Differential input range driver for SAR ADC measurement setup

ABSTRACT

Differential successive approximation register (SAR) of analog to digital converter (ADC) requires two balancing input signals that have same amplitude with 180⁰ out of phase. Otherwise, it performs inaccurately and degrades the performance during ADC testing procedure. Therefore, an implementation of AD8139 chip single to differential amplifier was chosen as an ADC driver to generate sufficient differential output for the ADC. The chip was placed on a printed circuit board (PCB) to test the functionality as well as the performance of static and dynamic SAR ADC. The result shows that the single-ended input transform into differential voltage outputs. The amplitudes for the amplifier remain equal and is 180° out of phase for DC and AC voltage input signal. Besides, the fabricated 0.18μm CMOS technology of differential 10-bit SAR ADC is capable of digitising full code digital output and perform 9.5-bit effective number of bit (ENOB) from analog input driving by the ADC driver.

Keyword: ADC driver; Analog to digital converter; Differential successive register; Single to differential amplifier