Design Solution # 31

Negative Buck Boost Converter: 5V IN to -5V OUT Using SP6137

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Part Number: SP6137

Application Description: Negative Buck-Boost converter 1A out using a 900kHz SP6137 PWM controller.

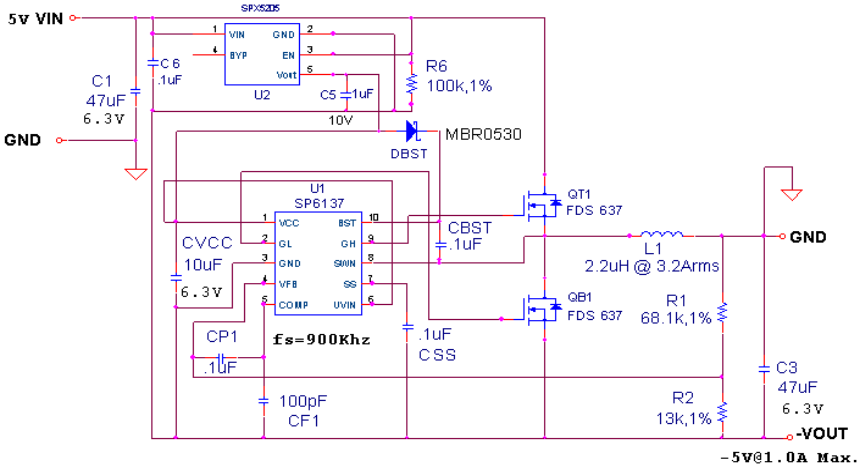
Electrical Requirements:

Input Voltage	5V
Output Voltage	-5V
Output Current	0A to 1A

Circuit Description:

This circuit has been designed to provide a -5V from a positive 5V. The topology used was a negative buck boost topology. For detailed description of the operation of the negative buck boost, please refer to the Application Note ANP9 “Using SP6652 for a Positive to Negative Buck Boost Converter”. This Application note can be found on the Sipex webpage in the Applications area at this URL: http://www.sipex.com/files/ApplicationNotes/SP6652%20AppNote.pdf

This report includes application schematic, complete Bill of Materials and figures 1-5 illustrating electrical performance of the design.



Schematic for SP6137 5V to -5V @ 1A out, also shown in larger format on page 4

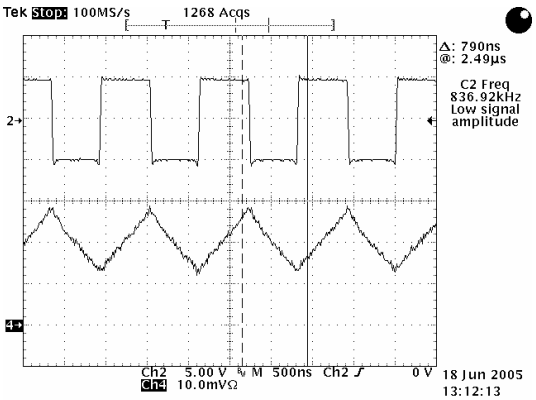


Figure 1. Channel 1: Inductor Current, 1 A per Division. Channel 2: Switch node.

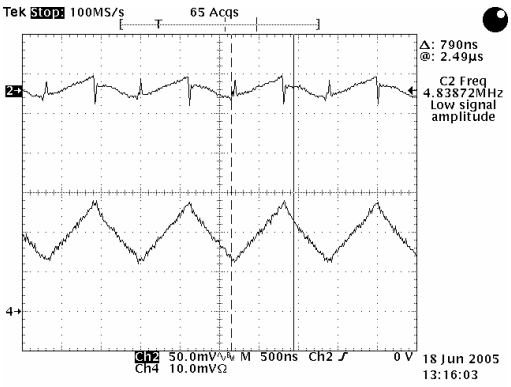


Figure 2. Channel 1: Inductor Current, 1 A per Division. Channel 2: Output Voltage Ripple

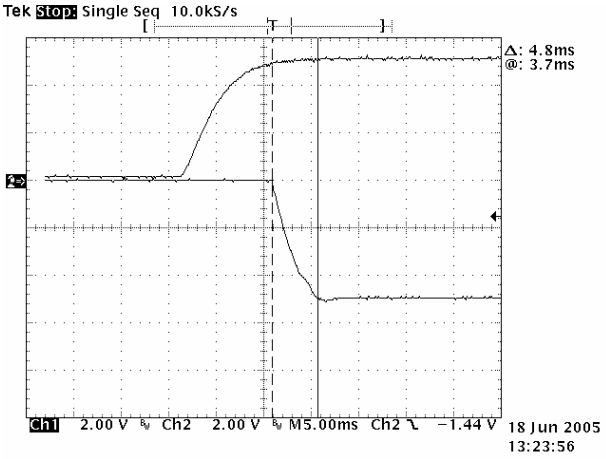


Figure 3. Startup 5V to -5V @ 1A out

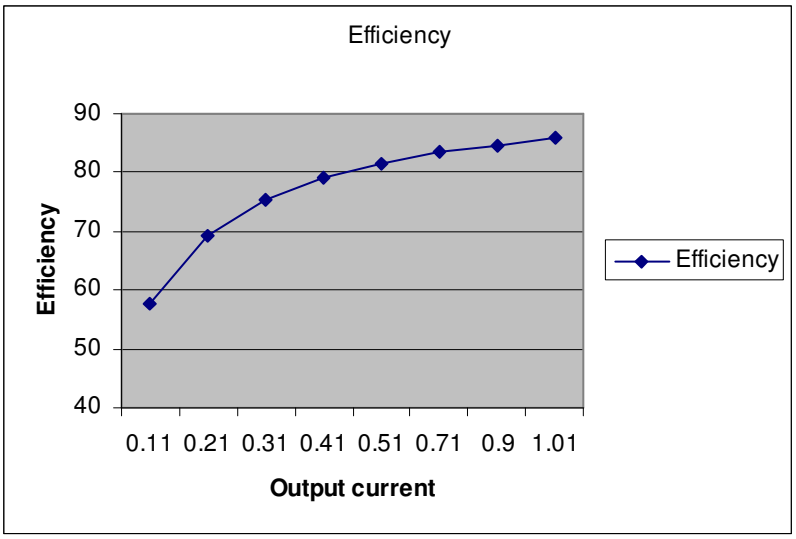
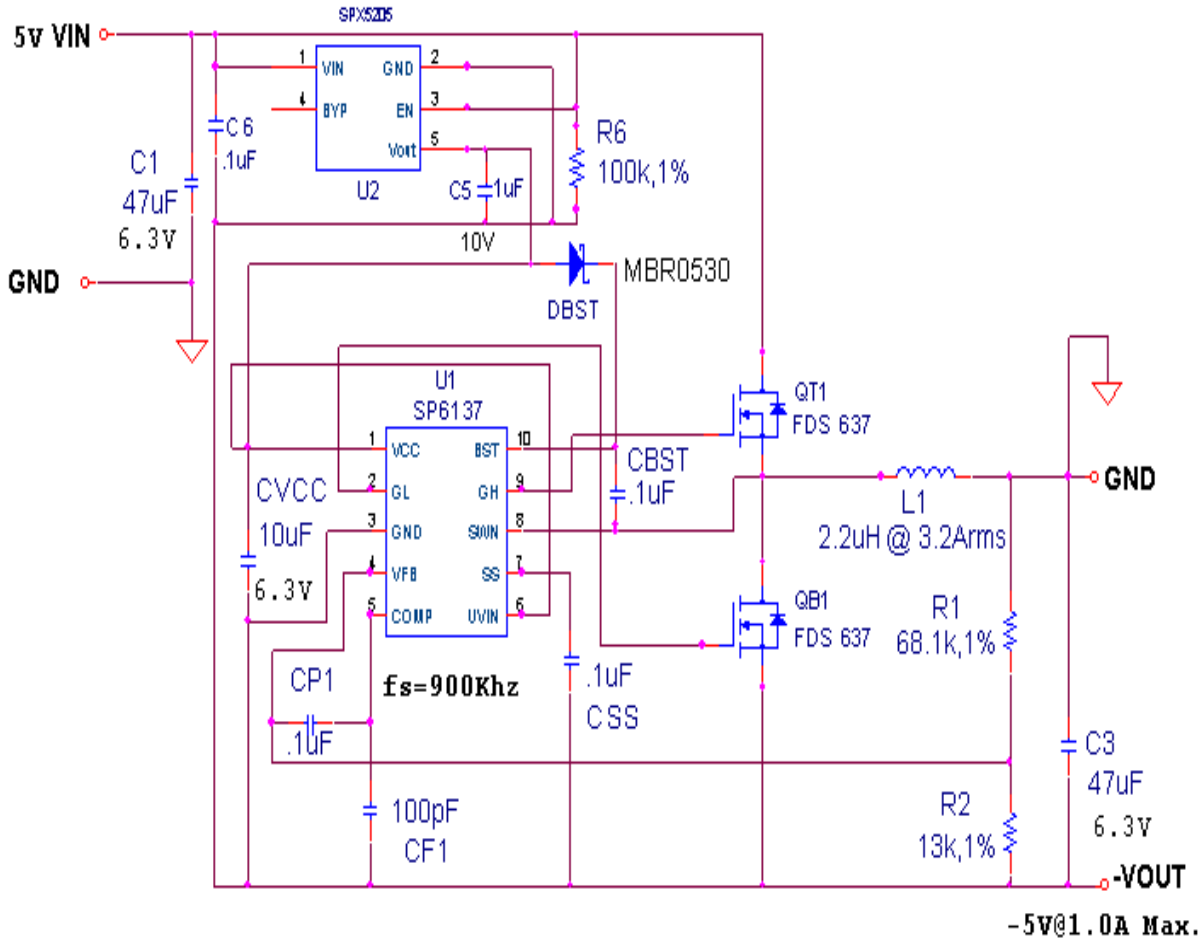


Figure 4. Efficiency Graph

SP6137 Evaluation Board Rev. 00 List of Materials							6/6/2006
Line No.	Ref. Des.	Qty.	Manuf.	Manuf. Part Number	Layout Size	Component	Vendor Phone Number
1	U1	1	Sipex	SP6137ES	10 pin MSOP	PWM Controller	978-667-7800
2	U2	1	Sipex	SP5205M5-5.0	Sot23-5	Linear Regulator	978-667-7800
3	QT1 QT2	2	Fairchild	FDS637	Sot23-6	Nchannel FET	
4	DSBST	1	On Semi	MBR530	SOD-323	Schottky Diode	
5	L1	1	Würth	WE744062002		2.2uH Inductor 3.2A	
6	C3 C1	2	TDK	C3225X5R0J476M	1210	47uF Ceramic X5R 6.3V	978-779-3111
7	CVCC	1	Murata	GRM40X5R106K6.3H520	805	10uF X5R Capacitor	770-436-1300
8	Css CP1 C6 CBST	4	TDK	C1608X5R1C104K	603	.1uF X5R Capacitor 16V	978-779-3111
9	CF1		Murata	GRM1885C1H101JA01	603	100pF capacitor COG	770-436-1300
10	C5	1	Murata	GRM39X5R105K10D534	603	1 uF X5R Capacitor	770-436-1300
11	R1	1	Panasonic	ERJ-3EKF6812V	0603	68.1K Ohm Thick Film Res 1%	800-344-4539
12	R2	1	Panasonic	ERJ-3EKF1302V	0603	13 K Ohm Thick Film Res 1%	800-344-4539
13	R6	1	Panasonic	ERJ-3EKF1003V	0603	100K Ohm thick Film Res1%	800-344-4539

Figure 5. BOM



Schematic in larger format for SP6137 5V to -5V @ 1A out