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NCP1421EVB

NCP1421 Up to 600 mA DC-DC Converter Evaluation Board User's Manual

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EVAL BOARD USER'S MANUAL

Description

NCP1421 is a monolithic, micro-power, high-frequency, step-up switching converter IC designed for battery operated hand-held electronic products with up to 600 mA loading. It integrates a synchronous rectifier (Sync-Rect) to improve efficiency and to eliminate the external Schottky Diode. The NCP1421's high switching frequency (up to 1.2 MHz) allows for a low profile, small sized inductor and output capacitor to be used. When the device is disabled, the internal conduction path from the battery to the load is fully blocked, which isolates the load from the battery. This True-Cutoff function reduces the shutdown current to typically only 50 nA. A Ring-Killer is also integrated to eliminate high-frequency ringing in discontinuous conduction mode. Finally, a Low-Battery Detector, Logic-Controlled Shutdown, Cycle by Cycle Current Limiting and Thermal Shutdown provide value-added features for various battery operated applications. With all these functions ON, the quiescent supply current is typically only 8.5 μA. This device is available in the compact and low profile Micro8™ package.

Features

- High Efficiency:
  - -94% for 3.3 V Output at 200 mA from 2.0 V Input
  - -84% for 3.3 V Output at 500 mA from 2.5 V Input
- High Switching Frequency, up to 1.2 MHz (Not Hitting Current Limit)
- True-Cutoff Function Reduces Device Shutdown Current to Typically 50 nA
- Anti-Ringing Ring-Killer for Discontinuous Conduction Mode

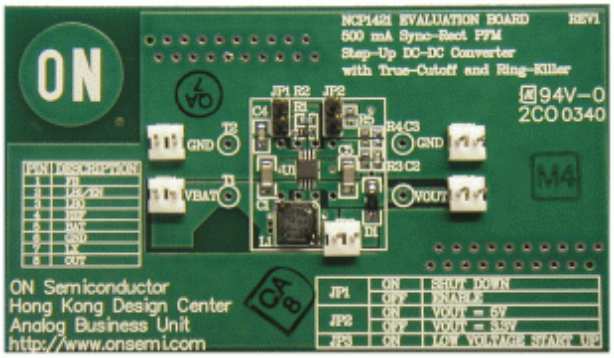

Figure 1. NCP1421 Evaluation Board

Test Procedure

1. Connect the test setup as shown in Figure 3.
2. **Turn OFF the JP1**; (Enable the device).
3. Set the Power Supply to 3.0 V and apply to TP1, TP2 (T1, T2).
4. Apply 500 mA loading from the electronic load.
5. Check the input current (I_{IN}), output voltage (V_{OUT}) and output ripple;
   - For V_{OUT} = 3.3 V; **JP2 OFF**
     I_{IN} = 590.7 mA ~ 608.7 mA
     V_{OUT} = 3.267 ~ 3.367 V
     $V_{RIPPLE} \leq$ 35 mV
   - For V_{OUT} = 5 V; **JP2** ON
     I_{IN} = 931.07 mA ~ 957.4 mA
     V_{OUT} = 4.859 ~ 5.0075 V
     $V_{RIPPLE} \leq$ 40 mV
6. Check the switching waveform at scope CH1 to see whether it is a normal continuous conduction mode switching node waveform and switching ON time (T_{ON}) is between 0.46 μs ~ 1.15 μs.

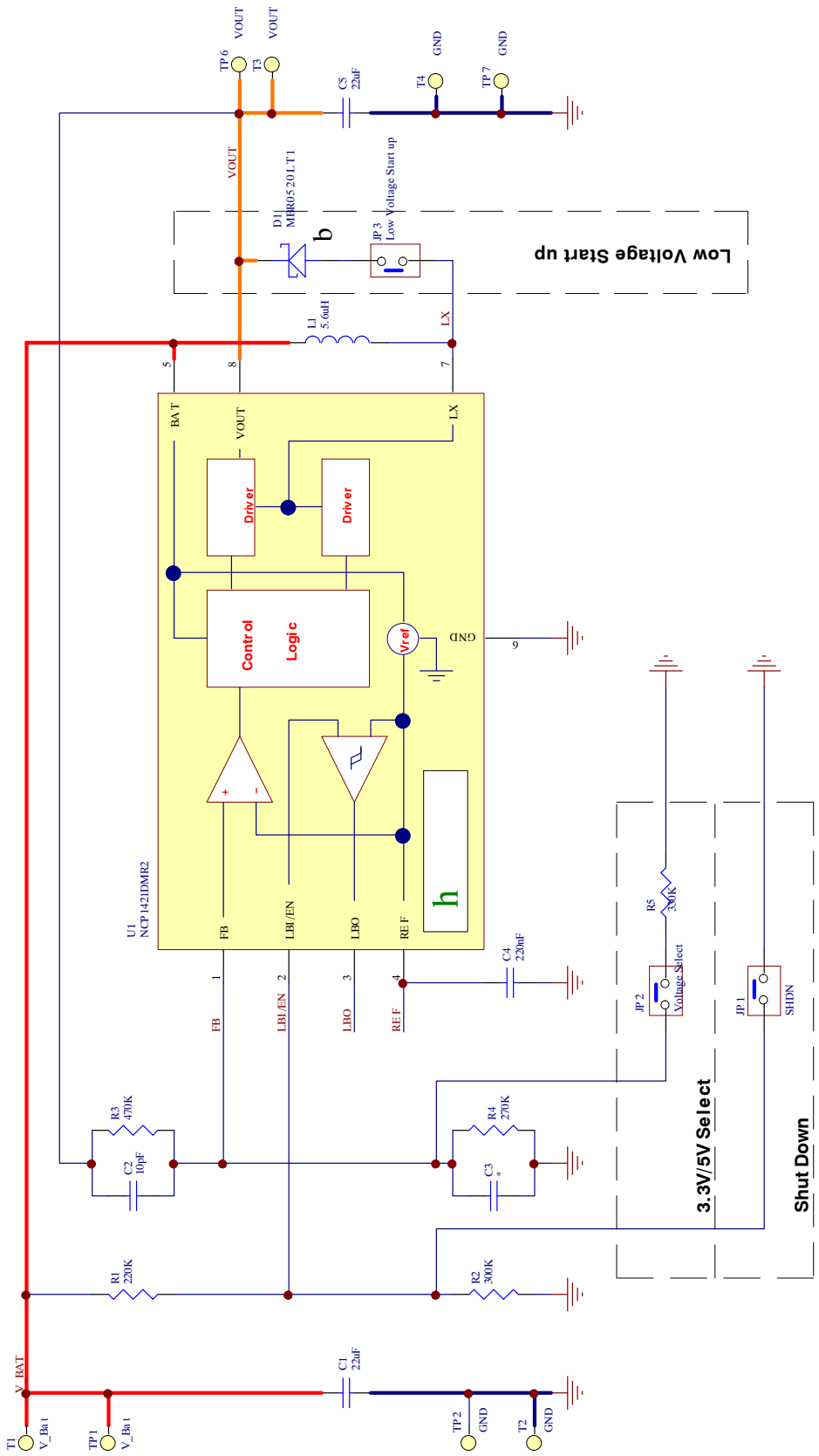

Figure 2. NCP1421 Evaluation Board Schematic

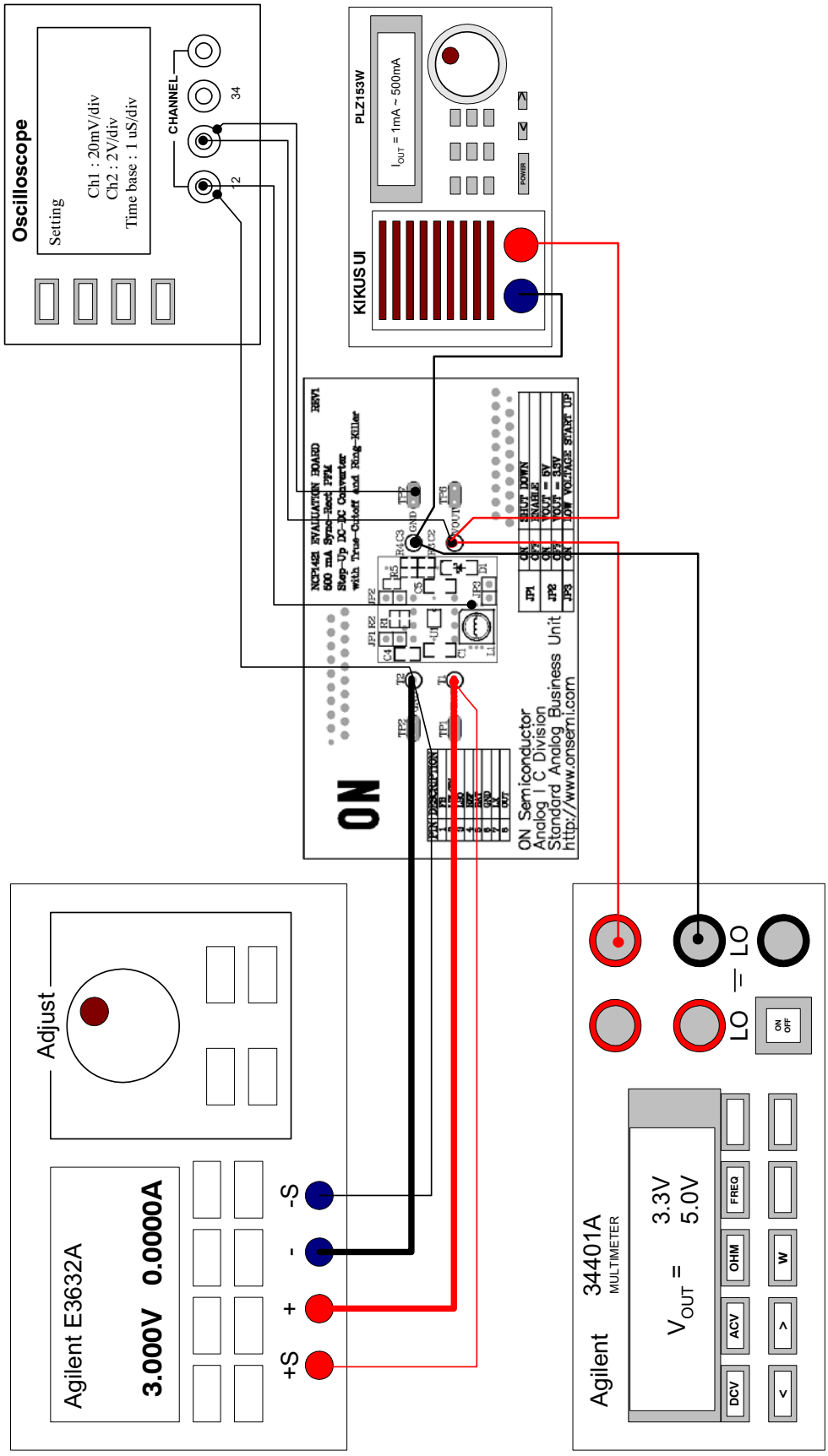

Figure 3. Test Procedure Schematic

Table 1. NCP1421 EVALUATION BOARD BILL OF MATERIALS

Desig-nator	Qty.	Descrip-tion	Value	Toler-ance	Footprint	Manufacturer	Manufacturer Part Number	Substi-tution Allowed	Lead Free
U1	1	Step-Up DC-DC Converter	600 mA	–	Micro8™	ON Semiconductor	NCP1421DMR2G	No	Yes
D1	1	Schottky Power Rectifier	500 mA, 20 V	–	SOD123	ON Semiconductor	MBR0520LT1G	No	Yes
C2	1	Ceramic Chip Capacitor	10 pF, 50 V	5%	0603	Panasonic	ECJ1VC1H100D	Yes	Yes
C3	–	Ceramic Chip Capacitor	–	–	–	–	–	Yes	Yes
C4	1	Ceramic Chip Capacitor	220 nF, 10 V	10%	0603	Panasonic	ECJ1VB1A224K	Yes	Yes
C1,C5	1	Ceramic Chip Capacitor	22 μF, 6.3 V	20%	1206	Panasonic	ECJ3YB0J226M	Yes	Yes
L1	1	SMT Power Inductor	5.6 μH	10%	5.8 x 5.8 x 2.5 mm	Sumida	CDC5D235R6	Yes	Yes
R1	1	Chip Resistor	220 kΩ, 1/10 W	1%	0603	Vishay	CRCW0603220KFKEA	Yes	Yes
R2	1	Chip Resistor	300 kΩ, 1/10 W	1%	0603	Vishay	CRCW0603300KFKEA	Yes	Yes
R3	1	Chip Resistor	470 kΩ, 1/10 W	1%	0603	Vishay	CRCW0603470KFKEA	Yes	Yes
R4	1	Chip Resistor	270 kΩ, 1/10 W	1%	0603	Vishay	CRCW0603270KFKEA	Yes	Yes
R5	1	Chip Resistor	330 kΩ, 1/10 W	1%	0603	Vishay	CRCW0603330KFKEA	Yes	Yes
T1,T2,T3, T4, JP1, JP2	6	2.54 mm Header	–	–	–	Mill-Max	350-10-112-00-006	Yes	Yes

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