User's Guide

TPS7H500x-SP Evaluation Module User's Guide

ABSTRACT

This user's guide describes the characteristics, operation, and use of the TPS7H5001EVM-CVAL, TPS7H5002EVM-CVAL, TPS7H5003EVM-CVAL, TPS7H5004EVM-CVAL evaluation module (EVM). Setup to ensure proper operation of the device as well as a complete schematic diagram, printed-circuit board layouts, and bill of materials are included in this document. Basic waveforms of operation are also shown.

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Trademarks

All trademarks are the property of their respective owners.

1 Introduction

This board enables the TPS7H5001/2/3/4EVM-CVAL to be connected to other components needed to quickly prototype and evaluate a complete power converter design. The TPS7H5001EVM-CVAL is placed on an open test board similar to the board used in the *TPS7H5001-SP Lookahead Total Ionizing Dose (TID)* radiation report. Adding test points and voltage terminals is the only major change to the design that was needed to facilitate probing the TPS7H5001/2/3/4EVM-CVAL without additional hardware. Minor changes were made to the BOM for manufacturability purposes.

1.1 Features

This EVM has the following features:

- Synchronous rectification outputs with adjustable dead time
- 0.613-V ±1% Voltage reference overtemperature, radiation, and line and load
- Adjustable slope compensation and soft start
- Configurable duty cycle limit

1.2 Applications

- Space satellite isolated power supplies
- Radiation hardened applications
- Space satellite payloads

2 EVM Setup and Quick Start Guide

Default EVM Configuration lists the default configuration.

Table 2-1. Default EVM Configuration

Parameter	Specification
Input Power Supply	4 V to 14 V
Operating Temperature	25°C
Switching Frequency	500 kHz

The TPS7H5001/2/3/4EVM-CVAL can be quickly turned on and run using the connections shown in *TPS7H5001EVM-CVAL Connections*.

Table 2-2. TPS7H5001/2/3/4EVM-CVAL Connections

Terminal or Test Point	Voltage Source
J11 (VIN)	4 to 14-V input at 10 mA. See Positive and Negative Terminal for J11 for connections.
TP9 (COMP)	1 V at < 10 mA (input range can be –0.3 V to 3.3 V based on the *TPS7H5001-SP Radiation-Hardness-Assured Si and GaN Dual Output Controller* data sheet)

Positive and Negative Terminal for J11 shows which terminal is the positive and negative on J11. Connect the positive input voltage to the positive terminal and GND to negative terminal.

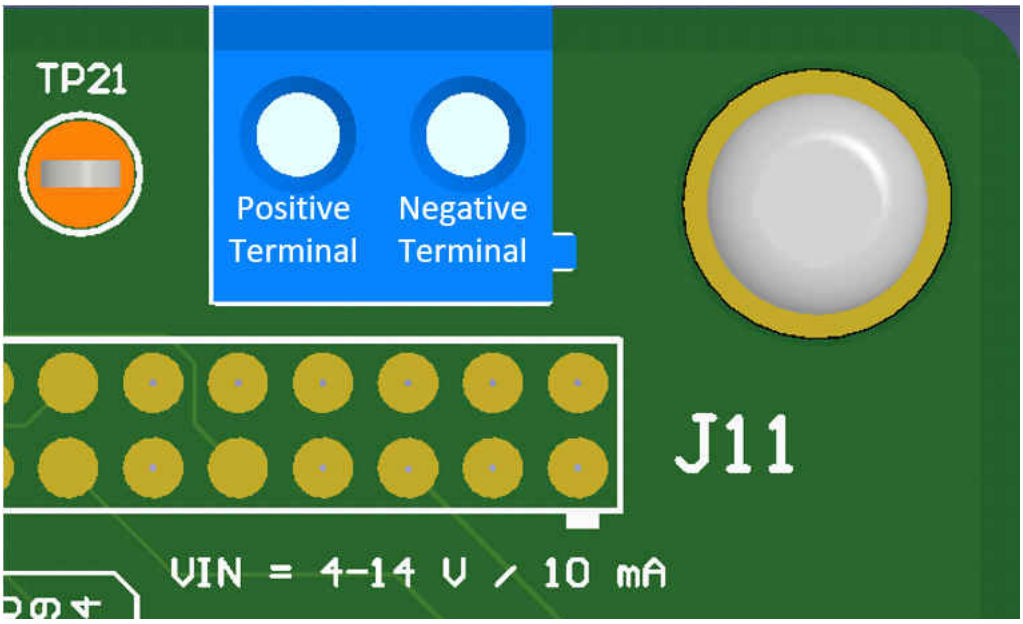

Figure 2-1. Positive and Negative Terminal for J11

The device then turns on and operates in open loop mode as shown in TPS7H5001-SP Output. TPS7H5001-SP Output shows the output of TPS7H5001-SP measured on J1–J4 with the quick start method.

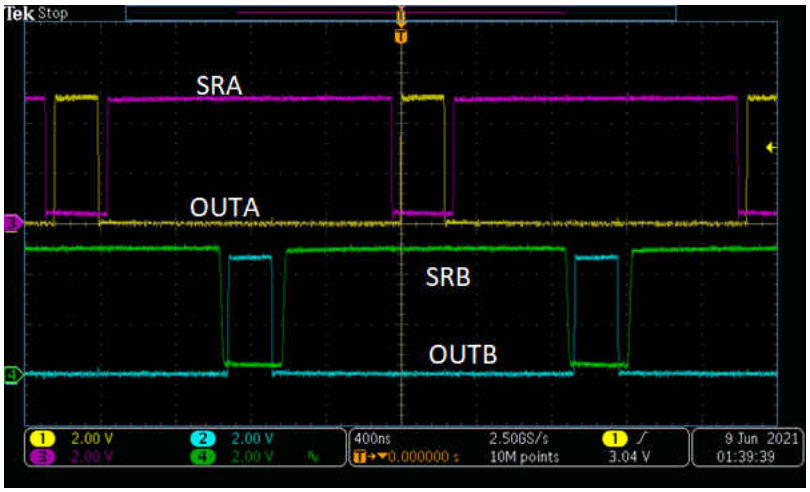

Figure 2-2. TPS7H5001/2/3/4-SP Output

The operation of this mode is such that forcing the voltage on COMP creates an output on the TPS7H5001/2/3/4EVM-CVAL. The duty cycle varies based on the input voltage on COMP as well as the triangle waveform created by the CS_LIM circuit or any other waveform that the user decides to add to the CS_LIM pin. See Duty Cycle Generation for signal generation waveforms. Note that OUTB and SRB is not present for TPS7H5002EVM-CVAL and TPS7H5003EVM-CVAL. SRA and SRB are not present for TPS7H5004EVM-CVAL.

Duty Cycle Generation shows waveforms for input and output signal generations for the TPS7H5001/2/3/4EVM-CVAL based on COMP voltage and CS_LIM pin voltage.

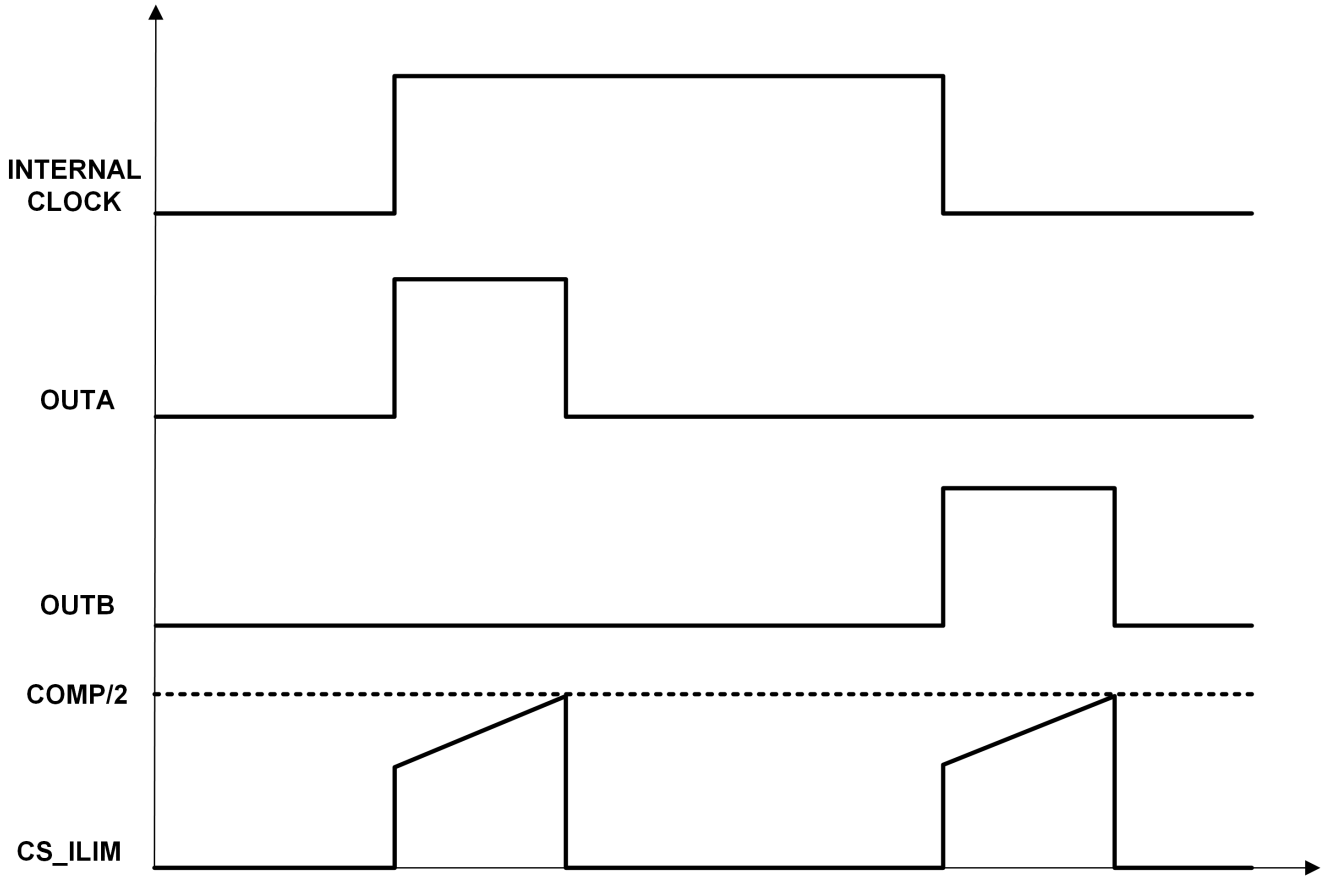

Figure 2-3. Duty Cycle Generation

3 EVM Connectors and Test Points

Table 3-1 is a list of major connections on the board. For further information, see the relevant section in the *TPS7H5001-SP Radiation-Hardness-Assured Si and GaN Dual Output Controller* data sheet. A ✓ means that the test point is included in the EVM.

Table 3-1. EVM Board Connections

Test Point	5001	5002	5003	5004	Connection	Description
TP1, J1	✓	✓	✓	✓	OUTA	Connected to the gate driver in the design. Components R5, C5 can be used to test different R/C loads.
TP2, J2	✓			✓	OUTB	Connected to the gate driver in the design. Components R6, C6 can be used to test different R/C loads.
TP3, J3	✓	✓	✓		SRA	Connected to the gate driver in the design. Components R7, C7 can be used to test different R/C loads.
TP4, J4	✓				SRB	Connected to the gate driver in the design. Components R8, C8 can be used to test different R/C loads.
TP5, TP6	✓	✓	✓	✓	CS_LIM	Input for current sense in the design. The CS_LIM circuit provides small triangle waveform from OUTA, OUTB. Note that this can load OUTA, OUTB causing a slow in the slew rate. If R9 and R10 are unpopulated, CS_LIM can be force from TP5.
TP7	✓	✓	✓	✓	VIN	Voltage input for the TPS7H5001/2/3/4EVM-CVAL device
TP8	✓	✓	✓	✓	EN	Enable pin for the TPS7H5001/2/3/4EVM-CVAL device, currently pulled high to VLDO
TP9	✓	✓	✓	✓	COMP	Error amplifier output for the TPS7H5001/2/3/4EVM-CVAL, forcing this voltage runs the TPS7H5001/2/3/4EVM-CVAL in open loop.
TP10	✓	✓	✓	✓	REFCAP	Internal reference for TPS7H5001/2/3/4EVM-CVAL
TP11, TP12	✓	✓	✓	✓	SS	In a closed loop design, this slowly increases converter output voltage during start-up
TP13, TP15	✓	✓	✓	✓	SYNC	Inputting a clock on this pin synchronizes the TPS7H5001/2/3/4EVM-CVAL to a frequency half of the input frequency
TP14	✓	✓	✓	✓	VLDO	Internal voltage rail for device logic
TP20	✓	✓	✓	✓	VSENSE	Voltage sense for the TPS7H5001/2/3/4EVM-CVAL. Connected to converter output voltage in the full design.
TP21	✓	✓	✓	✓	RSC	Slope compensation selection resistor. Sets slope compensation slew rate internal to the device.

Table 3-1. EVM Board Connections (continued)

Test Point	5001	5002	5003	5004	Connection	Description
TP22	✓	✓	✓	✓	HICC	Configurability for the hiccup time of the converter. While grounded through a resistor on the EVM, in a full design it is generally a capacitor.
TP23	✓	✓	✓	✓	FAULT	A signal high on this node turns the TPS7H5001/2/3/4EVM-CVAL off for any fault condition needed
TP24	✓	✓			SP	Configurability for the delay between the synchronous rectifiers and main output
TP25	✓	✓	✓	✓	RT	Frequency select for the TPS7H5001/2/3/4EVM-CVAL. Change this to vary the frequency of the converter.
TP26	✓	✓			PS	Configurability for the delay between the main output and synchronous rectifiers
TP27	✓	✓		✓	LEB	Configurability for the leading edge blanking time of the converter

Table 3-2 describes and lists the connections and configuration for J6. Use J6 to switch between different DCL connections to test different duty cycle limits. Pin 1 is noted by the dot next to the pin.

Table 3-2. J6 Connections and Configuration

Pin Connection	Duty Cycle Limit Configuration	Description
Pin 1 and Pin 2	100%	DCL is connected high to VLDO, Used for TPS7H5001/2/3 EVM variants
Pin 2 and Pin 3	50%	DCL is connected low to AVSS, Used for TPS7H5001/4 EVM variants
Floating	75%	DCL is left floating, Used for TPS7H5001/2/3 EVM variants

4 PCB Layouts

Top Overlay through Board Dimensions show the EVM PCB layout images.

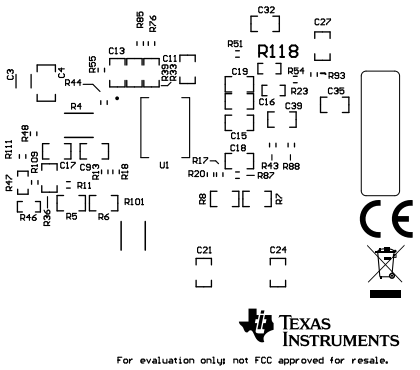

Figure 4-1. Top Overlay

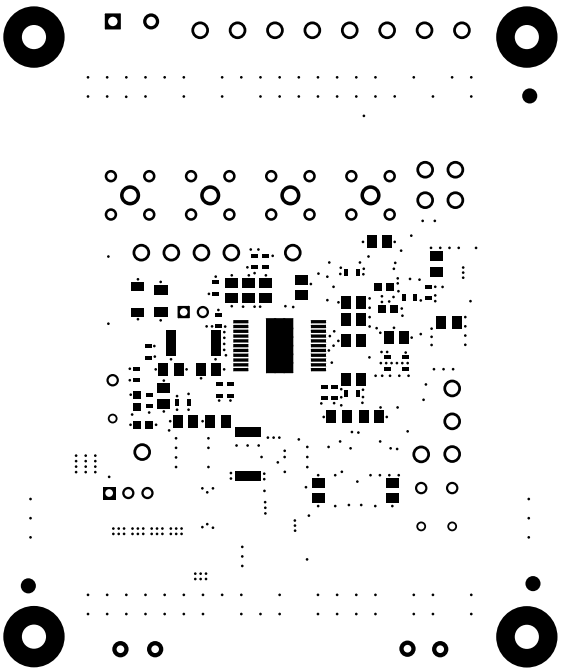

Figure 4-2. Top Solder

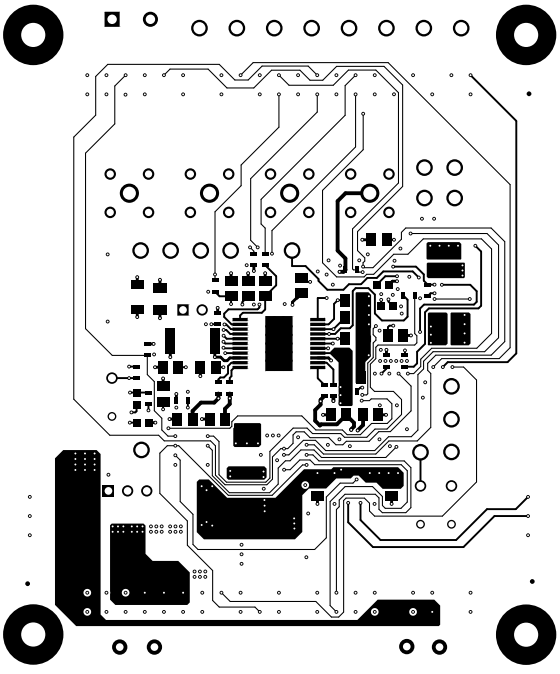

Figure 4-3. Top Layer

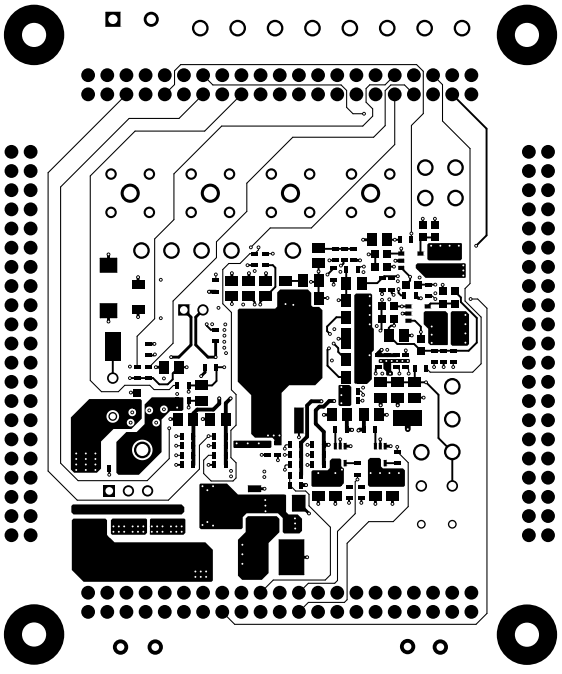

Figure 4-4. Bottom Layer

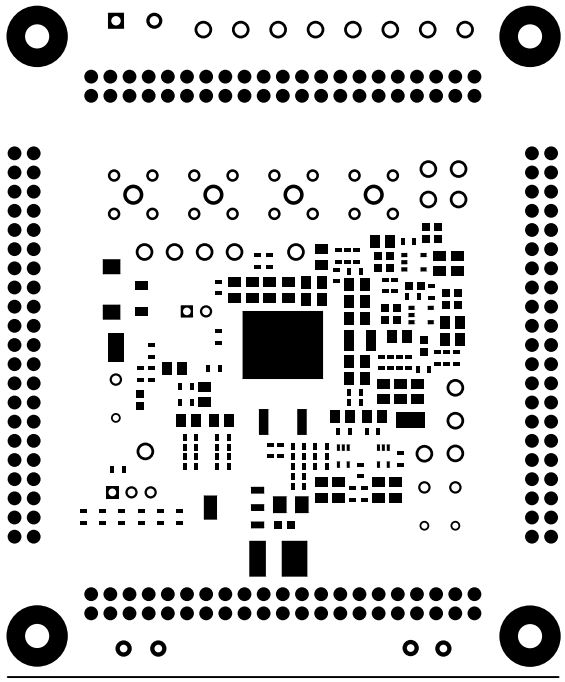

Figure 4-5. Bottom Solder

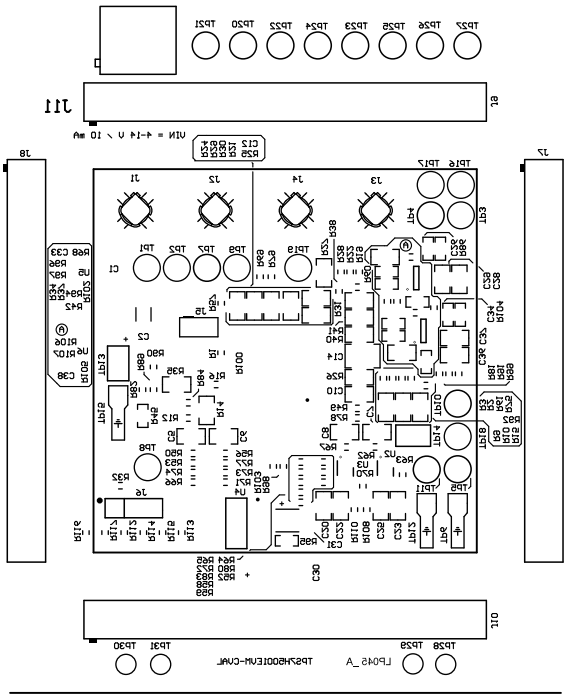

Figure 4-6. Bottom Overlay

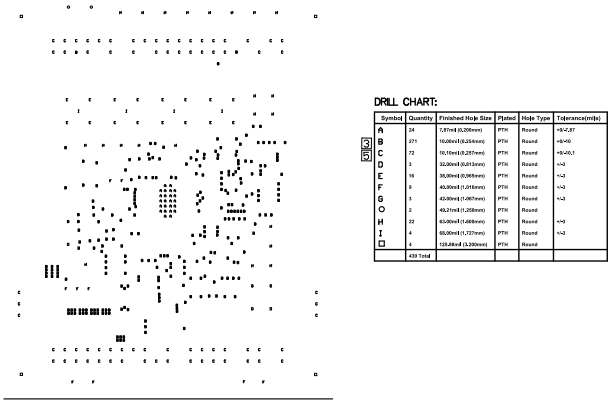

Figure 4-7. Drill Drawing

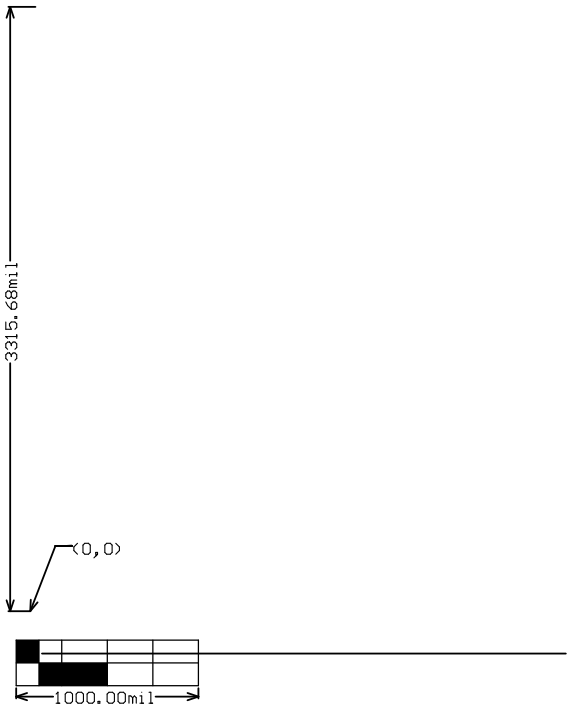

Figure 4-8. Board Dimensions

5 Schematics

Figure 5-1 through Figure 5-12 show the EVM schematics.

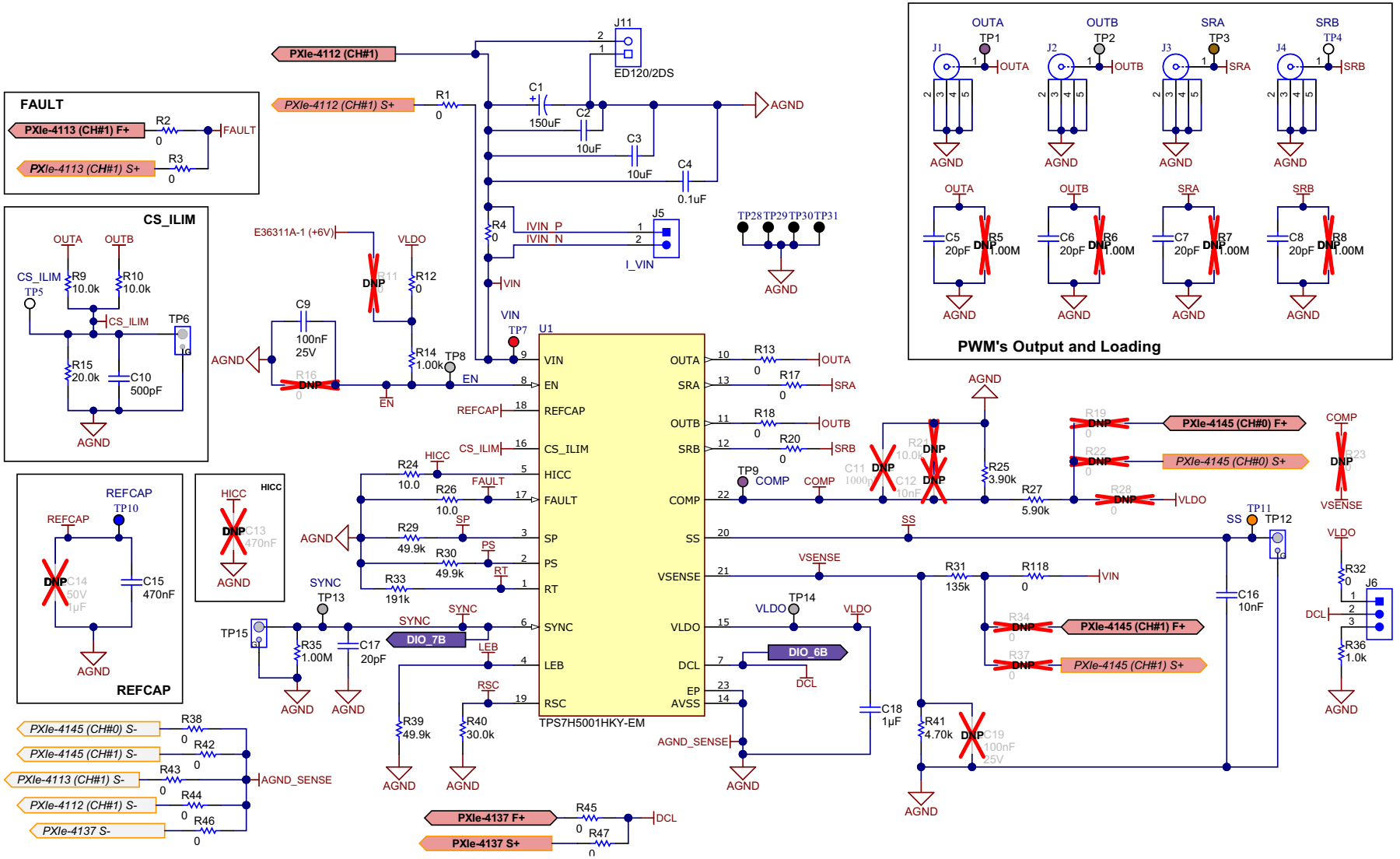

Figure 5-1. TPS7H5001EVM-CVAL Schematic (Page 1)

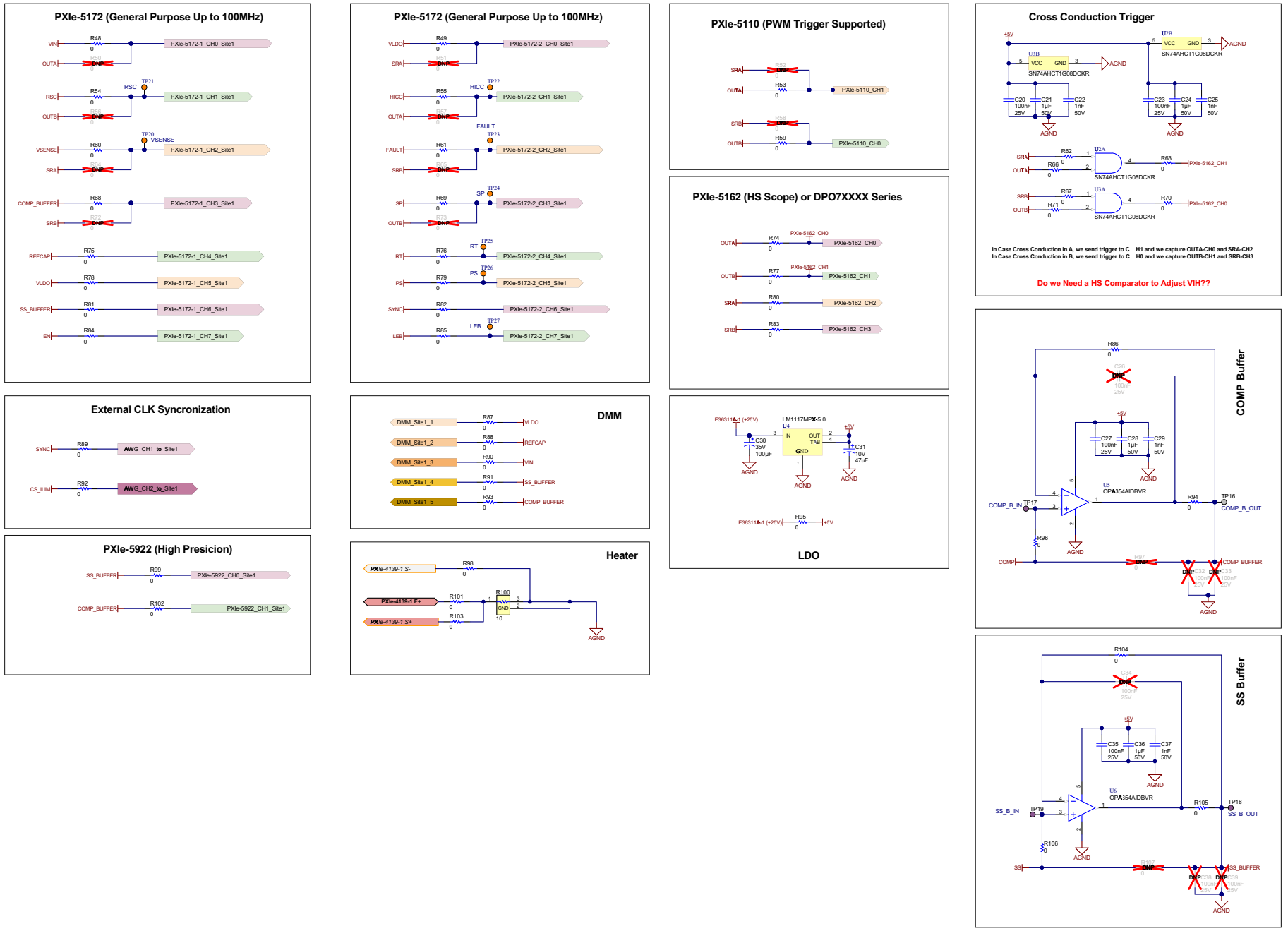

Figure 5-2. TPS7H5001EVM-CVAL Schematic (Page 2)

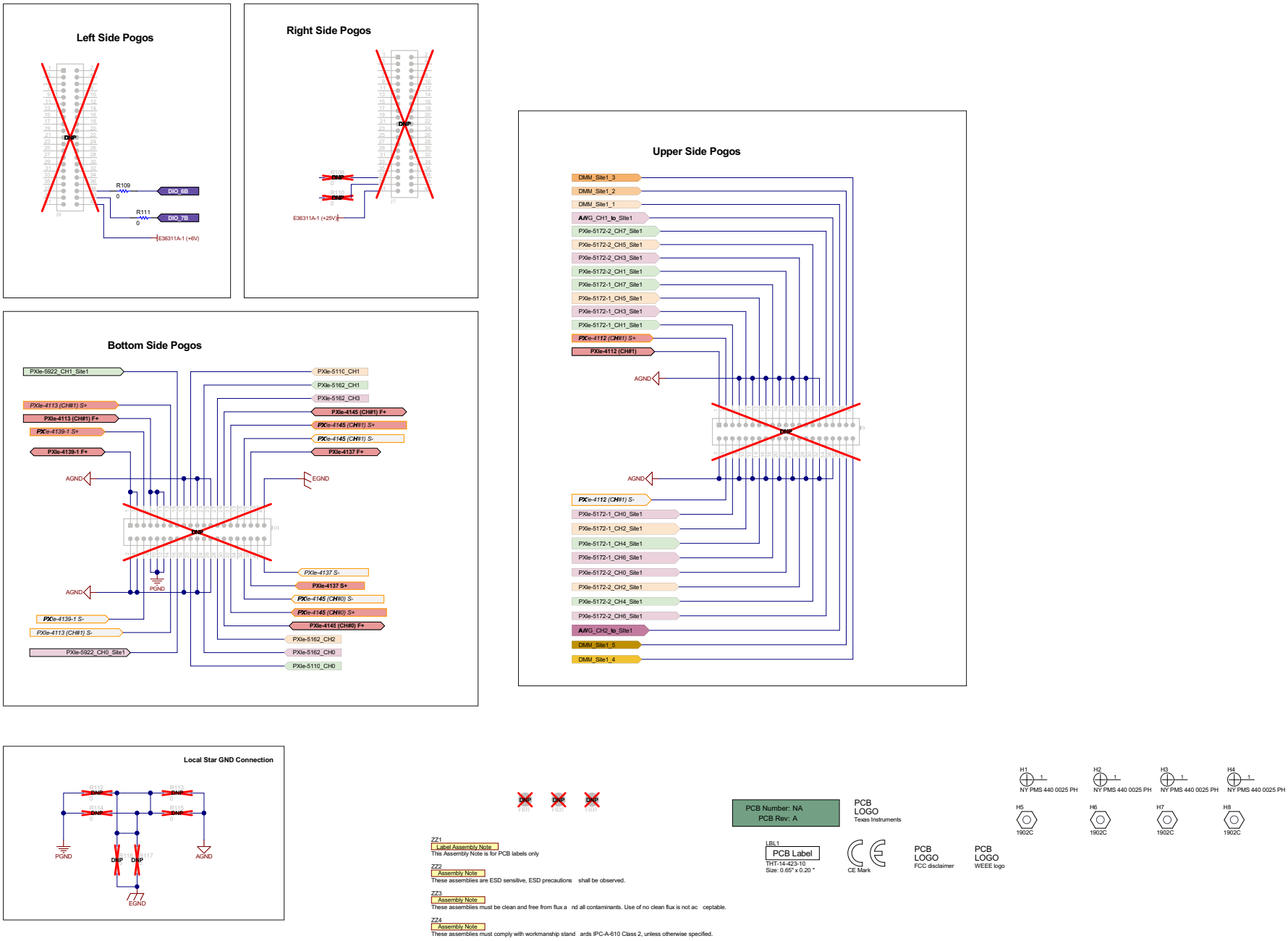

Figure 5-3. TPS7H5001EVM-CVAL Schematic (Page 3)

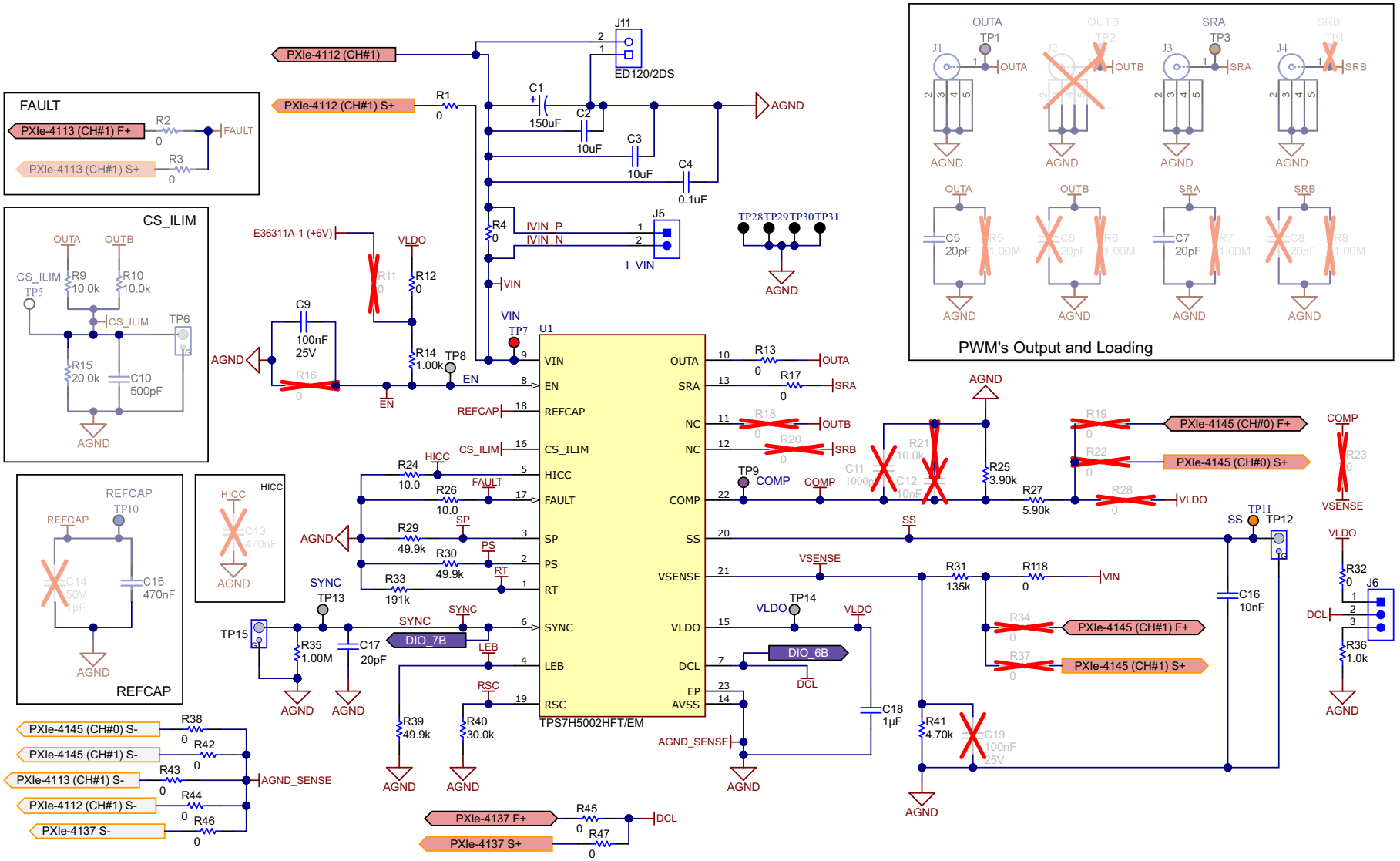

Figure 5-4. TPS7H5002EVM-CVAL Schematic (Page 1)

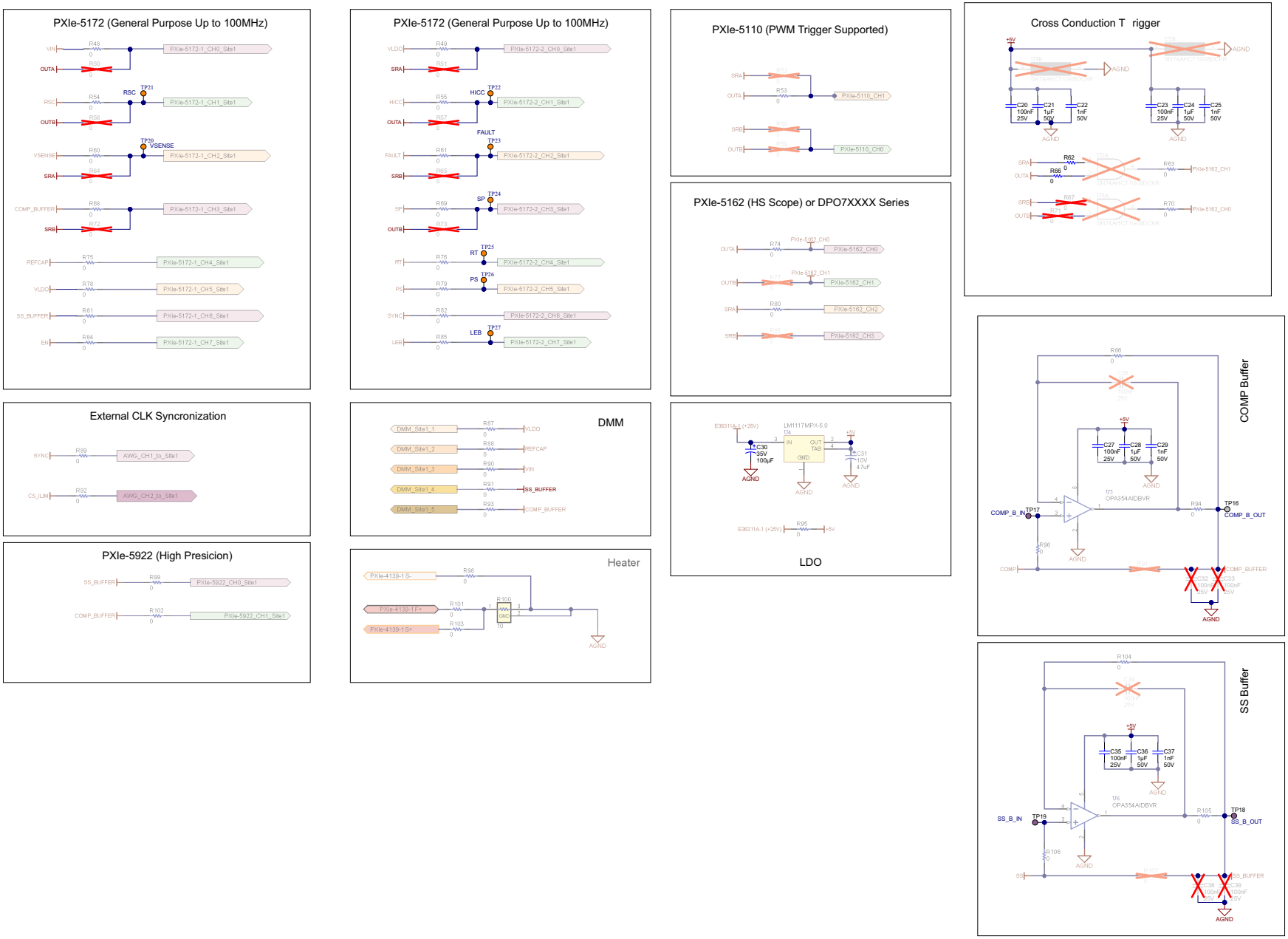

Figure 5-5. TPS7H5002EVM-CVAL Scheamtic (Page 2)

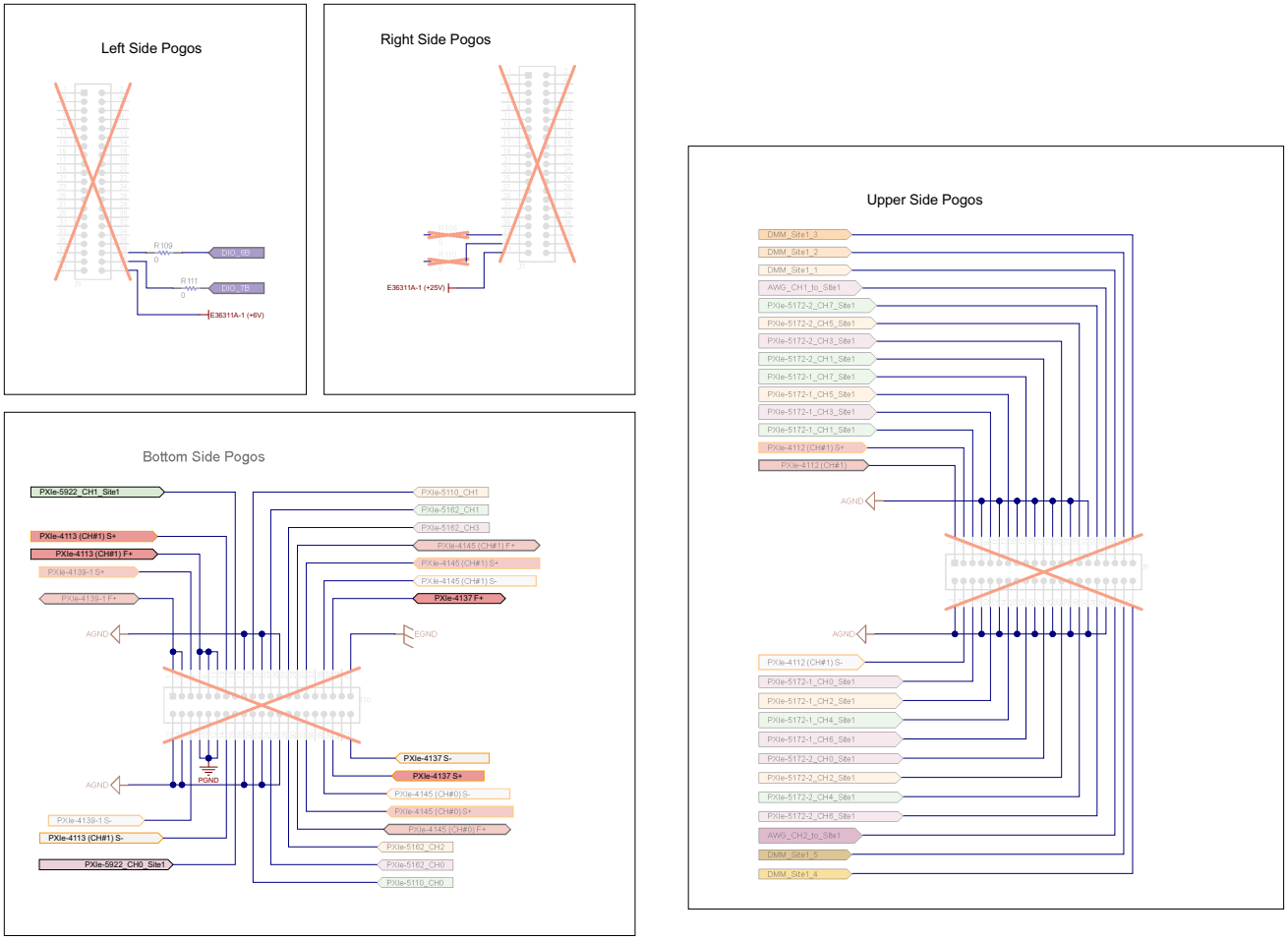

Figure 5-6. TPS7H5002EVM-CVAL Schematic (Page 3)

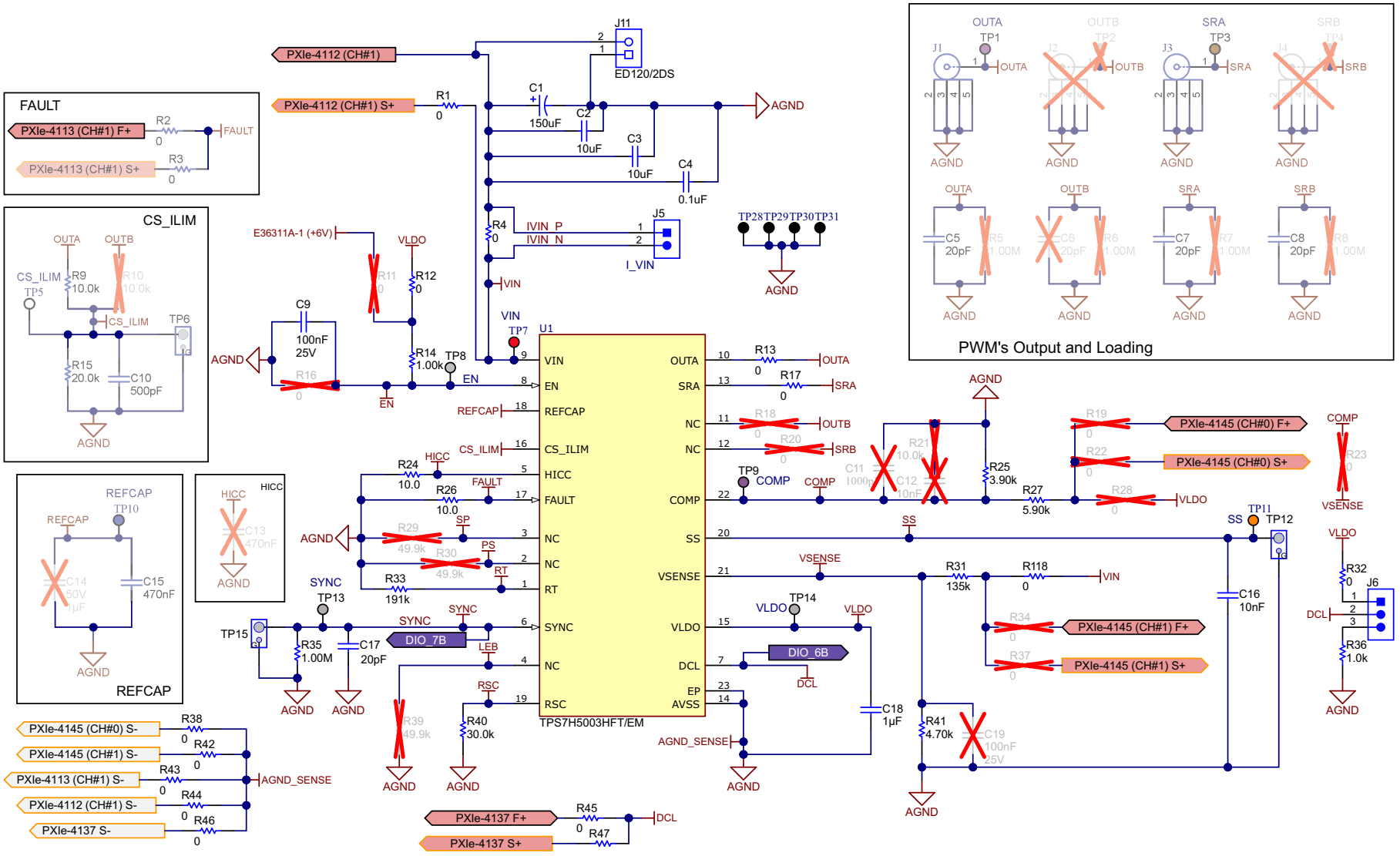

Figure 5-7. TPS7H5003EVM-CVAL Schematic (Page 1)

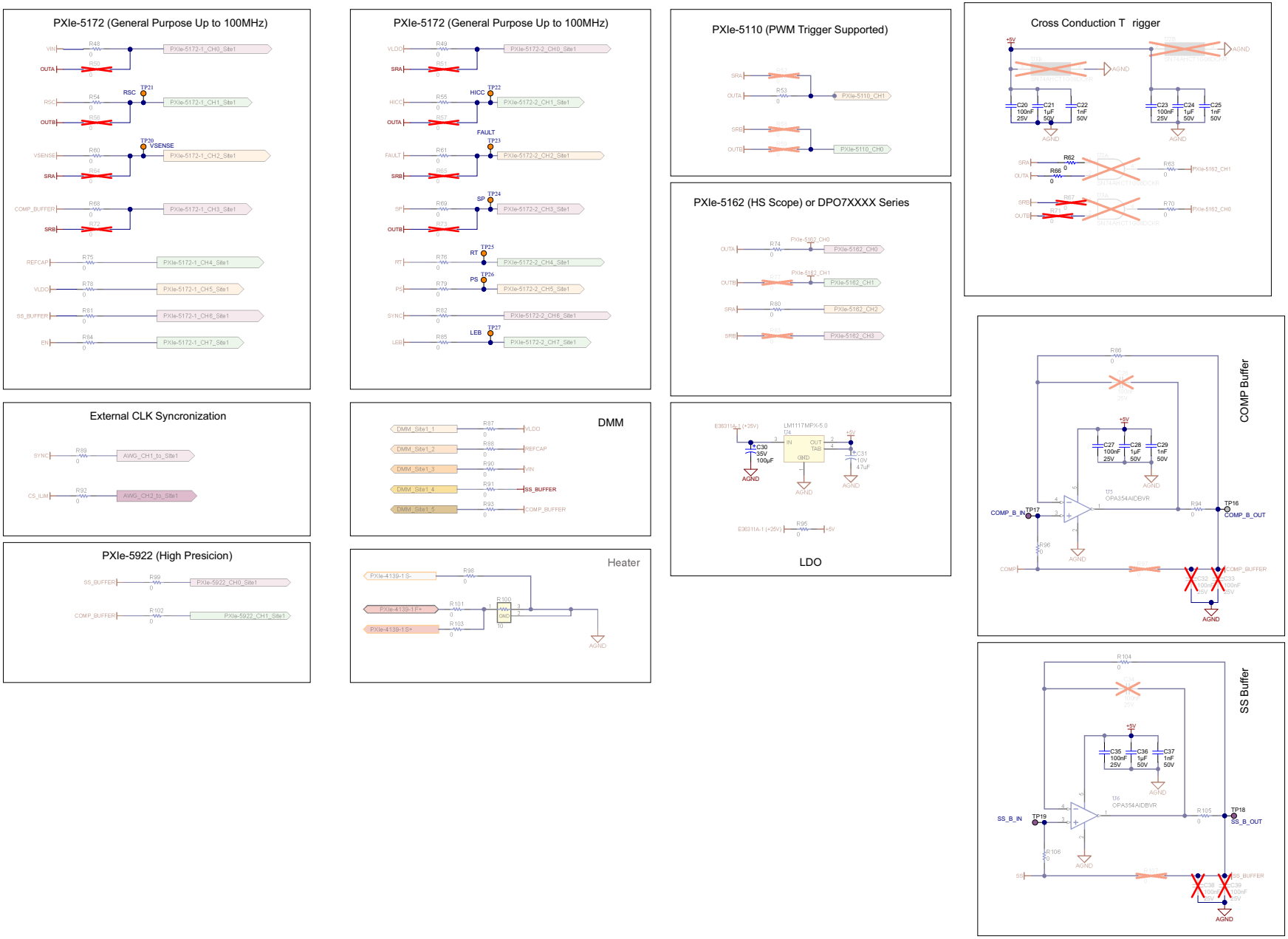

Figure 5-8. TPS7H5003EVM-CVAL Schematic (Page 2)

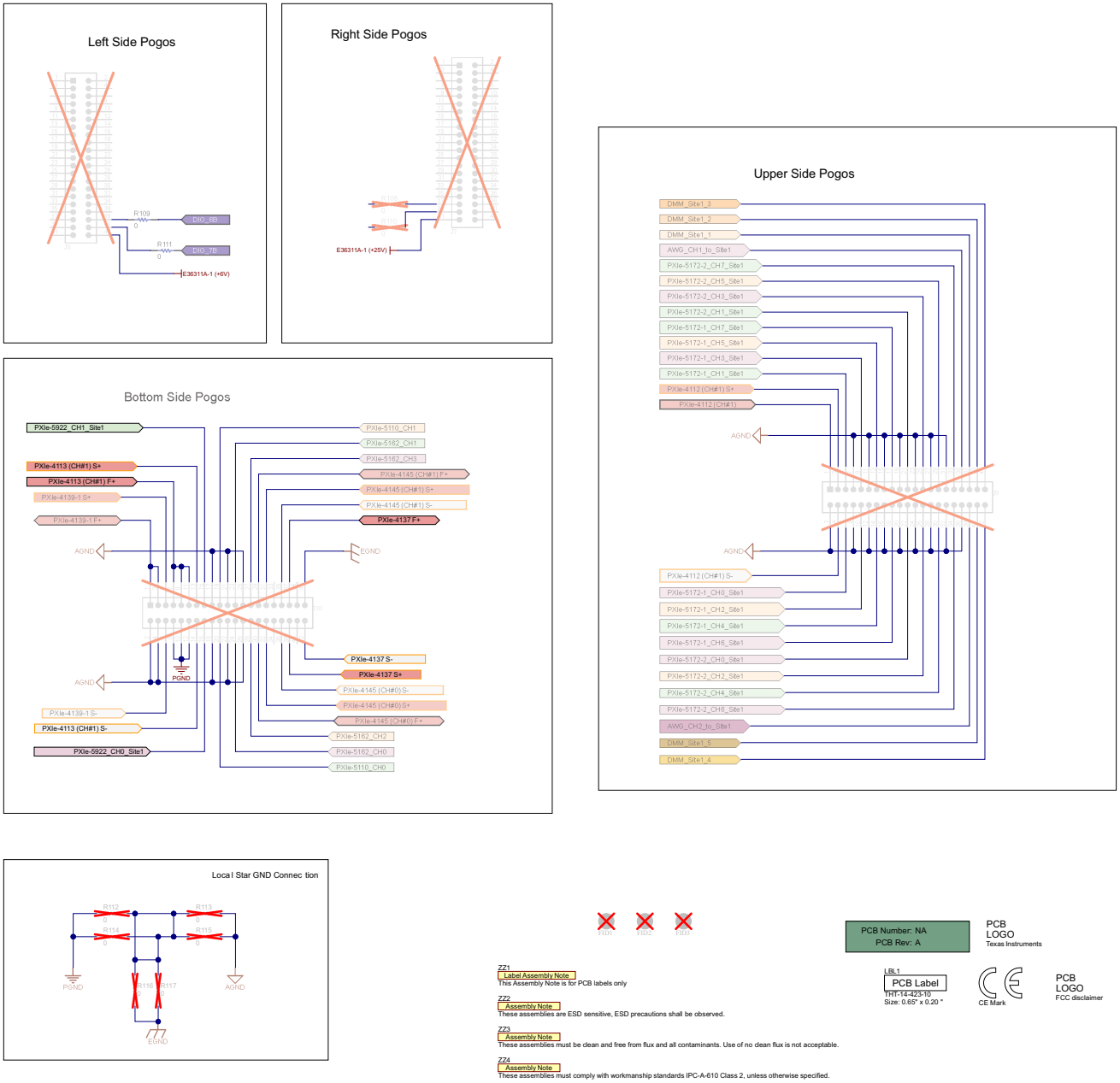

Figure 5-9. TPS7H5003EVM-CVAL Schematic (Page 3)

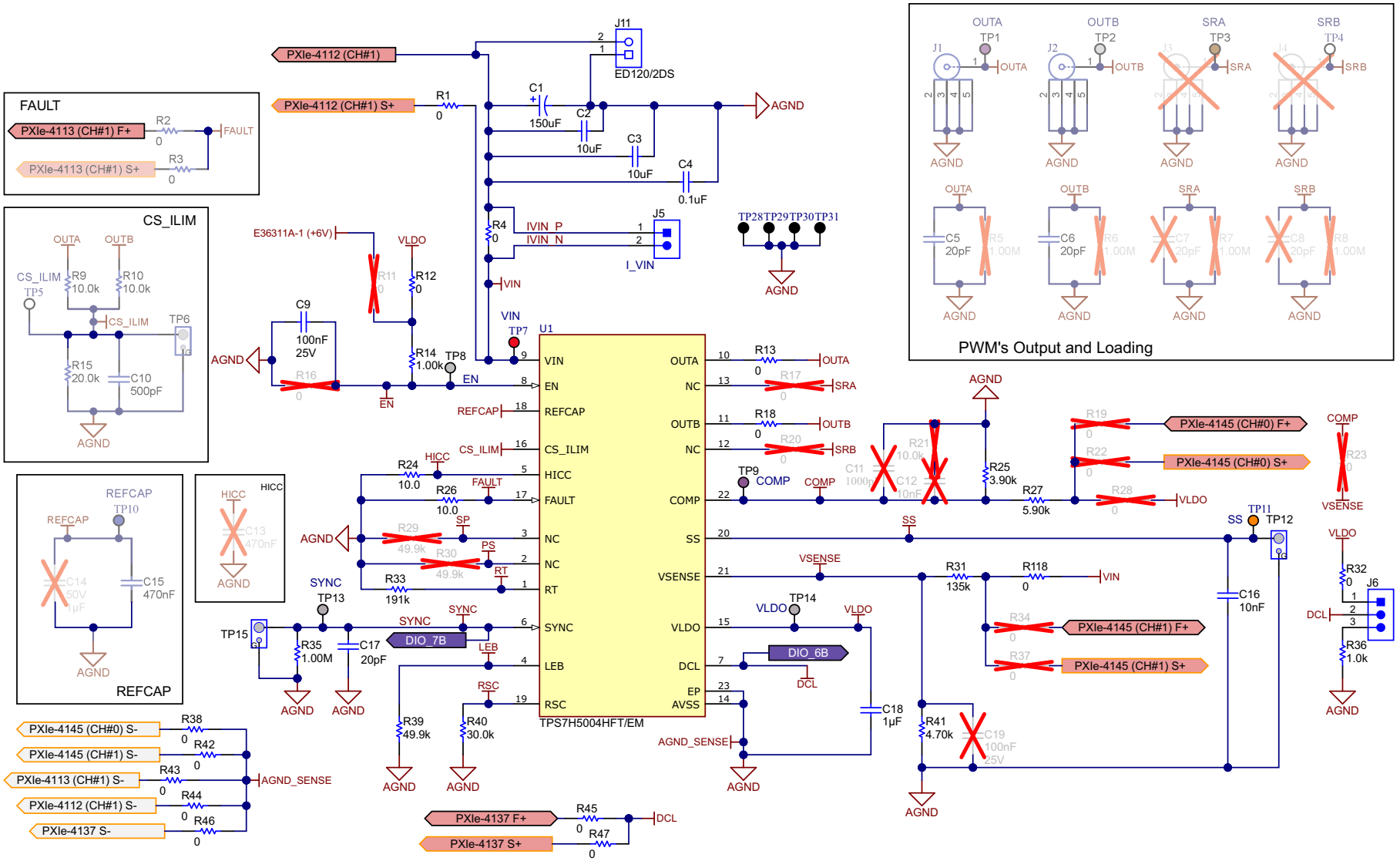

Figure 5-10. TPS7H5004EVM-CVAL Schematic (Page 1)

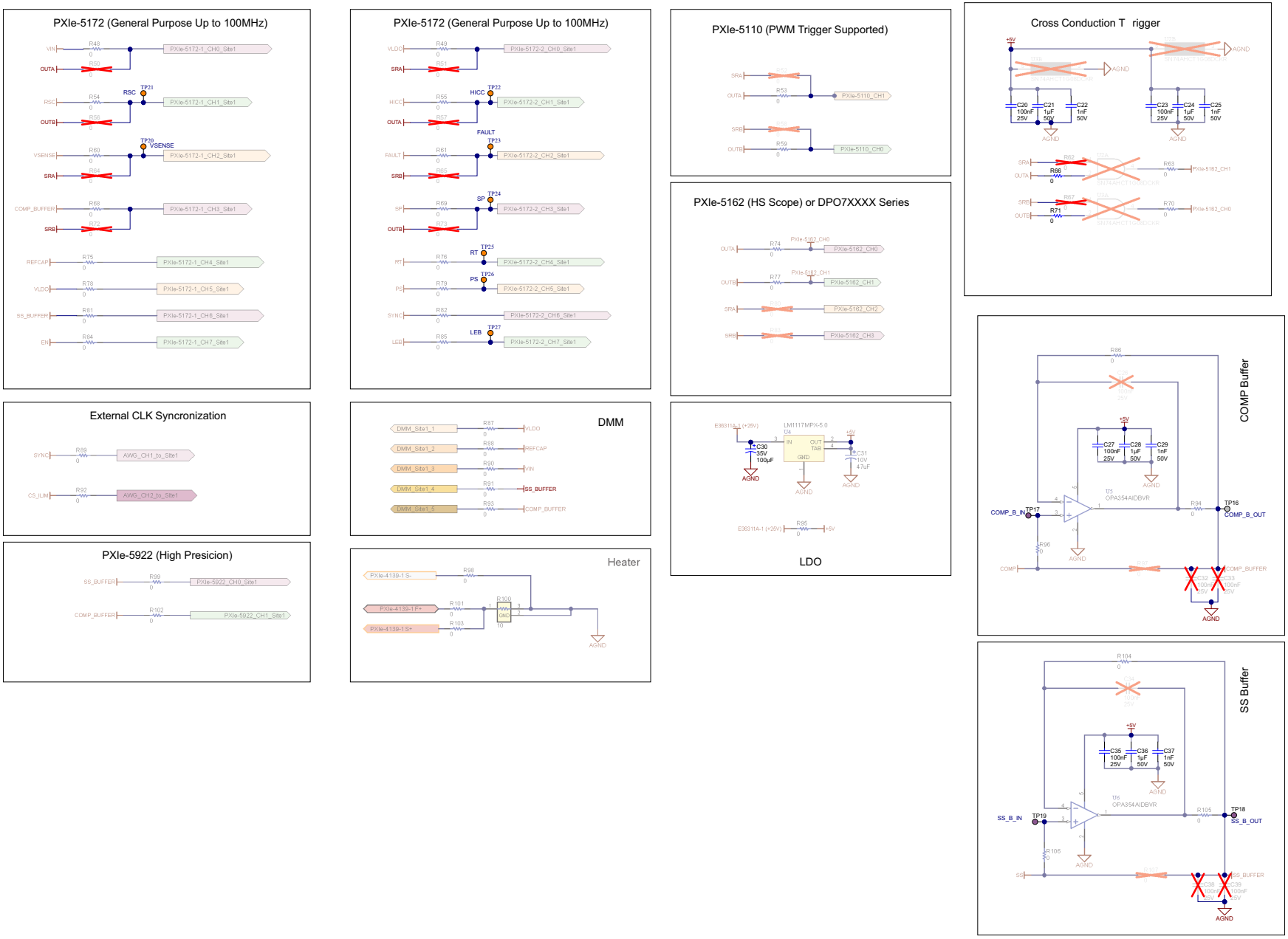

Figure 5-11. TPS7H5004EVM-CVAL Schematic (Page 2)

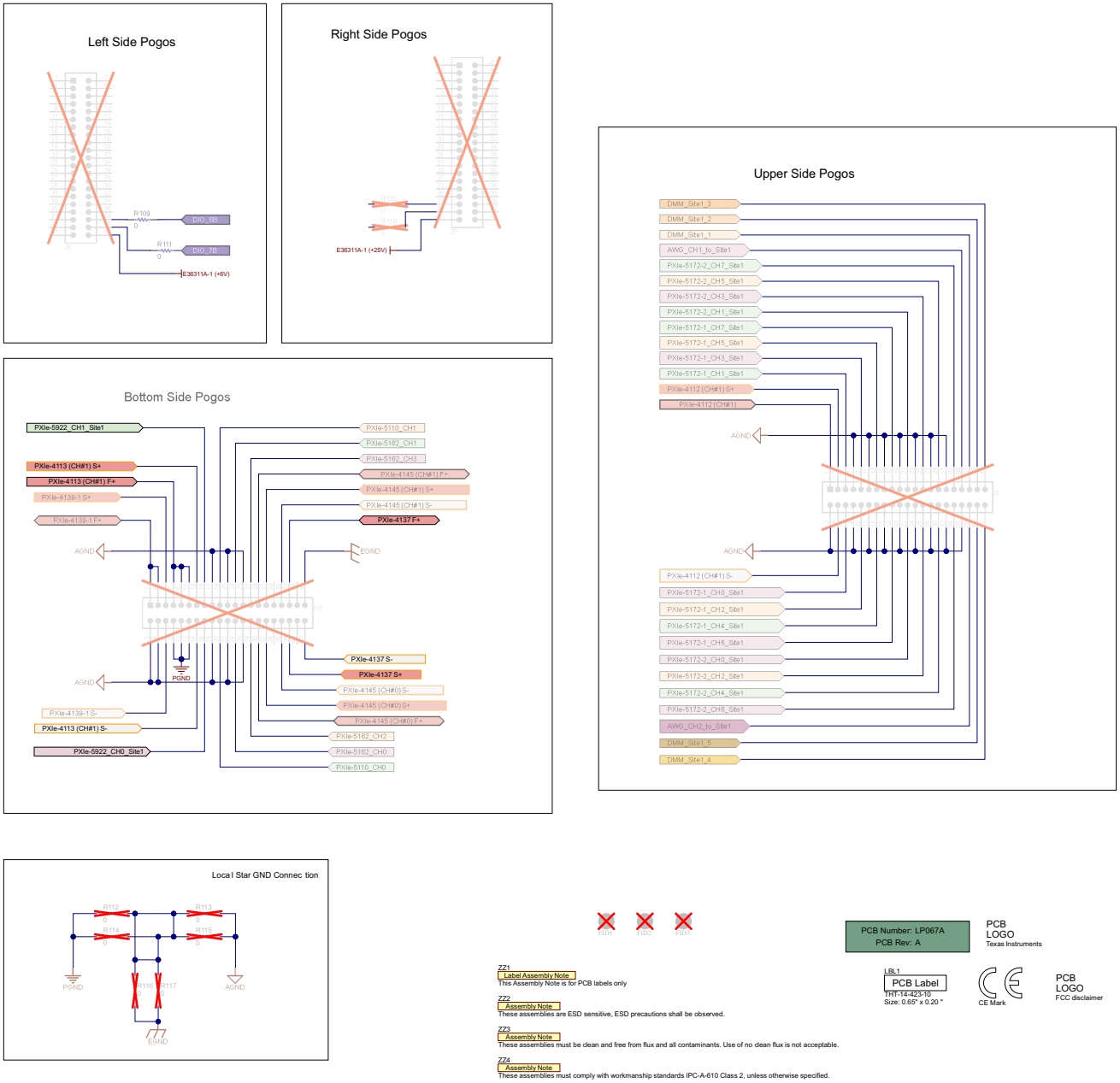

Figure 5-12. TPS7H5004EVM-CVAL Schematic (Page 3)

6 Bill of Materials

Table 6-1. TPS7H5001EVM-CVAL Bill of Materials

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
!PCB1	1		Printed Circuit Board		NA	Any
C1	1		150µF Molded Tantalum Polymer Capacitor 20V 2917 (7343 Metric) 50mOhm @ 100kHz	2917	T521D157M020ATE050	Kemet
C2, C3	2	10uF	CAP, CERM, 10 uF, 50 V, ±10%, X5R, 1206	1206	GRM31CR61H106KA12L	MuRata
C4	1	0.1uF	CAP, CERM, 0.1 uF, 50 V, ±5%, X7R, 1206	1206	12065C104JAT2A	AVX
C5, C6, C7, C8, C17	5	20pF	CAP, CERM, 20 pF, 100 V, ±5%, C0G/NP0, 0805	0805	08051A200JAT2A	AVX
C9, C20, C23, C27, C35	5	0.1uF	CAP, CERM, 0.1 uF, 25 V, ±10%, X7R, 0805	0805	C0805C104K3RACTU	Kemet
C10	1	500pF	CAP, CERM, 500 pF, 50 V,±2%, C0G/NP0, 0805	0805	08055A501GAT2A	AVX
C15	1	0.47uF	CAP, CERM, 0.47 uF, 50 V, ±10%, X7R, AEC-Q200 Grade 1, 0805	0805	GCM21BR71H474KA55L	MuRata
C16	1	0.01uF	CAP, CERM, 0.01 uF, 50 V, ±5%, X7R, 0805	0805	08055C103JAT2A	AVX
C18	1	1uF	CAP, CERM, 1 uF, 50 V, ±10%, X7R, 0805	0805	08055C105KAT2A	AVX
C21, C24, C28, C36	4	1uF	CAP, CERM, 1 uF, 50 V, ±10%, X7R, 0805	0805	885012207103	Wurth Elektronik
C22, C25, C29, C37	4	1000pF	CAP, CERM, 1000 pF, 50 V, ±10%, X7R, 0805	0805	C0805C102K5RACTU	Kemet
C30	1	100uF	CAP, Tantalum Polymer, 100 µF, 35 V,±20%, 0.1 ohm, 7.3x6.1mm SMD	7.3x6.1mm	TCN4107M035R0100	AVX
C31	1	47uF	CAP, TA, 47 uF, 10 V, ±10%, 0.5 ohm, SMD	3528-21	TPSB476K010R0500	AVX
H1, H2, H3, H4	4		Machine Screw, Round, #4-40 x 1/4, Nylon, Philips panhead	Screw	NY PMS 440 0025 PH	B&F Fastener Supply
H5, H6, H7, H8	4		Standoff, Hex, 0.5"L #4-40 Nylon	Standoff	1902C	Keystone
J1, J2, J3, J4	4		Compact Probe Tip Circuit Board Test Points, TH, 25 per	TH Scope Probe	131-5031-00	Tektronix
J5	1		Header, 100mil, 2x1, Tin, TH	Header, 2 PIN, 100mil, Tin	PEC02SAAN	Sullins Connector Solutions
J6	1		Header, 100mil, 3x1, Tin, TH	Header, 3 PIN, 100mil, Tin	PEC03SAAN	Sullins Connector Solutions
J11	1		Terminal Block, 5.08 mm, 2x1, Brass, TH	2x1 5.08 mm Terminal Block	ED120/2DS	On-Shore Technology
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650 x 0.200 inch	THT-14-423-10	Brady

Table 6-1. TPS7H5001EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
R1, R2, R3, R12, R13, R17, R18, R20, R32, R38, R42, R43, R44, R48, R49, R53, R54, R55, R59, R60, R61, R62, R63, R66, R67, R68, R69, R70, R71, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R87, R88, R89, R90, R91, R92, R93, R98, R99, R102, R103, R109, R111	54	0	RES, 0, 5%, 0.125 W, 0603	0603	MCT06030Z0000ZP500	Vishay/Beyschlag
R4, R101	2	0	RES, 0, 5%, 1 W, AEC-Q200 Grade 0, 2512	2512	CRCW25120000Z0EG	Vishay-Dale
R9, R10	2	10.0k	RES, 10.0 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	0805	CRCW080510K0FKEA	Vishay-Dale
R14	1	1.00k	RES, 1.00 k, 0.1%, 0.125 W, 0805	0805	RG2012P-102-B-T5	Susumu Co Ltd
R15	1	20.0k	RES, 20.0 k, 0.1%, 0.125 W, 0805	0805	RG2012P-203-B-T5	Susumu Co Ltd
R24, R26	2	10.0	RES, 10.0, 0.1%, 0.1 W, 0805	0805	CRT0805-BY-10R0ELF	Bourns
R25	1	3.90k	RES, 3.90 k, 0.5%, 0.1 W, 0805	0805	RR1220P-392-D	Susumu Co Ltd
R27	1	5.90k	RES, 5.90 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	0805	CRCW08055K90FKEA	Vishay-Dale
R29, R30, R39	3	49.9k	RES, 49.9 k, 0.1%, 0.125 W, 0805	0805	RG2012P-4992-B-T5	Susumu Co Ltd
R31	1	135k	RES, 135 k, 0.1%, 0.125 W, 0805	0805	RT0805BRD07135KL	Yageo America
R33	1	191k	RES, 191 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	0805	CRCW0805191KFKEA	Vishay-Dale
R35	1	1.00Meg	RES, 1.00 M, 0.5%, 0.1 W, 0805	0805	RR1220P-105-D	Susumu Co Ltd
R36	1	1.0k	RES, 1.0 k, 5%, 0.125 W, AEC-Q200 Grade 0, 0805	0805	CRCW08051K00JNEA	Vishay-Dale
R40	1	30.0k	RES, 30.0 k, 0.5%, 0.1 W, 0805	0805	RR1220P-303-D	Susumu Co Ltd
R41	1	4.70k	RES, 4.70 k, 1%, 0.5 W, AEC-Q200 Grade 0, 0805	0805	ERJ-P06F4701V	Panasonic
R45, R46, R47, R86, R94, R95, R96, R104, R105, R106, R118	11	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
R100	1	10	RES, 10, 5%, 35 W, DDPAK	DDPAK	TDH35P10R0JE	Ohmite
TP1, TP9, TP17, TP18, TP19	5		Test Point, Multipurpose, Purple, TH	Purple Multipurpose Testpoint	5129	Keystone
TP2, TP8, TP16	3		Test Point, Multipurpose, Grey, TH	Grey Multipurpose Testpoint	5128	Keystone
TP3	1		Test Point, Multipurpose, Brown, TH	Brown Multipurpose Testpoint	5125	Keystone
TP4, TP5	2		Test Point, Multipurpose, White, TH	White Multipurpose Testpoint	5012	Keystone
TP7	1		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone

Table 6-1. TPS7H5001EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
TP10	1		Test Point, Multipurpose, Blue, TH	Blue Multipurpose Testpoint	5127	Keystone
TP11, TP20, TP21, TP22, TP23, TP24, TP25, TP26, TP27	9		Test Point, Multipurpose, Orange, TH	Orange Multipurpose Testpoint	5013	Keystone
TP13, TP14	2		Test Point, Miniature, SMT	Test Point, Miniature, SMT	5019	Keystone
TP28, TP29, TP30, TP31	4		Test Point, Miniature, Black, TH	Black Miniature Testpoint	5001	Keystone
U1	1		Radiation-Hardness-Assured Si and GaN Dual Output Controller	CFP22	TPS7H5001HKY-EM	Texas Instruments
U2, U3	2		Single 2-Input Positive-AND Gate, DCK0005A, LARGE T&R	DCK0005A	SN74AHCT1G08DCKR	Texas Instruments
U4	1		800mA Low-Dropout Linear Regulator, 4-pin SOT-223	DCY0004A	TLV1117-50DCY	Texas Instruments
U5, U6	2		250 MHz, Rail-to-Rail I/O, CMOS Single Operational Amplifier, 2.5 to 5.5 V, -40 to 125 degC, 5-pin SOT23 (DBV5), Green (RoHS & no Sb/Br)	DBV0005A	OPA354AIDBVR	Texas Instruments
C11	0	1000pF	CAP, CERM, 1000 pF, 50 V, ±10%, C0G/NP0, 0805	0805	08055A102KAT2A	AVX
C12	0	0.01uF	CAP, CERM, 0.01 uF, 50 V, ±20%, X7R, 0805	0805	C0805C103M5RACTU	Kemet
C13	0	0.47uF	CAP, CERM, 0.47 uF, 50 V, ±10%, X7R, AEC-Q200 Grade 1, 0805	0805	GCM21BR71H474KA55L	MuRata
C14	0	1uF	CAP, CERM, 1 µF, 50 V,±5%, X7R, AEC-Q200 Grade 1, 1210	1210	C1210C105J5RACTU	Kemet
C19, C32, C33, C38, C39	0	0.1uF	CAP, CERM, 0.1 uF, 25 V, ±10%, X7R, 0805	0805	C0805C104K3RACTU	Kemet
C26, C34	0	0.1uF	CAP, CERM, 0.1 uF, 25 V, ±10%, X7R, 0603	0603	C0603X104K3RACTU	Kemet
FID1, FID2, FID3	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
J7, J8, J9, J10	0		Header Mate, 2.54mm, 21x2	Pads to Mate with Mill-Max_820-22-042-30-001101	820-22-042-30-001101_MATE	Mill-Max
R5, R6, R7, R8	0	1.00Meg	RES, 1.00 M, 0.5%, 0.1 W, 0805	0805	RR1220P-105-D	Susumu Co Ltd
R11, R16, R19, R22, R28, R34, R37, R50, R51, R52, R56, R57, R58, R64, R65, R72, R73, R108, R110, R112, R113, R114, R115, R116, R117	0	0	RES, 0, 5%, 0.125 W, 0603	0603	MCT06030Z0000ZP500	Vishay/Beyschlag
R21	0	10.0k	RES, 10.0 k, 1%, 0.2 W, 0805	0805	MCU08050C1002FP500	Vishay/Beyschlag
R23, R97, R107	0	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc

Table 6-2. TPS7H5002EVM-CVAL Bill of Materials

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
!PCB1	1		Printed Circuit Board		NA	Any
C1	1		150µF Molded Tantalum Polymer Capacitor 20V 2917 (7343 Metric) 50mOhm @ 100kHz	2917	T521D157M020ATE050	Kemet
C2, C3	2	10uF	CAP, CERM, 10 uF, 50 V, +/- 10%, X5R, 1206	1206	GRM31CR61H106KA12L	MuRata
C4	1	0.1uF	CAP, CERM, 0.1 uF, 50 V, +/- 5%, X7R, 1206	1206	12065C104JAT2A	AVX
C5, C6, C7, C8, C17	5	20pF	CAP, CERM, 20 pF, 100 V, +/- 5%, C0G/NP0, 0805	805	08051A200JAT2A	AVX
C9, C19, C20, C23, C27, C32, C33, C35, C38, C39	10	0.1uF	CAP, CERM, 0.1 uF, 25 V, +/- 10%, X7R, 0805	805	C0805C104K3RACTU	Kemet
C10	1	500pF	CAP, CERM, 500 pF, 50 V,+/- 2%, C0G/NP0, 0805	805	08055A501GAT2A	AVX
C11	1	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 10%, C0G/NP0, 0805	805	08055A102KAT2A	AVX
C12	1	0.01uF	CAP, CERM, 0.01 uF, 50 V, +/- 20%, X7R, 0805	805	C0805C103M5RACTU	Kemet
C13, C15	2	0.47uF	CAP, CERM, 0.47 uF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0805	805	GCM21BR71H474KA55L	MuRata
C14	1	1uF	CAP, CERM, 1 µF, 50 V,+/- 5%, X7R, AEC-Q200 Grade 1, 1210	1210	C1210C105J5RACTU	Kemet
C16	1	0.01uF	CAP, CERM, 0.01 uF, 50 V, +/- 5%, X7R, 0805	805	08055C103JAT2A	AVX
C18	1	1uF	CAP, CERM, 1 uF, 50 V, +/- 10%, X7R, 0805	805	08055C105KAT2A	AVX
C21, C24, C28, C36	4	1uF	CAP, CERM, 1 uF, 50 V, +/- 10%, X7R, 0805	805	885012207103	Wurth Elektronik
C22, C25, C29, C37	4	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 10%, X7R, 0805	805	C0805C102K5RACTU	Kemet
C26, C34	2	0.1uF	CAP, CERM, 0.1 uF, 25 V, +/- 10%, X7R, 0603	603	C0603X104K3RACTU	Kemet
C30	1	100uF	CAP, Tantalum Polymer, 100 µF, 35 V,+/- 20%, 0.1 ohm, 7.3x6.1mm SMD	7.3x6.1mm	TCN4107M035R0100	AVX
C31	1	47uF	CAP, TA, 47 uF, 10 V, +/- 10%, 0.5 ohm, SMD	3528-21	TPSB476K010R0500	AVX
FID1, FID2, FID3	3		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
H1, H2, H3, H4	4		Machine Screw, Round, #4-40 x 1/4, Nylon, Philips panhead	Screw	NY PMS 440 0025 PH	B&F Fastener Supply
H5, H6, H7, H8	4		Standoff, Hex, 0.5"L #4-40 Nylon	Standoff	1902C	Keystone
J1, J2, J3, J4	4		Compact Probe Tip Circuit Board Test Points, TH, 25 per	TH Scope Probe	131-5031-00	Tektronix

Table 6-2. TPS7H5002EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
J5	1		Header, 100mil, 2x1, Tin, TH	Header, 2 PIN, 100mil, Tin	PEC02SAAN	Sullins Connector Solutions
J6	1		Header, 100mil, 3x1, Tin, TH	Header, 3 PIN, 100mil, Tin	PEC03SAAN	Sullins Connector Solutions
J7, J8, J9, J10	4		Header Mate, 2.54mm, 21x2	Pads to Mate with Mill-Max_820-22-042-30-001101	820-22-042-30-001101_MATE	Mill-Max
J11	1		Terminal Block, 5.08 mm, 2x1, Brass, TH	2x1 5.08 mm Terminal Block	ED120/2DS	On-Shore Technology
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650 x 0.200 inch	THT-14-423-10	Brady
R1, R2, R3, R11, R12, R13, R16, R17, R18, R19, R20, R22, R28, R32, R34, R37, R38, R42, R43, R44, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R87, R88, R89, R90, R91, R92, R93, R98, R99, R102, R103, R108, R109, R110, R111, R112, R113, R114, R115, R116, R117	79	0	RES, 0, 5%, 0.125 W, 0603	603	MCT06030Z0000ZP500	Vishay/Beyschlag
R4, R101	2	0	RES, 0, 5%, 1 W, AEC-Q200 Grade 0, 2512	2512	CRCW25120000Z0EG	Vishay-Dale
R5, R6, R7, R8, R35	5	1.00Meg	RES, 1.00 M, 0.5%, 0.1 W, 0805	805	RR1220P-105-D	Susumu Co Ltd
R9, R10	2	10.0k	RES, 10.0 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW080510K0FKEA	Vishay-Dale
R14	1	1.00k	RES, 1.00 k, 0.1%, 0.125 W, 0805	805	RG2012P-102-B-T5	Susumu Co Ltd
R15	1	20.0k	RES, 20.0 k, 0.1%, 0.125 W, 0805	805	RG2012P-203-B-T5	Susumu Co Ltd
R21	1	10.0k	RES, 10.0 k, 1%, 0.2 W, 0805	805	MCU08050C1002FP500	Vishay/Beyschlag
R23, R45, R46, R47, R86, R94, R95, R96, R97, R104, R105, R106, R107, R118	14	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	RMCF0603ZT0R00	Stackpole Electronics Inc

Table 6-2. TPS7H5002EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
R24, R26	2	10	RES, 10.0, 0.1%, 0.1 W, 0805	805	CRT0805-BY-10R0ELF	Bourns
R25	1	3.90k	RES, 3.90 k, 0.5%, 0.1 W, 0805	805	RR1220P-392-D	Susumu Co Ltd
R27	1	5.90k	RES, 5.90 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW08055K90FKEA	Vishay-Dale
R29, R30, R39	3	49.9k	RES, 49.9 k, 0.1%, 0.125 W, 0805	805	RG2012P-4992-B-T5	Susumu Co Ltd
R31	1	135k	RES, 135 k, 0.1%, 0.125 W, 0805	805	RT0805BRD07135KL	Yageo America
R33	1	191k	RES, 191 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW0805191KFKEA	Vishay-Dale
R36	1	1.0k	RES, 1.0 k, 5%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW08051K00JNEA	Vishay-Dale
R40	1	30.0k	RES, 30.0 k, 0.5%, 0.1 W, 0805	805	RR1220P-303-D	Susumu Co Ltd
R41	1	4.70k	RES, 4.70 k, 1%, 0.5 W, AEC-Q200 Grade 0, 0805	805	ERJ-P06F4701V	Panasonic
R100	1	10	RES, 10, 5%, 35 W, DDPAK	DDPAK	TDH35P10R0JE	Ohmite
TP1, TP9, TP17, TP18, TP19	5		Test Point, Multipurpose, Purple, TH	Purple Multipurpose Testpoint	5129	Keystone
TP2, TP8, TP16	3		Test Point, Multipurpose, Grey, TH	Grey Multipurpose Testpoint	5128	Keystone
TP3	1		Test Point, Multipurpose, Brown, TH	Brown Multipurpose Testpoint	5125	Keystone
TP4, TP5	2		Test Point, Multipurpose, White, TH	White Multipurpose Testpoint	5012	Keystone
TP7	1		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone
TP10	1		Test Point, Multipurpose, Blue, TH	Blue Multipurpose Testpoint	5127	Keystone
TP11, TP20, TP21, TP22, TP23, TP24, TP25, TP26, TP27	9		Test Point, Multipurpose, Orange, TH	Orange Multipurpose Testpoint	5013	Keystone
TP13, TP14	2		Test Point, Miniature, SMT	Test Point, Miniature, SMT	5019	Keystone
TP28, TP29, TP30, TP31	4		Test Point, Miniature, Black, TH	Black Miniature Testpoint	5001	Keystone
U1	1		Radiation-Hardness-Assured Current Mode PWM Controllers	CFP22	TPS7H5003HFT/EM	Texas Instruments

Table 6-2. TPS7H5002EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
U2, U3	2		Single 2-Input Positive-AND Gate, DCK0005A, LARGE T&R	DCK0005A	SN74AHCT1G08DCKR	Texas Instruments
U4	1		800mA Low-Dropout Linear Regulator, 4-pin SOT-223	DCY0004A	LM1117MPX-5.0	Texas Instruments
U5, U6	2		250 MHz, Rail-to-Rail I/O, CMOS Single Operational Amplifier, 2.5 to 5.5 V, -40 to 125 degC, 5-pin SOT23 (DBV5), Green (RoHS & no Sb/Br)	DBV0005A	OPA354AIDBVR	Texas Instruments

Table 6-3. TPS7H5003EVM-CVAL Bill of Materials

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
!PCB1	1		Printed Circuit Board		NA	Any
C1	1		150µF Molded Tantalum Polymer Capacitor 20V 2917 (7343 Metric) 50mOhm @ 100kHz	2917	T521D157M020ATE050	Kemet
C2, C3	2	10uF	CAP, CERM, 10 uF, 50 V, +/- 10%, X5R, 1206	1206	GRM31CR61H106KA12L	MuRata
C4	1	0.1uF	CAP, CERM, 0.1 uF, 50 V, +/- 5%, X7R, 1206	1206	12065C104JAT2A	AVX
C5, C6, C7, C8, C17	5	20pF	CAP, CERM, 20 pF, 100 V, +/- 5%, C0G/NP0, 0805	805	08051A200JAT2A	AVX
C9, C19, C20, C23, C27, C32, C33, C35, C38, C39	10	0.1uF	CAP, CERM, 0.1 uF, 25 V, +/- 10%, X7R, 0805	805	C0805C104K3RACTU	Kemet
C10	1	500pF	CAP, CERM, 500 pF, 50 V,+/- 2%, C0G/NP0, 0805	805	08055A501GAT2A	AVX
C11	1	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 10%, C0G/NP0, 0805	805	08055A102KAT2A	AVX
C12	1	0.01uF	CAP, CERM, 0.01 uF, 50 V, +/- 20%, X7R, 0805	805	C0805C103M5RACTU	Kemet
C13, C15	2	0.47uF	CAP, CERM, 0.47 uF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0805	805	GCM21BR71H474KA55L	MuRata
C14	1	1uF	CAP, CERM, 1 µF, 50 V,+/- 5%, X7R, AEC-Q200 Grade 1, 1210	1210	C1210C105J5RACTU	Kemet
C16	1	0.01uF	CAP, CERM, 0.01 uF, 50 V, +/- 5%, X7R, 0805	805	08055C103JAT2A	AVX
C18	1	1uF	CAP, CERM, 1 uF, 50 V, +/- 10%, X7R, 0805	805	08055C105KAT2A	AVX
C21, C24, C28, C36	4	1uF	CAP, CERM, 1 uF, 50 V, +/- 10%, X7R, 0805	805	885012207103	Wurth Elektronik
C22, C25, C29, C37	4	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 10%, X7R, 0805	805	C0805C102K5RACTU	Kemet
C26, C34	2	0.1uF	CAP, CERM, 0.1 uF, 25 V, +/- 10%, X7R, 0603	603	C0603X104K3RACTU	Kemet

Table 6-3. TPS7H5003EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
C30	1	100uF	CAP, Tantalum Polymer, 100 µF, 35 V,+/- 20%, 0.1 ohm, 7.3x6.1mm SMD	7.3x6.1mm	TCN4107M035R0100	AVX
C31	1	47uF	CAP, TA, 47 uF, 10 V, +/- 10%, 0.5 ohm, SMD	3528-21	TPSB476K010R0500	AVX
FID1, FID2, FID3	3		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
H1, H2, H3, H4	4		Machine Screw, Round, #4-40 x 1/4, Nylon, Philips panhead	Screw	NY PMS 440 0025 PH	B&F Fastener Supply
H5, H6, H7, H8	4		Standoff, Hex, 0.5	Standoff	1902C	Keystone
J1, J2, J3, J4	4		Compact Probe Tip Circuit Board Test Points, TH, 25 per	TH Scope Probe	131-5031-00	Tektronix
J5	1		Header, 100mil, 2x1, Tin, TH	Header, 2 PIN, 100mil, Tin	PEC02SAAN	Sullins Connector Solutions
J6	1		Header, 100mil, 3x1, Tin, TH	Header, 3 PIN, 100mil, Tin	PEC03SAAN	Sullins Connector Solutions
J7, J8, J9, J10	4		Header Mate, 2.54mm, 21x2	Pads to Mate with Mill-Max_820-22-042-30-001101	820-22-042-30-001101_MATE	Mill-Max
J11	1		Terminal Block, 5.08 mm, 2x1, Brass, TH	2x1 5.08 mm Terminal Block	ED120/2DS	On-Shore Technology
LBL1	1		Thermal Transfer Printable Labels, 0.650	PCB Label 0.650 x 0.200 inch	THT-14-423-10	Brady
R1, R2, R3, R11, R12, R13, R16, R17, R18, R19, R20, R22, R28, R32, R34, R37, R38, R42, R43, R44, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R87, R88, R89, R90, R91, R92, R93, R98, R99, R102, R103, R108, R109, R110, R111, R112, R113, R114, R115, R116, R117	79	0	RES, 0, 5%, 0.125 W, 0603	603	MCT06030Z0000ZP500	Vishay/Beyschlag
R4, R101	2	0	RES, 0, 5%, 1 W, AEC-Q200 Grade 0, 2512	2512	CRCW25120000Z0EG	Vishay-Dale

Table 6-3. TPS7H5003EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
R5, R6, R7, R8, R35	5	1.00Meg	RES, 1.00 M, 0.5%, 0.1 W, 0805	805	RR1220P-105-D	Susumu Co Ltd
R9, R10	2	10.0k	RES, 10.0 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW080510K0FKEA	Vishay-Dale
R14	1	1.00k	RES, 1.00 k, 0.1%, 0.125 W, 0805	805	RG2012P-102-B-T5	Susumu Co Ltd
R15	1	20.0k	RES, 20.0 k, 0.1%, 0.125 W, 0805	805	RG2012P-203-B-T5	Susumu Co Ltd
R21	1	10.0k	RES, 10.0 k, 1%, 0.2 W, 0805	805	MCU08050C1002FP500	Vishay/Beyschlag
R23, R45, R46, R47, R86, R94, R95, R96, R97, R104, R105, R106, R107, R118	14	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	RMCF0603ZT0R00	Stackpole Electronics Inc
R24, R26	2	10	RES, 10.0, 0.1%, 0.1 W, 0805	805	CRT0805-BY-10R0ELF	Bourns
R25	1	3.90k	RES, 3.90 k, 0.5%, 0.1 W, 0805	805	RR1220P-392-D	Susumu Co Ltd
R27	1	5.90k	RES, 5.90 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW08055K90FKEA	Vishay-Dale
R29, R30, R39	3	49.9k	RES, 49.9 k, 0.1%, 0.125 W, 0805	805	RG2012P-4992-B-T5	Susumu Co Ltd
R31	1	135k	RES, 135 k, 0.1%, 0.125 W, 0805	805	RT0805BRD07135KL	Yageo America
R33	1	191k	RES, 191 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW0805191KFKEA	Vishay-Dale
R36	1	1.0k	RES, 1.0 k, 5%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW08051K00JNEA	Vishay-Dale
R40	1	30.0k	RES, 30.0 k, 0.5%, 0.1 W, 0805	805	RR1220P-303-D	Susumu Co Ltd
R41	1	4.70k	RES, 4.70 k, 1%, 0.5 W, AEC-Q200 Grade 0, 0805	805	ERJ-P06F4701V	Panasonic
R100	1	10	RES, 10, 5%, 35 W, DDPAK	DDPAK	TDH35P10R0JE	Ohmite
TP1, TP9, TP17, TP18, TP19	5		Test Point, Multipurpose, Purple, TH	Purple Multipurpose Testpoint	5129	Keystone
TP2, TP8, TP16	3		Test Point, Multipurpose, Grey, TH	Grey Multipurpose Testpoint	5128	Keystone
TP3	1		Test Point, Multipurpose, Brown, TH	Brown Multipurpose Testpoint	5125	Keystone
TP4, TP5	2		Test Point, Multipurpose, White, TH	White Multipurpose Testpoint	5012	Keystone
TP7	1		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone

Table 6-3. TPS7H5003EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
TP10	1		Test Point, Multipurpose, Blue, TH	Blue Multipurpose Testpoint	5127	Keystone
TP11, TP20, TP21, TP22, TP23, TP24, TP25, TP26, TP27	9		Test Point, Multipurpose, Orange, TH	Orange Multipurpose Testpoint	5013	Keystone
TP13, TP14	2		Test Point, Miniature, SMT	Test Point, Miniature, SMT	5019	Keystone
TP28, TP29, TP30, TP31	4		Test Point, Miniature, Black, TH	Black Miniature Testpoint	5001	Keystone
U1	1		Radiation-Hardness-Assured Current Mode PWM Controllers	CFP22	TPS7H5003HFT/EM	Texas Instruments
U2, U3	2		Single 2-Input Positive-AND Gate, DCK0005A, LARGE T&R	DCK0005A	SN74AHCT1G08DCKR	Texas Instruments
U4	1		800mA Low-Dropout Linear Regulator, 4-pin SOT-223	DCY0004A	LM1117MPX-5.0	Texas Instruments
U5, U6	2		250 MHz, Rail-to-Rail I/O, CMOS Single Operational Amplifier, 2.5 to 5.5 V, -40 to 125 degC, 5-pin SOT23 (DBV5), Green (RoHS & no Sb/Br)	DBV0005A	OPA354AIDBVR	Texas Instruments

Table 6-4. TPS7H5004EVM-CVAL Bill of Materials

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
!PCB1	1		Printed Circuit Board		LP067A	Any
C1	1		150µF Molded Tantalum Polymer Capacitor 20V 2917 (7343 Metric) 50mOhm @ 100kHz	2917	T521D157M020ATE050	Kemet
C2, C3	2	10uF	CAP, CERM, 10 uF, 50 V, +/- 10%, X5R, 1206	1206	GRM31CR61H106KA12L	MuRata
C4	1	0.1uF	CAP, CERM, 0.1 uF, 50 V, +/- 5%, X7R, 1206	1206	12065C104JAT2A	AVX
C5, C6, C7, C8, C17	5	20pF	CAP, CERM, 20 pF, 100 V, +/- 5%, C0G/NP0, 0805	805	08051A200JAT2A	AVX
C9, C19, C20, C23, C27, C32, C33, C35, C38, C39	10	0.1uF	CAP, CERM, 0.1 uF, 25 V, +/- 10%, X7R, 0805	805	C0805C104K3RACTU	Kemet
C10	1	500pF	CAP, CERM, 500 pF, 50 V,+/- 2%, C0G/NP0, 0805	805	08055A501GAT2A	AVX
C11	1	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 10%, C0G/NP0, 0805	805	08055A102KAT2A	AVX
C12	1	0.01uF	CAP, CERM, 0.01 uF, 50 V, +/- 20%, X7R, 0805	805	C0805C103M5RACTU	Kemet

Table 6-4. TPS7H5004EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
C13, C15	2	0.47uF	CAP, CERM, 0.47 uF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0805	805	GCM21BR71H474KA55L	MuRata
C14	1	1uF	CAP, CERM, 1 µF, 50 V,+/- 5%, X7R, AEC-Q200 Grade 1, 1210	1210	C1210C105J5RACTU	Kemet
C16	1	0.01uF	CAP, CERM, 0.01 uF, 50 V, +/- 5%, X7R, 0805	805	08055C103JAT2A	AVX
C18	1	1uF	CAP, CERM, 1 uF, 50 V, +/- 10%, X7R, 0805	805	08055C105KAT2A	AVX
C21, C24, C28, C36	4	1uF	CAP, CERM, 1 uF, 50 V, +/- 10%, X7R, 0805	805	885012207103	Wurth Elektronik
C22, C25, C29, C37	4	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 10%, X7R, 0805	805	C0805C102K5RACTU	Kemet
C26, C34	2	0.1uF	CAP, CERM, 0.1 uF, 25 V, +/- 10%, X7R, 0603	603	C0603X104K3RACTU	Kemet
C30	1	100uF	CAP, Tantalum Polymer, 100 µF, 35 V,+/- 20%, 0.1 ohm, 7.3x6.1mm SMD	7.3x6.1mm	TCN4107M035R0100	AVX
C31	1	47uF	CAP, TA, 47 uF, 10 V, +/- 10%, 0.5 ohm, SMD	3528-21	TPSB476K010R0500	AVX
FID1, FID2, FID3	3		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
H1, H2, H3, H4	4		Machine Screw, Round, #4-40 x 1/4, Nylon, Philips panhead	Screw	NY PMS 440 0025 PH	B&F Fastener Supply
H5, H6, H7, H8	4		Standoff, Hex, 0.5"L #4-40 Nylon	Standoff	1902C	Keystone
J1, J2, J3, J4	4		Compact Probe Tip Circuit Board Test Points, TH, 25 per	TH Scope Probe	131-5031-00	Tektronix
J5	1		Header, 100mil, 2x1, Tin, TH	Header, 2 PIN, 100mil, Tin	PEC02SAAN	Sullins Connector Solutions
J6	1		Header, 100mil, 3x1, Tin, TH	Header, 3 PIN, 100mil, Tin	PEC03SAAN	Sullins Connector Solutions
J7, J8, J9, J10	4		Header Mate, 2.54mm, 21x2	Pads to Mate with Mill-Max_820-22-042-30-001101	820-22-042-30-001101_MATE	Mill-Max
J11	1		Terminal Block, 5.08 mm, 2x1, Brass, TH	2x1 5.08 mm Terminal Block	ED120/2DS	On-Shore Technology
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650 x 0.200 inch	THT-14-423-10	Brady

Table 6-4. TPS7H5004EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
R1, R2, R3, R11, R12, R13, R16, R17, R18, R19, R20, R22, R28, R32, R34, R37, R38, R42, R43, R44, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R87, R88, R89, R90, R91, R92, R93, R98, R99, R102, R103, R108, R109, R110, R111, R112, R113, R114, R115, R116, R117	79	0	RES, 0, 5%, 0.125 W, 0603	603	MCT06030Z0000ZP500	Vishay/Beyschlag
R4, R101	2	0	RES, 0, 5%, 1 W, AEC-Q200 Grade 0, 2512	2512	CRCW25120000Z0EG	Vishay-Dale
R5, R6, R7, R8, R35	5	1.00Meg	RES, 1.00 M, 0.5%, 0.1 W, 0805	805	RR1220P-105-D	Susumu Co Ltd
R9, R10	2	10.0k	RES, 10.0 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW080510K0FKEA	Vishay-Dale
R14	1	1.00k	RES, 1.00 k, 0.1%, 0.125 W, 0805	805	RG2012P-102-B-T5	Susumu Co Ltd
R15	1	20.0k	RES, 20.0 k, 0.1%, 0.125 W, 0805	805	RG2012P-203-B-T5	Susumu Co Ltd
R21	1	10.0k	RES, 10.0 k, 1%, 0.2 W, 0805	805	MCU08050C1002FP500	Vishay/Beyschlag
R23, R45, R46, R47, R86, R94, R95, R96, R97, R104, R105, R106, R107, R118	14	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	RMCF0603ZT0R00	Stackpole Electronics Inc
R24, R26	2	10	RES, 10.0, 0.1%, 0.1 W, 0805	805	CRT0805-BY-10R0ELF	Bourns
R25	1	3.90k	RES, 3.90 k, 0.5%, 0.1 W, 0805	805	RR1220P-392-D	Susumu Co Ltd
R27	1	5.90k	RES, 5.90 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW08055K90FKEA	Vishay-Dale
R29, R30, R39	3	49.9k	RES, 49.9 k, 0.1%, 0.125 W, 0805	805	RG2012P-4992-B-T5	Susumu Co Ltd
R31	1	135k	RES, 135 k, 0.1%, 0.125 W, 0805	805	RT0805BRD07135KL	Yageo America
R33	1	191k	RES, 191 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW0805191KFKEA	Vishay-Dale
R36	1	1.0k	RES, 1.0 k, 5%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW08051K00JNEA	Vishay-Dale
R40	1	30.0k	RES, 30.0 k, 0.5%, 0.1 W, 0805	805	RR1220P-303-D	Susumu Co Ltd

Table 6-4. TPS7H5004EVM-CVAL Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
R41	1	4.70k	RES, 4.70 k, 1%, 0.5 W, AEC-Q200 Grade 0, 0805	805	ERJ-P06F4701V	Panasonic
R100	1	10	RES, 10, 5%, 35 W, DDPAK	DDPAK	TDH35P10R0JE	Ohmite
TP1, TP9, TP17, TP18, TP19	5		Test Point, Multipurpose, Purple, TH	Purple Multipurpose Testpoint	5129	Keystone
TP2, TP8, TP16	3		Test Point, Multipurpose, Grey, TH	Grey Multipurpose Testpoint	5128	Keystone
TP3	1		Test Point, Multipurpose, Brown, TH	Brown Multipurpose Testpoint	5125	Keystone
TP4, TP5	2		Test Point, Multipurpose, White, TH	White Multipurpose Testpoint	5012	Keystone
TP7	1		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone
TP10	1		Test Point, Multipurpose, Blue, TH	Blue Multipurpose Testpoint	5127	Keystone
TP11, TP20, TP21, TP22, TP23, TP24, TP25, TP26, TP27	9		Test Point, Multipurpose, Orange, TH	Orange Multipurpose Testpoint	5013	Keystone
TP13, TP14	2		Test Point, Miniature, SMT	Test Point, Miniature, SMT	5019	Keystone
TP28, TP29, TP30, TP31	4		Test Point, Miniature, Black, TH	Black Miniature Testpoint	5001	Keystone
U1	1		Radiation-Hardness-Assured Current Mode PWM Controllers	CFP-22	TPS7H5004HFT/EM	Texas Instruments
U2, U3	2		Single 2-Input Positive-AND Gate, DCK0005A, LARGE T&R	DCK0005A	SN74AHCT1G08DCKR	Texas Instruments
U4	1		800mA Low-Dropout Linear Regulator, 4-pin SOT-223	DCY0004A	LM1117MPX-5.0	Texas Instruments
U5, U6	2		250 MHz, Rail-to-Rail I/O, CMOS Single Operational Amplifier, 2.5 to 5.5 V, -40 to 125 degC, 5-pin SOT23 (DBV5), Green (RoHS & no Sb/Br)	DBV0005A	OPA354AIDBVR	Texas Instruments

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