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

LEARN MORE

Reference Number: U-5413

Dean Gallagher
Technology Manager
dean.gallagher@tvc.utah.edu
801-585-0396

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


INVENTOR PROFILE

Faisal Habib Khan, Ph.D., Associate Professor – Electrical Engineering
Abusaleh Imtiaz, Ph.D.