

TDA7382

4 x 22W FOUR BRIDGE CHANNELS CAR RADIO AMPLIFIER

- HIGH OUTPUT POWER CAPABILITY: 4 x 30W max./4Ω EIAJ
 4 x 22W/4Ω @ 14.4V, 1KHz, 10%
 4 x 18.5W/4Ω @ 13.2V, 1KHz, 10%
- CLIPPING DETECTOR (THD = 10%)
- LOW DISTORTION
- LOW OUTPUT NOISE
- ST-BY FUNCTION
- MUTE FUNCTION
- AUTOMUTE AT MIN. SUPPLY VOLTAGE DE-TECTION
- LOW EXTERNAL COMPONENT COUNT:
 INTERNALLY FIXED GAIN (26dB)
 - NO EXTERNAL COMPENSATION
 NO BOOTSTRAP CAPACITORS

BLOCK AND APP'.IC ATION DIAGRAM

- NO BOOTSTRAP CAPACI

PROTECTIONS:

- OUTPUT SHORT CIRCUIT TO GND, TO V_S, ACROSS THE LOAD
- VERY INDUCTIVE LOADS
- OVERRATING CHIP TEMPERATUFF V/ITH SOFT THERMAL LIMITER
- LOAD DUMP VOLTAGE
- FORTUITOUS OPEN GND

FLEXIWATT25 ORDERING NUMPER: IDA7382

- REVERSED BAITERY
- ESD PROTECTION

DESCRICTION

The TDA7382 is a new technology class AB Audio Power Amplifier in Flexiwatt 25 package designed for high end car radio applications. Thanks to the fully complementary PNP/NPN output configuration the TDA7382 allows a rail to rail output voltage swing with no need of bootstrap capactors. The extremely reduced components ount allows very compact sets. The on-board clipping detector simplifies gain compression operations.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
Vcc	Operating Supply Voltage	18	V
V _{CC (DC)}	DC Supply Voltage	28	V
V _{CC (pk)}	Peak Supply Voltage (t = 50ms)	50	V
lo	Output Peak Current: Repetitive (Duty Cycle 10% at $f = 10Hz$) Non Repetitive (t = 100 μ s)	4.5 5.5	A A
P _{tot}	Power dissipation, ($T_{case} = 70^{\circ}C$)	80	W
Tj	Junction Temperature	150	°C
T _{stg}	Storage Temperature	– 55 to 150	°C

PIN CONNECTION (Top view)



THERMAL DATA

Symbol	Parameter	Value	Unit
R _{th j} -case	Thermal Resistance Junction to Case Max	. 1	°C/W

Symbol	Parameter	Test Condition	Min.	Тур.	Max.	Unit
I _{q1}	Quiescent Current		85	180	300	mA
V _{OS}	Output Offset Voltage				100	mV
Gv	Voltage Gain		25	26	27	dB
Po	Output Power	THD = 10% THD = 1%	20 16.5	22 18		W W
		THD = 10%; V_{S} = 13.5V	17	20		W
		THD = 10%; V _S = 14V	19	21		W
		THD = 5%; $V_{S} = 14V$	17	19		W
		1HD = 1%; V _S = 14V	16	17	10	·/V
		THD = 10%; V_{S} = 13.2V	17	18.5	11	w
		THD = 1%; V _S = 13.2V	14	15		W
P _{o max}	Max. Output Power	EIAJ RULES	27.5	<u> </u>		W
THD	Distortion	$P_0 = 4W$		1.04	0.3	%
e _{No}	Output Noise	"A" Weighted Bw = 20Hz to 20KHz	X	50 65	120 150	μV μV
SVR	Supply Voltage Rejection	f = 100Hz	50	65		dB
f _{cl}	Low Cut-Off Frequency			20		Hz
f _{ch}	High Cut-Off Frequency	cO'	75			KHz
Ri	Input Impedance	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	60	100	130	KΩ
CT	Cross Talk	f = 1KH z	50	70		dB
I _{SB}	St-By Current Consumption	St-Bv = LOW		20	50	μA
V _{SB out}	St-By OUT Threshold Voltage	(/`mp: ON)	3.5			V
V _{SB IN}	St-By IN Threshold Voltage	(Amp: OFF)			1.5	V
A _M	Mute Attenuation	V _O = 1Vrms	80	90		dB
V _{M out}	Mute OUT Thresho's Voitage	(Amp: Play)	3.5			V
V _{M in}	Mute IN Threenc'd'Voltage	(Amp: Mute)			1.5	V
I _{m (L)}	Muting Pir. Current	V _{MUTE} = 1.5V (Source Current)	5	13	16	μΑ
	C is ging Detection THD Level		5	10	15	%

ELECTRICAL CHARACTERISTICS (V_S = 14.4V; f = 1KHz; R_g = 600 Ω ; R_L = 4 Ω ; T_{amb} = 25°C; Refer to the Test and application circuit (fig.1), unless otherwise specified.)

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TDA7382



Figure 1: Standard Test and Application Circuit

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Figure 2: P.C.B. and component layout of the figure 1 (1:1 scale)



Figure 3: Quiescent Current vs. Supply Voltage





Figure 5: Output Power vs. Supply Voltage







Figure 6: Distortion vs. Output Power



Figure 8: Supply Voltage Rejection vs. Frequency by varying C6



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Figure 9: Output Noise vs. Source Resistance





INPUT STAGE

The TDA7382'S inputs are ground-compatible and can stand very high input signals (± 8Vpk) without any performances degradation.

If the standard value for the input capacitors (0.1µF) is adopted, the low frequency cut-off will amount to 16 Hz.

STAND-BY AND MUTING

STAND-BY and MUTING facilities are both CMOS-COMPATIBLE. If unuced, a straight connection to Vs of their respective pins would be admissible. Conventional (cw-power transistors can be employed to drive nuting and stand-by pins in





audible transient noises. Since a DC current of about 10 uA normally flows cut of pin 22, the maximum allowable muting-series resistance (R_2) is 70K Ω , which is sufficiently high to permit a muting capacitor reasonably small (about 1µF).

If R₂ is higher than recommended, the involved risk will be that the voltage at pin 22 may rise to above the 1.5 V threshold voltage and the device will consequently fail to turn OFF when the mute line is brought down.

About the stand-by, the time constant to be as-



signed in order to obtain a virtually pop-free transition has to be slower than 2.5V/ms.

CLIPPING DETECTOR

The **CLIPPING DETECTOR** acts in a way to output a signal as soon as one or more outputs reach or trespass a typical THD level of 10%.

As a result, the clipping-related signal at pin 25 takes the form of pulses, which are syncronized with each single clipping event in the music program. Applications making use of this facility usually operate a filtering/integration of the pulses train through passive R-C networks and realize a volume (or tone bass) stepping down in association with microprocessor-driven audioprocessors.

The maximum load that pin 25 can sustain is

Figure 12: Diagnostics circuit.





1KΩ.

Due to its operating principles, the clipping detector has to be viewed mainly as a power-dependent feature rather than frequency-dependent. This means that clipping state causing THD = 10% typ. will be immediately signaled out whenever a fixed power level is reached, regardless of the audio frequency.

In other words, this feature offers the means to counteract the extremely sound-damaging effects of heavy clipping, caused by a sudden increase of odd order harmonics and appearance of serious intermodulation phenomena.







DIM.	mm			inch			
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
А	4.45	4.50	4.65	0.175	0.177	0.183	
В	1.80	1.90	2.00	0.070	0.074	0.079	
С		1.40			0.055		
D	0.75	0.90	1.05	0.029	0.035	0.041	
E	0.37	0.39	0.42	0.014	0.015	0.016	
F (1)			0.57			0.022	
G	0.80	1.00	1.20	0.031	0.040	0.047	
G1	23.75	24.00	24.25	0.935	0.945	0.955	
H (2)	28.90	29.23	29.30	1.138	1.150	1.153	
H1		17.00			0.669		
H2		12.80			0.503		
H3		0.80			0.031		
L (2)	22.07	22.47	22.87	0.869	0.884	0.904	
L1	18.57	18.97	19.37	0.731	0.747	0.762	
L2 (2)	15.50	15.70	15.90	0.610	0.618	0.626	
L3	7.70	7.85	7.95	0.303	0.309	0.313	
L4		5			0.197		
L5		3.5			0.138		
М	3.70	4.00	4.30	0.145	0.157	0.169	
M1	3.60	4.00	4.40	0.142	0.157	0.173	
Ν		2.20			0.086		
0		2			0.079		
R		1.70			0.067		
R1		0.5			0.02		
R2		0.3			0.12		
R3		1.25			0.049		
R4		0.50			0.019		
V	5° (Typ.)						
V1	3° (Typ.)						
V2	20° (Typ.)						
V3	45° (Typ.)						



(1): dam-bar protusion not included(2): molding protusion included

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