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ON-CHIP INDUCTORLESS POWER CONVERTER

HARDWARE, CIRCUITS, & SENSORS

On-chip power converter and switching power supply that uses a film bulk acoustic resonator (FBAR) in place of an inductor to offer high inductance density and excellent Q factor.

TECHNOLOGY TYPE

Semiconductors
MEMS/NEMS

STAGE OF DEVELOPMENT

- FBARs fabricated with superior results compared to on-chip inductors.

- Power converter model designed.

IP PROTECTION

U.S. Utility Patent Issued

On-Chip Power Converter Circuit and On-Chip Power Supply Using the Power Converter Circuit
US9450518B2

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TECHNOLOGY SUMMARY

Existing on-chip systems for power conversion optimize either performance or dynamic conversion. No solution offers simultaneous high efficiency and adjustable conversion ratios. Additionally, current devices are bulky and lack sufficient power density.

The *on-chip inductorless power converter* utilizes film bulk acoustic resonator (FBAR) technology to increase power density while minimizing electromagnetic interference (EMI). The FBAR device consists of a piezoelectric material sandwiched between two electrodes and acoustically isolated from the surrounding medium. Replacing the inductor with a FBAR reduces the size of power converters. The device offers high inductance density with a high Q factor and can be fabricated easily in a CMOS compatible process. This FBAR technology promises economical production of LEDs with dynamic conversion and lower electromagnetic interference.

FEATURES AND BENEFITS

- Eliminates need for inductors in the power supply circuit.
- Increases power density.
- Reduces electromagnetic interference.
- Enhances power converters' performance.
- Restricts energy leakage.

RECENT PUBLICATIONS

Imtiaz, A.M., Khan, F.H. (2013). Film bulk acoustic resonator (FBAR) based power converters: A new trend featuring EMI reduction and high power density. *2013 Twenty-Eighth Annual IEEE Applied Power Electronics Conference and Exposition (APEC)*. doi: [10.1109/apec.2013.6520494](https://doi.org/10.1109/apec.2013.6520494)

INVENTOR PROFILE

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