Application Brief

Flyback Selection Guide

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Flyback controllers are inherently isolated topologies which are ideal for offline (AC/DC) conversion. Flyback controllers are available with two control methods. The first is Primary-Side Regulation (PSR) which use the information from the auxiliary transformer winding to regulate the output and the other is Secondary-Side Regulation (SSR) which uses an optocoupler to provide more accurate feedback.

What are the pros and cons of Primary Side Regulation (PSR) vs. Secondary Side Regulation (SSR)? The following is a simple summary and a short list of popular controllers for each:

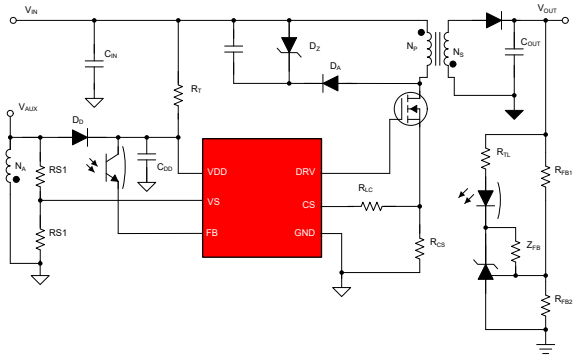

Figure 1. SSR Control

Pro – Tighter output voltage regulation (~2%) and faster load transient response
Con – Requires Opto-coupler and shunt regulator

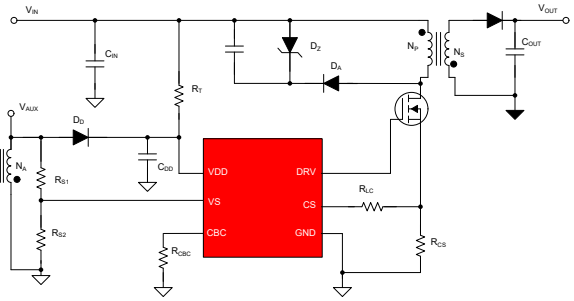

Figure 2. PSR Control

Pro – No Opto-coupler and shunt regulator
Con – Less accurate voltage regulation (~5%) and slower load transient response

Are you wondering when to choose Continuous Conduction Mode (CCM), Discontinuous Conduction Mode (DCM), or Transition Mode also known as Critical Conduction Mode (TM/CrM)? Table 1 highlights the pros and cons of each.

Table 1. Pros and Cons of CCM, DCM, or TM/CrM

Operating Mode	Pros	Cons	TI Product Family
CCM	Lower conduction and switching losses Improved cross regulation Smaller filtering solution	Low light-load efficiency Higher diode reverse recovery loss More difficult to compensate and stabilize	General Purpose PWM Controllers
DCM	No diode reverse recovery loss Improved stability Potentially smaller transformer size	Higher ripple currents Higher conduction and switching losses Larger filtering solution	
TM (CrM)	No diode reverse recovery loss Valley or Quasi Resonant (QR) switching Improved stability	Higher ripple currents Higher conduction and switching losses if not used with valley switching or QR mode Larger filtering solution	Dedicated Flyback Controllers

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Texas Instruments has Flyback controllers to support a wide variety of applications ranging from low power bias to high power density supplies. Our dedicated Flyback controllers combine our advanced control law to minimize switching losses and EMI by adjusting their switching frequency as a function of load. For high-power density or if you want to use a flyback more than 100 watts, check out our Zero-Voltage Switching (ZVS) and Active-Clamp Flyback (ACF) controllers.

Figure 3 is a quick selection guide for our controllers. To see more visit Flyback Controllers.

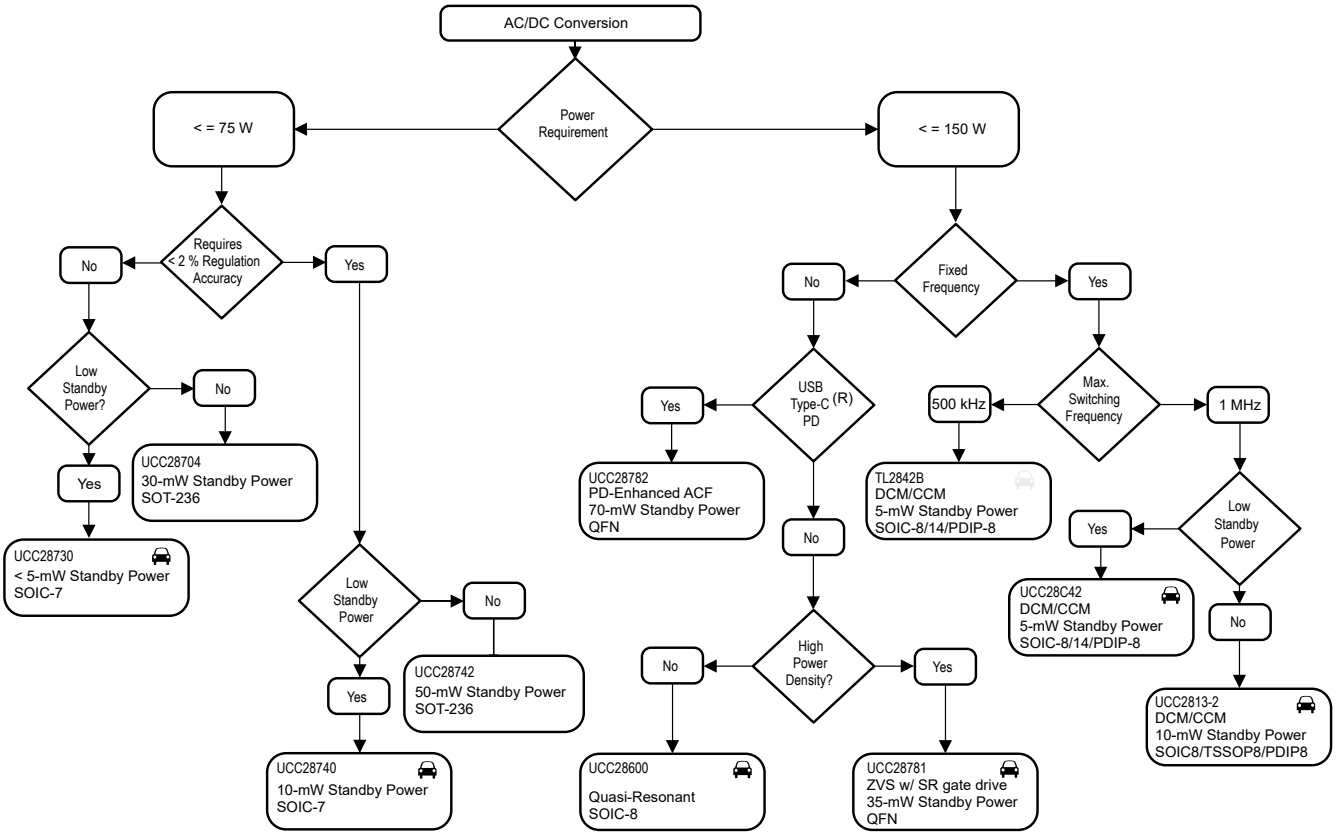

Figure 3. Flyback Selection Guide

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