A monolithically integrated smart rectifier is firstly presented in this work. The smart rectifier, which integrates a power MOSFET, gate driver and control circuitry, operates in a self-synchronized fashion based on its drain-source voltage, and does not need external control input.

As an example of the smart rectifier's application in isolated DC-DC converter, a synchronous flyback converter with SSR is analyzed, designed and tested. Experimental results show that the efficiency could be improved up to more than 10% compared with the use of hyper fast diode rectifier.

Based on a new resonant gate driver scheme, an integrated current-source gate driver is developed in this work by using a 0.35µm CMOS process with optional high voltage power MOSFET.

This work also presents a new implementation of a power supply in package (PSiP), which is different from all the prior-of-art PSiP solutions by using a high-Q bondwire inductor.

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The public is welcome to attend.