Abstracts

Small-Signal Second-Harmonic Generation by a Nonlinear Transmission Line (Short Papers)

K.S. Champlin and D.R. Singh. "Small-Signal Second-Harmonic Generation by a Nonlinear Transmission Line (Short Papers)." 1986 Transactions on Microwave Theory and Techniques 34.3 (Mar. 1986 [T-MTT]): 351-353.

Second-harmonic generation (SHG) by a relatively low-loss transmission line having a capacitive nonlinearity is treated with an extended small-signal analysis. This simple theory brings out the relevance of "phase matching" the fundamental- and second-harmonic waves and of reducing losses in order to optimize SHG. It is shown that maximum SHG will occur when the line is short compared with its "coherence length" and has radian electrical length equal to twice its "transmission Q" at the second-harmonic frequency. The product of a line's "transmission Q" and its "nonlinearity factor" should be maximized to obtain maximum efficiency and is, therefore, believed to be a useful figure of merit for comparing the SHG potential of different transmission-line implementations.

❑ Return to main document.