Abstracts

A Compact Broad-Band Thin-Film Lumped-Element L-Band Circulator

R.H. Knerr, C.E. Barnes and F. Bosch. "A Compact Broad-Band Thin-Film Lumped-Element L-Band Circulator." 1970 Transactions on Microwave Theory and Techniques 18.12 (Dec. 1970 [T-MTT] (1970 Symposium Issue)): 1100-1108.

Impedance matrices including magnetic losses are developed for a number of lumped-element ferrite-loaded symmetrical three-port junctions. The scattering matrix eigenvalues corresponding to these matrices are determined as functions of frequency and circuit parameters and are used to analyze these three-ports with emphasis on their properties as circulators. A very compact broad-band thin-film lumped-element circulator is derived from the idealized equivalent circuit. An experimental model approximately represented by this circuit is shown to have a 20-dB isolation bandwidth of greater than 30 percent with an insertion loss of less than 0.6 decibel. A switchable circulator which requires no magnetic-field switching is treated using this same analytical approach. It is suggested that this type of analysis together with additional experimental refinement of equivalent circuits will lead eventually to a computerized design of lumped-element circulators.

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