

LM2727 Design Document

National Semiconductor
LM2727
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1.0 Design Specifications

Inputs	Outputs #1
VinMin=10	Vout1=2.5
VinMax=13.2	Iout1=5

2.0 Design Description

The design uses a LM2727 synchronous controller utilizing external high side and low side N-channel MOSFETs operating at 600kHz. Operating the high frequency aids in minimizing the component size, thus resulting in overall smaller package. 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:

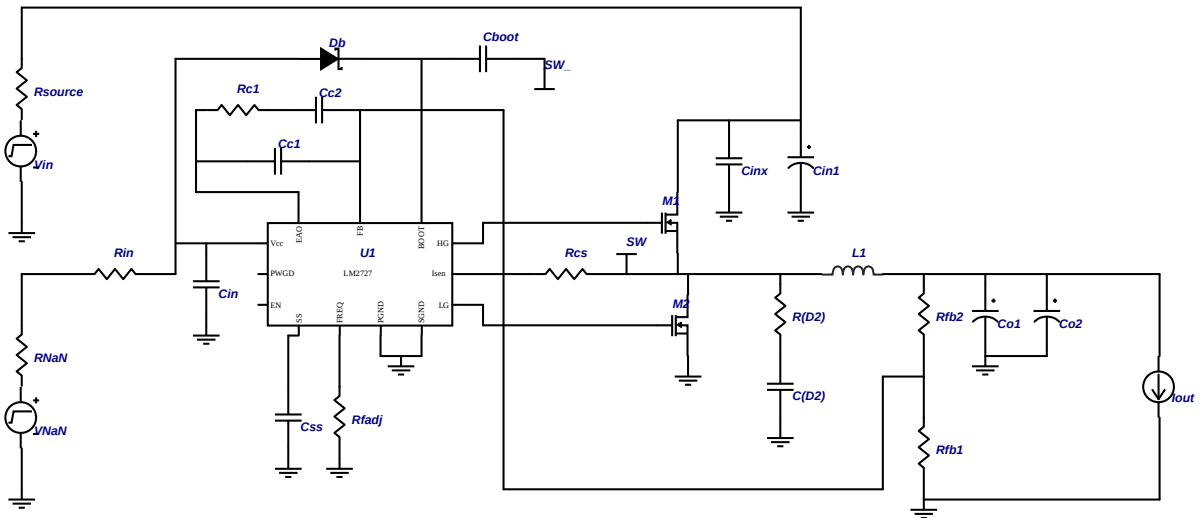
- 1) Decoupling capacitors are close to IC pins as possible. Keep separate power ground plane.
- 2) Input and output capacitors are connected to the power ground plane; all other capacitors are connected to the signal ground plane.

- 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 and routed away from any noisy traces (i.e. switch node).
- 6) High-side MOSFETs are as close as possible to the controller

Notes:

Note that MOSFETs M1 and M2 in the schematic are represented as Q1 and Q2 in the layout.

3.0 Schematic



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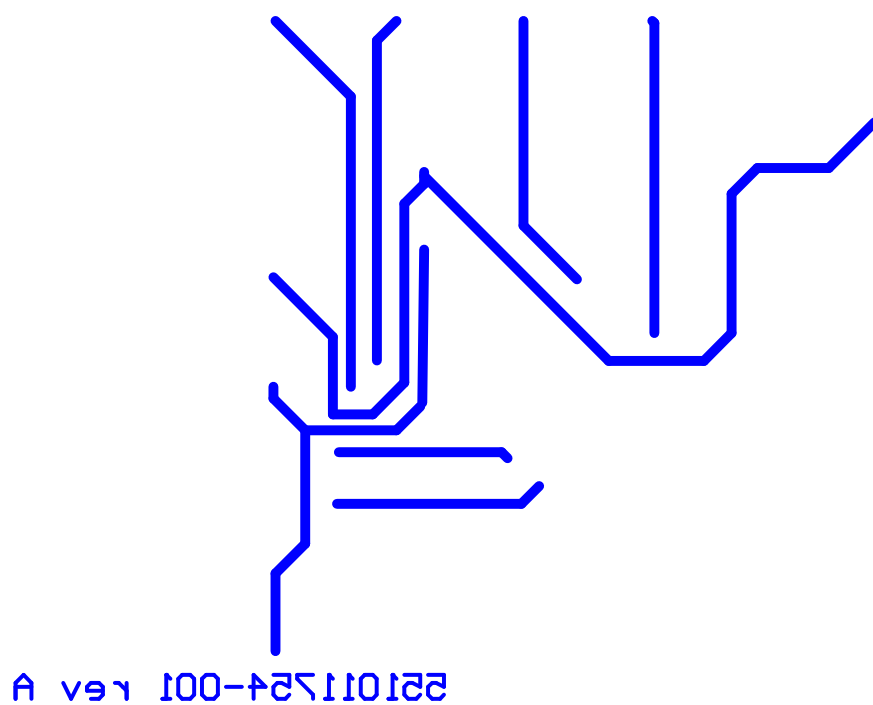
FIGURE 1. Example Schematic Showing Connection for all Components.

4.0 Bill Of Materials

Part	Manufacturer	Part#	Attributes
C(D2)	Vishay	VJ0805A471KXXAT	470p F
Cboot	Vishay	VJ1206Y104KXXAT	0.1u F
Cc1	Vishay	VJ1206A180KXXAT	18p F

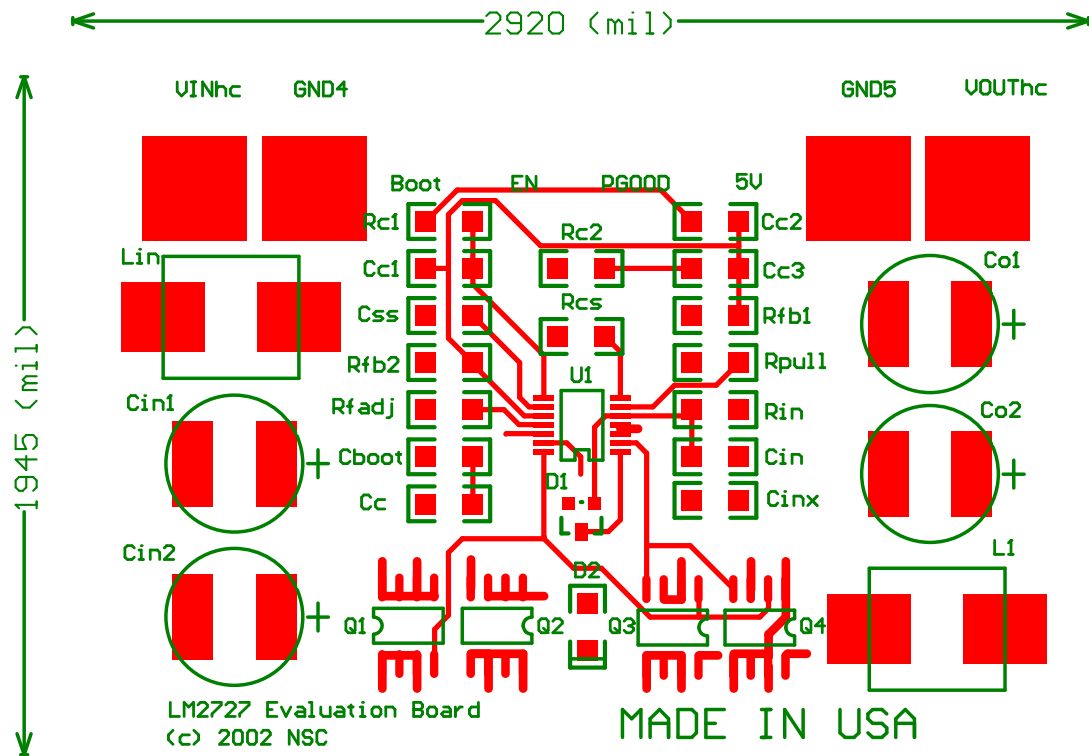
Part	Manufacturer	Part#	Attributes
Cc2	Vishay	VJ1206Y272KXXAT	2.7n F
Cin	TDK	C3316X5R0J105M	NumCaps=1, 1u F
Cin1	Sanyo	16MV470WG	470u F, 0.036 Ohms
Cinx	TDK	C3225X5R1C106K	10u F
Co1	Sanyo	16MV470WG	470u F, 0.036 Ohms
Co2	TDK	C3316X5R0J106M	10u F
Css	Vishay	VJ1206Y104KXXAT	0.1u F
Db	ONSEMI	MBR0520	0.385 V
L1	Pulse	P1168.332	3.3u H, 0.011 Ohms
M1	Siliconix	SI4894DY	
M2	Siliconix	SI4894DY	
R(D2)	Vishay	CRCW08052200FRT6	2.2 Ohms
Rc1	Vishay	CRCW12061212FRT6	12.1k Ohms
Rcs	Vishay	CRCW12063001FRT6	3.01k Ohms
Rfadj	Vishay	CRCW12064222FRT6	42.2k Ohms
Rfb1	Vishay	CRCW12066340FRT6	634 Ohms
Rfb2	Vishay	CRCW12062001FRT6	2k Ohms
Rin	Vishay	CRCW120610R0FRT6	10 Ohms
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5.0 Layout



PADC_NSC0143_lo_1

FIGURE 2. Board's Bottom View



PADC_NSC0143_i0_2

FIGURE 3. Board's Top View

6.0 Waveforms



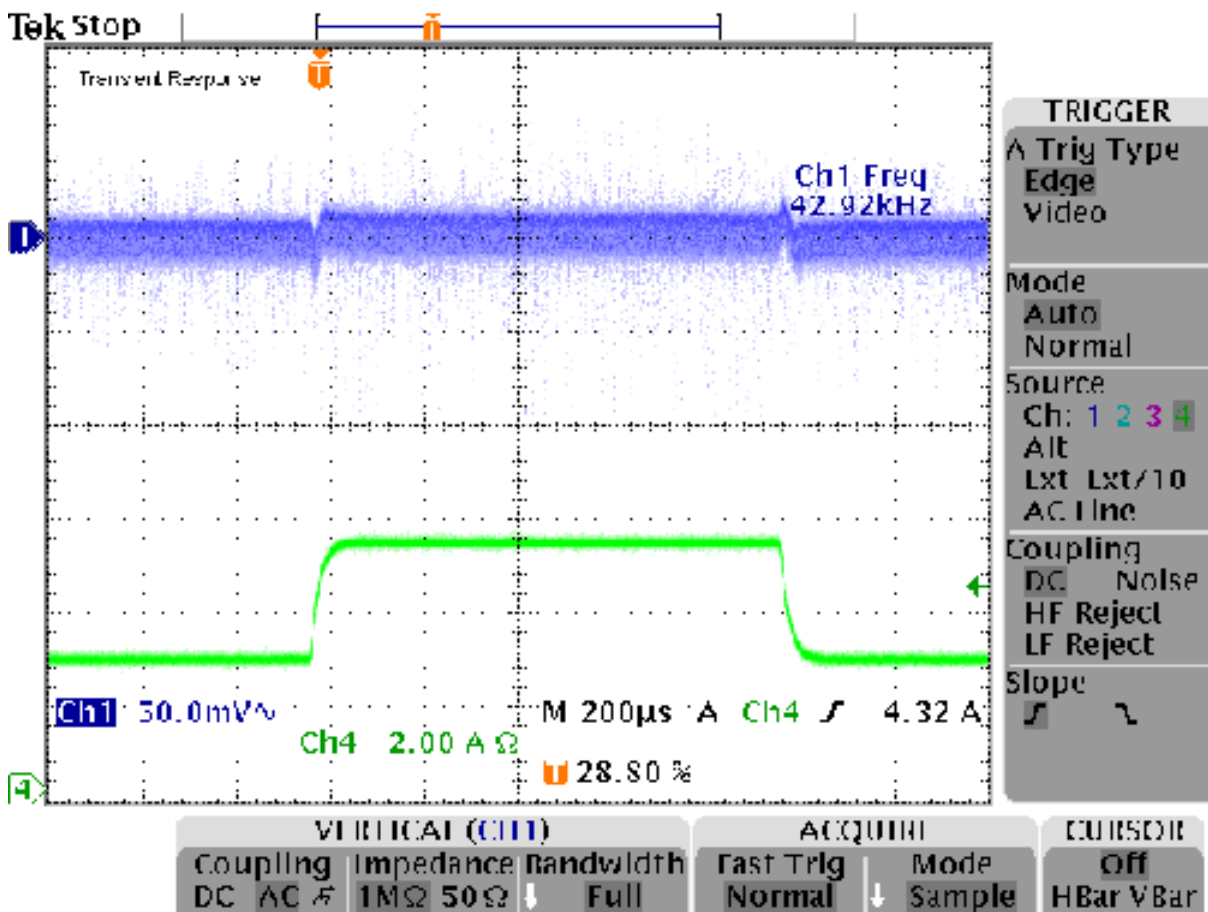
PADC_NSC0143_wf_3

FIGURE 4. Ripple volts



PADC_NSC0143_wf_4

FIGURE 5. switch pin



PADC_NSC0143_wf_5

FIGURE 6. Transient Response

Notes

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National Semiconductor Americas Customer Support Center
 Email: 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
 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

National Semiconductor Japan Customer Support Center
 Fax: 81-3-5639-7507
 Email: jpn.feedback@nsc.com
 Tel: 81-3-5639-7560