Abstracts

Millimeter-wave wide-band amplifiers using multilayer MMIC technology

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This paper describes millimeter-wave wide-band single-ended and balanced amplifiers using novel multilayer monolithic microwave/millimeter-wave integrated circuit (MMIC) technology. The fundamental characteristics of thin-film transmission lines and a 50-GHz-band multilayer MMIC directional coupler are described through measurements up to 60 GHz. A single-ended amplifier fabricated in a 1.1 mm/spl times/0.8 mm area, shows a gain of about 12 dB with a noise figure of better than 5 dB around 50 GHz. A balanced amplifier fabricated using the multilayer MMIC directional couplers and single-ended amplifiers, shows a gain of 10-17 dB with input and output return losses of better than 14 dB from 33 to 53 GHz. The transmission lines and directional couplers can be effectively combined with millimeter-wave active circuits without degrading the circuit performance or increasing the circuit area. To our knowledge, these are the first millimeter-wave active circuits employing multilayer MMIC technology.

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