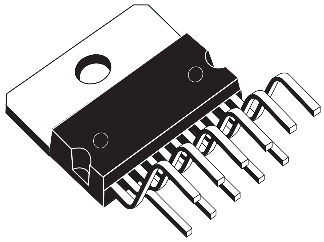
TDA7292

40 W + 40 W stereo amplifier with mute and standby

Datasheet — production data

Features

- Wide supply voltage range (up to ± 33 V)
- Split supply
- High output power
- 40 W + 40 W into 8 Ω
  with V_S = ±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



Multiwatt11

Description

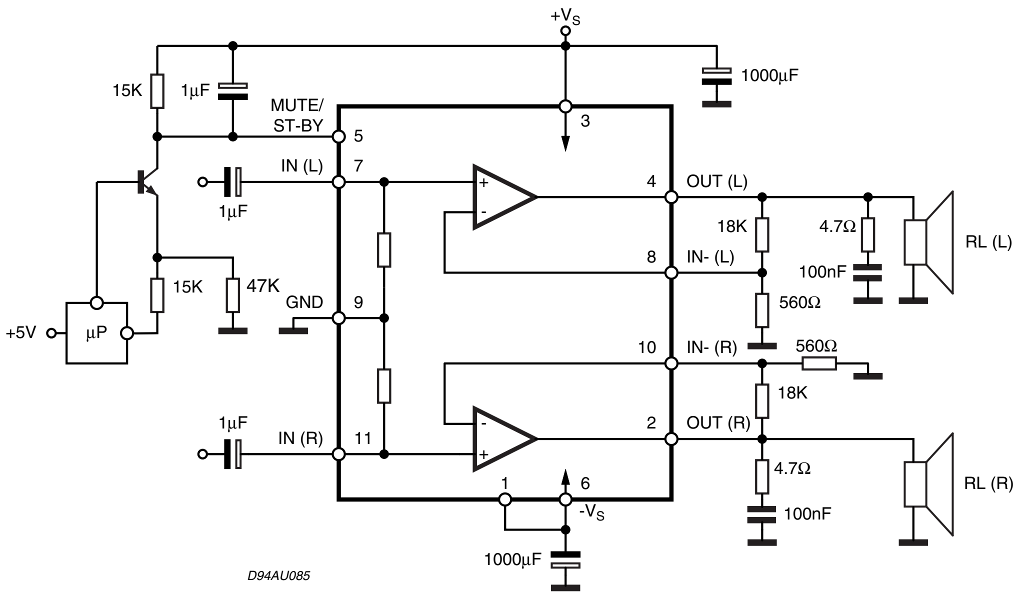
The TDA7292 is a class-AB dual audio power amplifier assembled in a Multiwatt package.

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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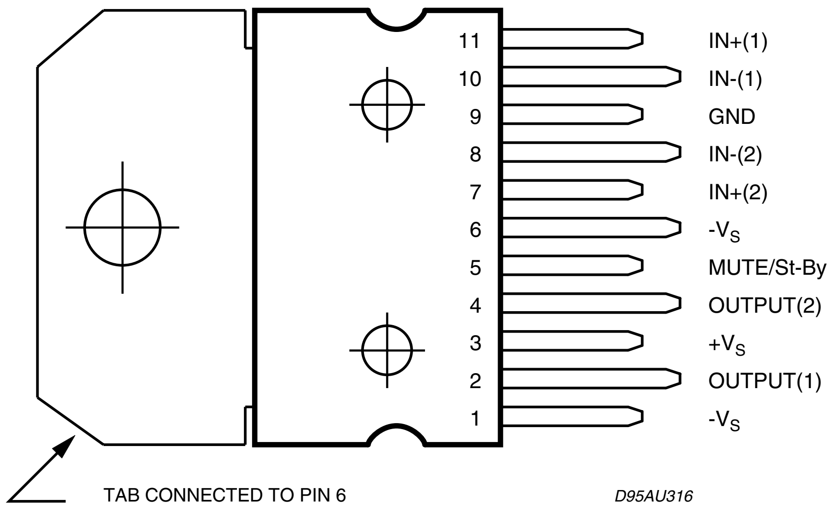


2 Electrical specifications

2.1 Absolute maximum ratings

Table 2. Absolute maximum ratings

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

2.2 Thermal data

Table 3. Thermal data

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

2.3 Electrical specifications

Unless otherwise stated, the results in *Table 4* below are given for the conditions: V_S = ±26 V, R_L (load) = 8 Ω, R_S (source) = 50 Ω, f = 1 kHz, G_V = 30 dB, and T_{amb} = 25° 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	-	±8	-	±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%: R_L = 8 Ω, V_S = ±26 V R_L = 4 Ω, V_S = ±18 V	-	40 31	-	W
		THD = 1%: R_L = 8 Ω, V_S = ±26 V R_L = 4 Ω, V_S = ±18 V	-	30 24	-	
I_{Peak}	Peak output current	Internally limited	-	5	-	A
THD	Total harmonic distortion	P_o = 1 W	-	0.02	-	%

Table 4. Electrical specifications (continued)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
C_T	Crosstalk	f = 1 kHz	-	70	-	dB
SR	Slew rate	-	-	11	-	V/ms
G_{OL}	Open-loop gain	-	-	80	-	dB
eN	Total input noise	f = 20 Hz to 22 kHz	-	4	-	µV
R_i	Input resistance	-	-	20	-	kΩ
SVRR	Supply voltage rejection ratio	-	-	75	-	dB
T_j	Junction temperature at thermal shut-down	-	-	145	-	°C
Mute mode (see also *Table 5 on page 13*)						
VT_{MUTE}	Mute/play threshold	-	-7	-6	-5	V
A_{MUTE}	Mute attenuation	-	-	75	-	dB
Standby mode (see also *Table 5 on page 13*)						
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

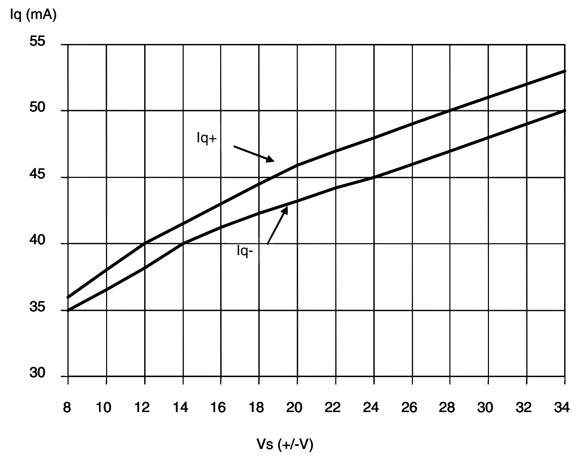


Figure 4. Frequency response

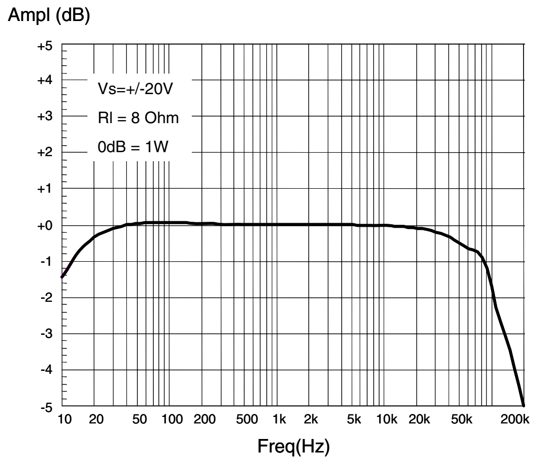


Figure 5. Output power vs. supply voltage

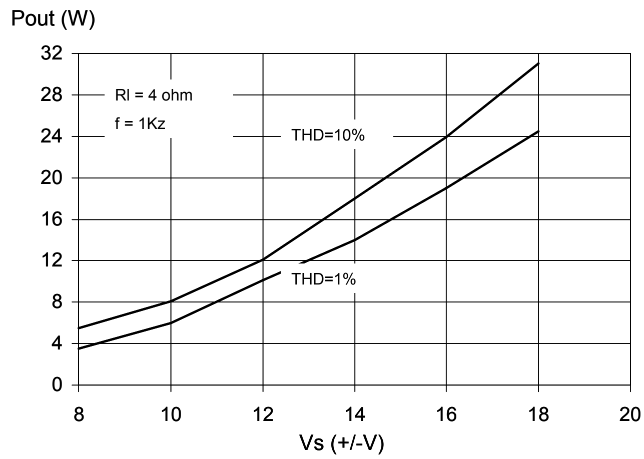


Figure 6. Output power vs. supply voltage

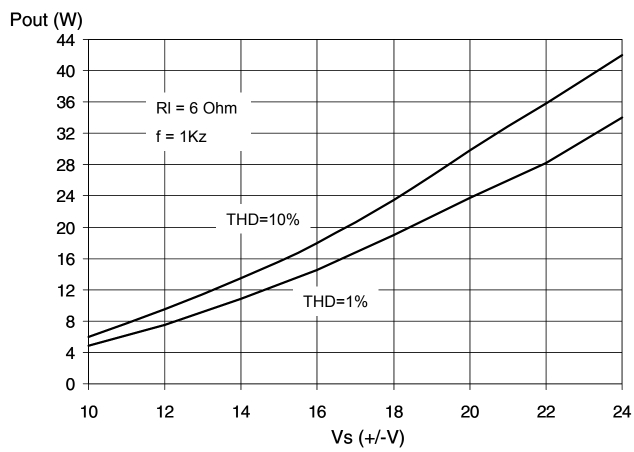


Figure 7. Output power vs. supply voltage

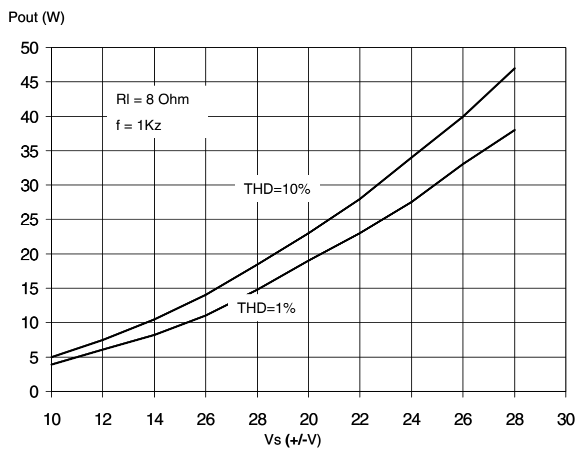


Figure 8. THD vs. output power

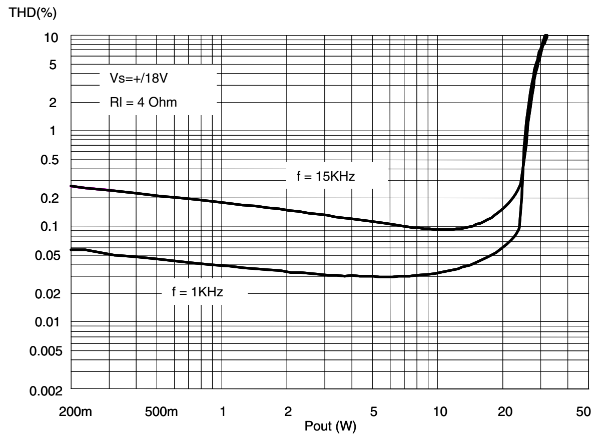


Figure 9. THD vs. output power

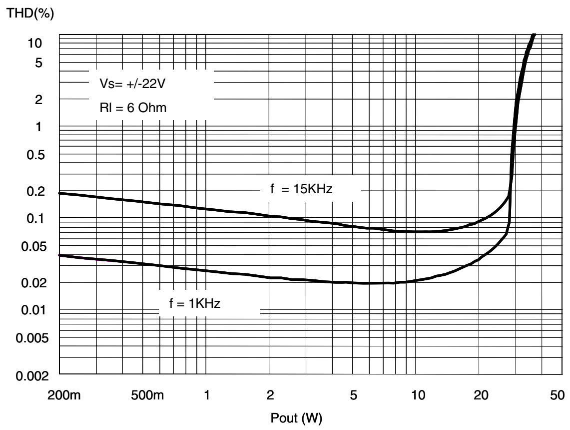


Figure 10. THD vs. output power

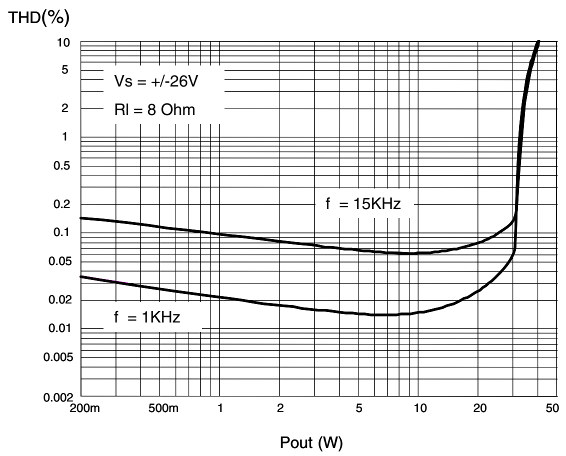


Figure 11. Quiescent current vs. voltage on pin 5

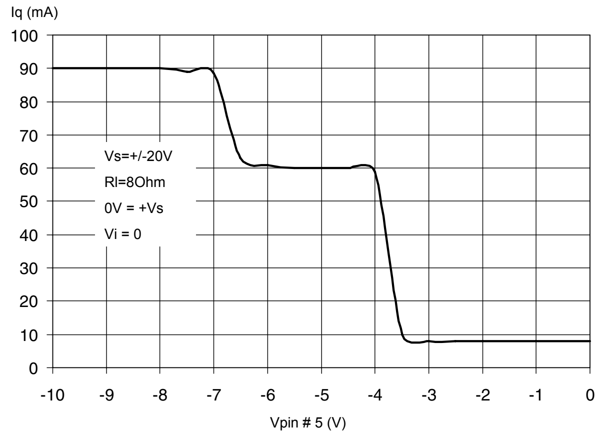


Figure 12. Attenuation vs. voltage on pin 5

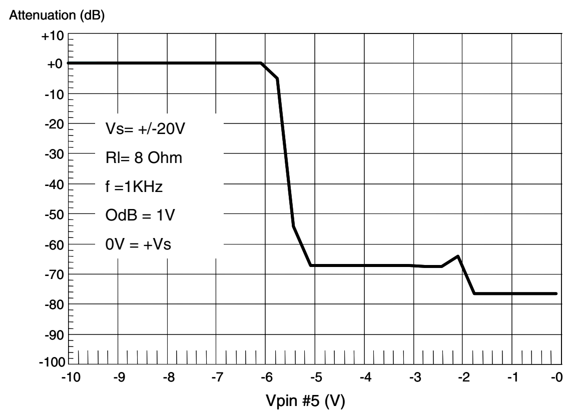


Figure 13. Crosstalk vs. frequency

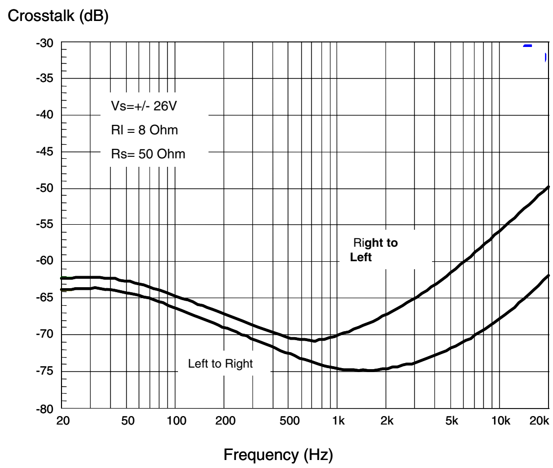


Figure 14. Power dissipation vs. output power

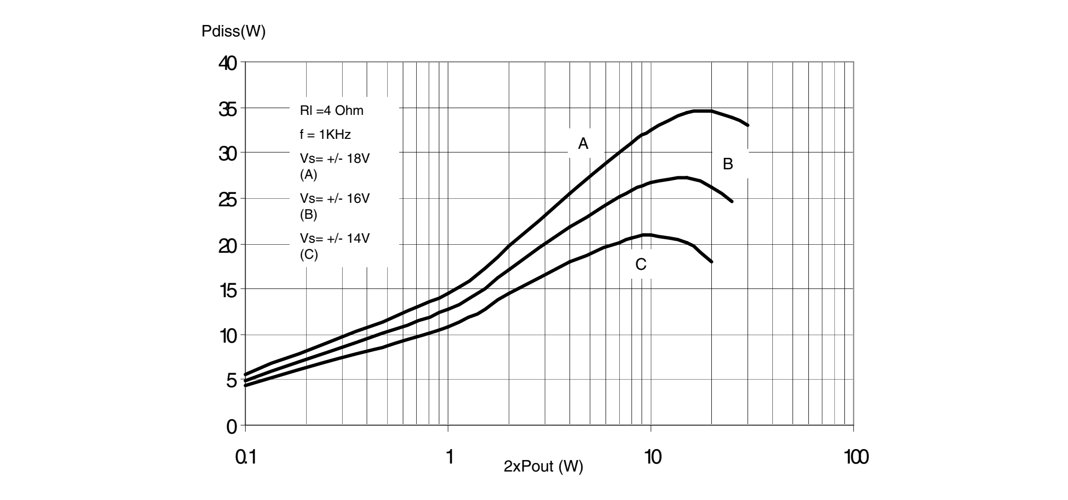


Figure 15. Power dissipation vs. output power

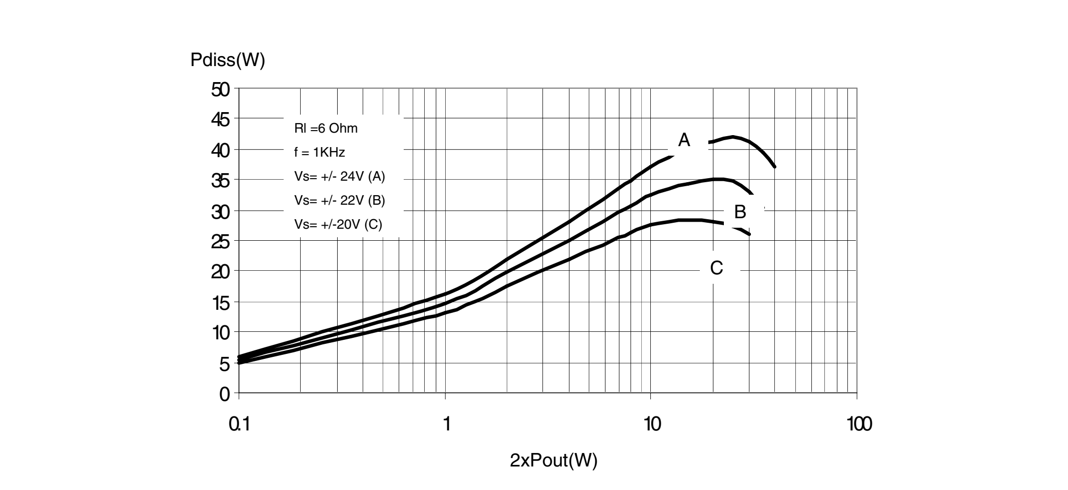
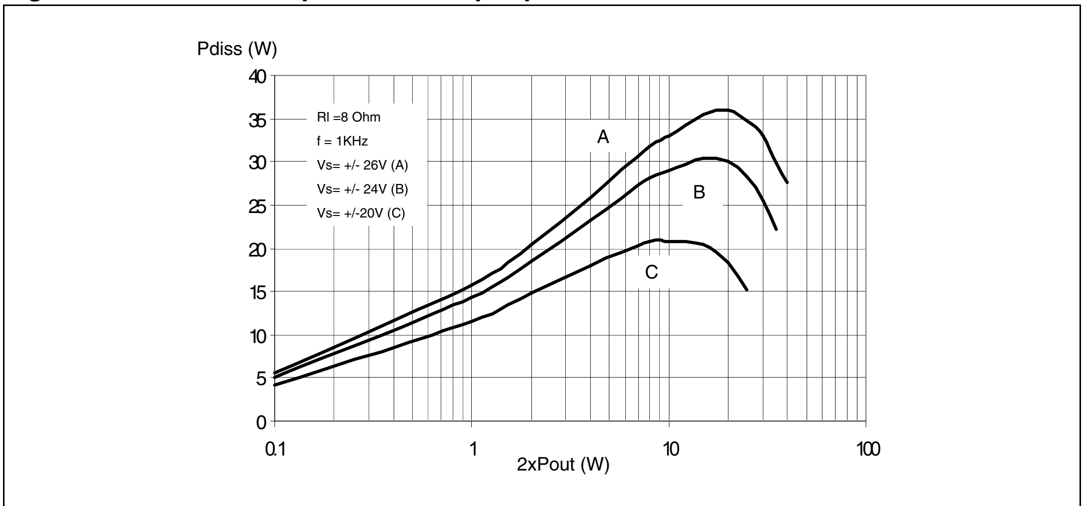


Figure 16. Power dissipation vs. output power



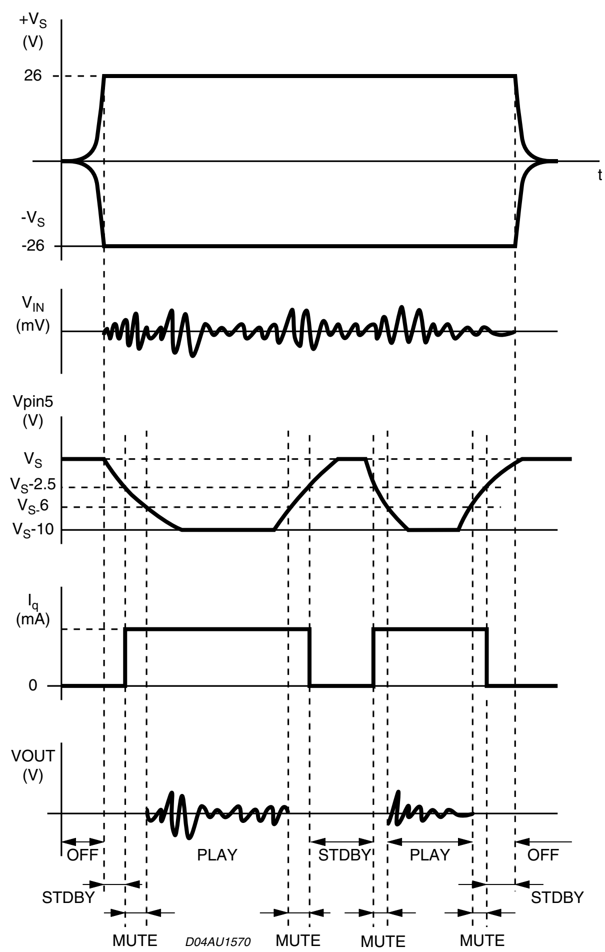
4 Mute and standby modes

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, V_{PIN5}	Mode	Remarks
$> +V_S - 2.5$ V	Standby	Output stages turned off
$> +V_S - 6.0$ V, $< +V_S - 2.5$ V	Mute	Output stages turned on, amplifiers muted
$< +V_S - 6.0$ V	Play	Amplifiers active

Figure 17. Mute and standby thresholds on pin 5



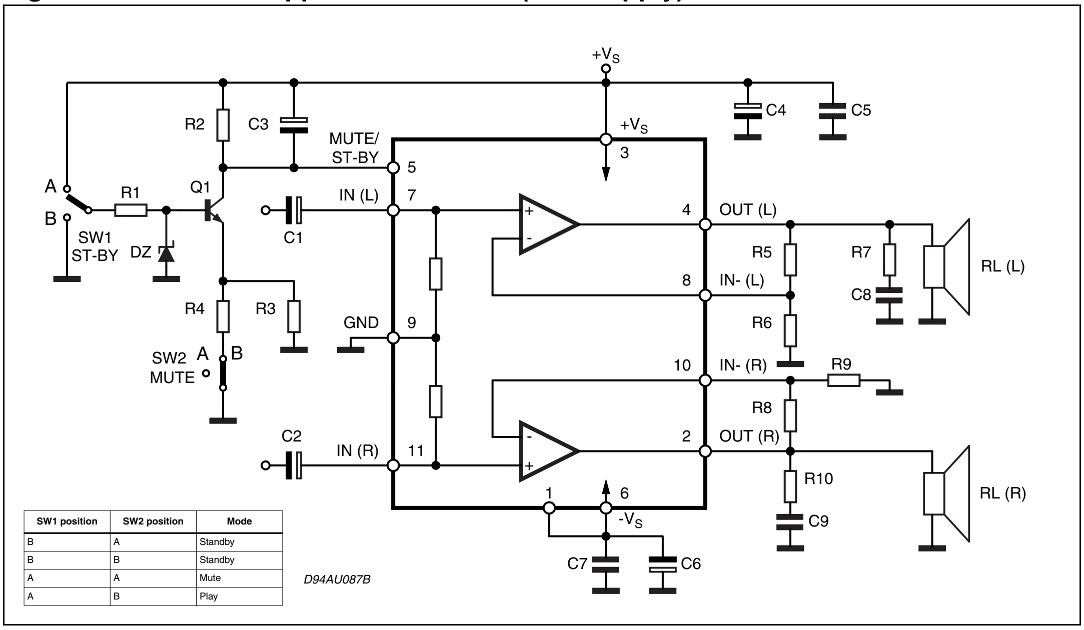
5 Applications information

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-kΩ / 1-W resistor can be used at Vcc = ±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)



SW1 position	SW2 position	Mode
B	A	Standby
B	B	Standby
A	A	Mute
A	B	Play

Table 6. **Recommended values**

Component	Recommended value	Purpose	Larger than recommended value	Smaller than recommended value
R1	10 kΩ	Mute circuit	Decrease in DZ biasing current	-
R2	15 kΩ	Mute circuit	V_{PIN5} shifted downwards	V_{PIN5} shifted upwards
R3	47 kΩ	Mute circuit	V_{PIN5} shifted upwards	V_{PIN5} shifted downwards
R4	15 kΩ	Mute circuit	V_{PIN5} shifted upwards	V_{PIN5} shifted downwards
R5, R8	18 kΩ	Closed-loop gain setting (1)	Increase in gain	-
R6, R9	560 Ω		Decrease in gain	-
R7, R10	4.7 Ω	Frequency stability	Danger of oscillation	Danger of oscillation
C1, C2	1 µF	Input AC coupling	-	Higher low-frequency cutoff
C3	1 µF	Standby/mute time constant	Larger on/off time	Smaller on/off time
C4, C6	1000 µF	Supply voltage decoupling	-	Danger of oscillation
C5, C7	0.1 µF	Supply voltage decoupling	-	Danger of oscillation
C8, C9	0.1 µF	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

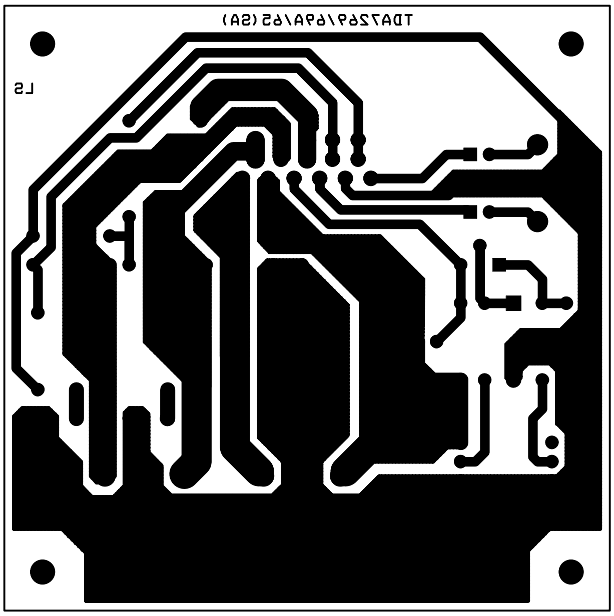


Figure 20. PCB layout, component side

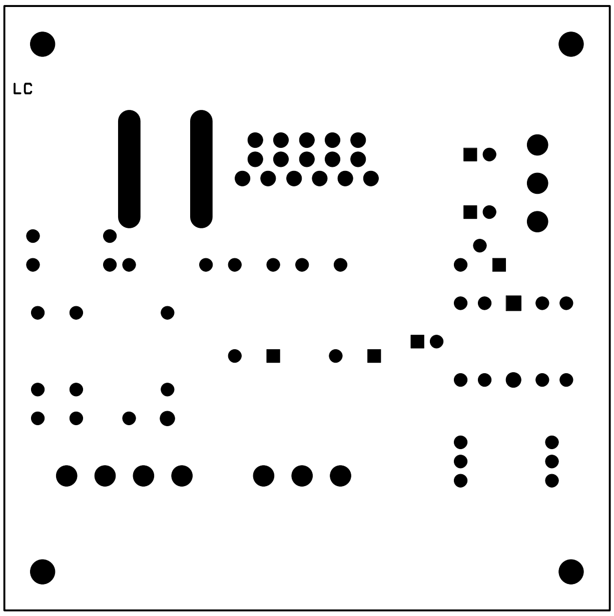
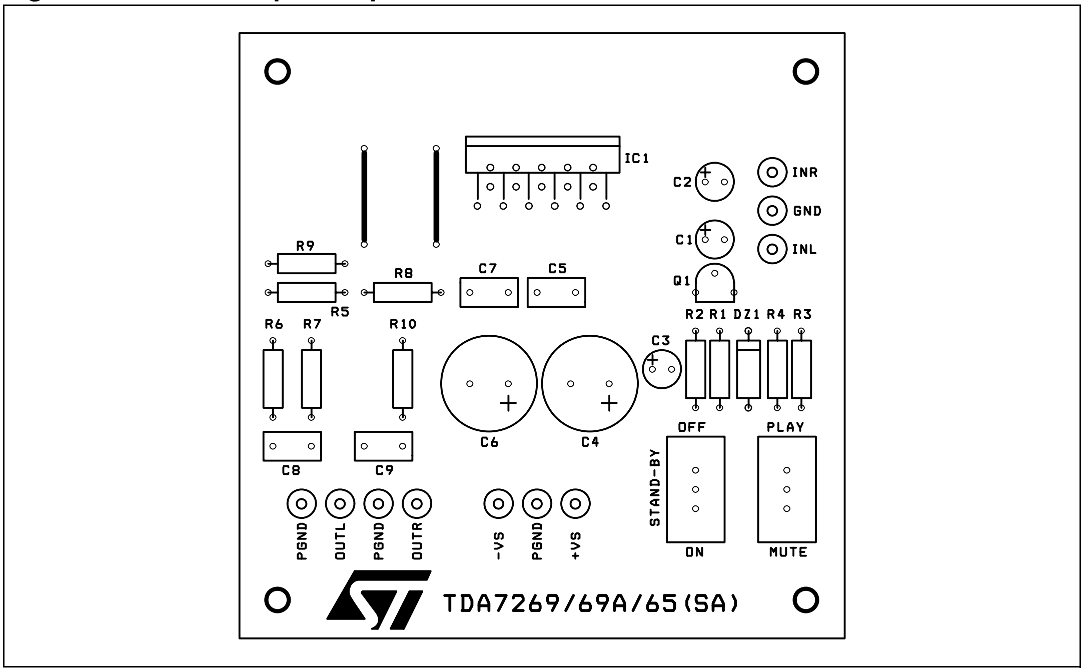
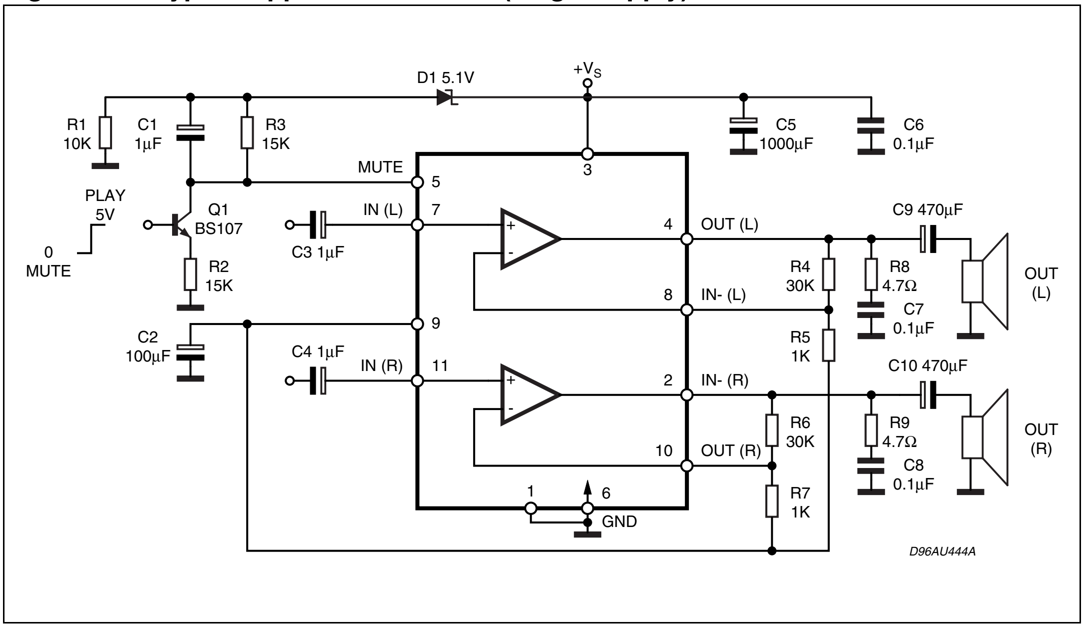


Figure 21. PCB component placement



5.2 Applications with single supply

Figure 22. Typical applications circuit (single supply)



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

Figure 23. PCB layout, solder side

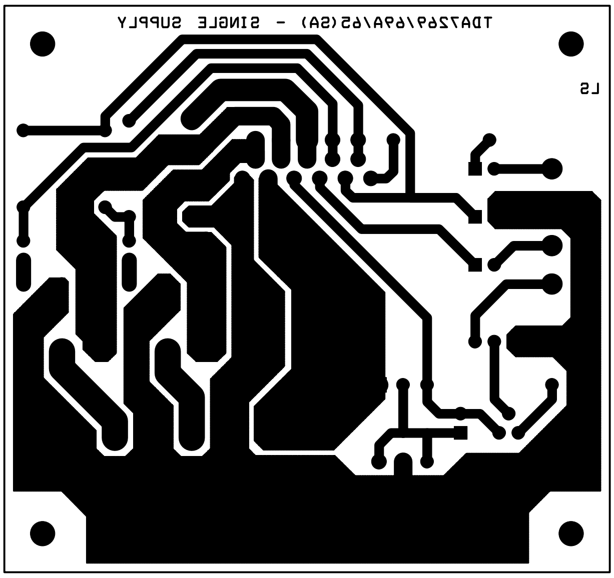
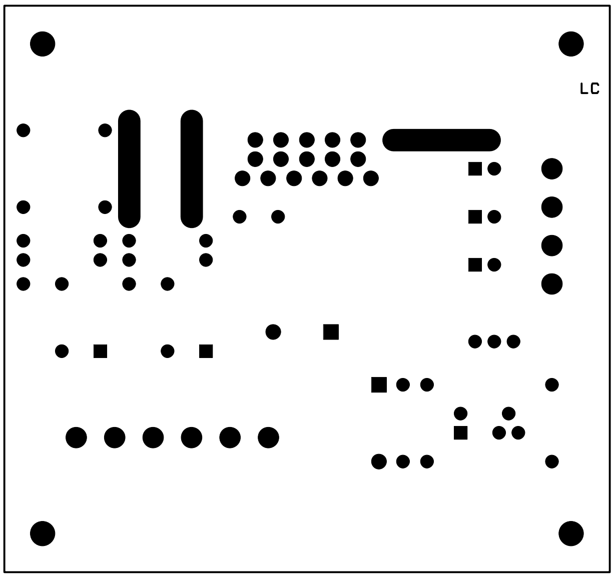


Figure 24. PCB layout, component side



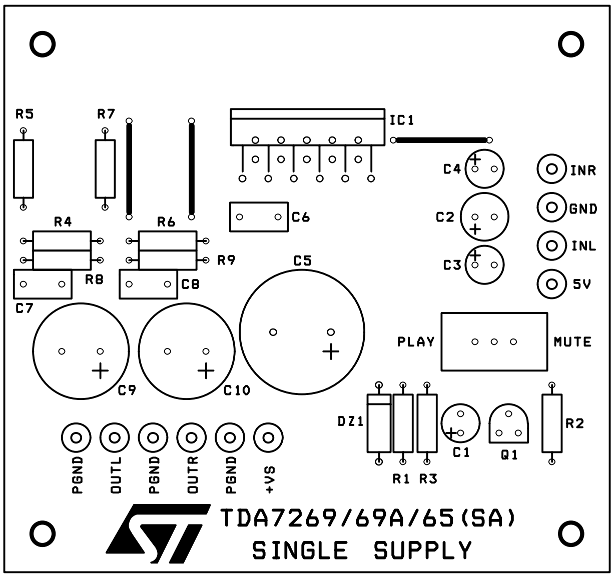


Figure 25. PCB component placement

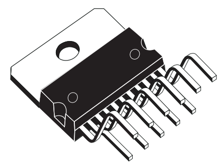
6 Package mechanical data

The TDA7292 comes in an 11-pin Multiwatt package.

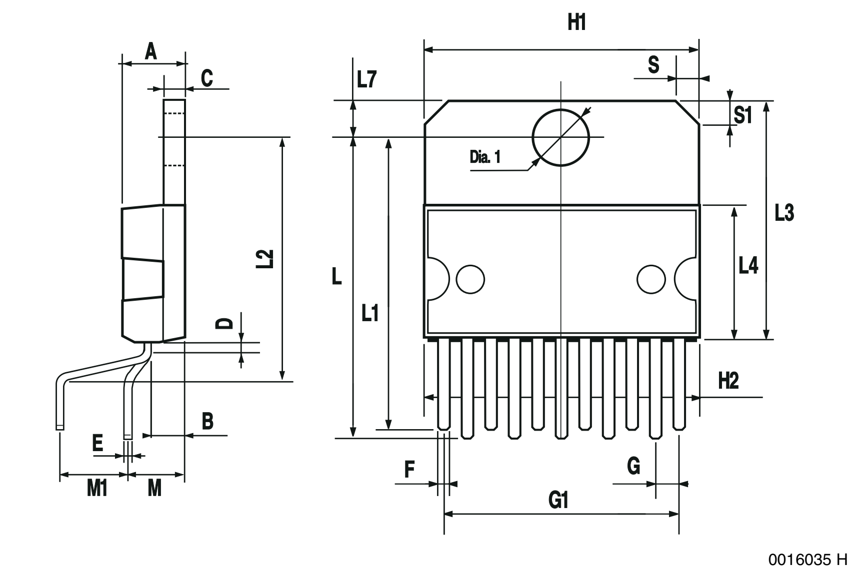
Figure 26. Multiwatt11 outline drawing and dimensions

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			5			0.197
B			2.65			0.104
C			1.6			0.063
D		1			0.039	
E	0.49		0.55	0.019		0.022
F	0.88		0.95	0.035		0.037
G	1.45	1.7	1.95	0.057	0.067	0.077
G1	16.75	17	17.25	0.659	0.669	0.679
H1	19.6			0.772		
H2			20.2			0.795
L	21.9	22.2	22.5	0.862	0.874	0.886
L1	21.7	22.1	22.5	0.854	0.87	0.886
L2	17.4		18.1	0.685		0.713
L3	17.25	17.5	17.75	0.679	0.689	0.699
L4	10.3	10.7	10.9	0.406	0.421	0.429
L7	2.65		2.9	0.104		0.114
M	4.25	4.55	4.85	0.167	0.179	0.191
M1	4.73	5.08	5.43	0.186	0.200	0.214
S	1.9		2.6	0.075		0.102
S1	1.9		2.6	0.075		0.102
Dia1	3.65		3.85	0.144		0.152

OUTLINE AND MECHANICAL DATA



Multiwatt11 (Vertical)



In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® 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 *Figure 1 on page 1* and *Table 5 on page 13*.
29-Feb-2012	5	Added *Note: on page 16* and *Note: on page 18* concerning PCB layout for pin-to-pin compatible devices.