

EVM User's Guide: TPS4141Q1EVM

TPS4141-Q1 Evaluation Module



Description

The TPS4141Q1EVM is a hardware evaluation module (EVM) containing multiple test points and jumpers to fully evaluate the performance and functionality of the device. The evaluation module contains everything needed to test and assess the TPS4141Q1 before designing into part of a greater application's power system. The TPS4141Q1EVM can be used standalone or can optionally be paired with an external microcontroller for driving the enable and configuration logic signals of the device. The full range of application features such as adjustable sense voltage gain for optimized ADC performance and bi-directional voltage monitoring are enabled and visible through use of this evaluation module. This EVM is populated with TPS4141Q1 in a SOIC package.

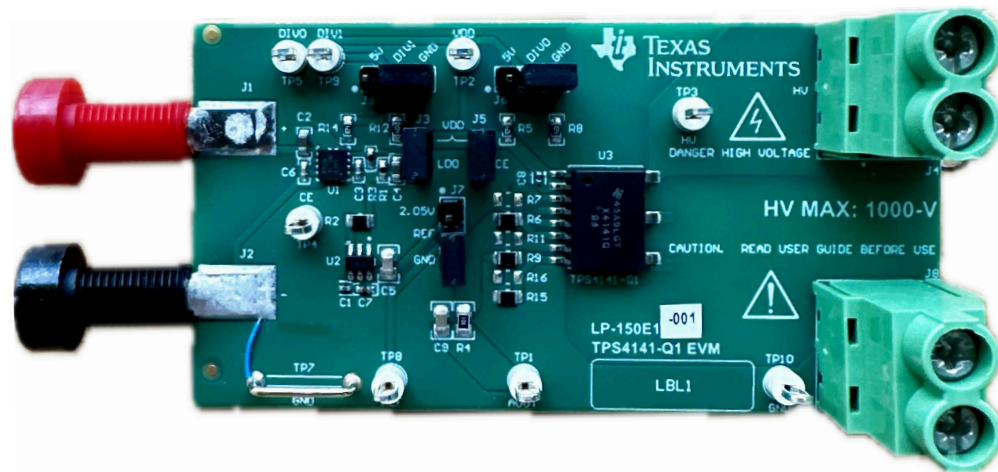
Features

- Onboard 5V LDO regulator for VDD rail and chip enable supply

- Configurable amplifier gain settings for optimized ADC performance
- Configurable bi-directional and uni-directional voltage monitoring mode
- Onboard 2.05V voltage reference to support bi-directional voltage monitoring
- Test points available for every pin and voltage supply to verify correct functionality
- Reusable test points for optionally driving control signals by external microcontroller
- Terminal blocks for easily wired high-voltage board connections

Applications

- [Hybrid, electric, and power train systems](#)
- [Battery Management Systems \(BMS\)](#)
- [Onboard charger](#)
- DC link pre-charge voltage measurement
- [Solar energy](#)
- [Electric vehicle chargers \(EV\)](#)



TPS4141Q1EVM

1 Evaluation Module Overview

1.1 Introduction

The TPS4141-Q1 is a high-voltage monitoring device designed for automotive and industrial applications. The TPS4141-Q1 compactly integrates a precision matched, thin-film SiCr resistor divider with a programmable-gain amplifier for sensing system voltages that require accurate measurement in the range of -1kV:1kV. The High-Voltage (HV) sense pin of the device can be seamlessly connected and disconnected from the broader system using the integrated high-voltage switches which also provide uni-directional current blocking when disconnected. With a nominal HV to GND resistance of 30M Ω , TPS4141-Q1 enables power efficient HV sensing that is optimized for a wide range of analog to digital converter full scale voltages through the programmable gain settings of the amplifier, selectable via the DIV0 and DIV1 pins.

The TPS4141Q1EVM helps designers evaluate the operation and performance of the TPS4141-Q1. The TPS4141-Q1 is a compact, -1kV:1kV high-voltage monitor. The inputs and output connections to the board are terminal blocks, which allow for easily wired connections. The TPS4141Q1EVM contains multiple test points for monitoring the TPS4141-Q1 functionality. This user's guide provides the connectors, test point descriptions, operational modes, schematic, bill of materials, and board layout of the EVM.

WARNING



Do not use EVM to test isolation above $V_{IOWM} = 1414V_{DC}$ High voltage

CAUTION



Hot surface. Contact can cause burns. Do not touch!

CAUTION



Read the user's guide before use.

CAUTION



Do not leave EVM powered when unattended.

1.2 Kit Contents

Table 1-1. Kit Contents

Item	Quantity
TPS4141Q1EVM	1

1.3 Specification

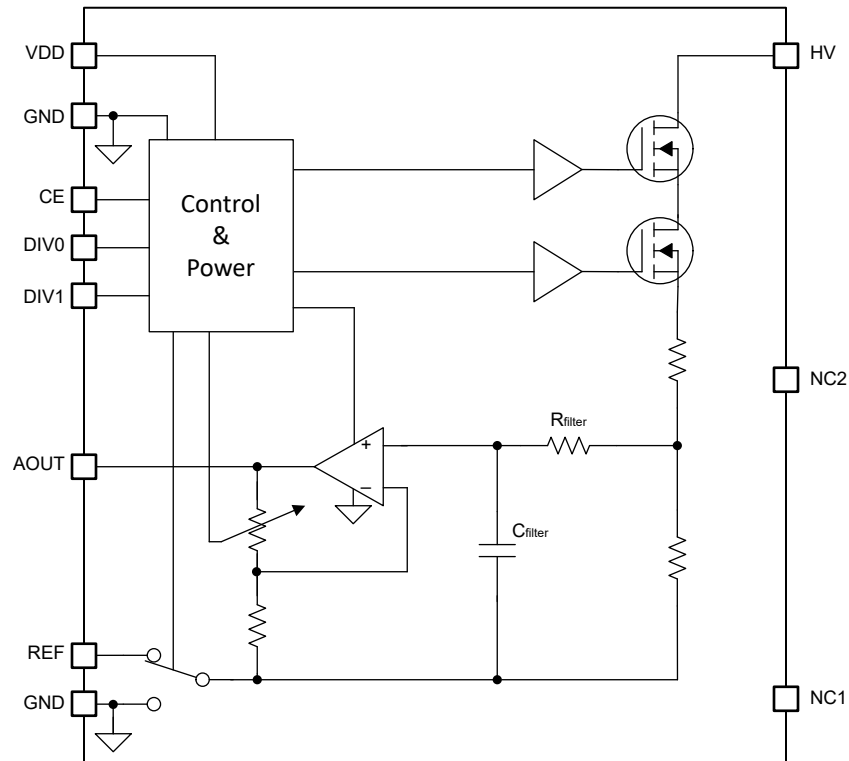


Figure 1-1. TPS4141-Q1 Functional Block Diagram

1.4 Device Information

Table 1-2. Device Information

PART NUMBER	PACKAGE	BODY SIZE (NOM)
TPS4141-Q1	SOIC 11 pin (DWQ)	10.3mm × 7.5mm

General Texas Instruments High Voltage Evaluation (TI HV EVM) User Safety Guidelines



Always follow TI's set-up and application instructions, including use of all interface components within the recommended electrical rated voltage and power limits. Always use electrical safety precautions to help verify your personal safety and those working around you. Contact TI's Product Information Center <http://ti.com/customer-support> for further information.

Save all warnings and instructions for future reference.

WARNING

Failure to follow warnings and instructions can result in personal injury, property damage or death due to electrical shock and burn hazards.

The term TI HV EVM refers to an electronic device typically provided as an open framed, unenclosed printed circuit board assembly. It is *intended strictly for use in development laboratory environments, solely for qualified professional users having training, expertise and knowledge of electrical safety risks in development and application of high voltage electrical circuits. Any other use and/or application are strictly prohibited by Texas Instruments.* If you are not suitably qualified, you should immediately stop from further use of the HV EVM.

1. Work Area Safety:
 - a. Keep work area clean and orderly.
 - b. Qualified observers must be present anytime circuits are energized.
 - c. Effective barriers and signage must be present in the area where the TI HV EVM and the interface electronics are energized, indicating operation of accessible high voltages can be present, for the purpose of protecting inadvertent access.
 - d. All interface circuits, power supplies, evaluation modules, instruments, meters, scopes, and other related apparatus used in a development environment exceeding 50Vrms/75VDC must be electrically located within a protected Emergency Power Off EPO protected power strip.
 - e. Use stable and non-conductive work surface.
 - f. Use adequately insulated clamps and wires to attach measurement probes and instruments. No freehand testing whenever possible.
2. Electrical Safety:
 - a. As a precautionary measure, a good engineering practice is to assume that the entire EVM can have fully accessible and active high voltages.
 - b. De-energize the TI HV EVM and all the inputs, outputs and electrical loads before performing any electrical or other diagnostic measurements. Revalidate that TI HV EVM power has been safely de-energized.
 - c. With the EVM confirmed de-energized, proceed with required electrical circuit configurations, wiring, measurement equipment hook-ups and other application needs, while still assuming the EVM circuit and measuring instruments are electrically live.
 - d. Once EVM readiness is complete, energize the EVM as intended.

WARNING

While the EVM is energized, never touch the EVM or the electrical circuits, as the EVM or the electrical circuits can be at high voltages capable of causing electrical shock hazard.

3. Personal Safety
 - a. Wear personal protective equipment e.g. latex gloves or safety glasses with side shields or protect EVM in an adequate lucent plastic box with interlocks from accidental touch.

Limitation for safe use:

EVMs are not to be used as all or part of a production unit.

2 Hardware

2.1 Test Equipment

The testing of the TPS4141Q1EVM recommends the following equipment:

- Adjustable power supplies for the input
- Oscilloscope
- Digital multimeter
- *Optional:* function generator or microcontroller to toggle the Chip Enable pin

2.2 Connection Descriptions

[Table 2-1](#) shows an overview of the input/output connectors. [Table 2-2](#) shows the test points and jumpers.

Table 2-1. Input and Output Connector Descriptions

Connector	Label	Description
J1	LDO_INPUT+	LDO input for connecting external power supply
J2	GND	Primary side GND
J4	HV	Secondary side High Voltage input
J8	GND	Secondary side GND

Table 2-2. Test Point and Jumper Descriptions

Test Point, Jumper	Label	Description
J3	LDO	Connects LDO output to VDD supply rail
J5	CE	Connects Chip Enable input signal to VDD or external input when left unconnected
J6	DIV0	Connects DIV0 (Divider Ratio input) to 5V/GND or float when left unconnected
J7	REF	Connects REF (Reference voltage input) to 2.05V/GND for Bi-directional/ Unidirectional voltage monitoring modes
J9	DIV1	Connects DIV1 (Divider Ratio input) to 5V/GND or float when left unconnected
TP1	AOUT	HV sense signal Analog Output
TP2	VDD	Primary side supply test point
TP3	HV	HV secondary side test point
TP4	CE	CE primary side test point, can be used to drive CE externally when J5 is disconnected
TP5	DIV0	DIV0 select voltage test point
TP7	GND	Primary side GND test point
TP8	REF	REF select voltage test point
TP9	DIV1	DIV1 select voltage test point
TP10	GND	Secondary side GND test point

3 Implementation Results

3.1 Recommended Test Setup

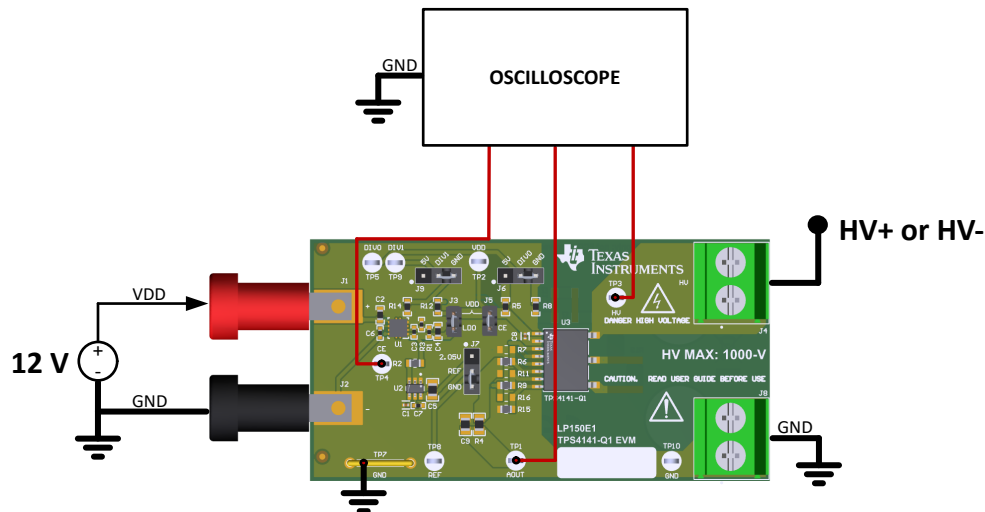


Figure 3-1. TPS4141Q1EVM Test Setup

Verify that the TPS4141Q1EVM has the following setting on the jumpers:

1. J3 - Connecting LDO output to VDD Rail
2. J5 - Disconnecting VDD Rail and Chip Enable (CE)
3. J7 - Connecting Ref to GND
4. J6 - Connecting DIV0 to GND
5. J9 - Connecting Div1 to GND

To test the normal operation of TPS4141-Q1, follow the steps outlined below:

1. Connect a 12V power supply to the banana jacks of **J1** with the negative lead connected to **J2** to power TPS4141-Q1.
2. Before placing in the enclosure or connecting the High-Voltage (HV) power supply, verify all voltages on the primary side of TPS4141-Q1 are as expected using **TP2** (VDD), **TP5** (DVI0), **TP9** (DIV1) and **TP8** (REF).
3. Placing the board in the enclosure, attach the high-voltage power supply positive lead to **J4** and the negative to **J8**.
4. Attach a 5V power supply, function generator or MCU I/O positive lead to **TP4** (CE) and the negative to **TP7** (GND).
5. With oscilloscope probes connected to voltages of interest (CE, HV, AOUT) turn on the high-voltage supply then subsequently toggle the 5V supply connected to CE, observe that **TP4** (CE), **TP3** (HV) and **TP1** (AOUT) show the expected voltages.

3.1.1 Waveforms

If connected as described above, then the following channels must be displayed in the waveforms below:

- CH 3 = CE
- CH 2 = AOUT
- CH 1 = HV

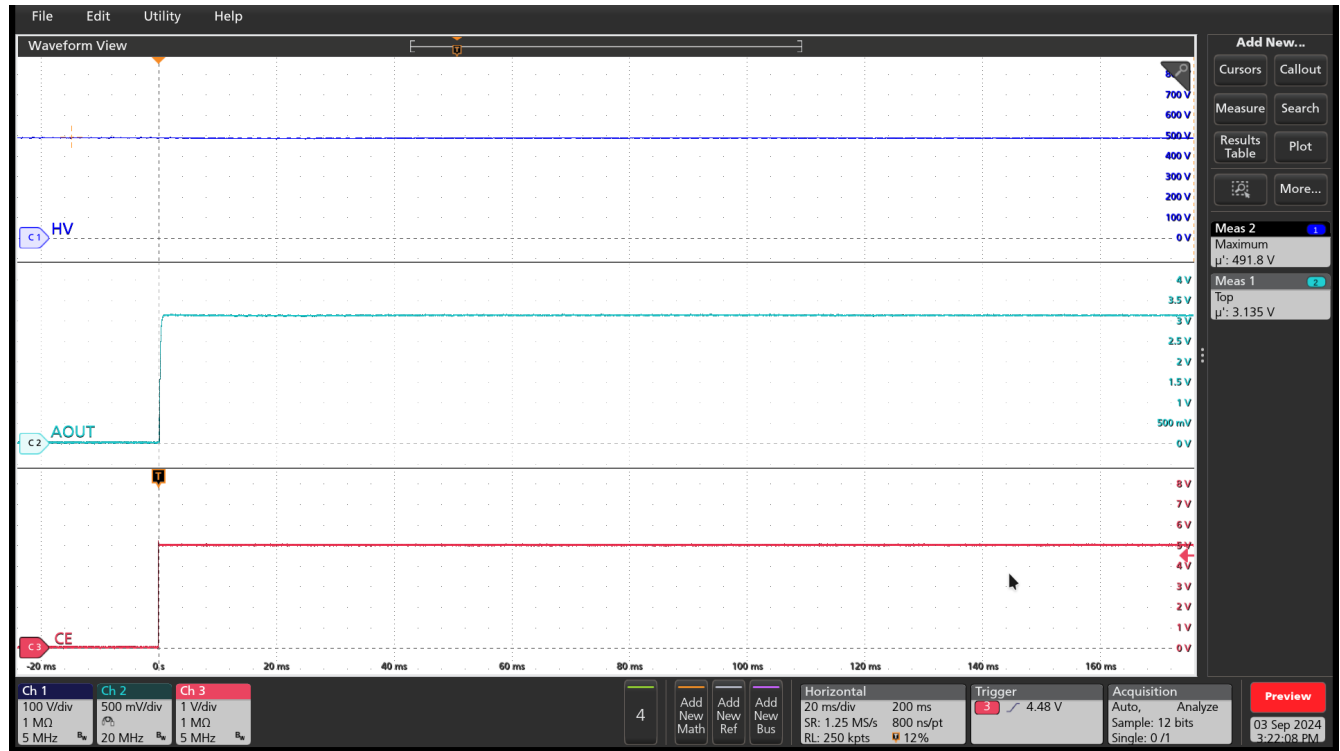


Figure 3-2. AOUT Voltage at HV=500V (CE=5V, DIV=160)

4 Hardware Design Files

4.1 Schematic

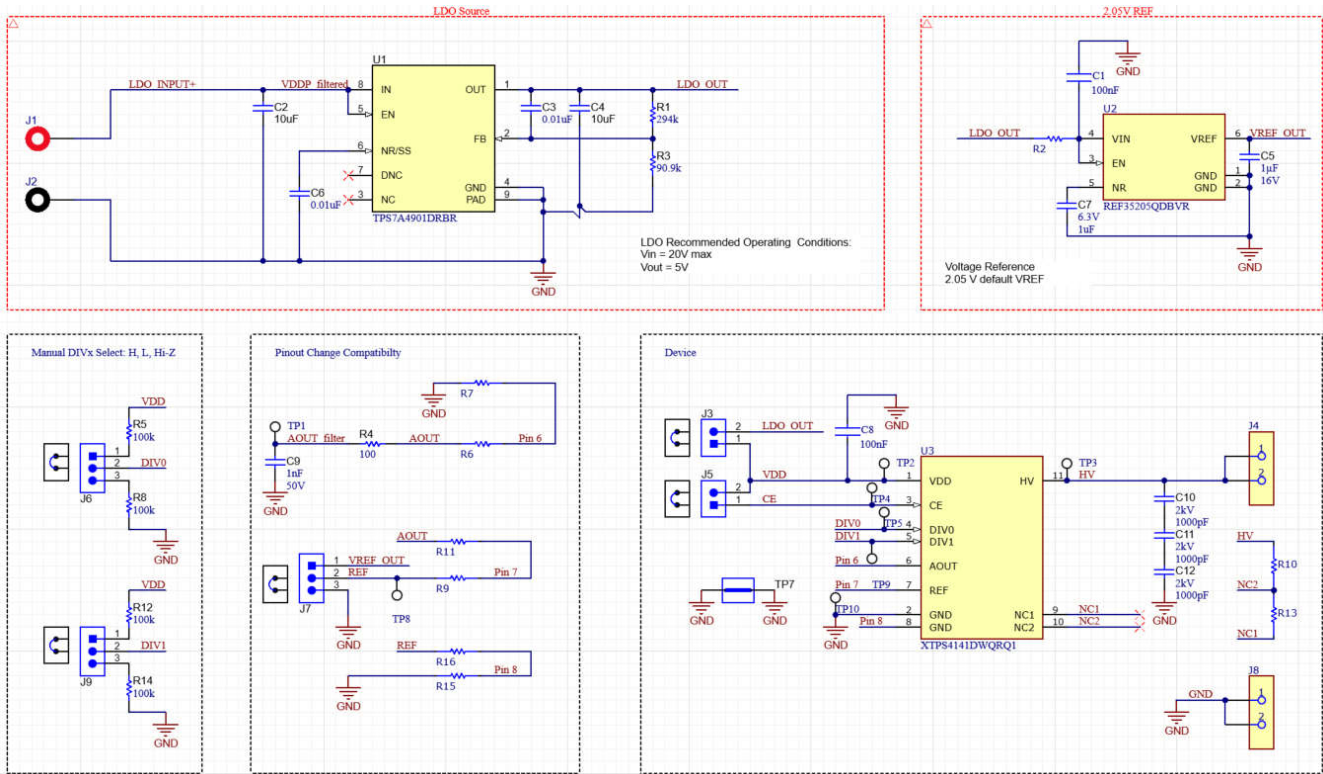


Figure 4-1. TPS4141Q1EVM Schematic

4.2 PCB Layout

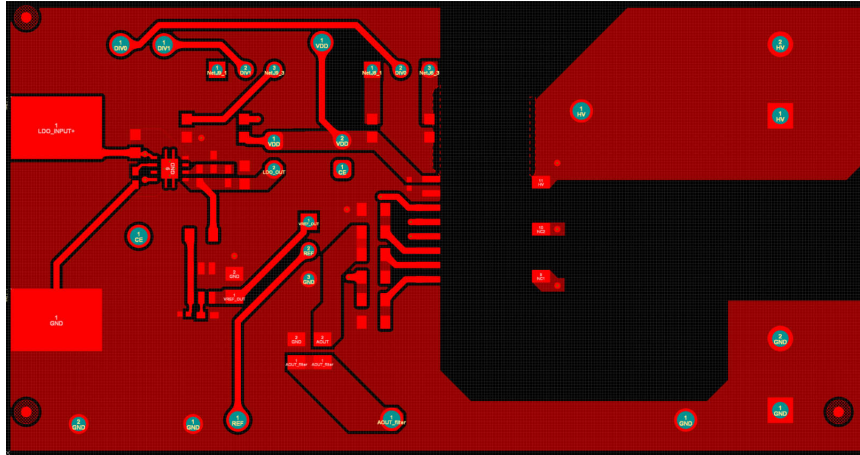


Figure 4-2. TPS4141-Q1 EVM - Layer 1

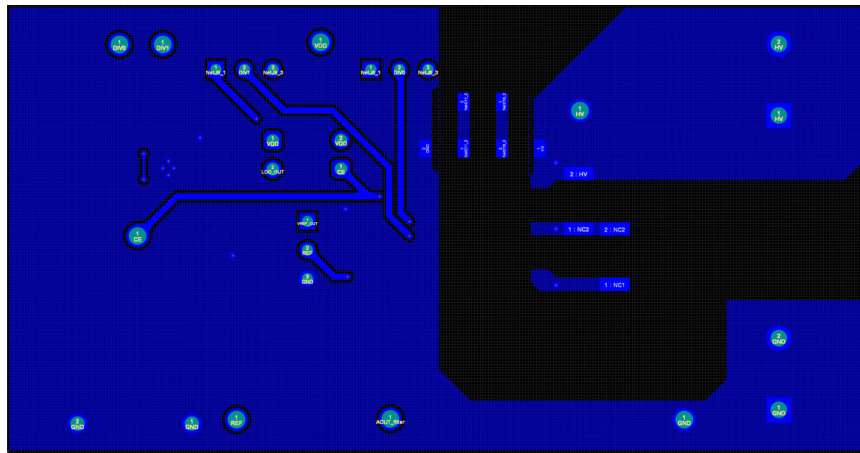


Figure 4-3. TPS4141-Q1 EVM - Layer 2

4.3 Bill of Materials

Table 4-1. Bill of Materials

DESIGNATOR	QUANTITY	VALUE	DESCRIPTION	PACKAGE REFERENCE	PART NUMBER	MANUFACTURER
PCB	1		Printed Circuit Board		LP-150	Any
C1, C8	2		Chip Multilayer Ceramic Capacitors for General Purpose, 0402, 0.10uF, X7R, 15%, 10%, 25V		GRM155R71E104KE14D	
C2, C4	2	10uF	CAP, CERM, 10uF, 25V, +/- 20%, X5R, 0603	0603	GRT188R61E106ME13D	MuRata
C3, C6	2	0.01uF	CAP, CERM, 0.01uF, 25V, +/- 10%, X7R, 0402	0402	GRM155R71E103KA01D	MuRata
C5	1	1uF	CAP, CERM, 1uF, 16V, +/- 10%, X7R, 0805	0805	C0805C105K4RACTU	Kemet
C7	1	1uF	CAP, CERM, 1uF, 6.3V,+/- 10%, X7R, 0402	0402	GRM155R70J105KA12D	MuRata
C9	1	1000pF	CAP, CERM, 1000pF, 50V, +/- 20%, X7R, 0805	0805	C0805C102M5RACTU	Kemet
H9, H10, H11, H12	4		Bumpon, Hemisphere, 0.44 X 0.20, Clear	Transparent Bumpon	SJ-5303 (CLEAR)	3M
J1	1		Banana Jack Insul Nylon Red, TH	Banana Jack Insul Nylon Red, TH	108-0902-001	Cinch Connectivity
J2	1		Banana Jack Insul Nylon Black, TH	Banana Jack Insul Nylon Black, TH	108-0903-001	Cinch Connectivity
J3, J5	2		Header, 2.54mm, 2x1, Gold, TH	Header, 2.54mm, 2x1, TH	61300211121	Würth Elektronik
J4, J8	2			CONN_TERM_BLOCK2	691250610002	Würth Electronics
J6, J7, J9	3		Header, 100mil, 3x1, Tin, TH	Header, 3 PIN, 100mil, Tin	PEC03SAAN	Sullins Connector Solutions
LBL1	1		Thermal Transfer Printable Labels, 0.650	PCB Label 0.650 x 0.200 inch	THT-14-423-10	Brady
R1	1	294k	RES, 294 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0402	0402	ERJ-2RKF2943X	Panasonic
R2, R6, R9, R15	4	0	RES SMD 0 OHM JUMPER 1/8W 0805	0805	RC0805FR-070RL	Yageo
R3	1	90.9k	RES, 90.9 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0402	0402	ERJ-2RKF9092X	Panasonic
R4	1	100	RES, 100, 5%, 0.125 W, AEC-Q200 Grade 0, 0805	0805	ERJ-6GEYJ101V	Panasonic
R5, R8, R12, R14	4	100k	RES, 100 k, 5%, 0.1 W, 0603	0603	CRCW0603100KJNEAC	Vishay-Dale
R10, R13	2	0	RES Thick Film, 0?, 1W, 2010	2010	CRCW20100000Z0EFHP	Vishay Dale

Table 4-1. Bill of Materials (continued)

DESIGNATOR	QUANTITY	VALUE	DESCRIPTION	PACKAGE REFERENCE	PART NUMBER	MANUFACTURER
SH-J1, SH-J2, SH-J3, SH-J4, SH-J5	5		Shunt, 2.54mm, Gold, Black	Shunt, 2.54mm, Black	60900213421	Würth Elektronik
TP1, TP2, TP3, TP4, TP5, TP8, TP9, TP10	8		Test Point, White, Through Hole, RoHS, Bulk	5012	5012	Keystone
TP7	1		1mm Uninsulated Shorting Plug, 10.16mm spacing, TH	Shorting Plug, 10.16mm spacing, TH	D3082-05	Harwin
U1	1		Vin 3V to 36V, 150mA, Ultra-Low-Noise, High-PSRR Low-Dropout (LDO) Linear Regulator, DRB0008A (VSON-8)	DRB0008A	TPS7A4901DRBR	Texas Instruments
U2	1		650nA quiescent current, 12ppm/°C drift, ultra-low-power precision voltage reference 6-SOT-23 -40 to 125	SOT23-6	REF35205QDBVR	Texas Instruments
U3	1		Automotive 1000V Configurable Precision Resistor Divider With Integrated Switch	SOIC11	XTPS4141DWQRQ1	Texas Instruments

5 Additional Information

5.1 Trademarks

All trademarks are the property of their respective owners.

STANDARD TERMS FOR EVALUATION MODULES

1. *Delivery:* TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, and/or documentation which may be provided together or separately (collectively, an "EVM" or "EVMs") to the User ("User") in accordance with the terms set forth herein. User's acceptance of the EVM is expressly subject to the following terms.
 - 1.1 EVMs are intended solely for product or software developers for use in a research and development setting to facilitate feasibility evaluation, experimentation, or scientific analysis of TI semiconductors products. EVMs have no direct function and are not finished products. EVMs shall not be directly or indirectly assembled as a part or subassembly in any finished product. For clarification, any software or software tools provided with the EVM ("Software") shall not be subject to the terms and conditions set forth herein but rather shall be subject to the applicable terms that accompany such Software
 - 1.2 EVMs are not intended for consumer or household use. EVMs may not be sold, sublicensed, leased, rented, loaned, assigned, or otherwise distributed for commercial purposes by Users, in whole or in part, or used in any finished product or production system.
2. *Limited Warranty and Related Remedies/Disclaimers:*
 - 2.1 These terms do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.
 - 2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for a nonconforming EVM if (a) the nonconformity was caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.
 - 2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

WARNING

Evaluation Kits are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems.

User shall operate the Evaluation Kit within TI's recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI's recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI's instructions for electrical ratings of interface circuits such as input, output and electrical loads.

NOTE:

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGRADATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

3 Regulatory Notices:

3.1 United States

3.1.1 Notice applicable to EVMs not FCC-Approved:

FCC NOTICE: This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

3.1.2 For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:

CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

3.3 Japan

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。

<https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-delivered-in-japan.html>

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

【無線電波を送信する製品の開発キットをお使いになる際の注意事項】 開発キットの中には技術基準適合証明を受けていないものがあります。技術適合証明を受けていないものご使用に際しては、電波法遵守のため、以下のいずれかの措置を取っていただく必要がありますのでご注意ください。

1. 電波法施行規則第6条第1項第1号に基づく平成18年3月28日総務省告示第173号で定められた電波暗室等の試験設備でご使用いただく。
2. 実験局の免許を取得後ご使用いただく。
3. 技術基準適合証明を取得後ご使用いただく。

なお、本製品は、上記の「ご使用にあたっての注意」を譲渡先、移転先に通知しない限り、譲渡、移転できないものとします。

上記を遵守頂けない場合は、電波法の罰則が適用される可能性があることをご留意ください。日本テキサス・イ

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西新宿三井ビル

3.3.3 *Notice for EVMs for Power Line Communication:* Please see http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_02.page

電力線搬送波通信についての開発キットをお使いになる際の注意事項については、次のところをご覧ください。 <https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-for-power-line-communication.html>

3.4 European Union

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive):*

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

-
- 4 *EVM Use Restrictions and Warnings:*
 - 4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.
 - 4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.
 - 4.3 *Safety-Related Warnings and Restrictions:*
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