ES7201/2

High Performance PDM Stereo Audio ADC

FEATURES

- High performance advanced delta-sigma audio ADC
- 100 dB signal to noise ratio
- -85 dB THD+N
- Low noise PGA
- 8 to 48 kHz sampling frequency
- Low power

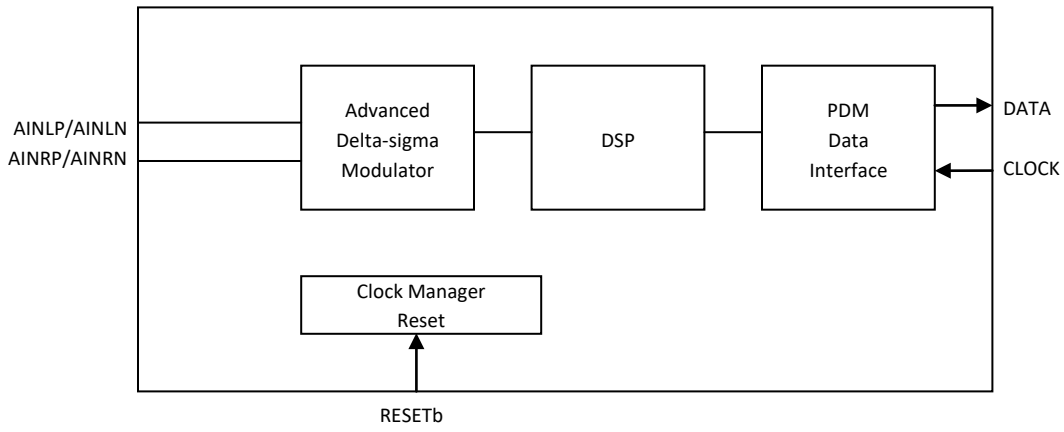
APPLICATIONS

- Mic Array
- Soundbar
- Audio Interface
- Digital TV
- A/V Receiver
- DVR
- NVR

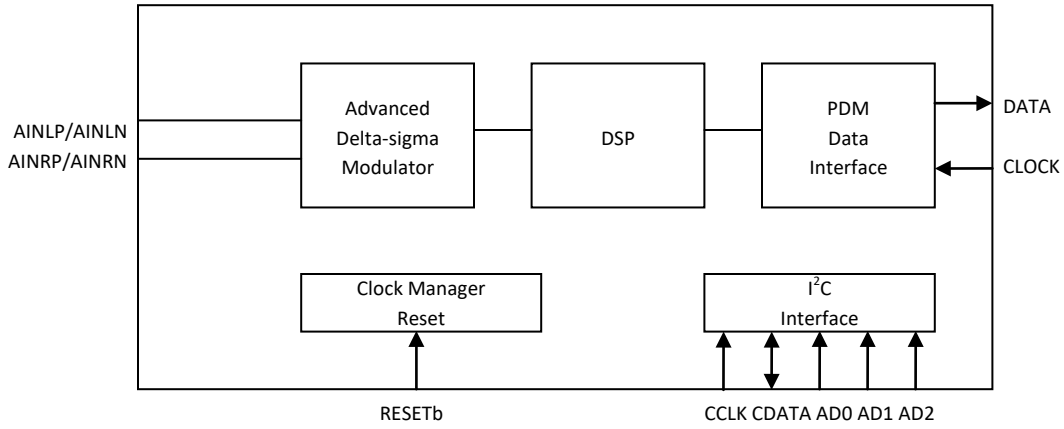
ORDERING INFORMATION

ES7201 -40°C ~ +85°C
QFN-12
ES7202 -40°C ~ +85°C
QFN-16

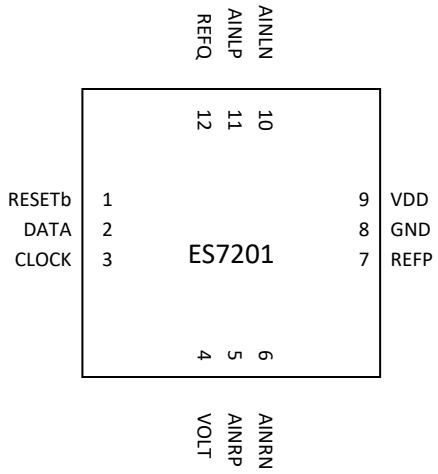
BLOCK DIAGRAM (ES7201, HARDWARE MODE)



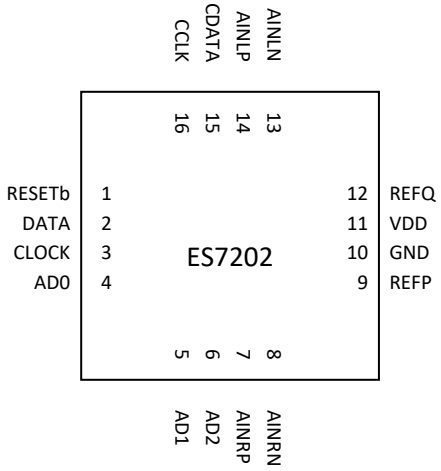
BLOCK DIAGRAM (ES7202, I²C MODE)



1. PIN OUT AND DESCRIPTION



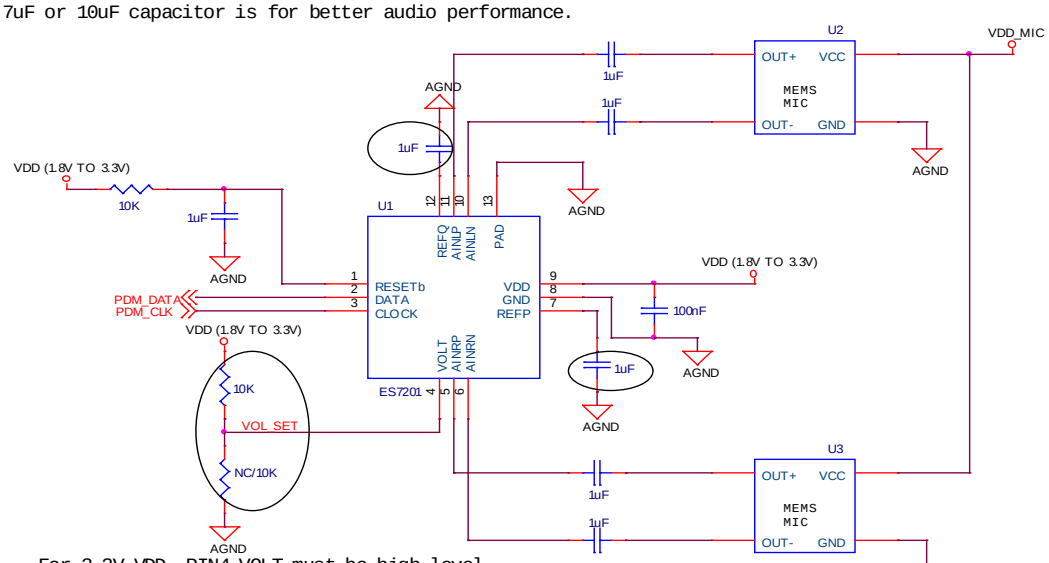
Pin Name	Pin number	Input or Output	Pin Description
DATA, CLOCK	2, 3	I, O	PDM clock and data
RESETb	1	I	Active low reset
VOLT	4	I	High 3.3V, low 1.8V
AINLP, AINLN	11,10	I	Analog left inputs
AINRP, AINRN	5, 6	I	Analog right inputs
VDD, GND	9, 8	I	Power supply
REFP	7	O	Filtering capacitor connection
REFQ	12	O	Filtering capacitor connection



Pin Name	Pin number	Input or Output	Pin Description
CCLK, CDATA	16, 15	I/O	I^2C clock and data
AD0, AD1, AD2	4, 5, 6	I	I^2C addresses
CLOCK, DATA	3, 2	I, O	PDM clock and data
RESETb	1	I	Active low reset
AINLP, AINLN AINRP, AINRN	14, 13 7, 8	I I	Analog left inputs Analog right inputs
VDD, GND	11, 10	I	Power supply
REFP	9	O	Filtering capacitor connection
REFQ	12	O	Filtering capacitor connection

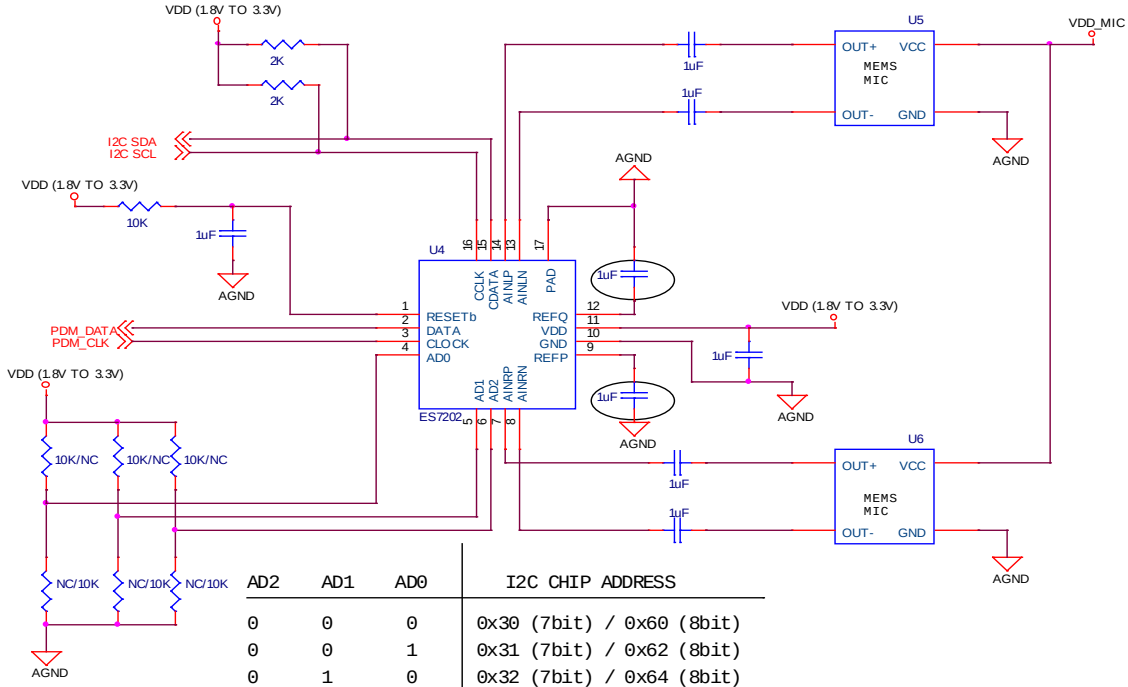
2. TYPICAL APPLICATION CIRCUIT

The filter capacitors on REFP and REFQ pins must be located as close to ES7201 package as possible.
4.7uF or 10uF capacitor is for better audio performance.



For 3.3V VDD, PIN4 VOLT must be high level
For 1.8V VDD, PIN4 VOLT must be low level

The filter capacitors on REFP and REFQ pins must be located as close to ES7202 package as possible.
4.7uF or 10uF capacitor is for better audio performance.



AD2	AD1	AD0	I2C CHIP ADDRESS
0	0	0	0x30 (7bit) / 0x60 (8bit)
0	0	1	0x31 (7bit) / 0x62 (8bit)
0	1	0	0x32 (7bit) / 0x64 (8bit)
0	1	1	0x33 (7bit) / 0x66 (8bit)
1	0	0	0x34 (7bit) / 0x68 (8bit)
1	0	1	0x35 (7bit) / 0x6a (8bit)
1	1	0	0x36 (7bit) / 0x6c (8bit)
1	1	1	0x37 (7bit) / 0x6e (8bit)

3. ELECTRICAL CHARACTERISTICS

ABSOLUTE MAXIMUM RATINGS

Continuous operation at or beyond these conditions may permanently damage the device.

PARAMETER	MIN	MAX
Supply Voltage Level	-0.3V	+3.6V
Analog Input Voltage Range	GND-0.3V	VDD+0.3V
Digital Input Voltage Range	GND-0.3V	VDD+0.3V
Operating Temperature Range	-40°C	+85°C
Storage Temperature	-65°C	+150°C

RECOMMENDED OPERATING CONDITIONS

PARAMETER	MIN	TYP	MAX	UNIT
VDD	1.7	1.8/3.3	3.6	V

ADC ANALOG AND FILTER CHARACTERISTICS AND SPECIFICATIONS

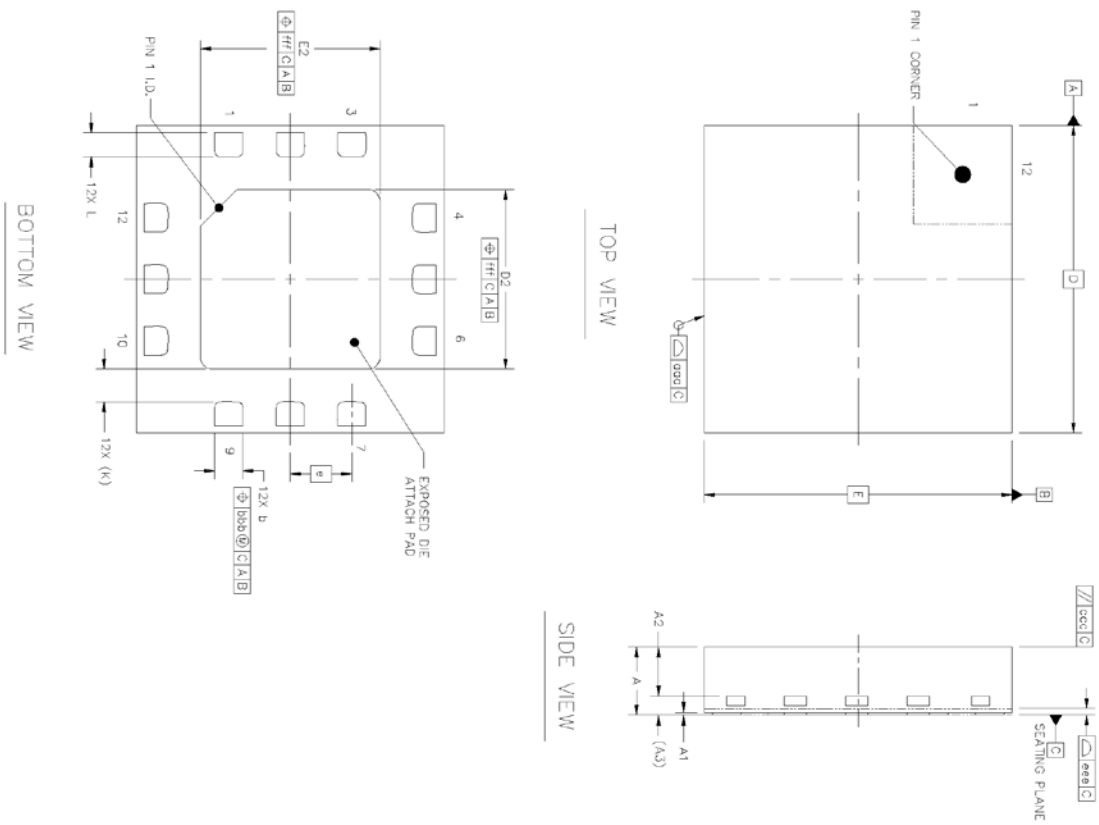
Test conditions are as the following unless otherwise specify: VDD=3.3V, GND=0V, ambient temperature=25°C, CLOCK=6.144 MHz.

PARAMETER	MIN	TYP	MAX	UNIT
ADC Performance				
ES7201 Signal to Noise ratio (A-weigh, 23 dB PGA)	83	88	91	dB
ES7202 Signal to Noise ratio (A-weigh, 0 dB PGA)	95	100	103	dB
ES7201 THD+N (23 dB PGA)	-83	-80	-75	dB
ES7202 THD+N (0 dB PGA)	-88	-85	-80	dB
Channel Separation (1KHz)	95	100	105	dB
Interchannel Gain Mismatch		0.1		dB
Gain Error			±5	%
Analog Input				
ES7201 Full Scale Input Level		0.0708*VDD/3.3		Vrms
ES7202 Full Scale Input Level		1.0*VDD/3.3		Vrms
ES7201 Input Impedance ES7202 Input Impedance		9.6 (23 dB PGA) 19.2 (0 dB PGA)		KΩ

DC CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT
Normal Operation Mode				
VDD=3.3V (16 kHz) VDD=1.8V (16 kHz)		22 4.6		mW
Power Down Mode		0		uA
Digital Voltage Level				
Input High-level Voltage	0.7*VDD			V
Input Low-level Voltage			0.5	V
Output High-level Voltage		VDD		V
Output Low-level Voltage		0		V

4. PACKAGE (ES7201)



	SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS	A	0.5	0.55	0.6
STAND OFF	A1	0	0.02	0.05
MOLD THICKNESS	A2	---	0.4	---
L/F THICKNESS	A3		0.152 REF	
LEAD WIDTH	b	0.18	0.23	0.28
BODY SIZE	X		2.5 BSC	
	Y		2.5 BSC	
LEAD PITCH	e		0.5 BSC	
EP SIZE	X	1.36	1.46	1.56
	Y	1.36	1.46	1.56
LEAD LENGTH	L	0.1425	0.1925	0.2425
LEAD TIP TO EXPOSED PAD EDGE	K		0.265 REF	
PACKAGE EDGE TOLERANCE	aaa		0.1	
MOLD FLATNESS	ccc		0.1	
COPLANARITY	eee		0.05	
LEAD OFFSET	bbb		0.1	
EXPOSED PAD OFFSET	fff		0.1	

NOTES
1.REFER TO JEDEC MO-220;
2.COPLANARITY APPLIES TO LEADS, CORNER LE

5. CORPORATE INFORMATION

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