AN-1397 LM2852X Demonstration Board

1 Introduction

This document describes the demonstration board for the LM2852X. The LM2852 is a 2A buck regulator belonging to Texas Instruments Simple Synchronous™ family. The LM2852 input voltage can range from 2.85 V to 5.5 V. Output voltages are factory set from 0.8 V to 3.3 V in 100mV increments. On-chip type-three compensation facilitates simple, low component count power supply design. Two frequency versions of the LM2852 are available: 500 kHz (LM2852Y) and 1500 kHz (LM2852X). The demonstration board for the LM2852X (1500 kHz version) is described in this document. A separate application note describes the LM2852Y. For detailed information regarding component selection, consult the device-specific data sheet.

2 V_{IN}, GND and V_{OUT}

Three solder terminals are provided for connections to V_{IN}, GND and V_{OUT}. The input voltage to the LM2852 is connected to two PVIN pins and an AVIN pin. PVIN is the supply connected to the output power switches; AVIN powers the controller logic of the regulator. The demonstration board includes filtering of the AVIN voltage using components R_F and C_F. The back side plane of the board is connected to ground through the solder terminal via as well as vias underneath the exposed DAP of the LM2852.

3 Enable (EN)

The LM2852 enable pin is internally pulled up through a large resistance. The demonstration board includes a via connected to the EN line to facilitate soldering a jumper wire if application of an enable signal is desired.

4 C_{IN} and C_{INX}

The demonstration board provides two capacitor footprints for the input capacitance. The larger footprint holds the bulk of the capacitance, for example 47 µF. Additional high frequency filtering may also be accomplished by adding a smaller capacitor – C_{INX}. A 1 µF or 100 nF capacitor is commonly used for high frequency filtering.

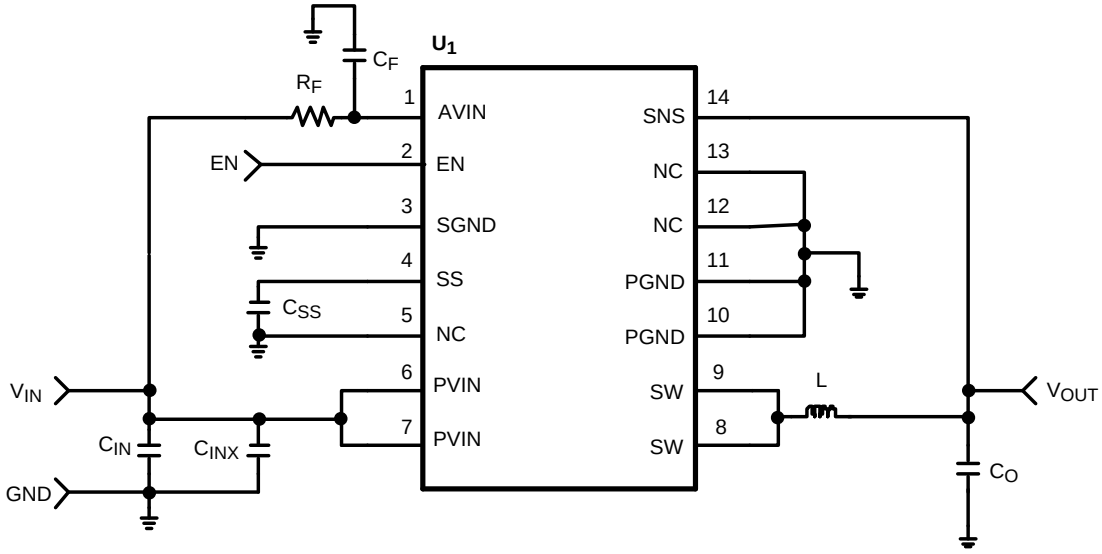
5 C_{SS}

The soft-start capacitor is used to control the startup behavior of the switching regulator. A 2.7 nF capacitor yields approximately a 3 ms startup time.

6 Output Filter - L, and C_o

Since the LM2852 uses on-chip compensation, the output filter component values must be restricted to a certain range. The LM2852X is designed for ceramic output capacitors with ESR values below 10 mΩ. The recommended inductance and capacitance for standard input and output voltages are 1 µH and 10 µF.

7 Board Schematic



8 Bill of Materials (BOM) for 1500 kHz Solution (LM2852X)

Table 1. Bill of Materials

ID	Part Number	Type	Size	Parameters	Qty	Vendor
U_1	LM2852XMXA-x.x	2A Buck	ETSSOP-14		1	NSC
L	DO1608C-102	Inductor		1 µH	1	Coilcraft
C_O	GRM31MR61A106KE19	Capacitor	1206	10 µF/X5R/10 V	1	Murata
C_{IN}	GRM31CR60J476M	Capacitor	1206	47 µF/X5R/6.3 V	1	Murata
C_{INX}	GRM188R61A105K	Capacitor	0603	1 µF/X5R/10 V	1	Murata
C_{SS}	VJ0603Y272KXXA	Capacitor	0603	2.7 nF ± 10%	1	Vishay-Vitramon
R_F	CRCW060310R0F	Resistor	0603	10 Ω ±10%	1	Vishay-Dale
C_F	GRM188R61A105K	Capacitor	0603	1 µF/X5R/10 V	1	Murata
	160-1026-02-05-00	Solder Terminals		Terminals for V_{IN}, GND and V_{OUT}	3	Wearnes

9 PCB Layouts: 835 (mil) X 850 (mil)

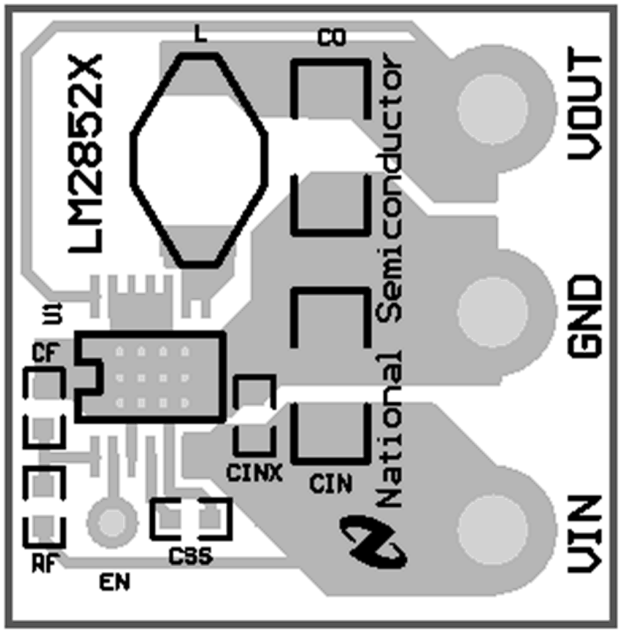


Figure 1. Top Layer

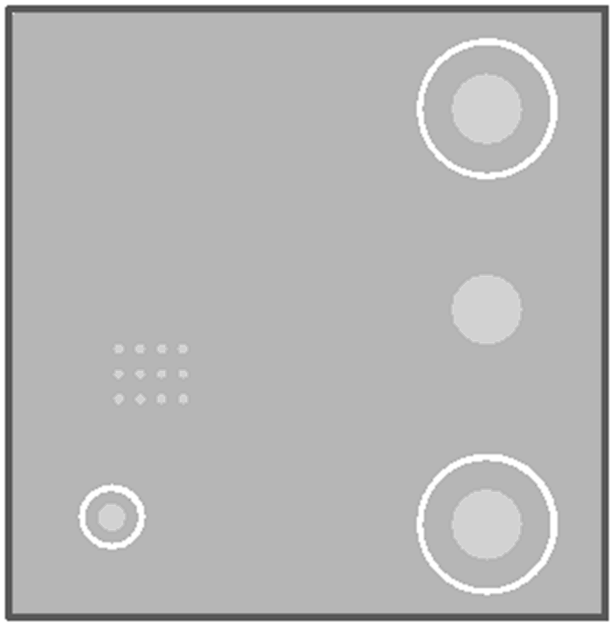


Figure 2. Bottom Layer

10 Efficiency Plot

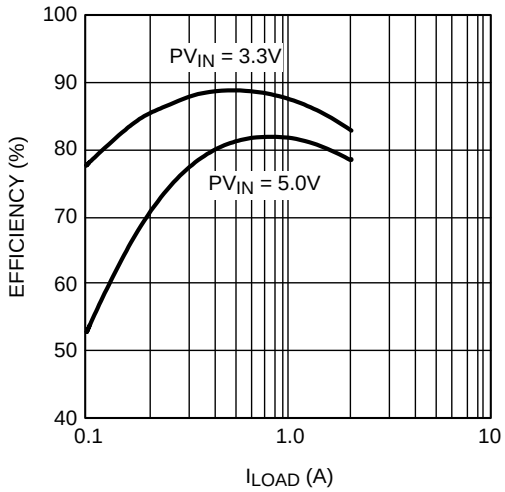


Figure 3. LM2852X Typical Efficiency for 2.5 V Output

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