LOW NOISE AMPLIFIER FOR WIRELESS LOCAL AREA NETWORK (WLAN) USING TWO DIFFERENT MICROSTRIPS LAMINATES

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ABSTRACT

This project describes the design and simulation of a low noise amplifier (LNA) for wireless local area network (WLAN) at the frequency of 2.5 GHz using the transistor low noise L to Ku-Band GaAs MESFET (NE76038). The circuit of LNA has been simulated using two different microstrips laminates with ε_r = 3.48 (RO4350B) and ε_r = 2.94 (RT/DUROID 6002) by using Genesys software and several calculation techniques using EESof Libra. Both amplifier are designed with the following specifications; the Rollets Stability Factor, k is stable on both microstrips laminates by using resistor 30 Ω, gain, S_{21} greater than 10 dB with 100 MHz bandwidth, noise figure smaller than 3 dB and voltage standing wave ratio (*VSWR*) between 1.5-2.5. Both are compared to determine which microstrips laminates contribute to better performance for the LNA.

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CHAPTER 1

PROJECT OVERVIEW

1.1 INTRODUCTION

Low noise amplifier is essential in the design of many classes of communication receivers [11]. The low noise amplifier is the first block in most receiver front ends [6]. Thus, the first stage of any communications receiver is the low noise amplifier. Its main function is to overcome the noise problem for the subsequent stages and make the signal easier to be processed with providing enough gain. A single transistor can provide gain. A low noise amplifier usually implies RF or wireless applications. Figure 1.1 [12] shows an example the RF low noise amplifier.

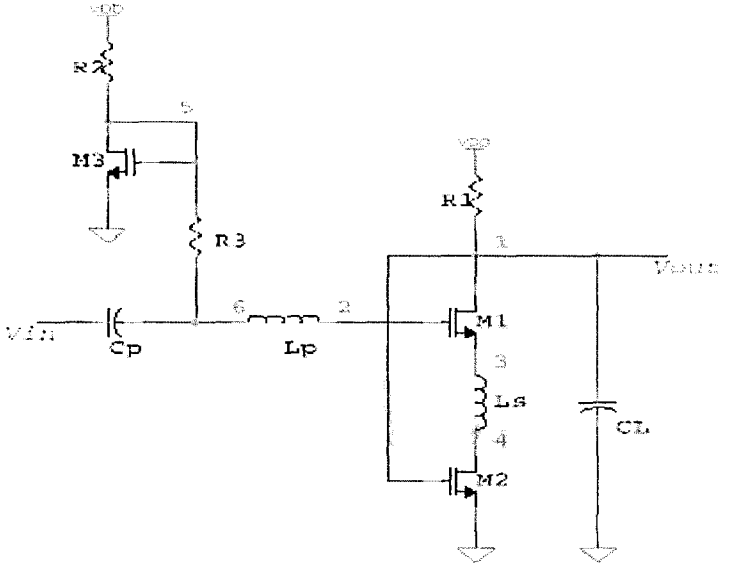

Figure 1.1: RF low noise amplifier [12]

High performance microwave receivers require a low noise amplifier as the input stage of the RF section to optimize their noise figure [13]. The first stage should have low noise and high gain. Generally, low noise amplifiers include two stages of amplification along with impedance matching networks to enhance their