LM2852 Evaluation Board (500kHz version)

National Semiconductor
Application Note 1343
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Introduction

This application note describes the evaluation board for the LM2852Y. Three output voltage options are available; all three come with the same bill of materials. The board may be configured in multiple ways providing various enabling schemes, split-rail operation and filtering options. The LM2852 is a 2A step-down buck converter belonging to National's SIMPLE SYNCHRONOUS® family. The LM2852 input voltage can range from 2.85V to 5.5V. Output voltages are factory set from 0.8V to 3.3V in 100mV increments. On-chip type-three compensation facilitates low component count power supply design. This evaluation board enables the power supply designer to investigate various functional configurations.

PVIN and AVIN

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 switcher. Since PVIN and AVIN are dedicated pins on the chip, split rail operation is possible. For example, AVIN can be set to 5V and PVIN to 3.3V. Jumper J_1 on the evaluation board is used to short together the AVIN and PVIN board inputs.

Enable (EN)

The LM2852 enable pin is internally pulled up so that the part is enabled anytime the input voltage exceeds the UVLO threshold. The evaluation board includes an input for enable so the user may set the voltage on the enable pin. Jumper J2 also may be used to short the enable pin to AVin. Resistor, Rp may be used as a pull down resistor to set the enable input to low.

C_f and R_f

Components C_f and R_f may be used to low-pass-filter the AVIN input. Filtering AVIN may improve line and load regulation by reducing interfering signals on AVIN. 10 Ω and 1 µF are typical filter components for AVIN.

C_{IN} and C_{INX}

This evaluation board provides two capacitor footprints for the C_{IN} function. The larger footprint holds the bulk of the C_{IN} capacitor, 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.

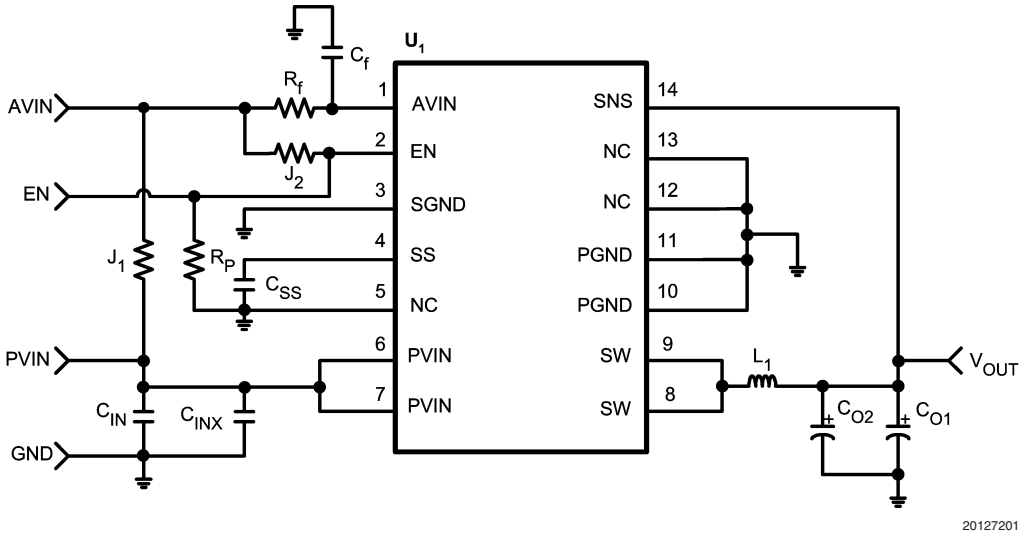
C_{SS}

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

Output Filter - L_1, C_{O1} and C_{O2}

Since the LM2852 uses on-chip compensation, the output filter component values must be restricted to a certain range. The datasheet includes a table and information on component selection. Generally, the output capacitors must have ESR values commonly found in Tantalum and non-Tantalum solution, Niobium Oxide capacitors.

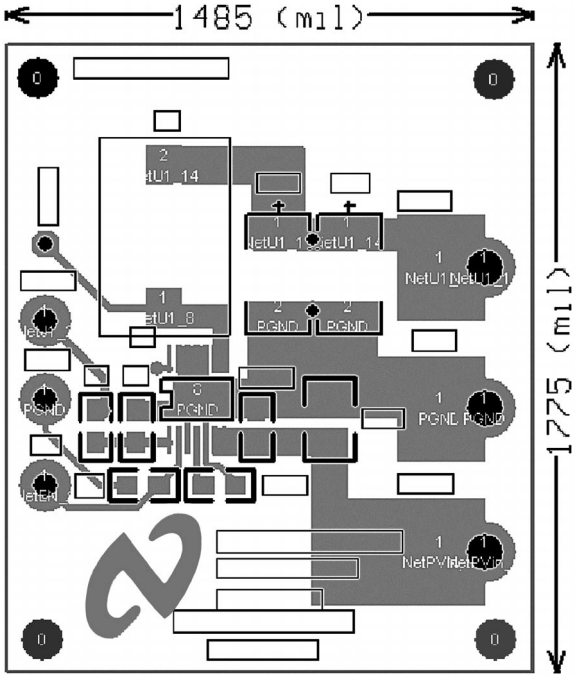
Board Schematic



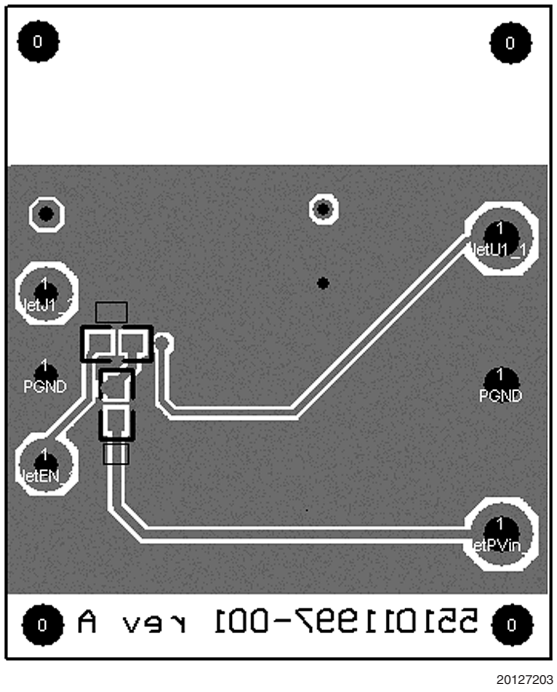
Bill of Materials

ID	Part Number	Type	Size	Parameters	Qty	Vendor
U_1	LM2852YMXA-1.2, LM2852YMXA-1.8 or LM2852YMXA-2.5	2A Buck	ETSSOP-14		1	NSC
L_1	DO3316P-153	Inductor		15 µH	1	Coilcraft
C_{O1}	NOSD107M006R0100	Capacitor		100 µF	1	AVX
C_{O2}	Not Populated				0	
C_{IN}	GRM32ER60J476ME20B	Capacitor	1210	47µF/X5R/6.3V	1	Murata
C_{INX}	GRM21BR71C105KA01B	Capacitor	0805	1µF/X7R/16V	1	Murata
C_{SS}	VJ0805Y272KXXA	Capacitor	0805	2.7nF/X7R/25V	1	Vishay-Vitramon
R_f	CRCW060310R0F	Resistor	0603	10Ω ±10%	1	Vishay-Dale
C_f	GRM21BR71C105KA01B	Capacitor	0805	1µF/X7R/16V	1	Murata
J_1	CRCW06030R0F	Resistor	0603	0Ω	1	Vishay-Dale
J_2	Not Populated				0	
R_P	Not Populated				0	

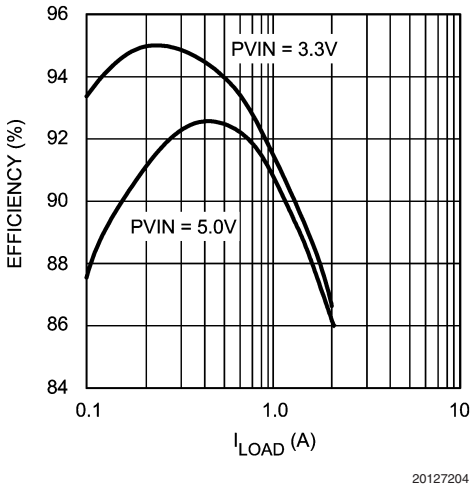
PCB Layouts



Top Layer



Bottom Layer



Typical Efficiency for 2.5V Output

Notes

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