Abstracts

GaAs Integrated Microwave Circuits

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GaAs has many desirable features that make it most useful for microwave and millimeter-wave integrated circuits. The process of selective epitaxial depositions of high purity single-crystal GaAs with various doping concentrations into semi-insulating GaAs substrates has been developed. These high-resistivity substrates (>10/sup 6/ ohm · cm) provide the electrical isolation between devices, eliminating the difficulties and deficiencies normally encountered in trying to obtain isolation with dielectrics, back-etching, p-n junctions, etc. This monolithic approach to integrated circuits thus allows for improved microwave performance from the devices since parasitic are reduced to a minimum. Planar Gunn oscillators and Schottky barrier diodes have been fabricated for use in a completely monolithic integrated millimeter wave (94 GHz) receiving front end. The Gunn oscillators are made in a sandwich-type structure of three selective deposits whose carrier concentrations are approximately 10/sup 18/ - 10/sup/15/ - 10/sup 18/ cm/sup -3/. The Schottky diodes consist of two deposits with concentrations of 10/sup 18/ and 10/sup 17/ cm /sup -3/. The Schottky contact is formed by evaporating Mo-Au onto the 10/sup 17/cm/sup -3/ deposits; all ohmic contacts are on the surface and are alloyed to the N/sup +/ regions.

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