substrates and waveguides at millimeter wavelengths. This paper presents the results of the fabrication of finned diamond-shaped waveguides and horn antennas by way of ethylene-diamene-pyrocatechol anisotropic etching of silicon. The structure is fabricated in two halves by etching V grooves in [100] silicon wafers. The etched faces of the wafers were metallized with gold. Metallic fins evaporated on a thin layer of Mylar and sandwiched between the two halves of the structure were used to improve the bandwidth of the waveguide. Measurements were taken of the dispersion curve of the waveguide with fins with different gap separations, and of the radiation patterns of the fabricated horns with different flare angles at different frequencies. Measurements showed a very good agreement with numerical calculations using the finite-element-method technique. Computed attenuation curves for the structure are provided as well.

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