Abstracts

Hybrid Integrated Lumped-Element Microwave Amplifiers

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This paper describes the development of microwave lumped-element thin-film amplifiers. The basic design philosophy underlying lumped inductors and capacitors at microwave f requencies is reviewed, showing how Q's of 100 are achieved. A variety of tunable input, output, and interstage integrated lumped-element networks for transistor amplifiers were fabricated. The gain and efficiency of 2-GHz class-C operated transistors mounted in these circuits were comparable with the beat performance achieved by the same transistors in less Iossy coaxial circuits. The measured losses (1.2 dB) at 2 GHz were very close to those calculated using the design parameters. Single-stage amplifiers at 2 GHz achieved one watt of output power with 4 dB of gain. At somewhat lower power levels more than 6 dB of gain was achieved. The circuits allowed the operation of low-power level class-A amplifiers with over 13 dB of gain. Cascaded operation yielded more than 17 dB of gain with 0.8 watts of CW power. It is concluded that lumped elements can be fabricated by thin-film technology and will play an important role in microwave integrated circuits.

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