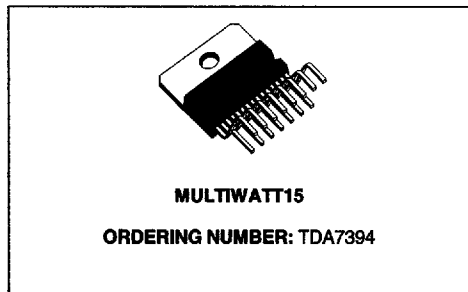


## 2 x 30W DUAL BRIDGE CAR RADIO AMPLIFIER

- **HIGH OUTPUT POWER CAPABILITY:**
  - 2 x 30W max./4Ω @ 13.2V, 1KHz
  - 2 x 22W typ./4Ω @ 14.4V, 1KHz, 10%
  - 2 x 19W typ./4Ω @ 13.2V, 1KHz, 10%
  - 2 x 28W typ./2Ω @ 14.4V, 1KHz, 10%
  - 2 x 25W typ./2Ω @ 13.2V, 1KHz, 10%
- **LOW DISTORTION**
- **LOW OUTPUT NOISE**
- **ST-BY FUNCTION**
- **MUTE FUNCTION**
- **AUTO-MUTE AT MIN. SUPPLY VOLTAGE DETECTION**
- **LOW EXTERNAL COMPONENT COUNT**
  - INTERNALLY FIXED GAIN (40dB)
  - NO EXTERNAL COMPENSATION
  - NO BOOTSTRAP CAPACITORS
- **ADDITIONAL MONO INPUT**

### PROTECTIONS:

- **OUTPUT AC/DC SHORT CIRCUIT TO GND AND TO V<sub>s</sub>**
- **VERY INDUCTIVE LOADS**
- **OVERRATING CHIP TEMPERATURE WITH SOFT THERMAL LIMITER**
- **LOAD DUMP VOLTAGE**

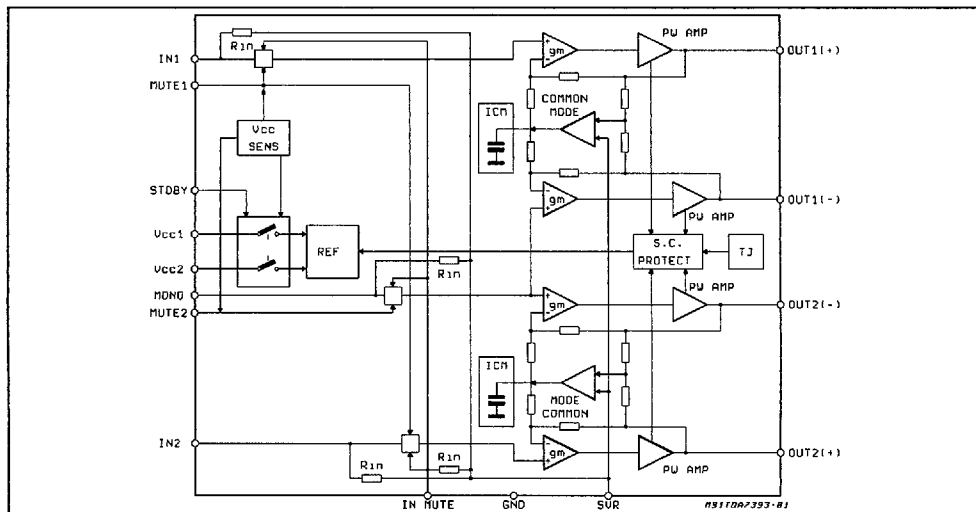


- **FORTUITOUS OPEN GND**
- **REVERSE BATTERY**
- **ESD PROTECTION**

### DESCRIPTION

The TDA7394 is a new technology class AB Audio Power Amplifier in Multiwatt15 package designed for high end car radio applications. Thanks to the fully complementary PNP/NPN output configuration the high power performances of the TDA7394 are obtained without bootstrap capacitors. The extremely reduced components count allows very compact sets.

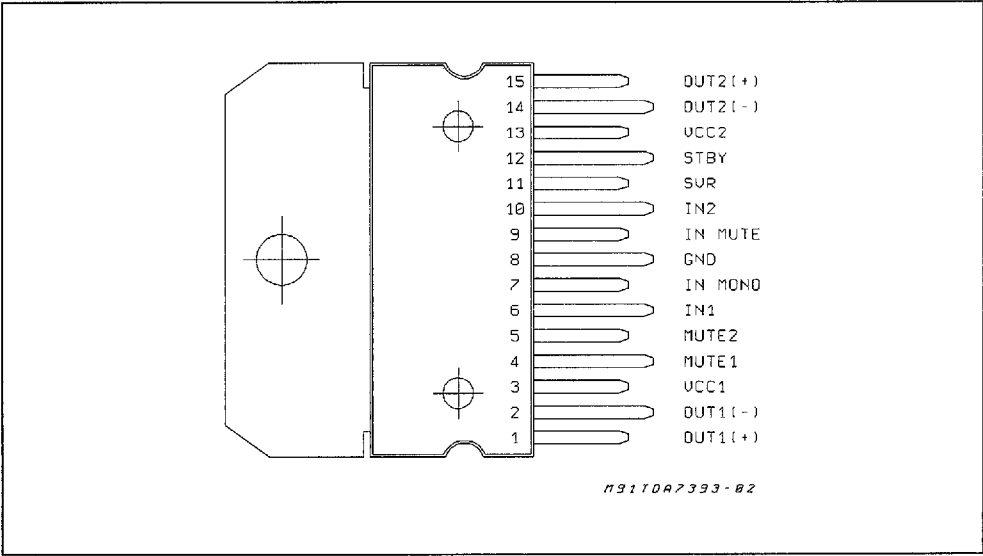
### BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Symbol               | Parameter                                                                                     | Value       | Unit   |
|----------------------|-----------------------------------------------------------------------------------------------|-------------|--------|
| V <sub>CC</sub>      | Operating Supply Voltage                                                                      | 18          | V      |
| V <sub>CC</sub> (DC) | DC Supply Voltage                                                                             | 28          | V      |
| V <sub>CC</sub> (pk) | Peak Supply Voltage (t = 50ms)                                                                | 50          | V      |
| I <sub>O</sub>       | Output Peak Current:<br>Repetitive (Duty Cycle 10% at f = 10Hz)<br>Non Repetitive (t = 100µs) | 4.5<br>5.5  | A<br>A |
| P <sub>tot</sub>     | Power dissipation, T <sub>case</sub> = 75°C (see derating curve)                              | 50          | W      |
| T <sub>J</sub>       | Junction Temperature                                                                          | 150         | °C     |
| T <sub>op</sub>      | Operating Ambient Temperature                                                                 | − 40 to 85  | °C     |
| T <sub>stg</sub>     | Storage Temperature                                                                           | − 55 to 150 | °C     |

PIN CONNECTION (Top view)



THERMAL DATA

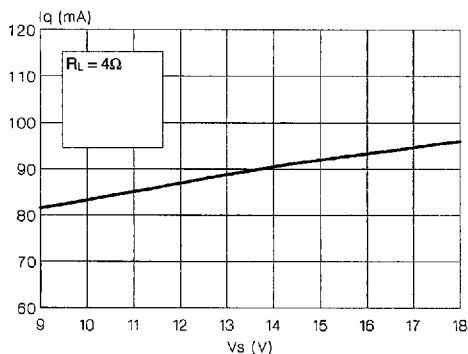
| Symbol                 | Parameter                           | Value    | Unit |
|------------------------|-------------------------------------|----------|------|
| R <sub>th j-case</sub> | Thermal Resistance Junction to Case | Max. 1.5 | °C/W |

7929237 0064839 847

**ELECTRICAL CHARACTERISTICS** ( $V_S = 13.2V$ ;  $f = 1KHz$ ;  $R_g = 600\Omega$ ;  $R_L = 4\Omega$ ;  $T_{amb} = 25^\circ C$ ;  
Refer to the application circuit, unless otherwise specified.)

| Symbol        | Parameter                        | Test Condition                                                                                                                   | Min.  | Typ.                 | Max.  | Unit             |
|---------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------|----------------------|-------|------------------|
| $I_{q1}$      | Quiescent Current                |                                                                                                                                  |       | 90                   | 180   | mA               |
| $V_{OS}$      | Output Offset Voltage            |                                                                                                                                  | - 200 |                      | + 200 | mV               |
| $G_v$         | Voltage Gain                     |                                                                                                                                  | 38.5  | 40                   | 41.5  | dB               |
| $P_o$         | Output Power                     | THD = 10%; $V_S = 14.4V$<br>THD = 10%<br>THD = 1%<br>THD = 10%; $R_L = 2\Omega$<br>THD = 10%; $V_S = 14.4V$ ;<br>$R_L = 2\Omega$ | 17    | 22<br>19<br>16<br>25 |       | W<br>W<br>W<br>W |
| $P_{o\ max}$  | Max. Output Power                | EIAJ RULES                                                                                                                       |       | 30                   |       | W                |
| THD           | Distortion                       | $P_o = 4W$                                                                                                                       |       | 0.08                 | 0.3   | %                |
| $e_{No}$      | Output Noise                     | $Bw = 20Hz$ to $20KHz$                                                                                                           |       |                      | 0.5   | mVrms            |
| SVR           | Supply Voltage Rejection         | $f = 100Hz$ (stereo)                                                                                                             |       | 60                   |       | dB               |
| $f_L$         | Low Cut-Off Frequency            |                                                                                                                                  |       | 10                   |       | Hz               |
| $f_H$         | High Cut-Off Frequency           |                                                                                                                                  |       | 200                  |       | KHz              |
| $R_i$         | Input Impedance                  |                                                                                                                                  | 10    | 15                   | 20    | K $\Omega$       |
| $C_T$         | Cross Talk                       | $f = 1KHz$                                                                                                                       | 50    | 65                   |       | dB               |
| $I_{SB}$      | St-By Current Consumption        |                                                                                                                                  |       |                      | 100   | $\mu A$          |
| $V_{SB\ out}$ | St-By OUT Threshold Voltage      | Amp: ON                                                                                                                          | 3.5   |                      |       | V                |
| $V_{SB\ in}$  | St-By IN Threshold Voltage       | Amp: OFF                                                                                                                         |       |                      | 1.5   | V                |
| $V_{SB}$      | Supply Dependent St-By Threshold | St-By = H,<br>$V_S$ reducing/increasing                                                                                          |       | 7.5                  | 8.3   | V                |
| $A_M$         | Mute Attenuation                 | $V_O = 1Vrms$                                                                                                                    |       | 75                   |       | dB               |
| $V_{M\ out}$  | Mute OUT Threshold Voltage       | Amp: Play                                                                                                                        | 3.5   |                      |       | V                |
| $V_{M\ in}$   | Mute IN Threshold Voltage        | Amp: Mute                                                                                                                        |       |                      | 1.5   | V                |
| $V_M$         | Supply Dependent Mute Threshold  | Mute = IN,<br>$V_S$ reducing/increasing                                                                                          |       | 8.5                  | 9.3   | V                |
| $I_m (L)$     | Muting Pin Current               | $V_{MUTE} = 1.5V$<br>(Source Current)                                                                                            | 6     | 10                   | 14    | $\mu A$          |
| $I_m (H)$     | Muting Pin Current               | $V_{MUTE} = 3.5V$<br>(Source Current)                                                                                            | 6     | 10                   | 14    | $\mu A$          |

**Figure 1: Quiescent Current vs. Supply Voltage**



**Figure 2: Output Power vs. Supply Voltage**

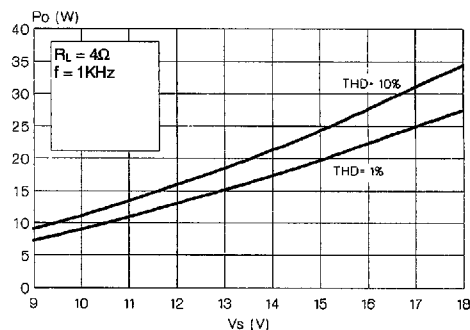


Figure 3: Output Power vs Supply Voltage

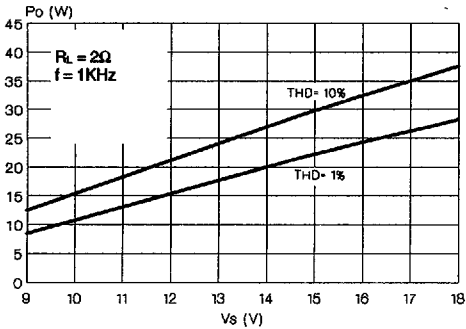


Figure 4: EIAJ Power vs. Supply Voltage

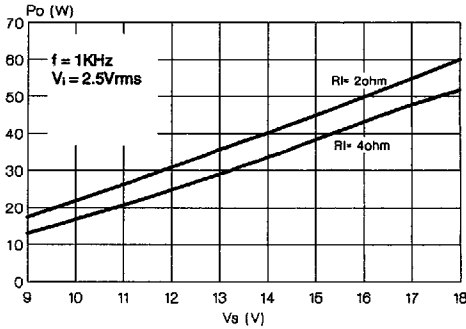


Figure 5: Cross-Talk vs. Frequency

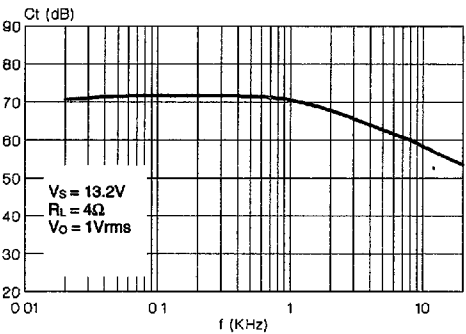


Figure 6: SVR vs. Frequency

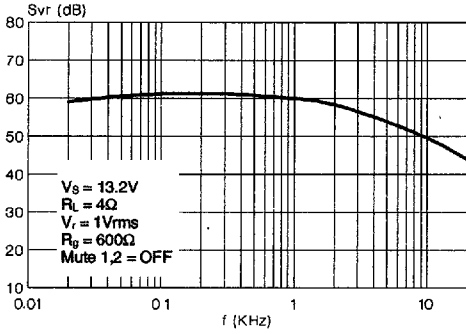


Figure 7: Distortion vs. Frequency

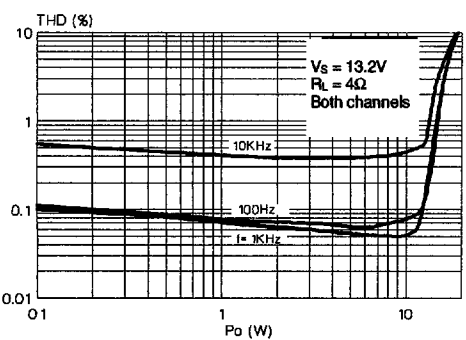


Figure 8: Distortion vs. Frequency

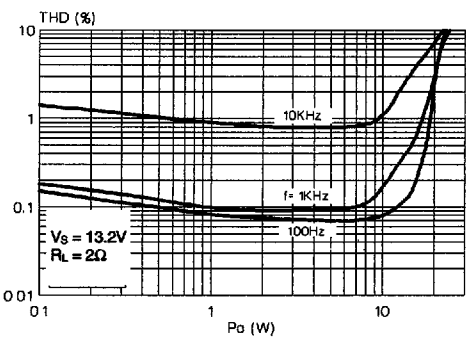


Figure 9: Block Diagram of Mute Circuit

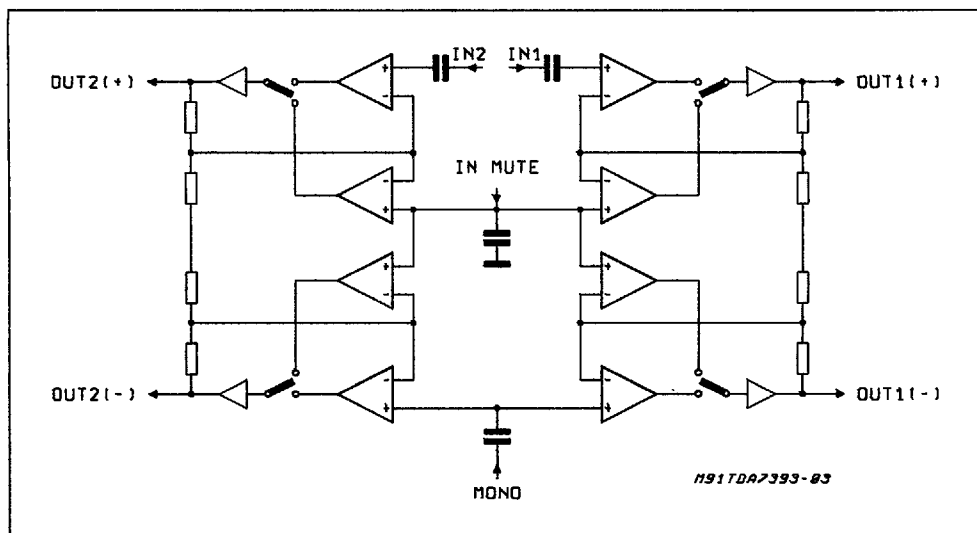


Figure 10: Explanatory Waveforms Of Mute Circuit

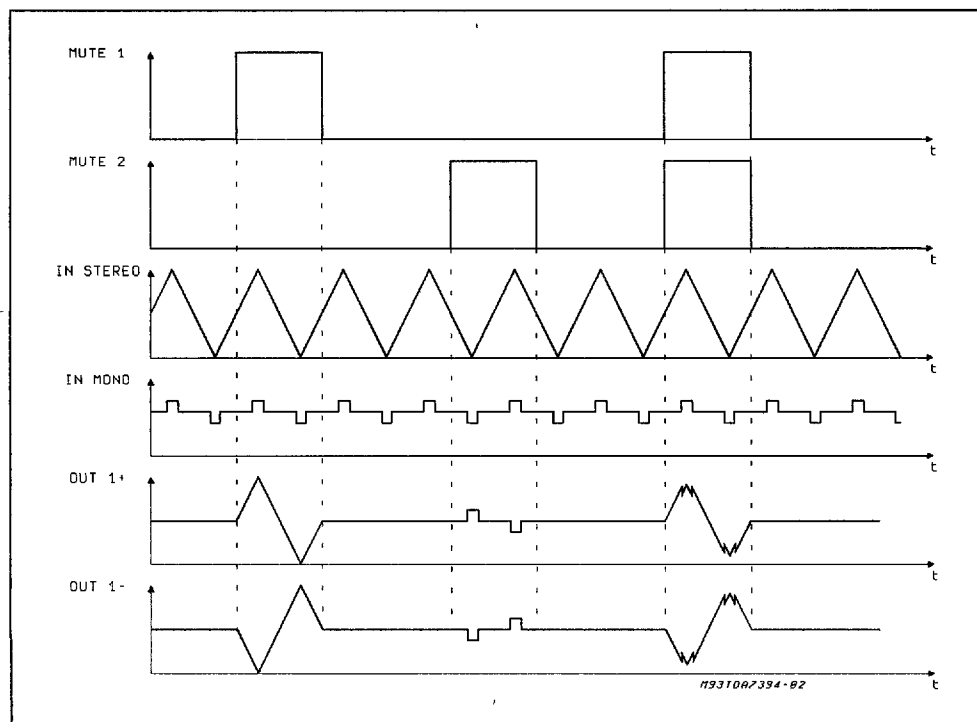


Figure 11: Application Circuit

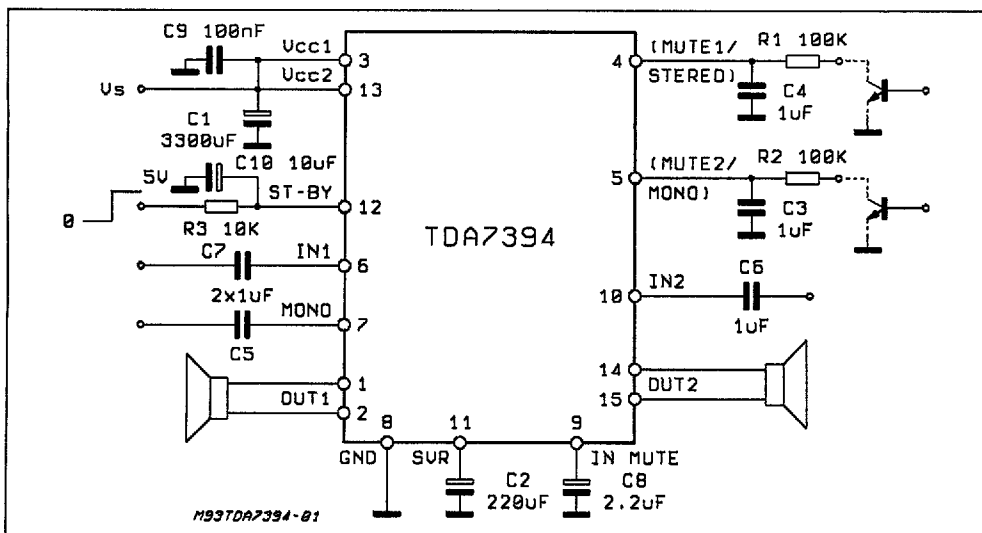


Figure 12: P.C. Board and Component Layout of the fig. 11 (1:1 scale)

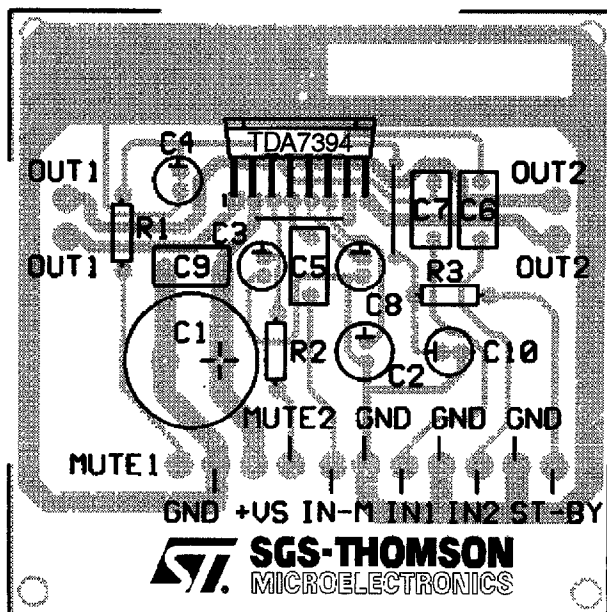
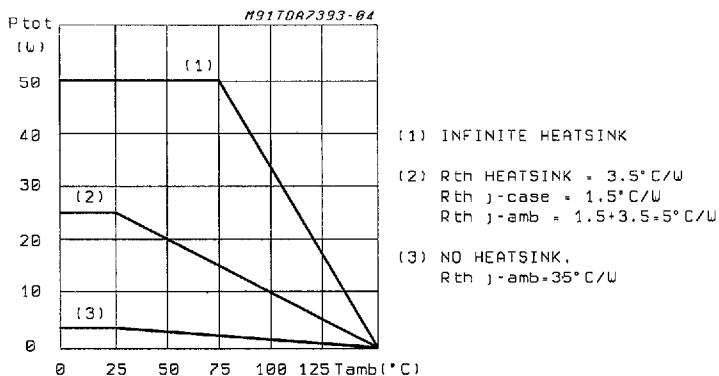


Figure 13: Power Dissipation Derating Curve



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