Abstracts

Novel Concepts for Improved Nonlinear Transmission Line Performance

H. Shi, W.-M. Zhang, C.W. Domier, N.C. Luhmann, Jr., L.B. Sjogren and H.-X.L. Liu. "Novel Concepts for Improved Nonlinear Transmission Line Performance." 1995 Transactions on Microwave Theory and Techniques 43.4 (Apr. 1995, Part I [T-MTT]): 780-789.

Three new device concepts have been investigated to improve the performance of nonlinear transmission lines (NLTL's). These devices, the Multi-Quantum Barrier Varactor, the Schottky Quantum Barrier Varactor, and the Schottky Superlattice Quantum Barrier Varactor, are predicted to offer significant advantages over the conventional Schottky varactor because of their stronger C-V nonlinearities, symmetric C-V characteristics, high cutoff frequency and increased breakdown voltages. The wave evolution on an NLTL has been numerically investigated using an improved model in which the effects of skin losses, line parasitic and device leakage current have been included. Combining a new transmission line layout design, which permits one to double and even triple the voltage handling capability of the NLTL (dependent upon the minimum pulse duration requirements), with a back-to-back device configuration, enables both positive and negative voltage waveforms to be efficiently compressed. These new devices are shown to be useful in high power harmonic generation applications as well.

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