SGS-THOMSON MICROELECTRONICS

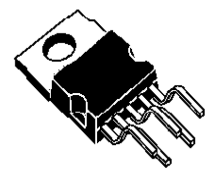
TDA2008

12W AUDIO AMPLIFIER (V_S = 22V, R_L = 4Ω)

DESCRIPTION

The TDA2008 is a mololithic class B audio power amplifier in Pentawatt package designed for driving low impedence loads (down to 3.2Ω). The divice provides a high output current capability (up to 3A), very low harmonic and crossover distortion.

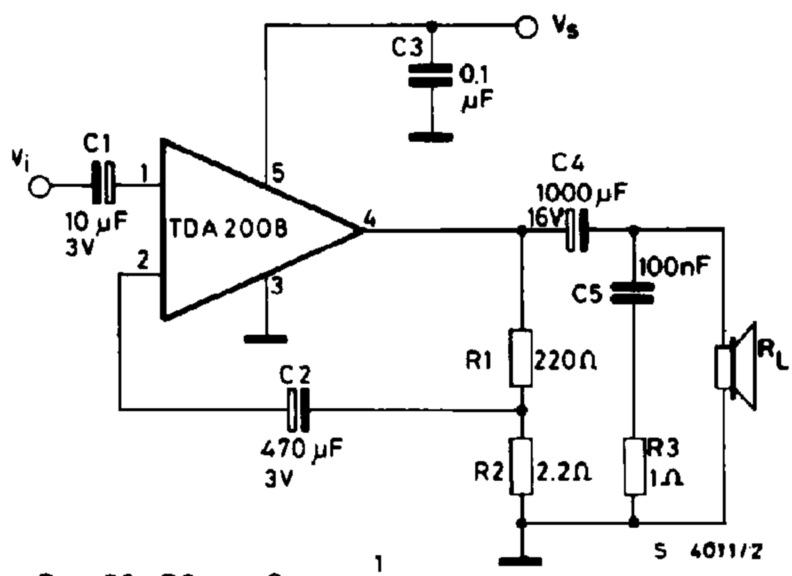
In addition, the device offers the following features:
- very low number of external components;
- assembly ease, due to Pentawatt power package with no electrical insulations requirements;
- space and cost saving;
- high reliability;
- flexibility in use;
- thermal protection.



Pentawatt

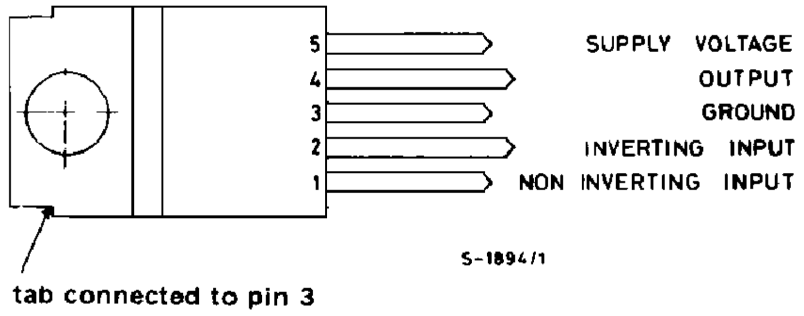
ORDERING NUMBER : TDA 2008V

TYPICAL APPLICATION CIRCUIT



$R_x = 20 \cdot R2$; $C_x = \frac{1}{2\pi BR1}$

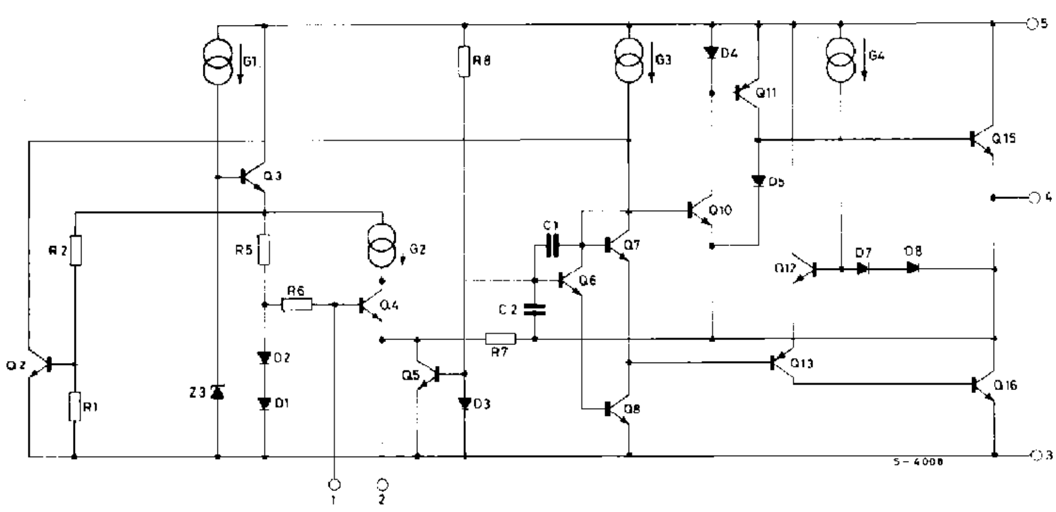
PIN CONNECTION (top view)



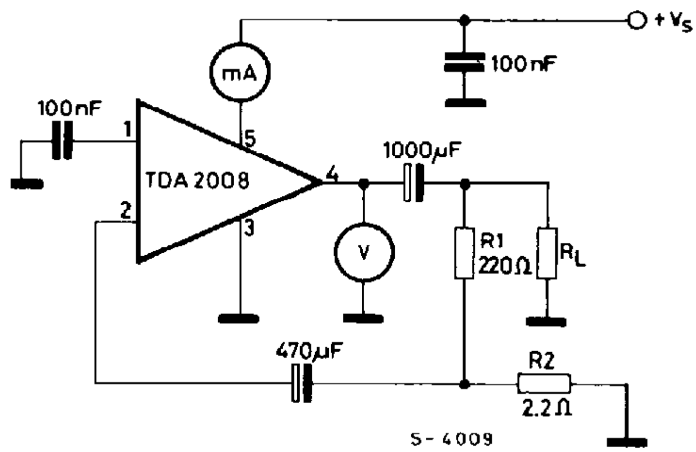
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_s	DC supply voltage	28	V
I_o	Output peak current (repetitive)	3	A
I_o	Output peak current (non repetitive)	4	A
P_{tot}	Power dissipation at T_{case} = 90°C	20	W
T_{stg}, T_j	Storage and junction temperature	- 40 to 150	°C

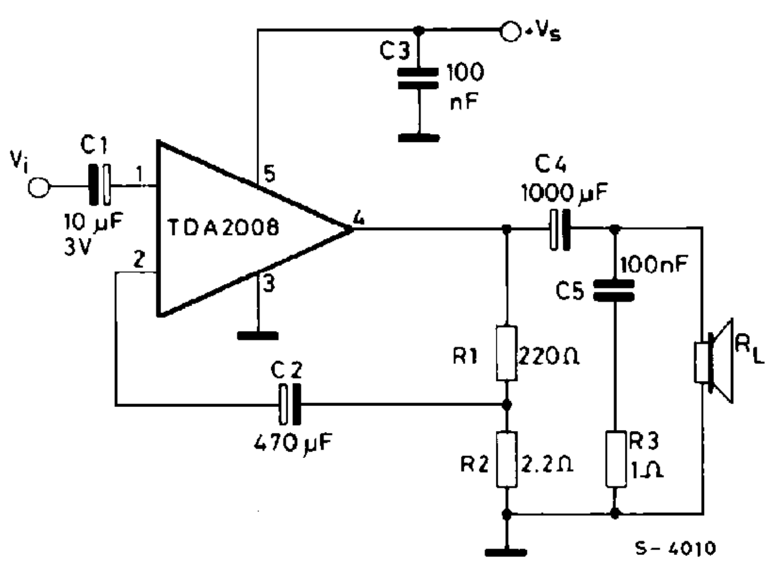
SCHEMATIC DIAGRAM



DC TEST CIRCUIT



AC TEST CIRCUIT



THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\text{-}j\text{-}case}$	Thermal resistance junction-case	max	3	°C/W

ELECTRICAL CHARACTERISTICS (Refer to the test circuit, V_s = 18V, T_{amb} = 25 °C unless otherwise specified)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
V_s	Supply voltage			10		28	V
V_o	Quiescent output voltage (pin 4)				10.5		V
I_d	Quiescent drain current (pin 5)				65	115	mA
P_o	Output power	d = 10%	R_L = 8Ω		8		W
		f = 1 KHz	R_L = 4Ω	10	12		W
V_i(RMS)	Input saturation voltage			300			mV
V_i	Input sensitivity	f = 1 KHz P_o = 0.5W P_o = 8W P_o = 0.5W P_o = 12W	 R_L = 8Ω R_L = 8Ω R_L = 4Ω R_L = 4Ω		 20 80 14 70		 mV mV mV mV
B	Frequency response (-3 dB)	P_o = 1W R_L = 4Ω		40 to 15,000			Hz
d	Distortion	f = 1 KHz P_o = 0.05 to 4W P_o = 0.05 to 6W	 R_L = 8Ω R_L = 4Ω		 0.12 0.12	 1 1	 % %
R_i	Input resistance (pin 1)	f = 1 KHz		70	150		KΩ
G_v	Voltage gain (open loop)	f = 1 KHz	R_L = 8Ω		80		dB
G_v	Voltage gain (closed loop)			39.5	40	40.5	dB
e_N	Input noise voltage	BW = 22Hz to 22 KHz			1	5	μV
i_N	Input noise current				60	200	pA
SVR	Supply voltage rejection	V_{ripple} = 0.5 R_g = 10KΩ R_L = 4Ω	f = 100 Hz	30	36		dB

APPLICATION INFORMATION

Figure 1. Typical application circuit

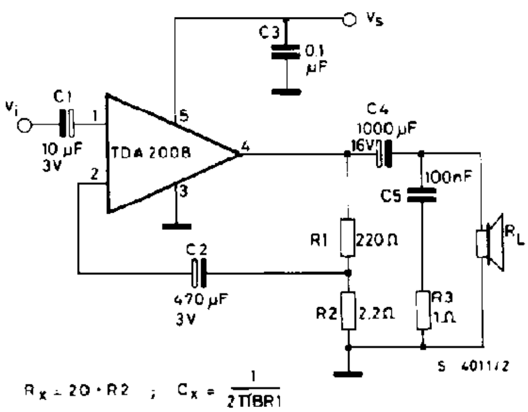


Figure 2. P.C. board and component layout for the circuit of fig. 1 (1:1 scale)

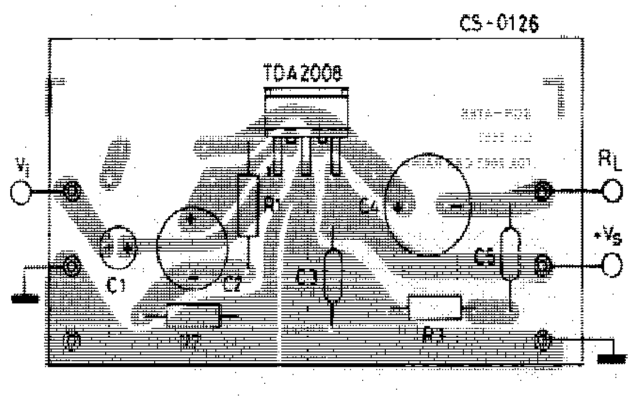


Figure 3. 25W bridge configuration applica- tion circuit (°)

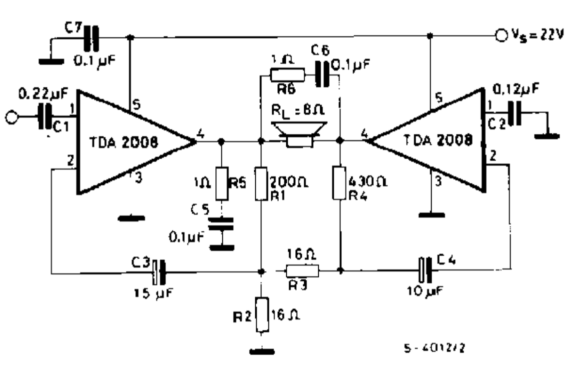
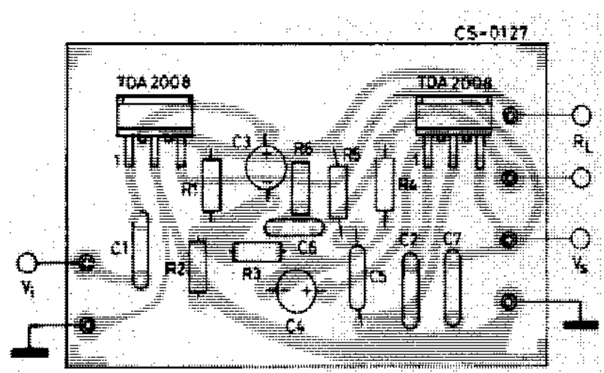


Figure 4. P.C. board and component layout for the circuit of fig. 3 (1:1 scale)



(°) The value of the capacitorr C3 and C4 are different to optimize the SVR (Typ. = 40 dB)

Figure 5. Quiescent current vs. supply voltage

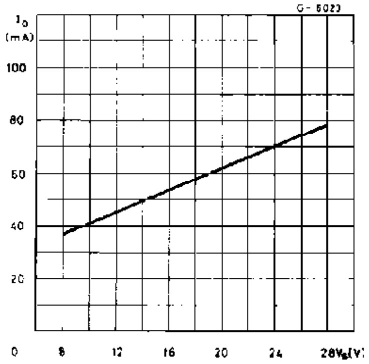


Figure 6. Output voltage vs. supply voltage

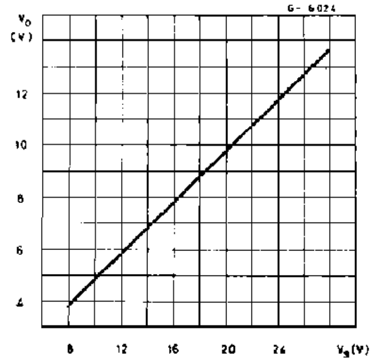


Figure 7. Output power vs. supply voltage

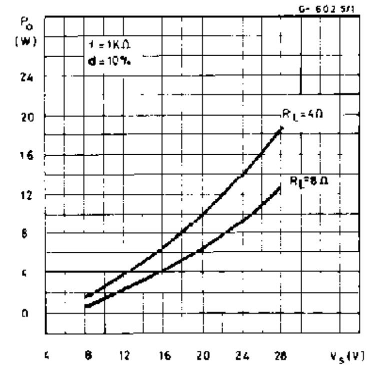


Figure 8. Distortion vs. frequency

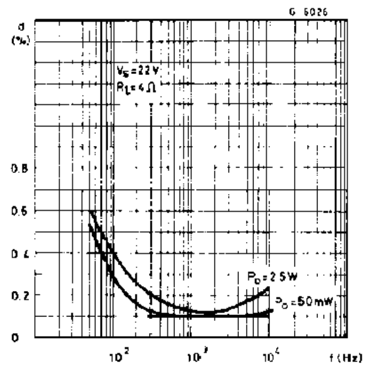


Figure 9. Supply voltage rejection vs. frequency

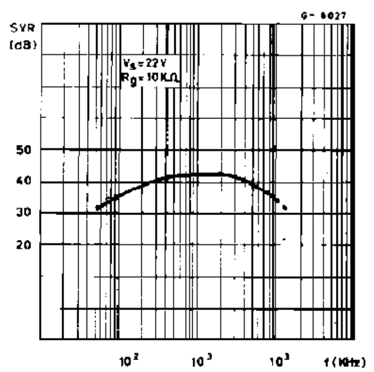
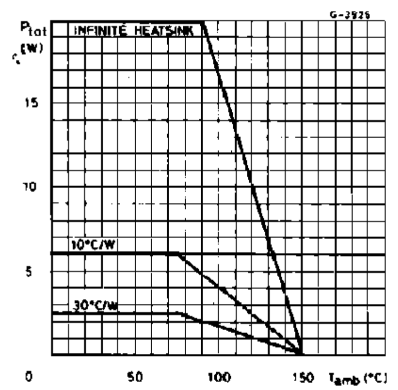


Figure 10. Maximum al- lowable power dissipation vs. ambient temperature



PRACTICAL CONSIDERATIONS

Printed circuit board

The layout shown in Fig. 2 is recommended. If different layouts are used, the ground points of input 1 and input 2 must be well decoupled from the ground of the output through which a rather high current flows.

Assembly suggestion

No electrical insulation is needed between the package and the heat-sink. Pin length should be as short as possible. The soldering temperature must not exceed 260°C for 12 seconds.

Application suggestions

The recommended component values are those shown in the application circuits of Fig. 1. Different values can be used. The following table is intended to aid the car-radio designer.

Component	Recommended value	Purpose	Larger than recommended value	Smaller than recommended value
C1	2.2µF	Input DC decoupling		Noise at switch-on, switch-off
C2	470µF	Ripple rejection.		Degradation of SVR.
C3	0.1µF	Supply by passing.		Danger of oscillation.
C4	1000µF	Output coupling.		Higher low frequency cutoff.
C5	0.1µF	Frequency stability.		Danger of oscillation at high frequencies with inductive loads.
R1	$(G_v - 1) \bullet R2$	Setting of gain. (*)		Increase of drain current.
R2	2.2Ω	Setting of gain and SVR.	Degradation of SVR.	
R3	1Ω	Frequency stability.	Danger of oscillation at high frequencies with inductive loads.	

(*) The closed loop gain must be higher than 26dB.

PENTAWATT PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			4.8			0.189
C			1.37			0.054
D	2.4		2.8	0.094		0.110
D1	1.2		1.35	0.047		0.053
E	0.35		0.55	0.014		0.022
F	0.8		1.05	0.031		0.041
F1	1		1.4	0.039		0.055
G		3.4		0.126	0.134	0.142
G1		6.8		0.260	0.268	0.276
H2			10.4			0.409
H3	10.05		10.4	0.396		0.409
L		17.85			0.703	
L1		15.75			0.620	
L2		21.4			0.843	
L3		22.5			0.886	
L5	2.6		3	0.102		0.118
L6	15.1		15.8	0.594		0.622
L7	6		6.6	0.236		0.260
M		4.5			0.177	
M1		4			0.157	
Dia	3.65		3.85	0.144		0.152