Abstracts

Frequency-Dependent FDTD Modeling of Optically Controlled Dielectric Resonators

Y. Shen, K. Nickerson and J. Litva. "Frequency-Dependent FDTD Modeling of Optically Controlled Dielectric Resonators." 1993 Transactions on Microwave Theory and Techniques 41.6 (Jun./Jul. 1993 [T-MTT]): 1005-1010.

A theoretical analysis is carried out, to describe the performance of optically controlled dielectric resonators. A previously developed frequency-dependent finite-difference time-domain formulation has been used to estimate the effect that solid state plasmas have on the resonant frequency of dielectric resonators. Optical generation of plasmas in contact with dielectric resonators is being considered here as a possible means of controlling the resonator's frequency. The effect that carrier diffusion and recombination-generation have on plasma permittivity and penetration depth are taken into account in this analyses. The results are compared with measurement and are shown to yield a quantitative estimate of the optically induced dielectric resonator frequency shift as a function of the illumination, properties of the plasma host semiconductor, and the properties of the dielectric resonator.

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