Abstracts

Optimization of Active Microwave Frequency Multiplier Performance Utilizing Harmonic Terminating Impedances (Dec. 1996, Part II [T-MTT])

D.G. Thomas, Jr. and G.R. Branner. "Optimization of Active Microwave Frequency Multiplier Performance Utilizing Harmonic Terminating Impedances (Dec. 1996, Part II [T-MTT])." 1996 Transactions on Microwave Theory and Techniques 44.12 (Dec. 1996, Part II [T-MTT] (1996 Symposium Issue)): 2617-2624.

A primary factor affecting optimum performance of microwave multipliers employing nonlinear devices is the proper termination of the fundamental and other harmonic frequency components. The objective of the paper is to present a quantitative analysis leading to the assessment of optimum terminating impedances in the design of active frequency multipliers with special attention given to harmonics other than those desired. The analysis includes computer modeled HEMT data and supporting measured data for corresponding circuit realizations. Circuit designs are presented utilizing HEMT transistors as the active element to verify modeled results. Based on available literature, the results demonstrate, for the first time, the quantitative effects of harmonic termination on active multiplier conversion gain and fundamental and higher harmonic suppression. An experimental design reveals an improvement in multiplier gain of 124% over the conventional approach and data is presented which quantitatively illustrates the advantages of impedance termination considerations under optimal bias conditions.

❑ Return to main document.