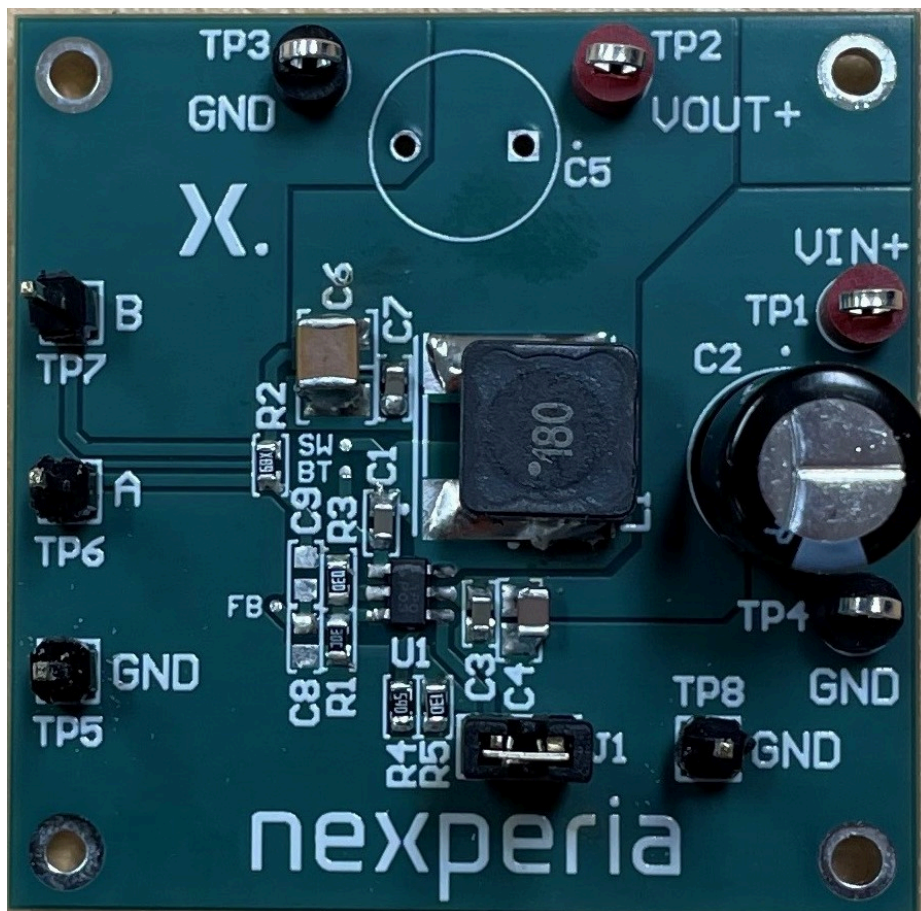




## NEX40400: 4.5 V to 40 V, 600 mA, synchronous step-down converter evaluation board



**Abstract:** The NEX40400EVM evaluation board is a reference design of a step down DC-DC switching voltage converter, assembled on a two-layer PCB.

**Keywords:** Synchronous step-down converter, input voltage, output current, switching frequency, Pulse Frequency Modulation, Forced PWM, evaluation board (EVB)

## 1. Introduction

The NEX40400EVM evaluation board allows to test functionality and measure performance of step-down DC-DC voltage regulator designed based on NEX40400 - integrated 4.5 V to 40 V, 600 mA synchronous step-down converter.

## 2. Features

- 4.5V to to 40V input voltage range
- 600mA continuous output current
- 5V output or 12V output
- 1.05 MHz switching frequency Forced PWM operation or
- 2.1 MHz with Pulse Frequency Modulation (PFM) at light load
- Frequency foldback for high conversion ratio and low drop-out application
- Internal compensation
- Short circuit protection with Hiccup mode
- TSOT23-6 package

**Table 1. Module Information**

PART NUMBER	Output Voltage	Operation Mode	Switching Frequency
NEX40400EVM-05	5 V	FPWM	1.05 MHz
NEX40400EVM-12	12 V	PFM	2.1 MHz



4. PCB layout

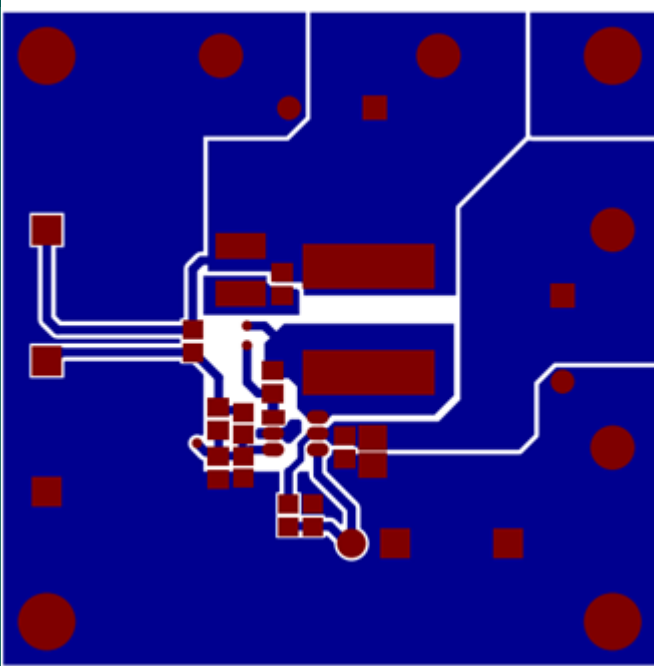


Fig. 2. Top copper layer

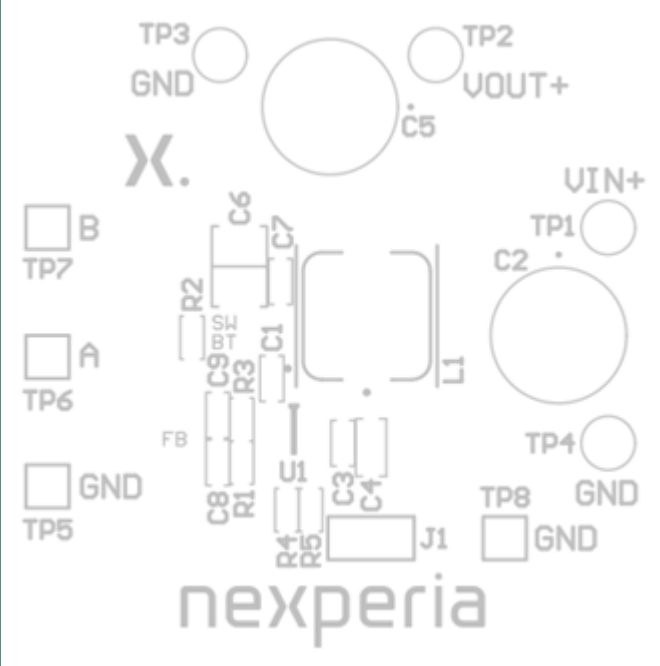


Fig. 3. Silkscreen top

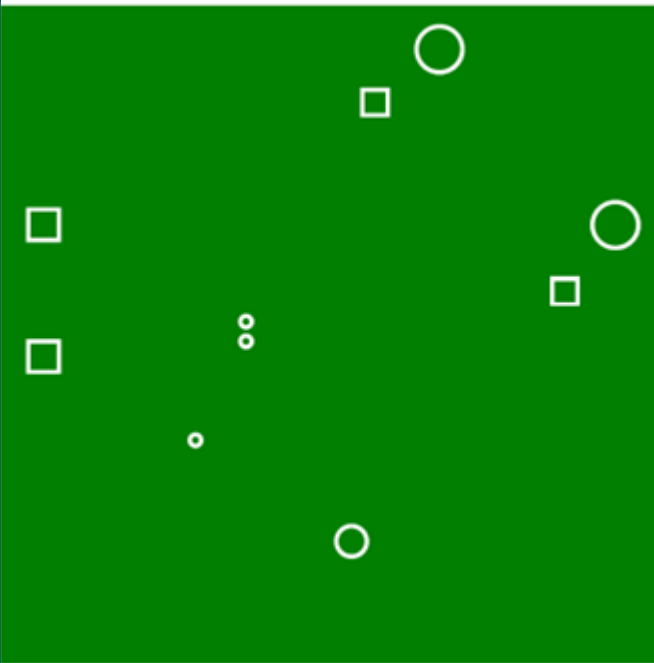


Fig. 4. Bottom copper layer



Fig. 5. Silkscreen Bottom

## 5. Bill of Material

Table 2. Bill of Material NEX40400EMV-05

Reference	Description	Quantity	Manufacturer name	Manufacturer part number
C1, C3, C7	CAP CER 0.1UF 100V X7R 0603	3	Murata	GRM188R72A104KA35D
C2	CAP ALUM 100UF 20% 50V RADIAL	1	Panasonic	EEUFR1H101B
C4	CAP CER 2.2UF 50V X7R 0805	1	Yageo	CC0805KKX7R9BB225
C6	CAP CER 22uF, X6S, 22%, 10%, 25V, 1210	1	Murata	GRM32EC81E226KE15L
J1	Header 2, Pitch 2.54 mm	1	Würth Electronics	61300211121
L1	SMT Power Inductor, 18uH, 1.5A, 91mOhm	1	Würth Electronics	744777118
R1	RES SMD 20K OHM 1% 1/10W 0603	1	Yageo	RT0603FRE0720KL
R2	RES SMD 49.9 OHM 1% 1/10W 0603	1	Yageo	RC0603FR-0749R9L
R3	RES SMD 105K OHM 1% 1/10W 0603	1	Yageo	RC0603FR-07105KL
R4	RES SMD 402K OHM 1% 1/10W 0603	1	Yageo	RC0603FR-07402KL
R5	RES SMD 133K OHM 1% 1/10W 0603	1	Yageo	RC0603FR-07133KL
TP1, TP2	PC TEST POINT COMPACT RED	2	Keystone Electronics	5005
TP3, TP4	PC TEST POINT COMPACT BLACK	2	Keystone Electronics	5006
TP5, TP6, TP7, TP8	Header, 1-Pin	4	Würth Electronics	61300111121
U1	40V 600mA Synchronous Step-down Converter 1.05 MHz , FPWM, TSOT23-6	1	Nexperia	NEX40400EDA
	CONN JUMPER SHORTING .100" GOLD	1	Sullins Connector Solutions	QPC02SXGN-RC

Table 3. Bill of Material difference for NEX40400EVM-12

Reference	Description	Quantity	Manufacturer name	Manufacturer part number
C6	CAP CER 10µF, X7R, 15%, 10%, 25V, 1206	1	Murata	GRM31CR71E106KA12L
R3	RES SMD 280KΩ 1% 1/10W 0603	1	Yageo	RC0603FR-07280KL
U1	40 V 600 mA synchronous Step-down Converter 2.1 MHz , PFM, TSOT23-6	1	Nexperia	NEX40400ADA

## 6. Quick start

- 6.1. Connect TP4 GND of the NEX40400EVM to the negative terminal of a power supply and connect TP1 VIN+ to the positive terminal of the power supply.
- 6.2. Apply 24V from the power supply than remove short from J1 to enable the converter.
- 6.3. Measure output voltage at the TP2 VOUT+ or TP7 B with respect to GND at TP1 or TP5.
- 6.4. Apply a load between TP2 VOUT+ and TP3 GND.
- 6.5. The converter SW pin and BOOT pin operation can be monitored with a scope by probing the SW and BT via correspondently next to resistor R2.
- 6.6. For measurements of the converter's control loop frequency response, use TP6 A, TP7 B and TP5 GND.
- 6.7. Short J1 to disable the converter.

## 7. Revision history

Table 4. Revision history

Revision number	Date	Description
UM90049 Rev.1	20241210	Initial version

## 8. Legal information

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