



## 1.0 Design Specifications

Inputs	Outputs #1
VinMin=4.5	Vout1=1
VinMax=5.5	Iout1=20

## 2.0 Design Description

The design uses a LM2737 synchronous controller utilizing external high side and low side N-channel MOSFETs. 200kHz switching frequency has been chosen to maximize efficiency. In such high current applications careful PC board layout is critical to achieve low switching losses and clean, stable operation. The switching power stage requires particular attention. Few points to note for this design are:

1) Decoupling capacitors are close to IC pins as possible. Keep separate power ground plane.

2) Input and output capacitors are connected to the power ground plane; all other capacitors are connected to the signal ground plane.

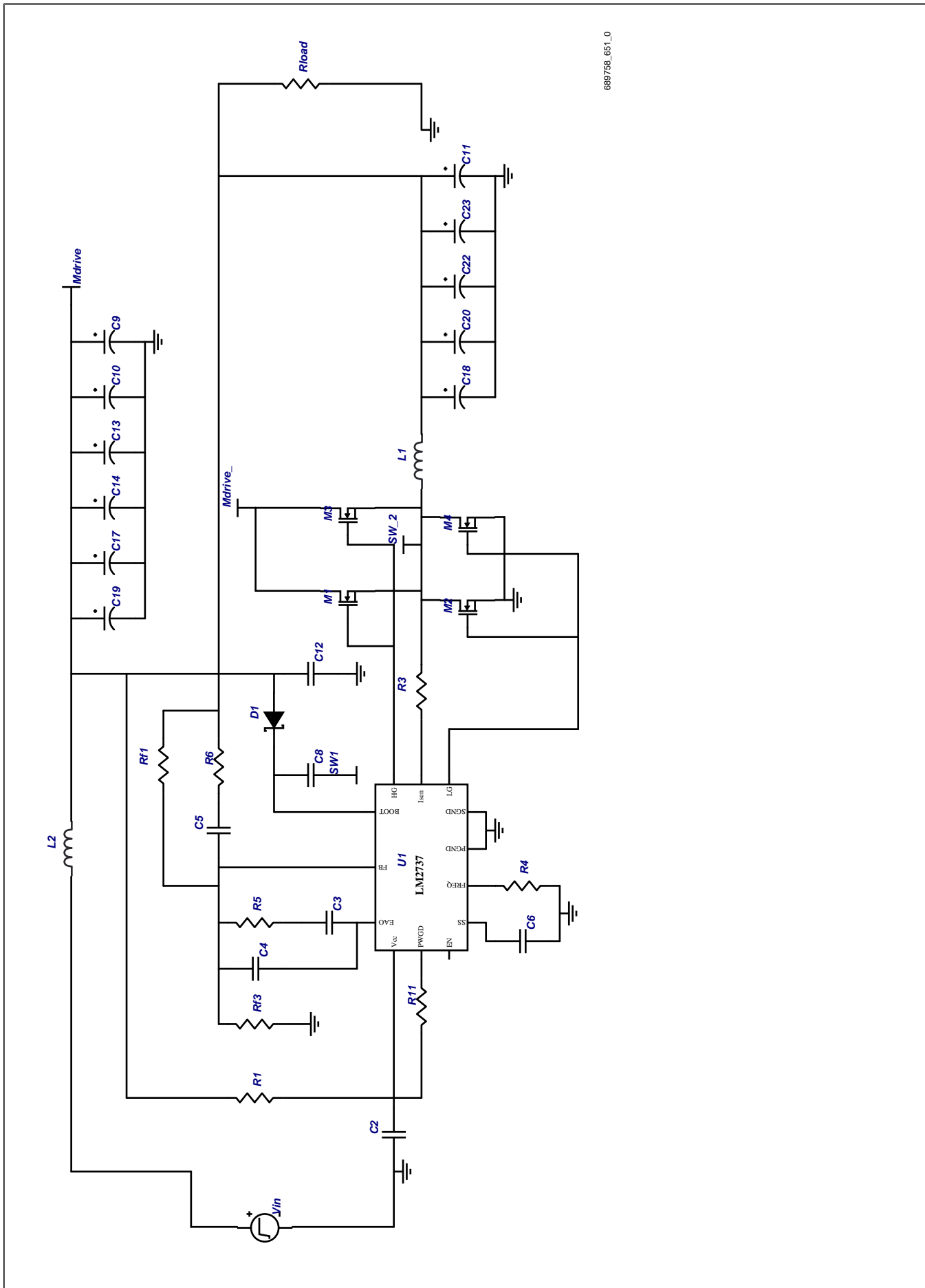
3) High current paths are very short.

4) Multiple MOSFETs have been used to reduce the conduction and switching losses

5) Feedback connections are short and direct.

6) High-side MOSFETs are as close as possible to the controller

## 3.0 Schematic



689756\_051\_0

FIGURE 1. Example Schematic Showing Connection for all Components.

## 4.0 Bill Of Materials

Part	Manufacturer	Part#	Attributes
C10	TDK	C3216X5R0J106M	10u F
C11	TDK	C3216X5R0J106M	10u F
C13	Sanyo	6MV2200WG	2200u F
C14	Sanyo	6MV2200WG	2200u F
C17	Sanyo	6MV2200WG	2200u F
C18	Sanyo	6MV2200WG	2200u F, 0.066 Ohms
C19	Sanyo	6MV2200WG	2200u F, 0.066 Ohms
C2	Vishay	VJ0805Y104KXXAT	0.1u F
C20	Sanyo	6MV2200WG	2200u F
C22	Sanyo	6MV2200WG	2200u F
C23	Sanyo	6MV2200WG	2200u F
C3	Vishay	VJ0805Y562KXXAT	5.6n F
C4	Vishay	VJ0805A680KXXAT	68p F
C5	Vishay	VJ0805Y273KXXAT	27n F
C6	Vishay	VJ0805Y104KXXAT	0.1u F
C8	Vishay	C2012X5R1C105K	1u F
C9	TDK	C3216X5R0J106M	10u F
D1	ONSEMI	MBR0520LT1	0.385 V
L1	Coilcraft	SER1590-681	0.68u H, 0.001 Ohms
L2	Coilcraft	DO1813P-561HC	0.56u H, 0.01 Ohms
M1	Siliconix	SI4866DY	
M2	Siliconix	SI4866DY	
M3	Siliconix	SI4866DY	
M4	Siliconix	SI4866DY	
R1	Vishay	CRCW080510R0JRT6	10 Ohms
R11	Vishay	CRCW08051002FRT6	10k Ohms
R3	Vishay	CRCW08052611FRT6	2.61k Ohms
R4	Vishay	CRCW08058252FRT6	82.5k Ohms
R5	Vishay	CRCW08057151FRT6	7.15k Ohms
R6	Vishay	CRCW08051001FRT6	1k Ohms
Rf1	Vishay	CRCW08051001FRT6	1k Ohms
Rf3	Vishay	CRCW08051501FRT6	1.5k Ohms
U1	National Semiconductor	LM2737	



# Notes

## Notes

National Semiconductor's design tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Reference designs are created using National's published specifications as well as the published specifications of other device manufacturers. While National does update this information periodically, this information may not be current at the time the reference design is built. National and/or its licensors do not warrant the accuracy or completeness of the specifications or any information contained therein. National and/or its licensors do not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. National and/or its licensors do not warrant that the designs are production worthy. You should completely validate and test your design implementation to confirm the system functionality for your application.

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.

For the most current product information visit us at [www.national.com](http://www.national.com).

### 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:

1. 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.

### BANNED SUBSTANCE COMPLIANCE

National Semiconductor certifies that the products and packing materials meet the provisions of the Customer Products Stewardship Specification (CSP-9-111C2) and the Banned Substances and Materials of Interest Specification (CSP-9-111S2) and contain no "Banned Substances" as defined in CSP-9-111S2.

Leadfree products are RoHS compliant.



**National Semiconductor Americas Customer Support Center**  
 Email: [new.feedback@nsc.com](mailto:new.feedback@nsc.com)  
 Tel: 1-800-272-9959

**National Semiconductor Europe Customer Support Center**  
 Fax: +49 (0) 180-530-85-86  
 Email: [europe.support@nsc.com](mailto:europe.support@nsc.com)  
 Deutsch Tel: +49 (0) 69 9508 6208  
 English Tel: +49 (0) 870 24 0 2171  
 Français Tel: +33 (0) 1 41 91 8790

**National Semiconductor Asia Pacific Customer Support Center**  
 Email: [ap.support@nsc.com](mailto:ap.support@nsc.com)

**National Semiconductor Japan Customer Support Center**  
 Fax: 81-3-5639-7507  
 Email: [jpn.feedback@nsc.com](mailto:jpn.feedback@nsc.com)  
 Tel: 81-3-5639-7560