Abstract

The on chip spiral inductors are one of the key components in the development of the RFICs as they determine the performance of the circuits such as VCO, LNA, mixers etc. In this paper, the design of an inductor for GaN based RFICs operating in C-band is presented. Sapphire (Al₂O₃), which is a common substrate for GaN, is used as substrate and silicon nitride (Si₃N₄), which is a common passivation layer in GaN technology, is used as insulator layer between the metal layers. While the use of Al₂O₃ alleviates the problem of substrate losses that are common in Si substrate, use of Si₃N₄ increases the inter-metal layer capacitance. IE3D EM simulation tool was used for the design and optimization of the spiral inductors. An inductor of 5 nH operating at 5 GHz has been designed and optimized to achieve high quality factor (Q) in low foot print. Finally a parallel LC resonant tank circuit was designed to resonate at 5 GHz to demonstrate the operation of the designed inductor.

References

- Hongtao Xu, Doctoral report on "MMICs using GaN HEMTs and Thin-Film BST Capacitors," submitted to University of California, 2005

**Index Terms**

Computer Science \hspace{1cm} \hspace{1cm} \hspace{1cm} Circuits And Systems

**Keywords**

Rfics \hspace{0.5cm} On Chip Inductor \hspace{0.5cm} Quality Factor \hspace{0.5cm} Foot Print \hspace{0.5cm} Self-resonance Frequency.