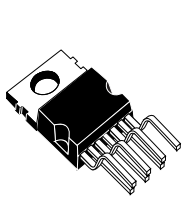
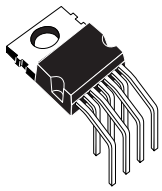
# TDA2052

## 60W Hi-Fi AUDIO POWER AMPLIFIER WITH MUTE / STAND-BY

- SUPPLY VOLTAGE RANGE UP TO ±25V
- SPLIT SUPPLY OPERATION
- HIGH OUTPUT POWER (UP TO 60W MUSIC POWER)
- LOW DISTORTION
- MUTE/STAND-BY FUNCTION
- NO SWITCH ON/OFF NOISE
- AC SHORT CIRCUIT PROTECTION
- THERMAL SHUTDOWN
- ESD PROTECTION



**Heptawatt V**



**Heptawatt H**

**ORDERING NUMBERS:**

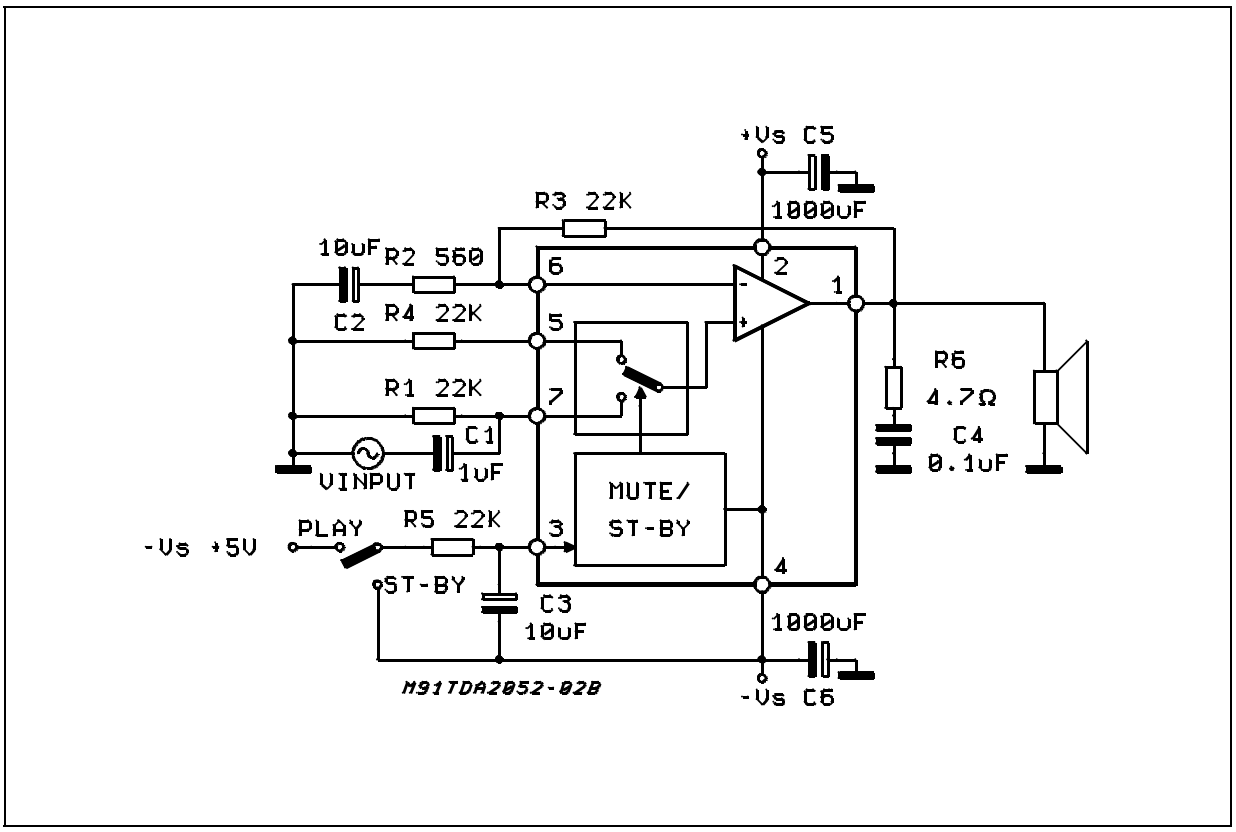
**TDA2052V** **TDA2052H**

### DESCRIPTION

The TDA2052 is a monolithic integrated circuit in Heptawatt package, intended for use as audio class AB amplifier in TV or Hi-Fi field application. Thanks to the wide voltage range and to the high out current capability it's able to supply the highest power into both 4Ω and 8Ω loads even in presence of poor supply regulation.

The built in Muting/Stand-by function simplifies the remote operations avoiding also switching on-off noises.

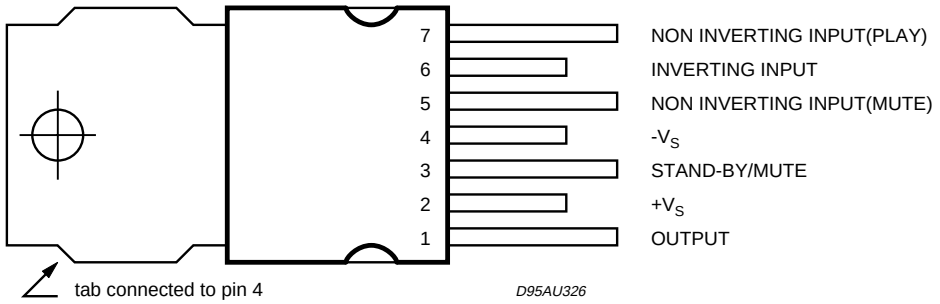
### TEST AND APPLICATION CIRCUIT



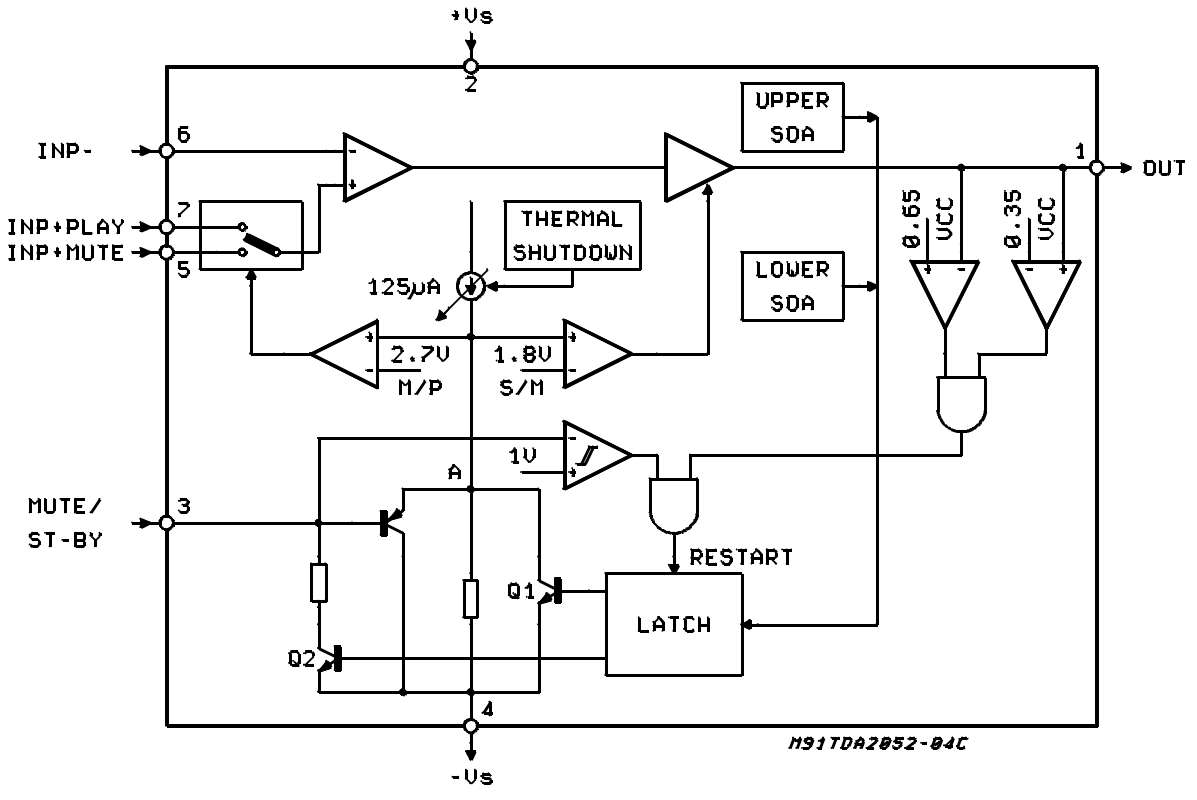
## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_S$ | DC Supply Voltage | ±25 | V |
| $I_O$ | Output Peak Current (internally limited) | 6 | A |
| $P_{tot}$ | Power Dissipation $T_{case}$ = 70°C | 30 | W |
| $T_{op}$ | Operating Temperature Range | 0 to +70 | °C |
| $T_{stg}$, $T_j$ | Storage and Junction Temperature | -40 to +150 | °C |

## PIN CONNECTION (Top view)




## BLOCK DIAGRAM



## THERMAL DATA

| Symbol | Description | | Value | Unit |
|---|---|---|---|---|
| $R_{th\ j\text{-}case}$ | Thermal Resistance Junction-case | Max | 2.5 | °C/W |

**ELECTRICAL CHARACTERISTICS** (Refer to the test circuit, $G_V$ = 32dB; $V_S$ ± 18V; f = 1KHz; $T_{amb}$ = 25°C, unless otherwise specified.)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_S$ | Supply Range | | ±6 | | ±25 | V |
| $I_q$ | Total Quiescent Current | $V_S$ = ±22V | 20 | 40 | 70 | mA |
| $I_b$ | Input Bias Current | | | | ±0.5 | µA |
| $V_{OS}$ | Input Offset Voltage | | | | ±15 | mV |
| $I_{OS}$ | Input Offset Current | | | | ±200 | nA |
| $P_O$ | Music Output Power IEC268-3 Rules (*) | $V_S$ = ± 22.5, $R_L$ = 4Ω, d = 10%, t = 1s | 50 | 60 | | W |
| $P_O$ | Output Power (continuous RMS) | d = 10%<br>RL = 4Ω<br>$R_L$ = 8Ω<br>$V_S$ = ±22V, $R_L$ = 8Ω | <br>35<br><br>30 | <br>40<br>22<br>33 | | <br>W<br>W<br>W |
| | | d = 1%<br>$R_L$ = 4Ω<br>$R_L$ = 8Ω<br>$V_S$ = ±22V, $R_L$ = 8Ω | | <br>32<br>17<br>28 | | <br>W<br>W<br>W |
| d | Total Harmonic Distortion | $R_L$ = 4Ω<br>$P_O$ = 0.1 to 20W;<br>f = 100Hz to 15KHz | | <br><br>0.1 | <br><br>0.7 | <br><br>% |
| | | $V_S$ ± 22V, $R_L$ = 8Ω<br>$P_O$ = 0.1 to 20W;<br>f = 100Hz to 15KHz | | <br><br>0.1 | <br><br>0.5 | <br><br>% |
| SR | Slew Rate | | 3 | 5 | | V/µs |
| $G_V$ | Open Loop Voltage Gain | | | 80 | | dB |
| $e_N$ | Total Input Noise | A Curve<br>f = 20Hz to 20KHz | | 2<br>3 | <br>10 | µV<br>µV |
| $R_i$ | Input Resistance | | 500 | | | KΩ |
| SVR | Supply Voltage Rejection | f = 100Hz, $V_{ripple}$ = 1$V_{RMS}$ | 40 | 50 | | dB |
| $T_S$ | Thermal Shutdown | | | 145 | | °C |

MUTE/STAND-BY FUNCTION (Ref. –$V_S$)

| | | | | | | |
|---|---|---|---|---|---|---|
| $VT_{ST\text{-}BY}$ | Stand-by - Threshold | | 1 | 1.8 | | V |
| $VT_{PLAY}$ | Play Threshold | | | 2.7 | 4 | V |
| $I_{q\ ST\text{-}BY}$ | Quiescent Current @ Stand-by | $V_{pin\ 3}$ = 0.5V | | 1 | 3 | mA |
| $ATT_{ST\text{-}BY}$ | Stand-by Attenuation | | 70 | 90 | | dB |
| $I_{pin3}$ | Pin 3 Current @ Stand-by | | | –1 | ±10 | µA |

**Note (*):**
MUSIC POWER CONCEPT
MUSIC POWER is ( according to the IEC clauses n.268-3 of Jan 83) the maximal power which the amplifier is capable of producing across the rated load resistance (regardless of non linearity) 1 sec after the application of a sinusoidal input signal of frequency 1KHz.

According to this definition our method of measurement comprises the following steps:
1) Set the voltage supply at the maximum operating value -10%
2) Apply a input signal in the form of a 1KHz tone burst of 1 sec duration; the repetition period of the signal pulses is > 60 sec
3) The output voltage is measured 1 sec from the start of the pulse
4) Increase the input voltage until the output signal show a THD = 10%
5) The music power is then $V^2_{out}/R1$, where $V_{out}$ is the output voltage measured in the condition of point 4) and R1 is the rated load impedance

The target of this method is to avoid excessive dissipation in the amplifier.

**APPLICATIONS SUGGESTIONS** (See Test and Application Circuit)
The recommended values of the external components are those shown on the application circuit. Different values can be used; the following table can help the designer.

| Comp. | Value | Purpose | Larger Than | Smaller Than |
|---|---|---|---|---|
| R1 | 22KΩ (*) | Input Impedance | Increase of Input Impedance | Decrease of Input Impedance |
| R2 | 560Ω | Closed Loop Gain set to 32dB (**) | Decrease of Gain | Increase of Gain |
| R3 | 22KΩ (*) | | Increase of Gain | Decrease of Gain |
| R4 | 22KΩ (*) | Input Impedance @ Mute | | |
| R5 | 22KΩ | Stand-by Time Constant | | |
| R6 | 4.7Ω | Frequency Stability | Danger of oscillations | Danger of oscillations |
| C1 | 1µF | Input DC Decoupling | | Higher Low-frequency cut-off |
| C2 | 10µF | Feedback DC Decoupling | | Higher Low-frequency cut-off |
| C3 | 10µF | Stand-by Time Constant | | |
| C4 | 0.100µF | Frequency Stability | | Danger of Oscillations |
| C5, C6 | 1000µF | Supply Voltage Bypass | | |

(*) R1 = R3 = R4 for POP optimization

(**) Closed Loop Gain has to be ≥ 30dB

## TYPICAL CHARACTERISTICS

**Figure 1:** Output Power vs. Supply Voltage

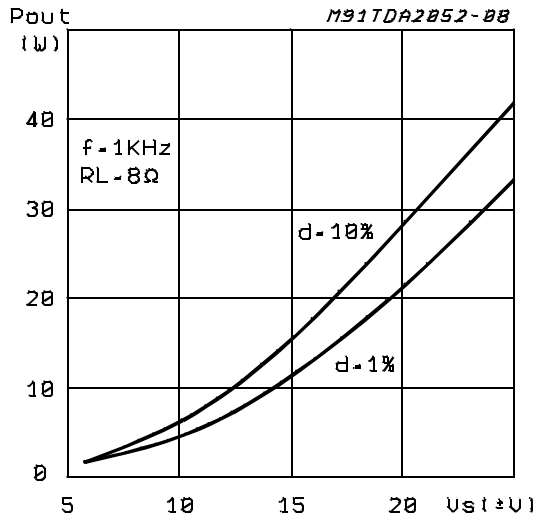



**Figure 2:** Distortion vs. Output Power