



NX2423 EVALUATION BOARD USER GUIDE

NX2423 Two Phase Synchronous PWM Controller

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Introduction to Product

The NX2423 is a two-phase PWM controller with integrated FET driver designed for low voltage high current application. The two phase synchronous buck converter offers ripple cancelation for both input and output. The NX2423 uses differential remote sensing using either current sense resistor or inductor DCR sensing to achieve accurate current matching between the two channels. Differential sensing eliminates the error caused by PCB board trace resistance that otherwise presents when using a single ended voltage sensing.

In addition, the NX2423 offers high drive current capability especially for keeping the synchronous MOSFET off during SW node transition, can provide regulated 5V to IC biasing and drivers via 5V bias regulator, allows the slave channel on and off via EN2_B pin while the main channel is working.

Other features: PGOOD output, programmable switching frequency and hiccup current limit circuitry.

Key Features

- ◆ Differential inductor DCR sensing eliminates the problem with layout parasitic
- ◆ 5V bias regulator available
- ◆ Low Impedance On board Drivers
- ◆ Hiccup current limit and IOOUT indication
- ◆ Power Good for power sequencing
- ◆ EN2_B pin allows the slave channel on and off while the master channel is working
- ◆ Programmable frequency
- ◆ Prebias start up
- ◆ OVP without negative spike at output
- ◆ Selectable between internal and external reference
- ◆ Internal Schottky diode from PVCC to BST
- ◆ Pb-free and RoHS compliant

Applications

- ◆ Graphic card High Current Vcore Supply
- ◆ High Current on board DC to DC converter applications

Part Specific Information

IC Part Number	Description
NX2423CMTR	MLPQ 4x4mm 24L

Evaluation Board Part Number	Description
NX2422-01F EVALUATION BOARD	Evaluation PCB for NX2423 in 1"X2"

Evaluation Board Schematic

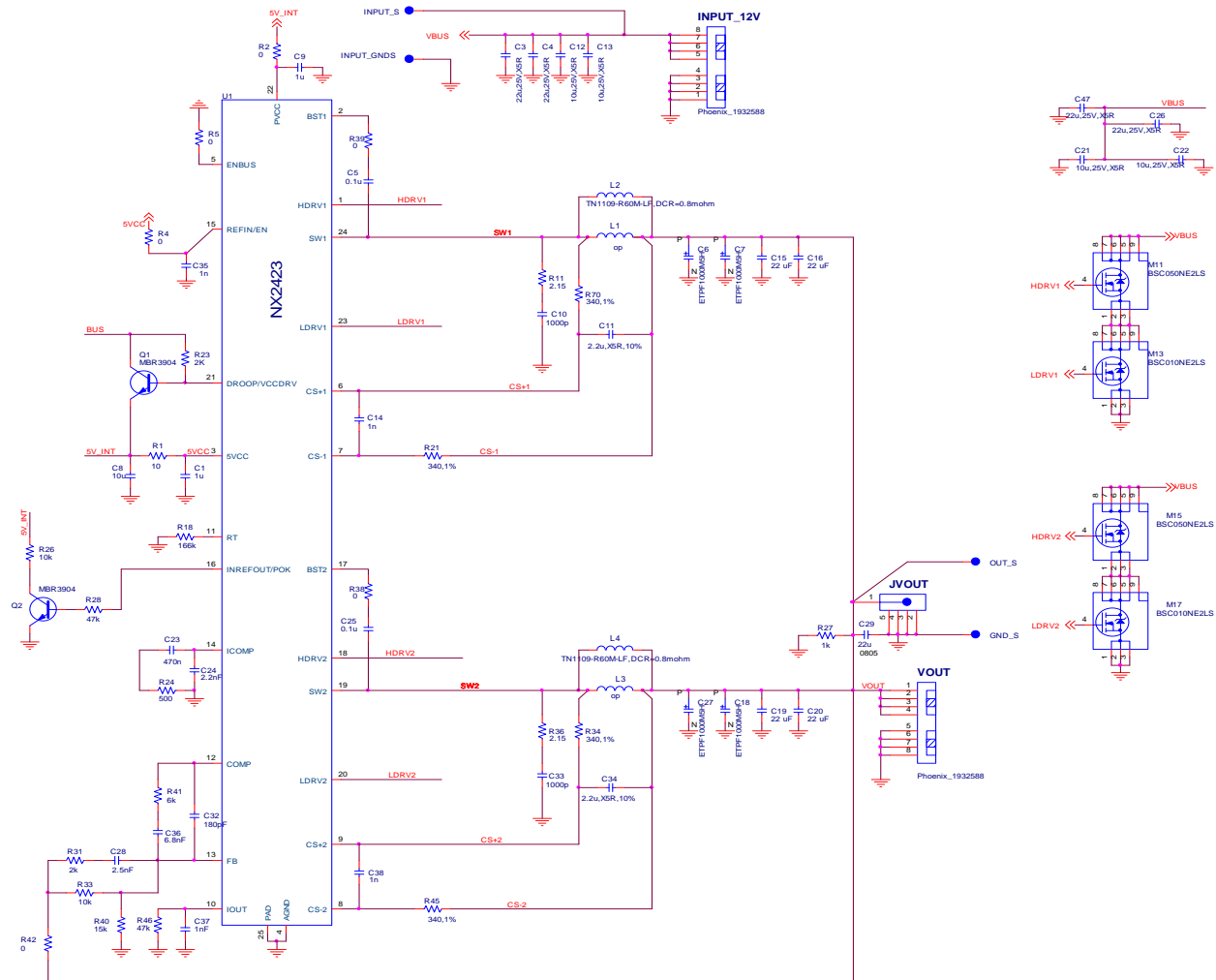


Figure 1 Schematic of Evaluation Board

Basic Connection Instructions

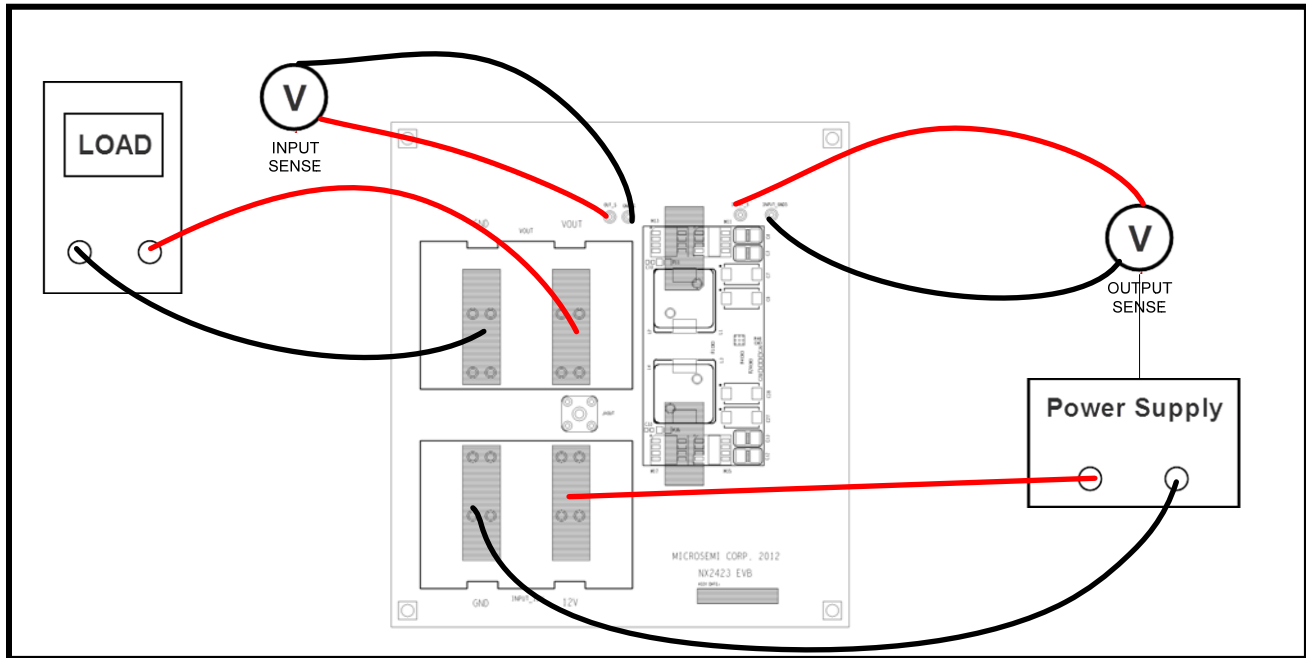


Figure 2 Power Supply and Load Connection

Recommended Operating Conditions

Description	Symbol	Min	Max	Unit
Input Voltage	V_{IN}	12	12	V
Output Current	I_{OUT}	0	40	A

PCB Layout of Evaluation Board

The NX2423 EVAL Board is a 4-layer 4.2" x 3.8" board. All NX2423 system components are routed in 1" x 2" area, the rest area is used as input and output voltage routing and terminals.



Figure 3 Top Layer

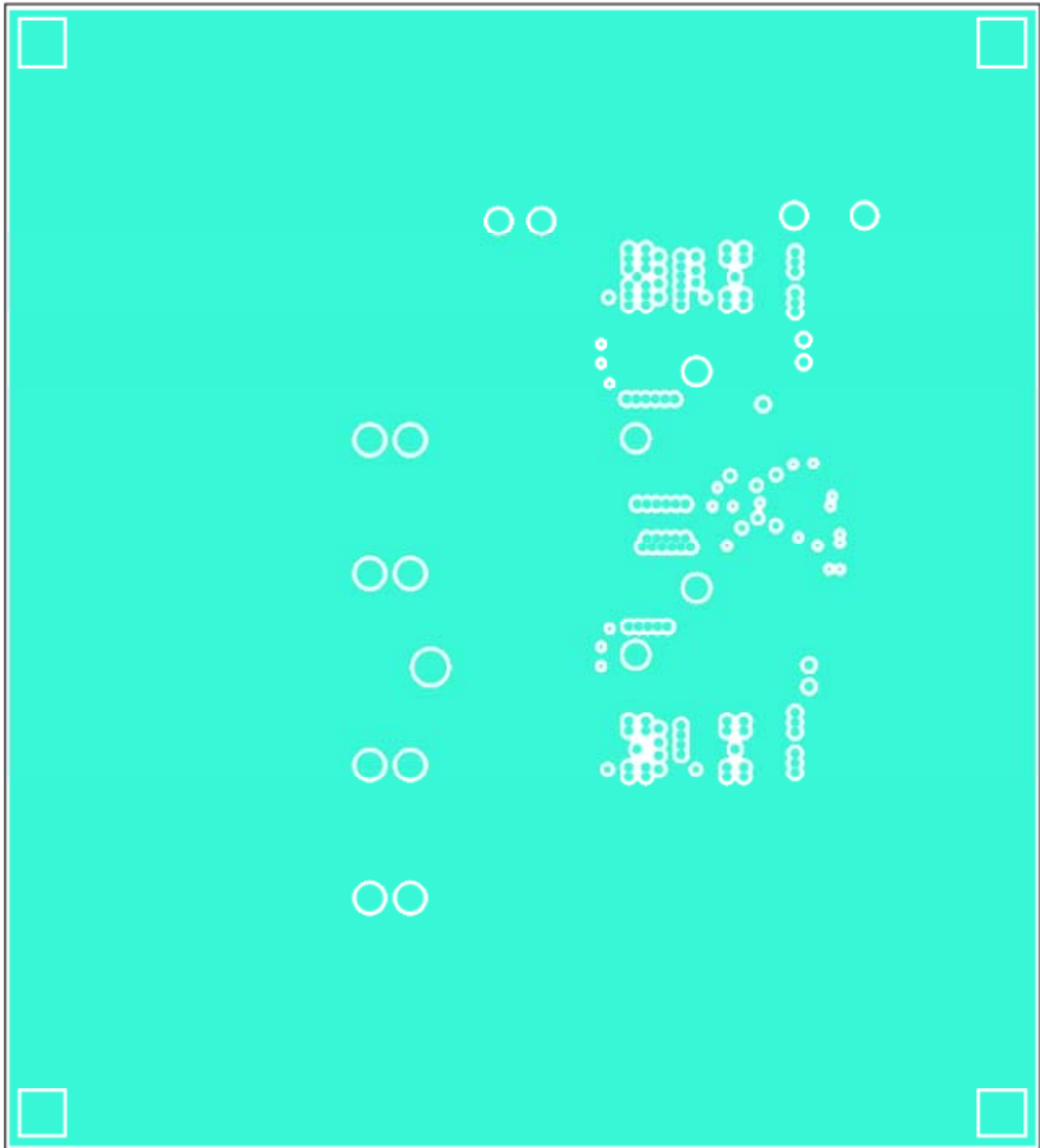


Figure 4 Inner Layer 1

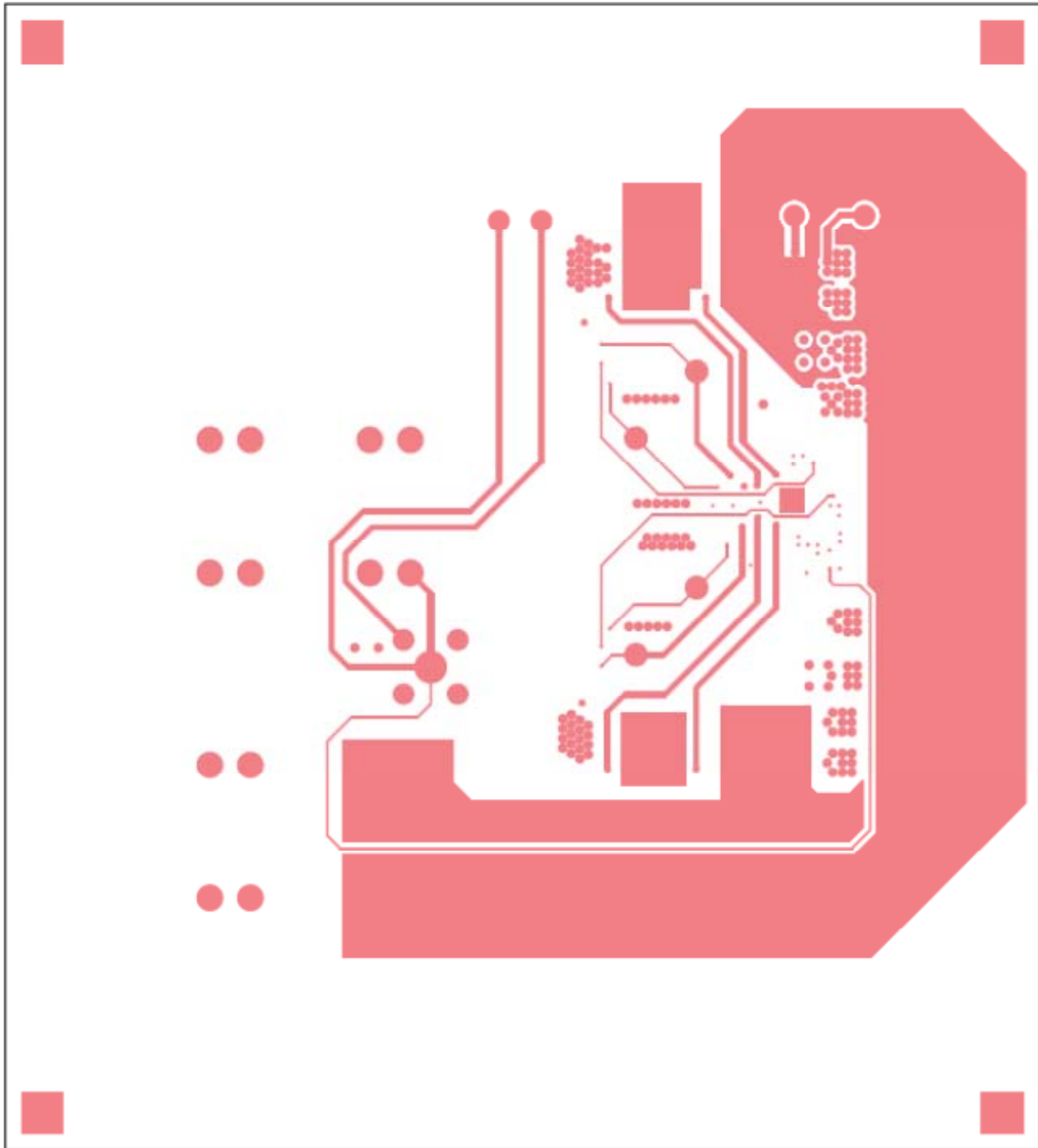


Figure 5 Inner Layer 2

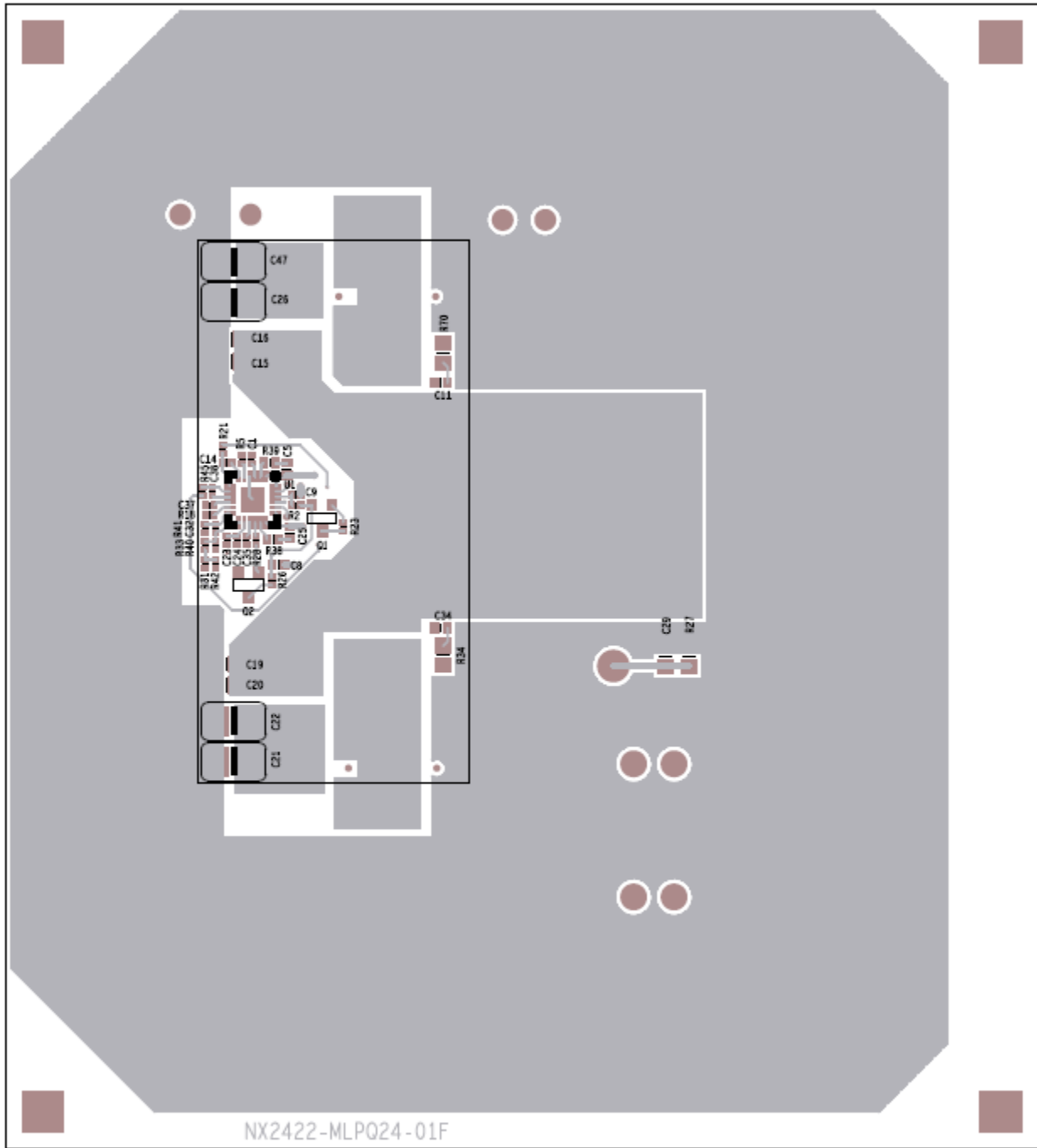


Figure 6 Bottom Layer

Bill of Material

MISCELLANEOUS COMPONENTS

Item	Part Description	Reference	Qty
1	Microsemi IC – NX2423	U1	1
2	Test Point	INPUT_S, OUT_S, INPUT_GNDS, GND_S	4
3	Terminal	12V, VOUT, GND, GND	4
4	MBR3904	Q1, Q2	2

CAPACITORS

Item	Part Description	Reference	Qty
5	1uF/6.3V/X7R	C1, C9	2
6	22uF/25V/X5R	C3, C4, C26, C47	4
7	0.1uF/X7R/6.3V	C5, C25	2
8	120pF/50V/X7R	C4	1
9	ETPF1000M5H	C6,C7,C18,C27	4
10	10uF/6.3V/X5R	C8	1
11	1000pF/6.3V/X7R	C10,C33	2
12	2.2uF/6.3V/X5R	C11,C34	2
13	10uF/25V/X5R	C12,C13,C21,C22	4
14	1n/6.3V/X7R	C14,C35,C38	3
15	22uF/6.3V/X5R	C15,C16,C19,C20, C29	5
16	470nF/6.3V/X5R	C23	1
17	2.2nF/6.3V/X5R	C24	1
18	2.5nF/6.3V/X5R	C28	1
19	180pF/50V/X5R	C32	1
20	6.8nF/6.3V/X5R	C36	1
21	1nF/6.3V/X5R	C37	1

RESISTORS

Item	Part Description	Reference	Qty
22	100Ohm	R1	1
23	00hm	R2,R4,R5,R38,R39,R42	6
24	2.15	R11,R36	2
25	166kOhm	R18	1
26	340,1%	R21,R34,R45,R70	4
27	2 kOhm	R23,R31	2
28	500	R24	1
29	10 kOhm,1%	R26,R33	2

30	1 kOhm	R27	1
31	47 kOhm	R28,R46	2
32	15 kOhm,1%	R40	1
33	6 kOhm	R41	1

INDUCTORS

Item	Part Description	Reference	Qty
34	0.6uH,TN1109-R60M-LF, ESR=0.8mohm	L2,L4	2

MOSFETS

Item	Part Description	Reference	Qty
35	M11, M15	BSC050NE2LS	2
36	M13, M17	BSC010NE2LS	2

Efficiency Table

Input (V)	Input current(A)	Output(V)	Output current(A)	Efficiency(%)
12.024	0.987	0.9906	10.068	84.04%
12.008	1.882	0.9901	20.13	88.19%
11.993	2.807	0.9895	30.05	88.33%
11.975	3.797	0.989	40.11	87.24%

Scope Shots

Dynamic load response

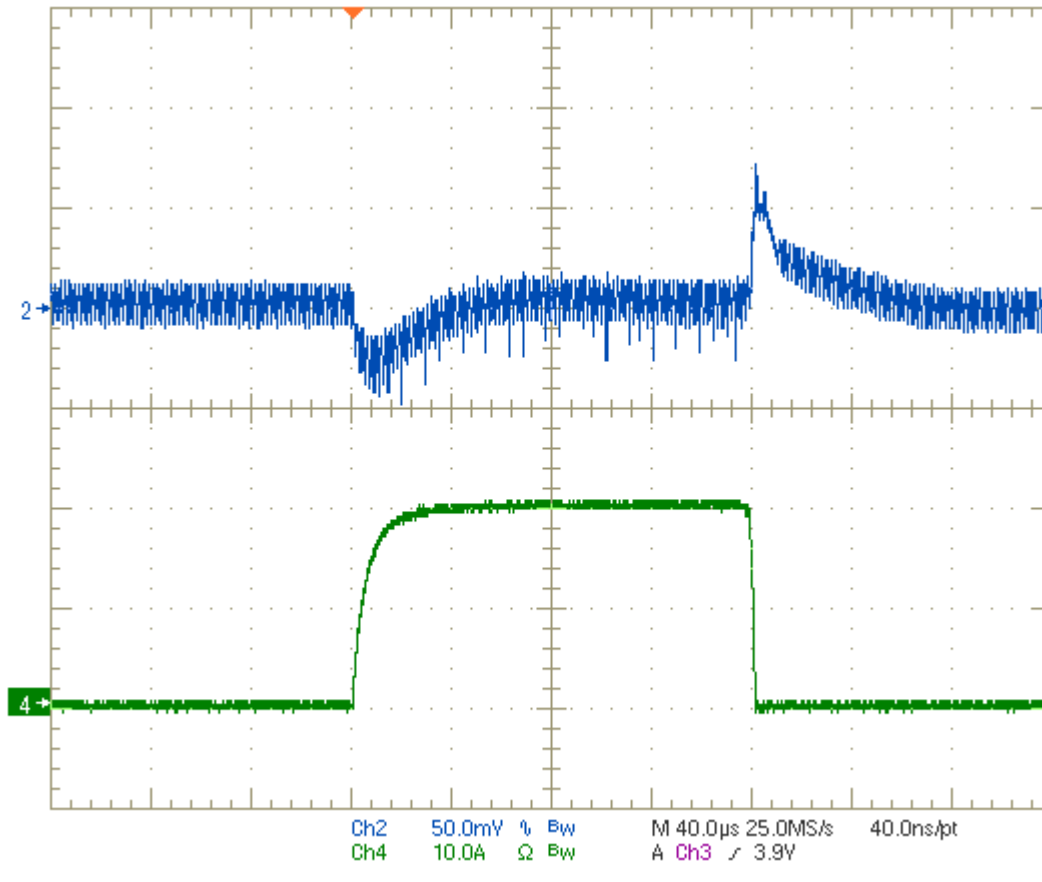


Figure 7 Dynamic Load Response

CH2: VOUT AC , CH4: Load Current

Power up with no load

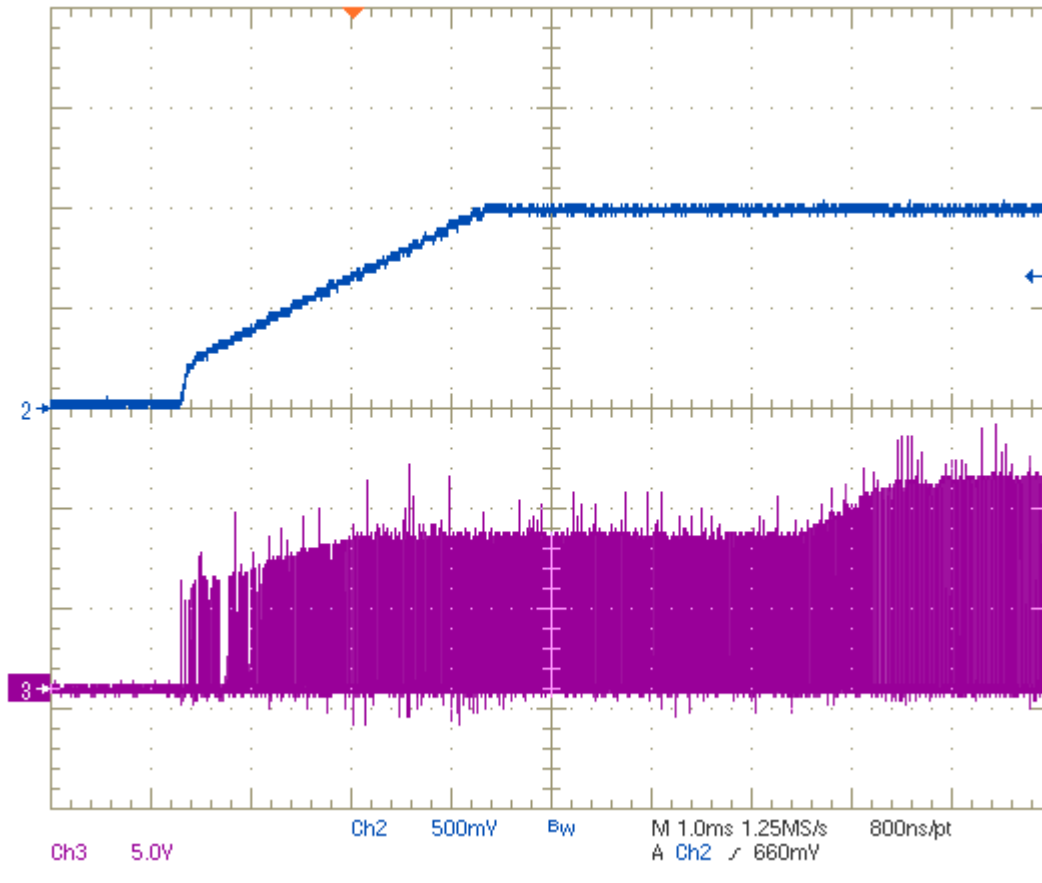


Figure 8 Power up with no load

CH2: VOUT, CH3, SW

Over current protection

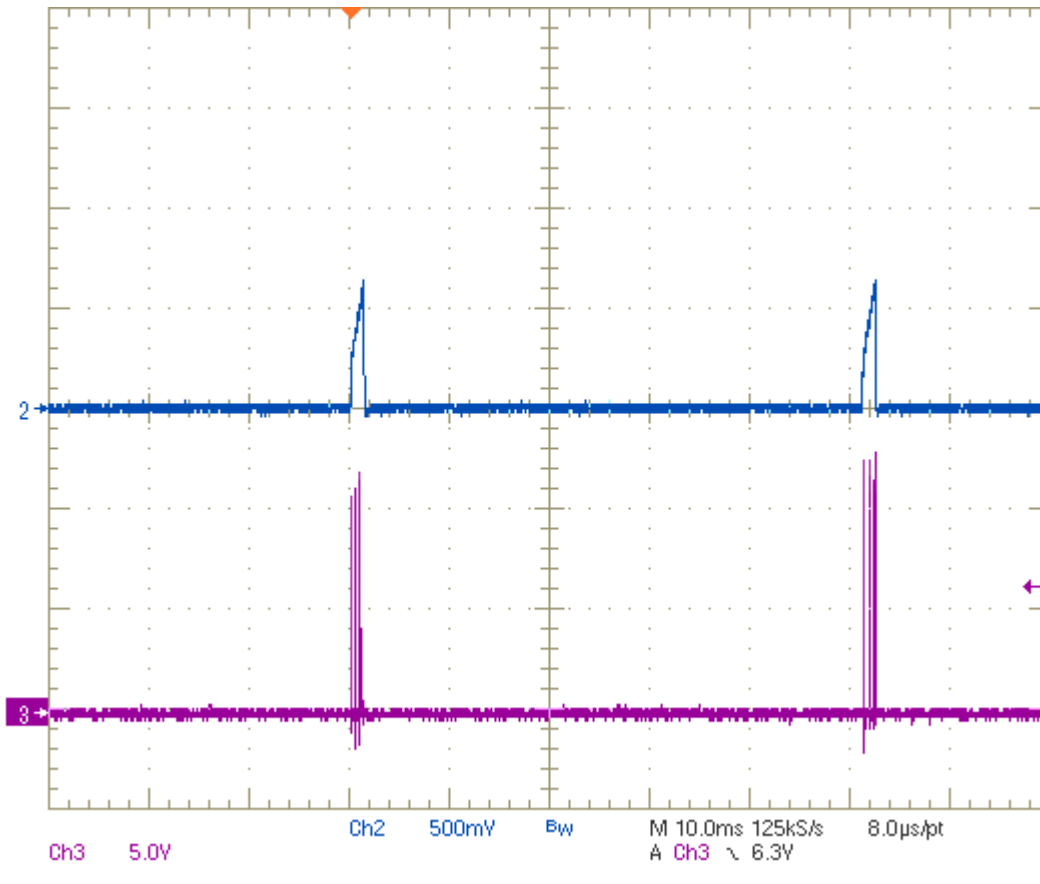


Figure 9 Power up with resistive load (EN tied to 5V VIN, PWM)

CH2: VOUT, CH3, SW