LM1770 Evaluation Board

National Semiconductor
Application Note 1400
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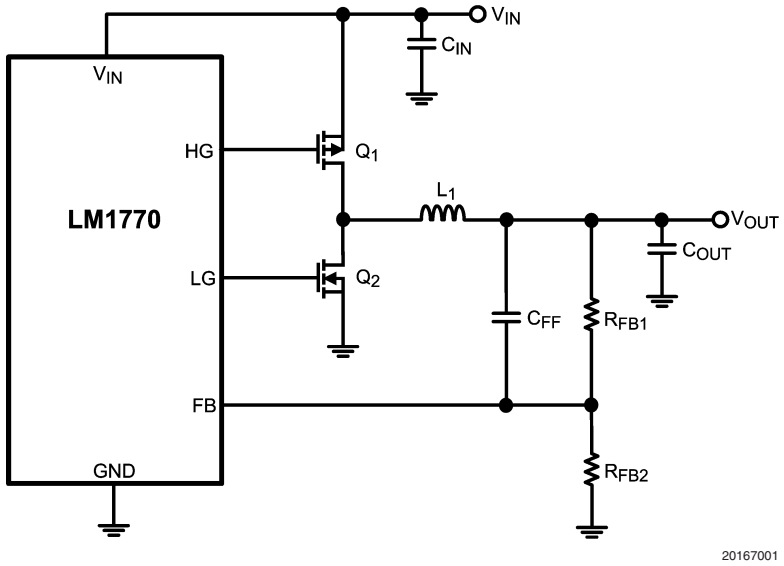
Introduction

The LM1770 is a synchronous buck switching controller that is capable of accepting an input voltage in the range of 2.8V to 5.5V and producing an output voltage as low as 0.8V. By utilizing a constant on time control scheme it allows a power supply to be designed quickly without the need for external compensation components. The LM1770 is available in three different timing options to allow flexibility on switching frequency and is offered in a small SOT23-5 package. These features enable a power supply to be designed that occupies an extremely small footprint while maintaining high efficiency.

The LM1770 demoboard was designed to illustrate what is possible when designing in space critical applications. It accepts a 5V input rail and produces a 2.5V output. Despite the small size (the board measures 0.7" v 0.68"), it is capable of delivering up to a maximum continuous current of 2A. At this load the efficiency is above 92%.

For testing of the board the input voltage can be varied over the entire operating range of 2.8V to 5.5V. The timing option used for this design is the 2000ns option (LM1770U), which sets the nominal switching frequency to 378kHz. Modifications can easily be made to the board to adjust the output voltage, by changing one of the feedback resistors.

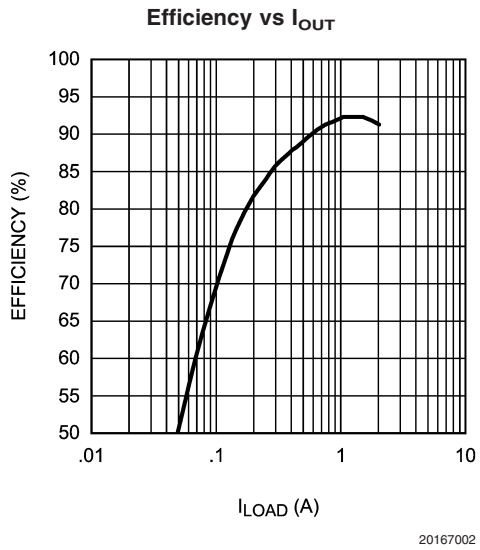
Schematic



Bill of Materials

Designator	Description	Part #	Quantity	Manufacturer
U1	LM1770, 2000ns Option	LM1770UMF	1	NSC
Q2	NMOS	SI3460DV	1	Siliconix
Q1	PMOS	SI3867DV	1	Siliconix
Cout	47µF Cap, 4V, 70mOhm, B Case	4TPC47M	1	Sanyo
Rfb1	21kΩ Resistor, 0603	CRCW06032102F	1	Vishay
Rfb2	10kΩ Resistor, 0603	CRCW06031002	1	Vishay
L	5.0µH Inductor	MSS7341-502NLB	1	Coilcraft
Cff	10nF Capacitor, 0603	VJ0603Y103KXAAT	1	Vishay
Cin	22µF Capacitor, 0805	GRM21BR60J226ME39B	1	muRata
Test Points	Individual test points	160-1026-02-05-00	3	Wearnes

Performance



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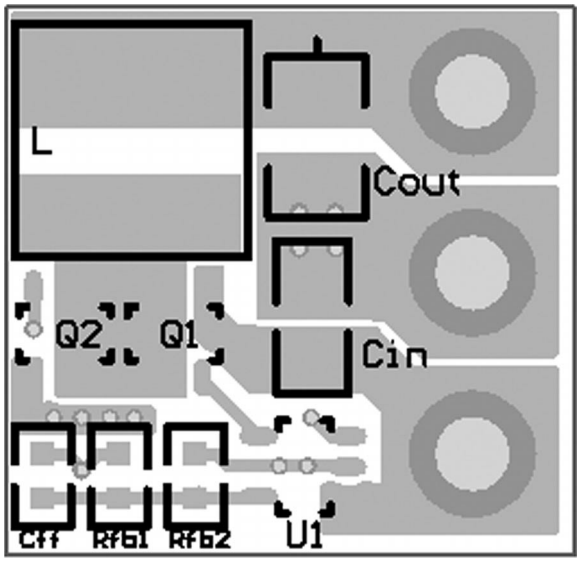
PCB Layout



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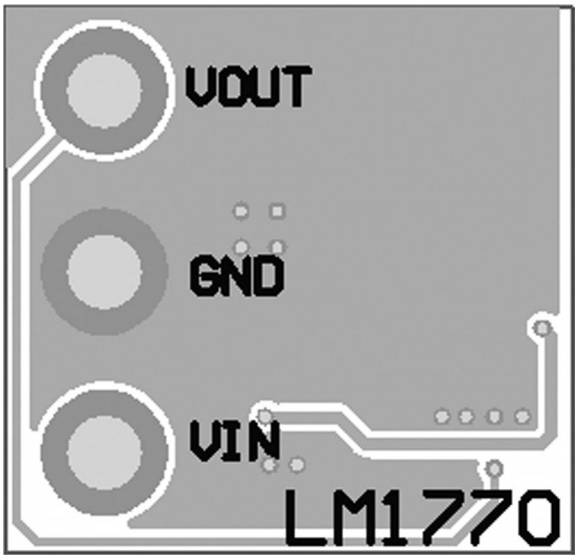
Top Layer



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Bottom Layer

LM1770 Demoboard Information	
Board Material	FR4
Size	0.7" x 0.68"
Layers	2
Copper Thickness	1oz
Plating	HASL
Board Thickness	0.062"

Notes

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