

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.

Contents

1	Introduction	1
2	Setup	2
3	Operation	3
4	Board Layout	5
5	Schematic and Bill of Materials	8

List of Figures

1	Using the TPS3808G01EVM as a Single-Rail Monitor	3
2	Using the TPS3808G01EVM as a Dual-Rail Monitor	4
3	Using the TPS3808G01EVM with Fixed-Voltage TPS3808Gxx	4
4	Top Layer Assembly	5
5	Top Layer Routing	6
6	Bottom Layer Routing	7

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-k Ω 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 RST output (J1) to an oscilloscope, multimeter, or external circuit.

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

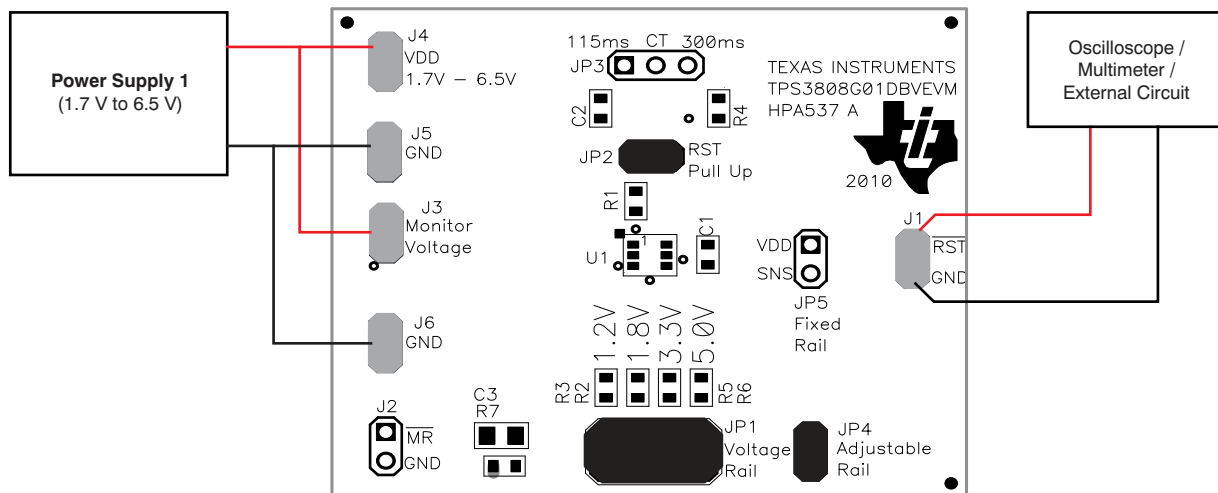


Figure 1. Using the TPS3808G01EVM as a Single-Rail Monitor

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 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](#).

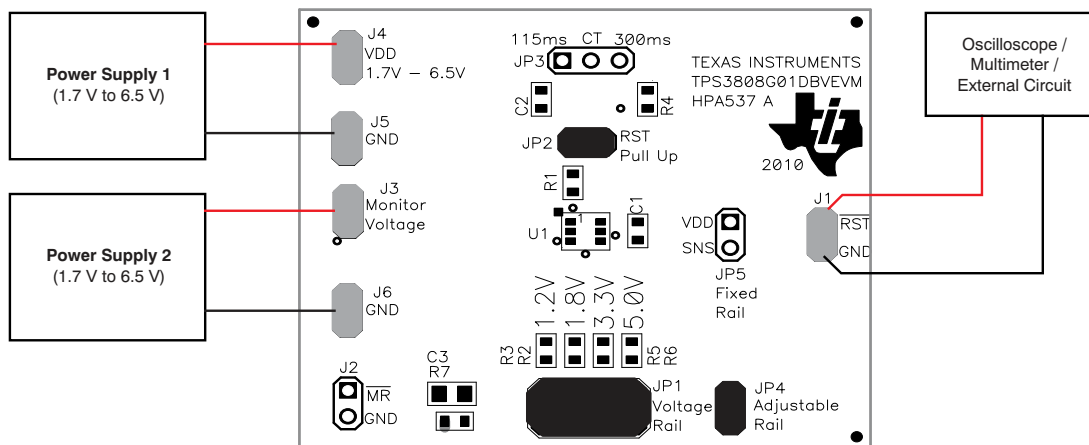


Figure 2. Using the TPS3808G01EVM as a Dual-Rail Monitor

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 RST output (J1) to an oscilloscope, multimeter, or external circuit.

[Figure 3](#) illustrates the proper configuration to evaluate fixed-voltage versions of the TPS3808Gxx.

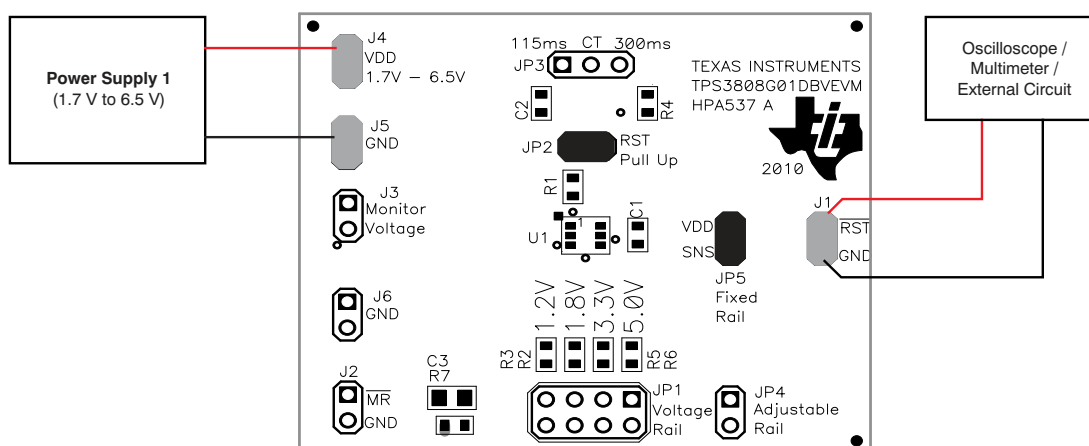


Figure 3. Using the TPS3808G01EVM with Fixed-Voltage TPS3808Gxx

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.

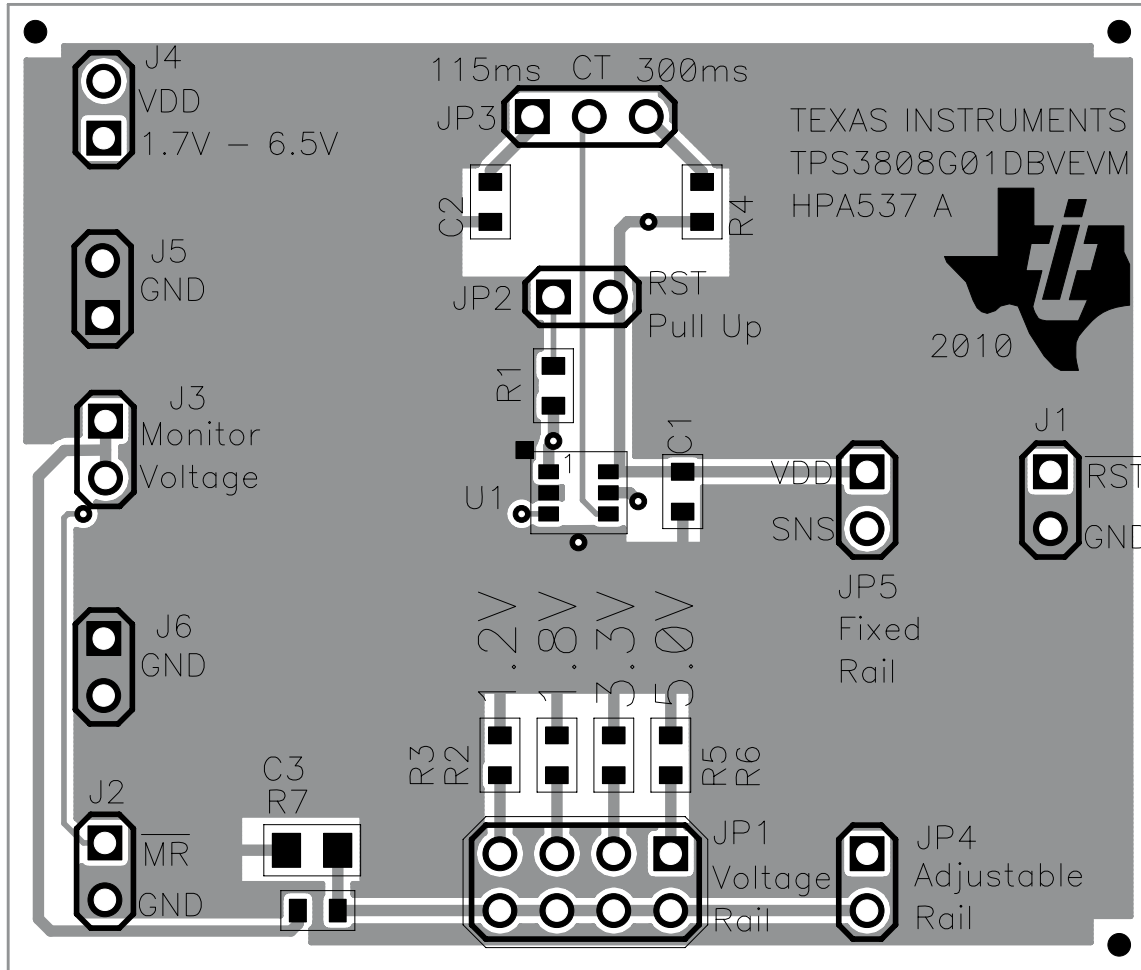


Figure 4. Top Layer Assembly

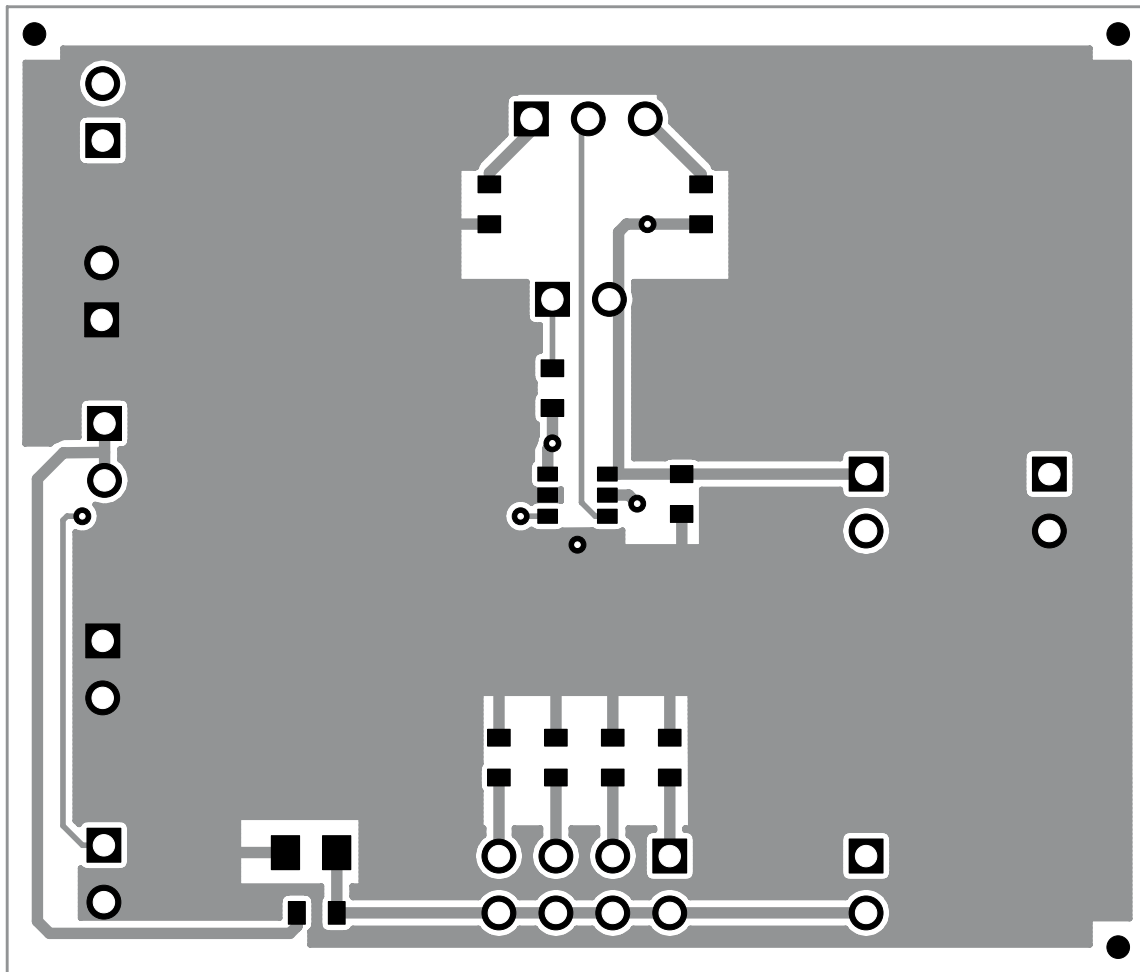


Figure 5. Top Layer Routing

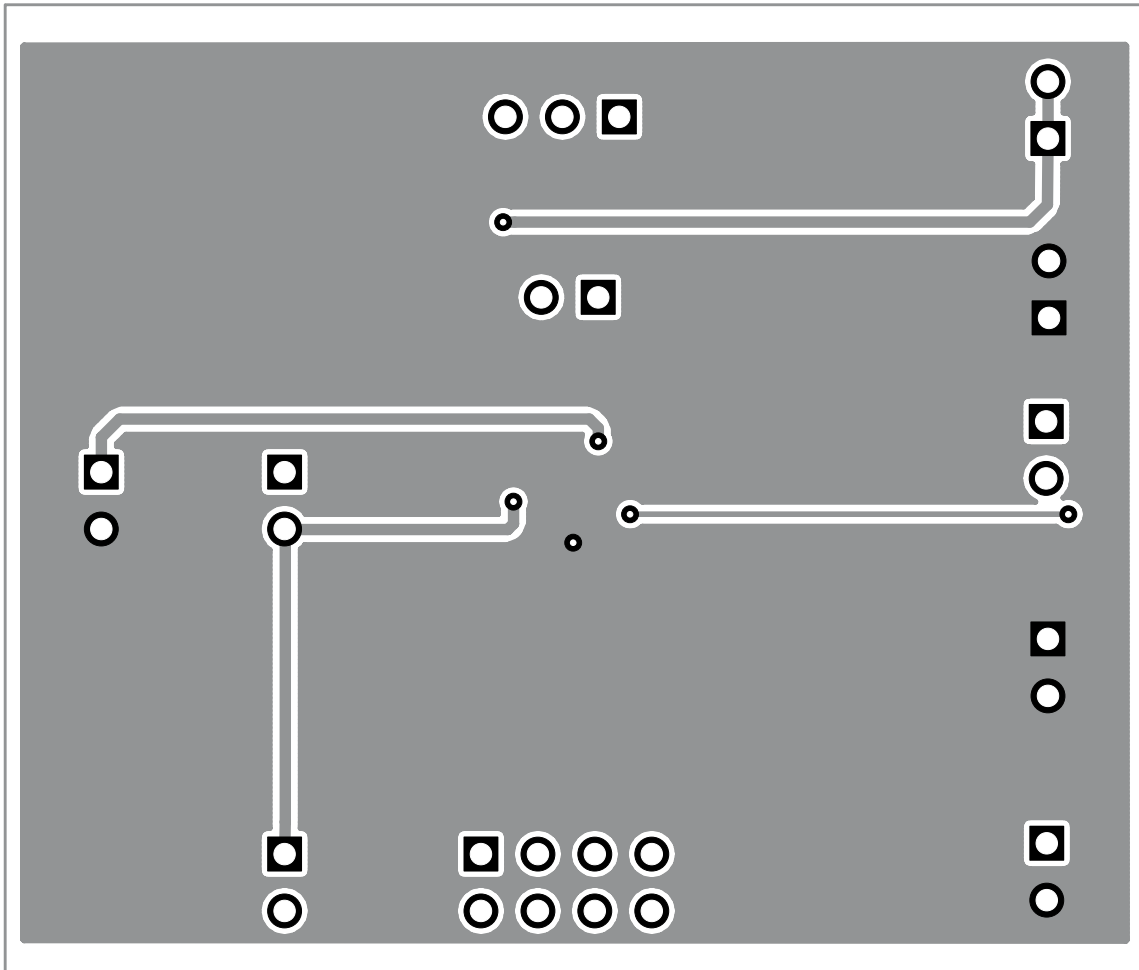


Figure 6. Bottom Layer Routing

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 μ F	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 k Ω	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R2	113 k Ω	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R3	63.4 k Ω	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R4	100 k Ω	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R5	30.9 k Ω	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R6	19.1 k Ω	Resistor, chip, 1/16W, 1%	0603	STD	STD
1	R7	200 k Ω	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.

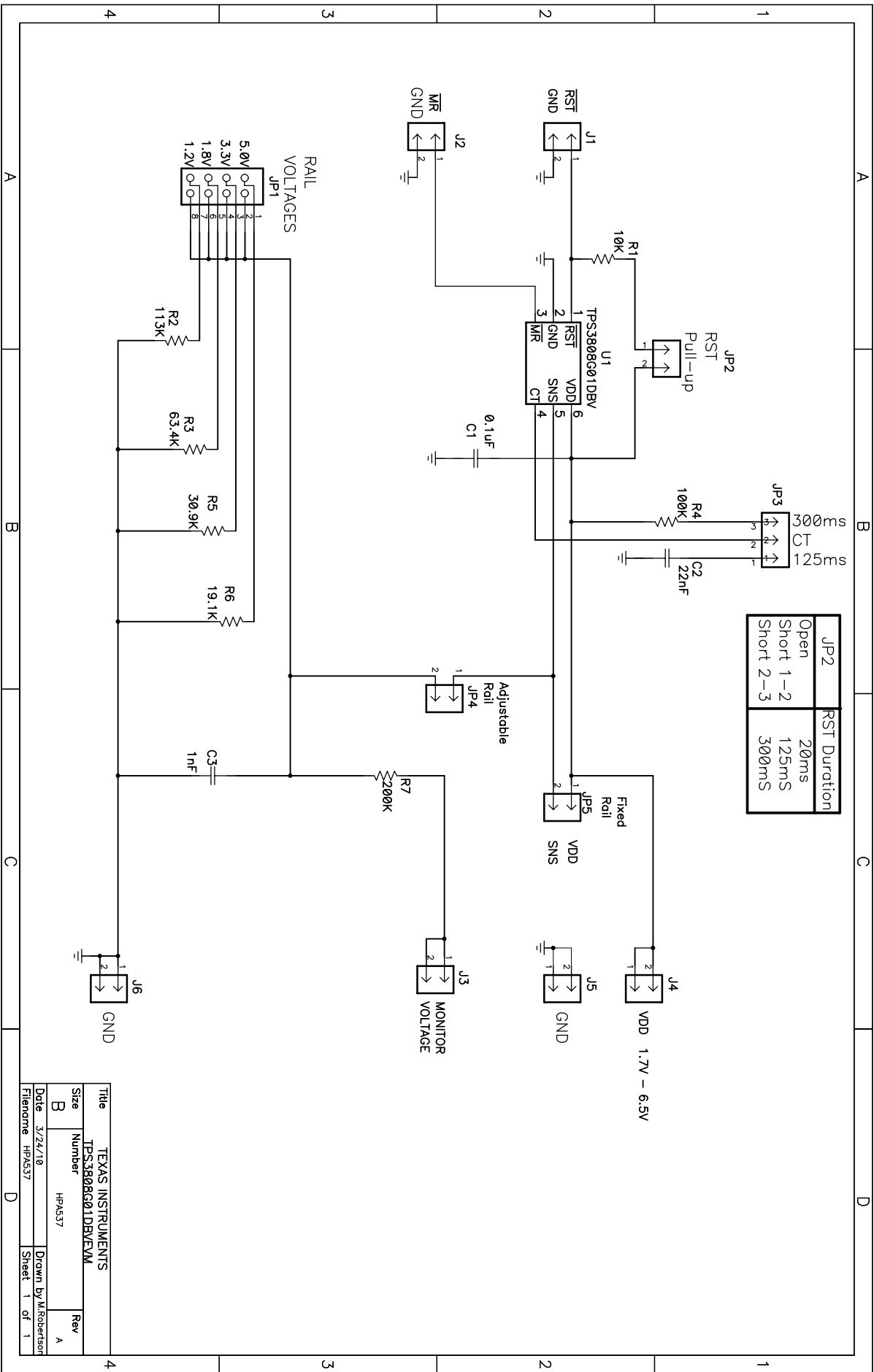
⁽²⁾ These assemblies must be clean and free from flux and all contaminants. Use of *no-clean flux* is not acceptable.

⁽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.



JP2	RST Duration
Open	20ms
Short 1-2	125ms
Short 2-3	300ms

Title		TEXAS INSTRUMENTS	
Size		TPS3808G01DBVEM	
Number		HPA537	
Date	3/24/10	Drawn By	M.Robertson
File name	HPA537	Sheet	1 of 1

Evaluation Board/Kit Important Notice

Texas Instruments (TI) provides the enclosed product(s) under the following conditions:

This evaluation board/kit is intended for use for **ENGINEERING DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY** and is not considered by TI to be a finished end-product fit for general consumer use. Persons handling the product(s) must have electronics training and observe good engineering practice standards. As such, the goods being provided are not intended to be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including product safety and environmental measures typically found in end products that incorporate such semiconductor components or circuit boards. This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and therefore may not meet the technical requirements of these directives or other related directives.

Should this evaluation board/kit not meet the specifications indicated in the User's Guide, the board/kit may be returned within 30 days from the date of delivery for a full refund. **THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.**

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies TI from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge.

EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

TI currently deals with a variety of customers for products, and therefore our arrangement with the user **is not exclusive.**

TI assumes **no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein.**

Please read the User's Guide and, specifically, the Warnings and Restrictions notice in the User's Guide prior to handling the product. This notice contains important safety information about temperatures and voltages. For additional information on TI's environmental and/or safety programs, please contact the TI application engineer or visit www.ti.com/esh.

No license is granted under any patent right or other intellectual property right of TI covering or relating to any machine, process, or combination in which such TI products or services might be or are used.

FCC Warning

This evaluation board/kit is intended for use for **ENGINEERING DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY** and is not considered by TI to be a finished end-product fit for general consumer use. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

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.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2010, Texas Instruments Incorporated

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DLP® Products	www.dlp.com	Communications and Telecom	www.ti.com/communications
DSP	dsp.ti.com	Computers and Peripherals	www.ti.com/computers
Clocks and Timers	www.ti.com/clocks	Consumer Electronics	www.ti.com/consumer-apps
Interface	interface.ti.com	Energy	www.ti.com/energy
Logic	logic.ti.com	Industrial	www.ti.com/industrial
Power Mgmt	power.ti.com	Medical	www.ti.com/medical
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
RFID	www.ti-rfid.com	Space, Avionics & Defense	www.ti.com/space-avionics-defense
RF/IF and ZigBee® Solutions	www.ti.com/lprf	Video and Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless-apps