EVM User's Guide: TPS7H3xx4EVM-CVAL

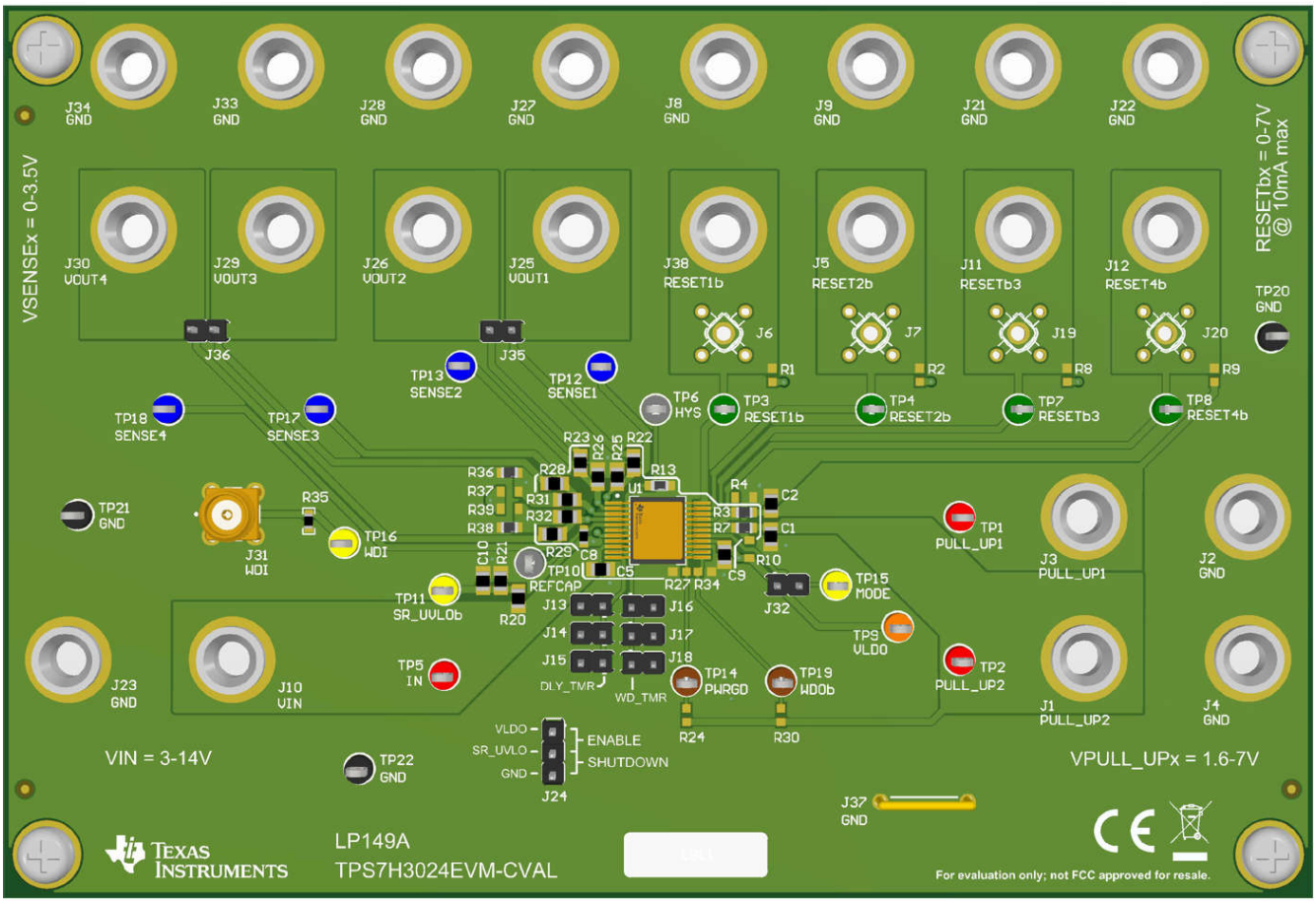
TPS7H3xx4EVM-CVAL Evaluation Module (EVM)

Description

TPS7H3024EVM-CVAL, TPS7H3124EVM-CVAL, TPS7H3034EVM-CVAL, and TPS7H3134EVM-CVAL demonstrate the operation of a single TPS7H3024-SP, TPS7H3124-SP, TPS7H3034-SP, or TPS7H3134-SP supervisor (ceramic package). These boards have identical layouts, but minor BOM differences, and can be used interchangeably as long as the configuration is updated for the IC that is populated. Collectively these boards will be refered to as TPS7H3xx4EVM-CVAL.

Features

- Flexible configuration options, including capability to sense negative rails
- Customizable timers, sense thresholds, sense hysteresis, sense mode selection, and turn on/off thresholds



EVM Board

1 Evaluation Module Overview

1.1 Introduction

The TPS7H3xx4EVM-CVAL is the Evaluation Module (EVM) for the ceramic package option of the TPS7H3xx4 supervisors and provides a platform to electrically evaluate their features. This user's guide provides details about the EVM, including the configuration, schematics, and BOM.

The EVM is designed to provide flexibility in configuring the device under different conditions, through footprints for external components and multiple connection options for monitored external rails and RESETb signal outputs. By default, the device on the EVM is configured as shown in TPS7H3xx4EVM-CVAL Default Configuration and Default EVM Schematic. To configure the device in a different configuration, please refer to the TPS7H3xx4 data sheet to calculate the values of the passives around the device that needs to be changed.

1.2 Kit Contents

- EVM board (1)
- EVM Kit User Guide (1)

1.3 Specification

The simplified schematic below assumes TPS7H30x4 (push-pull output variants). For the TPS7H31x4 (open-drain variants), the PULL_UPx pins will instead be GND or VLDO, and the 6 outputs will each be tied to the PULL_UPx rails with external 10k pull-up resistors.

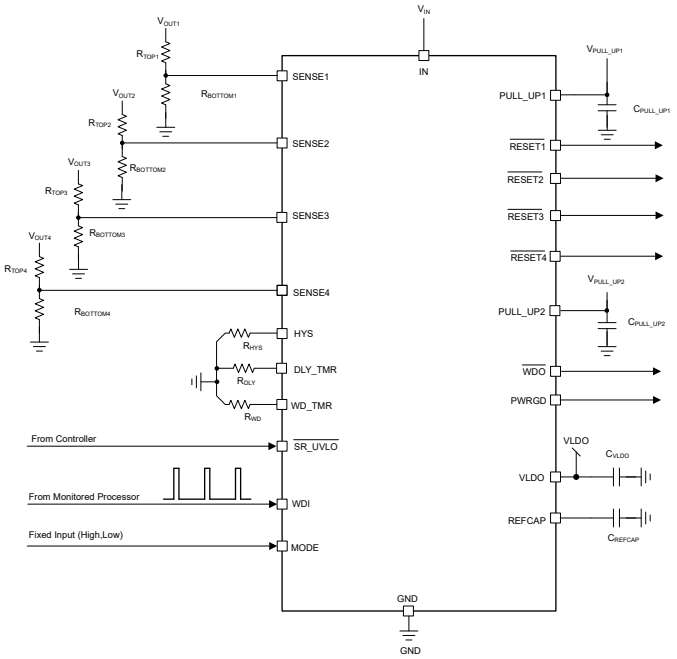


Figure 1-1. Default Configuration Simplified Schematic

Table 1-1. Default EVM Configuration

Specification	Value	Description
Input Voltage VIN	12V	Falls within the recommended device input voltage range of 3V to 14V.
Turn On Threshold	10.3V	VIN rising/falling value that turns the device ON/OFF. Set by: R20 = 10 kΩ R21 = 620 Ω
Turn Off Threshold	8.5V	
PULL_UP1 Voltage	1.8V	Voltage used by all RESETb outputs. Falls within the recommended device PULL_UPx voltage range of 1.6V to 7V.

Table 1-1. Default EVM Configuration (continued)

Specification	Value	Description
PULL_UP2 Voltage	1.8V	Voltage used by WDOb and PWRGD outputs. Falls within the recommended device PULL_UPx voltage range of 1.6V to 7V.
VOUT1 VRISE Threshold	2.20V (88 % of 2.5V)	Rising and falling voltage thresholds where the monitored VOUT rail is considered IN or OUT of regulation, respectively. Set by: R22 = 5.17 kΩ (or R22=5.10kΩ) R25 = 1.91 kΩ
VOUT1 VFALL Threshold	2.08V (83 % of 2.5V)	
VOUT2 VRISE Threshold	3.46 V (105 % of 3.3V)	Rising and falling voltage thresholds where the monitored VOUT rail is considered IN or OUT of regulation, respectively. Set by: R23 = 5.49 kΩ R26 = 1.15 kΩ
VOUT2 VFALL Threshold	3.33 V (101 % of 3.3V)	
VOUT3 VRISE Threshold	0.79 V (99 % of 0.8V)	Rising and falling voltage thresholds where the monitored VOUT rail is considered IN or OUT of regulation, respectively. Set by: R28 = 1.33 kΩ R31 = 4.12 kΩ
VOUT3 VFALL Threshold	0.76 V (95 % of 0.8V)	
VOUT4 VRISE Threshold	1.99 V (111 % of 1.8V)	Rising and falling voltage thresholds where the monitored VOUT rail is considered IN or OUT of regulation, respectively. Set by: R29 = 3.74 kΩ R32 = 1.62 kΩ
VOUT4 VFALL Threshold	1.90 V (106 % of 1.8V)	
RESETb Delay Time tDLY_TMR	12.5 ms	Programmable time delay between when the condition for a RESETb signal to go HIGH is met and when the signal actually transitions. Set by: R15 = 619 kΩ J14 shunted
Watchdog Timer tWD_TMR	1 s	Programmable timer that sets the amount of time allowed netween rising edges sensed at the WDI pin in order for WDOb to remain HIGH. If the timer expires, the WDOb output will go low until the next sensed rising edge at WDI. Set by: R18 = 118 kΩ J17 shunted

1.3.1 Negative Rail Sensing

The TPS7H3xx4EVM-CVAL board allows Channel 3 and 4 to be configured for sensing negative rails. This is done by removing a 0-ohm resistor that connects from the SENSEx resistor dividers to GND and replacing it with a 0-ohm resistor that instead sets VLDO as the reference. The datasheet contains more detailed information and equations for how to select appropriate resistor values when using this configuration.

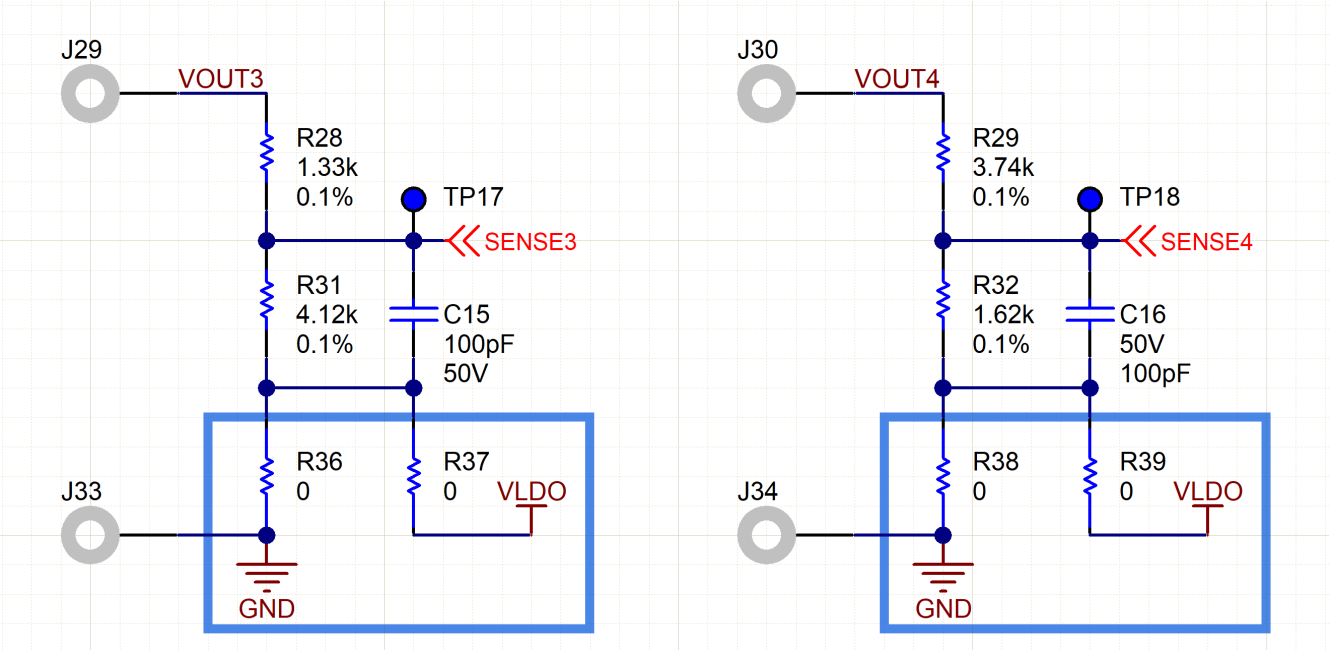


Figure 1-2. Negative Rail Sensing Circuitry

1.3.2 Configuration for Push-Pull vs Open-Drain

The TPS7H3xx4EVM-CVAL boards are by default configured for the specific IC they feature. These configurations are minor BOM differences, which are listed below and also highlighted in the EVM schematic. Users can re-configure the boards for testing the other IC variants if desired. The board layouts are the same.

1. Pin configuration
   - TPS7H30x4-SP (push-pull variants) use 0-ohm resistors to connect the PULL_UPx pins (pin 17 and pin 18) to the PULL_UPx rails
   - TPS7H31x4-SP (open-drain variants) use 0-ohm resistors to connect pin 17 and pin 18 to GND and VLDO as required by the datasheet
2. External pull-up resistors
   - TPS7H30x4-SP (push-pull variants) depopulate the 6 external pull-up resistors used for the RESETxb, PWRGD, and WDOb outputs
   - TPS7H31x4-SP (open-drain variants) populate 6 external pull-up resistors used for the RESETxb, PWRGD, and WDOb outputs. The board uses 10k resistors as a default.

1.4 Device Information

The TPS7H3xx4 is an integrated, 3V to 14V, four-channel radiation-hardness-assured power-supply supervisor with watchdog. An accurate 599.7mV ± 1% threshold voltage and a 599.7mV ± 3% hysteresis current provide programmable monitoring voltages. A global programmable delay timer is programmed via a single resistor. In addition a PWRGD output is provided to monitor the global power tree status. The device also incorporates a positive edge detection watchdog timer to monitor an external processor for coherent execution. External faults can be propagated to the system by using the SR_UVLO input. A standard microcircuit drawing (SMD) is available for the QMLV-grade units.

2 Hardware

2.1 Power Requirements

The TPS7H3xx4EVM-CVAL board requires 3 power rails (VIN, VPULL_UP1, and VPULL_UP2) to be externally provided by power supplies. These can be separate or shared as long as the voltage ranges of each are respected. The test results shown in this user guide were performed with 1 power supply used for VIN and 1 power supply shared by VPULL_UP1 and VPULL_UP2.

- 3V ≤ VIN ≤ 14V
- 1.6V ≤ VPULL_UPx ≤ 7V

2.2 Important Usage Notes

It is important to calculate the expected maximum SENSEx voltage both before and after the SENSEx hysteresis current has been added, since the hysteresis current increases the voltage at the SENSEx node.

2.3 Connector Descriptions

Primary Device		
Designator	**Function**	
J10	VIN	Power input connector for VIN.
TP5		Test point
J3	PULL_UP1	Power input connector for PULL_UP1.
TP1		Test point
J1	PULL_UP2	Power input connector for PULL_UP2.
TP2		Test point
J2, J4, J23	GND	Power input connector for GND.
TP20, TP21, TP22, J37		Test point
J25	VOUT1	Input connector for an external VOUT rail to be monitored by SENSE1.
J27	GND	
TP12	SENSE1	Test point
J26	VOUT2	Input connector for an external VOUT rail to be monitored by SENSE2.
J28	GND	
TP13	SENSE2	Test point
J29	VOUT3	Input connector for an external VOUT rail to be monitored by SENSE3.
J33	GND	
TP17	SENSE3	Test point
J30	VOUT4	Input connector for an external VOUT rail to be monitored by SENSE4.
J34	GND	
TP18	SENSE4	Test point
J35	VOUT1 & VOUT2	Shunt to connect VOUT1 and VOUT2 nodes for shared sensing.
J36	VOUT3 & VOUT4	Shunt to connect VOUT3 and VOUT4 nodes for shared sensing.
TP3	RESET1b	Test point
J6		Probe test point
J38		Output connector for RESET1b.
J8	GND	

Primary Device		
Designator	**Function**	
TP4	RESET2b	Test point
J7		Probe test point
J5		Output connector for RESET2b.
J9	GND	
TP7	RESET3b	Test point
J19		Probe test point
J11		Output connector for RESET3b.
J21	GND	
TP8	RESET4b	Test point
J20		Probe test point
J12		Output connector for RESET4b.
J22	GND	
J13, J14, J15	DLY_TMR	Shunt for DLY_TMR resistor configuration.
J16, J17, J18	WD_TMR	Shunt for REG_TMR resistor configuration.
TP16	WDI	Test point
J31		Probe test point
TP15	MODE	Test point
J32		Shunt for MODE selection.
TP6	HYS	Test point
TP11	SR_UVLOb	Test point
J24		Shunt for convenient enable/disable.
TP19	WDOb	Test point
TP14	PWRGD	Test point
TP9	VLDO	Test point
TP10	REFCAP	Test point

3 Implementation Results

Test results are shown below for TPS7H3024-SP for the following features:

1. Enable and disable
2. Undervoltage and overvoltage sensing (MODE=0)
3. Window and overvoltage sensing (MODE=1)
4. WDOb behavior

Keep in mind that the timing of the outputs will differ slightly between TPS7H30x4-SP (push-pull variants) and TPS7H31x4-SP (open-drain variants) due in part to differences in resistance between the push-pull outputs and the external pull-up resistors as well as capacitance or other loading that may be present externally.

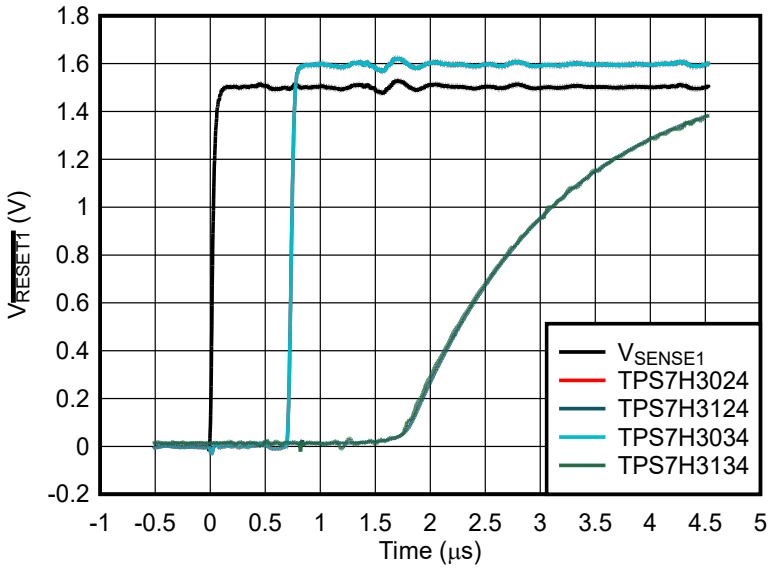


Figure 3-1.

3.1 Default Configuration Results

The following tests were performed using the TPS7H3024EVM-CVAL in the default configuration with VIN=12V and PULL_UP1=PULL_UP2=1.8V.

3.2 Enable and Disable

VIN≥10.3V puts SR_UVLOb above the $V_{TH\_SR\_UVLOb\_RISING}$ threshold to enable the device. Voltages at the monitored rails were already in regulation when enable occured.

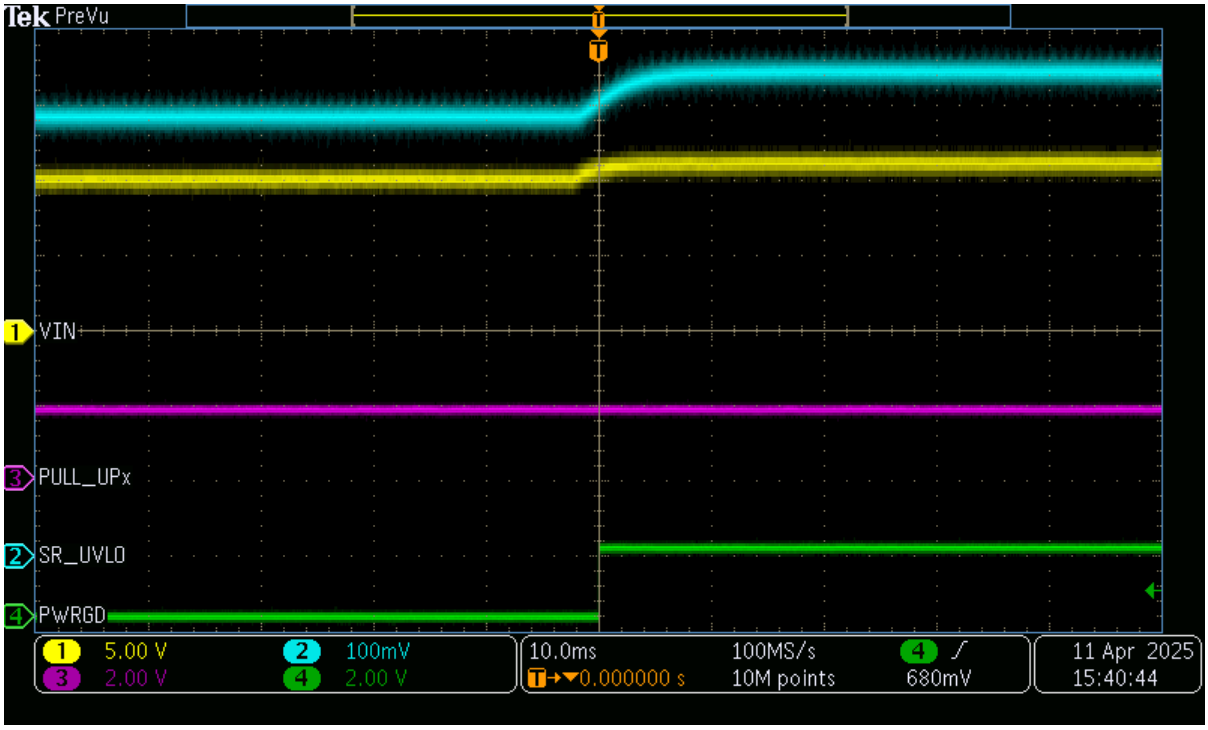


Figure 3-2. Enable using VIN resistor network to SR_UVLOb

VIN≤8.5V puts SR_UVLOb below the $V_{TH\_SR\_UVLOb\_FALLING}$ threshold to disable the device. Voltages at the monitored rails were in regulation during this test.

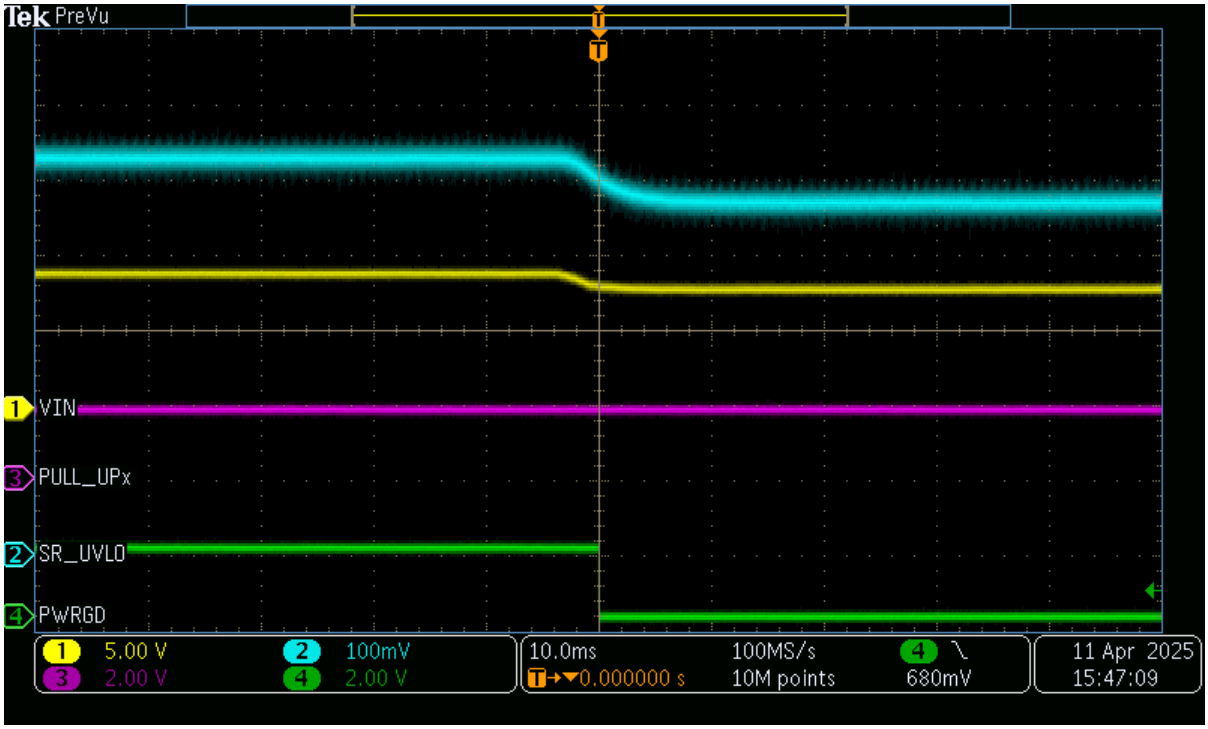


Figure 3-3. Disable using VIN resistor network to SR_UVLOb

3.3 Undervoltage and Overvoltage Monitoring (MODE=0)

For the following tests, J32 is left open to ground the MODE pin to select 2x Undervoltage + 2x Overvoltage monitoring mode. Voltages are kept in regulation for the pair of channels not shown in the scope capture. Different DLY_TMR settings are shown.

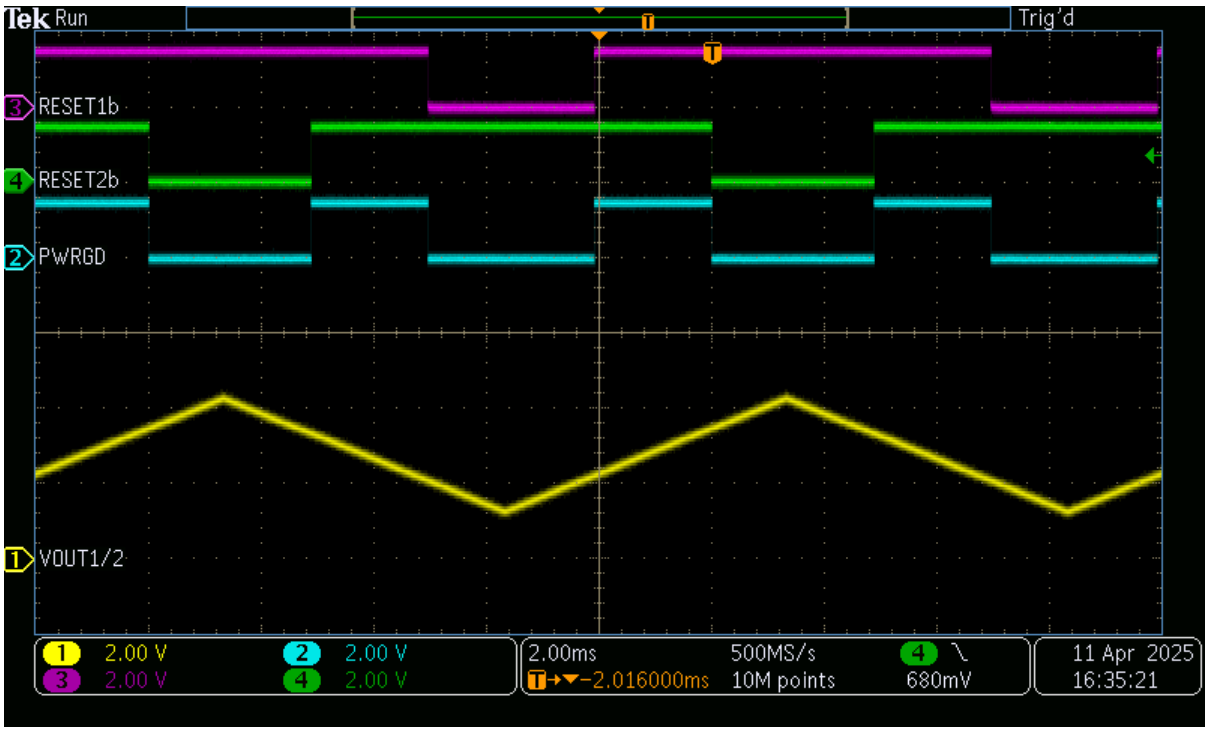


Figure 3-4. Channel 1/2 Regulation Monitoring with DLY_TMR floating

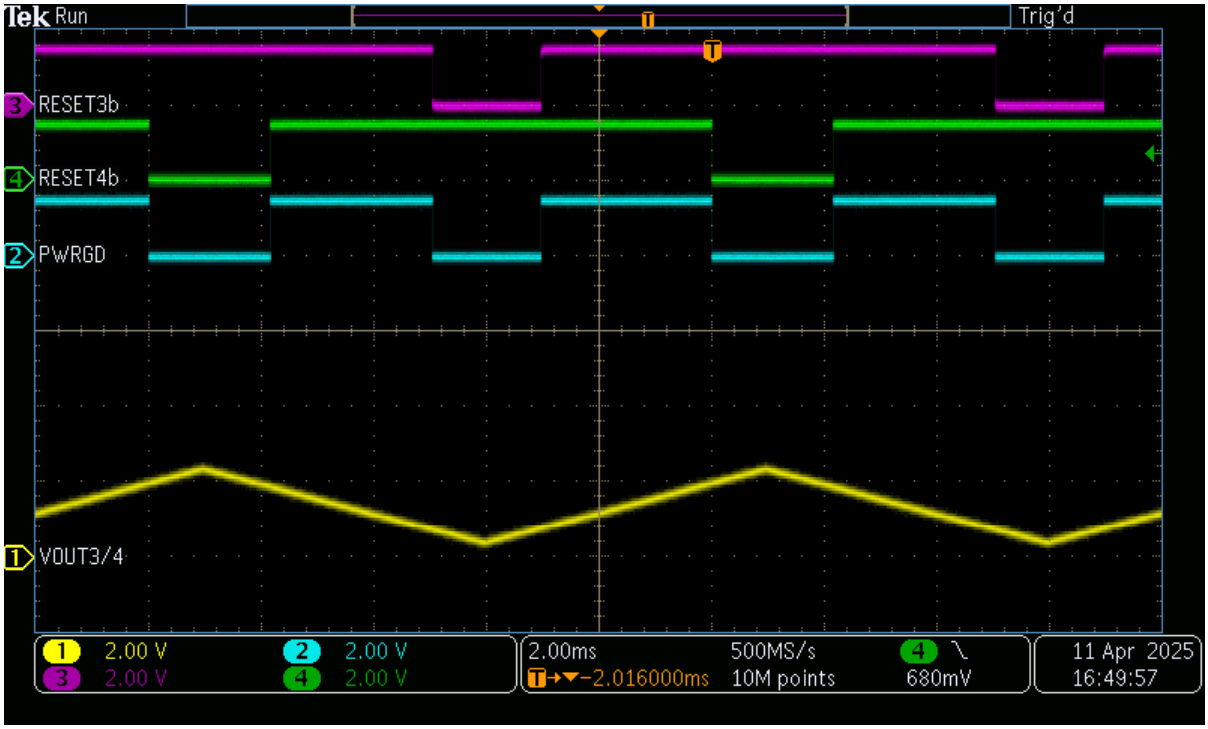


Figure 3-5. Channel 3/4 Regulation Monitoring with DLY_TMR floating

Figure 3-6. Channel 3/4 Enter Regulation with DLY_TMR=619kOhms

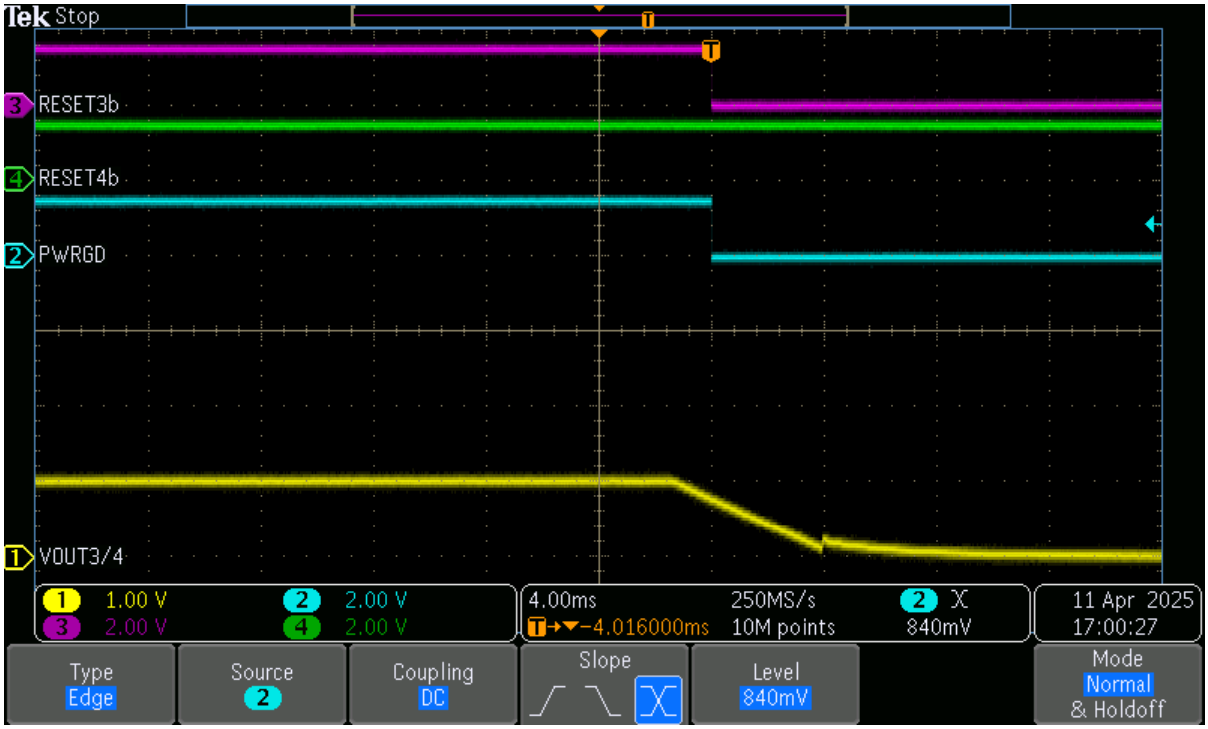


Figure 3-7. Channel 3/4 Leave Regulation with DLY_TMR=619kOhms

3.4 Window and Overvoltage Monitoring (MODE=1)

For the following tests, J32 is shunted to hold the MODE pin HIGH to select 2x Window + 2x Overvoltage monitoring mode. Voltages are kept in regulation for the pair of channels not shown in the scope capture.

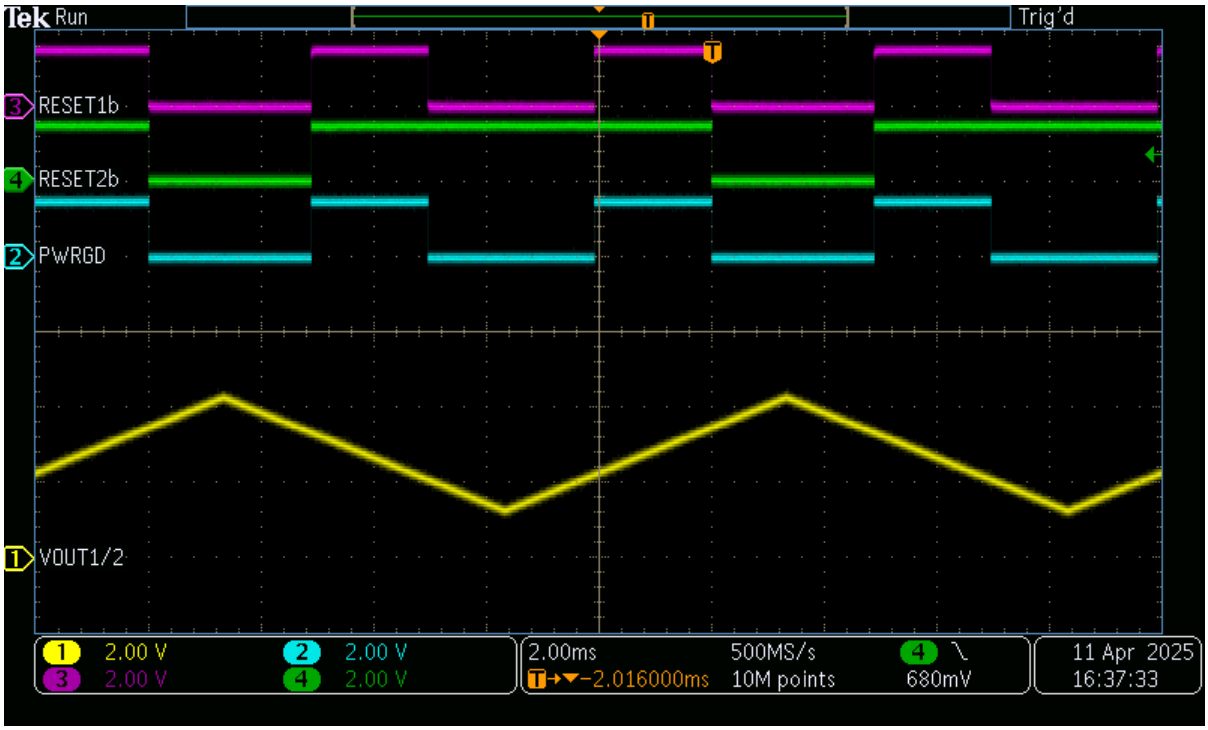


Figure 3-8. Channel 1/2 Regulation Monitoring with DLY_TMR Floating

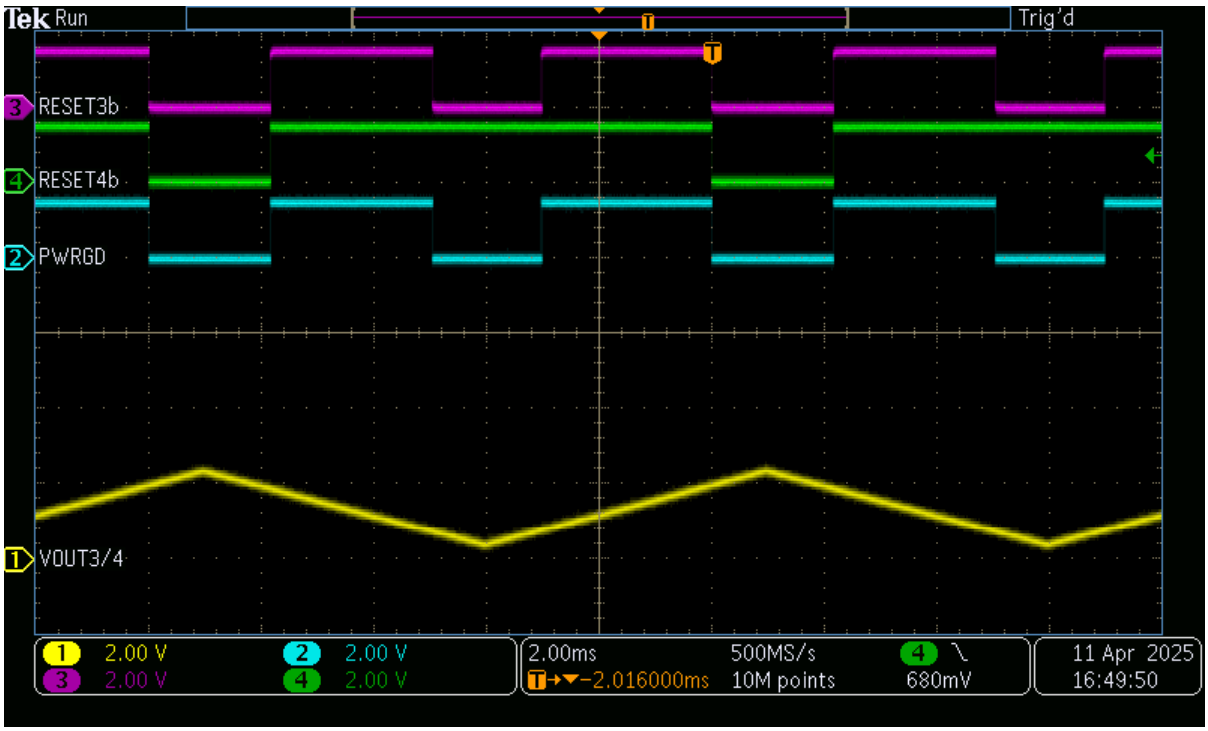


Figure 3-9. Channel 3/4 Regulation Monitoring with DLY_TMR Floating

3.5 WDOb

The following tests were performed with all monitored rails in regulation unless stated otherwise. Multiple WD_TMR settings are shown, as well as a scenario where at least one monitored rail is not in regulation (indicated by PWRGD).

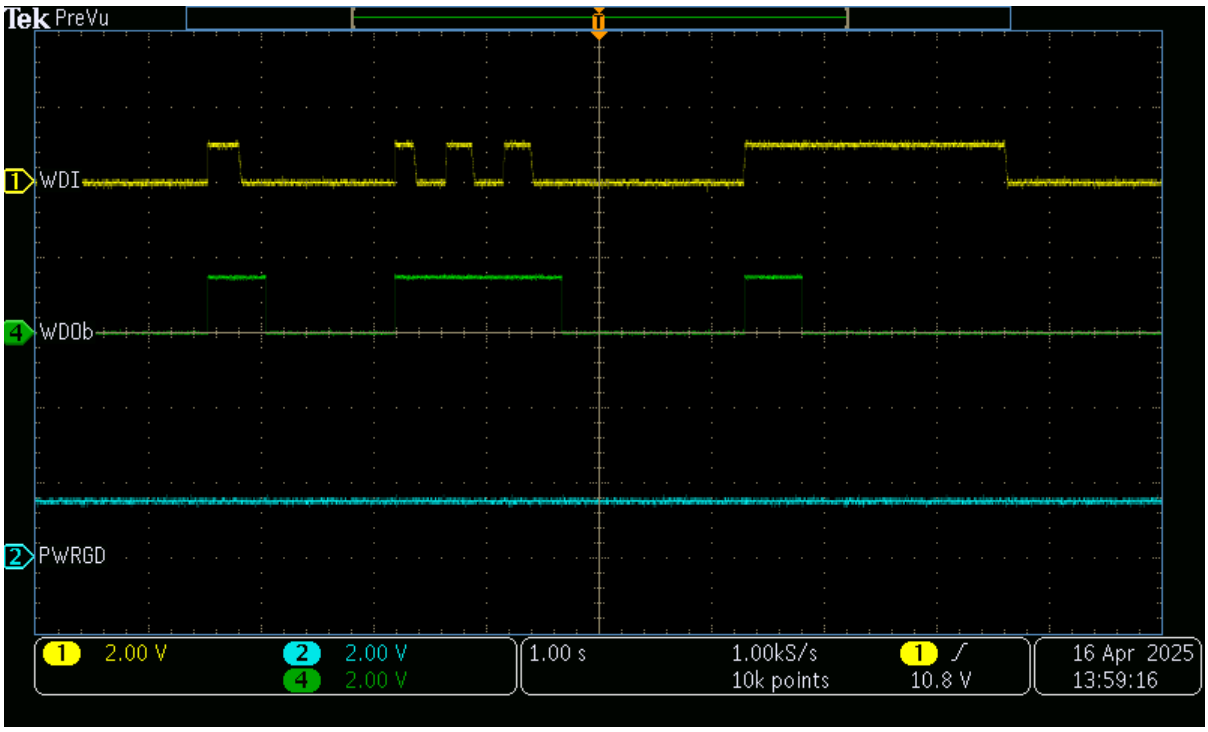


Figure 3-10. WD_TMR = 56.2kOhms

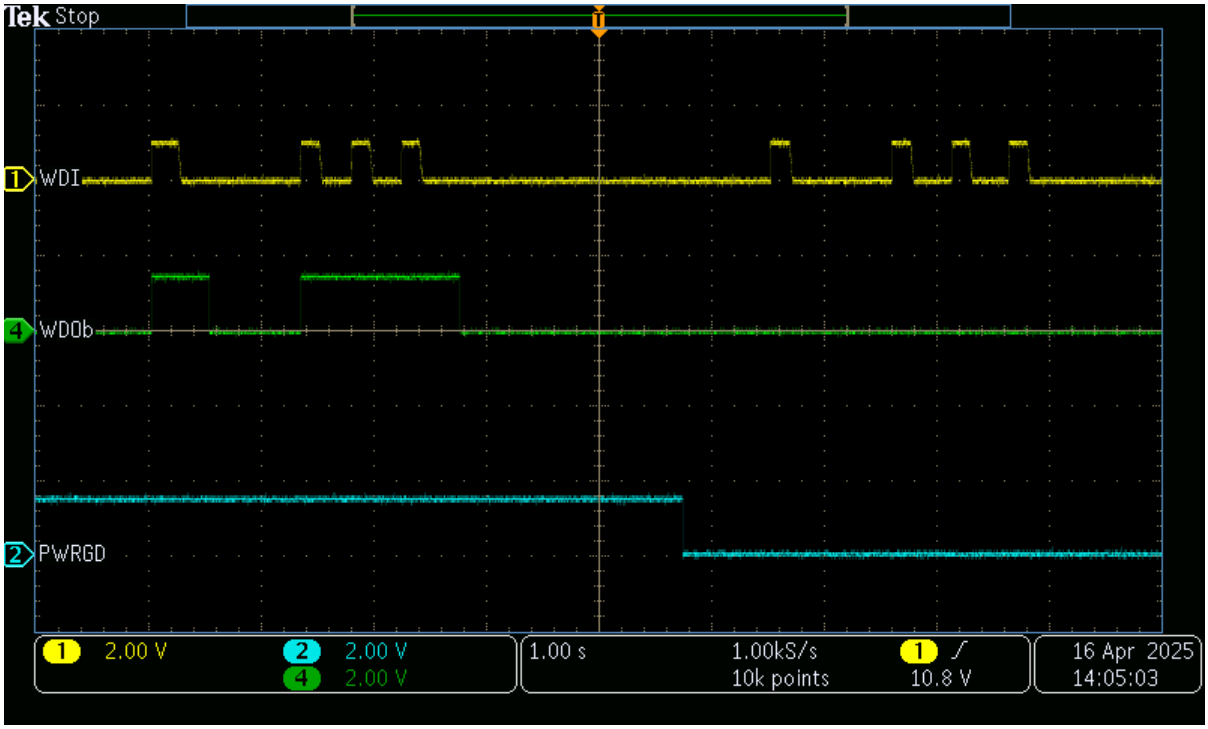


Figure 3-11. WD_TMR = 56.2kOhms when PWRGD indicates Channel 1/2 is no longer in regulation

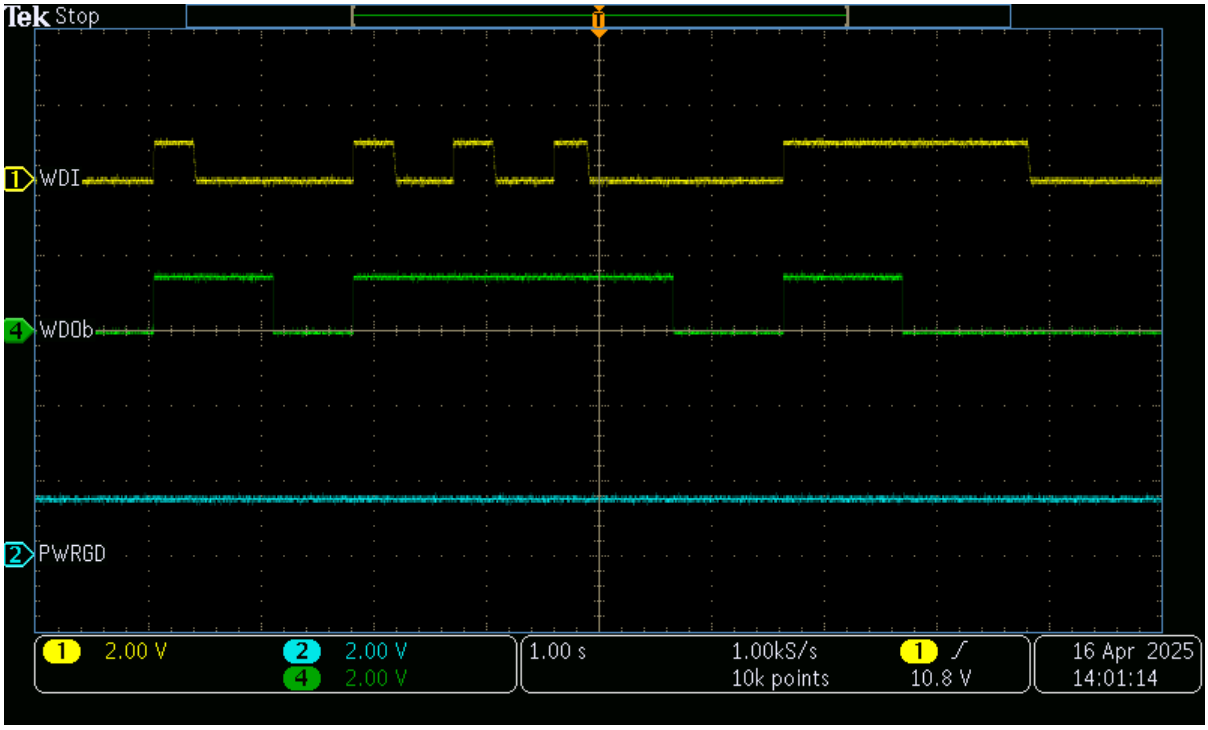


Figure 3-12. WD_TMR = 118kOhms

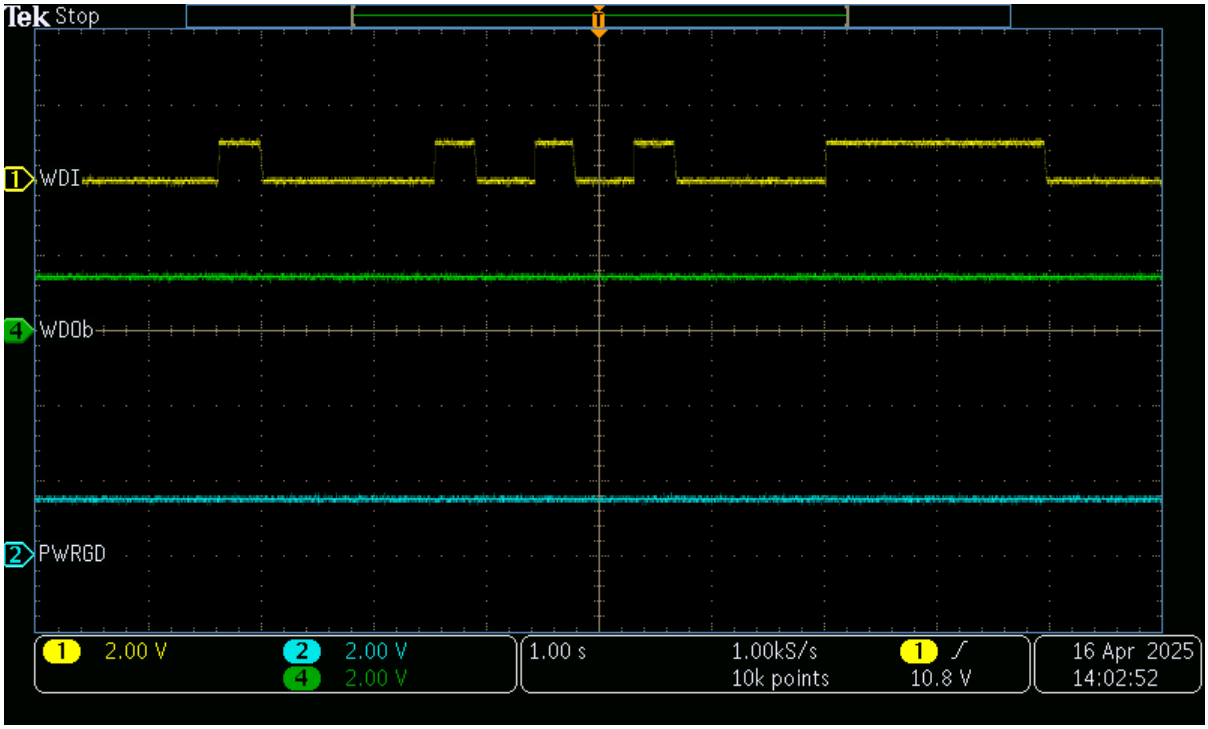


Figure 3-13. WD_TMR Floating

4 Hardware Design Files

4.1 Schematics

Schematics for TPS7H30x4EVM-CVAL and TPS7H31x4EVM-CVAL

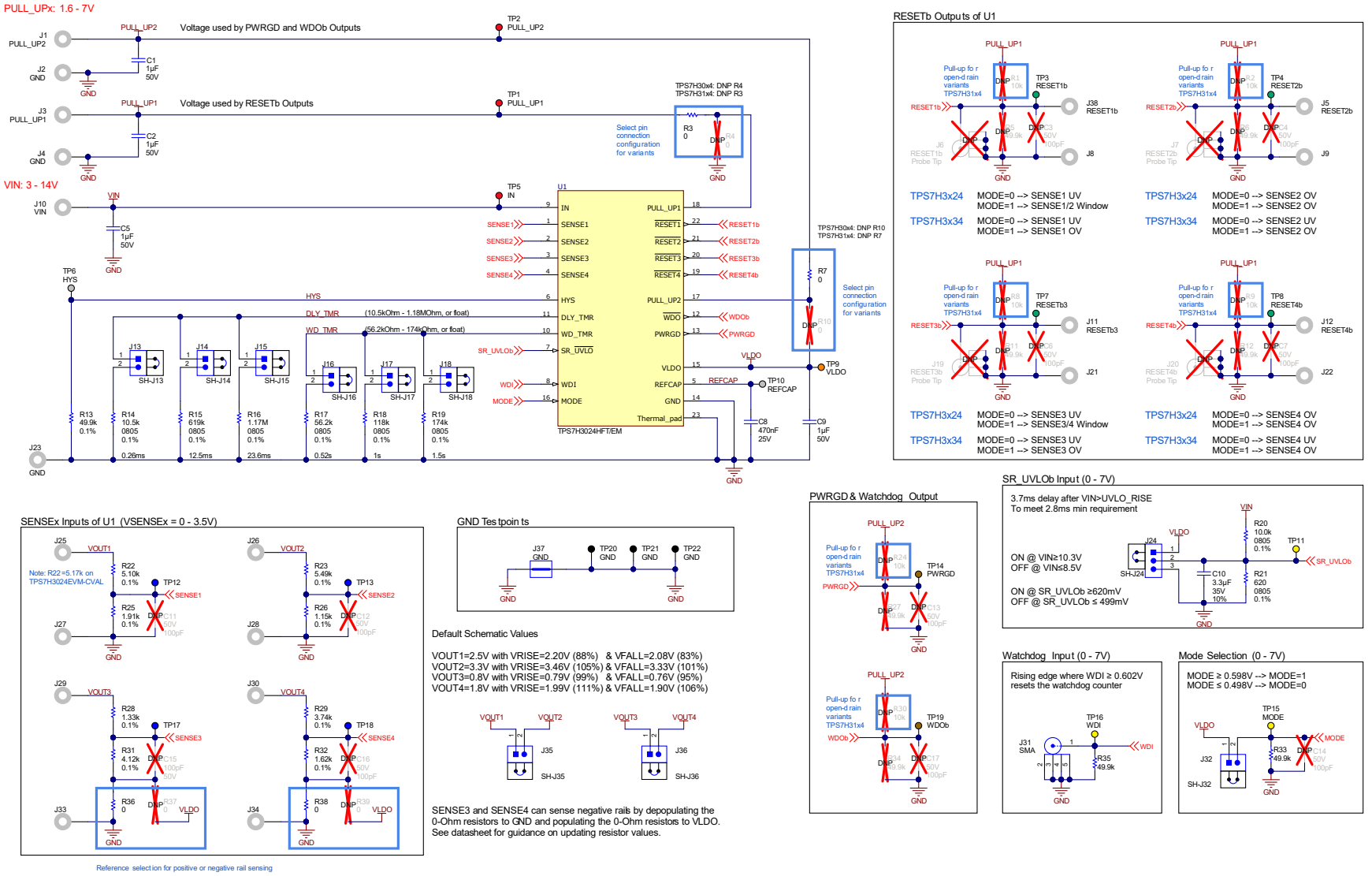


Figure 4-1. Default EVM Schematic (TPS7H3024EVM-CVAL and TPS7H3034EVM-CVAL)

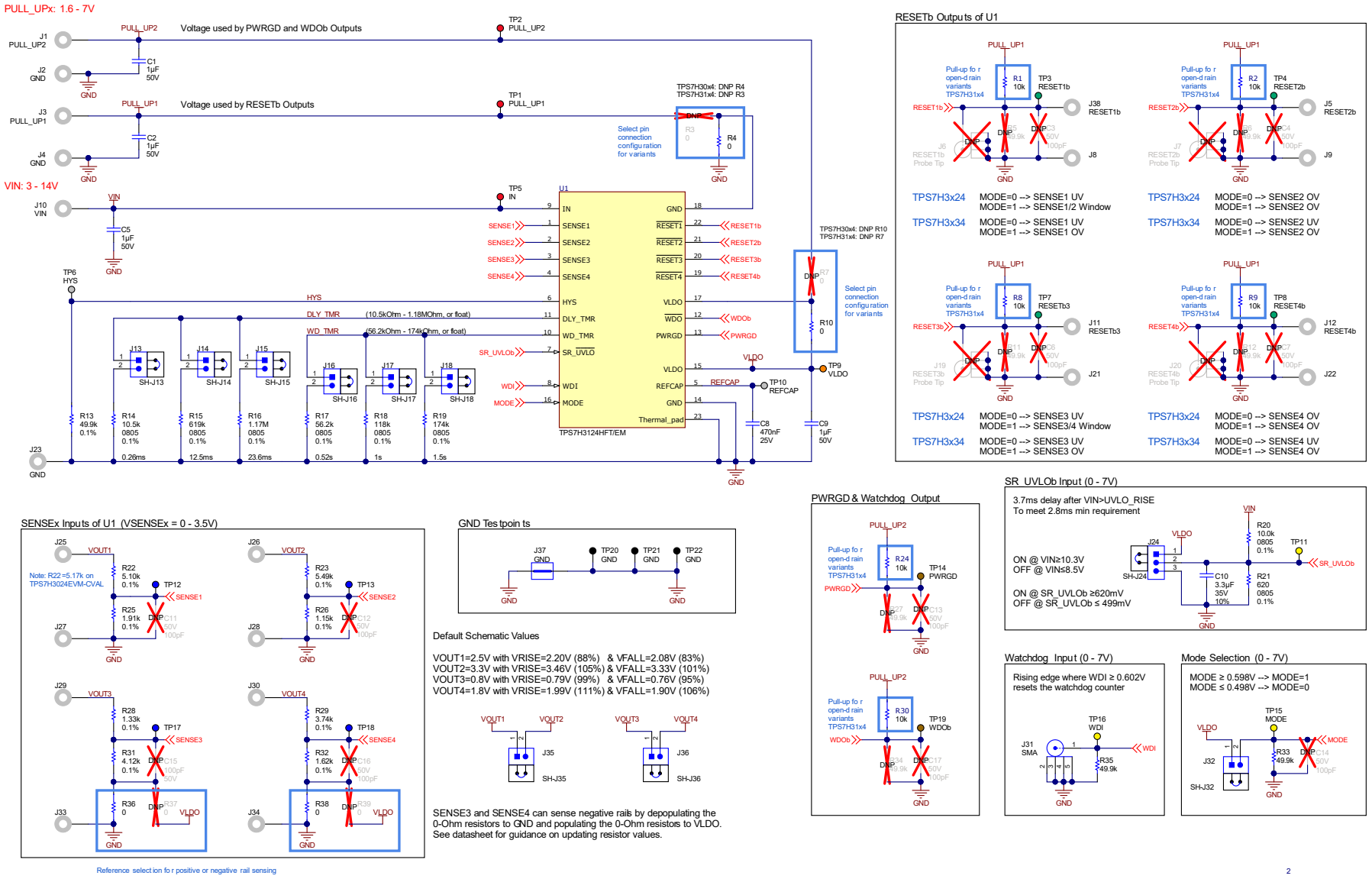


Figure 4-2. Default EVM Schematic (TPS7H3124EVM-CVAL and TPS7H3134EVM-CVAL)

4.2 Bill of Materials (BOM)

Table 4-1. BOM for TPS7H3024EVM-CVAL and TPS7H3034EVM-CVAL

Designator	Qty	Value	Description	Package Reference	Part Number	Manufacturer
C1, C2, C5, C9	4	1uF	CAP, CERM, 1 uF, 50 V, +/- 10%, X7R, 0805	0805	08055C105KAT2A	AVX
C8	1	0.47uF	CAP, CERM, 0.47 uF, 25 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	0603	GCM188R71E474KA64D	MuRata
C10	1	3.3uF	CAP, CERM, 3.3 uF, 35 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0805	0805	CGA4J1X7R1V335K125AC	TDK
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, J5, J8, J9, J10, J11, J12, J21, J22, J23, J25, J26, J27, J28, J29, J30, J33, J34, J38	22		Standard Banana Jack, Uninsulated, 5.5mm	Keystone_575-4	575-4	Keystone
J13, J14, J15, J16, J17, J18, J32, J35, J36	9		Header, 2.54mm, 2x1, Tin, TH	Header, 2.54mm, 2x1, TH	22284023	Molex
J24	1		Header, 2.54mm, 3x1, Tin, TH	Header, 2.54mm, 3x1, Tin, TH	22284030	Molex
J31	1		SMA Connector Receptacle, Female Socket 50Ohm Through Hole Solder	PTH_RF_CONN	733910060	Molex
J37	1		1mm Uninsulated Shorting Plug, 10.16mm spacing, TH	Shorting Plug, 10.16mm spacing, TH	D3082-05	Harwin
R3, R7, R36, R38	4	0	RES SMD 0 OHM JUMPER 1/8W 0805	0805	RC0805FR-070RL	Yageo
R13	1	49.9k		0805	ERA-6AEB4992V	Panasonic
R14	1	10.5k		0805	RG2012P-1052-B-T5	Susumu Co Ltd
R15	1	619k		0805	RT0805BRD07619KL	Yageo
R16	1	1.17Meg		0805	RT0805BRD071M17L	Yageo
R17	1	56.2k		0805	RG2012P-5622-B-T5	Susumu Co Ltd
R18	1	118k		0805	RT0805BRD07118KL	Yageo
R19	1	174k		0805	RT0805BRD07174KL	Yageo
R20	1	10.0k		0805	MCU0805MD1002BP100	Vishay/Beyschlag
R21	1	620		0805	RG2012P-621-B-T5	Susumu Co Ltd
R22	1	5.10k (5.17k)	5.17k resistor used on TPS7H3024EVM-CVAL only	0805	RT0805BRD075K1L (RT0805BRD075K17L)	Yageo
R23	1	5.49k		0805	RT0805BRD075K49L	Yageo

Table 4-1. BOM for TPS7H3024EVM-CVAL and TPS7H3034EVM-CVAL (continued)

Designator	Qty	Value	Description	Package Reference	Part Number	Manufacturer
R25	1	1.91k		0805	RT0805BRD071K91L	Yageo
R26	1	1.15k		0805	RT0805BRD071K15L	Yageo
R28	1	1.33k		0805	RT0805BRD071K33L	Yageo
R29	1	3.74k		0805	RT0805BRD073K74L	Yageo
R31	1	4.12k		0805	RT0805BRD074K12L	Yageo
R32	1	1.62k		0805	RT0805BRD071K62L	Yageo
R33, R35	2	49.9k		0603	RC0603FR-0749K9L	Yageo
SH-J13, SH-J14, SH-J15, SH-J16, SH-J17, SH-J18, SH-J24, SH-J32, SH-J35, SH-J36	10		CONN JUMPER S2 (1 x 2) Position Shunt Connector Black Open Top 0.100" (2.54mm) GoldHORTING .100" GOLD	Jumper	QPC02SXGN-RC	Sullins
TP1, TP2, TP5	3		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone
TP3, TP4, TP7, TP8	4		Test Point, Multipurpose, Green, TH	Green Multipurpose Testpoint	5126	Keystone
TP6, TP10	2		Test Point, Multipurpose, Grey, TH	Grey Multipurpose Testpoint	5128	Keystone
TP9	1		Test Point, Multipurpose, Orange, TH	Orange Multipurpose Testpoint	5013	Keystone
TP11, TP15, TP16	3		Test Point, Multipurpose, Yellow, TH	Yellow Multipurpose Testpoint	5014	Keystone
TP12, TP13, TP17, TP18	4		Test Point, Multipurpose, Blue, TH	Blue Multipurpose Testpoint	5127	Keystone
TP14, TP19	2		Test Point, Multipurpose, Brown, TH	Brown Multipurpose Testpoint	5125	Keystone
TP20, TP21, TP22	3		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone
U1	1		Radiation-Hardness-Assured, 14V, 4-Channel Supervisor with Watchdog	CFP22	TPS7H3024HFT/EM	Texas Instruments
C3, C4, C6, C7, C11, C12, C13, C14, C15, C16, C17	0	100pF	CAP, CERM, 100 pF, 50 V,+/- 1%, C0G/NP0, 0603	0603	C0603C101F5GACTU	Kemet
J6, J7, J19, J20	0		Compact Probe Tip Circuit Board Test Points, TH, 25 per	TH Scope Probe	131-5031-00	Tektronix
R1, R2, R8, R9, R24, R30	0	10k	RES, 10k, 1%, 0.1 W, 0603	0603	CRCW060310K0FKEAC	Vishay

Table 4-1. BOM for TPS7H3024EVM-CVAL and TPS7H3034EVM-CVAL (continued)

Designator	Qty	Value	Description	Package Reference	Part Number	Manufacturer
R4, R10, R37, R39	0	0	RES SMD 0 OHM JUMPER 1/8W 0805	0805	RC0805FR-070RL	Yageo
R5, R6, R11, R12, R27, R34	0	49.9k	RES, 49.9k, 1%, 0.1 W, 0603	0603	RC0603FR-0749K9L	Yageo

Table 4-2. BOM for TPS7H3124EVM-CVAL and TPS7H3134EVM-CVAL

Designator	Qty	Value	Description	Package Reference	Part Number	Manufacturer
C1, C2, C5, C9	4	1uF	CAP, CERM, 1uF, 50 V, +/- 10%, X7R, 0805	0805	08055C105KAT2A	AVX
C8	1	0.47uF	CAP, CERM, 0.47 uF, 25 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	0603	GCM188R71E474KA64D	MuRata
C10	1	3.3uF	CAP, CERM, 3.3 uF, 35 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0805	0805	CGA4J1X7R1V335K125AC	TDK
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, J5, J8, J9, J10, J11, J12, J21, J22, J23, J25, J26, J27, J28, J29, J30, J33, J34, J38	22		Standard Banana Jack, Uninsulated, 5.5mm	Keystone_575-4	575-4	Keystone
J13, J14, J15, J16, J17, J18, J32, J35, J36	9		Header, 2.54mm, 2x1, Tin, TH	Header, 2.54mm, 2x1, TH	22284023	Molex
J24	1		Header, 2.54mm, 3x1, Tin, TH	Header, 2.54mm, 3x1, Tin, TH	22284030	Molex
J31	1		SMA Connector Receptacle, Female Socket 50Ohm Through Hole Solder	PTH_RF_CONN	733910060	Molex
J37	1		1mm Uninsulated Shorting Plug, 10.16mm spacing, TH	Shorting Plug, 10.16mm spacing, TH	D3082-05	Harwin
R1, R2, R8, R9, R24, R30	6	10k	RES, 10k, 1%, 0.1 W, 0603	0603	CRCW060310K0FKEAC	Vishay
R4, R10, R36, R38	4	0	RES SMD 0 OHM JUMPER 1/8W 0805	0805	RC0805FR-070RL	Yageo
R13	1	49.9k		0805	ERA-6AEB4992V	Panasonic
R14	1	10.5k		0805	RG2012P-1052-B-T5	Susumu Co Ltd
R15	1	619k		0805	RT0805BRD07619KL	Yageo
R16	1	1.17Meg		0805	RT0805BRD071M17L	Yageo
R17	1	56.2k		0805	RG2012P-5622-B-T5	Susumu Co Ltd
R18	1	118k		0805	RT0805BRD07118KL	Yageo
R19	1	174k		0805	RT0805BRD07174KL	Yageo
R20	1	10.0k		0805	MCU0805MD1002BP100	Vishay/Beyschlag
R21	1	620		0805	RG2012P-621-B-T5	Susumu Co Ltd

Table 4-2. BOM for TPS7H3124EVM-CVAL and TPS7H3134EVM-CVAL (continued)

Designator	Qty	Value	Description	Package Reference	Part Number	Manufacturer
R22	1	5.10k		0805	RT0805BRD075K1L	Yageo
R23	1	5.49k		0805	RT0805BRD075K49L	Yageo
R25	1	1.91k		0805	RT0805BRD071K91L	Yageo
R26	1	1.15k		0805	RT0805BRD071K15L	Yageo
R28	1	1.33k		0805	RT0805BRD071K33L	Yageo
R29	1	3.74k		0805	RT0805BRD073K74L	Yageo
R31	1	4.12k		0805	RT0805BRD074K12L	Yageo
R32	1	1.62k		0805	RT0805BRD071K62L	Yageo
R33, R35	2	49.9k		0603	RC0603FR-0749K9L	Yageo
SH-J13, SH-J14, SH-J15, SH-J16, SH-J17, SH-J18, SH-J24, SH-J32, SH-J35, SH-J36	10		CONN JUMPER S2 (1 x 2) Position Shunt Connector Black Open Top 0.100" (2.54mm) GoldHORTING .100" GOLD	Jumper	QPC02SXGN-RC	Sullins
TP1, TP2, TP5	3		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone
TP3, TP4, TP7, TP8	4		Test Point, Multipurpose, Green, TH	Green Multipurpose Testpoint	5126	Keystone
TP6, TP10	2		Test Point, Multipurpose, Grey, TH	Grey Multipurpose Testpoint	5128	Keystone
TP9	1		Test Point, Multipurpose, Orange, TH	Orange Multipurpose Testpoint	5013	Keystone
TP11, TP15, TP16	3		Test Point, Multipurpose, Yellow, TH	Yellow Multipurpose Testpoint	5014	Keystone
TP12, TP13, TP17, TP18	4		Test Point, Multipurpose, Blue, TH	Blue Multipurpose Testpoint	5127	Keystone
TP14, TP19	2		Test Point, Multipurpose, Brown, TH	Brown Multipurpose Testpoint	5125	Keystone
TP20, TP21, TP22	3		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone
U1	1		Radiation-Hardness-Assured, 14V, 4-Channel Supervisor with Watchdog	CFP22	TPS7H3024HFT/EM or TPS7H3034HFT/EM	Texas Instruments
C3, C4, C6, C7, C11, C12, C13, C14, C15, C16, C17	0	100pF	CAP, CERM, 100pF, 50 V,+/- 1%, C0G/NP0, 0603	0603	C0603C101F5GACTU	Kemet
J6, J7, J19, J20	0		Compact Probe Tip Circuit Board Test Points, TH, 25 per	TH Scope Probe	131-5031-00	Tektronix
R3, R7, R37, R39	0	0	RES SMD 0 OHM JUMPER 1/8W 0805	0805	RC0805FR-070RL	Yageo
R5, R6, R11, R12, R27, R34	0	49.9k	RES, 49.9 k, 1%, 0.1 W, 0603	0603	RC0603FR-0749K9L	Yageo

4.3 PCB Layouts

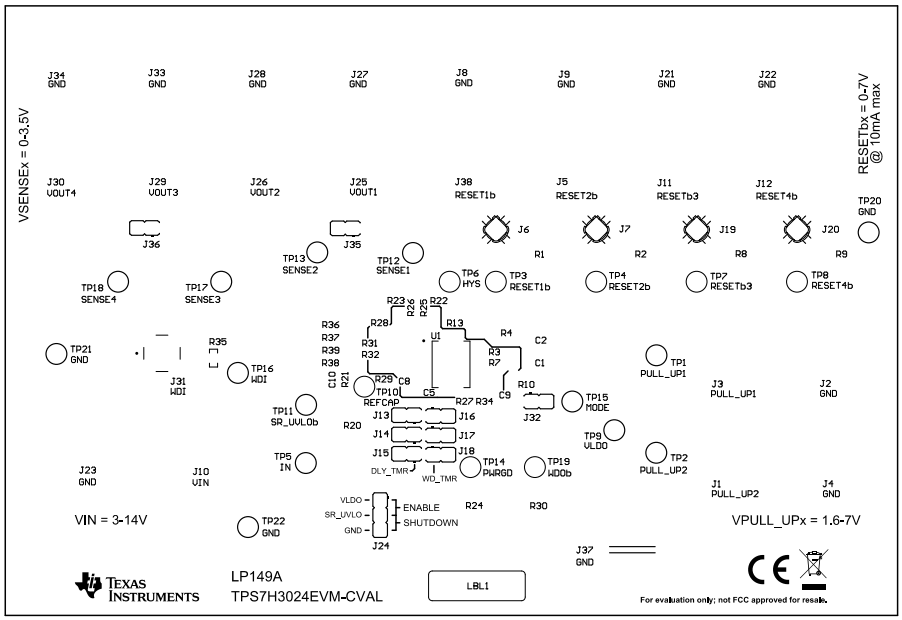


Figure 4-3. Top Overlay

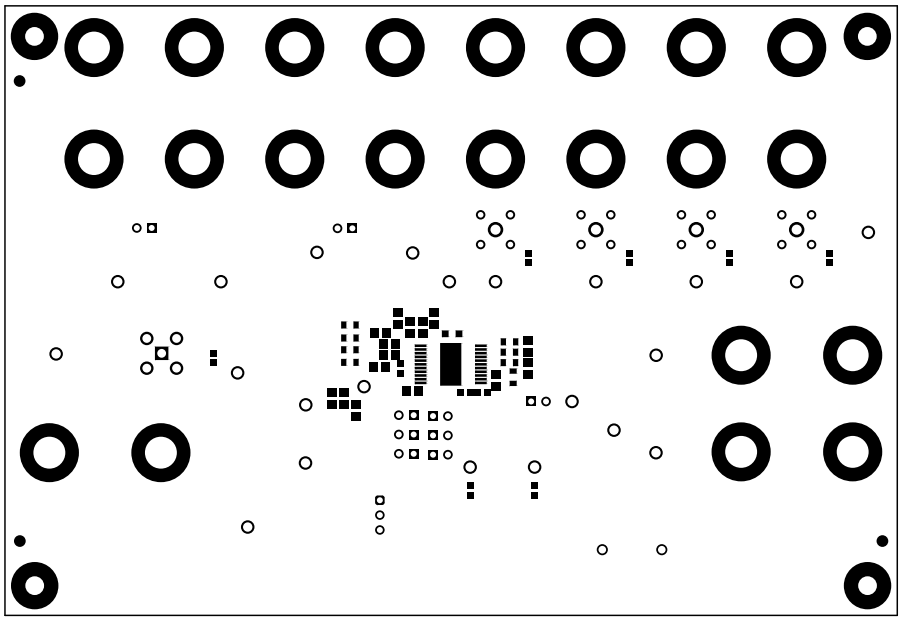


Figure 4-4. Top Solder Mask

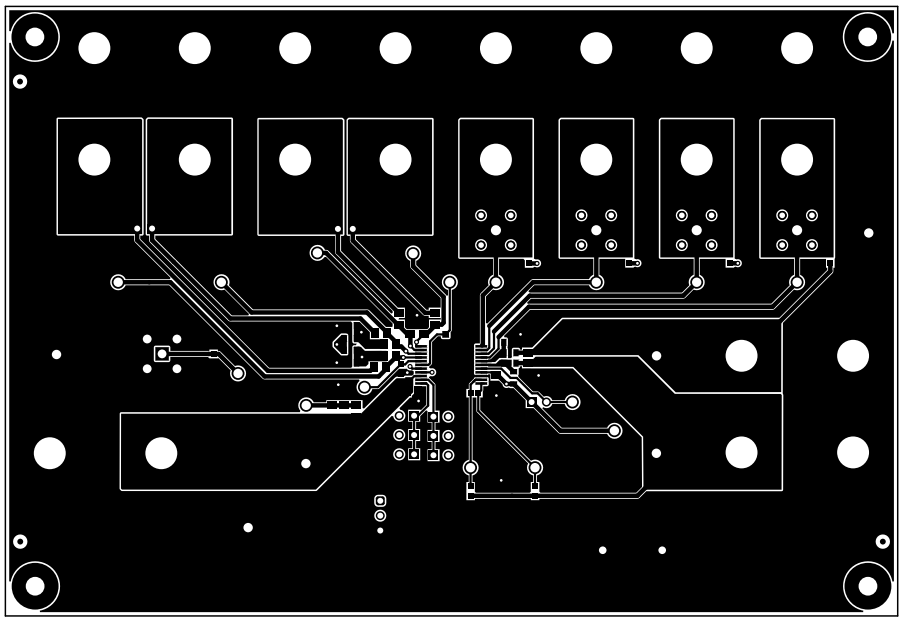


Figure 4-5. Layer 1 (Top)

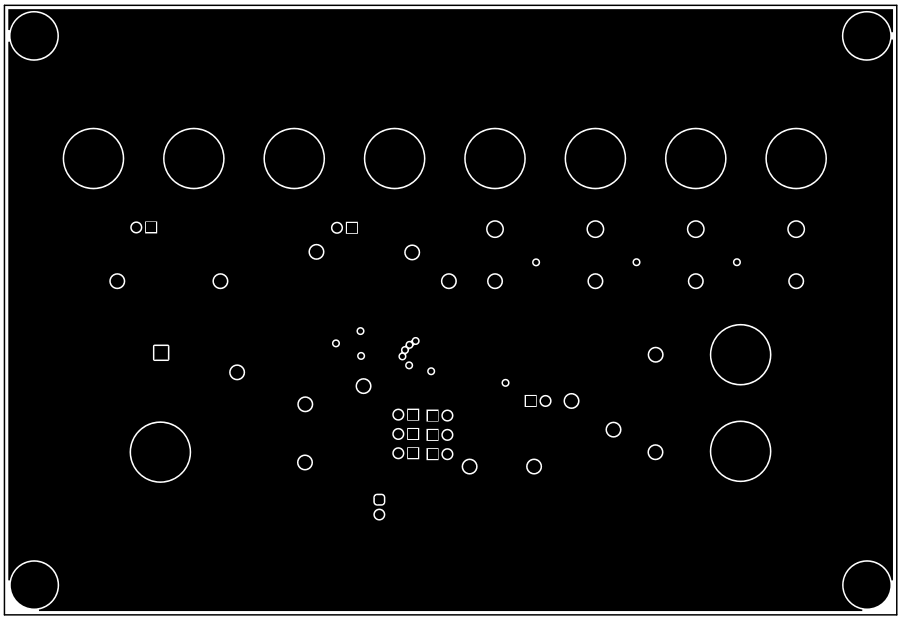


Figure 4-6. Layer 2

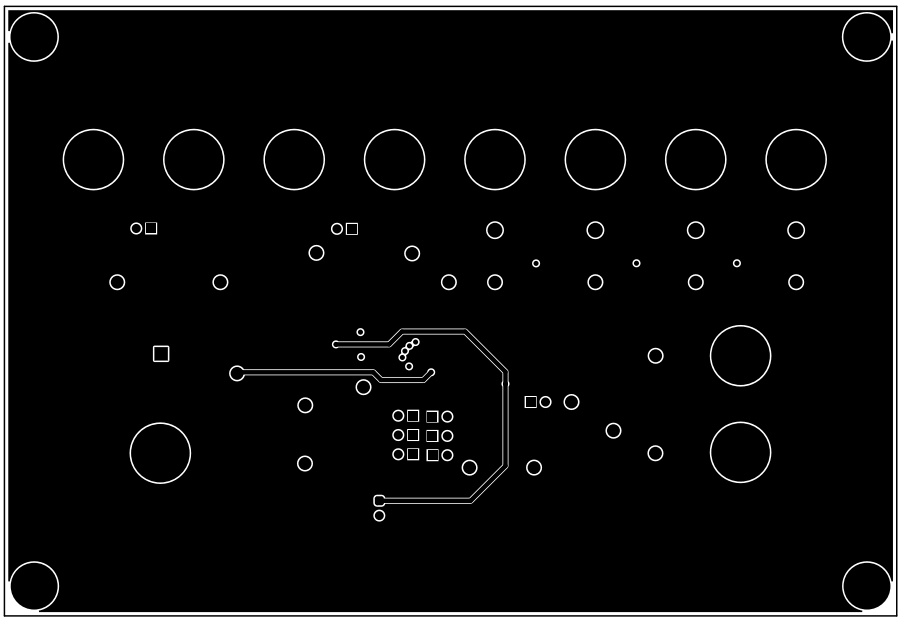


Figure 4-7. Layer 3

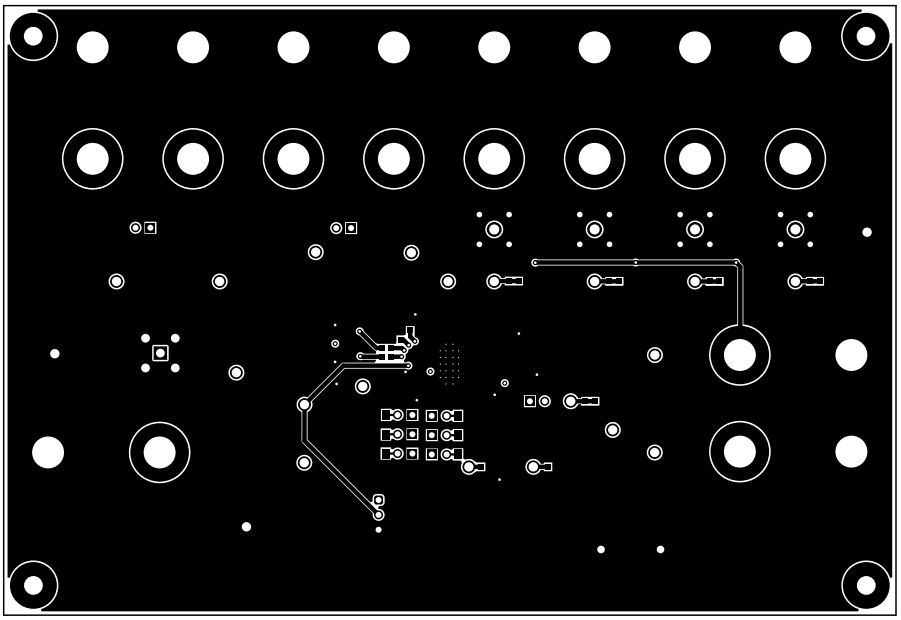


Figure 4-8. Layer 4 (Bottom)

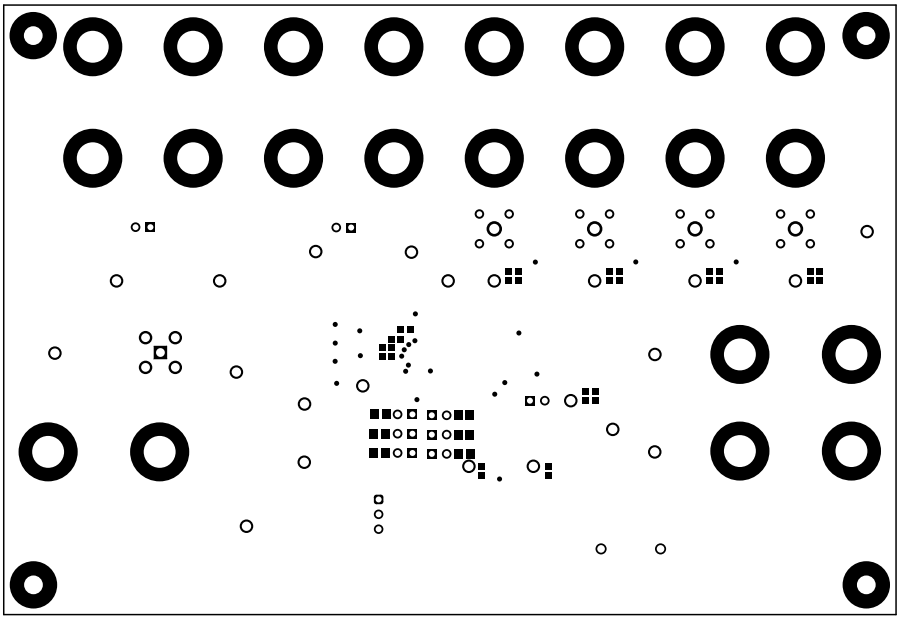


Figure 4-9. Bottom Solder Mask

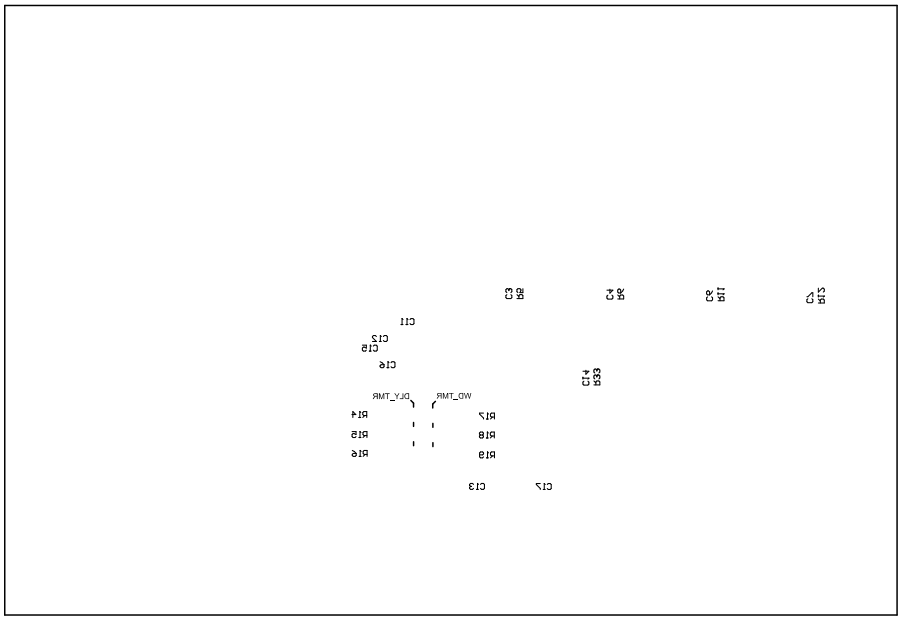


Figure 4-10. Bottom Overlay

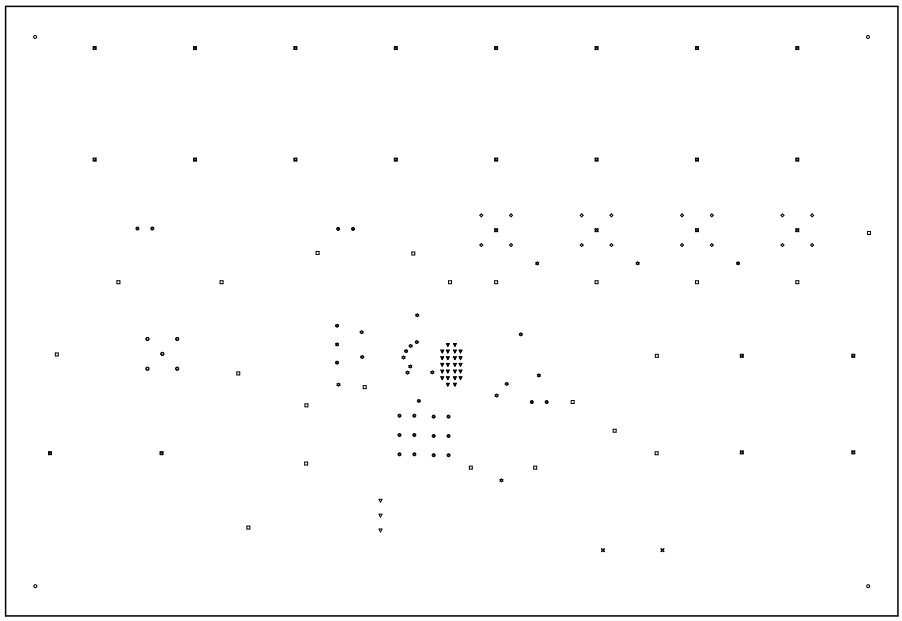


Figure 4-11. Drill Drawing

5 Compliance Information

5.1 Compliance and Certifications

- Texas Instruments, TPS7H3024EVM-CVAL EU RoHS Declaration of Conformity (DoC)

6 Related Documentation

- Texas Instruments, Standard Terms for Evaluation Modules

7 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision * (April 2025) to Revision A (May 2026)	Page
• Added new part numbers in addition to pre-existing mentions of TPS7H3024	1
• Updated Figure 1-1	2
• Updated calculated configuration values to match additional schematic	2
• Added description of how board configuration is different for push-pull vs open-drain outputs	4
• Deleted reference to 5962R2420601VXC	4
• Added clarifying information	7
• Added Figure 3-1	7
• Updated Figure 3-3 description	7
• Added device names for clarification	14
• Added schematic showing open-drain configuration in addition to the pre-existing push-pull configuration	14
• Added BOM showing open-drain configuration in addition to the pre-existing push-pull configuration	16

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you fully indemnify TI and its representatives against any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI’s products are provided subject to TI’s Terms of Sale, TI’s General Quality Guidelines, or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI’s provision of these resources does not expand or otherwise alter TI’s applicable warranties or warranty disclaimers for TI products. Unless TI explicitly designates a product as custom or customer-specified, TI products are standard, catalog, general purpose devices.

TI objects to and rejects any additional or different terms you may propose.

Last updated 10/2025