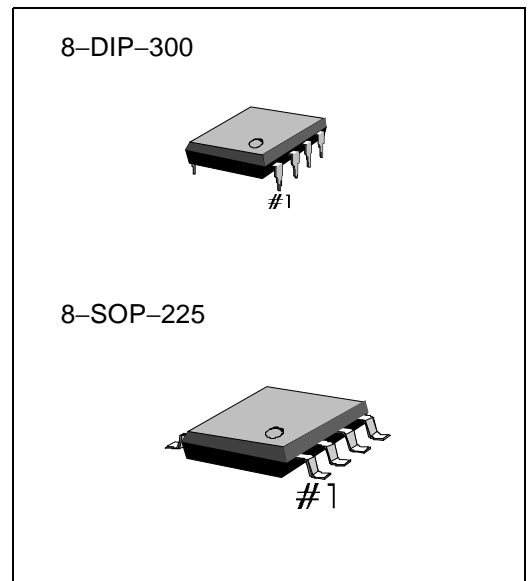


**INTRODUCTION**

The S1T8602B is the audio power amplifier available for low voltages. S1T8602B supplies differential outputs for maximizing output swing at low voltages. S1T8602B doesn't need coupling capacitors to the speaker. The gain of this amp is controlled easily by two external resistors.

**FEATURES**

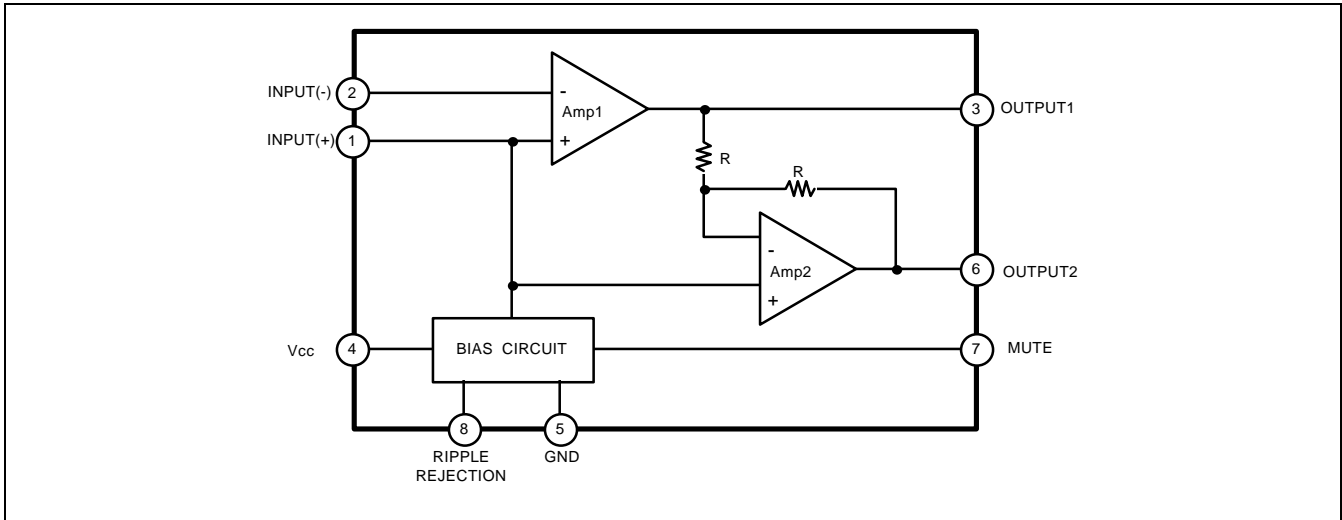
- Wide Supply Voltage (2 ~ 16V)
- Low Quiescent Supply Current ( $I_{CC} = 2.7\text{mA}$  : Typ)
- Easy Gain Control
- Medium Output Power  
 $P_O = 250\text{mW}$  at  $V_{CC} = 6\text{V}$ ,  $R_L = 32\Omega$ , THD = 10%
- Minimum External Parts
- Various Load Impedance Range ( $8\Omega \sim 100\Omega$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



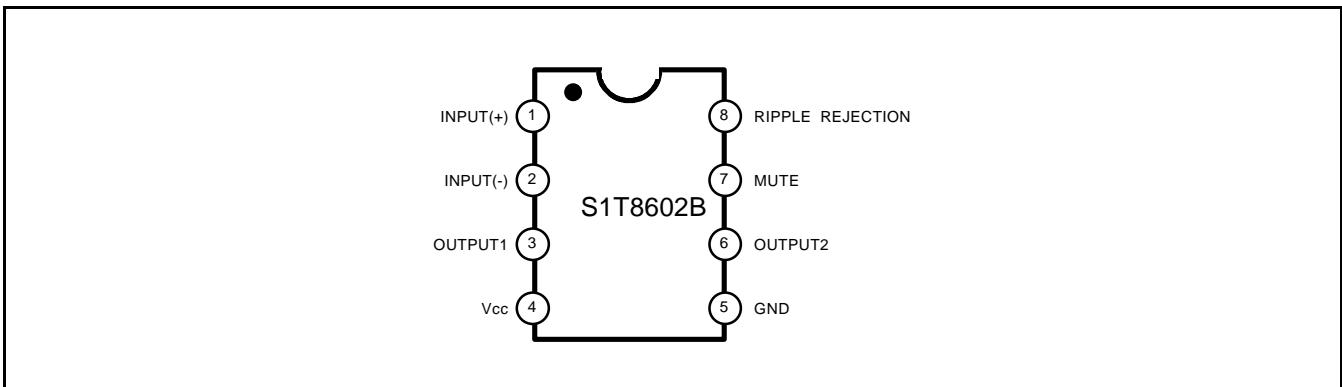
**ORDERING INFORMATION**

Device	Package	Operating Temperature
S1T8602B01-D0B0	8-DIP-300	- 20°C ~ +70°C
S1T8602B01-S0B0	8-SOP-225	

**BLOCK DIAGRAM**



**PIN CONFIGURATION**



**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 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 output1.
3	Output 1	The output of Amplifier 1. 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	The output of Amplifier 2. This signal is equal in amplitude, but 180° out of phase with that at output1. 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 S1T8602B 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**

Characteristic	Symbol	Vale	Unit
Supply Voltage	$V_{CC}$	- 1.0 ~ + 18	V
Output Current (output pin)	$I_O$	± 250	mA
Maximum Voltage (input, Ripple rejection, 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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	$V_{CC}$	+2.0	–	+16	V
Load Impedance	$Z_L$	8	–	100	W
Peak Load Current	$I_L$ (PK)	– 200	–	± 200	mA
Differential Gain (5KHz Bandwidth)	$\Delta G_V$	0	–	46	dB
Voltage at Mute (Pin 7)	$V_I$ (MUTE)	0	–	$V_{CC}$	V
Ambient Temperature	$T_a$	–20	–	470	°C

## ELECTRICAL CHARACTERISTIC

(V<sub>CC</sub> = 6V, T<sub>a</sub> = 25°C, unless otherwise noted)

Characteristic		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>DC ELECTRICAL CHARACTERISTICS</b>							
Operating Current (R <sub>L</sub> = 0)		$I_{CC}$	$V_{CC} = 3.0V, \text{Mute} = 0.8V$	–	2.7	4.0	mA
			$V_{CC} = 16.0V, \text{Mute} = 0.8V$		3.3	5.0	
			$V_{CC} = 3.0V, \text{Mute} = 2.0V$	–	65	100	μA
Output Voltage (output pin)		$V_O$	$R_L = 16\Omega$ $R_1 = 75k\Omega$	$V_{CC} = 3.0V$ $V_{CC} = 6.0V$ $V_{CC} = 12.0V$	1.0	1.15 2.65 5.65	1.25 V
Output Offset Voltage		$V_{OO}$	$V_{CC} = 6.0V, R_f = 75k\Omega, R_L = 32\Omega$	–30	0	+30	mV
Output High Level		$V_{OH}$	$2.0V \leq V_{CC} \leq 16V, I_{out} = -75mA$	–	$V_{CC} - 1.0$	–	V
Output Low Level		$V_{OL}$	$2.0V \leq V_{CC} \leq 16V, I_{out} = 75mA$	–	0.16	–	V
Input Bias Current (pin 2)		$I_{BIAS}$	–	–	–100	–200	nA
Equivalent 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)	$V_{CC} = \text{Mute} = 16V$	50	90	175	kΩ
<b>AC ELECTRICAL CHARACTERISTICS</b>							
Open Loop Gain (Amp 1)		$G_V$ (AMP1)	–	80	–	–	dB
Close Loop Gain (Amp 2)		$G_V$ (AMP2)	$f = 1.0kHz, R_L = 32\Omega$	–0.35	0	+0.35	dB
Output Power		$P_O$	$V_{CC} = 3.0V, R_L = 6\Omega, THD \leq 10\%$ $V_{CC} = 6.0V, R_L = 32\Omega, THD \leq 10\%$ $V_{CC} = 12V, R_L = 100\Omega, THD \leq 10\%$	55 250 400	–	–	mW

**ELECTRICAL CHARACTERISTIC (Continued)**(V<sub>CC</sub> = 6V, T<sub>a</sub> = 25°C, unless otherwise noted)

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Total Harmonic Distortion (f = 1.0kHz)	THD	V <sub>CC</sub> = 6.0V, R <sub>L</sub> = 32Ω, P <sub>O</sub> = 125mW V <sub>CC</sub> ≤ 3.0V, R <sub>L</sub> = 8Ω, P <sub>O</sub> = 20mW V <sub>CC</sub> ≤ 12V, R <sub>L</sub> = 32Ω, P <sub>O</sub> = 200mW	–	0.5 0.5 0.6	1.0	%
Gain Bandwidth Product	GBW	–	–	1.5	–	MHz
Power Supply Rejection (V <sub>CC</sub> = 6.0V, ΔV <sub>CC</sub> = 3.0V)	PSRR	C <sub>1</sub> = ∞, C <sub>2</sub> = 0.01μF C <sub>1</sub> = 0.1μF, C <sub>2</sub> = 0, f = 1.0kHz C <sub>1</sub> = 1.0μF, C <sub>2</sub> = 5.0μF, f = 1.0kHz	50	12 52	–	dB
Muting	G <sub>V (MUTE)</sub>	Mute = 2.0V, 1.0Khz ≤ f ≤ 20kHz	–	> 70	–	dB

APPLICATION CIRCUIT

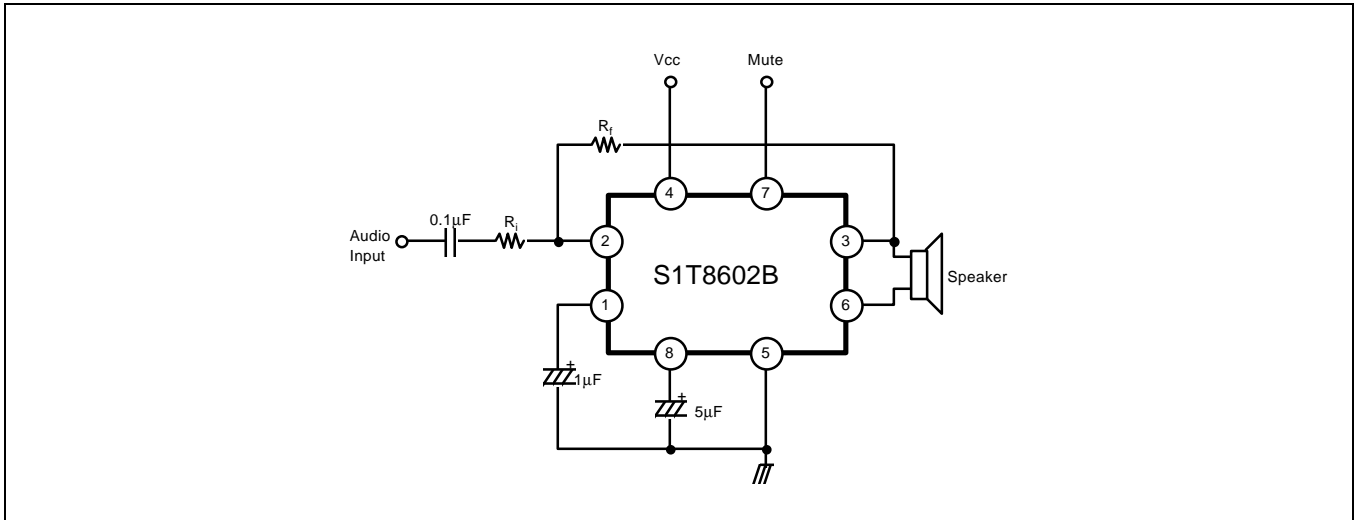


Figure 1.

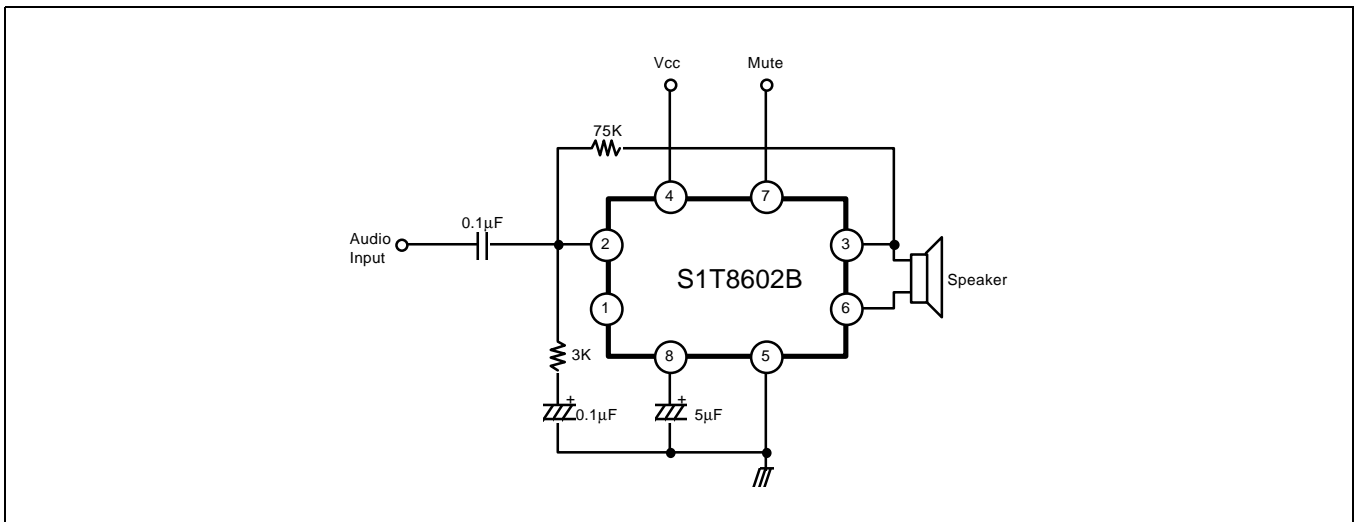


Figure 2.

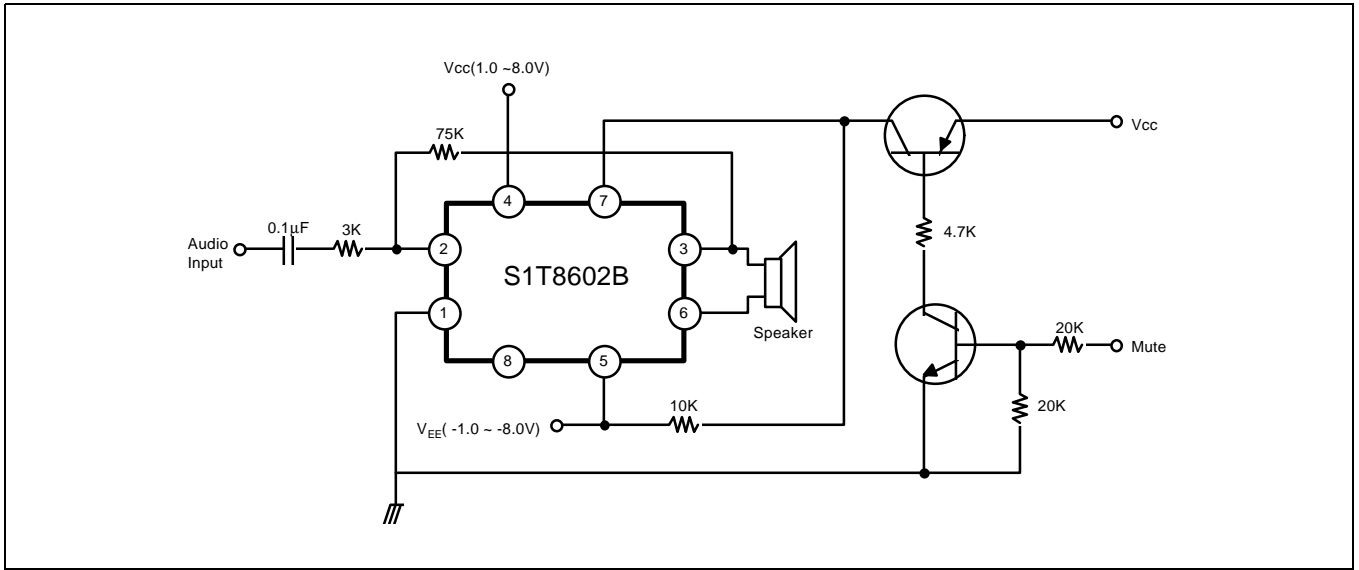


Figure 3.

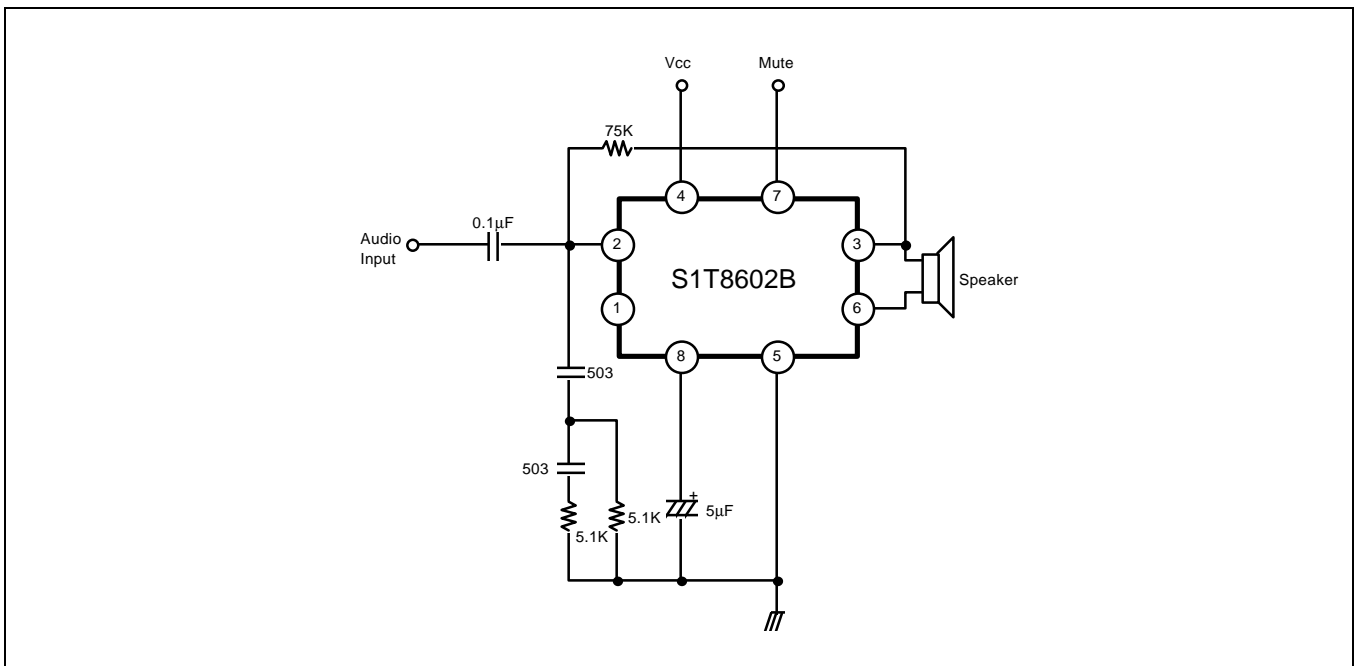


Figure 4.

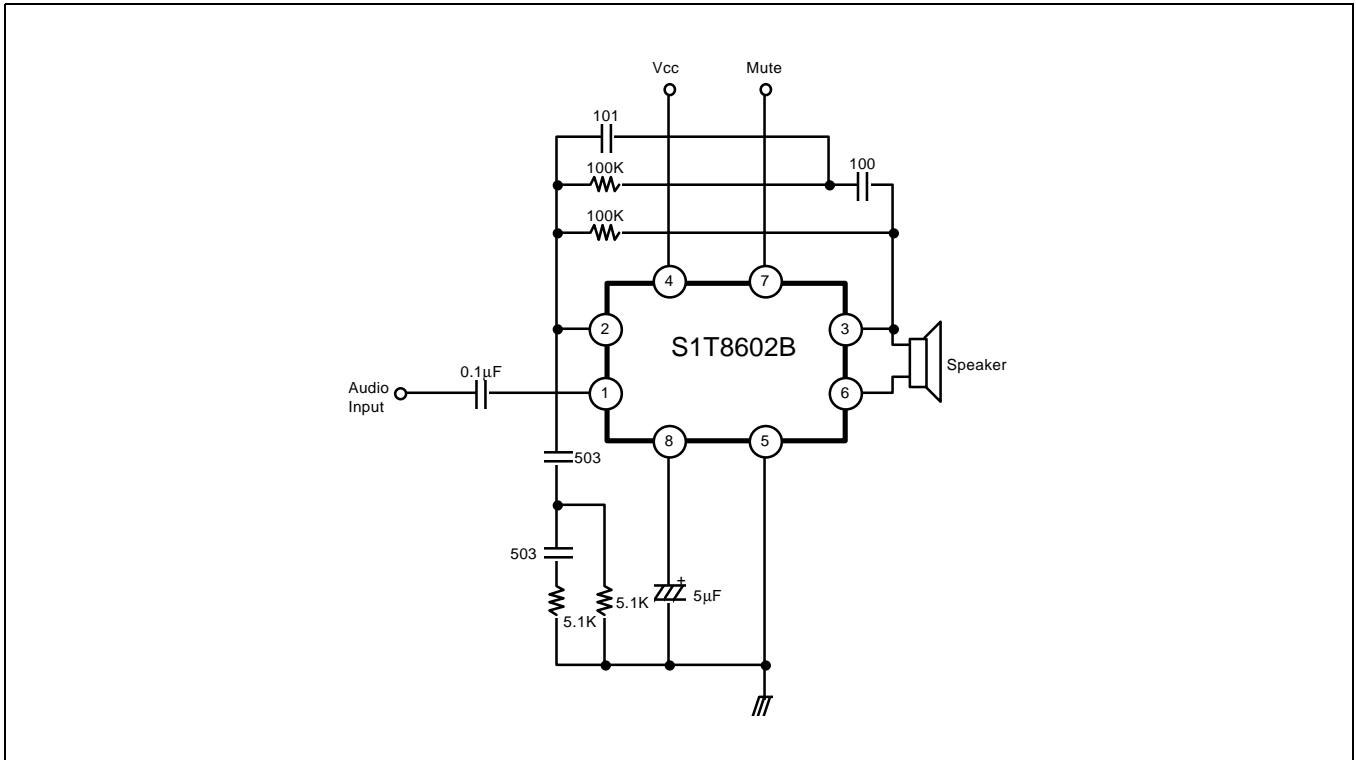


Figure 5.