Abstracts

Theory and Design of the Surface Acoustic Wave Multistrip Coupler

F.G. Marshall, C.O. Newton and E.G.S. Paige. "Theory and Design of the Surface Acoustic Wave Multistrip Coupler." 1973 Transactions on Microwave Theory and Techniques 21.4 (Apr. 1973 [T-MTT] (Special Issue on Microwave Acoustic Signal Processing)): 206-215.

The multistrip coupler performs the function of a directional coupler for freely propagating surface acoustic waves on a piezoelectrically active substrate. Its operation is analyzed in terms of a transmission line based equivalent circuit. Expressions are obtained for the directionality (transmission and reflection) in terms of the number of coupler strips and the acoustic frequency. Theory and experiment are shown to be in very good agreement. 50-percent metallization is found to give optimum performance; progressive increase in the proportion of the coupler area covered with metal is shown to involve a progressive change from an inline field model to a crossed-field model. Outside a stopband region it is found that a simplified expression for the directionality is valid; this greatly facilitates component design. Design criteria for multistrip components are discussed in terms of substrate and bandwidth requirements. An analysis is included of resistive and capacitative effects on coupling, and problems associated with coupling between dissimilar materials are discussed.

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