



CMOS High-Speed 8-Bit ADCs with Multiplexer and Reference

General Description

The MAX154/MAX158 are high-speed multi-channel analog-to-digital converters (ADCs). The MAX154 has four analog input channels while the MAX158 has eight channels. Conversion time for both devices is 2.5 μ s. The MAX154/MAX158 also feature a 2.5V on-chip reference, forming a complete high-speed data acquisition system.

Both converters include a built-in track/hold, eliminating the need for an external track/hold. The analog input range is 0V to +5V, although the ADC operates from a single +5V supply.

Microprocessor interfaces are simplified by the ADC's ability to appear as a memory location or I/O port without the need for external logic. The data outputs use latched, three-state buffer circuitry to allow direct connection to a microprocessor data bus or system input port.

Applications

Digital Signal Processing
High-Speed Data Acquisition
Telecommunications
High-Speed Servo Control
Audio Instrumentation

Features

- ♦ One-Chip Data Acquisition System
- ♦ Four or Eight Analog Input Channels
- ♦ 2.5 μ s per Channel Conversion Time
- ♦ Internal 2.5V Reference
- ♦ Built-In Track/Hold Function
- ♦ $\frac{1}{2}$ LSB Error Specification
- ♦ Single +5V Supply Operation
- ♦ No External Clock
- ♦ New Space-Saving SSOP Package

Ordering Information

PART	TEMP. RANGE	PIN-PACKAGE	ERROR (LSB)
MAX154ACNG	0°C to +70°C	24 Narrow Plastic DIP	$\pm 1/2$
MAX154BCNG	0°C to +70°C	24 Narrow Plastic DIP	± 1
MAX154BC/D	0°C to +70°C	Dice	$\pm 1/2$

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ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{DD} to GND.....0V, +10V
 Voltage at Any Other Pins.....GND -0.3V, V_{DD} +0.3V
 Output Current (REF OUT).....30mA
 Power Dissipation (any package) to +75°C450mW
 Derate above +25°C by6mW/°C

Operating Temperature Ranges

MAX15__C_.....0°C to +70°C
 MAX15__E_.....-40°C to +85°C
 MAX15__M_.....-55°C to +125°C
 Storage Temperature Range-65°C to +160°C
 Lead Temperature (soldering, 10sec).....+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V_{DD} = +5V, V_{REF+} = +5V, V_{REF-} = GND, Mode 0, T_A = T_{MIN} to T_{MAX} , unless otherwise noted).

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
ACCURACY						
Resolution			8			Bits
Total Unadjusted Error (Note 1)		MAX15__A			±1/2	LSB
		MAX15__B			±1	
No-Missing-Codes Resolution			8			Bits
Channel-to-Channel Mismatch						

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MAX154/MAX158

ELECTRICAL CHARACTERISTICS (continued)

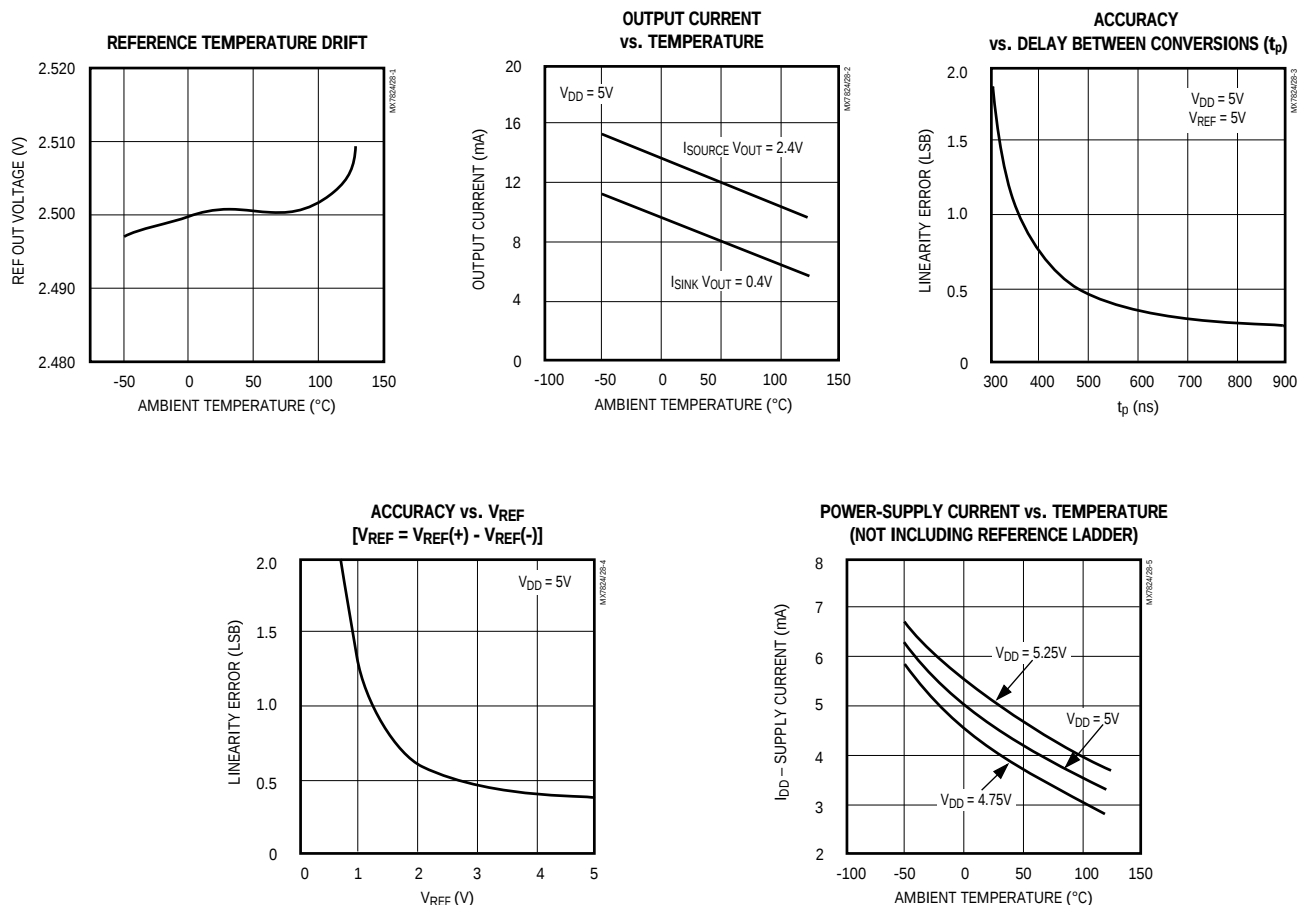
(V_{DD} = +5V, V_{REF+} = +5V, V_{REF-} = GND, MODE 0, T_A = T_{MIN} to T_{MAX}, unless otherwise noted).

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
LOGIC OUTPUTS						
Output High Voltage	V _{OH}	DB0-DB7, $\overline{\text{INT}}$; I _{OUT} = -360μA	4.0			V
Output Low Voltage	V _{OL}					

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Typical Operating Characteristics

($T_A = +25^\circ\text{C}$, unless otherwise noted.)



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Pin Descriptions

MAX154/MAX158

PIN MAX154	NAME	FUNCTION
1	AIN4	Analog Input Channel 4
2	AIN3	Analog Input Channel 3
3	AIN2	Analog Input Channel 2
4	AIN1	Analog Input Channel 1
5	REF OUT	Reference Output (2.5V) for MAX154
6	DB0	Three-State Data Output, bit 0 (LSB)
7	DB1	Three-State Data Output, bit 1
8	DB2	Three-State Data Output, bit 2
9	DB3	Three-State Data Output, bit 3
10	$\overline{RD}$	Read Input. $\overline{RD}$ controls conversions and data access. See <i>Digital Interface</i> section.

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Detailed Description

Converter Operations

The MAX154/MAX158 use what is commonly called a "half-flash" conversion technique (Figure 3). Two 4-bit flash ADC converter sections are used to achieve an 8-bit result. Using 15 comparators, the upper 4-bit MS (most significant) flash ADC compares the unknown input voltage to the reference ladder and provides the upper four data bits.

An internal DAC uses the MS bits to generate an analog signal from the first flash conversion. A residue voltage representing the difference between the unknown input and the DAC voltage is then compared to the reference ladder by 15 LS (least significant) flash comparators to obtain the lower four output bits.

Operating Sequence

The operating sequence is shown in Figure 4. A conversion is initiated by a falling edge of $\overline{RD}$ and $\overline{CS}$. The comparator

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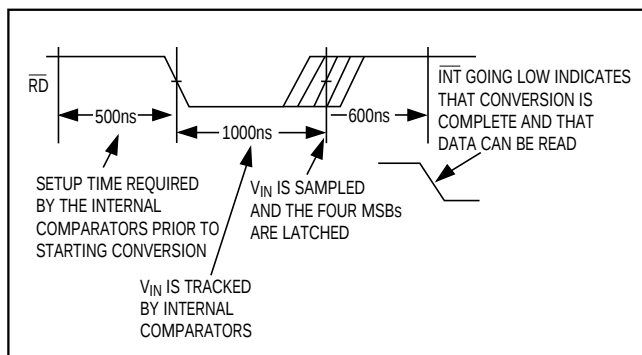


Figure 4. Operating Sequence

Interface Mode 0

Figure 5 shows

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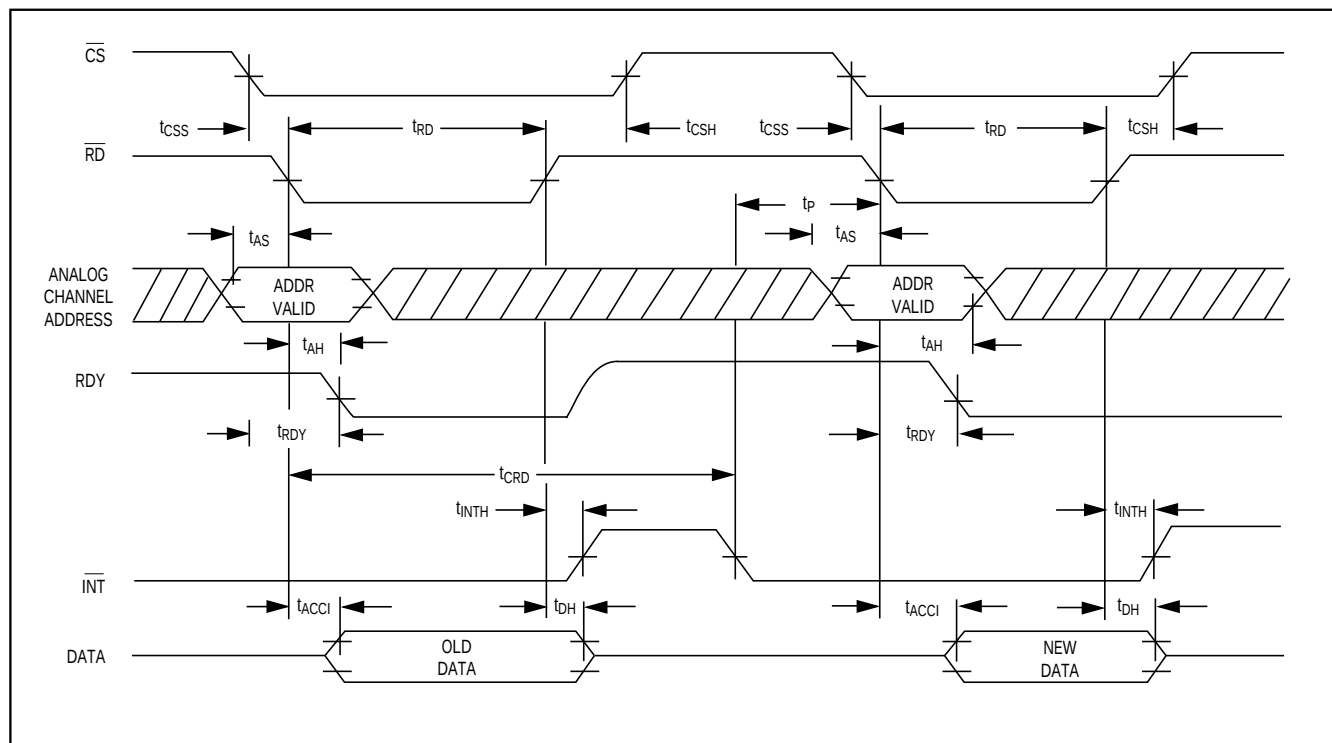


Figure 6. Mode 1 Timing Diagram

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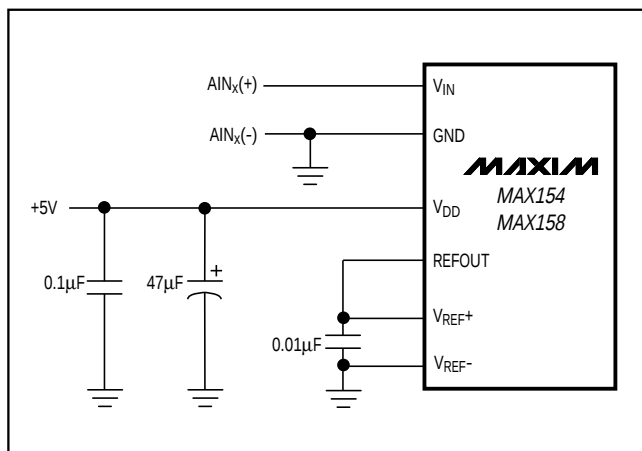
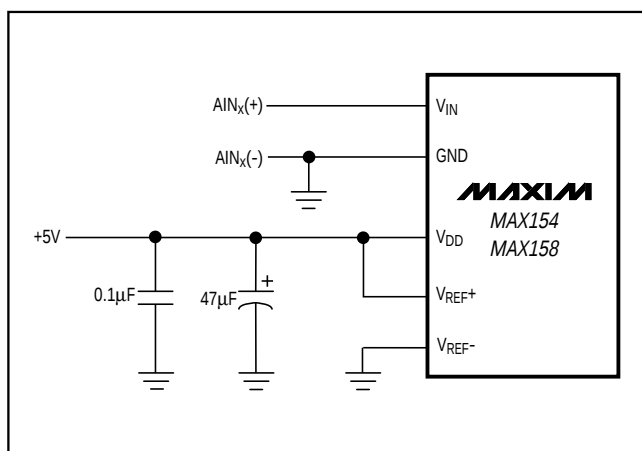


Figure 8a. Internal Reference

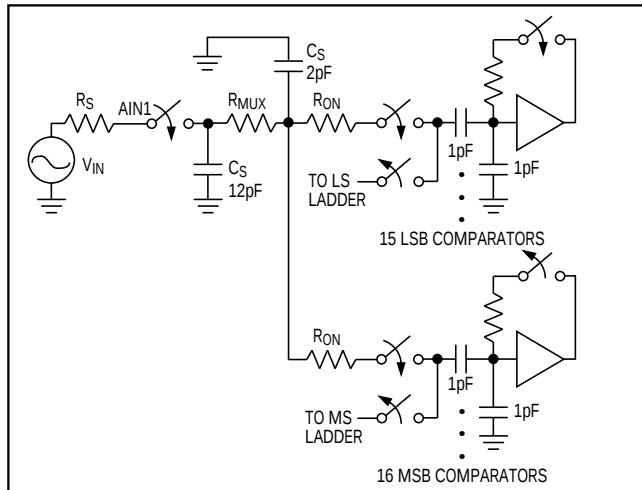


Figure

CMOS High-Speed 8-Bit ADCs with Multiplexer and Reference

Bipolar Input Operation

The circuit in Figure 10a can be used for bipolar input operation. The input voltage is scaled by an amplifier so that only positive voltages appear at the ADC's inputs. The analog input range is $\pm 4V$ and the output code is complementary offset binary. The ideal input/output characteristic is shown in Figure 10b.



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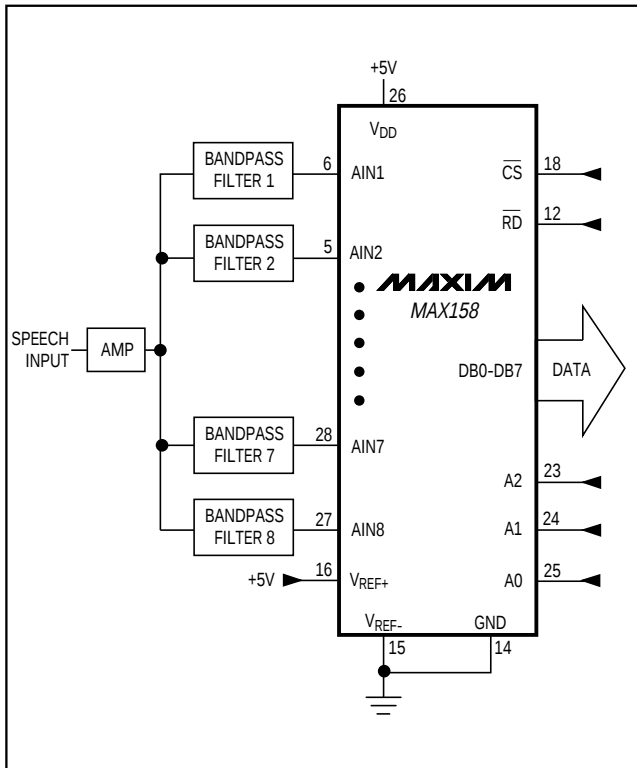


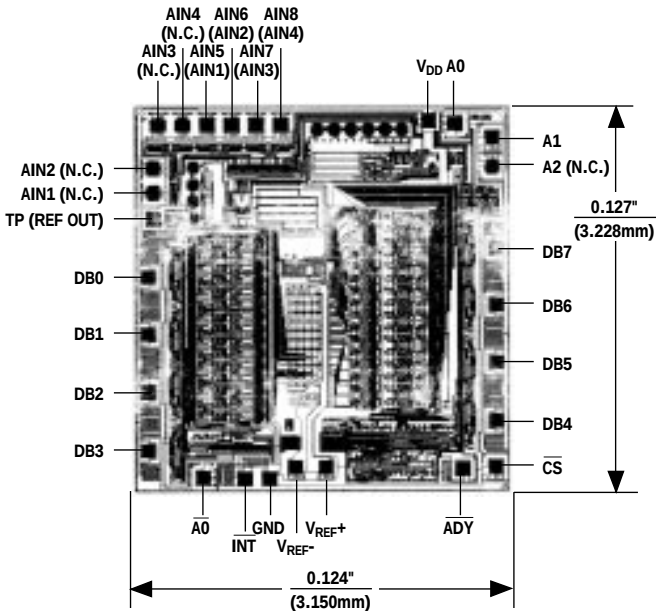
Figure 12. Speech Analysis Using Real-Time Filtering

Ordering Information (continued)

PART	TEMP. RANGE	PIN-PACKAGE	ERROR (LSB)
MAX154AENG	-40°C to +85°C	24 Plastic DIP	$\pm 1/2$
MAX154BENG	-40°C		

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Chip Topography



() ARE FOR MAX154/MX7824

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

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