Abstracts

High-performance inductors

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In this paper, we describe the design, test data, and analysis of several circular spiral inductors fabricated on GaAs substrates using the multifunction self-aligned gate multilayer process. Various factors such as high inductance, high-quality and, high current handling capacity, and compactness are studied. Several configurations for inductors were investigated to optimize the inductor geometry such as the linewidth, spacing between the turns, conductor thickness, and inner diameter. It includes measured effects of various parameters on inductor performance, such as linewidth, spacing, inner diameter, metal thickness, underlying dielectric, and dielectric thickness. It is shown experimentally that the Q factor of spiral inductors can be enhanced by using 9-/spl mu/m-thick metallization and placing inductors on a 10-/spl mu/m-thick polyimide layer, which is placed on top of the GaAs substrate. Using this technique, we have observed up to 93% improvement in the Q factor of circular spiral inductors, as compared to standard spiral inductors fabricated on GaAs substrates. Inductors having thick metallization can also handle dc currents as large as 0.6 A.

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