

### FEATURES

Complete Monolithic 12-Bit 10  $\mu$ s Sampling ADC  
On-Board Sample-and-Hold Amplifier  
Industry Standard Pinout  
8- and 16-Bit Microprocessor Interface  
AC and DC Specified and Tested  
Unipolar and Bipolar Inputs  
 $\pm 5$  V,  $\pm 10$  V, 0 V–10 V, 0 V–20 V Input Ranges  
Commercial, Industrial and Military Temperature  
Range Grades  
MIL-STD-883 and SMD Compliant Versions Available

### PRODUCT DESCRIPTION

The AD1674 is a complete, multipurpose, 12-bit analog-to-digital converter, consisting of a user-transparent onboard sample-and-hold amplifier (SHA), 10 volt reference, clock and three-state output buffers for microprocessor interface.

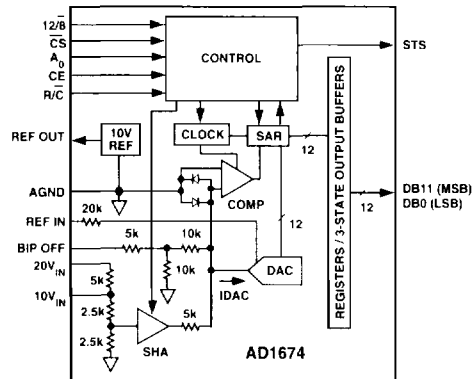
The AD1674 is pin compatible with the industry standard AD574A and AD674A, but includes a sampling function while delivering a faster conversion rate. The on-chip SHA has a wide input bandwidth supporting 12-bit accuracy over the full Nyquist bandwidth of the converter.

The AD1674 is fully specified for ac parameters (such as S/(N+D) ratio, THD, and IMD) and dc parameters (offset, full-scale error, etc.). With both ac and dc specifications, the AD1674 is ideal for use in signal processing and traditional dc measurement applications.

The AD1674 design is implemented using Analog Devices' BiMOS II process allowing high performance bipolar analog circuitry to be combined on the same die with digital CMOS logic.

Five different temperature grades are available. The AD1674J and K grades are specified for operation over the 0°C to +70°C temperature range. The A and B grades are specified from –40°C to +85°C; the AD1674T grade is specified from –55°C to +125°C. The J and K grades are available in both 28-lead plastic DIP and SOIC. The A and B grade devices are available

### FUNCTIONAL BLOCK DIAGRAM



in 28-lead hermetically sealed ceramic DIP and 28-lead SOIC. The T grade is available in 28-lead hermetically sealed ceramic DIP.

### PRODUCT HIGHLIGHTS

1. Industry Standard Pinout: The AD1674 utilizes the pinout established by the industry standard AD574A and AD674A.
2. Integrated SHA: The AD1674 has an integrated SHA which supports the full Nyquist bandwidth of the converter. The SHA function is transparent to the user; no wait-states are needed for SHA acquisition.
3. DC and AC Specified: In addition to traditional dc specifications, the AD1674 is also fully specified for frequency domain ac parameters such as total harmonic distortion, signal-to-noise ratio and input bandwidth. These parameters can be tested and guaranteed as a result of the onboard SHA.

\*Protected by U. S. Patent Nos. 4,962,325; 4,250,445; 4,808,908; RE30586.

### ORDERING GUIDE

Model <sup>1</sup>	Temperature Range	INL (T <sub>MIN</sub> to T <sub>MAX</sub> )	S/(N+D) (T <sub>MIN</sub> to T <sub>MAX</sub> )	Package Description	Package Option <sup>2</sup>
AD1674JN	0°C to +70°C	±1 LSB	69 dB	Plastic DIP	N-28
AD1674KN	0°C to +70°C	±1/2 LSB	70 dB	Plastic DIP	N-28
AD1674JR	0°C to +70°C	±1 LSB	69 dB	Plastic SOIC	R-28
AD1674KR	0°C to +70°C	±1/2 LSB	70 dB	Plastic SOIC	R-28
AD1674AR	–40°C to +85°C	±1 LSB	69 dB	Plastic SOIC	R-28
AD1674BR	–40°C to +85°C	±1/2 LSB	70 dB	Plastic SOIC	R-28
AD1674AD	–40°C to +85°C	±1 LSB	69 dB	Ceramic DIP	D-28
AD1674BD	–40°C to +85°C	±1/2 LSB	70 dB	Ceramic DIP	D-28
AD1674TD	–55°C to +125°C	±1 LSB	70 dB	Ceramic DIP	D-28

#### NOTES

<sup>1</sup>For details on grade and package offerings screened in accordance with MIL-STD-883, refer to the Analog Devices Military Products Databook or current AD1674883B data sheet. SMD is also available.

<sup>2</sup>N = Plastic DIP; D = Hermetic Ceramic DIP; R = Plastic 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>.

# AD1674—SPECIFICATIONS

**DC SPECIFICATIONS** ( $T_{MIN}$  to  $T_{MAX}$ ,  $V_{CC} = +15\text{ V} \pm 10\%$  or  $+12\text{ V} \pm 5\%$ ,  $V_{LOGIC} = +5\text{ V} \pm 10\%$ ,  $V_{EE} = -15\text{ V} \pm 10\%$  or  $-12\text{ V} \pm 5\%$  unless otherwise noted)

Parameter	AD1674J			AD1674K			Unit
	Min	Typ	Max	Min	Typ	Max	
RESOLUTION	12			12			Bits
INTEGRAL NONLINEARITY (INL)			$\pm 1$			$\pm 1/2$	LSB
DIFFERENTIAL NONLINEARITY (DNL) (No Missing Codes)	12			12			Bits
UNIPOLAR OFFSET <sup>1</sup> @ +25°C			$\pm 3$			$\pm 2$	LSB
BIPOLAR OFFSET <sup>1</sup> @ +25°C			$\pm 6$			$\pm 4$	LSB
FULL-SCALE ERROR <sup>1,2</sup> @ +25°C (with Fixed 50 $\Omega$ Resistor from REF OUT to REF IN)		0.1	0.25		0.1	0.25	% of FSR
TEMPERATURE RANGE	0		+70	0		+70	°C
TEMPERATURE DRIFT <sup>3</sup>							
Unipolar Offset <sup>4</sup>			$\pm 2$			+1	LSB
Bipolar Offset <sup>4</sup>			$\pm 2$			$\pm 1$	LSB
Full-Scale Error <sup>4</sup>			$\pm 6$			$\pm 3$	LSB
POWER SUPPLY REJECTION							
$V_{CC} = 15\text{ V} \pm 1.5\text{ V}$ or $12\text{ V} \pm 0.6\text{ V}$			$\pm 2$			$\pm 1$	LSB
$V_{LOGIC} = 5\text{ V} \pm 0.5\text{ V}$			$\pm 1/2$			$\pm 1/2$	LSB
$V_{EE} = -15\text{ V} \pm 1.5\text{ V}$ or $-12\text{ V} \pm 0.6\text{ V}$			$\pm 2$			$\pm 1$	LSB
ANALOG INPUT							
Input Ranges							
Bipolar	5		+5	5		+5	Volts
	10		+10	-10		+10	Volts
Unipolar	0		+10	0		+10	Volts
	0		+20	0		+20	Volts
Input Impedance							
10 Volt Span	3	5	7	3	5	7	k $\Omega$
20 Volt Span	6	10	14	6	10	14	k $\Omega$
POWER SUPPLIES							
Operating Voltages							
$V_{LOGIC}$	+4.5		+5.5	+4.5		+5.5	Volts
$V_{CC}$	+11.4		+16.5	+11.4		+16.5	Volts
$V_{EE}$	-16.5		11.4	-16.5		11.4	Volts
Operating Current							
$I_{LOGIC}$		5	8		5	8	mA
$I_{CC}$		10	14		10	14	mA
$I_{EE}$		14	18		14	18	mA
POWER DISSIPATION		385	575		385	575	mW
INTERNAL REFERENCE VOLTAGE	9.9	10.0	10.1	9.9	10.0	10.1	Volts
Output Current (Available for External Loads) <sup>4</sup> (External Load Should Not Change During Conversion)			2.0			2.0	mA

## NOTES

<sup>1</sup>Adjustable to zero.

<sup>2</sup>Includes internal voltage reference error.

<sup>3</sup>Maximum change from 25°C value to the value at  $T_{MIN}$  or  $T_{MAX}$ .

<sup>4</sup>Reference should be buffered for +12 V operation.

All min and max specifications are guaranteed.

Specifications subject to change without notice.