Abstracts

Development of a Monolithic, Programmable SAW Filter in Silicon

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In this paper the development of a monolithic, programmable Surface-Acoustic-Wave (SAW) filter in a ZnO-SiO/sub 2/-Si layered structure is presented. Two programmable taps with integrated detection-control capabilities are discussed, producing efficiencies of 40-50 dB with a control range of 15-20 dB at 100 MHz. They consist of implanted pn junction electrodes at the silicon surface and have a smooth surface for an unperturbed SAW propagation. A new SAW generating transducer is proposed with a combined junction-metal interdigital pattern. A large dielectric medium under the transducer is created by the depletion regions of the reverse-biased junction pattern. In this way optimal efficiency of SAW transducer and taps can be obtained. Experimental results are given for a 16-tap, full silicon programmable filter operating at 100 MHz.

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