

UC3853 Demo Board

by James Noon

The UC3853 is an 8 pin, High Power Factor Pre-regulator Integrated Circuit. This demo board was designed for 100W, 75kHz operation over a universal input voltage range (80VAC to 270VAC). A complete explanation of the UC3853 operation as well as a detailed design procedure can be found in Unitrode Application Note U-159. A parts list and schematic diagram for the typical application circuit described in U-159 are shown below.

The power factor correction circuit is based on a boost circuit topology with average current mode control. The oscillator frequency is fixed internally to 75kHz. Although having only 8 pins, the UC3853 incorporates an inner average current loop along with input voltage feedforward and overvoltage shutdown.

AC Voltage Application

AC voltage should be applied across terminals P1. AC voltage should be applied only when some load is present across VO and GND (P2).

Caution: High voltage levels are present on the demo board whenever it is energized. Proper precautions must be taken when working with the board. The output capacitor has high levels of energy storage and it must be discharged before the load is removed.

Reference Material

Application Note U-159 "Boost Power Factor Corrector Design With the UC3853"

Design Note DN-77 "Over Current Shutdown with the UC3853"

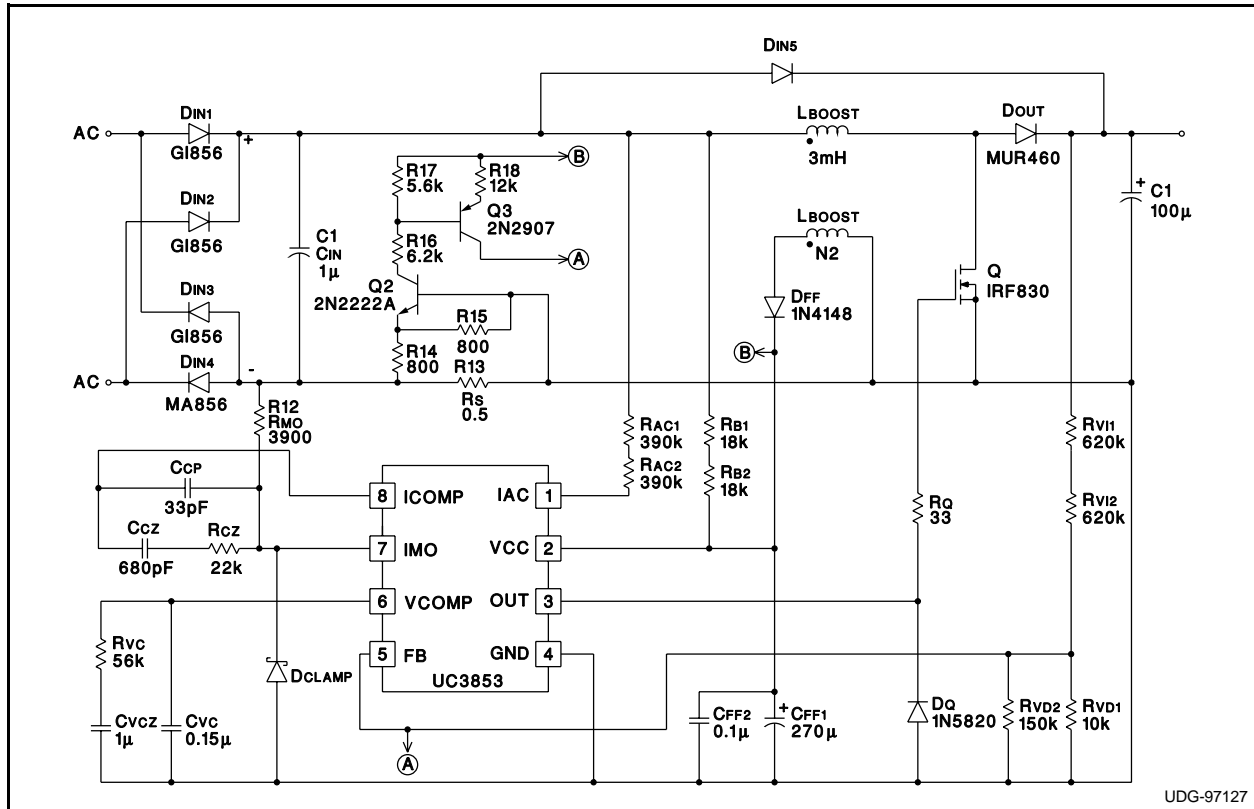


Figure 1.

Design Note

UC3853 Demo Board Parts List

Qty	Reference Designator	Part #/Type	Description	Comments
1	Co		Panasonic TSU; Electrolytic 100 μ F / 450V	
1	CIN		Panasonic ECQ-U2A105MV, 1 μ F/400V	
1	CCZ		Ceramic (N750=X7R), 680pF, 100V, N750	
1	CCP		Ceramic (N750=X7R), 33pF, 100V N750	
1	Cvc		Ceramic, 0.15F/100V/X7R	
1	Cvcz		Ceramic, 1F/63V/Z5U	
1	CFF1		Panasonic, SU, Electrolytic, 330F/50V	
1	CFF2		Ceramic, 0.1 μ F/63V/Z5U	
1	DOUT	HFA08TB60	International Rectifier, 600V/8A/19nS	
1	DOUT	MURH860CT	Motorola, 600V/8A/28nS	Alternative to above reference
1	DOUT	BYM26C	Philips, 600V/2.3A/30nS	Alternative to above reference
5	DIN, DIN2, DIN3, DIN4, DIN5	GI856	General Instruments	
5	DIN1, DIN2, DIN3, DIN4, DIN5	BYW95C	Philips, 600V/3A/200nS	Alternative to above reference
2	DQ, DIMO	1N5819	Schottky Rectifier, DO - 41	
1	DFF	HER102	Rectifier 100V/1A/50nS, DO - 41	
1	HS	529802B2500	AAVID Heatsink	
1	F1		2AG submin. Fuse 3A	250V
2	F1		Fuse Clip	
1	LBOOST	P0205	Inductor, with 220:24 turns, 3mH / 2A	
1	Q1	IRF830	International Rectifier TO-220	500V / 1.5 Ω
1	Q2	MPS2222A	NPN General Purpose	
1	Q3	MPS2907A	PNP General Purpose	
1	Rs	Wirewound	Memcor-Truohm SC3D	0.5 Ω

Design Note

UC3853 Demo Board Parts List (cont.)

Qty	Reference Designator	Part #/Type	Description	Comments
2	RAC1, RAC2	Metal Film	392k Ω	
1	RMO	Metal Film	3.92k Ω	
1	RCZ	Metal Film	22.1k Ω	
2	RVI1, RVI2	Metal Film	619 k Ω	
1	RVD1	Metal Film	10.0k Ω	
1	RVD2	Metal Film	150k Ω	Yageo, metal oxide film
2	RB1, RB2	Metal Oxide Film	18 k Ω /2 Ω	
1	RQ	Metal Film	33.2 Ω	
2	R14, R5	Metal Film	825 Ω	
1	R16	Metal Film	6.19k Ω	
1	R17	Metal Film	5.62k Ω	
1	R18	Metal Film	12.1k Ω	
1	RVC	Metal Film	56.2k Ω	
2	P1, P2		Terminal Block	
1	U1	UC3853N	Unitrode 8-pin PFC controller	