NCP1422LEDGEVB

NCP1422 High Current LED Driver Evaluation Board User's Manual

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EVAL BOARD USER'S MANUAL

Description

The NCP1422 is a monolithic, micro-power, high-frequency, step-up switching converter IC designed for battery operated hand-held electronic products with up to 800 mA loading. It integrates a synchronous rectifier (Sync-Rect) to improve efficiency and to eliminate the external Schottky Diode. The NCP1422'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 DFN-10 package.

The NCP1422LED evaluation board uses the NCP1422 to drive a high power, white LED. A low voltage MOSFET switch circuit on the board can be pulsed to switch between a low and high LED current as would be found in a focus and flash application.

The circuit is configured to minimize power dissipation in the current sense resistor and the effects of lot-to-lot LED forward voltage (VF) variation on LED current. Application note AND8171/D describes how to design this circuit.

Features

- Capable of driving White LEDs up to 800 mA
- High Switching Frequency, up to 1.2 MHz
- True-Cutoff Function Reduces Device Shutdown Current to Typically 50 nA

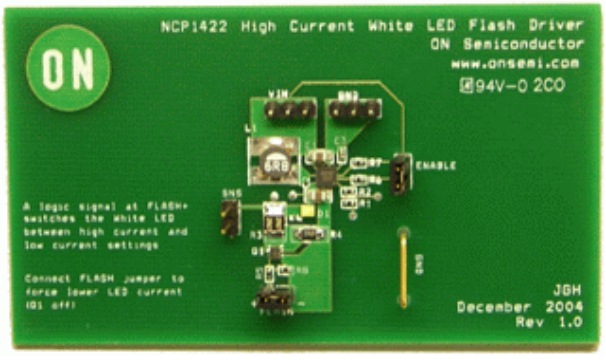

Figure 1. NCP1422LEDG Evaluation Board

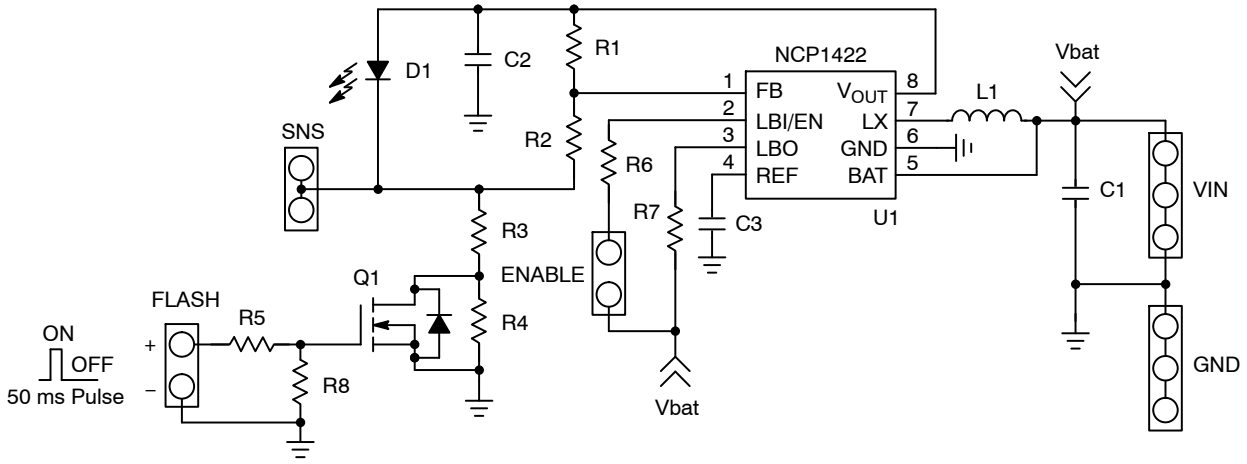

Figure 2. NCP1422LEDG Evaluation Board Schematic

Test Procedure

Required Equipment

1. Power Supply (Capable of > 5 V, 2 A with 100 mV Resolution)
2. Voltmeter
3. Function Generator Set to Parameters in PULSE Table (see Table 1)

Testing

1. Set DC Power Supply to 3.6 Vdc and Current Limit to 2 A
2. Disconnect Jumper from ENABLE
3. Connect Jumper to FLASH
4. Connect DC Power Supply to VIN and GND at Top of Board (Positive on VIN, Negative on GND)
5. LED Should be OFF
6. Connect Voltmeter between SNS and GND
7. Connect Jumper to ENABLE
8. LED Should be ON (CAUTION, DO NOT LOOK DIRECTLY AT THE LED. IT IS EXTREMELY BRIGHT)
9. Measure SNS voltage. It Should be between 700−900 mV
10. Disconnect Jumper from FLASH
11. Apply Function Generator Output Across FLASH+ and FLASH−
12. LED Should Alternate between Two Brightness Levels
13. Disconnect Function Generator from FLASH
14. Turn Off Power Supply and Disconnect. Reconnect Jumpers to ENABLE and FLASH

Table 1. PULSE (Note 1)

Waveform	Squarewave
Trequency	4.0 Hz
Amplitude	2.5 Vpp
Offset	1.25 Vdc
% Duty	20%

1. This produces a 5 V, 50 ms pulse train.

Table 2. NCP1422LEDG EVALUATION BOARD BILL OF MATERIALS

Designator	Qty.	Description	Value	Tolerance	Footprint	Manufacturer	Manufacturer Part Number	Substitution Allowed	RoHS Compliant
U1	1	NCP1422 Boost Converter	–	–	DFN−10 (3 × 3 mm)	ON Semiconductor	NCP1422MNR2G	No	Yes
D1	1	Lumiled High Power White LED	–	–	(1.64 × 2.04 × 0.9 mm)	Lumiled	LXCL−PWF1	No	Yes
Q1	1	Torch/Flash Switch	–	–	SC−88	ON Semiconductor	NTJS3157NT4G	No	Yes
L1	1	Inductor	6.8 μH, 800 mA	20%	(5.6 × 5.0 × 1.0 mm)	TDK	VLP5610T−6R8MR80	No	Yes
C1, C2	2	Ceramic Capacitor	22 μF, 6.3 V X5R	20%	0805	TDK	C2012X5R0J226M	Yes	Yes
C3	1	Ceramic Capacitor	470 nF, 6.3 V X5R	10%	0402	TDK	ECJ−0EB0J474K	Yes	Yes
R1	1	Resistor	665 kΩ	1%	0402	Vishay	CRCW0402665KFKED	Yes	Yes
R2, R6, R7	3	Resistor	100 kΩ	1%	0402	Vishay	CRCW0402100KFKED	Yes	Yes
R3	1	Resistor (1.33 Ω)*	2.67 Ω	1%	1206	Vishay	CRCW12062R67FKED	Yes	Yes
R4	1	Resistor	6.65 Ω	1%	1206	Vishay	CRCW12066R65FKED	Yes	Yes
R5	1	Resistor	1.0 kΩ	Any	0402	Vishay	CRCW04021K00FKED	Yes	Yes
R8	1	Resistor	10 kΩ	Any	0402	Vishay	CRCW040210K0FKED	Yes	Yes
GND	1	Ground Shunt	–	–	–	Harwin	D3082−05	Yes	Yes
VIN, GND	2	Post, 3 position, 0.1” spacing	–	–	–	Molex	90120−0160	Yes	Yes
FLASH, SNS, ENABLE	3	Post, 2 position, 0.1” spacing	–	–	–	Molex	90120−0161	Yes	Yes

*2−2.67 Ω resistors were used in parallel

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