GENERAL DESCRIPTION

This adc0420x is developed for AFE (Analog-front-end) function for voice signal processing with 14bit 8kHz A/D conversion. The core consists of serial interface and band-pass filters utilizing the sigma-delta A/D conversion architecture. Also it has AAF (anti-aliasing filter) and pre-amplifier for signal gain with external resistor configuration. On-chip voltage reference provide the single supply operation in analog blocks. And it has analog 3.3volts supply operation and digital 1.8volts supply operation.

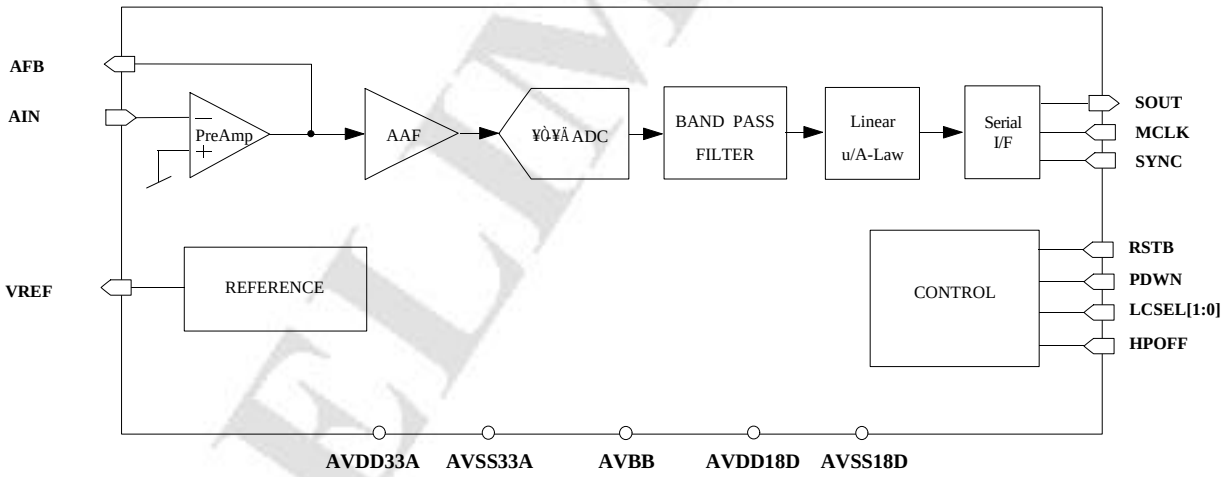
FEATURES

- Analog 3.3Volt / Digital 1.8Volt Operation
- Linear 14bits Output
- 8bits u/A-Law Companding Outputs
- Serial Data Output Format
- On Chip Band Pass Filter
- High Pass Filter On-Off
- On Chip Preamp for External Resister Signal Gain

APPLICATIONS

- Voice Signal Recording

FUNCTIONAL BLOCK DIAGRAM



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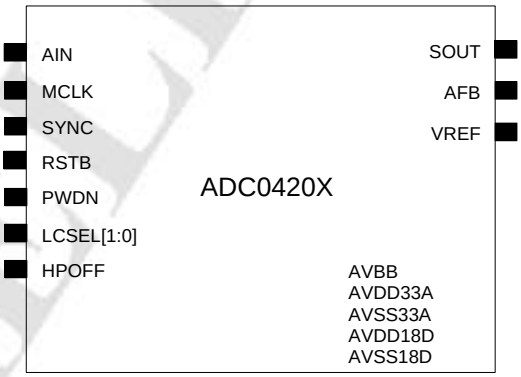
CORE PIN DESCRIPTIONS

PIN NAME	TYPE	PAD TYPE	FUNCTION
			Power Pins
AVDD33A	AP		Analog Power Supply 1 (3.3V)
AVSS33A	AG		Analog Ground
AVDD18D	DP		Digital Power Supply (1.8V)
AVSS18D	DG		Digital Ground
AVBB	AG		Analog Ground
			Analog Pins
AIN	AI		Analog Input. Virtual Ground of Pre-Amplifier
AFB	AO		Pre-Amplifier Output
VREF	AO		Reference Output
			Digital Pins
SOUT	DO		ADC Serial Data Ouput
MCLK	DI		Master Clock Input (2.048MHz)
SYNC	DI		Frame Sync Pulse Input (8KHz)
RSTB	DI		Reset Input (Low Active)
PWDN	DI		Power Down (High Active)
LCSEL[1:0]	DI		Linear, Compand Mode Select.
HPOFF	DI		High Pass Filter Off (High Active)

I/O TYPE ABBR.

- AI : Analog Input
- DI : Digital Input
- AO : Analog Output
- DO : Digital Output
- AB : Analog Bidirectional
- DB : Digital Bidirectional
- AP : Analog Power
- AG : Analog Ground
- DP : Digital Power
- DG : Digital Ground

CORE SYMBOL



ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	AVDD33A AVDD18D	5.0 2.5	V
Analog Input Voltage	-	AVSS33A-0.15 ~ AVDD33A+0.15	V
Digital Input Voltage	-	AVSS18D+0.5 ~ AVDD18D-0.15	V
Digital Output Voltage	.	AVSS18D-0.15 ~ AVDD18D+0.15	V
Storage Temperature Range	Tstg	-45 to 125	°C

NOTES

1. ABSOLUTE MAXIMUM RATING specifies the values beyond which the device may be damaged permanently. Exposure to ABSOLUTE MAXIMUM RATING conditions for extended periods may affect reliability. Each condition value is applied with the other values kept within the following operating conditions and function operation under any of these conditions is not implied.
2. All voltages are measured with respect to VSS unless otherwise specified.
3. 100pF capacitor is discharged through a 1.5KW resistor (Human body model)

RECOMMENDED OPERATING CONDITIONS

Characteristics	Symbol	Min	Typ	Max	Unit
Supply Voltage	AVDD33A AVDD18D	3.15 1.65	3.3 1.8	3.45 1.95	V
Digital Input High Voltage		1.65	-	-	V
Digital Input Low Voltage		-	-	0.15	V
Operating Temperature	Topr	-40	-	85	°C

NOTES

1. It is strongly recommended that all the supply pins (AVDD33A, AVDD18D) be powered from the same source to avoid power latch-up.

AC ELECTRICAL CHARACTERISTICS

(Measurement Bandwidth is 20Hz~4KHz. Full scale input sine wave 1KHz, FS=8KHz, AVDD33A=3.3V, AVDD18D=1.8V Ta=55°C,Unless otherwise specified.)

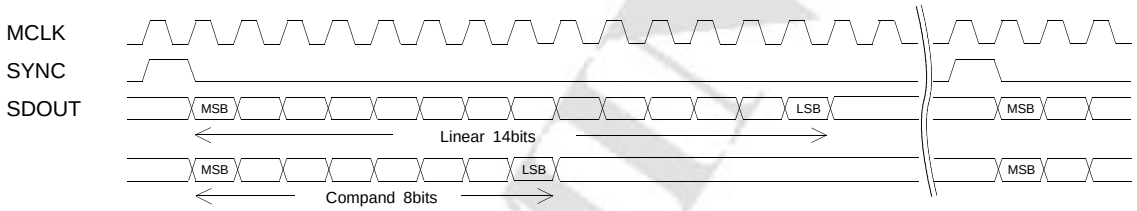
Characteristics	Symbol	Min	Typ	Max	Unit	Conditions
Resolution		-	14	-	Bits	-
Sampling rate		-	8	-	KHz	-
Signal to Distortion Ratio		-	65	-	dB	0dB Input, Linear 14bits Mode
		-	TBD	-	dB	A-Law 8bits Mode
		-	TBD	-	dB	u-Law 8bits Mode
Offset Error		-	-	±20	mV	-
Analog Maximum Input Range	Vain	-	2.0	-	Vpp	-
Reference Voltage	Vref	-	1.2	-	V	-
Operating Current Analog Digital			 1.5 0.3	 - -	 mA mA	 - -
Power Down Current			5		uA	-

TRANS-MISSION CHARACTERISTICS

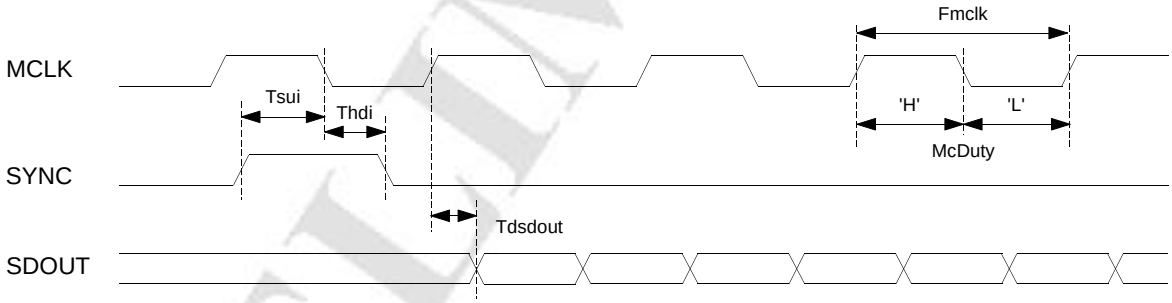
(Measurement Bandwidth is 60Hz~4KHz. Full scale, FS=8KHz, AVDD33A=3.3V, AVDD18D=1.8V, Ta=55ºC, Unless otherwise specified.)

Characteristics	Test Condition	Min	Typ	Max	Unit
Transmit Gain Variation with Frequency (HPOFF="L")	Relative to 1000Hz f = 60Hz f = 200Hz f = 300Hz f = 400Hz ~ 3000Hz f = 3400Hz f = 4000Hz f = 8000Hz	 - - - - - - -	 - - - - - - -	 -7.9 -1.5 -0.6 -0.2 -1.1 -17.8 -62.8	 dB dB dB dB dB dB dB
Transmit Gain Variation with Frequency (HPOFF="H")	Relative to 1000Hz f = 60Hz ~ 3000Hz f = 3400Hz f = 4000Hz f = 8000Hz	 - - - -	 - - - -	 -0.2 -1.1 -17.8 -62.8	 dB dB dB dB
Transmit Delay	f = 60hz ~ 3000Hz	-	-	750	us

TIMING DIAGRAM



Serial Output Format



Timing Diagram

Parameter	Symbol	min	typ	max	Units
SYNC Setup Time	Tsui	-	20	-	ns
SYNC Hold Time	Thdi	-	20	-	ns
SYNC Frequency	Fsync		Fmclk/256		Hz
MCLK Clock frequency	Fmclk	-	2.048	-	MHz
MCLK Duty ratio	McDuty	45	50	55	%
MCLK Rising to SDOUT Delay	Tdsdout		5		ns

FUNCTION DESCRIPTION

Linear, Companding Mode Selection

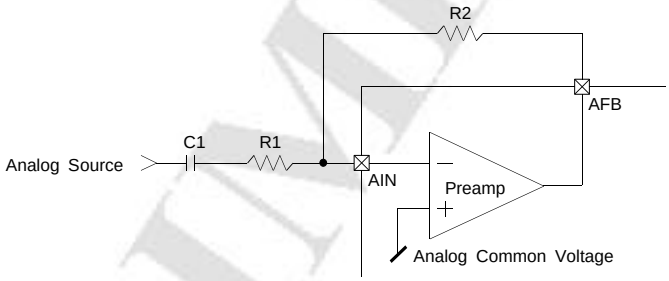
LCSEL[1:0]	Function
LL	Linear 14bits Format
LH	A-Law 8bits Format
HL	u-Law 8bits Format
HH	Not available

Control Signal Function

Port Name	Value	Function
PWDN	L	Normal Operation.
	H	Power Off.
RSTB	L	Reset Enabled.
	H	Normal Operation.
HPOFF	L	Normal Operation. Band Pass Filter.
	H	High Pass Filter Off, Only Low Pass Filter.

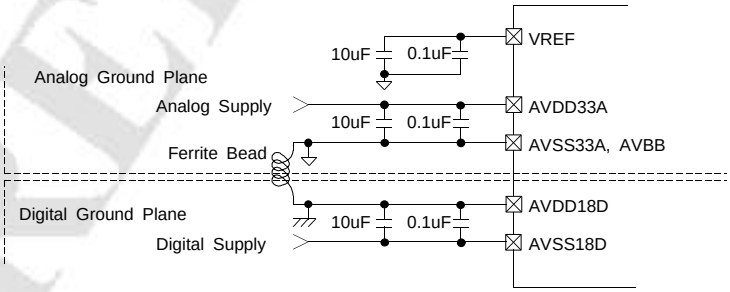
CORE APPLICATION GUIDE

External Resistor Configuration for Signal Gain



The C1 is AC-Coupling capacitor. It's recommanded value is 1uF. The R1, R2 make the signal gain like this, Gain=R2/R1. Recommanded resistors value is, R1 is minimum 10kOhm, and R2 is from 1xR1 to 10xR1.

Bypass Capacitors



HISTORY CARD

Version	Date	Modified Items	Comments
Ver 1.0	OCT.'00	1. First preliminary version published.	