

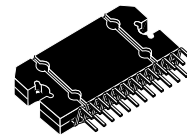


## TDA7490

### 25W + 25W STEREO CLASS-D AMPLIFIER 50W MONO IN BTL

PRODUCT PREVIEW

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



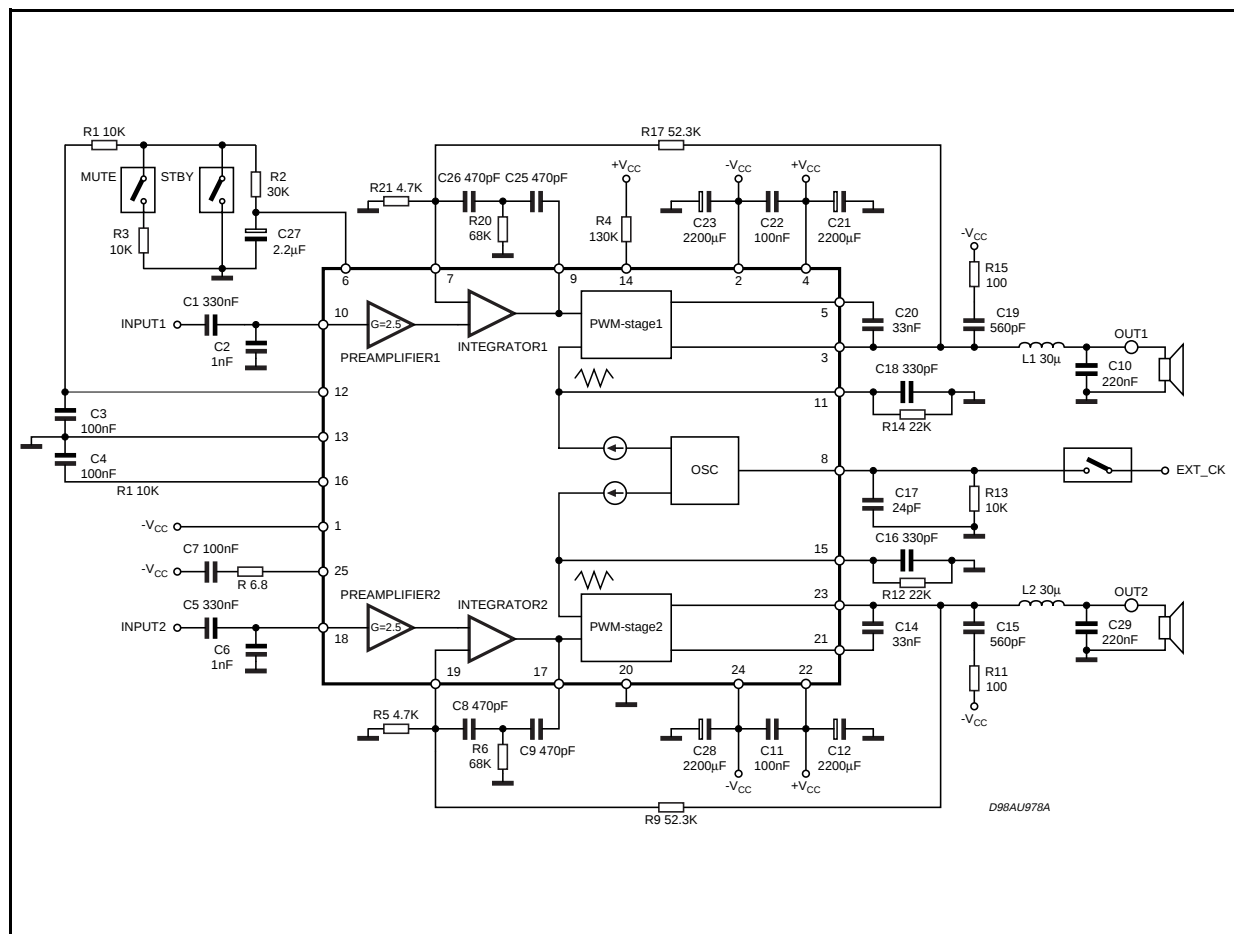
Flexiwatt 25

ORDERING NUMBER: TDA7490

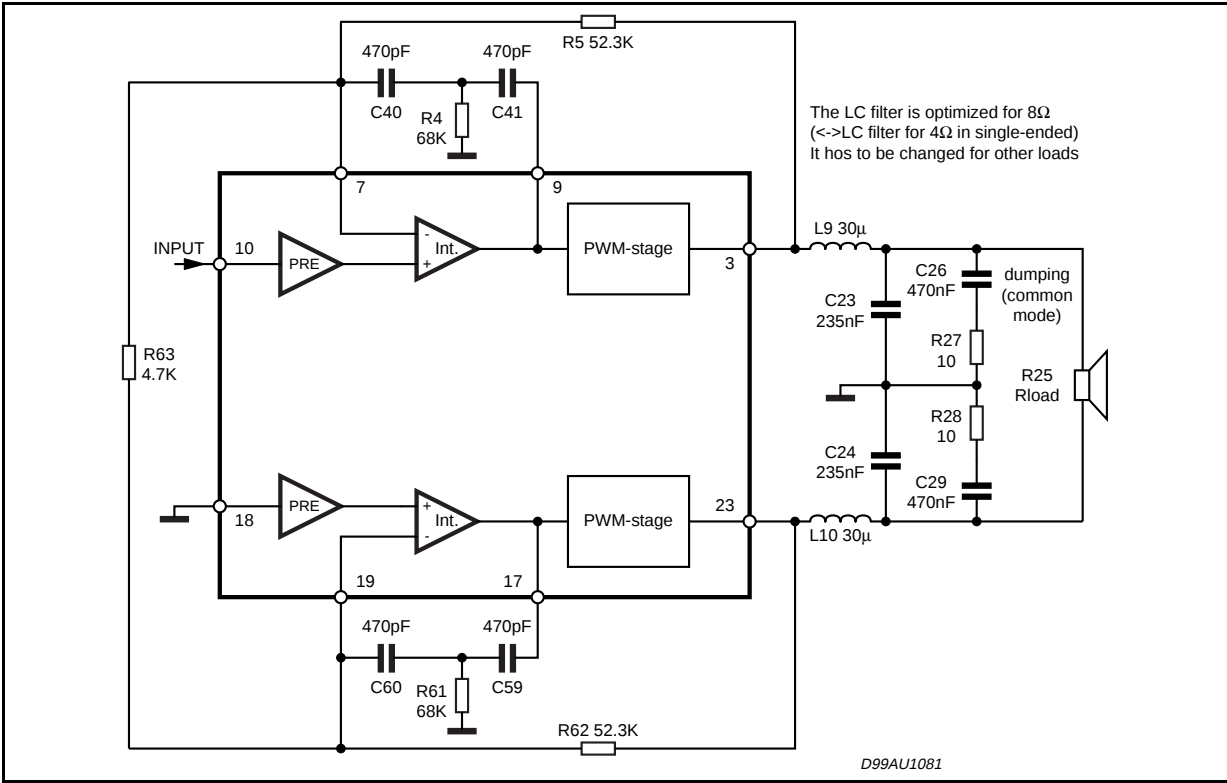
#### DESCRIPTION

The TDA7490 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 1. Test and application circuit. (Stereo Configuration)



**Figure 2.** Test and application circuit. (Bridge Configuration)



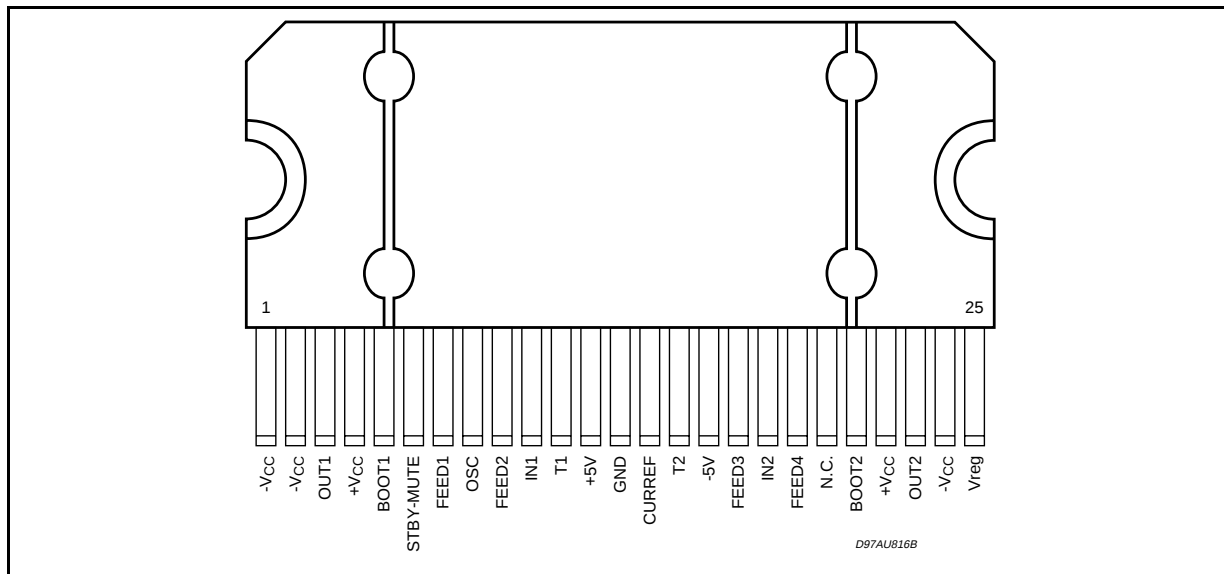
### ABSOLUTE MAXIMUM RATINGS

| Symbol          | Parameter                                           | Value      | Unit        |
|-----------------|-----------------------------------------------------|------------|-------------|
| $V_{CC}$        | DC Supply Voltage (no signal)                       | $\pm 30$   | V           |
| $P_{tot}$       | Power Dissipation $T_{case} = 70^{\circ}C$          | 35         | W           |
| $T_{stg}, T_j$  | Storage and Junction Temperature                    | -40 to 150 | $^{\circ}C$ |
| $T_{op}$        | Operating Temperature Range                         | 0 to 70    | $^{\circ}C$ |
| $V_{6,8,10,18}$ | Maximum Voltage on pins # 6,8,10,18 referred to GND | $\pm 5$    | V           |

### THERMAL DATA

| Symbol          | Parameter                        | Typ. | Max. | Unit          |
|-----------------|----------------------------------|------|------|---------------|
| $R_{th j-case}$ | Thermal Resistance Junction-case | 1    |      | $^{\circ}C/W$ |

## PIN CONNECTION (Top view)



## PIN FUNCTIONS

| N. | Name                      | Function                                                     |
|----|---------------------------|--------------------------------------------------------------|
| 1  | -V <sub>CC</sub> sign/sub | Negative signal/substrate supply                             |
| 2  | -V <sub>CCpow1</sub>      | Negative power supply CH1                                    |
| 3  | out 1                     | PWM output of CH1                                            |
| 4  | +V <sub>CCpow1</sub>      | 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 <sub>CCpow2</sub>      | Positive power supply CH2                                    |
| 23 | OUT2                      | PWM output of CH2                                            |
| 24 | -V <sub>CCpow2</sub>      | Negative power supply CH2                                    |
| 25 | V <sub>reg</sub>          | 10V regulator                                                |

**ELECTRICAL CHARACTERISTICS** (Refer to the test circuit,  $V_{CC} = \pm 21V$ ;  $R_L = 8\Omega$ ; Demod. filter  $L = 30mH$ ,  $C = 220nF$ ;  $f = 1KHz$ ;  $f_{sw} = 200kHz$ ;  $T_{amb} = 25^\circ C$  unless otherwise specified.)

| Symbol                               | Parameter                              | Test Condition                                                        | Min.     | Typ.     | Max.     | Unit               |
|--------------------------------------|----------------------------------------|-----------------------------------------------------------------------|----------|----------|----------|--------------------|
| $V_S$                                | Supply Range                           |                                                                       | $\pm 10$ |          | $\pm 25$ | 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%<br>THD = 1%                                                 |          | 25<br>18 |          | W<br>W             |
| $P_{O(BTL)}$                         | Output Power in Bridge Configuration   | $V_S = \pm 22V$ ; $R_L = 16\Omega$<br>THD = 10%<br>THD = 1%           |          | 50<br>40 |          | W<br>W             |
|                                      |                                        | $V_S = \pm 17V$ ; $R_L = 8\Omega$<br>THD = 10%<br>THD = 1%            |          | 50<br>40 |          | W<br>W             |
| $P_O^{(1)}$                          | Output Power                           | $R_L = 4\Omega$ $V_{CC} = \pm 16V$<br>THD = 10%<br>THD = 1%           |          | 25<br>18 |          | W<br>W             |
| $P_D$                                | Maximum Dissipated Power               | $V_{CC} = \pm 21V$ ; $R_L = 8\Omega$<br>$P_O = 25W + 25W$ ; THD = 10% |          | 6        |          | W                  |
| $\eta^{(2)}$                         | Efficiency (*)                         | $P_O = 25W + 25W$                                                     |          | 89       |          | %                  |
| THD                                  | Total Harmonic Distortion              | $R_L = 8\Omega$ ; $P_O = 1W$                                          |          | 0.1      |          | %                  |
| $I_{max}$                            | Overcurrent Protection Threshold       | $R_L = 0$                                                             | 3.5      | 5        |          | A                  |
| $T_j$                                | Thermal Shut-down Junction Temperature |                                                                       |          | 150      |          | $^\circ C$         |
| $G_V$                                | Closed Loop Gain                       |                                                                       |          | 30       |          | dB                 |
| $\Delta G_V^{(3)}$                   | Gain Matching                          |                                                                       | -1       |          | +1       | dB                 |
| $e_N$                                | Total Input Noise<br>$R_G = 50\Omega$  | A Curve<br>$f = 20Hz$ to $22KHz$                                      |          | 7<br>12  |          | $\mu V$<br>$\mu V$ |
| $C_T$                                | Cross talk                             | $f = 1KHz$ , $P_O = 1W$                                               |          | 55       |          | dB                 |
| $R_i$                                | Input Resistance                       |                                                                       |          | 30       |          | $k\Omega$          |
| SVR                                  | Supply Voltage Rejection               | $f = 100Hz$ ; $V_r = 0.5$                                             |          | 60       |          | dB                 |
| $V_{rmax}$                           | Overvoltage Threshold <sup>(5)</sup>   |                                                                       |          | 55       | 60       | V                  |
| $T_r, T_f$                           | Rising and Falling Time                |                                                                       |          | 50       |          | ns                 |
| $R_{DS(on)}$                         | Power Transistor on Resistance         |                                                                       |          | 0.4      |          | $\Omega$           |
| $F_{SW}^{(4)}$                       | Switching Frequency Range              |                                                                       | 100      | 200      | 230      | KHz                |
| <b>MUTE &amp; STAND-BY FUNCTIONS</b> |                                        |                                                                       |          |          |          |                    |
| $V_{ST-BY}$                          | 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                       |                                                                       |          | 60       |          | dB                 |
| $I_{qST-BY}$                         | Quiescent Current @ Stand-by           |                                                                       |          | 3        |          | mA                 |

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

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

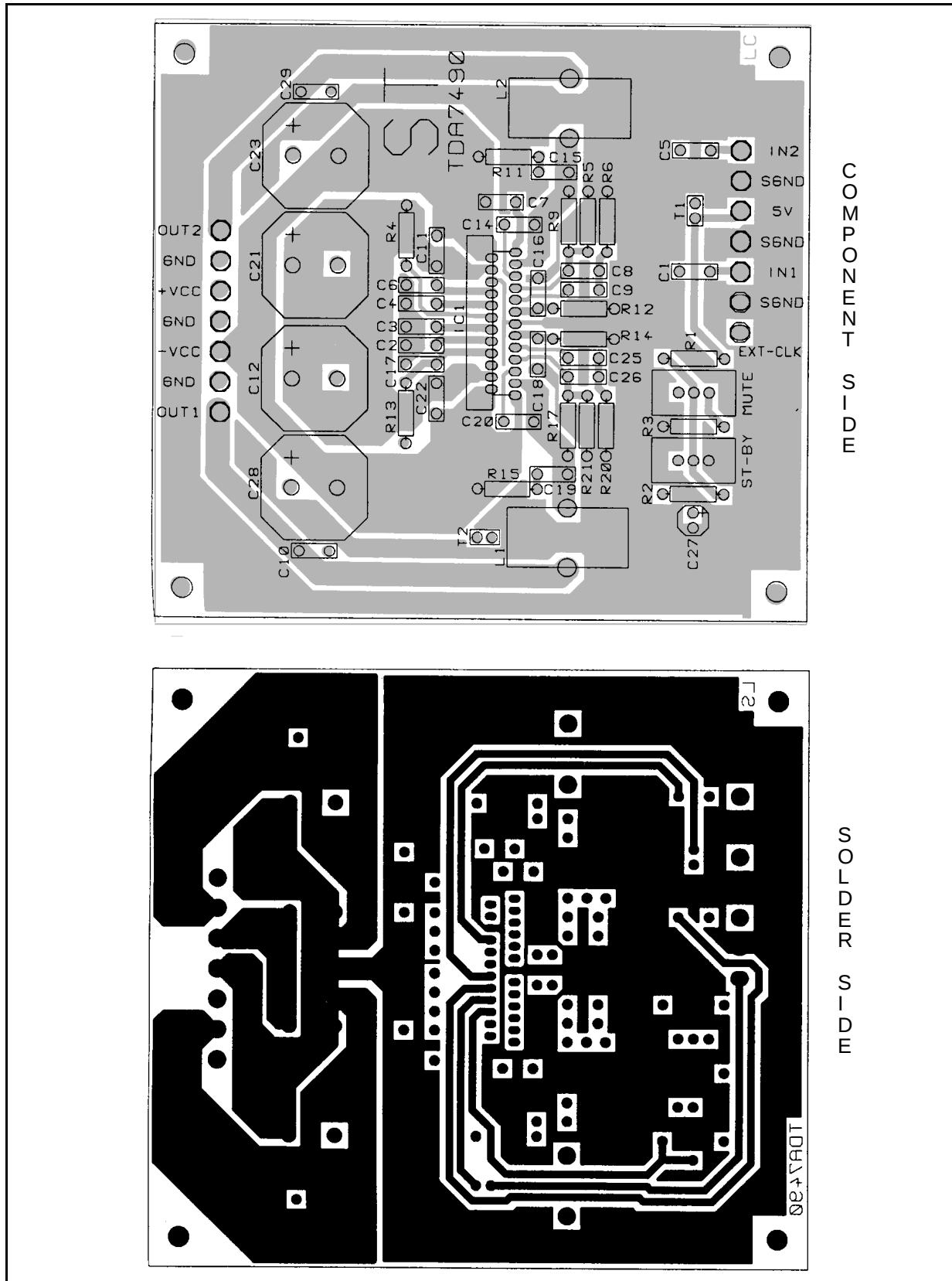
(2)  $\eta_{TOP} = 90\%$  where  $V_{CC} = \pm 25V$ ;  $R_L = 8\Omega$ ;  $P_O = 43W + 43W$ ; THD = 20%

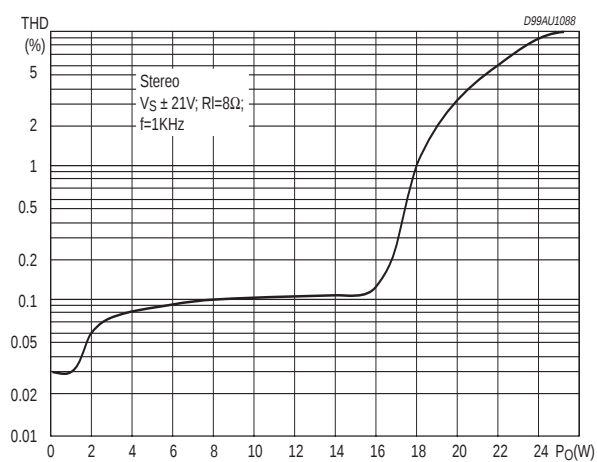
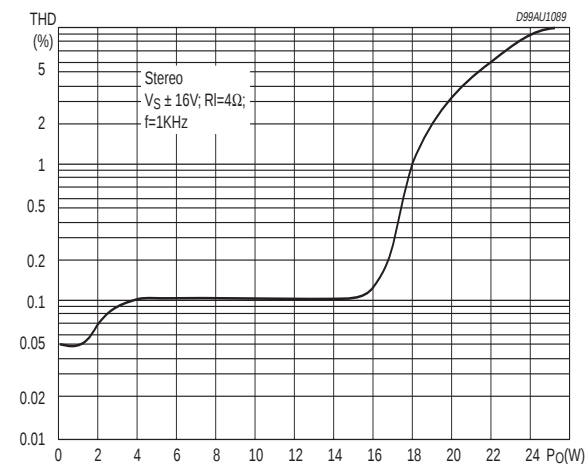
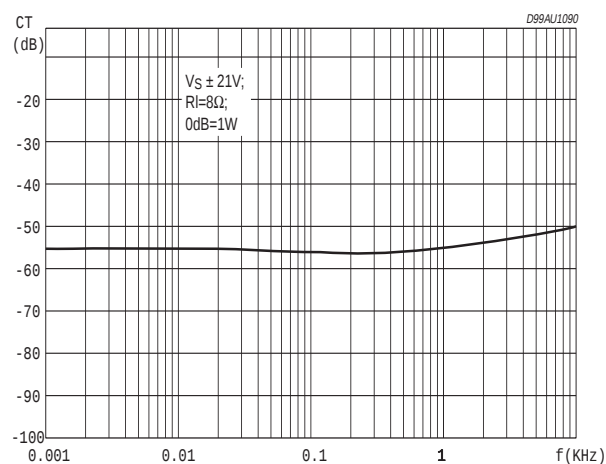
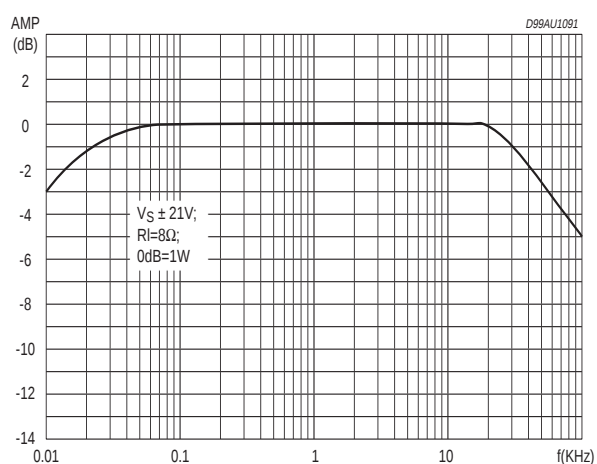
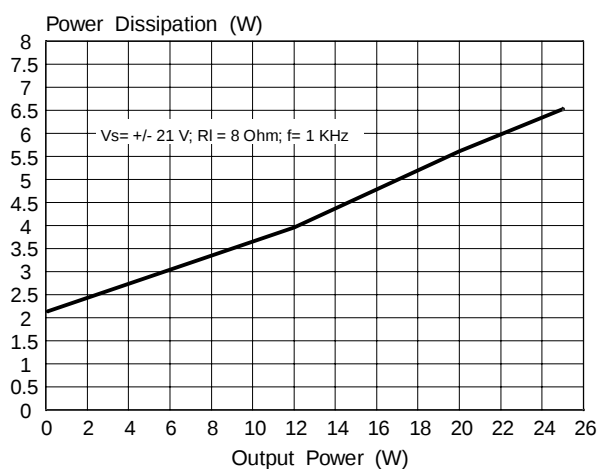
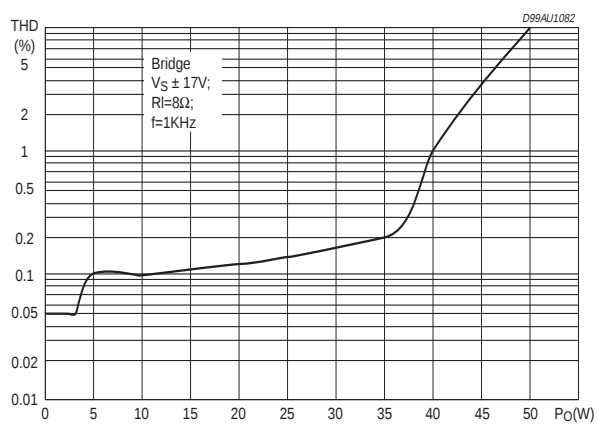
(3)  $\Delta G_V$  is intended with R2, R17, R5, R9 1% precision

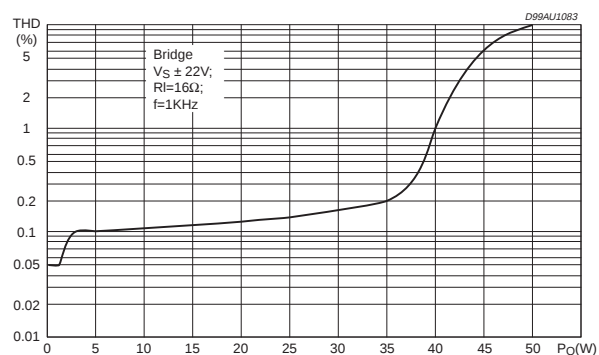
(4)  $F_{SW} = 0.25 \cdot (1/(300ns + R13 \cdot (C17 + 76pF)) \cdot 0.85)$

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

**Figure 3. P.C. Board and component layout of the Figs. 1, 2.**  
(for Stereo and Bridge compatible configuration)



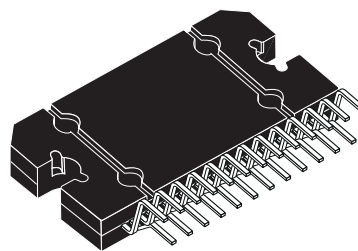
**Figure 4. Distortion vs. Output Power****Figure 5. Distortion vs. Output Power****Figure 6. Crosstalk vs. Frequency****Figure 7. Frequency Response****Figure 8. Power Dissipation vs. Output Power****Figure 9. Distortion vs Output Power in BTL**

**Figure 10.** Distortion vs Output Power in BTL

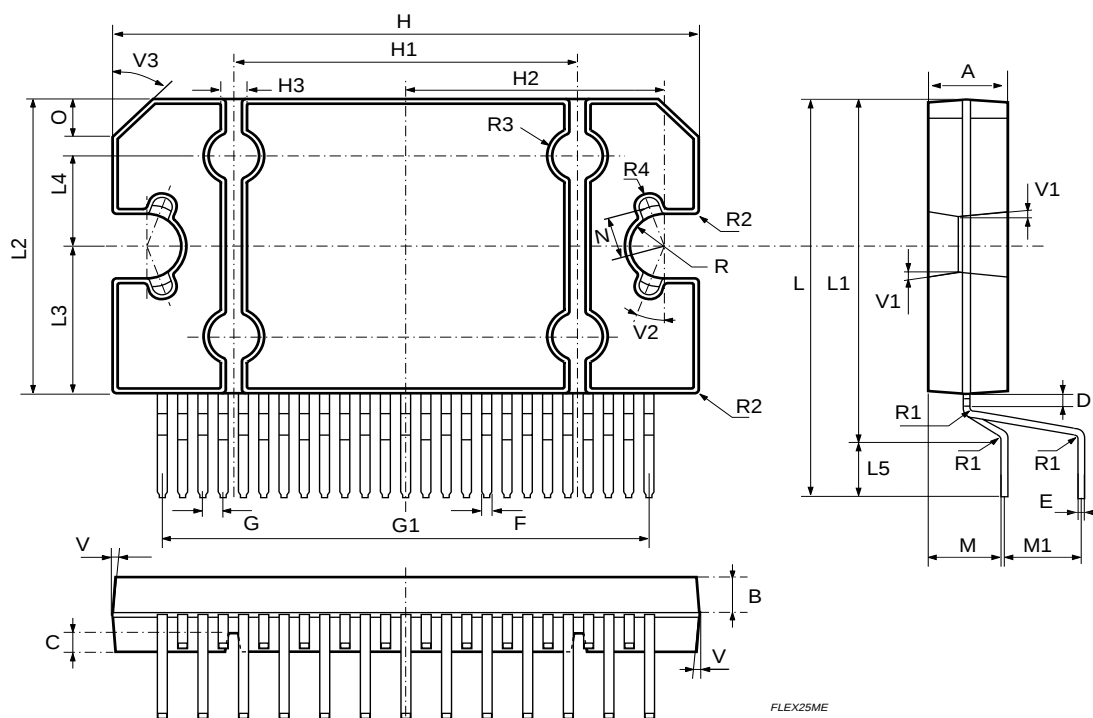
| DIM.   | mm         |       |       | inch  |       |       |
|--------|------------|-------|-------|-------|-------|-------|
|        | MIN.       | TYP.  | MAX.  | MIN.  | TYP.  | MAX.  |
| A      | 4.45       | 4.50  | 4.65  | 0.175 | 0.177 | 0.183 |
| B      | 1.80       | 1.90  | 2.00  | 0.070 | 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 | 1.138 | 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° (Typ.)  |       |       |       |       |       |
| V1     | 3° (Typ.)  |       |       |       |       |       |
| V2     | 20° (Typ.) |       |       |       |       |       |
| V3     | 45° (Typ.) |       |       |       |       |       |

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

## OUTLINE AND MECHANICAL DATA



## Flexiwatt25



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