LT3574 Isolated Monolithic Flyback Converter

DESCRIPTION

Demonstration circuit 1636A is an isolated flyback converter featuring the LT®3574. This demo circuit is designed for a 5.0V output from a 10V to 30V input. The maximum output current is 0.5A when the input voltage is higher than 20V. No third winding or opto-isolator is required for regulation. The part senses the isolated output voltage directly from the primary-side flyback waveform.

The LT3574 operates with input supply voltages from 3V to 40V, and can deliver an output power up to 3W with no external power switch. The LT3574 utilizes boundary mode operation to provide a small magnetic solution with improved load regulation. The LT3574 can be used in industrial, automotive and medical applications where an isolated output is required.

The LT3574 data sheet gives a complete description of the part, operation and application information. The data sheet must be read in conjunction with this quick start guide for demo circuit 1636A.

Design files for this circuit board are available at http://www.linear.com/demo

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C

PARAMETER	CONDITION	MIN	TYP	MAX	UNITS
Input Voltage		10		30	V
Output Voltage V_{OUT}	V_{IN} = 10V ~ 30V	4.75	5.0	5.25	V
Maximum Output Current I_{OUT}	V_{IN} = 10V ~ 20V V_{IN} = 20V ~ 30V	0.35 0.50			A A
Switching Frequency	V_{IN} = 12V, I_{OUT} = 0.35A V_{IN} = 24V, I_{OUT} = 0.5A		200 270		kHz kHz
Voltage Ripple V_{OUT}	V_{IN} = 24V, I_{OUT} = 0.5A		50		mV
Efficiency	V_{IN} = 24V, I_{OUT} = 0.5A		84		%

QUICK START PROCEDURE

Demo circuit 1636A is easy to set up to evaluate the performance of the LT3574. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

Note: When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. See Figure 2 for proper scope probe technique.

1. With power off, connect the input power supply to VIN and GND.
2. Turn on the power at the input.

Note: Make sure that the input voltage does not exceed 30V.

3. Check for the proper output voltages.

Note: If there is no output, temporarily disconnect the load to make sure that the load current is not set too high.

4. Once the proper output voltage is established, adjust the load current within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

QUICK START PROCEDURE

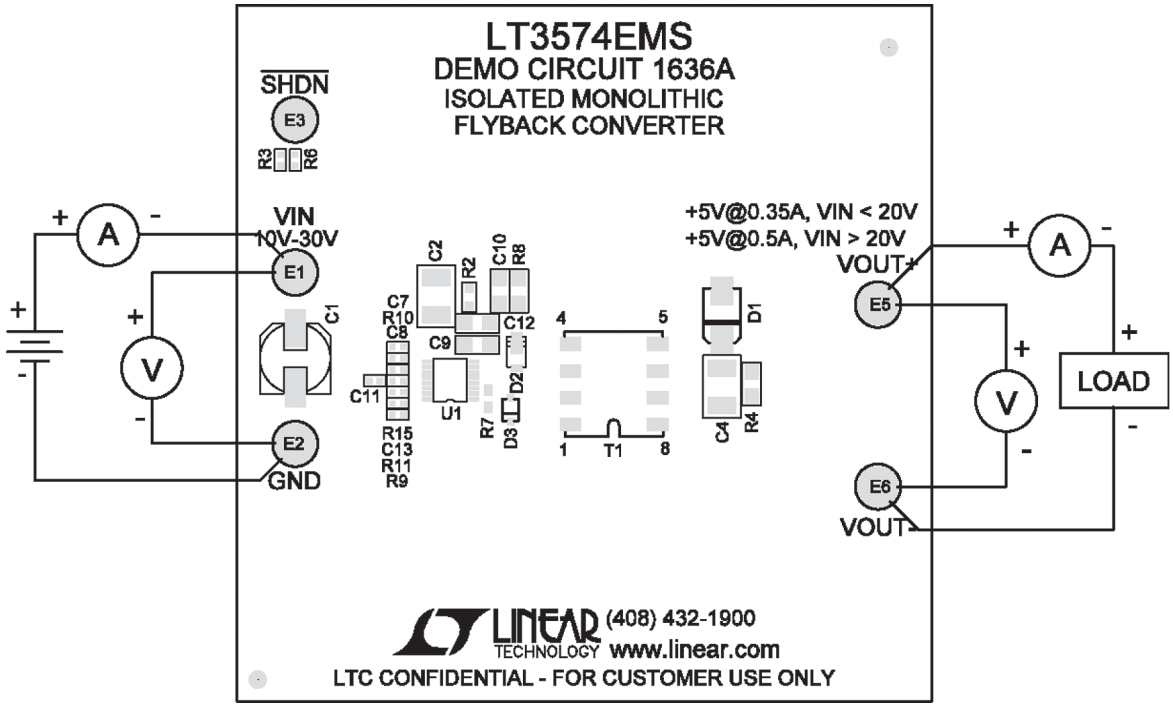


Figure 1. Proper Measurement Equipment Setup

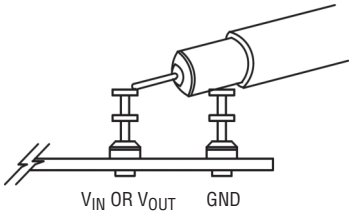
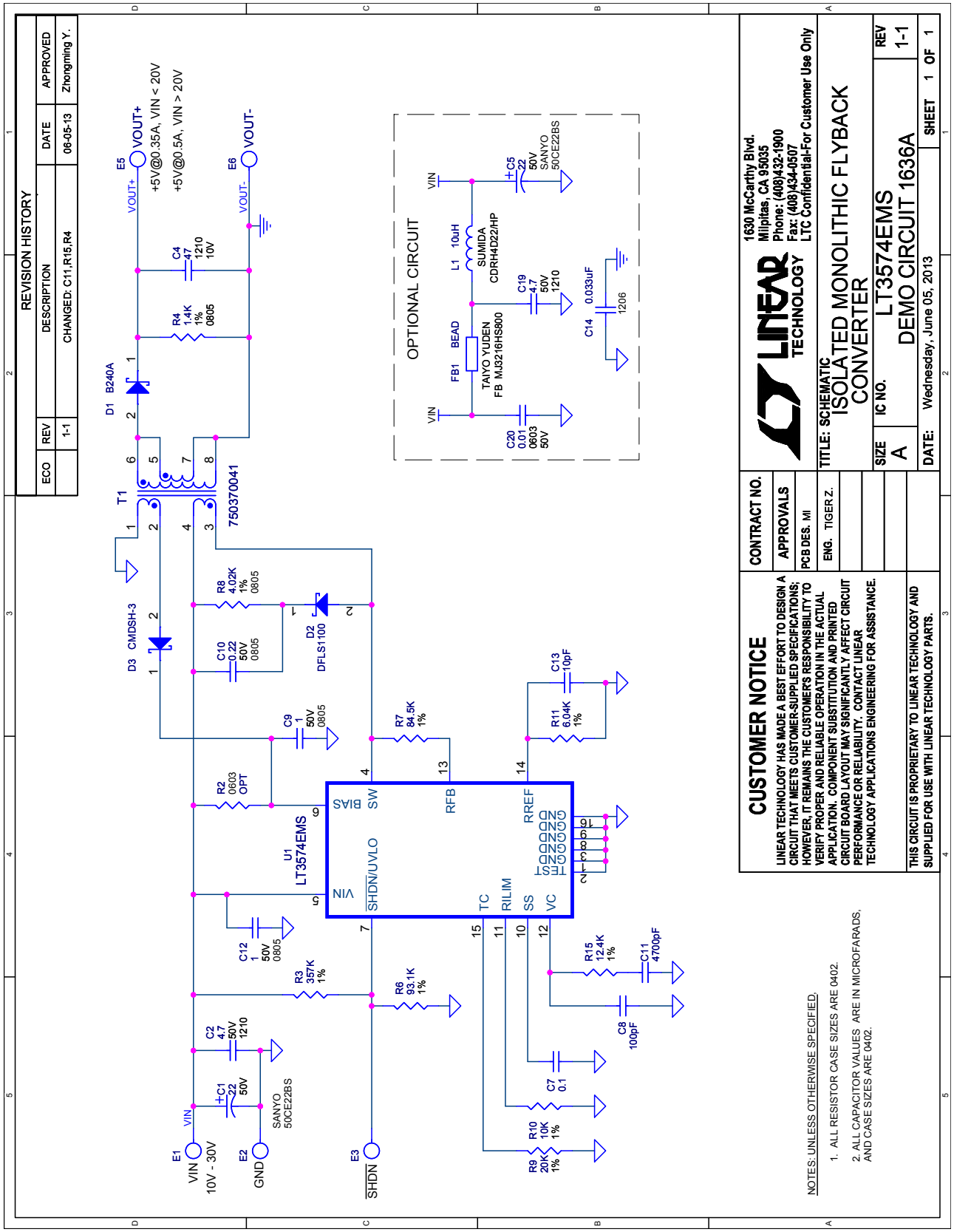


Figure 2. Measuring Input or Output Ripple

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C2	CAP, 1210 4.7µF 10% 50V X7R	AVX 12105C475KAT2A
2	1	C4	CAP, 1210 47µF 10% 10V X7R	MURATA GRM32ER71A476K
3	1	C7	CAP, 0402 0.1µF 10% 25V X5R	TDK C1005X5R1E104K
4	1	C8	CAP, 0402 100pF 5% 50V NPO	AVX 04025A101JAT2A
5	2	C12, C9	CAP, 0805 1µF 10% 50V X7R	MURATA GRM21BR71H105K
6	1	C10	CAP, 0805 0.22µF 10% 50V X7R	TAIYO YUDEN UMK212BJ224KG-T
7	1	C11	CAP, 0402 4700pF 10% 50V X7R	TDK C1005X7R1H472K
8	1	C13	CAP, 0402 10pF 5% 50V NPO	MURATA1555C1H100JZ01D
9	1	D1	DIODE, SCHOTTKY, BARRIER RECTIFIER 2A	DIODES INC B240A-13-F
10	1	D2	DIODE, RECTIFIER, BARRIER, SCHOTTKY 1.0A	DIODES INC. DFLS1100
11	1	D3	DIODE, SCHOTTKY SOD323	CENTRAL SEMI CMDSH-3
12	1	R3	RES, 0402 357K OHMS 1% 1/16W	VISHAY CRCW0402357KFKED
13	1	R6	RES, 0402 93.1k 1% 1/16W	VISHAY CRCW040293K1FKED
14	1	R7	RES, 0402 84.5k 1% 1/16W	VISHAY CRCW040284K5FKED
15	1	R8	RES, 0805 4.02k 1% 1/8W	VISHAY CRCW08054K02FKEA
16	1	R9	RES, 0402 20k 1% 1/16W	VISHAY CRCW040220K0FKED
17	1	R10	RES, 0402 10k 1% 1/16W	VISHAY CRCW040210K0FKED
18	1	R11	RES, 0402 6.04k 1% 1/16W	NIC NRC04F6041TRF
19	1	R15	RES, 0402 12.4k 1% 1/16W	VISHAY CRCW040212K4FKED
20	1	T1	TRANSFORMER	WURTH 750370041
21	1	U1	IC, MONOLITHIC FLYBACK CONVERTER	LINEAR TECH LT3574EMS
Additional Demo Board Circuit Components				
1	1	C1	CAP, 22µF 20% 50V ELECT.	SANYO 50CE22BS
2	0	C5	CAP, 22µF 20% 50V ELECT. OPTION	SANYO 50CE22BS OPTION
3	0	C14	CAP, 1206 0.033µF 10% 50V X7R OPTION	AVX 12065C333KAT2A OPTION
4	0	C19	CAP, 1210 4.7µF 10% 50V X7R OPTION	MURATA GRM32ER71H475K OPTION
5	0	C20	CAP, 0603 0.01µF 10% 50V X7R OPTION	NIC NMC0603X7R104K50TRPF OPTION
6	0	FB1	FERRITE BEAD OPTION	TAIYO YUDEN FB MJ3216HS800 OPTION
7	0	L1	IND, 10uH OPTION	SUMIDA CDRH4D22/HP OPTION
8	0	R2	RES, 0603 OPTION	OPTION
9	1	R4	RES, 0805 1.4k 1% 1/8W	VISHAY CRCW08051K40FKEA
Hardware-For Demo Board Only				
1	5	E1, E2, E3, E5, E6	TURRET	MILL-MAX 2501-2-00-80-00-00-07-0

SCHEMATIC DIAGRAM



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Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

Mouser Electronics

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