## 25W MONO CLASS-D AMPLIFIER

- 25W OUTPUT POWER:
$R_{L}=8 \Omega / 4 \Omega$; THD $=10 \%$
- HIGH EFFICIENCY
- WIDE SUPPLY VOLTAGE RANGE (UP TO $\pm 25 \mathrm{~V}$ )
- SPLIT SUPPLY
- OVERVOLTAGE PROTECTION
- ST-BY AND MUTE FEATURES
- SHORT CIRCUIT PROTECTION
- THERMAL OVERLOAD PROTECTION


## DESCRIPTION



Multiwatt15

ORDERING NUMBER: TDA7482
The TDA7482 is an audio class-D amplifier assembled in Multiwatt15 package specially designed for high efficiency applications mainly for TV and Home Stereo sets.

Figure 1: Test and Application circuit.


ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
| :---: | :--- | :---: | :---: |
| $\mathrm{V}_{\text {CC }}$ | DC Supply Voltage | $\pm 28$ | V |
| $\mathrm{P}_{\text {tot }}$ | Power Dissipation $\mathrm{T}_{\text {case }}=70^{\circ} \mathrm{C}$ | 35 | W |
| $\mathrm{~T}_{\text {stg }}, \mathrm{T}_{\mathrm{j}}$ | Storage and Junction Temperature | -40 to 150 | ${ }^{\circ} \mathrm{C}$ |
| $\mathrm{V}_{\text {FREQ }}$ | Maximum Voltage Across RF (pin6) | 8 | V |
| $\mathrm{~T}_{\text {op }}$ | Operating Temperature Range | 0 to 70 | ${ }^{\circ} \mathrm{C}$ |
| ESD | Max ESD on Pins | $\pm 1.2$ | KV |

PIN CONNECTION (Top view)


THERMAL DATA

| Symbol | Parameter | Typ. | Max. | Unit |
| :---: | :--- | :---: | :---: | :---: |
| $\mathrm{R}_{\mathrm{th} j \text {-case }}$ | Thermal Resistance Junction-case | 1.8 | 2.5 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |

## PIN FUNCTIONS

| $\mathbf{N}$. | Name |  | Function |
| :---: | :---: | :--- | :--- |
| 1 | OUT | PWM OUTPUT |  |
| 2 | BOOTDIODE | BOOTSTRAP DIODE ANODE |  |
| 3 | BOOT | BOOTSTRAP |  |
| 4 | NC | NOT CONNECTED |  |
| 5 | FEEDCAP | FEEDBACK INTEGRATING CAPACITOR |  |
| 6 | FREQ | SETTING FREQUENCY RESISTOR |  |
| 7 | SGN-GND | SIGNAL GROUND |  |
| 8 | -VCC SIGN | SIGNAL NEGATIVE SUPPLY |  |
| 9 | IN | INPUT |  |
| 10 | ST-BY/MUTE | CONTROL STATE PIN |  |
| 11 | +VCC SIGN | POSITIVE SIGNAL SUPPLY |  |
| 12 | VREG | INTERNAL VOLTAGE REGULATOR |  |
| 13 | +VCC POW | POSITIVE POWER SUPPLY |  |
| 14 | -VCC POW | NEGATIVE POWER SUPPLY (to be connected to pin 13 via CS) |  |
| 15 | -VCC POW | NEGATIVE POWER SUPPLY (to be connected to pin 13 via CS) |  |

ELECTRICAL CHARACTERISTICS (Refer to the test circuit, $\mathrm{V}_{\mathrm{CC}}= \pm 21 \mathrm{~V} ; \mathrm{R}_{\mathrm{L}}=8 \Omega ; \mathrm{R}_{\mathrm{S}}=50 \Omega$;
$R_{F}=12 \mathrm{~K} \Omega$; Demod.. filter $\mathrm{L}=60 \mu \mathrm{H}, \mathrm{C}=470 \mathrm{nF} ; \mathrm{f}=1 \mathrm{KHz} ; \mathrm{T}_{\mathrm{amb}}=25^{\circ} \mathrm{C}$ unless otherwise specified.)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{V}_{\mathrm{S}}$ | Supply Range |  | $\pm 10$ |  | $\pm 25$ | V |
| $\mathrm{I}_{\text {a }}$ | Total Quiescent Current | $\mathrm{R}_{\mathrm{L}}=\infty$, No LC Filter |  | 40 | 60 | mA |
| $\mathrm{V}_{\mathrm{OS}}$ | Output Offset Voltage | Play Condition | -70 | -30 | 10 | mV |
| Po | Output Power | $\begin{aligned} & \hline \text { THD }=10 \% \\ & \text { THD }=1 \% \\ & \hline \end{aligned}$ | $\begin{aligned} & 20 \\ & 14 \\ & \hline \end{aligned}$ | $\begin{aligned} & 25 \\ & 18 \end{aligned}$ |  | $\begin{aligned} & \hline W \\ & w \end{aligned}$ |
| Po | Output Power | $\begin{aligned} & \mathrm{R}_{\mathrm{L}}=4 \Omega ; \mathrm{V}_{\mathrm{CC}}= \pm 16 \mathrm{~V} ; \\ & \mathrm{THD}=10 \% \\ & \mathrm{THD}=1 \%\left(^{*}\right) \\ & \hline \end{aligned}$ |  | $\begin{array}{r} 25 \\ 18 \\ \hline \end{array}$ |  | $\begin{aligned} & \text { W } \\ & \text { W } \end{aligned}$ |
| $\mathrm{P}_{\mathrm{D}}$ | Maximum Dissipated Power | $\begin{aligned} & \mathrm{V}_{\mathrm{CC}}= \pm 21 \mathrm{~V} ; \mathrm{R}_{\mathrm{L}}=8 \Omega ; \\ & \mathrm{P}_{\mathrm{O}}=25 \mathrm{~W} \text { THD } 10 \% \\ & \hline \end{aligned}$ |  | 3.8 |  | W |
| $\eta$ | $\text { Efficiency } \equiv \frac{\mathrm{P}_{\mathrm{O}}}{\mathrm{P}_{\mathrm{O}}+\mathrm{P}_{\mathrm{D}}} \equiv \frac{\mathrm{P}_{\mathrm{O}}}{\mathrm{P}_{\mathrm{I}}}\left({ }^{* \star)}\right.$ | $\begin{aligned} & \mathrm{V}_{\mathrm{CC}}= \pm 21 \mathrm{~V} ; \mathrm{R}_{\mathrm{L}}=8 \Omega ; \\ & \mathrm{P}_{\mathrm{O}}=18 \mathrm{~W} \text { THD } 10 \% \end{aligned}$ |  | 87 |  | \% |
| $\eta_{\text {max }}$ | Top Efficiency maximum | $\begin{aligned} & \mathrm{V}_{\mathrm{CC}}= \pm 25 \mathrm{~V} ; \mathrm{R}_{\mathrm{L}}=8 \Omega ; \\ & \mathrm{P}_{\mathrm{O}}=43 \mathrm{~W} \text { THD } 20 \% \\ & \hline \end{aligned}$ |  | 88.5 |  | \% |
| THD | Total Harmonic Distortion | $\mathrm{R}_{\mathrm{L}}=8 \Omega ; \mathrm{P}_{\mathrm{O}}=1 \mathrm{~W}$ |  | 0.1 |  | \% |
| $I_{\text {max }}$ | Overcurrent Protection Threshold | $\mathrm{R}_{\mathrm{L}}=0$ | 3.5 | 5 |  | A |
| $\mathrm{T}_{\mathrm{j}}$ | Thermal Shut-down Junction Temperature |  |  | 150 |  | ${ }^{\circ} \mathrm{C}$ |
| $\mathrm{G}_{V}$ | Closed Loop Gain |  | 29 | 30 | 31 | dB |
| $\mathrm{e}_{\mathrm{N}}$ | Total Input Noise | A Curve $\mathrm{f}=20 \mathrm{~Hz} \text { to } 22 \mathrm{KHz}$ |  | $\begin{gathered} \hline 7 \\ 12 \\ \hline \end{gathered}$ |  | $\begin{aligned} & \mu \mathrm{V} \\ & \mu \mathrm{~V} \\ & \hline \end{aligned}$ |
| $\mathrm{V}_{\text {CCtotmax }}$ | Maximum Total V ${ }_{\text {cc }}$ Protection |  | 50 |  |  | V |
| $\mathrm{R}_{\mathrm{i}}$ | Input Resistance |  | 20 | 30 |  | $\mathrm{k} \Omega$ |
| SVR | Supply Voltage Rejection | $\mathrm{f}=100 \mathrm{~Hz} ; \mathrm{V}_{\mathrm{r}}=0.5$ | 46 | 60 |  | dB |
| $\mathrm{T}_{\mathrm{r}}, \mathrm{T}_{\mathrm{f}}$ | Rising and Falling Time |  |  | 50 |  | ns |
| R DSSN | Power Transistor on Resistance |  |  | 0.4 |  | $\Omega$ |
| Fsw-op | Switching Frequency Operative Range |  | 100 |  | 200 | KHz |
| $\mathrm{F}_{\text {SW }}$ | Switching Frequency |  | 100 | 120 | 140 | KHz |
| $B_{F}$ | Zero Signal Frequency Constant (***) |  |  | $1.4 \times 10^{9}$ |  | $\mathrm{Hz} \Omega$ |
| $\mathrm{R}_{\mathrm{F}}$ | Frequency Controller Resistor Range (****) |  | 7 | 12 | 14 | K $\Omega$ |
| MUTE \& STAND-BY FUNCTIONS |  |  |  |  |  |  |
| $\mathrm{V}_{\text {ST-BY }}$ | Stand-by range |  |  |  | 0.8 | V |
| $\mathrm{V}_{\text {MUTE }}$ | Mute Range |  | 1.8 |  | 2.5 | V |
| $\mathrm{V}_{\text {PLAY }}$ | Play Range (1) |  | 4 |  |  | V |
| $\mathrm{A}_{\text {MUTE }}$ | Mute Attenuation |  | 60 | 80 |  | dB |
| $\mathrm{I}_{\mathrm{qST} \text {-BY }}$ | Quiescent Current @ Stand-by |  |  | 3 | 5 | mA |

*: The output LC filter must be changed to: $\mathrm{L}=30 \mu \mathrm{H} ; \mathrm{C}=1 \mu \mathrm{~F}$
**: Po = measured across the load using the following inductor: COIL 58120 MPPA2 (magnetics) TURNS: $28 \varnothing 1 \mathrm{~mm}$
***: The zero-signal switching frequency can be obtained using the following expression: $\mathrm{Fssw}_{\mathrm{sw}}=\mathrm{B}_{\mathrm{F}} / \mathrm{R}_{\mathrm{F}}$
${ }^{* * * *}$ : The maximum value of $R_{F}$ is related to the maximum possible value for the voltage drop on $R_{F}$ itself
(1) For $\mathrm{V} 10>5.2 \mathrm{~V}$, an input impedance of $10 \mathrm{~K} \Omega$ is to be considered

Figure 2: Recommended P.C. Board and Component Layout of the Circuit of Figure 1 (1.25:1 scale)


Note: Capacitor C5 must be as close as possible to device's pins 16 and 17

MULTIWATT15 PACKAGE MECHANICAL DATA

| 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 |



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