Abstracts

A global finite difference time domain analysis of a silicon nonlinear transmission line

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This paper presents a global finite difference time domain (FDTD) analysis of a silicon nonlinear transmission line (NLTL) using optimized varactors. The simulation is based on the FDTD method also including transmission line losses and the drift-diffusion model for the semiconductor devices solved by means of finite differences (FD). The diodes are included in the FDTD scheme as lumped elements. The fall time of 74 ps of a 4 GHz sinewave was compressed to approximately 15 ps at the output of a 20 mm long NLTL with 40 diodes. Comparing the measured output signal to the simulation, a good agreement could be achieved.

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