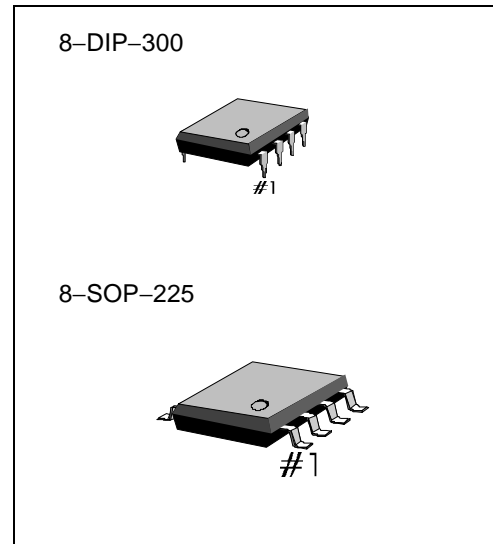


INTRODUCTION

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

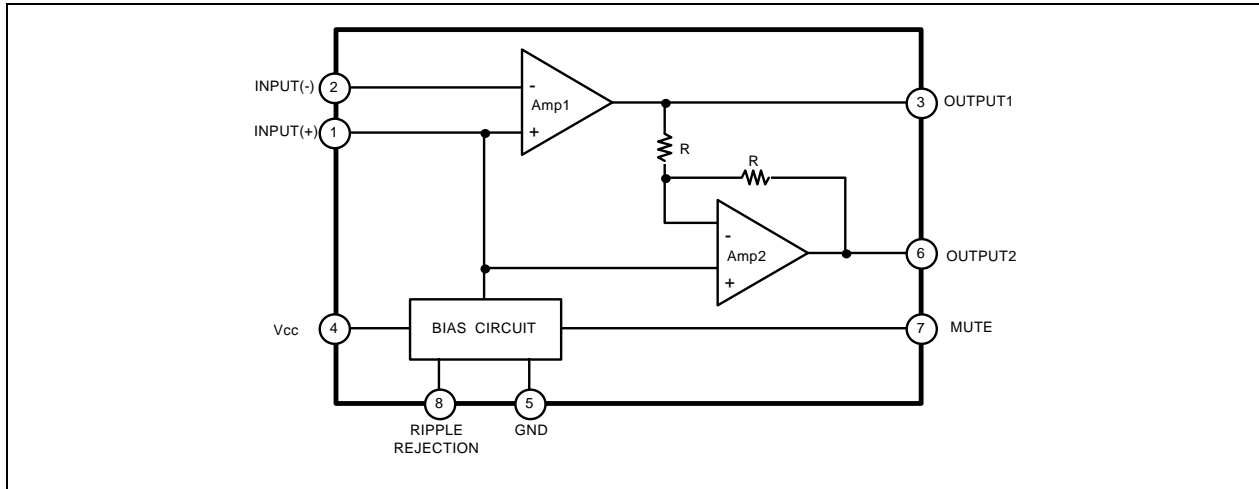
- Wide Supply Voltage (2 ~ 16V)
- Low Quiescent Supply Current ($I_{CC} = 2.7\text{mA}$: Typ)
- Easy Gain Control
- Medium Output Power
 $P_O = 250\text{mW}$ at $V_{CC} = 6\text{V}$, $R_L = 32\Omega$, THD = 10%
- Minimum External Parts
- Various Load Impedance Range ($8\Omega \sim 100\Omega$)
- Low Distortion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



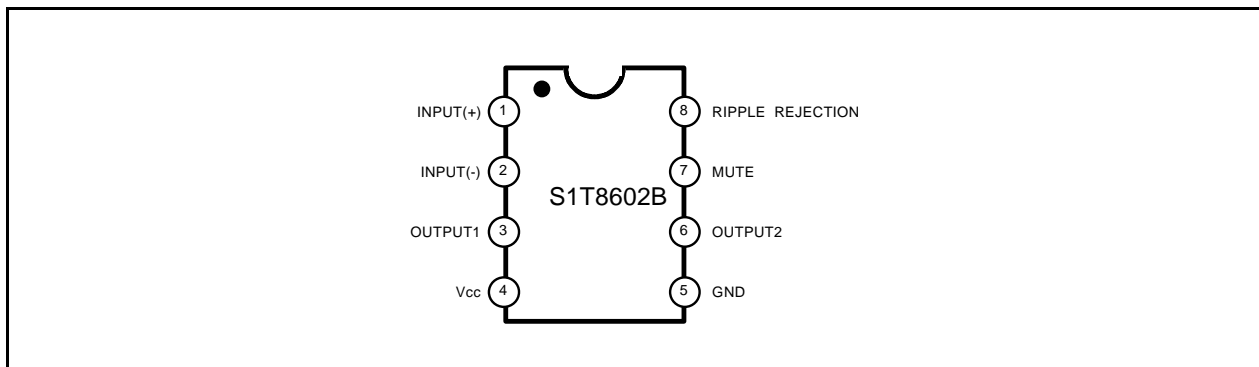
ORDERING INFORMATION

| 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 1.0 μ F capacitor at this pin (with a 5.0 μ 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 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) | ΔG_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_{CC} = 6V, T_a = 25°C, unless otherwise noted)

| Characteristic | Symbol | Test Conditions | Min. | Typ. | Max. | Unit | |
|--------------------------------------|--------------------|---|--|--------------|----------------------|------|----|
| DC ELECTRICAL CHARACTERISTICS | | | | | | | |
| Operating Current (RL = 0) | I_{CC} | $V_{CC} = 3.0V$, Mute = 0.8V | – | 2.7 | 4.0 | mA | |
| | | $V_{CC} = 16.0V$, Mute = 0.8V | | 3.3 | 5.0 | | |
| | | $V_{CC} = 3.0V$, Mute = 2.0V | – | 65 | 100 | μA | |
| Output Voltage (output pin) | V_O | RL = 16Ω R1 = 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} | $2.0V \leq V_{CC} \leq 16V$, 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 | 100 | 150 | 220 | kΩ | |
| | | pin 8 | 18 | 25 | 40 | | |
| 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 |
| AC ELECTRICAL CHARACTERISTICS | | | | | | | |
| Open Loop Gain (Amp 1) | G_V (AMP1) | – | 80 | – | – | dB | |
| Close 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 = 6Ω, THD ≤ 10% | 55 | – | – | mW | |
| | | $V_{CC} = 6.0V$, R _L = 32Ω, THD ≤ 10% | 250 | | | | |
| | | $V_{CC} = 12V$, R _L = 100Ω, THD ≤ 10% | 400 | | | | |

ELECTRICAL CHARACTERISTIC (Continued)(V_{CC} = 6V, T_a = 25°C, unless otherwise noted)

| Characteristic | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|-----------------------|---|------|-------------------|------|------|
| 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, ΔV _{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

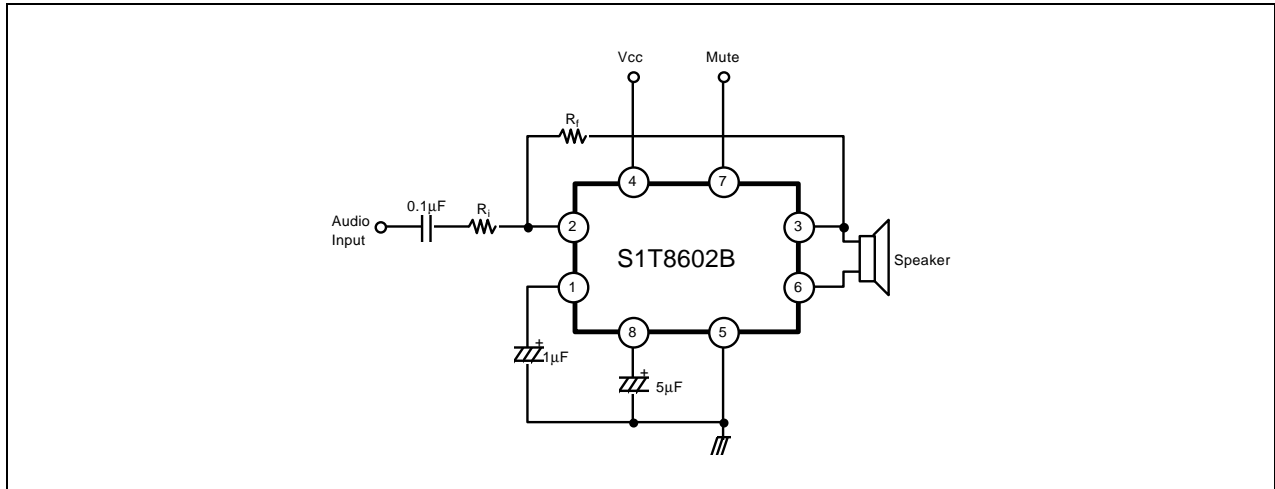


Figure 1.

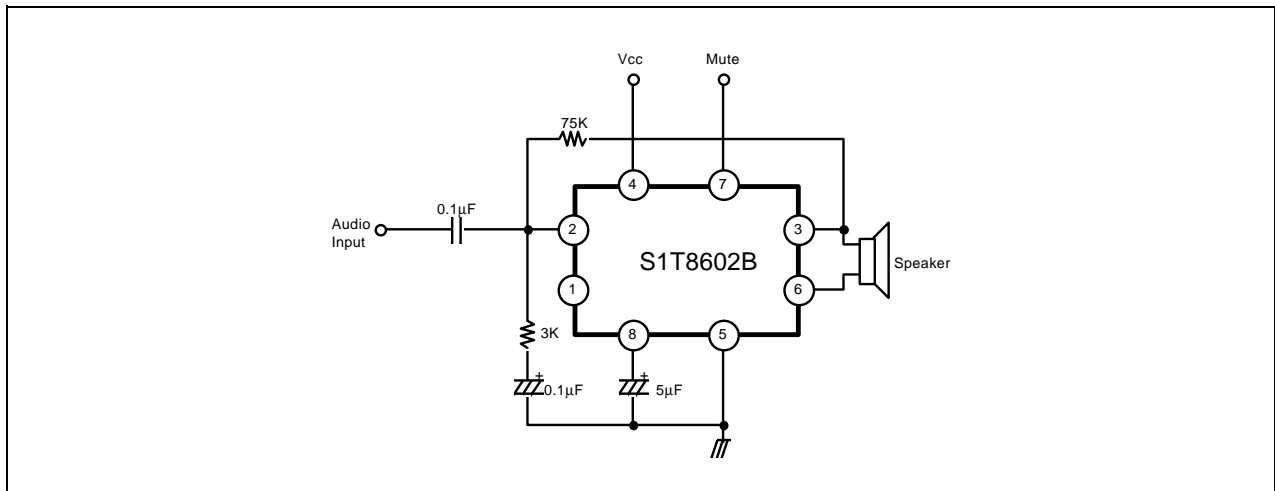


Figure 2.

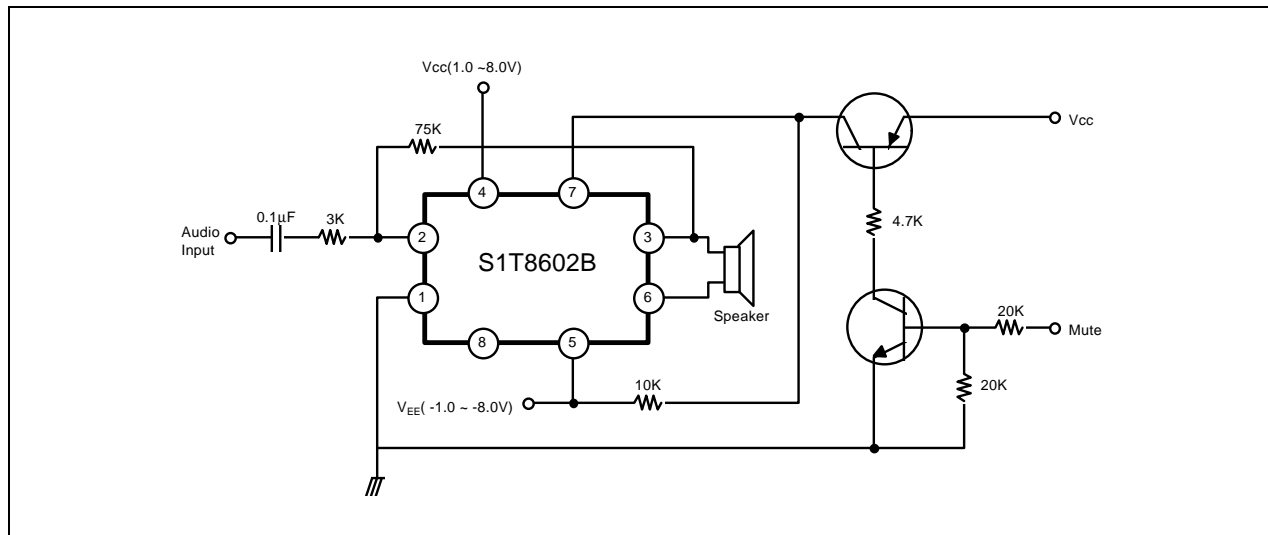


Figure 3.

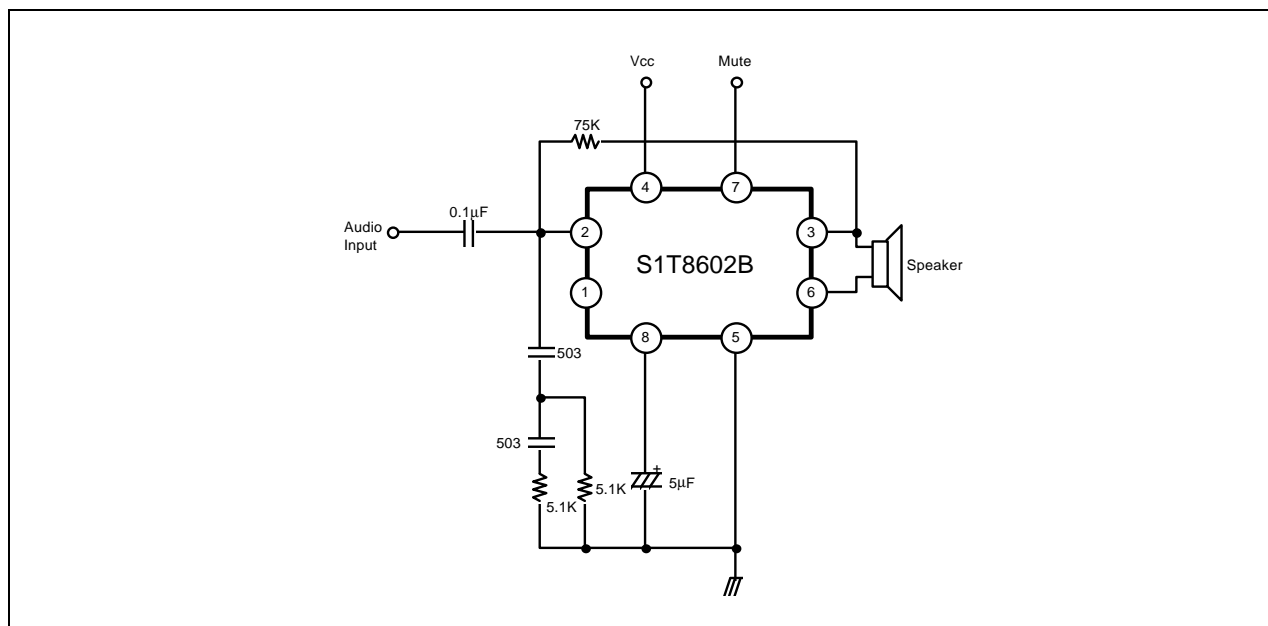


Figure 4.

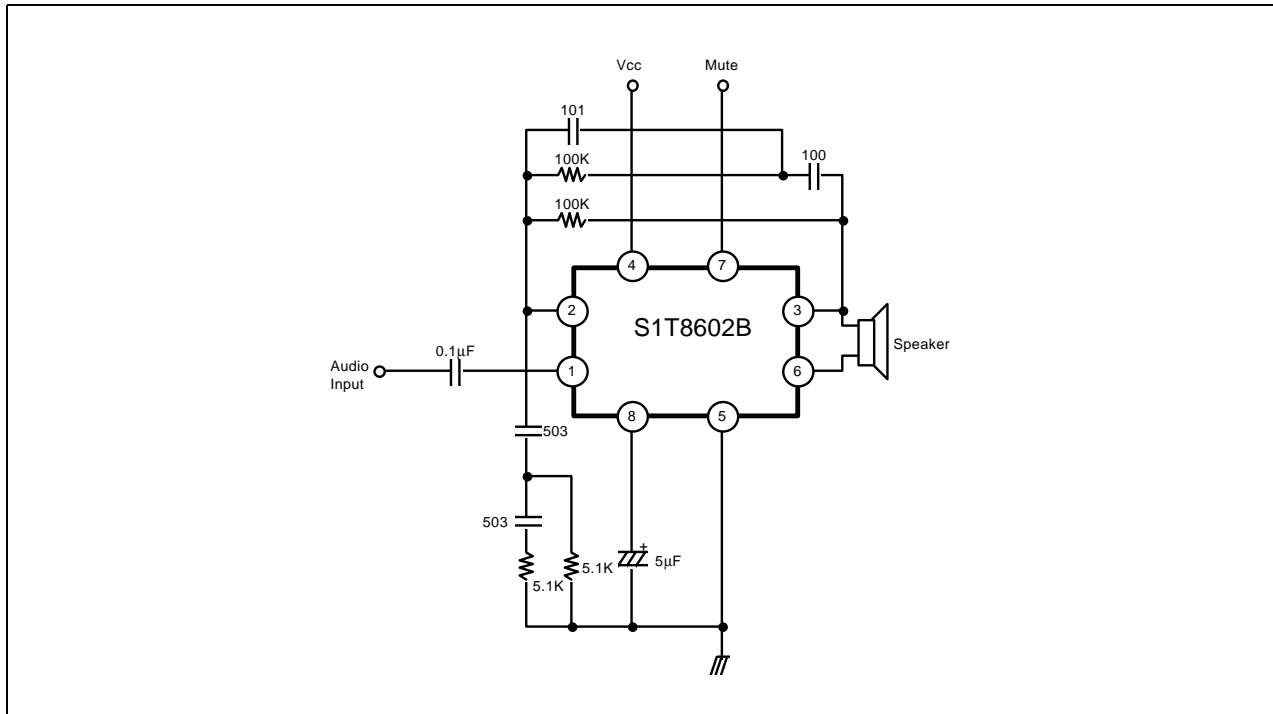


Figure 5.