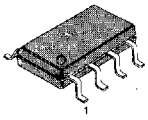
LOW VOLTAGE AUDIO AMPLIFIER

The KA8602 is the audio power amplifier available for low voltages. This supplies differential outputs for maximizing output swing at low voltages. KA8602 doesn't need coupling capacitors to the speaker. The gain of this amp is controlled easily by two external resistors.

8-DIP-300

8-SOP-225



FEATURES

- **Wide Supply Voltage (2 ~ 16V)**
- **Low Quiescent Supply Current (I_{CC} = 2.7mA: Typ)**
- **Easy Gain Control**
- **Medium Output Power**
  P_O = 250mW at V_{CC} = 6V, R_L = 32Ω, THD = 10%
- **Minimum External Parts**
- **Load Impedance Range (8Ω ~ 100Ω)**
- **Low Distortion**
- **Mute Function (I_{CC} = 65μA: Typ)**

ORDERING INFORMATION

Device	Package	Operating Temperature
KA8602	8-DIP-300	−20~+70°C
KA8602D	8-SOP- 225	

BLOCK DIAGRAM

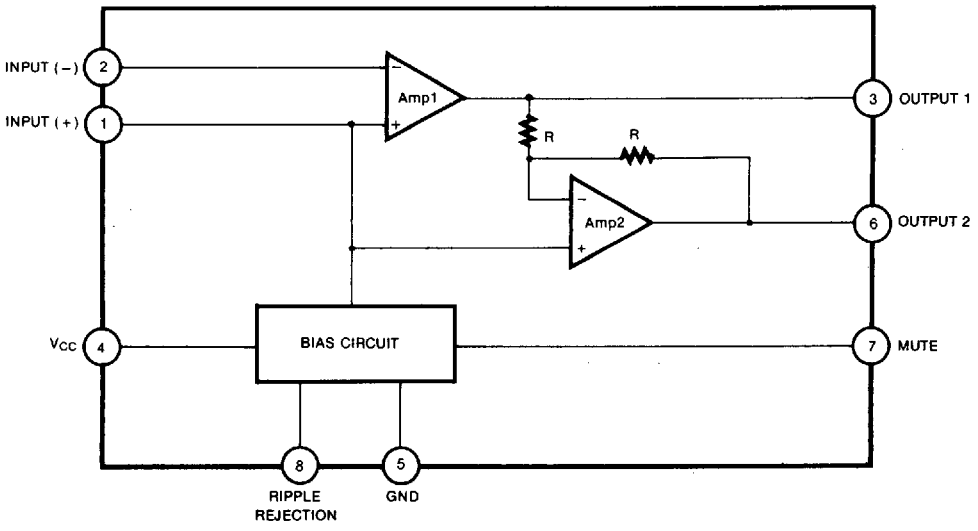


Fig. 1

PIN CONFIGURATION

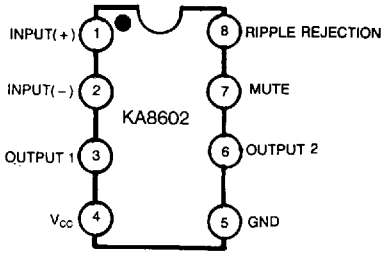


Fig. 2

PIN DESCRIPTION

Pin No	Symbol	Description
1	Input (+)	Analog Ground for the amplifiers. A 1.0μF capacitor at this pin (with a 5.0μF capacitor at pin 8) provides 52dB (Typ) of power supply rejection. Turn-on time of the circuit is affected by the capacitor on this pin. This pin can be used as an alternate input.
2	Input (−)	Amplifier input. The input capacitor and resistor set low frequency rolloff and input impedance. The feedback resistor is connected to this pin and output.
3	Output 1	Amplifier 1's output. The DC Level is ≈ (V_{CC} − 0.7V)/2
4	V_{CC}	DC supply voltage (+2.0 ~ +16V) is applied to this pin.
5	GND	Ground pin.
6	Output 2	Amplifier 2's output. This signal is equal in amplitude, but 180° out of phase with that at output pin. The DC level is ≈ (V_{CC} + 0.7V)/2.
7	Mute	This pin can be used to power down the IC to conserve power, or for muting, or both. When at a logic "Low" (0 to 0.8 volts), the KA8602 is enabled for normal operation. When at a logic "High" (2.0 to V_{CC} volts), the IC is disabled. If Mute is open, that is equivalent to a logic "Low".
8	Ripple Rejection	A capacitor at this pin increases power supply rejection, and affects turn-on time. This pin can be left open if the capacitor at pin 1 is sufficient.

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	−1.0 ~ +18	V
Output Current (output pin)	I_O	±250	mA
Maximum Voltage (input, RR, Mute pin)	$V_{I(MAX)}$	−1.0 ~ V_{CC} + 1.0	V
Applied Output Voltage (output pin) when disabled	V_O	−1.0 ~ V_{CC} + 1.0	V
Junction Temperature	T_J	−55 ~ +140	°C

RECOMMENDED OPERATING CONDITIONS (Ta = 25°C)

Characteristic	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	+2.0		+16	V
Load Impedance	Z_L	8		100	Ω
Peak Load Current	$I_{L(PK)}$			±200	mA
Differential Gain (5KHz Bandwidth)	ΔG_V	0		46	dB
Voltage at Mute (Pin 7)	$V_{I(MUTE)}$	0		V_{CC}	V
Ambient Temperature	Ta	−20		470	°c

ELECTRICAL CHARACTERISTIC

(V_{CC} = 6V, Ta = 25°C, unless otherwise noted)

Characteristic		Symbol	Test Conditions		Min	Typ	Max	Unit
DC ELECTRICAL CHARACTERISTICS								
Operating Current (R_L = 0)		I_{CC}	V_{CC} = 3.0V, Mute = 0.8V V_{CC} = 16.0V, Mute = 0.8V			2.7 3.3	4.0 5.0	mA
			V_{CC} = 3.0V, Mute = 2.0V			65	100	μA
Output Voltage (output pin)		V_O	R_L = 16Ω R_1 = 75KΩ	V_{CC} = 3.0V V_{CC} = 6.0V V_{CC} = 12.0V	1.0	1.15 2.65 5.65	1.25	V
Output Offset Voltage		V_{OO}	V_{CC} = 6.0V, R_f = 75KΩ, R_L = 32Ω		−30	0	+30	mV
Output High Level		V_{OH}	2.0V ≤ V_{CC} ≤ 16V, I_{out} = −75mA			V_{CC} − 1.0		V
Output Low Level		V_{OL}	2.0V ≤ V_{CC} ≤ 16V, I_{out} = 75mA			0.16		V
Input Bias Current (pin 2)		I_{BIAS}				−100	−200	nA
Equipment Resistance		R_{EQ}	pin 1 pin 8		100 18	150 25	220 40	KΩ
Mute	Input Low Voltage	$V_{IL(MUTE)}$					0.8	V
	Input High Voltage	$V_{IH(MUTE)}$			2.0			V
	Input Resistance	$R_{I(MUTE)}$	V_{CC} = Mute = 16V		50	90	175	KΩ
AC ELECTRICAL CHARACTERISTICS								
Open Loop Gain (Amp 1)		$G_{V(AMP1)}$			80			dB
Closed Loop Gain (Amp 2)		$G_{V(AMP2)}$	f = 1.0KHz, R_L = 32Ω		−0.35	0	+0.35	dB
Output Power		P_O	V_{CC} = 3.0V, R_L = 16Ω, THD ≤ 10% V_{CC} = 6.0V, R_L = 32Ω, THD ≤ 10% V_{CC} = 12V, R_L = 100Ω, THD ≤ 10%		55 250 400			mW
Total Harmonic Distortion (f = 1.0KHz)		THD	V_{CC} = 6.0V, R_L = 32Ω, P_O = 125mW V_{CC} ≤ 3.0V, R_L = 8Ω, P_O = 20mW V_{CC} ≤ 12V, R_L = 32Ω, P_O = 200mW			0.5 0.5 0.6	1.0	%
Gain Bandwidth Product		GBW				1.5		MHz
Power Supply Rejection (V_{CC} = 6.0V, ΩV$_{CC}$ = 3.0V)		PSRR	C_1 = ∞, C_2 = 0.01μF C_1 = 0.1μF, C_2 = 0, f = 1.0KHz C_1 = 1.0μF, C_2 = 5.0μF, f = 1.0KHz		50	 12 52		dB
Muting		$G_{V(MUTE)}$	Mute = 2.0V, 1.0KHz ≤ f ≤ 20KHz			>70		dB

APPLICATION CIRCUIT

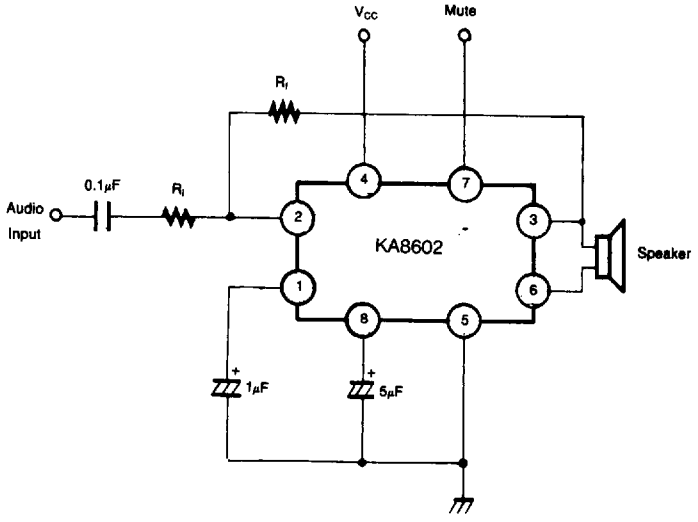


Fig. 3

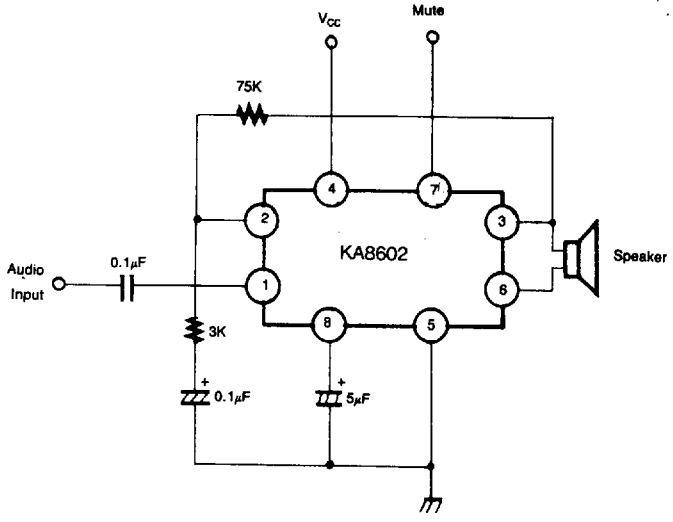


Fig. 4

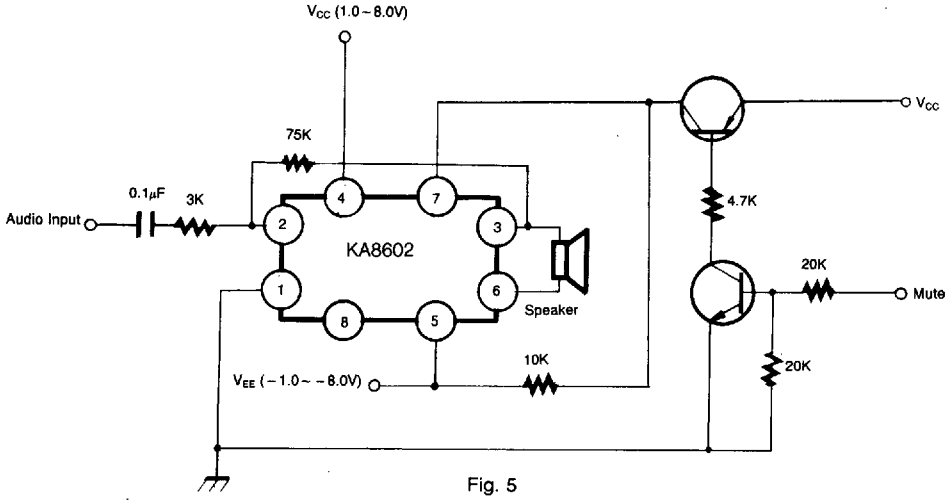


Fig. 5

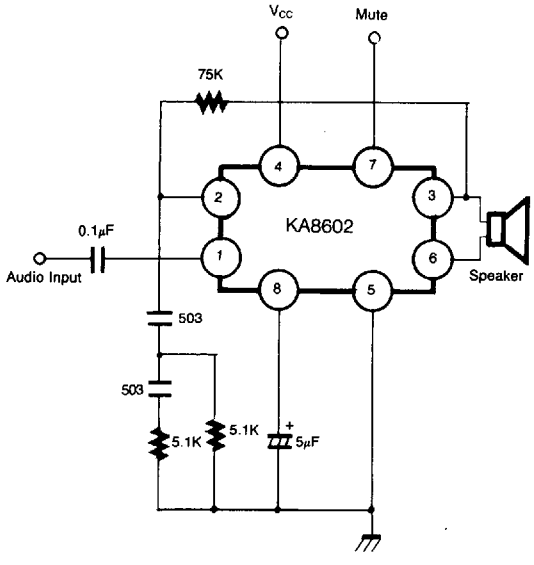


Fig. 6

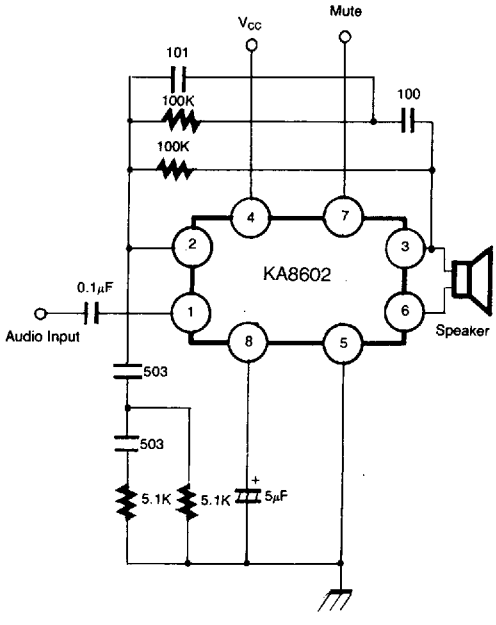


Fig. 7