Abstracts

The Microwave Realization of a Simple Surface Wave Filter Function

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Surface wave acoustic device technology continues to generate new ideas, analyses and potential applications at an impressive rate. Concomitant introduction of some specific low-frequency prototypes into systems design and subsequently hardware is witness to the growing acceptance of this technology by the systems community. The demand for specific filter functions at steadily increasing frequencies is a natural consequence of this trend. Therefore, second order as well as high frequency effects must be understood in detail, if the desired filter properties are to be realized. In this paper the authors discuss the design and fabrication of a microwave delay line with a precisely specified bandpass characteristic and center frequency. The filter design required a parabolic form factor (to within ±0.3 dB) and essentially ripple free (<0.1 dB) in-band response between 3 dB points. The filter was fabricated using three-period tuned interdigital transducers produced by electron beam microfabrication. The emphasis of this paper will be on interaction of the various effects, such as electrical load and acoustic mass loading, frequency dependent propagation loss and matching element parasitics which, particularly at microwave frequencies, render the achievement of the desired pass band properties more difficult. In addition, the accuracy and stability requirements of the electron beam microfabrication of micron-sized electrode geometry will be discussed. The sources and control of spurious response ripples which degrade the otherwise smooth transfer function are also discussed.

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