

Theoretical Study of Phase and Amplitude Characteristics of Microwave Coplanar Delay Line Containing Thin Ferroelectric Layer

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Abstract

We theoretically studied the microwave coplanar line of different geometry based on MgO substrate with a thin (30 nm) ferroelectric layer under the external electric field using the environment of 3D modeling in COMSOL Multiphysics®, RF Module, Frequency Domain. The frequency dependence of the delay line coefficient S₂₁ was obtained. The sizes of the microstrip and the gap between the strip and the ground below which the influence of turns undercuts geometry of microstrip upon the coefficient S₂₁ becomes significant were found. Calculation of influence of an external electric field on the line delay time were accomplished. The results of the calculations show that the time delay under an external field can be changed in several times. It provides to create the delay line controlled by voltage.