

## 18W+18W STEREO AMPLIFIER WITH MUTE & ST-BY

### 1 FEATURES

- WIDE SUPPLY VOLTAGE RANGE (UP TO +25V ABS MAX.)
- SPLIT SUPPLY
- HIGH OUTPUT POWER 18+18W @THD = 10%,  $R_L = 8\Omega$ ,  $V_S = \pm 17.5V$
- NO POP AT TURN-ON/OFF
- MUTE (POP FREE)
- STAND-BY FEATURE (LOW  $I_Q$ )
- SHORT CIRCUIT PROTECTION TO GND
- THERMAL OVERLOAD PROTECTION
- CLIPWATT 11 PACKAGE

### 2 DESCRIPTION

The TDA7265SA is class AB Dual Audio Power amplifier assembled in the @ Clipwatt 11 package, specially designed for high quality sound ap-

Figure 1. Package



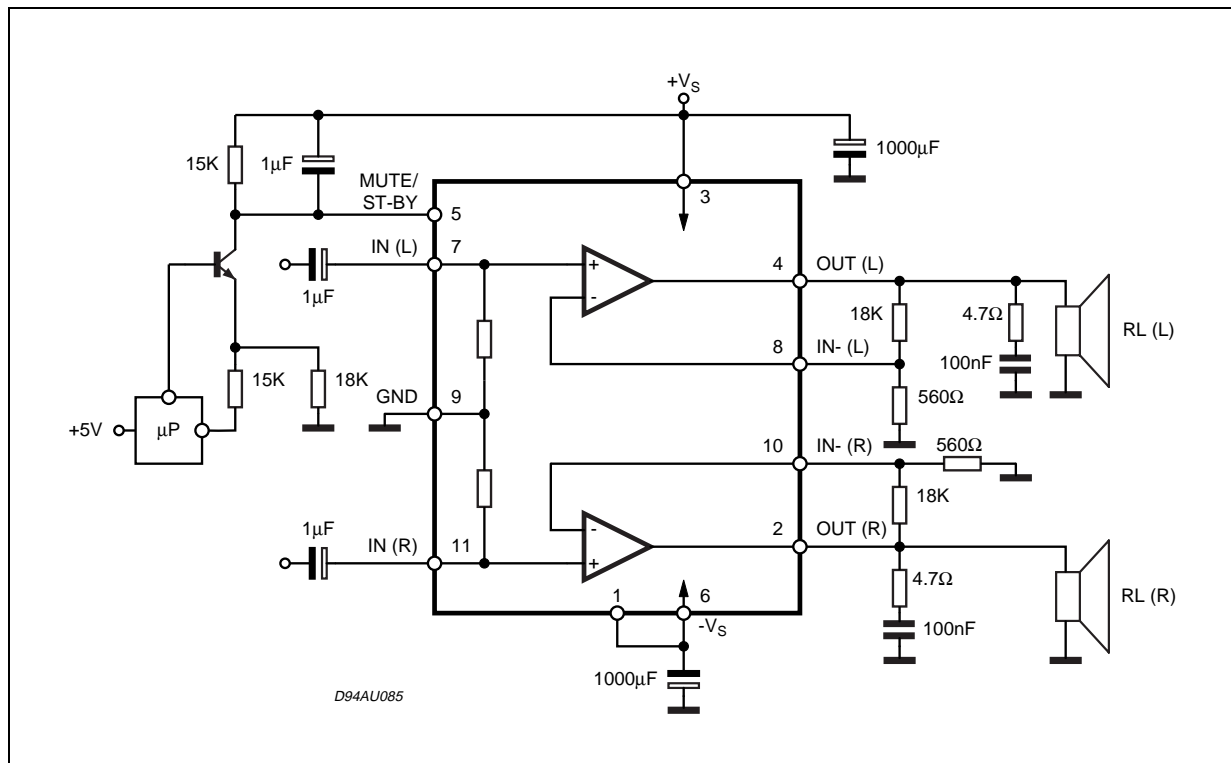
Table 1. Order Codes

Part Number	Package
TDA7265SA	Clipwatt11

plication as Hi-Fi music centers and stereo TV sets.

The TDA7265SA is pin to pin compatible with TDA7269, TDA7269A, TDA7269SA, TDA7265, TDA7499, TDA7499SA.

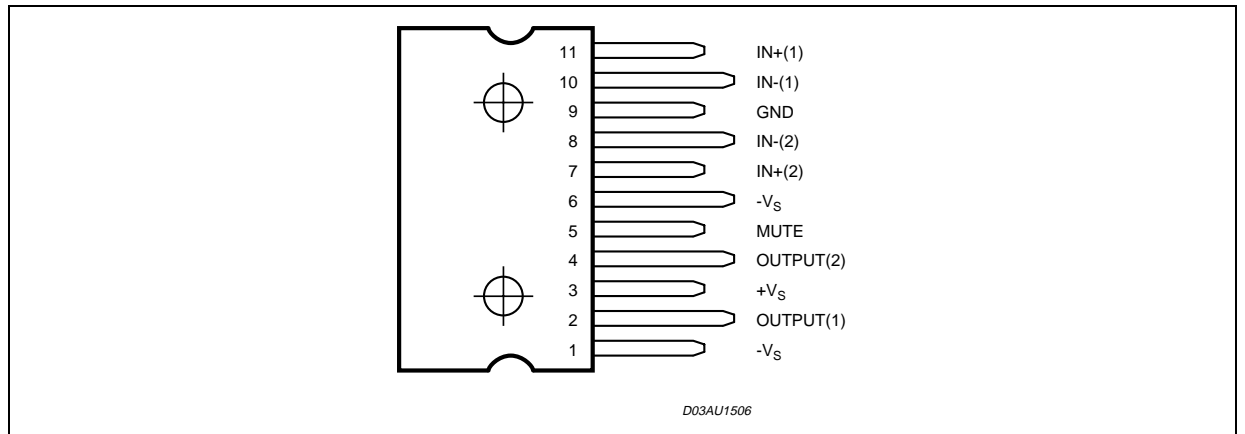
Figure 2. Test and Application Diagram



**Table 2. Absolute Maximum Ratings**

Symbol	Parameter	Value	Unit
V <sub>S</sub>	DC Supply Voltage	±25	V
I <sub>O</sub>	Output Power Current (internally limited)	4.5	A
P <sub>tot</sub>	Total Power Dissipation (T <sub>amb</sub> = 70°C)	30	W
T <sub>amb</sub>	Ambient Operating Temperature (1)	0 to 70	°C
T <sub>stg</sub> , T <sub>j</sub>	Storage and Junction Temperature	-40 to 150	°C

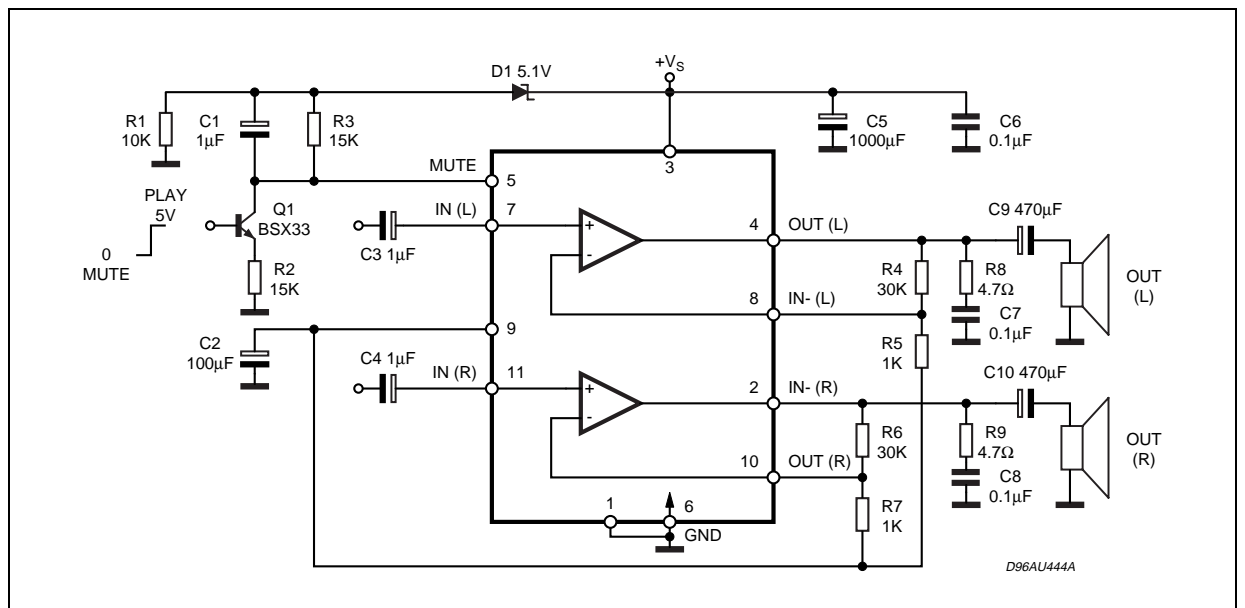
**Figure 3. Pin Connection (Top view)**



**Table 3. Thermal Data**

Symbol	Parameter	Value	Unit
R <sub>th j-case</sub>	Thermal Resistance Junction-case	max = 3	°C/W
R <sub>th j-amb</sub>	Thermal Resistance Junction-ambient	48	°C/W

**Figure 4. Single Supply Application**



**Table 4. Electrical Characteristics**

(Refer to the test circuit  $V_S = \pm 17.5V$ ;  $R_L = 8\Omega$ ;  $R_S = 50\Omega$ ;  $G_V = 30dB$ ,  $f = 1KHz$ ;  $T_{amb} = 25^\circ C$ , unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_S$	Supply Voltage Range		$\pm 5$		$\pm 25$	V
$I_q$	Total Quiescent Current			80	130	mA
$V_{OS}$	Input Offset Voltage		-20		20	mV
$I_b$	Non Inverting Input Bias Current			500		nA
$P_O$	Output Power	THD = 10%; $R_L = 8\Omega$ ; $V_S = \pm 13V$ ; $R_L = 4\Omega$ ;		18 18		W W
		THD = 1%; $R_L = 8\Omega$ ; $V_S = \pm 13V$ ; $R_L = 4\Omega$ ;		13 13		W W
THD	Total Harmonic Distortion	$R_L = 8\Omega$ ; $P_O = 1W$ ; $f = 1KHz$ ;		0.03		%
		$R_L = 8\Omega$ ; $P_O = 0.1$ to $5W$ ; $f = 100Hz$ to $15KHz$ ;			0.7	%
		$R_L = 4\Omega$ ; $P_O = 1W$ ; $f = 1KHz$ ;		0.02		%
		$R_L = 4\Omega$ ; $V_S = \pm 10V$ ; $P_O = 0.1$ to $5W$ ; $f = 100Hz$ to $15KHz$ ;			1	%
$C_T$	Cross Talk	$f = 1KHz$ ;		70		dB
		$f = 10KHz$ ;		60		dB
SR	Slew Rate		6.5	10		V/ $\mu s$
$G_{OL}$	Open Loop Voltage Gain			80		dB
$e_N$	Total Output Noise	A Curve $f = 20Hz$ to $22KHz$		3 4	8	$\mu V$ $\mu V$
				15	20	
SVR	Supply Voltage Rejection (each channel)	$f = 100Hz$ ; $V_R = 0.5V$		60		dB
$T_j$	Thermal Shut-down Junction Temperature			145		$^\circ C$
<b>MUTE FUNCTION [ref +Vs] (*)</b>						
$V_{MUTE}$	Mute /Play threshold		-7	-6	-5	V
$A_{MUTE}$	Mute Attenuation		60	70		dB
<b>STAND-BY FUNCTIONS [ref: +Vs] (only for Split Supply)</b>						
$V_{ST-BY}$	Stand-by Mute threshold		-3.5	-2.5	-1.5	V
$A_{ST-BY}$	Stand-by Attenuation			110		dB
$I_{qST-BY}$	Quiescent Current @ Stand-by			3	6	mA

(\*) In mute condition the current drawn from Pin 5 must be  $\leq 650\mu A$

### 3 MUTE STAND-BY FUNCTION

The pin 5 (MUTE/STAND-BY) controls the amplifier status by two different thresholds, referred to  $+V_S$ .

- When  $V_{pin5}$  higher than  $= +V_S - 2.5V$  the amplifier is in Stand-by mode and the final stage generators are off.
- When  $V_{pin5}$  between  $= +V_S - 2.5V$  and  $V_S - 6V$  the final stage current generators are switched on and the amplifier is in mute mode.
- When  $V_{pin5}$  lower than  $= +V_S - 6V$  the amplifier is in play mode.

Figure 5.

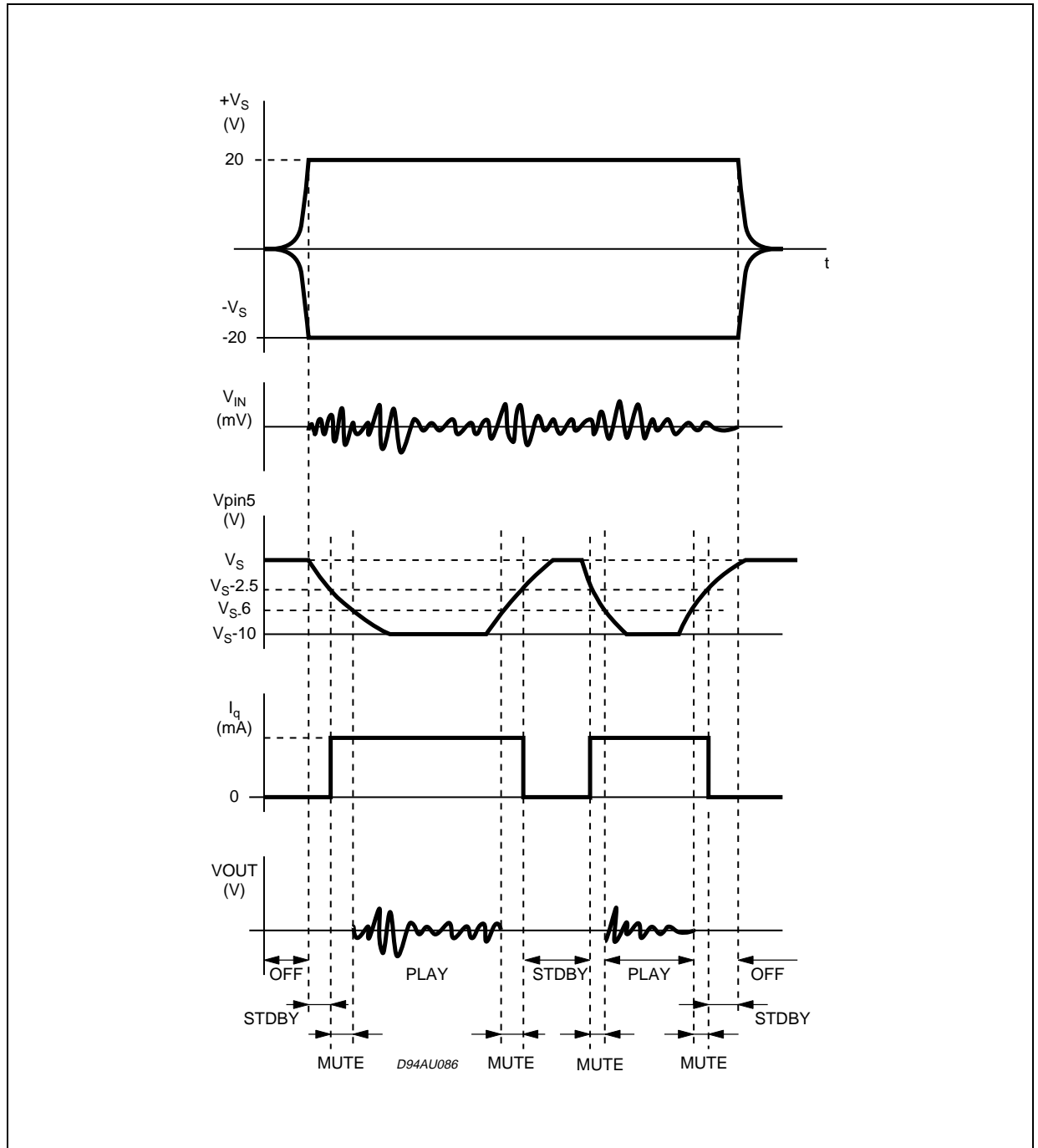
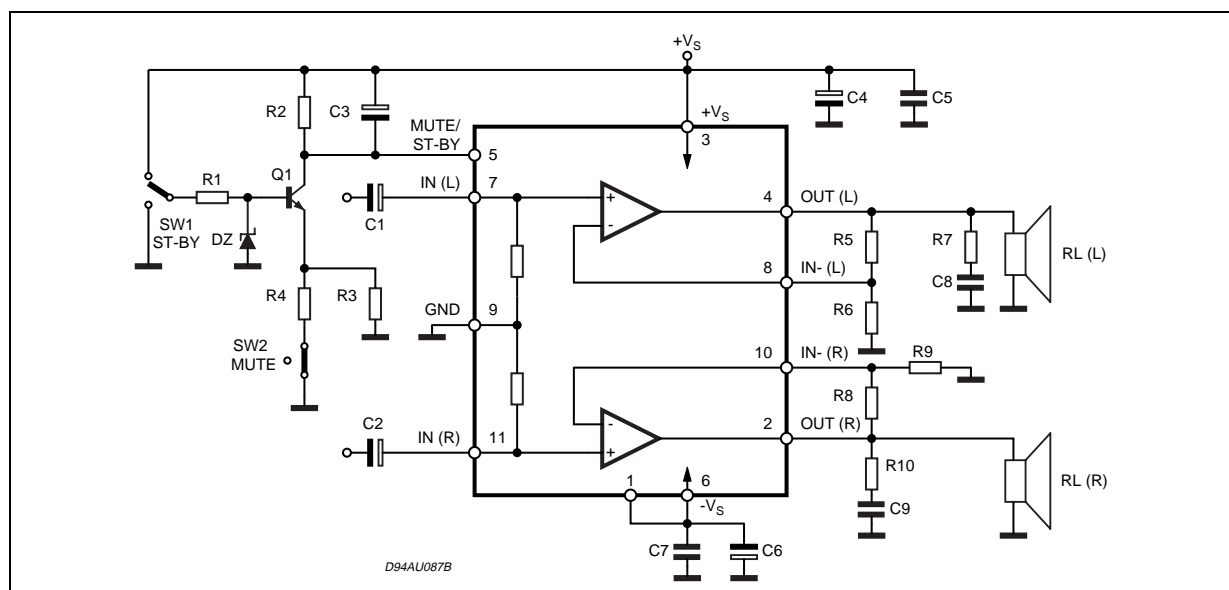


Figure 6. Test and Application Circuit (Stereo Configuration)



#### 4 APPLICATION SUGGESTIONS (DEMO BOARD SCHEMATIC)

The recommended values of the external components are those shown the demoboard schematic different values can be used, the following table can help the designer

Table 5. .

COMPONENT	SUGGESTION VALUE	PURPOSE	LARGER THAN RECOMMENDED VALUE	SMALLER THAN RECOMMENDED VALUE
R1	10K $\Omega$	Mute Circuit	Increase of Dz Biasing Current	
R2	15K $\Omega$	Mute Circuit	V <sub>pin #5</sub> Shifted Downward	V <sub>pin #5</sub> Shifted Upward
R3	18K $\Omega$	Mute Circuit	V <sub>pin #5</sub> Shifted Upward	V <sub>pin #5</sub> Shifted Downward
R4	15K $\Omega$	Mute Circuit	V <sub>pin #5</sub> Shifted Upward	V <sub>pin #5</sub> Shifted Downward
R5, R8	18K $\Omega$	Closed Loop Gain Setting (*)	Increase of Gain	
R6, R9	560 $\Omega$		Decrease of Gain	
R7, R10	4.7 $\Omega$	Frequency Stability	Danger of Oscillations	Danger of Oscillations
C1, C2	1 $\mu$ F	Input DC Decoupling		Higher Low Frequency Cutoff
C3	1 $\mu$ F	St-By/Mute Time Constant	Larger On/Off Time	Smaller On/Off Time
C4, C6	1000 $\mu$ F	Supply Voltage Bypass		Danger of Oscillations
C5, C7	0.1 $\mu$ F	Supply Voltage Bypass		Danger of Oscillations
C8, C9	0.1 $\mu$ F	Frequency Stability		
Dz	5.1V	Mute Circuit		

(\*) Closed loop gain has to be  $\geq 25$ dB

## 5 PC BOARD

Figure 7. Evaluation Board Top Layer Layout

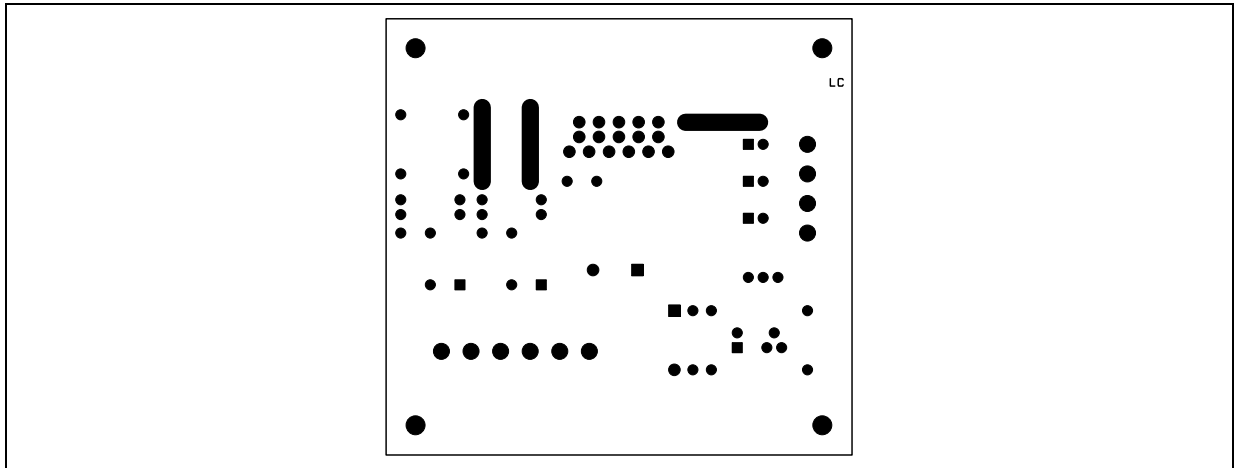


Figure 8. Evaluation Board Bottom Layer Layout

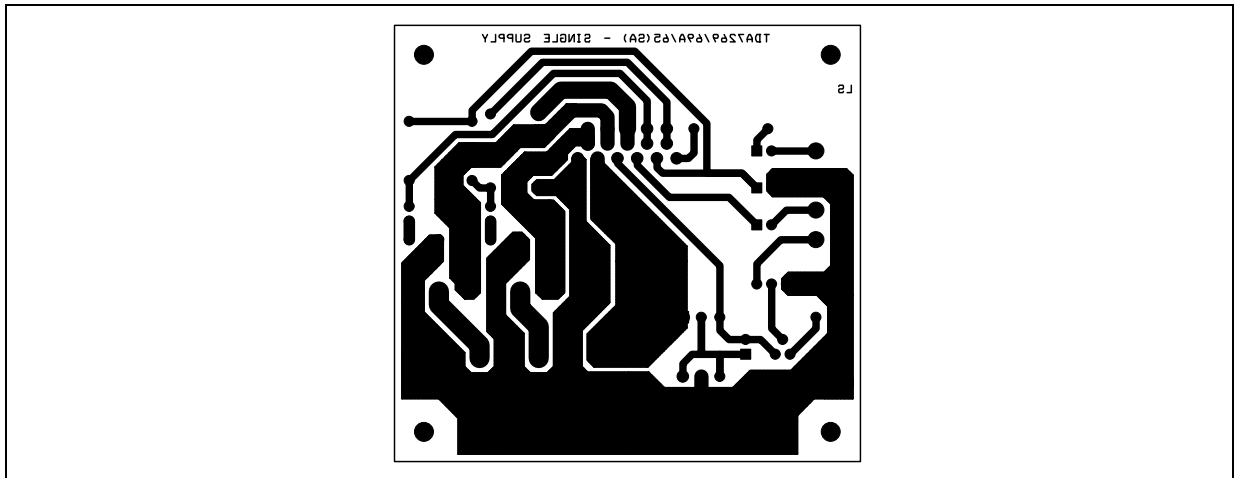
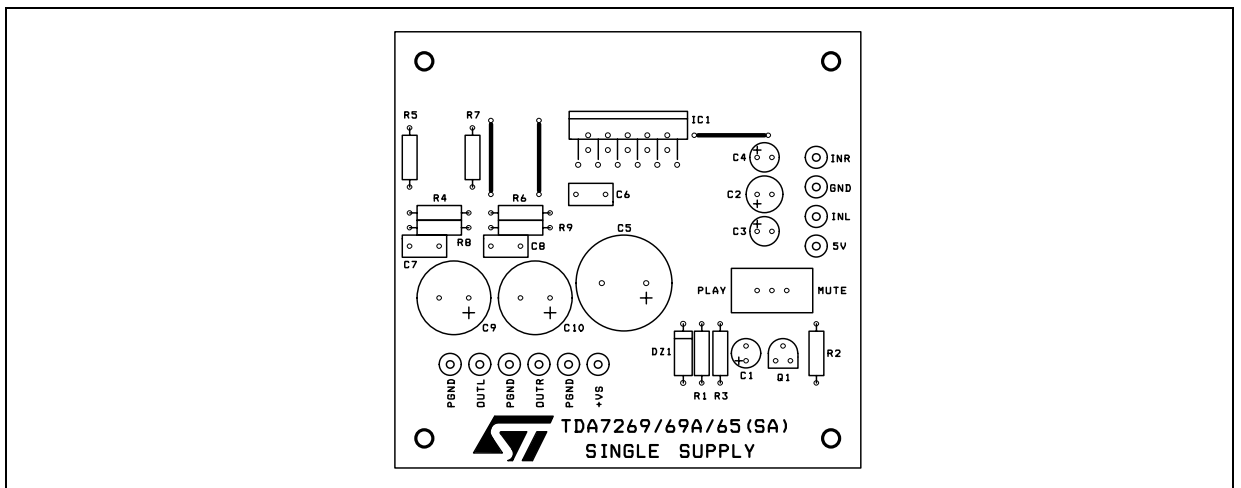
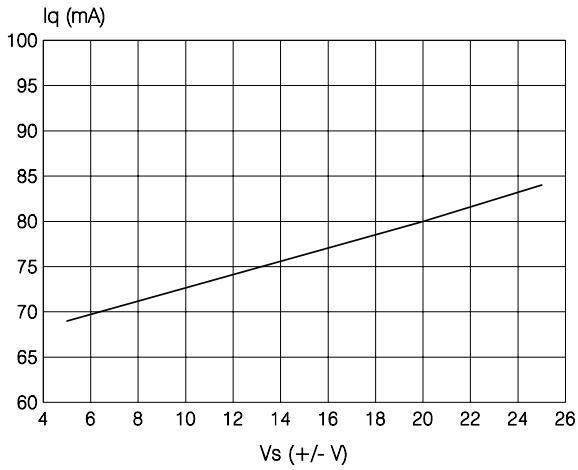


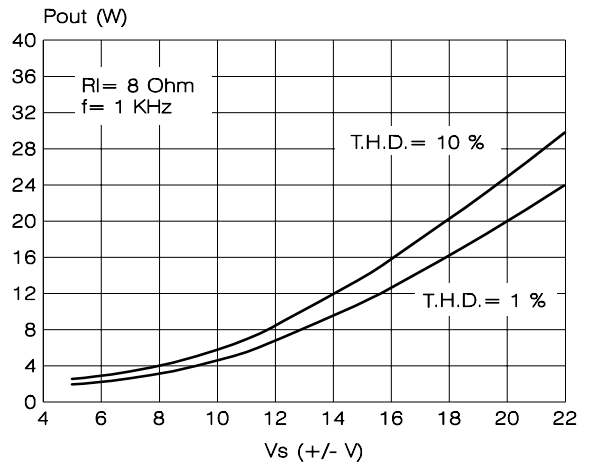
Figure 9. Component Layout



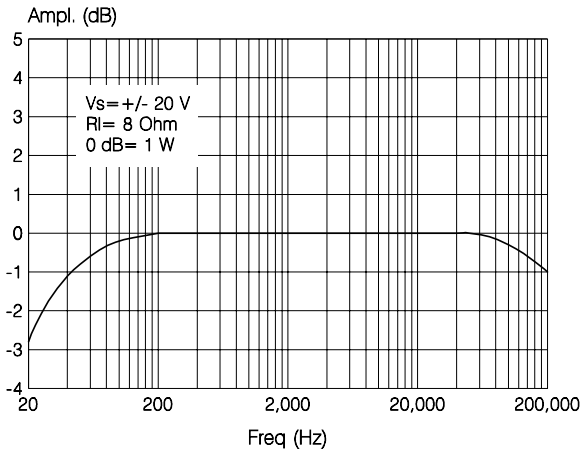
**Figure 10. Quiescent Current vs. Supply Voltage**



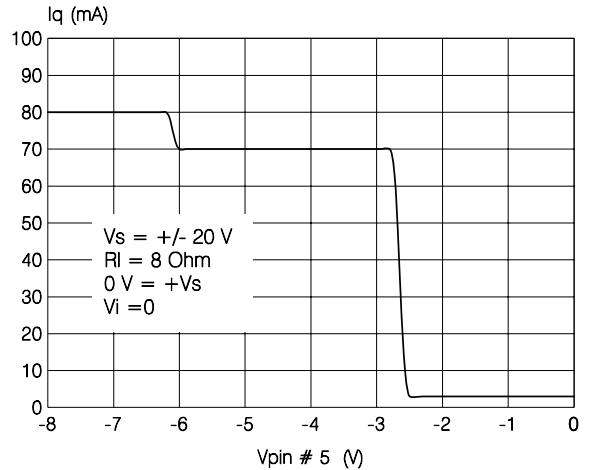
**Figure 13. Output Power vs. Supply Voltage**



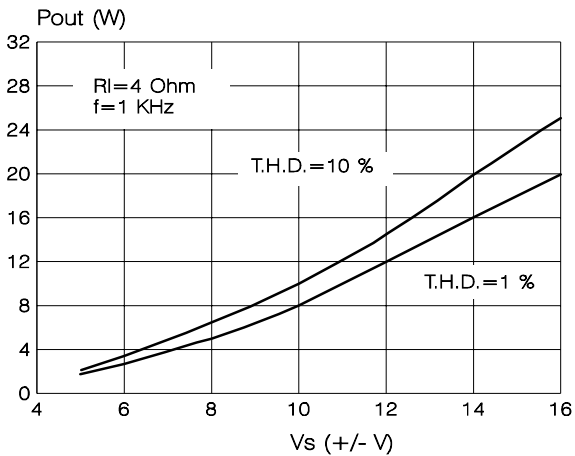
**Figure 11. Frequency Response**



**Figure 14. Quiescent Current vs. Pin #5 Voltage**



**Figure 12. Output Power vs. Supply Voltage**



**Figure 15. Attenuation vs. Pin #5 Voltage**

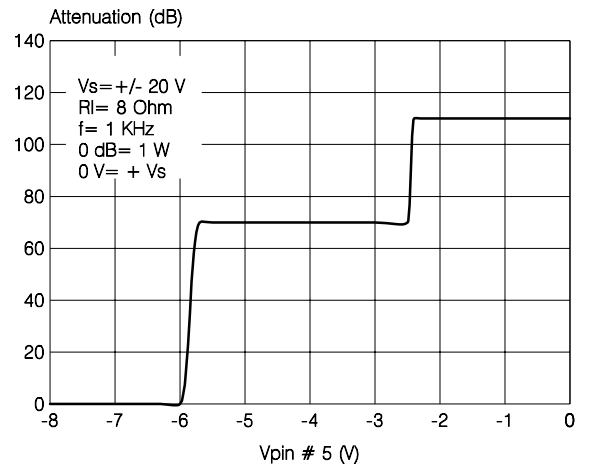


Figure 16. SVR vs. Frequency

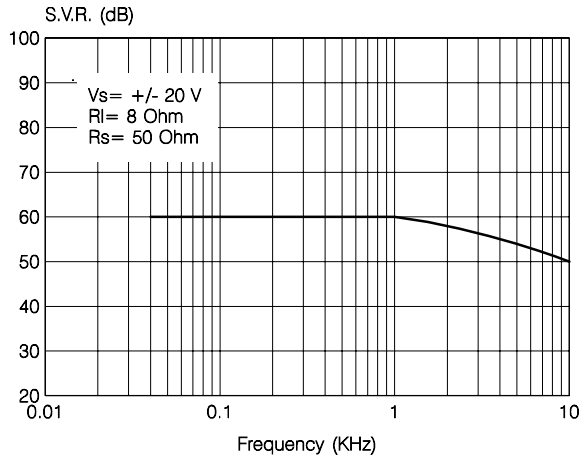


Figure 18. Power Dissipation vs. Output Power

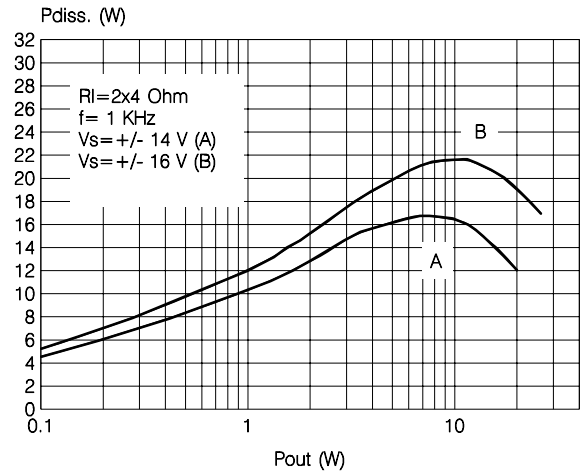


Figure 17. Attenuation vs. Pin #5 Voltage

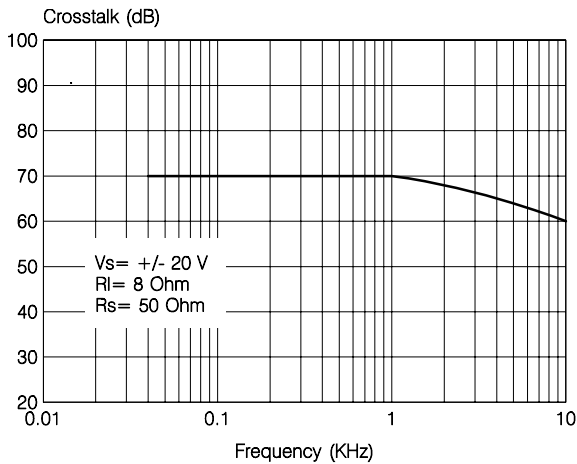
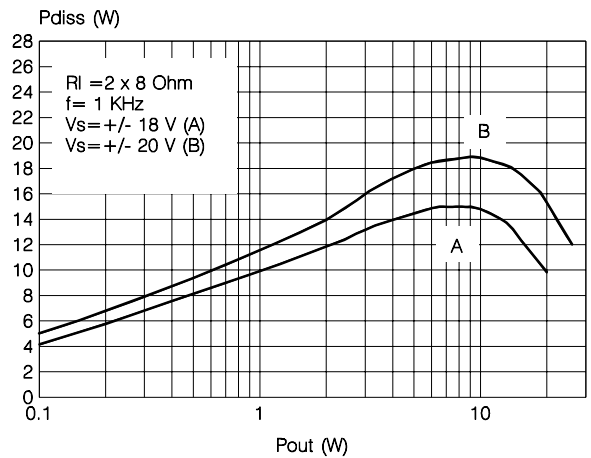


Figure 19. Power Dissipation vs. Output Power



## 6 HEAT SINK DIMENSIONING:

In order to avoid the thermal protection intervention, that is placed approximatively at  $T_j = 150^\circ\text{C}$ , it is important the dimensioning of the Heat Sinker  $R_{Th}$  ( $^\circ\text{C}/\text{W}$ ).

The parameters that influence the dimensioning are:

- Maximum dissipated power for the device ( $P_{dmax}$ )
- Max thermal resistance Junction to case ( $R_{Th j-c}$ )
- Max. ambient temperature  $T_{amb max}$
- Quiescent current  $I_q$  (mA)

Example:

$V_{CC} = \pm 17.5\text{V}$ ,  $R_{load} = 8\text{ohm}$ ,  $R_{Th j-c} = 3^\circ\text{C}/\text{W}$ ,  $T_{amb max} = 50^\circ\text{C}$

$$P_{dmax} = (N^\circ \text{ channels}) \cdot \frac{2V_{cc}^2}{\Pi^2 \cdot R_{load}} + I_q \cdot V_{cc}$$

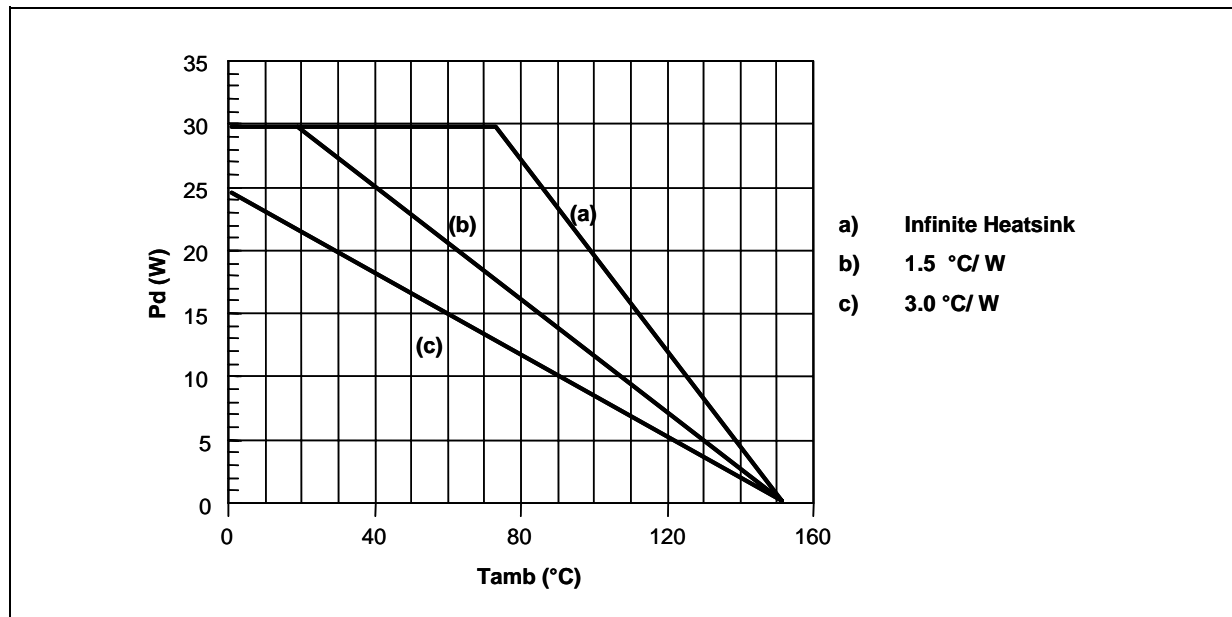


$$P_{dmax} = 2 \cdot (7.7) + 1.0 = 16 \text{ W}$$

$$\text{(Heat Sink)} R_{Th\ c-a} = \frac{150 - T_{amb\ max}}{P_{d\ max}} - R_{Th\ j-c} = \frac{150 - 50}{16} - 3 = 3.25^\circ\text{C/W}$$

In figure 20 is shown the Power derating curve for the device.

**Figure 20. Power derating curve**



## 7 CLIPWATT ASSEMBLING SUGGESTIONS

The suggested mounting method of Clipwatt on external heat sink, requires the use of a clip placed as much as possible in the plastic body center, as indicated in the example of figure 21.

A thermal grease can be used in order to reduce the additional thermal resistance of the contact between package and heatsink.

A pressing force of 7 - 10 Kg gives a good contact and the clip must be designed in order to avoid a maximum contact pressure of 15 Kg/mm<sup>2</sup> between it and the plastic body case.

As example, if a 15Kg force is applied by the clip on the package, the clip must have a contact area of 1mm<sup>2</sup> at least.

**Figure 21. Example of right placement of the clip**

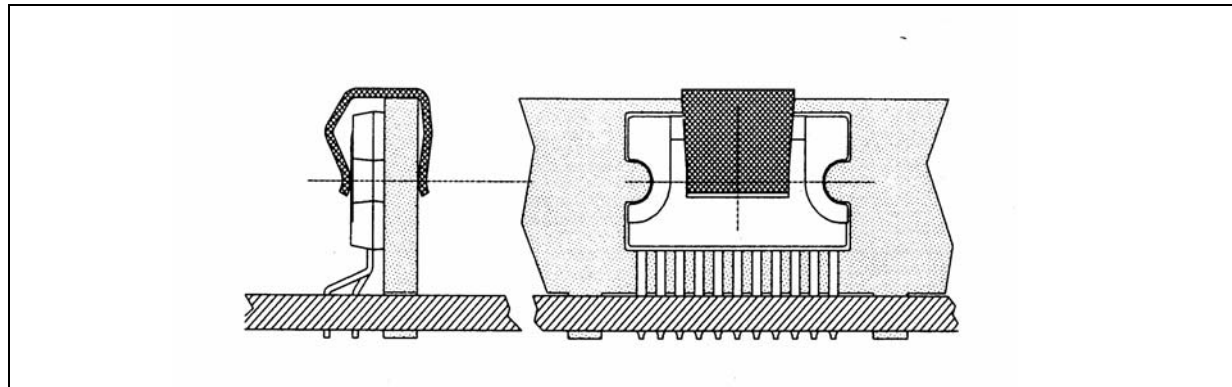
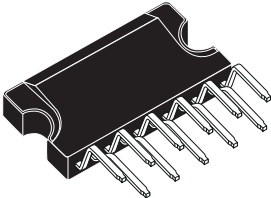


Figure 22. Clipwatt11 Mechanical Data & Package Dimensions

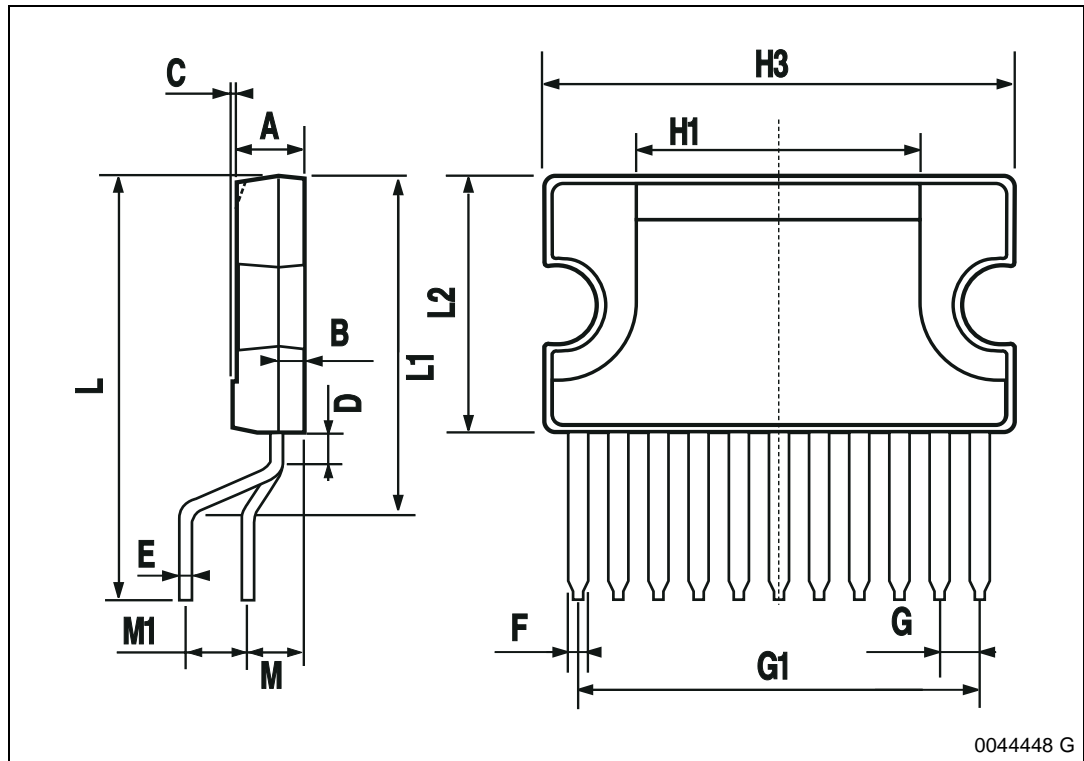
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			3.2			0.126
B			1.05			0.041
C		0.15			0.006	
D		1.5			0.059	
E	0.49		0.55	0.019		0.002
F	0.77	0.8	0.88	0.030	0.031	0.035
F1			0.15			0.006
G	1.57	1.7	1.83	0.062	0.067	0.072
G1	16.87	17	17.13	0.664	0.669	0.674
H1		12			0.480	
H2		18.6			0.732	
H3	19.85			0.781		
L		17.9			0.700	
L1		14.55			0.580	
L2	10.7	11	11.2	0.421	0.433	0.441
L3		5.5			0.217	
M		2.54			0.100	
M1		2.54			0.100	

**OUTLINE AND MECHANICAL DATA**

Weight: 1.80gr



**Clipwatt11**



**Table 6. Revision History**

Date	Revision	Description of Changes
September 2003	1	First Issue
July 2004	2	Changing of the Style-sheet. Changed the maturity from Product Preview to Final.

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