SGS-THOMSON MICROELECTRONICS

TDA7394

# 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 Vs
- VERY INDUCTIVE LOADS
- OVERRATING CHIP TEMPERATURE WITH SOFT THERMAL LIMITER
- LOAD DUMP VOLTAGE

MULTIWATT15

ORDERING NUMBER: TDA7394
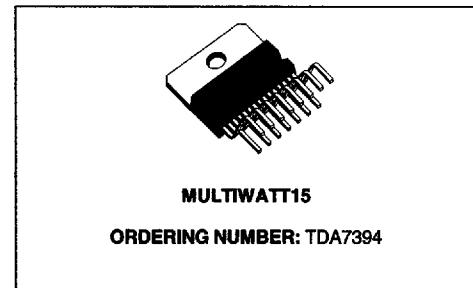
- FORTUITOUS OPEN GND
- REVERSE BATTERY
- ESD PROTECTION

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

7929237 0064838 900
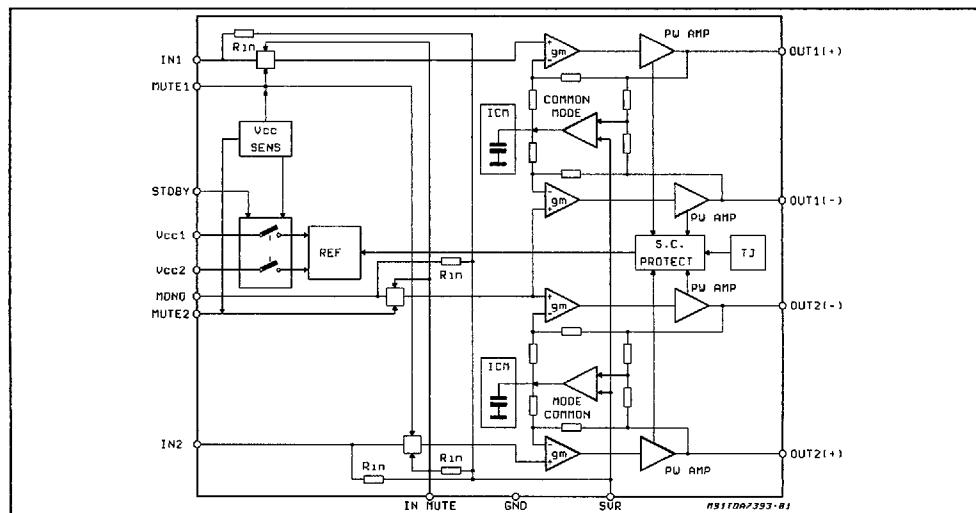
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Operating Supply Voltage	18	V
$V_{CC(DC)}$	DC Supply Voltage	28	V
$V_{CC(pk)}$	Peak Supply Voltage (t = 50ms)	50	V
I_O	Output Peak Current: Repetitive (Duty Cycle 10% at f = 10Hz) Non Repetitive (t = 100µs)	4.5 5.5	A A
P_{tot}	Power dissipation, Tcase = 75°C (see derating curve)	50	W
T_j	Junction Temperature	150	°C
T_{op}	Operating Ambient Temperature	− 40 to 85	°C
T_{stg}	Storage Temperature	− 55 to 150	°C

PIN CONNECTION (Top view)


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15    OUT2(+)
14    OUT2(-)
13    VCC2
12    STBY
11    SVR
10    IN2
 9    IN MUTE
 8    GND
 7    IN MONO
 6    IN1
 5    MUTE2
 4    MUTE1
 3    VCC1
 2    OUT1(-)
 1    OUT1(+)
```

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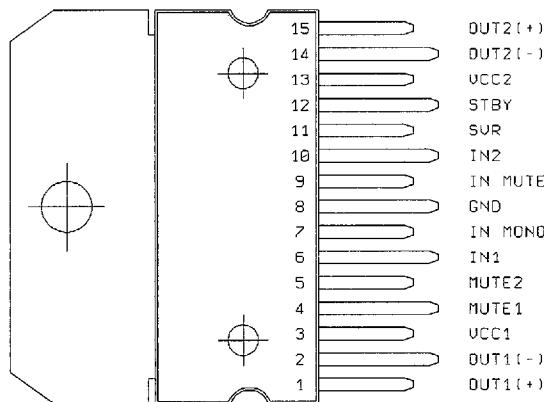
THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ j-case}$	Thermal Resistance Junction to Case	Max.	1.5	°C/W

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ELECTRICAL CHARACTERISTICS (V_S = 13.2V; f = 1KHz; R_g = 600Ω; R_L = 4Ω; T_{amb} = 25°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		22		W
		THD = 10%	17	19		W
		THD = 1%		16		W
		THD = 10%; R_L = 2Ω		25		W
		THD = 10%; V_S = 14.4V; R_L = 2Ω		28		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	KΩ
C_T	Cross Talk	f = 1KHz	50	65		dB
I_{SB}	St-By Current Consumption				100	μA
$V_{SB\ out}$	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, 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, V_S reducing/increasing		8.5	9.3	V
$I_{m\ (L)}$	Muting Pin Current	V_{MUTE} = 1.5V (Source Current)	6	10	14	μA
$I_{m\ (H)}$	Muting Pin Current	VMUTE = 3.5V (Source Current)	6	10	14	μA

Figure 1: Quiescent Current vs. Supply Voltage
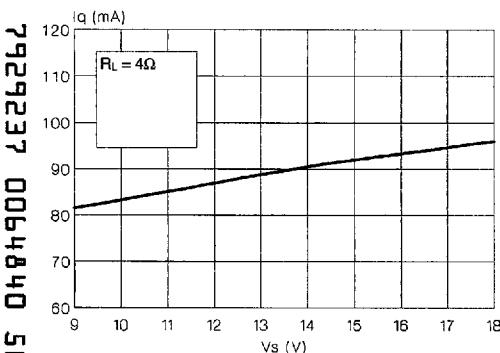
Figure 2: Output Power vs. Supply Voltage

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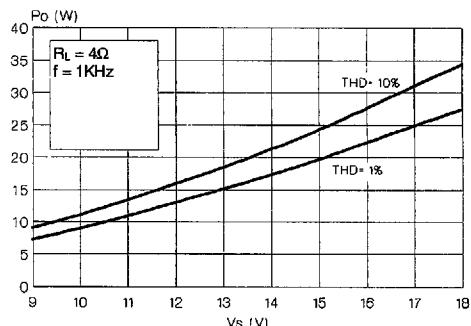
**Figure 3:** Output Power vs Supply Voltage
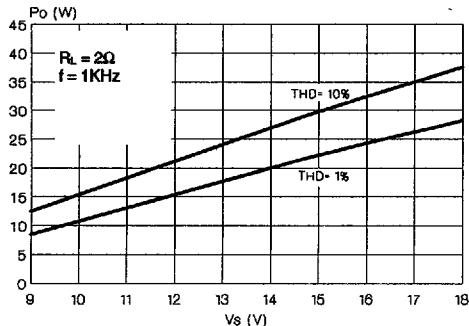
**Figure 4:** EIAJ Power vs. Supply Voltage
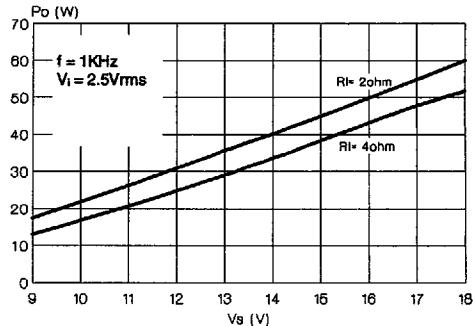

Figure 5: Cross-Talk vs. Frequency
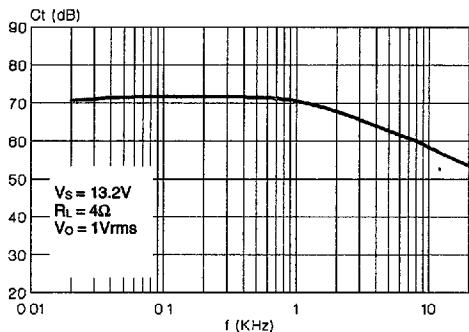
Figure 6: SVR vs. Frequency
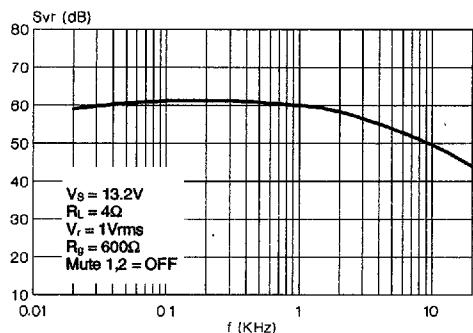
Figure 7: Distortion vs. Frequency
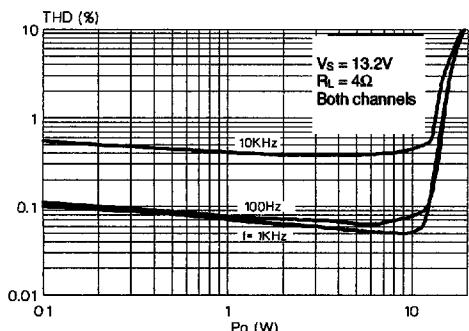
Figure 8: Distortion vs. Frequency

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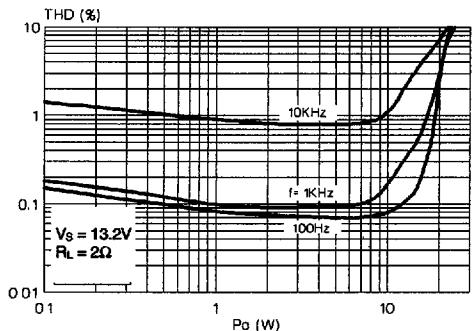
Figure 9: Block Diagram of Mute Circuit
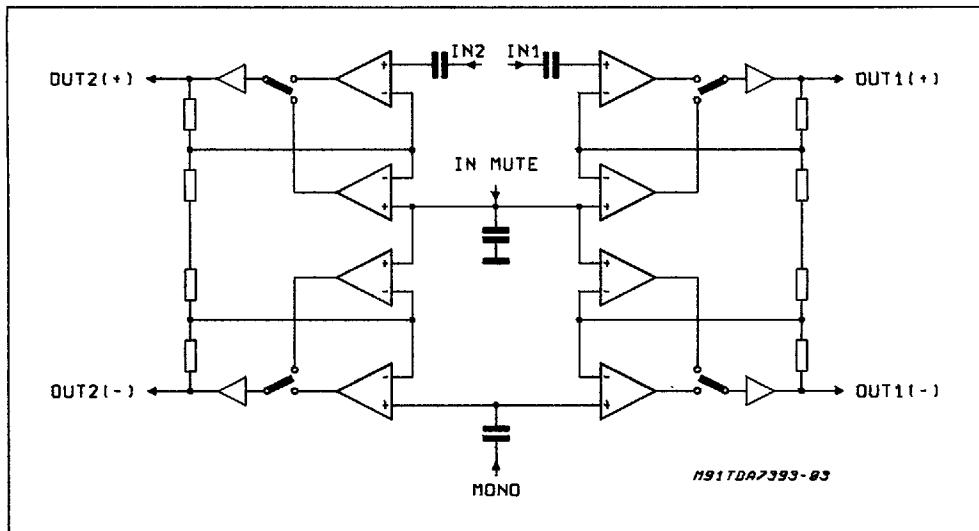
Figure 10: Explanatory Waveforms Of Mute Circuit

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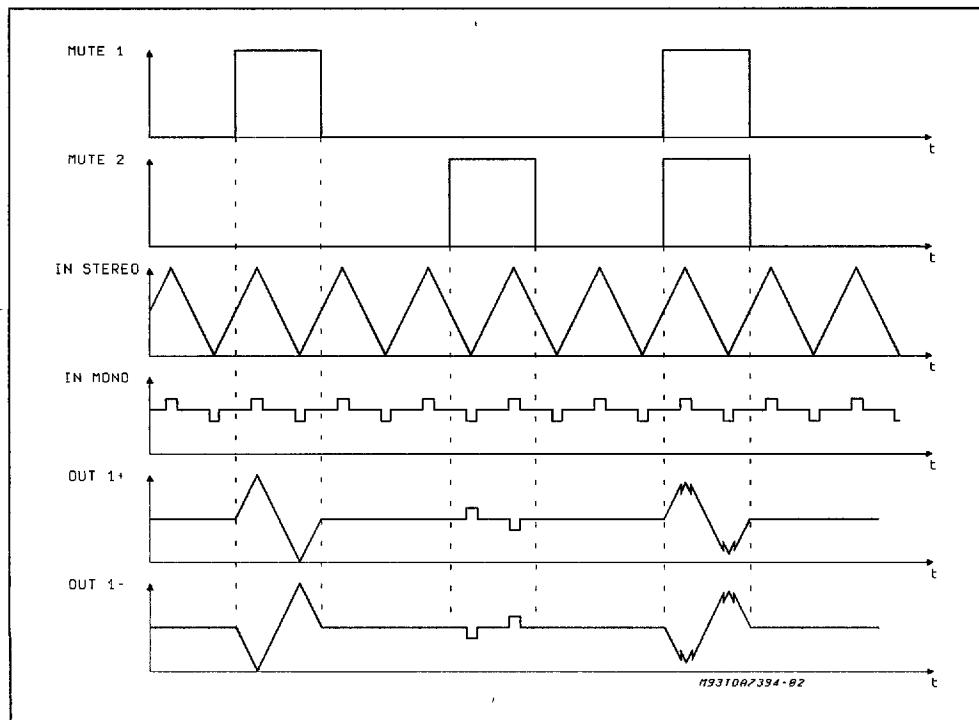
Figure 11: Application Circuit
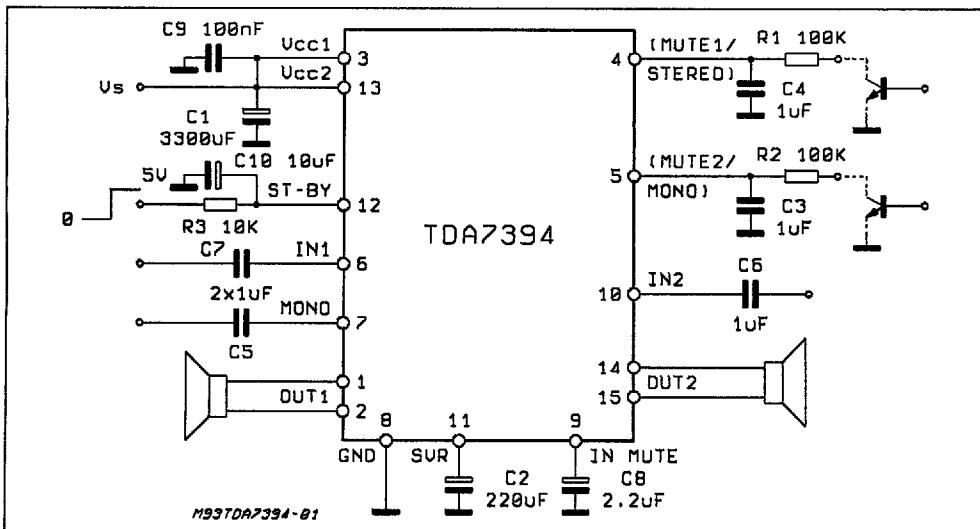
Figure 12: P.C. Board and Component Layout of the fig. 11 (1:1 scale)

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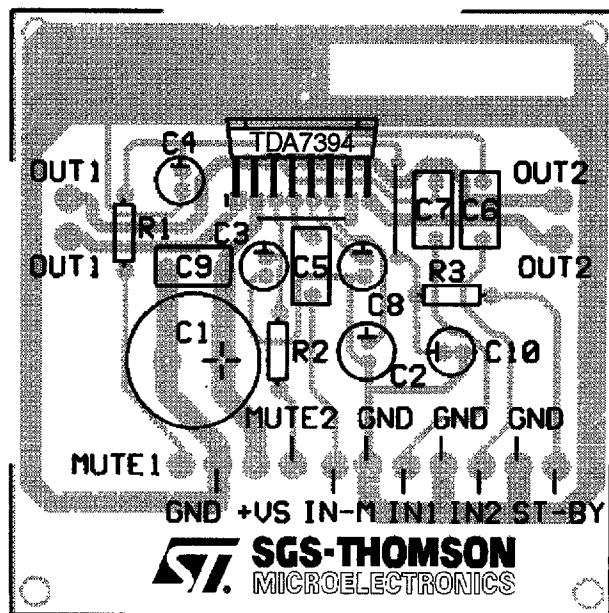
Figure 13: Power Dissipation Derating Curve