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.

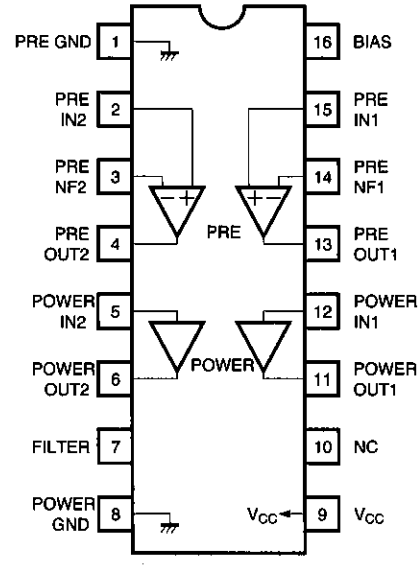
●Applications

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 μVrms), and low distortion (0.03%).
5) The power amplifiers have high output (40mW × 2), low noise (80 μVrms), and low distortion (0.5%).

●Block diagram



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●Absolute maximum ratings (Ta = 25℃)

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	4.5	V
Power dissipation	Pd	1000*1	mW
Operating temperature	Topr	−25~75	℃
Storage temperature	Tstg	−55~125	℃

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

●Recommended operating conditions (Ta = 25℃)

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

●Electrical characteristics (unless otherwise specified Ta = 25℃, 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	μVrms	Rg=2.2kΩ, BPF20~20kHz	Fig.1
Ripple rejection	RR_1	40	47	−	dB	V_{RR}=−20dBm, f=100Hz NAB33dB, Rg=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	μVrms	Rg=0Ω, BPF20~20kHz	Fig.1
Ripple rejection	RR_2	35	48	−	dB	V_{RR}=−20dBm, f=100Hz, Rg=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}, Rg=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-Rg=2.2kΩ, VR Max.*2 Single channel Power-Vo=-5dBm BPF20~20kHz	Fig.1
Leakage from preamp to power amp for signal leak VR Min.	SL	−	−63	−57	dBm	Power-Rg=0Ω*3 When both channels are operating Pre V_{OUT}=-12dBm	Fig.1

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

VB2: Voltage at each end of Rg=10kΩ.

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

*3 Power amplifier signal source impedance is 0Ω

●Measurement circuit

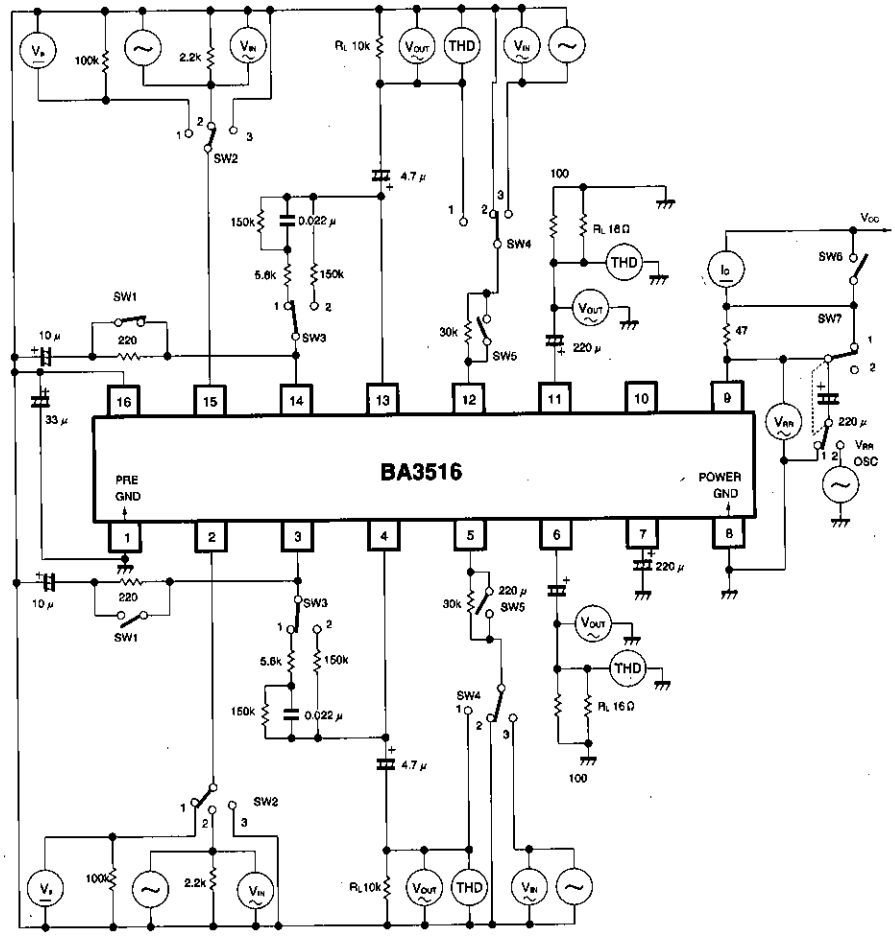


Fig. 1

●Application example

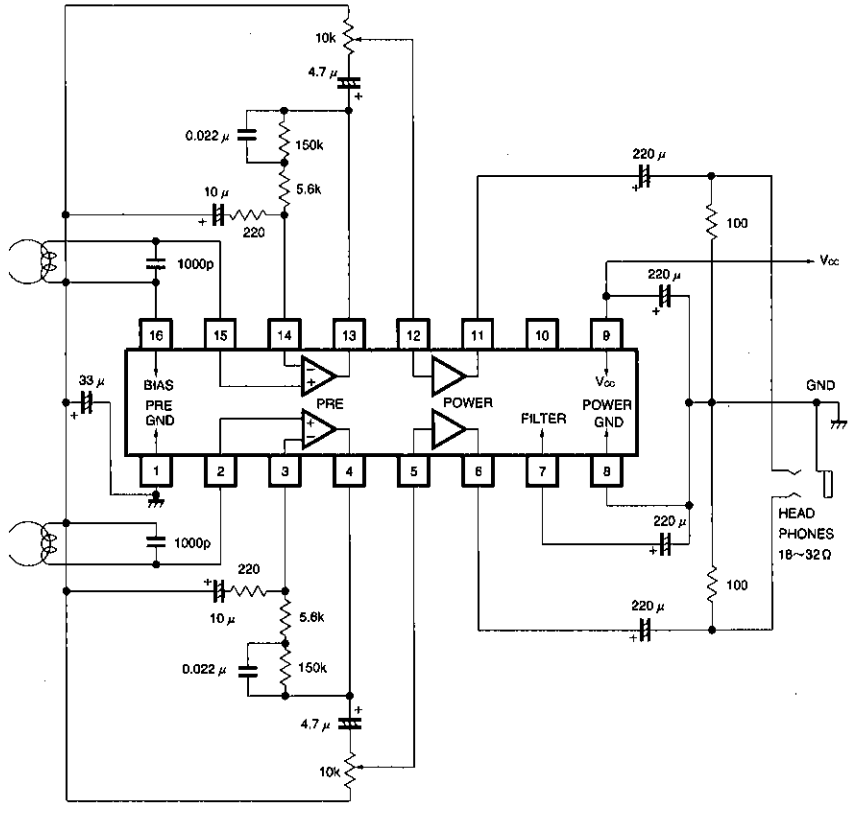
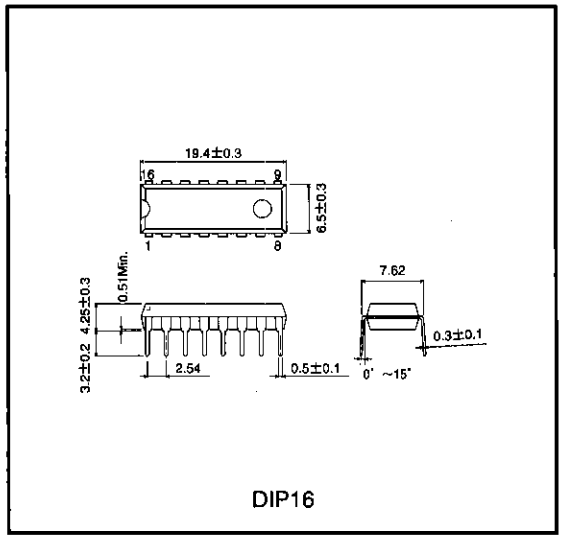


Fig. 2

●External dimensions (Unit: mm)



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