Abstracts

Analysis of Interdigital Surface Wave Transducers by Use of an Equivalent Circuit Model

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Immittance, transfer, and scattering characteristics are studied for acoustic surface wave transducers of the interdigital electrode form. Linear network models are used to represent the transducer as a chain of identical three-ports which are acoustically in cascade but electrically in parallel. Transducer operation at acoustic synchronism is described theoretically and compared to current experimental data for transducers operating at 100 MHz and fabricated on lithium niobate. Favorable lithium niobate configurations for efficient, broad-band transducer operation are given. Scattering characteristics as a function of electric load are discussed. Low values of acoustic reflection loss are predicted theoretically and observed experimentally when the electric load and transducer capacitance are in resonance. The frequency dependence of transducer radiation immittance is studied, and the response is found to be analogous to the response of an endfire antenna array.

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