# Abstracts

## Generic-device frequency-multiplier analysis-a unified approach

*E. O'Ciardha, S.U. Lidholm and B. Lyons. "Generic-device frequency-multiplier analysis-a unified approach." 2000 Transactions on Microwave Theory and Techniques 48.7 (Jul. 2000, Part I [T-MTT]): 1134-1141.*

In this paper, a unified generic FET frequency multiplier theory is developed. The predictions of this approach are consistent with previously published results, but this theory is valid for an extended set of bias/drive regimes of operation. The model can be applied in the cases of both single- and double-sided current clipping. The model predictions are presented as contour plots. These provide a general summary of the harmonic generation characteristics of a generic device, and the optimum bias and drive conditions. For a frequency doubler, 15% more second harmonic power than that indicated by a conventional analysis is predicted for the optimum configuration. For a frequency tripler, an alternative biasing condition is proposed, which yields interesting advantages over previously published approaches. The predictions of the unified generic approach are shown to be consistent with the corresponding contour plots for a specific device, as determined from a numerical Fourier analysis of its current waveform as given by a nonlinear device model. The trend in measured conversion efficiency versus input power for a fabricated GaAs monolithic-microwave integrated-circuit frequency tripler, with an output at 56 GHz, is compared with the predictions of the generic and device-specific models, with acceptable agreement being achieved.

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