Abstracts

A One-GHz Ferroelectric Limiter

J.B. Horton and M.R. Donaldson. "A One-GHz Ferroelectric Limiter." 1967 Transactions on Microwave Theory and Techniques 15.9 (Sep. 1967 [T-MTT]): 517-523.

The design and analysis of a 1-GHz limiter which uses voltage variation of the dielectric constant of a ferroelectric material to achieve limiting is described. An RF electric field derived from the input power is used to change the relative dielectric constant epsilon/sub r/ of the material; the resulting nonlinear change of capacitance of a small element of the material is used to change the condition of a tuned circuit. The tuned circuit terminates a quarter-wavelength stub which shunts the main transmission line, thereby providing a power-dependent mismatch at the junction of the two transmission lines. The degree of this mismatch is controlled by the condition of the tuned circuit and, therefore, the magnitude of the input power. Theoretical analysis and experimental results for small signal and large signal operation are presented. Limiter analysis is based on the measured change of ferroelectric (nonlinear) capacitance as a function of dc electric field. The ferroelectric element is 0.011 by 0.013 by 0.020 (inches) machined from polycrystalline (Pb/sub 0.315/-Sr/sub 0.685/) TiO/sub 3/ material.

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