

# AN7109S

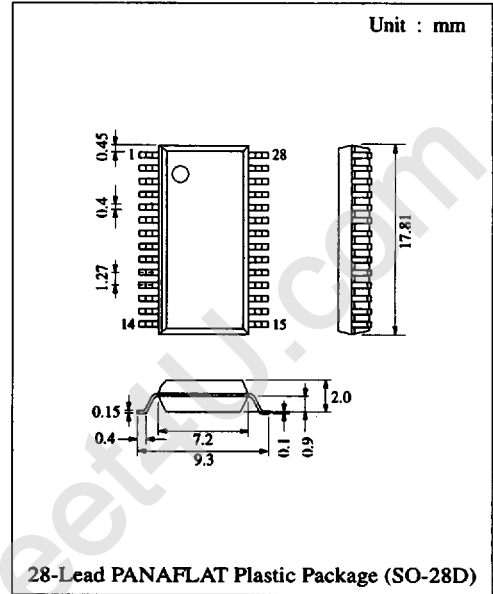
## 2-channel Recording / Playback Pre / Power Amplifier IC for Headphone Stereo

### ■ Description

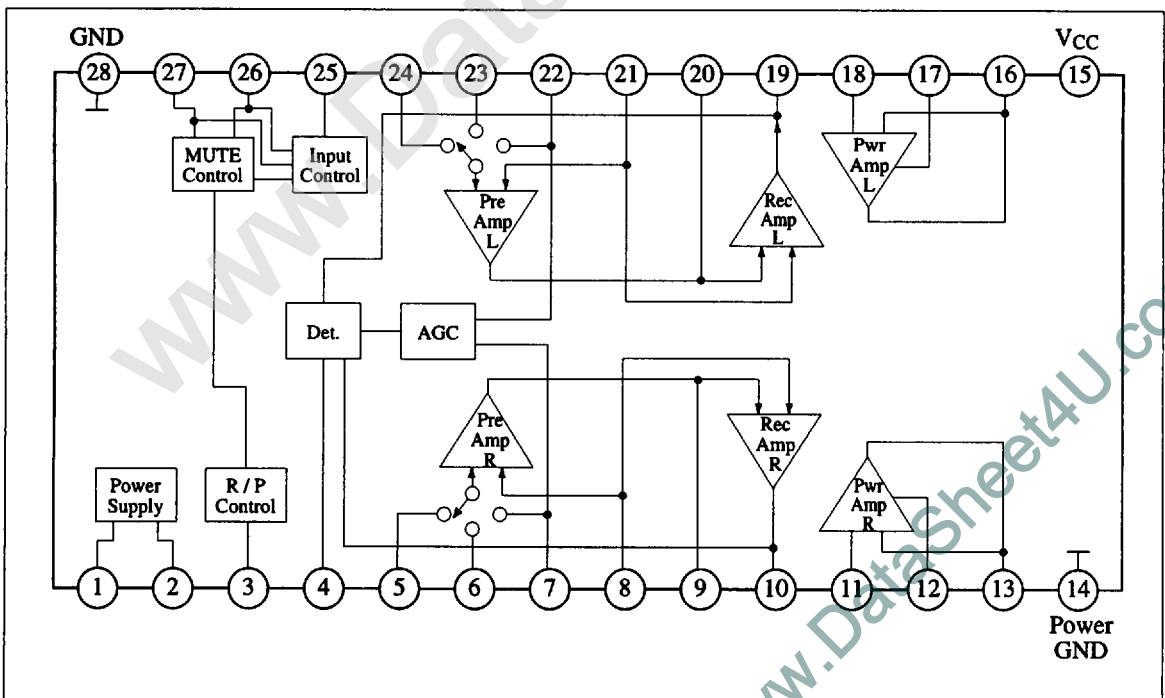
The AN7109S is a monolithic integrated circuit designed for recording playback pre / power amplifier so far constituted by 3 ICs. This IC allows low-end and process simplification of switching, etc.

### ■ 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 <sub>CC</sub>	6	V
Supply Current	I <sub>CC</sub>	200	mA
Power Dissipation	P <sub>D</sub>	562	mW
Operating Ambient Temperature	Topr	-20 ~ +75	°C
Storage Temperature	Tstg	-55 ~ +125	°C

Operating Supply Voltage Range: V<sub>CC</sub> = 1.8V ~ 4.5V

### ■ Electrical Characteristics (V<sub>CC</sub>=3V, f=1kHz, Ta=25°C)

Item	Symbol	Condition	min.	typ.	max.	Unit
Quiescent Circuit Current	I <sub>CQ</sub>	V <sub>in</sub> = 0mV, H <sub>1</sub> Input, Play	6	15	25	mA

#### Pre-Amp.

H <sub>1</sub> , H <sub>2</sub> Closed Circuit Gain	G <sub>V1</sub>	V <sub>in</sub> = -60dBV, R <sub>L</sub> = 10kΩ	29	31	33	dB
Tu Closed Circuit Gain	G <sub>V2</sub>	V <sub>in</sub> = 2mV, R <sub>L</sub> = 10kΩ	18	20	22	dB
Output Voltage	V <sub>OP</sub>	THD = 3%, R <sub>L</sub> = 10kΩ, H <sub>1</sub> Input	300	430		mV
H <sub>1</sub> , H <sub>2</sub> Noise Input Voltage	V <sub>ni</sub>	R <sub>g</sub> = 2.2kΩ, DIN/AUDIO, H <sub>1</sub> Input		1	2	μV
Total Harmonic Distortion	THD <sub>1</sub>	H <sub>1</sub> Input V <sub>O</sub> = -20dBV, R <sub>L</sub> = 10kΩ		0.04	1	%

#### Recording Amp.

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

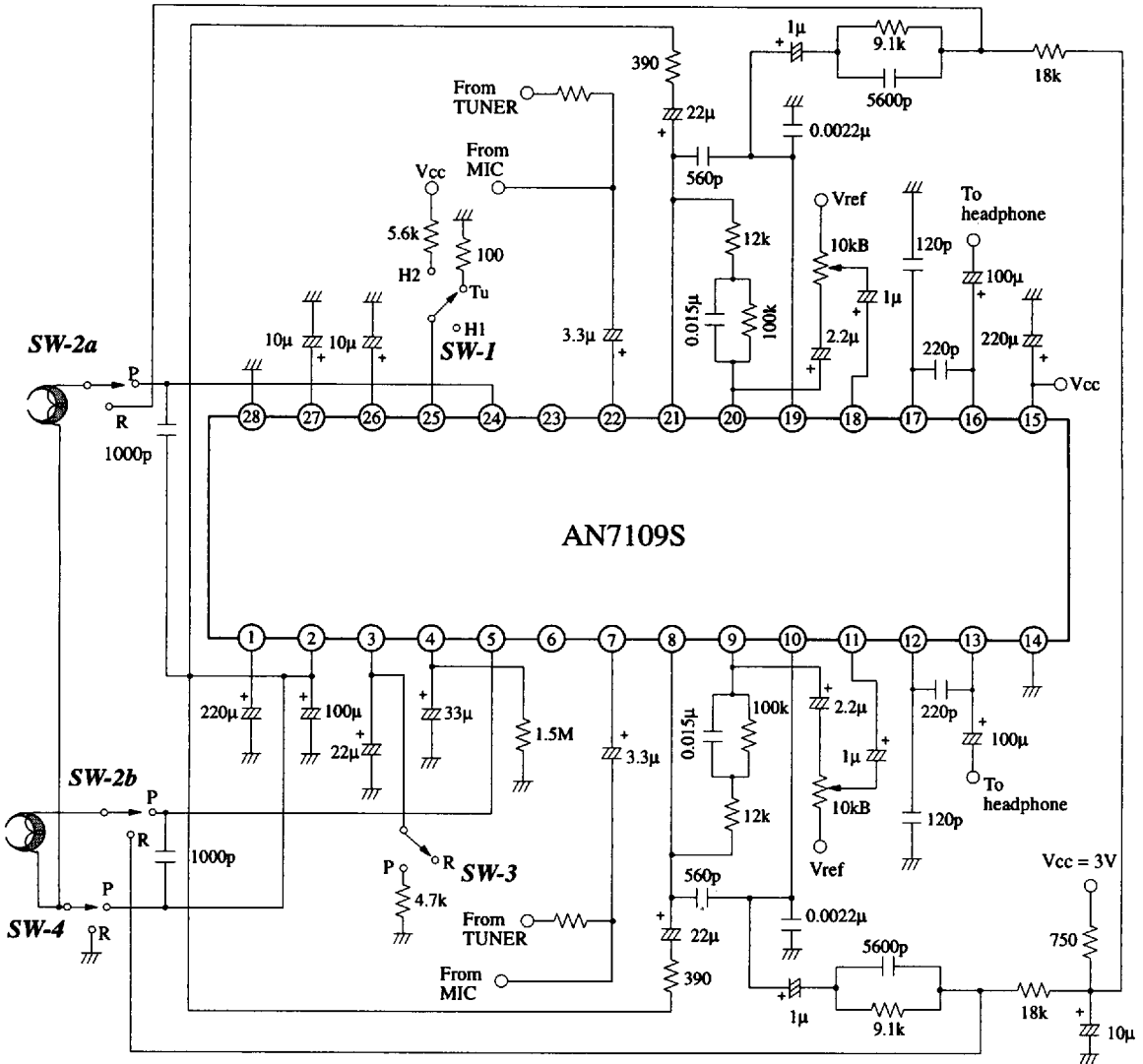
#### Power Amp.

Closed Circuit Gain	G <sub>V(PO)</sub>	V <sub>O</sub> = -15dBV, R <sub>L</sub> = 32Ω	33	35	37	dB
Total Harmonics Distortion	THD <sub>(PO)</sub>	V <sub>O</sub> = 0.2V, R <sub>L</sub> = 32Ω		0.2	1	%
Output Voltage	V <sub>O(PO)</sub>	THD = 10%, R <sub>L</sub> = 32Ω	0.75	1		V
Output Noise Voltage	V <sub>n(PO)</sub>	R <sub>g</sub> = 0Ω, R <sub>L</sub> = 32Ω, DIN/AUDIO		-80	-70	dBV

#### AGC

Effective Voltage	V <sub>S</sub>	Tu Input = 13mV	0.43	0.57	0.76	V
Effective Width	W	Effective time ~ THD = 3%	35	40		dB

■ Application Circuit



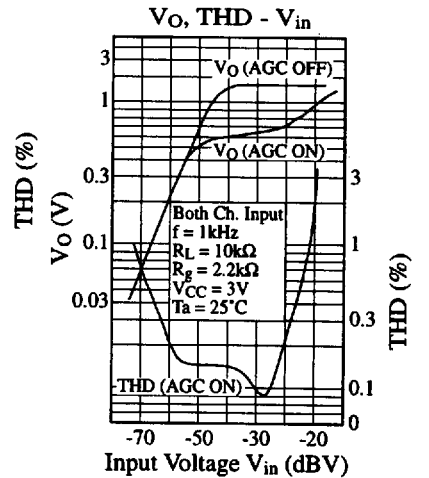
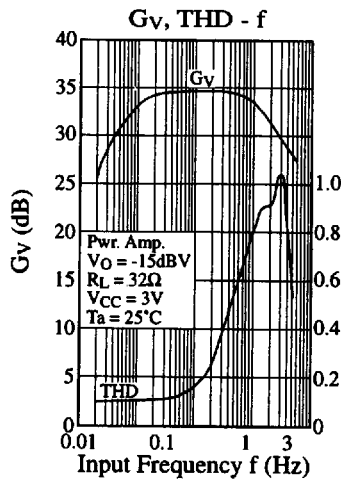
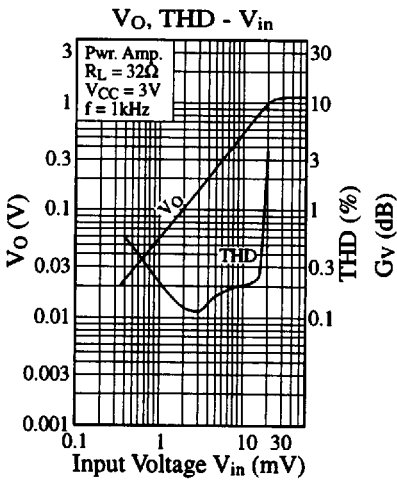
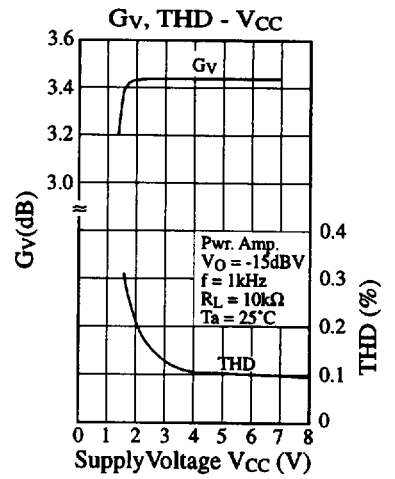
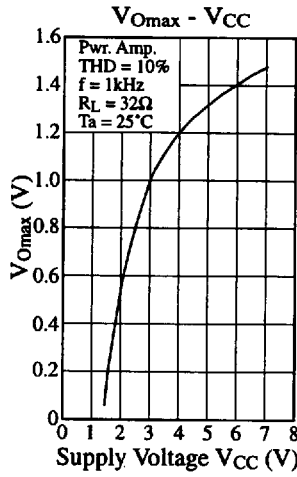
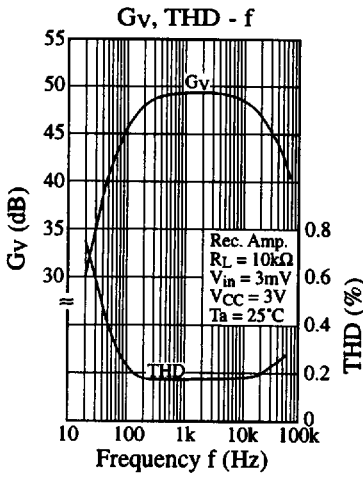
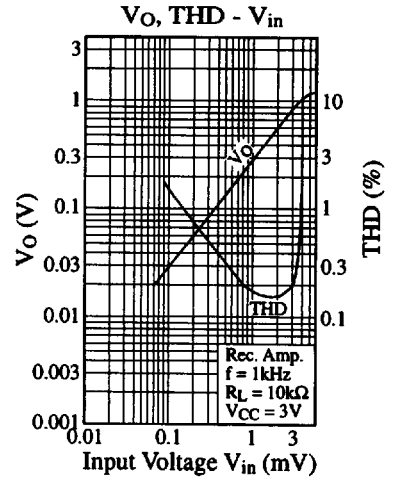
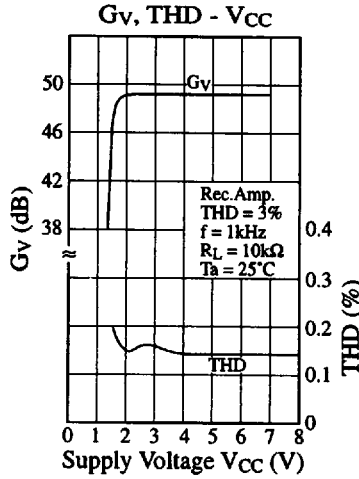
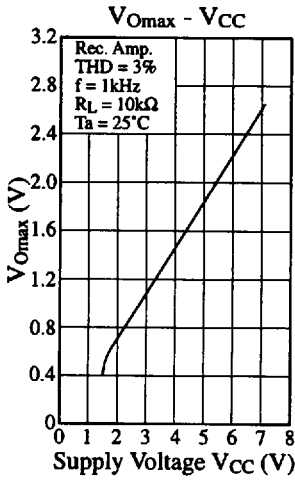
■ Pin Descriptions

Pin No.	Pin Name	Equivalent Circuit	Description
1	Filter		DC = 2.6V
2	V <sub>REF</sub>		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 <sub>1</sub> Input		DC = 1.5V H <sub>1</sub> input pin.
24	L-ch H <sub>1</sub> Input		
8	R-ch PB / Rec. NF Input		DC = 1.5V PB (H <sub>1</sub> , H <sub>2</sub> ), REC NF input pin.
21	L-ch PB / Rec. NF Input		
6	R-ch H <sub>2</sub> Input		DC = 1.5V H <sub>2</sub> input pin.
23	L-ch H <sub>2</sub> 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 <sub>1</sub> input, H <sub>2</sub> 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 $\Omega$ internal feedback resistance and the 390 $\Omega$ 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 $\Omega$ resistance is respectively connected as the internal load. The recommended load impedance value is 32 $\Omega$ .
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	$\tau_2$		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	$\tau_1$		The charging current is a constant current of 10 $\mu$ A. The charging current mentioned above and the 20 $\mu$ A discharging current are simultaneously made to flow.
25	Input Control		DC = 2V Input switching pin. H <sub>1</sub> Open 2V H <sub>2</sub> filter at 5.6k $\Omega$ 2.6V Tu GND at 100 $\Omega$ 0.1V
28	Pre-GND		DC = 0V Pre-section ground.

■ Characteristics Curve



■ Characteristics Curve (Continue)

