

AN7109S

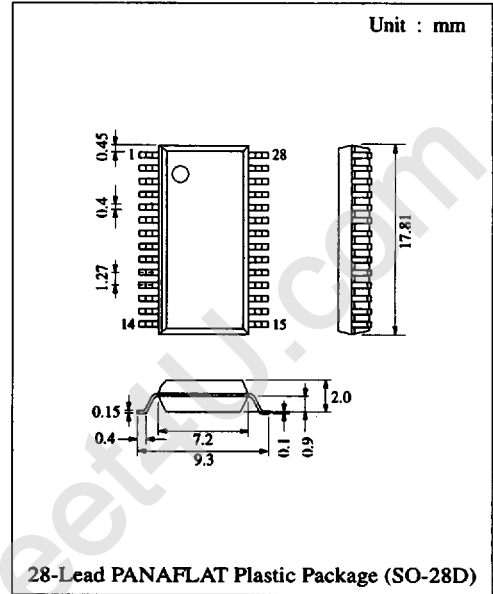
2-channel Recording / Playback Pre / Power Amplifier IC for Headphone Stereo

■ Description

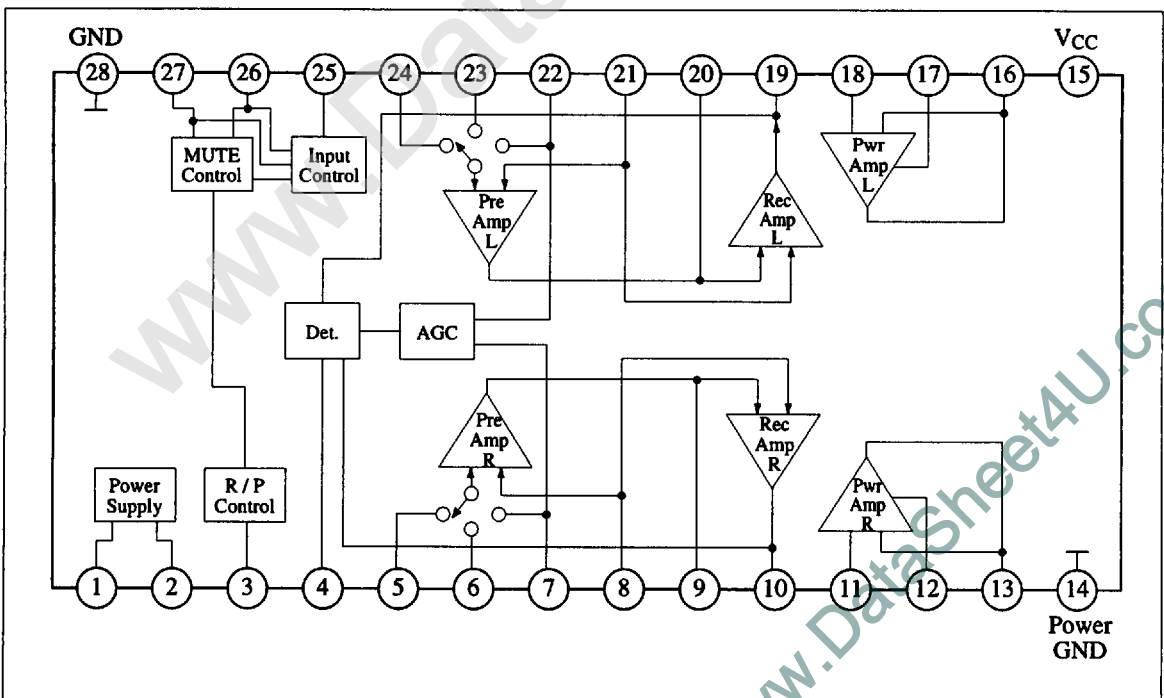
The AN7109S is a monolithic integrated circuit designed for recording playback pre / power amplifier so far constituted by 3 ICs. This IC allows low-end and process simplification of switching, etc.

■ Features

- Available for head fixed type auto reverse deck
- AGC circuit built-in
- Amp. switching built-in
- Rec. /playback power amplifier 2 channel built-in
- Radio input pin
- Vcc range : $V_{CC} = 1.8V \sim 4.5V$



■ Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

| Item | Symbol | Rating | Unit |
|-------------------------------|-----------------|------------|------|
| Supply Voltage | V _{CC} | 6 | V |
| Supply Current | I _{CC} | 200 | mA |
| Power Dissipation | P _D | 562 | mW |
| Operating Ambient Temperature | Topr | -20 ~ +75 | °C |
| Storage Temperature | Tstg | -55 ~ +125 | °C |

Operating Supply Voltage Range: V_{CC} = 1.8V ~ 4.5V

■ Electrical Characteristics (V_{CC}=3V, f=1kHz, Ta=25°C)

| Item | Symbol | Condition | min. | typ. | max. | Unit |
|---------------------------|-----------------|---|------|------|------|------|
| Quiescent Circuit Current | I _{CQ} | V _{in} = 0mV, H ₁ Input, Play | 6 | 15 | 25 | mA |

Pre-Amp.

| | | | | | | |
|---|------------------|---|-----|------|----|----|
| H ₁ , H ₂ Closed Circuit Gain | G _{V1} | V _{in} = -60dBV, R _L = 10kΩ | 29 | 31 | 33 | dB |
| Tu Closed Circuit Gain | G _{V2} | V _{in} = 2mV, R _L = 10kΩ | 18 | 20 | 22 | dB |
| Output Voltage | V _{OP} | THD = 3%, R _L = 10kΩ, H ₁ Input | 300 | 430 | | mV |
| H ₁ , H ₂ Noise Input Voltage | V _{ni} | R _g = 2.2kΩ, DIN/AUDIO, H ₁ Input | | 1 | 2 | μV |
| Total Harmonic Distortion | THD ₁ | H ₁ Input V _O = -20dBV, R _L = 10kΩ | | 0.04 | 1 | % |

Recording Amp.

| | | | | | | |
|----------------------------|--------------------|--|------|------|------|-----|
| Closed Circuit Gain | G _{VR} | Tu Input V _{in} = 3.5mV, R _L = 10kΩ | 45.5 | 49 | 52.5 | dB |
| Total Harmonics Distortion | THD _(R) | Tu Input V _{in} = 3.5mV, R _L = 10kΩ | | 0.2 | 1 | % |
| Output Voltage | V _{O(R)} | Tu Input THD = 3%, R _L = 10kΩ | 0.8 | 1.05 | | V |
| Output Noise Voltage | V _{n(R)} | Tu Input R _g = 0Ω, DIN/AUDIO, R _L = 10kΩ | | -69 | -60 | dBV |

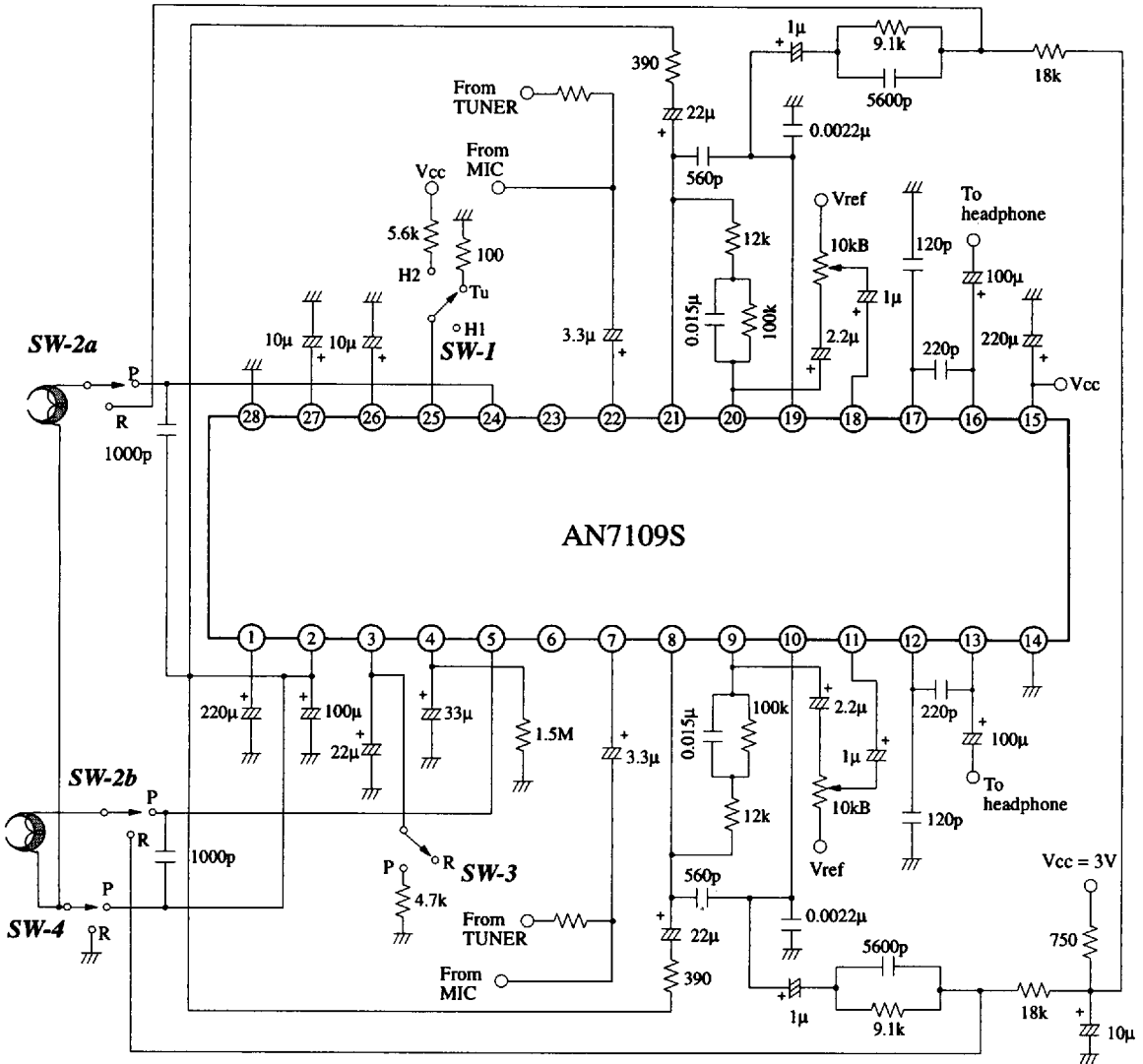
Power Amp.

| | | | | | | |
|----------------------------|---------------------|--|------|-----|-----|-----|
| Closed Circuit Gain | G _{V(PO)} | V _O = -15dBV, R _L = 32Ω | 33 | 35 | 37 | dB |
| Total Harmonics Distortion | THD _(PO) | V _O = 0.2V, R _L = 32Ω | | 0.2 | 1 | % |
| Output Voltage | V _{O(PO)} | THD = 10%, R _L = 32Ω | 0.75 | 1 | | V |
| Output Noise Voltage | V _{n(PO)} | R _g = 0Ω, R _L = 32Ω, DIN/AUDIO | | -80 | -70 | dBV |

AGC

| | | | | | | |
|-------------------|----------------|---------------------------|------|------|------|----|
| Effective Voltage | V _S | Tu Input = 13mV | 0.43 | 0.57 | 0.76 | V |
| Effective Width | W | Effective time ~ THD = 3% | 35 | 40 | | dB |

■ Application Circuit



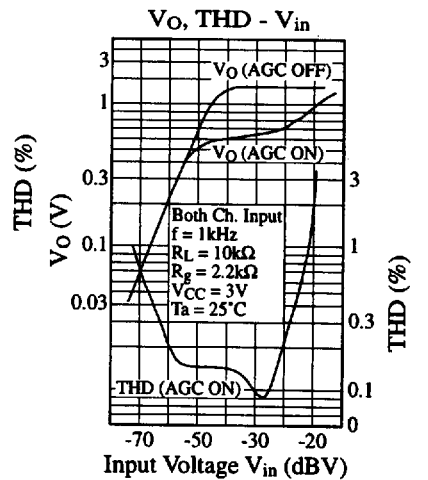
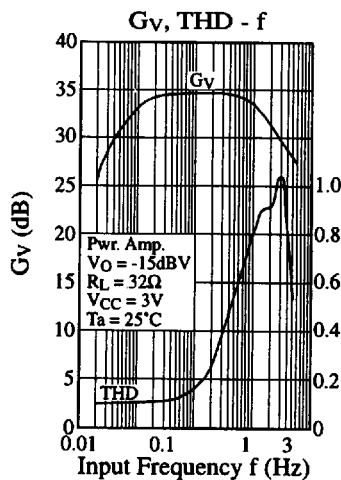
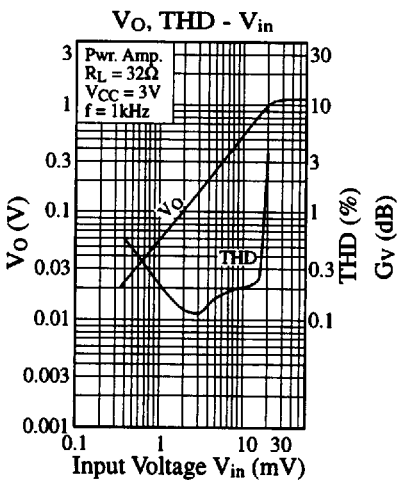
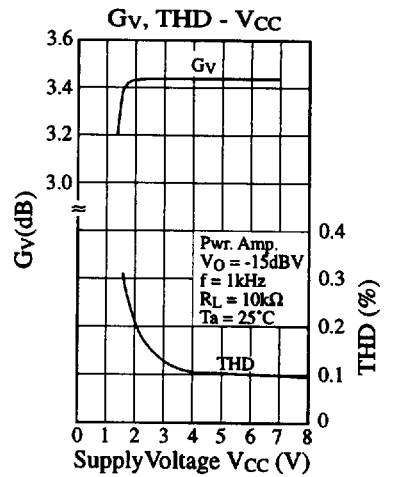
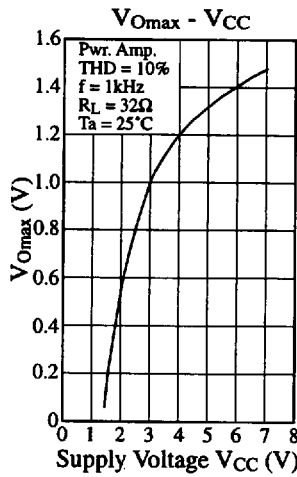
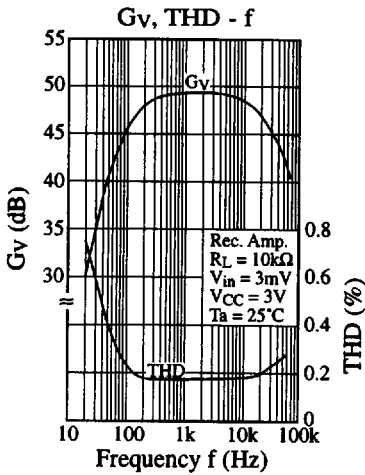
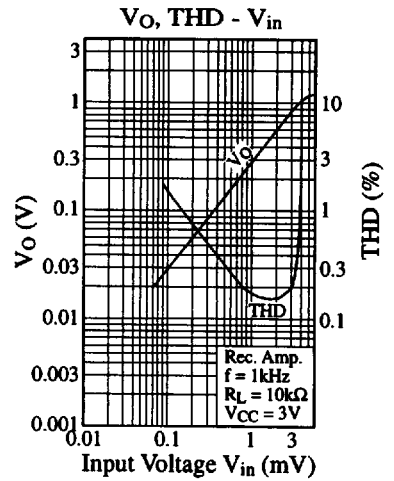
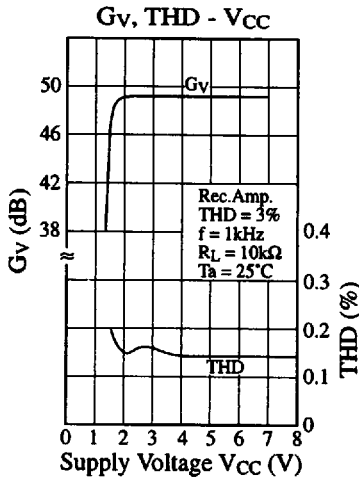
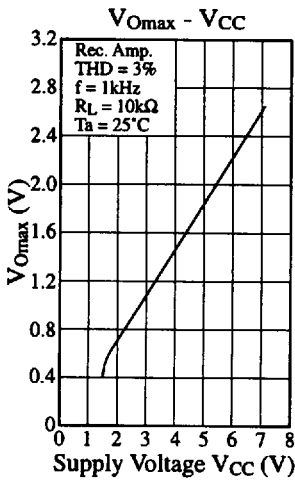
■ Pin Descriptions

| Pin No. | Pin Name | Equivalent Circuit | Description |
|---------|---------------------------|--------------------|---|
| 1 | Filter | | DC = 2.6V |
| 2 | V _{REF} | | DC = 1.5V |
| 3 | Rec. / PB Control | | DC = 2.1V Rec. / PB switching. OPEN at 2.1V in Rec. mode. GND at 4.7kΩ 0.1V in PB mode |
| 4 | AGC | | DC = 0.9V AGC filter connection pin. Connect the RC filter between the GND. The attack time is determined by the internal 2kΩ resistor and the externally connected C, and the recovery time is determined by the externally connected RC. |
| 5 | R-ch H ₁ Input | | DC = 1.5V H ₁ input pin. |
| 24 | L-ch H ₁ Input | | DC = 1.5V PB (H ₁ , H ₂), REC NF input pin. |
| 8 | R-ch PB / Rec. NF Input | | |
| 21 | L-ch PB / Rec. NF Input | | |
| 6 | R-ch H ₂ Input | | DC = 1.5V H ₂ input pin. |
| 23 | L-ch H ₂ Input | | |
| 7 | R-ch Tu Input | | DC = 1.5V Tu input pin. This pin also serves as the Mic. input pin. Connection of an external Mic. Amp. is required as the gain is insufficient in case of direct input of the Mic. signal. The gain of the Tu Amp. is 20dB. |
| 22 | L-ch Tu Input | | |
| 9 | R-ch Pre-Out | | DC = 1.5V Pre-amplifier output pin. All the H ₁ input, H ₂ input and Tu input are output from this pin. |
| 20 | L-ch Pre-Out | | |
| 15 | Power Supply | | DC = 3V |

Pin Descriptions (Continue)

| Pin No. | Pin Name | Equivalent Circuit | Description |
|---------|------------------|--------------------|--|
| 10 | R-ch Rec. Out | | DC = 1.5V Rec. amp. output pin. The Rec. amp. input is directly connected inside, and the gain is determined by the 12k Ω internal feedback resistance and the 390 Ω resistor of Pin 8. (29dB) The resistor of Pin 8 is also purposed to determine the gain of the respective pre-amplifier of H1 and H2. So, when changing the gain, take this fact duly into account. |
| 19 | L-ch Rec. Out | | |
| 11 | R-ch Power Input | | DC = 1.5V Power amp. input pin. The gain (35dB) of the power amp. has been internally decided, and cannot be changed. Pin 12 and Pin 17 are phase compensation pins for prevention of the power amp. oscillation trouble. |
| 18 | L-ch Power Input | | |
| 12 | R-ch Phase Cont. | | |
| 17 | L-ch Phase Cont. | | |
| 13 | R-ch Power Out | | DC = 1.5V Power output pin. These pins are push-pull output pins, and a 3k Ω resistance is respectively connected as the internal load. The recommended load impedance value is 32 Ω . |
| 16 | L-ch Power Out | | |
| 14 | Power GND | | DC = 0V Ground this pin near the power source because electric currents flow through the ground of the power block. |
| 26 | τ_2 | | DC = 0.7V These pins are time constant setting pins for smooth switching of three pre-amplifier inputs. The two capacitors efficiently determine the time constants for switching control of the three input states. |
| 27 | τ_1 | | The charging current is a constant current of 10 μ A. The charging current mentioned above and the 20 μ A discharging current are simultaneously made to flow. |
| 25 | Input Control | | DC = 2V Input switching pin. H ₁ Open 2V H ₂ filter at 5.6k Ω 2.6V Tu GND at 100 Ω 0.1V |
| 28 | Pre-GND | | DC = 0V Pre-section ground. |

■ Characteristics Curve



■ Characteristics Curve (Continue)

