TLV8xxxEVM-019 Evaluation Modules

This user's guide describes the characteristics, operation, and use of the TLV809K (TLV809KEVM-019), TLV810S (TLV810SEVM-019), and TLV803S (TLV803SEVM-019) evaluation modules (EVM). The TLV8xxxEVM is a fully assembled and tested platform for evaluating the performance of the TLV8xxx family of supervisory circuits. The TLV809K, TLV810S, and TLV803S are single channel, 3-pin, 3.3-V supply voltage supervisors (SVS) with built-in power-on reset generator with fixed delay time of 200ms. This user's guide includes setup configuration instructions, a complete schematic diagram, bill of materials (BOM), and printed circuit board (PCB) layout drawings for the evaluation module.

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1   Introduction

The TLV8xxxEVM helps designers evaluate the operation and performance of the TLV8xxx family of single channel supervisors in a 3-pin SOT-23 package. This particular EVM configuration contains a single SVS capable of supervising up to 6-V supply voltage. The TLV8xxx EVM is assembled with the TLV809K, TLV810S, or TLV803S, all of which are 3.3-V supply voltage supervisors with threshold voltage, V_{IT}, of 2.93-V. To evaluate the TLV8xxx EVM with a different supply voltage, the IC will need to be replaced. The TLV8xxx family of supervisory circuits provides initialization and timing supervision, primarily for DSPs and processor-based systems; and, is available for supply voltages of 2.5-V, 3.0-V, 3.3-V, and 5.0-V.

1.1   Features

- Low supply current: 9 µA (typical)
- Power-on RESET / $\overline{\text{RESET}}$ generator with fixed delay time of 200ms

1.2 Orderable Options

- TLV809KEVM-019: 3.3-V single channel supervisor with active low, push-pull $\overline{\text{RESET}}$ output
- TLV810SEVM-019: 3.3-V single channel supervisor with active high, push-pull RESET output
- TLV803SEVM-019: 3.3-V single channel supervisor with active low, open-drain $\overline{\text{RESET}}$ output
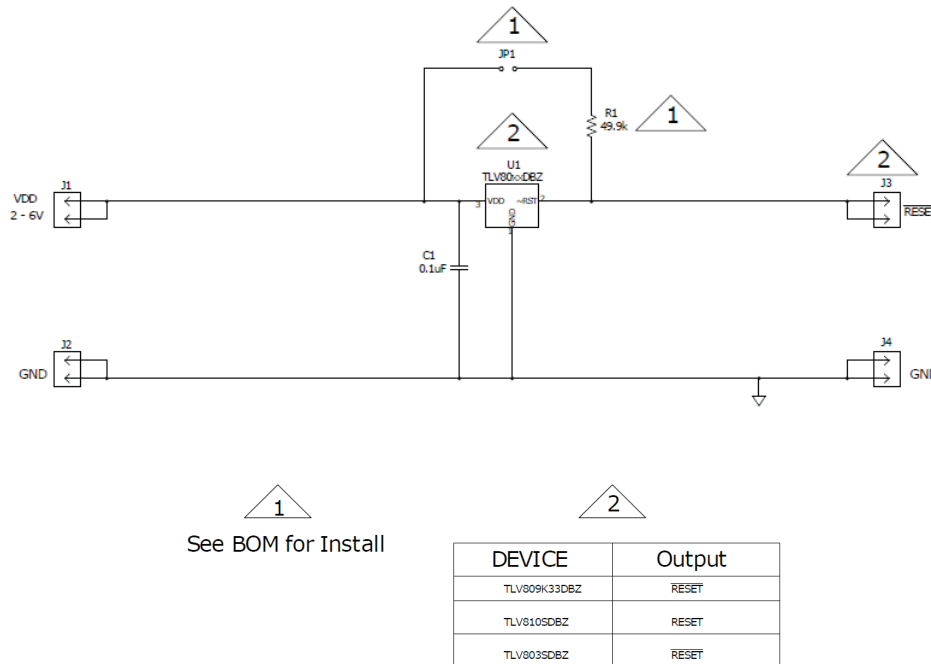
2 Schematic

See BOM for Install

DEVICE	Output
TLV809K33DBZ	RESET
TLV810SDBZ	RESET
TLV803SDBZ	RESET

Figure 1. TLV8xxxEVM Rev A Schematic

3 Setup and Board Description

3.1 EVM Input/Output Connectors and Test Jumpers

Connector	Label	Description
J1	VDD	Input power supply connection: 2V to 6V
J2	GND	Return connection for input power supply
J3	RESET $\overline{\text{RESET}}$	RESET / $\overline{\text{RESET}}$ output of supervisor IC. Connect this output to a multimeter or oscilloscope to verify output voltage.
J4	GND	Return connection for output (RESET / $\overline{\text{RESET}}$)
JP1	Pull-Up	Necessary for TLV803SEVM-019 only. Placing a jumper on JP1 connects the 49.9kΩ (R1) pull-up resistor to VDD and RESET output.

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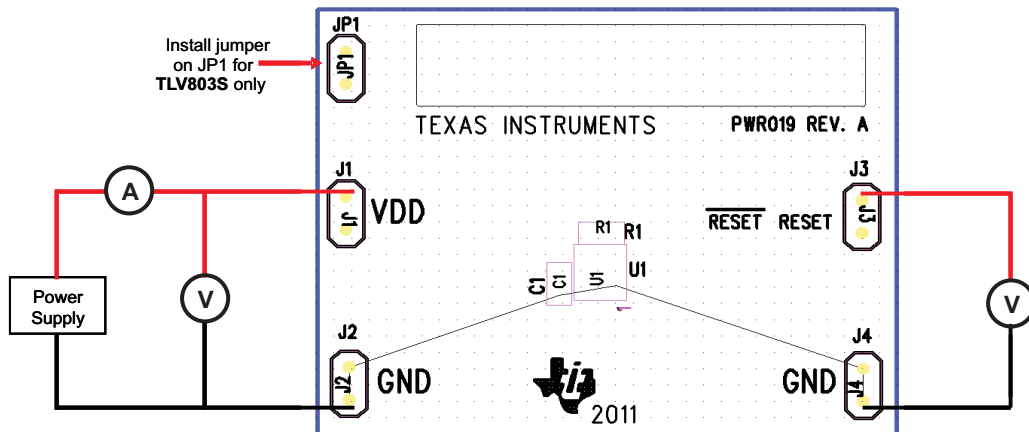
3.2   Connection Setup

Figure 2. Quick Start Connection Setup

1. Connect the power supply and its return connection to J1 and J2 as shown above.
2. An ammeter can be connected in series with the power supply to measure the supply current. A voltmeter can also be connected across J1 and J2 to measure the effective voltage at the pins.
3. Connect a voltmeter or an oscilloscope voltage probe across the output pins J3 and J4 to observe and measure the output voltage.

NOTE: For TLV803SEVM-019, please verify that jumper on JP1 is present so that pull-up resistor R1 is connected to VDD and to $\overline{RESET}$. If an output voltage different from VDD is desired, a power supply can be connected to JP1 to pull the $\overline{RESET}$ pin to a different voltage.

4   Operation

This section provides information about the operation of the TLV8xxxEVM and the outputs expected. The TLV8xxx parts can support supply voltage, V_{DD}, in the range of 2-V to 6-V. No external components are required. All the devices in this family have a fixed sense-threshold voltage (V_{IT}) set by an internal voltage divider.

4.1   Threshold Voltage, V_{IT}

During power-on, RESET / $\overline{RESET}$ is asserted when the supply voltage (V_{DD}) becomes higher than 1.1-V. Thereafter, for active low devices, the supervisory circuit monitors V_{DD} and keeps $\overline{RESET}$ active as long as V_{DD} remains below the threshold voltage, V_{IT}. For active high devices, the supervisory circuit keeps RESET active as long as V_{DD} remains above the threshold voltage, V_{IT}.

TLV809K and TLV803S (active low $\overline{RESET}$ output):

*   When $V_{DD} < V_{IT}$, the output across the $\overline{RESET}$ pins J3 and J4 should be 0-V (low).
*   When $V_{DD} > V_{IT}$, the output across the $\overline{RESET}$ pins J3 and J4 should equal $V_{DD} \pm 0.5$-V (high) with no load.

TLV810S (active high RESET output):

*   When $V_{DD} < V_{IT}$, the output across the RESET pins J3 and J4 should equal $V_{DD} \pm 0.5$-V (high) with no load.
*   When $V_{DD} > V_{IT}$, the output across the RESET pins J3 and J4 should be 0-V (low).

Table 1. Threshold voltage, V_{IT}, Values for Each TLV8xxxEVM

Part	V_{IT} [1]		
	Min (V)	Typ (V)	Max (V)
TLV809K	2.87	2.93	2.99
TLV810S	2.87	2.93	2.99
TLV803S	2.87	2.93	2.99

[1] V_{IT} values taken from datasheet.

4.2 Timing

The TLV8xxx parts have a reset generator with a fixed delay time. An internal timer delays the return of the output to the inactive state (high) to ensure proper system reset. The delay time ($t_{d(typ)}$ = 200ms) starts after V_{DD} has risen above the threshold voltage, V_{IT}. When the supply voltage, V_{DD}, drops below the V_{IT} voltage, the output becomes active (low) again. Min and max values for t_d can be found in the datasheet, labeled Switching Characteristics.
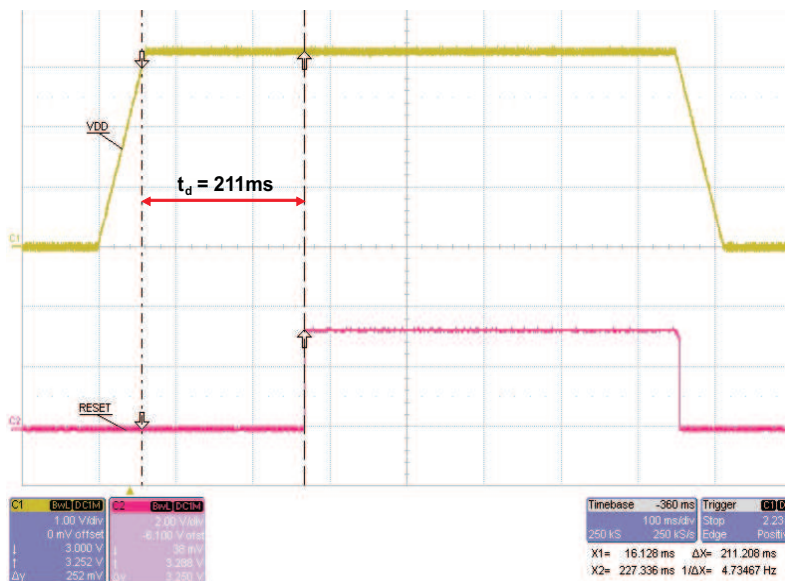

Figure 3. Timing Diagram for TLV8xxxEVM

5 Board Layout

This section provides the TLV8xxxEVM board layout and illustrations.

5.1 Layout

NOTE: Board layouts are not to scale. These figures are intended to show how the board is laid out; they are not intended to be used for manufacturing TLV8xxx EVM PCBs.
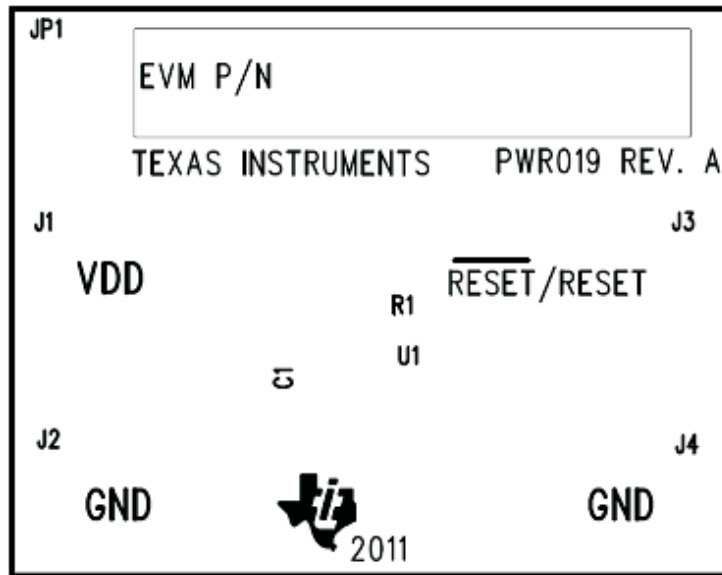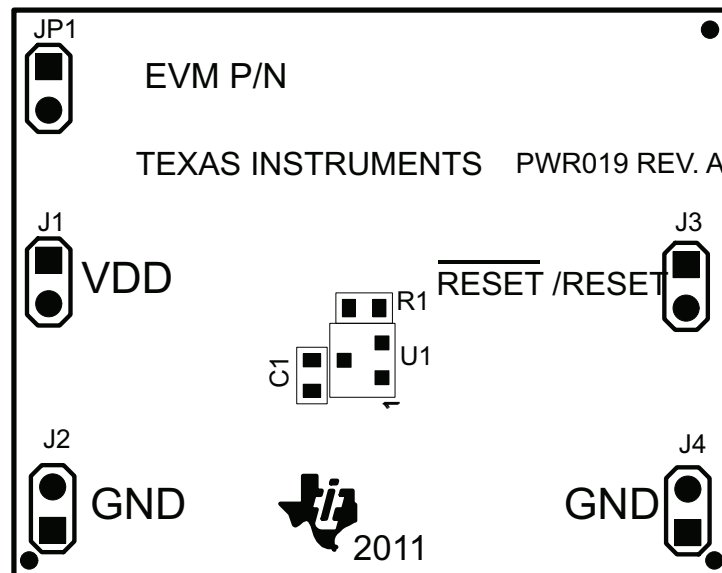
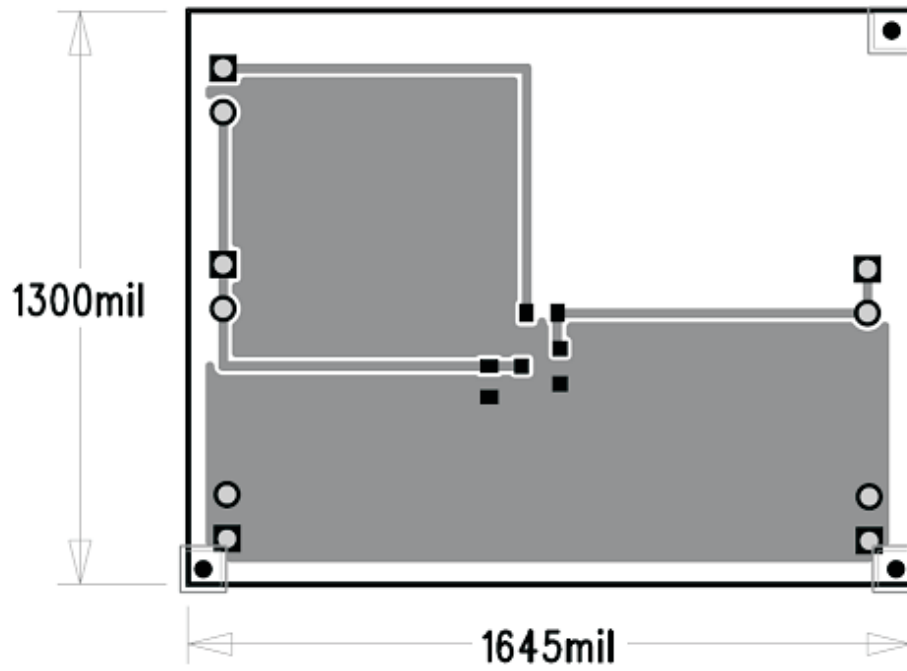**Figure 4. Silkscreen Layer**

Figure 5. Assembly Layer

Figure 6. Top Layer Routing

Figure 7. Bottom Layer Routing

6 Bill of Materials

Table 2. Bill of Materials

PWR019-001	PWR019-002	PWR019-003						
COUNT	COUNT	COUNT	RefDes	Value	Description	Size	Part Number	MFR
1	1	1	C1	0.1uF	Capacitor, Ceramic, 10V, X7R, 20%	0603	STD	STD
4	4	4	J1, J2, J3, J4	PEC02SAAN	Header, Male 2-pin, 100mil spacing	0.100 inch x 2	PEC02SAAN	Sullins
0	0	1	JP1	PEC02SAAN	Header, Male 2-pin, 100mil spacing	0.100 inch x 2	PEC02SAAN	Sullins
0	0	1	R1	49.9k	Resistor, Chip, 1/16W, 1%	0603	STD	STD
1	0	0	U1	TLV809KDBZ	IC, Voltage Supervisors with Active-Low, Push-Pull $\overline{\text{RESET}}$	SOT23-3	TLV809K33DBZ	TI
0	1	0	U1	TLV810SDBZ	IC, Voltage Supervisors with Active-High, Push-Pull RESET	SOT23-3	TLV810SDBZ	TI
0	0	1	U1	TLV803SDBZ	IC, Voltage Supervisors with Active-Low, Open-Drain $\overline{\text{RESET}}$	SOT23-3	TLV803SDBZ	TI
0	0	1	–		Shunt, 100-mil, Black	0.1	929950-00	3M
1	1	1	–		Label	1.25 x 0.25 inch	THT-13-457-10	Brady
1	1	1	–	PWR019	1.645 x 1.300 x 0 .062 inch 2 layer 2oz. PCB	1.645 inch x 1.300 inch	PWR019	Any

Notes 1. These assemblies are ESD sensitive, ESD precautions shall be observed.

2. These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.

3. These assemblies must comply with workmanship standards IPC-A-610 Class 2.

4. Ref designators marked with an asterisk ('**') cannot be substituted. All other components can be substituted with equivalent MFG's components.

5. Install label after final wash. Text shall be 8 pt font. Text shall be per Table 3.

Table 3. Assembly Number and Corresponding Label Text

Assembly Number	Text
PWR019-001	TLV809KEVM-019
PWR019-002	TLV810SEVM-019
PWR019-003	TLV803SEVM-019

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EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of 2 V to 6 V and the output voltage range of 0 V to 6 V .

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 85° C. The EVM is designed to operate properly with certain components above 85° C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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