Abstracts

The Resonant Frequency of Interdigital Filter Elements (May 1966 [T-MTT])

B.F. Nicholson. "The Resonant Frequency of Interdigital Filter Elements (May 1966 [T-MTT])." 1966 Transactions on Microwave Theory and Techniques 14.5 (May 1966 [T-MTT]): 250-251.

The purpose of this correspondence is to describe a method of predicting the center frequencies of band-pass interdigital filters. The individual filter elements consist of approximately quarter-wavelength fingers between parallel ground-planes, the fingers being short-circuited at one end and a finite distance from another short-circuit plane at the open end. At present the accepted technique appears to be to separate the short-circuit planes by a quarter-wavelength at the design center frequency and to fore-shorten the fingers by an arbitrary amount, based upon the designer's experience. This procedure is rather inexact and tends to shift the center frequency of the filter by an amount which is often unacceptably large, particularly in the case of very narrow-band designs. As an example, the ten percent bandwidth filter of Crystal suffered a shift, when measured, of 3.8 percent from the design center frequency. Therefore, it is apparent that the center frequencies of filters with bandwidths less than three percent could easily be shifted beyond the desired band edges, and although the filter can be tuned by adjusting either the length of the finger or the capacitive gap at the open-circuited end, this method is not always desirable. Tuning mechanisms are not suitable when the filter is for a high power application or when dissipation losses or manufacturing costs must be minimized.

❑ Return to main document.