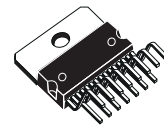




## 5W+5W AMPLIFIER WITH DC VOLUME CONTROL

- 5+5W OUTPUT POWER  
 $R_L = 8\Omega$  @THD = 10%  $V_{CC} = 22V$
- ST-BY AND MUTE FUNCTIONS
- LOW TURN-ON TURN-OFF POP NOISE
- LINEAR VOLUME CONTROL DC COUPLED WITH POWER OP. AMP.
- 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
- VARIABLE OUTPUT AFTER VOLUME CONTROL CIRCUIT
- MULTIWATT 15 PACKAGE

### MULTIPOWER BI50II TECHNOLOGY



Multiwatt 15

ORDERING NUMBER: TDA7496

plifier assembled in the @ Multiwatt 15 package, specially designed for high quality sound, TV applications.

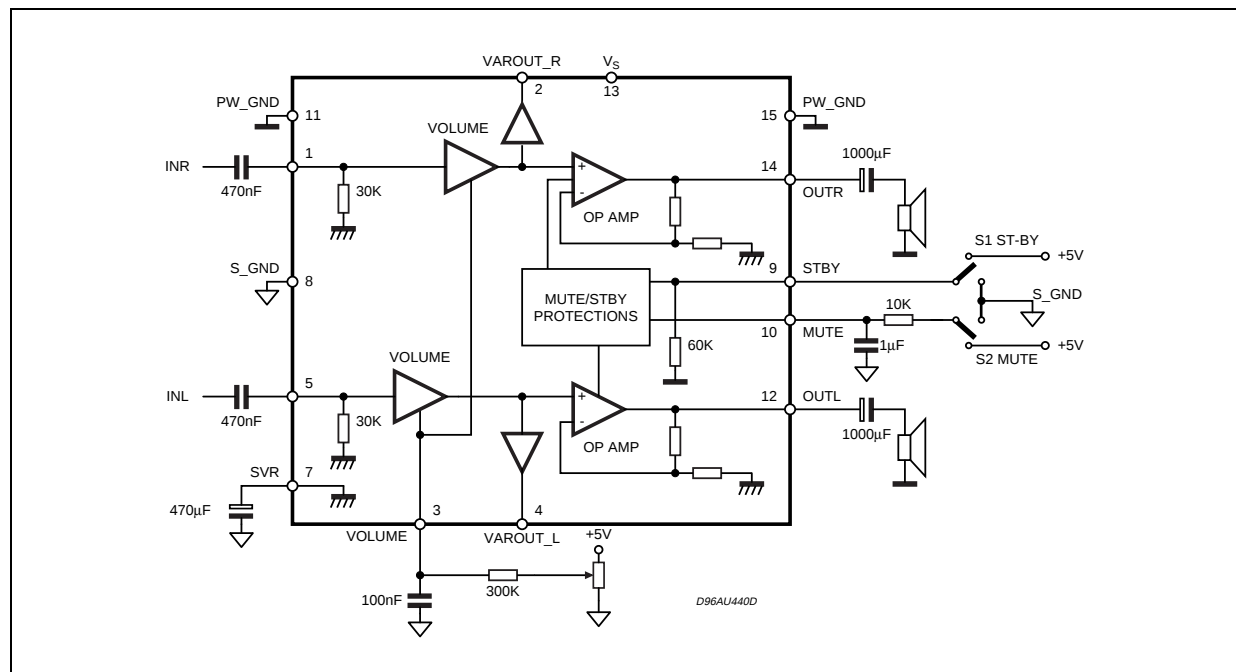
Features of the TDA7496 include linear volume control Stand-by and Mute functions.

The TDA7496 is pin to pin compatible with TDA7496S, TDA7496SA, TDA7495, TDA7495SA, TDA7494S, TDA7494SA.

### DESCRIPTION

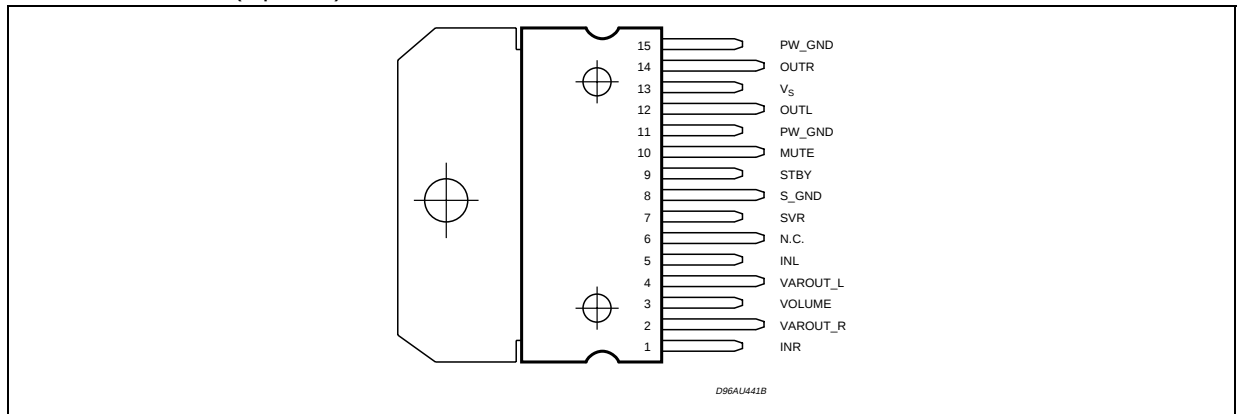
The TDA7496 is a stereo 5+5W class AB power am-

### BLOCK DIAGRAM



**ABSOLUTE MAXIMUM RATINGS**

| Symbol         | Parameter                                                  | Value      | Unit               |
|----------------|------------------------------------------------------------|------------|--------------------|
| $V_S$          | DC Supply Voltage                                          | 35         | V                  |
| $V_{IN}$       | Maximum Input Voltage                                      | 8          | V <sub>pp</sub>    |
| $P_{tot}$      | Total Power Dissipation ( $T_{amb} = 80^{\circ}\text{C}$ ) | 15         | W                  |
| $T_{amb}$      | Ambient Operating Temperature (1)                          | 0 to 70    | $^{\circ}\text{C}$ |
| $T_{stg}, T_J$ | Storage and Junction Temperature                           | -40 to 150 | $^{\circ}\text{C}$ |
| $V_3$          | Volume Control DC Voltage                                  | 7          | V                  |

**PIN CONNECTION (top view)****THERMAL DATA**

| Symbol           | Parameter                                | Value                | Unit                 |
|------------------|------------------------------------------|----------------------|----------------------|
| $R_{th\ j-case}$ | Thermal Resistance junction-case         | Typ. = 4; Max. = 4.6 | $^{\circ}\text{C/W}$ |
| $R_{th\ j-amb}$  | Thermal Resistance junction-ambient Max. | 35                   | $^{\circ}\text{C/W}$ |

**ELECTRICAL CHARACTERISTICS**

(Refer to the test circuit  $V_S = 22\text{V}$ ;  $R_L = 8\Omega$ ,  $R_g = 50\Omega$ ,  $T_{amb} = 25^{\circ}\text{C}$ )

| Symbol     | Parameter                                  | Test Condition                                                                                    | Min. | Typ.       | Max. | Unit |
|------------|--------------------------------------------|---------------------------------------------------------------------------------------------------|------|------------|------|------|
| $V_S$      | Supply Voltage Range                       |                                                                                                   | 10   |            | 32   | V    |
| $I_q$      | Total Quiescent Current                    |                                                                                                   |      | 25         | 50   | mA   |
| $DCV_{os}$ | Output DC Offset Referred to SVR Potential | No Input Signal                                                                                   |      | 200        |      | mV   |
| $V_O$      | Quiescent Output Voltage                   |                                                                                                   |      | 11         |      | V    |
| $P_O$      | Output Power                               | THD = 10%; $R_L = 8\Omega$ ;<br>THD = 1%; $R_L = 8\Omega$ ;                                       | 5    | 5.5<br>4   |      | W    |
|            |                                            | THD = 10%; $R_L = 4\Omega$ ; $V_S = 12\text{V}$<br>THD = 1%; $R_L = 4\Omega$ ; $V_S = 12\text{V}$ |      | 2.1<br>1.0 |      | W    |
| THD        | Total Harmonic Distortion                  | $G_V = 30\text{dB}$ ; $P_O = 1\text{W}$ ; $f = 1\text{KHz}$                                       |      |            | 0.4  | %    |

**ELECTRICAL CHARACTERISTICS** (continued)(Refer to the test circuit  $V_S = 22V$ ;  $R_L = 8\Omega$ ,  $R_G = 50\Omega$ ,  $T_{amb} = 25^\circ C$ )

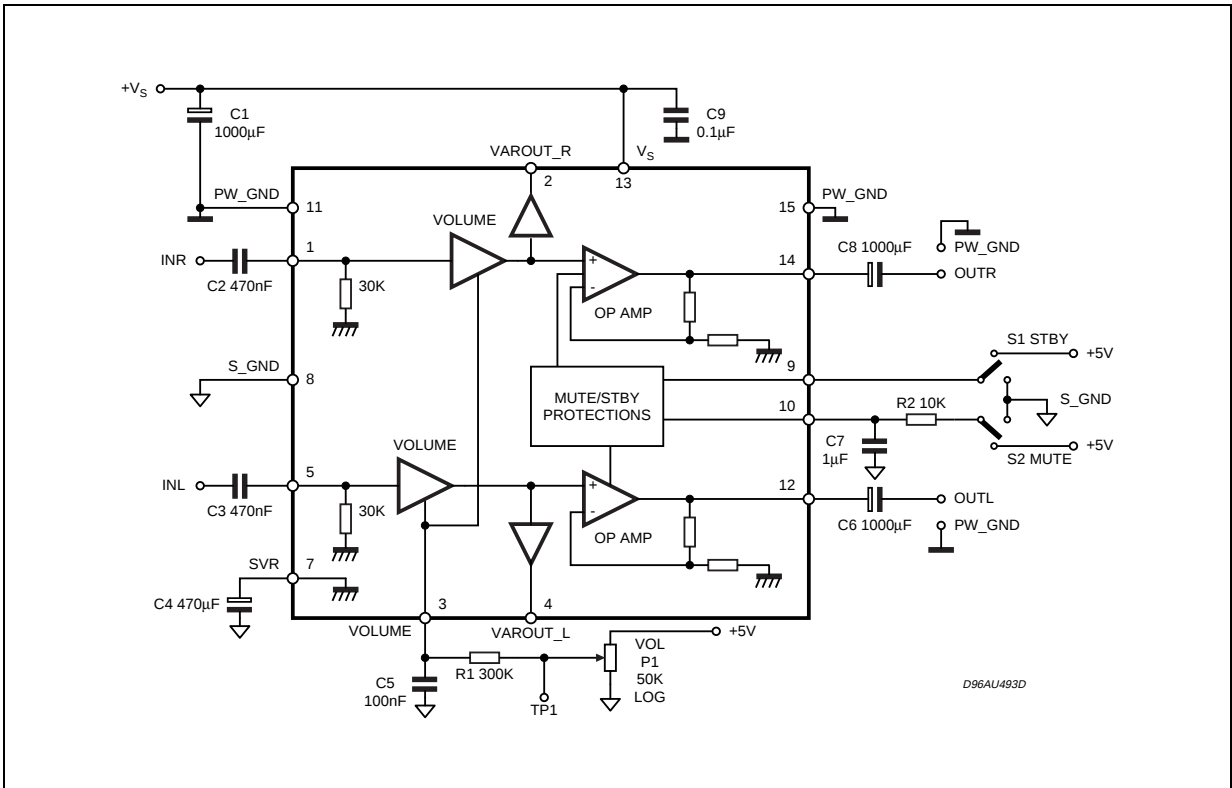
| Symbol                                      | Parameter                     | Test Condition                                                              | Min. | Typ. | Max. | Unit             |
|---------------------------------------------|-------------------------------|-----------------------------------------------------------------------------|------|------|------|------------------|
| $I_{peak}$                                  | Output Peak Current           | (internally limited)                                                        | 1.0  | 1.3  |      | A                |
| $V_{IN}$                                    | Input Signal                  |                                                                             |      |      | 2.8  | V <sub>rms</sub> |
| $G_V$                                       | Closed Loop Gain              | $V_{OI\ Ctrl} > 4.5V$                                                       | 28.5 | 30   | 31.5 | dB               |
| $G_{VLine}$                                 | Monitor Out Gain              | $V_{OI\ Ctrl} > 4.5V$ ; $Z_{load} > 30K\Omega$                              | -1.5 | 0    | 1.5  | dB               |
| $A_{Min\ VOL}$                              | Attenuation at Minimum Volume | $V_{OI\ Ctrl} < 0.5V$                                                       | 80   |      |      | dB               |
| BW                                          |                               |                                                                             |      | 0.6  |      | MHz              |
| $e_N$                                       | Total Output Noise            | $f = 20Hz$ to $22KHz$<br>PLAY, max volume                                   |      | 500  | 800  | $\mu V$          |
|                                             |                               | $f = 20Hz$ to $22KHz$<br>PLAY, max attenuation                              |      | 100  | 250  | $\mu V$          |
|                                             |                               | $f = 20Hz$ to $22KHz$ MUTE                                                  |      | 60   | 150  | $\mu V$          |
| SR                                          | Slew Rate                     |                                                                             | 5    | 8    |      | V/ $\mu s$       |
| $R_i$                                       | Input Resistance              |                                                                             | 22.5 | 30   |      | $K\Omega$        |
| $R_{Var\ Out}$                              | Variable Output Resistance    |                                                                             |      | 30   | 100  | $\Omega$         |
| $R_{L\ Var\ Out}$                           | Variable Output Load          |                                                                             | 2    |      |      | $K\Omega$        |
| SVR                                         | Supply Voltage Rejection      | $f = 1KHz$ ; max volume<br>$C_{SVR} = 470\mu F$ ; $V_{RIP} = 1V_{rms}$      | 35   | 39   |      | dB               |
|                                             |                               | $f = 1KHz$ ; max attenuation<br>$C_{SVR} = 470\mu F$ ; $V_{RIP} = 1V_{rms}$ | 55   | 65   |      | dB               |
| $T_M$                                       | Thermal Muting                |                                                                             |      | 150  |      | $^\circ C$       |
| $T_S$                                       | Thermal Shut-down             |                                                                             |      | 160  |      | $^\circ C$       |
| <b>MUTE &amp; INPUT SELECTION FUNCTIONS</b> |                               |                                                                             |      |      |      |                  |
| $V_{ST-ON}$                                 | Stand-by ON Threshold         |                                                                             | 3.5  |      |      | V                |
| $V_{ST-OFF}$                                | Stand-by OFF Threshold        |                                                                             |      |      | 1.5  | V                |
| $V_{MUTEON}$                                | Mute ON threshold             |                                                                             | 3.5  |      |      | V                |
| $V_{MUTEOFF}$                               | Mute OFF threshold            |                                                                             |      |      | 1.5  | V                |
| $A_{MUTE}$                                  | Mute Attenuation              |                                                                             | 50   | 65   |      | dB               |
| $I_{qST-BY}$                                | Quiescent Current @ Stand-by  |                                                                             |      | 0.6  | 1    | mA               |
| $I_{stbyBIAS}$                              | Stand-by bias current         | Stand by ON: $V_{ST-BY} = 5V$ ;<br>$V_{mute} = 5V$                          |      | 80   |      | $\mu A$          |
|                                             |                               | Play or Mute                                                                | -20  | -5   |      | $\mu A$          |
| $I_{muteBIAS}$                              | Mute Bias Current             | Mute                                                                        |      | 1    | 5    | $\mu A$          |
|                                             |                               | Play                                                                        |      | 0.2  | 2    | $\mu A$          |

# 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        |
|-----------|------------------|------------------------------|-------------------------------|--------------------------------|
| R1        | 300K             | Volume Control Circuit       | Larger volume regulation time | Smaller volume regulation time |
| R2        | 10K              | Mute time constant           | Larger mute on/off time       | Smaller mute on/off time       |
| P1        | 50K              | Volume Control Circuit       |                               |                                |
| C1        | 1000μF           | Supply voltage bypass        |                               | Danger of oscillation          |
| C2        | 470nF            | Input DC decoupling          | Lower low frequency cutoff    | Higher low frequency cutoff    |
| C3        | 470nF            | Input DC decoupling          | Lower low frequency cutoff    | Higher low frequency cutoff    |
| C4        | 470μF            | Ripple rejection             | Better SVR                    | Worse SVR                      |
| C5        | 100nF            | Volume control time constant | Larger volume regulation time | Smaller volume regulation time |
| C6        | 1000μF           | Output DC decoupling         | Lower low frequency cutoff    | Higher low frequency cutoff    |
| C7        | 1μF              | Mute time constant           | Larger mute on/off time       | Smaller mute on/off time       |
| C8        | 1000μF           | Output DC decoupling         | Lower low frequency cutoff    | Higher low frequency cutoff    |
| C9        | 100nF            | Supply voltage bypass        |                               | Danger of oscillation          |

Figure 1. Application Circui

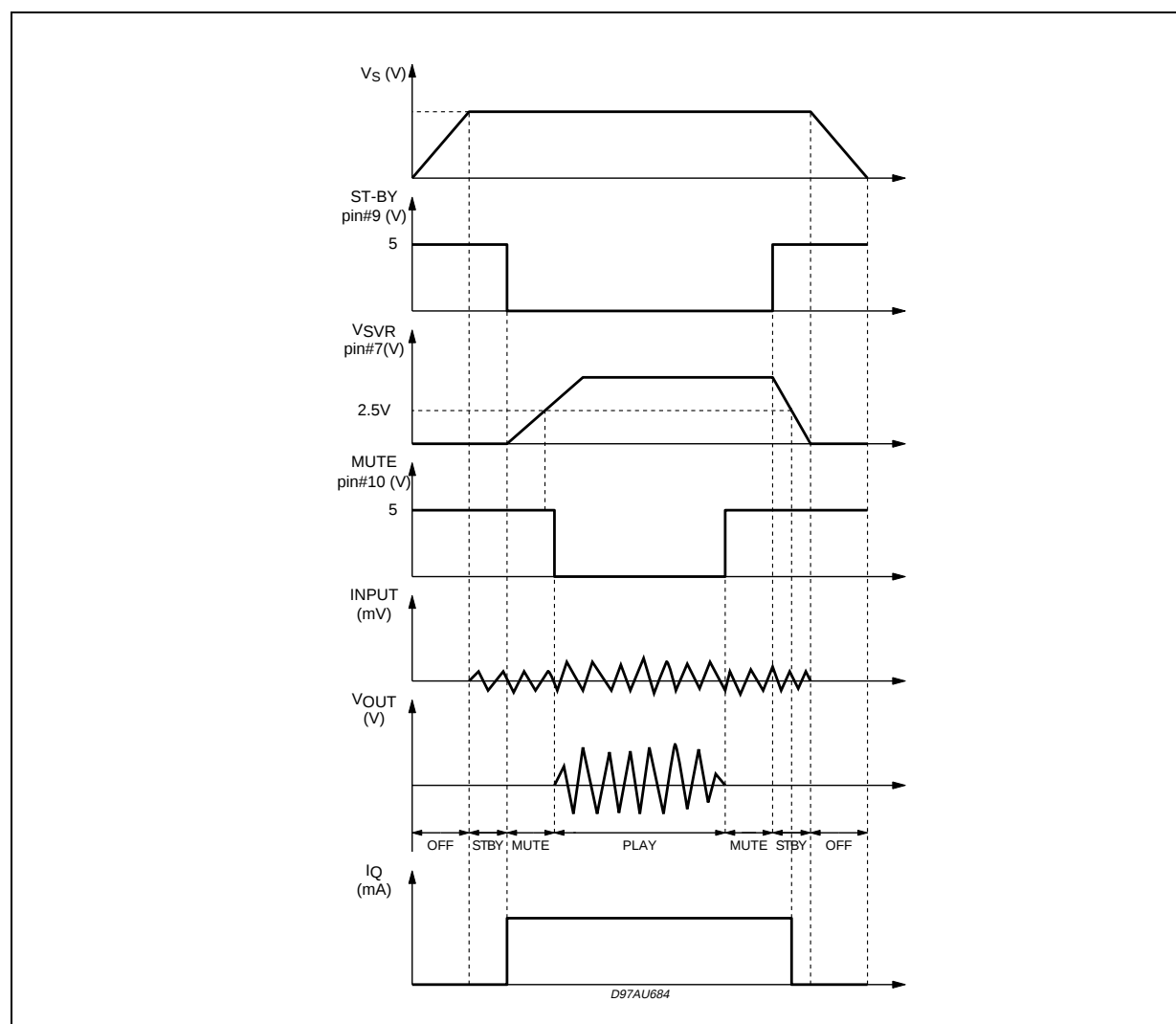


**MUTE STAND-BY TRUTH TABLE**

| MUTE | St-BY | OPERATING CONDITION |
|------|-------|---------------------|
| H    | H     | STAND-BY            |
| L    | H     | STAND-BY            |
| H    | L     | MUTE                |
| L    | L     | PLAY                |

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

**Figure 1. USING ONLY THE MUTE FUNCTION**

**USING ONLY THE MUTE FUNCTION**

To simplify the application, the stand-by pin can be connected directly to Ground. During the ON/OFF transitions it is recommended 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 TDA7496 must be brought to mute from the play condition when the SVR pin is higher than 2.5V.

Figure 2. P.C.B. and Component layoutPCB and Component Layout

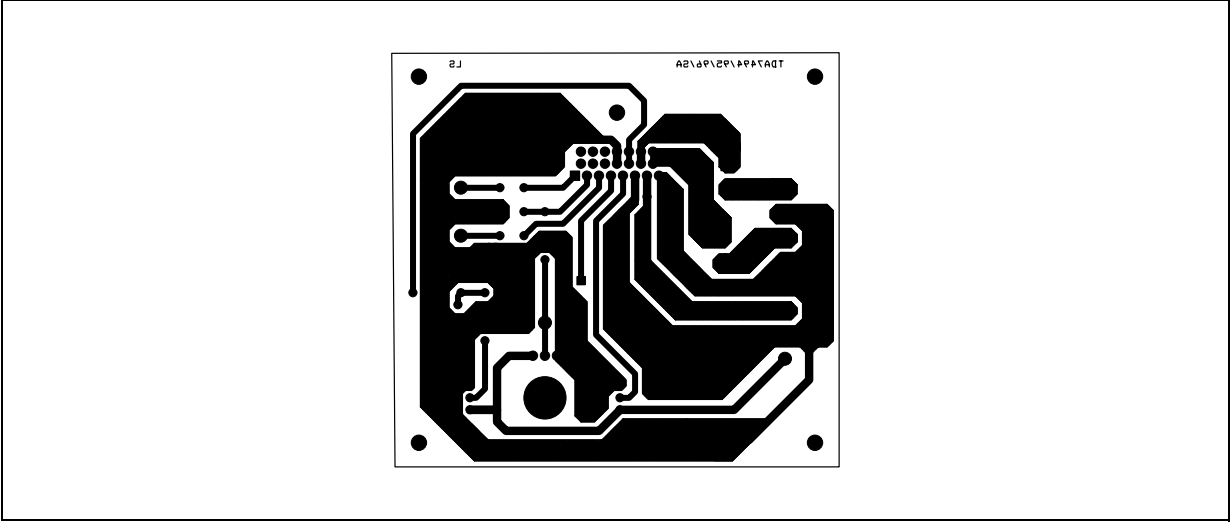


Figure 3.

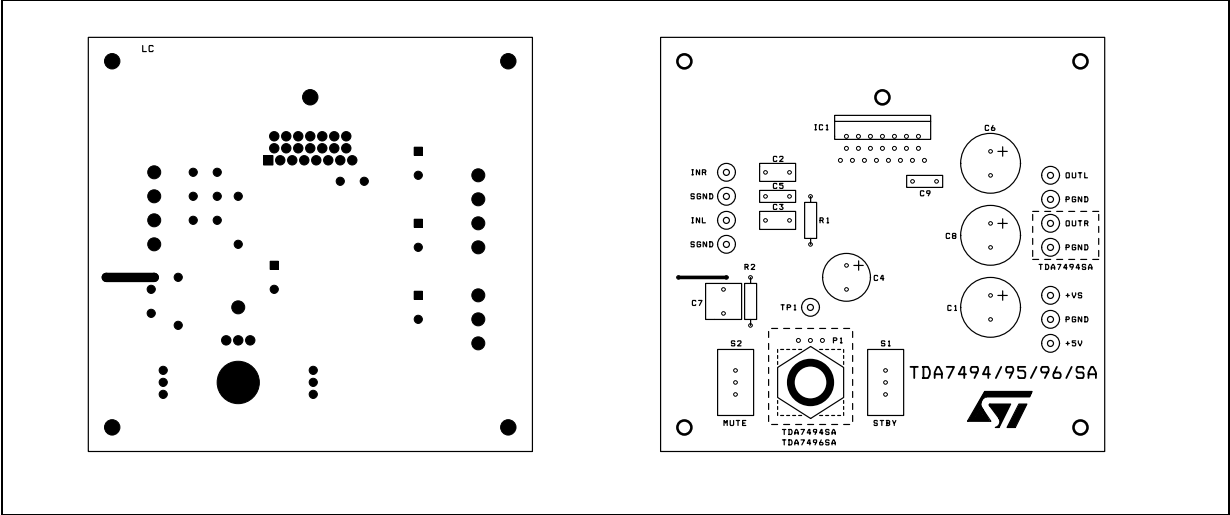


Figure 4. Quiescent Current vs. Supply Voltage

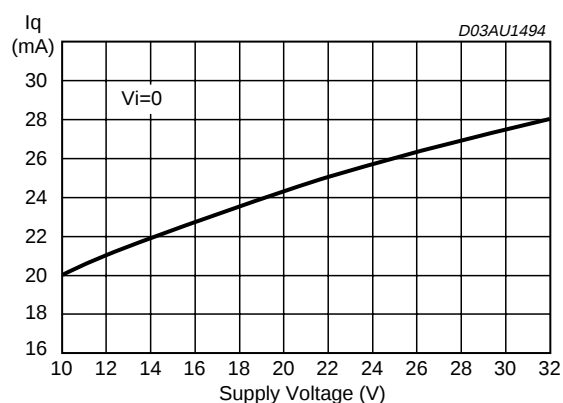


Figure 7. Output DC Offset vs. Supply Voltage

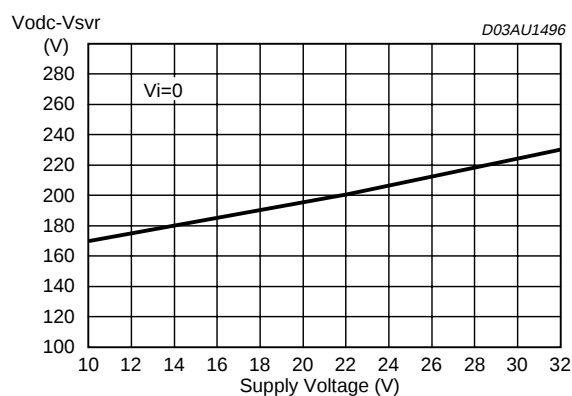


Figure 5. Output Dc Offset vs. Supply Voltage

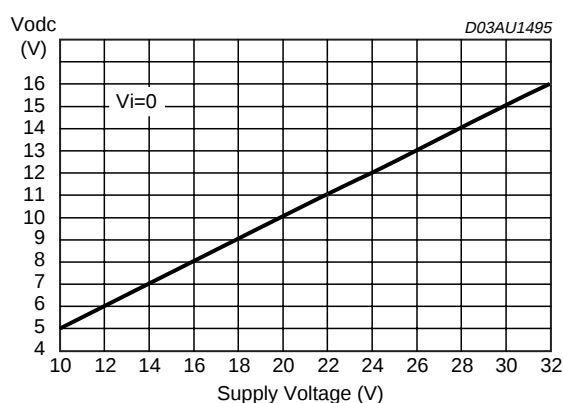


Figure 8. Output Power vs Supply Voltage

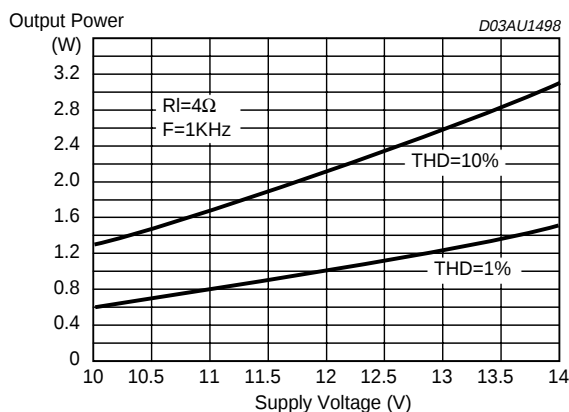


Figure 6. Output Power vs. Supply Voltage

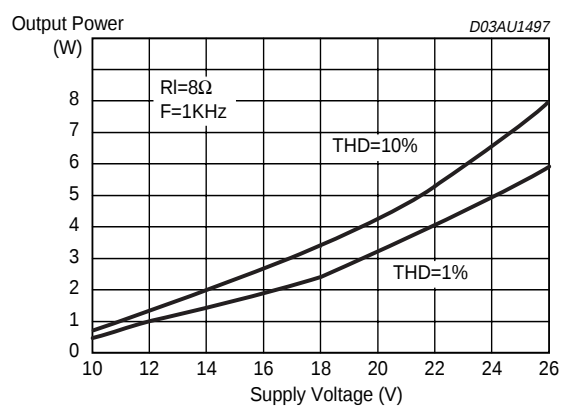


Figure 9. Distortion vs Output Power

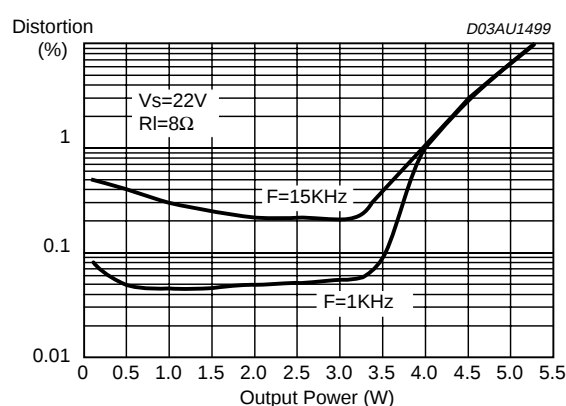


Figure 10. Distortion vs Output Power

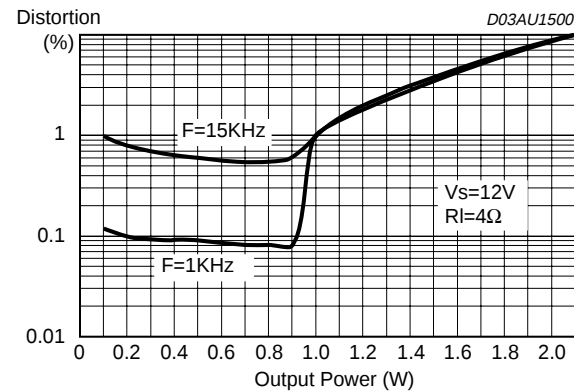


Figure 13. Mute Attenuation vs Vpin 10

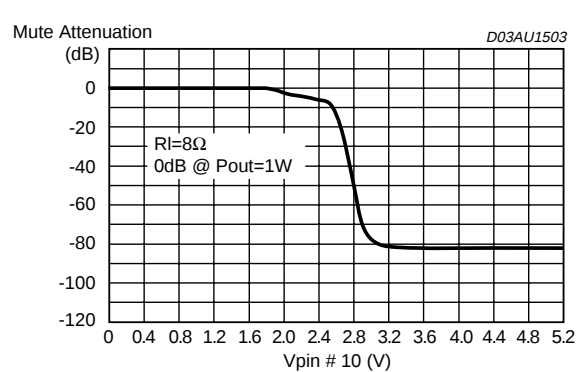
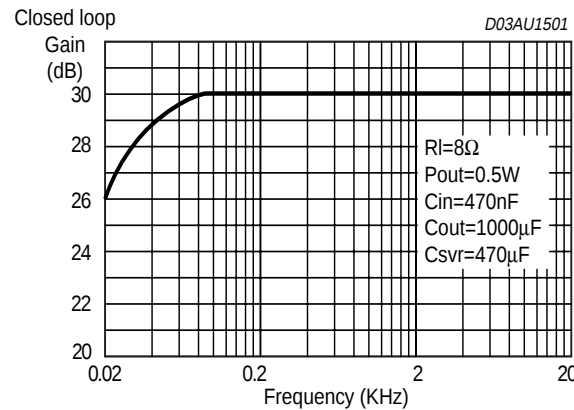


Figure 11. Closed Loop Gain vs. Frequency



PINS DESCRIPTION

Figure 14. PIN SVR

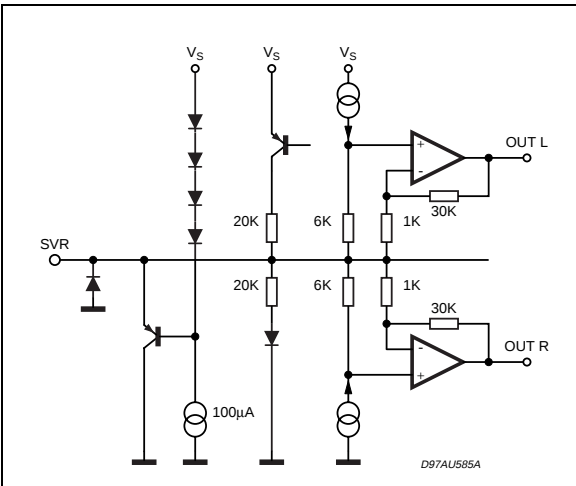


Figure 12. St-By Attenuation vs Vpin 9

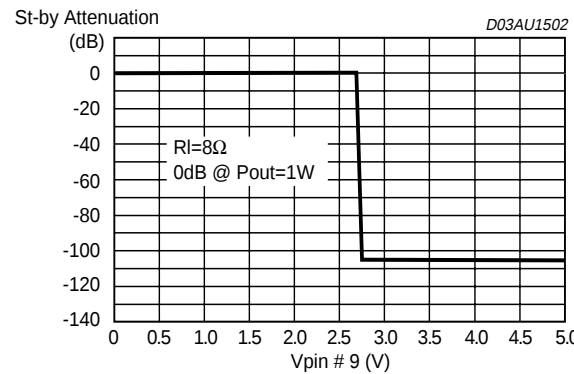


Figure 15. PINS: INL,INR

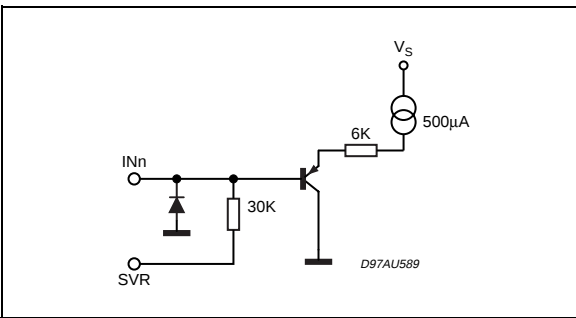


Figure 17. PIN ST-BY

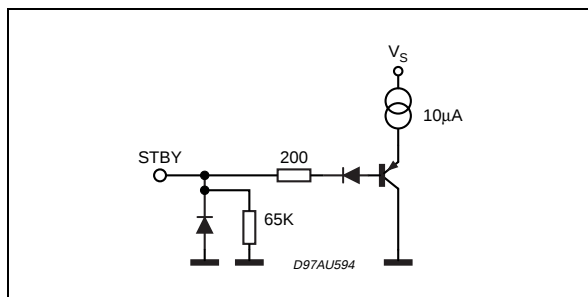


Figure 18. PIN: MUTE

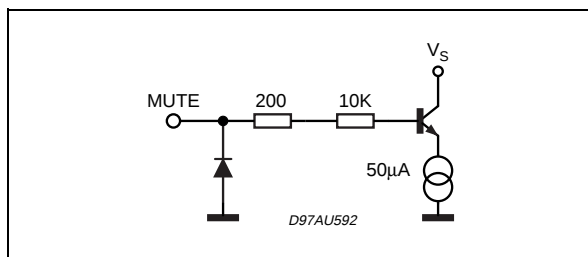


Figure 19. PINS: OUT R, OUT L

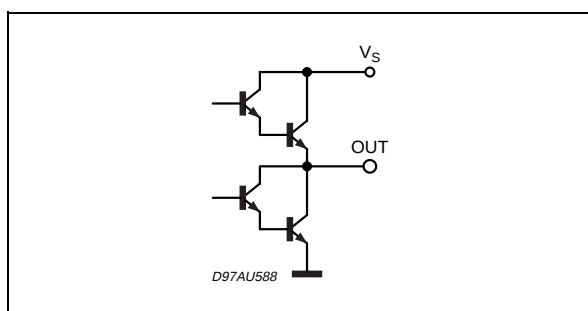


Figure 20. PINS: VAROUT-L VAROUT-R

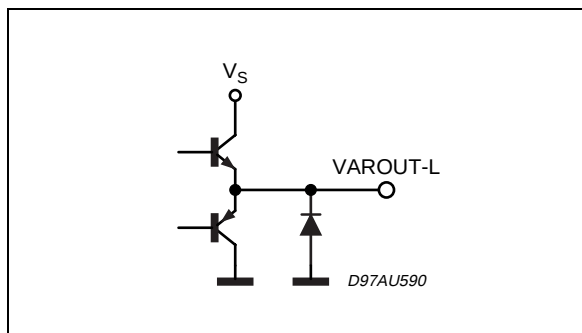


Figure 21. PIN: VOLUME

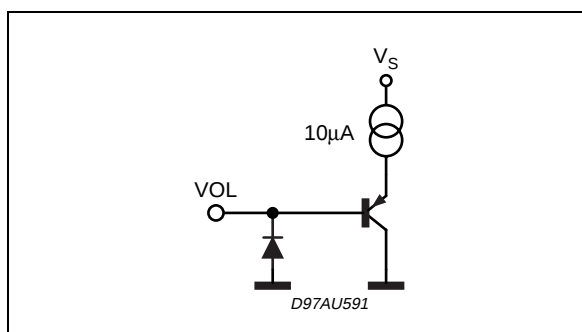
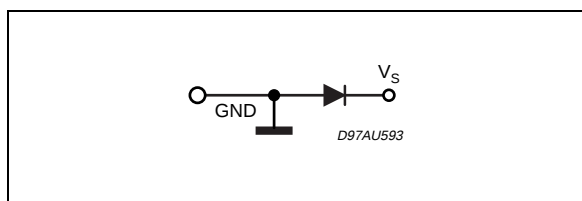
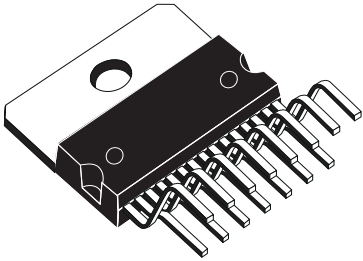


Figure 22. PINS: PW-GND, S-GND

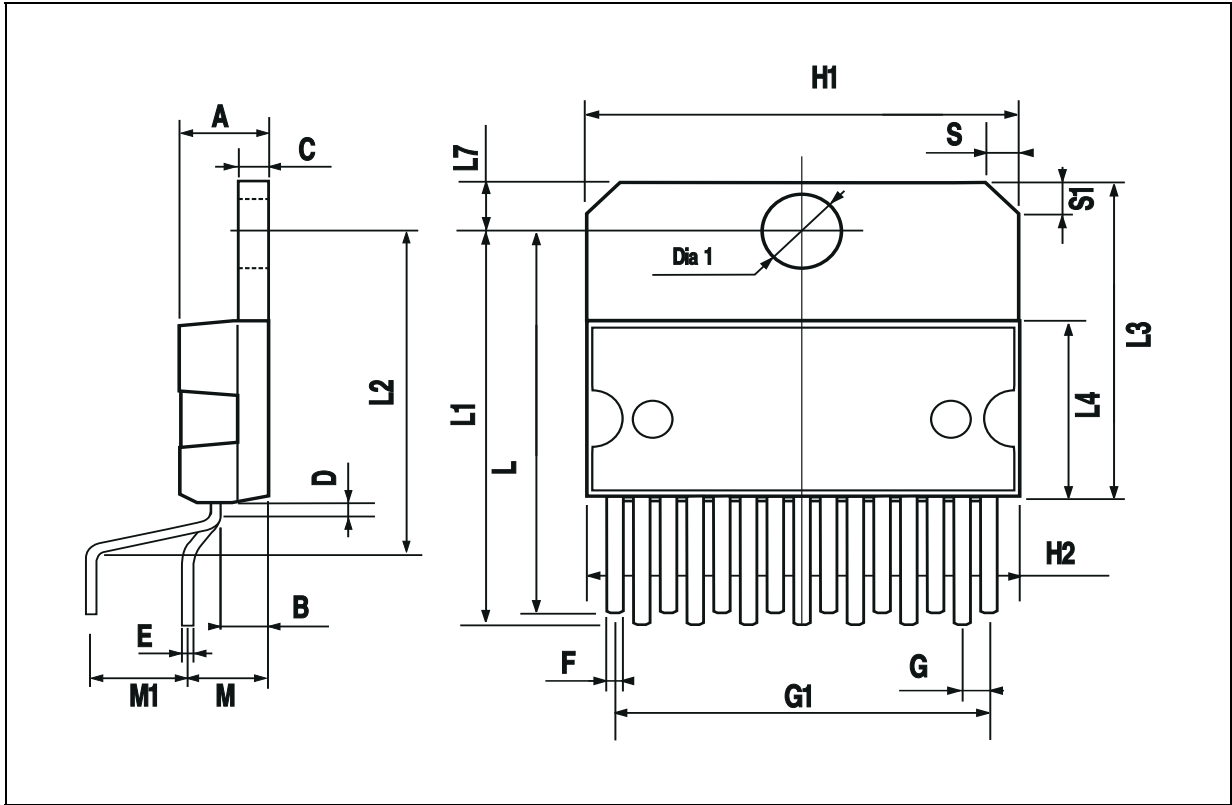


| DIM. | mm    |       |       | inch  |       |       |
|------|-------|-------|-------|-------|-------|-------|
|      | MIN.  | TYP.  | MAX.  | MIN.  | TYP.  | MAX.  |
| A    |       |       | 5     |       |       | 0.197 |
| B    |       |       | 2.65  |       |       | 0.104 |
| C    |       |       | 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**



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