

LM3475 Evaluation Board

National Semiconductor
Application Note 1381
Wei Gu
May 2005



Introduction

The LM3475 evaluation board is provided as a tool for developing DC/DC converters based on the LM3475 IC. As shown in *Figure 1*, the evaluation board is configured to provide an output of 2.5V at up to 2A from an input up to 10V. The corresponding bill of material is given in *Table 1*. Typical efficiencies are shown in *Figure 2* and *Figure 3*. *Figure 4* and *Figure 5* show the board layout.

To aid in the design and evaluation of dc/dc buck converters based on the LM3475 controller, the LM3475 Evaluation Board can be easily re-configured for different output voltages.

Setting Vout

Vout can be set using R_{FB1}, as shown in the following equation:

$$V_{OUT} = V_{FB} \times (R_{FB1} + R_{FB2}) / R_{FB2}$$

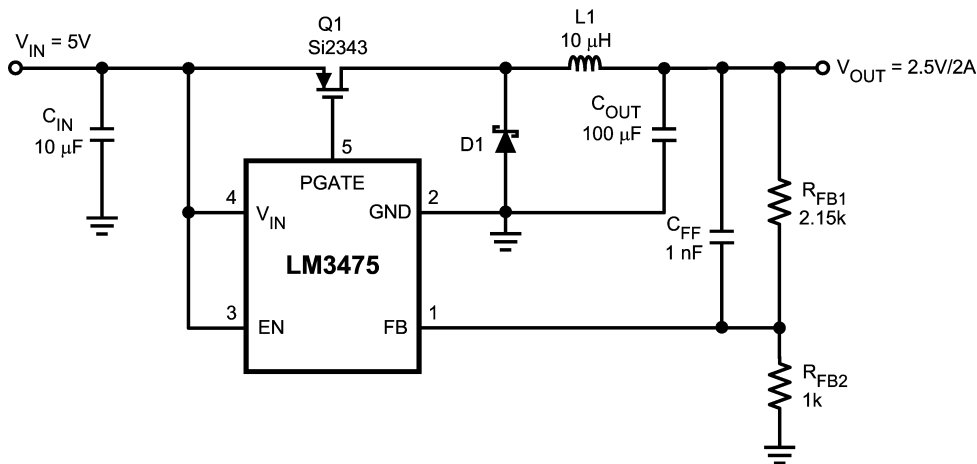
Where V_{FB} is 0.8V typically.

Refer to the datasheet before changing any component values, since additional design adjustments may be required.

Optional Components

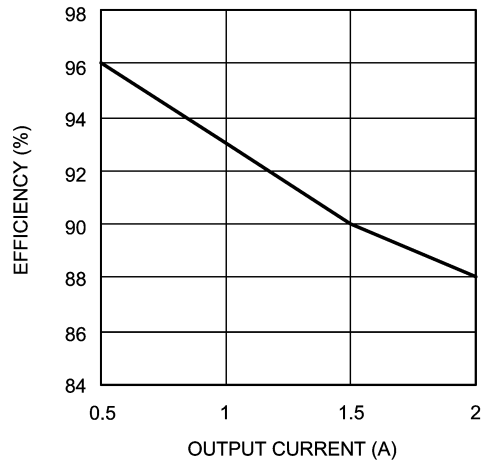
A feed-forward capacitor C_{FF} is placed on the board, which will increase operating frequency. However, the speed up effect decreases with lower output voltage and is negligible below 1.6V output.

A zero Ohm is used to pull up the EN pin for always on operation. The enable pin can be pulled low at the EN post to shutdown the device. If this resistor is removed, any analog level signal can be used to enable and disable the device.



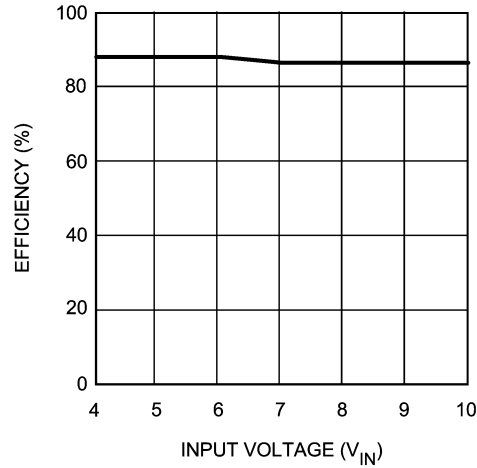
20152301

FIGURE 1. Full Demo Board Schematic



20152302

**FIGURE 2. Efficiency vs Output Current
($V_{in} = 5V$)**



20152303

**FIGURE 3. Efficiency vs Input Voltage
($I_{out} = 2A$)**

TABLE 1. Bill of Materials

Designator	Part Description	Part Number
CIN	10 μ F 16V ceramic	Yuden EMK325BJ106MN
COUT	100 μ F 6V tantalum	AVX TPSY107M006R0100
CFF	1 nF 25V ceramic	VJ1206Y102KXXA
D1	Schottky 20V 2A	Central CMSH2-20L
L1	10 μ H 3.1 A	Sumida CDRH103R100
Q1	Si 2343 30V 2.5A	Vishay Si2343
RFB2	1 k Ω	Vishay CRCW08051001F
RFB1	2.15 k Ω	Vishay CRCW08052151F
R2	0 Ω	Vishay CRCW08050R00F

PCB Layout Diagram(s)

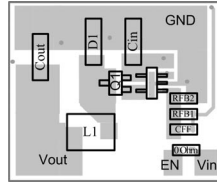


FIGURE 4. Top Side Layout

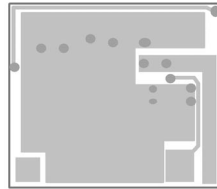


FIGURE 5. Bottom Side Layout

National does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and National reserves the right at any time without notice to change said circuitry and specifications.

For the most current product information visit us at www.national.com.

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

BANNED SUBSTANCE COMPLIANCE

National Semiconductor manufactures products and uses packing materials that meet the provisions of the Customer Products Stewardship Specification (CSP-9-111C2) and the Banned Substances and Materials of Interest Specification (CSP-9-111S2) and contain no "Banned Substances" as defined in CSP-9-111S2.



National Semiconductor
Americas Customer
Support Center
Email: new.feedback@nsc.com
Tel: 1-800-272-9959

National Semiconductor
Europe Customer Support Center
Fax: +49 (0) 180-530 85 86
Email: europe.support@nsc.com
Deutsch Tel: +49 (0) 69 9508 6208
English Tel: +44 (0) 870 24 0 2171
Français Tel: +33 (0) 1 41 91 8790

National Semiconductor
Asia Pacific Customer
Support Center
Email: ap.support@nsc.com

National Semiconductor
Japan Customer Support Center
Fax: 81-3-5639-7507
Email: jpn.feedback@nsc.com
Tel: 81-3-5639-7560

www.national.com