

عنوان مقاله:

An Accurate Period-Modulator-Based Interface for Grounded Capacitive Sensors

محل انتشار:

ششمین کنگره ملی تازه های مهندسی برق و کامپیوتر ایران با نگاه کاربردی بر انرژی های نو (سال: 1398)

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نویسندگان:

M Karimi - *Department of Electronic Engineering, University of Guilan, Rasht, Iran*

A Heidary - *Department of Electronic Engineering, University of Guilan, Rasht, Iran*

M Dehban - *Department of Electronic Engineering, University of Guilan, Rasht, Iran*

خلاصه مقاله:

This paper presents a high-precision capacitance-to-digital converter (CDC) based on period-modulation (PM) for grounded capacitive sensors. With a symmetrical design, the performance of the CDC is significantly improved by applying zoom-in and auto-calibration techniques. The nonidealities of the CDC circuit which are mainly caused by charge injection of switches and associated parasitic effects is reduced by utilizing dummy switches at asymmetrical paths of the applied auto-calibration. The proposed interface is designed as an integrated circuit using a standard 0.18 μm CMOS technology. A worst-case capacitance error less than 0.2fF for a 10pF sensor capacitor with maximum variation of 200fF, and parasitic capacitance of up to 20pF is obtained. The achieved latency is 125 μs and the CDC consumes 170 μA from a 2V power supply.

کلمات کلیدی:

Capacitive-to-voltage converter (CVC), Zoom-in technique, Grounded capacitive sensor

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