Abstracts

A Two-Stage Monolithic IF Amplifier Utilizing a Ta/sub 2/O/sub 5/ Capacitor

A. Chu, L.J. Mahoney, M.E. Elta, W.E. Courtney, M.C. Finn, W.J. Piacentini and J.P. Donnelly. "A Two-Stage Monolithic IF Amplifier Utilizing a Ta/sub 2/O/sub 5/ Capacitor." 1983 Transactions on Microwave Theory and Techniques 31.1 (Jan. 1983 [T-MTT] (Joint Special Issue on Monolithic Microwave IC's)): 21-26.

A two-stage monolithic IF amplifier incorporating a sputtered Ta/sub 2/O/sub 5/ capacitor has been fabricated. The monolithic capacitor is based on a composite layer structure consisting of Au, Ta, Ta/sub 2/O/sub 5/, Ta, and Au. This layered structure is sequentially deposited in a single sputtering run, which eliminates particulate contamination. As a result, a thin pinhole-free dielectric layer can be deposited over large areas, and 140-pF capacitors have been fabricated with excellent yields. The large unit area capacitance of 1500 pF/mm² available with the present process has the potential for reducing the size of matching and bias circuits in microwave monolithic circuits and hybrid thin-film circuits. The monolithic amplifiers exhibit a gain of 17.5 ± 1.0 dB from 1.2 to 2.6 GHz and a minimum noise figure of ~2.7 dB, with an associated gain of 17.5 dB at 1.7 GHz.

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