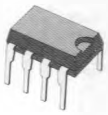
SGS-THOMSON MICROELECTRONICS

# TDA2822M

## DUAL LOW-VOLTAGE POWER AMPLIFIER

- SUPPLY VOLTAGE DOWN TO 1.8V
- LOW CROSSOVER DISTORTION
- LOW QUIESCENT CURRENT
- BRIDGE OR STEREO CONFIGURATION

The TDA2822M is a monolithic integrated circuit in 8 lead Minidip package. It is intended for use as dual audio power amplifier in portable cassette players and radios.



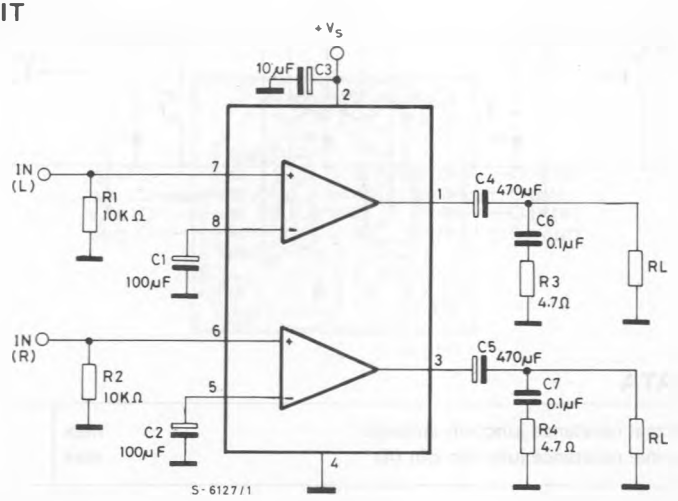
Minidip Plastic

**ORDERING NUMBER:** TDA2822M

## ABSOLUTE MAXIMUM RATINGS

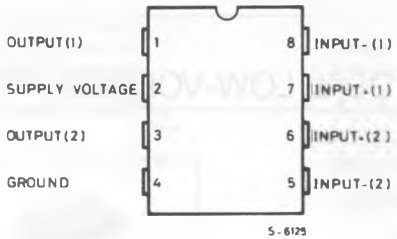
| | | | |
|---|---|---|---|
| $V_s$ | Supply voltage | 15 | V |
| $I_o$ | Peak output current | 1 | A |
| $P_{tot}$ | Total power dissipation at $T_{amb} = 50°C$ | 1 | W |
| | at $T_{case} = 50°C$ | 1.4 | W |
| $T_{stg}$, $T_j$ | Storage and junction temperature | -40 to 150 | °C |

## TEST CIRCUIT

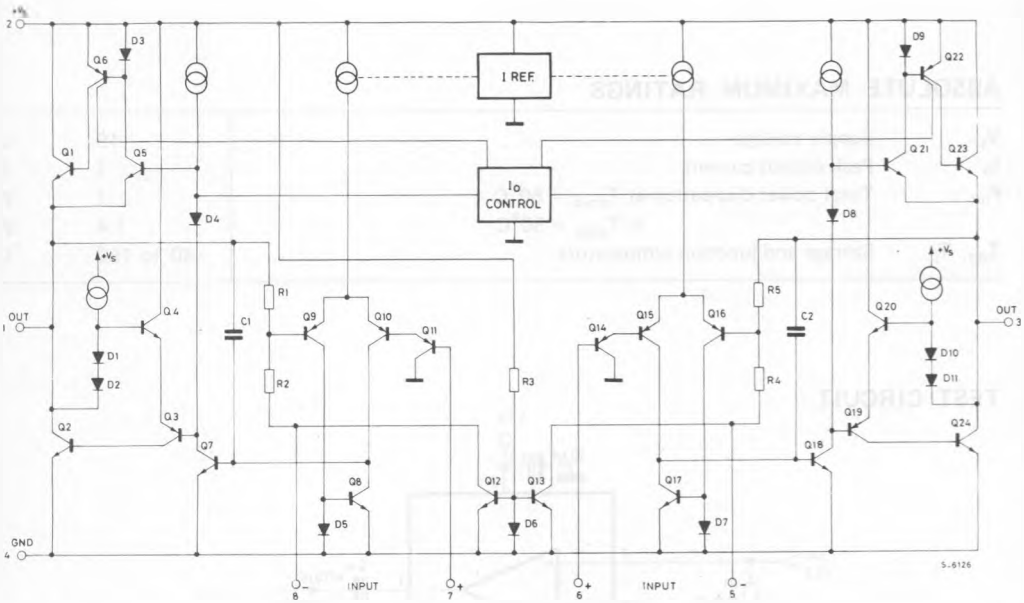


## CONNECTION DIAGRAM

(Top view)




## SCHEMATIC DIAGRAM




## THERMAL DATA

| | | | | |
|---|---|---|---|---|
| $R_{th\ j\text{-}amb}$ | Thermal resistance junction-ambient | max | 100 | °C/W |
| $R_{th\ j\text{-}case}$ | Thermal resistance junction-pin (4) | max | 70 | °C/W |

## STEREO APPLICATION

Fig. 1 - Test circuit

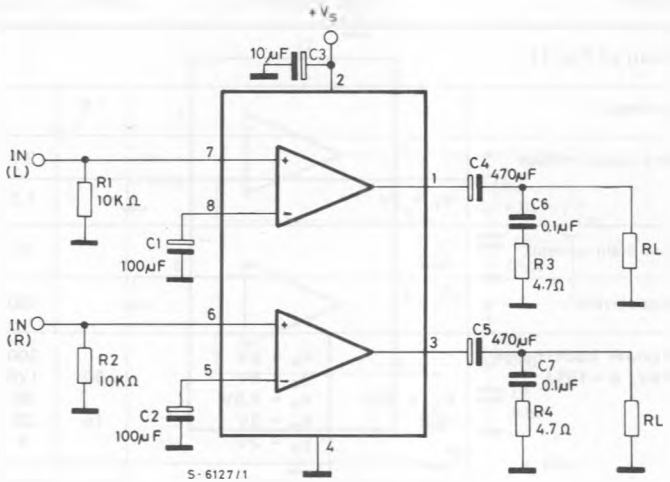
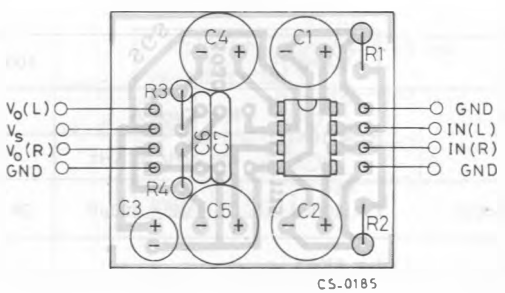



Fig. 2 - P.C. board and component layout of the circuit of Fig. 1 (1 : 1 scale)



## ELECTRICAL CHARACTERISTICS ($V_s$ = 6V, $T_{amb}$ = 25°C, unless otherwise specified)

| Parameter | | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **STEREO** (Test circuit of Fig. 1) | | | | | | | |
| $V_s$ | Supply voltage | | | 1.8 | | 15 | V |
| $V_o$ | Quiescent output voltage | | | | 2.7 | | V |
| | | $V_s$ = 3V | | | 1.2 | | V |
| $I_d$ | Quiescent drain current | | | | 6 | 9 | mA |
| $I_b$ | Input bias current | | | | 100 | | nA |
| $P_o$ | Output power (each channel) (f = 1KHz, d = 10%) | $R_L$ = 32Ω | $V_s$ = 9V<br>$V_s$ = 6V<br>$V_s$ = 4.5V<br>$V_s$ = 3V<br>$V_s$ = 2V | <br>90<br><br>15<br> | 300<br>120<br>60<br>20<br>5 | | mW |
| | | $R_L$ = 16Ω | $V_s$ = 6V | 170 | 220 | | mW |
| | | $R_L$ = 8Ω | $V_s$ = 9V<br>$V_s$ = 6V | <br>300 | 1000<br>380 | | mW |
| | | $R_L$ = 4Ω | $V_s$ = 6V<br>$V_s$ = 4.5V<br>$V_s$ = 3V | 450 | 650<br>320<br>110 | | mW |
| d | Distortion (f = 1KHz) | $R_L$ = 32Ω | $P_o$ = 40mW | | 0.2 | | % |
| | | $R_L$ = 16Ω | $P_o$ = 75mW | | 0.2 | | % |
| | | $R_L$ = 8Ω | $P_o$ = 150mW | | 0.2 | | % |
| $G_v$ | Closed loop voltage gain | f = 1KHz | | 36 | 39 | 41 | dB |
| $\Delta G_v$ | Channel balance | | | | | ± 1 | dB |
| $R_i$ | Input resistance | f = 1KHz | | 100 | | | KΩ |
| $e_N$ | Total input noise | $R_s$ = 10KΩ | B = Curve A | | 2 | | μV |
| | | | B = 22Hz to KHz | | 2.5 | | |
| SVR | Supply voltage rejection | f = 100Hz | C1 = C2 = 100μF | 24 | 30 | | dB |
| $C_s$ | Channel separation | f = 1KHz | | | 50 | | dB |

## BRIDGE APPLICATION

Fig. 3 - Test circuit

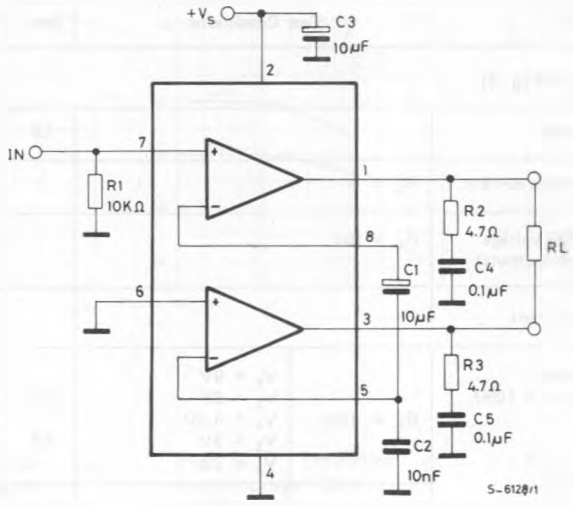
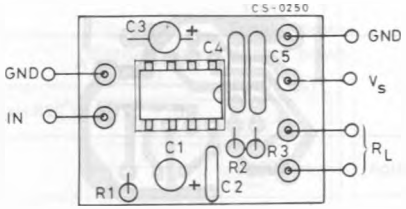



Fig. 4 - P.C. board and components layout of the circuit of Fig. 3 (1 : 1 scale)



## ELECTRICAL CHARACTERISTICS ($V_s$ = 6V, $T_{amb}$ = 25°C unless otherwise specified)

| Parameter | | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **BRIDGE** (Test circuit of Fig. 3) | | | | | | | |
| $V_s$ | Supply voltage | | | 1.8 | | 15 | V |
| $I_d$ | Quiescent drain current | $R_L$ = ∞ | | | 6 | 9 | mA |
| $V_{os}$ | Output offset voltage (between the outputs) | $R_L$ = 8Ω | | | | ± 50 | mV |
| $I_b$ | Input bias current | | | | 100 | | nA |
| $P_o$ | Output power (f = 1KHz, d = 10%) | $R_L$ = 32Ω | $V_s$ = 9V<br>$V_s$ = 6V<br>$V_s$ = 4.5V<br>$V_s$ = 3V<br>$V_s$ = 2V | 320<br><br>50 | 1000<br>400<br>200<br>65<br>8 | | mW |
| | | $R_L$ = 16Ω | $V_s$ = 9V<br>$V_s$ = 6V<br>$V_s$ = 3V | | 2000<br>800<br>120 | | mW |
| | | $R_L$ = 8Ω | $V_s$ = 6V<br>$V_s$ = 4.5V<br>$V_s$ = 3V | 900 | 1350<br>700<br>220 | | mW |
| | | $R_L$ = 4Ω | $V_s$ = 4.5V<br>$V_s$ = 3V<br>$V_s$ = 2V | 200 | 1000<br>350<br>80 | | mW |
| d | Distortion | $P_o$ = 0.5W<br>f = 1KHz | $R_L$ = 8Ω | | 0.2 | | % |
| $G_v$ | Closed loop voltage gain | f = 1KHz | | | 39 | | dB |
| $R_i$ | Input resistance | f = 1KHz | | 100 | | | KΩ |
| $e_N$ | Total input noise | $R_s$ = 10KΩ | B = Curve A | | 2.5 | | μV |
| | | | B = 22Hz to 22KHz | | 3 | | |
| SVR | Supply voltage rejection | f = 100Hz | | | 40 | | dB |
| B | Power bandwidth (-3dB) | $R_L$ = 8Ω | $P_o$ = 1W | | 120 | | KHz |

Fig. 5 - Quiescent current vs. supply voltage

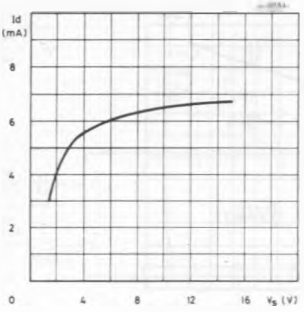



Fig. 6 - Supply voltage rejection vs. frequency

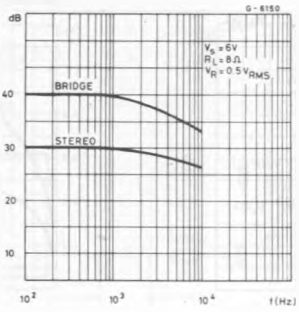



Fig. 7 - Output power vs. supply voltage (THD= 10%, f = 1KHz Stereo)

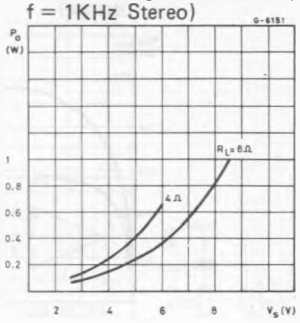



Fig. 8 - Distortion vs. output power (Stereo)

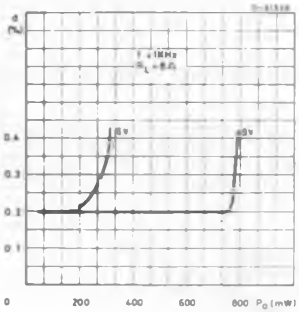



Fig. 9 - Distortion vs. output power (Stereo)

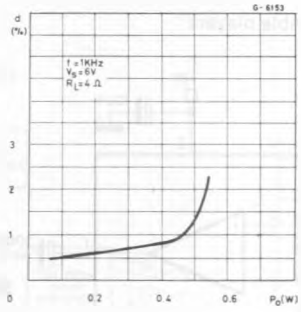



Fig. 10 - Output power vs. supply voltage (Bridge)

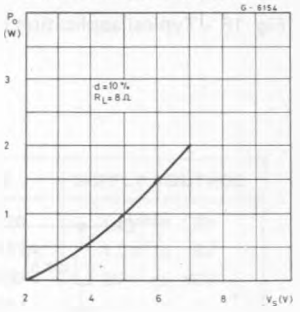



Fig. 11 - Distortion vs. output power (Bridge)

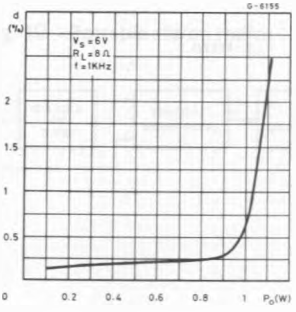



Fig. 12 - Total power dissipation vs. output power (Bridge)

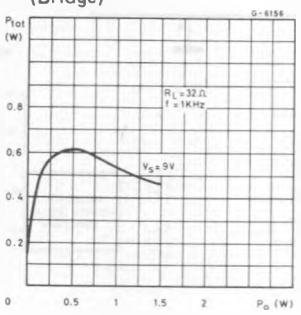



Fig. 13 - Total power dissipation vs. output power (Bridge)

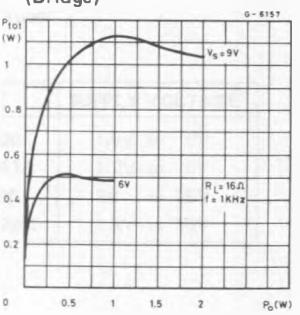


Fig. 14 - Total power dissipation vs. output power (Bridge)

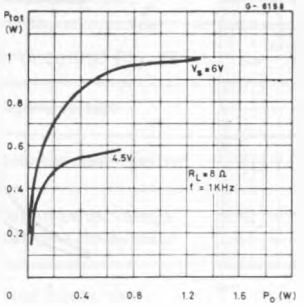



Fig. 15 - Total power dissipation vs. output power (Bridge)

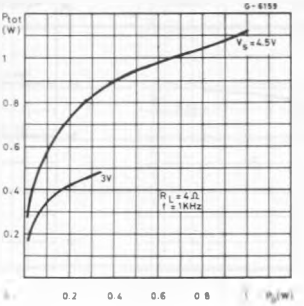



Fig. 16 - Typical application in portable players

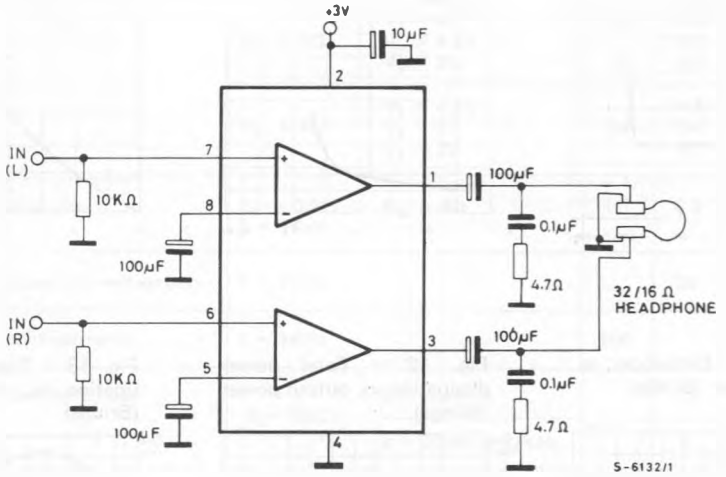


Fig. 17 - Application circuit for portable radio receivers

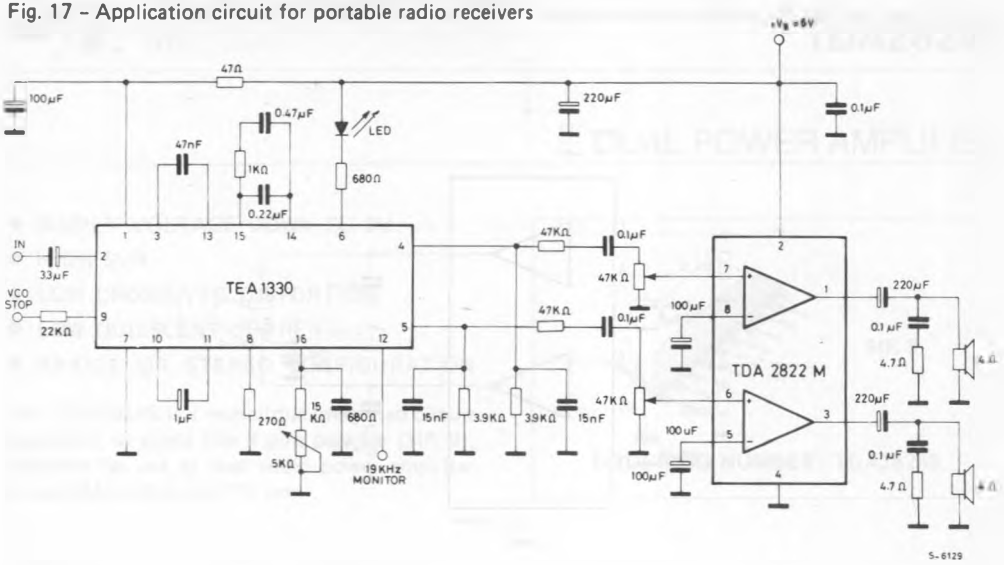
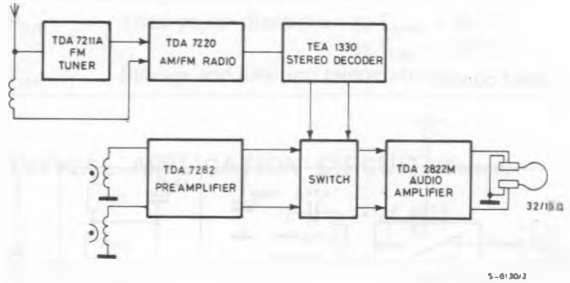
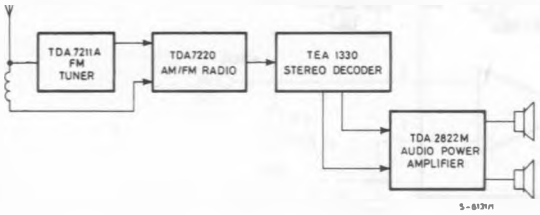



Fig. 18 - Portable radio cassette players




| TYPE | SUPPLY VOLTAGE |
|---|---|
| TDA 7220 | 1.5V to 6V |
| TDA 7211A | 1.2V to 6V |
| TEA 1330 | 3V to 15V |
| TDA 7282 | 1.5V to 6V |
| TDA 2822M | 1.8V to 15V |

Fig. 19 - Portable stereo radios




| TYPE | SUPPLY VOLTAGE |
|---|---|
| TDA 7220 | 1.5V to 6V |
| TDA 7211A | 1.2V to 6V |
| TEA 1330 | 3V to 15V |
| TDA 2822M | 1.8V to 15V |

Fig. 20 Low cost application for portable players (using only one 100μF output capacitor)

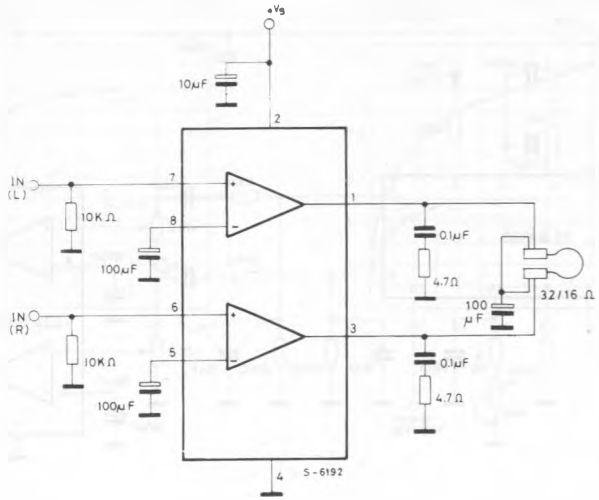



Fig. 21 - 3V Stereo cassette player with motor speed control