

NCP1523BEVB

NCP1523B Adjustable Output Voltage Step Down Converter Demonstration Board

Prepared by: Bertrand RENAUD
On Semiconductor



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DEMONSTRATION NOTE

OVERVIEW

The NCP1523B step-down PWM DC-DC converter is optimized for portable applications powered from one cell Li-ion or three cell Alkaline/NiCd/NiMH batteries.

The device is available in an adjustable output voltage from 0.9 V to 3.3 V. It uses synchronous rectification to increase efficiency and reduce external part count. The device also has a built-in 1.5 MHz (nominal) oscillator which reduces component size by allowing a small inductor and

capacitors. Available in PWM mode only (NCP1523BFCT2G), it offers a very efficient load transient solution.

Finally, it includes an integrated soft-start, cycle-by-cycle current limiting, and thermal shutdown protection. The NCP1523B is available in a space saving, 8 pin chip scale package.

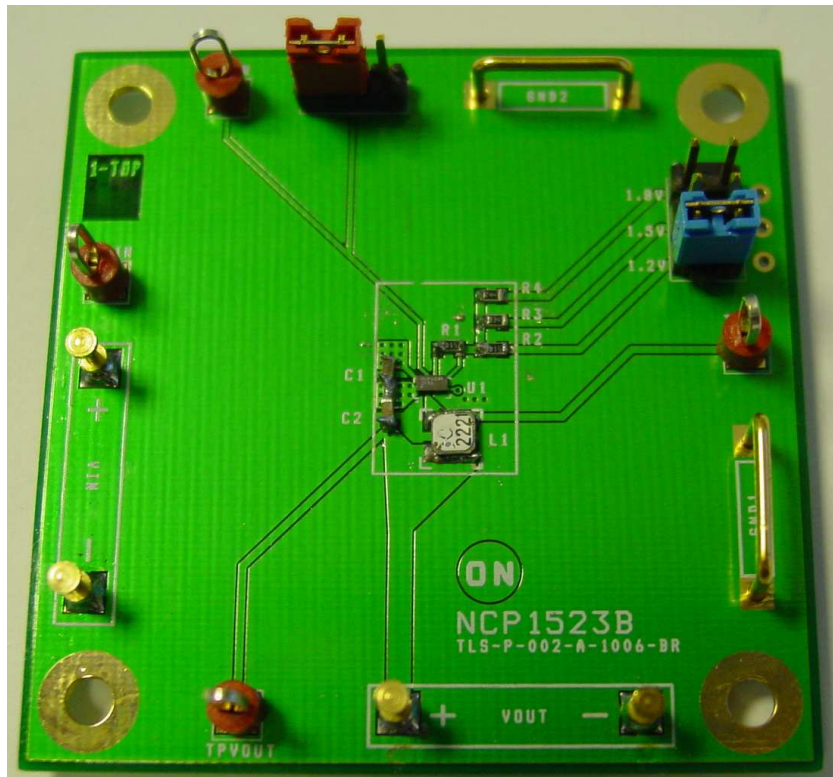


Figure 1: NCP1523B Board Picture

NCP1523B DEMOBOARD MANUAL

MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur. Exposure to these conditions or conditions beyond those indicated may adversely affect device reliability. Functional operation under absolute maximum-rated conditions is not implied. Functional operation should be restricted to the Recommend Operating Conditions (Note 1).

Rating	Symbol	Value	Unit
Minimum Voltage All Pins	V _{min}	-0.3	V
Maximum Voltage All Pins (Note 2)	V _{max}	7	V
Maximum Voltage Enable, FB, LX	V _{max}	V _{IN} +0.3	V
Thermal resistance junction to air	R _{θJA}	159	°C/W
Operating Ambient Temperature Range	T _a	-40 to 85	°C
Storage Temperature Range	T _{stg}	-55 to 150	°C
Junction Operating Temperature	T _j	-40 to 125	°C
Latch-up current maximum rating Ta=85°C (Note 4)	Lu	+/- 100	mA
ESD Withstand Voltage (Note 3)			
Human Body Model	V _{ESD}	2.0	kV
Machine Model		200	V

Notes:

1. Maximum electrical ratings are defined as those values beyond which damage to the device may occur at T_A = 25°C
2. According JEDEC standard JESD22-A108B
3. This device series contains ESD protection and exceeds the following tests:
Human Body Model (HBM) +/-2.0kV per JEDEC standard: JESD22-A114
Machine Model (MM) +/-200V per JEDEC standard: JESD22-A115
4. Latch-up current maximum rating per JEDEC standard: JESD78.

ELECTRICAL CHARACTERISTICS

For Electrical Characteristic, please see our NCP1523 datasheet available on our website.

<http://www.onsemi.com/PowerSolutions/product.do?id=NCP1523>

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INPUT POWER

Symbol	Switch Descriptions
VIN+	This is the positive connection for power supply.
VIN-	This is the return connection for the power supply
GND1, GND2	Ground clip

SETUP

Symbol	Switch Descriptions
ENABLE	To enable the buck converter, connect a shorting jumper between ENABLE-1 and ENABLE-2. To disable the buck converter, connect a shorting jumper between ENABLE-3 and ENABLE-2.
SELECT	A shorting jumper must be used to select an output voltage of 1.2V, 1.5V or 1.8V

OUTPUT POWER

Symbol	Switch Descriptions
VOUT+	This is the positive connection of the output voltage.
VOUT-	This is the return connection of the output voltage.

TEST POINT

Symbol	Switch Descriptions
TPVIN	This is the test point of the input voltage.
TPEN	This is the test point of the enable pin.
TPLX	This is the test point of the inductor voltage.
TPVOUT	This is the test point of the output voltage.

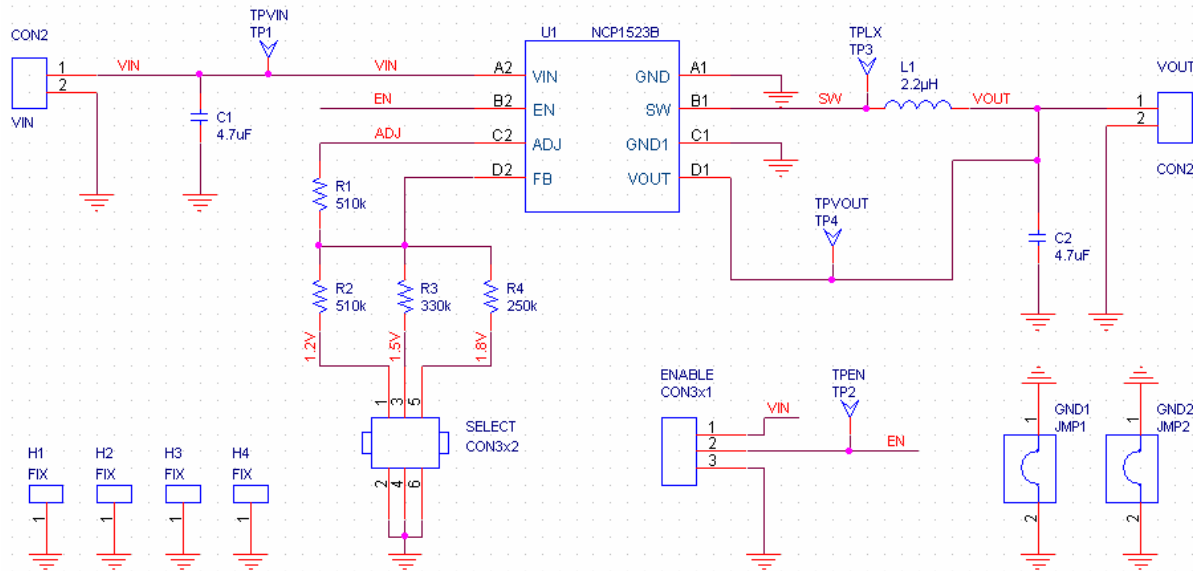


Figure 2: NCP1523B Board Schematic

NCP1523B DEMOBOARD MANUAL

NCP1523B TEST PROCEDURE

Equipment needed

- Power supply
- Digital Volt Meter
- Digital Amp Meter

Test

- 1) Jumper ENABLE should be open.
- 2) Set the power supply to 3.6 V and the current limit of at least 800mA.
- 3) Connect the power supply connector to connectors VIN+ and VIN-. The DC current measurement on Vin line should be around 0.3 μ A.
- 4) Close ENABLE connector. The DC current measurement on Vin line should be around 3mA.
- 5) Measure the output voltage between VOUT+ and VOUT- connectors. You should see around 1.2V voltage operation.
- 6) Remove the ENABLE jumper. The DC current measurement on Vin line should be back around 0.3 μ A.

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NCP1523B BILL OF MATERIAL

Designator	Qty.	Description	Value	Tolerance	Footprint	Manufacturer	Manufacturer Part Number	Lead Free
U1	1	IC, Converter, DC/DC	NA	NA	8-Pin Flip Chip	ON Semiconductor	NCP1523B	Yes
C1, C2	2	Ceramic capacitor	4.7uF, 6.3V, X5R	10%	0603	Murata	GRM188R60J475KE19D	Yes
R1, R2	2	SMD resistor	510k	1%	0603	std	std	Yes
R3	1	SMD resistor	330k	1%	0603	std	std	Yes
R4	1	SMD resistor	240k	1%	0603	std	std	Yes
L1	1	Inductor	2.2uH	30%	1210	Coilcraft	LPS3008-222NL	Yes
VIN, VOUT	4	Connector	NA	NA	NA	Kontek Comatel Cambion	3110014000500 160-1724-02-05-00	Yes
ENABLE	1	3 Pin Jumper Header	NA	NA	2,54mm	TYCO/AMP Molex / Waldom	5-826629-0 90120-0160	Yes
SELECT	1	3x2 Pin Jumper Header	NA	NA	2,54mm	TYCO/AMP Molex / Waldom	4731955180470 90131-0140	
GND1, GND2	2	Jumper for GND	NA	NA	10,16mm	Harwin Molex / Waldom	D3082-01 90120-0160	Yes
TPEN, TPLX, TPVIN, TPVOUT	4	Test point type 3	NA	NA	φ 1,60mm	Keystone	5010	Yes
PCB	1	50.8mm x 50.8mm x 1.0 mm 4 Layers	NA	NA	NA	Any	TLS-P-002-A-1006-BR	Yes

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PCB LAYOUT

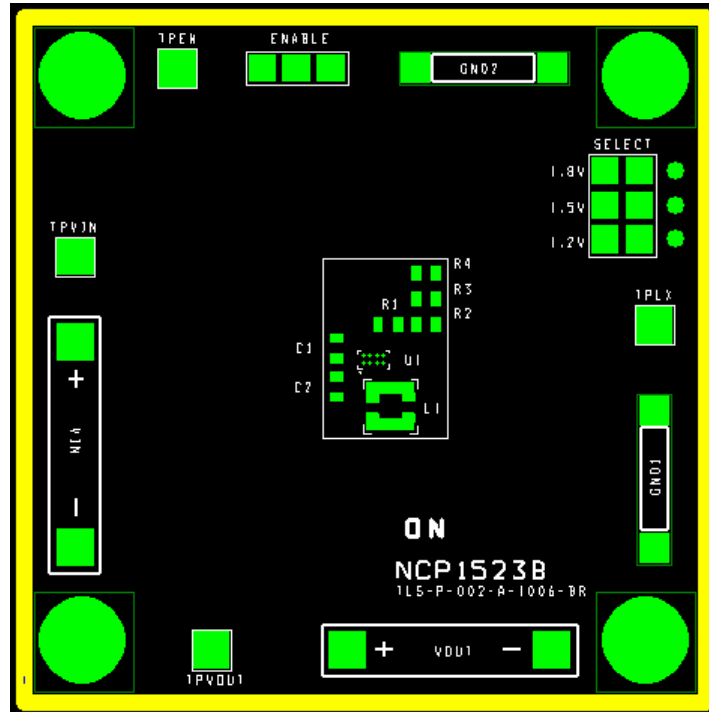


Figure 3: NCP1523B Assembly Layer

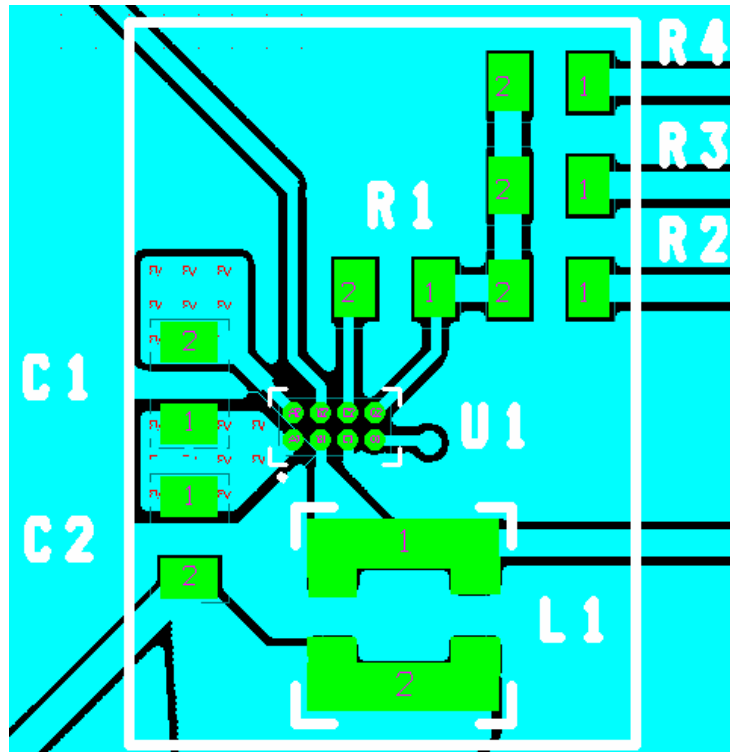


Figure 4: NCP1523B Layout

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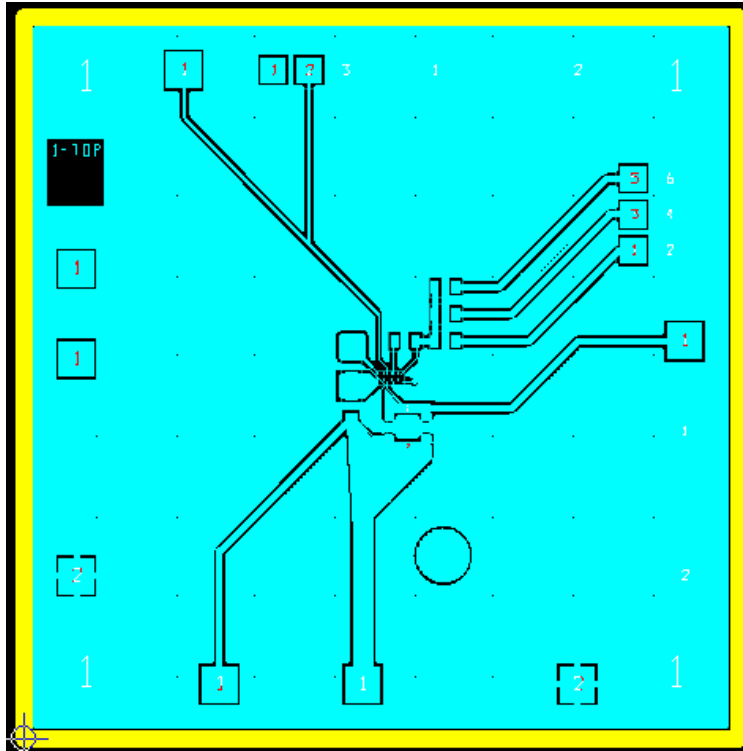


Figure 5: NCP1523B Top Layer Routing

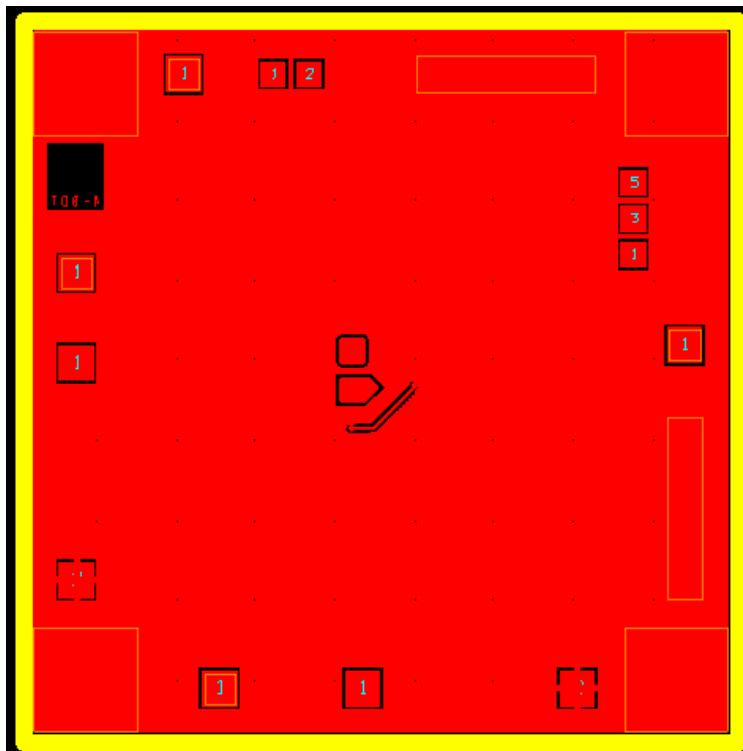


Figure 6: NCP1523B Bottom Layer Routing