LM3485 Evaluation Board

National Semiconductor Application Note 1227 Naomi Sugiura May 2002



Introduction

The LM3485 is a Hysteretic P-FET Buck Controller, which uses a pulse-frequency modulation (PFM) scheme to regulate the output voltage. This LM3485 demo board and the recommended components are intended to demonstrate the performance with a 3.3V output from a 12V source. The

demo board can be used with source voltages from 7V to 28V to deliver output load currents up to 1A. By changing the size of a single resistor, regulated output voltages from 1.242V to 5V can be obtained.

The circuit schematic is shown in *Figure 1* and the bill of materials is given in *Table 1*.



FIGURE 1. Regulator with 3.3V Output at 0.5A

TABLE	1. Bi	ll of N	laterials
-------	-------	---------	-----------

Code	Description	Manufacturer
C1	Input Capacitor CAP-Tantalum 22µF 35V EEJL1VD226R	Panasonic
C2	Output Capacitor CAP-POSCAP 100µF 6.3V 6TPC100M	Sanyo
C3	C _{ADJ} CAP-Ceramic Chip 1nF 50V GRM39X7R102K50	Murata
C4	C _{ff} CAP-Ceramic Chip 100pF 50V GRM39X7R101K50	Murata
D1	Catch Diode Schottky Diode 1A 30V MBRS130T3	On Semiconductor
L1	Inductor 22µH LQH66SN220M01L	Murata
Q1	P-channel MOSFET -60V FDC5614P	Fairchild
R1	Feedback high side resistor Chip Resistor 33K Ω MCR10EZHF3302	Rohm
R2	Feedback low side resistor Chip Resistor 20KΩ MCR10EZHF2002	Rohm
R3	R_{ADJ} Chip Resistor 24K Ω MCR10EZHF2402	Rohm
U1	Buck Controller LM3485	National Semiconductor

Output Voltage Current Limit Setting



AN-1227

LM3485 Evaluation Board

Layout Fundamentals

The LM3485 can work in a wide range of applications. For your application circuit, proper layout for the buck regulator should be implemented by following a few simple guidelines.

- 1. Place the power components, which are the MOSFET, diode, inductor and filter capacitors, close together. Make the traces between them as short and as wide as possible.
- 2. Place the trace for the Gate of the external PFET as close as possible to the PGATE pin of the LM3485.



Top Layer

- 3. Separate any noise sensitive traces, primarily in the voltage feedback path, from noise source traces associated with the inductor.
- 4. Keep the trace short between the ground pin of the input capacitor and the anode of the diode.
- 5. Ensure the ground is low impedance.



Bottom Layer

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

- Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
- 2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

N	National Semiconductor Corporation	National Semiconductor Europe
\boldsymbol{v}	Americas	Fax: +49 (0) 180-530 85 86
	Email: support@nsc.com	Email: europe.support@nsc.com
	Deutsch Tel: +49 (0) 69 9508 6208	
	English Tel: +44 (0) 870 24 0 2171	
www.national.com		Français Tel: +33 (0) 1 41 91 8790

National Semiconductor Asia Pacific Customer Response Group Tel: 65-2544466 Fax: 65-2504466 Email: ap.support@nsc.com National Semiconductor Japan Ltd. Tel: 81-3-5639-7560 Fax: 81-3-5639-7507

AN-1227

National does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and National reserves the right at any time without notice to change said circuitry and specifications.