

BA3506A

3 V dual pre- and power amplifier

The BA3506A IC is a dual channel preamplifier and power amplifier.

The preamplifiers are direct coupled and the power amplifiers have a built-in fixed-gain NF circuit, making an output coupling capacitor unnecessary.

Features

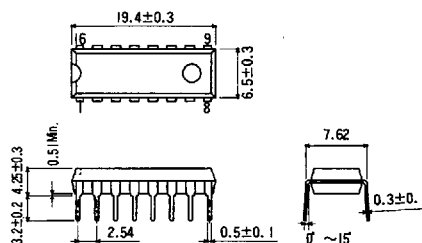
- available in DIP16 package
- low voltage operation (1.8 ~ 3.6 Vdc)
- preamplifier has high voltage gain (83 dB), low noise ($0.9 \mu V_{rms}$) and low distortion (0.03%).
- power amplifier has high output ($69 mW \times 2$), low noise ($80 \mu V_{rms}$) and low distortion (0.6%)

Applications

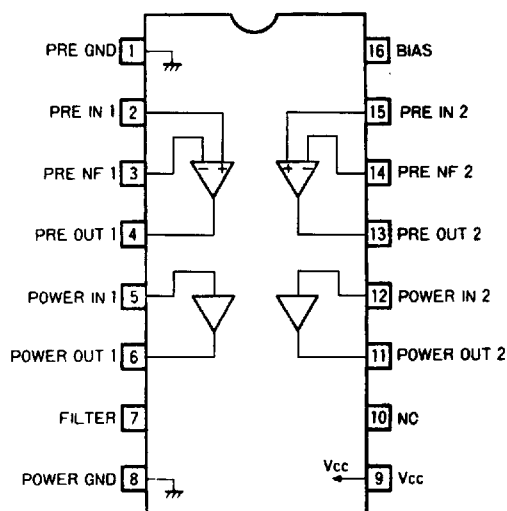
- 3 V headphone stereo player

Dimensions (Units : mm)

BA3506A (DIP18)



Block diagram



Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit	Conditions
Power supply voltage	V_{CC}	4.5	V	
Power dissipation	P_d	1000	mW	Reduce power by 10.0 mW for each degree above 25°C .
Operating temperature	T_{opr}	$-25 \sim +75$	$^\circ\text{C}$	
Storage temperature	T_{stg}	$-55 \sim +125$	$^\circ\text{C}$	

Recommended operating conditions ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Power supply voltage	V_{CC}	1.8	3.0	3.6	V	
Load resistance	R_L	16		3.2	Ω	$V_{CC} = 3\text{ V}$

**Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 3\text{ V}$, $f = 1\text{ kHz}$)
(Sheet 1 of 2)**

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Quiescent current	I_Q		9	15	mA	$V_{IN} = 0\text{ V}_{rms}$
Preamplifier ($R_L = 10\text{ k}\Omega$)						
Open loop voltage gain	G_{VO}	72	83		dB	$V_O = -10\text{ dBm}$
Output voltage	V_{OM}	300	450		mV_{rms}	THD = 1%
Total harmonic distortion 1	THD ₁		0.03	0.15	%	$V_O = 0.2\text{ V}_{rms}$, NAB 33 dB
Input bias current 1	I_{B1}		130	500	nA	$V_{IN} = 0\text{ V}_{rms}$
Input conversion noise voltage	V_{NIN}		0.9	1.8	μV_{rms}	$R_g = 2.2\text{ k}\Omega$, BPF = 20 Hz ~ 20 kHz
Ripple rejection	RR ₁	43	53		dB	$V_{RR} = -20\text{ dBm}$, $f = 100\text{ Hz}$, $R_g = 2.2\text{ k}\Omega$, NAB 33 dB
Power amplifier ($R_L = 16\text{ }\Omega$)						
Rated output	P_{OUT}	50	69		mW	THD = 10%
Closed loop voltage gain	G_{VC}	33	36	39	dB	$V_{IN} = -40\text{ dBm}$
Total harmonic distortion 2	THD ₂		0.6	2.0	%	$P_O = 1\text{ mW}$
Output noise voltage	V_{NO}		80	125	μV_{rms}	$R_g = 0\text{ }\Omega$, BPF = 20 Hz ~ 20 kHz
Ripple rejection	RR ₂	35	51		dB	$V_{RR} = -20\text{ dBm}$, $f = 100\text{ Hz}$, $R_g = 0\text{ }\Omega$
Input resistance	R_{IN}	21.4	30	38.6	$\text{k}\Omega$	
Input bias current	I_{B2}		10	90	nA	$V_{IN} = 0\text{ V}_{rms}$

Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 3\text{ V}$, $f = 1\text{ kHz}$)
(Sheet 2 of 2)

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Preamplifier and power amplifier						
Channel separation	CS	40	48		dB	Power amp: $V_O = -5\text{ dBm}$, $R_g = 2.2\text{ k}\Omega$, BPF = $20\text{ Hz} \sim 20\text{ kHz}$
Signal leak	SL		-66	-60	dBm	Preamp: $V_O = -12\text{ dBm}$ Power amp: $R_g = 0\text{ }\Omega$

Figure 1 Application example

