Abstracts

Nonlinear Response to Picosecond Pulse Excitations in Magneto-Dielectric Media

H. How, C. Vittoria and K. Trott. "Nonlinear Response to Picosecond Pulse Excitations in Magneto-Dielectric Media." 1993 Transactions on Microwave Theory and Techniques 41.2 (Feb. 1993 [T-MTT]): 255-259.

Nonlinear responses of magneto-dielectric thin layers to picosecond excitation have been calculated utilizing direct time-domain integration. Relaxations, hysteresis, and magnetic saturation phenomena associated with the response are therefore discussed in depth. The purpose of this calculation was to provide an analytical method by which physical properties of materials can be identified under picosecond-pulse excitation as well as to explore special cases of excitations in which picosecond pulses are efficiently absorbed. The calculations indicate that by examining the reflected waveform of the incident rectangular picosecond pulse the amount of magnetic hysteresis and saturation of the material may be estimated. It is shown that magnetic hysteresis will affect the shape of the trailing edge of the reflected signal, whereas the magnetic saturation effect can be identified from the slope of the reflected pulse step. Examples of designing effective picosecond-pulse screening structures have also been illustrated.

❑ Return to main document.