Digitally Controlled 20W, 500 kHz Synchronous Buck Converter

Abstract - The demand for scalable and flexible power architecture has made the DC-DC converters required for various applications like Battery Powered Devices, Solid State Drives (SSD) and Portable instruments. Most commonly used topologies used in these applications are buck and boost converters. This paper is focused on the buck converter. Conventional Buck converter used in power management unit has drawback of diode conduction loss which reduces the efficiency of converter. To increase the efficiency by reducing the conduction losses, synchronous Buck converter is proposed. So, the proposed buck converters use second MOSFET in place of diode. To reduce the ringing at the switch node, RC Snubber is incorporated across the second MOSFET. Digital Controller is used in the closed loop of the converter to generate PWM signals to switch the gate of the MOSFETs. The converter is designed with an output power of 20W, 500 kHz switching frequency using MSP430f5172 Digital Controller.