

## High Performance PDM Stereo Audio ADC

### FEATURES

- High performance advanced delta-sigma audio ADC
- 90 dB dynamic range at 26 dB PGA
- -85 dB THD+N
- Low noise PGA
- 8 to 96 kHz sampling frequency
- Low power

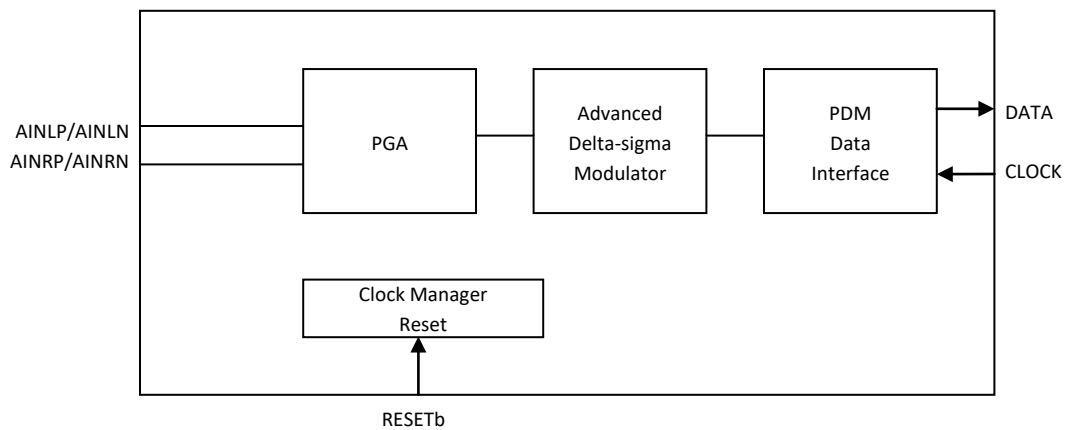
### APPLICATIONS

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

### ORDERING INFORMATION

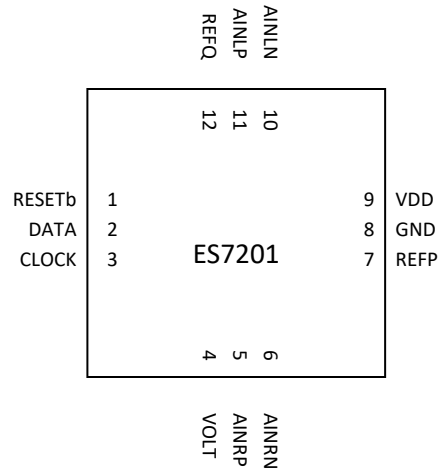
ES7201 -40°C ~ +85°C  
QFN-12

### BLOCK DIAGRAM



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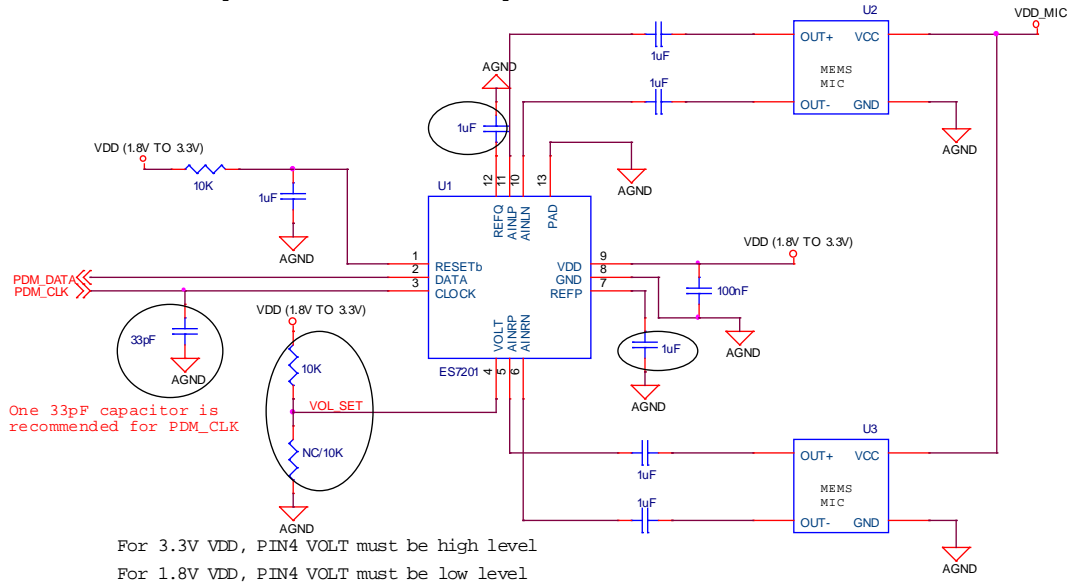
## 1. PIN OUT AND DESCRIPTION



Pin Name	Pin number	Input or Output	Pin Description
DATA, CLOCK	2, 3	O, I	PDM clock and data
RESETb	1	I	Active low reset
VOLT	4	I	High: VDD = 3.3V Low: VDD = 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

## 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.



## 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
<b>ADC Performance</b>				
Dynamic Range (A-weight, 26 dB PGA)	87	90	93	dB
THD+N (26 dB PGA)	-88	-85	-82	dB
Channel Separation (1KHz)	97	100	103	dB
Interchannel Gain Mismatch		0.1		dB
Gain Error			±5	%
<b>Analog Input</b>				
Full Scale Input Level		±0.0708*VDD/3.3		Vrms
Input Impedance		9.6 (23 dB PGA)		KΩ

**DC CHARACTERISTICS**

PARAMETER	MIN	TYP	MAX	UNIT
<b>Normal Operation Mode</b>				
VDD=3.3V (16 kHz)		22		mW
VDD=1.8V (16 kHz)		4.6		
Power Down Mode		0		uA
<b>Digital Voltage Level</b>				
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

**PDM DATA SWITCHING SPECIFICATIONS**

PARAMETER		Symbol	MIN	MAX	UNIT
CLOCK frequency			0.512	6.144	MHz
CLOCK duty cycle	≤ 3.072 MHz		40	60	%
			45	55	%
DATA valid	VDDD=3.3V VDDD=1.8V	T <sub>VALID</sub>	11 19	27 61	ns
DATA hold	VDDD=3.3V VDDD=1.8V	T <sub>HOLD</sub>	10 18	26 56	ns

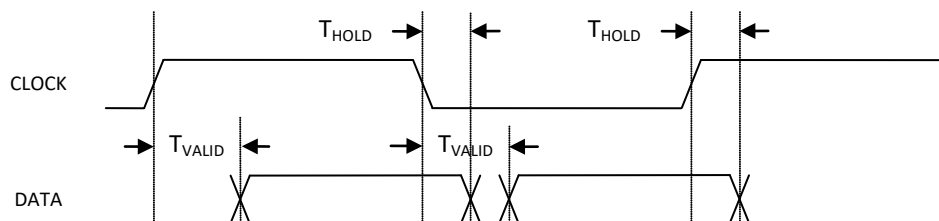
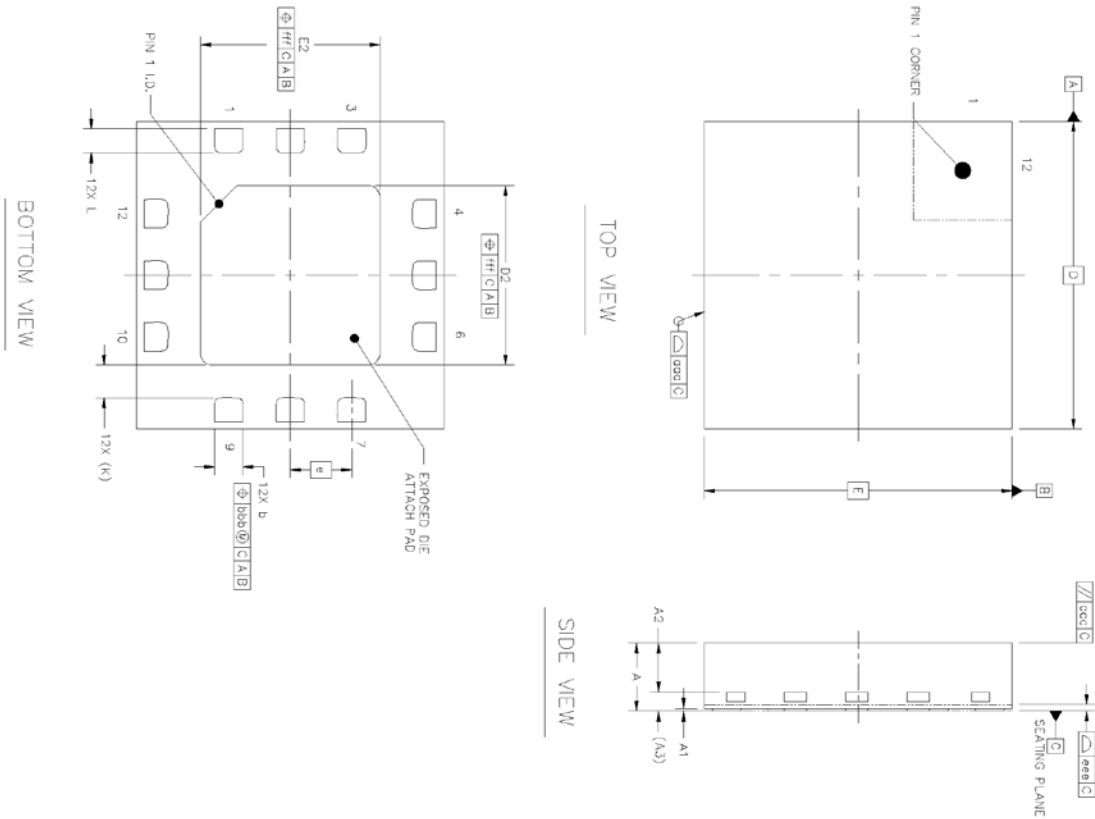


Figure 1 PDM Data Timing

### 4. PACKAGE (UNIT: MM)



	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		0.28
LEAD WIDTH	b	0.18	0.23	0.28
BODY SIZE	X	2.5 BSC		0.28
	Y	2.5 BSC		
LEAD PITCH	X	0.5 BSC		1.56
	Y	0.5 BSC		
EP SIZE	X	1.36	1.46	1.56
	E2	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		0.28
PACKAGE EDGE TOLERANCE	ccc	0.1		
MOLD FLATNESS	eee	0.1		
COP PLANARITY	fff	0.05		
LEAD OFFSET	bbb	0.1		
EXPOSED PAD OFFSET	fff	0.1		

NOTES  
 1:REFER TO JEDEC MO-220;  
 2:COP PLANARITY APPLIES TO LEADS, CORNER LE

## 5. CORPORATE INFORMATION

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