

# LT3573

## Isolated Monolithic Flyback Converter

### DESCRIPTION

Demonstration circuit 1228A is an isolated flyback converter featuring the [LT<sup>®</sup>3573](#). This demo circuit is designed for a 5.0V output from a 10V to 30V input. The maximum output current is 1A 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 LT3573 operates with input supply voltages from 3V to 40V, and can deliver an output power up to 7W with no external power devices. The LT3573 utilizes boundary mode operation to provide a small magnetic solution

with improved load regulation. The LT3573 can be used in industrial, automotive and medical applications where an isolated output is required.

The LT3573 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 demonstration circuit 1228A.

**Design files for this circuit board are available at <http://www.linear.com/demo/DC1228A>**

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### PERFORMANCE SUMMARY

Specifications are at  $T_A = 25^\circ\text{C}$

| PARAMETER                        | CONDITION                                                                                  | MIN        | TYP        | MAX  | UNITS      |
|----------------------------------|--------------------------------------------------------------------------------------------|------------|------------|------|------------|
| Input Voltage Range              |                                                                                            | 10         |            | 30   | V          |
| Output Voltage $V_{OUT}$         | $V_{IN} = 10\text{V to } 30\text{V}$                                                       | 4.75       | 5          | 5.25 | V          |
| Maximum Output Current $I_{OUT}$ | $V_{IN} = 10\text{V to } 20\text{V}$<br>$V_{IN} = 20\text{V to } 30\text{V}$               | 0.7<br>1.0 |            |      | A<br>A     |
| Switching Frequency              | $V_{IN} = 12\text{V}, I_{OUT} = 0.7\text{A}$<br>$V_{IN} = 24\text{V}, I_{OUT} = 1\text{A}$ |            | 169<br>238 |      | kHz<br>kHz |
| Voltage Ripple $V_{OUT}$         | $V_{IN} = 24\text{V}, I_{OUT} = 1\text{A}$                                                 |            | 100        |      | mV         |
| Efficiency                       | $V_{IN} = 24\text{V}, I_{OUT} = 1\text{A}$                                                 |            | 84         |      | %          |

## QUICK START PROCEDURE

Demonstration circuit 1228A is easy to set up to evaluate the performance of the LT3573. 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  $V_{IN}$  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

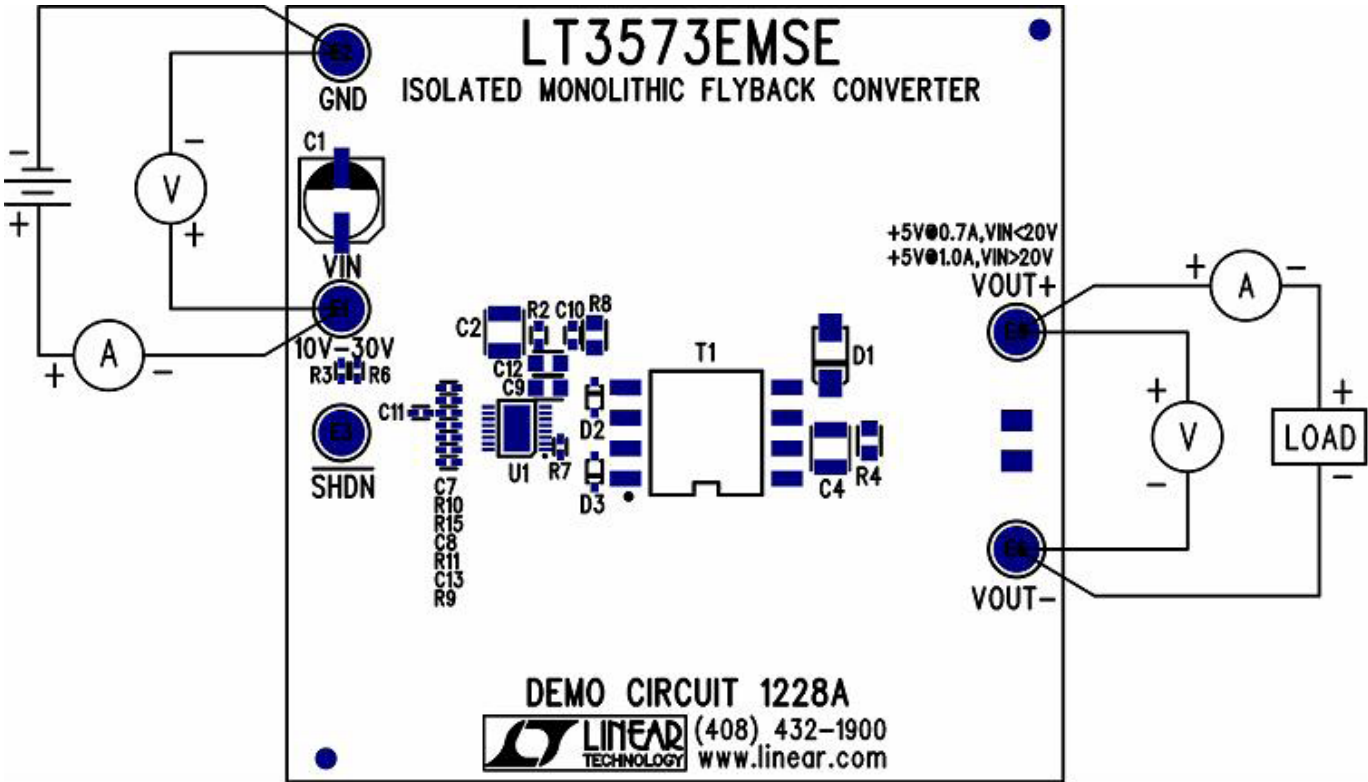


Figure 1. Proper Measurement Equipment Setup

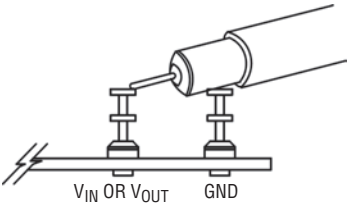


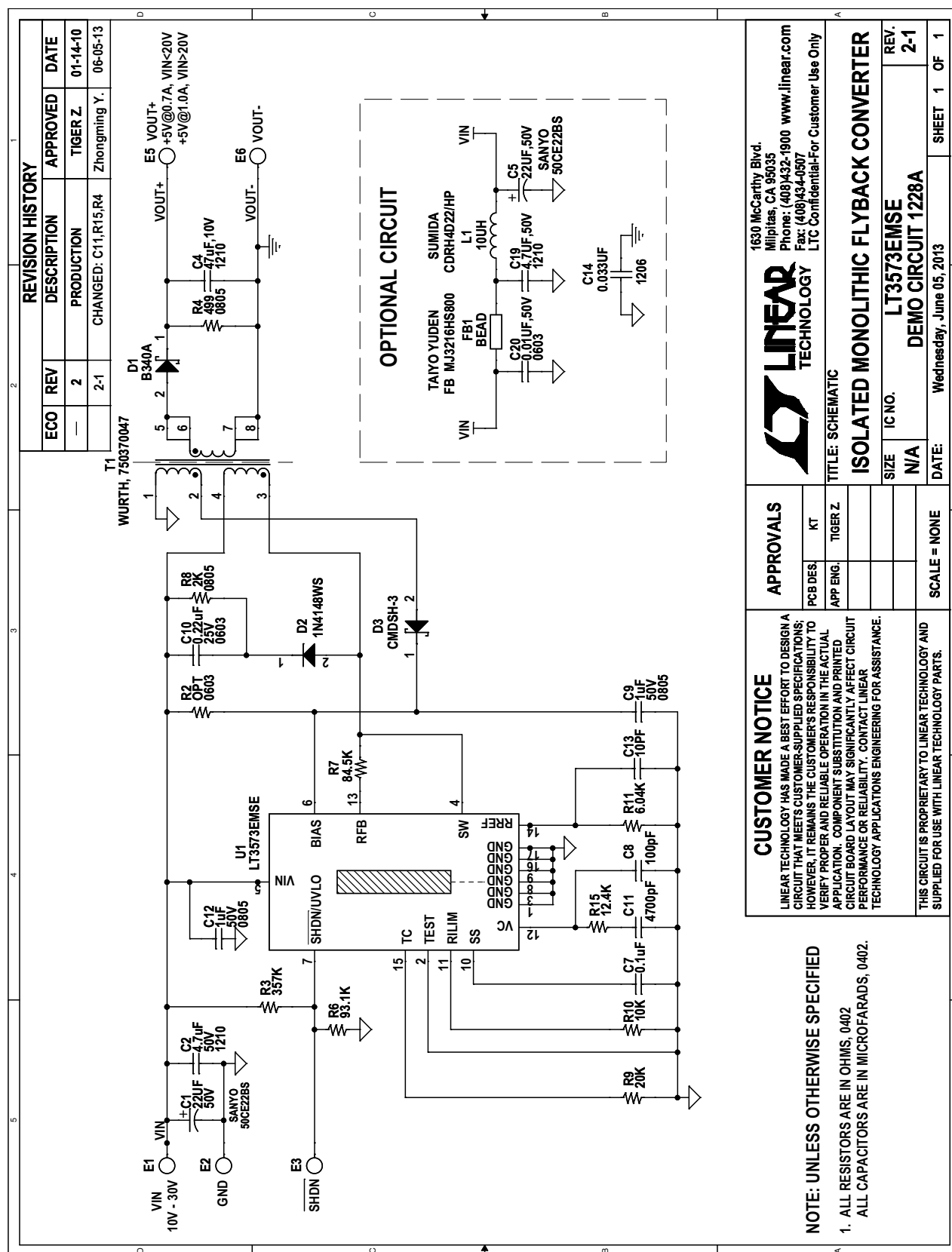
Figure 2. Measuring Input or Output Ripple

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## PARTS LIST

| ITEM                                            | QTY | REFERENCE          | PART DESCRIPTION                                    | MANUFACTURER/PART NUMBER          |
|-------------------------------------------------|-----|--------------------|-----------------------------------------------------|-----------------------------------|
| <b>Required Circuit Components</b>              |     |                    |                                                     |                                   |
| 1                                               | 1   | C2                 | CAP., X7R, 4.7µF 50V, 1210                          | MURATA, GRM32ER71H475K            |
| 2                                               | 1   | C4                 | CAP., X7R, 47µF 10V, 1210                           | MURATA, GRM32ER71A476K            |
| 3                                               | 1   | C7                 | CAP., X7R, 0.1µF 16V, 0402                          | TDK, C1005X7R1C104MT              |
| 4                                               | 1   | C8                 | CAP., NPO, 100pF 50V, 0402                          | AVX, 04025A101JAT2A               |
| 5                                               | 2   | C12, C9            | CAP., X7R, 1µF 50V, 0805                            | MURATA, GRM21BR71H105K            |
| 6                                               | 1   | C10                | CAP., X7R, 0.22µF 25V, 0603                         | MURATA, GRM188R71E224K            |
| 7                                               | 1   | C11                | CAP., X7R, 4700pF 25V, 0402                         | AVX, 04023C472KAT2A               |
| 8                                               | 1   | C13                | CAP., NPO, 10pF 50V, 0402                           | AVX, 04025A100JAT2A               |
| 9                                               | 1   | D1                 | DIODE, SCHOTTKY BARRIER RECTIFIER 3.0A              | DIODES INC., B340A-13-F           |
| 10                                              | 1   | D2                 | DIODE, SWITCHING, SOD323                            | DIODES INC., 1N4148WS-7-F         |
| 11                                              | 1   | D3                 | DIODE, SCHOTTKY MINI, SOD323                        | CENTRAL SEMI., CMDSH-3            |
| 12                                              | 1   | R3                 | RES., CHIP 357k 1/16W 1%, 0402                      | VISHAY, CRCW0402357KFKED          |
| 13                                              | 1   | R6                 | RES., CHIP 93.1k 1/16W 1%, 0402                     | VISHAY, CRCW040293K1FKED          |
| 14                                              | 1   | R7                 | RES., CHIP 84.5k 1/16W 1%, 0402                     | VISHAY, CRCW040284K5FKED          |
| 15                                              | 1   | R8                 | RES., CHIP 2k 1/10W 1%, 0805                        | VISHAY, CRCW08052K00FKEA          |
| 16                                              | 1   | R9                 | RES., CHIP 20k 1/16W 1%, 0402                       | VISHAY, CRCW040220K0FKED          |
| 17                                              | 1   | R10                | RES., CHIP 10k 1/16W 1%, 0402                       | VISHAY, CRCW040210K0FKED          |
| 18                                              | 1   | R11                | RES., CHIP 6.04k 1/16W 1%, 0402                     | VISHAY, CRCW04026K04FKED          |
| 19                                              | 1   | R15                | RES., CHIP 12.4k 1/16W 1%, 0402                     | VISHAY, CRCW040212K4FKED          |
| 20                                              | 1   | T1                 | XFMR, 750370047                                     | WÜRTH, 750370047                  |
| 21                                              | 1   | U1                 | IC., LT3573EMSE, MSE16                              | LINEAR TECH., LT3573EMSE          |
| <b>Additional Demo Board Circuit Components</b> |     |                    |                                                     |                                   |
| 1                                               | 1   | C1                 | CAP., ELECTROLYTIC, 22µF 50V, C-SANYO-CE-BS-6.3X6.0 | SANYO, 50CE22BS                   |
| 2                                               | 0   | C5                 | CAP., 22µF 50V, C-SANYO-CE-BS-6.3X6.0 OPT           | SANYO, 50CE22BS                   |
| 3                                               | 0   | C14                | CAP., 1206 OPT                                      | OPT                               |
| 4                                               | 0   | C19                | CAP., X7R, 4.7µF 50V, 1210 OPT                      | MURATA, GRM32ER71H475K            |
| 5                                               | 0   | C20                | CAP., X7R, 0.01µF 50V, 0603 OPT                     | AVX, 06035C103KAT                 |
| 6                                               | 0   | FB1                | BEAD, 1206 OPT                                      | TAIYO YUDEN, FB MJ3216HS800       |
| 7                                               | 0   | L1                 | IND, PWR, L-CDRH4D22/HP OPT                         | SUMIDA, CDRH4D22HPNP-100MC        |
| 8                                               | 0   | R2                 | RES., 0603 OPT                                      | OPT                               |
| 9                                               | 1   | R4                 | RES., CHIP 499Ω 1/10W 1%, 0805                      | VISHAY, CRCW0805499RFKEA          |
| <b>Hardware: For Demo Board Only</b>            |     |                    |                                                     |                                   |
| 1                                               | 5   | E1, E2, E3, E5, E6 | TP, TURRET, 0.094"                                  | MILL-MAX, 2501-2-00-80-00-00-07-0 |

## SCHEMATIC DIAGRAM



# DEMO MANUAL DC1228A

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This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

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