

Flyback V1

This is a Simplis simulation model of a 36V to 72V input Flyback that is regulated by the boost strap winding. The output voltage is 12V and capable of up to 6A. The model includes leakage inductance on the secondary to include the effects of cross-regulation. The PWM is a UC3845 by Unitrode.

Note 1: If supplying power to the IC through a bootstrap winding as show here, the phase of the voltage loop may start from 0 deg at very low frequencies. The reason for this is that there is a small signal path from Vdd pin to the 5V reference and then resistor divided down to 2.5V. Even though this path attenuates the signal, it may not be enough to have no effect.

Note 2: Note that the Bode probe is shifted to reference the ground instead of RTN. This is done because the internal bode probe calculates the AC signal response referenced to Ground yet the signals are referenced to RTN in this case.

To better view the schematic, do the following from the SIMetrix command shell to set up the fonts for the text:

File → Options → Font → Schematic – user 1 → Arial,Bold,14

File → Options → Font → Schematic – user 1 → Times New Roman,Bold,22

The following are simulation circuits:

Flyback_Combo.sxsch - This finds the periodic operating point, then performs an AC analysis and last performs a load transient of 1A at 100usec. Takes 52 sec to run on a 1Ghz machine.

Flyback_AC_Ref.sxsch – This circuit simulation shows the effect of a small signal path through VDD from the bootstrap winding. This finds the periodic operating point, then performs an AC analysis. Takes 5 sec to run on a 1Ghz machine.

Flyback_Startup.sxsch - This model shows how the converter starts up. Takes 32 sec to run on a 1Ghz machine.

The following are required models to run the simulation circuits: The internal schematic can be viewed by highlighting the component, and clicking on Hierarchy → Descend Into

100Vzener.sxcmp - This is a component model of a 100V zener.

