TPS3808G01EVM

This user's guide describes the characteristics, operation, and use of the TPS3808G01EVM (HPA537). The TPS3808G01EVM is a fully assembled and tested platform for evaluating the performance of the TPS3808G01, a low quiescent current, programmable-delay supervisory circuit from Texas Instruments in a 195-mm x 200-mm SOT-23 package. This user's guide includes setup and configuration instructions, a complete schematic diagram, bill of materials (BOM), and printed circuit board (PCB) layout drawings for the evaluation module. Throughout this document, the abbreviation *EVM* and the term *evaluation module* are synonymous with the TPS3808G01EVM unless otherwise noted.

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1 Introduction

The TPS3808G01 evaluation module (EVM) helps designers evaluate the operation and performance of the TPS3808Gxx supervisor in a 195-mm x 200-mm SOT-23 package. The TPS3808Gxx is a low quiescent current, programmable-delay supervisory circuit with either an adjustable or fixed threshold voltage. The threshold voltage is indicated by the last two digits of the part number, with *01* indicating the adjustable version and other values indicating various fixed thresholds.

This document describes the configuration and set up of the TPS3808G01EVM board.

2 Setup

This section describes the jumpers and connectors on the EVM as well as how to properly connect, set up, and use the TPS3808G01EVM.

2.1 Input / Output Connector Descriptions

J1: $\overline{\text{RST}}$

This connector is the $\overline{\text{RST}}$ output. Connect this output to a multimeter, oscilloscope, or external circuit to verify that $\overline{\text{RST}}$ goes low when MONITOR VOLTAGE goes below its threshold.

J2: $\overline{\text{MR}}$

This connector is the manual reset input of the TPS3808G01. Pulling this pin low causes the device to signal a reset. For convenience, pull this pin low by placing a short across the connector.

J3: MONITOR VOLTAGE

This connector is the voltage to be monitored. Connect J3 to a power supply or other voltage source. $\overline{\text{RST}}$ should transition low when this voltage drops below its threshold.

J4: VDD

This connector is the power-supply connection for the TPS3808G01. It can be between 1.7 V and 6.5 V.

J5: GND

This connector is the return connection for the input power supply. It is electrically connected to J6.

J6: GND

This connector is the return connection for the power supply to be monitored. It is electrically connected to J5.

JP2: $\overline{\text{RST}}$ Pull-Up

Connecting a short across JP2 connects a 10-kΩ pull-up resistor to the $\overline{\text{RST}}$ output.

JP3: Reset Timer

The setting of this jumper configures the reset delay of the device as described in Table 1.

Table 1. Reset Timer Settings

Setting	Description
Open	No connection to CT; reset delay set to 20 ms
Short connected across pins 1 and 2	CT connected to a timer capacitor; reset delay set to 125 ms
Short connected across pins 2 and 3	CT connected to a pull-up resistor; reset delay set to 300 ms

JP5: Fixed Rail

Short this jumper for use of a fixed-voltage TPS3808Gxx device.

JP4: Adjustable Rail

Short this jumper for use of the adjustable-voltage TPS3808G01.

JP1: Rail Voltages

The setting of these jumpers configures the threshold of the MONITOR VOLTAGE input, as listed in Table 2.

Table 2. Monitor Voltage Input Configurations

Setting	Description
Short 1-2	Threshold set for monitoring 5.0-V rail
Short 3-4	Threshold set for monitoring 3.3-V rail
Short 5-6	Threshold set for monitoring 1.8-V rail
Short 7-8	Threshold set for monitoring 1.2-V rail

3 Operation

This section provides information about the operation of the TPS3808G01EVM.

3.1 General Operation

The TPS3808G01EVM can be configured as either a single- or dual-rail monitor. As a single-rail monitor, the device triggers a reset when its own supply rail falls beneath a particular set threshold. As a dual-rail monitor, the part triggers a reset when an external supply rail is below the threshold.

The TPS3808G01EVM can also be used to evaluate the fixed-voltage devices in the TPS3808Gxx family with minimal changes to the board. These various configurations are described in detail in the following sections.

3.1.1 Single-Rail Monitoring

To use the TPS3808G01EVM as a single-rail monitor, connect shorts on JP2 and JP4. Use JP1 to set the desired level of the voltage rail to be monitored. JP3 can be used to set the duration of the reset signal, or left open for a fixed 20-ms duration. Connect a power supply to VDD (J4), Monitor Voltage (J3), and GND (J5 and J6). Connect the $\overline{\text{RST}}$ output (J1) to an oscilloscope, multimeter, or external circuit.

Figure 1 shows a diagram of the proper configuration for single-rail monitoring.

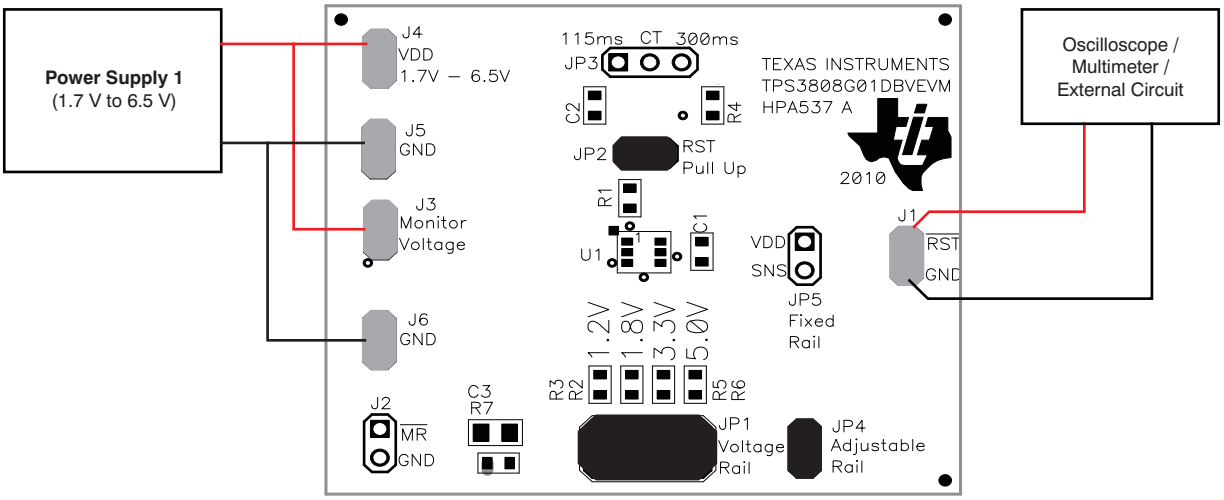


Figure 1. Using the TPS3808G01EVM as a Single-Rail Monitor

3.1.2 Dual-Rail Monitoring

To use the TPS3808G01EVM as a dual-rail monitor, connect shorts on JP2 and JP4. Use JP1 to set the desired level of the voltage rail to be monitored. JP3 can be used to set the duration of the reset signal, or left open for a fixed 20-ms duration. Connect one power supply to VDD (J4) and GND (J5) and a second power supply (or external rail to be monitored) to Monitor Voltage (J3) and GND (J6). Connect the $\overline{\text{RST}}$ output (J1) to an oscilloscope, multimeter, or external circuit.

A diagram showing the proper configuration for dual-rail monitoring is given in Figure 2.

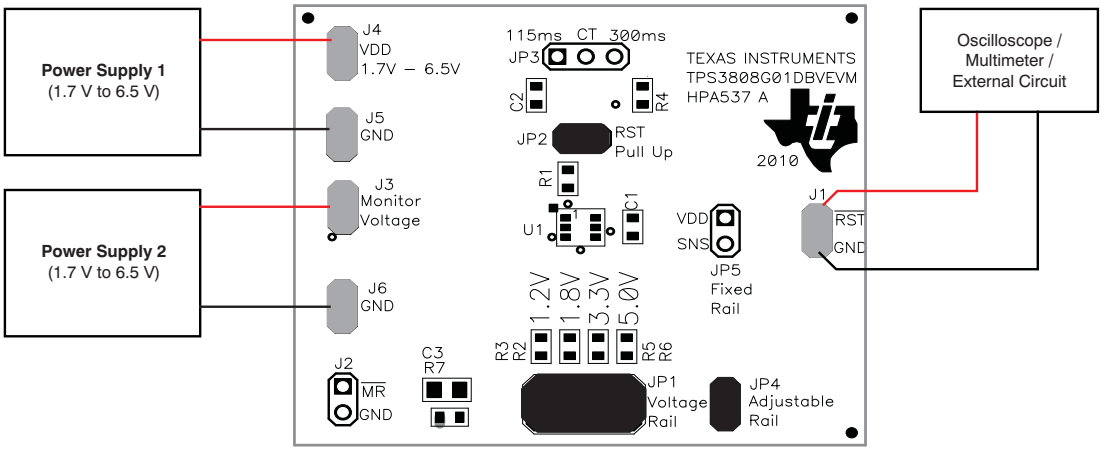


Figure 2. Using the TPS3808G01EVM as a Dual-Rail Monitor

3.1.3 Using Fixed-Voltage Versions of TPS3808Gxx

It is possible to use the TPS3808G01EVM to evaluate fixed-voltage versions of the TPS3808Gxx as well. First, the TPS3808G01 device (U1) must be carefully replaced with the desired fixed-voltage TPS3808Gxx device. Configure the board jumpers so that JP2 and JP5 are shorted and JP4 is open. Again, JP3 may be used to set the reset signal duration, or simply left open for a fixed 20-ms duration. Connect a power supply to VDD (J4) and GND (J5). Connect the $\overline{\text{RST}}$ output (J1) to an oscilloscope, multimeter, or external circuit.

Figure 3 illustrates the proper configuration to evaluate fixed-voltage versions of the TPS3808Gxx.

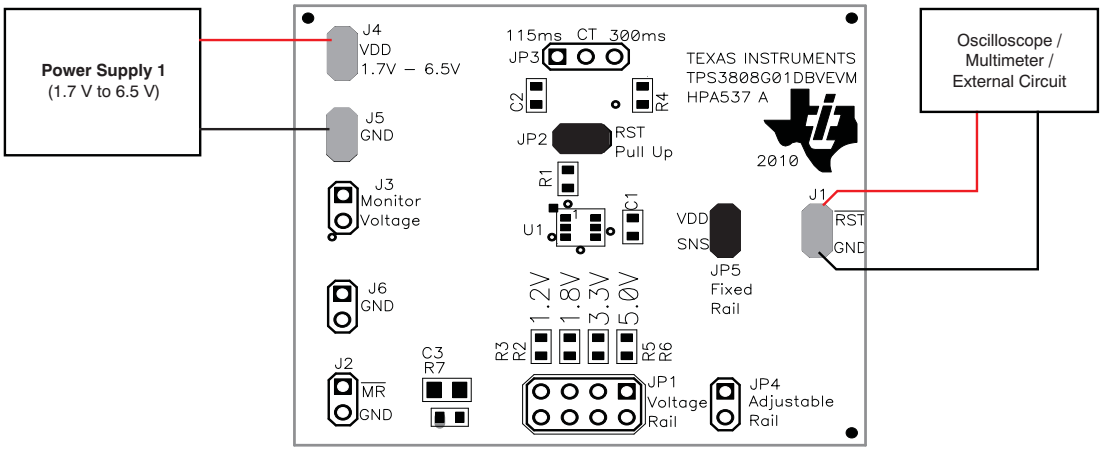


Figure 3. Using the TPS3808G01EVM with Fixed-Voltage TPS3808Gxx

Note that jumper JP5 shorts VDD (the power supply rail) to the SNS input of the TPS3808Gxx. In order to configure the TPS3808G01EVM to monitor an external power rail, simply remove the short across JP5 and connect the voltage to be monitored to pin 2 (marked *SNS*) of the JP5 header. J6 (GND) can be used as a ground connection for this voltage.

4 Board Layout

This section provides the TPS3808G01EVM board layout and illustrations.

4.1 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 TPS3808G01EVM PCBs.

Figure 4 through Figure 6 show the PCB layouts.

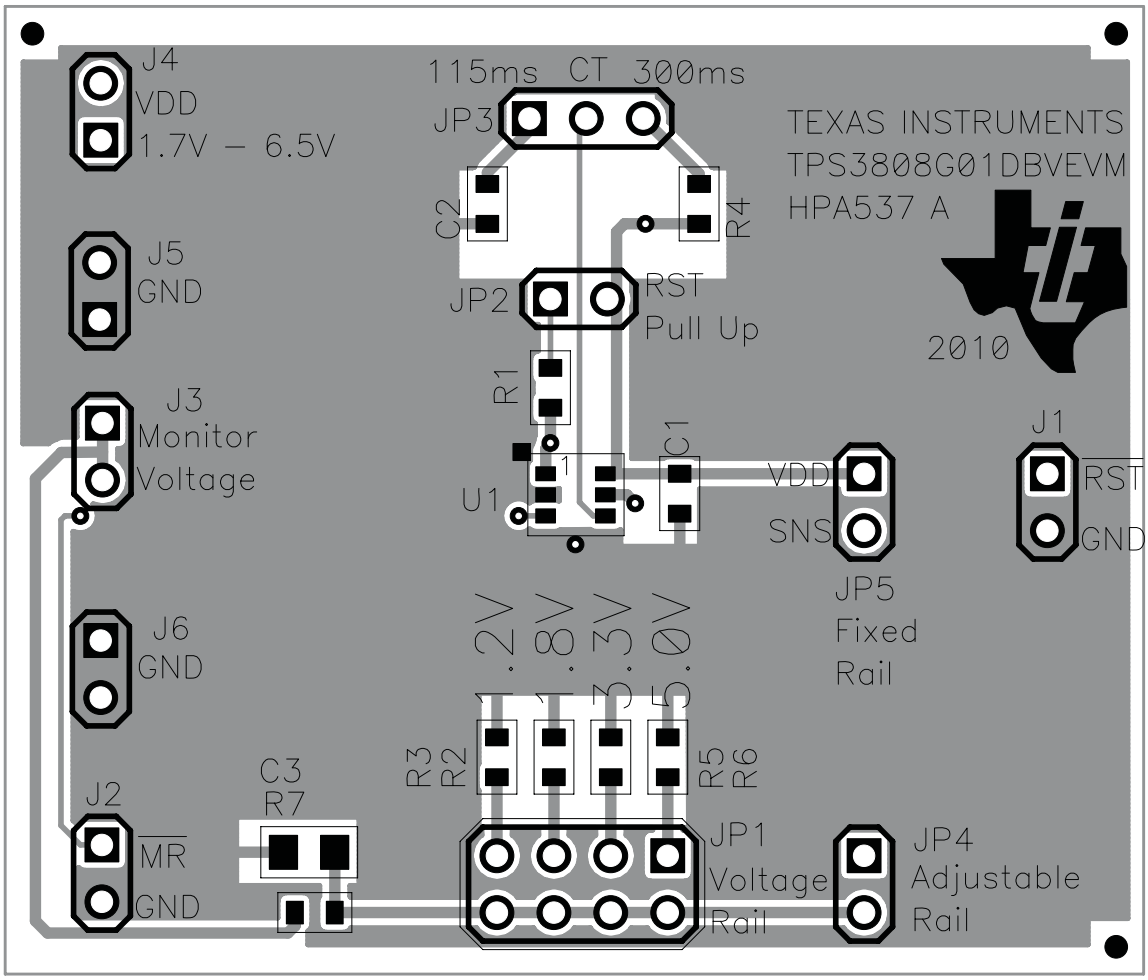


Figure 4. Top Layer Assembly

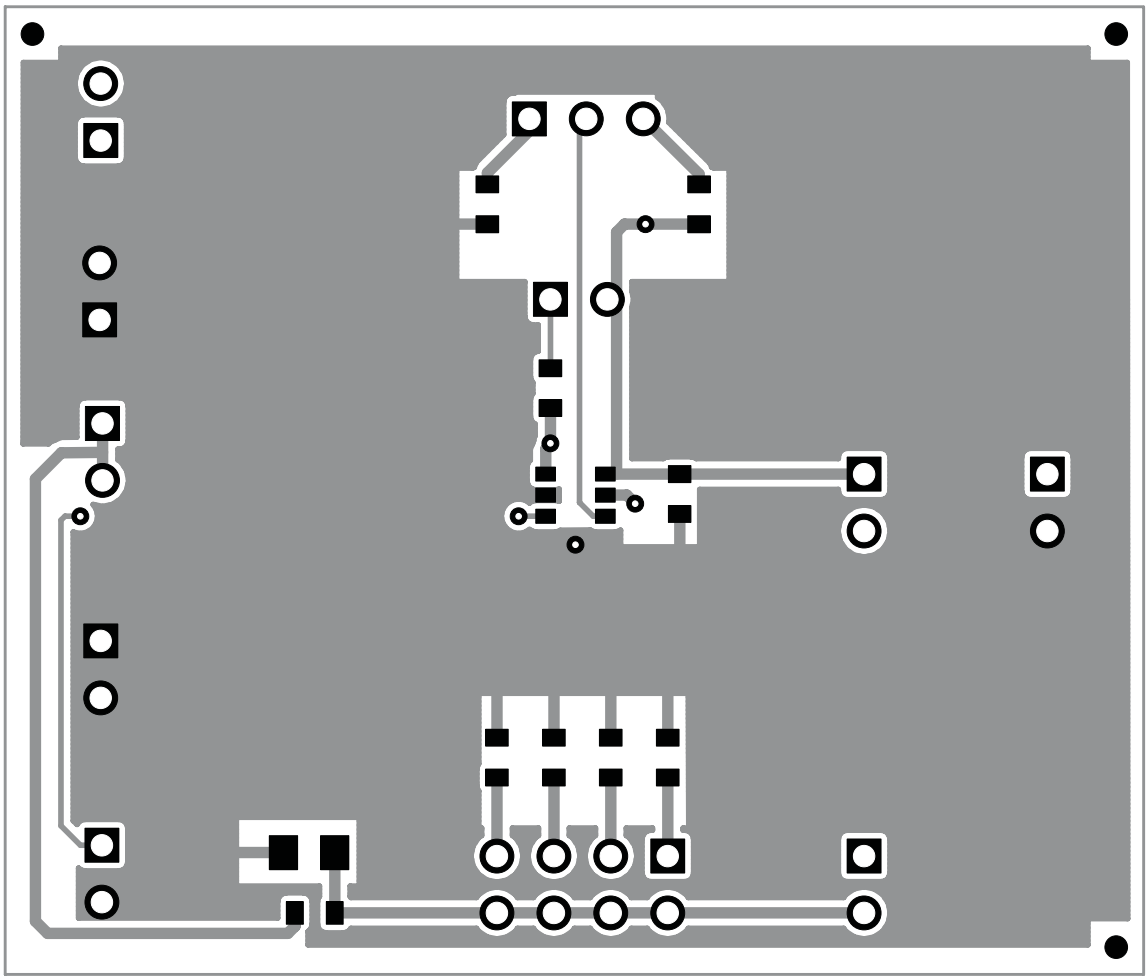


Figure 5. Top Layer Routing

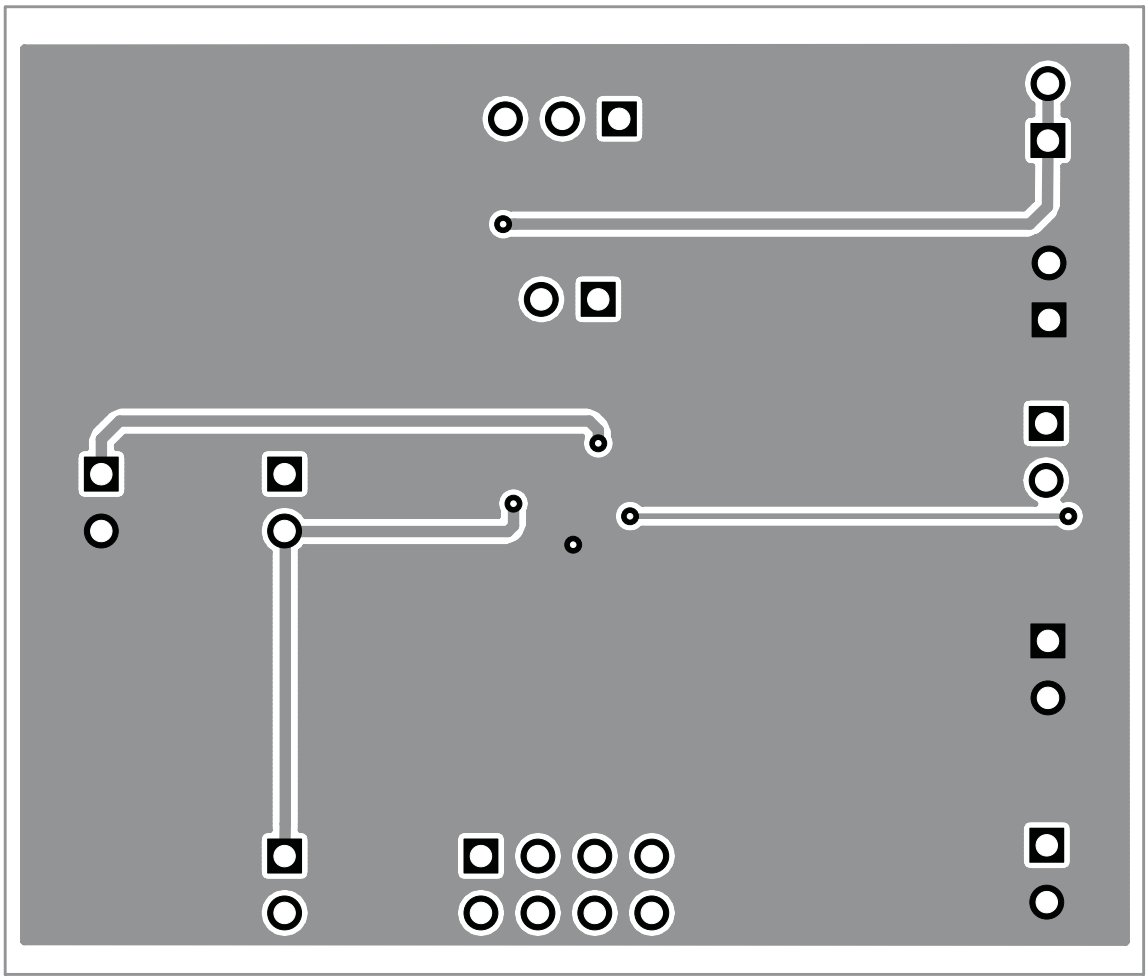


Figure 6. Bottom Layer Routing

5 Schematic and Bill of Materials

This section provides the TPS3808G01EVM bill of materials and schematic.

5.1 Parts List

Table 3 lists the bill of materials for the TPS3808G01EVM.

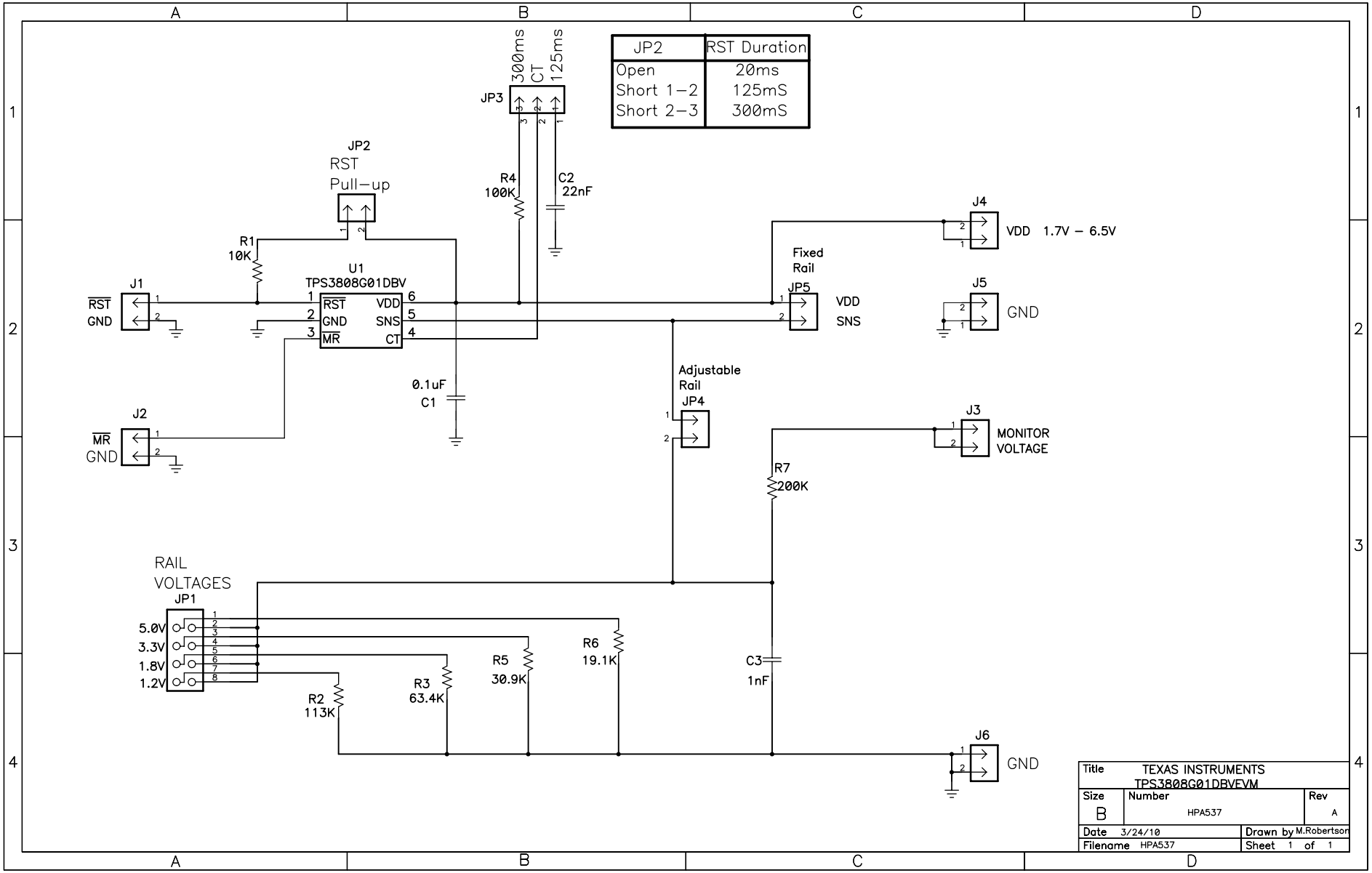
Table 3. TPS3808G01EVM Bill of Materials[(1)(2)(3)(4)]

Count	RefDes	Value	Description	Size	Part Number	MFR
1	C1	0.1 µF	Capacitor, ceramic, low inductance, 10 V, X7R, 10%	0603	STD	STD
1	C2	22 nF	Capacitor, ceramic, low inductance, 10 V, X7R, 10%	0603	STD	STD
1	C3	1 nF	Capacitor, ceramic, 10 V, X7R, 10%	0805	STD	STD
6	J1, J2, J3, J4, J5, J6	PEC02SAAN	Header, male 2-pin, 100-mil spacing	TH	PEC02SAAN	Sullins
1	JP1	PEC04DAAN	Header, male 2x4-pin, 100-mil spacing	TH	PEC04DAAN	Sullins
3	JP2, JP3, JP4	PEC02SAAN	Header, male 2-pin, 100-mil spacing	TH	PEC02SAAN	Sullins
1	JP5	PEC03SAAN	Header, male 3-pin, 100-mil spacing	TH	PEC03SAAN	Sullins
1	R1	10 kΩ	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R2	113 kΩ	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R3	63.4 kΩ	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R4	100 kΩ	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R5	30.9 kΩ	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R6	19.1 kΩ	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R7	200 kΩ	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	U1	TPS3808G01DBV	Low quiescent current, programmable-delay supervisory circuit	SOT23-6	TPS3808G01DBV	TI
1	N/A		PCB, FR-4, 2-Layer, SMOBC, 1.700" x 2.00" x .062"		HPA537**	Any
5	N/A		Shunt, Open-top		151-8000	Kobiconn

(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 manufacturing components.

5.2 Schematic

The schematic for this EVM is appended to this document.


A
B
C
D
1
2
3
4
JP2 | RST Duration
Open | 20ms
Short 1–2 | 125mS
Short 2–3 | 300mS
JP3
300ms
CT
125ms
JP2
RST
Pull–up
R4
100K
C2
22nF
R1
10K
U1
TPS3808G01DBV
RST
GND
MR
VDD
SNS
CT
J1
RST
GND
J2
MR
GND
0.1uF
C1
Fixed
Rail
JP5
VDD
SNS
J4
VDD 1.7V – 6.5V
J5
GND
Adjustable
Rail
JP4
J3
MONITOR
VOLTAGE
R7
200K
RAIL
VOLTAGES
JP1
5.0V
3.3V
1.8V
1.2V
R2
113K
R3
63.4K
R5
30.9K
R6
19.1K
C3
1nF
J6
GND
Title TEXAS INSTRUMENTS
TPS3808G01DBVEVM
Size B
Number HPA537
Rev A
Date 3/24/10
Drawn by M.Robertson
Filename HPA537
Sheet 1 of 1

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EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of 1.7 V to 6.5 V and the output voltage range of 0 V to 6.5 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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