

### 电力电子与电力传动

#### 带有源浮充平台的新型电压调整模块

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摘要: 多相交错型同步整流降压式变换器广泛地应用于微处理器电压调整模块(voltage regulator module, VRM)设计中。针对基本Buck变换器在输入、输出电压相差悬殊时, 占空比过小问题, 提出了一种新型电压调整模块--带有源浮充平台Buck变换器。该文对新拓扑进行了稳态和动态分析, 并对拓扑结构进行了探讨。与传统两相交错型同步整流Buck变换器实验结果对比表明, 由于新拓扑在基本Buck变换器中加入了有源浮充平台单元, 不仅具有大变比的电压转换能力和实现电感电流的交错并联, 而且无需采取任何均流措施实现自动均衡各相电感电流, 简化了控制电路。同时新拓扑具有开关应力小, 效率高的特点。

关键词: 有源浮充平台 多相交错并联 降压型变换器 电压调整模块 耦合电感 移相控制

#### A Novel Voltage Regulator Module With Active Floating Charging Landing

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Abstract: Multiphase interleaving synchronous Buck converter is widely adopted for voltage regulator module. As the small duty cycle of basic buck converter when it has high input voltage but low output voltage, Buck converter with active floating charging landing, which is a novel voltage regulator module is proposed. The steady and dynamic analysis and further discussion of this novel topology is given. Performances of this novel converter are compared with those of traditional two phases interleaving synchronous buck converter under the same experimental specifications. The results show that the new topology not only has large voltage conversion capability and interleaving inductor current, but also low switches stress, high efficiency. Moreover the current unbalance between inductors in each phase is removed automatically without any current sensing means, so simplify the control circuit.

Keywords: active floating charging landing multiphase interleaving Buck converter voltage regulator module coupled-inductor phase shift control

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