Low Voltage High Current Power Conversion with Integrated Magnetics

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(ABSTRACT)

Very low voltage, high current output requirement have necessitated improvements in power supply's density and efficiency. Existing power conversion techniques cannot meet very stringent size and efficiency requirements. By applying the proposed magnetic integration procedure, new integrated magnetic circuits featuring low loss, simple structure, and ripple cancellation technique are then developed to overcome the limitations of prior art. Both cores and windings are integrated. Consequently, the power loss and the size of the integrated magnetic device are greatly reduced. Detailed analysis and design considerations of the proposed circuits are presented. As a result of applying the proposed technique, very high density, high efficiency, low voltage, high current power modules were developed. A typical example features an isolated 3.3V/30A power module with a power density of 130W/in^3 and an efficiency of 90% at 500 KHz switching frequency.

To my parents

Zhaoping Chen

Dongxuan Li

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