AN7109S

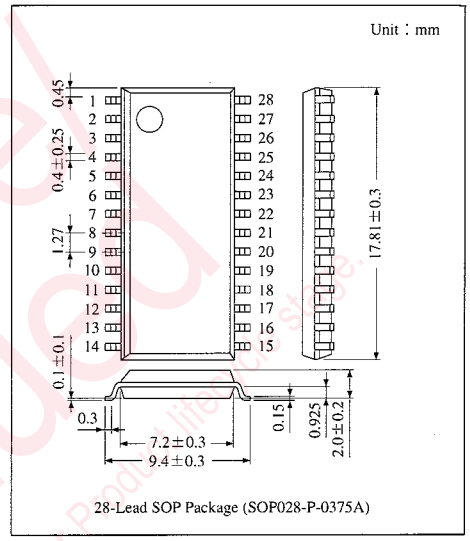
2-channel Recording/Playback Pre-/Power Amplifier IC for Headphone Stereo

■ Overview

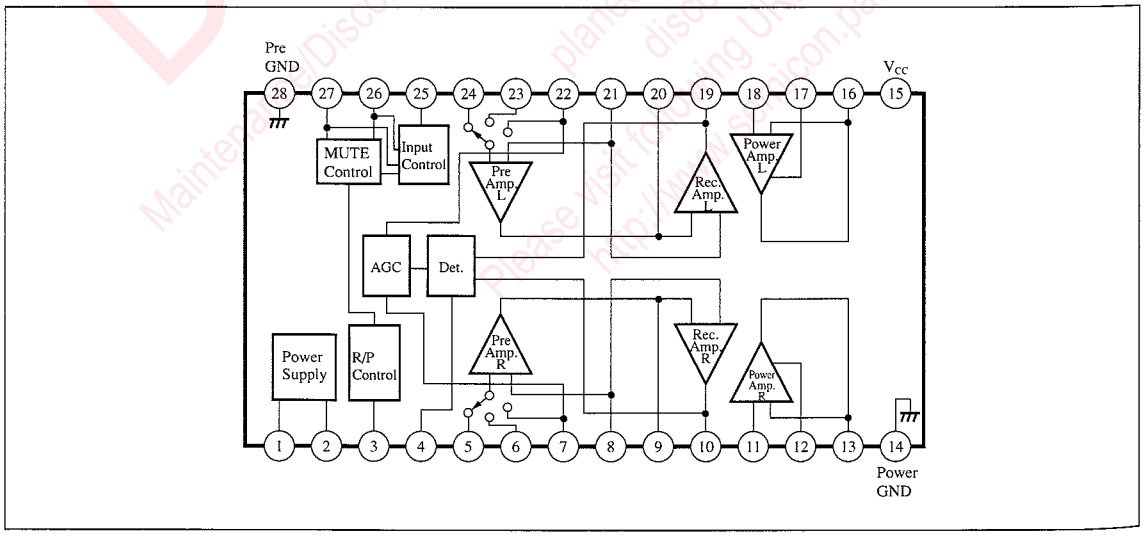
The AN7109S is a single chip IC integrating rec./playback/power amp. so far constituted by 3 ICs. And this IC allows low-end and process simplification of a switching, etc.

■ Features

- Available for head fixed type auto reverse deck
- AGC circuit built-in
- Amp. switching built-in
- Rec./playback power amp. 2ch built-in
- With radio input pin



■ Block Diagram



■ Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	6	V
Supply Current	I_{CC}	200	mA
Power Dissipation	P_D	562	mW
Operating Ambient Temperature	T_{opr}	−20 ~ +75	℃
Storage Temperature	T_{stg}	−55 ~ +125	℃

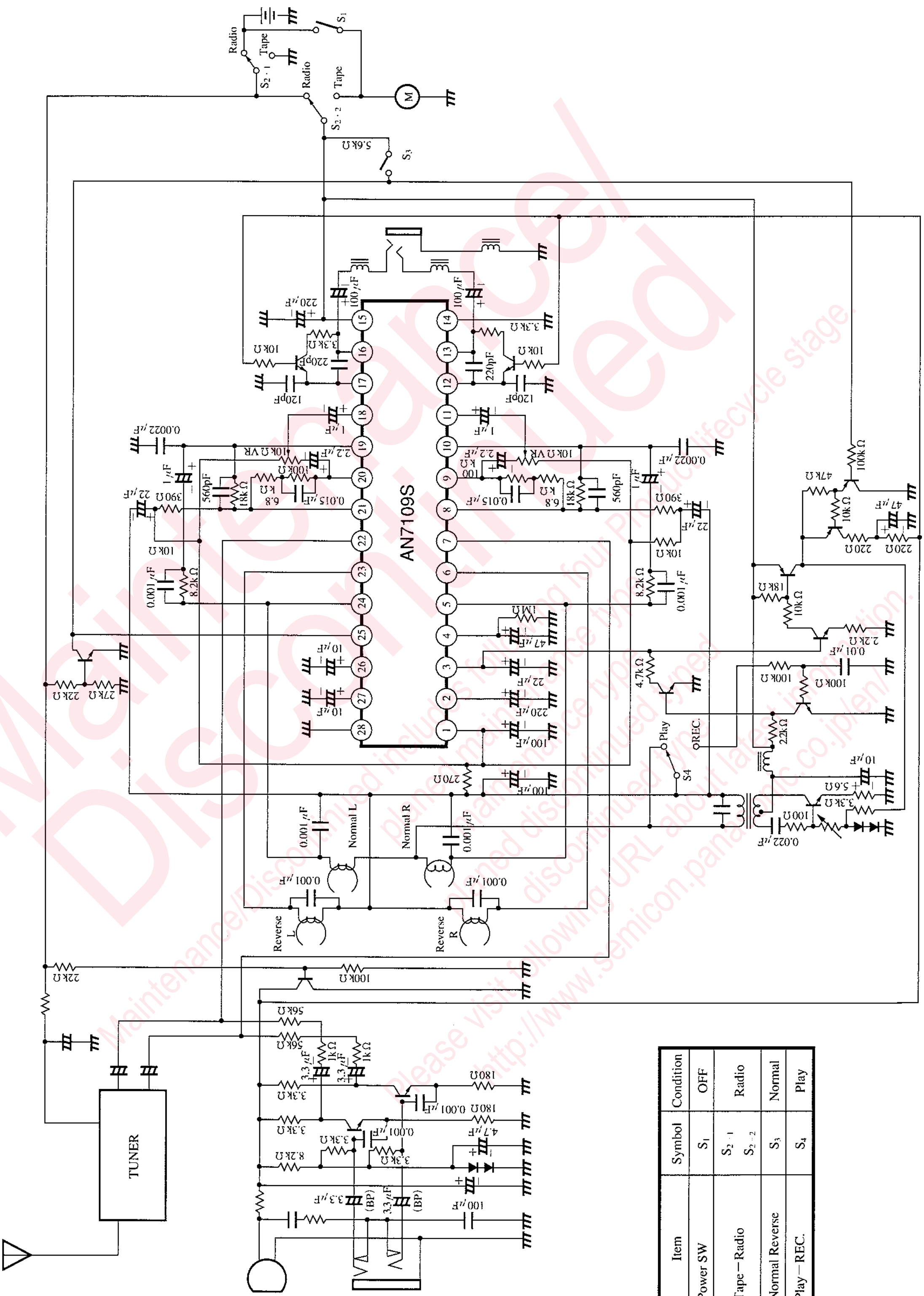
■ Recommended Operating Range (Ta=25℃)

Parameter	Symbol	Range
Operating Supply Voltage Range	V_{CC}	1.8V ~ 4.5V

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

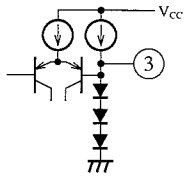
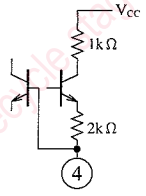
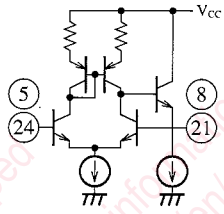
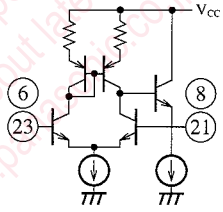
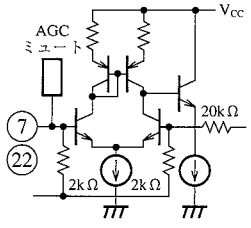
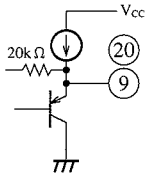
Parameter	Symbol	Condition	min.	typ.	max.	Unit
Supply Current at No Signal	I_{CQ}	V_{in}=0mV, H_1 Input, Play	6	15	25	mA
<Pre. Amp. Section>						
H_1, H_2 Closed Circuit Gain	G_{V1}	V_{in}=−60dBV, R_L=10kΩ	29	31	33	dB
Tu Closed Circuit Gain	G_{V2}	V_{in}=2mVrms, R_L=10kΩ	18	20	22	dB
Output Voltage	V_{op}	THD=3%, R_L=10kΩ, H_1 Input	300	430	—	mVrms
H_1, H_2 Noise Voltage Referred to Input	V_{ni}	DIN/AUDIO Filter, R_g=2.2kΩ, H_1 Input	—	1	2	μVrms
Total Harmonic Distortion	THD_1	H_1 Input V_O=−20dBV, R_L=10kΩ	—	0.04	1	%
<Pre. Amp. Section>						
Closed Circuit Gain	G_VR	Tu Input V_{in}=3.5mVrms, R_L=10kΩ	45.5	49	52.5	dB
Output Voltage	V_OR	Tu Input THD=3%, R_L=10kΩ	0.8	1.05	—	Vrms
Total Harmonic Distortion	THDR	Tu Input V_{in}=3.5mVrms, R_L=10kΩ	—	0.2	1	%
Output Noise Voltage	V_nR	Tu Input R_g=0Ω, DIN/AUDIO, R_L=10kΩ	—	−69	−60	dBV
<AGC Section>						
Effective Width	W	Effective time~THD=3%	35	40	—	dBV
Effective Voltage	V_S	Tu Input =13mV	0.43	0.57	0.76	Vrms
<Power Amp. Section>						
Closed Circuit Gain	G_{Vpo}	V_O=−15dBV, R_L=32Ω	33	35	37	dB
Output Voltage	V_{Opo}	THD=10%, R_L=32Ω	0.75	1	—	Vrms
Total Harmonic Distortion	THD_{po}	V_O=0.2V, R_L=32Ω	—	0.2	1	%
Output Noise Voltage	V_{npo}	R_g=0Ω, R_L=32Ω, DIN/AUDIO	—	−80	−70	dBV

Application Circuit

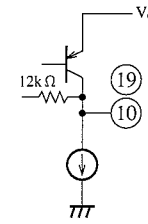
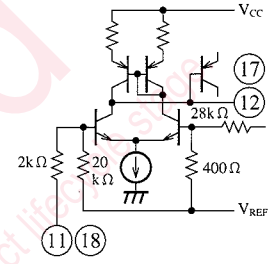
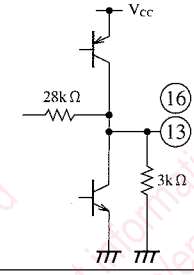
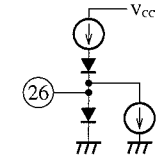
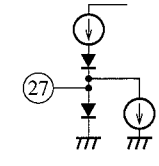


Item	Symbol	Condition
Power SW	S_1	OFF
Tape−Radio	$S_{2 \cdot 1}$ $S_{2 \cdot 2}$	Radio
Normal Reverse	S_3	Normal
Play−REC.	S_4	Play

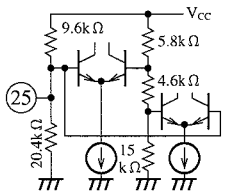
■ Pin Descriptions

Pin No.	Pin Name	Pin Description	Pin Voltage	Equivalent Circuit
1	Filter	———	2.6V	———
2	V_{REF}	———	2.7V	———
3	REC./PB Cont.	REC/PB switching OPEN at 2.1V in REC mode GND at 4.7kΩ 0.1V in PB mode	2.1V	
4	AGC	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.	0.9V	
5 24	R-ch. H_1 Input L-ch. H_2 Input	H_1 input pin	1.5V	
8 21	R-ch. PB/REC. NF Input L-ch. PB/REC. NF Input	PB (H_1, H_2), REC. NF input pin		
6 23	R-ch. H_1 Input L-ch. H_2 Input	H_2 input pin	1.5V	
7 22	R-ch. Tu Input L-ch. Tu Input	Tu input pin. This pin also serves as the MIC input pin. Connection of an external MIC Amp. is reguired as the gain is insufficient in case of direct input of the MIC signal. The gain of the Tu Amp. is 20dB.	1.5V	
9 20	R-ch. Pre-OUT L-ch. Pre-OUT	Pre-amplifier output pin. All the H_1 input, H_2 input, and Tu input are output from this pin.	1.5V	

■ Pin Descriptions (Cont.)

Pin No.	Pin Name	Pin Description	Pin Voltage	Equivalent Circuit
10 19	R-ch. REC. OUT L-ch. REC. OUT	Rec. amp. output pin. The Rec Amp. input is directly connected inside, and the gain is determined by the 12kΩ internal feedback resistance and the 390Ω resistor of Pin⑧. (29dB) The resistor of Pin⑧ is also purposed to determine the gain of the respective pre-amplifier of H_1 and H_2 So, when changing the gain, take this fact duly into account.	1.5V	
11 18 12 17	R-ch. Power Input L-ch. Power Input R-ch. Phase Cont. L-ch. Phase Cont.	Power Amp. input pin. The gain (35dB) of the power Amp. has been internally decided, and cannot be changed. Pin⑫ and Pin⑰ are phase compensation pins for prevention of the power amp. oscillation trouble.	1.5V	
13 16	R-ch. Power OUT L-ch. Power OUT	Power output pin. These pins are push-pull output pins, and a 3kΩ resistance is respectively connected as the internal load. The recommended load impedance value is 32Ω.	1.5V	
14	Power GND	Ground this pin near the power source because electric currents flow through the ground of the power block.	0V	
15	V_{CC}	Power supply pin	3V	
26	τ2	These pins are time constant setting pins for smooth switching of three pre-amplifier inputs. The two capacitors efficiently ditermine the time constants for switching control of the three input states. The charging current is a constant current of 10μA. The charging current mentioned above and the 20μA discharging current are simultaneously made to flow.	0.7V	
27	τ1		0.7V	

■ Pin Descriptions (Cont.)

Pin No.	Pin Name	Pin Description	Pin Voltage	Equivalent Circuit
25	Input Cont.	Input switching pin H_1 Open 2V H_2 Filter at 5.6kΩ 2.6V T_u GND at 100Ω 0.1V	2V	
28	Pre-GND	Pre-section ground	0V	———

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