High Speed PWM Controller Shrinks Off-Line Power Supplies

Shrinking off-line power supplies requires operation at higher switching frequencies. This allows the size of the magnetic and capacitive components to be reduced. Higher switching speeds generate unique problems in switching power supply design. The LT1241 eliminates the speed limitations of existing off-line switching control circuits. The LT1241 current mode PWM control IC implements a high frequency oscillator, 50ns current sense delay and a fast slewing output driver to make PWM switching speeds in excess of 300kHz realizable. Output cross-conduction has been eliminated and supply current is a low 10mA (max), increasing the controller's efficiency. Current sense leading edge blanking is included to reduce component count and reduce sense delay time.

The circuit depicted here uses the LT1241 in a space efficient 300kHz, 30W isolated off-line switching power supply design which is excellent for distributed power or wall adapter AC/DC applications. Flux-sensed feedback is used to eliminate opto-couplers and their inherent accuracy and drift problems. Line regulation for low to high line is $\pm 5\%$. Load regulation from 250mA to 1.5A loads is $\pm 5\%$. Short-circuit protection is included with a special "burp" mode whereby the circuit will continuously shut down and restart during overcurrent conditions. All components listed are standard, including the transformer and balun, which are available from Coiltronics (305-781-8900).

The LT1241 is available in 8-lead DIP and SOIC packages in the commercial temperature range. The LT1242 through LT1245 PWM controller series provides an assortment of undervoltage lockout and maximum duty cycle combinations, and the LT1246 extends the switching frequency range to 1MHz.

WARNING!

DANGEROUS AND LETHAL POTENTIALS ARE PRESENT IN OFF-LINE CIRCUITS!

BEFORE PROCEEDING ANY FURTHER, THE READER IS WARNED THAT CAUTION MUST BE USED IN THE CONSTRUCTION, TESTING AND USE OF OFF-LINE CIRCUITS. HIGH VOLTAGE, AC LINE-CONNECTED POTENTIALS ARE PRESENT IN THESE CIRCUITS. EXTREME CAUTION MUST BE USED IN WORKING WITH AND MAKING CONNECTIONS TO THESE CIRCUITS. REPEAT: OFF-LINE CIRCUITS CONTAIN DANGEROUS, AC LINE-CONNECTED HIGH VOLTAGE POTENTIALS. USE CAUTION.

ALL TESTING PERFORMED ON AN OFF-LINE CIRCUIT MUST BE DONE WITH AN ISOLATION TRANSFORMER CONNECTED BETWEEN THE OFF-LINE CIRCUIT'S INPUT AND THE AC LINE. USERS AND CONSTRUCTORS OF OFF-LINE CIRCUITS MUST OBSERVE THIS PRECAUTION WHEN CONNECTING TEST EQUIPMENT TO THE CIRCUIT TO AVOID ELECTRIC SHOCK. REPEAT: AN ISOLATION TRANSFORMER MUST BE CONNECTED BETWEEN THE CIRCUIT INPUT AND THE AC LINE IF ANY TEST EQUIPMENT IS TO BE CONNECTED.



