

# AN7511, AN7511S

## 1-W BTL audio power amplifier

### Overview

The AN7511 and AN7511S are the audio power amplifier ICs with 1-ch output. The BTL (Balanced Transformer-Less) method can provide fewer external parts and more easy design for applications.

### Features

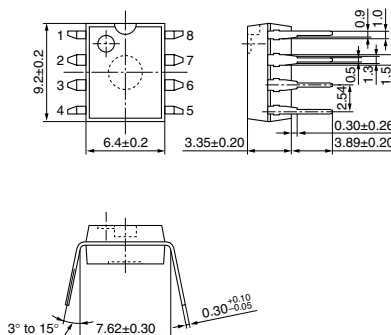
- 1-W output (8  $\Omega$ ) with supply voltage of 5 V: AN7511
- 0.5-W output (16  $\Omega$ ) with supply voltage of 5 V: AN7511S
- On-chip standby function
- On-chip muting function

### Applications

- Televisions, radios, and personal computers

AN7511

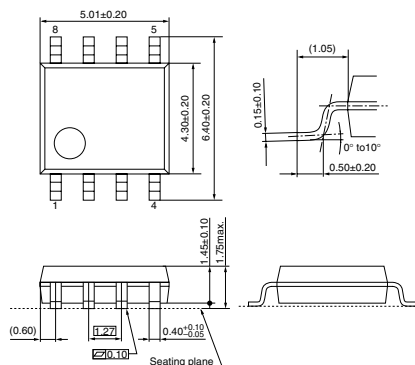
Unit: mm



DIP008-P-0300

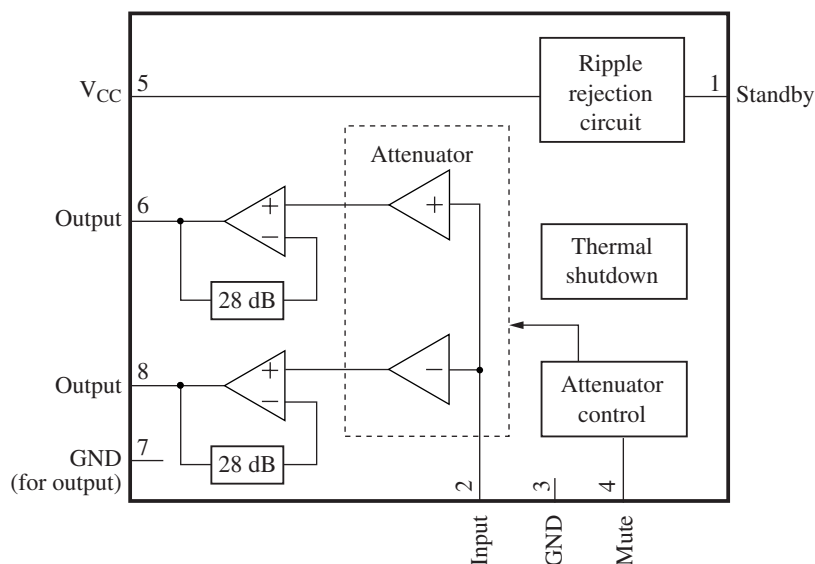
AN7511S

Unit: mm



SOP008-P-0225C

### Block Diagram



## ■ Pin Descriptions

| Pin No. | Description                                  |
|---------|----------------------------------------------|
| 1       | Standby (standby state if this pin is open.) |
| 2       | Input                                        |
| 3       | Ground (for input)                           |
| 4       | Muting (muting on if this pin is open.)      |
| 5       | Supply voltage                               |
| 6       | + Output                                     |
| 7       | Ground (for output ch.1)                     |
| 8       | – Output                                     |

## ■ Absolute Maximum Ratings

| Parameter                        | Symbol    | Rating      | Unit |
|----------------------------------|-----------|-------------|------|
| Supply voltage *2                | $V_{CC}$  | 14          | V    |
| Supply current                   | $I_{CC}$  | 1.0         | A    |
| Power dissipation *3             | $P_D$     | 541         | mW   |
| Operating ambient temperature *1 | $T_{opr}$ | –25 to +70  | °C   |
| Storage temperature *1           | $T_{stg}$ | –55 to +150 | °C   |

Note) \*1: Except for the operating ambient temperature and storage temperature, all ratings are for  $T_a = 25^\circ\text{C}$ .

\*2: At no signal

\*3: The power dissipation shown is the value for  $T_a = 70^\circ\text{C}$ .

## ■ Recommended Operating Range

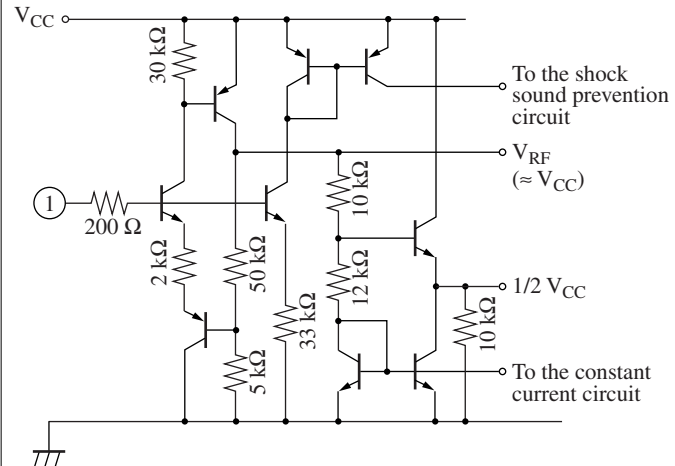
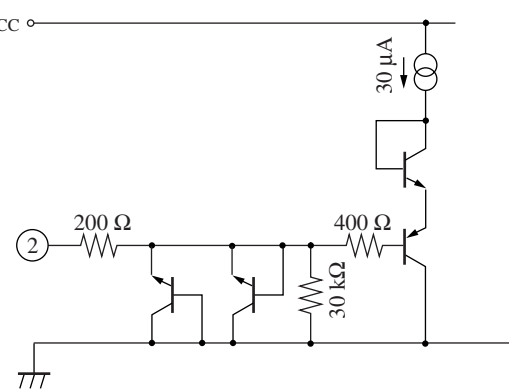
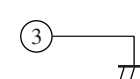
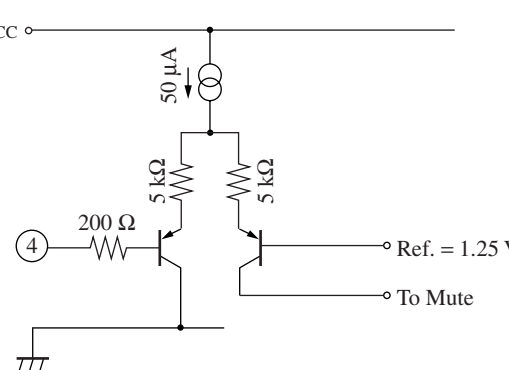
| Parameter      | Symbol   | Range       | Unit |
|----------------|----------|-------------|------|
| Supply voltage | $V_{CC}$ | 3.5 to 13.5 | V    |

■ Electrical Characteristics at  $V_{CC} = 5.0\text{ V}$ ,  $R_L = 8\ \Omega$ ,  $f = 1\text{ kHz}$ ,  $T_a = 25^\circ\text{C} \pm 2^\circ\text{C}$ 

| Parameter                 | Symbol    | Conditions                                                                  | Min  | Typ  | Max | Unit          |
|---------------------------|-----------|-----------------------------------------------------------------------------|------|------|-----|---------------|
| Quiescent circuit current | $I_{CQ}$  | $V_{IN} = 0\text{ mV}$                                                      | —    | 30   | 60  | mA            |
| Standby current           | $I_{STB}$ | $V_{IN} = 0\text{ mV}$                                                      | —    | 1    | 10  | $\mu\text{A}$ |
| Output noise voltage *    | $V_{NO}$  | $R_g = 10\text{ k}\Omega$                                                   | —    | 0.14 | 0.4 | mV[rms]       |
| Voltage gain              | $G_V$     | $P_O = 0.25\text{ W}$                                                       | 32   | 34   | 36  | dB            |
| Total harmonic distortion | THD       | $P_O = 0.25\text{ W}$                                                       | —    | 0.05 | 0.5 | %             |
| Maximum output power      | $P_{OI}$  | THD = 10%                                                                   | 0.8  | 1.1  | —   | W             |
| Ripple rejection ratio *  | RR        | $R_g = 10\text{ k}\Omega$ , $V_R = 1\text{ V[rms]}$ , $f_R = 120\text{ Hz}$ | 30   | 50   | —   | dB            |
| Output offset voltage     | $V_{OFF}$ | $R_g = 10\text{ k}\Omega$                                                   | –300 | 0    | 300 | mV            |
| Muting effect *           | MT        | $P_O = 0.25\text{ W}$                                                       | 70   | 86   | —   | dB            |

Note) \*: In measuring, the filter for the range of 15 Hz to 30 kHz (12 dB/OCT) is used.

■ Terminal Equivalent Circuits

| Pin No. | Pin name    | Equivalent circuit                                                                   | Voltage       |
|---------|-------------|--------------------------------------------------------------------------------------|---------------|
| 1       | Standby pin |    | 5 V           |
| 2       | Input pin   |   | 0 mV to 10 mV |
| 3       | GND         |   | 0 V           |
| 4       | Muting pin  |  | —             |

## ■ Terminal Equivalent Circuits (continued)

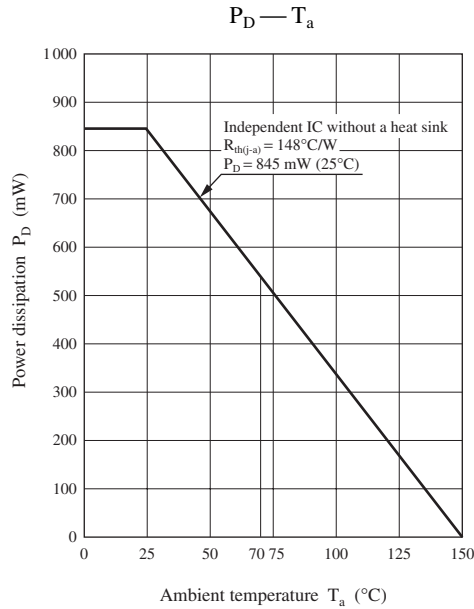
| Pin No. | Pin name     | Equivalent circuit | Voltage |
|---------|--------------|--------------------|---------|
| 5       | $V_{CC}$     | —                  | 5.0 V   |
| 6       | + Output pin |                    | 2.15 V  |
| 7       | GND          |                    | 0 V     |
| 8       | – Output pin |                    | 2.15 V  |

## ■ Usage Notes

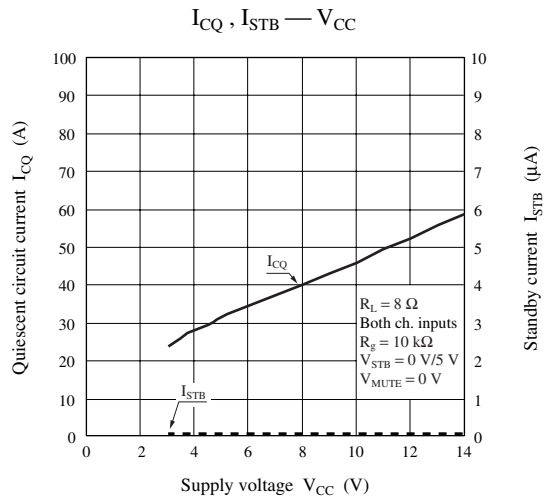
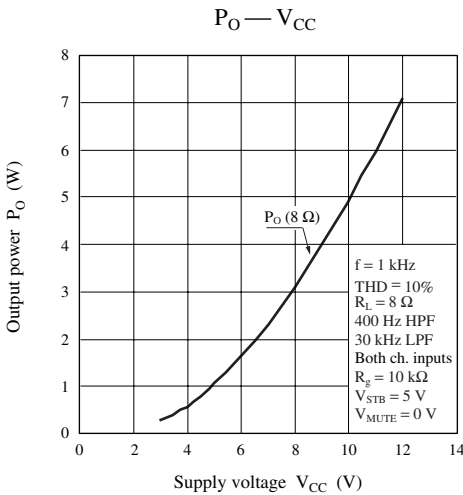
- Please avoid the short circuit to  $V_{CC}$ , ground, or load short circuit.
- Please connect the cooling fin with the GND potential.
- The thermal shutdown circuit operates at about  $T_j = 150^{\circ}\text{C}$ . However, the thermal shutdown circuit is reset automatically if the temperature drops.
- Please carefully design the heat radiation especially when you take out high power at high  $V_{CC}$ .
- Please connect only the ground of signal with the signal GND of the amplifier in the previous stage.

■ Technical Data

1. Package power dissipation



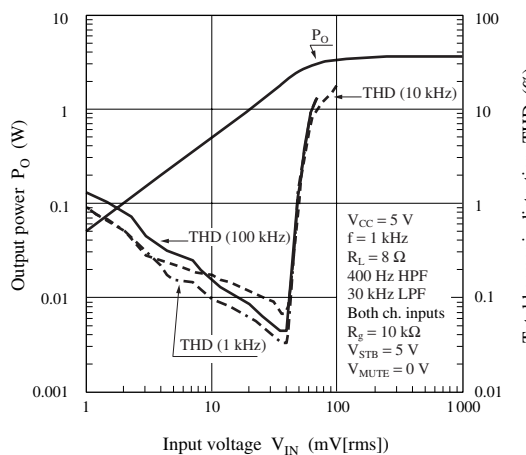
2. Main characteristics



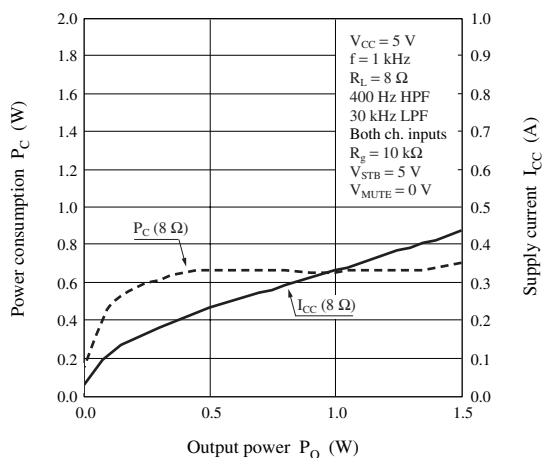
## ■ Technical Data (continued)

### 2. Main characteristics (continued)

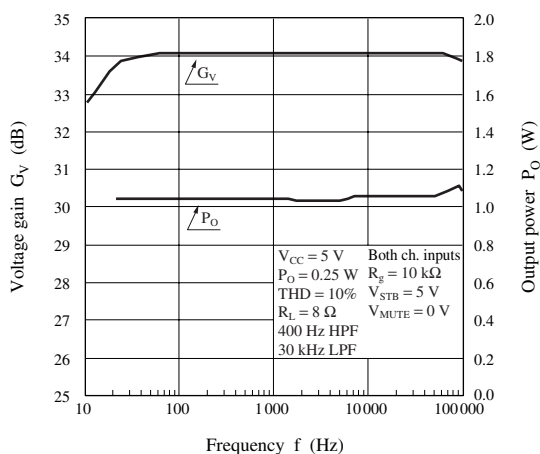
$P_O$ , THD —  $V_{IN}$



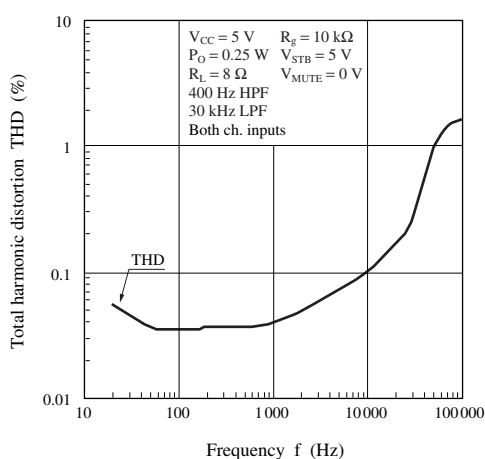
$P_C$ ,  $I_{CC}$  —  $P_O$



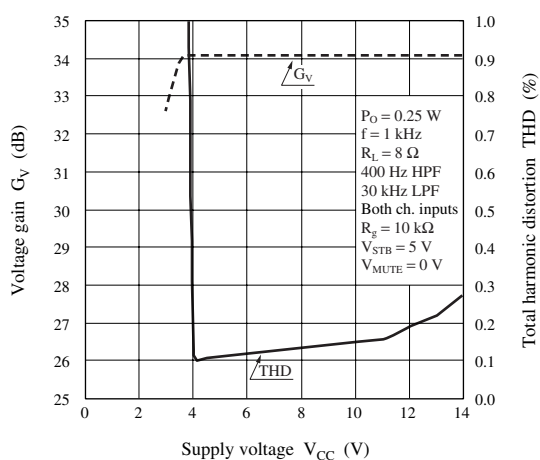
$G_V$ ,  $P_O$  —  $f$



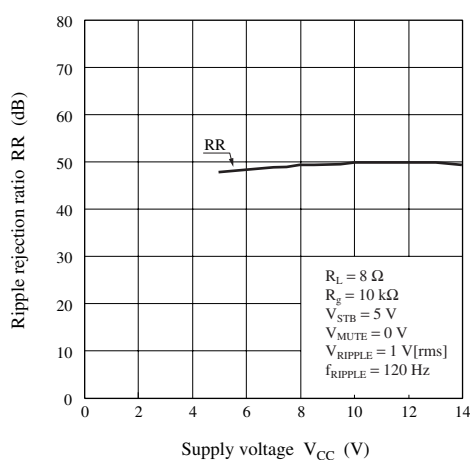
THD —  $f$



$G_V$ , THD —  $V_{CC}$

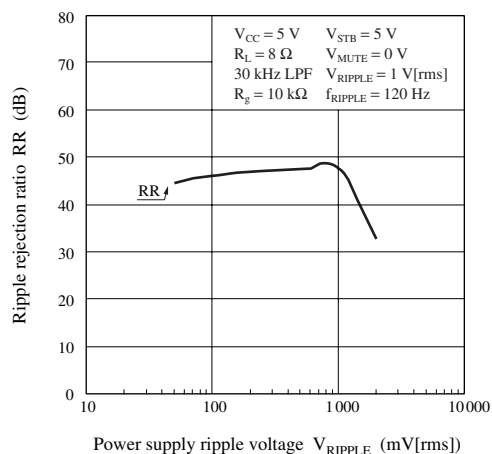
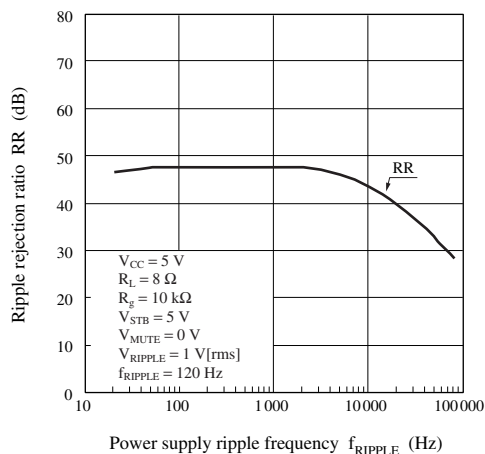
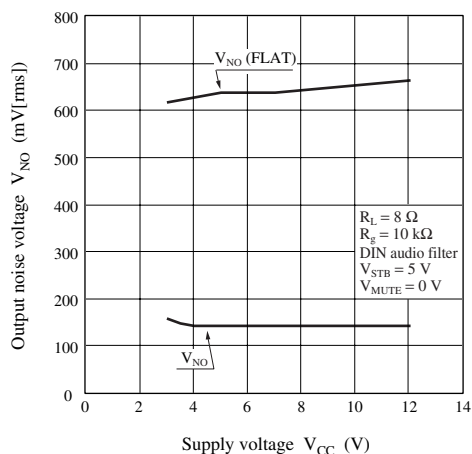
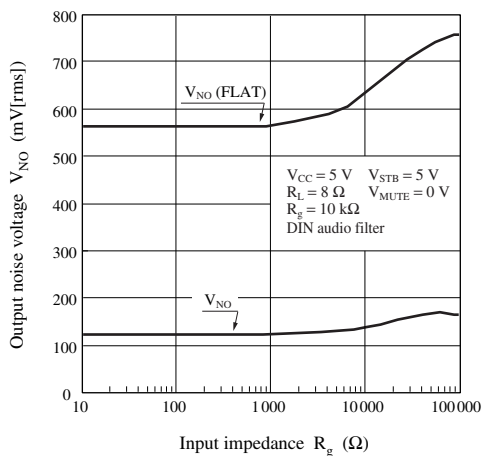
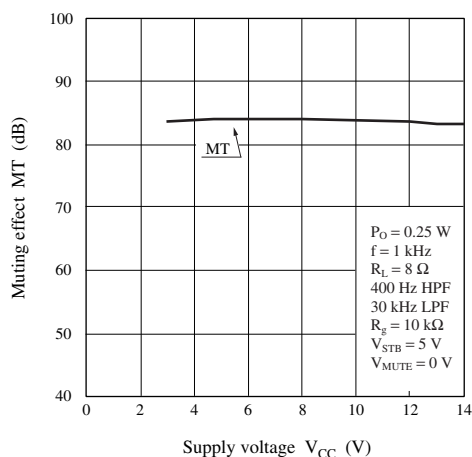
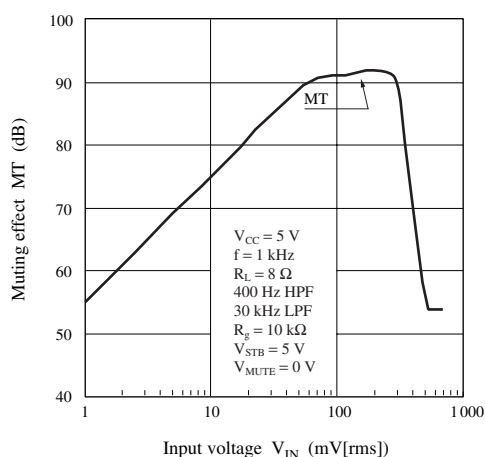


RR —  $V_{CC}$



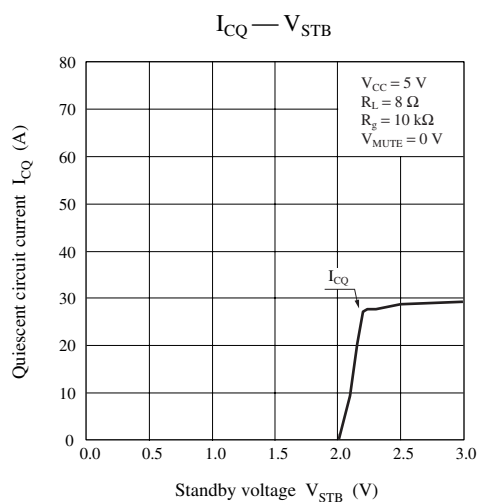
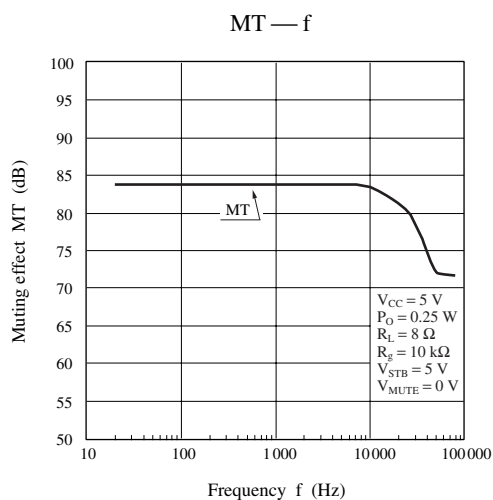
## ■ Technical Data (continued)

### 2. Main characteristics (continued)

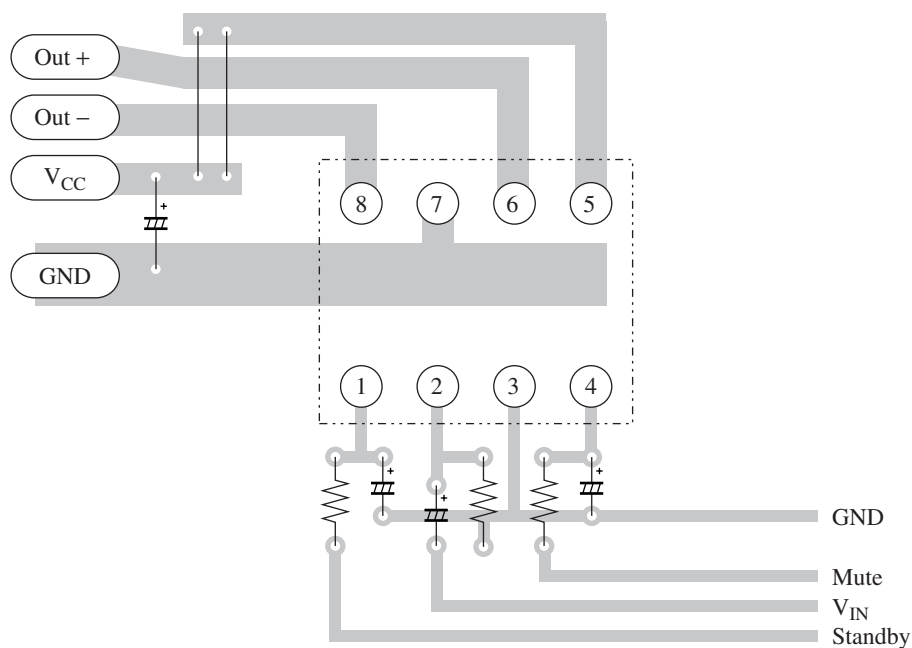
RR —  $V_{\text{RIPPLE}}$ RR —  $f_{\text{RIPPLE}}$  $V_{\text{NO}}$  —  $V_{\text{CC}}$  $V_{\text{NO}}$  —  $R_{\text{g}}$ MT —  $V_{\text{CC}}$ MT —  $V_{\text{IN}}$ 

## ■ Technical Data (continued)

### 2. Main characteristics (continued)



### 3. Example of PCB pattern



## ■ Application Circuit Example

