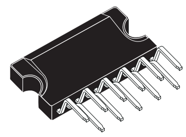
TDA7265SA

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

PRODUCT PREVIEW

- WIDE SUPPLY VOLTAGE RANGE (UP TO +25V ABS MAX.)
- SPLIT SUPPLY
- HIGH OUTPUT POWER 18+18W @THD = 10%, R_L= 8Ω, V_S = ±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



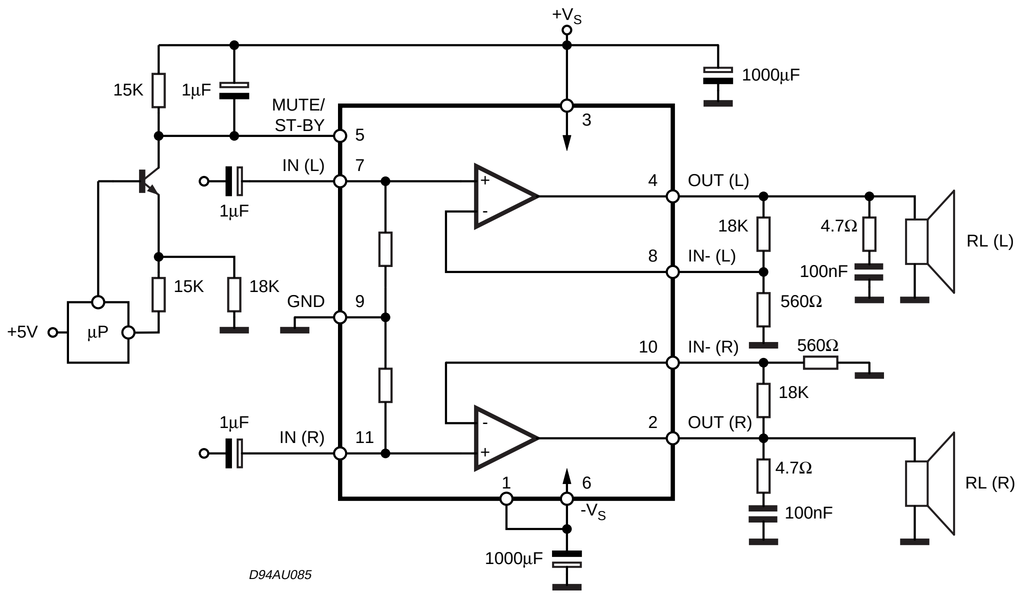
Clipwatt11
ORDERING NUMBER: TDA7265SA

DESCRIPTION

The TDA7265SA is class AB Dual Audio Power amplifier assembled in the @ Clipwatt 11 package, specially designed for high quality sound application as Hi-Fi music centers and stereo TV sets.

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

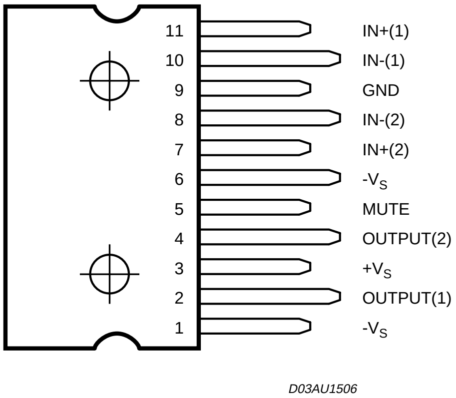
TEST AND APPLICATION DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	DC Supply Voltage	±25	V
I_O	Output Power Current (internally limited)	4.5	A
P_{tot}	Total Power Dissipation (Tamb = 70°C)	30	W
T_{amb}	Ambient Operating Temperature (1)	0 to 70	°C
T_{stg}, T_j	Storage and Junction Temperature	-40 to 150	°C

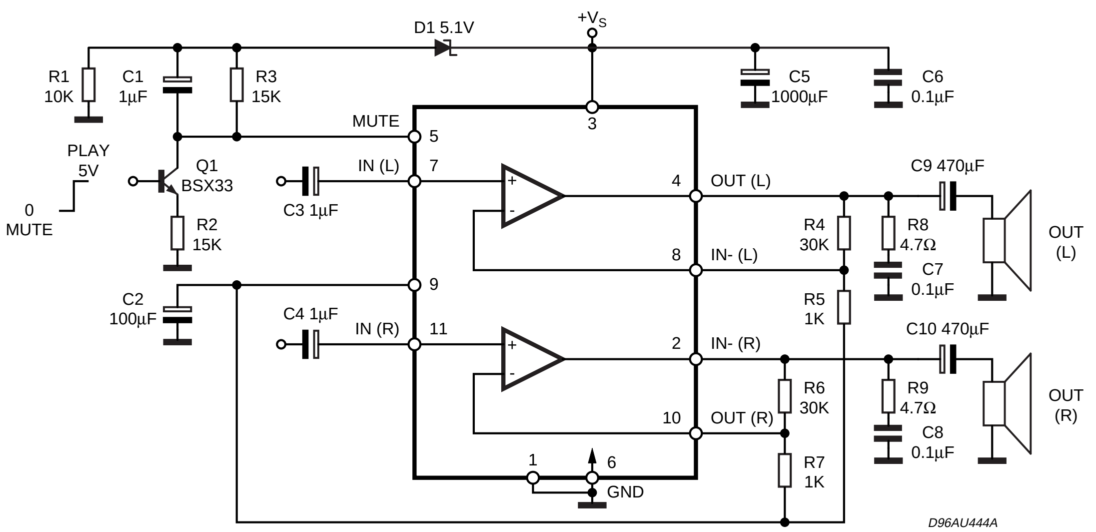
PIN CONNECTION (Top view)



THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	max = 3	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	48	°C/W

Figure 1. Single Supply Application



ELECTRICAL CHARACTERISTCS (Refer to the test circuit V_S = ±17.5V; R_L = 8Ω; R_S = 50Ω; G_V = 30dB, f = 1KHz; T_{amb} = 25°C, unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_S	Supply Voltage Range		±5		±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 = 8Ω; V_S = ±13V; R_L = 4Ω;		 18 18		 W W
		THD = 1%; R_L = 8Ω; V_S = ±13V; R_L = 4Ω;		 13 13		 W W
THD	Total Harmonic Distortion	R_L = 8Ω; P_O = 1W; f = 1KHz;		0.03		%
		R_L = 8Ω; P_O = 0.1 to 5W; f = 100Hz to 15KHz;			0.7	%
		R_L = 4Ω; P_O = 1W; f = 1KHz;		0.02		%
		R_L = 4Ω; V_S = ±10V; P_O = 0.1 to 5W; f = 100Hz to 15KHz;			1	%
C_T	Cross Talk	f = 1KHz; f = 10KHz;		70 60		dB dB
SR	Slew Rate		6.5	10		V/µs
G_{OL}	Open Loop Voltage Gain			80		dB
e_N	Total Output Noise	A Curve f = 20Hz to 22KHz		3 4	 8	µV µV
R_i	Input Resistance		15	20		KΩ
SVR	Supply Voltage Rejection (each channel)	f = 100Hz; V_R = 0.5V		60		dB
T_j	Thermal Shut-down Junction Temperature			145		°C
MUTE FUNCTION [ref +V_S] (*)						
V_{MUTE}	Mute /Play threshold		-7	-6	-5	V
A_{MUTE}	Mute Attenuation		60	70		dB
STAND-BY FUNCTIONS [ref: +V_S] (only for Split Supply)						
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 ≤650µA

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 play mode.

Figure 2.

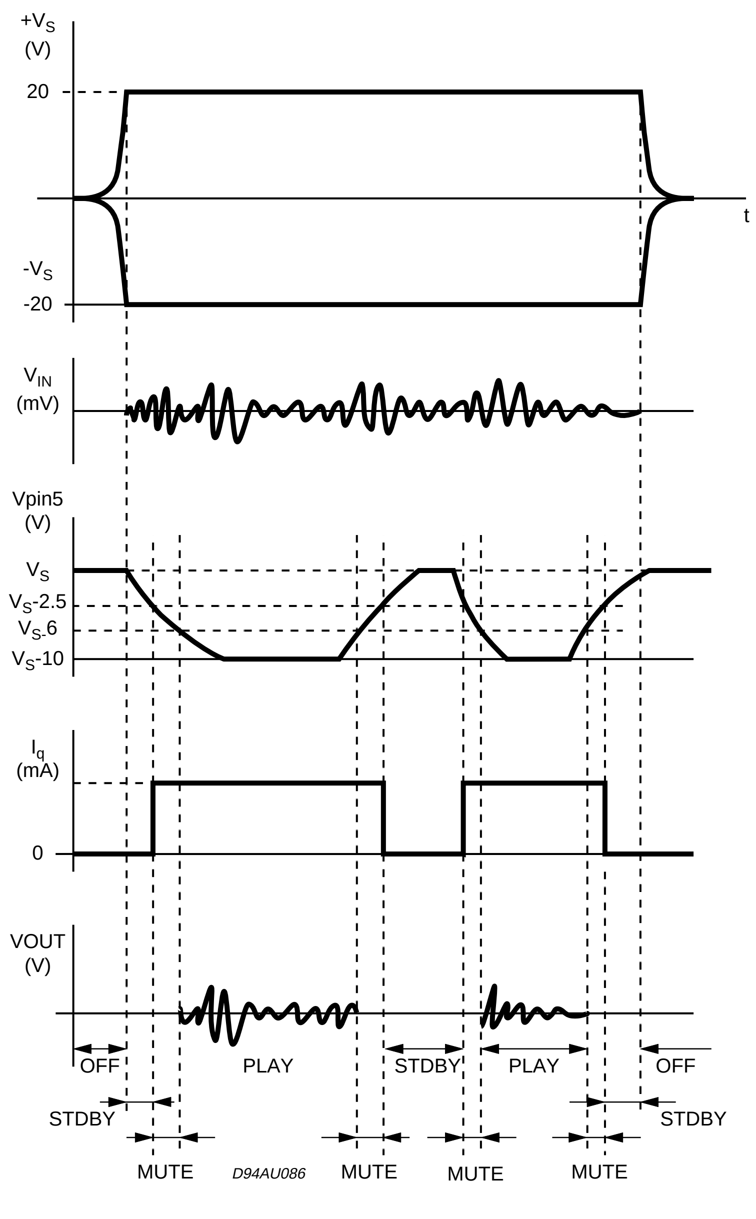
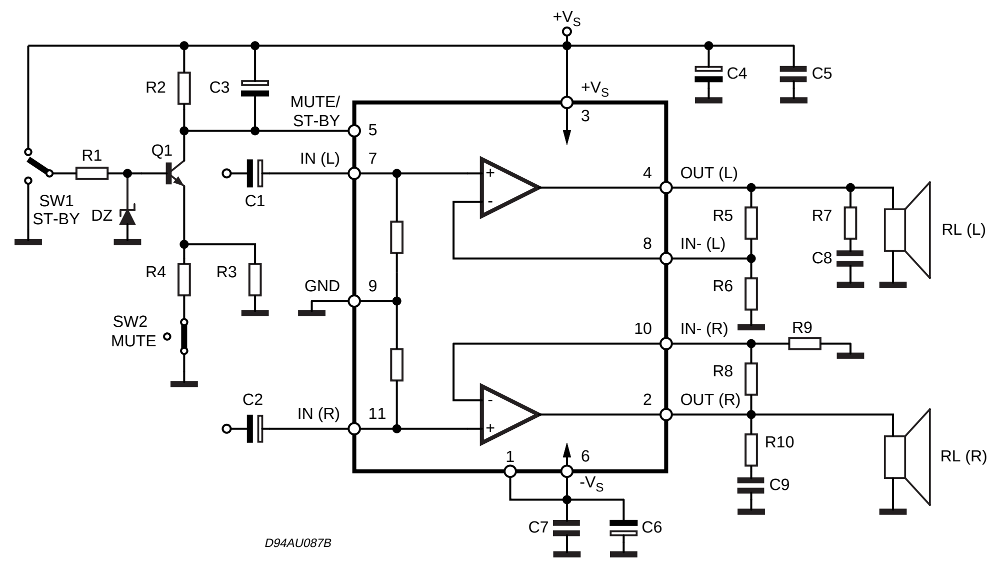


Figure 3. Test and Application Circuit (Stereo Configuration)



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.

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

(*) Closed loop gain has to be ≥25dB

PC Board

Figure 4. Evaluation Board Top Layer Layou

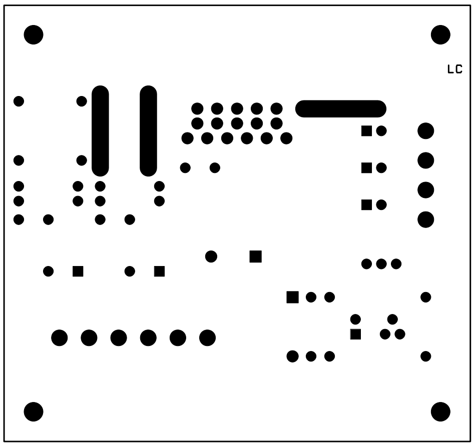


Figure 5. Evaluation Board Bottom Layer Layout

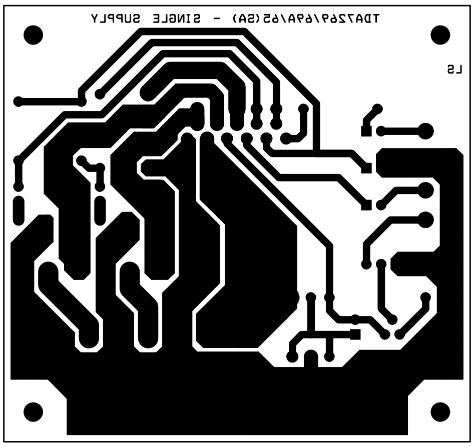


Figure 6. Component Layout

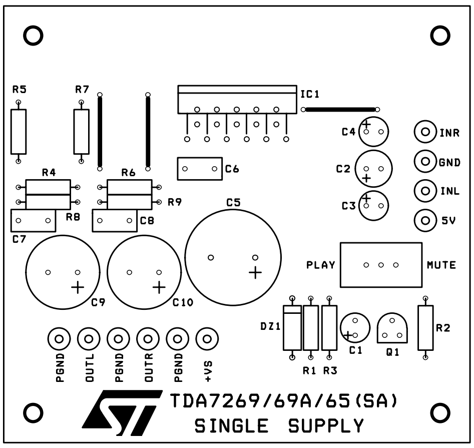


Figure 7. Quiescent Current vs. Supply Voltage

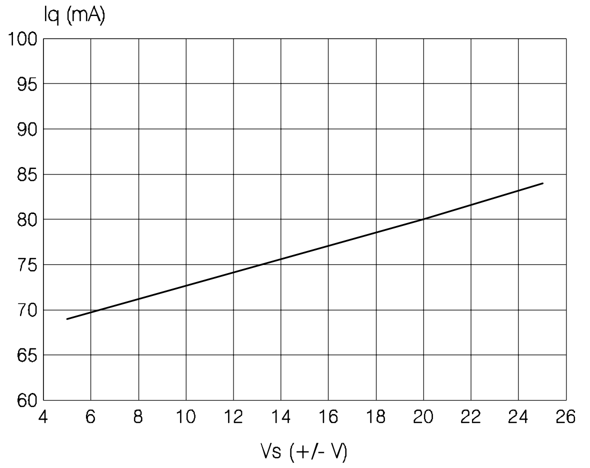


Figure 8. Frequency Response

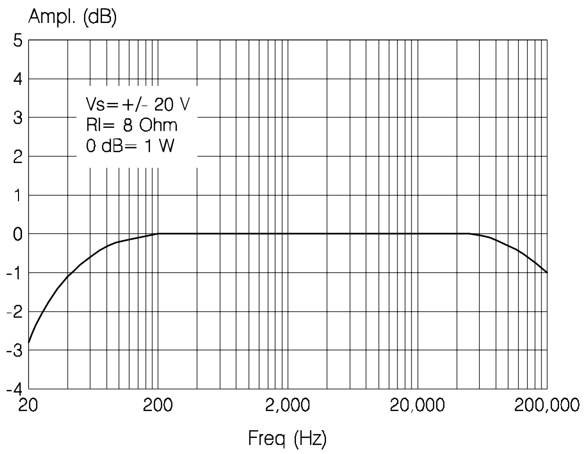


Figure 9. Output Power vs. Supply Voltage

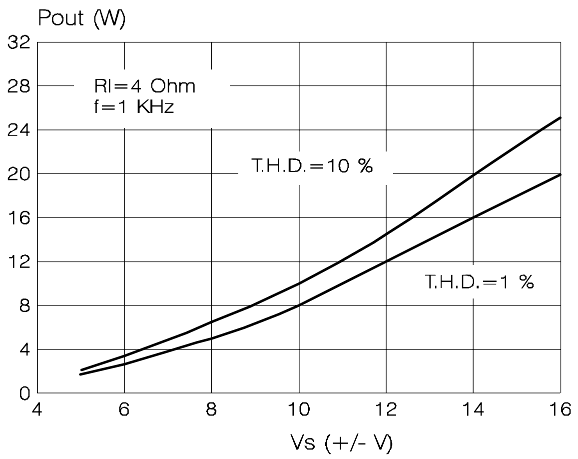


Figure 10. Output Power vs. Supply Voltage

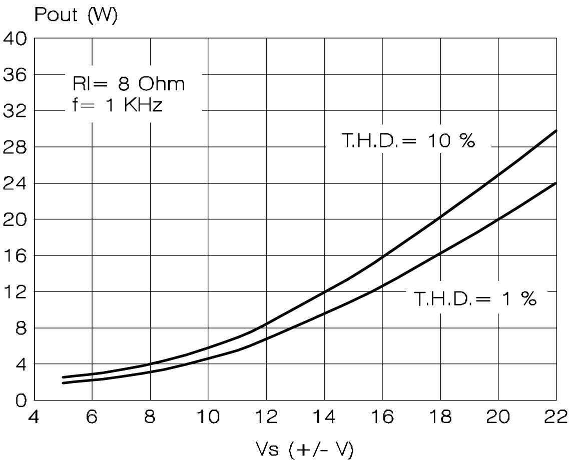


Figure 11. Quiescent Current vs. Pin #5 Voltage

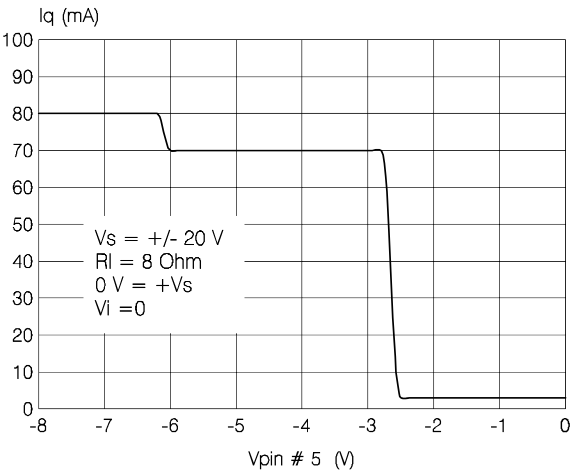


Figure 12. Attenuation vs. Pin #5 Voltage

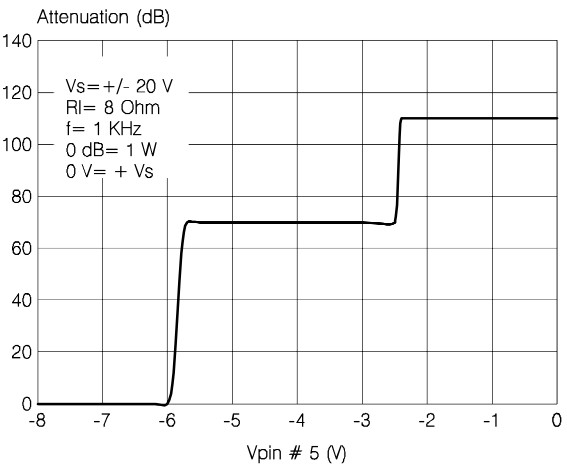


Figure 13. SVR vs. Frequency

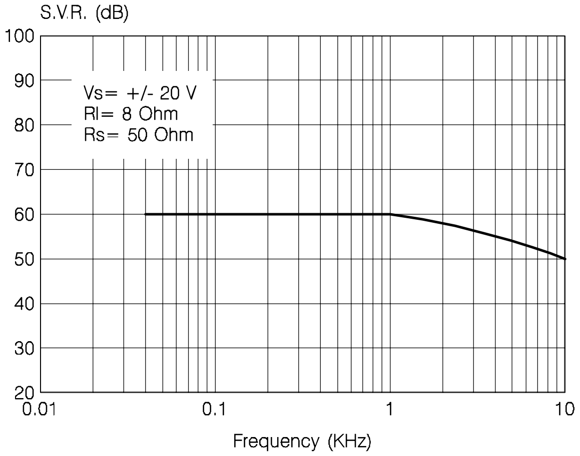


Figure 14. Attenuation vs. Pin #5 Voltage

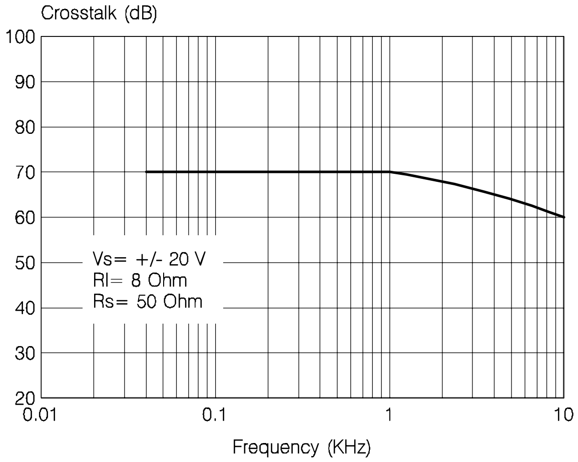


Figure 15. Power Dissipation vs. Output Power

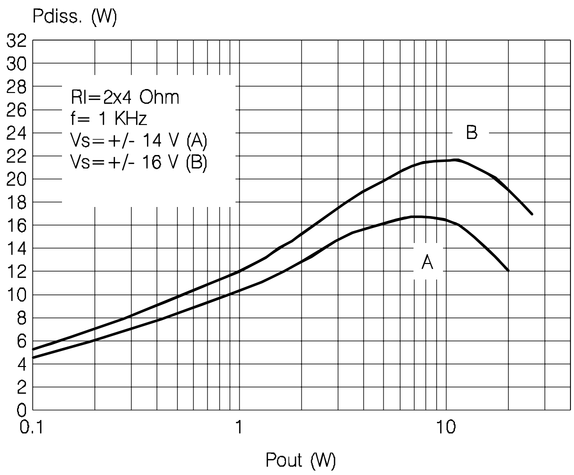
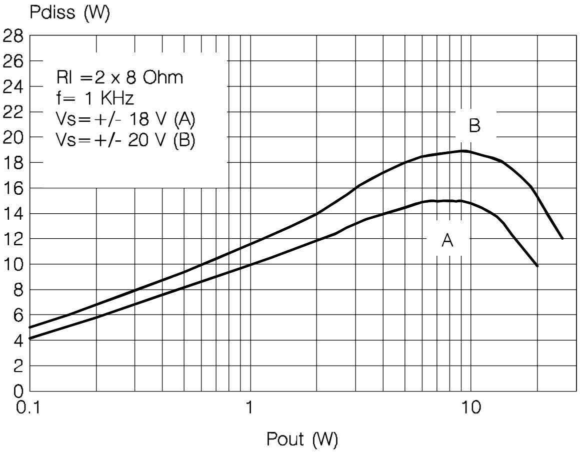


Figure 16. Power Dissipation vs. Output Power



HEAT SINK DIMENSIONING:

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

The parameters that influence the dimensioning are:

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

Example:

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

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

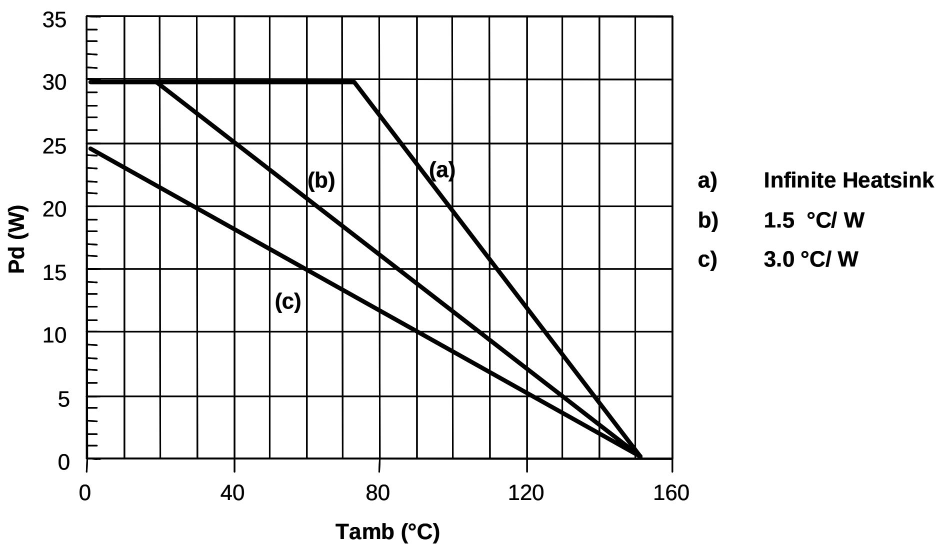
$$P_{dmax} = 2 \cdot (7.7) + 1.0 = 16\ W$$

(Heat Sinker)

$$R_{Th\ c\text{-}a} = \frac{150 - T_{amb\ max}}{P_{d\ max}} - R_{Th\ j\text{-}c} = \frac{150 - 50}{16} - 3 = 3.25°C$$

In figure 17 is shown the Power derating curve for the device.

Figure 17. Power derating curve



Clipwatt Assembling Suggestions

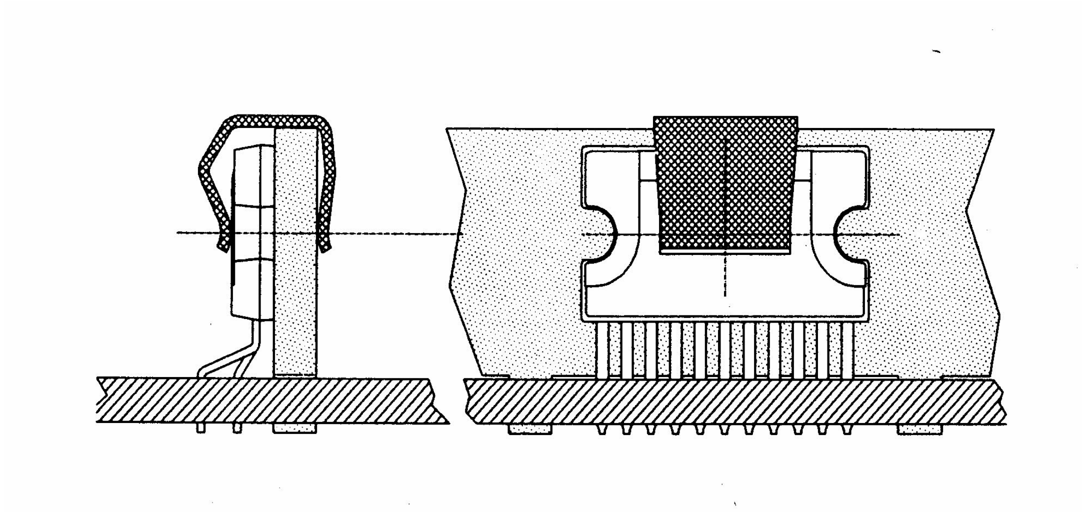
The suggested mounting method of Clipwatt on external heat sink, requires the use of a clip placed as much as possible in the plastic body center, as indicated in the example of figure 18.

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/mm2 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 1mm2 at least.

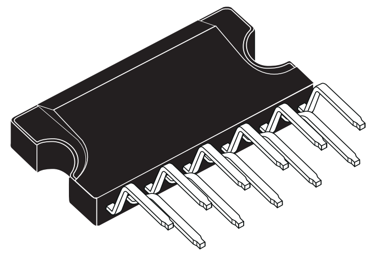
Figure 18. Example of right placement of the clip



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



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