Abstracts

Integrated Circuit Compatible Surface Acoustic Wave Devices on Gallium Arsenide

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Improvements in gallium arsenide materials technology have led to the rapid development of GaAs MIC, CCD, and digital IC technologies in the last several years. In this paper we consider the additional capabilities afforded by the inherent piezoelectric properties of GaAs. The primary emphasis of the work is on surface acoustic wave (SAW) device configurations using MESFET and Schottky-barrier diode fabrication techniques which are compatible with the eventual monolithic integration of electronic devices on the same substrate. The GaAs SAW technology described here provides a means for achieving electronically variable delay, high-Q resonator structures for VHF/UHF oscillator frequency control, and real-time signal processing operations such as convolution and correlation. Prototype device designs and performance are described, includlng two-port GaAs SAW resonators with Q's as large as 13 000 at 118 MHz and a programmable GaAs SAW PSK correlator capable of signal correlation at 10-MHz chip rates. Further GaAs SAW device development required for increasing the operating frequency range to 500 MHz and processing bandwidth to 100 MHz is indicated.

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