



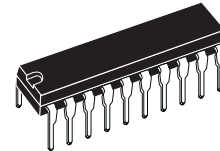
# TDA7480

## 10W MONO CLASS-D AMPLIFIER

- 10W OUTPUT POWER:  
 $R_L = 8\Omega/4\Omega$ ; THD = 10%
- HIGH EFFICIENCY
- NO HEATSINK
- SPLIT SUPPLY
- OVERVOLTAGE PROTECTION
- ST-BY AND MUTE FEATURES
- SHORT CIRCUIT PROTECTION
- THERMAL OVERLOAD PROTECTION

### DESCRIPTION

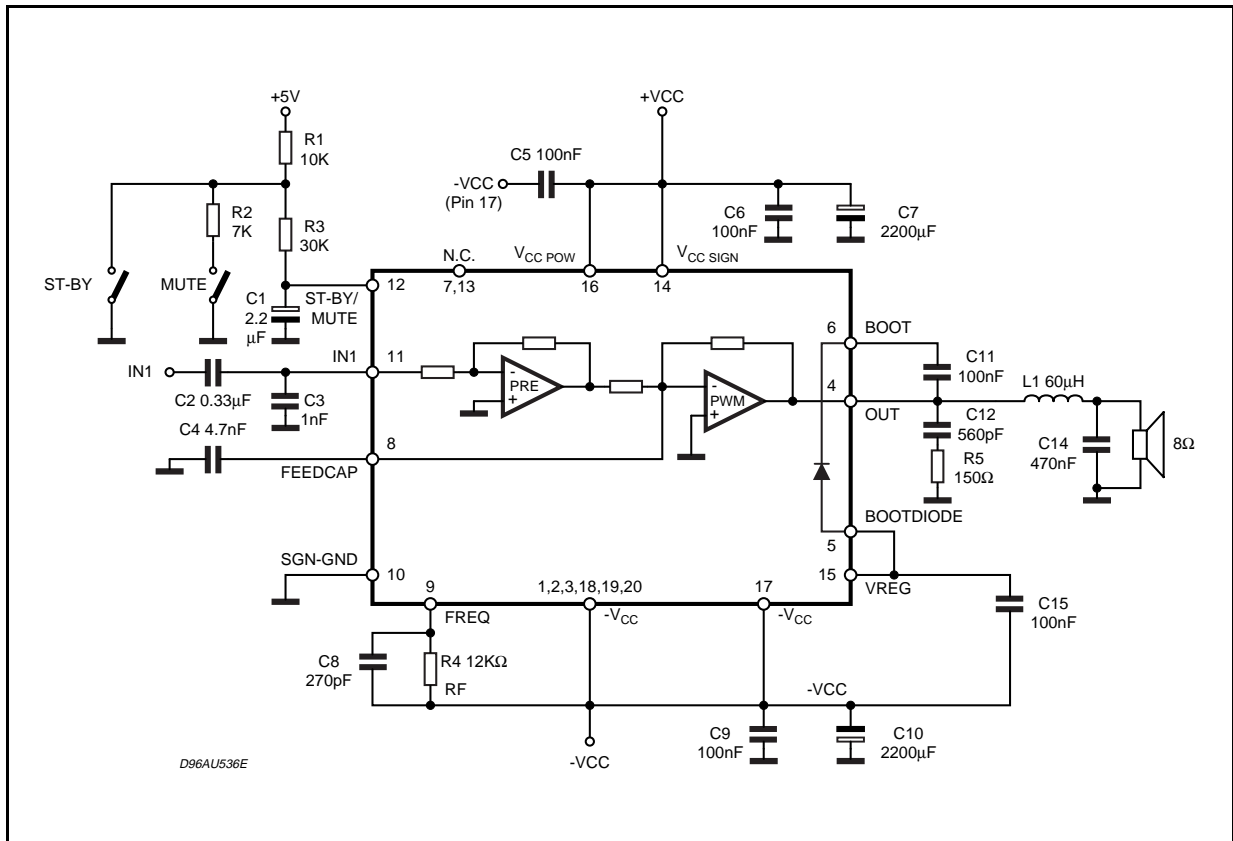
The TDA7480 is an audio class-D amplifier assembled in Power DIP package specially designed for high efficiency applications mainly for TV and Home Stereo sets.



PDIP20 (14+3+3)

ORDERING NUMBER: TDA7480

Figure 1: Test and Application Circuit.

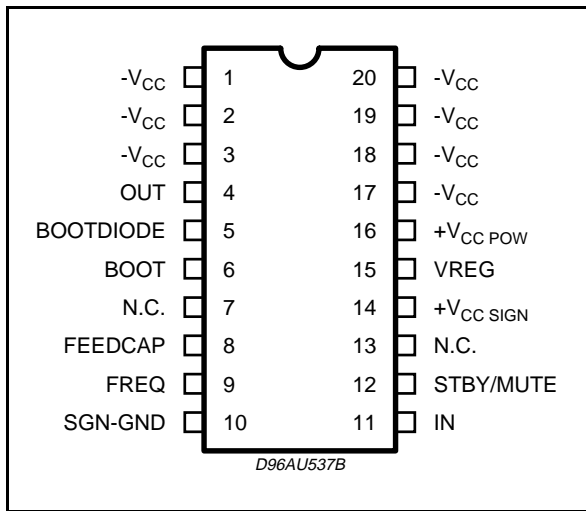


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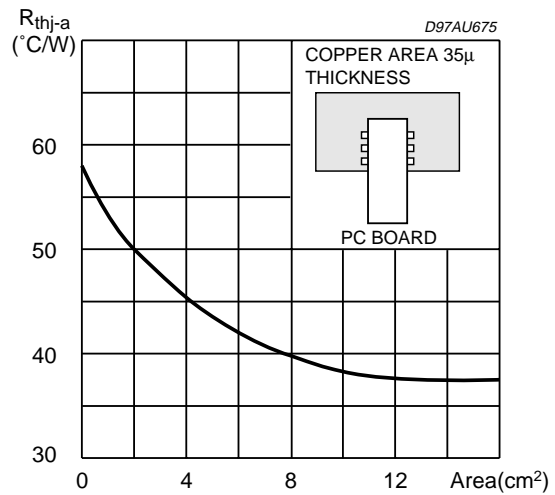
## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CC}$	DC Supply Voltage	$\pm 20$	V
$T_{stg}, T_j$	Storage and Junction Temperature	-40 to 150	$^{\circ}C$
$V_{FREQ}$	Maximum Voltage Across VFREQ (Pin 9)	8	V
$T_{op}$	Operating Temperature Range	-20 to 70	$^{\circ}C$
ESD	Maximum ESD on Pins	$\pm 1.8$	kV

## PIN CONNECTION (Top view)



## Rth with "on board" Square Heatsink vs. copper area.



## THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{thj-amb}$	Thermal Resistance Junction to ambient	80	$^{\circ}C/W$
$R_{thj-pin}$	Thermal Resistance Junction to Pin	Max. 12	$^{\circ}C/W$

## PIN FUNCTIONS

N.	Name	Function
1	$-V_{CC}$	NEGATIVE SUPPLY.
2	$-V_{CC}$	NEGATIVE SUPPLY.
3	$-V_{CC}$	NEGATIVE SUPPLY.
4	OUT	PWM OUTPUT
5	BOOTDIODE	BOOTSTRAP DIODE ANODE
6	BOOT	BOOTSTRAP CAPACITOR
7	NC	NOT CONNECTED
8	FEEDCAP	FEEDBACK INTEGRATING CAPACITANCE
9	FREQUENCY	SETTING FREQUENCY RESISTOR
10	SGN-GND	SIGNAL GROUND
11	IN	INPUT
12	ST-BY-MUTE	ST-BY/ MUTE CONTROL PIN
13	NC	NOT CONNECTED
14	$+V_{CC} SIGN$	POSITIVE SIGNAL SUPPLY
15	VREG	10V INTERNAL REGULATOR
16	$+V_{CC} POW$	POSITIVE POWER SUPPLY
17	$-V_{CC}$	NEGATIVE SUPPLY (TO BE CONNECTED TO PIN 16 VIA C5)
18	$-V_{CC}$	NEGATIVE SUPPLY
19	$-V_{CC}$	NEGATIVE SUPPLY
20	$-V_{CC}$	NEGATIVE SUPPLY

**ELECTRICAL CHARACTERISTICS** (Refer to the test circuit,  $V_{CC} = \pm 14V$ ;  $R_L = 8\Omega$ ;  $R_S = 50\Omega$ ;  $R_f = 12K\Omega$ ; Demod.. filter  $L = 60\mu H$ ,  $C = 470nF$ ;  $f = 1KHz$ ;  $T_{amb} = 25^\circ C$  unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_S$	Supply Range		$\pm 10$		$\pm 16$	V
$I_q$	Total Quiescent Current	$R_L = \infty$ ; NO LC Filter		25	40	mA
$V_{OS}$	Output Offset Voltage	Play Condition	-50		+50	mV
$P_O$	Output Power	THD = 10% THD = 1%	8.5 6	10 7		W W
		$R_L = 4\Omega$ $V_{CC} = \pm 10.5V$ THD = 10% THD = 1%		10 7		W W
$P_d$ (*)	Dissipated Power at 1W Output Power	$R_f = 12K\Omega$ $P_O = 1W$		1		W
$P_{DMAX}$	Maximum Dissipated Power	$P_O = 10W$ THD 10% $R_{th-j-amb} = 38^\circ C/W$ (Area $12cm^2$ )		1.8		W
$\eta$	Efficiency $\equiv \frac{P_O}{P_O + P_D} \equiv \frac{P_O}{P_I}$ (**)	THD 10% $R_{th-j-amb} = 38^\circ C/W$ (Area $12cm^2$ )	80	85		%
THD	Total Harmonic Distortion	$R_L = 8\Omega$ ; $P_O = 0.5W$		0.1		%
$I_{max}$	Overcurrent Protection Threshold	$R_L = 0$	3.5	5		A
$T_j$	Thermal Shut-down Junction Temperature			150		$^\circ C$
$G_V$	Closed Loop Gain		29	30	31	dB
$e_N$	Total Input Noise	A Curve $f = 20Hz$ to $22KHz$		7 12		$\mu V$ $\mu V$
$R_i$	Input Resistance		20	30		$K\Omega$
SVR	Supply Voltage Rejection	$f = 100Hz$ ; $V_r = 0.5$	46	60		dB
$T_r, T_f$	Rising and Falling Time			50		ns
$R_{DSON}$	Power Transistor on Resistance			0.4		$\Omega$
$F_{SW}$	Switching Frequency		100	120	140	KHz
$F_{SW\_OP}$	Switching Frequency Operative Range		100		200	KHz
$B_F$	Zero Signal Frequency Constant (***)			$1.4 \times 10^9$		Hz $\Omega$
$R_F$	Frequency Controller Resistor Range (****)		7	12	14	$K\Omega$
<b>MUTE &amp; STAND-BY FUNCTIONS</b>						
$V_{ST-BY}$	Stand-by range				0.8	V
$V_{MUTE}$	Mute Range		1.8		2.5	V
$V_{PLAY}$	Play Range (1)		4			V
$A_{MUTE}$	Mute Attenuation		60	80		dB
$I_{qST-BY}$	Quiescent Current @ Stand-by			3	5	mA

\*: The output average power when the amplifier is playing music can be considered roughly 1/10 of the maximum output power. So it is useful to consider the dissipated power in this condition for thermal dimensioning.

\*\* $P_O$  = measured across the load using the following inductor:  
COIL 58120 MPPA2 (magnetics)    TURNS: 28  $\varnothing$  1mm  
COIL77120 KOOL M $\mu$  (magnetics)    TURNS: 28  $\varnothing$  1mm

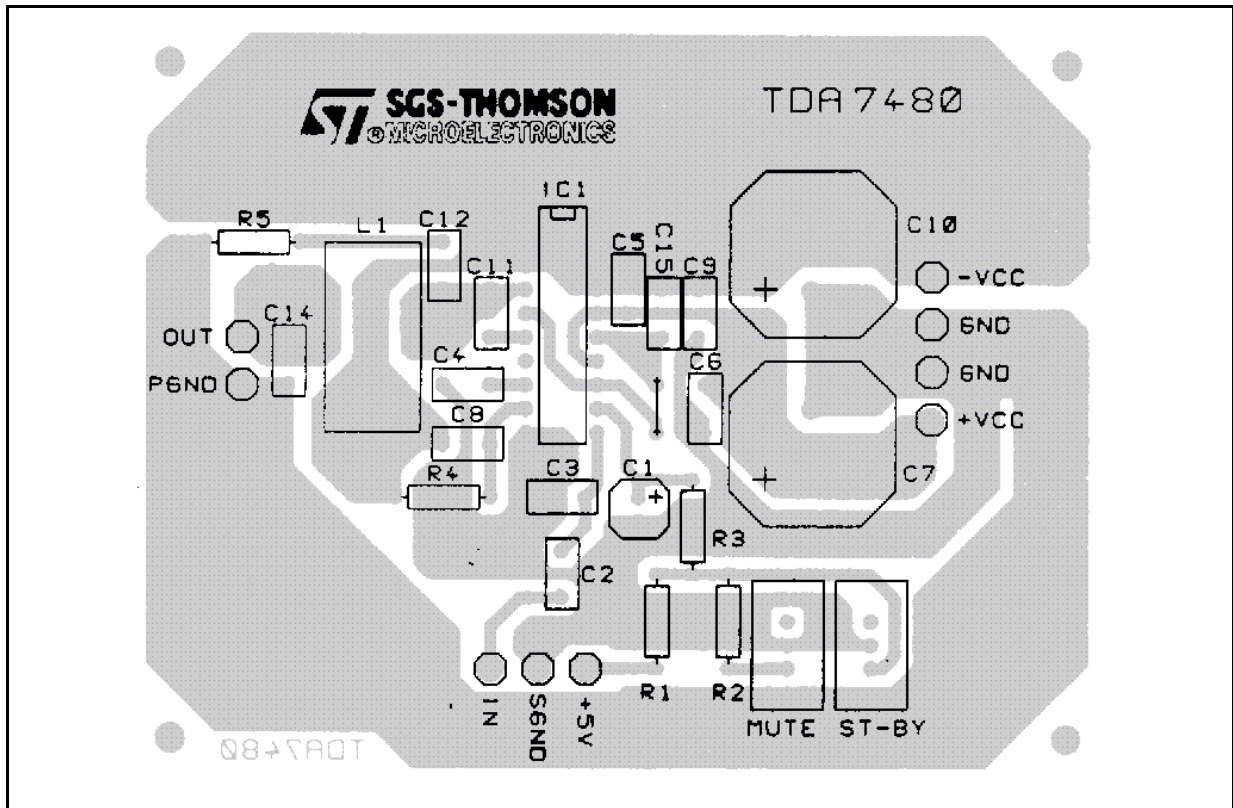
\*\*\*: The zero-signal switching frequency can be obtained using the following expression:  $F_{SW} = B_F/R_F$

\*\*\*\*: The maximum value of  $R_F$  is related to the maximum possible value for the voltage drop on  $R_F$  itself.

(1): For  $V_{12} > 5.2V$ , an input impedance of  $10K\Omega$  is to be considered.

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Figure 2: Recommended P.C. Board and Component Layout of the Circuit of Figure1 (1.25:1 scale).



Note: Capacitor C5 must be as close as possible to device's pins 16 and 17

Figure 3: Stereo Application in Single Supply.

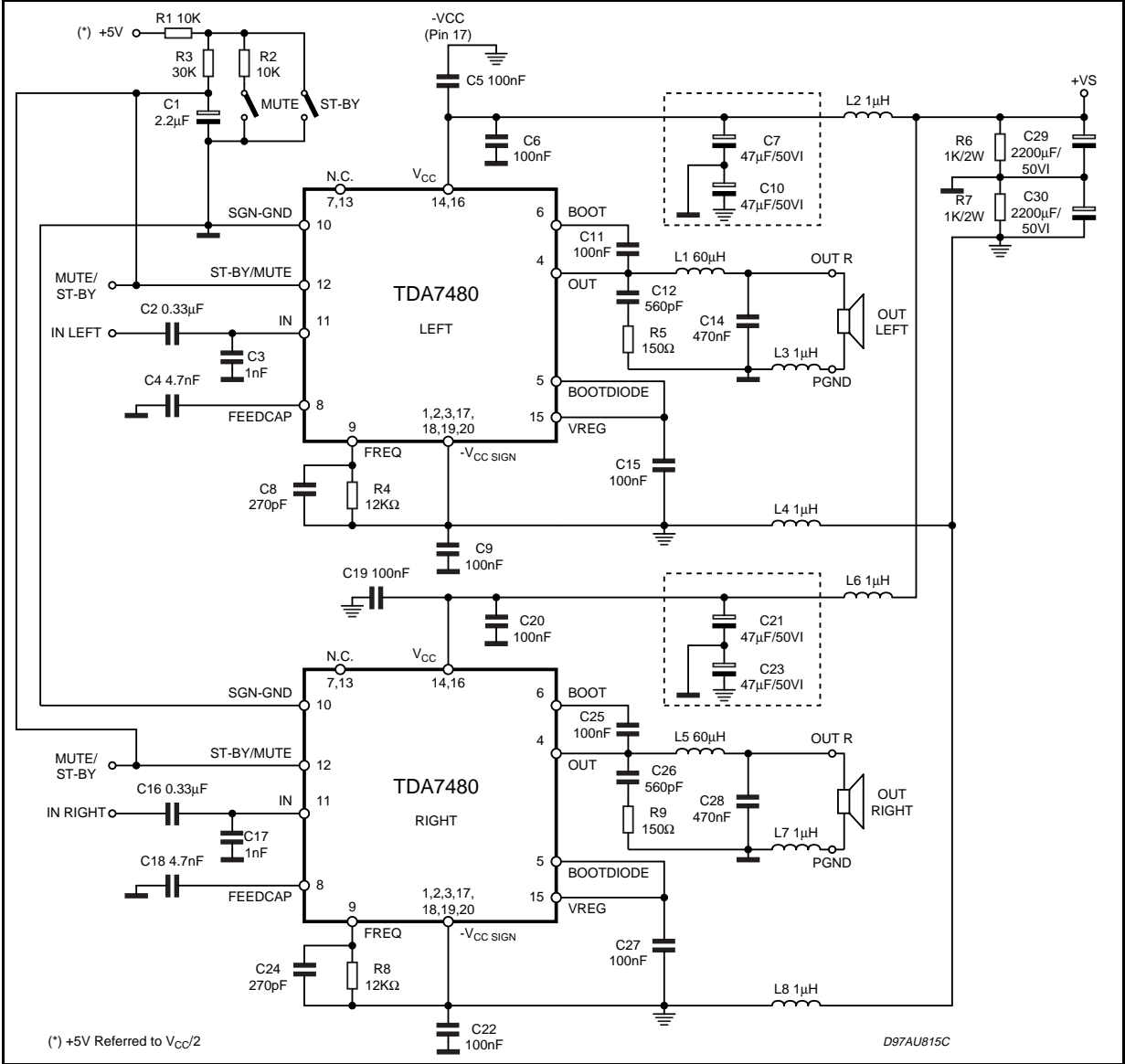
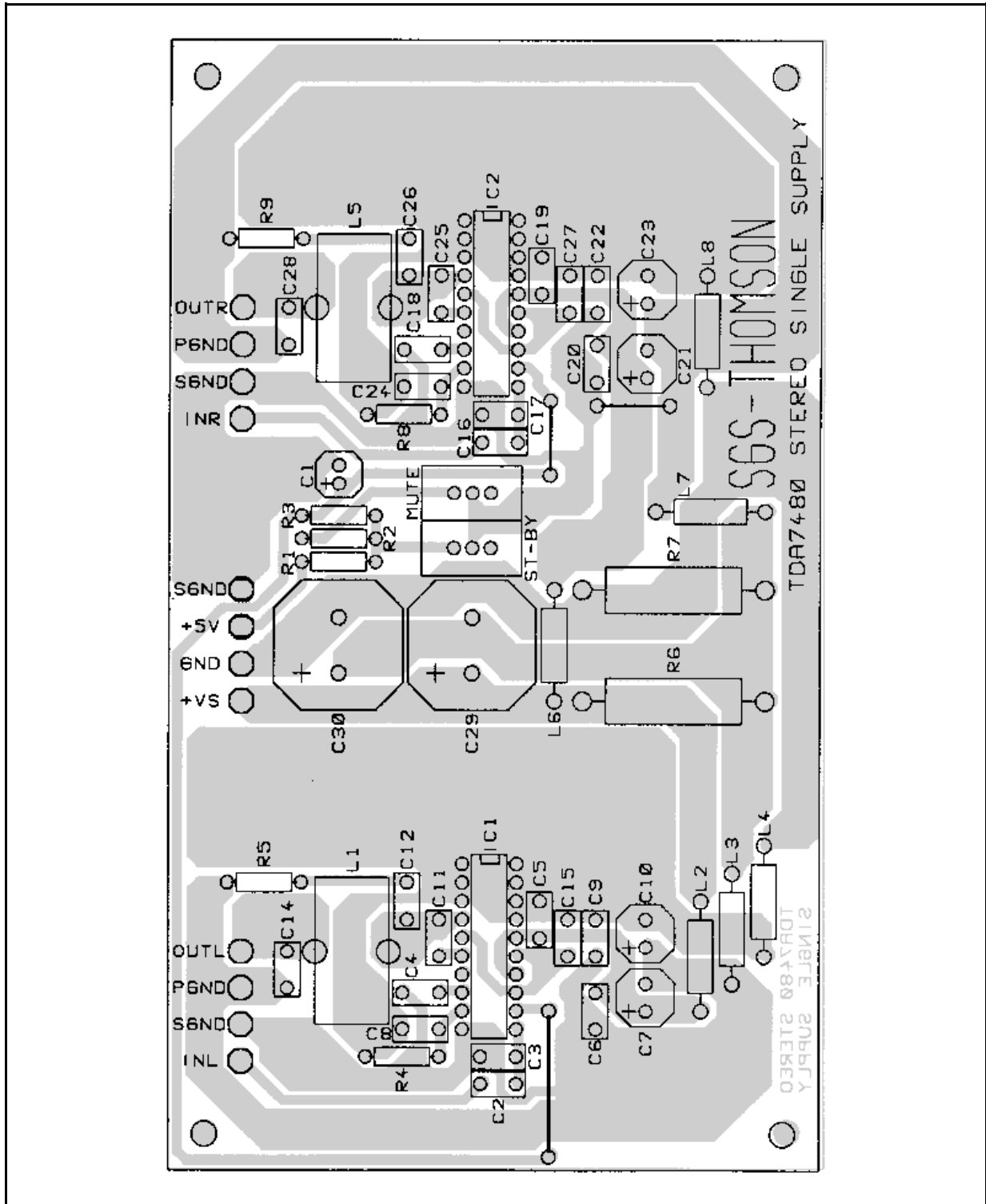
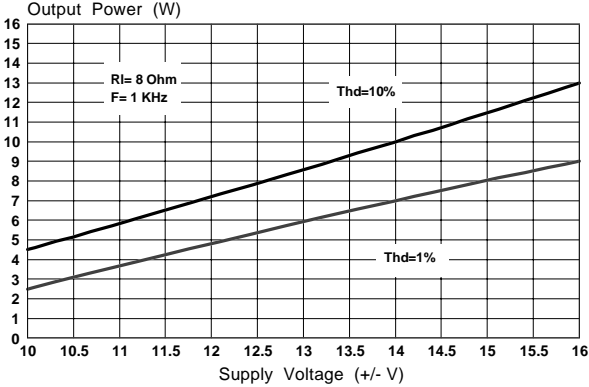


Figure 4: PC Board and component Layout of the Circuit of Figure 3.

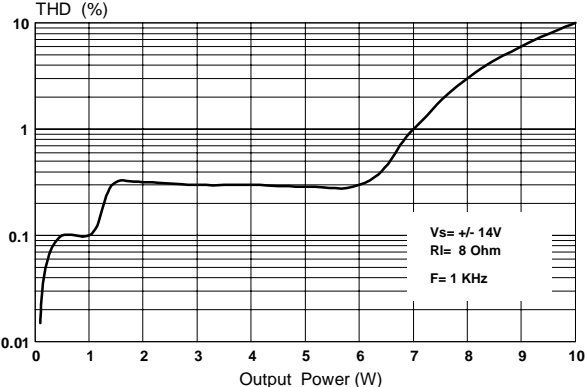


**TYPICAL CHARACTERISTICS** (Application Circuit of fig 1 unless otherwise specified)

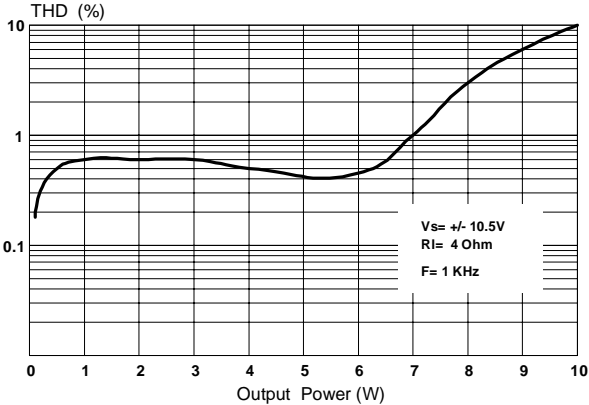
**Figure 5.** Output Power vs. Supply Voltage



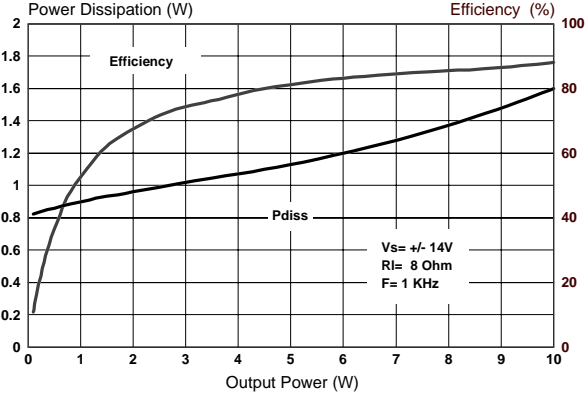
**Figure 6.** Distortion vs. Output Power



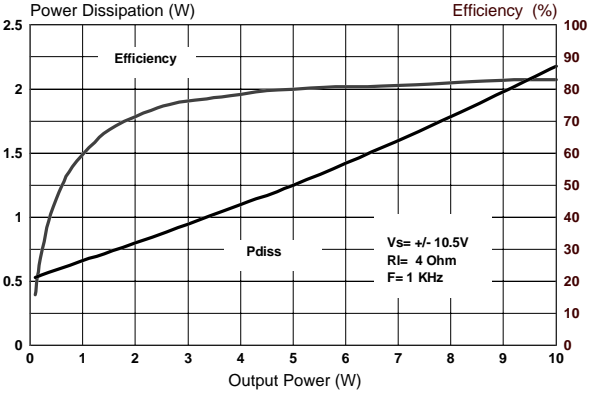
**Figure 7.** Distortion vs. Output Power



**Figure 8.** Power Dissipation and Efficiency vs. Output Power



**Figure 9.** Power Dissipation and Efficiency vs. Output Power



**Figure 10.** Mute Attenuation vs. Vpin 12

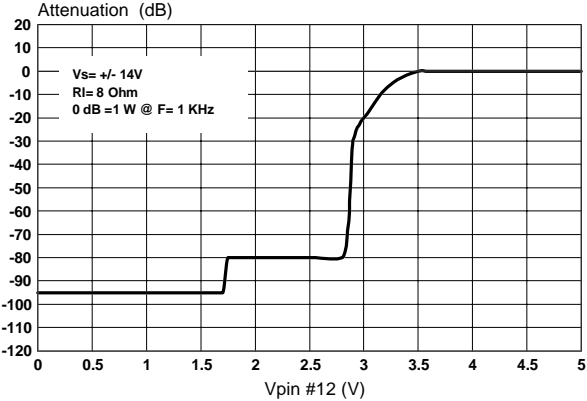
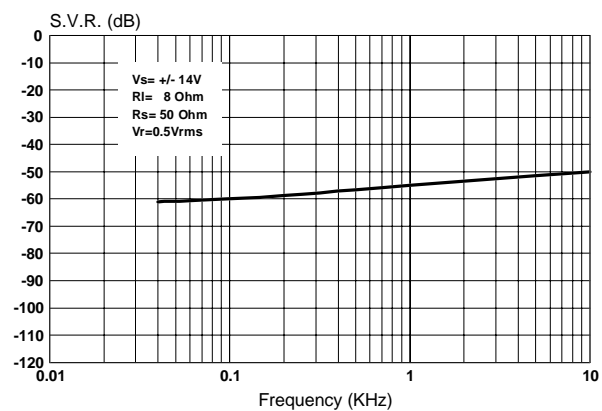


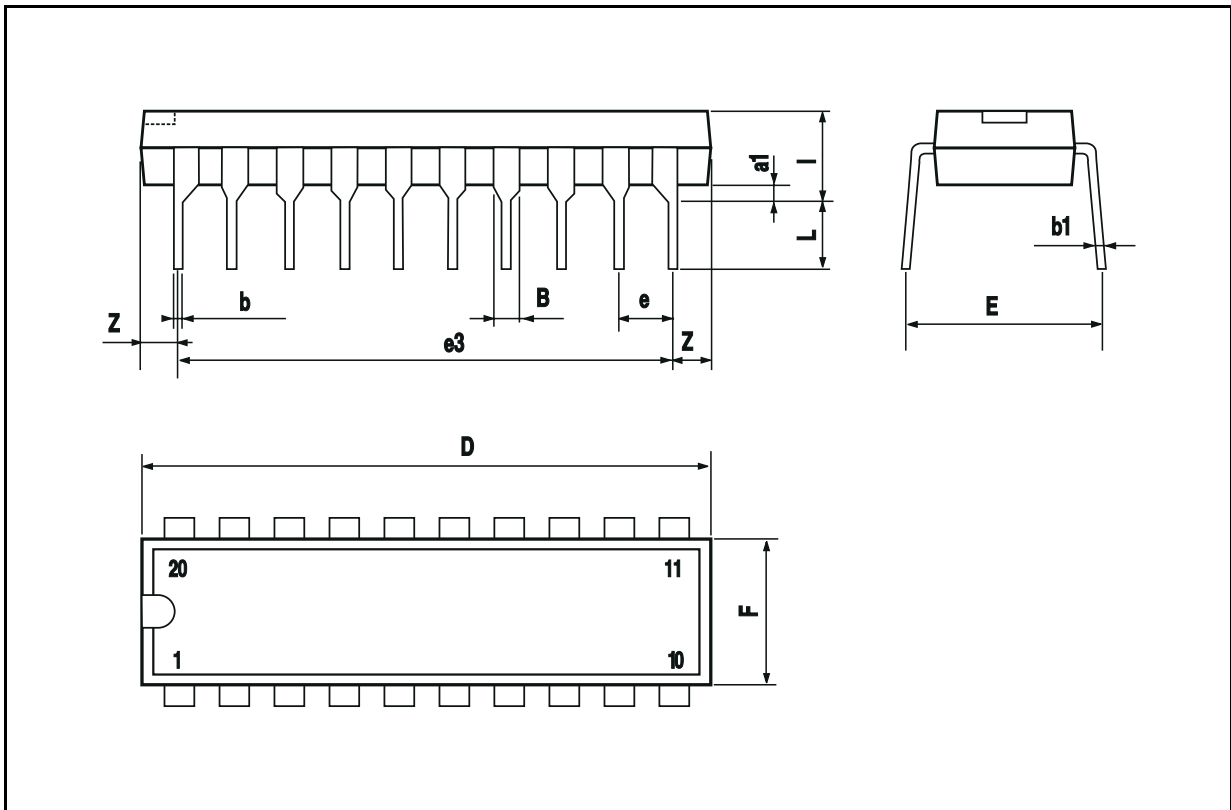
Figure 11. Supply Voltage Rejection vs. Frequency





**POWERDIP20 PACKAGE MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.85		1.40	0.033		0.055
b		0.50			0.020	
b1	0.38		0.50	0.015		0.020
D			24.80			0.976
E		8.80			0.346	
e		2.54			0.100	
e3		22.86			0.900	
F			7.10			0.280
l			5.10			0.201
L		3.30			0.130	
Z			1.27			0.050



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