

# 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

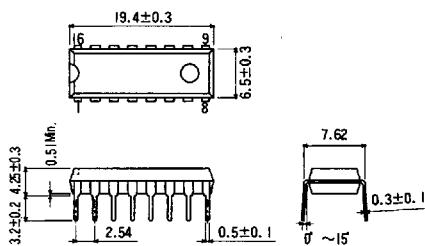
- available in DIP16 package
- low voltage operation (1.8 ~ 3.6 Vdc)
- preamplifier has high voltage gain (83 dB), low noise (0.9  $\mu$ V<sub>rms</sub>) and low distortion (0.03%).
- power amplifier has high output (69 mW  $\times$  2), low noise (80  $\mu$ V<sub>rms</sub>) and low distortion (0.6%).

### Applications

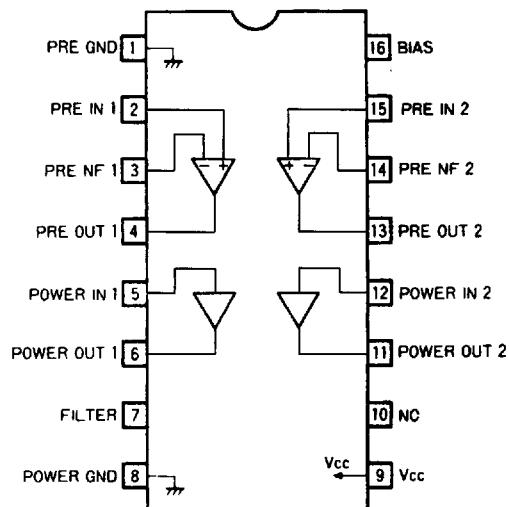
- 3 V headphone stereo player

### Dimensions (Units : mm)

BA3506A (DIP18)



### Block diagram



## BA3506A Pre- and power amplifiers for headphone stereos

### 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 $25^\circ\text{C}$ .
Operating temperature	$T_{opr}$	-25 ~ +75	°C	
Storage temperature	$T_{stg}$	-55 ~ +125	°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,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 3\text{ V}$ ,  $f = 1\text{ kHz}$ )**  
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Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Quiescent current	$I_Q$		9	15	mA	$V_{IN} = 0\text{ V}_{rms}$
<b>Preamplifier (<math>R_L = 10\text{ k}\Omega</math>)</b>						
Open loop voltage gain	$G_{VO}$	72	83		dB	$V_O = -10\text{ dBm}$
Output voltage	$V_{OM}$	300	450		$\text{mV}_{rms}$	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	$\mu\text{V}_{rms}$	$R_g = 2.2\text{ k}\Omega$ , 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
<b>Power amplifier (<math>R_L = 16\text{ }\Omega</math>)</b>						
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	$\mu\text{V}_{rms}$	$R_g = 0\text{ }\Omega$ , 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	kΩ	
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
<b>Preamplifier and power amplifier</b>						
Channel separation	CS	40	48		dB	Power amp: $V_O = -5\text{ dBm}$ , $R_g = 2.2\text{ k}\Omega$ , BPF = 20 Hz ~ 20 kHz
Signal leak	SL		-66	-60	dBm	Preamp: $V_O = -12\text{ dBm}$ Power amp: $R_g = 0\text{ }\Omega$

**Figure 1 Application example**