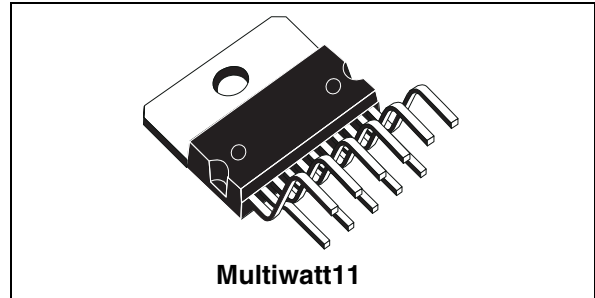


## 40 W + 40 W stereo amplifier with mute and standby

Datasheet — production data

### Features

- Wide supply voltage range (up to  $\pm 33$  V)
- Split supply
- High output power
- 40 W + 40 W into  $8\ \Omega$  with  $V_S = \pm 26$  V and THD = 10%
- No “pop” at turn on/off
- Mute (“pop”-free)
- Standby feature (low  $I_Q$ )
- Short-circuit protection
- Thermal overload protection



### Description

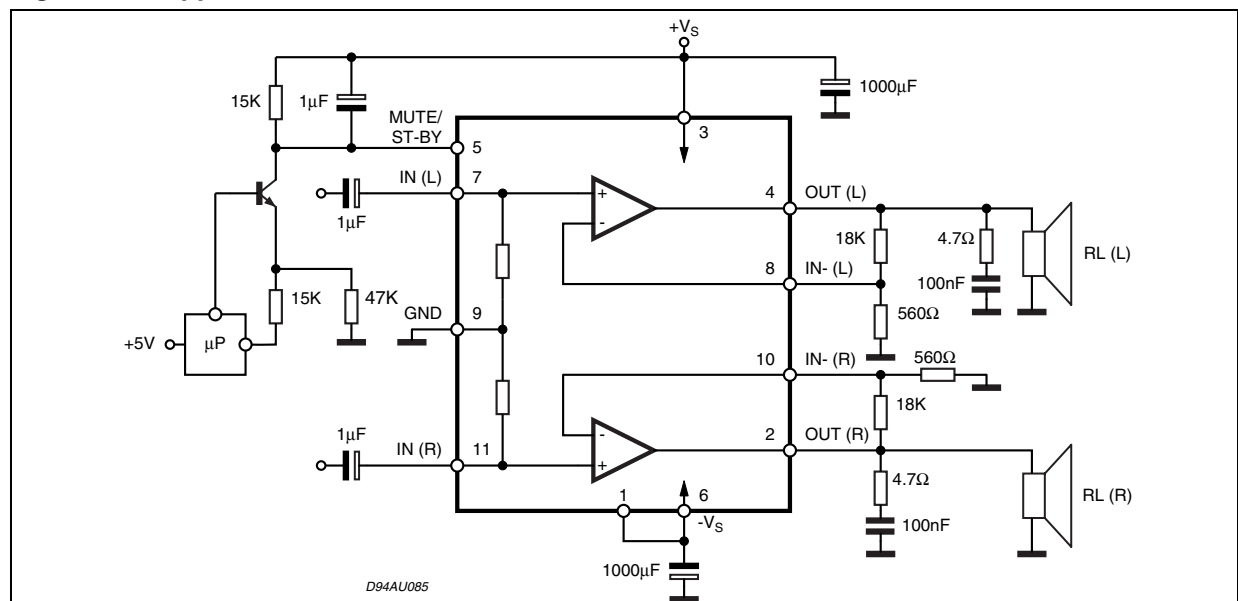
The TDA7292 is a class-AB dual audio power amplifier assembled in a Multiwatt package.

It has been specifically designed for high-quality sound applications such as hi-fi music centers and stereo TV sets.

**Table 1. Device summary**

| Order code | Operating temp. range | Package     | Packaging |
|------------|-----------------------|-------------|-----------|
| TDA7292    | 0° to 70° C           | Multiwatt11 | Tube      |

**Figure 1. Applications circuit**



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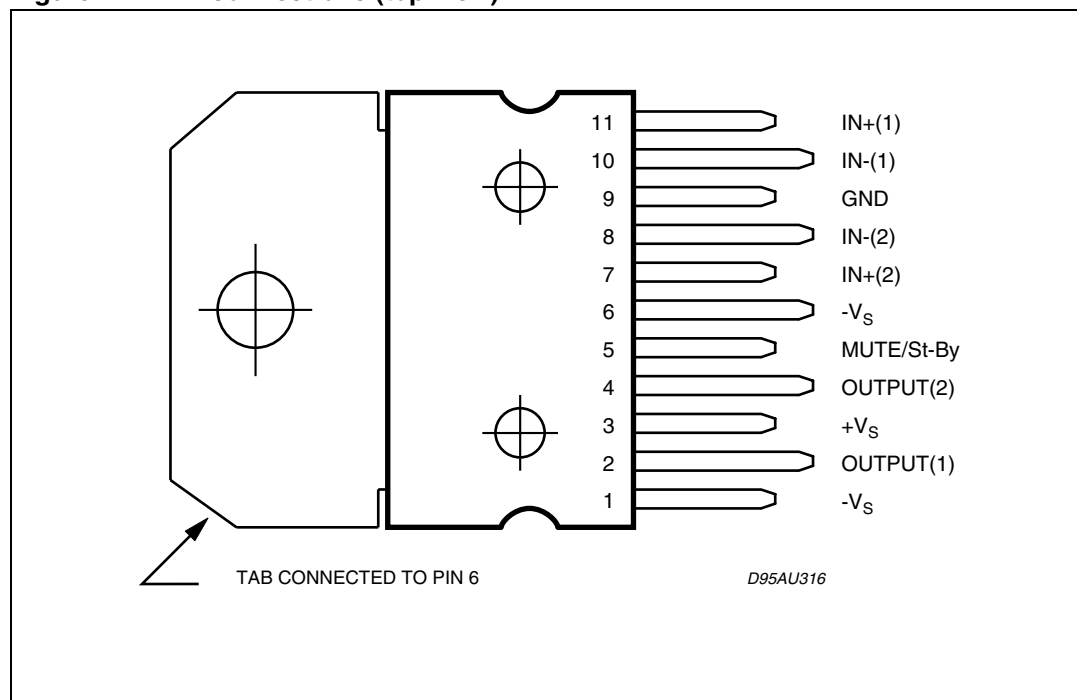
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# 1 Pin description

Figure 2. Pin connections (top view)



## 2 Electrical specifications

### 2.1 Absolute maximum ratings

**Table 2. Absolute maximum ratings**

| Symbol    | Parameter                                       | Value      | Unit             |
|-----------|-------------------------------------------------|------------|------------------|
| $V_S$     | DC supply voltage                               | $\pm 35$   | V                |
| $I_O$     | Output peak current (internally limited)        | 5          | A                |
| $P_{tot}$ | Power dissipation $T_{case} = 70^\circ\text{C}$ | 40         | W                |
| $T_{op}$  | Operating temperature                           | -20 to 85  | $^\circ\text{C}$ |
| $T_j$     | Junction temperature                            | -40 to 150 | $^\circ\text{C}$ |
| $T_{stg}$ | Storage temperature                             | -40 to 150 | $^\circ\text{C}$ |

### 2.2 Thermal data

**Table 3. Thermal data**

| Symbol           | Parameter                            | Min | Typ | Max | Unit               |
|------------------|--------------------------------------|-----|-----|-----|--------------------|
| $R_{th\ j-case}$ | Thermal resistance, junction to case | -   | 1.5 | -   | $^\circ\text{C/W}$ |

### 2.3 Electrical specifications

Unless otherwise stated, the results in [Table 4](#) below are given for the conditions:

$V_S = \pm 26\text{ V}$ ,  $R_L$  (load) = 8  $\Omega$ ,  $R_S$  (source) = 50  $\Omega$ ,  $f = 1\text{ kHz}$ ,  $G_V = 30\text{ dB}$ , and  $T_{amb} = 25^\circ\text{C}$ .

See also the test circuit in [Figure 18 on page 14](#).

**Table 4. Electrical specifications**

| Symbol     | Parameter                        | Condition                                                                                                | Min     | Typ      | Max      | Unit |
|------------|----------------------------------|----------------------------------------------------------------------------------------------------------|---------|----------|----------|------|
| $V_S$      | Supply voltage range             | -                                                                                                        | $\pm 8$ | -        | $\pm 33$ | V    |
| $I_q$      | Total quiescent current          | -                                                                                                        | -       | 50       | 130      | mA   |
| $V_{OS}$   | Output offset voltage            | -                                                                                                        | -20     | -        | 20       | mV   |
| $I_b$      | Non-inverting input bias current | -                                                                                                        | -       | 500      | -        | nA   |
| $P_o$      | Output power                     | THD = 10%:<br>$R_L = 8\ \Omega$ , $V_S = \pm 26\text{ V}$<br>$R_L = 4\ \Omega$ , $V_S = \pm 18\text{ V}$ | -       | 40<br>31 | -        | W    |
|            |                                  | THD = 1%:<br>$R_L = 8\ \Omega$ , $V_S = \pm 26\text{ V}$<br>$R_L = 4\ \Omega$ , $V_S = \pm 18\text{ V}$  | -       | 30<br>24 | -        |      |
| $I_{Peak}$ | Peak output current              | Internally limited                                                                                       | -       | 5        | -        | A    |
| THD        | Total harmonic distortion        | $P_o = 1\text{ W}$                                                                                       | -       | 0.02     | -        | %    |

**Table 4. Electrical specifications (continued)**

| Symbol                                                      | Parameter                                 | Condition                              | Min  | Typ  | Max  | Unit               |
|-------------------------------------------------------------|-------------------------------------------|----------------------------------------|------|------|------|--------------------|
| $C_T$                                                       | Crosstalk                                 | $f = 1 \text{ kHz}$                    | -    | 70   | -    | dB                 |
| SR                                                          | Slew rate                                 | -                                      | -    | 11   | -    | V/ms               |
| $G_{OL}$                                                    | Open-loop gain                            | -                                      | -    | 80   | -    | dB                 |
| eN                                                          | Total input noise                         | $f = 20 \text{ Hz to } 22 \text{ kHz}$ | -    | 4    | -    | $\mu\text{V}$      |
| $R_i$                                                       | Input resistance                          | -                                      | -    | 20   | -    | $\text{k}\Omega$   |
| SVRR                                                        | Supply voltage rejection ratio            | -                                      | -    | 75   | -    | dB                 |
| $T_j$                                                       | Junction temperature at thermal shut-down | -                                      | -    | 145  | -    | $^{\circ}\text{C}$ |
| Mute mode (see also <a href="#">Table 5 on page 13</a> )    |                                           |                                        |      |      |      |                    |
| $VT_{MUTE}$                                                 | Mute/play threshold                       | -                                      | -7   | -6   | -5   | V                  |
| $A_{MUTE}$                                                  | Mute attenuation                          | -                                      | -    | 75   | -    | dB                 |
| Standby mode (see also <a href="#">Table 5 on page 13</a> ) |                                           |                                        |      |      |      |                    |
| $VT_{STBY}$                                                 | Standby/mute threshold                    | -                                      | -3.5 | -2.5 | -1.5 | V                  |
| $A_{STBY}$                                                  | Standby attenuation                       | -                                      | -    | 110  | -    | dB                 |
| $I_{q\_STBY}$                                               | Quiescent current in standby              | -                                      | -    | 8    | -    | mA                 |

### 3 Characterization curves

Figure 3. Quiescent current vs. supply voltage

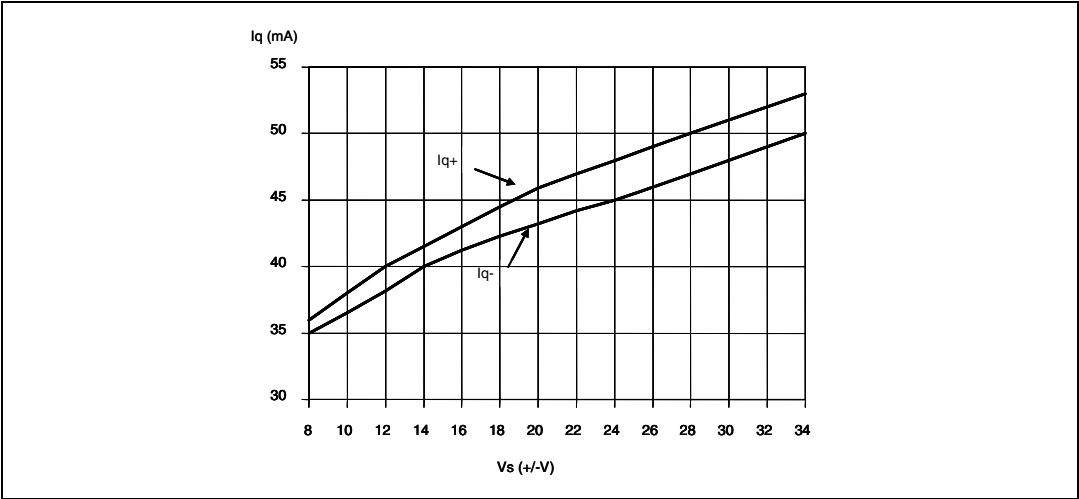


Figure 4. Frequency response

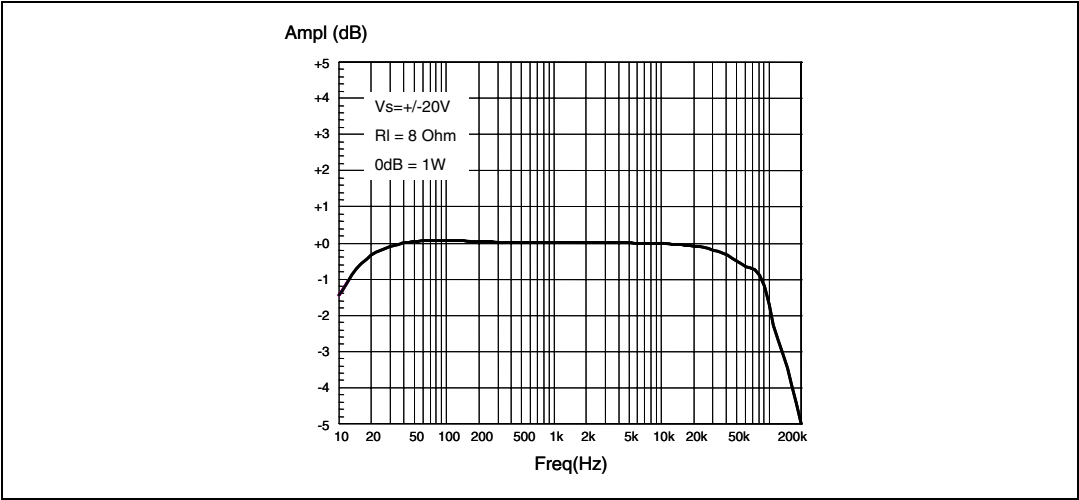




Figure 5. Output power vs. supply voltage

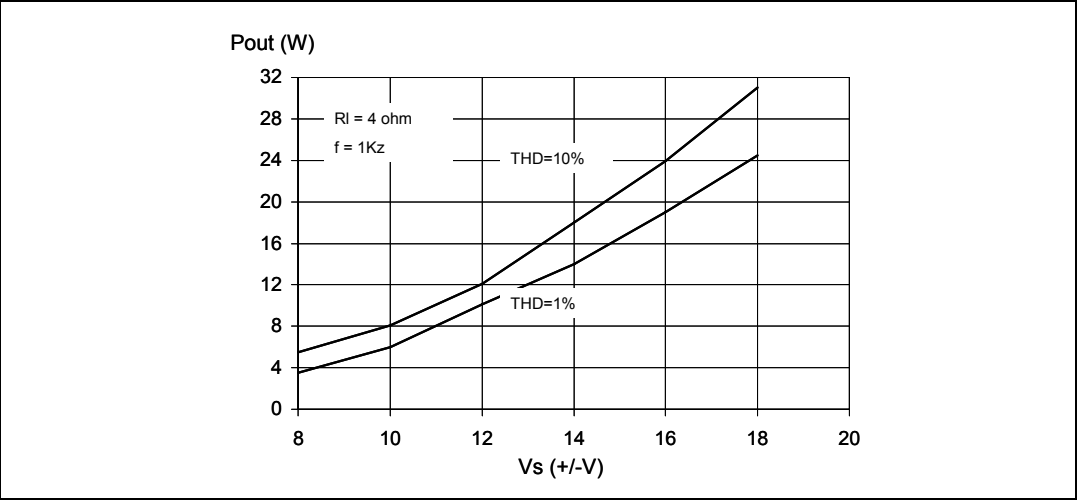


Figure 6. Output power vs. supply voltage

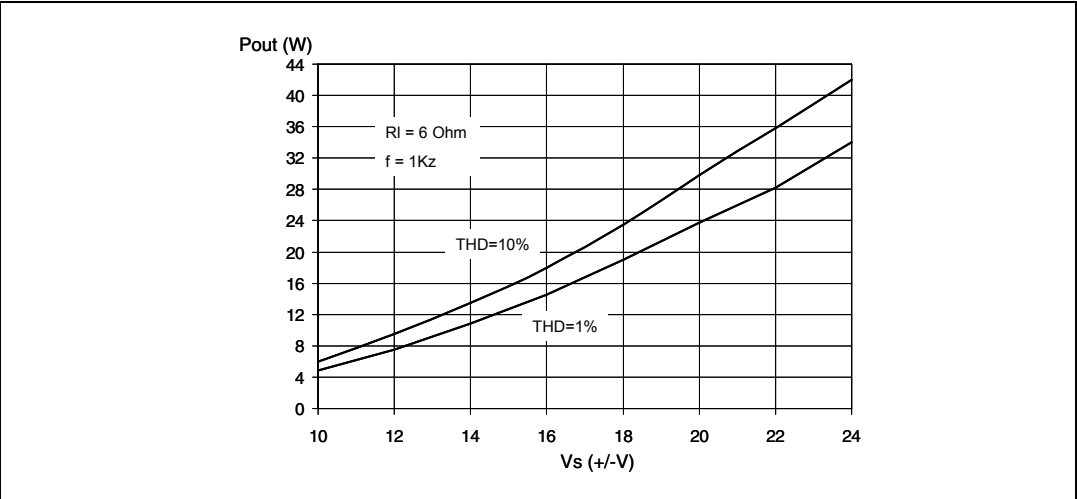


Figure 7. Output power vs. supply voltage

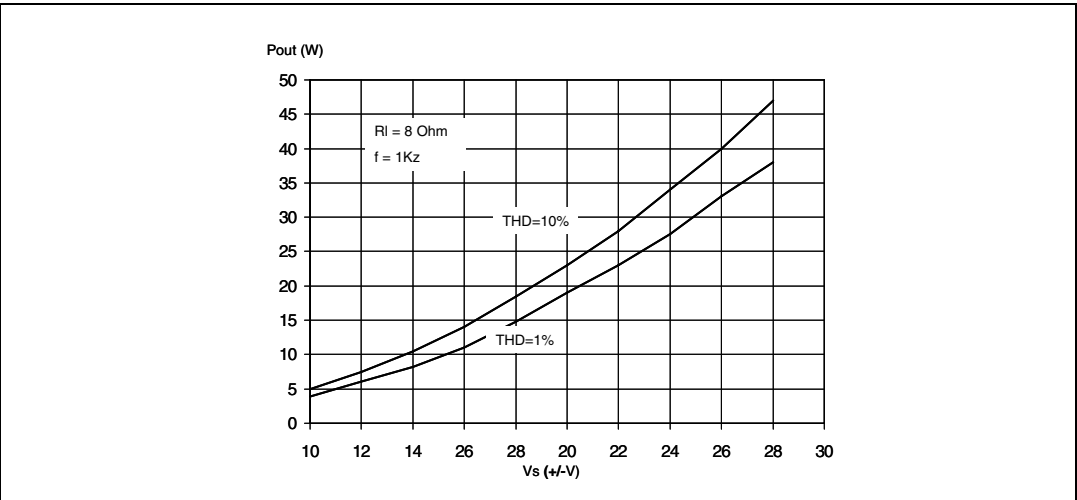


Figure 8. THD vs. output power

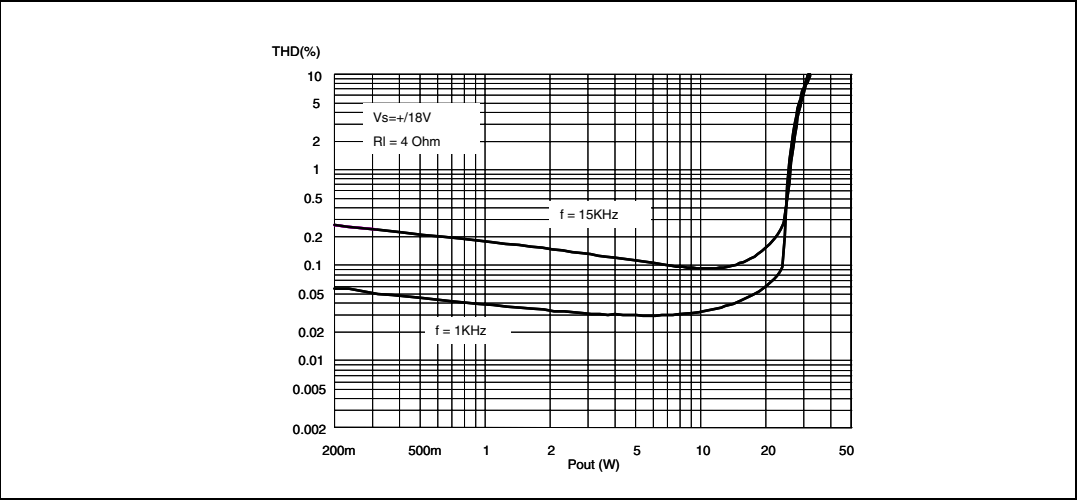


Figure 9. THD vs. output power

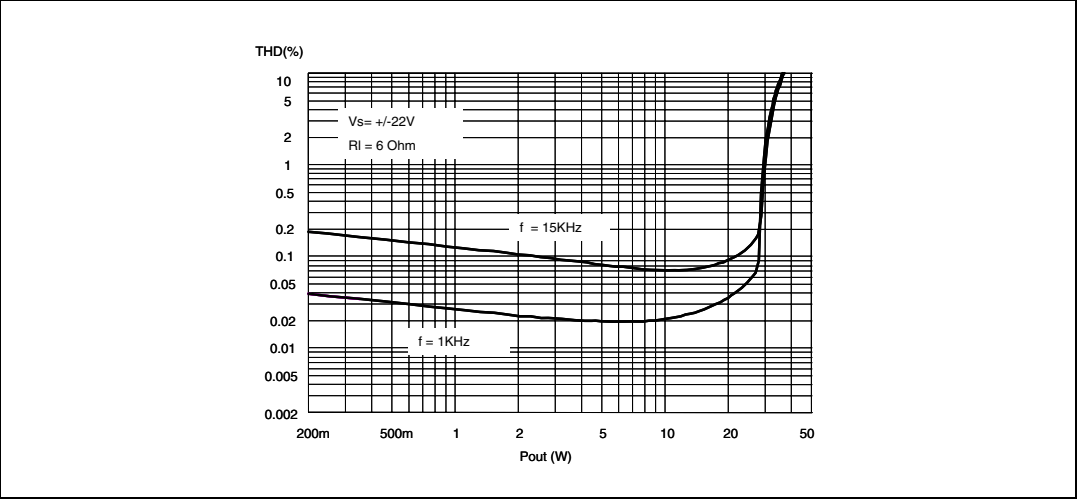


Figure 10. THD vs. output power

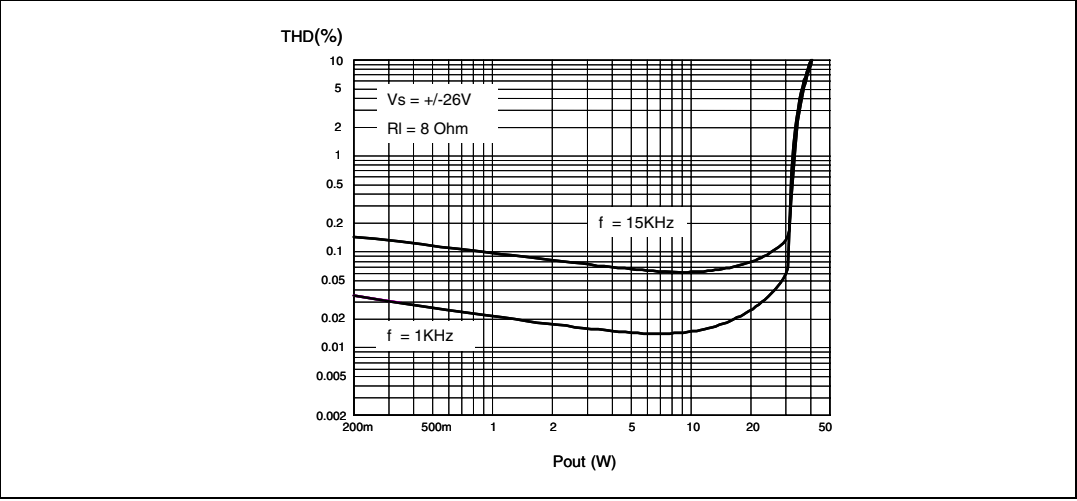


Figure 11. Quiescent current vs. voltage on pin 5

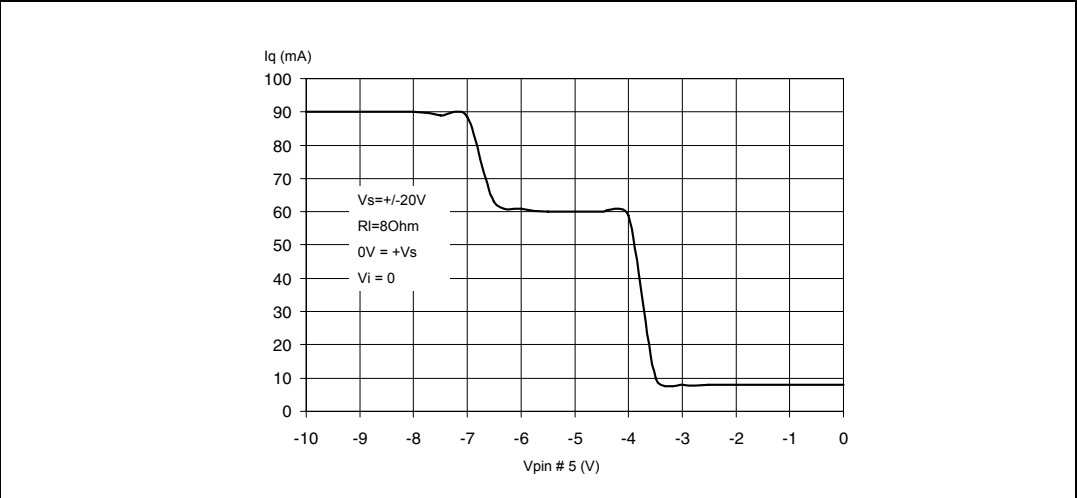


Figure 12. Attenuation vs. voltage on pin 5

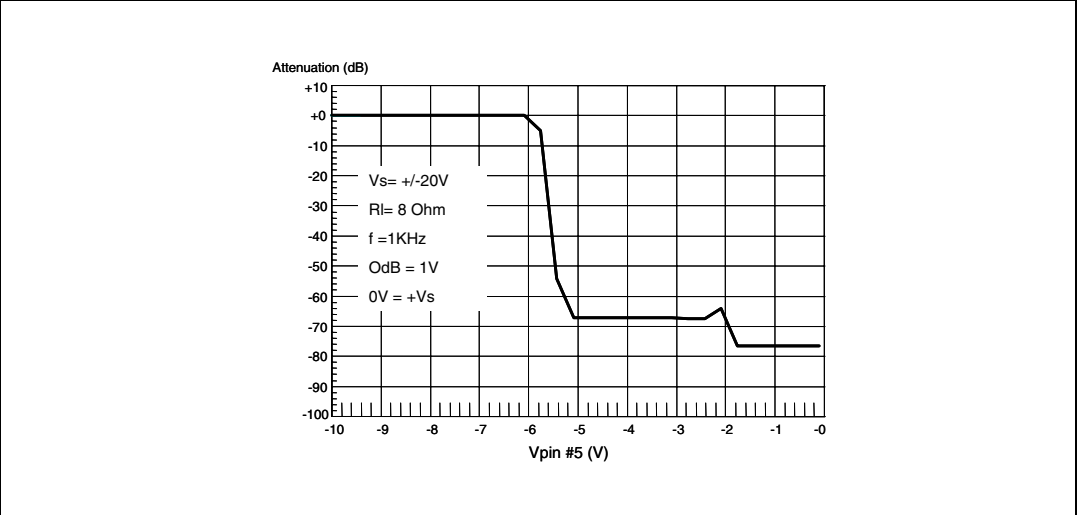


Figure 13. Crosstalk vs. frequency

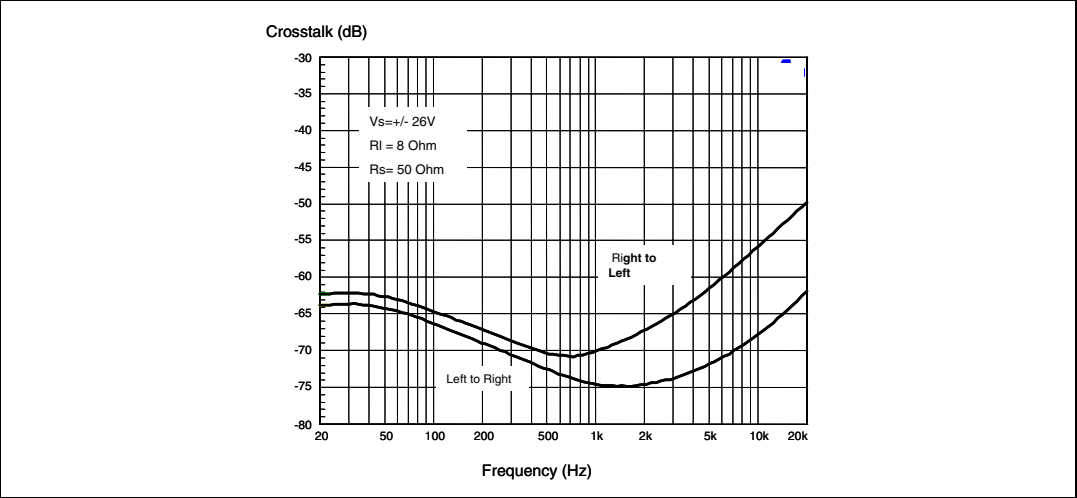


Figure 14. Power dissipation vs. output power

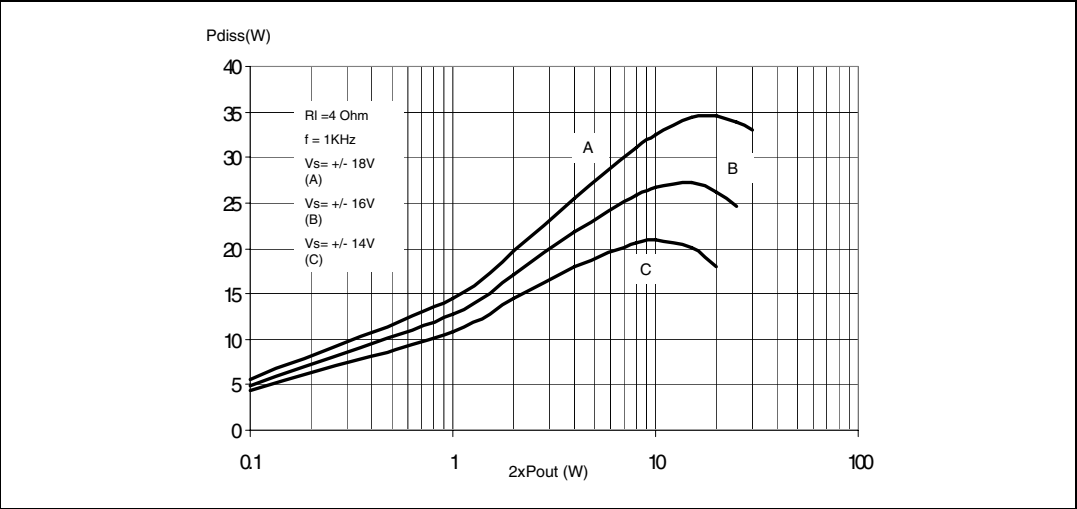


Figure 15. Power dissipation vs. output power

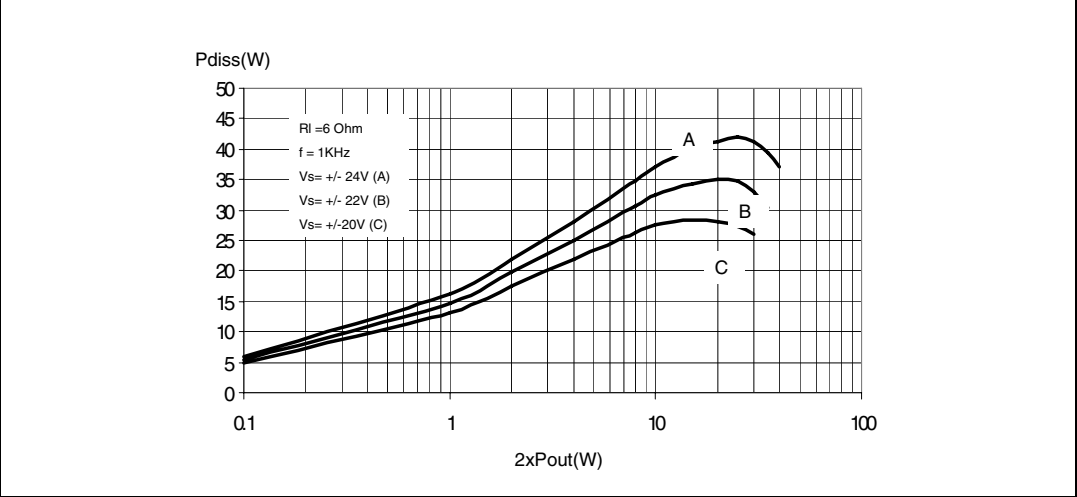
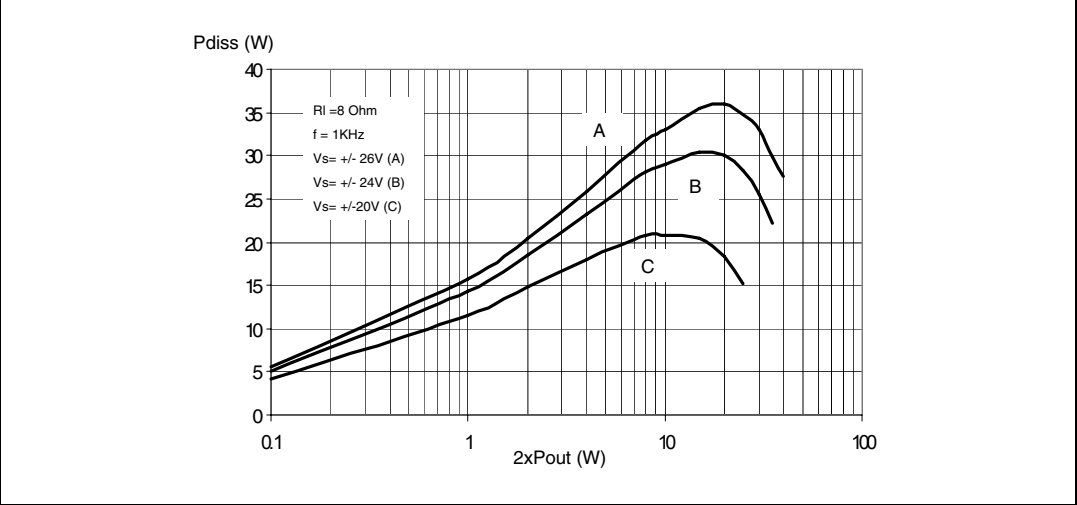


Figure 16. Power dissipation vs. output power



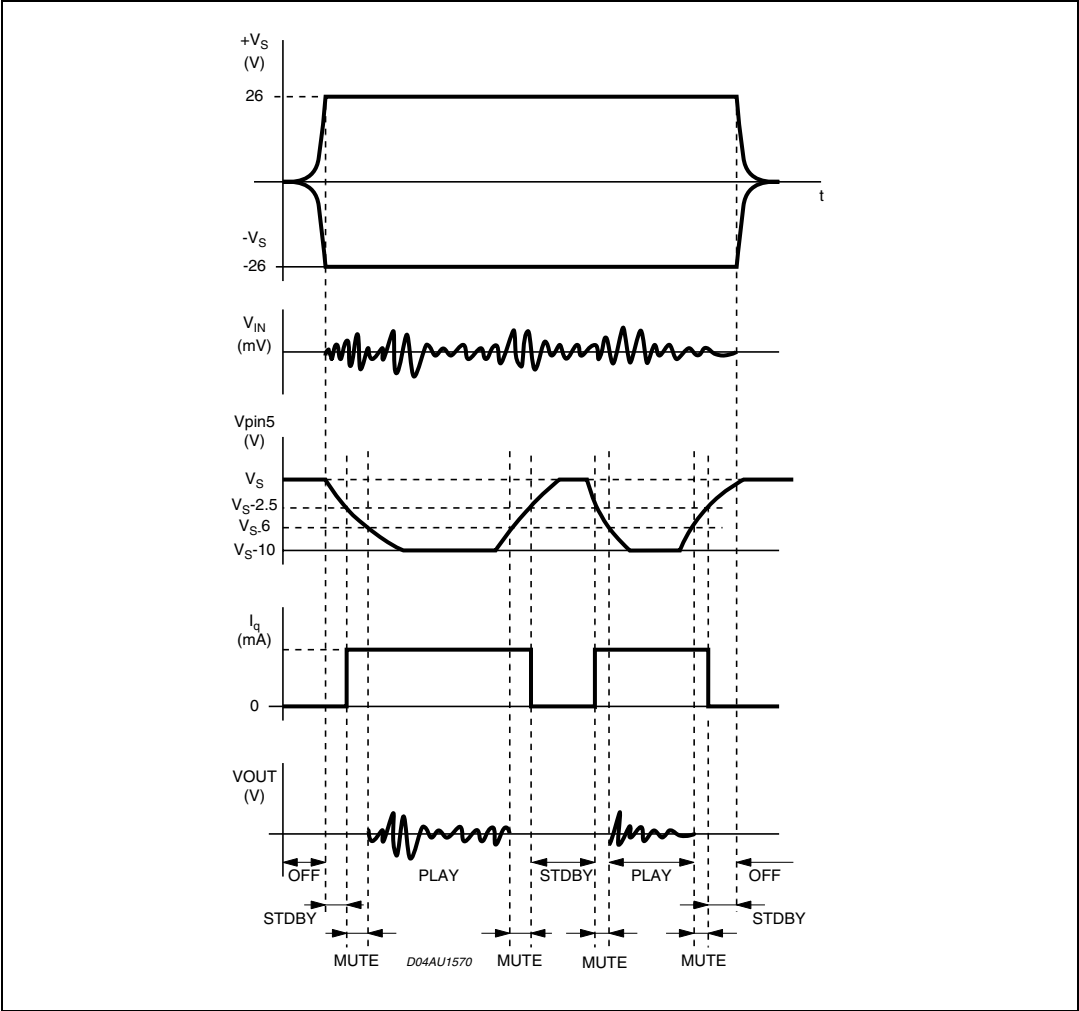
# 4 Mute and standby modes

Pin 5 (MUTE/STANDBY) controls the amplifier status by two different thresholds referenced to  $+V_S$  as given in [Table 5](#) below. See also [Table 4: Electrical specifications on page 6](#).

**Table 5. Mute and standby thresholds on pin 5**

| Nominal voltage on pin 5,<br>$V_{PIN5}$        | Mode    | Remarks                                   |
|------------------------------------------------|---------|-------------------------------------------|
| $> +V_S - 2.5\text{ V}$                        | Standby | Output stages turned off                  |
| $> +V_S - 6.0\text{ V}, < +V_S - 2.5\text{ V}$ | Mute    | Output stages turned on, amplifiers muted |
| $< +V_S - 6.0\text{ V}$                        | Play    | Amplifiers active                         |

**Figure 17. Mute and standby thresholds on pin 5**



## 5 Applications information

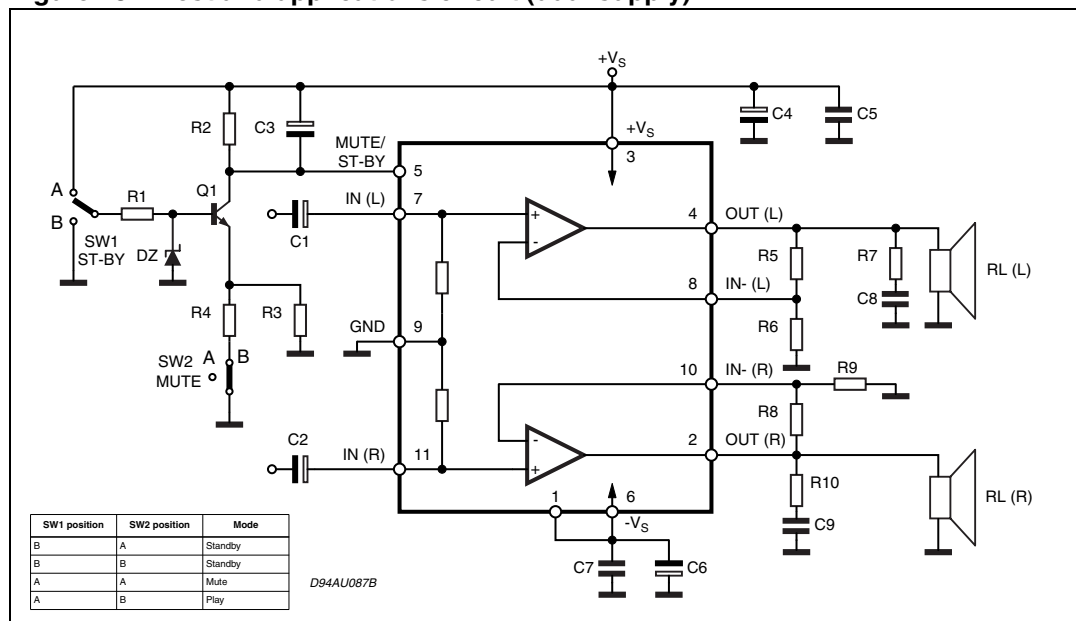
### Warning: SOA protection:

If the TDA7292 is operated without a load connected to the output terminals, the SOA protection circuit could be activated when a high amplitude and high frequency signal is applied to the input.

The frequency and amplitude of the signal able to trigger the protection is a function also of the supply voltage level used. If the above mentioned condition is possible when the speakers are not connected, it is recommended to connect the input to ground or add a dummy resistive load. For example, a 1-k $\Omega$  / 1-W resistor can be used at  $V_{CC} = \pm 26$  V. If a lower supply voltage is used, the resistor value must be decreased accordingly.

### 5.1 Applications with dual supply

Figure 18. Test and applications circuit (dual supply)



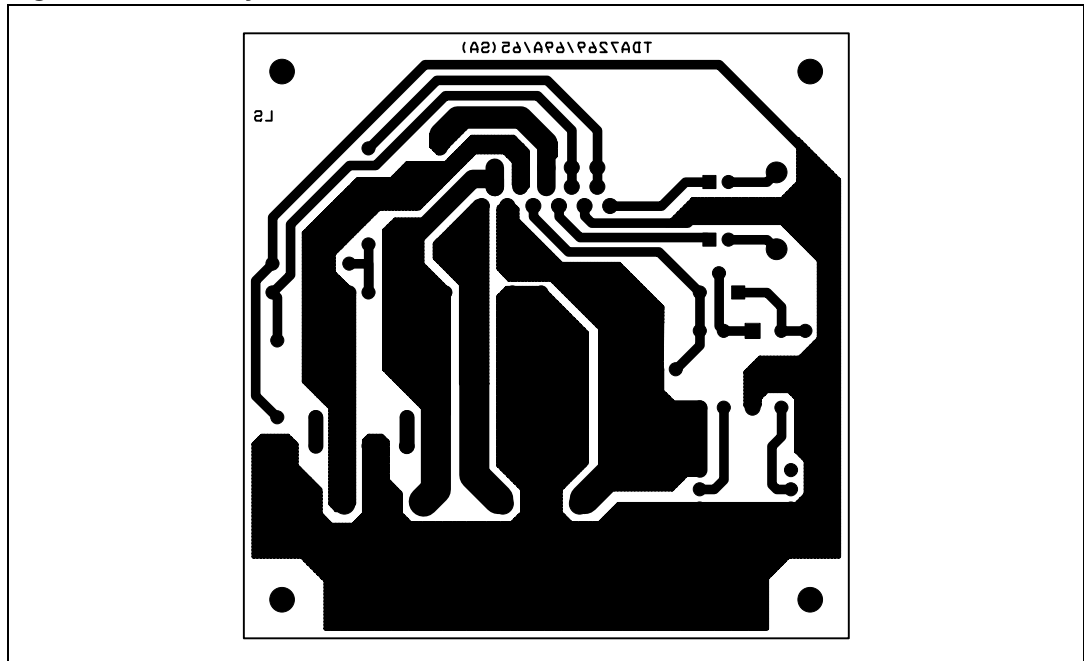
**Table 6. Recommended values**

| Component | Recommended value | Purpose                                 | Larger than recommended value       | Smaller than recommended value      |
|-----------|-------------------|-----------------------------------------|-------------------------------------|-------------------------------------|
| R1        | 10 k $\Omega$     | Mute circuit                            | Decrease in DZ biasing current      | -                                   |
| R2        | 15 k $\Omega$     | Mute circuit                            | V <sub>PIN5</sub> shifted downwards | V <sub>PIN5</sub> shifted upwards   |
| R3        | 47 k $\Omega$     | Mute circuit                            | V <sub>PIN5</sub> shifted upwards   | V <sub>PIN5</sub> shifted downwards |
| R4        | 15 k $\Omega$     | Mute circuit                            | V <sub>PIN5</sub> shifted upwards   | V <sub>PIN5</sub> shifted downwards |
| R5, R8    | 18 k $\Omega$     | Closed-loop gain setting <sup>(1)</sup> | Increase in gain                    | -                                   |
| R6, R9    | 560 $\Omega$      |                                         | Decrease in gain                    | -                                   |
| R7, R10   | 4.7 $\Omega$      | Frequency stability                     | Danger of oscillation               | Danger of oscillation               |
| C1, C2    | 1 $\mu$ F         | Input AC coupling                       | -                                   | Higher low-frequency cutoff         |
| C3        | 1 $\mu$ F         | Standby/mute time constant              | Larger on/off time                  | Smaller on/off time                 |
| C4, C6    | 1000 $\mu$ F      | Supply voltage decoupling               | -                                   | Danger of oscillation               |
| C5, C7    | 0.1 $\mu$ F       | Supply voltage decoupling               | -                                   | Danger of oscillation               |
| C8, C9    | 0.1 $\mu$ F       | Frequency stability                     | -                                   | -                                   |
| Dz        | 5.1 V             | Mute circuit                            | -                                   | -                                   |
| Q1        | BC107             | Mute circuit                            | -                                   | -                                   |

1. Closed-loop gain must be >29 dB

*Note:* The PCB layout shown in [Figure 19](#), [20](#), and [21](#) is common to the pin-to-pin compatible devices TDA7269A, TDA7265 and TDA7265B.

**Figure 19. PCB layout, solder side**



**Figure 20. PCB layout, component side**

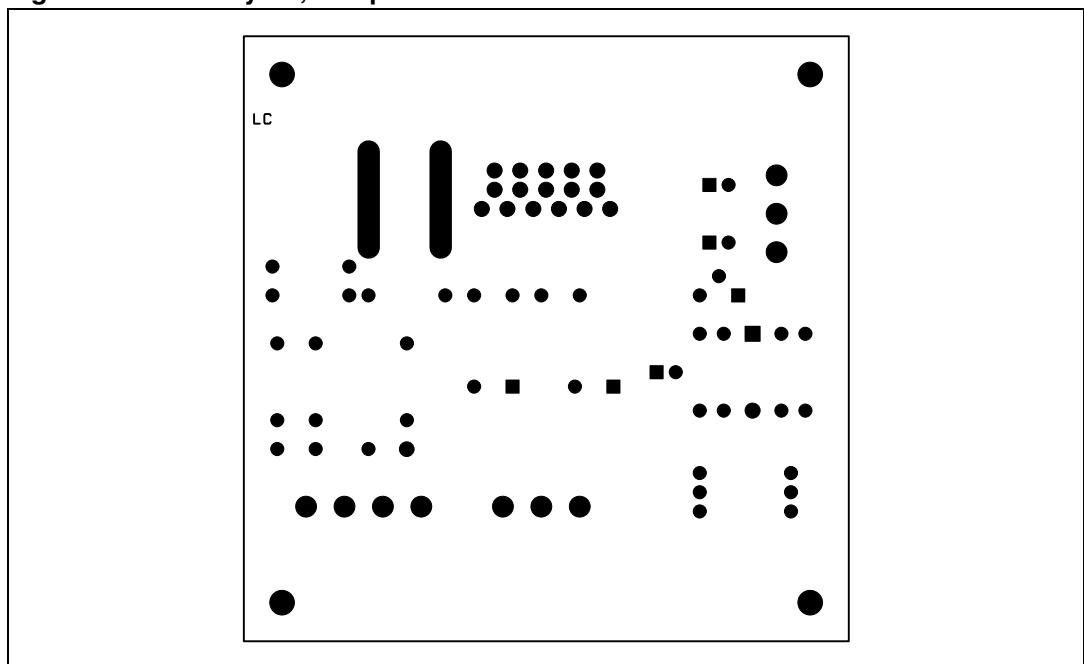
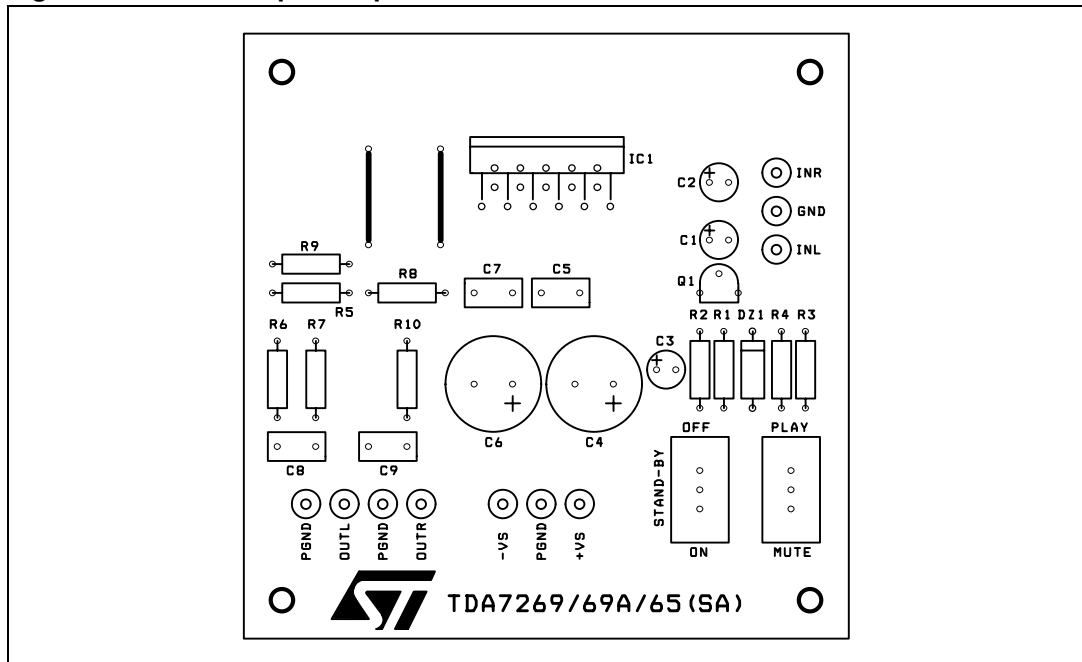


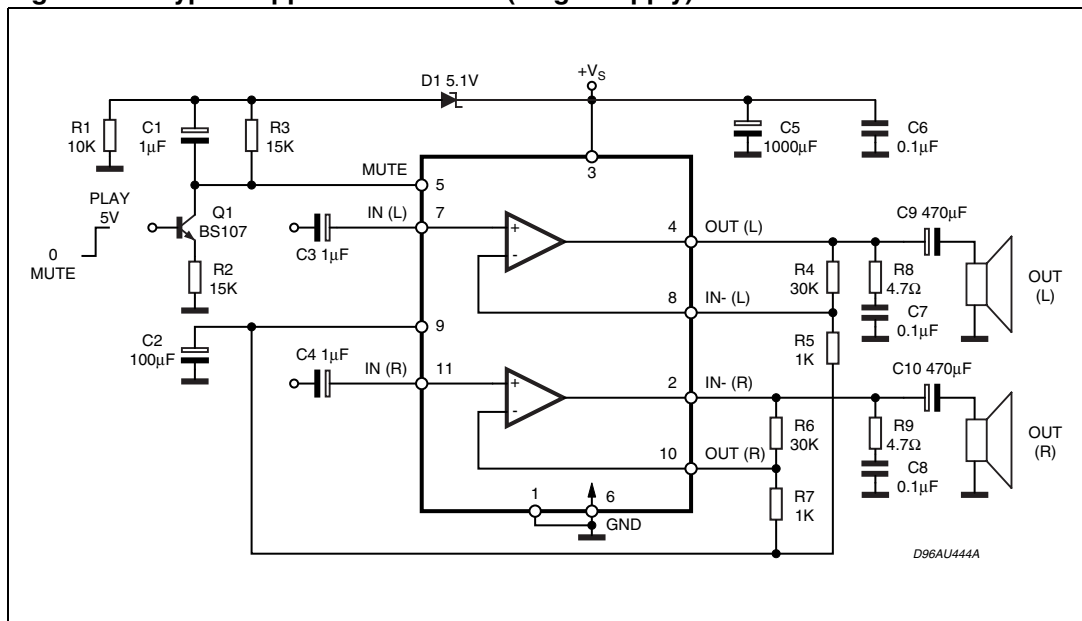


Figure 21. PCB component placement



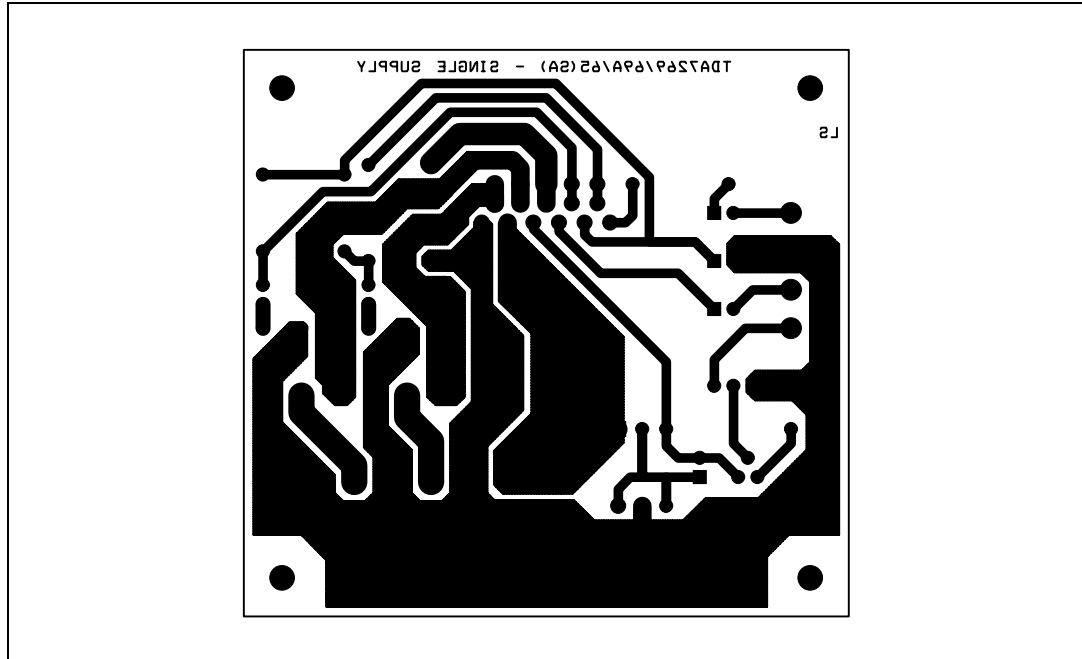
## 5.2 Applications with single supply

Figure 22. Typical applications circuit (single supply)



*Note:* The PCB layout shown in [Figure 23](#), [Figure 24](#), and [Figure 25](#) is common to the pin-to-pin compatible devices TDA7269A, TDA7265, and TDA7265B.

**Figure 23. PCB layout, solder side**



**Figure 24. PCB layout, component side**

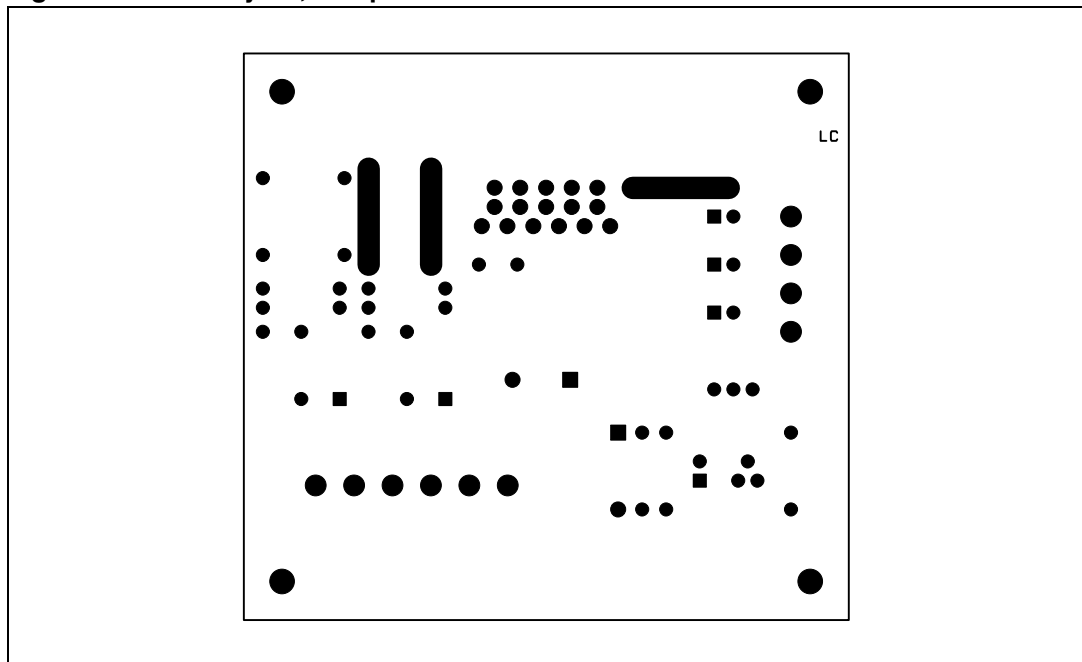
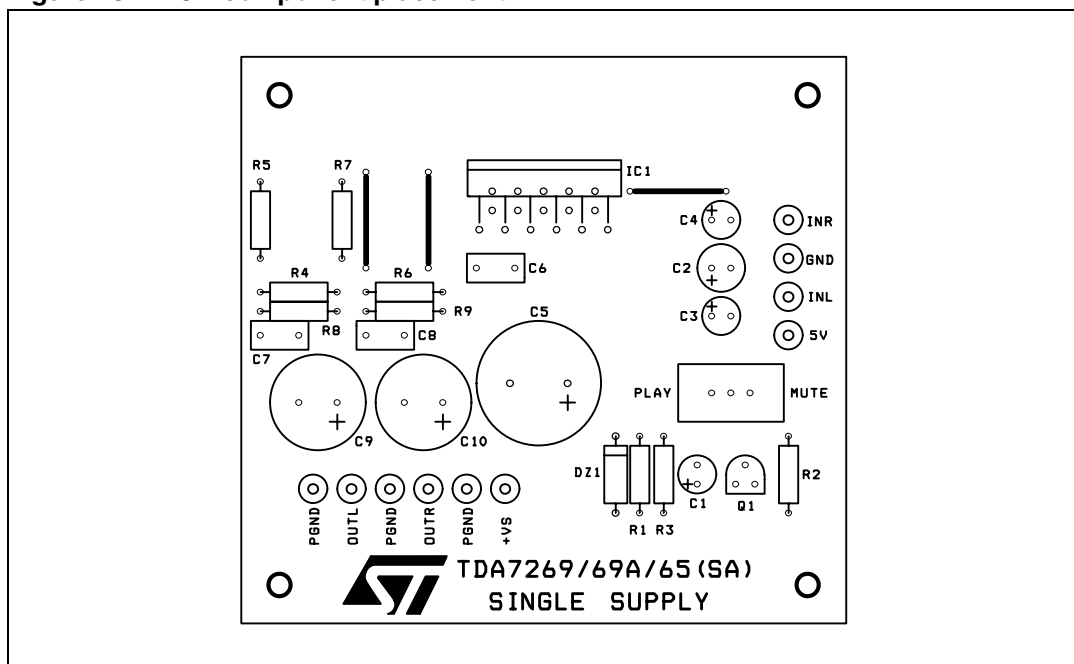


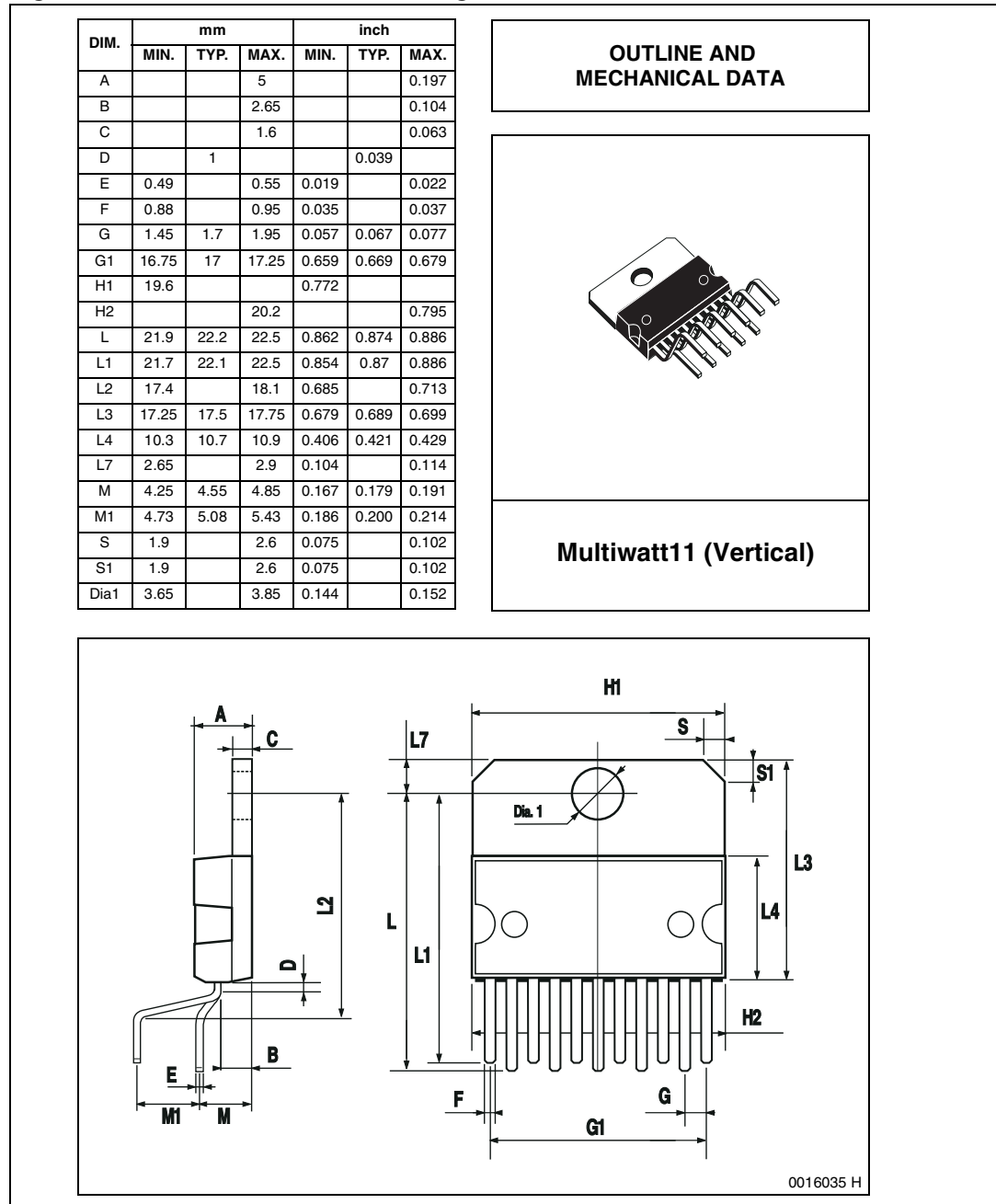
Figure 25. PCB component placement



## 6 Package mechanical data

The TDA7292 comes in an 11-pin Multiwatt package.

**Figure 26. Multiwatt11 outline drawing and dimensions**



In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

## 7 Revision history

**Table 7. Document revision history**

| Date        | Revision | Changes                                                                                                                              |
|-------------|----------|--------------------------------------------------------------------------------------------------------------------------------------|
| Nov-2004    | 1        | Initial release.                                                                                                                     |
| Oct-2005    | 2        | Inserted PC board and graphics.                                                                                                      |
| Mar-2006    | 3        | Ouput peak current changed.                                                                                                          |
| 29-May-2009 | 4        | Updated resistor value setting mute voltage in <a href="#">Figure 1 on page 1</a> and <a href="#">Table 5 on page 13</a> .           |
| 29-Feb-2012 | 5        | Added <a href="#">Note: on page 16</a> and <a href="#">Note: on page 18</a> concerning PCB layout for pin-to-pin compatible devices. |

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