



## KA8602

## LINEAR INTEGRATED CIRCUIT

### LOW VOLTAGE AUDIO POWER AMPLIFIER

#### DESCRIPTION

The UTC **KA8602** is the audio power amplifier available for low voltage. The UTC **KA8602** supplies differential outputs for maximizing output swing at low voltages. The UTC **KA8602** does not need coupling capacitors to the speaker. The gain of this amplifier is controlled easily by two external resistors.

#### FEATURES

- \*Wide operating supply voltage:  $V_{CC}=2V\sim 16V$
- \*Low quiescent supply current(  $I_{CC}=2.7mA$ , typ)
- \*Medium output power ( $P_{OUT}=250mW$  at  $V_{CC}=6V$ ,  $R_L=32ohm$ , THD=10%)
- \*Load impedance range: 8~100ohm
- \*Mute function ( $I_{CC}=65\mu A$ , typ)
- \*Minimum number of external parts required.
- \*Low distortion

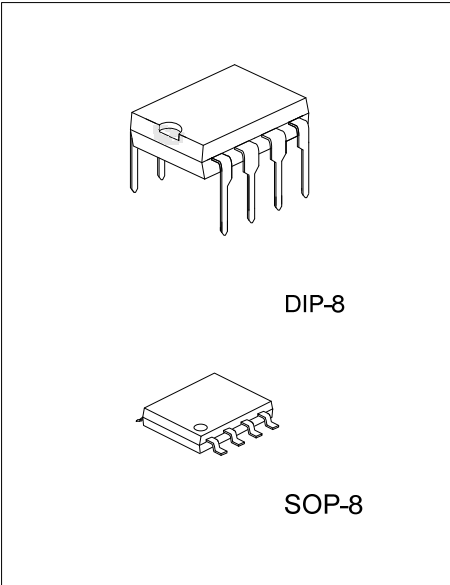
#### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
KA8602L-D08-T	KA8602G-D08-T	DIP-8	Tube
-	KA8602G-S08-R	SOP-8	Tape Reel

	<p>(1) T: Tube, R: Tape Reel  (2) D08: DIP-8, S08: SOP-8  (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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#### MARKING

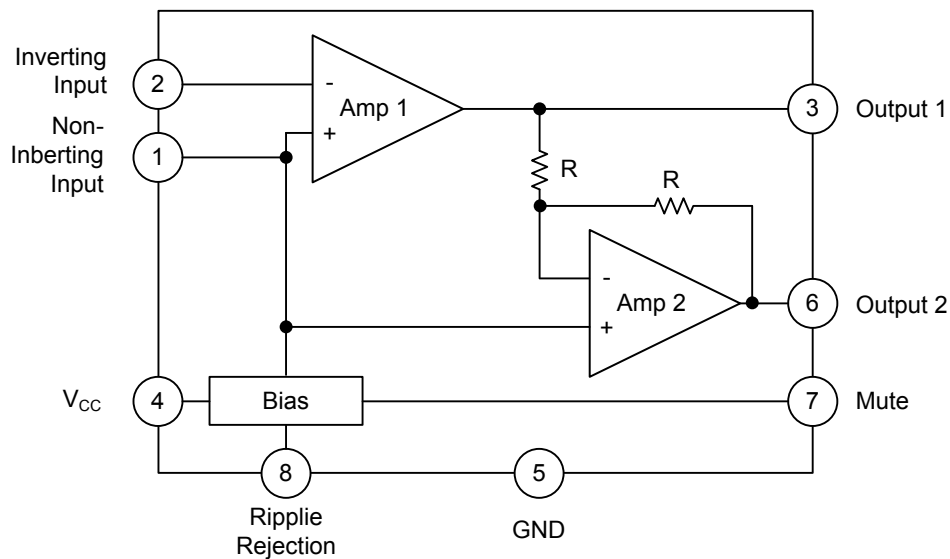
DIP-8	SOP-8



### ■ PIN CONFIGURATIONS

PIN	NAME	DESCRIPTION
1	Input(+)	Analog Ground for the amplifiers. A 1 $\mu$ F capacitor at this pin (with a 5 $\mu$ F 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 alternative input.
2	Input(-)	Amplifier input. The input capacitor and resistor set low frequency roll-off and input impedance. The feedback resistor is connected between this pin and output 1.
3	Output 1	Amplifier 1's output. The DC level is about $(V_{CC}-0.7V)/2$ .
4	V <sub>CC</sub>	DC supply voltage is applied to this pin ( $V_{CC}=2\sim 16V$ ).
5	GND	Ground pin.
6	Output 2	Amplifier 2's output. This signal is equal in amplitude, but 180 $^{\circ}$ out of phase with that output 1, the DC level is about $(V_{CC}-0.7V)/2$ .
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" (less than 0.8V), the IC is enabled for normal operation. When at a logic "HIGH" (2V to V <sub>CC</sub> ), the IC is disabled. If Mute is open, that is equivalent to a logic "LOW".
8	Ripple Rejection	A capacitor at this pin increase power supply rejection, and affects turn-on time. This pin can be left open if the capacitor at pin 1 is sufficient.

### ■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-1~18	V
Output Current	$I_{OUT}$	+250	mA
Maximum Input, Ripple Rejection, Mute Pin Voltage	$V_I(\text{max})$	-1~ $V_{CC}+1$	V
Applied Output Voltage( Output Pin When Disabled)	$V_{OUT}$	-1~ $V_{CC}+1$	V
Temperature Junction	$T_J$	-55 ~ +150	$^{\circ}\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

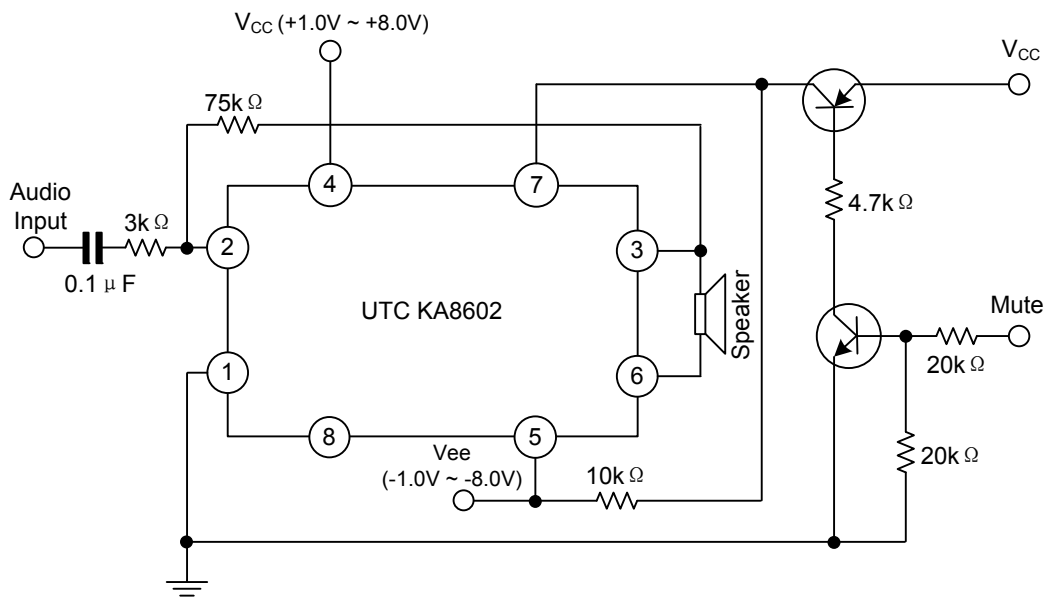
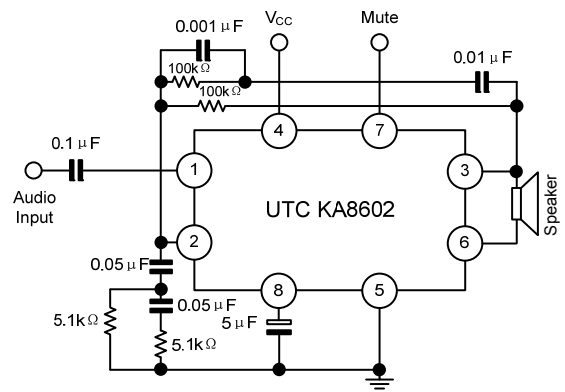
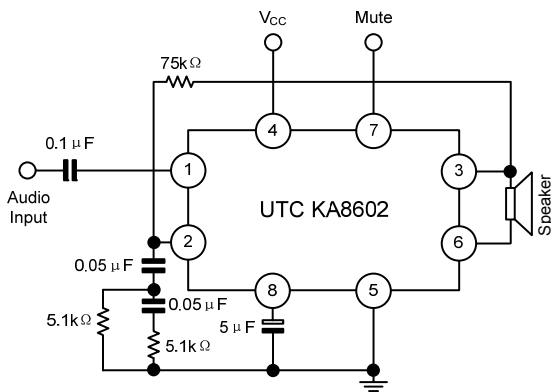
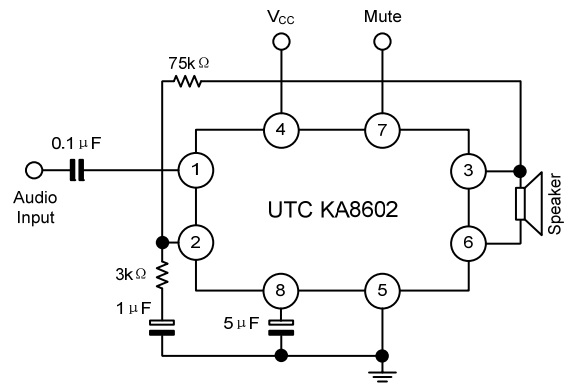
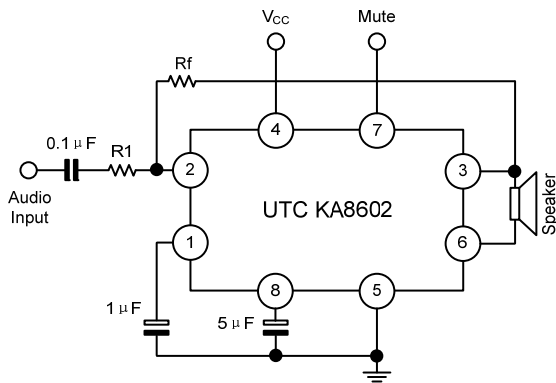
■ RECOMMENDED OPERATION CONDITIONS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	2~16	V
Voltage at Mute	$V_{I(\text{MUTE})}$	0~ $V_{CC}$	V
Peak Load Current	$I_{L(\text{PEAK})}$	$\pm 200$	mA
Load Impedance	$Z_L$	8~100	$\Omega$
Differential Gain (5KHz Bandwidth)	$\Delta G_V$	0~46	dB
Ambient Temperature	$T_A$	-20~+70	$^{\circ}\text{C}$

■ ELECTRICAL CHARACTERISTICS ( $V_{CC}=6\text{V}$ ,  $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>DC PARAMETER</b>						
Operating Current	$I_{CC}$	$V_{CC}=3\text{V}$ , Mute=0.8V		2.7	4	mA
		$V_{CC}=16\text{V}$ , Mute=0.8V		3.3	5	mA
		$V_{CC}=3\text{V}$ , Mute=2V		65	100	$\mu\text{A}$
Output Voltage	$V_{OUT}$	$V_{CC}=3\text{V}$ , $R_L=16\Omega$ , $R_1=75\text{K}\Omega$	1	1.15	1.25	V
		$V_{CC}=6\text{V}$ , $R_L=16\Omega$ , $R_1=75\text{K}\Omega$		2.65		V
		$V_{CC}=12\text{V}$ , $R_L=16\Omega$ , $R_1=75\text{K}\Omega$		5.65		V
Output Offset Voltage	$V_{O(\text{OFF})}$	$V_{CC}=6\text{V}$ , $R_F=75\text{K}\Omega$ , $R_L=32\Omega$	-30	0	30	mV
Output High Level	$V_{OH}$	$2\text{V}<V_{CC}<16\text{V}$ , $I_{OUT}=-75\text{mA}$		$V_{CC}-1$		V
Output Low Level	$V_{OL}$	$2\text{V}<V_{CC}<16\text{V}$ , $I_{OUT}=75\text{mA}$		0.16		V
Input Bias Current	$I_{I(\text{BIAS})}$			-100	-200	nA
Equivalent Resistance	$R_{EQ}$	Pin 1	100	150	220	$\text{K}\Omega$
		Pin 8	18	25	40	$\text{K}\Omega$
<b>AC PARAMETER</b>						
Open Loop Gain of Amp. 1	$G_{V1}$		80			dB
Open Loop Gain of Amp. 2	$G_{V2}$	$f=1\text{KHz}$ , $R_L=32\Omega$	-0.35	0	0.35	dB
Output Power	$P_{OUT}$	$V_{CC}=3\text{V}$ , $R_L=6\Omega$ , THD<10%	55			mW
		$V_{CC}=6\text{V}$ , $R_L=32\Omega$ , THD<10%	250			mW
		$V_{CC}=12\text{V}$ , $R_L=100\Omega$ , THD<10%	400			mW
Total Harmonic Distortion (f=1KHz)	THD	$V_{CC}=6\text{V}$ , $R_L=32\Omega$ , $P_{OUT}=125\text{mW}$		0.5	1	%
		$V_{CC}<3\text{V}$ , $R_L=8\Omega$ , $P_{OUT}=20\text{mW}$		0.5		%
		$V_{CC}<12\text{V}$ , $R_L=32\Omega$ , $P_{OUT}=200\text{mW}$		0.6		%
Gain Bandwidth Product	GBW			1.5		MHz
Power Supply Rejection ( $V_{CC}=6\text{V}$ , $\Delta V_{CC}=3\text{V}$ )	PSRR	$C_1=\infty$ , $C_2=0.01\mu\text{F}$	50			dB
		$C_1=0.1\mu\text{F}$ , $C_2=0$ , $f=1\text{KHz}$		12		dB
		$C_1=1\mu\text{F}$ , $C_2=5\mu\text{F}$ , $f=1\text{KHz}$		52		dB
Muting	$G_{V(\text{MUTE})}$	Mute=2V, $1\text{KHz}<f<20\text{KHz}$	70			dB

## APPLICATION CIRCUIT



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