

SP6136 Converts 12V Input to 3.3V Output at 2A

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Part Number: SP6136

Application Description: Set-top Box

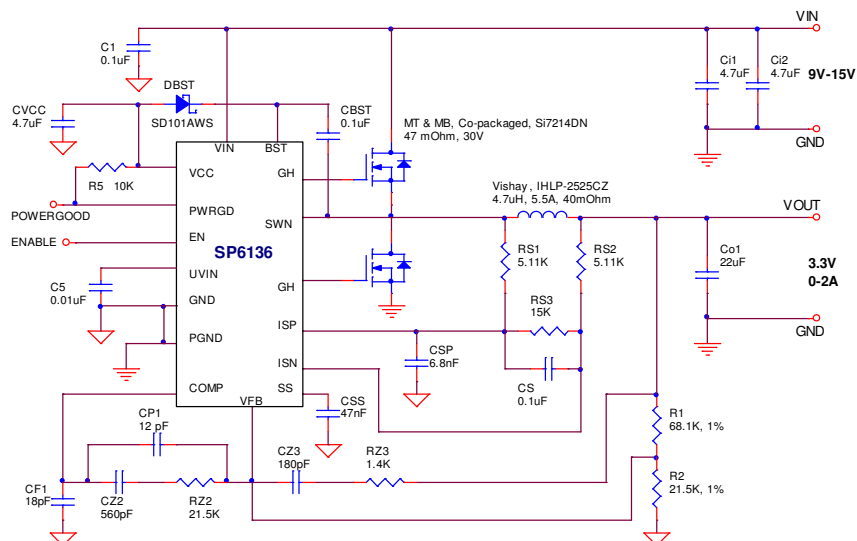
Electrical Requirements:

Input Voltage	9V - 15V
Output Voltage	3.3V
Output Current	2A

Circuit Description:

This circuit has been designed to provide 3.3V output at 2A for powering applications such as a set-top boxes or DSL modems. This solution provides high efficiency while requiring a small PCB area of 1cm x 2cm (1cm x 1cm if both sides of PCB are populated). The SP6136 is a high performance buck regulator controller that provides all necessary functions required by a buck regulator: Over-current protection, Powergood output, adjustable UVLO and Enable input. The constant switching frequency (600kHz) optimizes against switching losses.

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



Circuit Schematic

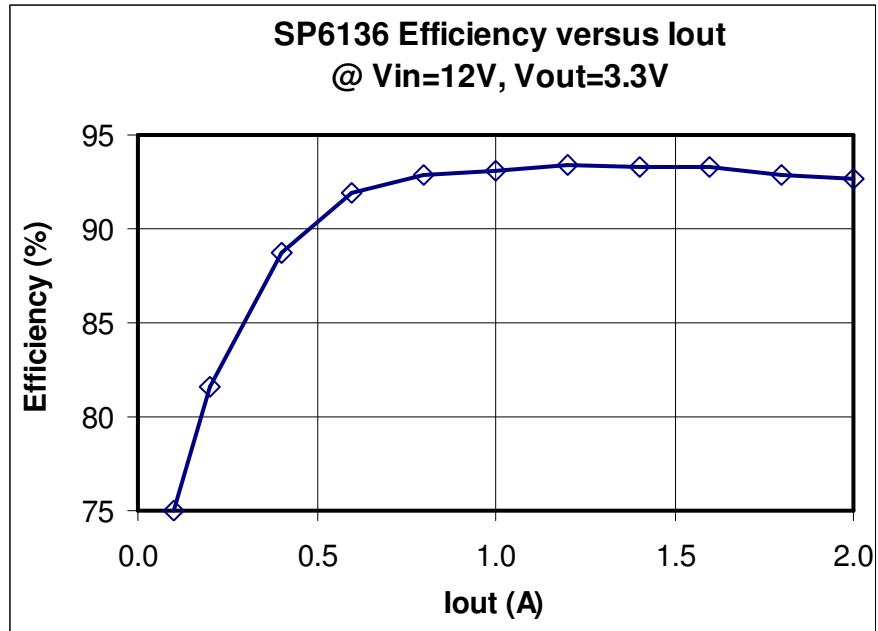


Figure 1: Efficiency Graph at 25°C, Natural Convection

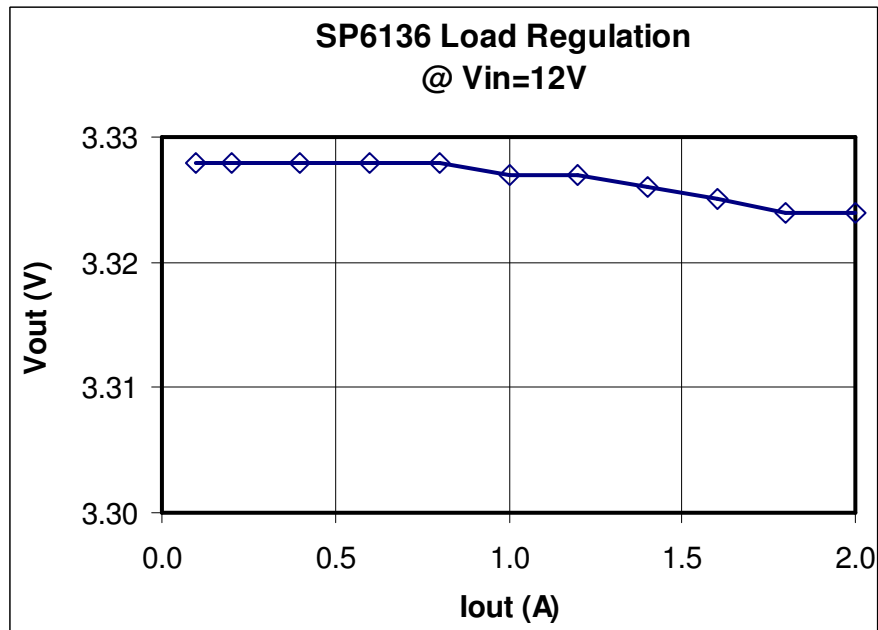


Figure 2: Load Regulation

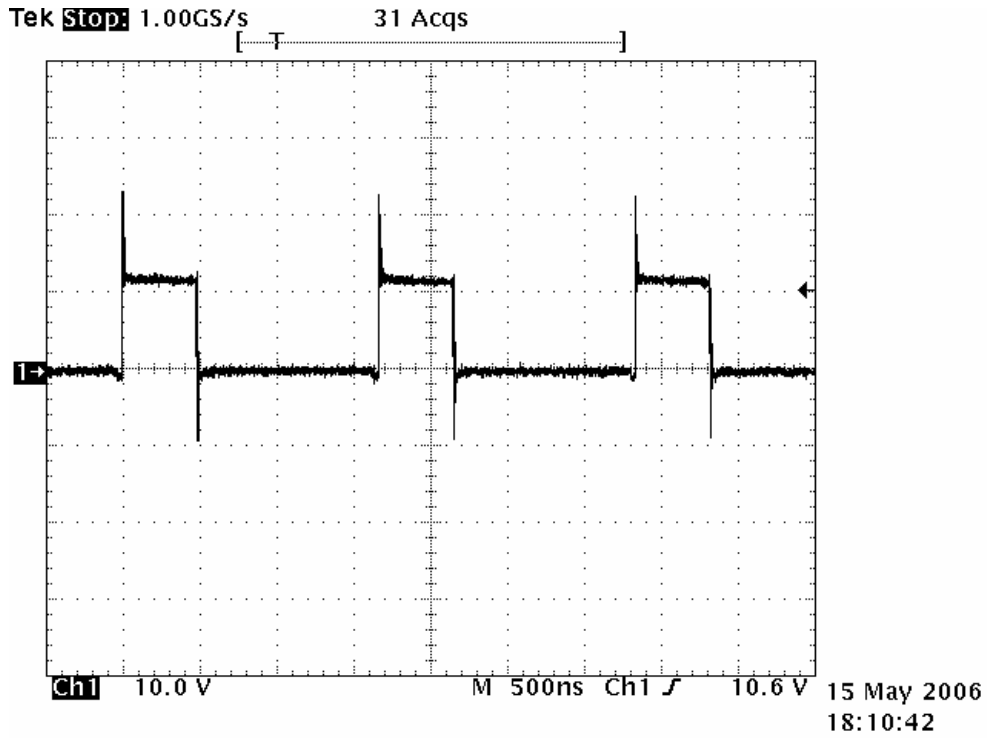


Figure 3: Switching Node

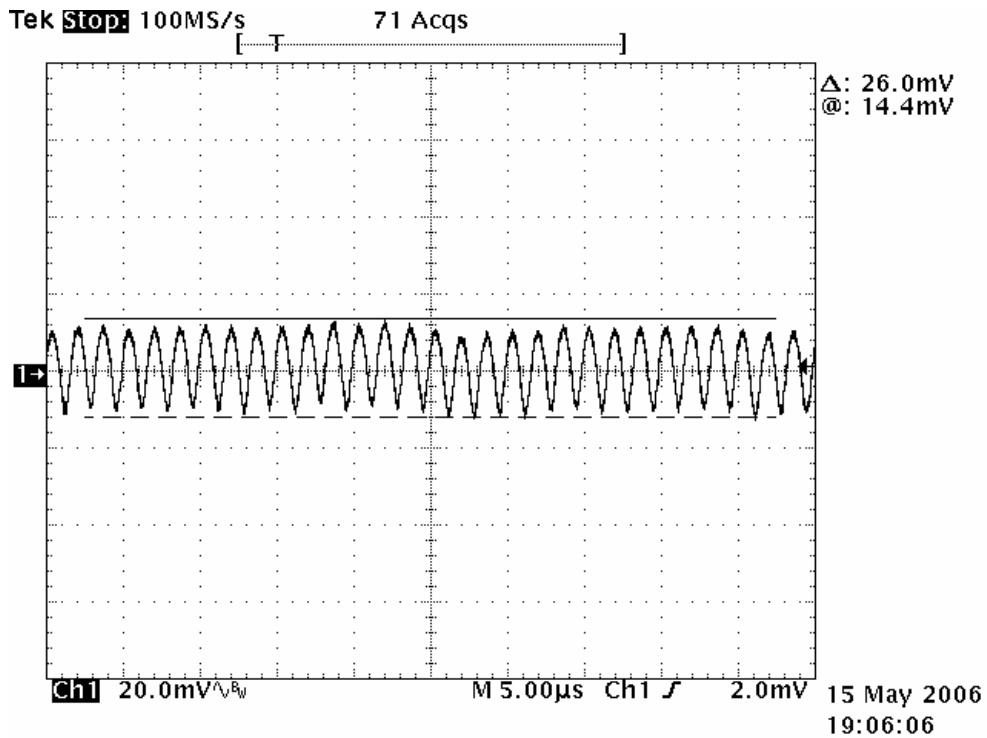


Figure 4: Output Ripple is 26mV peak-to-peak at I_{OUT}=2A

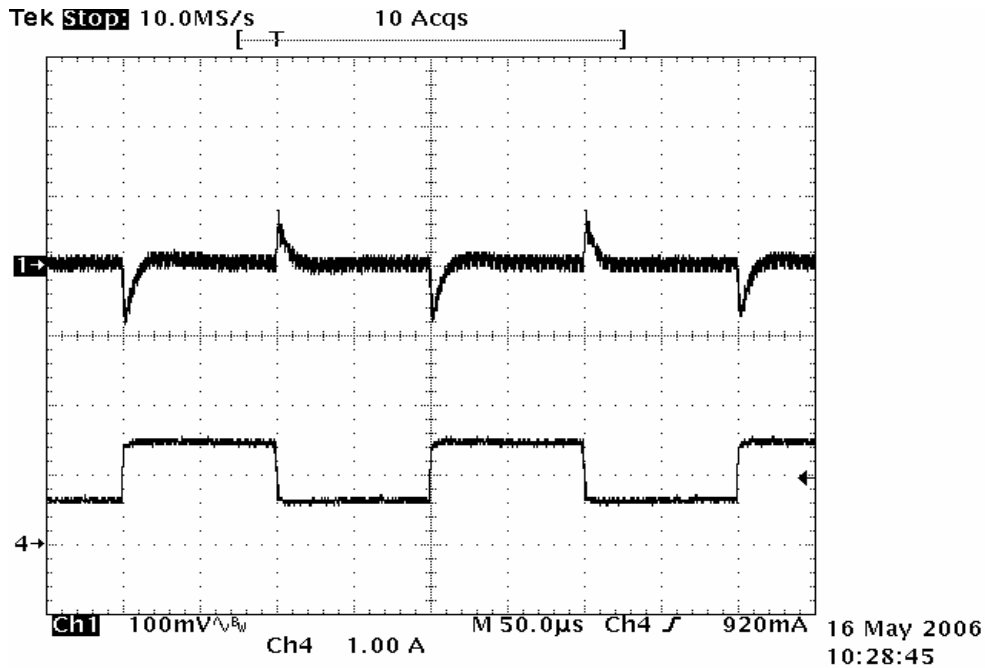


Figure 5: Step Load Response to 0.5A-1.5A. Ch1: VOUT, ch4: IOUT.

Line No.	Ref. Des.	Qty.	Manuf.	Manuf. Part Number	Layout Size	Component	Vendor Phone Number
1	PCB	1	Sipex	146-6599-00	1.175"x1.934"	Evaluation Board	978-667-7800
2	U1	1	Sipex	SP6136ER1	QFN-16	600KHz Synchronous Buck Controller	978-667-7800
3	MT.MB	1	Vishay Semi	Si7214DN	1212-8 Dual	Dual NFET 30V, 47mOhm	402-563-6866
4	DBST	1	Vishay Semi	SD101AWS	SOD-323	15mA-30V Schottky Diode	800-344-4539
5	L1	1	Vishay	IHLP-2525CZ	6.86x6.47mm	4.7uH Coil 5.5A 40mOhm	
6	C1, CBST, CS	3	TDK	C1005JB1C104K	0402	0.1 uF Ceramic X5R 16V	978-779-3111
7	CSP	1	TDK	C1005JB1H682K	0402	6.8nF Ceramic X5R 50V	978-779-3111
8	Ci1, Ci2	2	AVX	08053D475MAT	0805	4.7uF Ceramic X5R 25V 20%	843-448-9411
9	Co1	1	AVX	08056D226MAT	0805	22uF Ceramic X5R 6.3V 20%	843-448-9411
10	CVCC	1	TDK	C1608JF0J475Z	0603	4.7uF Ceramic X5R 6.3V	978-779-3111
11	C5	1	TDK	C1005JB1E103K	0402	0.01uF Ceramic X7R 25V	978-779-3111
12	CSS	1	TDK	C1005JB1E473K	0402	47nF Ceramic X7R 25V	978-779-3111
13	CP1	1	TDK	C1005CH1H120D	0402	12pF Ceramic COG 50V 5%	978-779-3111
14	CF1	1	TDK	C1005CH1H180J	0402	18pF Ceramic COG 50V 5%	978-779-3111
15	CZ2	1	TDK	C1005CH1H561J	0402	560pF Ceramic COG 25V 5%	978-779-3111
16	CZ3	1	TDK	C1005CH1H180J	0402	180pF Ceramic COG 50V 5%	978-779-3111
17	R1	1	Panasonic	ERJ-2RKF6812X	0402	68.1K Ohm Thick Film Res 1%	800-344-4539
18	R2	1	Panasonic	ERJ-2RKF2152X	0402	21.5K Ohm Thick Film Res 1%	800-344-4539
19	R3, R4, RS3		Not populated				
20	R5	1	Panasonic	ERJ-2RKF1002X	0402	10.0K Ohm Thick Film Res 1%	800-344-4539
21	RZ2	1	Panasonic	ERJ-2RKF2152X	0402	21.5K Ohm Thick Film Res 1%	800-344-4540
22	RZ3	1	Panasonic	ERJ-2RKF1401X	0402	1.4K Ohm Thick Film Res 1%	800-344-4540
23	RS1, RS2	1	Panasonic	ERJ-2RKF5111X	0402	5.11K Ohm Thick Film Res 1%	800-344-4541
24	J1	1	Sullins	PTC36SAAN	.32x.12	36-Pin (3x12) Header	800-344-4539
25	(J1)	1	Sullins	STC02SYAN	.2x.1	Shunt	800-344-4539
26	VIN, VOUT, VCC, GIN, GO, GND, SS, PWRGD, UVIN	9	Vector Electronic	K24C/M	.042 Dia	Test Point Post	800-344-4539

Bill Of Materials

