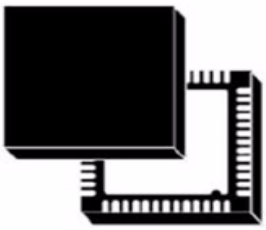
STA321MP

Four-channel digital audio system with FFX™ driver

Data brief

Features

- High efficiency FFX™ class-D modulator
- 100 dB dynamic range
- Two stereo channels with I²S input/output data interface
- 16-bit stereo ADC input with PGA and microphone biasing
- PDM input interface for MEMS microphones connection
- Analog and digital muxing/mixing capability
- Eight-channel input sample rate converter (8 kHz to 192 kHz)
- Four channels of 24-bit audio processing
- Flexible channel mapping and routing
- Output configurations:
  - 2.0
  - 2.1
  - 4.0
  - Mono
- Advanced Four-channel programmable audio processor including:
  - Embedded CMOS bridge, up to 0.5 W/channel
  - pfStart for pop-free single-ended operations
  - Dynamic range compressor
  - Play and record simultaneous operation
  - Pre and post mix stages
  - Individual channel and master gain/attenuation
  - Digital gain/attenuation -105 dB to +36 dB in 0.5 dB steps
  - Soft volume update and muting
  - DC-blocking selectable high-pass filter
  - Selectable de-emphasis filter
  - Up to 13 28-bit user programmable biquads (EQ) per channel



QFN 56
(8x8 mm)

  - Advanced noise-shaping technologies enabling low frequencies optimized processing
  - Bass/treble tone control
- Ternary, binary or phase shift modulation
- PWM output
- Headphone output with jack detector
- I²C control

Description

The STA321MP is a single chip solution for digital audio processing applications of up to 4.0 channels, and provides a seamless connection with MEMS and the most common sensors. The STA321MP is optimized for the latest tablet PC and portable applications.

The STA321MP is part of the Sound Terminal™ family that provides full digital audio streaming to the speaker, offering cost effectiveness, low energy dissipation and sound enrichment.

1 Overview

The STA321MP input section consists of two multiplexed stereo analog inputs; a 16-bit ADC, two independent digital input interfaces, and a PDM interface for MEMS microphone connection. The serial audio data input interface accepts all possible formats, including the popular I²S format. There is also a digital output interface fed by the ADC or by the digitally processed signals.

The device has a full assortment of digital processing features. This includes sample rate conversion, pre and post mixing, dynamic range compression, up to 13 programmable 28-bit biquads (EQ) per channel, bass/treble tone control, and DRC. The embedded headphone detector indicates when the headphone jack is inserted. The 13 programmable biquads embed the most advanced noise shaping technologies for optimized low frequencies processing and quantization noise removal.

The STA321MP provides four independent channels of FFX™ output capability. In conjunction with a power device, it provides high-quality, high-efficiency, all digital amplification.

The embedded CMOS bridge supplies up to 0.5 W into an 8 Ω load and 70 mW into a 16 Ω load for the headphones output.

2 Package mechanical data

The STA321MP comes in a 56-pin, 8 mm × 8mm, VFQFPN2 package.

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

Figure 1. VFQFPN2 56 outline drawing

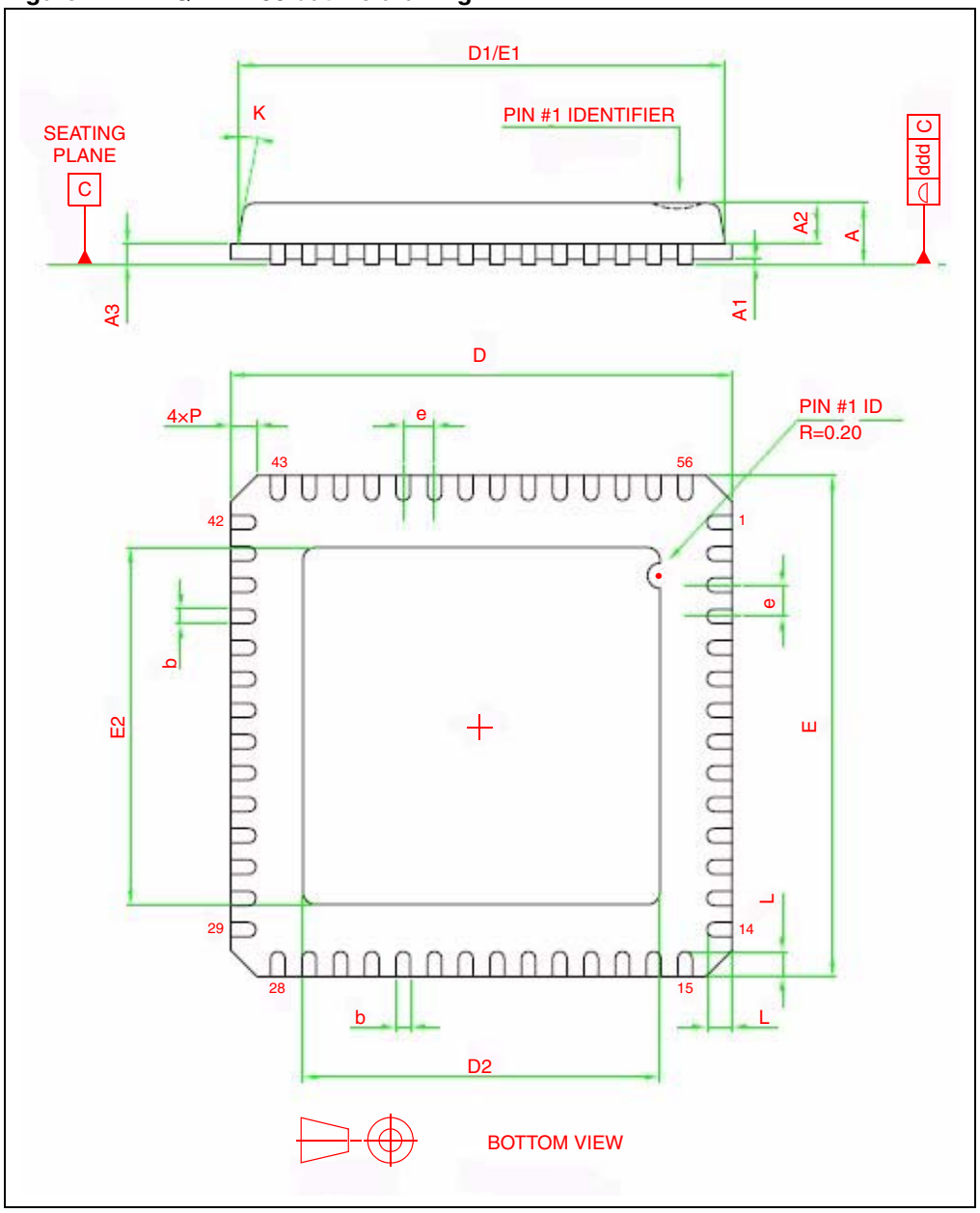


Table 1. VFQFPN2 56 dimension

REF	MIN	TYP	MAX	NOTES
A	0.80	0.90	1.00	
A1		0.02	0.05	
A2		0.65	1.00	
A3		0.20		
b	0.18	0.25	0.30	
D	7.85	8.00	8.15	
D1		7.75		
D2	SEE EXPOSED PAD VARIATION			
E	7.85	8.00	8.15	
E1		7.75		
E2	SEE EXPOSED PAD VARIATION			
e		0.50		
L	0.30	0.40	0.50	
P			0.60	
K			12	DEGREES
ddd			0.08	

Table 2. VFQFPN2 56 exposed pad variation

	D2			E2			
VARIATION	MIN	TYP	MAX	MIN	TYP	MAX	NOTES
A	4.15	4.30	4.45	4.15	4.30	4.45	
B	5.75	5.90	6.05	5.75	5.90	6.05	
C	6.15	6.30	6.40	6.15	6.30	6.40	

3 Revision history

Table 3. Document revision history

Date	Revision	Changes
4-Jan-2011	1	Initial release.

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