





## Document details

[Back to results](#) | 1 of 1
[Export](#)
[Download](#)
[Print](#)
[E-mail](#)
[Save to PDF](#)
[Add to List](#)
[More...](#)
[Full Text](#)

IEACon 2016 - 2016 IEEE Industrial Electronics and Applications Conference  
 12 October 2017, Article number 8067399, Pages 323-329  
 2016 IEEE Industrial Electronics and Applications Conference, IEACon 2016; La Meridien Kota Kinabalu Kota Kinabalu, Sabah; Malaysia; 20 November 2016 through 22 November 2016; Category number CFP16G63-ART; Code 131122

**Single supply differential capacitive sensor with energy harvester compatibility** (Conference Paper)

Mustapha, N.A.C. , Alam, A.H.M.Z. , Khan, S. , Azman, A.W. 

Dept. of Electrical and Computer Engineering, International Islamic University Malaysia, P.O. Box 10, Kuala Lumpur, Malaysia

## Abstract

[View references \(8\)](#)

This paper presents a single supply differential capacitive sensing technique suitable to be used with a hybrid energy harvester in providing power to the circuit. The proposed differential capacitive circuit is designed based on the available off-the-shelf components. Theoretical and experimental study has been carried out to observe the performance of the circuit for various excitation frequencies. Tests that were carried out include using excitation frequencies ranging with a 0.1 pF capacitance change. Results from 40 kHz up to 400 kHz show a high level of linearity up to a 0.999 R-squared value. Range of capacitance detection can be increased by controlling the feedback capacitor,  $C_f$ , and the filter components,  $R_d$  and  $C_d$ . The sensitivity range is from 0.004 to 0.122 mV per every FF change, with  $\pm 5\%$  error. The circuit consumes 3.83 mW, with a 3.3 V supply voltage. This circuit is also suitable for a wireless sensing node application. © 2016 IEEE.

## Author keywords

cvc differential capacitive sensing hybrid energy harvester single supply wain-bridge oscillator

## Indexed keywords

Engineering controlled terms: Capacitance Energy harvesting Industrial electronics

Compendex keywords: Capacitance detections Capacitive sensing Differential capacitive sensors Excitation frequency Hybrid energy  
 Off-the-shelf components Wain-bridge oscillators Wireless sensing nodes

Engineering main heading: Capacitive sensors

## Funding details

Funding number	Funding sponsor	Acronym
	International Islamic University Malaysia	IUM
	Ministry of Higher Education, Malaysia	MOHE

## Funding text

This work is funded by the Exploratory Research Grant Scheme ERGS-2013 (Ref: IUM/504/RES/G/14/3/2/ERGS13-021-0054) by Ministry of Higher Education Malaysia through the Research Centre, International Islamic University Malaysia.

ISBN: 978-150900925-1  
 Source Type: Conference Proceeding  
 Original language: English

DOI: 10.1109/IEACon.2016.8067399  
 Document Type: Conference Paper  
 Sponsors: IEEE, IEEE Industrial Applications (IA)/Industrial Electronics (IE) Joint Chapter of Malaysia, IES  
 Publisher: Institute of Electrical and Electronics Engineers Inc.

## Metrics

[View all metrics](#)

1 Citation in Scopus

0 Field-Weighted Citation Impact



PlumX Metrics

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

## Cited by 1 document

Current behavior analysis of the single supply differential capacitive sensing  
 Che Mustapha, N.A., Alam, A.H.M.Z., Khan, S.  
 (2017) Proceedings - 14th IEEE Student Conference on Research and Development: Advancing Technology for Humanity, SCOReD 2016

[View details of this citation](#)

Inform me when this document is cited in Scopus:

## Related documents

Find more related documents in Scopus based on:

[Authors](#) > [Keywords](#) >