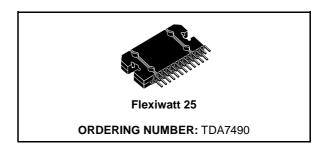


## **TDA7490**

## 25W + 25W STEREO CLASS-D AMPLIFIER 50W MONO IN BTL

PRODUCT PREVIEW

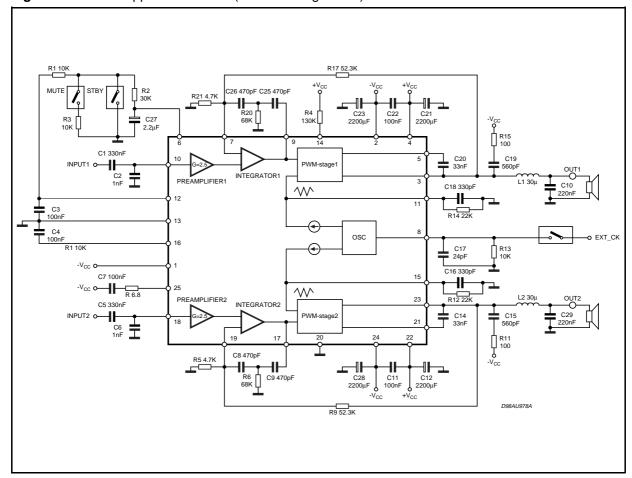
- 25W + 25W OUTPUT POWER:  $R_L = 8\Omega/4\Omega$ ; THD = 10%
- HIGH EFFICIENCY
- WIDE SUPPLY VOLTAGE RANGE (FROM ±10 TO ±25V)
- SPLIT SUPPLY
- TURN OFF/ON POP FREE
- ST-BY AND MUTE FEATURES
- SHORT CIRCUIT PROTECTION ACROSS THE LOAD
- THERMAL OVERLOAD PROTECTION
- EXTERNALLY SINCHRONIZABLE
- BRIDGE CONFIGURATION



#### **DESCRIPTION**

The TDA7490 is a dual audio class D amplifier assembled in Flexiwatt 25 package; it is specially designed for high efficiency application mainly for TV and Home Stereo sets.

Figure 1. Test and application circuit. (Stereo Configuration)



December 1999 1/9

R5 52.3K 470pF 470pF The LC filter is optimized for  $8\Omega$  (<->LC filter for  $4\Omega$  in single-ended) It hos to be changed for other loads C40 R4 68K C41 L9 30μ INPUT PWM-stage 3 C26 470nF dumping C23 235nF mode) R27 R63 4.7K 10 R25 Rload R28 C24 235nF C29 470nF 23 L10 30μ 17 470pF 470pF ╂ ┨┠ C60 R61 68K C59 R62 52.3K D99AU1081

Figure 2. Test and application circuit. (Bridge Configuration)

#### **ABSOLUTE MAXIMUM RATINGS**

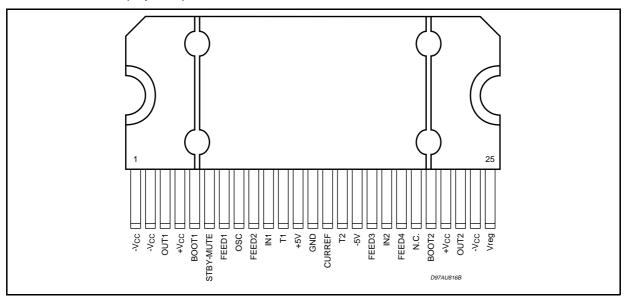
Symbol	Parameter	Value	Unit
$V_{CC}$	DC Supply Voltage (no signal)	±30	V
P <sub>tot</sub>	Power Dissipation T <sub>case</sub> = 70°C	35	W
T <sub>stg</sub> , T <sub>j</sub>	Storage and Junction Temperature	-40 to 150	°C
T <sub>op</sub>	Operating Temperature Range	0 to 70	°C
V <sub>6,8,10,18</sub>	Maximum Voltage on pins # 6,8,10,18 referred to GND	±5	V

#### **THERMAL DATA**

Symbol	Parameter	Тур.	Max.	Unit
R <sub>th i-case</sub>	Thermal Resistance Junction-case	1		°C/W

2/9

### PIN CONNECTION (Top view)



#### **PIN FUNCTIONS**

N.	Name	Function		
1	-V <sub>CC sign/sub</sub>	Negative signal/substrate supply		
2	-V <sub>CCpow1</sub>	Negative power supply CH1		
3	out 1	PWM output of CH1		
4	+V <sub>CCpow1</sub>	Positive power supply CH1		
5	BOOT1	Bootstrap CH1		
6	STBY-MUTE	Control State Pin		
7	FEED1	Feedback pin 1 CH1		
8	OSC	Master Oscillator Setting Freequency Pin (or external sync.)		
9	FEED2	Feedback pin2 CH1		
10	IN1	Input CH1		
11	T1	Triangular waveform CH1		
12	+5V	+5V regulator (only for internal purposes)		
13	GND	Signal ground		
14	CURREF	Setting current resistor		
15	T2	Triangular waveform CH2		
16	-5V	-5V regulator (only for internal purposes)		
17	FEED3	Feedback pin1 CH2		
18	IN2	Input CH2		
19	FEED4	Feedback pin2 CH2		
20	NC	Not connected		
21	BOOT2	Bootstrap CH2		
22	+V <sub>CCpow2</sub>	Positive power supply CH2		
23	OUT2	PWM output of CH2		
24	-V <sub>CCpow2</sub>	Negative power supply CH2		
25	V <sub>reg</sub>	10V regulator		

**ELECTRICAL CHARACTERISTICS** (Refer to the test circuit,  $Vcc = \pm 21V$ ;  $RL = 8\Omega$ ; Demod. filter L = 30mH, C = 220nF; f = 1KHz; fsw = 200kHz; Tamb =  $25^{\circ}C$  unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Тур.	Max.	Unit
Vs	Supply Range		±10		±25	V
$I_q$	Total Quiescent Current	R <sub>L</sub> = ∞ no LC filter		70	120	mA
Т			-150		+150	mV
		THD = 10% THD = 1%		25 18		W W
P <sub>O(BTL)</sub>	Output Power in Bridge Configuration	$Vs = \pm 22V$ ; $R_L = 16Ω$ THD = 10% THD = 1%		50 40		W W
		$\label{eq:section} \begin{array}{l} \text{Vs =$\pm$17V; R_L = $\Omega$} \\ \text{THD = 10\%} \\ \text{THD = 1\%} \end{array}$		50 40		W W
Po (1)	Output Power	$R_L = 4\Omega  V_{CC} = \pm 16V$ $THD = 10\%$ $THD = 1\%$		25 18		W W
$P_D$	Maximum Dissipated Power	$V_{CC} = \pm 21V; R_L = 8\Omega$ $P_O = 25W + 25W; THD = 10\%$		6		W
η <sup>(2)</sup> Efficiency (*)		$P_0 = 25W + 25W$		89		%
THD	Total Harmonic Distortion	$R_L = 8\Omega; P_O = 1W$		0.1		%
I <sub>max</sub>	Overcurrent Protection Threshold	$R_L = 0$	3.5	5		Α
Tj	Thermal Shut-down Junction Temperature			150		°C
$G_V$	Closed Loop Gain			30		dB
$\Delta G_V^{(3)}$	Gain Matching		-1		+1	dB
e <sub>N</sub>	Total Input Noise $R_G = 50\Omega$	A Curve f = 20Hz to 22KHz		7 12		μV μV
$C_{T}$	Cross talk	$f = 1KHz, P_O = 1W$		55		dB
$R_{i}$	Input Resistance			30		kΩ
SVR	Supply Voltage Rejection	$f = 100Hz; V_r = 0.5$		60		dB
$V_{rmax}$	Overvoltage Threshold (5)			55	60	V
$T_r,T_f$	Rising and Falling Time			50		ns
$R_{DSON}$	Power Transistor on Resistance			0.4		Ω
Fsw <sup>(4)</sup>	Switching Frequency Range		100	200	230	KHz
MUTE & STAND-BY FUNCTIONS						T
$V_{ST-BY}$	Stand-by range		0		0.7	V
$V_{MUTE}$	Mute Range		1.7		2.5	V
$V_{PLAY}$	Play Range		4		5	V
A <sub>MUTE</sub>	Mute Attenuation			60		dB
I <sub>qST-BY</sub>	Quiescent Current @ Stand-by			3		mA

<sup>\*:</sup> P<sub>O</sub> = measured across the load using the following inductor: COIL58120 MPPA 2 (magnectics) TURNS = 20 Ø 1mm

5/

<sup>(1)</sup>  $L = 15\mu H$ , C = 470nF

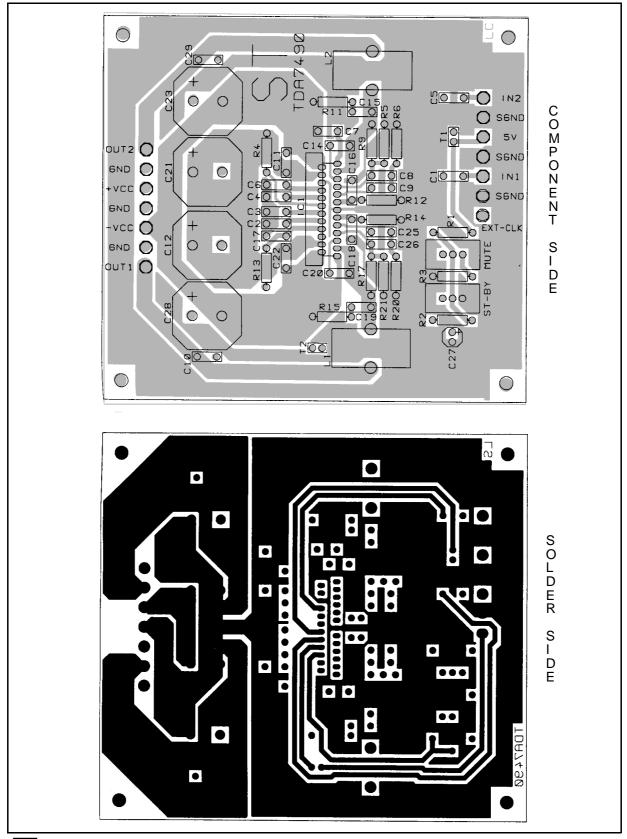
<sup>(2)</sup>  $\eta_{\text{Top}}$  = 90% where Vcc =  $\pm 25\text{V};~R_{\text{L}}$  = 8 $\Omega;~P_{\text{O}}$  = 43W + 43W; THD = 20%

<sup>(3)</sup>  $\Delta Gv$  is intended with R2, R17, R5, R9 1% precision

<sup>(4)</sup>  $F_{SW} = 0.25 \cdot (1/(300 \text{ns} + \text{R13} \cdot (\text{C17} + 76 \text{pF}) \cdot 0.85)$ 

<sup>(5)</sup>  $V_{RMAX} = (+V_{CC}) - (-V_{CC})$  when  $V_{R} \ge V_{RMAX}$  the device goes in Stand-By mode

Figure 3. P.C. Board and component layout of the Figs. 1, 2. (for Stereo and Bridge compatible configuration)



4

Figure 4. Distortion vs. Output Power

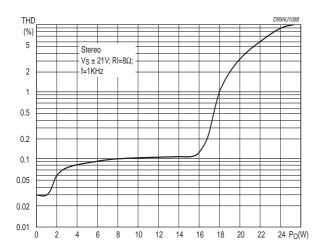


Figure 6. Crosstalk vs. Frequency

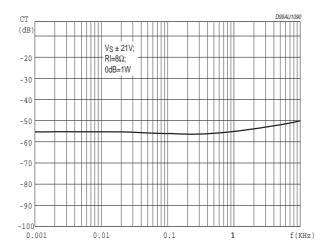


Figure 8. Power Dissipation vs. Output Power

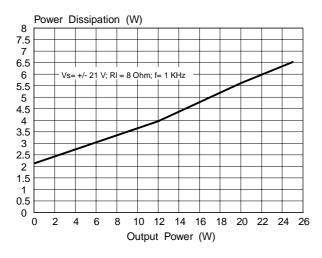


Figure 5. Distortion vs. Output Power

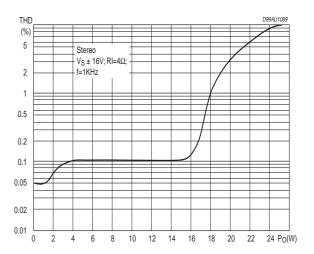


Figure 7. Frequency Response

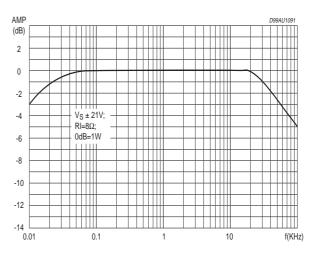
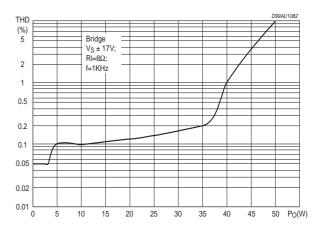
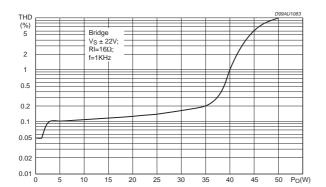


Figure 9. Distortion vs Output Power in BTL



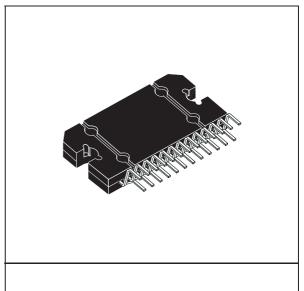
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Figure 10. Distortion vs Output Power in BTL



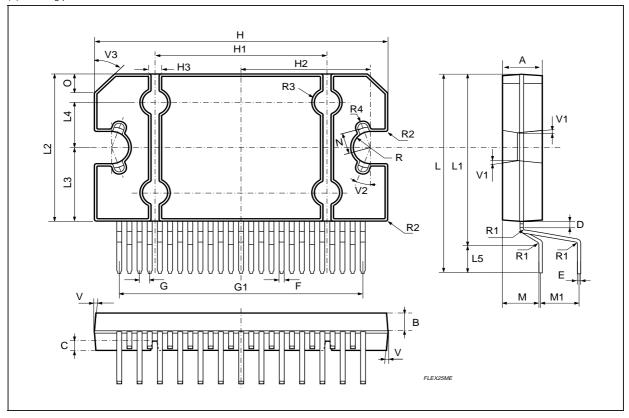
DIM.	mm			inch			
DIIVI.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Α	4.45	4.50	4.65	0.175	0.177	0.183	
В	1.80	1.90	2.00	0.070	0.074	0.079	
С		1.40			0.055		
D	0.75	0.90	1.05	0.029	0.035	0.041	
Е	0.37	0.39	0.42	0.014	0.015	0.016	
F (1)			0.57			0.022	
G	0.80	1.00	1.20	0.031	0.040	0.047	
G1	23.75	24.00	24.25	0.935	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		
M	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	
N		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.)						

# OUTLINE AND MECHANICAL DATA



Flexiwatt25

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



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