Abstracts

Temperature-Stabilized 1.7-GHz Broad-Band Lumped-Element Circulator

H. Katoh. "Temperature-Stabilized 1.7-GHz Broad-Band Lumped-Element Circulator." 1975 Transactions on Microwave Theory and Techniques 23.8 (Aug. 1975 [T-MTT]): 689-696.

A new construction technique for broad-banding and temperature stabilization of a lumped-element circulator is presented to obtain a compact circulator for practical usage. By using a new integrated wide-banding network consisting of three series resonant circuits on the back of the junction substrate, 1.7-GHz double-tuned and triple-tuned broad-band circulators have been successfully developed. Fundamental junction parameters, such as an in-phase eigeninductance, parasitic capacitance, and nonreciprocal filling factor, have been investigated experimentally. A design theory for temperature compensation of a lumped-element circulator is also presented, and temperature compensation with bias magnetic field of postitive temperature coefficient has been applied to the 1.7-GHz broad-band circulators. As a result, 20-dB isolation bandwidths of more than 600 MHz (double-tuned type) and 950 MHz (triple-tuned type) have been obtained throughout the temperature range of -10 ~ +60°C.

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