General Description

The MAX77231 evaluation kit (EV kit) is a fully assembled and tested PCB for evaluating the MAX77231 low-noise step-up DC-DC converter. It is optimized for boost applications requiring very low ripple/noise and small PCB space. The EV kit is set up to provide an 11.2V output from an input voltage ranging from 2.7V to 4.8V, and can deliver up to 10mA of current. The output ripple and noise are suppressed to $35\mu V_{RMS}$. Other output voltages up to 16.2V can be factory set. Jumpers are provided to help evaluate features of the MAX77231 IC.

Features

- Ultra-Small Solution Circuit Area (< 7mm²)
- $35\mu V_{RMS}$ Typical Output Ripple/Noise
- 2.7V to 4.8V Input Range
- 11.2V/10mA Output
- Output Factory-Trimmable from 11.2V to 16.2V
- 125µA No-Load Supply Current—Output On
- < 1µA Shutdown Supply Current
- True Shutdown Load Disconnect
- Selectable Active Discharge
- Proven PCB layout
- Fully Assembled and Tested

Ordering Information appears at end of data sheet.

Quick Start

Recommended Equipment

- MAX77231 EV kit
- 2.5V to 6V 100mA bench power supply (PS1)
- Two digital multimeters (DMM1, DMM2)
- 0–50mA electronic load or appropriate load resistors

Procedure

The EV kit is a fully assembled and tested surface mount circuit board. Follow the steps below to set up and verify the IC and board operation:

1) Verify that the jumpers on the EV kit are configured as shown in Table 1.

2) If using an electronic load, set it to 6mA and turn it off. Alternately, obtain a 2kΩ resistor (values from 1.8kΩ to 2.4kΩ are also acceptable).

3) Set the power supply to 3.6V and turn it off.

4) Connect the MAX77231 evaluation board, bench power supply and DMMs as shown in Figure 1.

5) Turn on the power supply.

6) Verify that voltage read by DMM1 is 3.6V.

7) Verify that voltage read by DMM2 is 11.2V.

8) Sweep the power supply down to 2.7V.

9) Verify that voltage read by DMM2 is 11.2V.

10) Sweep the power supply up to 4.8V.

11) Verify that voltage read by DMM2 is 11.2V.

12) Disconnect RL (or electronic load).

13) Verify that voltage read by DMM2 is 11.2V.

Table 1. Default Jumper Settings

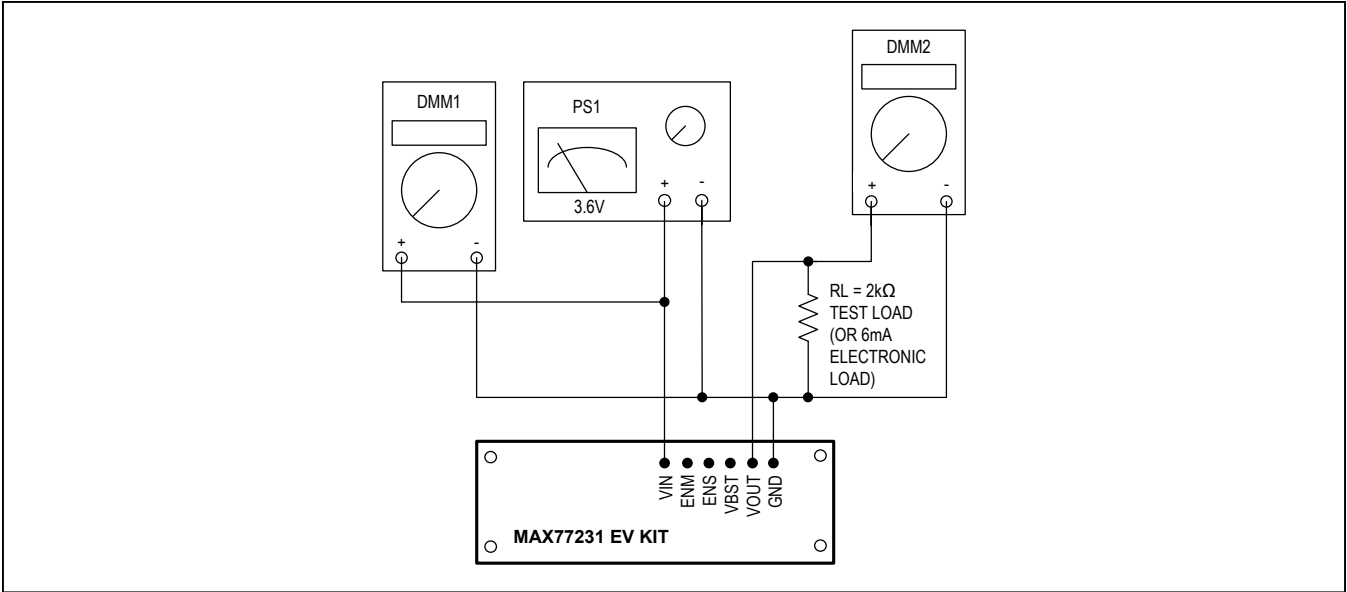| JUMPER	DEFAULT SHUNT POSITION	MODE
JU1	1-2	Active Discharge Off
JU2	1-2	Power On

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Figure 1. Quick-Start Connection Diagram

Detailed Description

The MAX77231 EV kit evaluates the MAX77231 low-noise boost DC-DC converter IC. The IC utilizes a high-frequency PFM boost followed by a low-noise pMOS linear LDO regulator that reduces output noise and ripple to $35\mu V_{RMS}$ in a 1MHz BW at V_{OUT}.

The step-up converter output is 11.7V at V_{BST}, and 11.2V at V_{OUT} from an input voltage range from 2.7V to 4.8V. Other output voltages up to 16.2V are available after replacing U1. Contact the factory for other ICs.

Enable/Active Discharge

The MAX77231 can be disabled with/without active discharge. See Table 2 for ENM and ENS control logic for active discharge.

Overload and Short Circuit Protection

The MAX77231 is fully protected against output short circuits. In the case of a short circuit, off time is lengthened to prevent inductor current from climbing. The device will source current into the short indefinitely, without damage, until the short is removed.

Note, however, that only OUT (and not BST) is overload protected. A short at V_{BST} to ground may cause inductor and LX current to rise above guaranteed operating levels.

Table 2. MAX77231 Enable Truth Table

JU1		JU2		POWER STATE	ACTIVE DISCHARGE
JUMPER POSITION	ENM	JUMPER POSITION	ENS		
2-3	0	X	X	Power Down	ON
1-2	1	2-3	0	Power Down	OFF
1-2	1	1-2	1	Active	OFF

Component Suppliers

SUPPLIER	WEBSITE
Taiyo Yuden	www.t-yuden.com
Cyntec	www.cyntec.com

Note: *Indicate that you are ordering the MAX77231 EV kit when contacting these suppliers.*

Component List, PCB Layout, and Schematic

See the following links for component information, PCB layout diagrams, and schematics.

- **MAX77231 EV BOM**
- **MAX77231 EV PCB Layout**
- **MAX77231 EV Schematic**
- **MAX77231 EV Minimal Component Schematic**

Ordering Information

PART	TYPE
MAX77231EVKIT#	EV Kit

#Denotes RoHS compliant.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	1/16	Initial release	—

TITLE: Bill of Materials

DATE: 12/11/2015

DESIGN: max77231_evkit_b

						NOTE: DNI--> DO NOT INSTALL ; DNP--> DO NOT PROCURE	
ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
1	C1	-	1	LMK107BJ225KA	TAIYO YUDEN	2.2UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 2.2UF; 10V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R	
2	C2, C3	-	2	C1608X5R1E225K; TMK107ABJ225KA-T; TMK107BJ225KA	TDK/TAIYO YUDEN	2.2UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 2.2UF; 25V; TOL=10%; MODEL=; TG=-55 DEGC TO +85 DEGC; TC=X5R	
3	ENM, ENS, VBST	-	3	5000	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
4	GND, VIN, PGND, VOUT	-	4	9020 BUSS	WEICO WIRE	MAXIMPAD	EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG	
5	JU1, JU2	-	2	PEC03SAAN	SULLINS	PEC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS	
6	L1	-	1	PSB12101T-1R0MSD	CYNTEC	1UH	INDUCTOR; SMT; MAGNETICALLY SHIELDED; 1UH; TOL=+/- 20%; 1.12A	
7	U1	-	1	MAX77231EZL+	MAXIM	MAX77231EZL+	IC; VREG; ULTRA LOW NOISE BOOST REGULATOR; WLP9	
8	H1	DNP	0	PEC06SAAN	SULLINS ELECTRONICS CORP.	PEC06SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 6PINS	
9	PCB	-	1	MAX77231	MAXIM	PCB	PCB Board:MAX77231 EVALUATION KIT	
TOTAL			15					

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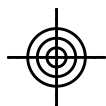
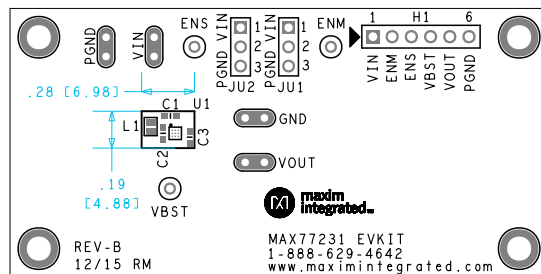HARDWARE NAME:MAX77231_EVKIT_B

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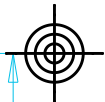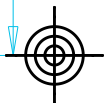
ENGINEER: DESIGNER:

DATE: 12/05/2015   ODB++/GERBER: SILK_TOP

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2.80 [71.12]

1.40 [35.56]

.28 [6.98]

PGND   VIN   ENS   PGND VIN   PGND VIN   ENM   H1
                       1   1   1   6
                       2   2
                       3   3
                      JU2   JU1

VIN ENM ENS VBST VOUT PGND

C1 U1
L1   C3   GND
C2

.19
[4.88]   VBST   VOUT

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REV-B   MAX77231 EVKIT
12/15 RM   1-888-629-4642
               www.maximintegrated.com

1"

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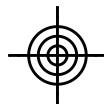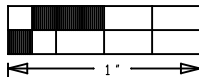
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HARDWARE NUMBER:

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DATE: 12/05/2015   ODB++/GERBER: TOP

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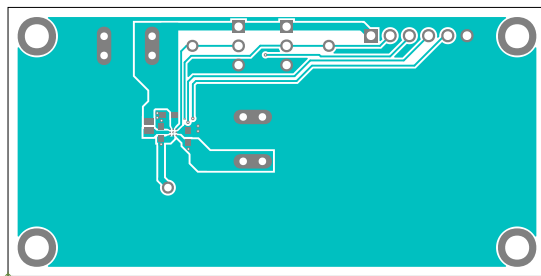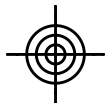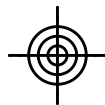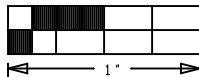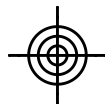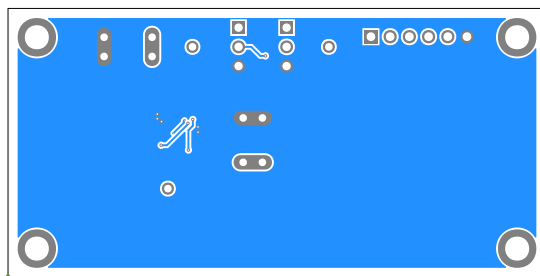
HARDWARE NAME:MAX77231_EVKIT_B

HARDWARE NUMBER:

ENGINEER: DESIGNER:

DATE: 12/05/2015   ODB++/GERBER: BOTTOM

1"

3/3

DNI
H1

VIN

1 2 3 4 5 6

VIN   VIN

JU2   JU1
1   1

2   2

3   3

U1
MAX77231EZL+

VIN
(2.7V TO 4.8V)   VIN   ENM   B2 ENM   BSTP C1   C2   VBST
                                                              2.2UF
                        ENS   A3 ENS   BST   C2   VBST
                                   A2 IN   VOUT
                    L1   B1 LX   OUT   C3   VOUT
PGND   1 1UH 2   C3   (11.2V/10mA)
            C1   A1 PGND   GND   B3 2.2UF
            2.2UF   GND

                                                        GND   PGND

U1
MAX77231EZL+

B2	ENM	BSTP	C1
A3	ENS	BST	C2
A2	IN		
B1	LX	OUT	C3
A1	PGND	GND	B3

VIN

PGND

C1
2.2UF

L1
1UH
1   2

C2
2.2UF

C3
2.2UF

VOUT

GND

GND   PGND
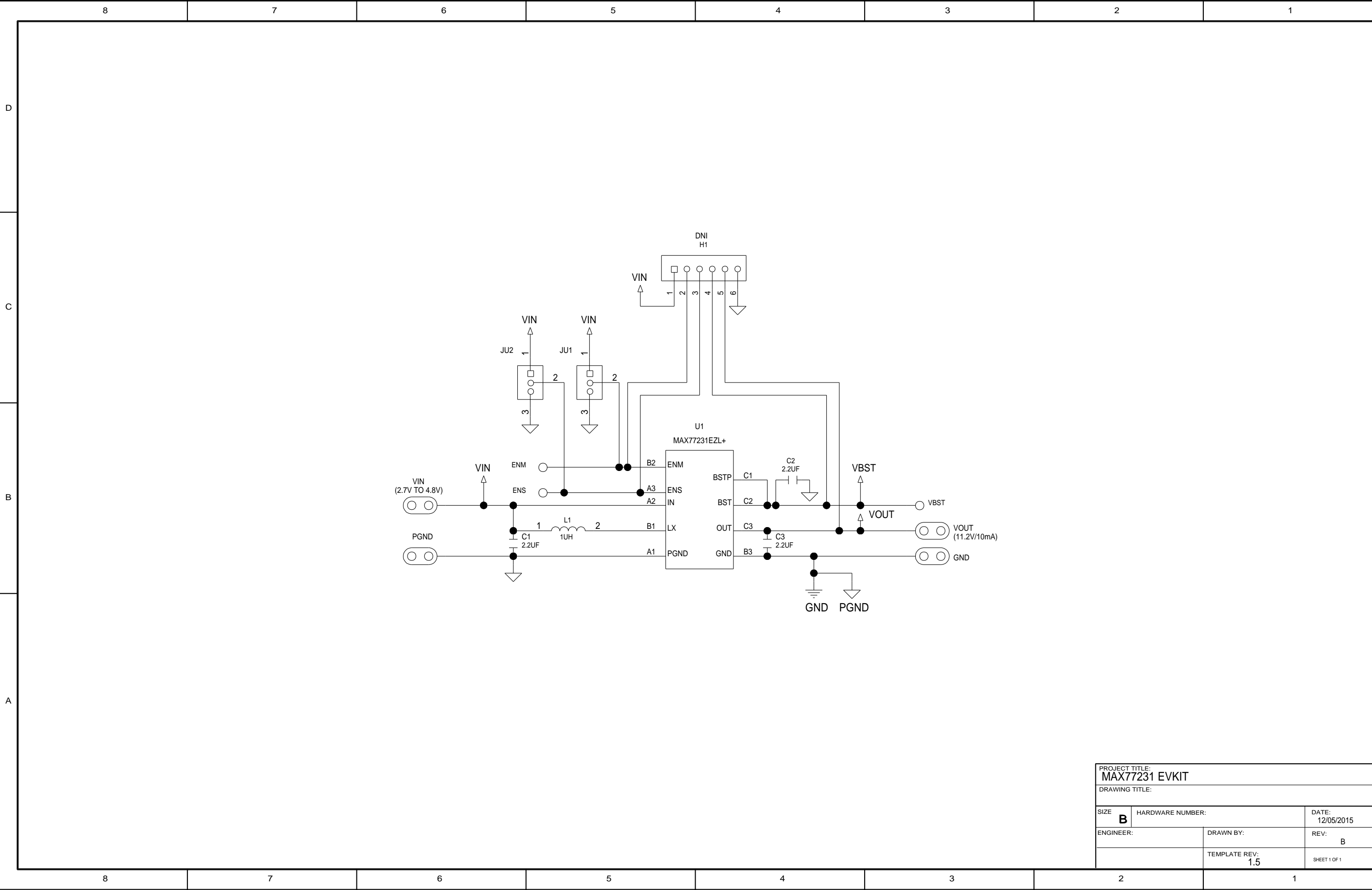
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