User Guide

NX7102 3 A Step-Down Converter Evaluation Board

Contents

1 Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

1.1 Revision 1.0

Revision 1.0 was published in August 2017. It was the first publication of this document.

2 Product Overview

The NX7102 evaluation board is available from Microsemi for evaluating the functionality and performance of the NX7102 device, which is a 3 A step-down converter. On the evaluation board, the output is preset through an external resistive divider network for an output voltage of VOUT= 3.3 V. The component sizes used on the evaluation board facilitate easy probing; however, in practice, smaller component sizes are used to minimize the circuit's physical size.

2.1 Key Features

- Output preset at VOUT= 3.3 V
- 3 A synchronous step-down regulator
- Operational input supply voltage range: 4.75 V–18 V
- Integrated upper NMOS and lower NMOS
- 340 kHz switching frequency
- Input UVLO
- Enable
- Programmable external soft-start
- Cycle-by-cycle over-current protection
- Over-voltage protection
- Frequency fold-back under short condition

2.2 Applications

- Set-top box
- LCD TVs
- Notebook/netbook
- PoE-powered devices

2.3 Ordering Information

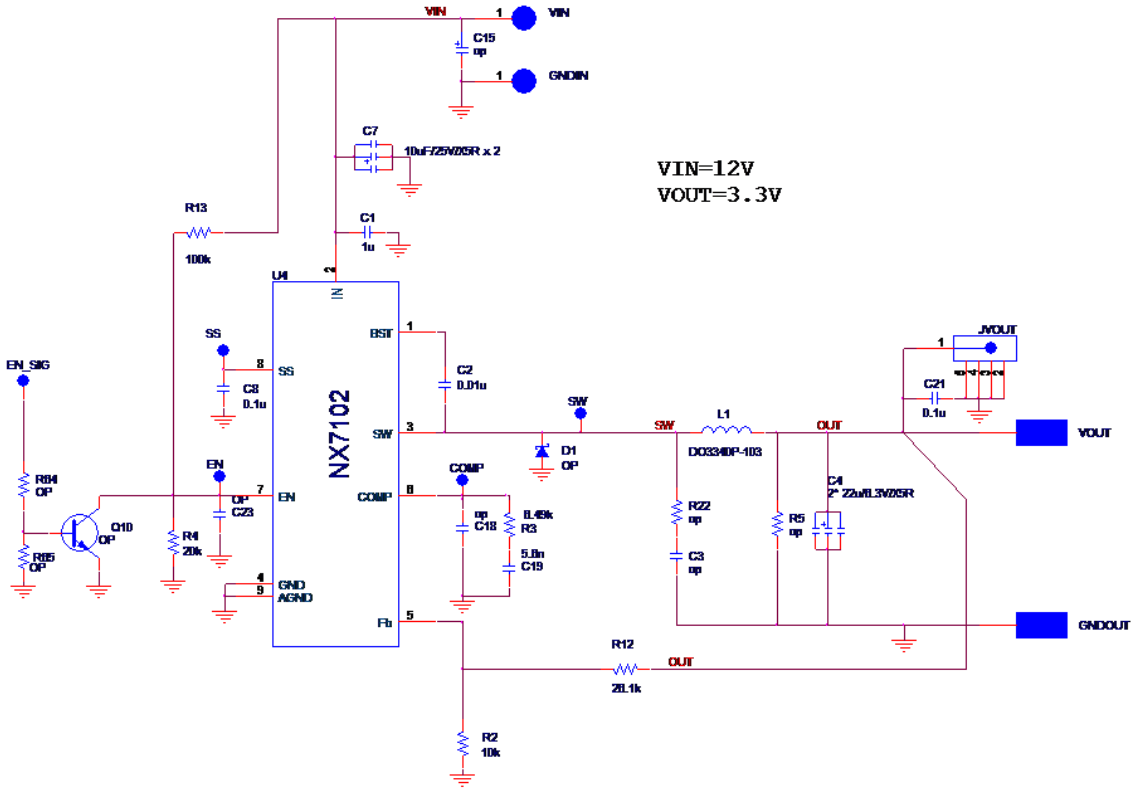
IC Part Number	Description
NX7102IDE	Plastic SOIC 8-pin with exposed pad.

Evaluation Board Part Number	Description
NX7102 EVAL KIT	Evaluation PCB for the NX7102IDE device.

2.4 Schematic and PCB Layout

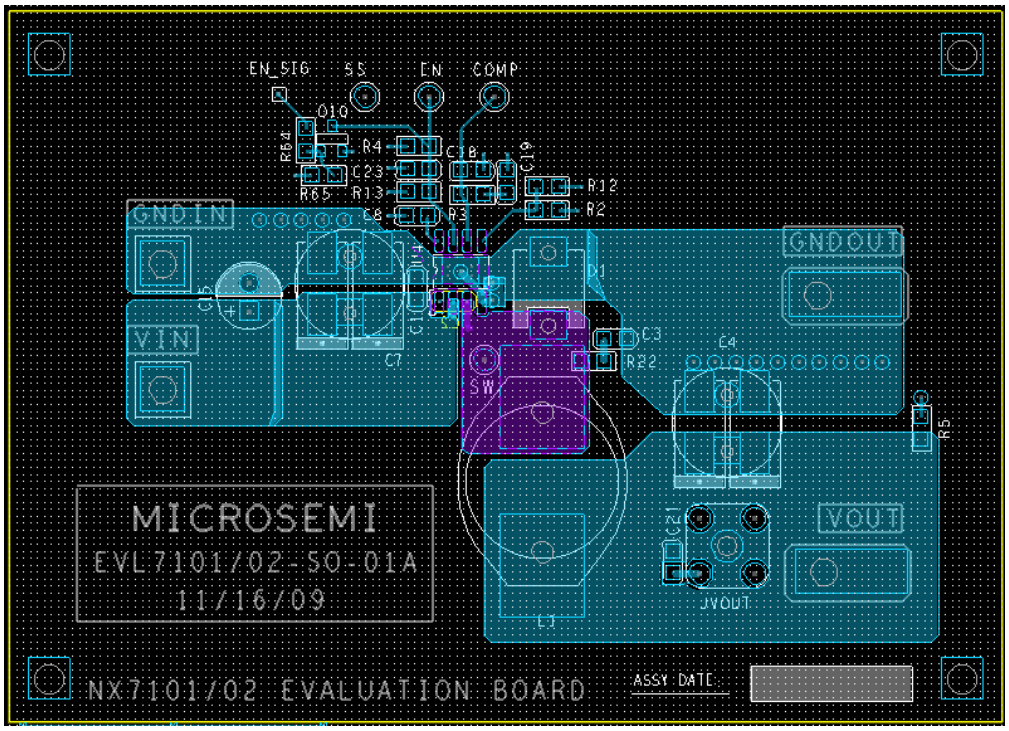
The following illustration shows a schematic of the NX7102 evaluation board.

Figure 1 • NX7102 Evaluation Board Schematic



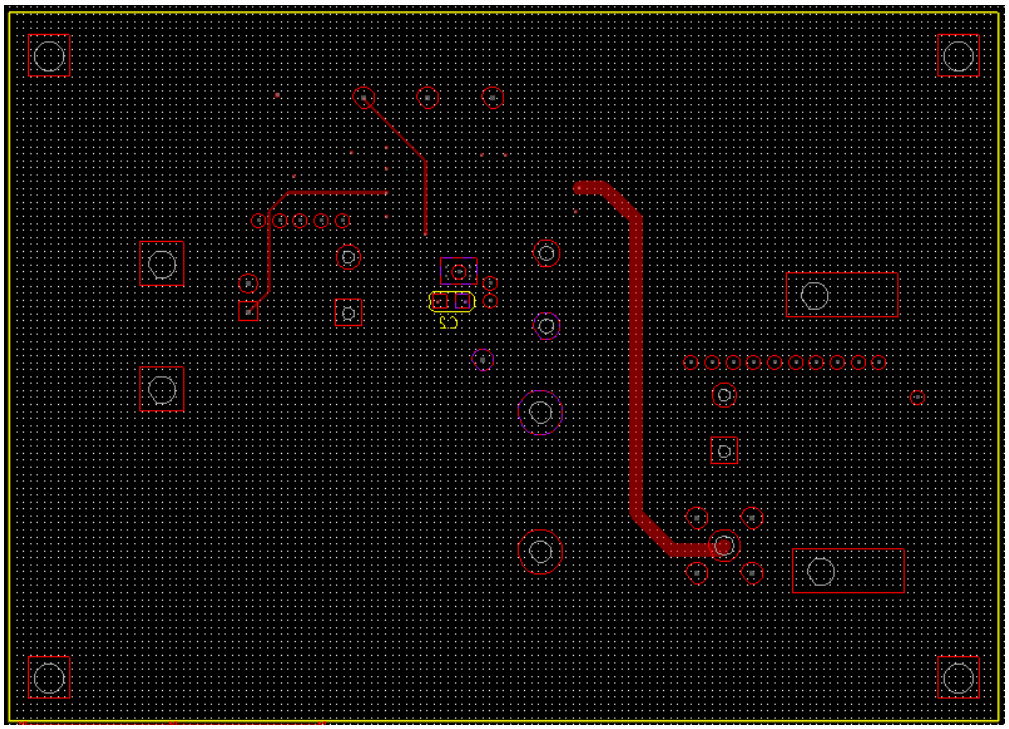
The following illustration shows the top view of the NX7102 evaluation board.

Figure 2 • Top View



The following illustration shows the bottom view of the NX7102 evaluation board.

Figure 3 • Bottom View



2.5 Connections

The following table lists the test point connections of the NX7102 evaluation board.

Table 1 • Test Point Assignment

Name	Description
VOUT	Output of converter. Set at 3.3 V.
GNDOUT	Ground reference pin for VOUT.
JVOUT	Oscilloscope probe holder for probing VOUT.
SW	Switch node for converter.
EN	Connector to device enable pin.
COMP	Connector to device COMP pin, or output of the error amplifier.
VIN	Device power input connector. Input voltage range from 4.75 V to 18 V.
GNDIN	Ground reference pin for VIN.
SS	Connector to device SS pin.
EN_SIG	Input to turn on/off the NPN transistor Q10 for inverting the polarity of the device enable logic. Not used.

2.6 Test Setup Considerations

For good load transient response and noise rejection, the 2 10 µF input bypass capacitor at VIN may not be sufficient if additional parasitic inductance is introduced by the cables through the bench power supply to the NX7102 EVB input. Use additional input bypassing to help alleviate the parasitic inductance. Recommended capacitance value depends on the setup; however, a 100 µF electrolytic should be adequate to account for typical power supply cable connection parasitics. In real application, the extra input bypassing is not needed.

2.7 Test Procedure

The following steps describe the test procedure for the NX7102 device.

1. Before connecting the power supply to VIN and GNDIN connector pins, set the power supply voltage to 12 V. Use a power supply capable of 0 V–18 V, 7 A or one that is capable of supplying at least approximately 20 W.
2. Turn on the power supply. Measure the voltage at VOUT. VOUT should be approximately 3.3 V.
3. Apply a DC load current of 3 A at VOUT. Use either an electronic load, or resistive loads with adequate power rating.
4. Use an oscilloscope to monitor the output voltages to make sure that the outputs do not oscillate.
5. Observe the SW node on the oscilloscope to make sure that the duty cycle is stable and approximately equal to the ratio of the output to input voltages.

2.8 Bill of Materials

The following tables list the bill of materials for the NX7102 device.

Table 2 • Bill of Materials

Line Item	Part Description	Manufacturer and Part Number	Case	Reference Designators	Qty
1	Microsemi IC—3 A step-down converter	Microsemi, NX7102IDE	8-pin SOIC with PAD	U4	1
2	Test point, through hole mount	Keystone, 5002	Through hole	SW, COMP, EN, SS	4
3	Circuit board test point probe connector	Tektronix, 131503100	Through hole	JVOUT	1
4	Terminal DBL turret. 109" L brass	Keystone, 1502-2	Staking flare	VOUT, GNDOUT, VIN, GNDIN	4
5	Ceramic capacitor, 10 µF, 25 V, ±20 %, X5R		1206	C7	2
6	Ceramic capacitor, 22 µF, 6.3 V, ±20 %, X5R		805	C4	2
7	Ceramic capacitor, 1 µF, ±10%, X7R		805	C1	1
8	Ceramic capacitor, 0.1 µF, ±10%, X7R		805	C8, C21	2
9	Ceramic capacitor, 5.6 nF, ±10%, X7R		805	C19	1
10	Inductor, 10 uH, 40 mΩ, 3.5 A	Coilcraft, DO3340P-103MLP	9.4 mm × 12.95 mm × 11.43 mm	L1	1
11	Resistor, 1%, 10K	Any	805	R2	1
12	Resistor, 1%, 6.49K	Any	805	R3	1
13	Resistor, 1%, 20K	Any	805	R4	1
14	Resistor, 1%, 26.1K	Any	805	R12	1
15	Resistor, 1%, 100K	Any	805	R13	1

Microsemi Corporate Headquarters
One Enterprise, Aliso Viejo,
CA 92656 USA
Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Fax: +1 (949) 215-4996
Email: sales.support@microsemi.com
www.microsemi.com

Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions; security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, California, and has approximately 4,800 employees globally. Learn more at www.microsemi.com.

MSCC-0102-UG-01002-1.0-0717