

3V dual pre/power amplifier

BA3516

The BA3516 is a dual pre/power amplifier designed for headphone stereo applications. It operates off a 3V supply. The preamplifier block can be direct-coupled, and the power amplifiers do not require bootstrap capacitors, and use a fixed-gain negative feedback circuit to reduce the number of external components required and allow compact and reliable set designs.

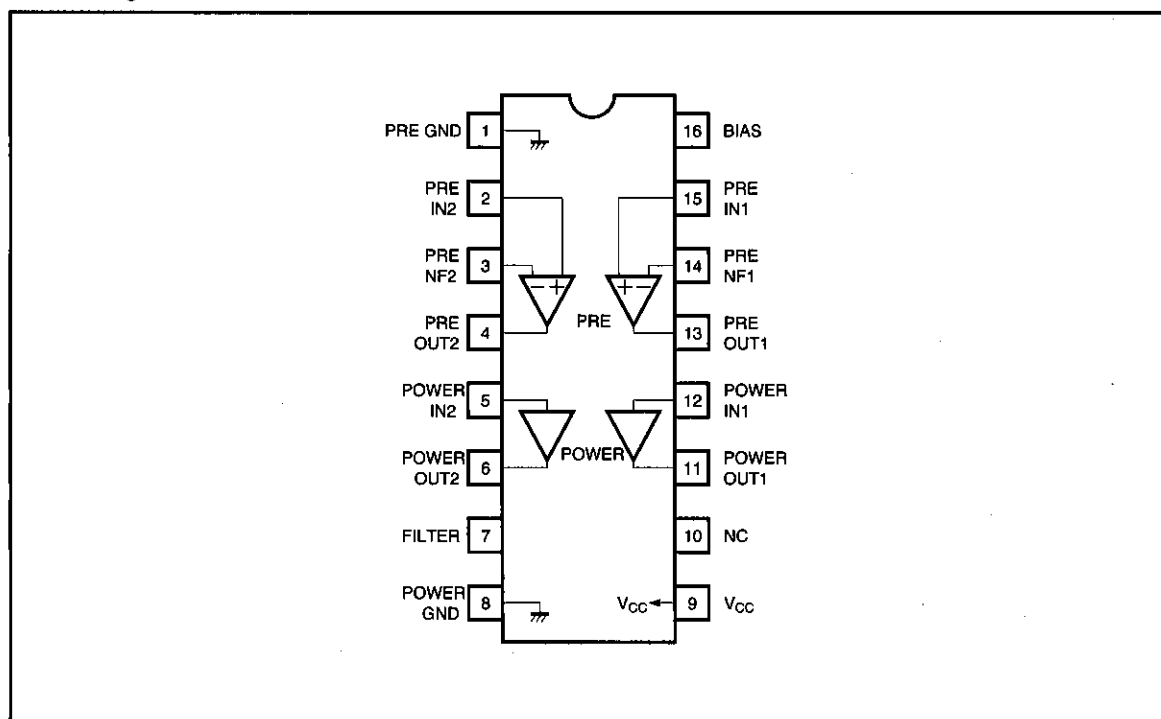
●Applications

3V headphone stereos and 3V radio cassette players.

●Features

- 1) Dual preamplifiers and power amplifiers on one chip.
- 2) Preamplifiers can be direct coupled.
- 3) Bootstrap capacitors for the power amplifiers are not required.
- 4) The preamplifiers have high gain (78dB), low noise ($1 \mu\text{Vrms}$), and low distortion (0.03%).
- 5) The power amplifiers have high output ($40\text{mW} \times 2$), low noise ($80 \mu\text{Vrms}$), and low distortion (0.5%).

●Block diagram



●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	V _{CC}	4.5	V
Power dissipation	P _d	1000*1	mW
Operating temperature	T _{opr}	−25~75	°C
Storage temperature	T _{stg}	−55~125	°C

*1 Reduced by 10.0mW for each increase in Ta of 1°C over 25°C.

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V _{CC}	1.8	2.4	3.6	V

●Electrical characteristics (unless otherwise specified Ta = 25°C, V_{CC} = 2.4V and f = 1kHz)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Quiescent circuit current	I _Q	—	8	14	mA	V _{IN} =0V _{rms}	Fig.1
<Preamplifier> R _L =10kΩ							
Open-circuit voltage gain	G _{VO}	72	78	—	dB	V _O =−10dBm	Fig.1
Maximum output voltage	V _{OM}	200	300	—	mV _{rms}	THD=1%	Fig.1
Total harmonic distortion	THD ₁	—	0.03	0.15	%	V _O =0.2V _{rms} , NAB33dB	Fig.1
Input conversion-noise voltage	V _{NIN}	—	1.0	1.8	μV _{rms}	R _g =2.2kΩ, BPF20~20kHz	Fig.1
Ripple rejection	RR ₁	40	47	—	dB	V _{RR} =−20dBm, f=100Hz NAB33dB, R _g =2.2kΩ	Fig.1
Input bias current	I _{B1}	—	60	300	nA	V _{IN} =0V _{rms}	Fig.1
<Power amplifier> R _L =16Ω							
Rated output	P _{OUT}	30	40	—	mW	THD=10%	Fig.1
Closed-circuit voltage gain	G _{VC}	34	36	38	dB	V _{IN} =−40dBm	Fig.1
Total harmonic distortion	THD ₂	—	0.5	1.5	%	P _O =1mW	Fig.1
Output noise voltage	V _{NO}	—	80	125	μV _{rms}	R _g =0Ω, BPF20~20kHz	Fig.1
Ripple rejection	RR ₂	35	48	—	dB	V _{RR} =−20dBm, f=100Hz, R _g =0Ω	Fig.1
Input resistance	R _{IN}	21.4	30	38.6	kΩ	—	Fig.1
Input bias current	I _{B2}	—	22	80	nA	V _{IN} =0V _{rms} , R _g =10kΩ *1	Fig.1
Channel balance	CB	—	0	0.7	dB	V _O =−10dBm	Fig.1
<Preamplifier + power amplifier> connection as per application example circuit>>							
Channel separation	CS _{L-R}	27	37	—	dB	Pre-R _g =2.2kΩ, VR Max.*2 Single channel Power-V _O =−5dBm BPF20~20kHz	Fig.1
Leakage from preamp to power amp for signal leak VR Min.	SL	—	−63	−57	dBm	Power-R _g =0Ω *3 When both channels are operating Pre V _{OUT} =−12dBm	Fig.1

$$*1 \quad I_{B2} = \frac{V_{B2}}{10k\Omega} \times \frac{4}{3}$$

V_{B2}: Voltage at each end of R_g=10kΩ.

*2 0dB attenuation from the preamplifier output to power amplifier input.

*3 Power amplifier signal source Impedance is 0Ω

● Measurement circuit

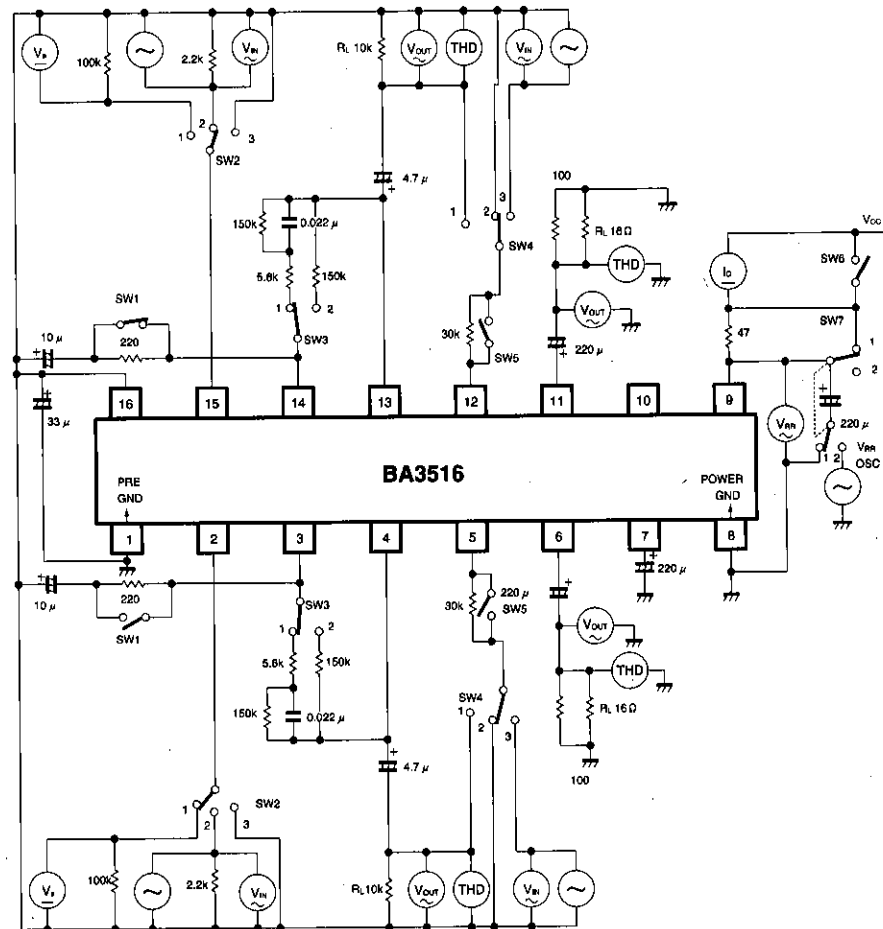


Fig. 1

●Application example

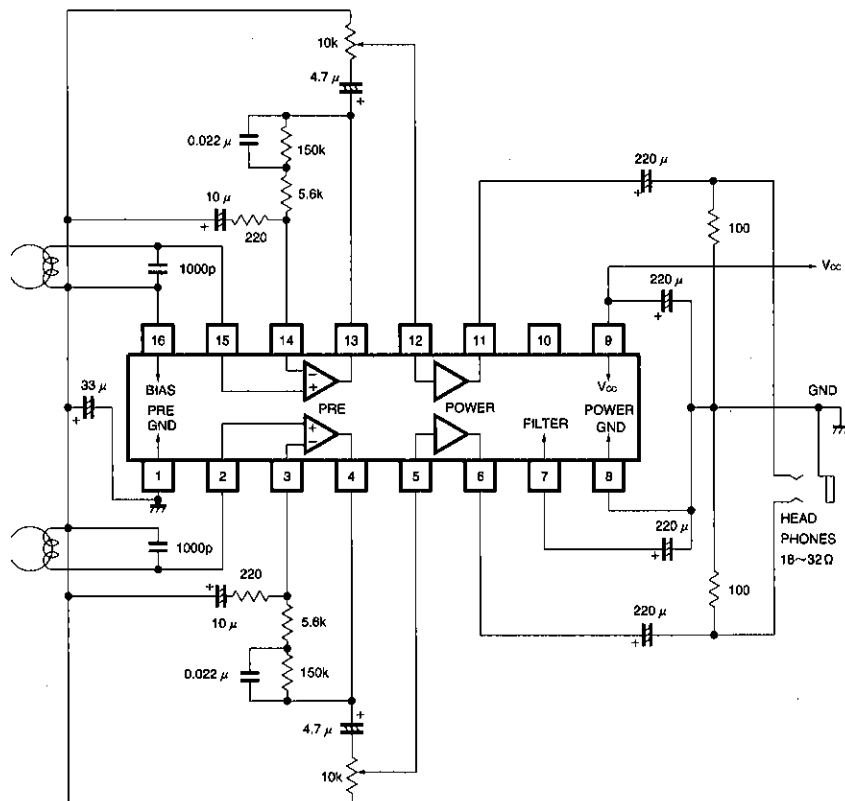
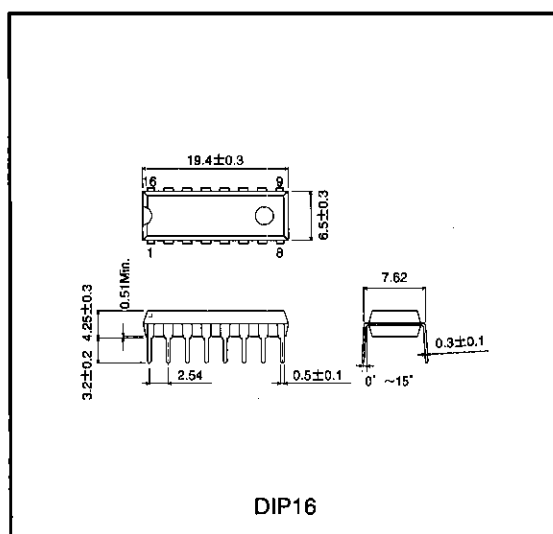


Fig. 2

●External dimensions (Unit: mm)



Notes

- The contents described in this catalogue are correct as of March 1997.
- No unauthorized transmission or reproduction of this book, either in whole or in part, is permitted.
- The contents of this book are subject to change without notice. Always verify before use that the contents are the latest specifications. If, by any chance, a defect should arise in the equipment as a result of use without verification of the specifications, ROHM CO., LTD., can bear no responsibility whatsoever.
- Application circuit diagrams and circuit constants contained in this data book are shown as examples of standard use and operation. When designing for mass production, please pay careful attention to peripheral conditions.
- Any and all data, including, but not limited to application circuit diagrams, information, and various data, described in this catalogue are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO., LTD., disclaims any warranty that any use of such device shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes absolutely no liability in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices; other than for the buyer's right to use such devices itself, resell or otherwise dispose of the same; no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by ROHM CO., LTD., is granted to any such buyer.
- The products in this manual are manufactured with silicon as the main material.
- The products in this manual are not of radiation resistant design.

The products listed in this catalogue are designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys). Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers, or other safety devices) please be sure to consult with our sales representatives in advance.

- Notes when exporting
 - It is essential to obtain export permission when exporting any of the above products when it falls under the category of strategic material (or labor) as determined by foreign exchange or foreign trade control laws.
 - Please be sure to consult with our sales representatives to ascertain whether any product is classified as a strategic material.