SGS-THOMSON MICROELECTRONICS

TDA7240A

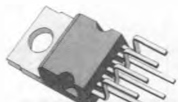
20W BRIDGE AMPLIFIER FOR CAR RADIO

PRELIMINARY DATA

- COMPACT HEPTAWATT PACKAGE
- FEW EXTERNAL COMPONENTS
- OUTPUT PROTECTED AGAINST SHORT CIRCUITS TO GROUND AND ACROSS LOAD
- DUMP TRANSIENT
- THERMAL SHUTDOWN
- LOUDSPEAKER PROTECTION
- HIGH CURRENT CAPABILITY
- LOW DISTORTION / LOW NOISE

The TDA7240A is a 20W bridge audio amplifier IC designed specially for car radio applications. Thanks to the low external part count and compact Heptawatt 7-pin power package the TDA7240A occupies little space on the printed circuit board.

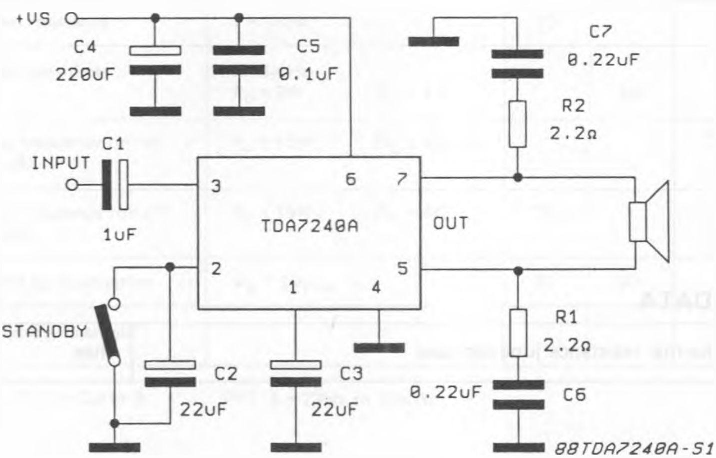
Reliable operation is guaranteed by a comprehensive array of on-chip protection features. These include protection against AC and DC output short circuits (to ground and across the load), load dump transients, and junction overtemperature. Additionally, the TDA7240A protects the loudspeaker when one output is short-circuited to ground.



Heptawatt

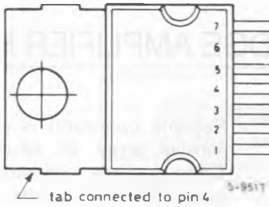
ORDERING NUMBERS: TDA 7240AH
TDA 7240AV

TYPICAL APPLICATION CIRCUIT



CONNECTION DIAGRAM

(Top view)



ABSOLUTE MAXIMUM RATINGS

V_s	Operating supply voltage	18	V
V_s	DC supply voltage	28	V
V_s	Peak supply voltage (for 50ms)	40	V
I_o (*)	Peak output current (non repetitive $t = 0.1ms$)	4.5	A
I_o (*)	Peak output current (repetitive $f \geq 10Hz$)	3.5	A
P_{tot}	Power dissipation at $T_{case} = 70°C$	20	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

(*) Internally limited

THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal resistance junction-case	max	4	°C/W

ELECTRICAL CHARACTERISTICS (Refer to the circuit of Fig. 1, $T_{amb} = 25°C$, R_{th} (heatsink) $= 4°C/W$, $V_s = 14.4V$)

	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_s	Supply voltage					18	V
V_{os}	Output offset voltage					150	mV
I_d	Total quiescent current	$R_L = 4\Omega$			65	120	mA
P_o	Output power	f = 1KHz	$R_L = 4\Omega$	18	20		W
		d = 10%	$R_L = 8\Omega$	10	12		W
d	Distortion	$R_L = 4\Omega$ P_o = 50mW to 12W	f = 1KHz		0.1	0.5	%
		$R_L = 8\Omega$ P_o = 50mW to 6W	f = 1KHz		0.05	0.5	%
G_v	Voltage gain	f = 1KHz		39.5	40	40.5	dB
SVR	Supply voltage rejection	f = 100Hz	Rg = 10KΩ	35	40		dB
E_n	Total input noise	(*)	R_s = 10KΩ		2	4	µV
		(**)	R_s = 10KΩ		3		µV
η	Efficiency	$R_L = 4\Omega$ P_o = 20W	f = 1KHz		65		%
I_{sb}	Stand-by current				200		µA
R_i	Input resistance	f = 1KHz		70			KΩ
V_i	Input sensitivity	f = 1KHz P_o = 2W	$R_L = 4\Omega$		28		mV
f_L	Low frequency roll off (-3dB)	P_o = 15W	$R_L = 4\Omega$			30	Hz
f_H	High frequency roll off (-3dB)	P_o = 15W	$R_L = 4\Omega$	25			KHz
A_s	Stand-by attenuation	$V_o = 2V_{rms}$		70	90		dB
V_{TH} (pin 2)	Stand-by threshold					1	V

Bandwidth (*) B = Curve A (**) B = 22Hz to 22KHz

Fig. 1 - Test and application circuit

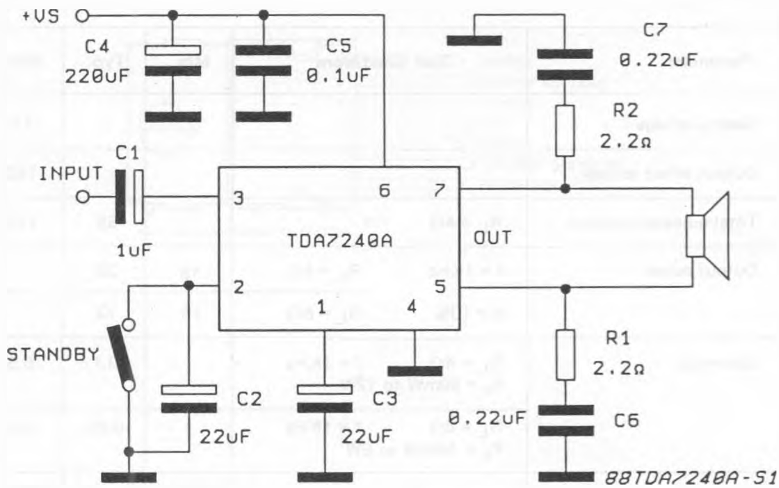
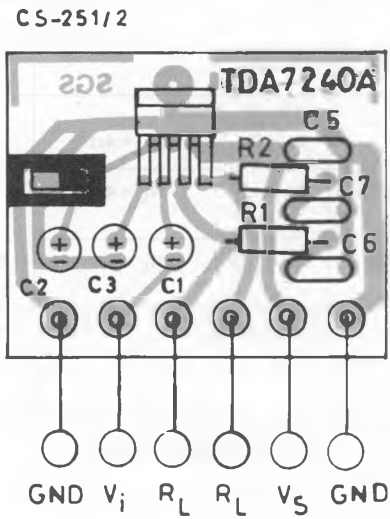


Fig. 2 - P.C. board and components layout of the circuit of Fig. 1 (1 : 1 scale)



APPLICATION SUGGESTION

The recommended values of the components are those shown on application circuit of Fig. 1. Different values can be used, the following table can help the designer.

Component	Recommended Value	Purpose	Larger than	Smaller than
R1, R2	2.2 Ω	Frequency stability.	Danger of high frequency oscillation.	
C1	1µF	Input DC decoupling.	Higher turn 'ON' and stand-by delay.	Higher turn 'ON' pop. Higher low frequency cutoff.
C2	22µF	Ripple rejection.	Increase of SVR. Increase of the turn 'ON' delay.	Degradation of SVR.
C3	22µF	Feedback low frequency cutoff		Higher low frequency cutoff
C6, C7	0.22µF	Frequency stability.		Danger of oscillation.
C4	220µF	Supply filter.		Danger of oscillation.
C5	0.1µF	Supply by pass.		Danger of oscillation.

Fig. 3 - Output power vs. supply voltage

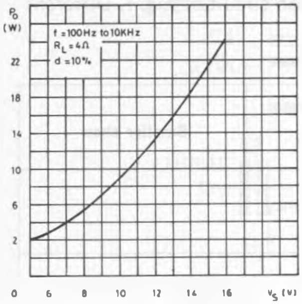


Fig. 4 - Distortion vs. output power

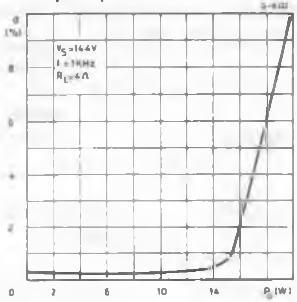


Fig. 5 - Output power vs. supply voltage

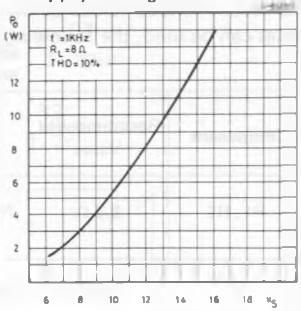


Fig. 6 - Distortion vs. output power

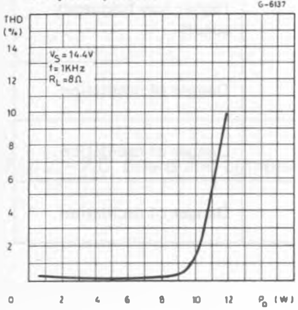


Fig. 7 - Distortion vs. frequency

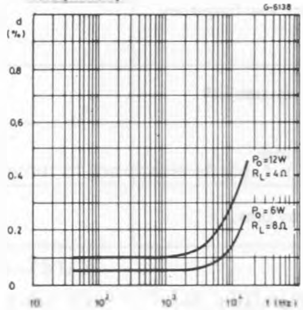


Fig. 8 - Supply voltage rejection vs. frequency

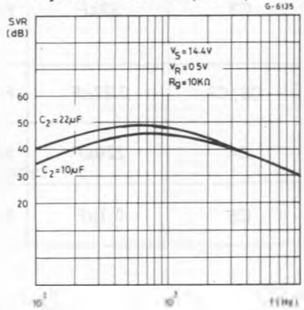


Fig. 9 - Output offset voltage vs. supply voltage

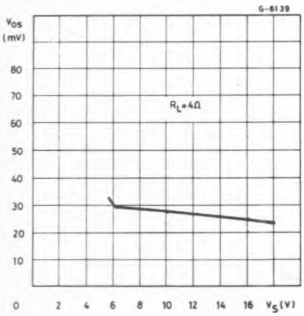


Fig. 10 - Power dissipation and efficiency vs. output power

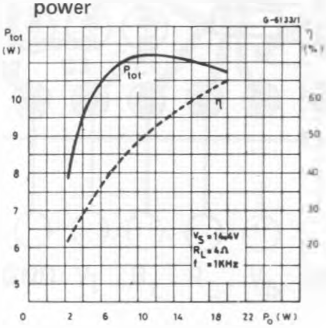
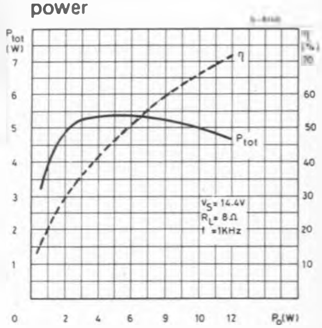


Fig. 11 - Power dissipation and efficiency vs. output power



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