

ADS8345EVM

User's Guide

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EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of +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 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.

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Preface

Read This First

About This Manual

This users guide describes the characteristics, operation, and use of the ADS8345EVM 16-bit serial analog to digital converter evaluation board. A complete circuit description as well as schematic diagram and bill of materials is included.

How to Use This Manual

This document contains the following chapters:

- ☐ Chapter 1—Introduction and EVM Description
- ☐ Chapter 2—EVM Bill of Materials and Schematic

Related Documentation From Texas Instruments

ADS8345	(literature number SBAS177A)
OPA627	(literature number PDS998H)
REF1004C-2.5	(literature number PDS-1172)

FCC Warning

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of 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.

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Introduction and EVM Description

The ADS8345EVM is an 8-channel, 16-bit analog-to-digital converter board based on the ADS8345 ADC. Typical power dissipation is 8 mW at a 100 kHz throughput rate and a 5-V supply. The device uses a synchronous serial interface, which is buffered on the EVM.

The EVM also incorporates a stable voltage reference and operational amplifier, configured as a buffer to ensure a low-noise voltage to the ADC.

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1.1 Features

- ☐ Full-featured evaluation board for the ADS8345 100 kHz, 16-bit, 8-channel analog-to-digital converter
- ☐ Onboard reference
- ☐ Signal conditioning available

1.2 Analog Interface

For maximum flexibility, the ADS8345EVM is designed for easy interfacing to multiple analog sources. An amplifier is present in a noninverting configuration, for channel 0 only.

Samtec part numbers SSW-110-22-F-D-VS-K and TSM-110-01-T-DV-P provide a convenient 10-pin dual-row header/socket combination at P1. This header/socket provides access to the analog input pins of the ADS8345. Consult Samtec at www.samtec.com or 1-800-SAMTEC-9 for a variety of mating connector options.

Table 1-1. Connector P1 Pinout—Analog Input

Pin Number	Signal	Description
P1.2	CH0	Channel 0 input, can be direct from connector or through op-amp
P1.4	CH1	Channel 1 input, direct from P1 connector
P1.6	CH2	Channel 2 input, direct from P1 connector
P1.8	CH3	Channel 3 input, direct from P1 connector
P1.10	CH4	Channel 4 input, direct from P1 connector
P1.12	CH5	Channel 5 input, direct from P1 connector
P1.14	CH6	Channel 6 input, direct from P1 connector
P1.16	CH7	Channel 7 input, direct from P1 connector
P1.18	Reserved	
P1.20	REF+	External reference input

The appropriate jumpers are configured to enable the input for channel 0 to be derived from the onboard dual-supply op-amp.

Table 1-2. Channel 0 Input Jumper Configuration

Reference Designator	Description	Factory Set Condition	
		1-2	2-3
W1	Enables reference offset for single-supply amplifiers	Not installed	N/A
W3	Input Source for channel 0	Onboard amplifier, U1	P1.2

1.3 Digital Interface

The ADS8345EVM is designed for easy interfacing to multiple platforms. Samtec part numbers SSW-110-22-F-D-VS-K and TSM-110-01-T-DV-P provide a convenient ten-pin dual-row header/socket combination at P2. This header/socket provides access to the digital control and serial data pins of the ADS8345. Consult Samtec at www.samtec.com or 1-800-SAMTEC-9 for a variety of mating connector options.

Table 1-3. Interface Converter J2 Pinout

Pin Number	Signal	Description
J2.1	CS	Chip select—Active low signal, enables data transfer and device configuration
J2.3	SCLK	Serial clock
J2.5	Reserved	
J2.7	Reserved	
J2.9	Reserved	
J2.11	SDI	Serial data in
J2.13	SDO	Serial data out
J2.15	BUSY	Indicates internal state of ADC
J2.17	Reserved	
J2.19	Reserved	

1.4 Power Supplies

The ADS8345EVM board can accept three power supplies.

- ☐ A dual ± 12 -V dc supply for the dual-supply op-amps, and also to power the voltage reference.
- ☐ A single 2.7-V to 5-V dc supply for the ADC and the digital interface.

Table 1-4. Power Supply Jumper Configuration

Reference Designator	Description	Factory Set Condition	
		1-2	2-3
W2	Negative supply for amplifiers	-12 V, via J3.4	AGND
W4	Positive supply for amplifiers	+12 V, via J3.2	+V _{CC} , via J3.1

1.5 Reference Voltage

The ADS8345EVM can be configured to use its onboard reference, or external reference source via W5.

Table 1-5. Reference Source Jumper Configuration

Reference Designator	Description	Factory Set Condition	
		1-2	2-3
W5	Reference is derived from onboard source	Installed	Not installed
	Reference is derived from P1.20	Not installed	Installed

1.6 EVM Operation

Apply the appropriate current-limited (500 mA max) dc sources to J3 prior to connecting the analog input signals and digital control signals. The digital control signals can be applied directly to P2 or the ADS8345EVM can be connected to a Texas Instruments DSP interface board.

A number of interface options are available for this style of EVM. Consult the product folder for a complete list of TI DSP interface cards and optional analog interface modules. If the interface options listed are not suitable, contact the PIC for the latest information.

EVM Bill of Materials and Schematic

This chapter contains a complete bill of materials and schematic for the ADS8345EVM. Contact the Product Information Center or e-mail dataconvapps@list.ti.com if you have questions regarding this EVM.

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2.1 EVM Bill of Materials

Table 2-1. ADS8345EVM Bill of Materials

Ref Des	Description	Vendor	Part number
R10, R12, R18	1/16 W 5% 0 Ω chip resistor	Panasonic	ERJ-3GEY0R00V
R2, R3, R4, R5, R6, R7, R8, R9, R11	1/16W 5% 33 Ω chip resistor	Panasonic	ERJ-3GEYJ330V
R13 R14 R15 R16	1/16W 1% 100 Ω chip resistor	Panasonic	ERJ-3GEYJ101V
R17	1/16W 1% 1K Ω chip resistor	Panasonic	ERJ-3GEYJ102V
C24	10 pF, 50 V ceramic chip capacitor, ± 0.5 pF, NPO	Panasonic	ECJ-2VC1H100D
C10, C13, C17, C19, C22, C23, C26, C28, C30	0.1 μ F, 25 V ceramic chip capacitor, 80%, -20%, Y5V	Panasonic	ECJ-1VF1E104Z
C29	0.1 μ F, 5 0V ceramic chip capacitor, $\pm 10\%$, X7R	Panasonic	ECJ-2YB1H104K
C1, C9, C14, C16	10 μ F, 16 V VS series electrolytic	Panasonic	ECE-V1CA100SR
C12, C15, C18 C21, C25, C27	10 μ F, low-profile tantalum capacitor	Panasonic	ECS-T1CX106R
C2, C3, C4, C5, C6, C7, C8, C11	47 nF, 16 V ceramic capacitor, 80%, -20%	Murata	GRM39Y5V473Z016AD
FB1, FB2, FB3	Ferrite bead inductor	Fair-Rite	2744044447
U1, U5	Precision single amplifier	Texas Instruments	OPA627AU
U2	ADS8345	Texas Instruments	ADS8345EB
U3	REF1004 2.5 V voltage regulator	Texas Instruments	REF1004C-2.5
U6, U7	Single IC buffer driver with open drain o/p	Texas Instruments	SN74LVC1G07DBVR
N/A	ADS8345 EVM PWB	Texas Instruments	6443151
AGND1, DGND1	Miniature test point terminal	Keystone Electronics	5000
P1, P2	20 Pin SMT plug	Samtec	SSW-110-22-F-D-VS-K
J1, J2	20 pin SMT socket	Samtec	TSM-110-01-T-DV-P
W1	2 Position jumper, 0 .1 inch spacing	Samtec	TSW-102-07-L-S
W2, W3, W4, W5, W6	3 Position jumper, 0 .1 inch spacing	Samtec	TSW-103-07-L-S
J3	4-terminal screw connector	Lumberg	KRMZ4

2.2 EVM Schematic

A complete schematic of the ADS8345EVM is furnished on the following page.

