



Enpirion[®] Power Evaluation Board

EN5365QI 6A Buck PowerSoC With VID Output Voltage Select Evaluation Board User Guide

Description

This is the EN5365QI User Guide. The EN5365QI features an integrated inductor, power MOSFETS, controller, a bulk of the compensation network, and protection circuitry against system faults. The EN5365QI features a 3 pin VID output voltage selector. The 3 pin VID allows the user to choose from one of

seven predefined output voltage settings. This level of integration delivers a substantial reduction in footprint and parts count over competing solutions. The evaluation board is optimized for engineering ease of testing through programming options, clip leads, test points etc.

Evaluation Board Overview

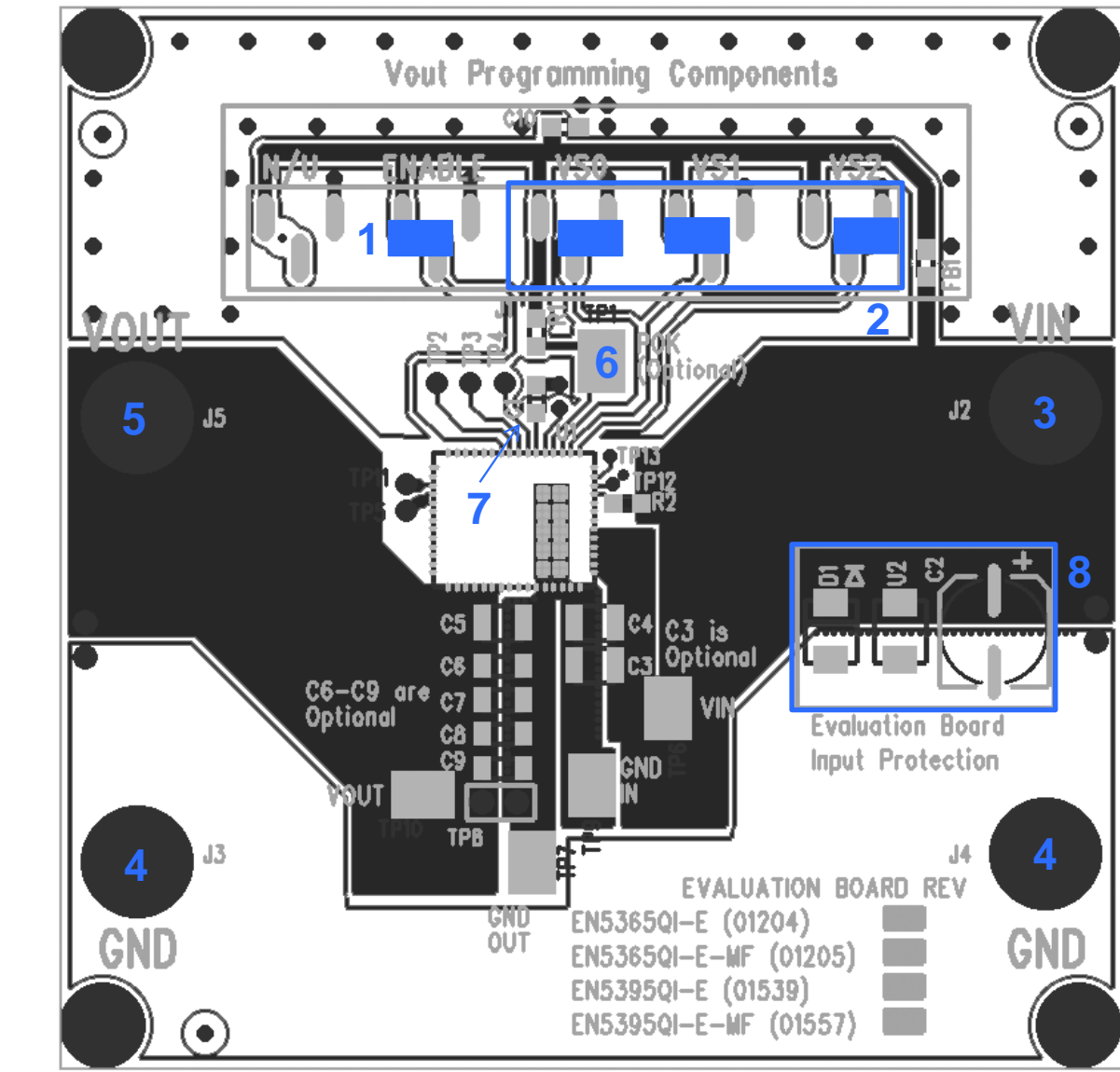


Figure 1. EN5365QI Evaluation Board Illustration (Follow instructions on page 2)

Instructions

The numbers in the instructions below correspond to the numbers in Figure 1. By following the number sequence below, the device can be turned on by step 5.

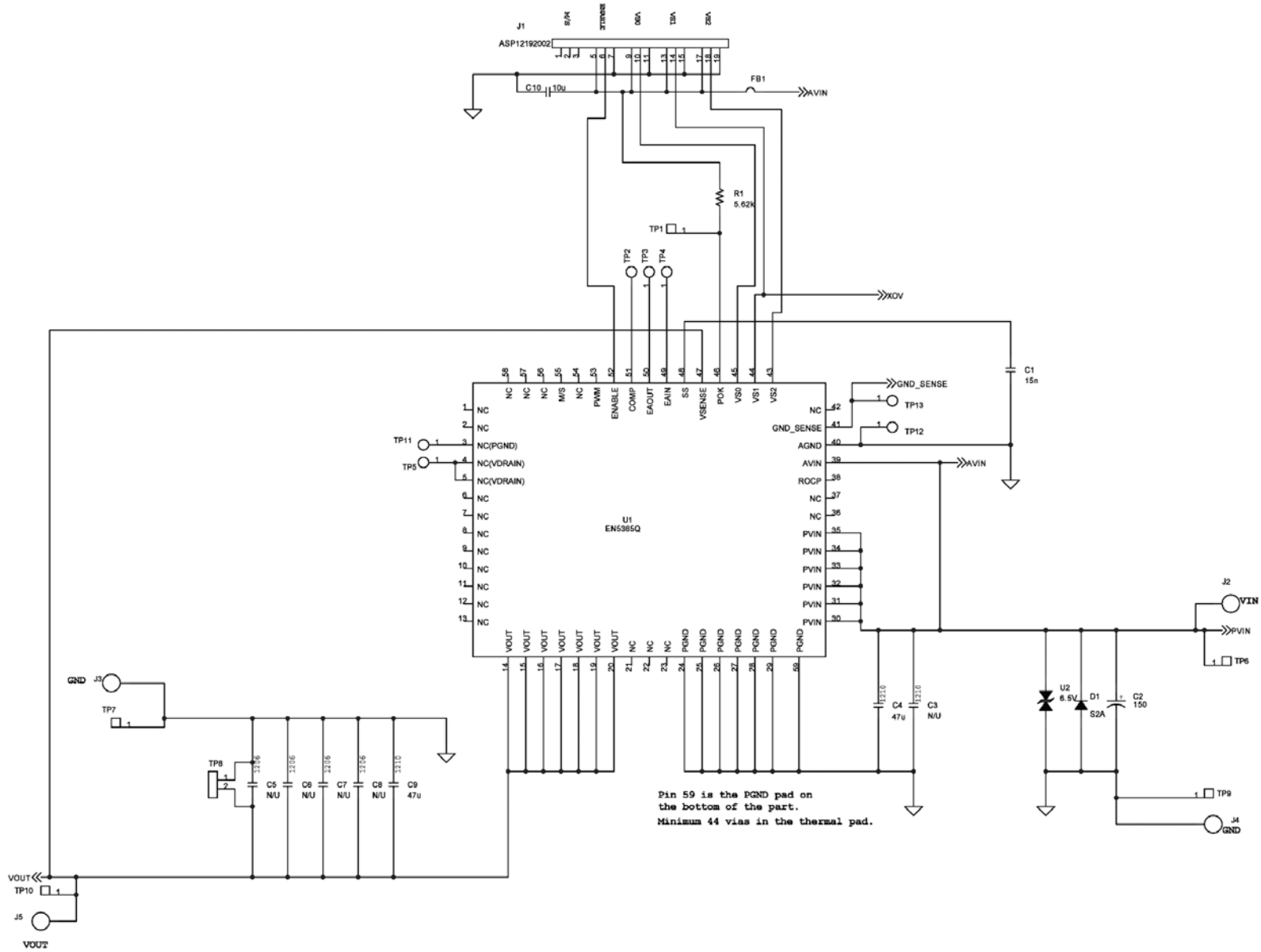
- 1) **ENABLE** – The jumper on the left two pins enables the device by connecting ENABLE to AVIN. Remove this jumper and then connect it to the right two pins to connect ENABLE to ground and disable the device. Leave the pins open and use an external signal to the center pin to toggle the ENABLE on (>1.8V) and off (<0.8V).
- 2) **Output Voltage Settings (VSx)** - As shown, output voltage is set to 1.8V. The left pin of VS2, VS1, VS0 pulls VS2, VS1, VS0 pin to AVIN (high = 1), respectively. The right pin pulls the VS2, VS1, VS0 pin to ground (low = 0). DO NOT change the output voltage when the device is in regulation; otherwise, damage may occur. Follow the Table below for other output voltage settings.

VS2	VS1	VS0	VOUT
0	0	0	3.3V
0	0	1	2.5V
0	1	0	1.8V
0	1	1	1.5V
1	0	0	1.25V
1	0	1	1.2V
1	1	0	0.8V
1	1	1	Reserved

- 3) **PVIN (J2)** - Connect 2.5V to 5.5V supply on J2 (VIN). Do not turn on until everything is connected correctly.
- 4) **Ground (J3 and J4)** - Connect the input supply ground to J4 and the output ground to J3.
- 5) **VOUT (J5)** - Connect the load to J5. If the instructions were followed up to this point, the device may be powered to turn on.
- 6) **POK** - This is the open drain POK flag, which is pulled up to AVIN by R1. When VOUT is between 90% and 120% of the nominal regulation output voltage, POK will be pulled high to AVIN; otherwise, the POK pin is pulled low.
- 7) **Soft Start Capacitor (C1)** – The soft start capacitor is by defaulted 15nF and can be adjusted to increase or decrease the soft-start time. See the equation below.

$$T_{ss} [s] = C_{ss} [F] * 75$$
 The soft-start time (T_{ss}) is in seconds and the soft-start capacitance (C_{ss}) is in Farads. See Datasheet for details.
- 8) **Input Protection** – The EN5365QI evaluation board comes with some input polarity protection.

Evaluation Board Schematic



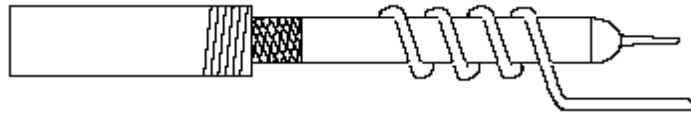
Bill of Materials

Designator	Qty	Description
C1	1	15000PF 10% 50V SMD 0805 X7R CERAMIC CHIP CAPACITOR
C2	1	CAPACITOR, SMT ELECTROLYTIC, 150UF, 20%, 10V
U2	1	TRANSIENT VOLTAGE SUPPRESSOR, 6.5V, BIDIRECTIONAL, SMT
D1	1	S2A DIODE
R1	1	RES 5.62K OHM 1/8W 1% 0805 SMD
R2	1	COMPONENT NOT USED ** DO NOT INSTALL **
C10	1	CAP, 10UF, 0805, 10%, X5R
FB1	1	MULTILAYER SMD FERRITE BEAD 4000MA 0805
C4,C9	2	CAP, 47UF, 10V, X5R, 1210
C3,C5, C6,C7,C8	5	COMPONENT NOT USED ** DO NOT INSTALL **
U1	1	EN5365QI QFN 6A PowerSoC with VID Output Voltage Select

Test Recommendations

To guarantee measurement accuracy, the following precautions should be observed:

1. Make all input and output voltage measurements at the board using the test points provided as this will eliminate voltage drop across the line and load cables that can produce false readings.
2. Measure input and output current with series ammeters or accurate shunt resistors. This is especially important when measuring efficiency.
3. Use a low-loop-inductance scope probe tip similar to the one shown below to measure switching signals and input / output ripple to avoid noise coupling into the probe ground lead. Input ripple, output ripple, and load transient deviation are best measured near the respective input / output capacitors. For more accurate ripple measurement, please see Altera Enpirion App Note regarding this subject.



4. The board includes a pull-up resistor for the POK signal and ready to monitor the power OK status at clip lead marked POK.

Contact Information

Altera Corporation
101 Innovation Drive
San Jose, CA 95134
Phone: 408-544-7000
www.altera.com

© 2015 Altera Corporation—Confidential. All rights reserved. ALTERA, ARRIA, CYCLONE, ENPIRION, HARDCOPY, MAX, MEGACORE, NIOS, QUARTUS and STRATIX words and logos are trademarks of Altera Corporation and registered in the U.S. Patent and Trademark Office and in other countries. All other words and logos identified as trademarks or service marks are the property of their respective holders as described at www.altera.com/common/legal.html. Altera warrants performance of its semiconductor products to current specifications in accordance with Altera's standard warranty, but reserves the right to make changes to any products and services at any time without notice. Altera assumes no responsibility or liability arising out of the application or use of any information, product, or service described herein except as expressly agreed to in writing by Altera. Altera customers are advised to obtain the latest version of device specifications before relying on any published information and before placing orders for products or services.