AsahiKASEI
MICRODEVICES

= Product Brief =

AK5707

Low-Power 1-ch ADC with AAA and Audio Buffer

1. General Description

The AK5707 is a low power 16-bit monaural ADC featuring the Acoustic Activity Analyzer (AAA), which may be configured by the user to detect specific types of acoustic events. The AK5707 can extend the battery life of connected products by allowing the system SoC to sleep until user-defined qualified audio activity occurs. The AK5707 consumes only 34 µA while the AAA listens for the target sound to occur. Once qualifying audio activity has been detected, the integrated audio buffer begins recording and a wakeup interrupt is sent to the system SoC. The SoC may then read the AK5707's audio buffer and further analyze the contents without having missed audio activity that occurred during boot. The AK5707's AAA feature is well-suited for battery-operated smart security devices that listen for sounds such as glass breaking, intercom ring tones, or specific alarm patterns. Additionally, the AK5707's ADC, which may be powered on and off independently of the AAA, consumes only 200 µA during operation; the efficiency of the ADC makes it equally well-suited for products such as voice-triggered wearable devices, which may require constant audio data capture to the integrated buffer.

2. Features

1. **Acoustic Activity Analyzer (AAA)**
   - **Power Supply Current**
        High Accuracy Mode (All filters on): 34 µA
        External Trigger Mode: 8 µA
   - **Two Interrupt Outputs**
2. **Built-in Audio Buffer: 32 kB for up to 1 sec of recording**
3. **Audio Capture**
   - **1-Channel Low-Power 16-bit ADC**
        S/N, DR: 96 dB
   - **Single-ended Inputs or Full-differential Inputs**
   - **MIC Amplifier Gain: +24 dB to 0 dB, 3 dB step**
   - **Selectable Digital Filter (Low-latency Sharp Roll-off or Voice)**
   - **1-output MEMS Microphone Power Supply**
        AVDD (1.8 V) / Internal LDO (1.22 V) Selectable
4. **External Trigger Input for AAA / ADC Power-up**
5. **Digital Audio Interface**
   - **Slave Mode**
   - **Sampling Frequency**
        8 kHz to 48 kHz
   - **Interface Format**
        16-bit I²S / MSB justified (Serial audio interface)
        PDM (Digital mic interface [64fs / 32fs / 48fs / 24fs], Direct interface [64fs])
        16-bit I²C-bus / SPI (Audio buffer access)
6. **Built-in PLL**
7. **Power-on Reset Circuit**
8. **Control I/F: I²C-bus (400 kHz) / SPI (13 MHz)**
9. **Operation Temperature Range: Ta = −40 to 85 °C**
10. **Power Supply:**
    - **AVDD (ADC, MIC, PLL, LDO): 1.7 to 1.9 V**
    - **TVDD (Host & Audio I/F):   1.65 to 3.6 V**
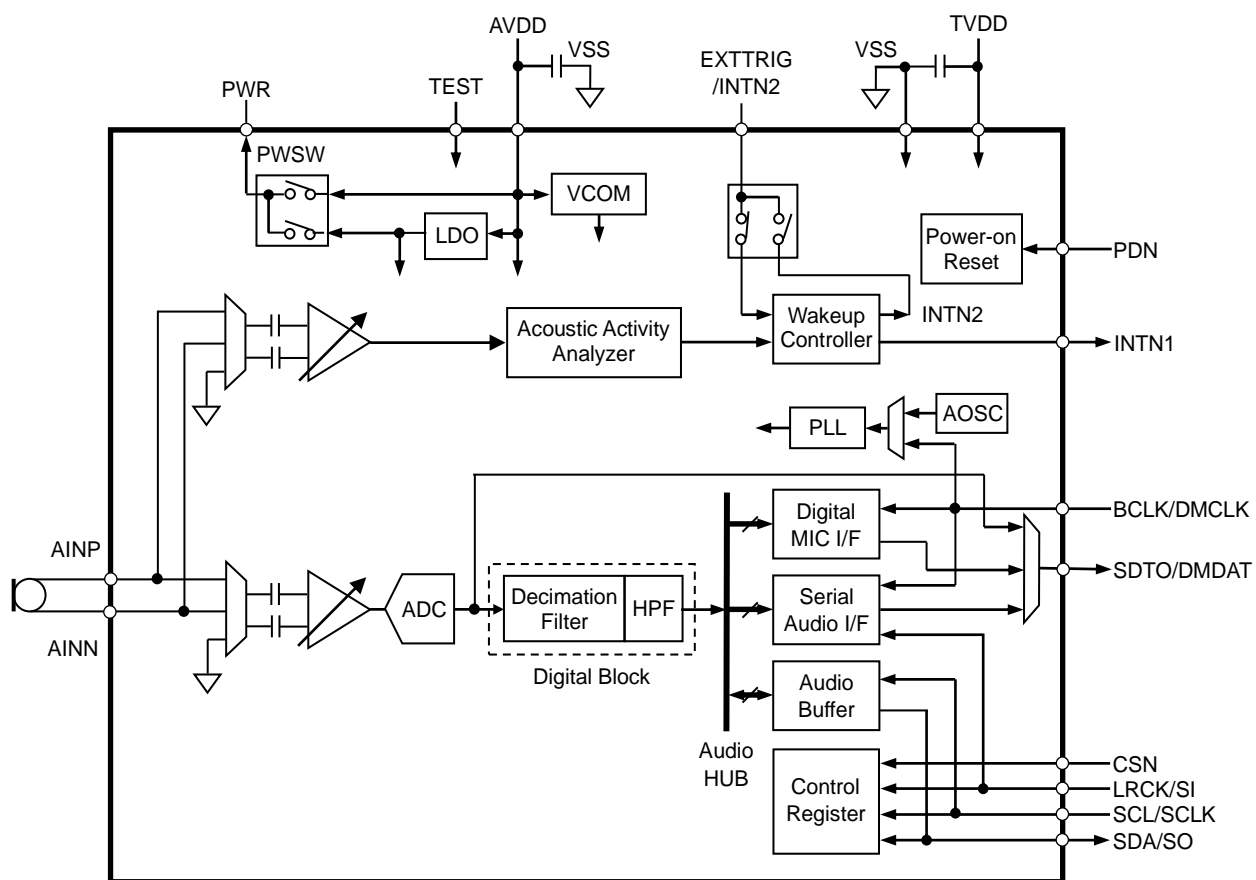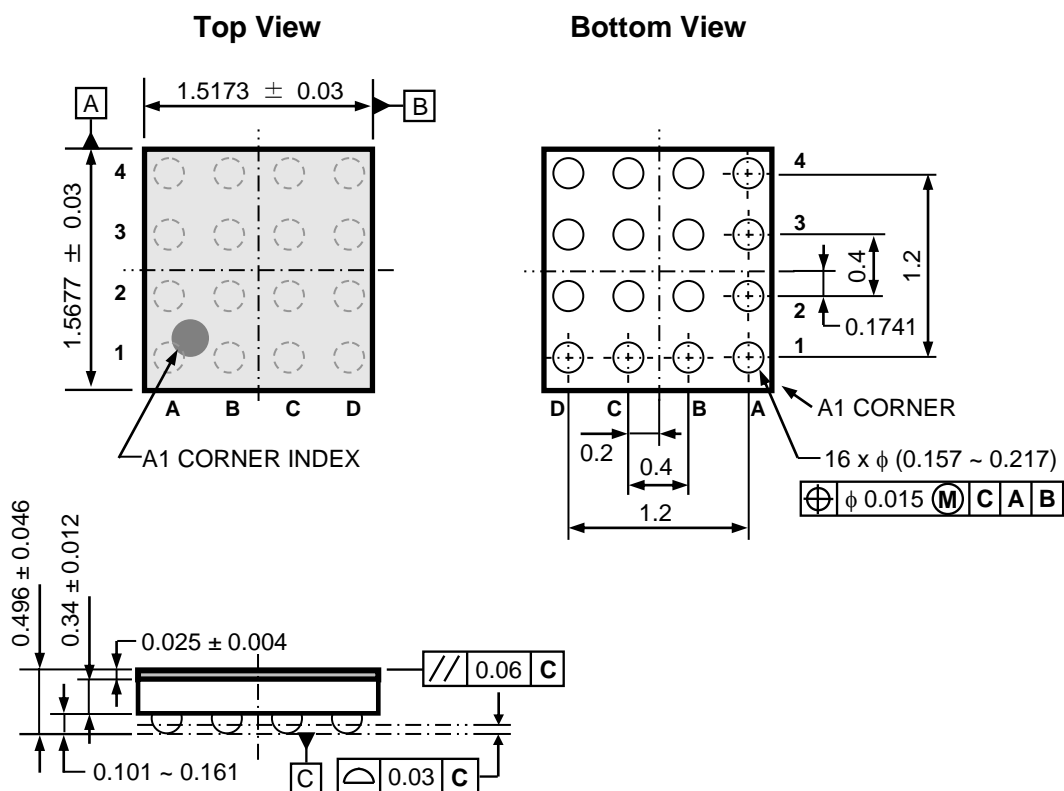11. **Package: 16-pin CSP (1.5173 × 1.5677 mm, 0.4mm pitch)**

E-00

ASAHI KASEI MICRODEVICES CORPORATION

3. Block Diagram

Figure 1. AK5707 Block Diagram

ASAHI KASEI MICRODEVICES CORPORATION

4. Package

11.1. Outline Dimensions

16-pin CSP (1.5173 x 1.5677 mm, 0.4mm pitch)

Top View

Bottom View

A1 CORNER INDEX

1.5173 ± 0.03

1.5677 ± 0.03

A1 CORNER

16 x φ (0.157 ~ 0.217)

0.4

1.2

0.1741

0.2

0.4

1.2

φ 0.015 (M) C A B

0.496 ± 0.046

0.34 ± 0.012

0.025 ± 0.004

// 0.06 C

0.101 ~ 0.161

C

0.03 C

11.2. Material & Lead finish

Package molding compound: Epoxy, Halogen free
Solder ball material: SnAgCu

11.3. Marking

5707

XXXX

1
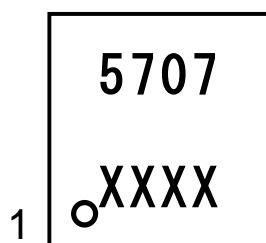
A

XXXX: Date code (4 digits)
Pin #A1 indication

E-00

ASAHI KASEI MICRODEVICES CORPORATION

IMPORTANT NOTICE

E-00

ASAHI KASEI MICRODEVICES CORPORATION