

## FEATURES

- PROVIDE FAST AND EASY PERFORMANCE TESTING FOR THE ADS2806 AND ADS2807
- SINGLE-ENDED AC-COUPLED INPUT
- SELECTABLE REFERENCE OPERATION: Internal or External
- SELECTABLE INPUT RANGE: 2Vpp or 3Vpp

## DESCRIPTION

The ADS280x-EVM is designed for ease of use when evaluating the ADS2806 or the ADS2807 high-speed, dual channel Analog-to-Digital Converter (ADC). Both the ADS2806 and the ADS2807 offer 12 bits of resolution at sample rates of 32MHz and 50MHz, respectively. The evaluation module has been designed for ease of use with only a transformer-coupled input. The data outputs from the ADS280x converter are isolated from the output connectors by CMOS logic buffers.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

All trademarks are the property of their respective owners.

# INITIAL CONFIGURATION

The ADS280x-EVM is designed to apply a differential signal to the ADC by utilizing a single-ended input coupled through a transformer. The input range of the ADS280x is user-selectable by the SEL jumper (J1). Table I shows the input configuration of the SEL jumper.

| SEL (J1) CONNECTIONS |               |
|----------------------|---------------|
| 2Vpp                 | No Connection |
| 3Vpp                 | Connected     |

TABLE I. Input Range Selection.

The outputs from each channel of the ADS280x device can be enabled or disabled. In order for the outputs to be active, the  $\overline{OE\bar{A}}$  and  $\overline{OE\bar{B}}$  jumpers should be connected.

## POWER SUPPLY

The evaluation module requires +5V for the analog circuitry of the ADS280x, +5V for the digital circuitry of the ADS280x, +5V for the digital output drivers (DRV) of the ADS280x, and +5V for the digital output buffers. **Please note that the ADS280x devices are capable of running +3V supplies for the digital output drivers (DRV); however, the logic buffers supplied are +5V operation only. If +3V digital output levels are desired, the output logic buffers must be replaced with the SN74ALB16244DGGR.** Three separate power connectors are on the board. The power supplies for the ADS280x are available on connector J1, with the analog supply labeled +5ADUT, the digital supply labeled +5DDUT and GND as the common ground. Connector J2, labeled with +3DRVB, GND, and +5VD, is the digital output supply for channel B of the ADS280x device, ground, and the digital supply to the output buffers. Connector J7, labeled with GND and +3DRVA, is ground and the digital output supply for channel A of the ADS280x device.

## SIGNAL INPUT CONFIGURATION

The input configuration to the ADS280x-EVM utilizes transformers to change the single-ended inputs applied to J5 and J6 to differential inputs into the ADS280x.

## CLOCK INPUT

The ADS280x-EVM requires an external clock applied to connector J4. This input represents a 50 $\Omega$  impedance to the clock source. In order to preserve the specified performance of the ADS280x converter, the clock should contain very low jitter. This is particularly important if the device will be used in the evaluation of an undersampled system.

## REFERENCE

The ADS280x-EVM is initially configured for operation from the internal reference. If external reference is desired, JP4 must be disconnected, JP5, JP6, JP7, and JP8 must be connected. The external reference voltages can then be applied to J3.

**Note: External reference should be capable of driving a low impedance (typical 375 $\Omega$ ) load.**

## OVER-RANGE INDICATOR

The OVRA and OVRB indicators are used to show when the inputs the the ADS280x are over the selected input range. Refer to the ADS280x data sheet for a further explanation on the OVR indicators.

## DATA VALID OUTPUTS

The DVA and DVB indicators are used to show when the data is valid and ready to be read.

## DATA OUTPUT

The ADS280x uses Straight Offset Binary coding. CMOS buffers are used to isolate the outputs of the ADS280x device from the data bus.

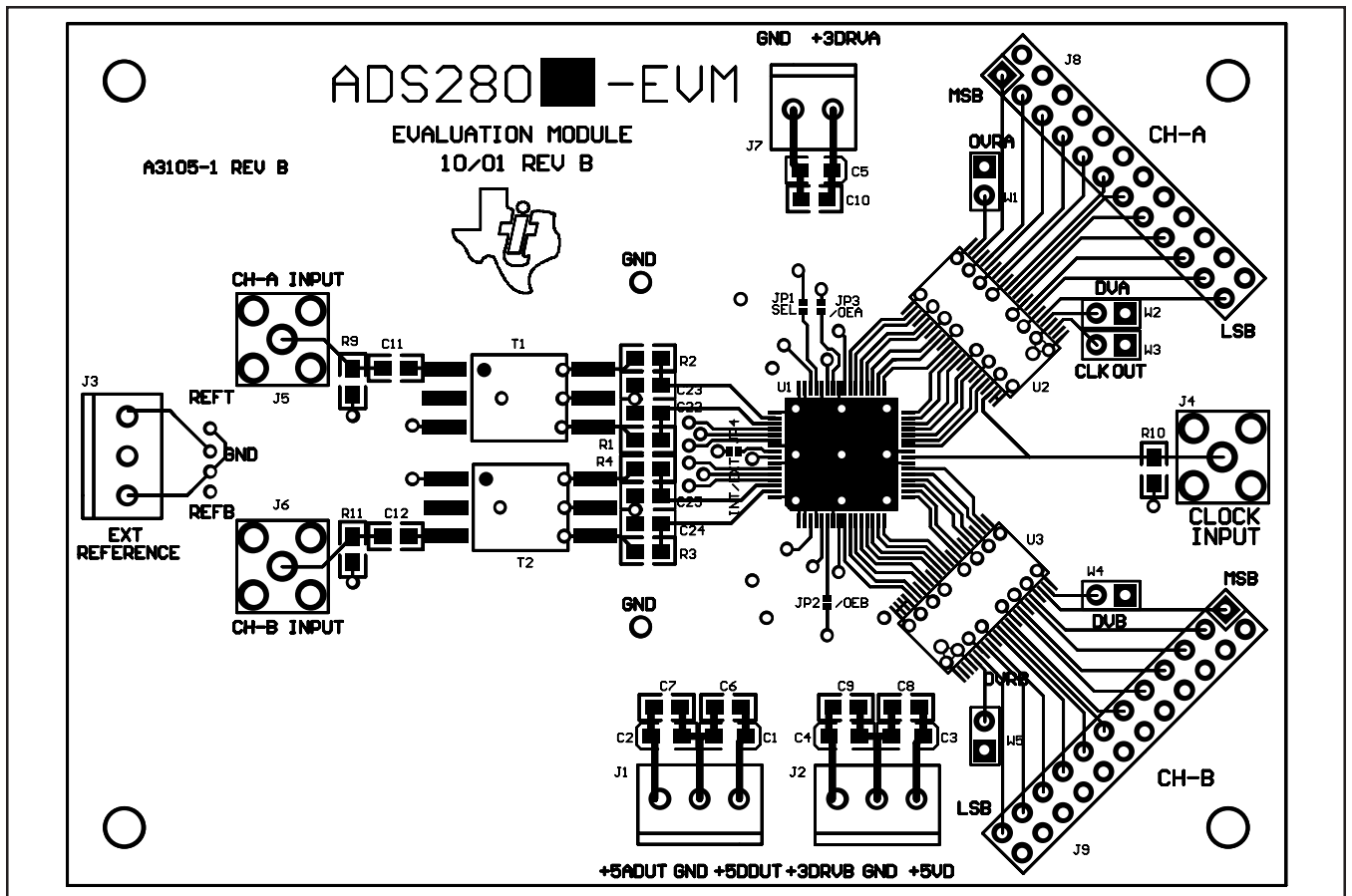


FIGURE 1. Top Layer with Silk Screen.

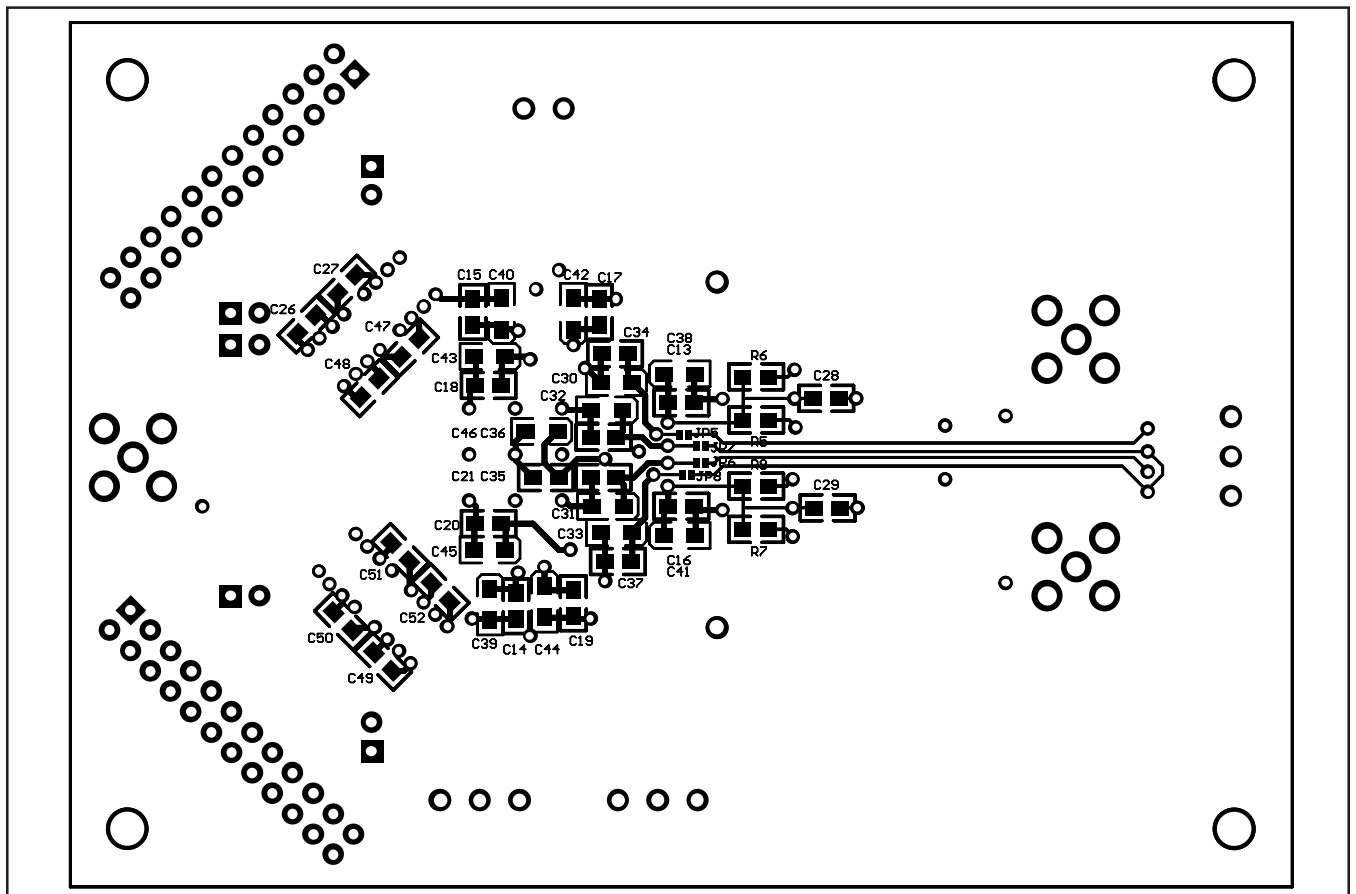


FIGURE 2. Bottom Layer with Silk Screen.

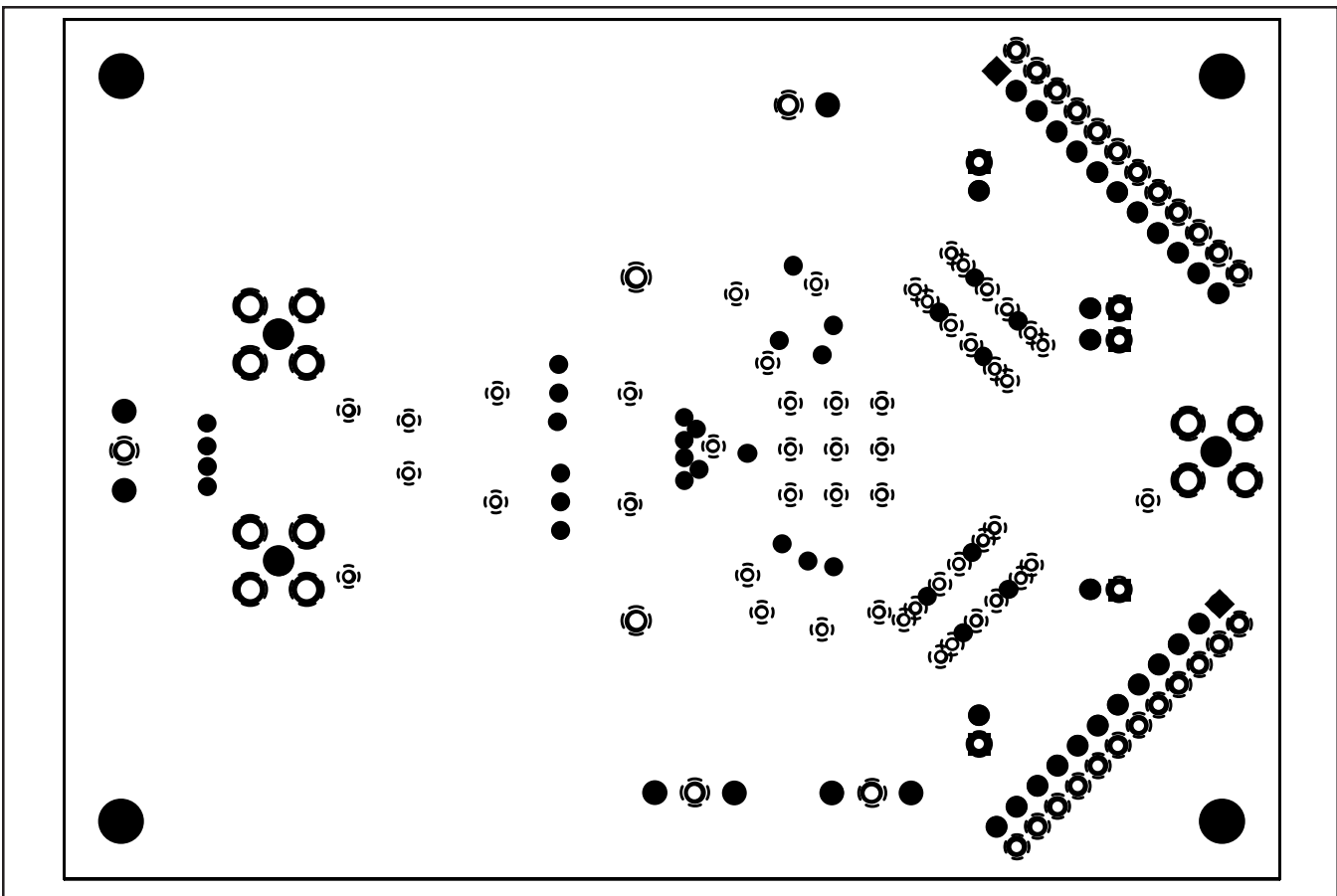


FIGURE 3. Ground Plane.

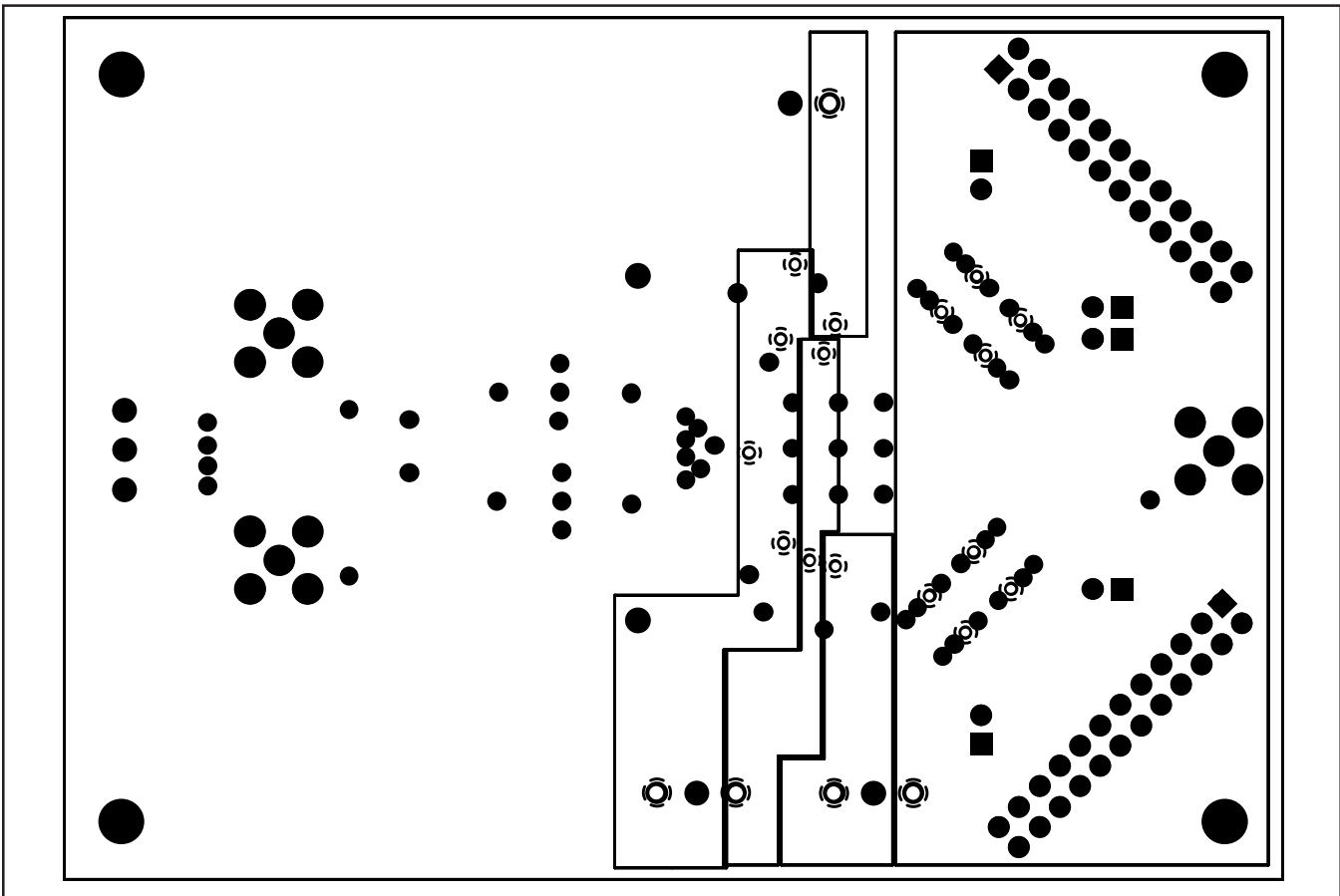


FIGURE 4. Power Plane.

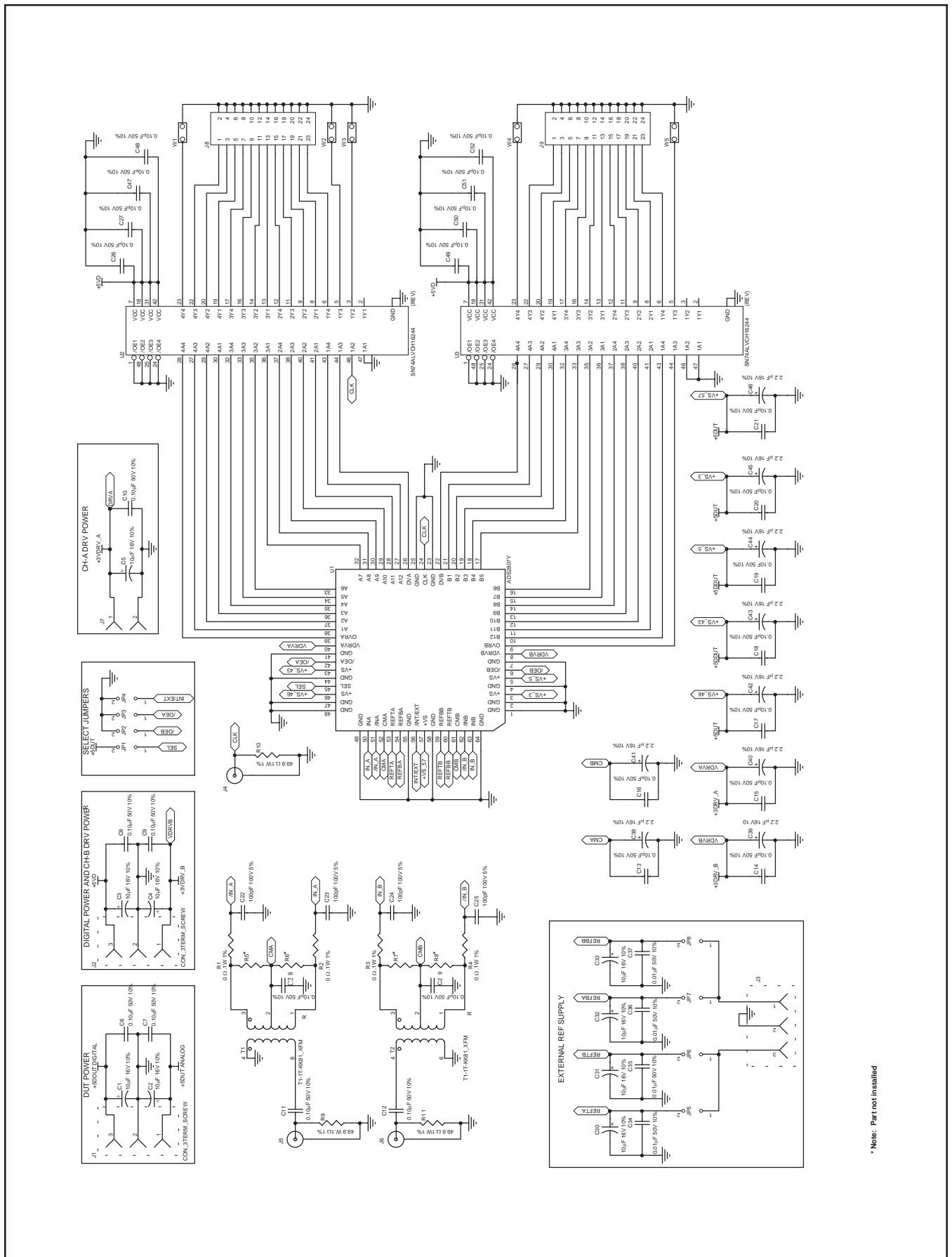


FIGURE 5. ADS2806, 2807-EVM Circuit Schematic.

\* Note: Part not installed

## BILL OF MATERIALS

| USED | PART TYPE             | DESIGNATOR               | FOOTPRINT    | DESCRIPTION                           | PART NUMBER    |
|------|-----------------------|--------------------------|--------------|---------------------------------------|----------------|
| 4    | 0.01 $\mu$ F 50V 10%  | C34-C37                  | 0805W        | Multilayer Ceramic - 0805 Size        | C0805C103K5RAC |
| 26   | 0.10 $\mu$ F 50V 10%  | C6-C21, C26-C29, C47-C52 | 0805W        | Multilayer Ceramic                    | C0805C104K5RAC |
| 4    | 100pF 100V 5%         | C22-C25                  | 805          | Capacitor                             | C0805C101J1GAC |
| 9    | 2.2 $\mu$ F 16V 10%   | C38-C46                  | 3216         | Low Profile Tantalum Capacitor        | T491B225K016AS |
| 9    | 10 $\mu$ F 16V 10%    | C1-C5, C30-C33           | 3216         | Low Profile Tantalum Capacitor        | T491B106K016AS |
| 4    | 0 $\Omega$ 0.1W 1%    | R1-R4                    | 0805W        | 1/10W 0805 Chip Resistor              | CRCW0805000'   |
| 4    | **NOT INSTALLED**     | R5-R8                    | 0805W        | 1/10W 0805 Chip Resistor              |                |
| 3    | 49.9 $\Omega$ 0.1W 1% | R9-R11                   | 0805W        | 1/10W 0805 Chip Resistor              | CRCW080549R9F  |
| 1    | ADS2807Y              | U1                       | 64-PQFP (PM) | TI ADS280XY DUAL 12-BIT ADC           | ADS280X        |
| 1    | CON_2TERM_SCREW       | J7                       | 2P-TERM      | 2 Terminal Screw Connector            | ED-1514-ND     |
| 3    | CON_3TERM_SCREW       | J1, J2, J3               | 3P-TERM      | 3 Terminal Screw Connector            | ED-1515-ND     |
| 2    | TERMINAL STRIP        | J8, J9, W1-W5            | —            | 32-Pin Terminal Strip (use as needed) | TS-132-G-A-2   |
| 1    | SMA_PCB_MT            | J4                       | SMA_JACK     | SMA Right-Angle                       | 142-0801-301   |
| 2    | SN74ABT16244A         | U2, U3                   | DGG          | 16-Bit Buffer                         | SN74ABT16244A  |
| 2    | T1-1T-KK81_XFMR       | T1, T2                   | T1-1T        | RF Transformer MINI-Circuits T1-1T    | T1-1T          |

## EVM IMPORTANT NOTICE

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

This evaluation kit being sold by TI is intended for use for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY** and is not considered by TI to be fit for commercial use. As such, the goods being provided may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including product safety measures typically found in the end product incorporating the goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may not meet the technical requirements of the directive.

Should this evaluation kit not meet the specifications indicated in the EVM User's Guide, the 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. Please be aware that the products received may not be regulatory compliant or agency certified (FCC, UL, CE, etc.). 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 EVM User's Guide and, specifically, the EVM Warnings and Restrictions notice in the EVM User's Guide prior to handling the product. This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact the TI application engineer.

Persons handling the product must have electronics training and observe good laboratory practice standards.

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.

Mailing Address:

Texas Instruments  
Post Office Box 655303  
Dallas, Texas 75265

Copyright © 2003, Texas Instruments Incorporated

## EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the specified input and output ranges described in the EVM User's Guide.

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 60°C. The EVM is designed to operate properly with certain components above 60°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 © 2003, 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 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.

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:

| <b>Products</b>       |  | <b>Applications</b> |  |
|-----------------------|--|---------------------|--|
| Amplifiers            | <a href="http://amplifier.ti.com">amplifier.ti.com</a>             | Audio               | <a href="http://www.ti.com/audio">www.ti.com/audio</a>                   |
| Data Converters       | <a href="http://dataconverter.ti.com">dataconverter.ti.com</a>     | Automotive          | <a href="http://www.ti.com/automotive">www.ti.com/automotive</a>         |
| DSP                   | <a href="http://dsp.ti.com">dsp.ti.com</a>                         | Broadband           | <a href="http://www.ti.com/broadband">www.ti.com/broadband</a>           |
| Interface             | <a href="http://interface.ti.com">interface.ti.com</a>             | Digital Control     | <a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a> |
| Logic                 | <a href="http://logic.ti.com">logic.ti.com</a>                     | Military            | <a href="http://www.ti.com/military">www.ti.com/military</a>             |
| Power Mgmt            | <a href="http://power.ti.com">power.ti.com</a>                     | Optical Networking  | <a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a> |
| Microcontrollers      | <a href="http://microcontroller.ti.com">microcontroller.ti.com</a> | Security            | <a href="http://www.ti.com/security">www.ti.com/security</a>             |
| RFID                  | <a href="http://www.ti-rfid.com">www.ti-rfid.com</a>               | Telephony           | <a href="http://www.ti.com/telephony">www.ti.com/telephony</a>           |
| Low Power<br>Wireless | <a href="http://www.ti.com/lpw">www.ti.com/lpw</a>                 | Video & Imaging     | <a href="http://www.ti.com/video">www.ti.com/video</a>                   |
|                       |  | Wireless            | <a href="http://www.ti.com/wireless">www.ti.com/wireless</a>             |

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2007, Texas Instruments Incorporated