

II-P-1.72

A FULLY INTEGRATED 2-MHZ GAUSSIAN FREQUENCY-SHIFT KEYING DEMODULATOR

V. T. Nam, D. Duy

IC Design Research & Education Center

Abstract

An efficient mixed-mode Gaussian Frequency-Shift Keying demodulator is presented. The demodulator was designed for 433-MHz receiver in which the RF signal was down converted to 2-MHz single-ended IF signal before being put in Gaussian Frequency-Shift Keying demodulator's input. Single-channel demodulation with zero-crossing detection structure was chosen for low-power demodulation. The circuit was designed in CMOS 130 nm process of Globalfoundries. The demodulator is able to recover 120-kbps input data from a 2-MHz GFSK signal with frequency deviation of ± 100 kHz. It consumes 6 mA from 3.3-V power supply and occupies 0.687 mm² (1239 μ m x 555 μ m) of silicon area.

Keywords: Gaussian Frequency-Shift Keying demodulator, zero-crossing detector, shape keeping one shot, Sallen-Key Butterworth low pass filter, two-stage op-amp