



Fast, 16-Bit, 100 kSPS A/D Converter with Parallel Interface

SMD/883B

AD676

Scope

This specification covers the detail requirements for a 16-bit resolution, sampling A/D converter with a parallel output interface. The electrical specifications match the Standard Military Drawing (SMD) 5962-94743 in effect at the release of this data sheet. For a copy of the latest official SMD, contact DESC-ELDS.

Part Number/Case Outline

For case outline dimensions, see Package Information Appendix of General Specification ADI-M-1000. The complete part numbers of these SMD and 883 devices are as follows:

Device Type	SMD Part Number	ADI 883B Part Number	Package Description	Package Designation ADI	Package Designation MIL-STD-1835
01	5962-9474301MXA	AD676TD/883B	28-Pin Side Braze Ceramic DIP	D-28	CDIP2-T28

Absolute Maximum Ratings (T_A = +25°C unless otherwise noted)¹

V _{CC} to V _{EE}	-0.3 V to +26.4 V
V _{DD} to DGND	-0.3 V to +7 V
V _{CC} to AGND	-0.3 V to +18 V
V _{EE} to AGND	-18 V to +0.3 V
AGND to DGND	±0.3 V
Digital Inputs (CAL, SAMPLE, CLK) to DGND	0 V to +5.5 V
Analog Inputs (V _{IN} , V _{REF} , AGND SENSE) to AGND	(V _{CC} + 0.3 V) to (V _{EE} - 0.3 V)
Power Dissipation (P _D) 10 V	630 mW
Power Dissipation (P _D) 5 V	480 mW
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering 10 sec)	+300°C

Recommended Operating Conditions²

Ambient Operating Temperature Range (T _A)	-55°C to +125°C
Positive Analog Supply Voltage (V _{CC})	11.4 V to 12.6 V
Negative Analog Supply Voltage (V _{EE})	-11.4 V to -12.6 V
Digital Supply Voltage (V _{DD})	4.5 V to 5.5 V
Analog Reference Voltage (V _{REF})	5 V to 10 V
Analog Input Voltage Range (V _{IN})	-V _{REF} to V _{REF}
Analog Ground Sense Voltage	-0.1 V to 0.1 V

Thermal Characteristics

Thermal Resistance, Junction-to-Case (θ _{JC})	28°C/W
Thermal Resistance, Junction-to-Ambient (θ _{JA})	60°C/W

NOTES

¹Permanent damage may occur if any absolute maximum rating is exceeded. Functional operation is not implied and device reliability may be impaired by exposure to higher-than-recommended voltages for extended periods of time.

²AGND and DGND tied at ADC.

REV. A

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One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106, U.S.A.
Tel: 617/329-4700 Fax: 617/326-8703

AD676—SPECIFICATIONS

Table 1. Electrical Performance Characteristics

Test	Symbol	Conditions $V_{CC} = +12\text{ V}$, $V_{EE} = -12\text{ V}$, $V_{DD} = +5\text{ V}$, $V_{REF} = 10\text{ V}$, $V_{IH} = 2.0\text{ V}$, $V_{IL} = 0.8\text{ V}$ unless otherwise specified	Group A Subgroups	Device Type	Limits		Units
					Min	Max	
Logic Input High Voltage	V_{IH}		1, 2, 3	01	2.0		+V
Logic Input Low Voltage	V_{IL}		1, 2, 3	01		0.8	+V
Logic Input Current	I_{LIN}	$V_{IH} = 5\text{ V}$; $V_{IL} = 0\text{ V}$	1, 2, 3	01		10	$\pm\mu\text{A}$
Logic Output High Voltage	V_{OH}	$I_{OH} = 0.5\text{ mA}$	1, 2, 3	01	2.4		+V
Logic Output Low Voltage	V_{OL}	$I_{OL} = 1.6\text{ mA}$	1, 2, 3	01		0.4	+V
Power Supply Current	I_{CC}	$V_{REF} = 10\text{ V}$, Device Converting	1, 2, 3	01		24	+mA
	I_{EE}					24	-mA
	I_{DD}					5	+mA
Power Supply Current	I_{CC}	$V_{REF} = 5\text{ V}$, Device Converting	1, 2, 3	01		18	+mA
	I_{EE}					18	-mA
	I_{DD}					5	+mA
Power Dissipation	P_D	10 V	1, 2, 3	01		630	mW
		5 V				480	
Integral Nonlinearity	INL	All Codes	1	01		1.5	$\pm\text{LSB}$
			2, 3			2	
Differential Nonlinearity ¹	DNL	All Codes	1, 2, 3	01	16		Bits
Bipolar Zero Error	B_{PZE}	Code = 32767.5	1	01		4	$\pm\text{LSB}$
			2, 3			6	
Negative Full-Scale Error	A_N	Code = 0.5	1	01		4	$\pm\text{LSB}$
			2, 3			6	
Positive Full-Scale Error	A_P	Code = 65535.5	1	01		4	$\pm\text{LSB}$
			2, 3			6	
Voltage Reference Input	V_{REF}		1, 2, 3	01	5	10	+V
Signal-to-Noise + Distortion ²	$S/(N + D)$	$f_{IN} = 1\text{ kHz}$	4, 5, 6	01	89		dB
Total Harmonic Distortion ²	THD	$f_{IN} = 1\text{ kHz}$	4, 5, 6	01		-92	dB
Conversion Time	t_C	See Figures 1, 2 for Timing Diagrams	9, 11	01		10	μs
			10			13.3	
CLK Period	t_{CLK}		9, 11	01		480	ns
			10			670	
Calibration Time	t_{CT}		9, 10, 11	01		85,530	t_{CLK}
Sampling Time (Included in t_C)	t_S		9, 10, 11	01	2		μs
CAL to BUSY Delay	t_{CALB}		9, 10, 11	01		150	ns
BUSY to SAMPLE Delay	t_{BS}		9, 10, 11	01	2		μs
SAMPLE to BUSY	t_{SB}		9, 10, 11	01		100	ns
CLK High	t_{CH}		9, 10, 11	01	50		ns
CLK Low	t_{CL}		9, 10, 11	01	50		ns
SAMPLE Low to 1st CLK	t_{SC}		9, 10, 11	01	50		ns
SAMPLE Low	t_{SL}		9, 10, 11	01	100		ns

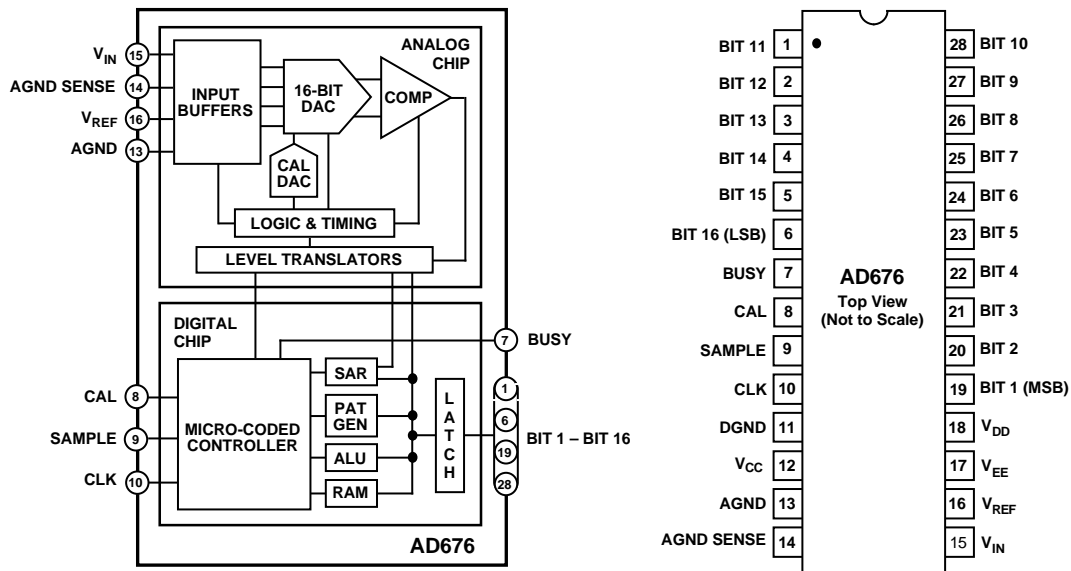
Test	Symbol	Conditions $V_{CC} = +12\text{ V}$, $V_{EE} = -12\text{ V}$, $V_{DD} = +5\text{ V}$, $V_{REF} = 10\text{ V}$, $V_{IH} = 2.0\text{ V}$, $V_{IL} = 0.8\text{ V}$ unless otherwise specified	Group A Subgroups	Device Type	Limits		Units
					Min	Max	
CAL HIGH	t_{CALH}		9, 10, 11	01	50		ns
Output Delay	t_{OD}		9, 10, 11	01		200	ns
Status Delay	t_{SD}		9	01	50		ns
			10, 11		40		

NOTES

¹Minimum resolution for which “No Missing Codes” is guaranteed.

² $V_{IN} = 0.05\text{ dB}$, $f_{IN} = 1\text{ kHz}$, all measurements referred to a 0 dB (20 V p-p) input signal. The full Nyquist bandwidth is used for all values.

Functional Block Diagram and Terminal Assignment



Microcircuit Technology Group

This microcircuit is covered by technology group (H).

AD676

Life Test /Burn-In Circuit

Steady state life test is per MIL-STD-883 Method 1005. Burn-in is per MIL-STD-883 Method 1015 test condition (B).

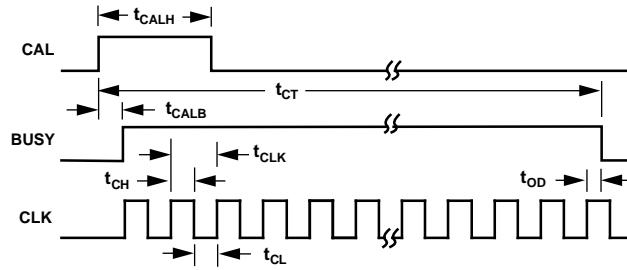
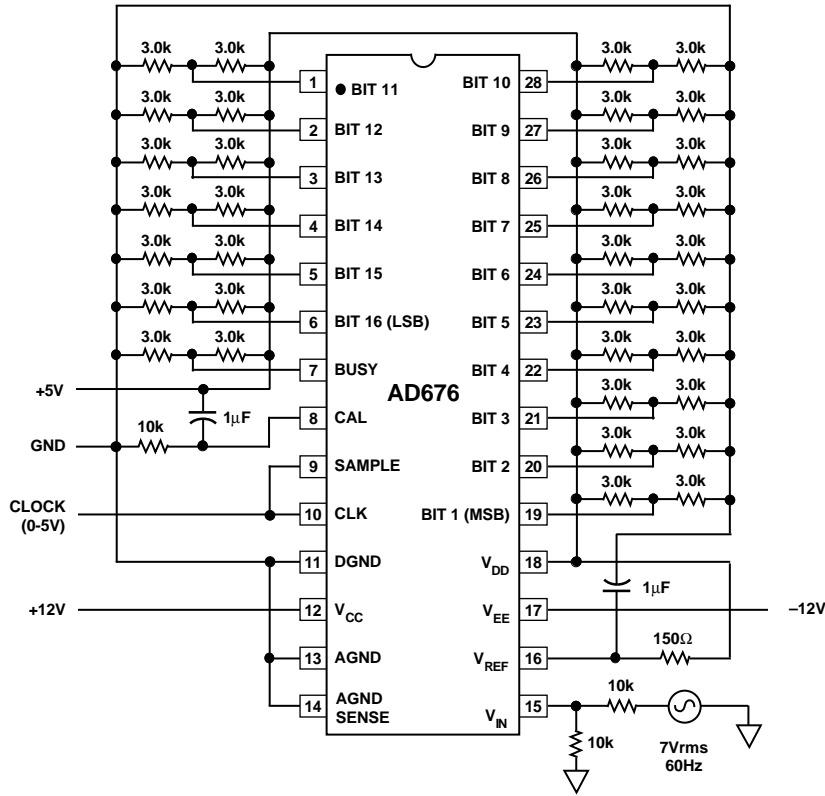


Figure 1. Calibration Timing

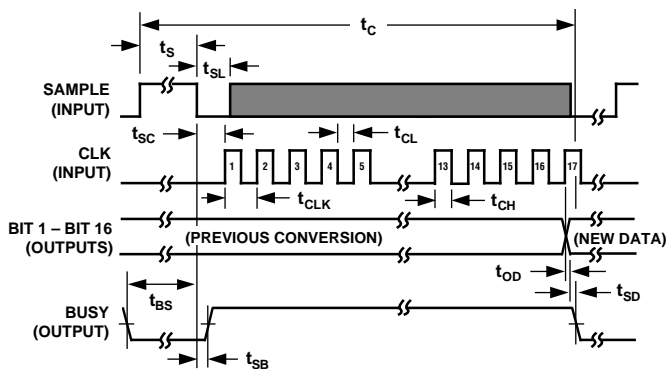


Figure 2a. General Conversion Timing

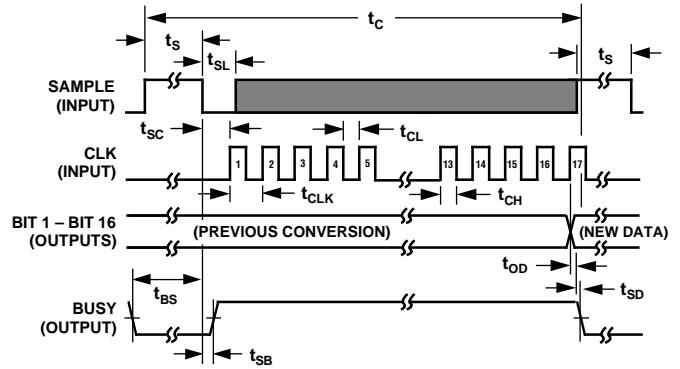


Figure 2b. Continuous Conversion Timing