

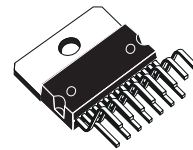


# TDA7494S

## 10W AMPLIFIER

- 10W OUTPUT POWER  $R_L = 8\Omega$ ,  
@ THD = 10%  $V_{CC} = 28V$
- ST-BY AND MUTE FUNCTIONS
- NO BOUCHEROT CELL
- NO ST-BY RC INPUT NETWORK
- SINGLE SUPPLY RANGING UP TO 35V
- SHORT CIRCUIT PROTECTION
- THERMAL OVERLOAD PROTECTION
- INTERNALLY FIXED GAIN
- SOFT CLIPPING
- LOW TURN-ON TURN-OFF POP NOISE
- MULTIWATT 15 PACKAGE

### MULTIPOWER BI50II TECHNOLOGY



Multiwatt15

ORDERING NUMBER: TDA7494S

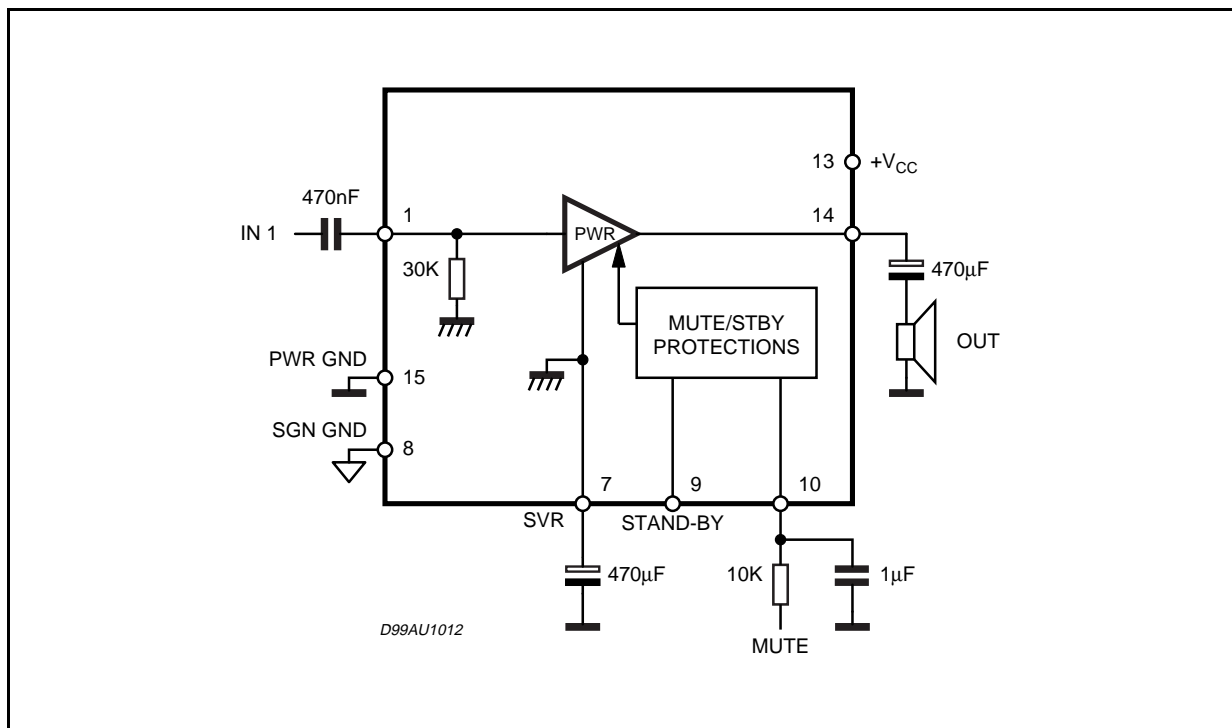
### DESCRIPTION

The TDA7494S 10W is class AB power amplifier assembled in the @Multiwatt 15 package, spe-

cially designed for high quality sound, TV applica-

tions. Features of the TDA7494S include Stand-by and mute functions.

### BLOCK AND APPLICATION DIAGRAM



# TDA7494S

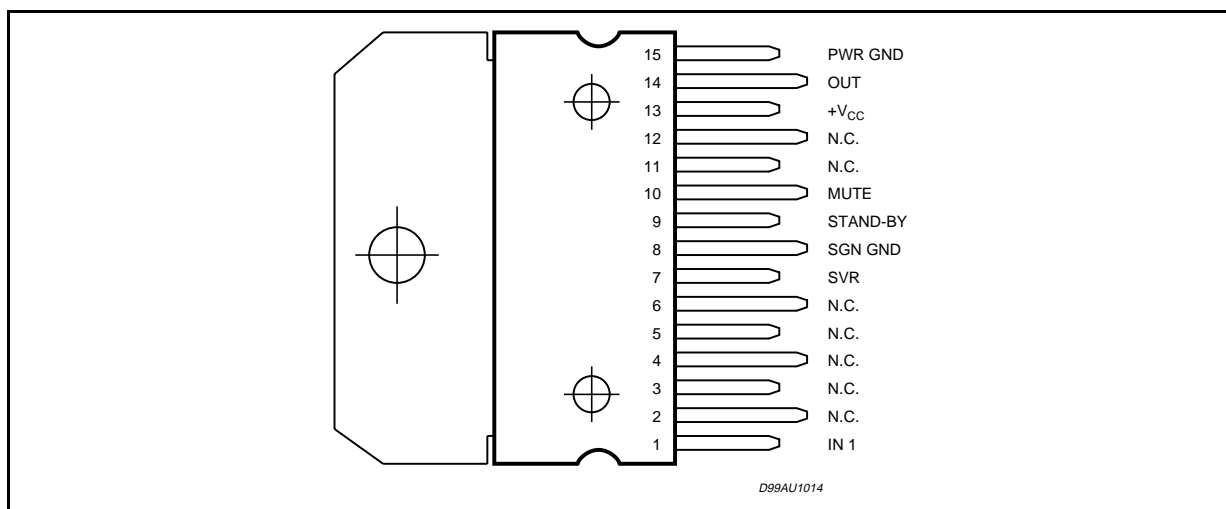
## ABSOLUTE MAXIMUM RATINGS

| Symbol         | Parameter   | Value      | Unit            |
|----------------|---|------------|-----------------|
| $V_S$          | DC Supply Voltage                                   | 40         | V               |
| $V_{IN}$       | Maximum Input Voltage                               | 8          | V <sub>pp</sub> |
| $P_{tot}$      | Total Power Dissipation ( $T_{amb} = 70^{\circ}C$ ) | 16         | W               |
| $T_{amb}$      | Ambient Operating Temperature Range (1)             | -20 to +85 | $^{\circ}C$     |
| $T_{stg}, T_j$ | Storage and Junction Temperature                    | -40 to 150 | $^{\circ}C$     |

(1) Operation between -20 to 85  $^{\circ}C$  guaranteed by correlation with 0 to 70 $^{\circ}C$ .

(2) Pin 3 is ESD sensitive (max. voltage  $\pm 1.5KV$ )

## PIN CONNECTION



## THERMAL DATA

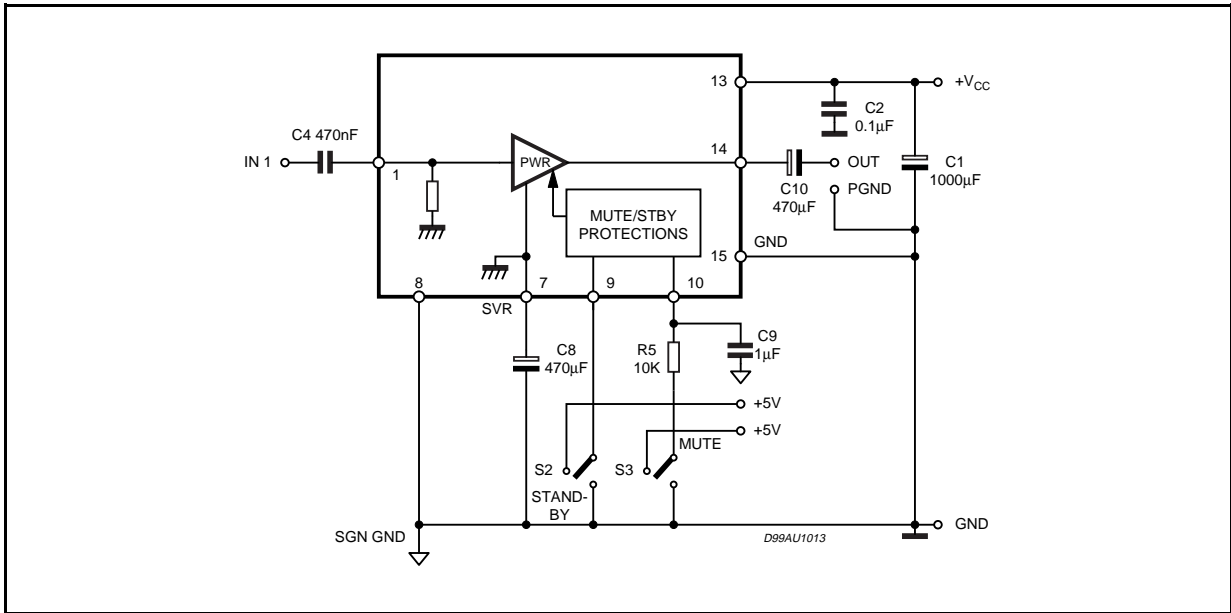
| Symbol           | Parameter                           | Value                  | Unit          |
|------------------|-------------------------------------|------------------------|---------------|
| $R_{th\ j-case}$ | Thermal Resistance Junction-case    | Typ = 3.8    Max = 4.8 | $^{\circ}C/W$ |
| $R_{th\ j-amb}$  | Thermal Resistance Junction-ambient | max 35                 | $^{\circ}C/W$ |

**ELECTRICAL CHARACTERISTICS**(Refer to the test circuit,  $V_S = 21V$ ,  $R_L = 8\Omega$ ;  $R_g = 50\Omega$ ;  $T_{amb} = 25^\circ C$ ; unless otherwise specified.)

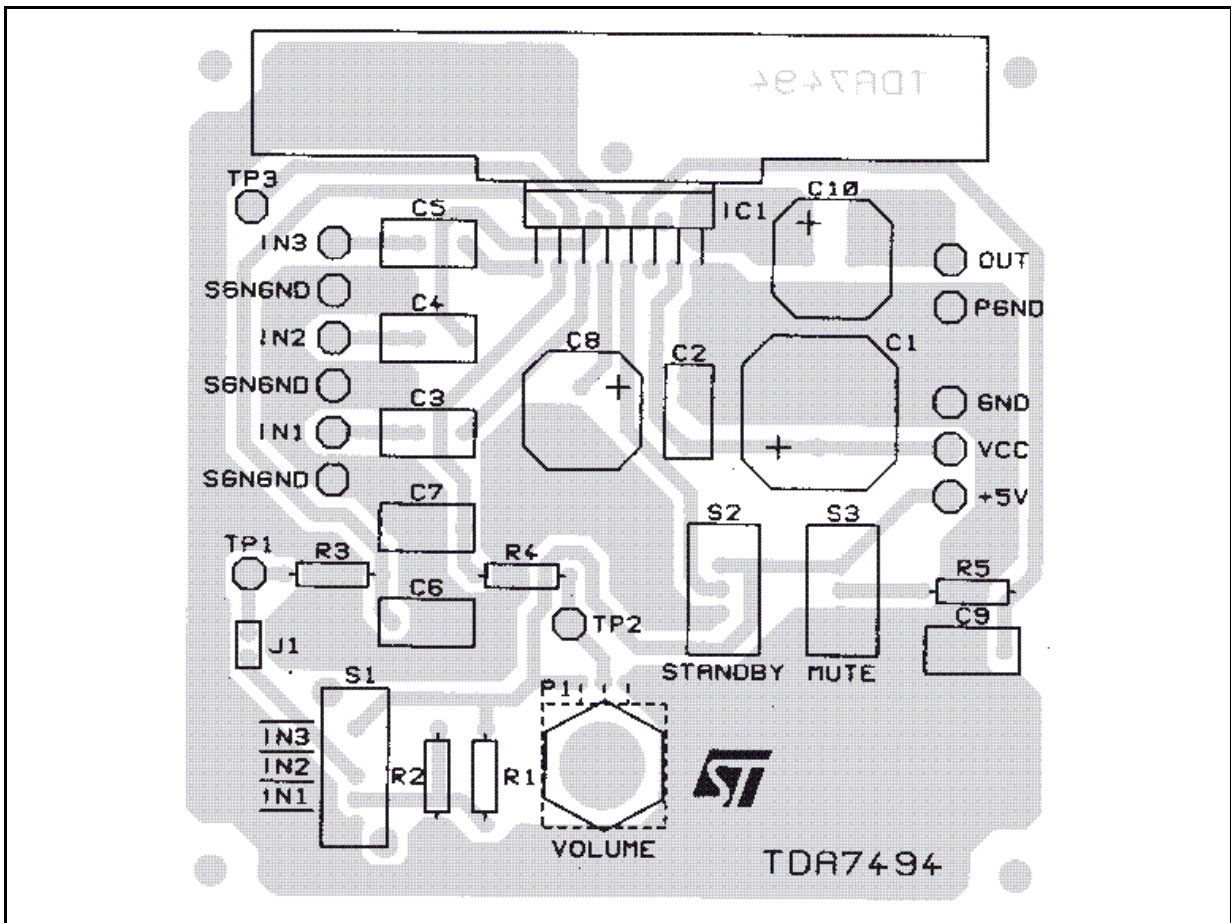
| Symbol         | Parameter                                  | Test Condition  | Min.                      | Typ.                                   | Max. | Unit       |
|----------------|--|---|---------------------------|--|------|------------|
| $V_S$          | Supply Voltage Range                       |   | 11                        |  | 35   | V          |
| $I_q$          | Total Quiescent Current                    |   |                           | 22                                     | 50   | mA         |
| DCVos          | Output DC Offset Referred to SVR Potential | No Input Signal   | -550                      |  | 550  | mV         |
| $V_o$          | Quiescent Output Voltage                   | $V_S = 18V$   | 7.8                       | 9                                      | 10.2 | V          |
|                |  | $V_S = 21V$   | 10                        | 10.5                                   | 11   | V          |
| $P_o$          | Output Power                               | THD = 10%; $V_{CC} = 28V$ , $R_L = 8\Omega$<br>THD = 1%; $V_{CC} = 28V$   | 8<br>6                    | 10<br>8                                |      | W          |
|                |  | THD = 10%; $V_{CC} = 21V$ ,<br>THD = 1%; $V_{CC} = 21V$ ,                 | 5<br>3.5                  | 5.5<br>4                               |      | W          |
|                |  | THD = 10%; $V_{CC} = 21V$ , $R_L = 4\Omega$<br>THD = 1%; $V_{CC} = 21V$ , | 5<br>3.9                  | 6.6<br>5.5                             |      | W          |
|                |  | THD = 10%; $V_{CC} = 18V$ ,<br>THD = 1%; $V_{CC} = 18V$                   | 4.5<br>3.5                | 6<br>4.5                               |      | W          |
|                |  | THD = 10%; $V_{CC} = 18V$ , $R_L = 8\Omega$<br>THD = 1%; $V_{CC} = 18V$   | 3.5<br>2.2                | 3.75<br>2.85                           |      | W<br>W     |
|                |  | THD   | Total Harmonic Distortion | $P_O = 1W$ ; $f = 1KHz$ ; $G_v = 26dB$ |      |            |
| $I_{peak}$     | Output Peak Current                        | (internally limited)  | 1.4                       | 1.9                                    |      | A          |
| $T_{op}$       | Operating Temperature                      |   | 0                         |  | 70   | $^\circ C$ |
| $V_{in}$       | Input Signal                               |   |                           |  | 2.8  | Vrms       |
| $G_v$          | Closed Loop Gain                           |   | 24.5                      | 26                                     | 27.5 | dB         |
| BW             |  |   |                           | 0.6                                    |      | MHz        |
| $e_n$          | Total Output Noise                         | $f = 20Hz$ to $22KHz$<br>Play   |                           | 30                                     | 50   | $\mu V$    |
|                |  | $f = 20Hz$ to $22KHz$<br>Mute   |                           | 30                                     | 50   | $\mu V$    |
| SR             | Slew Rate                                  |   | 5                         | 8                                      |      | V/ $\mu s$ |
| $R_i$          | Input Resistance                           |   | 22.5                      | 30                                     |      | K $\Omega$ |
| SVR            | Supply Voltage Rejection                   | $f = 1kHz$ ;<br>$C_{SVR} = 470\mu A$ ; $V_{RIP} = 1V_{RMS}$               | 36                        | 43                                     |      | dB         |
| $T_M$          | Thermal Muting                             |   |                           | 150                                    |      | $^\circ C$ |
| $T_s$          | Thermal Shut-down                          |   |                           | 160                                    |      | $^\circ C$ |
| $V_{ST-BY}$    | Stand-by threshold                         |   | 2.3                       | 2.5                                    | 2.7  | V          |
| $V_{MUTE}$     | Mute Threshold                             |   | 2.3                       | 2.5                                    | 2.7  | V          |
| $I_{qST-BY}$   | Quiescent Current @ Stand-by               |   |                           | 0.6                                    | 1    | mA         |
| $A_{MUTE}$     | Mute Attenuation                           |   | 60                        | 75                                     |      | dB         |
| $I_{stbyBIAS}$ | Stand-by bias current                      | Stand by on; $V_{ST-BY} = 5V$ ;<br>$V_{MUTE} = 5V$ ;                      |                           | 80                                     | 150  | $\mu A$    |
|                |  | Play or Mute  |                           | 2                                      | 20   | $\mu A$    |
| $I_{muteBIAS}$ | Mute bias current                          | Mute  |                           | 1.5                                    | 10   | $\mu A$    |
|                |  | Play  |                           | 0.5                                    | 5    | $\mu A$    |

# TDA7494S

**Figure 1: Test and Application Circuit.**



**Figure 2: P.C.B. and component layout**  
 (Pin IN1 of relevant device must be connected to IN3 of TDA7494 Board position).



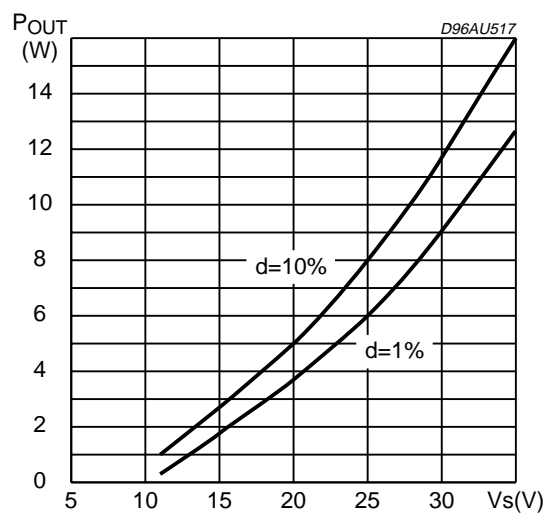
### APPLICATION SUGGESTIONS

The recommended values of the external components are those shown on the application circuit of figure 1. Different values can be used; the following table can help the designer.

| COMPONENT | SUGGESTION VALUE | PURPOSE               | LARGER THAN SUGGESTION     | SMALLER THAN SUGGESTION     |
|-----------|------------------|-----------------------|----------------------------|-----------------------------|
| R5        | 10K $\Omega$     | Mute time constant    | Larger mute on/off time    | Smaller mute on/off time    |
| C1        | 1000 $\mu$ F     | Supply voltage bypass |                            | Danger of oscillation       |
| C2        | 100nF            | Supply voltage bypass |                            | Danger of oscillation       |
| C5        | 470nF            | Input DC decoupling   | Lower low frequency cutoff | Higher low frequency cutoff |
| C8        | 470 $\mu$ F      | Ripple Rejection      | Better SVR                 | Worse SVR                   |
| C9        | 1 $\mu$ F        | Mute time constant    | Larger mute on/off time    | Smaller mute on/off time    |
| C10       | 470 $\mu$ F      | Output DC decoupling  | Lower low frequency cutoff | Higher low frequency cutoff |

**TYPICAL CHARACTERISTICS:** Refer to the Application Circuit of Fig.1  $V_S = 21V$ ;  $R_L = 8\Omega$ ;  $f = 1KHz$ ;  $R_s = 8\Omega$ ;  $T_{amb} = 25^\circ C$ ;  $R_s = 50\Omega$ ; unless otherwise specified

**Figure 3:** Output Power vs Supply Voltage



**Figure 4:** Distortion vs Output Power

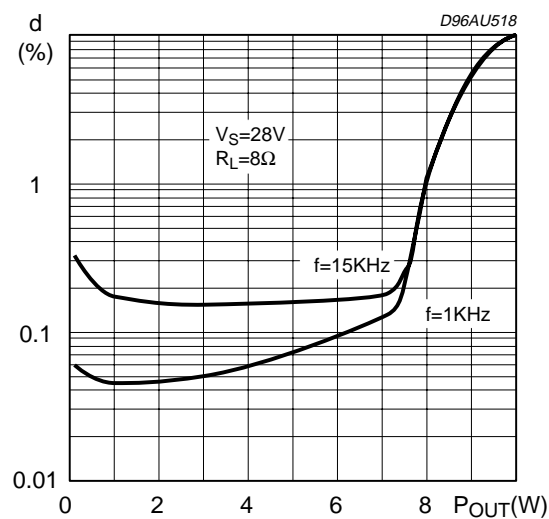


Figure 5: Output Power vs Supply Voltage

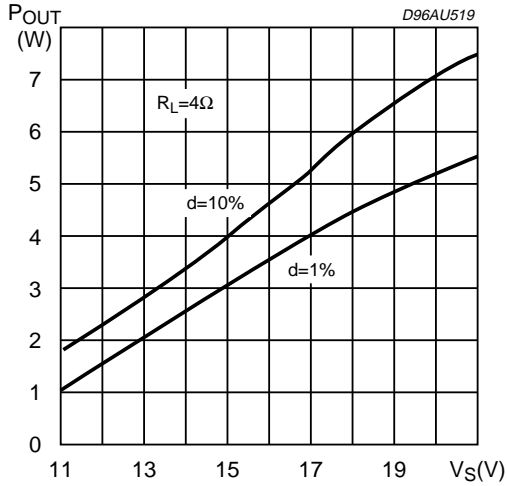


Figure 6: Distortion vs Output Power

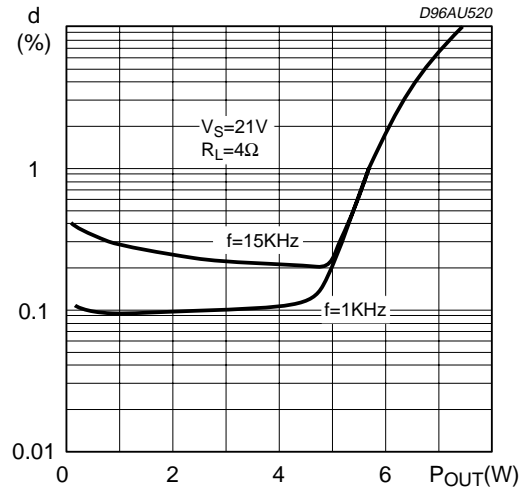


Figure 7: Distortion vs Frequency

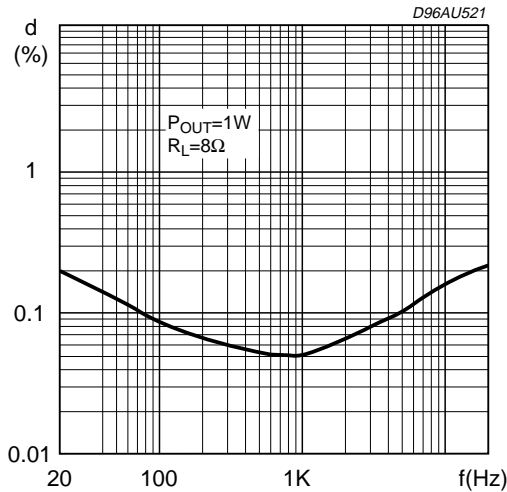


Figure 8: Distortion vs Frequency

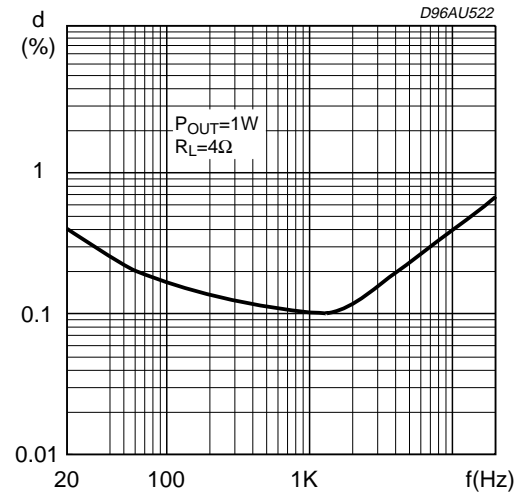


Figure 9: Quiescent Current vs Supply Voltage

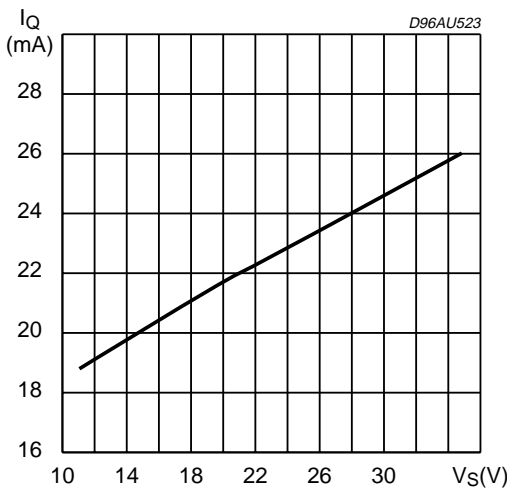
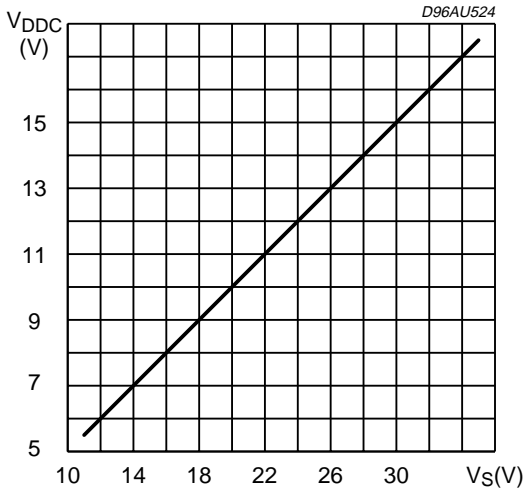
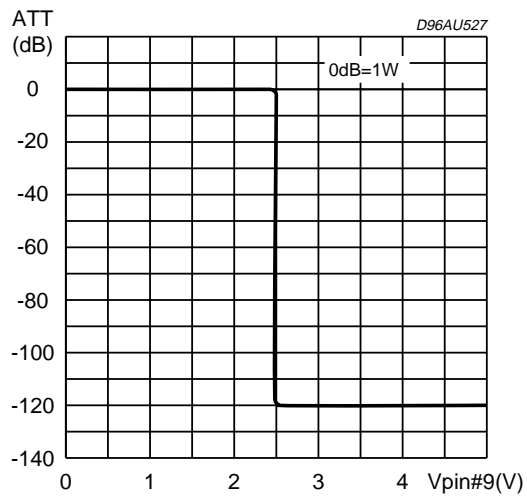


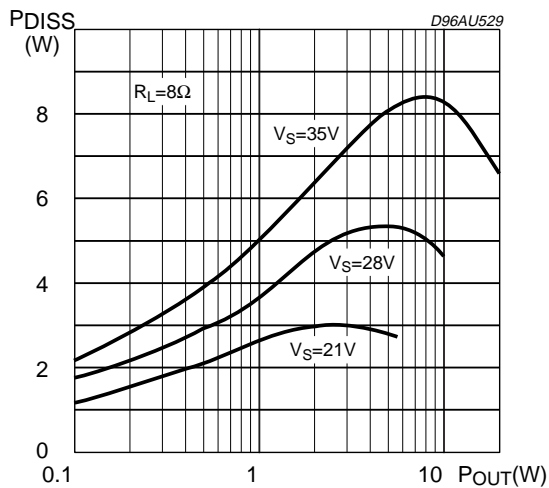
Figure 10: Quiescent Output Voltage vs Supply Voltage



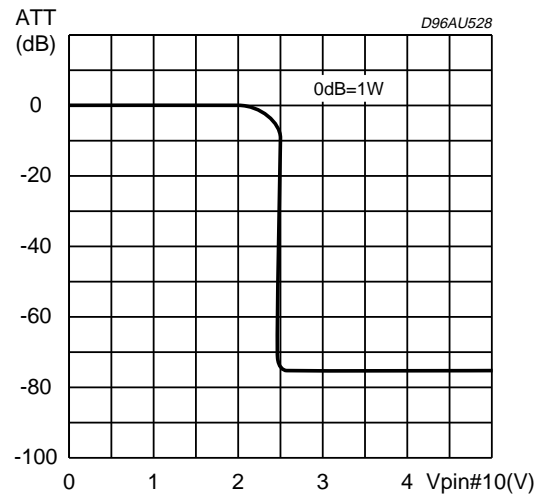
**Figure 11: Stand-by Attenuation vs Vpin # 9**



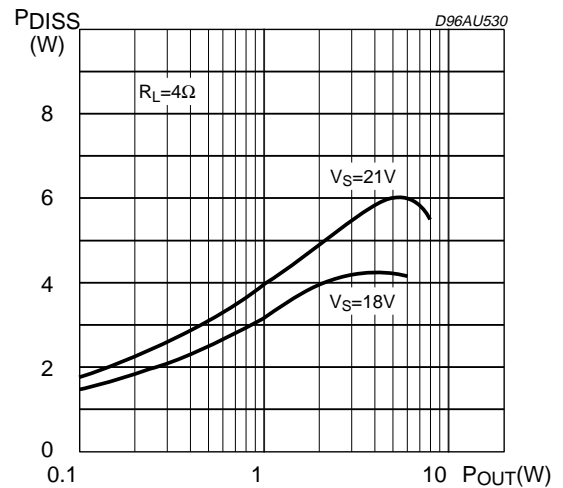
**Figure 13: Power Dissipation vs Output Power**



**Figure 12: Mute Attenuation vs Vpin # 10**



**Figure 14: Power Dissipation vs Output Power**

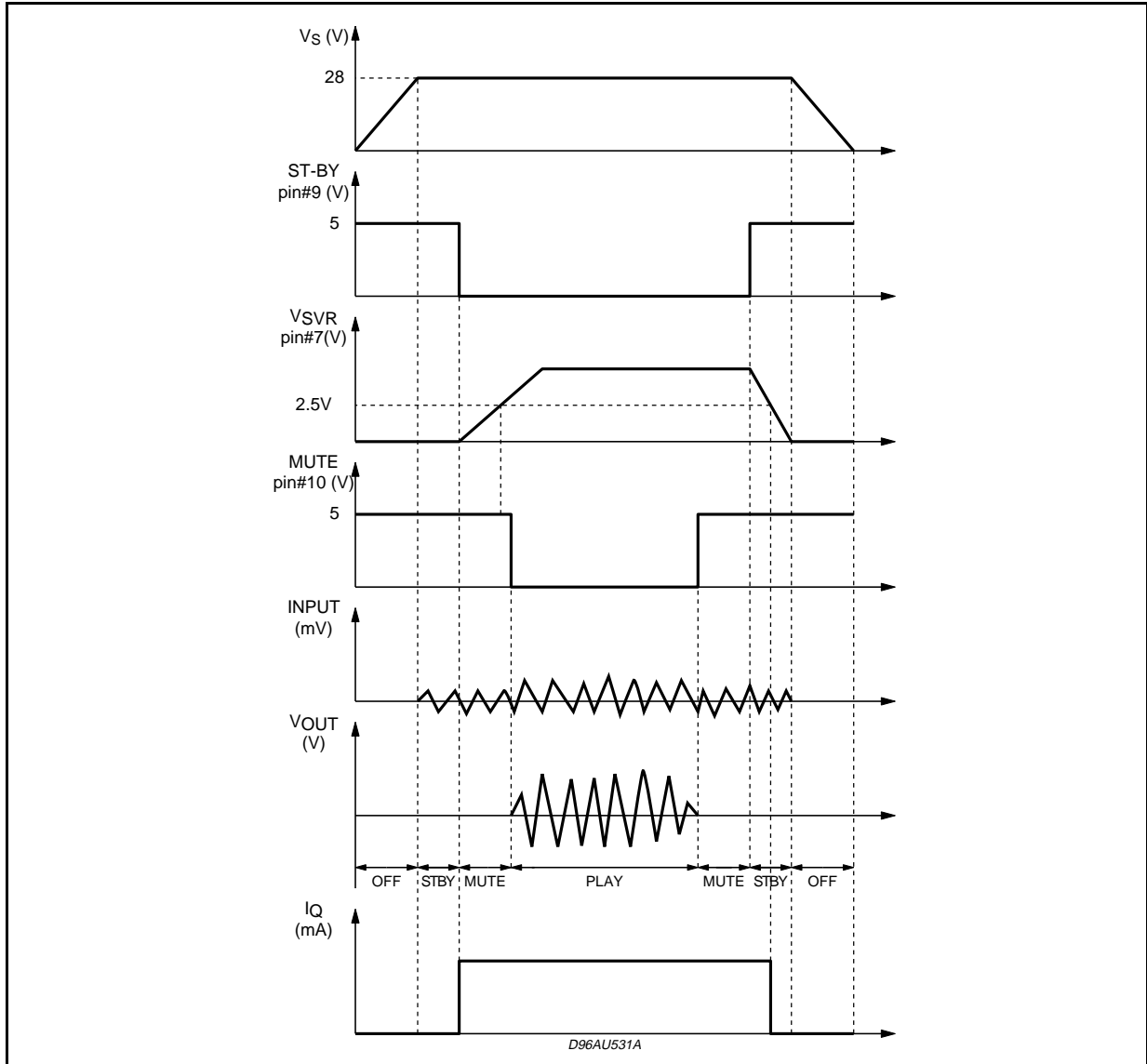


MUTE STAND-BY TRUTH TABLE

| MUTE | ST-BY | OPERATING CONDITION |
|------|-------|---------------------|
| H    | H     | STANDBY             |
| L    | H     | STANDBY             |
| H    | L     | MUTE                |
| L    | L     | PLAY                |

Turn ON/OFF Sequences (for optimising the POP performances)

A) USING MUTE AND STAND-BY FUNCTIONS



B) USING ONLY THE MUTE FUNCTION

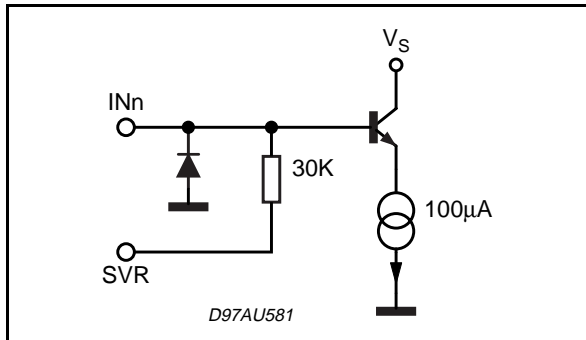
To simplify the application, the stand-by pin can be connected directly to Ground.

During the ON/OFF transitions we recommend to respect the following conditions:

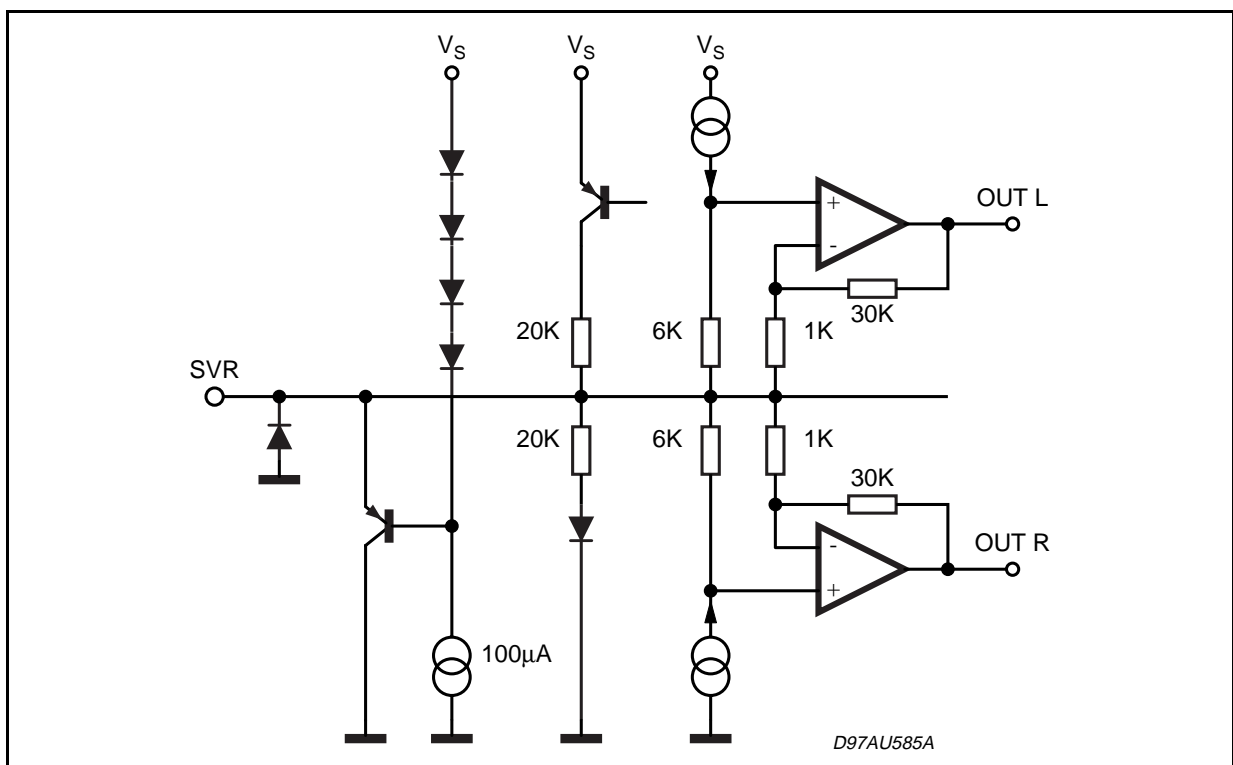
- At the turn-on the transition mute to play must be made when the SVR pin is higher than 2.5V
- At the turn-off the TDA7494S must be brought to mute from the play condition when the SVR pin is higher than 2.5V.



**PINS: IN1**

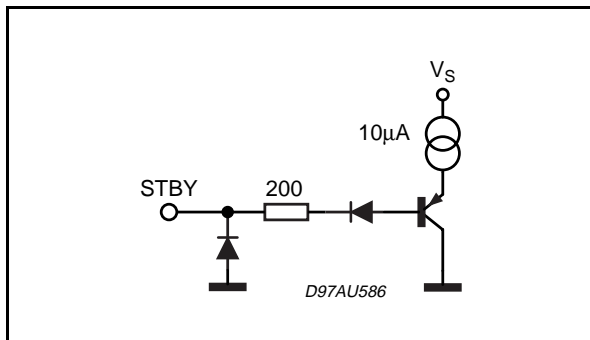


**PIN: SVR**

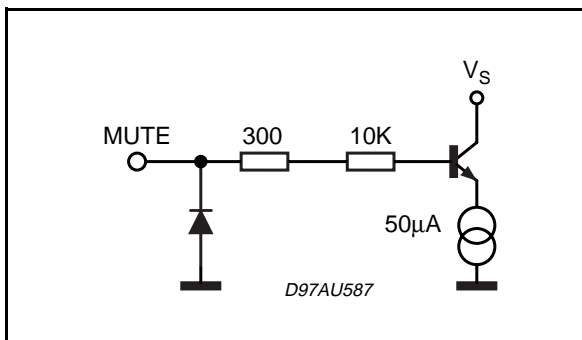


# TDA7494S

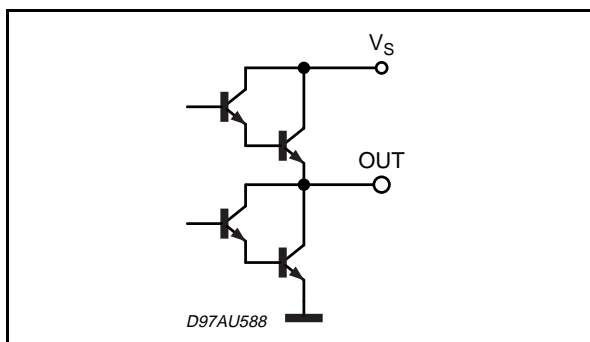
**PIN: ST-BY**



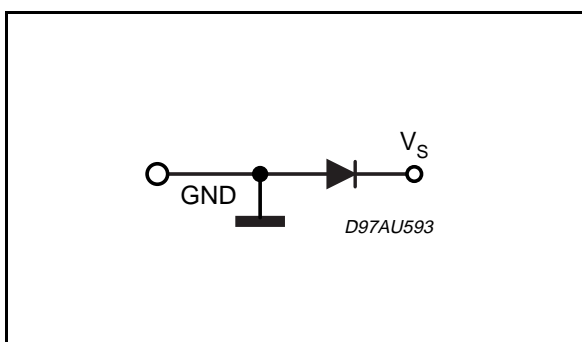
**PIN: MUTE**



**PIN: OUT**

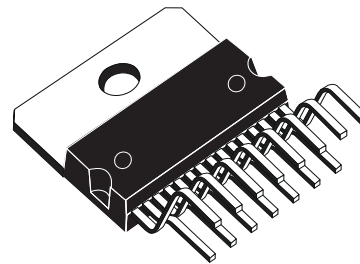


**PINS: PW-GND, S-GND**

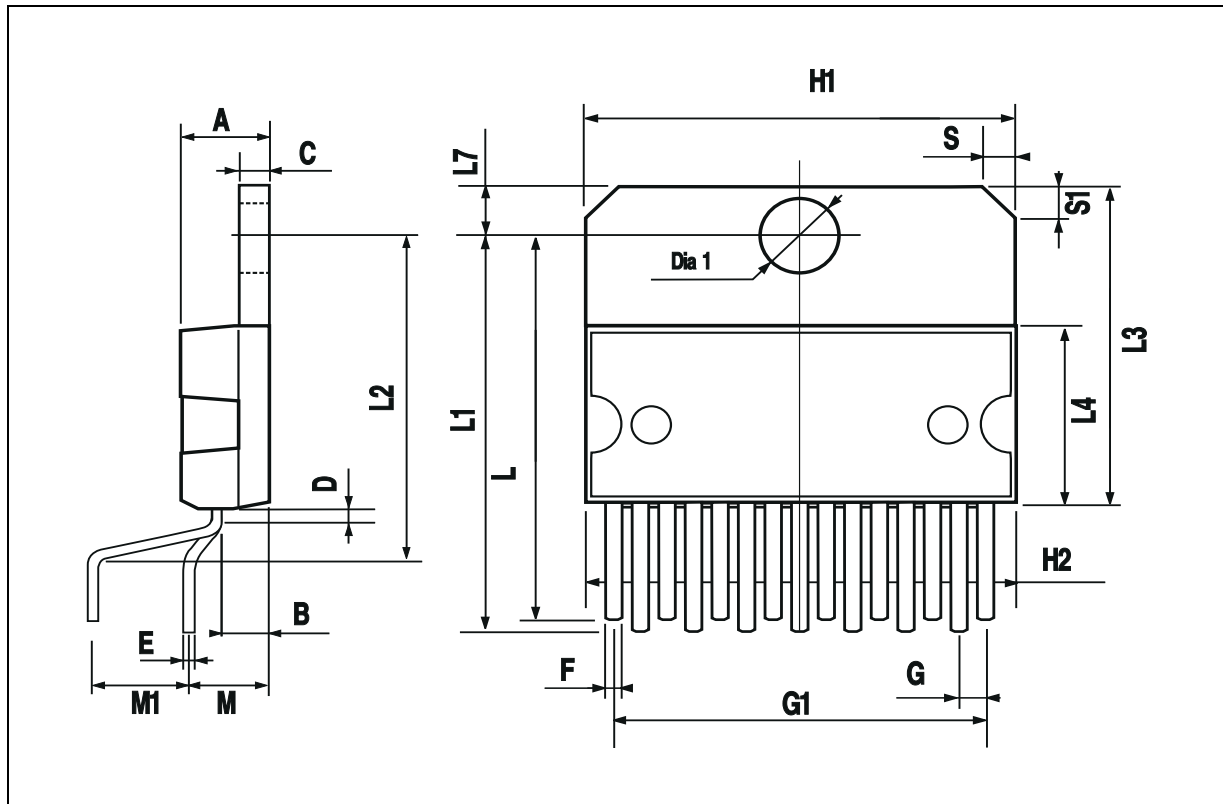


| DIM. | mm    |       |       | inch  |       |       |
|------|-------|-------|-------|-------|-------|-------|
|      | MIN.  | TYP.  | MAX.  | MIN.  | TYP.  | MAX.  |
| A    |       |       | 5     |       |       | 0.197 |
| B    |       |       | 2.65  |       |       | 0.104 |
| C    |       |       | 1.6   |       |       | 0.063 |
| D    |       | 1     |       |       | 0.039 |       |
| E    | 0.49  |       | 0.55  | 0.019 |       | 0.022 |
| F    | 0.66  |       | 0.75  | 0.026 |       | 0.030 |
| G    | 1.02  | 1.27  | 1.52  | 0.040 | 0.050 | 0.060 |
| G1   | 17.53 | 17.78 | 18.03 | 0.690 | 0.700 | 0.710 |
| 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 | 0.870 | 0.886 |
| L2   | 17.65 |       | 18.1  | 0.695 |       | 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   | 4.63  | 5.08  | 5.53  | 0.182 | 0.200 | 0.218 |
| 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**



**Multiwatt15 V**



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 2000 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco -  
Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>