

1. General Description

The AK4333 is an advanced 32-bit Hi-Fi stereo audio DAC with a built-in ground-referenced headphone amplifier. The headphone amplifier has impedance detection. The AK4333 has four types of 32-bit digital filters for superior sound quality, achieving low distortion characteristics and a wide dynamic range. The AK4333 is available in a 24-pin CSP package, utilizing less board space than competitive offerings.

2. Features

1. **High Sound Quality Low Power Advanced 32-bit Stereo DAC**
 - 4 types of Digital Filter for Sound Color Selection
 - Short Delay Sharp Roll-off, GD = 5.5 / fs
 - Short Delay Slow Roll-off, GD = 4.5 / fs
 - Sharp Roll-off
 - Slow Roll-off
2. **Ground-referenced Class-AB Stereo Headphone Amplifier**
 - Output Power: 60 mW @ 8Ω
 - THD+N: -100 dB
 - S/N: 109 dB
 - Output Noise Level: -114 dBV (Analog Volume = -10 dB)
 - Analog Volume: +4 to -10 dB, 2 dB Step
 - Ground Loop Noise Cancellation
 - Impedance Detection
3. **Low Power Consumption: 6.4 mW (fs = 48 kHz, External Slave Mode)**
6.9 mW (fs = 48 kHz, PLL Slave Mode)
4. **Headphone-Amp Output pins comply with IEC61000-4-2 Level4 ESD protection**
±8 kV Contact Discharge
5. **Digital Audio interface**
 - Master / Slave Mode
 - Sampling Frequency (Slave Mode / Master Mode):
8 k, 11.025 k, 12 k, 16 k, 22.05 k, 24 k, 32 k, 44.1 k, 48 k, 64 k, 88.2 k, 96 k, 128 k,
176.4 k, 192 kHz
 - Interface Format: 32/24/16-bit I²S/MSB justified
6. **Power Management**
7. **PLL**
8. **μP Interface: I²C-bus (400 kHz)**
9. **Parallel Mode Control**
10. **Operation Temperature Range: Ta = -40 to 85 °C**
11. **Power Supply:**
 - AVDD (DAC, PLL): 1.7 to 1.9 V
 - CTVDD (Headphone Amplifier, Charge Pump, Digital Interface): 1.7 to 1.9 V
 - VDD12 (Digital Core): 1.14 to 1.26 V
12. **Registers Backward Compatible with the AK4331**
13. **Package: 24-pin CSP (2.443 × 1.759 mm, 0.4 mm pitch)**

3. Block Diagram

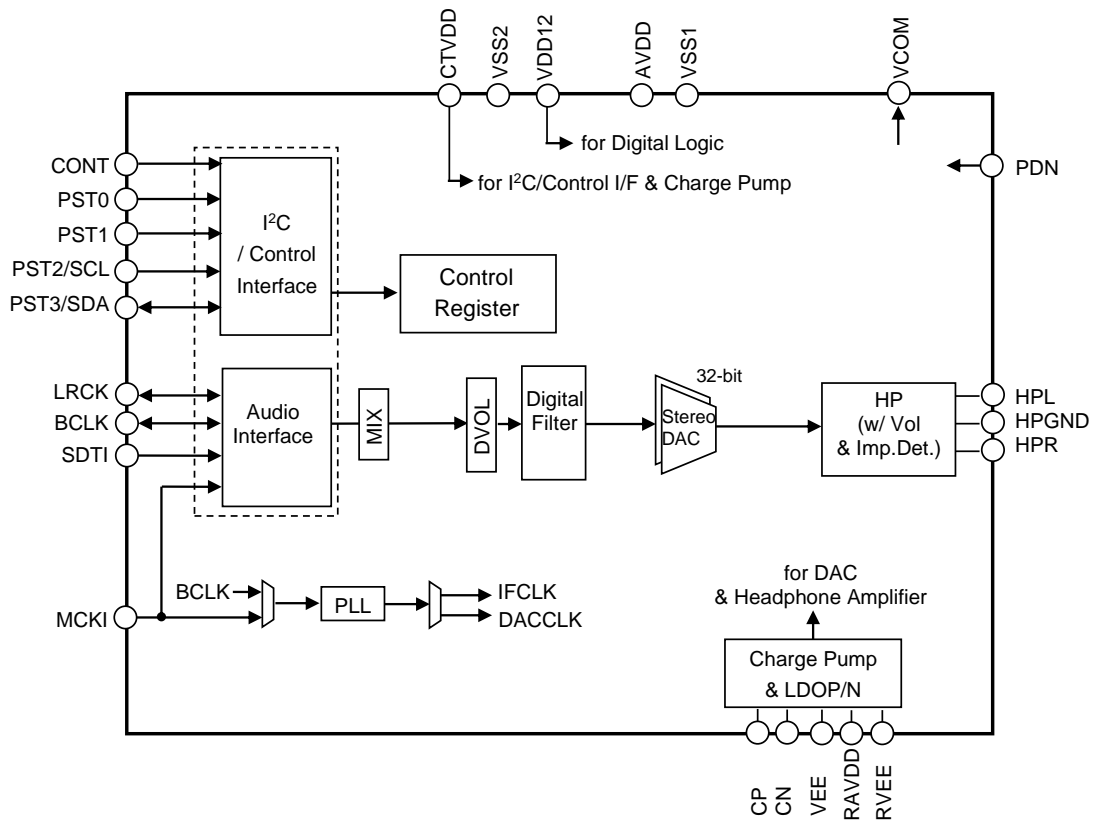
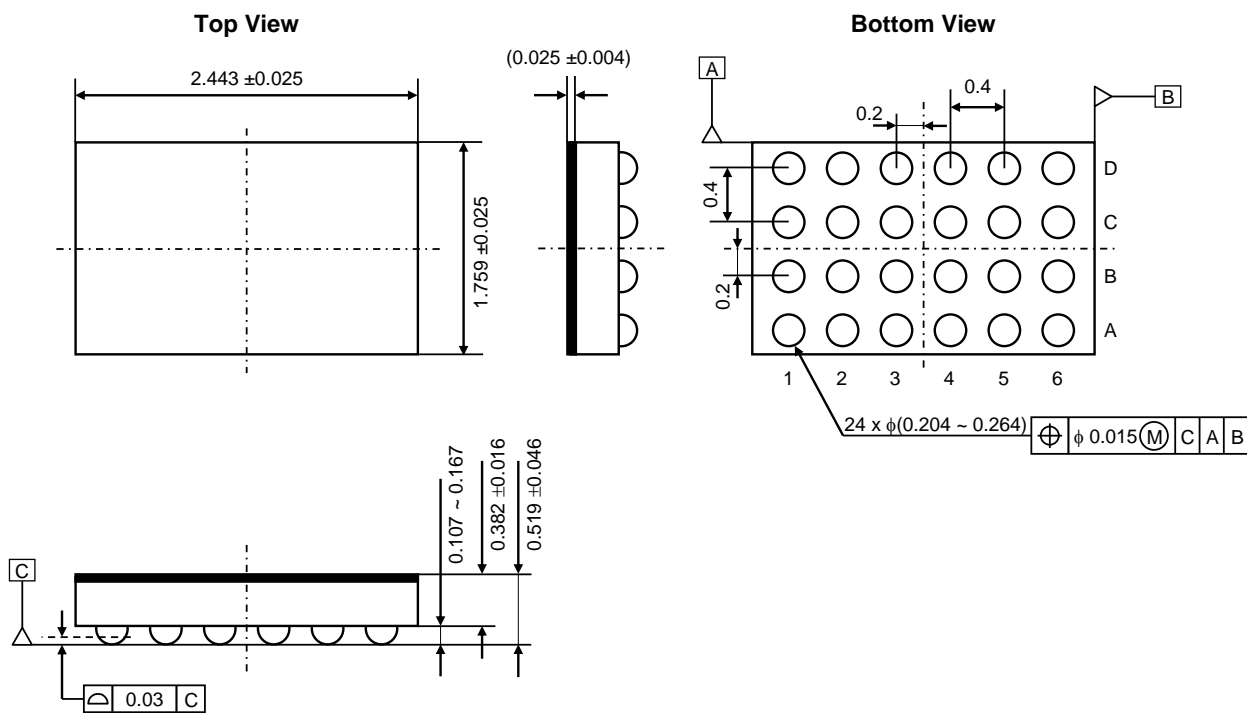


Figure 1. AK4333 Block Diagram

4. Package

4-1. Outline Dimensions

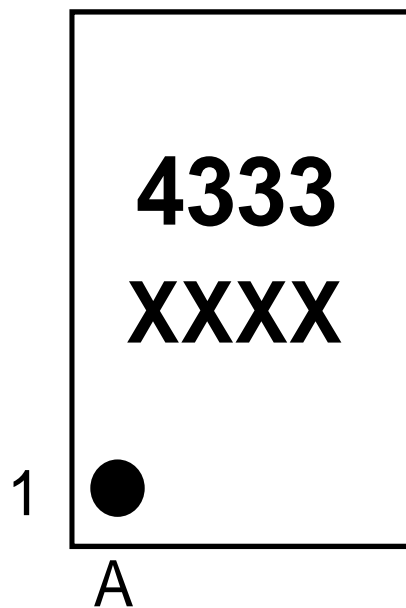
24-pin CSP Package (2.443 × 1.759 mm, 0.4mm pitch)



4-2. Material and Lead Finish

Package molding compound: Epoxy Resin, Halogen Free
 Solder ball material: SnAgCu

4-3. Marking



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

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