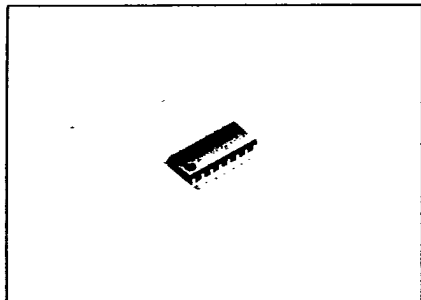


**3V-400mW BTL Power Amplifier  
BA5208AF**

T-77-21



**Dimensions (Unit : mm)**

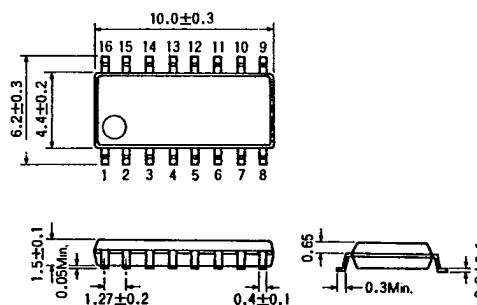


Fig. 1

The BA5208AF is a high-power dual power amplifier designed for BTL operation. The device can drive a load impedance of as low as 8Ω in BTL connection, and as low as 4Ω in OTL connection. It has a filter output pin for a preamplifier and a built-in muting circuit.

**Features**

1. High output power of 400 mW into 8Ω loads in BTL connection, and 200mW×2 into 4Ω loads in OTL connections.
2. Requires neither large bootstrap capacitors nor output coupling when in BTL connection.
3. Low distortion.
4. Low noise.
5. Minimal power-on/off pop noise.
6. Built-in muting circuit.
7. Compact 16-pin MF package.

**Block Diagram**

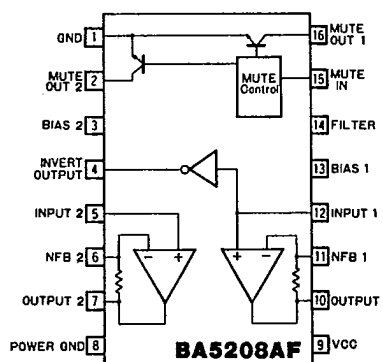


Fig. 2

**Applications**

- 3V Compact cassette recorders
- 3V Microcassette recorders
- 3V Radio cassette recorders

**Absolute Maximum Ratings (Ta=25°C)**

Parameter	Symbol	Conditions	Unit
Supply voltage	Vcc	4.5	V
Power dissipation	Pd	500*	mW
Operating temperature range	Topr	-25~75	°C
Storage temperature range	Tstg	-55~125	°C

\* Derating is done at 5mW/°C for operation above Ta=25°C

**Recommended Operating Conditions**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	Vcc	2	3	4	V
Load impedance (BTL)	RL	8	—	—	Ω
Load impedance (OTL)	RL	4	—	—	Ω

Electrical Characteristics / BTL ( $T_a=25^{\circ}\text{C}, V_{CC}=3\text{V}, R_L=8\Omega$ )

Parameter	Symbol	Min	Typ	Max	Unit	Conditions	Test circuit
Quiescent current	$I_o$	—	14	24	mA	—	Fig. 3
Closed loop voltage gain	$G_{VC}$	36.5	39	41.5	dB	$V_{OUT}=0\text{dBm}, f=1\text{kHz}$	Fig. 3
Rated output power	$P_{OUT}$	350	400	—	mW	$\text{THD}=10\%, f=1\text{kHz}$	Fig. 3
Total harmonic distortion	THD	—	0.5	3.0	%	$P_{OUT}=100\text{mW}, f=1\text{kHz}$	Fig. 3
Output noise voltage	$V_{NO}$	—	200	380	$\mu\text{Vms}$	$R_g=0\Omega, \text{BPF}=20\sim 20\text{kHz}$	Fig. 3
Ripple rejection ratio	RR	18	25	—	dB	$V_{RR}=-20\text{dBm}, f_{RR}=100\text{Hz}$	Fig. 3
Input impedance	$R_{IN}$	21	28	35	$\text{k}\Omega$	—	Fig. 3
Muting transistor resistance	$R_{MUTE}$	—	5	30	$\Omega$	$V_{IN}=0.5\text{V}, f=1\text{kHz}$	Fig. 3

Electrical Characteristics / OTL ( $T_a=25^{\circ}\text{C}, V_{CC}=3\text{V}, R_L=4\Omega$ )

Parameter	Symbol	Min	Typ	Max	Unit	Conditions	Test circuit
Quiescent current	$I_o$	—	14	24	mA	—	Fig. 4
Closed loop voltage gain	$G_{VC}$	29.5	32.5	35.5	dB	$V_{OUT}=0\text{dBm}, f=1\text{kHz}$	Fig. 4
Rated output power	$P_{OUT}$	160	200	—	mW	$\text{THD}=10\%, f=1\text{kHz}$	Fig. 4
Total harmonic distortion	THD	—	2.0	5.5	%	$P_{OUT}=50\text{mW}, f=1\text{kHz}$	Fig. 4
Output noise voltage	$V_{NO}$	—	50	120	$\mu\text{Vms}$	$R_g=0\Omega, \text{BPF}=20\sim 20\text{kHz}$	Fig. 4
Ripple rejection	RR	36	45	—	dB	$V_{RR}=-20\text{dBm}, f_{RR}=100\text{Hz}$	Fig. 4
Input impedance	$R_{IN}$	—	27	—	$\text{k}\Omega$	—	Fig. 4
Muting transistor resistance	$R_{MUTE}$	—	5	30	$\Omega$	$V_{IN}=0.5, f=1\text{kHz}$	Fig. 4

Test Circuits

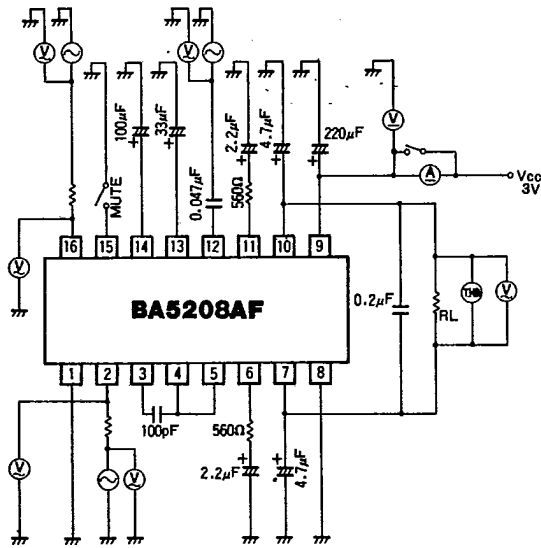


Fig. 3 BTL

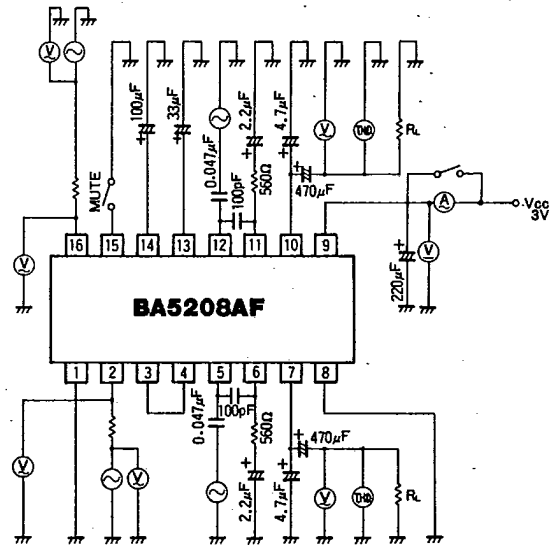


Fig. 4 OTL

Application Examples

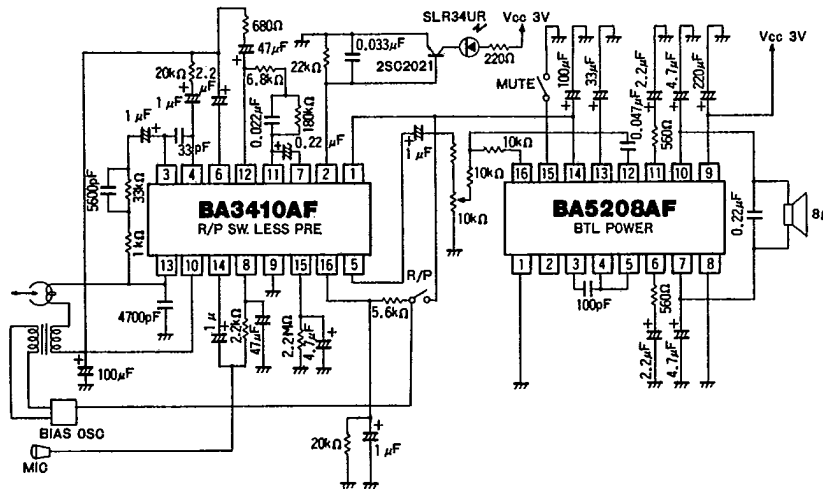


Fig. 5 BTL application example

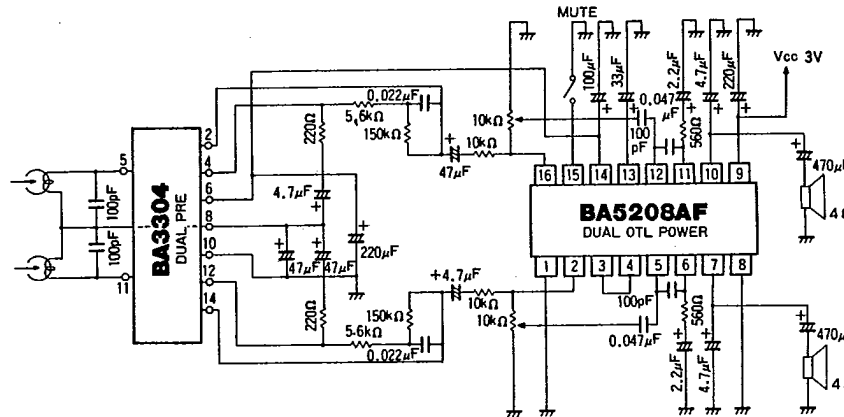


Fig. 6 OTL application example

Precautions for Use

- 1) If the device is used at just below the absolute maximum ratings, a slight change in operating conditions may cause the device to exceed the maximum ratings, possibly leading to unrecoverable damage. Allow reasonable margins for the operating parameters so that the device never exceeds the absolute maximum rating under any circumstances.
- 2) If the device is powered when a short-circuit failure exists between its pins, unrecoverable damage may result. Make sure that no short circuit (due to a solder bridge, etc.) exists between pins before powering the device. The BA5208AF requires special attention on this point as it has a small pin pitch of 1.27 mm and is designed for mounting on pattern foils.
- 3) The BA5208AF delivers a maximum power of 400 mW/8 Ω out of its compact mini-flat package. Carefully design the circuit foil pattern to allow for adequate heat dissipation.

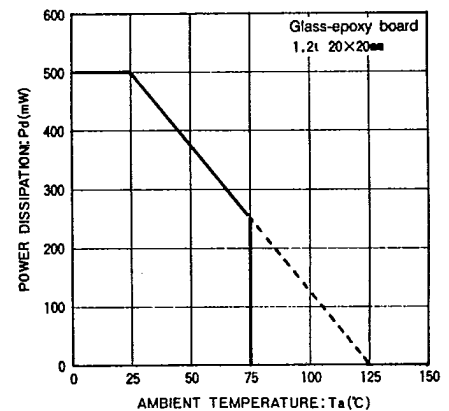


Fig. 7 Thermal derating curve

Electrical Characteristic Curves

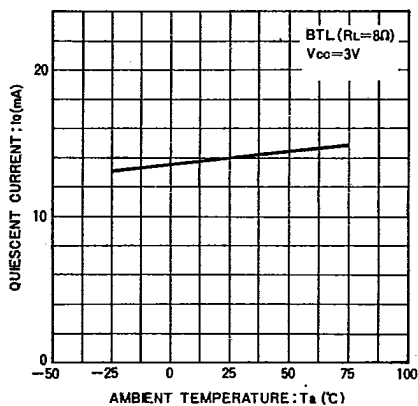


Fig. 8 Quiescent current vs. ambient temperature

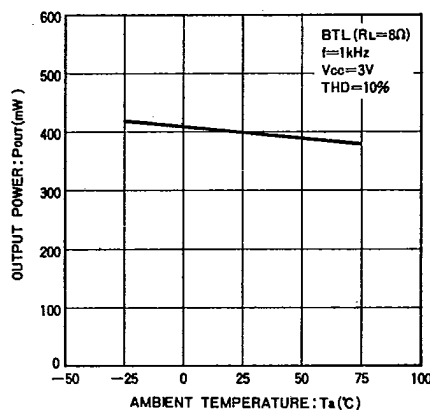


Fig. 9 Output power vs. ambient temperature

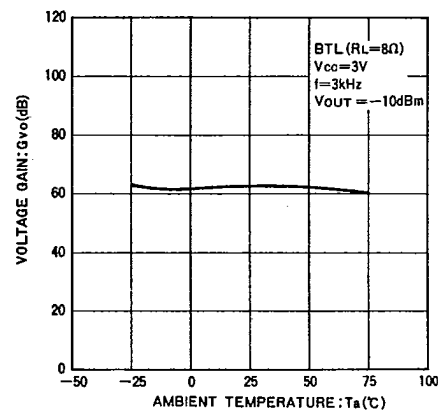


Fig. 10 Voltage gain vs. ambient temperature

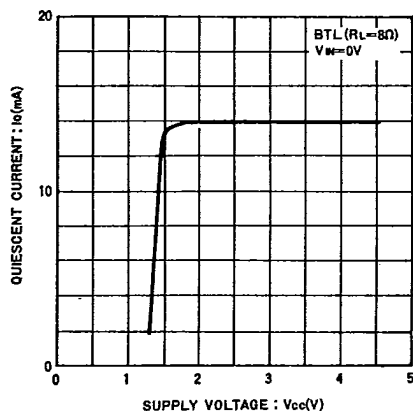


Fig. 11 Quiescent current vs. supply voltage

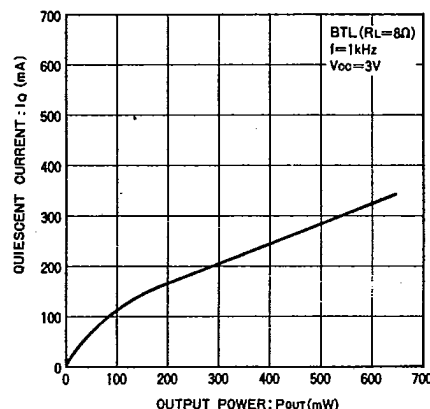


Fig. 12 Quiescent current vs. output power

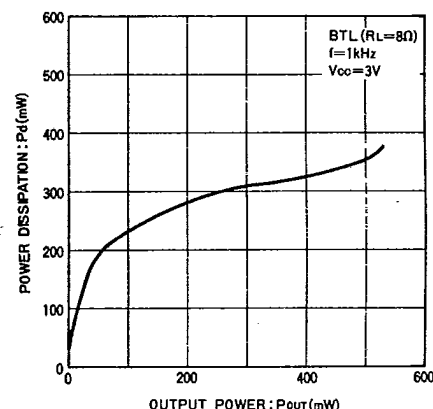


Fig. 13 Power dissipation vs. output power

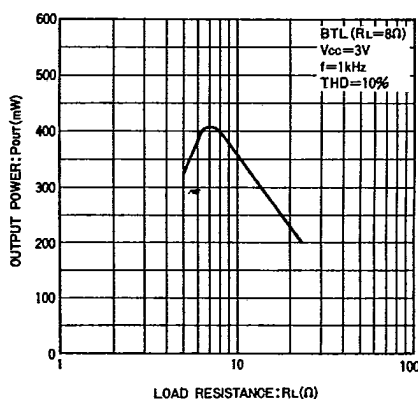


Fig. 14 Output power vs. load resistance

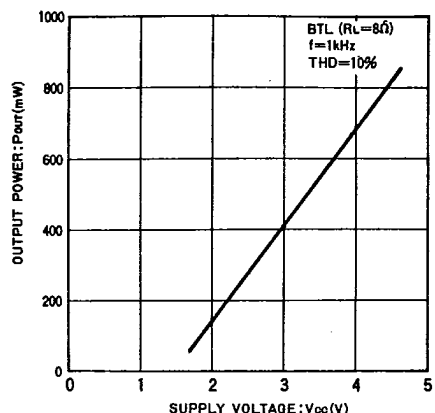


Fig. 15 Output power vs. supply voltage

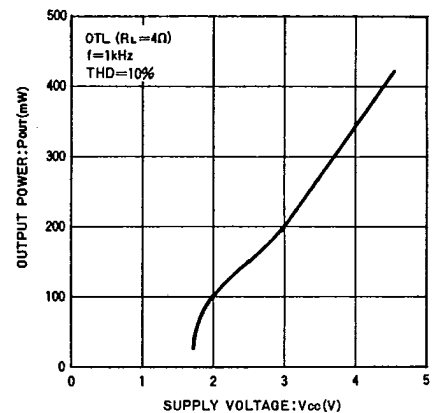


Fig. 16 Output power vs. supply voltage

Electrical Characteristic Curves

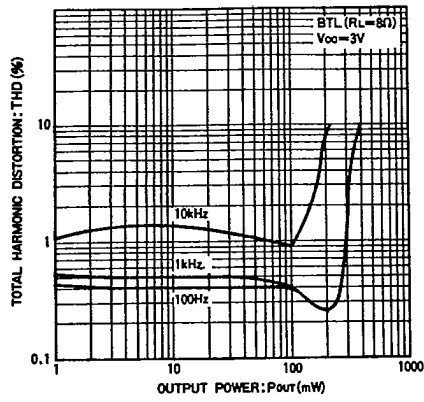


Fig. 17 Total harmonic distortion vs. output power

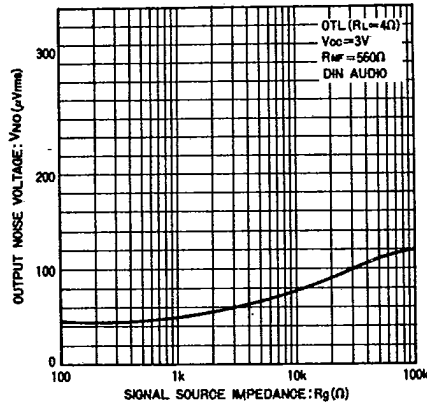


Fig. 18 Output noise voltage vs. signal source impedance

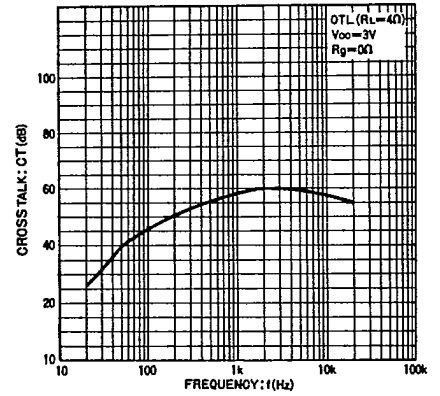


Fig. 19 Crosstalk vs. frequency

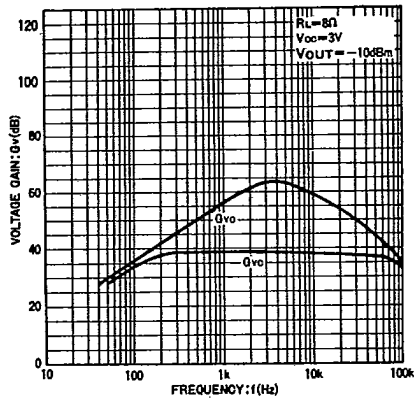


Fig. 20 Voltage gain vs. frequency (BTL)

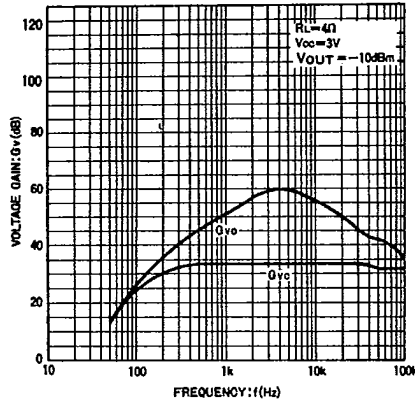


Fig. 21 Voltage gain vs. frequency (OTL)

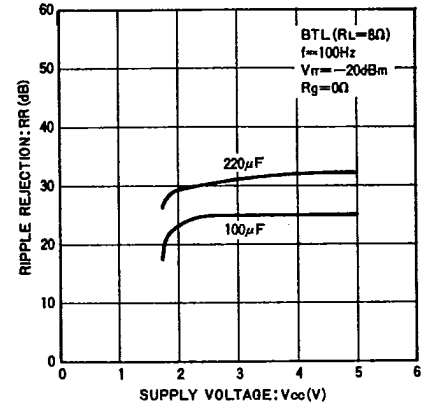


Fig. 22 Ripple rejection ratio vs. supply voltage