Abstracts

A Fully Monolithic 4-18 GHz Digital Vector Modulator

G.B. Norris, D.C. Boire, G. St. Onge, C. Wutke, C. Barratt, W. Coughlin, III and J. Chickanosky. "A Fully Monolithic 4-18 GHz Digital Vector Modulator." 1990 MTT-S International Microwave Symposium Digest 90.2 (1990 Vol. II [MWSYM]): 789-792.

A fully monolithic vector modulator covering the entire 4-18 GHz band is presented that features independent direct digital control of amplitude and phase. The modulator output amplitude can be varied over a 25 dB range with 32 steps of resolution and the phase can be independently varied over 360° with 32 steps. The vector modulator chip set consists of a miniaturized 5 bit MMIC phase shifter and a 5 bit MMIC segmented dual gate distributed variable gain amplifier/attenuator. The chips are assembled on a carrier measuring less than 0.4" x 0.5" and require no supporting RF hybrid or DAC circuitry. The vector modulator demonstrates state-of-the-art performance with ultrawide (instantaneous) bandwidth, high uncorrected accuracy and resolution, and direct digital control with a potential transition time of a few nanoseconds. In addition, the individual MMIC chip performance is the best reported to date for ultrawide bandwidth phase and amplitude control functions.

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