AN7085NS

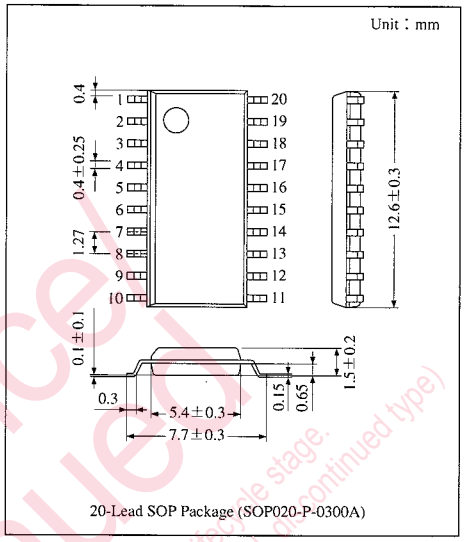
Recording/Playback Pre-/Power Amplifier IC for 3V Microcassette

■ Overview

The AN7085NS is an integrated circuit developed for recording playback pre-/power amp., built-in VAS (Voice Activated System) function especially.

■ Features

- Recording playback pre-/power amp. IC
- VAS function built-in
- Earphone monitor at recording is possible.
- 200mW BTL, OCL power amp. built-in
- Mic. amp. built-in
- ALC function built-in
- Rec./Play switching is possible by a switch of a single circuit.



20-Lead SOP Package (SOP020-P-0300A)

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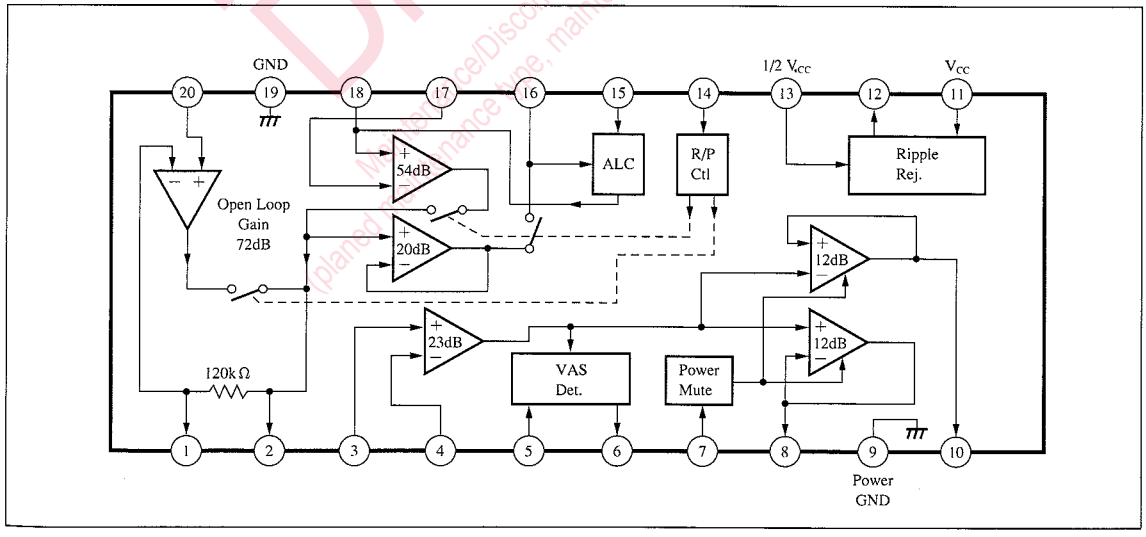
■ Block Diagram



■ Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	6	V
Supply Current	I_{CC}	1000	mA
Power Dissipation	P_D	460	mW
Operating Ambient Temperature	T_{opr}	−20 ~ +75	℃
Storage Temperature	T_{stg}	−55 ~ +125	℃

■ Recommended Operating Range (Ta=25℃)

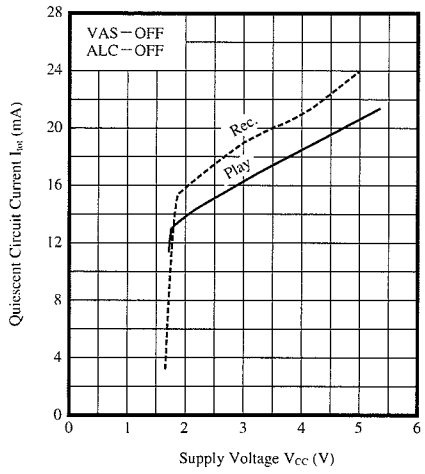
Parameter	Symbol	Range
Operating Supply Voltage Range	V_{CC}	1.8V ~ 4.5V

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

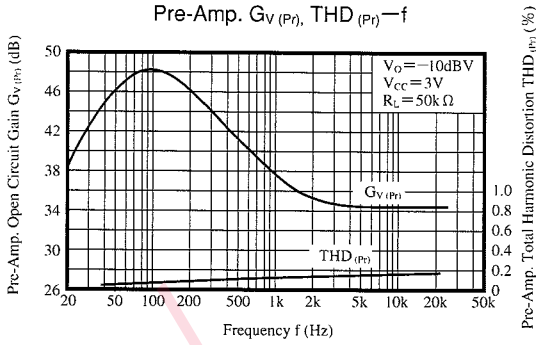
Parameter	Symbol	Condition	min.	typ.	max.	Unit
Quiescent Circuit Current	I_{tot}	At No Input/Playback	10	16	35	mA
<Pre-Amp.>						
Open Circuit Gain	$G_{V(Pr)}$	V_{in}=−85dBV, R_g=1kΩ	65	74	—	dB
Total Harmonic Distortion	$THD_{(Pr)}$	V_{in}=3mVrms, R_g=1kΩ	—	0.1	1	%
Maximum Output Voltage	$V_{O(Pr)}$	THD=1%, R_g=1kΩ	0.4	0.6	—	Vrms
Noise Voltage Referred to Input	$V_{ni(Pr)}$	R_g=1kΩ, DIN/AUDIO Filter	—	1	1.8	μVrms
<Recording Amp.>						
Close Circuit Gain	$G_{V(R)}$	V_{in}=−80dBV	71	74	77	dB
Total Harmonic Distortion	$THD_{(R)}$	V_{in}=−80dBV	—	1.3	3	%
Maximum Output Voltage	$V_{O(R)}$	THD=5%	0.8	1.08	—	Vrms
Output Noise Voltage	$V_{no(R)}$	R_g=2.2kΩ, DIN/AUDIO Filter	—	−46	−42	dBV
<Power Amp.>						
Close Circuit Gain	$G_{V(Po)}$	V_{in}=−46dBV, R_L=8Ω	38.5	41	43.5	dB
Total Harmonic Distortion	$THD_{(Po)}$	V_{in}=−46dBV, R_L=8Ω	—	0.11	1	%
Maximum Output Voltage	$V_{O(Po)}$	THD=10%, R_L=8Ω	1.2	1.3	—	Vrms
Output Noise Voltage	$V_{no(Po)}$	R_g=0Ω, R_L=8Ω, DIN/AUDIO Filter	—	−74	−65	dBV
Output Offset Voltage	$V_{O(offset)}$	R_g=0Ω, R_L=8Ω,	−50	0	50	mV
<VAS>						
VAS Operation Input Voltage	VAS	Mic. input level at Pin⑥ voltage=0.2V	8	14	18	μVrms
<ALC>						
Effective Voltage	V_{ALC}	V_{in}=−60dBV, R_g=1.5kΩ	−6.5	−4.5	−2.5	dBV
Effective Width	W_{ALC}	V_{in}=−30dBV, R_g=1.5kΩ	—	1.5	3	%
<Ripple Rejection>						
Playback System Ripple Rejection	$RR_{(P)}$	f_r=270Hz, V_r=30mVrms, R_g=1kΩ	—	−70	−50	dBV
Recording System Ripple Rejection	$RR_{(R)}$	f_r=270Hz, V_r=30mVrms, R_g=2.2kΩ	—	−40	−30	dBV
<Switching Pin>						
Rec./Playback Switching Pin	V_{PB}	Playback mode	0.1	—	0.3	V
Rec./Playback Switching Pin	V_{REC}	Recording mode	1.6	—	2.3	V

■ Characteristics Curve

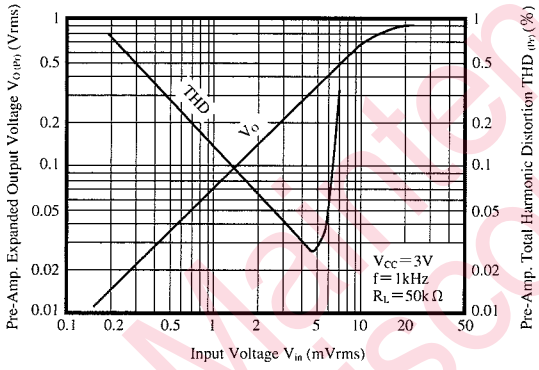
I_{tot}—V_{CC}



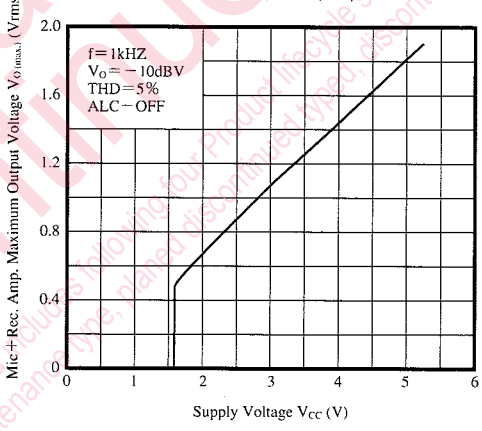
Pre-Amp. $G_{V\,(Pr)}$, $THD_{(Pr)}$—f



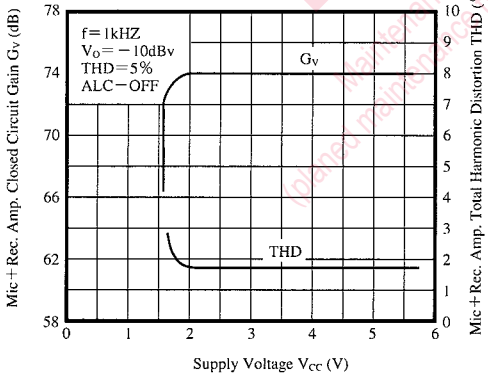
Pre-Amp. $V_{O\,(Pr)}$, $THD_{(Pr)}$— V_{in}



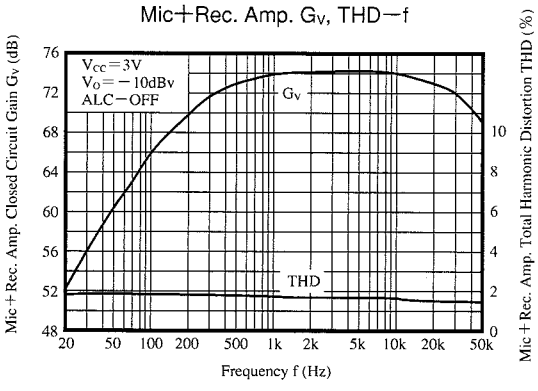
Mic+Rec. Amp. $V_{O\,(max.)}$—V_{CC}



Mic+Rec. Amp. G_V, THD—V_{CC}



Mic+Rec. Amp. G_V, THD—f



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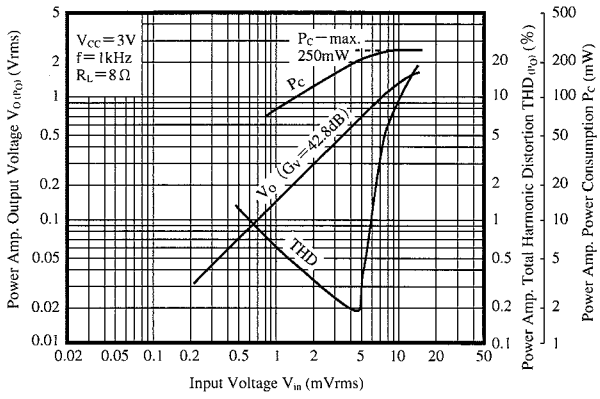
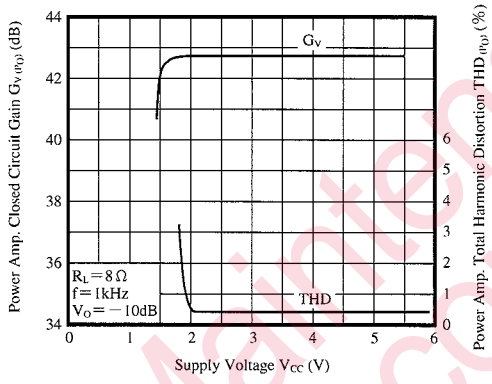
Power Amp. V_O, THD, P_C—V_{in}

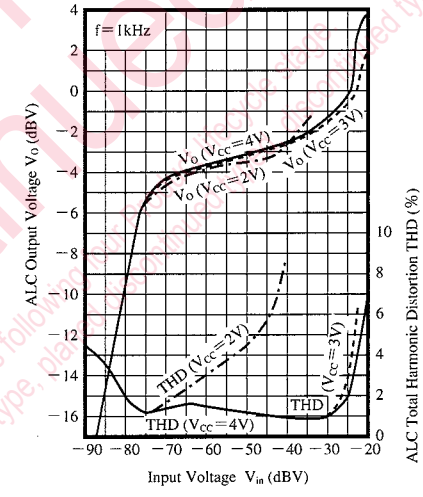


Power Amp. $V_{O\,(max.)}$—V_{CC}

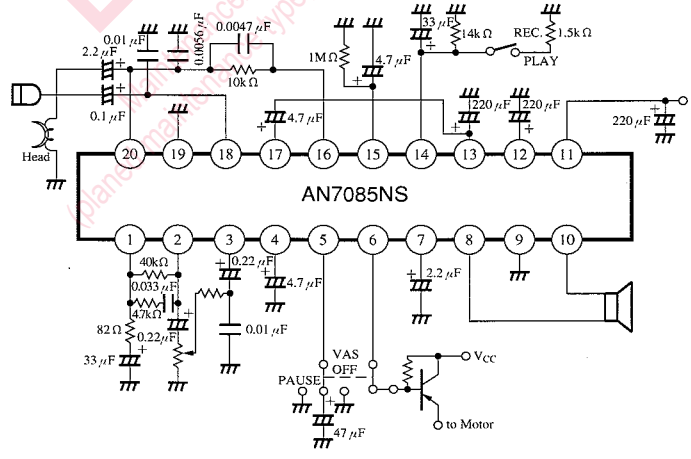
Power Amp. $G_{V\,(Po)}$, THD $_{(Po)}$—V_{CC}



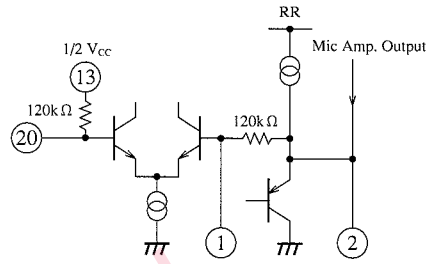
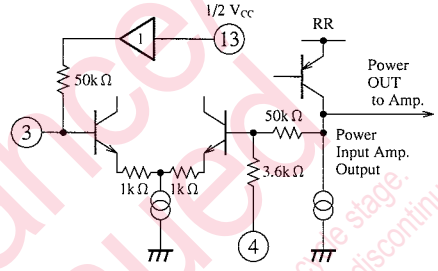
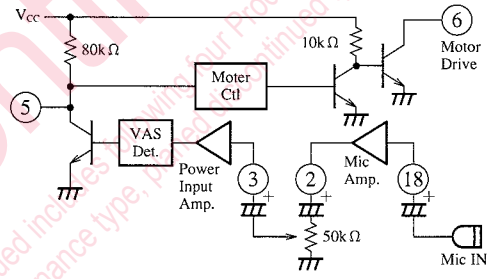
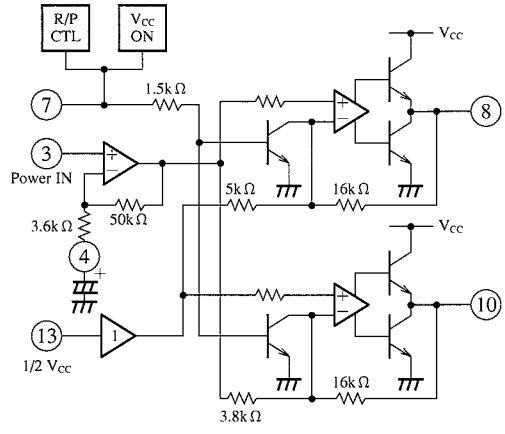
ALC V_O, THD—V_{in}



■ Application Circuit

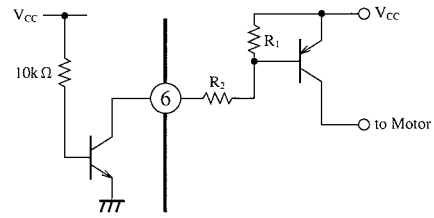
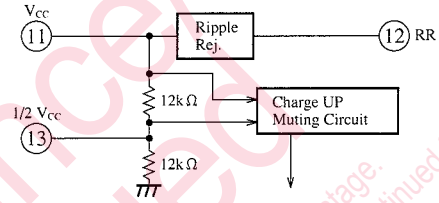
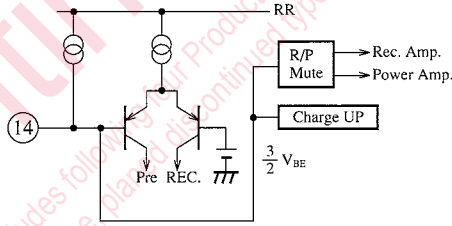
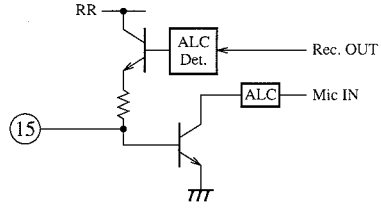
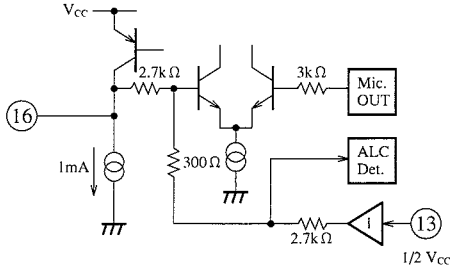


■ Pin Descriptions

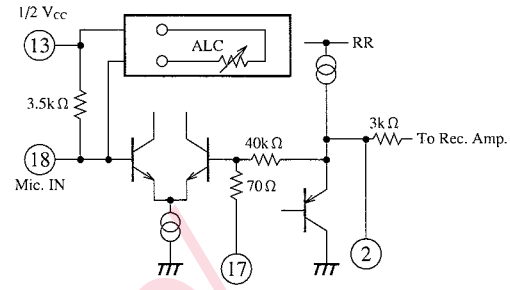
Pin No.	Pin Description	Equivalent Circuit
20	Pre-Amp. Input Pin •Input impedance = 120k Ω	
1	Pre-Amp. NF Pin •NF resistance = 120k Ω	
2	Pre-Amp. Output Pin •I_{out} (max.) = 300 μA	
3	Power Amp. Input Pin •Input impedance = 50k Ω	
4	Power Amp. NF Pin •NF resistance = 50k Ω, 3.6k Ω •Gain = 23dB	
5	VAS Detection •VAS-ON : GND at 47μF •VAS-OFF : GND •VAS detection level change is possible at Vol.	
7	Power Mute Pin •Power Amp. NF becomes low and output pin does High by setting Pin⑦ voltage High (0.7V). Mute power amp. by this	
8	Power Output 1-Pin •Output impedance at Rec = High impedance	
9	Power GND •No contact with Sub	
10	Power Output 2-Pin •Inverting output •Earphone monitor at Rec. is possible.	

ICs for Cassette Deck

■ Pin Descriptions (Cont.)

Pin No.	Pin Description	Equivalent Circuit
6	Motor Drive Pin • I_{out} (typ.) = 57mA (V_{CC} = 3V) • I_{out} (min.) = 14mA (V_{CC} = 1.8V) • I_{out} current control by using R_1, R_2	
11	V_{CC} • Charge Up Circuit { 1/2 V_{CC} / R/P CTL / Pre NF / Power NF • Muting Circuit Power Mute	
12	Filter Pin • V_{12}=V_{CC}×0.93 • 1/2 V_{CC} > 0.7V ~ V_{12} ON • V_{12} < 2/3, within V_{CC} ALC OFF	
13	1/2 V_{CC}	
14	Rec./Play Switching Pin • Playback mode at less than 0.7V • Rec. mode at more than 1.4V • Total circuit Mute mode at less than 0.7V/more than 1.4V • I_{out} = 150μA (enable to use DC bias for head)	
15	ALC Detection • Detect Rec. Amp. output level and generate voltage at Pin⑮. Change input impedance of Mic input pin by the voltage and apply ALC.	
16	Rec. Amp. Output Pin • Gain = 20dB	

■ Pin Descriptions (Cont.)

Pin No.	Pin Description	Equivalent Circuit
17	Mic Amp. NF Pin • It is desirable to put capacitance between 1/2V_{CC} and this pin to prevent shock sound.	
18	Mic Amp. Input • Input impedance = 3.5kΩ • ALC level change by input resistance (R_g = 1.5kΩ) is possible.	
19	GND • Pre, Rec., Mic Amp. GND and Sub GND	

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