Abstracts

Silicon low noise amplifier chips for multi-chip module integration on a silicon-based substrate

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A method of designing low noise amplifier (LNA) using multi-chip module (MCM) technology is described here. First, low noise amplifier blocks using silicon BiCMOS process were fabricated. Noise figure and gain from 2-6 GHz were measured at different bias voltages after chips were fabricated. These chips were designed for multi-chip module integration on a newly developed low cost, low loss silicon substrate on which high-Q matching inductors are fabricated. Since the electrical characteristics of passive components on MCM are well controlled and the electrical characteristics of active devices are measured after fabrication, design accuracy and high yield can be achieved. Two design examples of low noise amplifiers at 2 GHz and 5 GHz are discussed. The 2 GHz LNA design utilizes high-Q spiral inductors as matching components whereas the 5 GHz LNA design utilizes microstrip lines as matching inductors.

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