

## DC 373A-A Introduction

DC373A-A is a 48V to isolated 5V/2A converter based on the LT1725 isolated flyback controller. DC373A-A is designed to operate over the standard telecom input voltage range of 36V to 72V. The output is a regulated 5V. The transformer provides 1500V of isolation between the input and the output.

### **Quick Start**

To evaluate the function of the demo board you will need, at minimum, the following items: a power supply with an output voltage range of 36V–72V capable of 15 watts, a voltmeter for measuring output voltage and a load variable from 0A–2A or from infinite resistance down to 2.5 $\Omega$ . It is also desirable to have an additional voltmeter for the input, ammeters for measuring input and output currents and an oscilloscope for examining operating waveforms.

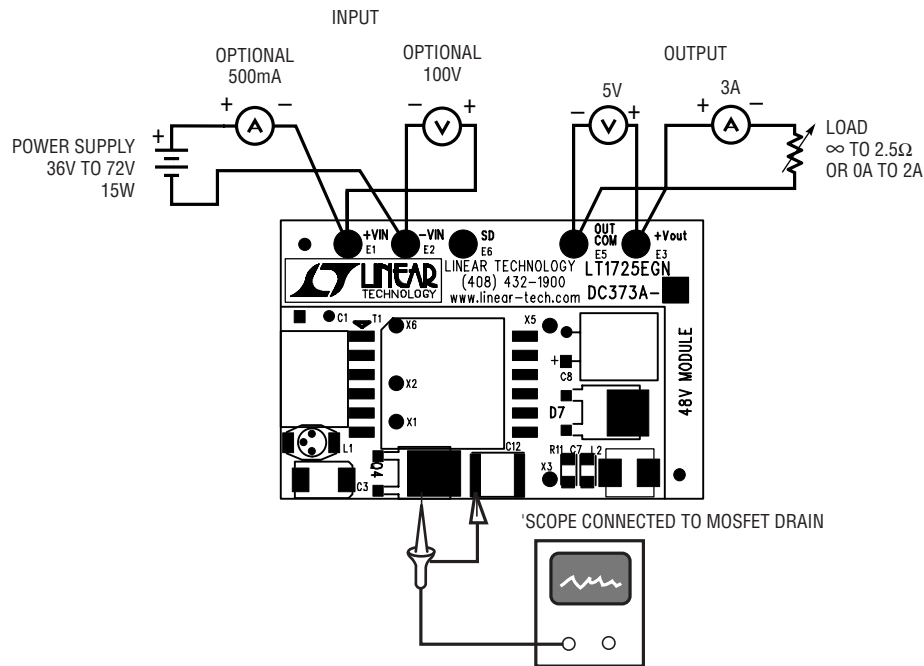
Refer to Figure 1 and follow the instructions below:

### **Input Side**

1. Connect the 36V–72V power supply across +VIN and –VIN.
2. Connect the input ammeter, if available, between the positive terminal of the power supply and +VIN.
3. Connect the input voltmeter, if available, directly across the input terminals, +VIN and –VIN.

### **Output Side**

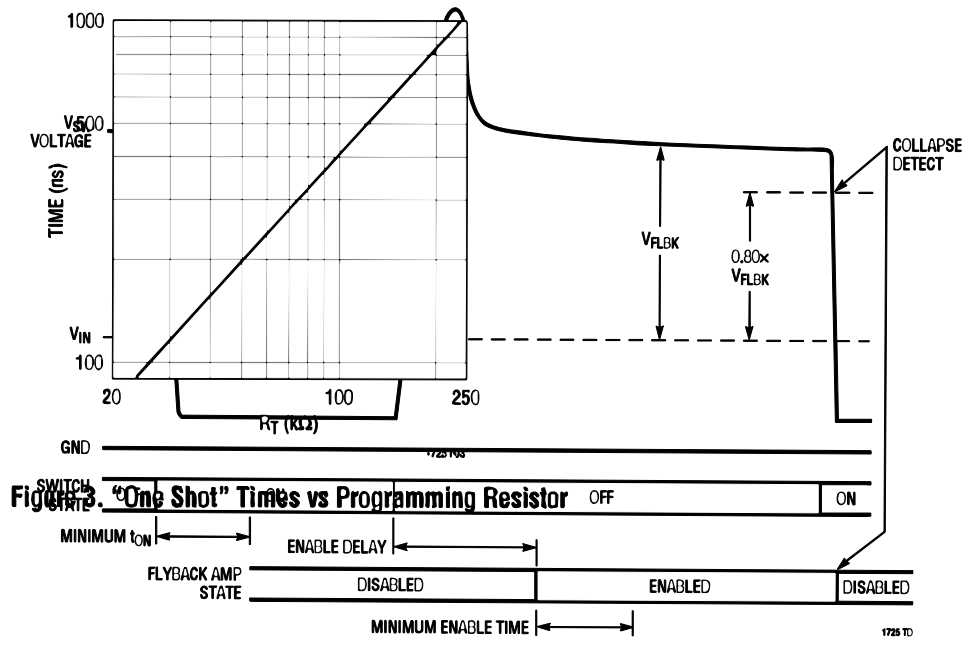
1. Connect the load is across the +VOUT and OUT COM terminals.
2. Connect the output voltmeter directly across the output terminals.
3. Connect the output ammeter, if available, between the +VOUT terminal and the load.
4. If an oscilloscope is available, the most informative waveform is at the drain of the MOSFET. The second channel can be used on the gate of the FET.



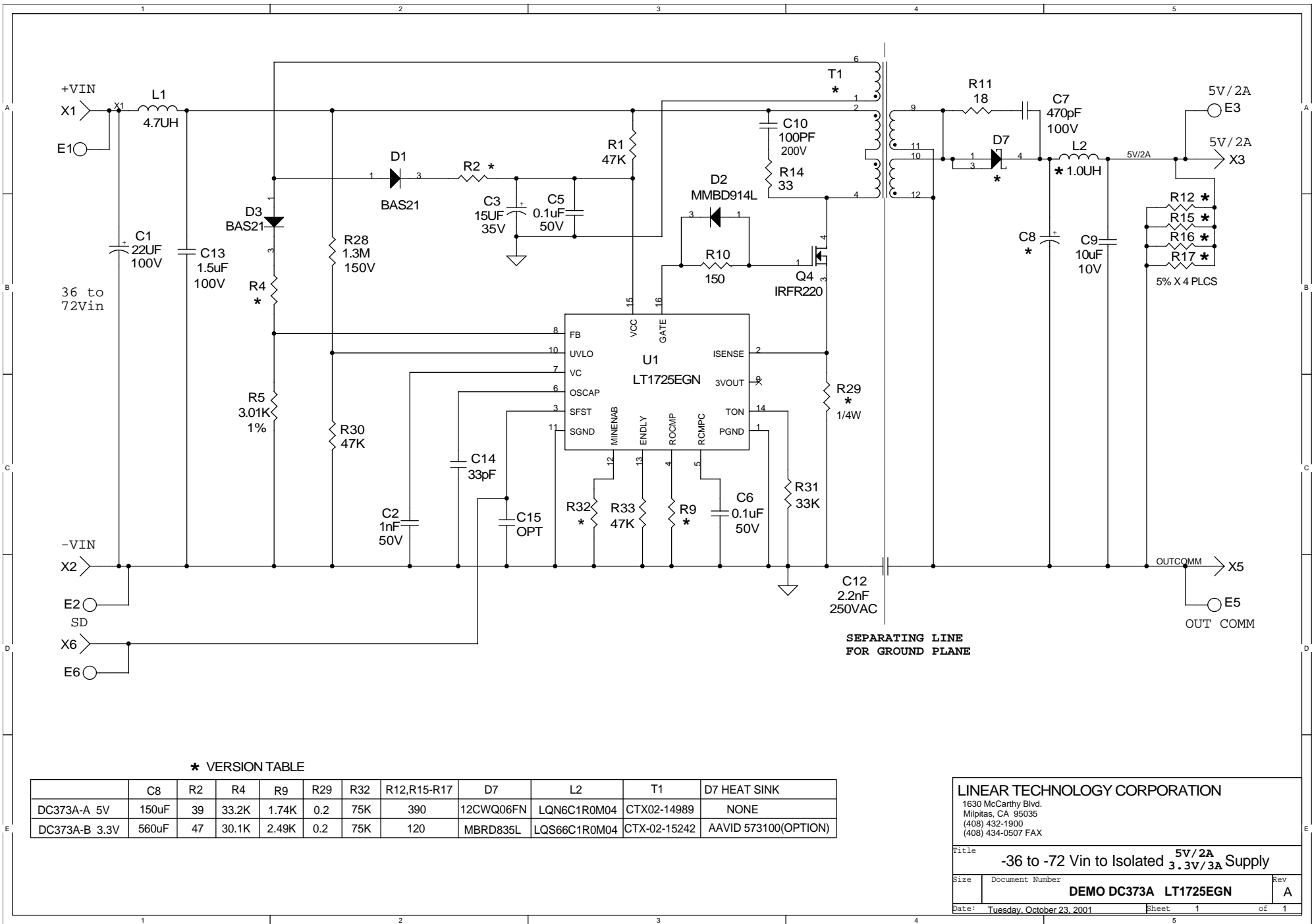
### DC373A-A Test and Measurement Setup

5. Once the demo board is connected you can begin to exercise it. Apply power to the board. At input voltages lower than about 33V the board should draw very low current and the output voltage will be 0V. Once the LT1725 UVLO threshold is reached, the output voltage will rise into regulation. Observe the output voltage as input voltage and output load are varied.
6. If an oscilloscope is available, it is instructive to observe the drain waveform. Note how the waveform changes as both the line voltage and load are varied. At low line and high loads the drain waveform is similar to that shown in the timing diagram. As the line voltage is increased and the load is decreased then the drain waveform changes and shows some ringing prior to the turn on of the MOSFET. This is characteristic of the so-called discontinuous conduction mode. Note that output voltage regulation is maintained even during the discontinuous conduction mode. The selection of the one-shot timing resistors is determined by the nature of the drain voltage waveform. The one-shot timing sets the “shutter” that samples the drain waveform to determine the output voltage. The drain voltage is a valid picture of the output voltage during the flat portion of the voltage waveform after the turn off of the FET. Correct selection of the one-shot resistors allows operation in discontinuous mode.

**TIMING DIAGRAM**



\Drain voltage waveform (continuous mode) showing operation of one-shots to set voltage sampling "shutter"



Item	Qty	Reference	Part Description	Manufacture / Part #
1	1	C1	CAP ELE 22uF,100V,8x11.5mm, LAY ON BD	Nichicon UPF2A220MPH
		OR		United Chemi. SXE100VB22RM8X12LL
2	1	C2	CAP CER NPO 1nF 50V (25V) 10%,0805 (1206)	AVX 08055A102KAT2
3	1	C3	CAP TANT 15uF 35V 20%,7343	AVX TPSD156M035R0300
4	2	C5,C6	CAP X7R 0.1uF,50V +/-10%,0805	AVX 08055C104KATMA
5	1	C7	CAP CER NPO 470pF 100V 10%,1206	AVX 12061A471KAT2
6	1	C8	CAP OSCON 150uF 6.3V, 20%, 8X10.5MM, LAY ON BD	Sanyo 6SA150M
7	1	C9	CAP CER X7R 10UF 10V, 1210	Taiyo Yuden LMK325BJ106MN
8	1	C10	CAP CER NPO 100pF 200V 10%, 1206,	AVX 12062A101KAT2
9	1	C12	CAP 2.2NF X7R 250V,+/-10% TYPE "Y2"	Murata GHM3045X7R222K-GC
10	1	C13	CAP X7R 1.5UF 100V,20%, 1825	Vitramon VJ1825Y155MXB
11	1	C14	CAP CER NPO 33pF 100V 10%, 0603	AVX 06031A330KAT2
12	0	C15 (OPT)	CAP 0805	
13	2	D1,D3	DIODE SWITCHING 200V 200mA 50ns 5pF, SOT-23	ZETEX BAS21TA
14	1	D2	DIODE SWITCHING 70V 200mA 4ns, SOT23	DIODES INC. MMBD914-7
15	1	D7	DIODE SCHOTTKY 60V 12A,D-PAK	IR 12CWQ06FN
16	5	E1-E3,E5,E6	TP TERMINAL, TURRET, 0.094"	MILL-MAX 2501-2
17	1	L1	IND 4.7UH 20%,90MOHMS,1.5A	Coilcraft DO1608C-472
18	1	L2	IND 1.0UH 20% 19OHMS, 4A	Murata LQN6C1R0M04
19	1	Q4	MOSFET N-CHNL 200V 0.8ohm,D-PAK	IR IRFR220
20	1	R1	RES CHIP 47K 1/4W 5% 1206	AAC CR18-473JM
21	1	R2	RES CHIP 39 1/4W 5% 1206	AAC CR18-390JM
22	1	R11	RES CHIP 18 1/4W 5% 1206	AAC CR18-180JM
23	1	R4	RES CHIP 33.2K 1/16W 1% 0603	AAC CR16-3322FM
24	1	R5	RES CHIP 3.01K 1/16W 1% 0603	AAC CR16-3011FM
25	1	R9	RES CHIP 1.74K 1/16W 1% 0603	AAC CR16-1741FM
26	1	R10	RES CHIP 150 1/16W 5% 0603	AAC CR16-151JM
27	4	R12,R15-R17	RES CHIP 390 1/4W 5% 1206	AAC CR18-391JM
28	1	R14	RES CHIP 33 OHM 1/4W 5% 1206	AAC CR18-330JM
29	1	R28	RES CHIP 1.3M 1/10W 150V 5% 0805	AAC CR10-135JM
30	1	R29	RES CHIP 0.2 OHM 1/4W 5% 1206	IRC LR1206-01-R200-J
31	2	R30,R33	RES CHIP 47K 1/16W 5% 0603	AAC CR16-473JM
32	1	R31	RES CHIP 33K 1/16W 5% 0603	AAC CR16-333JM
33	1	R32	RES CHIP 75K 1/16W 5% 0603	AAC CR16-753JM
34	1	T1	XFMR., FLYBACK 1800VAC ISOLATION,EFD15	Coiltronics CTX02-14989
35	1	U1	IC LT1725IGN SSOP16GN	LINEAR TECH, LT1725IGN
36	5	X1-X3,X5,X6	PIN 0.040" X 0.32" TIN (Solder Botton Side of Board)	Keystone 1425-2
37	1		PRINTED CIRCUIT BOARDS	DEMO BOARD DC373A-A
38	2		STENCIL	STENCIL DC373A

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14	1	D2	DIODE SWITCHING 70V 200mA 4ns, SOT23	DIODES INC. MMBD914-7
15	1	D7	DIODE SCHOTTKY D-PAK	ON SEMI MBRD835L
16	0	D7 HEAT SINK	SURFACE MOUNT HEAT SINK 573100	AAVID 573100D00010
17	5	E1-E3,E5,E6	TP TERMINAL, TURRET, 0.094"	MILL-MAX 2501-2
18	1	L1	IND 4.7UH 20%,90MOHMS,1.5A	Coilcraft DO1608C-472
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24	1	R4	RES CHIP 30.1K 1/16W 1% 0603	AAC CR16-3012FM
25	1	R5	RES CHIP 3.01K 1/16W 1% 0603	AAC CR16-3011FM
26	1	R9	RES CHIP 2.49K 1/16W 1% 0603	AAC CR16-2491FM
27	1	R10	RES CHIP 150 1/16W 5% 0603	AAC CR16-151JM
28	4	R12,R15-R17	RES CHIP 120 1/4W 5% 1206	AAC CR18-121JM
29	1	R14	RES CHIP 33 OHM 1/4W 5% 1206	AAC CR18-330JM
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