

**UC3584DW Secondary Side Post Regulator
Evaluation Board, Schematic, and List of Materials**

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Introduction

The operation of the UC3584 Secondary Side Post Regulator can quickly be evaluated in a given system by using this separate board containing a fully functional auxiliary converter. This controller provides a semiconductor solution for regulating auxiliary outputs in transformer isolated power supplies where magnetic amplifiers (magamps) were previously used. Circuit operation is synchronized to the main power converter and is based on leading edge modulation. This technique is compatible with both primary side current-mode and voltage-mode controls employed by the main converter.

Circuit Description

As shown in Fig. 1, a buck power stage produces the regulated auxiliary output at connector TB2. The input power is provided at TB1 and can be connected to a variety of single and double ended buck-derived converters. One such case is shown in Fig. 2 for a push-pull converter. This power connection is made at the common cathode of the main output node just before the main filter inductor. Connection at this node affords both synchronization to the primary controller and power transfer. Note that the oscillator is set at 125kHz to make synchronization to a 150kHz converter possible. To guarantee synchronization, the free running oscillator frequency should be set to less than the main frequency by adjusting R11 and C10.

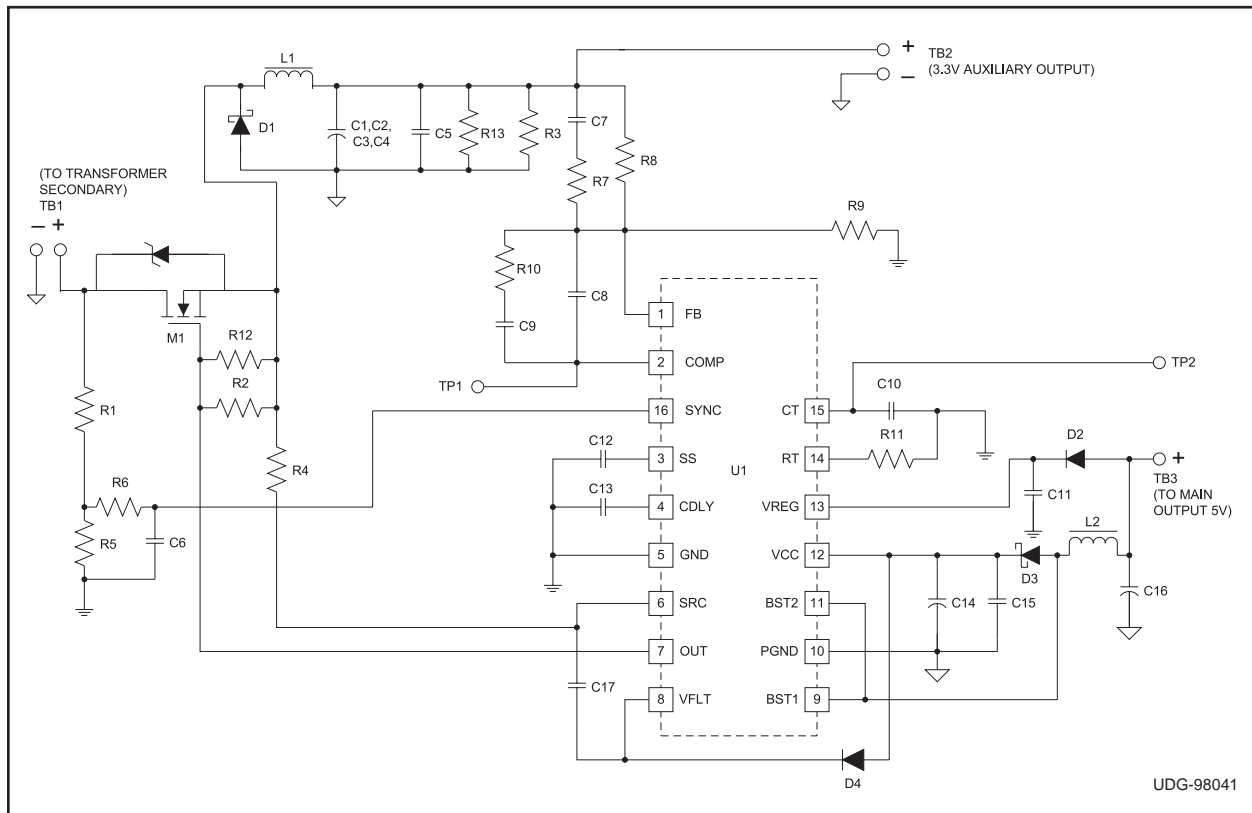


Figure 1. Evaluation Board Schematic

The auxiliary circuit is designed to interface to a 5.0V main output and its output is set to 3.3V at 10W. Other configurations are possible with minor changes to R7, C7, R8, R9, C8, C9 and C10. The surface mount design permits the use of the lowest thermal impedance package (UC3584DW) and minimizes required circuit board area. Compensation of the auxiliary circuit results in a measured loop crossover frequency of 1450Hz and a phase margin of 76.8°. A lead-lag network was chosen to permit the most flexibility for other compensation

designs. Power to the IC (U1) is generated by the boost circuit consisting primarily of L2, D3, C14 and an internal boost switch. The boost circuit can be replaced if desired, by a simple voltage doubler attached to the main transformer secondary winding.

For more complete information, pin descriptions and specifications for the UC3584DW Secondary Side Regulator, please refer to the UC3584, UCC3583 and the UCC3808 data sheet or contact your Unitrode Field Applications Engineer.

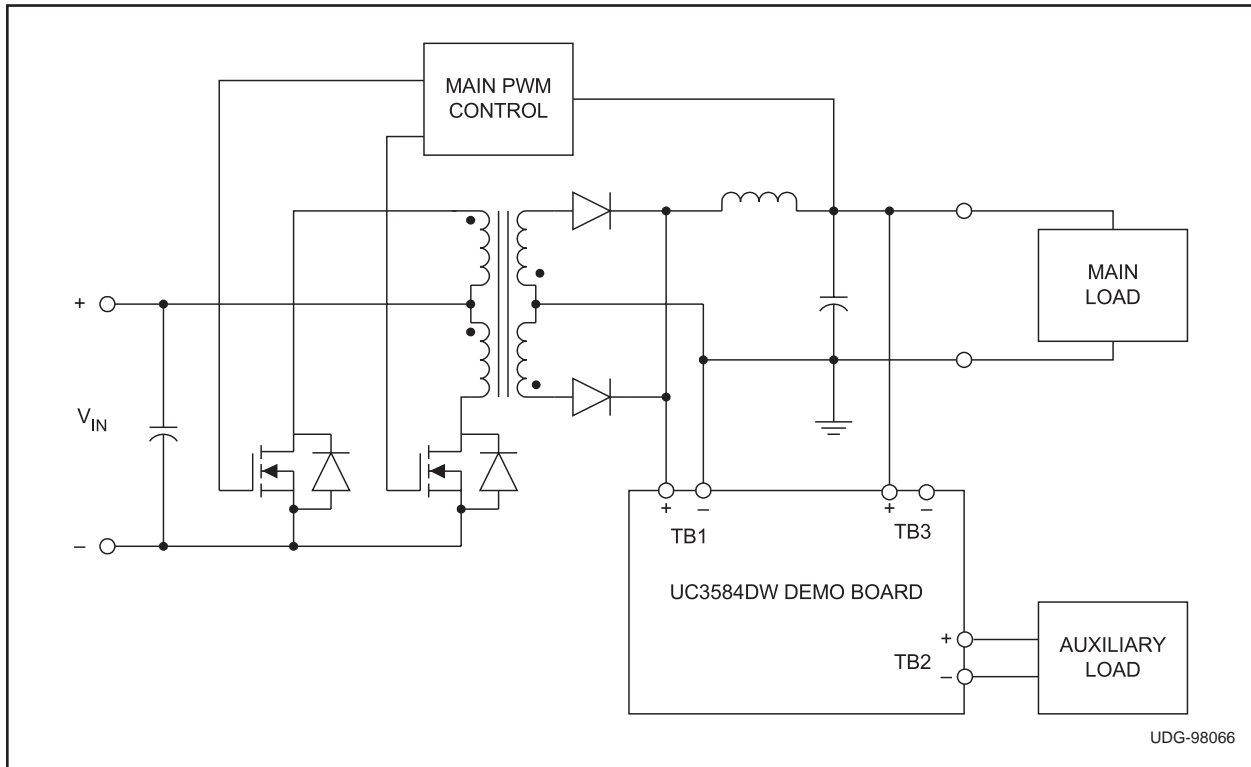


Figure 2. Connections Between Push-Pull Power Stage and UC3584DW Evaluation Board

Reference Designator	Description	Manufacturer	Part Number
C1, C2, C3, C4	390 μ F, 6.3V, R Case Code, Solid Tantalum	Sprague, Newark	595D397X06R3R2T
C5, C11, C12, C15	0.1 μ F, 50V, 1206, X7R, \pm 10%	Xicon, Mouser	140-CC502B104K
C6	100 pF, 50V, 1206, NPO, \pm 5%	Xicon, Mouser	140-CC502N101J
C7	4700 pF, 50V, 1206, X7R, \pm 10%	Xicon, Mouser	140-CC502B472K
C8	120 pF, 50V, 1206, NPO, \pm 5%	Xicon, Mouser	140-CC502N121J
C9	0.01 μ F, 50V, 1206, X7R, \pm 10%	Xicon, Mouser	140-CC502B103K
C10	220 pF, 50V, 1206, NPO, \pm 5%	Xicon, Mouser	140-CC502N221J
C13	1000 pF, 50V, 1206, X7R, \pm 10%	Xicon, Mouser	140-CC502B102K
C14	10 μ F, 25V, 7343, Tantalum, \pm 20%	Kemet, Newark	T491D106M025AS
C16	470 μ F, 6V, 7343H, Tantalum, \pm 20%	Kemet	T510X477M006AS

Table 1. Evaluation Board List of Materials

Reference Designator	Description	Manufacturer	Part Number
C17	1.5 μ F, 25V, Tantalum, \pm 20%	Panasonic, Digikey	ECS-H1EX155R
D1	Schottky, 10A, 45V	Central Semiconductor	CSDH10-45L
D2, D4	1N4148	Diodes Inc.	1N4148
D3	Schottky, 1.5A, 40V	IR	15MQ040
L1	33 μ H, 3.7A rms, 52m Ω	Coiltronics	UP4-330
L2	33 μ H, 2.4A rms, 98.9m Ω	Coiltronics	UP2-330
M1	MOSFET, 60V, 0.10 Ω , 14A	IR	IRFR024
R1	47.5k Ω , 1206, 1/8W	Panasonic, Digikey	P47.5KFCT-ND
R2	2k Ω , 1206, 1/8W	Panasonic, Digikey	P2.0KFCT-ND
R3	200 Ω , 1206, 1/8W	Panasonic, Digikey	P200FCT-ND
R4	3 Ω , 1206, 1/8W	Panasonic, Digikey	P3.3SCT-ND
R5	35.7k Ω , 1206, 1/8W	Panasonic, Digikey	P35.7KFCT-ND
R6	1k Ω , 1206, 1/8W	Panasonic, Digikey	P1.0KFCT-ND
R7	13.3k Ω , 1206, 1/8W	Panasonic, Digikey	P13.3KFCT-ND
R8	68.1k Ω , 1206, 1/8W	Panasonic, Digikey	P68.1KFCT-ND
R9	57.6k Ω , 1206, 1/8W	Panasonic, Digikey	P57.6KFCT-ND
R10	17.8k Ω , 1206, 1/8W	Panasonic, Digikey	P17.8KFCT-ND
R11	15k Ω , 1206, 1/8W	Panasonic, Digikey	P15.0KFCT-ND
R12	2k Ω , 1206, 1/8W	Panasonic, Digikey	P2.0KFCT-ND
R13	200 Ω , 1206, 1/8W	Panasonic, Digikey	P200KFCT-ND
TB1, TB2, TB3	Terminal Board Connector	Augat / RDI	2sv series
U1	Secondary Side Synchronous Post Regulator	Unitrode	UC3584DW

Table 1. Evaluation Board List of Materials (Continued)