UNIVERSITY OF ALBERTA
TECHNOLOGY TRANSFER SERVICES

SELF-DRIVEN, BOOST CONVERTER FOR LOW VOLTAGE APPLICATIONS

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HIGHLIGHTS

- Miniaturized, printable resonant converter offering voltage boosting.
- Unlike conventional counterparts, the technology utilizes a variable capacitor in a novel topology to modulate and boost the input voltage at the output.
- Self-driven boost converter is cheap as it can be mass-produced and can operate at variable frequencies making it suitable for many different applications.

OPPORTUNITY

Low power energy harvesting circuits often have unstable energy sources and require some kind of stabilizing circuitry to stabilize the output voltage for meaningful applications. Conventional converters either require extrinsic sources such as digital micro-controllers or have poor gain, unable to amplify signals. The first type of converters dominate primarily due to their circuit simplicity but are less compatible with high frequency integrated circuits (IC). On the other hand, a resonant converter, in which an inductor-capacitor network causes self-oscillation at resonance, does not require an external driver and are operable at higher frequencies, which allows for the miniaturization of component size, making it ideal for IC applications. Unfortunately, these class of converters pose the gain limitation of at most unity, achieved only at the resonant frequency. Therefore, there is still a need for a converter that offers miniaturization, is compatible with IC technology and has the ability to boost the input power for very low voltage applications.

Researchers at the University of Alberta have developed a resonant converter that offers these combined features. Unlike its conventional counterpart, the technology utilizes a variable capacitor in a novel topology to modulate and boost the input voltage at the output. This self-driven boost converter is cheap as it can be mass-produced and can operate at different frequencies making it suitable for many different applications.

COMPETITIVE ADVANTAGE

- Miniaturization and lower cost due to elimination of micro-controllers or external drivers
- Electronic circuit can be fully printed on flexible substrates
- Offers higher than unity gain which is generally not achievable in resonant converters
- Can operate at variable frequencies and has been tested for very high frequencies (30 MHz- 300 MHz)

STATUS

- Patent issued United States - US9397561B2

INVENTOR

- Douglas Barlage

MORE INFORMATION

Mandira Das
Associate Director, Licensing
Technology Transfer Services, University of Alberta

mandira@ualberta.ca 780.492.9123