

DCM 反向电流优化全集成 KY 变换器设计

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摘 要: 针对一种新型升压变换器——KY 变换器提出了 NMOS 管漏端电压采样的控制方法, 通过合理设计开关管工作的时序及负反馈控制电路, 达到更为准确的过零关断效果. 采用标准 0.18 μm CMOS 工艺, 完成了一款全集成 KY 变换器的设计, 开关频率为 100 MHz. 仿真结果表明, 变换器输入电压为 1.8 V, 输出电压为 2.5 V, 负载电流为 150 mA 时, 变换器的峰值效率为 81.3%, 与常规通过检测电感电流过零点, 继而关断开关管的 KY 变换器相比, 效率提高了 4.5%.

关键词: KY 变换器; 全集成; DCM 控制; 零电流检测

Fully Integrated KY Converter with Optimized

Reverse Current for DCM Operation

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Abstract: By analyzing the topology of KY converter and the reverse current problem, a NMOS drain-voltage sampling control loop is proposed. Reasonable sequential circuit and feedback controller are designed and more accurate zero-crossing turn-off is achieved. A fully integrated 100 MHz KY converter is designed based on a standard 0.18 μm CMOS process. The simulation results show that the reverse current is reduced. The peak efficiency is 81.3% when input voltage is 1.8 V, output voltage is 2.5 V and load current is 150 mA. Improvement of 4.5% is achieved compared with other circuit which turns off the switches based on the normal zero-crossing signal of inductor current.

Key words: KY converter; fully integrated; DCM control; zero current detecting

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