AMERICAN MICROSYSTEMS, INC.

DAC/ADC

ADC06R02

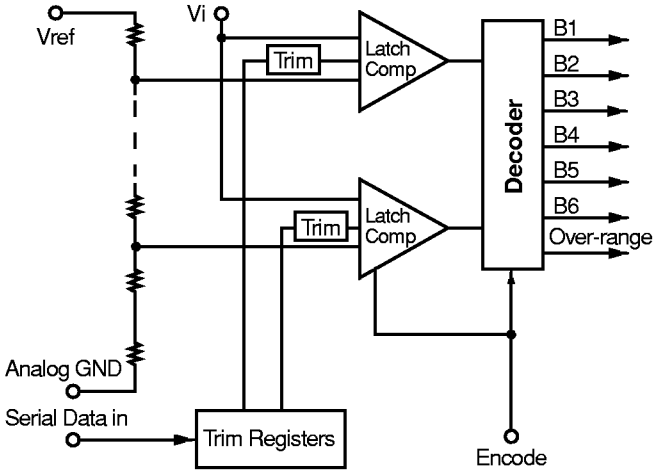
+4.5V to 5.5V, 6-Bit 100 MSPS, Flash ADC

AMI 0.6 micron CMOS

Features

- Single 6-Bit ADC
- 100mW power consumption
- On-chip programmable trim circuitry
- High-speed 100MSPS
- Low input capacitance < 2.5pF
- Over-range bit
- Standard CMOS interface

Functional Block Diagram



Notes: Output register (66 bit)
Vi
Decoder
VDD
Analog GND
VREF
Resistor string
ENCODE
Latching comparator
Trim Registers
Trim Circuitry

General Description

The AMI06R02 is realized as a 6-bit, high-speed, analog to digital converter fabricated on a 0.6µ process.

The total circuit is comprised of 64 parallel latching comparators. Comparator outputs are decoded to drive CMOS latches and are capable of clock speeds up to 100 MHz. The ADC06R02 employs trim circuitry for each comparator. The trim circuitry enables operation at 8-bit accuracy. The part features a minimum 62dB spurious free dynamic range (SFDR) and 35dB signal-to-noise ratio (SNR). The ADC06R02 operates over the industrial temperature range from -40°C to +85°C.

Applications

- High-speed data conversion
- Communications circuits
- High-speed LAN / WAN
- Image processing

Product Highlights

- Single-supply operation. This part operates from a single +4.5 V to +5.5 V supply.
- Programmable trim circuitry allows 8-bit accuracy.
- Encode rate of 100MSPS.
- Low power consumption.

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Electrical Characteristics (VS = 5.0V; reference Voltage = 5.0V; +27°C; unless otherwise noted)

PARAMETER	MIN	TYP	MAX	UNITS
RESOLUTION		6		Bits
DC ACCURACY				
Differential Linearity		0.1	0.35	LSB
Integral Linearity		0.1	0.35	LSB
No Missing Codes		Guaranteed		LSB
ANALOG INPUT				
Input Capacitance		2.5		pF
Large Signal Bandwidth	>20			MHz
Input Voltage Range	2.2	2.5	3	V
REFERENCE INPUT				
Reference Ladder Resistance	115.2k	128k	140.8k	Ohm
Reference Input Linear Range	4.5	5	5.8	V
DYNAMIC PERFORMANCE			130	
Conversion Rate		100		MSPS
Output Delay (t_{PD})	7	9		ns
Transient Response		10		ns
Overvoltage Recovery Time		7		ns
Output Rise Time	0.3	0.5	0.8	ns
Output Fall Time	0.3	0.5	0.8	ns
ENCODE INPUT				
Logic "1" Voltage	3.5	5		V
Logic "0" Voltage		0	0.8	V
Input Capacitance		1		pF
Encode Pulse Width (Low)	5	7		ns
Encode Pulse Width (High)	2	3		ns
AC LINEARITY				
Effective Number of Bits (ENOB)	>5	5.5		Bits
Signal-to-Noise Ratio (SNR)	>31.86	35		dB
Spurious Free Dynamic Range (SFDR)	>62			dB
Total Harmonic Distortion (THD)			<-60	dB
Two Tone Intermod Rejection			<+/-1	dB
POWER SUPPLY				
Operating Voltage				
AV_{DD}	4.5	5	5.5	Volts
DV_{DD}	4.5	5	5.5	Volts
Operating Current				
IAV_{DD}		7.2		mA
IDV_{DD}		3.6		mA
POWER CONSUMPTION			<100	mW

Absolute Maximum Ratings

PARAMETERS		
Supply Voltage (–VS)		V
Analog-to-Digital Supply Voltage Differential		V
Analog Input Voltage		V
Digital Input Voltage		V
Reference Input Voltage (+VREF – VREF)		V
Differential Reference Voltage		V
Reference Midpoint Current		mA
Digital Output Current		mA
Operating Temperature Range		°C
Storage Temperature Range		°C
Junction Temperature		°C
Lead Soldering Temperature (10 Sec.)		°C

Recommended Operating Conditions

PARAMETERS	INPUT VOLTAGE		
	MIN	NOMINAL	MAX
–VS	4.5	5	5.5
+VREF	4.95	5	5.05
–VREF	1.25		3.75
Analog Input			

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