

## **A High Linear and Low Power with 71dB 35.1MHz/4.38GHz Variable Gain Amplifier in 180nm CMOS Technology**

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**Abstract :** This paper proposes a high linear, low power and wideband Variable Gain Amplifier (VGA) with a direct current (DC) gain range of -10.2dB to 60.7dB. By applying the proposed idea to the folded cascade amplifier, it is possible to achieve a 71dB DC gain, 35MHz (-3dB) bandwidth, accompanied by high linearity and low sensitivity as well. It is noteworthy that the proposed idea can be able to apply on every differential amplifier, too. Moreover, the total power consumption and unity gain bandwidth of the proposed VGA is 1.41mW with a power supply of 1.8 volts and 4.37GHz, respectively, and 0.8pF capacitor load is applied at the output nodes of the amplifier. Furthermore, the proposed structure is simulated in whole process corners and different temperatures in the region of -60 to +90 °C. Simulations are performed for all corner conditions by HSPICE using the BSIM3 model of the 180nm CMOS technology and MATLAB software.

**Keywords :** variable gain amplifier, low power, low voltage, folded cascade, amplifier, DC gain

**Conference Title :** ICCEEE 2024 : International Conference on Computing, Electrical and Electronic Engineering

**Conference Location :** Stockholm, Sweden

**Conference Dates :** July 15-16, 2024