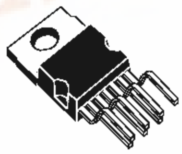
SGS-THOMSON MICROELECTRONICS

TDA7241B

20W BRIDGE AMPLIFIER FOR CAR RADIO

- VERY LOW STAND-BY CURRENT
- GAIN = 32dB
- OUTPUT PROTECTED AGAINST SHORT CIRCUITS TO GROUND AND ACROSS LOAD
- COMPACT HEPTAWATT PACKAGE
- DUMP TRANSIENT
- THERMAL SHUTDOWN
- LOUDSPEAKER PROTECTION
- HIGH CURRENT CAPABILITY
- LOW DISTORTION / LOW NOISE



Heptawatt

ORDERING NUMBER: TDA7241BH

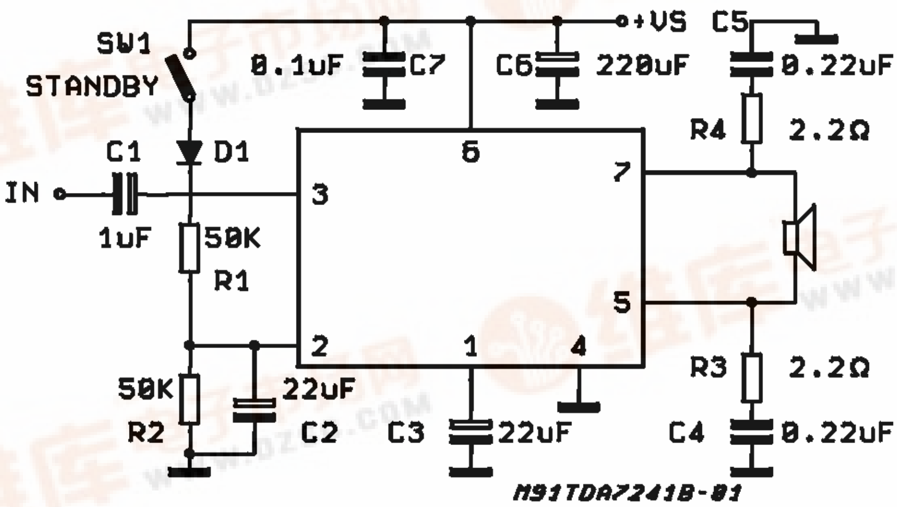
DESCRIPTION

The TDA7241B 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 TDA7241B occupies little space on the printed circuit board.

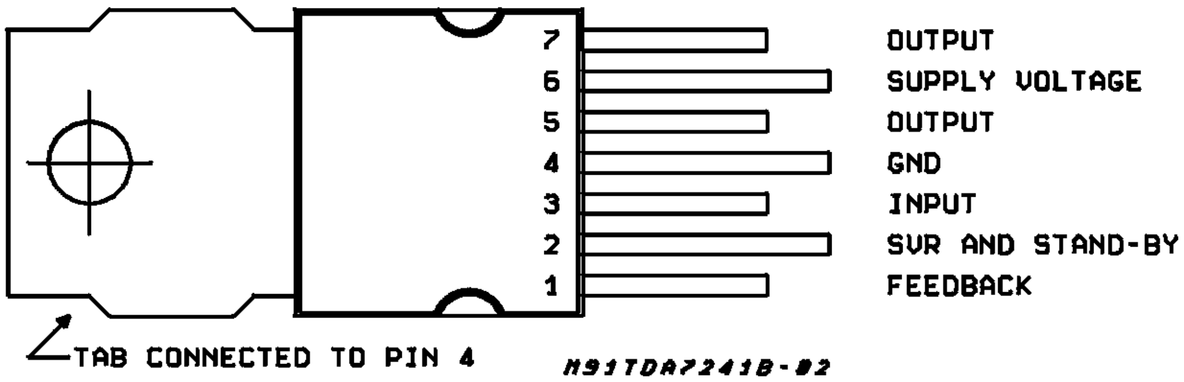
Reliable operation is guaranteed by a comprehensive array of on-chip protection features.

These include protection against AC and DC output short circuits (to ground and across the load), load dump transients, and junction overtemperature. Additionally, the TDA7241B protects the loudspeaker when one output is short-circuited to ground.

Figure 1: Test and Appliication Circuit



PIN CONNECTION (Top view)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	Operating Supply Voltage	18	V
V_S	DC Supply Voltage	28	V
V_S	Peak Supply Voltage (t = 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} = 85°C	16	W
T_{stg}, T_j	Storage and Junction Temperature	-40 to 150	°C

THERMAL DATA

Symbol	Description		Value	Unit
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	4	°C/W

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_S	Supply Range				18	V
I_d	Total Quiescent Current	R_L = 4Ω			80	mA
V_{OS}	Output Offset Voltage				100	mV
P_O	Output Power	f = 1KHz d = 10% R_L = 2Ω R_L = 4Ω R_L = 8Ω	18	26 20 12		W
d	Distortion	R_L = 4Ω f = 1KHz P_O = 50mW to 12W		0.1	0.5	%
		R_L = 8Ω f = 1KHz P_O = 50mW to 6W		0.05		%
G_V	Voltage Gain	f = 1KHz	31	32	33	dB
SVR	Supply Voltage Rejection	f =100Hz R_g = 10KΩ	40	50		dB
E_n	Total Input Noise	B = Curve A R_g = 10KΩ		2		µV
		B = 22Hz to 22KHz R_S = 10KΩ		3	10	mV
η	Efficiency	R_L = 4Ω f = 1KHz P_O = 20W		65		%
I_{sb}	Stand-by Current				100	µA
R_i	Input Resistance	f = 1KHz	70			KΩ
V_i	Input Sensitivity	f = 1KHz P_O = 2W R_L = 4Ω		70		mV
f_L	Low Frequency Roll Off (-3dB)	P_O = 15W R_L = 4Ω		30		Hz
f_H	High Frequency Roll Off (-3dB)	PO = 15W R_L = 4Ω	25			KHz
A_S	Stand-by Attenuation	V_O = 2Vrms	70	90		dB
V_{TH}(pin.2)	Stand-by Threshold				1	V
T_{sd}	Thermal Shutdown Junction Temp.			150		°C

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

Figure 2: P.C. Board and Component Layout of the Circuit of Fig. 1 (1:1 scale).

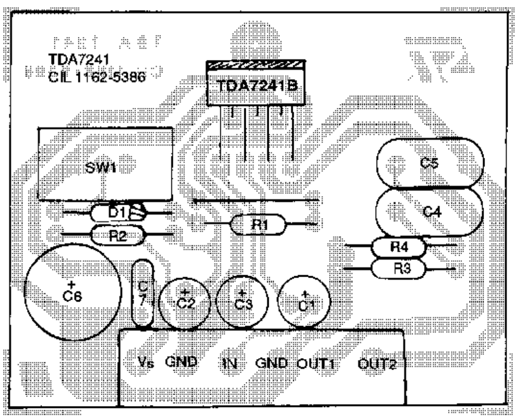


Figure 3: Output Power vs. Supply Voltage

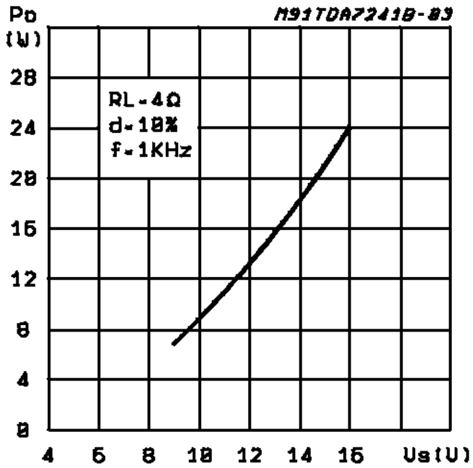


Figure 4: Output Power vs. Supply Voltage

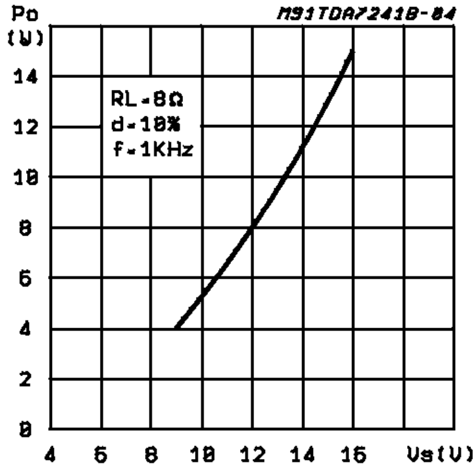


Figure 5: Distortion vs. Output Power

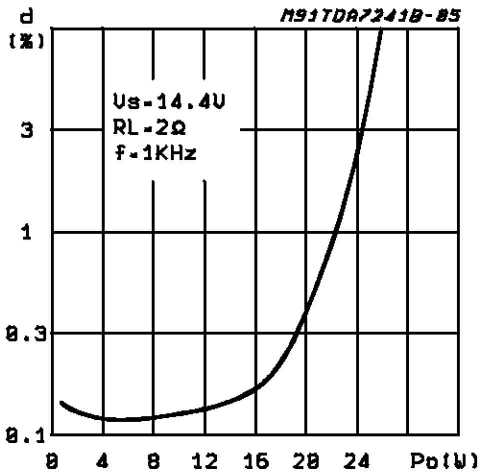


Figure 6: Distortion vs. Output Power

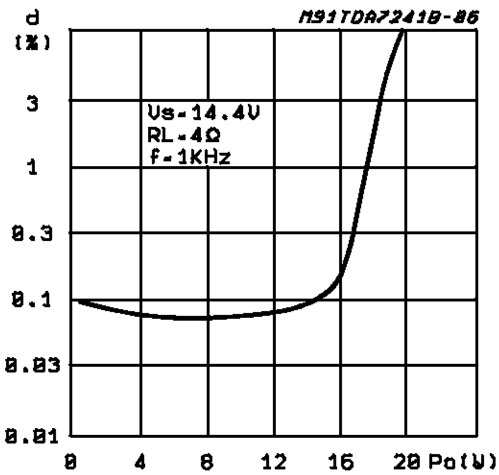


Figure 7: Distortion vs. Output Power

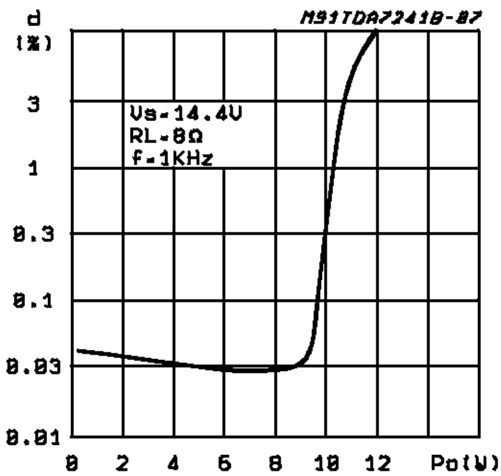


Figure 8: SVR vs. Frequency

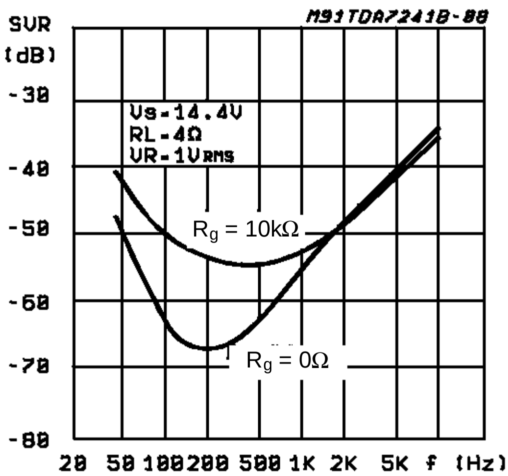


Figure 9: Power Dissipation and Efficiency vs. Output Power

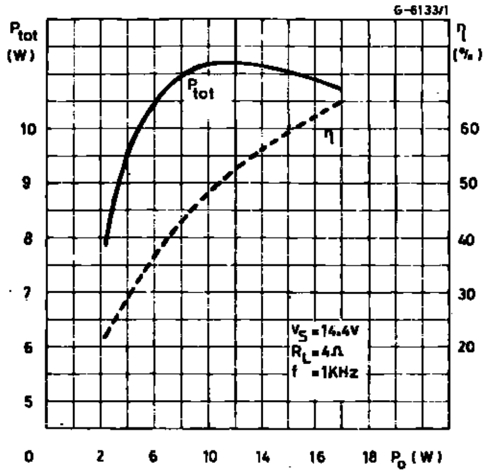
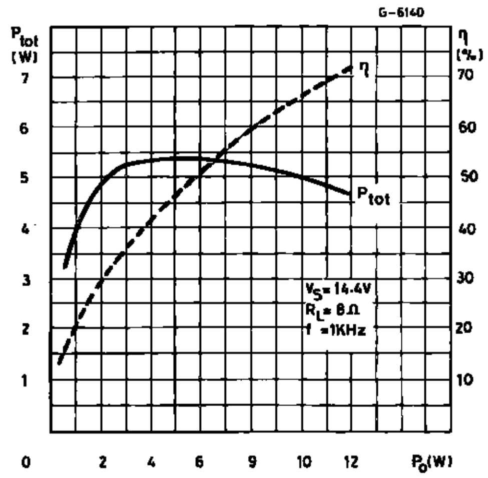


Figure 10: Power Dissipation and Efficiency vs. Output Power



HEPTAWATT 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	0.6		0.8	0.024		0.031
F1			0.9			0.035
G	2.41	2.54	2.67	0.095	0.100	0.105
G1	4.91	5.08	5.21	0.193	0.200	0.205
G2	7.49	7.62	7.8	0.295	0.300	0.307
H2			10.4			0.409
H3	10.05		10.4	0.396		0.409
L		16.97			0.668	
L1		14.92			0.587	
L2		21.54			0.848	
L3		22.62			0.891	
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		2.8			0.110	
M1		5.08			0.200	
Dia	3.65		3.85	0.144		0.152