A New Method for Start-up of Isolated Boost Converters Using Magnetic- and Winding-Integration

A new solution to the start-up and low output voltage operation of isolated boost family converters is presented. By the use of integrated magnetics and winding integration, the transformer secondary winding is re-used during start-up as a flyback winding coupled to the boost inductor. The traditional added flyback winding coupled to the boost inductor is thus eliminated from the circuit, bringing substantial cost savings, increased efficiency and simplified design. Each subinterval of the converter operation is described through electrical and magnetic circuit diagrams, and the concept is extended to other isolated boost family topologies. The principle of operation is demonstrated with a 800W isolated boost prototype, and a 1600W primary parallel series secondary isolated boost converter. Efficiency measurements of both prototypes are presented, including measurements during both start-up and normal boost operation.