OPERATION

How to Measure Voltage Regulation and Efficiency

When measuring voltage regulation or efficiency, voltage measurements should be made directly across the VOUT and GND terminals, not at the end of test leads at the load. Similarly, input voltage should be measured directly at the VIN and GND terminals of the LT1766 demo board. Input and output current should be measured by placing an ammeter in series with the input supply and load. Refer to figure 2 for proper monitoring equipment setup.

How to Measure Output Voltage Ripple

When measuring output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. A sturdy wire should be soldered to the output side of the GND terminal. The other end of the wire is looped around the ground side of the probe and should be kept as short as possible. The tip of the probe is touched directly to VOUT (see Figure 3). Bandwidth is generally limited to 20MHz for ripple measurements. Also, if multiple pieces of line-powered test equipment are used, be sure to use isolation transformers on their power lines to prevent ground loops, which can cause erroneous results. Figure 4 shows the output voltage ripple with a steady-state load of 1A for the LT1766.

Heat Dissipation Issues

Since the LT1766 includes a 1.5A onboard power switch, care must be taken not to exceed the 125c maximum operating junction temperature for the part. A simple technique is to use the PC board as a heat sink. On the LT1766 demo board, the power IC is surrounded by ground plane on both sides of the PC board. The two sides are connected through vias to better handle the power dissipation. If the LT1766 is laid out on a multilayer board, there should be metal on the inner layers directly underneath the LT1766. This helps in spreading heat and improves the power dissipation capability of the PCB. **Note: See 'Thermal Calculations' section in the Applications Information of the LT1766 datasheet.**

OPERATION

Introduction

The LT1766 is a 1.5A 200kHz Step-Down switching regulator capable of operation at input voltages as high as 60V. The demonstration circuit shown in the schematic allows for output selection of 3.3V or 5V using the jumper J1. The board comes equipped with input (VIN), output (VOUT), GND, SYNC and S/D terminals to simplify bench testing. The demonstration circuit highlights the ability of the LT1766 to achieve excellent efficiencies at both high and low input voltages. The efficiency curves in Figure 1 illustrate both 42V to 5V and 12V to 5V conversions with peak efficiencies of greater than 80% and 90%.

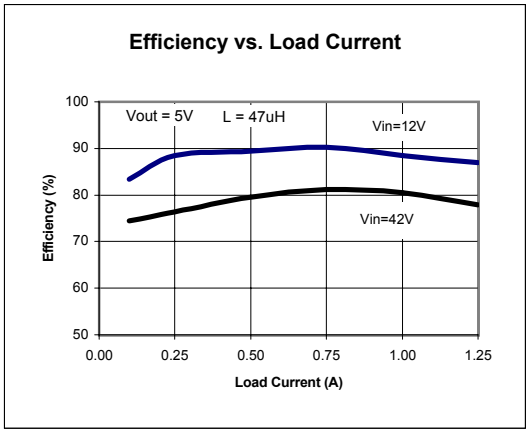


Figure 1. LT1766 efficiency vs. Load Current

Shutdown Pin

For normal operation, the S/D pin can be left floating. S/D has two output-disable modes, lockout and shutdown.
When the pin is taken below the 2.38V lockout threshold, switching is disabled. This is typically used for input undervoltage lockout.
Grounding the S/D pin places the LT1766 in shutdown mode. This reduces total board supply current to typically 25uA.

Synchronization Pin

To synchronize switching to an external clock, apply a logic-level signal to the SYNC pin. Amplitude must be from a logic low level to greater than 2.2V with a duty cycle from 10% to 90%. Synchronization frequency is possible from 228kHz up to 700kHz.

Quick Start Guide

A list of procedures for getting started, including the basic set-up for measurement equipment, are provided in the 'quick start guide' attached.

NOTE: The LT1766 datasheet should be read in conjunction with the demonstration board information provided.

QUICK START GUIDE

Refer to Figure 2 for proper measurement setup and follow the procedure outlined below :

1. Connect the input power supply to the VIN and GND terminals. The input voltage must be between 5.5V and 60V.

2. Connect an ammeter in series with the input supply to measure input current.

3. Connect either power resistors or an electronic load to the VOUT and GND terminals.

4. Connect an ammeter in series with the output load to measure output current.

5. The S/D pin should be left floating for normal operation and tied to GND for shutdown.

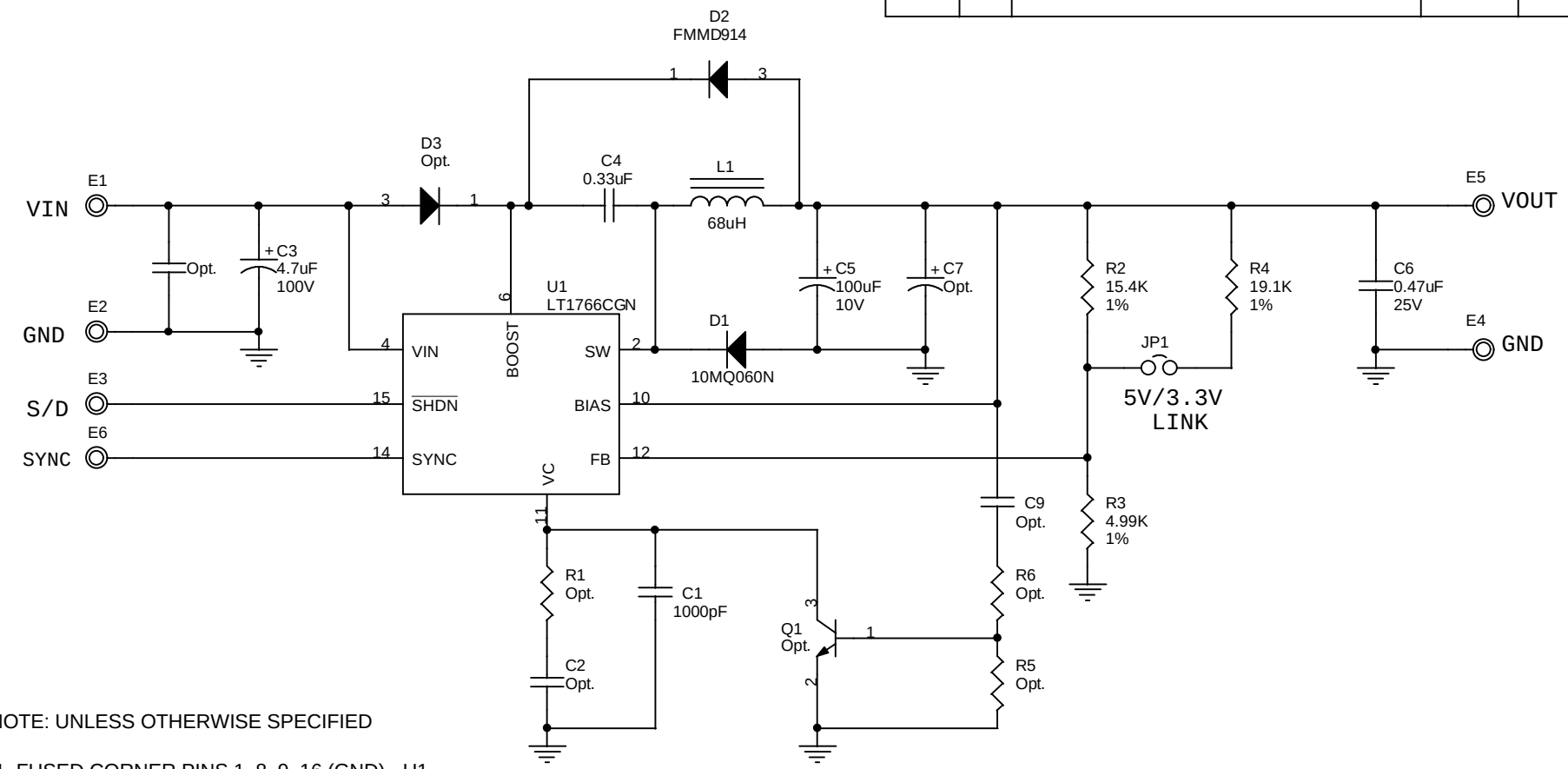
6. Set the output voltage with the jumper J1, as shown in the table below.

7. After all connections are made, turn on input power and verify that the output voltage is correct.

POSITION	OUTPUT VOLTAGE
Jumper J1 open	5.0V
Jumper J1 inserted	3.3V

LTC CONFIDENTIAL - For Customer Use Only

REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	APPROVED
	1	DEMO BOARD RELEASE	11/29/00	



NOTE: UNLESS OTHERWISE SPECIFIED

1. FUSED CORNER PINS 1, 8, 9 ,16 (GND) - U1.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON ANGLE - - - 2 PLACES - - - 3 PLACES - - - INTERPRET DIM AND TOL PER ASME Y14.5M -1994	CONTRACT NO.		LINEAR TECHNOLOGY 1630 McCarthy Blvd. Milpitas, CA 95035 Phone: (408)432-1900 Fax: (408)434-0507
	APPROVALS	DATE	TITLE: SCH, 1.5A 200KHz HIGH VOLTAGE BUCK CONVERTER PCB
THIRD ANGLE PROJECTION	DRAWN L.SANTOS	7/14/00	
	CHECKED		
	APPROVED		
	ENGINEER		
	DESIGNER		
DO NOT SCALE DRAWING	Wednesday, November 29, 2000		SIZE A | CAGE CODE | DWG NO DC326B | REV 1
			SCALE: NONE | FILENAME:326Br1.DSN | SHEET 1 OF 1

Item	Qty	Reference	Part Description	Manufacture / Part #	
1	1	C1	Capacitor, X7R 220pF 50V 10%	AVX 08055A221KAT	
2	1	C3	Capacitor, chip 4.7uF 100V	MARCON THCR70E2A475ZT	
3	0	C3 (Option2)	Capacitor, chip 150uF 63V AL ELECT	PANASONIC ECA63FQ150L	
4	1	C4	Capacitor, X7R 0.33uF 16V 10%	AVX 0805YC334KAT1A	
5	1	C5	Capacitor, Tant. 100uF 10V 20%	AVX TPSD107M010R0100	
6	1	C6	Capacitor, Y5V 0.47uF 25V 80%	AVX 08053G474ZAT1A	
7	1	C2	Capacitor, X7R .022uF 16V 10%	AVX 0805YC223KAT	
8	0	C7 (Option 1)	Capacitor, Tant. 100uF 10V 20%	AVX TPSD107M010R0100	
9	0	C7 (Option 2)	Capacitor, X5R, 47uF, 6.3V	TAIYO YUDEN JMK432BJ476MM	
10	0	C9 (Option)	CAP, .1UF, 25V Y5V, 0603	AVX 06033G104ZAT	
11	0	C12 (Option)	Capacitor, X7R, 1000pF, 50V, 10%	AVX 08055C102KAT	
12	1	D1	Diode Schottky,1.5A, 60V	IR 10MQ060N	
13	0	D1 (Option)	Diode Schottky,3A, 60V	OPT:MOTOROLA MBRS360T4	
14	1	D2	Diode, 200mA, 100V	ZETEX FMMD914TA	
15	0	D3 (Option)	Diode, 200mA, 100V		
16	6	E1-E6	Test Point,	MILL MAX 2501-2	
17	1	J1	Header, 2pin, 1 Row, .079CC	COMM-CON 2802S-02-G1	
18	1	J1	Shunt, .079" center	COMM CON CCIJ2MM-138G	
19	0	L1 (Option 3)	Inductor, 68uH	COOPER ELECTRONICS UP2-680	
20	1	L1	Inductor, 33uH	SUMIDA CDRH125-330MC	
21	0	L1 (Option 2)	Inductor, 47uH	COOPER ELECTRONICS UP2-470	
22	0	Q1 (Option)	Xstr, NPN, SOT23		
23	1	R2	Resistor, Chip 15.4K 1%	AAC CR10-1542FM	
24	1	R3	Resistor, Chip 4.99K 1%	AAC CR10-4991FM	
25	1	R4	Resistor, Chip 19.1K 1%	AAC CR10-1912FM	
26	0	R5 (Option)	Resistor, Chip XXK 1%	AAC	
27	0	R6 (Option)	Resistor, Chip 2K 1%	AAC	
28	1	R1	Resistor, Chip, 2.2K, 5%, 1/8W	AAC CR10-222JM	
29	1	U1	I.C. LT1766	LINEAR TECHNOLOGY LT1766EGN or LT1766IGN	
30	4	MH1-MH4	STAND-OFF, NYLON HEX #4-40x1/4"	MICRO PLASTICS #14HTSP101	
31	4	MH1-MH4	SCREW, #4-40 x 1/4	ANY	

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Power Management IC Development Tools ***category:***

Click to view products by Analog Devices ***manufacturer:***

Other Similar products are found below :

EVAL-ADM1168LQEBZ EVB-EP5348UI MIC23451-AAAYFL EV MIC5281YMME EV DA9063-EVAL ADP122-3.3-EVALZ ADP130-0.8-EVALZ ADP130-1.2-EVALZ ADP130-1.5-EVALZ ADP130-1.8-EVALZ ADP1714-3.3-EVALZ ADP1716-2.5-EVALZ ADP1740-1.5-EVALZ ADP1752-1.5-EVALZ ADP1828LC-EVALZ ADP1870-0.3-EVALZ ADP1871-0.6-EVALZ ADP1873-0.6-EVALZ ADP1874-0.3-EVALZ ADP1882-1.0-EVALZ ADP199CB-EVALZ ADP2102-1.25-EVALZ ADP2102-1.875EVALZ ADP2102-1.8-EVALZ ADP2102-2-EVALZ ADP2102-3-EVALZ ADP2102-4-EVALZ ADP2106-1.8-EVALZ ADP2147CB-110EVALZ AS3606-DB BQ24010EVM BQ24075TEVM BQ24155EVM BQ24157EVM-697 BQ24160EVM-742 BQ24296MEVM-655 BQ25010EVM BQ3055EVM NCV891330PD50GEVB ISLUSBI2CKIT1Z LM2744EVAL LM2854EVAL LM3658SD-AEV/NOPB LM3658SDEV/NOPB LM3691TL-1.8EV/NOPB LM4510SDEV/NOPB LM5033SD-EVAL LP38512TS-1.8EV EVAL-ADM1186-1MBZ EVAL-ADM1186-2MBZ