

AD677
FEATURES

Autocalibrating
On-Chip Sample-Hold Function
Serial Output
16 Bits No Missing Codes
 ± 1 LSB INL
 -99 dB THD
 92 dB S/(N+D)
1 MHz Full Power Bandwidth

PRODUCT DESCRIPTION

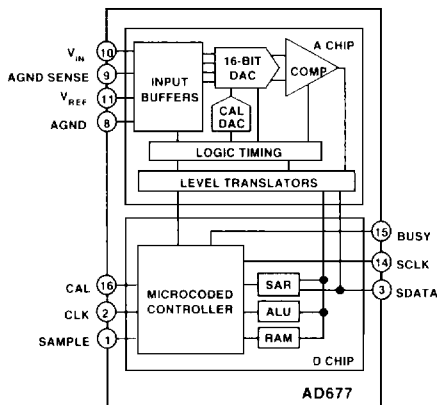
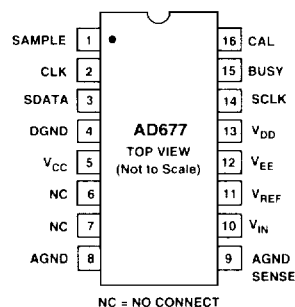
The AD677 is a multipurpose 16-bit serial output analog-to-digital converter which utilizes a switched-capacitor/charge redistribution architecture to achieve a 100 kSPS conversion rate (10 μ s total conversion time). Overall performance is optimized by digitally correcting internal nonlinearities through on-chip autocalibration.

The AD677 circuitry is segmented into two monolithic chips: a digital control chip fabricated on Analog Devices DSP CMOS process and an analog ADC chip fabricated on our BiMOS II process. Both chips are contained in a single package.

The AD677 is specified for ac (or "dynamic") parameters such as S/(N+D) Ratio, THD and IMD which are important in signal processing applications. In addition, dc parameters are specified which are important in measurement applications.

The AD677 operates from +5 V and ± 12 V supplies and typically consumes 450 mW using a 10 V reference (360 mW with 5 V reference) during conversion. The digital supply (V_{DD}) is separated from the analog supplies (V_{CC} , V_{EE}) for reduced digital crosstalk. An analog ground sense is provided to remotely sense the ground potential of the signal source. This can be useful if the signal has to be carried some distance to the A/D converter. Separate analog and digital grounds are also provided.

The AD677 is available in a 16-pin narrow plastic DIP, 16-pin narrow side-braced ceramic package, or 28-lead SOIC. A parallel output version, the AD676, is available in a 28-pin ceramic

FUNCTIONAL BLOCK DIAGRAM

PIN CONFIGURATION


or plastic DIP. All models operate over a commercial temperature range of 0°C to +70°C or an industrial range of -40°C to +85°C.

ORDERING GUIDE

Model	Temperature Range	S/(N+D)	Max INL	Package Description	Package Option*
AD677JN	0°C to +70°C	89 dB	Typ Only	Plastic 16-Pin DIP	N-16
AD677KN	0°C to +70°C	90 dB	± 1.5 LSB	Plastic 16-Pin DIP	N-16
AD677JD	0°C to +70°C	89 dB	Typ Only	Ceramic 16-Pin DIP	D-16
AD677KD	0°C to +70°C	90 dB	± 1.5 LSB	Ceramic 16-Pin DIP	D-16
AD677JR	0°C to +70°C	89 dB	Typ Only	Plastic 28-Lead SOIC	R-28
AD677KR	0°C to +70°C	90 dB	± 1.5 LSB	Plastic 28-Lead SOIC	R-28
AD677AD	40°C to +85°C	89 dB	Typ Only	Ceramic 16-Pin DIP	D-16
AD677BD	40°C to +85°C	90 dB	± 1.5 LSB	Ceramic 16-Pin DIP	D-16

*D = Ceramic DIP; N = Plastic DIP; R = Small Outline IC (SOIC). For outline information see Package Information section.

To obtain the most recent version or complete data sheet, call our fax retrieval system at 1-800-446-6212 or visit our World Wide Web site at <http://www.analog.com>.

AD677—SPECIFICATIONS

AC SPECIFICATIONS (T_{MIN} to T_{MAX}, V_{CC} = +12 V ± 5%, V_{EE} = -12 V ± 5%, V_{DD} = +5 V ± 10%)

Parameter	AD677J/A			AD677K/B			Units
	Min	Typ	Max	Min	Typ	Max	
Total Harmonic Distortion (THD)							
<i>a</i> 83 kSPS, T _{MIN} to T _{MAX}		97	92		99	95	dB
<i>a</i> 100 kSPS, +25°C		97	92		99	95	dB
<i>a</i> 100 kSPS, T _{MIN} to T _{MAX}		93			95		dB
Signal-to-Noise and Distortion Ratio (S/(N+D))							
<i>a</i> 83 kSPS, T _{MIN} to T _{MAX}	89	91		90	92		dB
<i>a</i> 100 kSPS, +25°C	89	91		90	92		dB
<i>a</i> 100 kSPS, T _{MIN} to T _{MAX}		89			90		dB
Peak Spurious or Peak Harmonic Component		101			101		dB
Intermodulation Distortion (IMD)							
2nd Order Products		102			102		dB
3rd Order Products		98			98		dB
Full Power Bandwidth		1			1		MHz
Noise		160			160		μV rms

TTL/CMOS COMPATIBLE

Parameter	AD677J/A			AD677K/B			Units
	Min	Typ	Max	Min	Typ	Max	
ACCURACY							
Resolution	16			16			Bits
Integral Nonlinearity (INL)							
<i>a</i> 83 kSPS, T _{MIN} to T _{MAX}		+1			±1	±1.5	LSB
<i>a</i> 100 kSPS, +25°C		+1			+1	±1.5	LSB
<i>a</i> 100 kSPS, T _{MIN} to T _{MAX}		±2			+2		LSB
Differential Nonlinearity (DNL) No Missing Codes		16		16			Bits
Bipolar Zero Error		±2	±4		±1	±3	LSB
Positive, Negative FS Errors							
<i>a</i> 83 kSPS		±2	±4		±1	±3	LSB
<i>a</i> 100 kSPS, +25°C		±2	±4		±1	±3	LSB
<i>a</i> 100 kSPS		±4			±4		LSB
TEMPERATURE DRIFT							
Bipolar Zero		+0.5			+0.5		LSB
Positive Full Scale		+0.5			±0.5		LSB
Negative Full Scale		±0.5			+0.5		LSB
VOLTAGE REFERENCE INPUT RANGE (V _{REF})	5		10	5		10	V
ANALOG INPUT							
Input Range (V _{IN})			±V _{REF}			±V _{REF}	V
Input Impedance		*			*		
Input Settling Time		2			2		μs
Input Capacitance During Sample			50*			50*	pF
Aperture Delay		6			6		ns
Aperture Jitter		100			100		ps
POWER CONSUMPTION							
V _{REF} = 5 V		360	480		360	480	mW
V _{REF} = 10 V		450	630		450	630	mW

Specifications subject to change without notice.