



12-Bit, 25/20 MSPS A/D Converters

AD9032/AD9034

FEATURES

25 MSPS (AD9032), 20 MSPS (AD9034)

Conversion Speeds

On-Board T/H, References, Timing

Low Power: 5 W

Single 40-Pin Package

70 dB Spurious-Free Dynamic Range
to 10 MHz

Bipolar Input: ± 1.024 V

APPLICATIONS

Radar

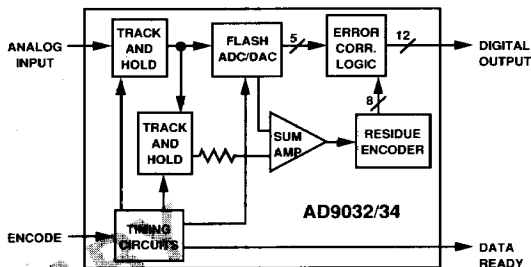
Signal Intelligence

Digital Spectrum Analyzers

Medical Imaging

Electro-Optics

FUNCTIONAL BLOCK DIAGRAM



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GENERAL DESCRIPTION

The AD9032 is the world's fastest (25 MSPS) complete 12-bit analog-to-digital converter (ADC), and features the latest in track-and-hold technology. The unit is a complete solution on board T/H, voltage references, and timing are all contained in a single 40-pin hybrid package. The pin-compatible AD9034 A/D converter operates at word rates of 20 MSPS.

This ECL-compatible ADC requires only +5 V and -5.2 V supplies, an analog input, and a stable ECL clock to obtain the best dynamic performance available in a 12-bit ADC.

Dynamic performance has been optimized to achieve SNR of 66 dB and a spurious-free dynamic range (SFDR) of 72 dB for analog bandwidths up to 10 MHz. All dynamic performance is guaranteed for sample rates from dc to 25.6 MSPS.

This information applies to a product under development. Its characteristics and specifications are subject to change without notice. Analog Devices assumes no obligation regarding future manufacture unless otherwise agreed to in writing.

REV. 0

ANALOG-TO-DIGITAL CONVERTERS 2-765

AD9032/AD9034—SPECIFICATIONS

ELECTRICAL CHARACTERISTICS (+V_S = +5 V; -V_S = -5.2 V; Encode = 25.6 MSPS, unless otherwise noted)

Parameter (Conditions)	Temp	Test Level	AD9032AD/AZ			AD9032BD/BZ			AD9032TD/TZ			Units
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
RESOLUTION			12			12			12			Bits
DC ACCURACY												
Differential Nonlinearity	+25°C	I			1.0		0.5	0.7		0.5	0.7	LSB
	Full	VI			1.0			1.0			1.0	LSB
Integral Nonlinearity	+25°C	I			0.7			0.7			0.7	LSB
	Full	VI			1.0			1.0			1.0	LSB
No Missing Codes	Full	VI		Guaranteed			Guaranteed			Guaranteed		
Offset Error	+25°C	I		5	10		5	10		5	10	LSB
	Full	VI			25			25			50	LSB
Gain Error	+25°C	I		±0.5	±1.0		±0.5	±1.0		±0.5	±1.0	LSB
	Full	VI			±2.0			±2.0			±2.0	LSB
ANALOG INPUT												
Input Voltage Range	+25°C	I		±1.024			±1.024			±1.024		V
Input Bias Current ¹	+25°C	I			100			100			100	μA
	Full	VI			200			200			200	μA
Input Resistance	+25°C	VI		350			350			350		kΩ
Input Capacitance	+25°C	III		2	10		2	10		2	10	pF
Analog Bandwidth	+25°C	III	150			150			150			MHz
SWITCHING PERFORMANCE ²												
Conversion Rate	Full	VI									26	MSPS
Aperture Delay (t _A)	Full	IV	2	4		2	4		1	4	7	ns
Aperture Uncertainty (Jitter)	Full	IV		5			5			5	10	ps, rms
Output Delay (t _{OD})	Full	IV		20	24		20	24	16	20	24	ns
Data Ready Delay	Full	IV		30	32		28	32	24	28	32	ns
Output Time Skew	Full	IV		1	2		1	2		1	2	ns
ENCODE INPUT												
Logic "1" Voltage	Full	IV		1.1			1.1			-1.1		V
Logic "0" Voltage	Full	IV			1.5			-1.5			-1.5	V
Logic "1" Current	Full	VI		150	300		150	300		150	300	μA
Logic "0" Current	Full	VI		150	300		150	300		150	300	μA
Input Capacitance	+25°C	V		5			5			5		pF
Pulse Width (High)	+25°C	IV	10			10			10			ns
Pulse Width (Low)	+25°C	IV	10			10			10			ns
DYNAMIC PERFORMANCE												
Transient Response	+25°C	IV		TBD	40		TBD	40		TBD	40	ns
Overvoltage Recovery Time	+25°C	IV		TBD	70		TBD	70		TBD	70	ns
Harmonic Distortion												
Analog Input @ 1.2 MHz	+25°C	I	TBD	80		TBD	80		TBD	80		dBc
@ 1.2 MHz	Full	VI	TBD			TBD			TBD			dBc
@ 4.3 MHz	+25°C	V		76			76			76		dBc
@ 9.6 MHz	+25°C	I	TBD	74		TBD	74		TBD	74		dBc
@ 9.6 MHz	Full	VI	TBD			TBD			TBD			dBc
Signal-to-Noise Ratio ³												
Analog Input @ 512 kHz	+25°C	I	66	68		66	68		66	68		dB
@ 512 kHz	Full	VI	65			65			64			dB
@ 4.3 MHz	+25°C	V		TBD			TBD			TBD		dB
@ 9.6 MHz	+25°C	I	64	TBD		64	TBD		64	TBD		dBc
@ 9.6 MHz	Full	VI	63			63			62			dBc
Two-Tone Intermodulation Distortion Rejection ⁴	+25°C	V		74			77			77		dBc

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Parameter (Conditions)	Temp	Test Level	AD9032AD/AZ			AD9032BD/BZ			AD9032TD/TZ			Units
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
DIGITAL OUTPUTS²												
Logic "1" Voltage	Full	VI	-1.1			-1.1			-1.1			V
Logic "0" Voltage	Full	VI			-1.5			-1.5			-1.5	V
Output Coding			2s Complement			2s Complement			2s Complement			
POWER SUPPLY												
+V _S Supply Voltage	Full	VI	4.75	5.0	5.25	4.75	5.0	5.25	4.75	5.0	5.25	mA
+V _S Supply Analog Current	Full	VI		250	285		250	285		250	285	mA
-V _S Supply Voltage	Full	VI	-5.45	-5.2	-4.95	-5.45	-5.2	-4.95	-5.45	-5.2	-4.95	mA
-V _S Supply Analog Current	Full	VI		500	525		500	525		500	525	mA
-V _S Supply Digital Current	Full	VI		310	330		310	330		310	330	mA
Power Dissipation	Full	VI		5.4	6		5.4	6		5.4	6	W
Power Supply Rejection Ratio (PSRR) ⁵	Full	VI		2.5	5.0		2.5	5.0		2.5	5.0	mV/V

NOTES

¹Measured with analog input = 0 V.²Outputs terminated through 510 Ω to -5.2 V; C_L < 4 pF.³RMS signal to rms noise with analog input signal 1 dB below full scale at specified frequency.⁴Intermodulation measured with analog input frequencies of 11 MHz and 12 MHz at 7 dB below full scale.⁵PSRR is sensitivity of offset error to power supply variations within the 5% limits shown.

Specifications subject to change without notice.

ABSOLUTE MAXIMUM RATINGS¹

+V _S	+6 V
-V _S	-6 V
Analog Input	-V _S to +V _S
Digital Inputs	V _S to 0 V
Digital Output Current	20 mA
Operating Temperature Range	
AD9032AD/BD/AZ/BZ	-25°C to +85°C
AD9032TD/TZ	-55°C to +125°C
Maximum Junction Temperature ²	+175°C
Lead Temperature (Soldering, 10 seconds)	+300°C
Storage Temperature Range	-65°C to +150°C

NOTES

¹Absolute maximum ratings are limiting values to be applied individually, and beyond which the serviceability of the circuit may be impaired. Functional operability is not necessarily implied. Exposure to absolute maximum rating conditions for an extended period of time may affect device reliability.²Typical thermal impedances: θ_{CA} = 12°C/W; T_J-T_C = 10°C max (worst case die junction temperature rise).

EXPLANATION OF TEST LEVELS

I	100% production tested.
II	100% production tested at +25°C, and sample tested at specified temperatures. AC testing done on sample basis.
III	Sample tested only.
IV	Parameter is guaranteed by design and characterization testing.
V	Parameter is a typical value only.
VI	All devices are 100% production tested at +25°C. 100% production tested at temperature extremes for extended temperature devices; sample tested at temperature extremes for commercial/industrial devices.

ORDERING GUIDE

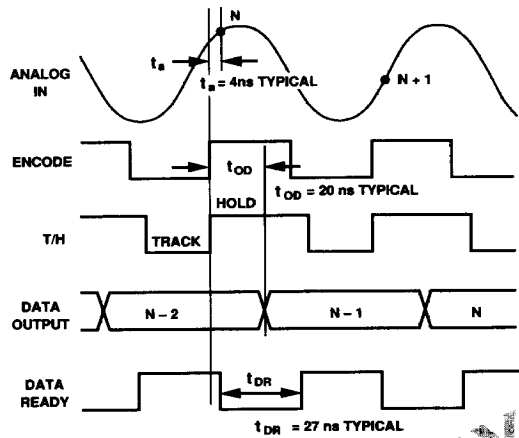
Model	Temperature Range	Description	Package Option ¹
AD9032AD	-25°C to +85°C	40-Pin Ceramic DIP, Industrial Temperature	D-40
AD9032AZ ²	-25°C to +85°C	40-Pin Leaded Flatpack, Industrial Temperature	Z-40
AD9032BD	-25°C to +85°C	40-Pin Ceramic DIP, Industrial Temperature	D-40
AD9032BZ ²	-25°C to +85°C	40-Pin Leaded Flatpack, Industrial Temperature	Z-40
AD9032TD	-55°C to +125°C	40-Pin Ceramic DIP, Military Temperature	D-40
AD9032TZ ²	-55°C to +125°C	40-Pin Leaded Flatpack, Military Temperature	Z-40

NOTES

¹D = Ceramic DIP; Z = Ceramic Leaded Chip Carrier. For outline information see Package Information section.²Surface mount leaded packages are tested and shipped with unformed leads. Consult the factory for price and availability of packages with formed leads.

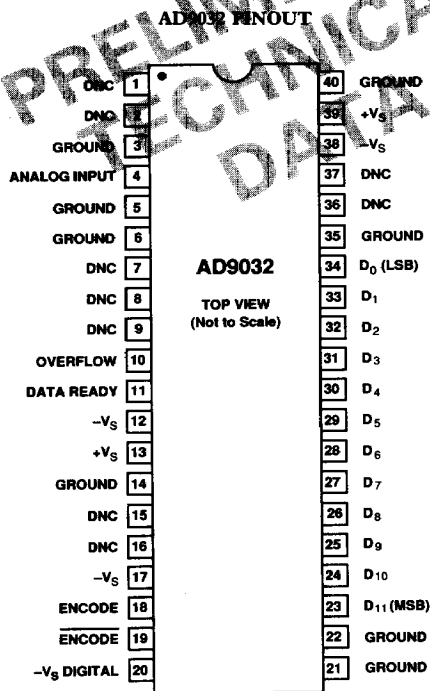
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AD9032/AD9034



AD9032 Timing Diagram

PRELIMINARY
TECHNICAL
DATA



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