

For Immediate Assistance, Contact Your Local Salesperson



ADS704

PRELIMINARY INFORMATION
SUBJECT TO CHANGE
WITHOUT NOTICE

18-Bit 500kHz Sampling ANALOG-TO-DIGITAL CONVERTER

FEATURES

- HIGH SPURIOUS-FREE DYNAMIC RANGE:
100dB AT Nyquist
- HIGH SNR: 96dB
- NO MISSING CODES AT 18 BITS
- LOW NONLINEARITY: $\pm 0.0015\%$
- PIN CONSISTENT WITH ADS610, ADS703:
(14-Bit 10MHz, 16-Bit 2.5MHz)
- $\pm 2.5V$ ANALOG INPUT RANGE
- LOW POWER: 2.75Watts
- SMALL HERMETIC PACKAGE: 0.6" x 2.0"

APPLICATIONS

- MEDICAL IMAGING
- SPECTRUM ANALYZERS
- IR SPECTROMETERS
- CCD IMAGING
- ULTRASOUND SIGNAL PROCESSING
- SONAR SIGNAL PROCESSING
- AUTOMATIC TEST EQUIPMENT
- HIGH SPEED DATA ACQUISITION

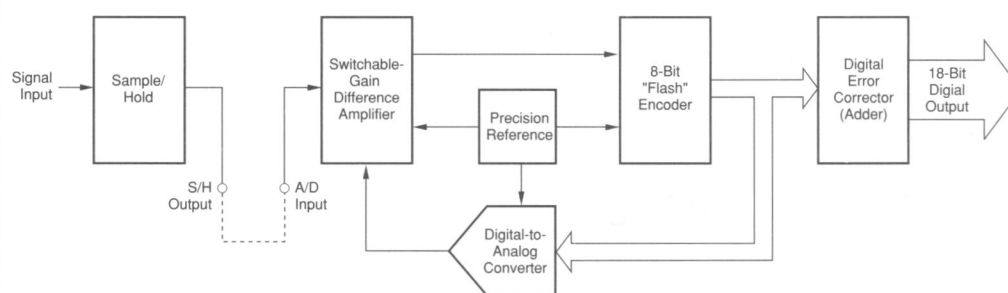
DESCRIPTION

The ADS704 is a very high speed, highly integrated 18-bit sampling A/D converter. It is designed for superior linearity, low noise and wideband spectral performance.

The ADS704 is a three-step subranging design containing a quantizer, sample/hold amplifier, voltage reference and timing circuitry in a slim 40-pin package. It is pin consistent with the ADS610 (14-bit 10MHz) and the

ADS703 (16-bit 2.5MHz) sampling ADC's, allowing the user to choose easily between speed and resolution. A convenient TTL-compatible logic interface is provided.

A demonstration board (DEM-ADS704) is available for quick evaluation.



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SPECIFICATIONS

T_A = +25°C, +V_S = +5V, -V_S = -5.2V, ±2.5V Input Range, Sampling Rate = 500kHz unless otherwise noted.

PARAMETER	CONDITIONS	TEMPERATURE	ADS704H			ADS704HB			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
RESOLUTION					18			*	Bits
TEMPERATURE RANGE: H, HB	T _{AMBIENT}		-40		+85	*		*	°C
ANALOG INPUT									
Full Scale Input Range			-2.5		+2.5	*	*	*	V
Input Impedance			0.3 x 10 ¹² 2						Ω pF
DIGITAL INPUTS									
Logic Family			TTL/HCT Compatible				*	*	
Start Conversion			Convert Command Rising Edge				*	*	
Convert Command Pulse Width	t = Conversion Period		10		t - 20	*		*	ns
CONVERSION CHARACTERISTICS									
Sample Rate		Full	DC		500k	*		*	Samples/s
Data Latency				1			*	*	Convert Cycle
DC ACCURACY									
Gain Error		Full		0.3	0.7		0.2	0.5	%FSR
Input Offset		Full		0.4	0.7		0.2	0.5	%FSR
Power Supply Rejection	Δ +V _S = 5% Δ -V _S = 5%	Full		±0.03	±0.07		*	*	%FSR/%
		Full		±0.01	±0.07		*	*	%FSR/%
DYNAMIC CHARACTERISTICS									
No Missing Codes		+25°C	Guaranteed			Guaranteed			
		Full		Typical			Guaranteed		
Differential Linearity Error		+25°C							
f = 8kHz		Full		0.8	1.5		0.6	1.0	LSB
f = 250kHz		Full		0.8	1.5		0.7	1.0	LSB
		+25°C		0.9	1.5		0.7	1.0	LSB
		Full		0.9	1.5		0.8	1.0	LSB
Integral Linearity Error		+25°C		0.0025	0.004		0.0015	0.0025	%FSR
f = 8kHz		Full		0.003	0.006		0.002	0.003	%FSR
Spurious Free Dynamic Range (SFDR)		+25°C							
f = 8kHz (-1dBFS Input)		Full	88	94		100	102		dBFS
f = 250kHz (-1dBFS Input)		Full	85	92		97	100		dBFS
		+25°C	85	88		90	92		dBFS
		Full	82	86		87	90		dBFS
Two-Tone Intermodulation Distortion		+25°C		-88			-91		dBFS
f = 200 and 210kHz (-7dB each tone)		Full		-86			-90		dBFS
Signal-to-Noise Ratio (SNR)		+25°C		90	93		91	96	dB
f = 8kHz (-1dBFS Input)		Full	85	91		89	94		dB
f = 250kHz (-1dBFS Input)		+25°C	87	90		90	92		dB
		Full	84	89		87	91		dB
SINAD		+25°C		85	90		89	92	dB
f = 8kHz (-1dBFS Input)		Full		84	90		88	92	dB
f = 250kHz (-1dBFS Input)		+25°C		84	89		87	91	dB
		Full		83	88		86	90	dB
Output Noise	Input Grounded	+25°C		2			*		LSBrms
Aperture Delay Time		+25°C		5			*		ns
Aperture Jitter		+25°C		5			*		ps rms
Analog Input Bandwidth (-3dB)									
Small Signal	-20dB Input	+25°C		6			*		MHz
Full Power	0dB Input	+25°C		1			*		MHz
Overload Recovery Time	2x Full Scale Input	+25°C		2			*		μs
OUTPUTS									
Logic Family			TTL/HCT Compatible				*	*	
Logic Coding	Logic Selectable		SOB or COB				*	*	
Logic Levels									
Logic "LO"	I _{OL} < 3.2mA	Full	0		0.5	*	*	*	V
Logic "HI"	I _{OH} < μA	Full	4.0	4.9		*	*	*	V
3-State Enable/Disable Time		Full		10	25		*	*	ns
POWER SUPPLY REQUIREMENTS									
Supply Voltages: +V _S	Operating	Full	+4.75	+5.0	+5.25	*	*	*	V
-V _S		Full	-5.46	-5.2	-4.94	*	*	*	V
Supply Currents: +I _S	Operating	Full		150			*	*	mA
-I _S		Full		425			*	*	mA
Power Consumption		Full		2.75	2.9		*	*	W
θ _{JA}				TBD			*	*	°C/W
θ _{JA}	Still Air			TBD			*	*	°C/W

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A/D CONVERTERS, DATA ACQUISITION COMPONENTS



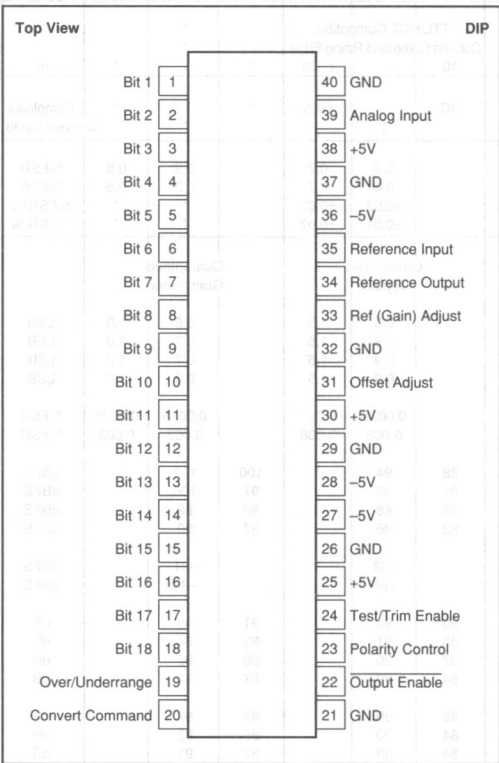
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ABSOLUTE MAXIMUM RATINGS

+V _S	+6V
-V _S	0.3V to -6V
Logic Inputs	0V to -5.5V
Junction Temperature	+165°C
Storage Temperature	-65°C to +165°C
Lead Temperature (soldering, 10s)	+300°C

NOTE: Stresses above these ratings may permanently damage the device.

PIN CONFIGURATION



PACKAGING INFORMATION⁽¹⁾

MODEL	PACKAGE	PACKAGE DRAWING NUMBER
ADS704H, HB	40-Pin, 0.6" Wide Hermetic DIP	214

NOTE: (1) For detailed drawing and dimension table, please see end of data sheet, or Appendix D of Burr-Brown IC Data Book.

ORDERING INFORMATION

ADS704 H ()

Basic Model Number _____

Package Code _____

Performance Grade Code _____

No letter or "B" = -40°C to +70°C Ambient Temperature

 ELECTROSTATIC DISCHARGE SENSITIVITY

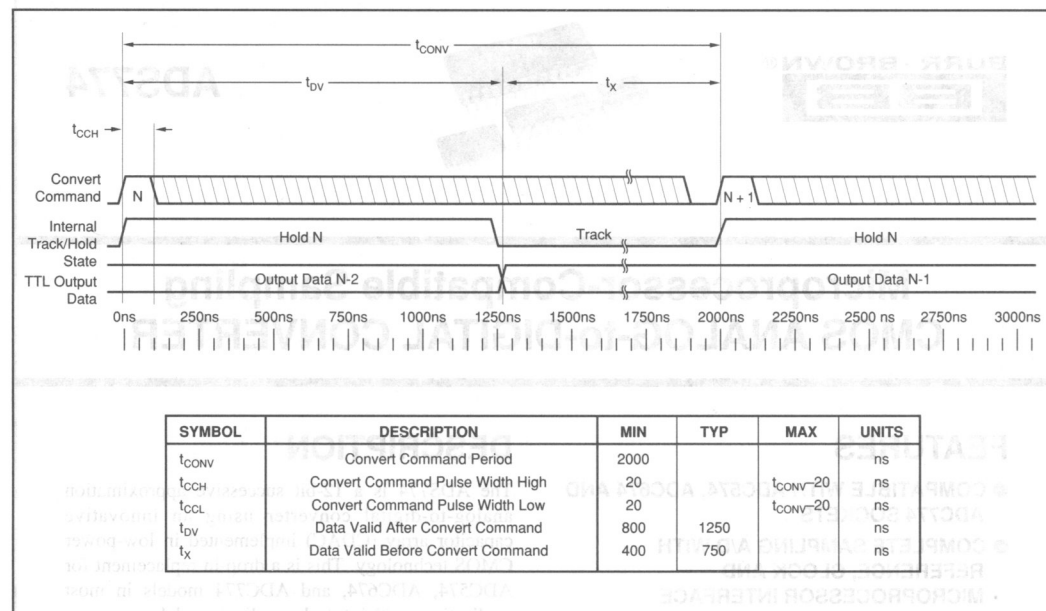
This integrated circuit can be damaged by ESD. Burr-Brown recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

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TIMING DIAGRAM



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A/D CONVERTERS, DATA ACQUISITION COMPONENTS

