TPS65917EVM User's Guide

This user's guide describes the characteristics, operation, and use of the TPS65917EVM. An EVM description, graphical user interface (GUI) description, interface requirements, and complete schematic are included.

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Trademarks

1 Introduction

The TPS65917-Q1 device is a power-management integrated circuit (PMIC) for automotive applications. The device provides five configurable step-down converters, with up to 7 A of output current for memory, processor core, input/output (I/O), or preregulation of LDOs. The TPS65917-Q1 device contains 5 LDO regulators for external use. For more details, see the device data sheet, *TPS65917-Q1 Power Management Unit (PMU) for Processor*.

1.1 EVM Overview

The features of this EVM are as follows:

- Allows monitoring of all LDO and SMPS output voltages.
- Allows loading of all SMPS outputs.
- Allows access to the GPIOs and other logic signals to test functionality.
- Optimized layout for stable operation of all SMPS.
- Onboard MSP430 to enable communication with the PMIC.
- Graphical User Interface (GUI) on Windows® to allow access to the registers of the PMIC through USB-I2C.

1.2 EVM with Components Identified

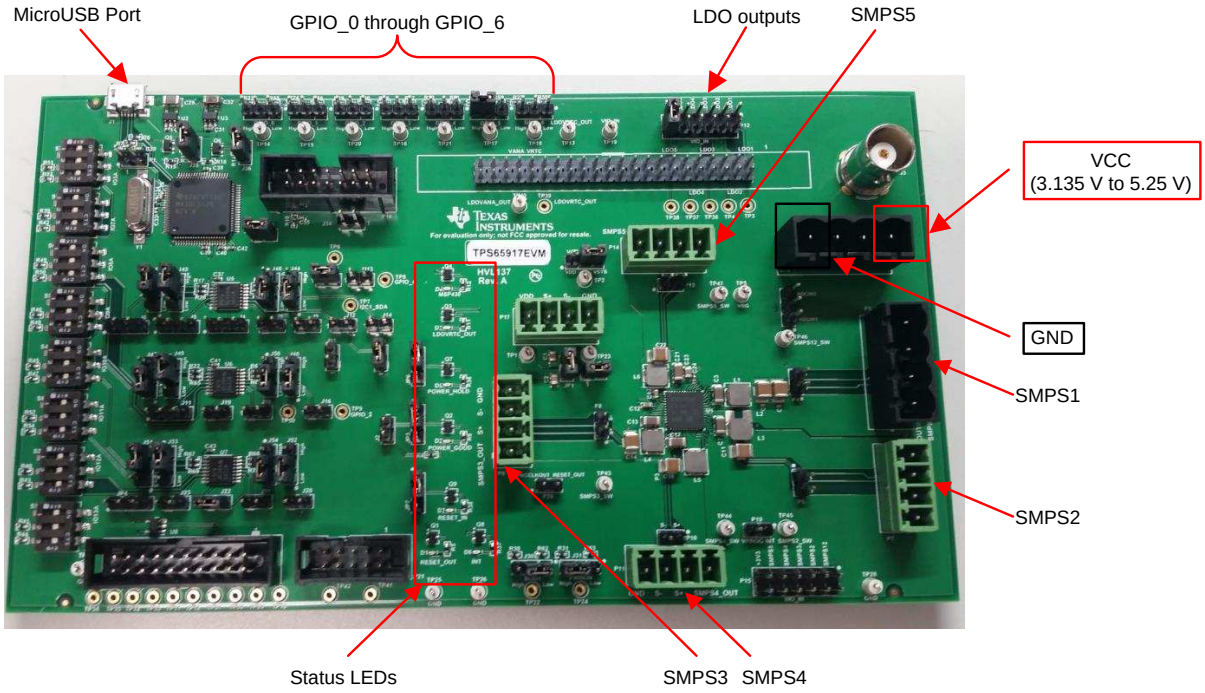

Figure 1. EVM

LEDs — Display status of POWERGOOD, RESET_IN, POWER_HOLD, LDOVRTC_OUT, RESET_OUT, INT, and power supply of MSP430

USB — Connection to PC to enable communication through the GUI

MSP430 — Microcontroller used to convert USB data to I^2C format

SMPSxx — Monitor point for SMPS outputs

LDO Outputs — Monitor point for LDO outputs

VIO SelectorX — Jumper used to select VIO voltage. P12 requires a jumper installed, and by default pins 11 and 12 are shorted to select external 1.8 V as VIO. Only one jumper should be installed between P12 and P15.

GPIOs — Jumper that provides access to the GPIOs

VSYS — VSYS power supply input. P16 is the same connector as SMPS12_OUT and must not be confused to prevent applying VSYS to SMPS-output.

1.3 Default Jumper Settings

Table 1 describes the default jumper settings for the TPS65917-Q1 EVM. No changes should be made to these settings without consulting the TPS65917-Q1 EVM schematic.

Table 1. Default Jumper Settings for TPS65917-Q1EVM

JUMPER	PURPOSE	EVM CONFIGURATION
P12	VIO Selection	Pins 11 and 12 are shorted to select external 1.8V as VIO
P15	VIO Selection	No pins on this header are shorted since there is a shunt on P12.
J2	POWERGOOD Pull-up resistor	J2 is **closed** to enable the pull-up resistor for the POWERGOOD signal
J3	Level Shifter Voltage Selection	J3 is **closed** to select VIO as the level shifted voltage for U5, U6, and U7
J7	I^2C or SPI CLK	J7 is **closed** to select the I2C_SCL signal
J10	I^2C or SPI Data	J10 is **closed** to select the I2C_SDA signal
J22	GPIO_1 GUI Control	J22 is **closed** to allow GPIO_1 (RESET_IN) to be controlled through the GUI
J26	GPIO_5 Selection	GPIO_5 is shorted HIGH to allow the device to power-up
J30	BOOT Selection	BOOT is shorted LOW to exercise the default power-up sequence
J31	PWRON Selection	PWRON is shorted HIGH
J32	LDO5 Input Selection	J32 is **closed** to supply LDO5 from the same supply as the other LDOs
J35	I2C_SCL Connection to PMIC	J35 is **closed** to use the onboard SCL signal from the MSP430
J36	I2C_SDA Connection to PMIC	J36 is **closed** to use the onboard SDA signal from the MSP430
J43 – J54	Level Shifter Direction Selection and Enable	Jumpers J43 through J54 should be left as they are configured to enable proper level shifter functionality
JP1	LDO Input Selection	JP1 is closed to supply the LDOs from VSYS instead of an external supply (VDD)
JP2	VCC_SENSE Selection	VCC_SENSE is shorted to VSYS instead of an external supply (VDD)
JP3	D2 Indicator Selection	Pins 1 and 2 are shorted to allow the status of POWERGOOD signal to be indicated by D2
JP6	D5 Indicator Selection	Pins 1 and 2 are shorted to allow the status of the POWER_HOLD signal to be indicated by D5
JP7	D7 Indicator Selection	Pins 1 and 2 are shorted to allow the status of the RESET_IN signal to be indicated by D7

1.4 Power-Supply Requirements and Connections

To set up the EVM, ensure that VSYS (3.3 V to 5 V) is connected to the pin labeled **VSYS** of P16, and that GND is connected to the pin labeled **GND** of P16.

1.4.1 VIO Selection

As mentioned in Table 1, there are two 12-pin headers (P12 and P15) for selecting the voltage to use for the VIO supply voltage of the PMIC.

CAUTION

It is important to make sure that there is a total of one shunt populated between P12 and P15. If there is a shunt on P12, there should not be one on P15 and vice versa. Also, there should never be more than one shunt on either P12 or P15. Violating this requirement will short two PMIC outputs together, which could potentially damage the PMIC device.

Power for the MSP430 and the two fixed voltage LDOs (3.3-V and 1.8-V outputs) is supplied through the USB connection, as shown in Figure 2.

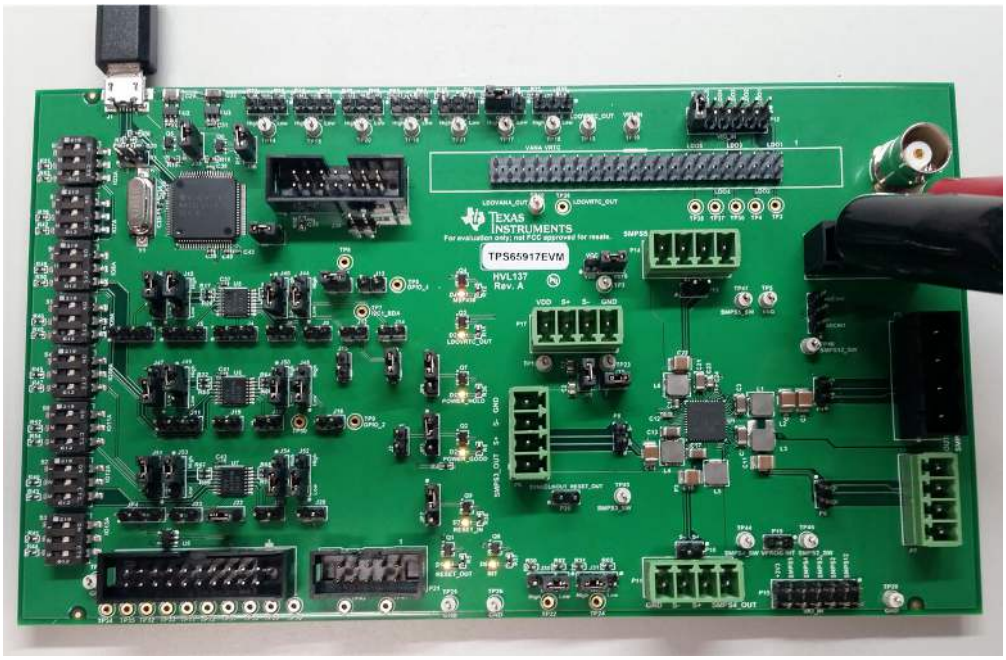

Figure 2. Powered EVM

2 Schematics, Bill of Materials, and Layout

This section contains the schematics, bill of materials (BOM) and layout for the EVM.

2.1 EVM Schematics

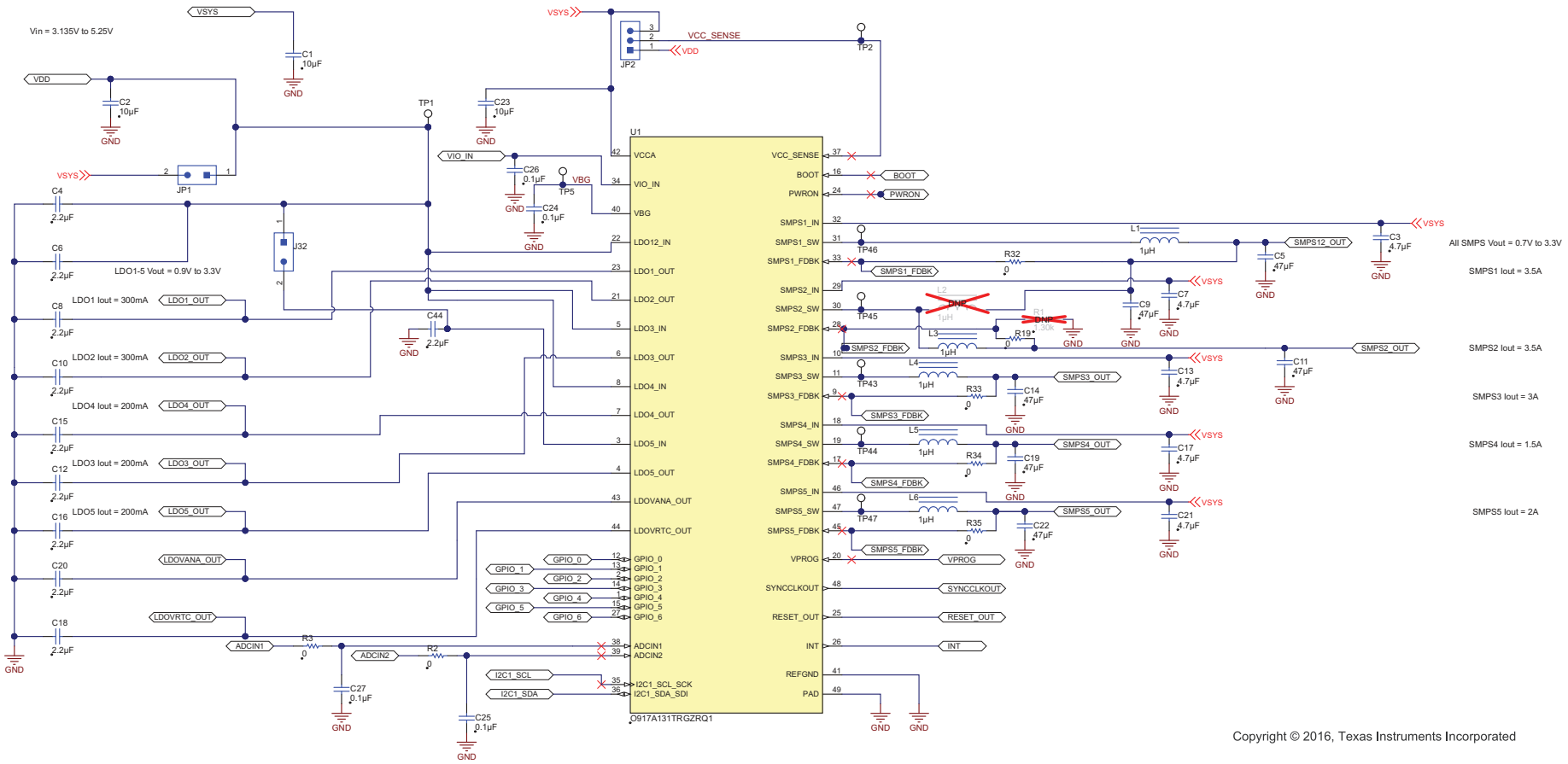

Figure 3. TPS65917-Q1 EVM Schematic (Page 1)

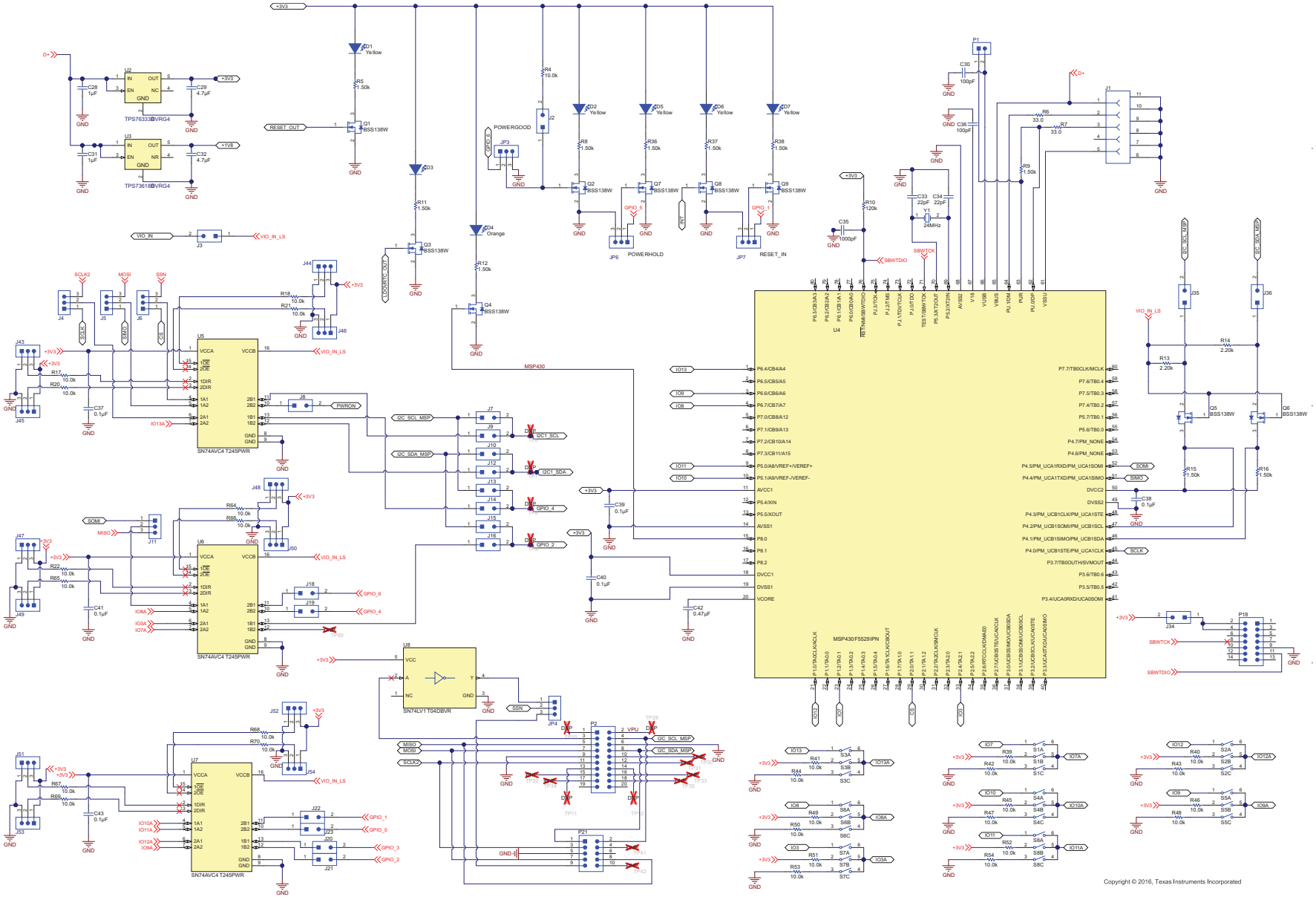

Figure 4. TPS65917-Q1 EVM Schematic (Page 2)

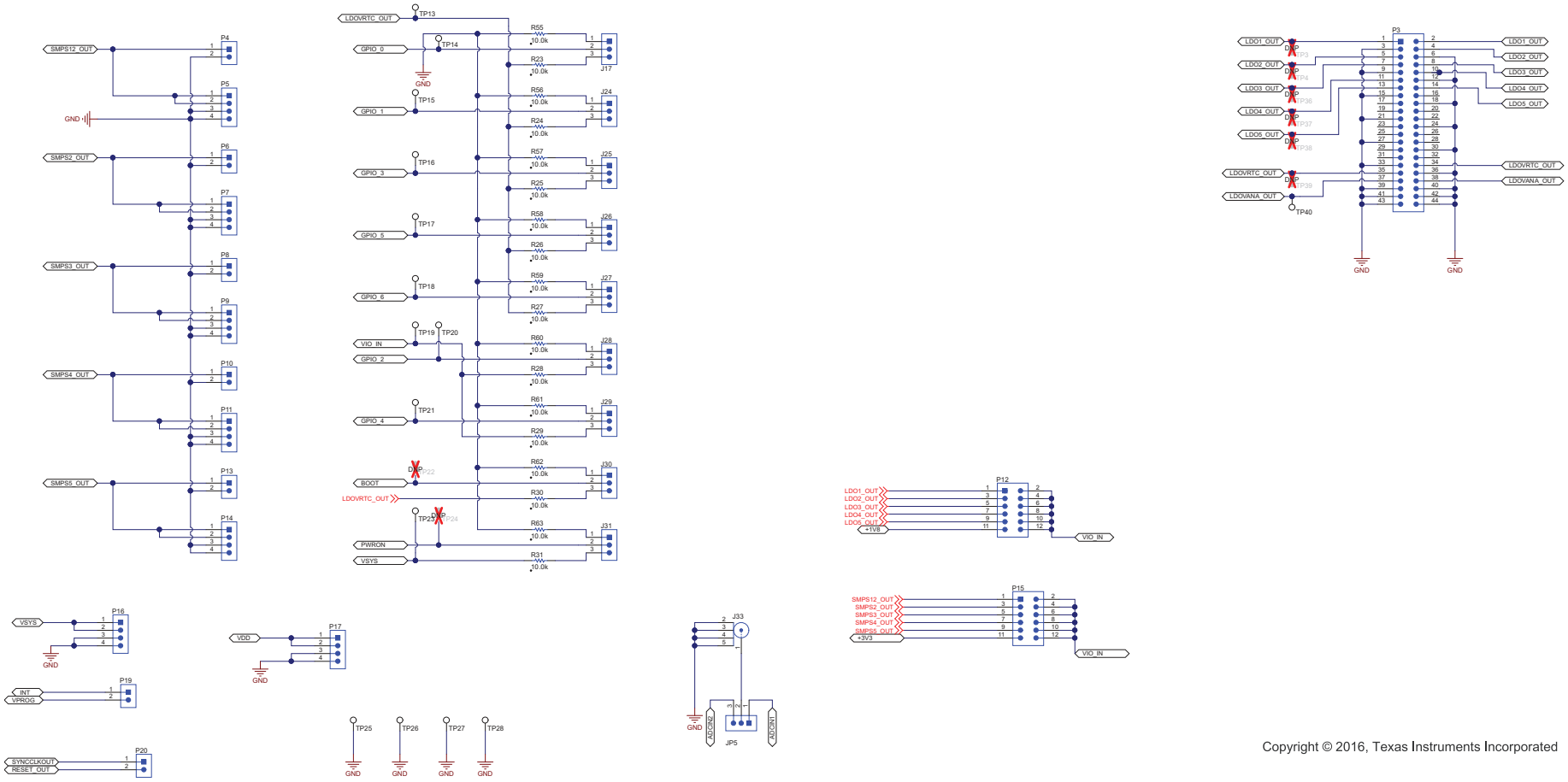

Figure 5. TPS65917-Q1 EVM Schematic (Page 3)

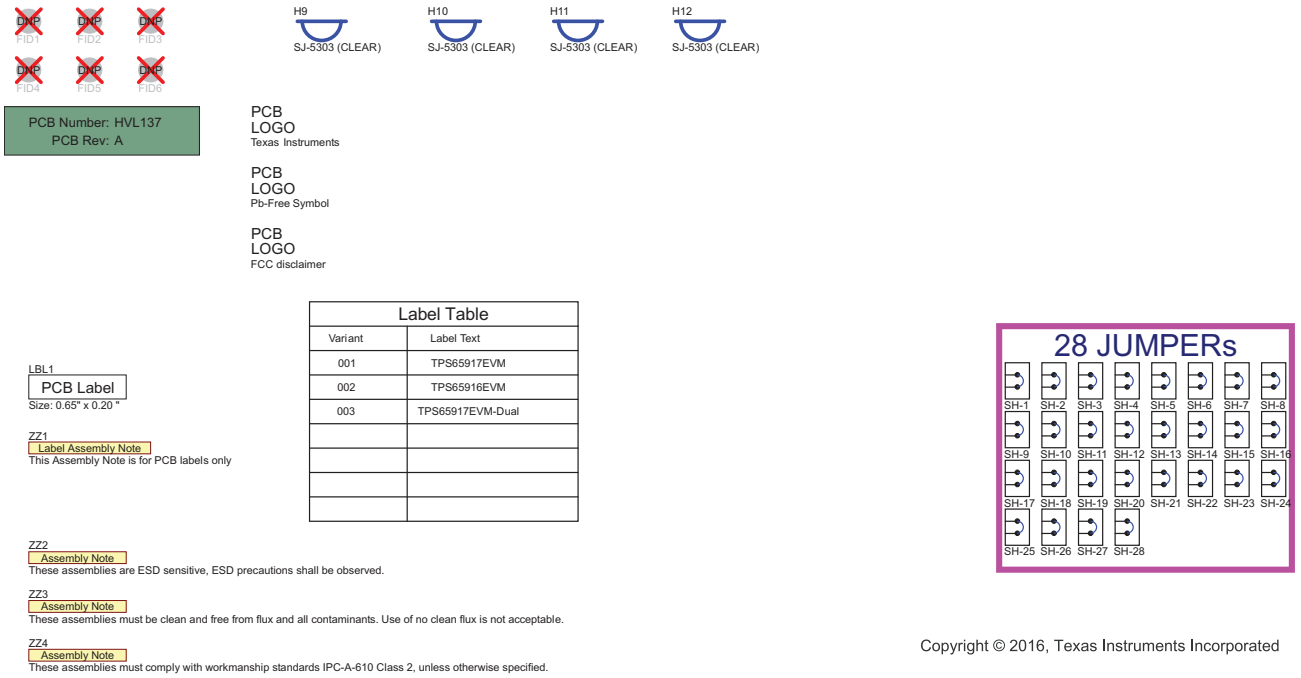

Figure 6. TPS65917-Q1 EVM Schematic (Page 4)

2.2 EVM Bill of Materials

Table 2 lists the bill of materials (BOM) for the TPS65917-Q1 EVM.

Table 2. TPS65917-Q1 EVM BOM

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
!PCB	1		Printed Circuit Board		HVL137	Any
C1, C2, C23	3	10uF	CAP, CERM, 10 µF, 6.3 V, +/- 10%, X7R, 0805	0805	GCM21BR70J106KE22L	MuRata
C3, C7, C13, C17, C21, C29, C32	7	4.7uF	CAP, CERM, 4.7 µF, 16 V, +/- 10%, X7R, AEC-Q200 Grade 1, 1206	1206	GCM31CR71C475KA37L	MuRata
C4, C6, C8, C10, C12, C15, C16, C18, C20, C44	10	2.2uF	CAP, CERM, 2.2 µF, 6.3 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	0603	GCM188R70J225KE22D	MuRata
C5, C9, C11, C14, C19, C22	6	47uF	CAP, CERM, 47 µF, 6.3 V, +/- 20%, X7R, 1210	1210	GCM32ER70J476ME19L	MuRata
C24, C25, C26, C27	4	0.1uF	CAP, CERM, 0.1 µF, 16 V, +/- 10%, X7R, 0402	0402	GCM155R71C104KA55D	MuRata
C28, C31	2	1uF	CAP, CERM, 1 µF, 6.3 V, +/- 10%, X5R, 0402	0402	GRM155R60J105KE19D	MuRata

Table 2. TPS65917-Q1 EVM BOM (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
C30, C36	2	100pF	CAP, CERM, 100 pF, 50 V, +/- 5%, C0G/NP0, 0402	0402	GRM1555C1H101JA01D	MuRata
C33, C34	2	22pF	CAP, CERM, 22 pF, 50 V, +/- 5%, C0G/NP0, 0402	0402	C1005C0G1H220J050BA	TDK
C35	1	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 10%, X7R, 0402	0402	GRM155R71H102KA01D	MuRata
C37, C38, C39, C40, C41, C43	6	0.1uF	CAP, CERM, 0.1 µF, 6.3 V, +/- 10%, X5R, 0402	0402	GRM155R60J104KA01D	MuRata
C42	1	0.47uF	CAP, CERM, 0.47 µF, 6.3 V, +/- 10%, X5R, 0402	0402	04026D474KAT2A	AVX
D1, D2, D3, D5, D6, D7	6	Yellow	LED, Yellow, SMD	Yellow LED	SML-P12YTT86	Rohm
D4	1	Orange	LED, Orange, SMD	Orange LED	SML-P12DTT86	Rohm
H9, H10, H11, H12	4		Bumpon, Hemisphere, 0.44 X 0.20, Clear	Transparent Bumpon	SJ-5303 (CLEAR)	3M
J1	1		Connector, Receptacle, Micro-USB Type B, R/A, Bottom Mount SMT	Micro USB-B receptacle	ZX62-B-5PA(11)	Hirose Electric Co. Ltd.
J2, J3, J7, J8, J9, J10, J12, J13, J14, J15, J16, J18, J19, J20, J21, J22, J23, J32, J34, J35, J36, JP1	22		Header, 100mil, 2x1, Tin, TH	Header, 2 PIN, 100mil, Tin	PEC02SAAN	Sullins Connector Solutions
J4, J5, J6, J11, J17, J24, J25, J26, J27, J28, J29, J30, J31, J43, J44, J45, J46, J47, J48, J49, J50, J51, J52, J53, J54, JP2, JP3, JP4, JP5, JP6, JP7	31		Header, 100mil, 3x1, Tin, TH	Header, 3 PIN, 100mil, Tin	PEC03SAAN	Sullins Connector Solutions
J33	1		Connector, TH, BNC	Amphenol_112404	112404	Amphenol Connex
L1, L3, L4, L5, L6	5	1uH	Inductor, Shielded Drum Core, Powdered Iron, 1 µH, 4.2 A, 0.043 ohm, SMD	4.7x1.2x4.3mm	IHLP1616ABER1R0M11	Vishay-Dale
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650"H x 0.200"W	THT-14-423-10	Brady
P1, P4, P6, P8, P10, P13, P19, P20	8		Header, 100mil, 2x1, Tin plated, TH	Header, 2 PIN, 100mil, Tin	PEC02SAAN	Sullins Connector Solutions
P2	1		Header (Shrouded), 2.54mm, 10x2, Gold, Black, TH	Header (Shrouded), 2.54mm, 10x2, TH	SBH11-PBPC-D10-ST-BK	Sullins Connector Solutions
P3	1		Header, 2.54 mm, 22x2, Tin, TH	Header, 2.54 mm, 22x2, TH	MTLW-122-05-T-D-170	Samtec
P5, P16	2		Header(shrouded), 5.08mm, 4x1, Tin, TH	Header(shrouded), 5.08mm, 4x1, TH	1740288	Phoenix Contact
P7, P9, P11, P14, P17	5		Header(shrouded), 3.81mm, 4x1, Tin, TH	Header(shrouded), 3.81mm, 4x1, TH	1803442	Phoenix Contact
P12, P15	2		Header, 100mil, 6x2, Tin, TH	Header, 6x2, 100mil, Tin	PEC06DAAN	Sullins Connector Solutions
P18	1		Header (shrouded), 100 mil, 7x2, Gold plated, TH	7x2 Shrouded Header	SBH11-PBPC-D07-ST-BK	Sullins Connector Solutions
P21	1		Header (shrouded), 100mil, 5x2, High-Temperature, Gold, TH	5x2 Shrouded header	N2510-6002-RB	3M
Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9	9	50V	MOSFET, N-CH, 50 V, 0.21 A, SOT-323	SOT-323	BSS138W	Fairchild Semiconductor

Table 2. TPS65917-Q1 EVM BOM (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
R2, R3, R19, R32, R33, R34, R35	7	0	RES, 0, 5%, 0.063 W, 0402	0402	ERJ-2GE0R00X	Panasonic
R4, R17, R18, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70	47	10.0k	RES, 10.0 k, 1%, 0.1 W, 0402	0402	ERJ-2RKF1002X	Panasonic
R5, R8, R9, R11, R12, R15, R16, R36, R37, R38	10	1.50k	RES, 1.50 k, 0.1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	ERA-2AEB152X	Panasonic
R6, R7	2	33.0	RES, 33.0, 1%, 0.062 W, 0402	0402	RC0402FR-0733RL	Yageo America
R10	1	120k	RES, 120 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0402	0402	ERJ-2RKF1203X	Panasonic
R13, R14	2	2.20k	RES, 2.20 k, 1%, 0.063 W, 0402	0402	RC0402FR-072K2L	Yageo America
S1, S2, S3, S4, S5, S6, S7, S8	8		Switch, Slide, SPST 3 poles, SMT	3 poles SPST Switch	219-3LPST	CTS Electrocomponents
SH-1, SH-2, SH-3, SH-4, SH-5, SH-6, SH-7, SH-8, SH-9, SH-10, SH-11, SH-12, SH-13, SH-14, SH-15, SH-16, SH-17, SH-18, SH-19, SH-20, SH-21, SH-22, SH-23, SH-24, SH-25, SH-26, SH-27, SH-28	28	1x2	Shunt, 100mil, Gold plated, Black	Shunt	969102-0000-DA	3M
TP1, TP2, TP5, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP23, TP25, TP26, TP27, TP28, TP40, TP43, TP44, TP45, TP46, TP47	23		Test Point, Miniature, White, TH	White Miniature Testpoint	5002	Keystone
U1	1		Power Management Unit (PMU) for Processor, RGZ0048D	RGZ0048D	O917A131TRGZRQ1	Texas Instruments
U2	1		Single Output LDO, 150 mA, Fixed 3.3 V Output, 2.7 to 10 V Input, with Low IQ, 5-pin SOT-23 (DBV), -40 to 125 degC, Green (RoHS & no Sb/Br)	DBV0005A	TPS76333DBVRG4	Texas Instruments
U3	1		Single Output Low Noise LDO, 400 mA, Fixed 1.8 V Output, 1.7 to 5.5 V Input, with Reverse Current Protection, 5-pin SOT-23 (DBV), -40 to 85 degC, Green (RoHS & no Sb/Br)	DBV0005A	TPS73618DBVRG4	Texas Instruments
U4	1		Mixed Signal MicroController, PN0080A	PN0080A	MSP430F5529IPN	Texas Instruments
U5, U6, U7	3		4-Bit Dual-supply Bus Transceiver with Configurable Voltage Translation and 3-State Outputs, PW0016A	PW0016A	SN74AVC4T245PWR	Texas Instruments
U8	1		SN74LV1T04 Single Power Supply Inverter Gate CMOS Logic Level Shifter, DBV0005A	DBV0005A	SN74LV1T04DBVR	Texas Instruments

Table 2. TPS65917-Q1 EVM BOM (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
Y1	1		Crystal, 24MHz, 18pF, SMD	Body12.7x4.7mm	ABLS-24.000MHZ-K4F-T	Abracon Corporation
FID1, FID2, FID3, FID4, FID5, FID6	0		Fiducial mark. There is nothing to buy or mount.	Fiducial	N/A	N/A
L2	0	1uH	Inductor, Shielded Drum Core, Powdered Iron, 1 µH, 4.2 A, 0.043 ohm, SMD	4.7x1.2x4.3mm	IHLP1616ABER1R0M11	Vishay-Dale
R1	0	1.30k	RES, 1.30 k, 1%, 0.063 W, 0402	0402	CRCW04021K30FKED	Vishay-Dale
TP3, TP4, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP22, TP24, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP41, TP42, TP50	0		Test Point, Miniature, White, TH	White Miniature Testpoint	5002	Keystone

2.3 Layout and Component Placement

Figure 7 through Figure 13 show the overviews and layers of the printed circuit board (PCB) and the component placement of the EVM.

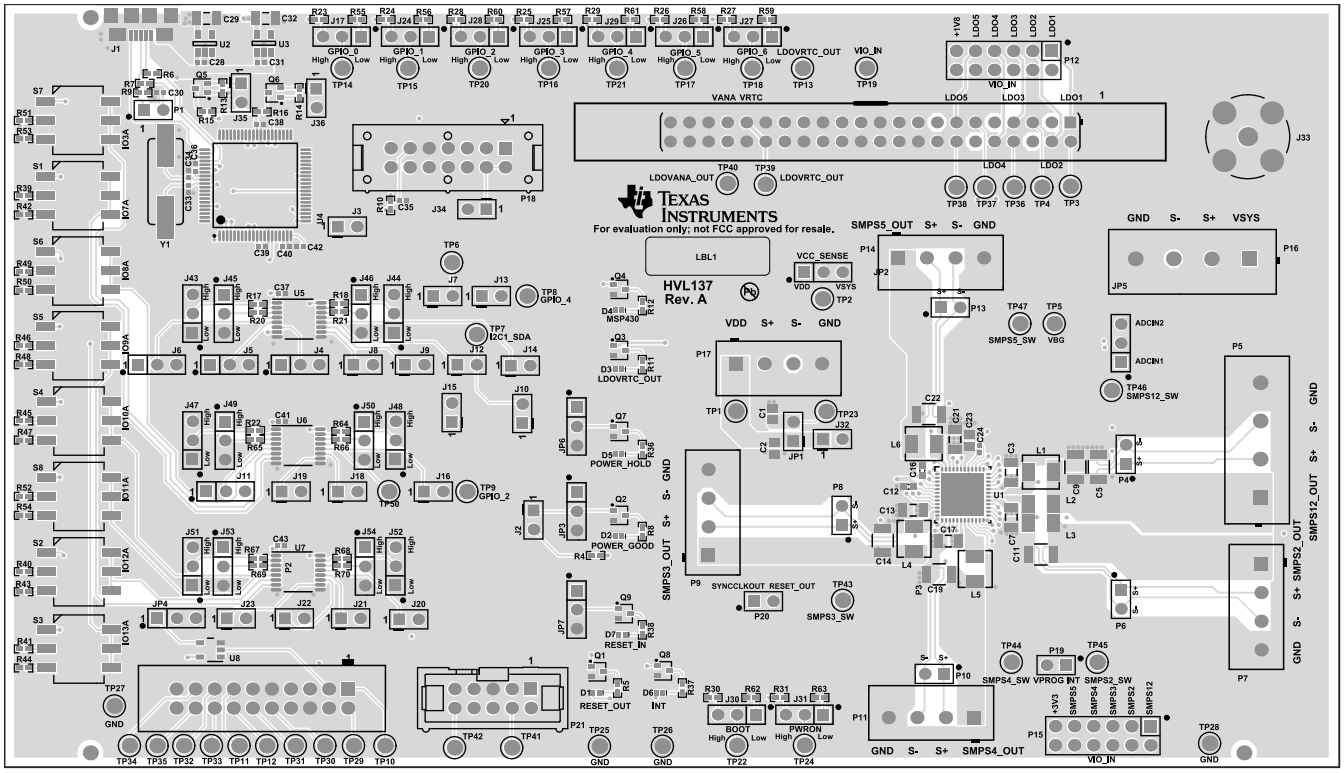

Figure 7. Composite - Top View

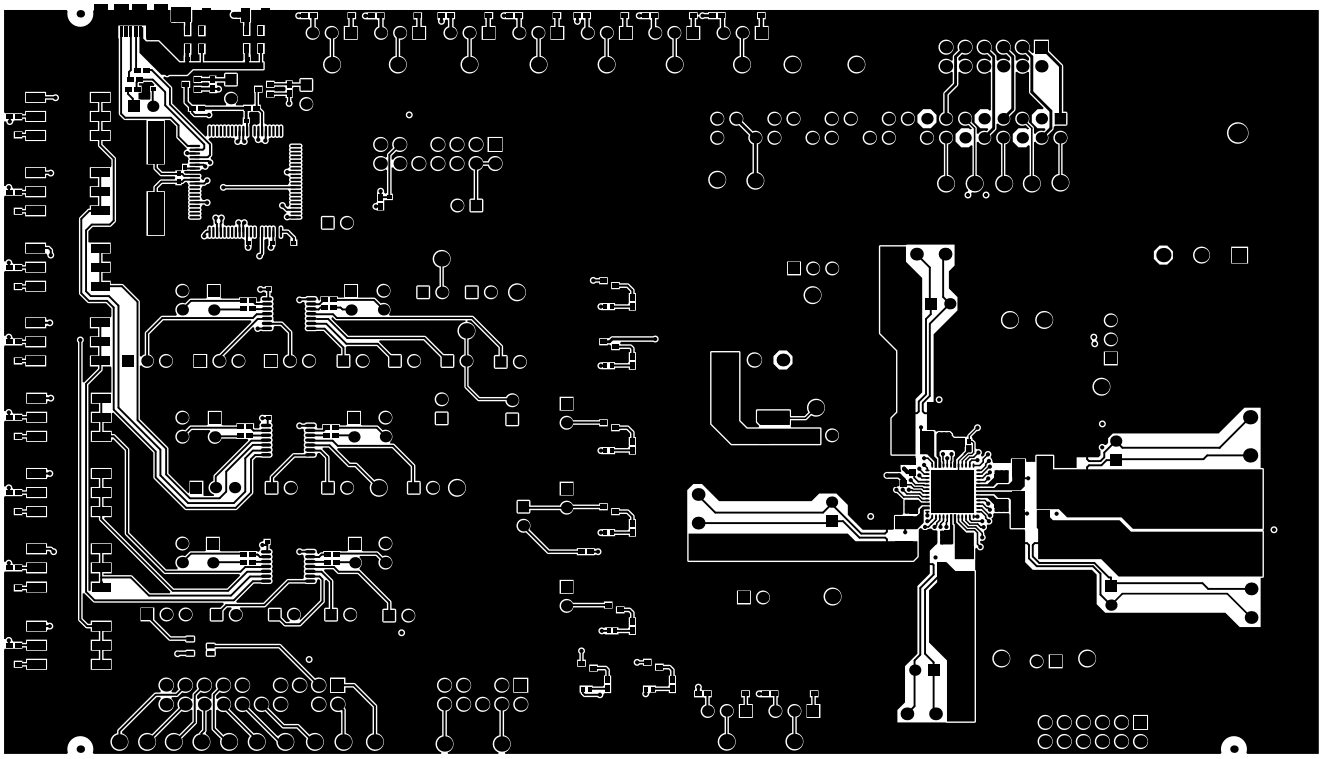

Figure 8. Top Layer

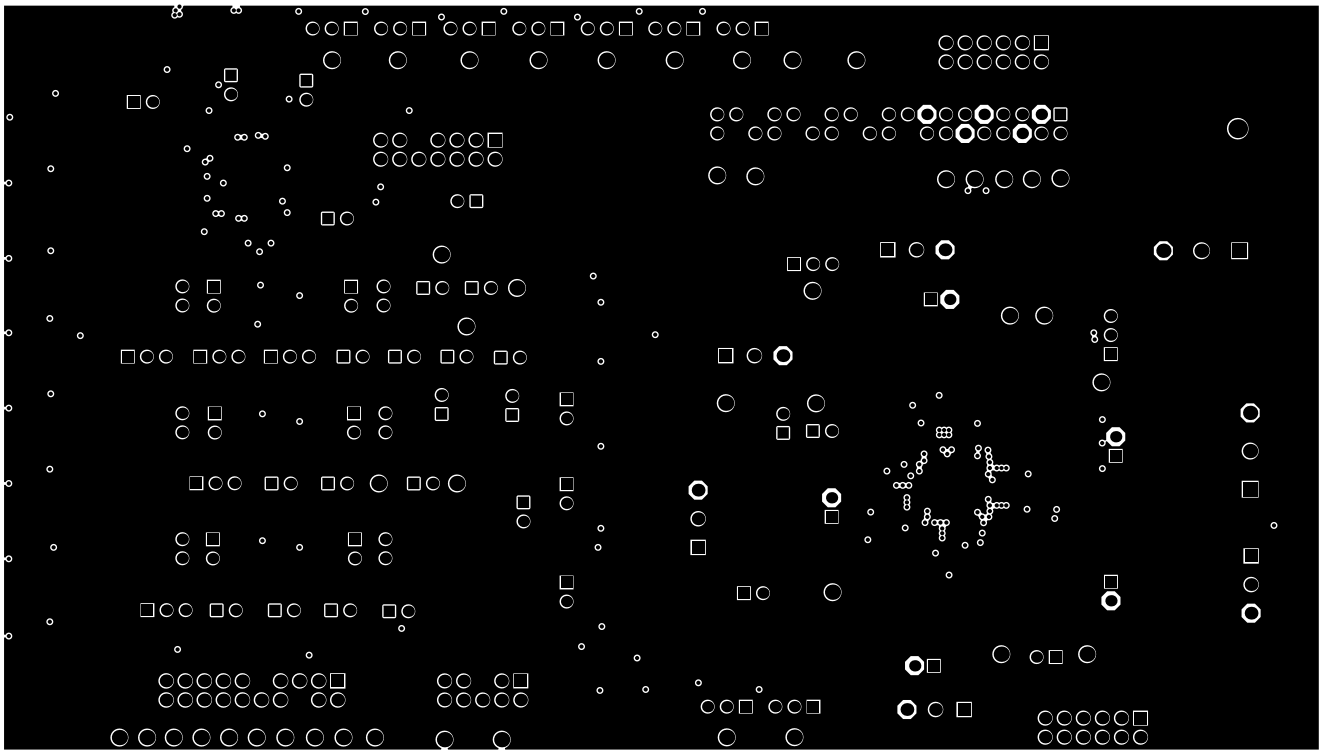

Figure 9. Layer 1 GND

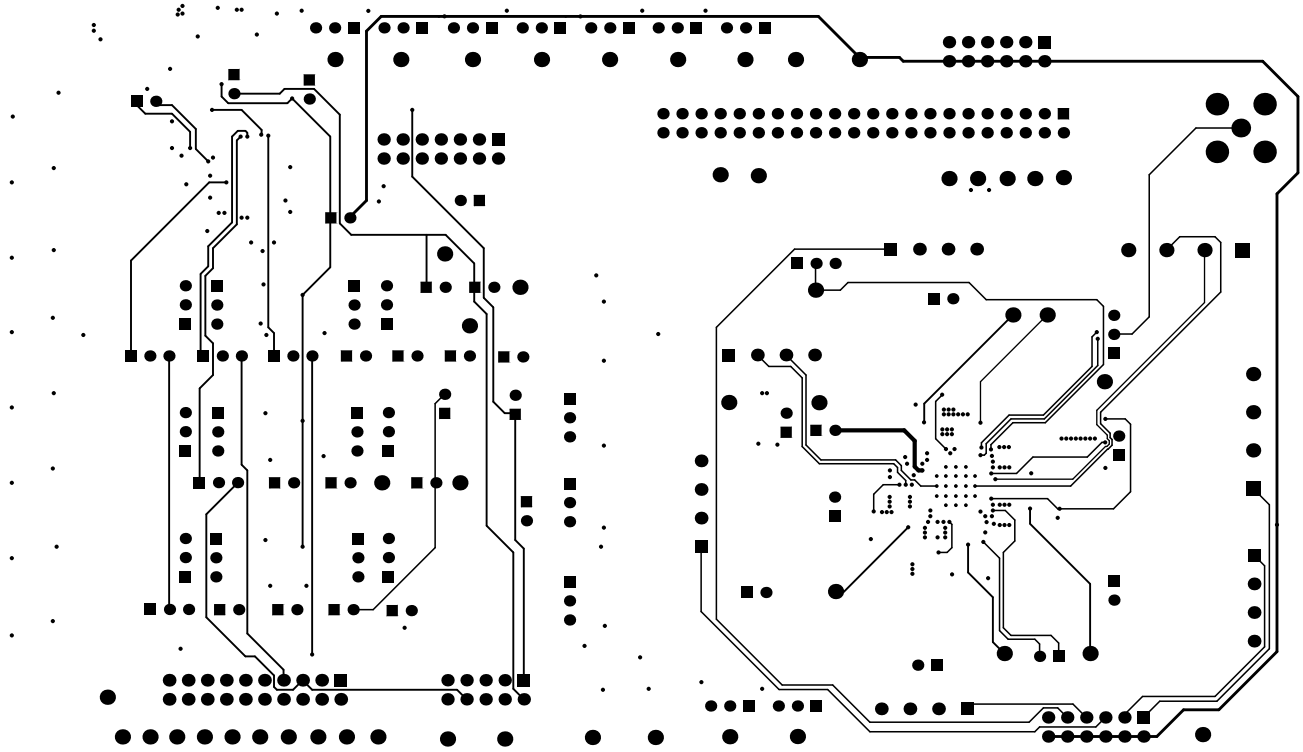

Figure 10. Layer 2 SIGNAL

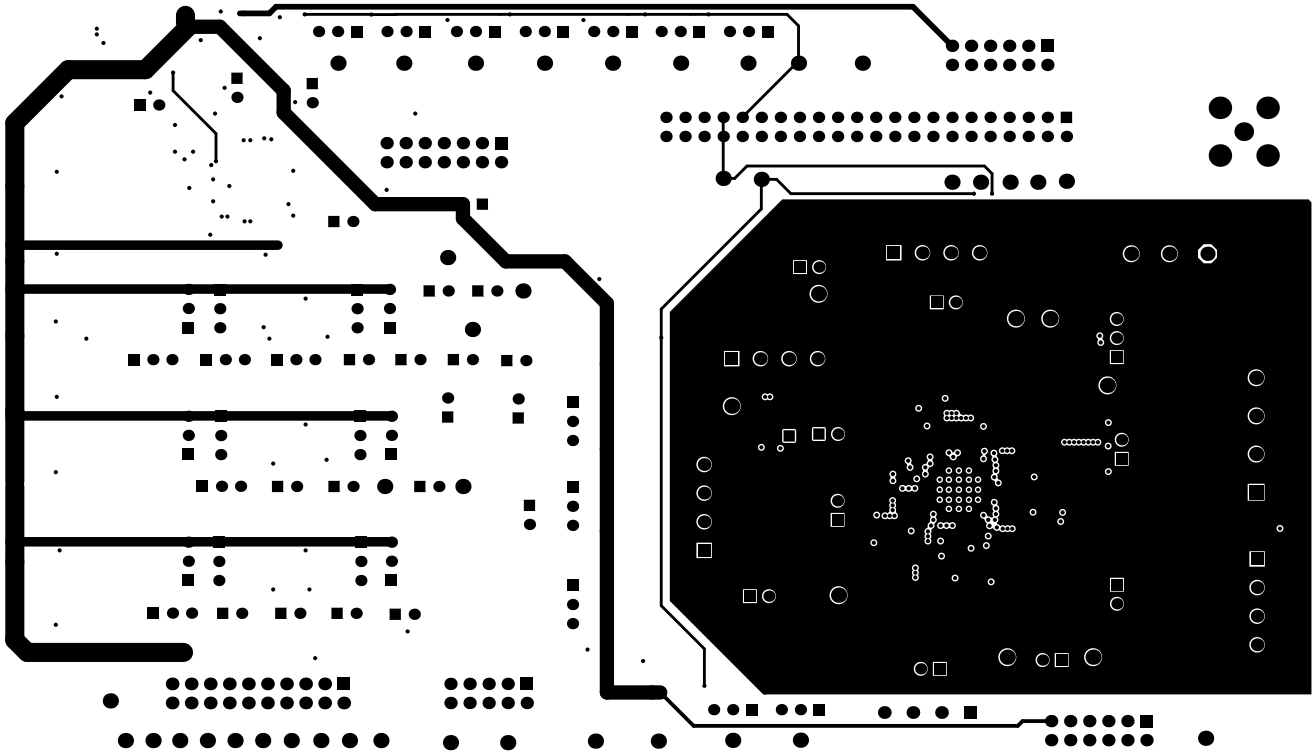

Figure 11. Layer 3 POWER

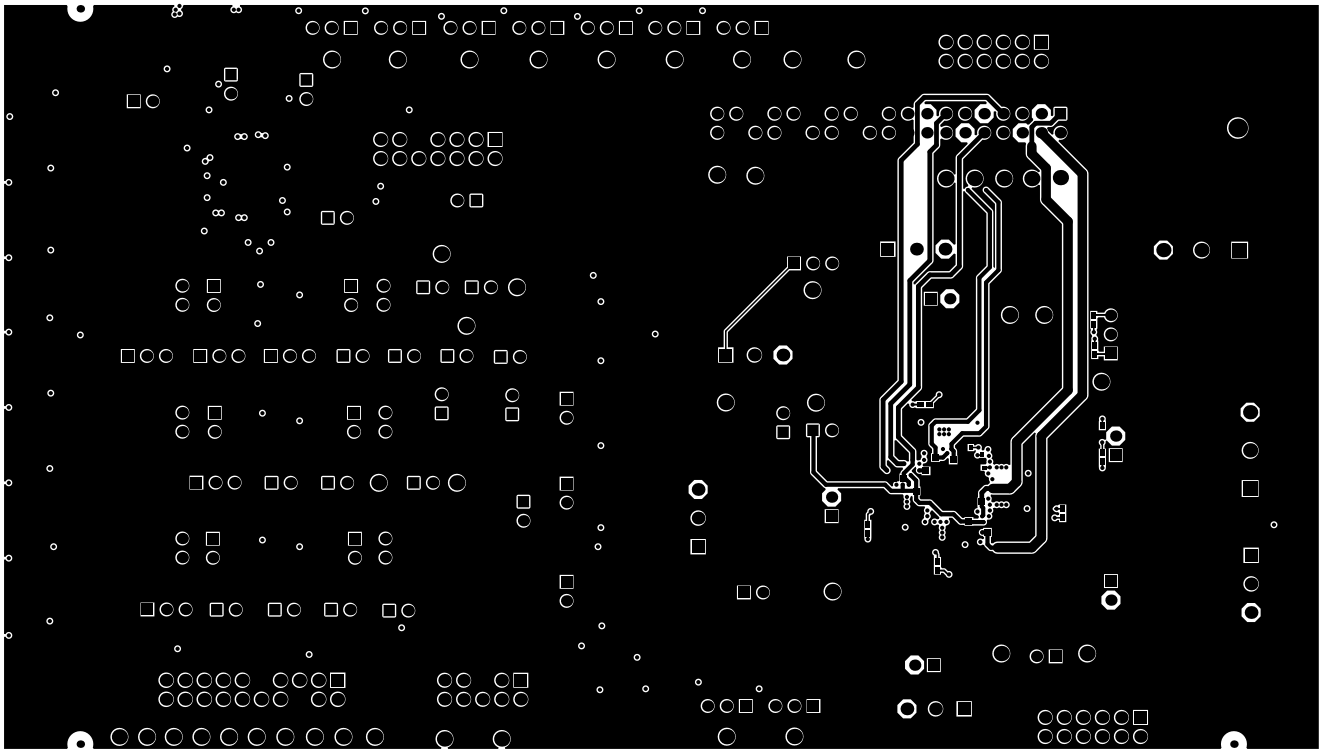

Figure 12. Bottom Layer

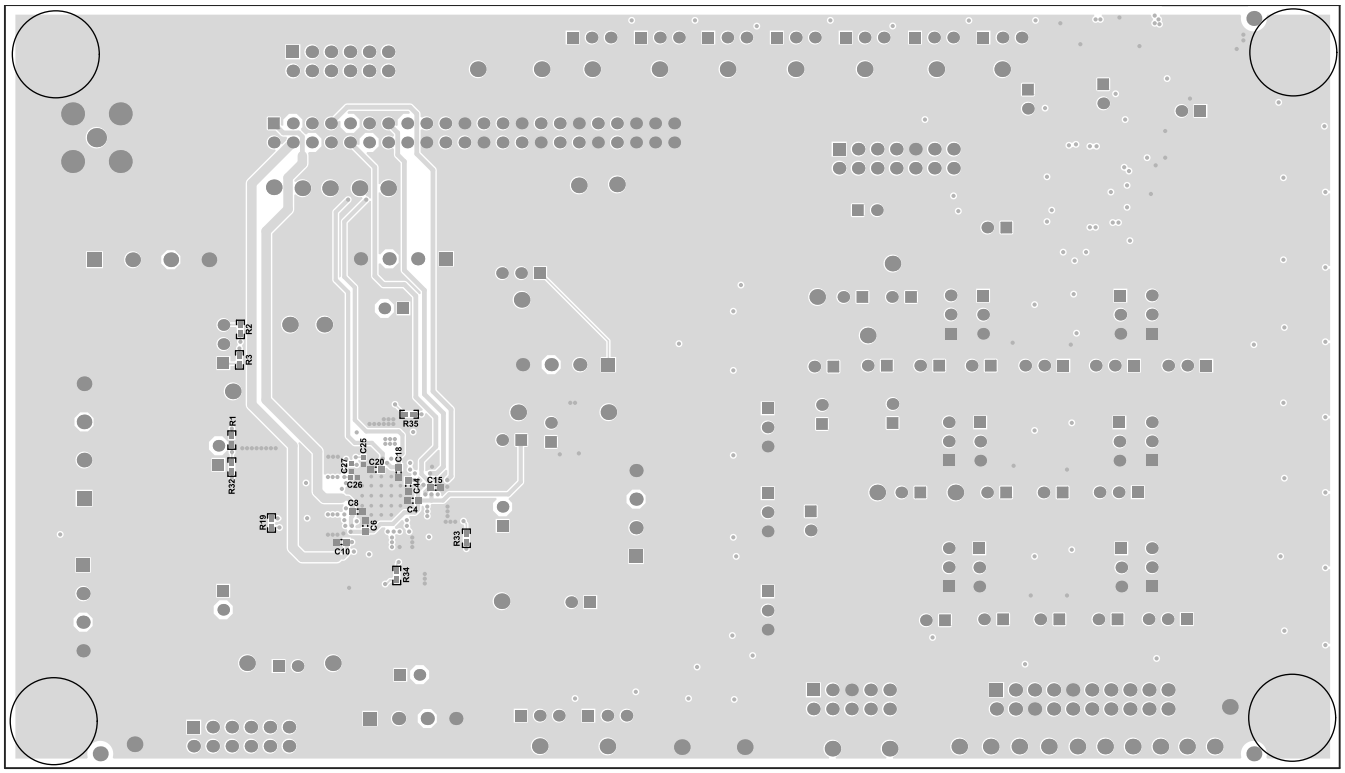

Figure 13. Composite - Bottom View

3 Setup and Operation

3.1 Powering up the Device

To turn on the device, perform the following steps:

1. Make sure supply voltage is off, unplug the USB, and close the GUI.
2. Plug in the USB cable to the EVM through the J1 micro-USB connector.
3. Plug in the other end of the USB cable to the computer USB port.
4. Ensure that VSYS (3.3 V to 5 V) is connected to the pin labeled VSYS of P16 and that GND is connected to the pin labeled GND of P16 (Figure 1).
5. Set supply voltage to between 3.3 V and 5 V with an appropriate current limit. Turn on supply voltage. The RESET_OUT LED (D1), LDOVRTC_OUT LED (D3), POWER_HOLD LED (D5), LDOVRTC_OUT, and POWER_GOOD (D2) should light. See Figure 2.

3.2 TPS65917-Q1EVM Graphical User Interface (GUI)

The GUI for TPS65917-Q1EVM gives the user the ability to interact with the internal registers of the device while also allowing control of some input pins. Please contact your local TI representative to get the TPS65917-Q1 EVM GUI.

The TPS65917-Q1EVM GUI has three pages. The first page is labeled *DUT Config*, the second page is labeled *Low Level Configuration*, and the third page is labeled *About*.

3.2.1 Communicating with Device – Digital Inputs

The *DUT_Control* page of the GUI controls the digital input signals to the PMIC. The GUI can control 6 signals. Since all of these signals are inputs to the PMIC, they need to be configured as outputs from the perspective of the GUI . To set the desired signal as an input or output, check the box next to the corresponding signal. Checking this box changes the text label to *Output* and configures the signal as an output. Any GPIO configured as output has a second check box labeled *Low* to the right of it. (Figure 14).

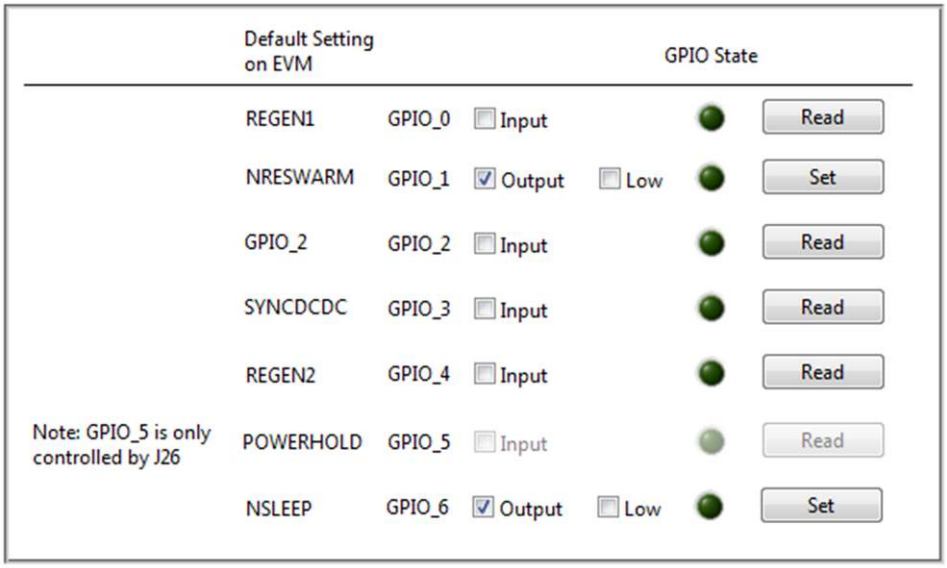

Figure 14. Default GPIO Configuration

To set the desired signal to a logic low, while the new check box displays *Low*, click the corresponding **Set** button. The corresponding indicator LED should stay off.

To set the desired signal to a logic high, check the *Low* check box and the text changes to display *High*.

Next, click the **Set** button and the corresponding indicator LED should light (Figure 15).

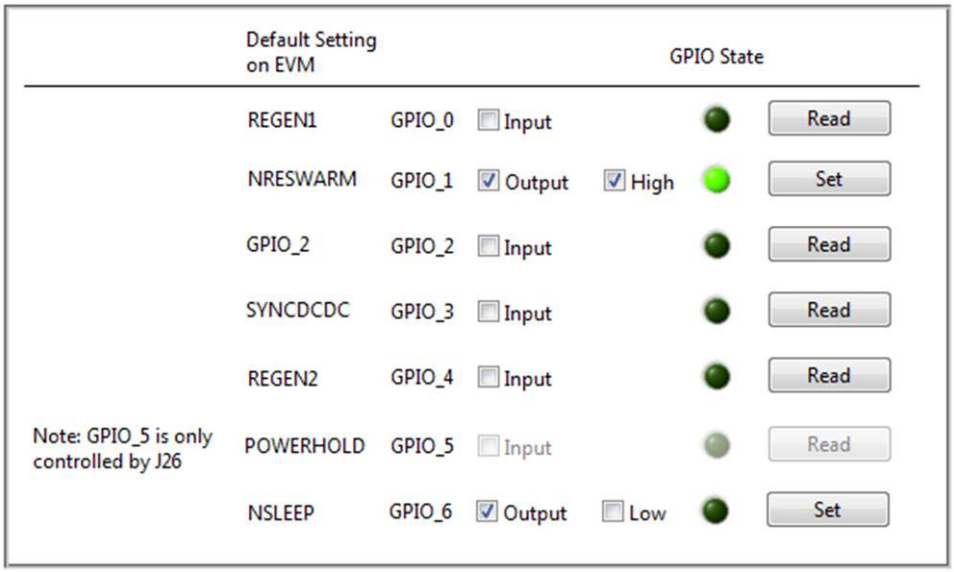

Figure 15. GPIO Configuration After GPIO_1 Set to Logic High

3.2.2 Communicating With Device – I²C

The *Low Level Configuration* page (Figure 16) of the GUI is where I²C communication with the device is done. This page has four groups (blocks) of registers. Expand each group by clicking the "+" next to the group, which lists all the registers in that group. Additional columns display when the name of a register is selected (highlighted), including the Address, Default state, R/W status, and bit fields of the register.

- To read data from the register, select the appropriate register and click the *Read Register* icon .
- The register data displays on the right side of the page in the *Bit Fields* columns labeled 7 to 0.
- To write data to the register, click the bits in the *Bit Fields* labeled 7 to 0 for the register to write. The register will be written to immediately. If writes should not be immediate, change the write type using the **Update Mode** pulldown to *Deferred*, change the bits to the desired value, and click the *Write Register* icon .

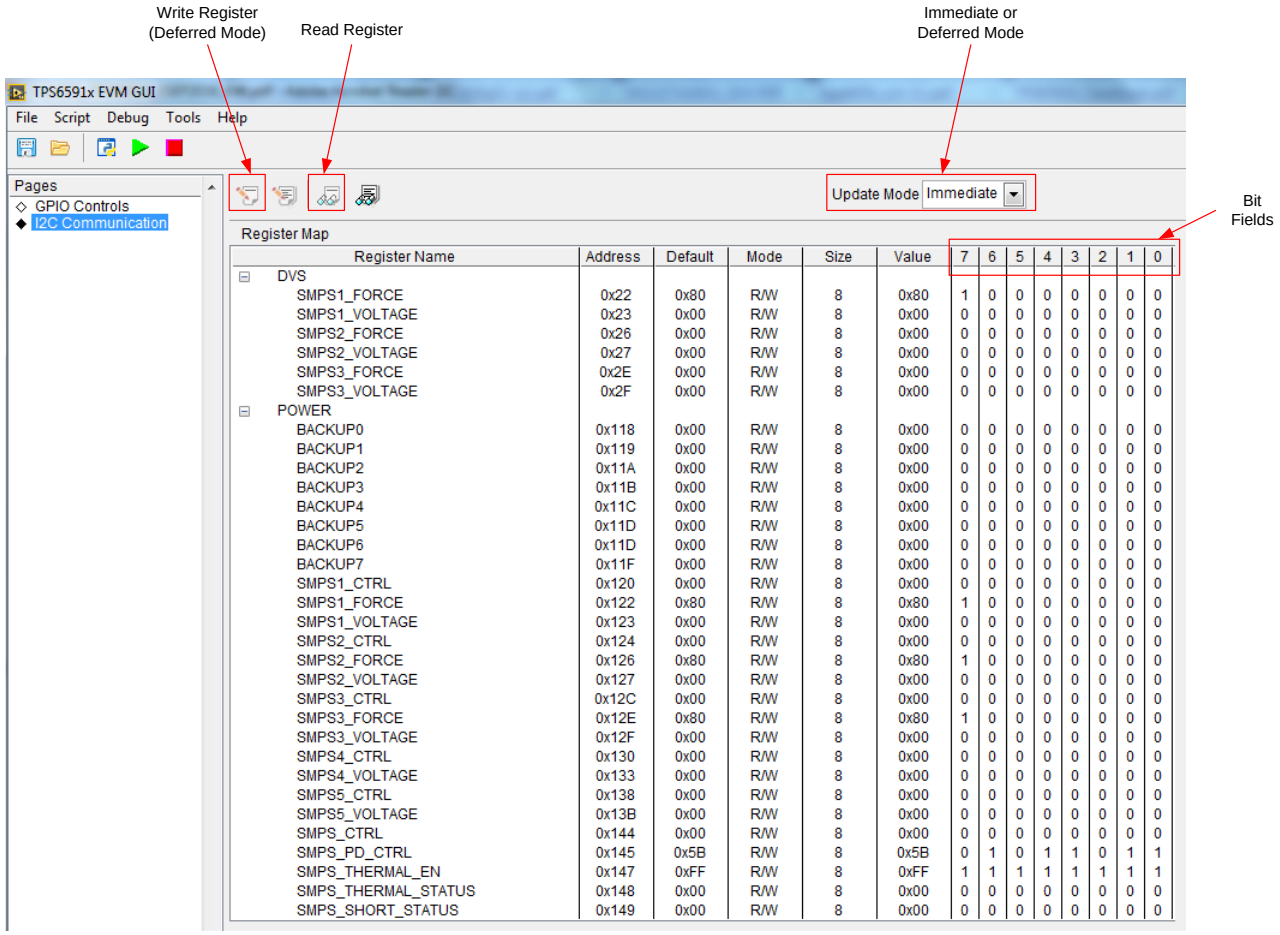

Figure 16. Low Level Configuration Page

3.3 Running a Script with the GUI

Use the script editor to automate a series of register writes, static bit writes, and delays.

- To launch the script window from the main GUI menu, select *Script* → *Launch Window*. The script editor opens a blank window.
- To record a script, from the main GUI menu, select *Script* →*Start Recording* and then run the commands from the main GUI. After each register write or read, the script editor records the command that was run.
- When finished recording, select *Script* →*Stop Recording*.
- To save the script, on the script window menu select *File* →*Save As...* and then choose the destination for the script file.
- To run the script again, press the **F5** key or on the *Script* window menu, select *Run* → *Run Module*.
  - If an attempt is made to run the script before being saved, a prompt displays for the user to save the script.
  - Otherwise, to save the script, select *File* →*Save As...* and then choose the destination for the script file.
- The script in Figure 17 turns on SMPS1 to 1.15 V and then turns on SMPS3 to 1.25 V. These commands can run a power up and power down sequence quickly, eliminating the need to manually turn on all of the rails.

File Edit Format Run Options Window Help

```
GUI_Module=__import__('TPS6591x')

GUI=GUI_Module.Device_GUI("TPS6591x.exe")
GUI.write_register("POWER","SMPS1_VOLTAGE", 0x49)
GUI.write_register("POWER","SMPS1_CTRL", 0x5)
GUI.write_register("POWER","SMPS3_VOLTAGE", 0x51)
GUI.write_register("POWER","SMPS3_CTRL", 0x5)
GUI.__del__()
```

Figure 17. Sample Script

Revision History

Changes from A Revision (March 2017) to B Revision	Page
• Corrected EVM name on the first page	1

Changes from Original (September 2016) to A Revision	Page
• First public release of document	1

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3 *Regulatory Notices:*

   3.1 *United States*

      3.1.1 *Notice applicable to EVMs not FCC-Approved:*

      FCC NOTICE: This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

      3.1.2 *For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:*

      CAUTION

      This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

      Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

      FCC Interference Statement for Class A EVM devices

      NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

3.2 *Canada*

3.2.1 *For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247*

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

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http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_01.page

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If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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4.3.2 EVMs are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems. User assumes all responsibility and liability for proper and safe handling and use of the EVM by User or its employees, affiliates, contractors or designees. User assumes all responsibility and liability to ensure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard. User assumes all responsibility and liability for any improper or unsafe handling or use of the EVM by User or its employees, affiliates, contractors or designees.

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