LM1771 Evaluation Board

National Semiconductor
Application Note 1477
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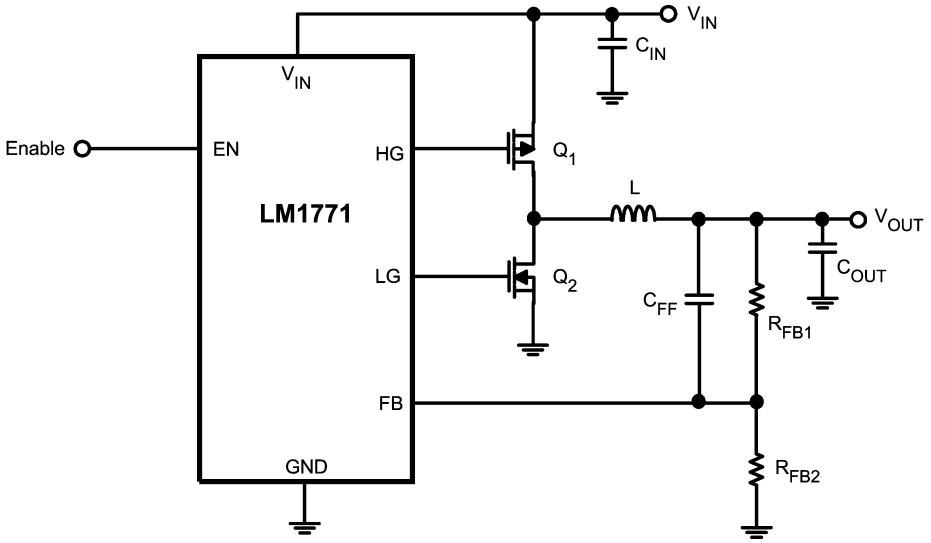
Introduction

The LM1771 is an efficient buck switching controller capable of converting an input voltage between 2.8V to 5.5V into a regulated output voltage as low as 0.8V. The LM1771 utilizes a constant on-time control scheme which eliminates the need for external compensation components. The LM1771 features a precision enable pin to allow for easy sequencing and flexibility in setting the operating range of the power supply. Three timing options are available which translates to three possible frequency options for any given output voltage. Available in the small-sized LLP-6 package, the LM1771 allows for a complete power supply design to occupy very little board space without sacrificing efficiency.

The LM1771 Evaluation Board was designed with space critical applications in mind. The entire power supply occupies less than .86" X .76" on a two layer PCB, but is capable of delivering a maximum continuous load current of 2A. The output voltage is set at 2.5V, but can be easily varied by replacing one of the feedback resistors. The 2000ns timing option (LM1771U) is used to attain a 378kHz switching frequency. The input voltage is nominally 5V, but can varied over the entire operating range of the LM1771 (2.8V to 5.5V) for testing purposes. At the full 2A load, the efficiency of the power supply is greater than 92%.

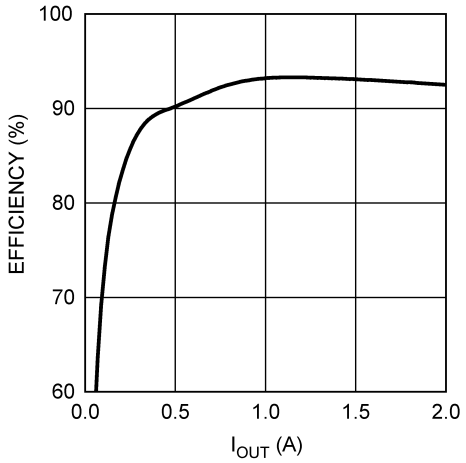


Schematic

Bill of Materials (5V to 2.5V Conversion)

Designator	Description	Part Number	Quantity	Manufacturer
U1	LM1771, 2000ns	LM1771USD/NOPB	1	National Semiconductor
Q1	PMOS	Si3867DV	1	Siliconix
Q2	NMOS	Si3460DV	1	Siliconix
Cin	22µF Capacitor, 0805	GRM21BR60J226ME39	1	Murata
Cout	68µF Capacitor, 6V, 55mΩ, C-Case	6TPC68M	1	Sanyo
Rfb1	21kΩ Resistor, 0603	CRCW06032102F	1	Vishay
Rfb2	10kΩ Resistor, 0603	CRCW06031002F	1	Vishay
L	5.0µH Inductor	MSS7341-502NLB	1	Coilcraft
Cff	1nF Capacitor, 0603	VJ0603102KXXA	1	Vishay
Test Points	Individual Test Points	160-1026-02-05-00	4	Wearnes

Performance



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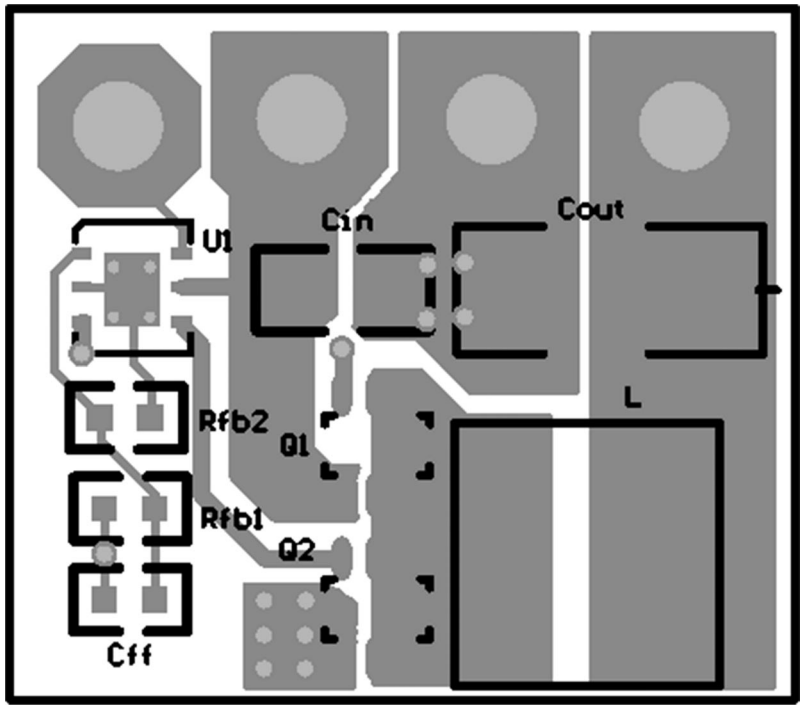
Efficiency vs I_{OUT} (V_{IN} = 5V)

PCB Layout



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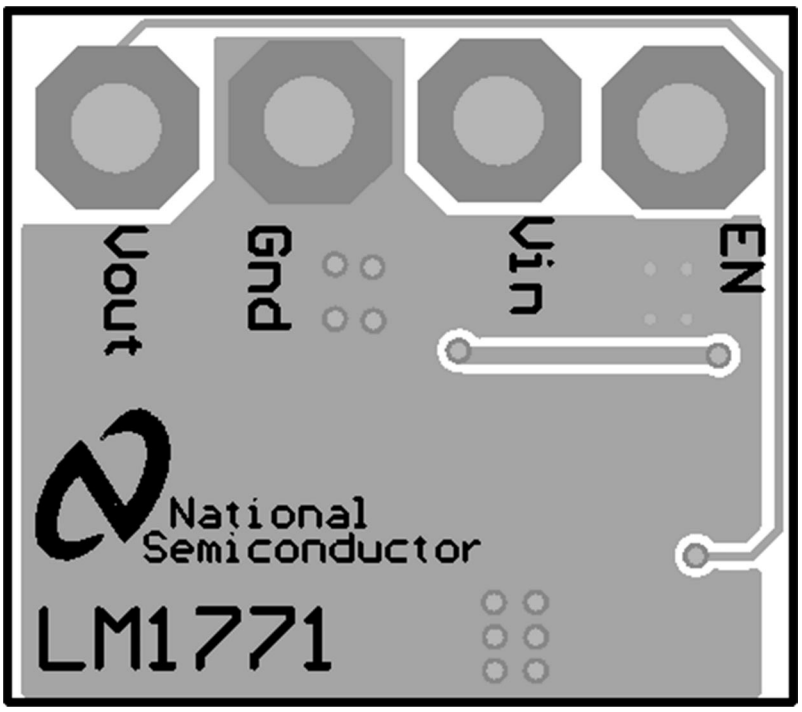
Top Layer

PCB Layout (Continued)



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Bottom Layer

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