

**Design Note**
**UCC3750 Demonstration Board Operating Guidelines**
**by Dhaval Dalal**

The UCC3750 demonstration board is designed to illustrate a typical ring generator application using the UCC3750. It is designed to provide a 20Hz, 85V RMS output for loads up to 10 -15 REN with no offset voltage. Accompanying schematics and parts list provide details of the circuit.

To ensure proper operation, apply +5V between VDD and GND inputs. The circuit draws about 45 mA of current and a sinusoidal output of 1Vpp (centered around 3V) should appear at pin 9 of the UCC3750. The frequency of the sinusoid is set by the DIP switches(SW1). With S1 and S2 in the ON (down) position, a 20Hz signal is obtained. With other settings of these switches (as per datasheet information), other frequencies can be obtained. Please note that it can take about 3 seconds for the crystal oscillator to stabilize after power-up or a change in setting.

The power stage can be evaluated by applying the input voltage (40V - 60V) across VIN and RTN. The VB terminal should be connected to GND for zero offset. For true isolation, the input voltage return and VDD ground should be separate. The output voltage can be observed (and load connected) across terminals labeled VOUT and GND.

The AC current limit for the board is presently disabled by shorting pins 13 and 14. It can be set at 150mA by removing the short. In an AC limit condition, the sine-wave reference is attenuated and the output AC level goes down for 5 cycles. However, there can be a transient overshoot that can make the output temporarily saturate before the current limit sets in. The DC limit is set for +/-500 mA and is sufficient for most situations. The AC limit circuit is noise sensitive and needs proper filtering if it is enabled. Based on the value of R8, C24 should be chosen to introduce a pole just above the ring frequency in order to minimize any high frequency noise. Also, introducing a scope probe at pin 13 can cause the circuit to go into AC limit.

For different output voltage levels and offset requirements, values of R10-R15 will need to be changed along with the compensation. -48V operation based on the VB input may necessitate higher values of C16 and a smaller R15. Please refer to the applications section of the datasheet for further information. With certain capacitive loads, the output voltage waveform can see distortion in modes 2 and 4. This distortion can be minimized by using a transformer with lower magnetizing inductance (with the associated penalty of higher peak currents).

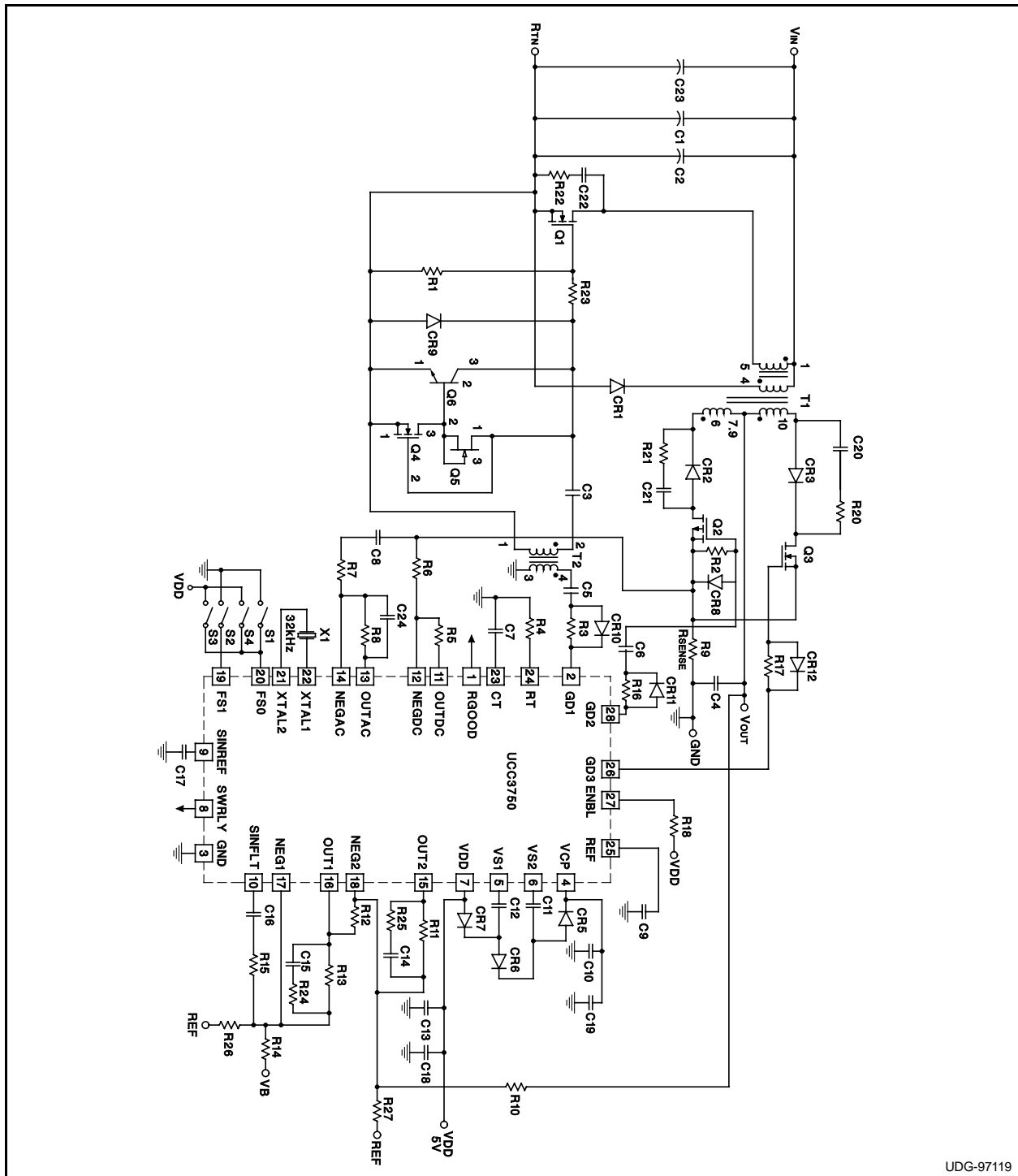
**UC3750 Demo Board Parts List**

Reference Designator	Part Number/Type	Manufacturer	Part Description
CR1	BYV99	Philips	
CR2, CR3	BYV26C	Philips	600V, 1A, 30ns
CR4	Short w/ jumper		
CR5 - CR12	1N5818	Diodes, Inc.	30V, 1A Schottky
Q1	IRF640	IR	200V, 0.18Ω
Q2	MTP2P50	Motorola	500V, p-channel
Q3	IRF840	IR	500V, 0.85Ω
Q4	2N7001	Diodes Inc.	60V, 1.2Ω
Q5	2N5457	National	n-channel JFET
Q6	MPSA06	National	npn - 80V, 50mA
C1, C2	HFS series, Aluminum	Panasonic	100μF, 63V
C3	Film	Panasonic	0.1μF, 50V

## UC3750 Demo Board Parts List (cont.)

Reference Designator	Part Number/Type	Manufacturer	Part Description
C4	ECQ-E(F)	Panasonic	1 $\mu$ F, 250V
C5, C9	Film	Panasonic	0.47 $\mu$ F, 50V
C6	Film	Panasonic	0.1 $\mu$ F, 50V
C7	Ceramic	Panasonic	470 pF, 63V
C8	Film	Panasonic	1 $\mu$ F, 50V
C10, C16	Ceramic/Tantalum	Panasonic	2.2 $\mu$ F, 50V/25V
C11, C12	Ceramic	Panasonic	0.22 $\mu$ F, 50V
C13	Ceramic	Panasonic	1 $\mu$ F, 63V
C14	Ceramic	Panasonic	1000 pF, 50V
C15	Omit		
C17	Film	Panasonic	0.047 $\mu$ F, 50V
C18	KA Series - Aluminum	Panasonic	22 $\mu$ F, 16V
C19	KA Series - Aluminum	Panasonic	100 $\mu$ F, 16V
C20, C21	Omit (short)		0 $\Omega$
C22	Ceramic	Panasonic	1nF, 500V, 10%
C23	Film	Panasonic	0.47 $\mu$ F, 63V
C24	Ceramic	Panasonic	3.3nF, 50V
T1	CTX08-13484-X1	Coiltronics	Power Transformer
T2	CTX08-13619-X1	Coiltronics	Gate Drive Transformer
U1	UCC3750N	Unitrode	
R1, R2, R6, R18, R25			10k
R3, R16, R17, R23			4.7 $\Omega$
R4			16.2k
R5			30.1k
R7			100k
R8			0.0k
R9			1 $\Omega$ , 1W
R10			200k
R11, R20, R21			1M
R12			3.32k
R13			61.9k
R14			374k
R15			15k
R19			Not used
R22			1k
R24			Omitted
R26			560k
R27			300k

UC3853 Demo Board Parts List (cont.)



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Figure 1. UCC3750 Demonstration Board Schematic

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