INTERSIL

ADC0801–ADC0804
8-Bit Microprocessor Compatible A/D Converters

FEATURES

- **MCS-48 and MCS-80/85 bus compatible–no interfacing logic required**
- **Conversion time < 100 μs**
- **Easy interface to all microprocessors**
- **Will operate "stand alone"**
- **Differential analog voltage inputs**
- **Bandgap voltage references**
- **TTL compatible inputs and outputs**
- **ON-chip clock generator**
- **0V to 5V analog voltage input range (single +5V supply)**
- **No zero adjust required**

GENERAL DESCRIPTION

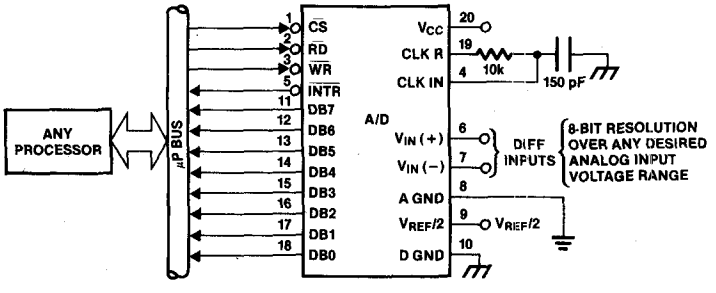
The ADC0801 family are CMOS 8-bit successive approximation A/D converters which use a modified potentiometric ladder, and are designed to operate with the 8080A control bus via three-state outputs. These converters appear to the processor as memory locations or I/O ports, hence no interfacing is required.

A differential analog voltage input allows increasing the common-mode-rejection and offsetting the analog zero input voltage value. In addition, the voltage reference input can be adjusted to allow encoding any smaller analog voltage span to the full 8 bits of resolution.

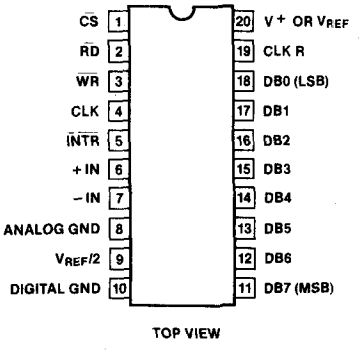
The ADC0801 family is available in the industry standard 20 pin CERDIP packages.

4

TYPICAL APPLICATION



PIN CONFIGURATION



TOP VIEW

ORDERING INFORMATION

PART	ERROR	TEMPERATURE RANGE	PACKAGE	ORDER NUMBER
ADC0801	± 1/4 bit adjusted full scale	0°C to +70°C	20 pin CERDIP	ADC0801LCN
		−40°C to +85°C	20 pin CERDIP	ADC0801LCD
		−55°C to +125°C	20 pin CERDIP	ADC0801LD
ADC0802	± 1/2 bit no adjust	0°C to +70°C	20 pin CERDIP	ADC0802LCN
		−40°C to +85°C	20 pin CERDIP	ADC0802LCD
		−55°C to +125°C	20 pin CERDIP	ADC0802LD
ADC0803	± 1/2 bit adjusted full scale	0°C to +70°C	20 pin CERDIP	ADC0803LCN
		−40°C to +85°C	20 pin CERDIP	ADC0803LCD
		−55°C to +125°C	20 pin CERDIP	ADC0803LD
ADC0804	± 1 bit no adjust	0°C to +70°C	20 pin CERDIP	ADC0804LCN
		−40°C to +85°C	20 pin CERDIP	ADC0804LCD

ABSOLUTE MAXIMUM RATINGS

Supply Voltage 6.5V
Voltage at Any Input ..... −0.3V to (V+ + 0.3V)
Storage Temperature Range ..... −65°C to +150°C
Package Dissipation at T_A = 25°C ..... 875 mW
Lead Temperature (Soldering, 10 seconds) ..... 300°C

OPERATING RATINGS

Temperature Range
ADC0801/02/03LD ..... −55°C to +125°C
ADC0801/02/03/04LCD ..... −40°C to +85°C
ADC0801/02/03/04LCN ..... 0°C to +70°C
Supply Voltage Range ..... 4.5V to 6.5V

ELECTRICAL CHARACTERISTICS

Converter Specifications: $V^+ = 5V$, $V_{REF}/2 = 2.500V$, $T_{MIN} \le T_A \le T_{MAX}$ and $f_c = 640$ kHz unless otherwise stated.

PARAMETER	MIN	TYP	MAX	UNIT	TEST CONDITIONS
ADC0801: Total Adjusted Error			±1/4	LSB	With Full Scale Adjust
ADC0802: Total Unadjusted Error			±1/2	LSB	Completely Unadjusted
ADC0803: Total Adjusted Error			±1/2	LSB	With Full Scale Adjust
ADC0804: Total Unadjusted Error			±1	LSB	Completely Unadjusted
$V_{REF}/2$ Input Resistance	1.0	1.3		kΩ	Input Resistance at Pin 9
Analog Input Voltage Range	GND − 0.05		$V^+ + 0.05$	V	
DC Common-Mode Rejection		±1/16	±1/8	LSB	Over Analog Input Voltage Range
Power Supply Sensitivity		±1/16	±1/8	LSB	$V^+ = 5V \pm 10\%$ Over Allowed Input Voltage Range

Timing Specifications: $V^+ = 5V$ and $T_A = 25°C$ unless otherwise stated.

PARAMETER		MIN	TYP	MAX	UNIT	TEST CONDITIONS
f_c	Clock Frequency	100 100	640 640	1280 800	kHz kHz	$V^+ = 6V$, $V^+ = 5V$
t_{conv}	Conversion Time	66		73	ns	
CR	Conversion Rate In Free-Running Mode			8770	Conv/S	$\overline{INTR}$ tied to $\overline{WR}$ with $\overline{CS} = 0V$, $f_c = 640$ kHz
$t_{W(\overline{WR})L}$	Width of $\overline{WR}$ Input (Start Pulse Width)	100			ns	$\overline{CS} = 0V$
t_{ACC}	Access Time (Delay from Falling Edge of $\overline{RD}$ to Output Data Valid)		135	200	ns	C_L = 100 pF (Use Bus Driver IC for Larger C_L)
t_{1H}, t_{0H}	3-State Control (Delay from Rising Edge of $\overline{RD}$ to Hi-Z State)		125	250	ns	C_L = 10 pF, R_L = 10k
t_{WI}	Delay from Falling Edge of $\overline{WR}$ to Reset of $\overline{INTR}$		300	450	ns	
C_{IN}	Input Capacitance of Logic Control Inputs		5	7.5	pF	
C_{OUT}	3-State Output Capacitance (Data Buffers)		5	7.5	pF	