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Built-in Self Test of DCDC Buck Regulators and Digital Lossless Current Sensing Method

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Inventors

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Background

A buck converter is a step down DC/DC converter used in portable electronic devices to convert higher DC voltages to small voltages necessary to function. Lossless load current sensing ability is one of the most desirable features of contemporary current or voltage mode controlled DC/DC converters. Recently, current sensing techniques in DC/DC converters that use the existing inductor series DC resistance (DCR) are gaining attention due to their reduced complexity and minimized loss. This is important for critical monitoring of output within the device. The increase in the use of DCR sensing techniques creates a need for a built in self test to monitor DCR.

Invention Description

Researchers at Arizona State University have invented a DC/DC buck regulator with a built-in self-test (BIST) and a digital lossless current sensing method. The Technology presented has a digitally controlled buck regulator with an inductor BIST and a digital lossless load current sensing scheme and is digitally controlled. In addition, the proposed technology can sense load (filter) the inductance value and potential shorts or faults in its load.

Potential Applications

Any device that uses DC/DC converter

- Laptops
- Cell phones
- Portable Electronic Devices

Best suited where monitoring output is critical

- Industrial
- Military
- Medical
- Aerospace

Benefits and Advantages

- Single chip solution that uses lossless current sensing and BIST
- Saves space, which allows for less overhead
- Reduces likelihood of inaccuracy versus multichip solution
- Accurate lossless digital load current sensing capability using DCR of the inductor

Intellectual Property Status:

Patent Pending

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