Dual preamplifier with ALC BA3306

The BA3306 is a dual preamplifier with ALC designed for use in stereo radio-cassette recorders and tape recorders. It comes in a compact 9-pin SIP package and has two record/playback preamplifiers, and an ALC circuit. The preamplifiers have high gain and low distortion, and can be directly coupled to the tape head without coupling capacitors. This prevents tape head magnetization and "pop" noise generation.

The ALC circuit has good channel balance and large dynamic range and can be constructed with addition of just an external detector and time constant circuit.

The IC also includes a power-on mute circuit that suppresses "pop" noise generation.

Applications

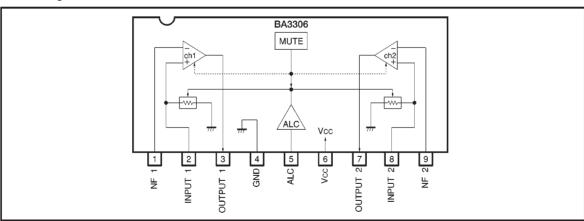
Stereo radio cassette players

Features

- 1) Wide operating power supply voltage range (Vcc = 4.5V to 14V).
- 2) Low current dissipation ($I_Q = 2.5 \text{mA}$).
- 3) High gain ($G_{VO} = 80dB$).
- 4) Low distortion (THD = 0.1%).

- 5) Low noise ($V_{NIN} = 1 \mu V_{rms}$).
- 6) Input coupling capacitors and not necessary.
- 7) Good ALC channel balance.
- 8) Power-on mute circuit.

Block diagram



■Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	Vcc	16	V
Power dissipation	Pd	950*	mW
Operating temperature	Topr	−25 ~ + 75	Ĉ
Storage temperature	Tstg	− 55∼ + 125	Ĉ

^{*} Reduced by 9.5mW for each increase in Ta of 1°C over 25°C.

■Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Тур.	Max.	Unit
Power supply voltage	Vcc	4.5	7	14	V

●Electrical characteristics (unless otherwise noted, Ta = 25°C, Vcc = 7V, and f= 1kHz)

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Quiescent current	lα	1.5	2.5	4.0	mA	V _{IN} =0V _{rms}
Open loop voltage gain	Gvo	70	80	_	dB	V _{OUT} =-10dBV
Total harmonic distortion	THD	_	0.1	0.3	%	NAB 34dB, V _{OUT} =40mV _{rms}
Input resistance	Rin	15	25	45	kΩ	_
Maximum output voltage	Vом	0.6	1.2	_	Vrms	THD=1%
Input conversion-noise voltage	V _{NIN}	_	1.0	2.0	μ V _{rms}	R_g =2.2k Ω , BPF=20Hz \sim 20kHz
ALC Channel balance	△ALC	_	0	2.5	dB	V _{IN} =-60dBV, -30dBV

Measurement circuit

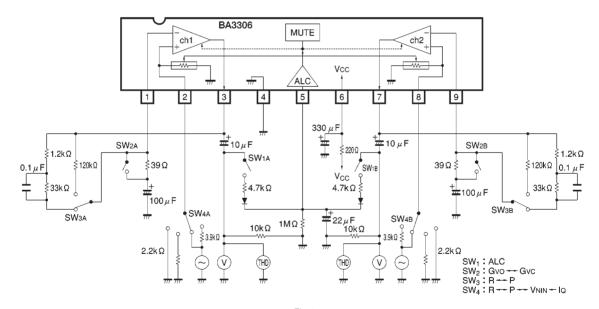


Fig.1

Application example

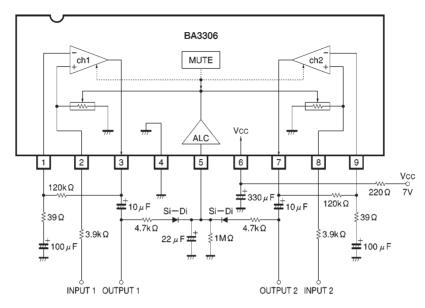


Fig.2

Circuit operation

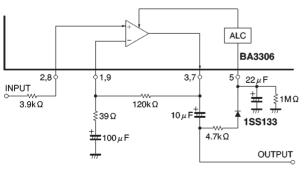
(1) Recording (See Fig. 3)

For recording, insert an attenuation resistor (3.9k Ω recommended) into the input line.

The ALC timing is determined by the time constant of the circuit connected between pin 5 and GND. The attack time is set the capacitor (22µF) and the resistor (4.7k Ω) that is connected in series with the diode. The recovery time is set by this capacitor and the resistor (1M Ω) connected to pin 5.

(2) Playback (See Fig. 4)

For playback, the amplifier is used as a NAB equalizer amplifier. The ALC circuit is not needed at this time, so pin 5 is earthed. The negative feedback time constant settings are Hi - $120\mu s$ and Lo - $3180\mu s$.



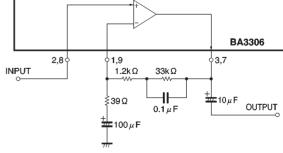


Fig. 3

Fig. 4

Electrical characteristics curves

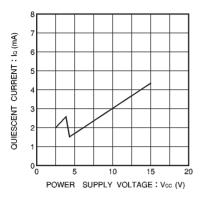


Fig. 5 Quiescent current vs. power supply voltage

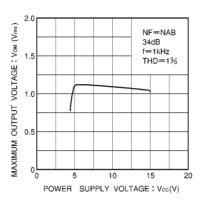


Fig. 6 Maximum output voltage vs. power supply voltage

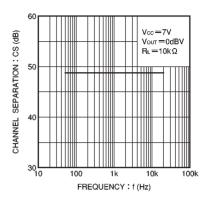


Fig. 7 Channel separation vs. signal frequency

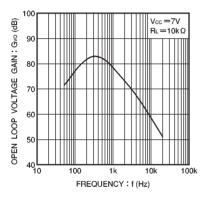


Fig. 8 Open loop voltage gain vs. signal frequency

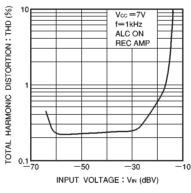


Fig. 9 Total harmonic distortion vs. input voltage

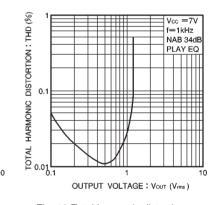


Fig. 10 Total harmonic distortion vs. output voltage

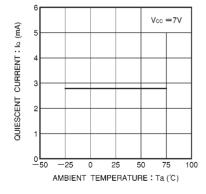


Fig. 11 Quiescent current vs. ambient temperature

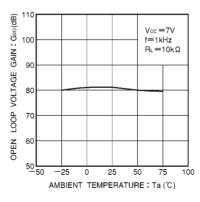


Fig. 12 Open loop voltage gain vs. ambient temperature

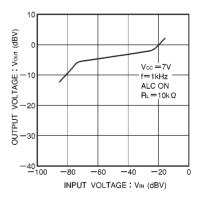


Fig. 13 ALC I / O characteristics



●External dimensions (Units: mm)

