



TDA7490L

20W + 20W STEREO CLASS-D AMPLIFIER 40W MONO IN BTL

1 FEATURES

- 20W + 20W OUTPUT POWER:
@ $R_L = 8\Omega/4\Omega$; THD = 10%
- HIGH EFFICIENCY
- WIDE SUPPLY VOLTAGE RANGE (FROM ± 10 TO $\pm 25V$)
- SPLIT SUPPLY, SINGLE SUPPLY OPERATION
- TURN OFF/ON POP FREE
- ST-BY AND MUTE FEATURES
- SHORT CIRCUIT PROTECTION ACROSS THE LOAD
- THERMAL OVERLOAD PROTECTION
- EXTERNALLY SYNCHRONIZABLE
- BRIDGE CONFIGURATION

Figure 1. Package



Table 1. Order Codes

| Part Number | Package |
|-------------|--------------|
| TDA7490L | Flexiwatt 25 |

2 DESCRIPTION

The TDA7490L is a dual audio class D amplifier assembled in Flexiwatt 25 package; it is specially designed for high efficiency application mainly for TV and Home Stereo sets.

Figure 2. Test and Application Circuit. (Stereo Configuration)

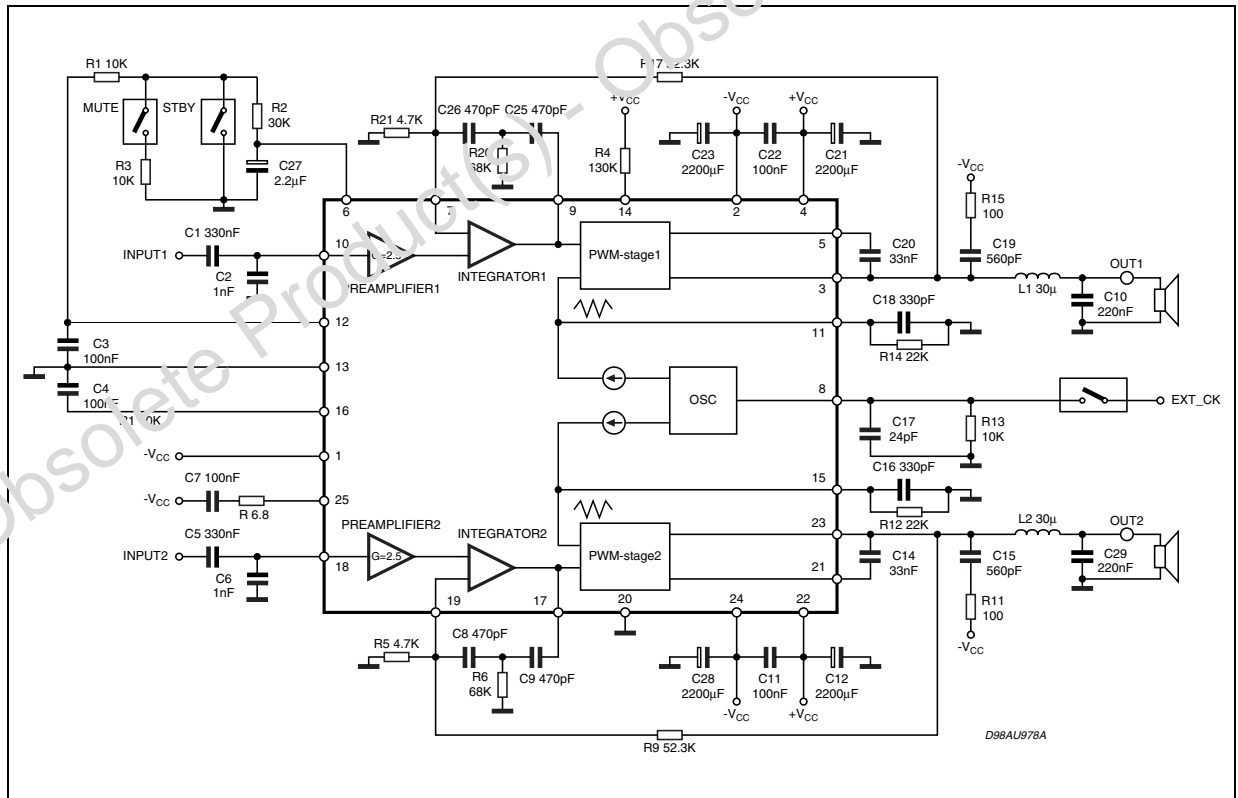


Figure 3. Test and Application Circuit. (Bridge Configuration)

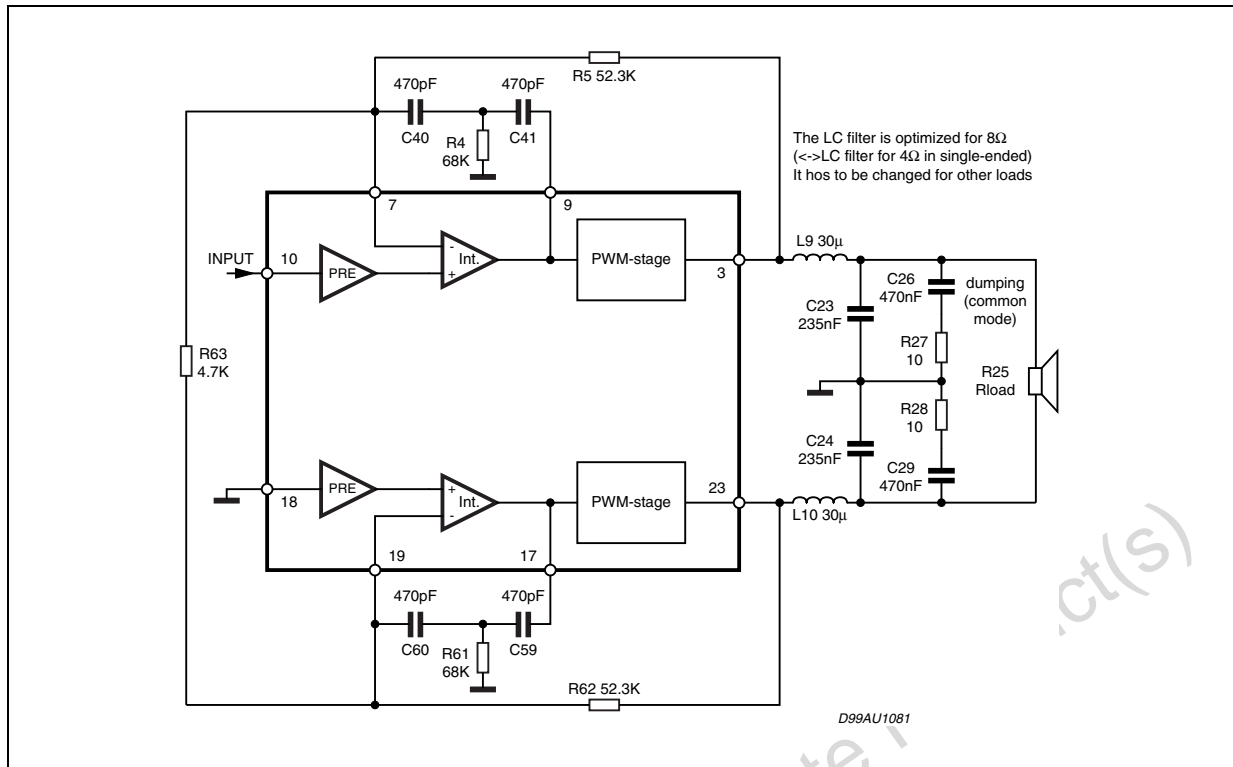


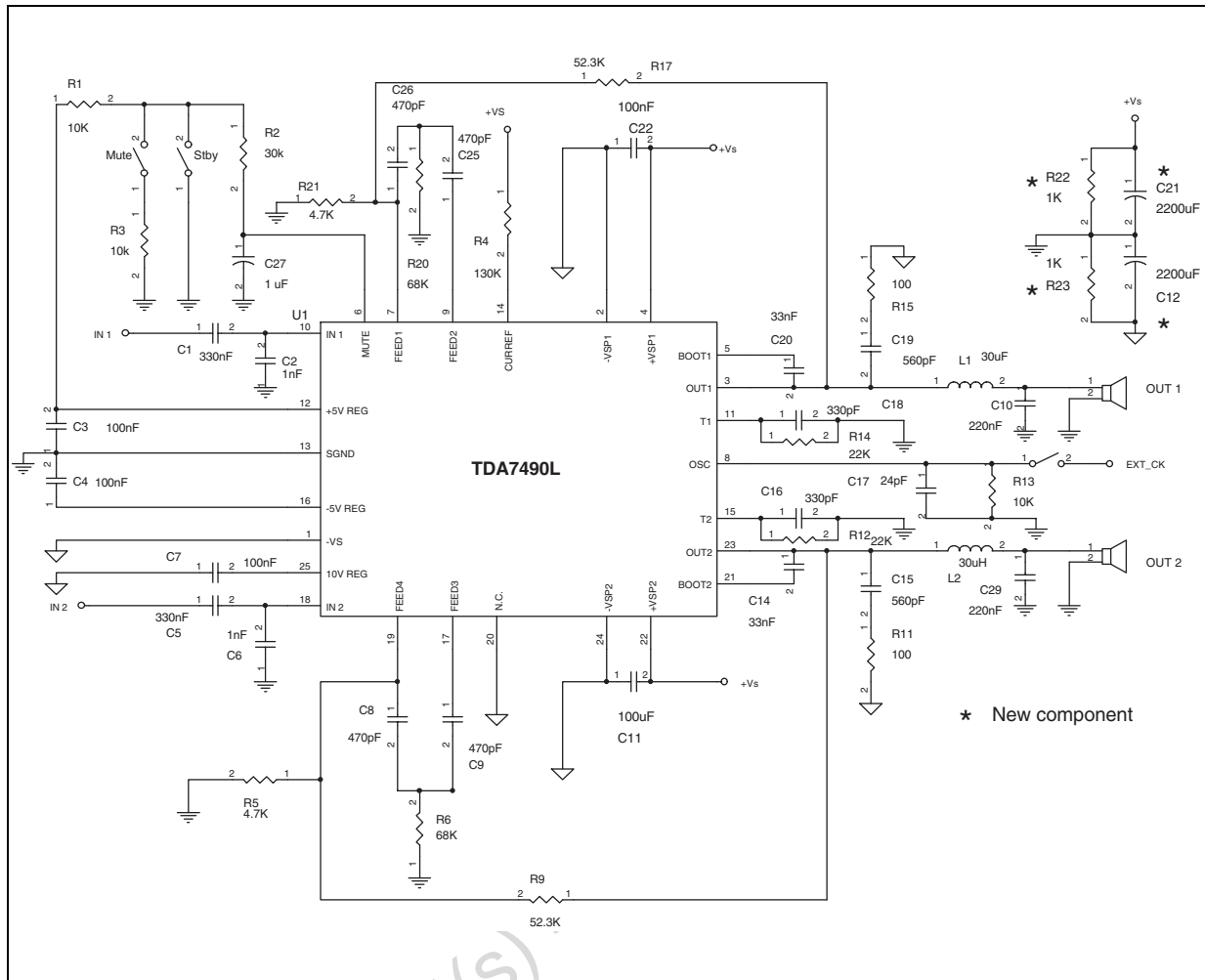
Table 2. Absolute Maximum Ratings

| Symbol | Parameter | Value | Unit |
|-----------------------------------|---|------------|------|
| V _{CC} | DC Supply Voltage (no signal) | ±30 | V |
| P _{tot} | Power Dissipation T _{case} = 70°C | 35 | W |
| T _{stg} , T _j | Storage and Junction Temperature | -40 to 150 | °C |
| T _{op} | Operating Temperature Range | 0 to 70 | °C |
| V _{6,8,10,18} | Maximum Voltage on pins # 6,8,10,18 referred to GND | ±5 | V |

Table 3. Thermal Data

| Symbol | Parameter | Value | Unit |
|------------------------|----------------------------------|--------|------|
| R _{th j-case} | Thermal Resistance Junction-case | Typ. 1 | °C/W |

Figure 4. Application in Supply Voltage



Obsolete Product(s)

Figure 5. Pin Connection

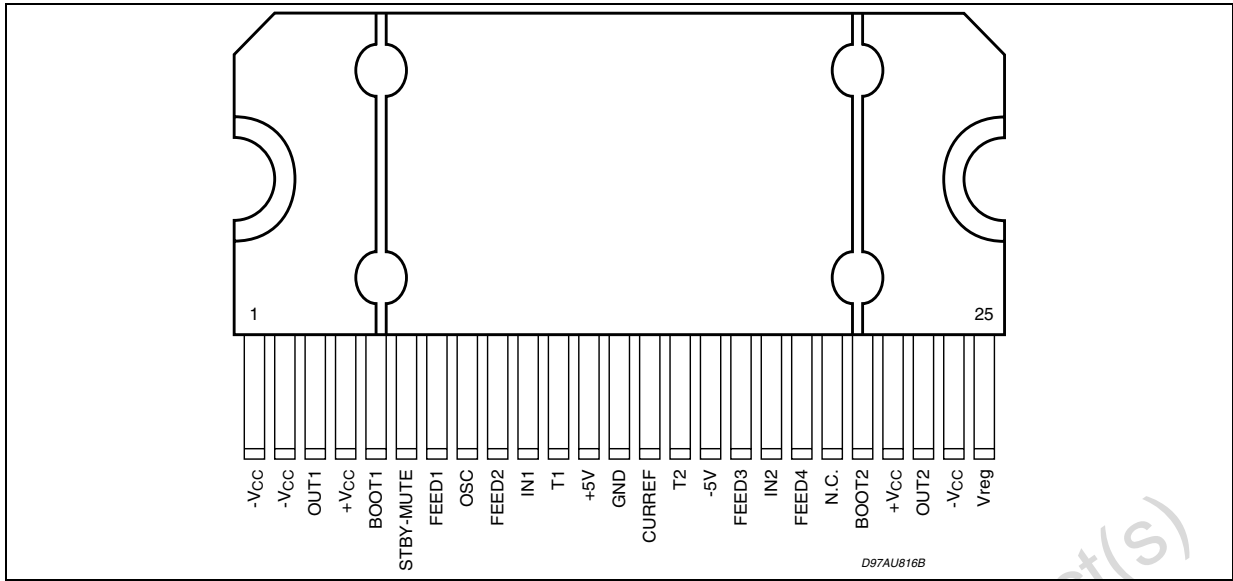


Table 4. Pin Description

| Pin N° | Name | Function |
|--------|---------------------------|--|
| 1 | -V _{CC} sign/sub | Negative signal/substrate supply |
| 2 | -V _{CCpow1} | Negative power supply CH1 |
| 3 | out 1 | PWM output of CH1 |
| 4 | +V _{CCpow1} | Positive power supply CH1 |
| 5 | BOOT1 | Bootstrap CH1 |
| 6 | STBY-MUTE | Control State Pin |
| 7 | FEED1 | Feedback pin 1 CH1 |
| 8 | OSC | Master Oscillator Setting Freequency Pin (or external sync.) |
| 9 | FEED2 | Feedback pin2 CH1 |
| 10 | IN1 | Input CH1 |
| 11 | T1 | Triangular waveform CH1 |
| 12 | +5V | +5V regulator (only for internal purposes) |
| 13 | GND | Signal ground |
| 14 | CUREF | Setting current resistor |
| 15 | T2 | Triangular waveform CH2 |
| 16 | -5V | -5V regulator (only for internal purposes) |
| 17 | FEED3 | Feedback pin1 CH2 |
| 18 | IN2 | Input CH2 |
| 19 | FEED4 | Feedback pin2 CH2 |
| 20 | NC | Not connected |
| 21 | BOOT2 | Bootstrap CH2 |
| 22 | +V _{CCpow2} | Positive power supply CH2 |
| 23 | OUT2 | PWM output of CH2 |
| 24 | -V _{CCpow2} | Negative power supply CH2 |
| 25 | V _{reg} | 10V regulator |

Table 5. Electrical Characteristics

(Refer to the test circuit, $V_{CC} = \pm 19V$; $R_L = 8\Omega$; Demod. filter $L = 30\mu H$, $C = 220nF$; $f = 1KHz$; $f_{sw} = 200kHz$; $T_{amb} = 25^\circ C$ unless otherwise specified.)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|--------------------------------------|--|---|----------|------------|----------|------------|
| V_S | Supply Range | | ± 10 | | ± 25 | V |
| I_q | Total Quiescent Current | $R_L = \infty$ no LC filter | | 70 | 120 | mA |
| V_{OS} | Output Offset Voltage | | -150 | | +150 | mV |
| P_o | Output Power | THD = 10% THD= 1% | | 20 16 | | W W |
| $P_{o(BTL)}$ | Output Power in Bridge Configuration | $V_S = \pm 20V$; $R_L = 16\Omega$ THD = 10% THD=1% | | 40 32 | | W W |
| | | $V_S = \pm 15.5V$; $R_L = 8\Omega$ THD = 10% THD=1% | | 40 32 | | W W |
| $P_o^{(1)}$ | Output Power | $R_L = 4\Omega$ $V_{CC} = \pm 13.5V$ THD = 10% THD=1% | | 18 14.5 | | W W |
| P_D | Maximum Dissipated Power | $V_{CC} = \pm 19V$; $R_L = 8\Omega$ $P_o = 20W + 20W$; THD = 10% | | 5.6 | | W |
| η | Efficiency (%) | $P_o = 20W + 20W$ | | 86 | | % |
| THD | Total Harmonic Distortion | $R_L = 8\Omega$; $P_o = 1 W$ | | 0.1 | | % |
| I_{max} | Overcurrent Protection Threshold | $R_L = 0$ | | 5 | | A |
| T_j | Thermal Shut-down Junction Temperature | | | 150 | | $^\circ C$ |
| G_v | Closed Loop Gain | | 29 | 30 | 31 | dB |
| $\Delta G_v^{(3)}$ | Gain Matching | | -1 | | +1 | dB |
| e_N | Total Input Noise $R_G = 50\Omega$ | A Curve $f = 20Hz$ to $22KHz$ | | 7 | | μV |
| | | | | 12 | | μV |
| C_T | Cross talk | $f = 1 KHz$, $P_o = 1W$ | | 55 | | dB |
| R_i | Input Resistance | | 20 | 30 | | k Ω |
| SVR | Supply Voltage Rejection | $f = 100Hz$; $V_r = 0.5$ | | 60 | | dB |
| V_{rmax} | Overvoltage Threshold ⁽⁵⁾ | | | 55 | 60 | V |
| T_r, T_t | Rising and Falling Time | | | 50 | 70 | ns |
| R_{DSON} | Power Transistor on Resistance | | | 0.4 | 0.8 | Ω |
| $F_{sw}^{(4)}$ | Switching Frequency Range | | 100 | 200 | 230 | KHz |
| MUTE & STAND-BY FUNCTIONS | | | | | | |
| V_{ST-BY} | Stand-by range | | 0 | | 0.7 | V |
| V_{MUTE} | Mute Range | | 1.7 | | 2.5 | V |
| V_{PLAY} | Play Range | | 4 | | 5 | V |
| A_{MUTE} | Mute Attenuation | | 55 | 60 | | dB |
| I_{qST-BY} | Quiescent Current @ Stand-by | | | 3 | 5 | mA |

*: P_o = measured across the load using the following inductor: COIL58120 MPPA 2 (magnetics) TURNS= $20\varnothing 1 mm$

(1) $L = 15\mu H$, $C = 470nF$

(3) ΔG_v is intended with R2, R17, R5, R9 1% precision

(4) $F_{sw} = 0.25 \cdot (1/(300ns + R13 \cdot (C17 + 76pF)) \cdot 0.85)$

(5) $V_{RMAX} = (+V_{CC}) - (-V_{CC})$ when $V_R \geq V_{RMAX}$ the device goes in Stand-By mode

Figure 6. P.C. Board and Component Layout of the Figs. 2, 3 (for Stereo and Bridge Compatible Configuration)

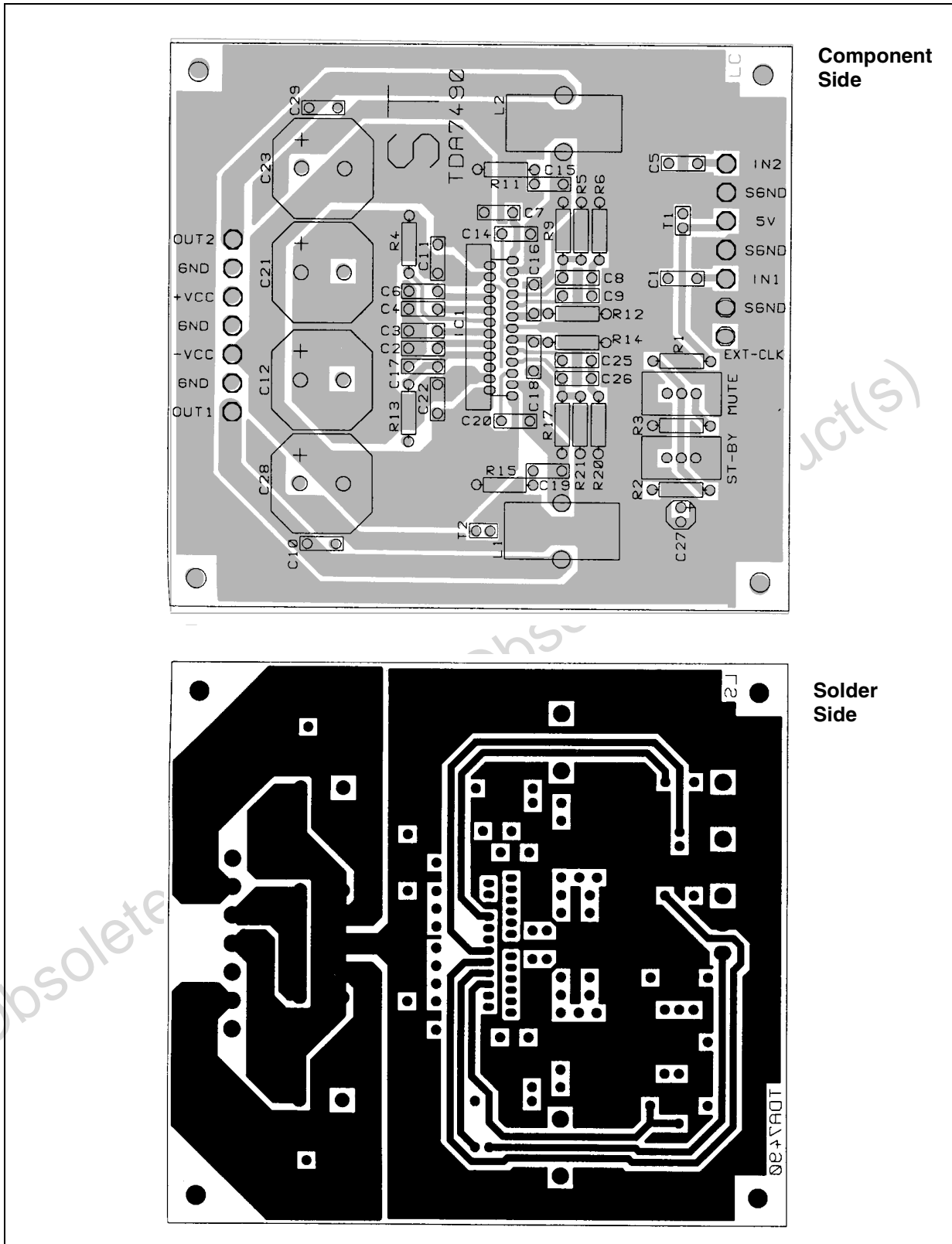


Figure 7. Distortion vs. Output Power

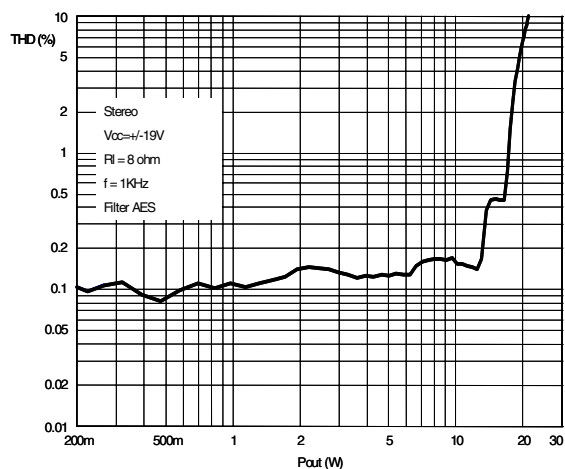


Figure 10. Frequency Response

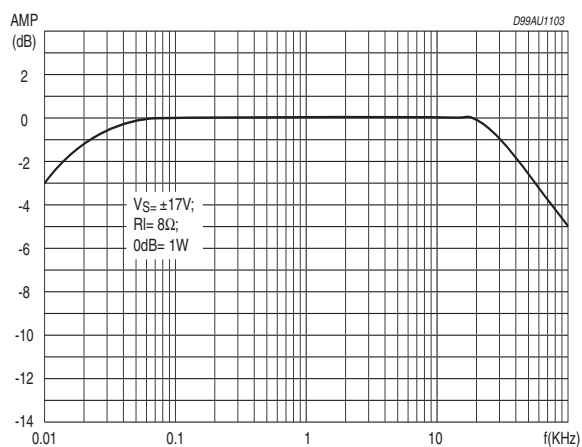


Figure 8. Distortion vs. Output Power

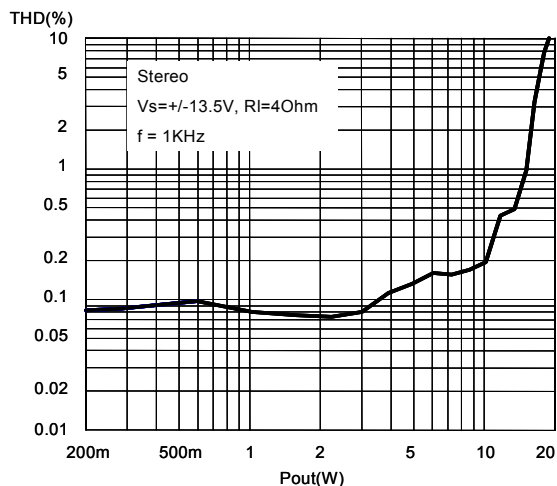


Figure 11. Power Dissipation vs. Output Power

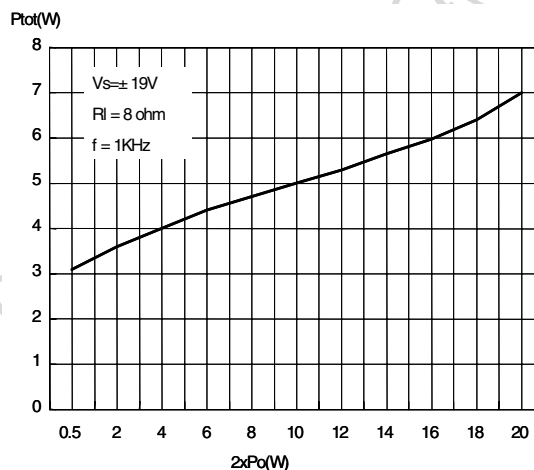


Figure 9. Crosstalk vs. Frequency

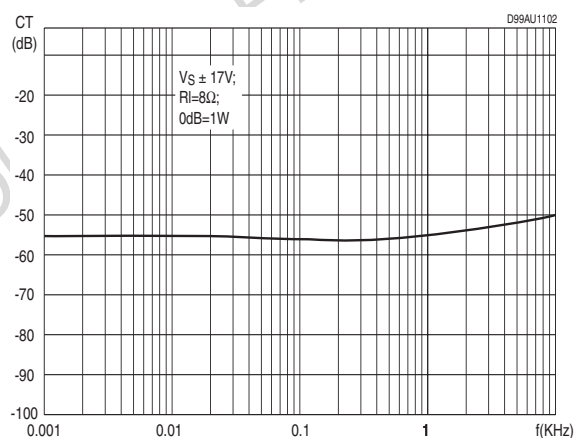


Figure 12. Distortion vs. Output Power in BTL

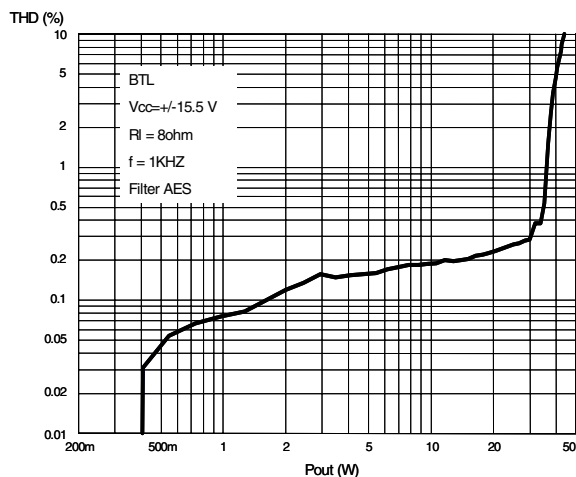


Figure 13. Distortion vs. Output Power in BTL

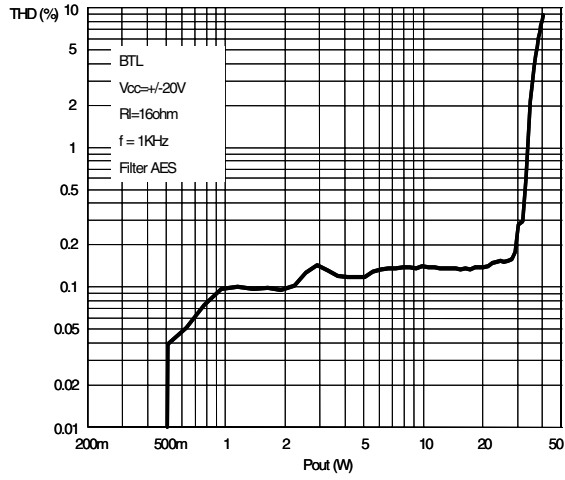
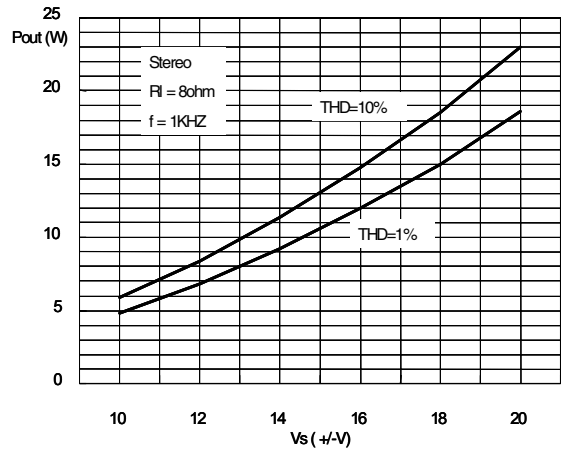


Figure 14. Pout vs Supply Voltage

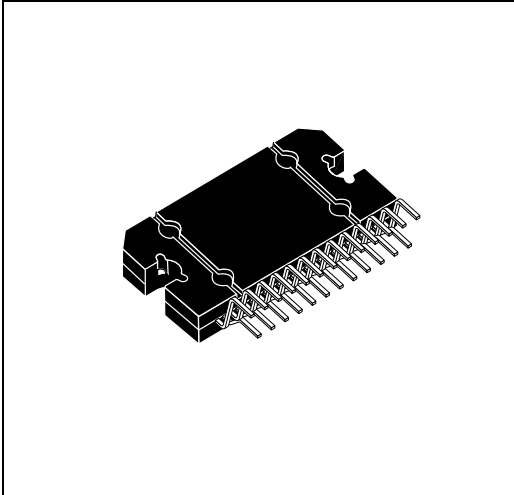


Obsolete Product(s) - Obsolete Product(s)

Figure 15. Flexiwatt 25 Mechanical Data & Package Dimensions

| DIM. | mm | | | inch | | |
|--------|-------|-------|-------|-------|------------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.45 | 4.50 | 4.65 | 0.175 | 0.177 | 0.183 |
| B | 1.80 | 1.90 | 2.00 | 0.070 | 0.074 | 0.079 |
| C | | 1.40 | | | 0.055 | |
| D | 0.75 | 0.90 | 1.05 | 0.029 | 0.035 | 0.041 |
| E | 0.37 | 0.39 | 0.42 | 0.014 | 0.015 | 0.016 |
| F (1) | | | 0.57 | | | 0.022 |
| G | 0.80 | 1.00 | 1.20 | 0.031 | 0.040 | 0.047 |
| G1 | 23.75 | 24.00 | 24.25 | 0.935 | 0.945 | 0.955 |
| H (2) | 28.90 | 29.23 | 29.30 | 1.139 | 1.150 | 1.153 |
| H1 | | 17.00 | | | 0.669 | |
| H2 | | 12.80 | | | 0.503 | |
| H3 | | 0.80 | | | 0.031 | |
| L (2) | 22.07 | 22.47 | 22.87 | 0.869 | 0.884 | 0.904 |
| L1 | 18.57 | 18.97 | 19.37 | 0.731 | 0.747 | 0.762 |
| L2 (2) | 15.50 | 15.70 | 15.90 | 0.610 | 0.618 | 0.626 |
| L3 | 7.70 | 7.85 | 7.95 | 0.303 | 0.309 | 0.313 |
| L4 | | 5 | | | 0.197 | |
| L5 | | 3.5 | | | 0.138 | |
| M | 3.70 | 4.00 | 4.30 | 0.145 | 0.157 | 0.169 |
| M1 | 3.60 | 4.00 | 4.40 | 0.142 | 0.157 | 0.173 |
| N | | 2.20 | | | 0.086 | |
| O | | 2 | | | 0.079 | |
| R | | 1.70 | | | 0.067 | |
| R1 | | 0.5 | | | 0.02 | |
| R2 | | 0.3 | | | 0.12 | |
| R3 | | 1.25 | | | 0.049 | |
| R4 | | 0.50 | | | 0.019 | |
| V | | | | | 5° (T p.) | |
| V1 | | | | | 3° (Typ.) | |
| V2 | | | | | 20° (Typ.) | |
| V3 | | | | | 45° (Typ.) | |

OUTLINE AND MECHANICAL DATA



Flexiwatt25 (vertical)

(1): dam-bar protusion not included
 (2): molding protusion included

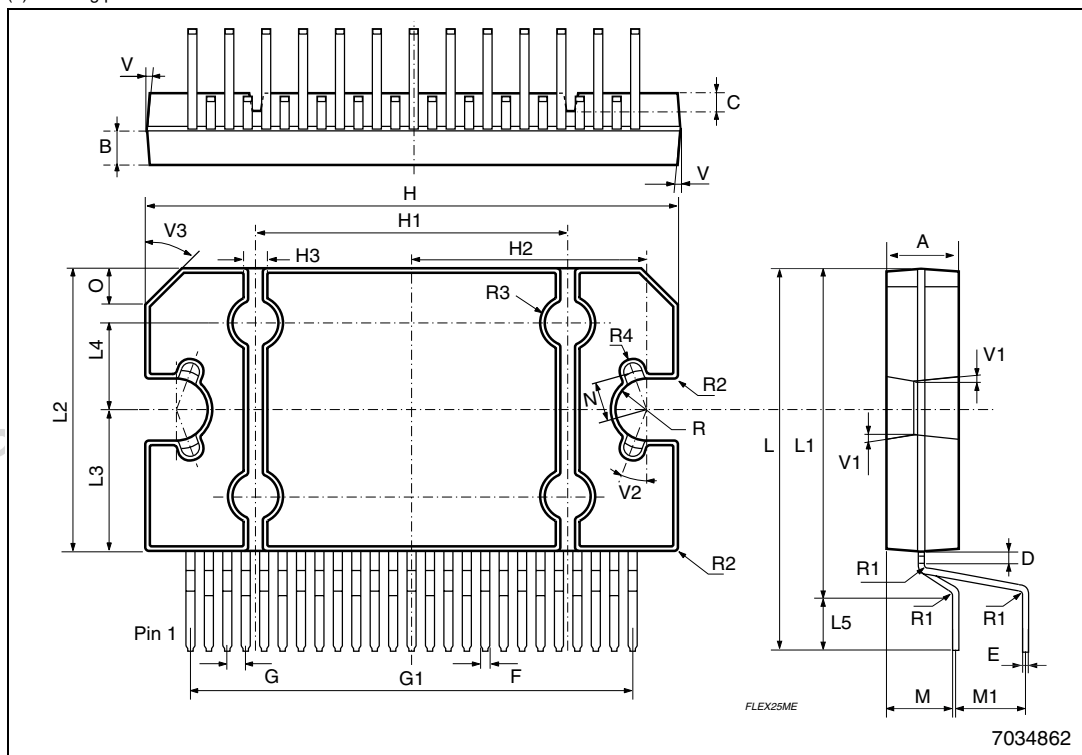


Table 6. Revision History

| Date | Revision | Description of Changes |
|---------------|-----------------|---|
| March 2001 | 1 | First Issue |
| December 2005 | 2 | Corrected the value of the inductance in the caption of the Table 5 "Electrical Characteristics". |

Obsolete Product(s) - Obsolete Product(s)

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. Specifications 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.
All other names are the property of their respective owners

© 2005 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com