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(54) **METHOD AND CIRCUITS FOR REDUCING DEAD TIME AND REVERSE RECOVERY LOSS IN BUCK REGULATORS**

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(58) **Field of Search** 323/282, 222, 323/223, 285

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(57) **ABSTRACT**

A buck regulator having a voltage sensor for sensing a voltage reversal caused by freewheeling current from an output inductor in the regulator. Upon sensing a reversed voltage, the voltage sensor triggers a gate controller to turn on a switch in the regulator, and thereby terminate a dead time. The voltage sensor and gate controller are high speed circuits, and therefore can reduce the duration of the dead time. Reducing the dead time duration improves efficiency by reducing the duration of body diode conduction. The dead time can be reduced to less than a turn-on time of the body diode, thereby preventing charge buildup in the body diode, and, consequently, preventing reverse recovery loss in the body diode. The present invention improves electrical conversion efficiency, and allows for increased operating frequency in buck regulators.

17 Claims, 7 Drawing Sheets

