

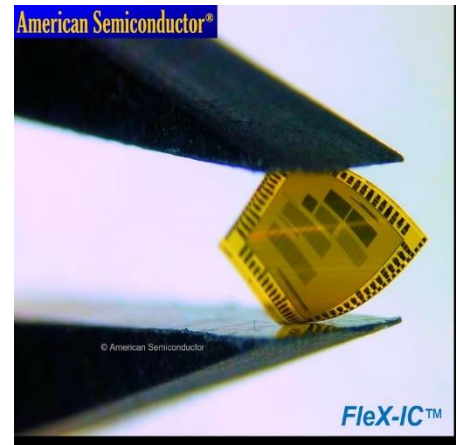
FleX-ADC2001™ Analog-to-Digital Converter with 3 Programmable Operational Amplifiers

Overview

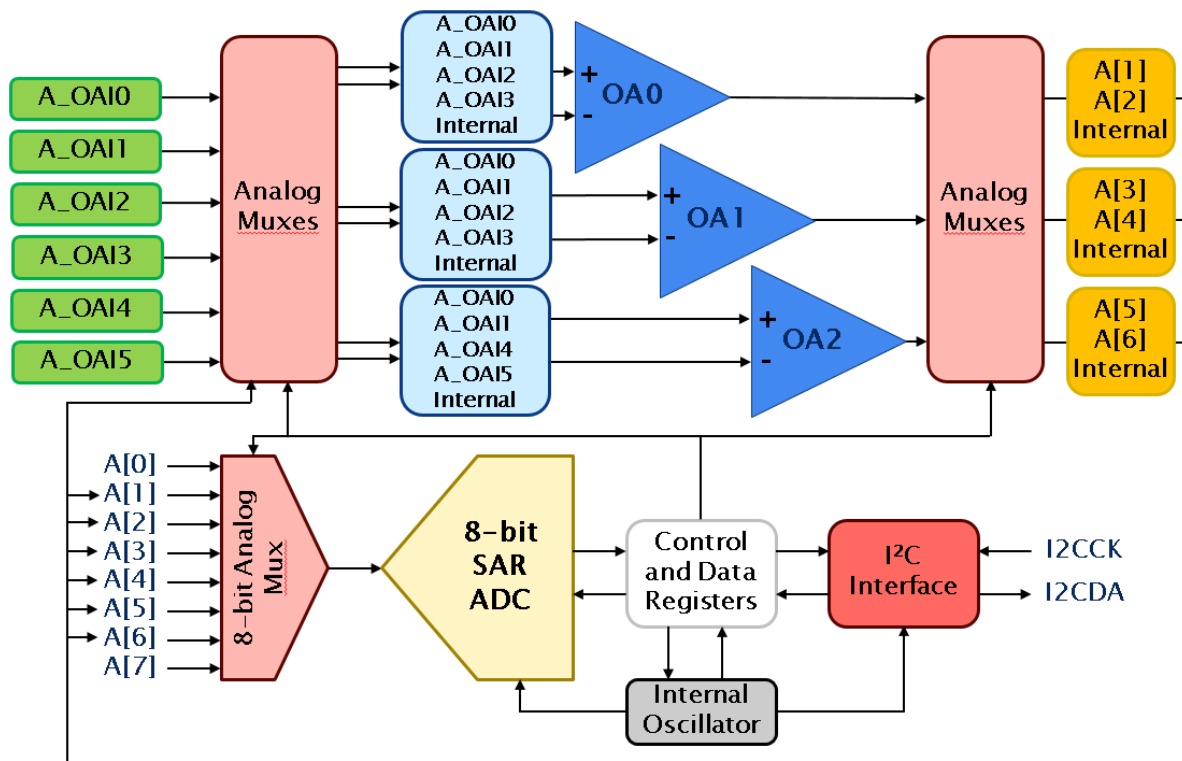
The Flex-ADC2001 is the world's first physically flexible, 8-channel analog-to-digital converter enhanced with three user configurable high performance operational amplifiers. The FleX-ADC2001 is ideal for printed and/or flexible sensor systems that require signal amplification and data conversion. Ultra-thin (25um) FleX-ICs have demonstrated flexibility below 5mm radius of curvature. Video demonstrations of the FleX devices in operation can be viewed at <http://www.americansemi.com/>

Operating at 2.5V, the low-power FleX-ADC2001 simplifies system integration for applications that may include wearables, IoT, and embedded sensors. The programmable amplifiers can provide signal condition prior to analog-to-digital conversion. These amplifiers can be configured for a wide range of functions including inverting with programmable gain, non-inverting with programmable gain, cascaded with programmable gain, unity gain buffer, and differential amplification.

The two-wire I²C communication interface supports easy software configuration of the amplifiers and data converter. The Flex-ADC2001 is fabricated in the TowerJazz CS18 180nm SOI process and converted to a flexible form factor using the American Semiconductor FleX™ Silicon-on-Polymer process.



Block Diagram



FleX-ADC2001™ Analog-to-Digital Converter with 3 Programmable Operational Amplifiers

System Features

The FleX-ADC2001 is a low-power mixed-signal system with user configuration and bi-directional data communication through a 2-wire I²C interface.

Operating Voltage	2.5V
Analog-to-Digital Converters	1
Operational Amplifiers	3
Operating Frequency	10MHz
Internal Oscillator	Configurable to 0.5, 1, 2, 4, and 8 MHz nominal
Crystal Oscillator	Yes
Clock Source	Programmable selection of internal, crystal or external clock
Communication	2-wire I ² C™
Communication Rate	20kb/s

Features of the Analog-to-Digital Converter

The FleX-ADC2001 contains an 8-bit successive approximation analog-to-digital converter with 8 input channels.

Analog Input Channels	8
Resolution	8 bits
Operating Frequency	1MHz
ADC Sample Clock	Clock prescaler divides system clock by 2^N , N=0,1,2,...8 Clock divider divides further by 2,4,8,...512
Communication	2-wire I ² C™
Channel Data Storage	One byte per channel
Conversion Modes	Single, Continuous, Scan
Channel Select	User Configurable

Features of the 3 Operational Amplifiers

Each of the three on-board operational amplifiers low noise and high performance to provide maximum utility in a wide range of flexible system applications.

Stability	Unity-gain; internally compensated
Open Loop Gain	>90 dB typical
Gain Bandwidth	4.4MHz typical
Slew Rate	3.8V/μs typical
Input Range	Rail-to-rail
Output Swing	Rail-to-rail
Input Offset Voltage	1.1μV typical
Low Noise	0.1Hz to 10Hz noise is just 0.9μVP-P; 1kHz noise is less than 37nV/√Hz
Channel Select	User Configurable

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Physical Specifications

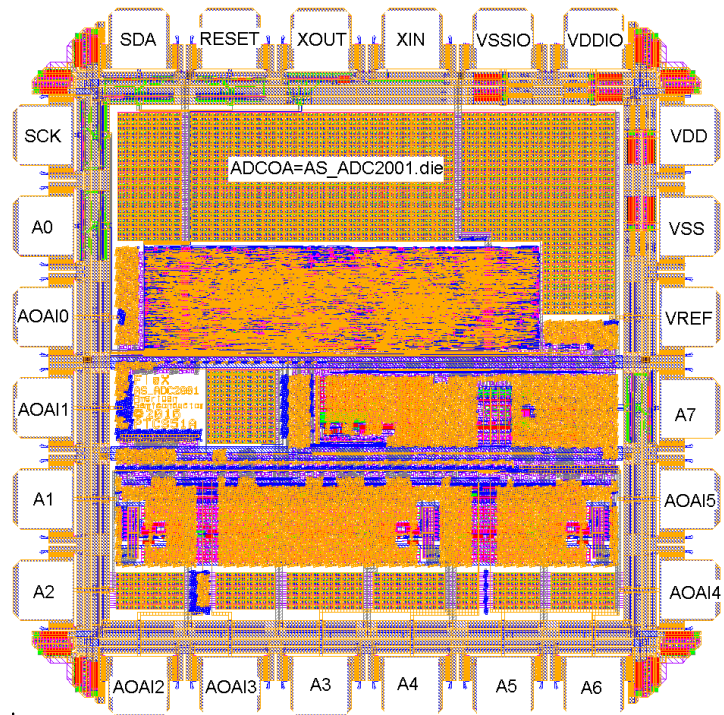
Die Size	2.4mm X 2.4mm
Pin Count	24
Pad Openings	160um X 160um
Pad Pitch	300um
Thickness	25um
Flexible	Yes
Conformal	Yes

Process Details

Technology	TowerJazz 180nm PD-SOI
Interconnect	4-level Aluminum
Flexibility	FleX Silicon-on-Polymer

Pin List

Pin Name	Function
A[7:0]	Analog I/O [7:0]
VDDIO	Digital and I/O Power
VSSIO	Digital and I/O Ground
VDD	Analog Power
VSS	Analog Ground
I2CCK	I ² C Clock Input
I2CDA	I ² C Data Input/Output
RESET	Reset Input
VREF	Analog Voltage Reference
AOAI[5:0]	Op Amp analog inputs
XIN	Crystal / Clock Input
XOUT	Crystal Output



Contact Info

For more information or to purchase FleX products, please contact us at:

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NOTE: The information provided in this datasheet is preliminary as the product is still in testing. Changes to the final product specifications based upon the test results are possible.

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