LM2698 Demoboard

National Semiconductor
Application Note 1202
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Introduction

A printed circuit board has been developed to aid in the design and evaluation of the LM2698 DC-DC boost converter. This application note contains information about the board.

General Description

The LM2698 is a general purpose, high frequency DC-DC converter. This board is intended to demonstrate the primary advantages of the LM2698. The LM2698 is able to operate at 1.25MHz switching frequency, yielding extremely high power density. The low $R_{DS(ON)}$ internal MOSFET allows for high conversion efficiency. It uses a current mode control scheme, giving superior line and load regulation. The LM2698 is a Simple Switcher®™, which includes Switchers Made Simple software for fast, effective designs.

The LM2698 demoboard will operate with the following parameters:

$4.5V \le V_{IN} \le 9V$

$V_{OUT} = 12V$

$0 \le I_{OUT} \le 400mA$*

Note: * See *Figure 2* for I_{OUT} vs V_{IN}

Note 1: The inductance affects the stability of the converter. See the COMPENSATION section in the datasheet for tips on optimizing the inductance value, especially for input voltages less than 5V. To operate this demoboard at voltages below 4.5V with the supplied 10µH inductor and remain in a safe stability region, use a 1.25 MHz switching frequency (if V_{IN} > 5V, a 600 kHz or 1.25 MHz switching frequency is acceptable).

Note 2: When operating the LM2698 at 1.25 MHz switching frequency, it is recommended to increase the bypass capacitance, C_{BYP}, to 0.220 µF.

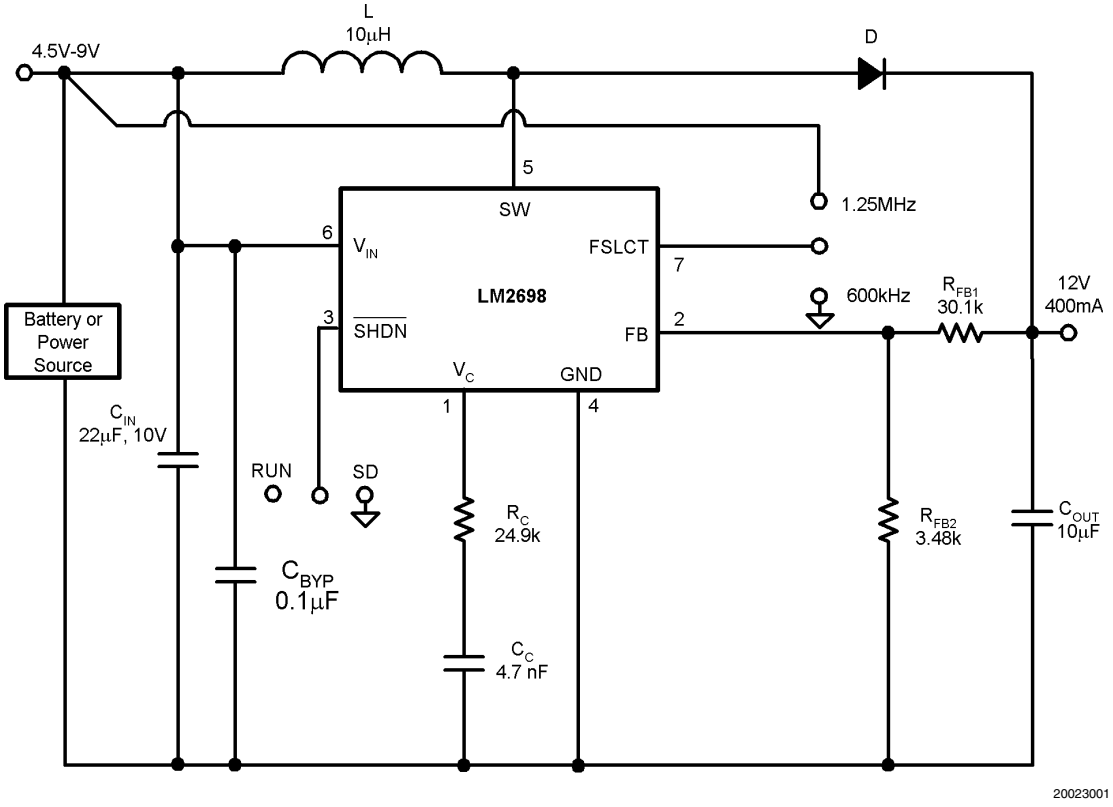

FIGURE 1. LM2698 Demoboard Schematic

TABLE 1. Bill of Materials

Component	Value	Description	Model Number
C_{OUT}	10µF	Output Capacitor	TMK432BJ106MM (Taiyo Yuden)
C_{IN}	22µF	Input Capacitor	LMK432BJ226MM (Taiyo Yuden)
C_C	4.7nF	Compensation Capacitor	VJ0805Y472MXAAT (Vishay)
C_{BYP}	0.1µF	Bypass Capacitor	VJ0805Y104KXAAT (Vishay)
D	1A, 20V	Schottky Power Diode	MBRM120LT3 (ON-Semiconductor)
L	10µH	Power Inductor	CDRH6D38-100 (Sumida)
R_C	24.9k	Compensation Resistor	CRCW 0805 2492 FRT1 (Vishay)
R_{FB1}	30.1k	Top Feedback Resistor	CRCW 0805 3012 FRT1 (Vishay)
R_{FB2}	3.48k	Bottom Feedback Resistor	CRCW 0805 3481 FRT1 (Vishay)

TABLE 2. Jumper Settings

Jumper	Setting	Description
J1	600 kHz	600 kHz switching frequency
	1.25 MHz	1.25 MHz switching frequency
J2	Run	LM2698 is regulating
	SD	LM2698 is shutdown

Maximum Output Current

The current limit of the LM2698 is with respect to the switch current. This means that the maximum output current to the load is dependent on duty cycle. With a fixed V_{OUT}, the maximum output current will be a function of V_{IN}, as shown in *Figure 2*.

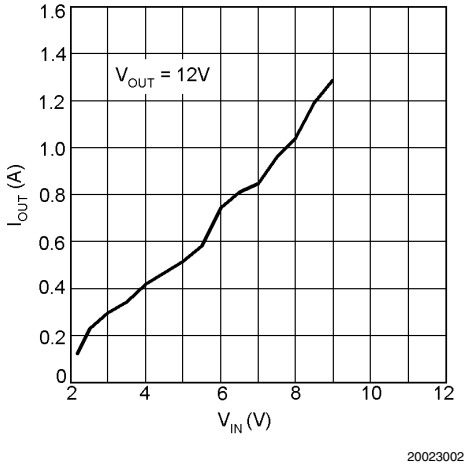

FIGURE 2. Maximum Output Current vs Input Voltage

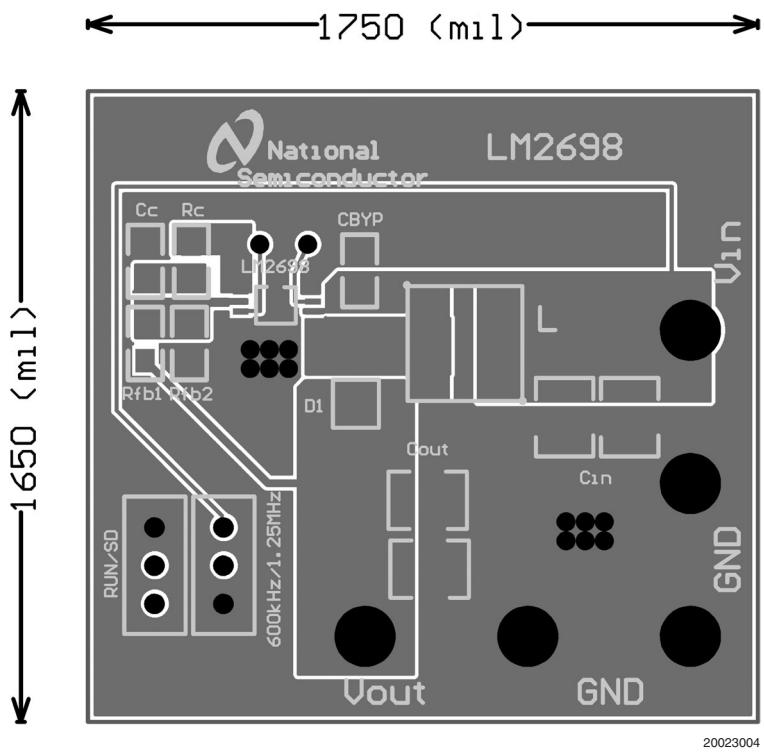

FIGURE 3. LM2698 Demoboard Top Layer Layout

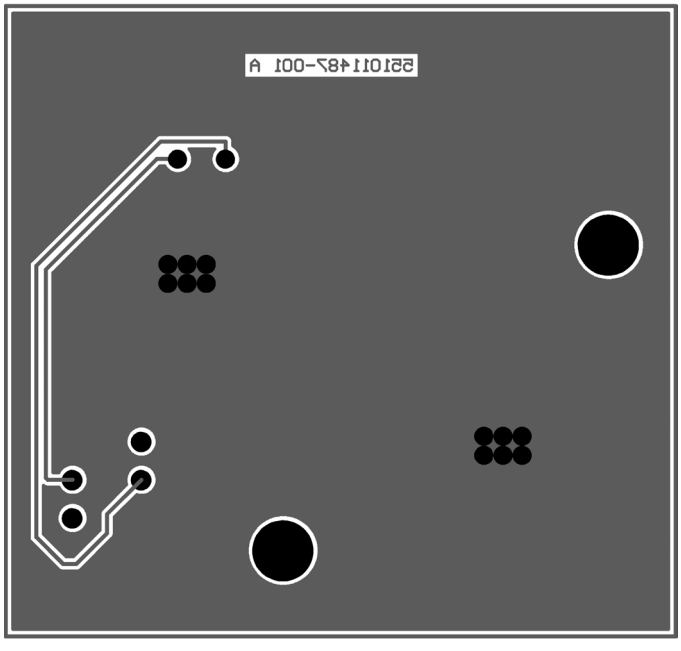

FIGURE 4. LM2698 Demoboard Bottom Layer Layout

Notes

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