Abstract

In this paper a three stage Active Inductor (AI) based Low Noise Amplifier (LNA) for Ultra Wide Band (UWB) receiver is presented. A fully differential topology has been adopted in order to improve the circuit robustness against unwanted common mode signals. T-coil peaking is used to enhance the bandwidth over the entire Ultra Wide Band frequency range. Active inductor is employed because of its low area, tunable inductance and high quality factor. Simultaneous Noise and Impedance Matching (SNIM) is employed to reduce the noise figure of the design. Resistive source degeneration has been implemented to improve the linearity of the circuit. The proposed LNA is designed using 90nm CMOS technology. The proposed LNA achieves power gain (S21) greater than 12dB throughout the UWB spectrum providing a bandwidth of 4 – 11 GHz. The input matching (S11) and output matching (S22) are kept well below -10 dB and – 8dB respectively, while the reverse isolation (S12) is less than -43 dB providing a linearity of -6. 9 dBm. Upon adoption of SNIM the Noise Figure falls in the range 4. 4 - 8. 2 dB.
Active Inductor based Low Noise Amplifier for Ultra Wide Band Receiver

References

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Index Terms

Computer Science
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Keywords

Power Gain  Simultaneous Noise And Impedance Matching  Noise Figure  Resistive Source Degeneration  Third Order Input Intercept Point