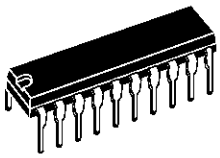
SGS-THOMSON MICROELECTRONICS

TDA7480

10W MONO CLASS-D AMPLIFIER

PRODUCT PREVIEW

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



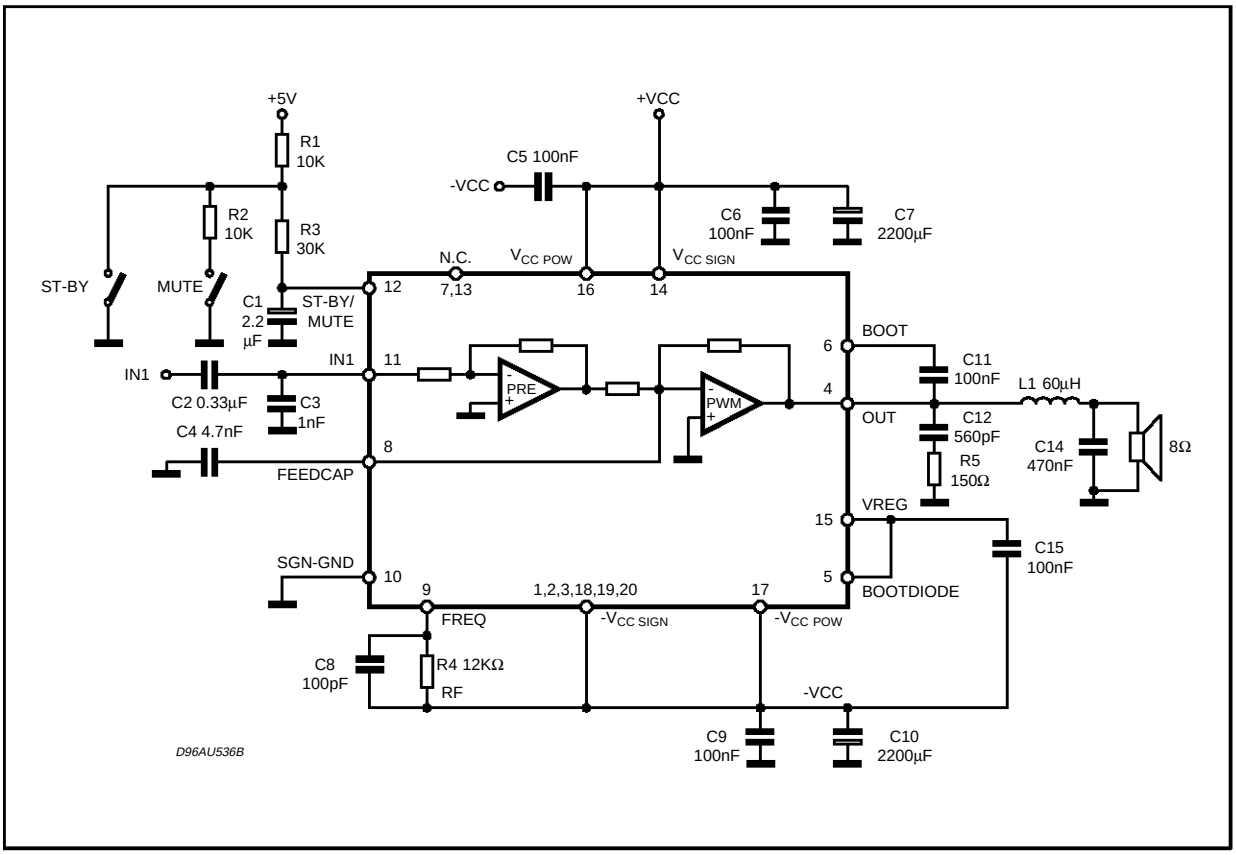
PDIP20 (14+3+3)

ORDERING NUMBER: TDA7480

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.

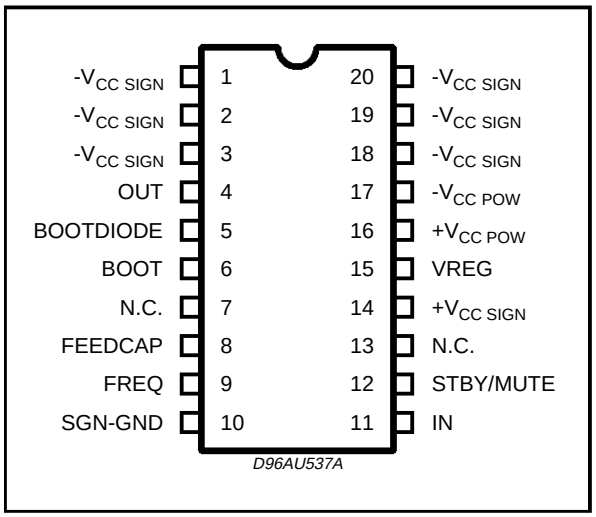
Figure 1: Test and Application Circuit.



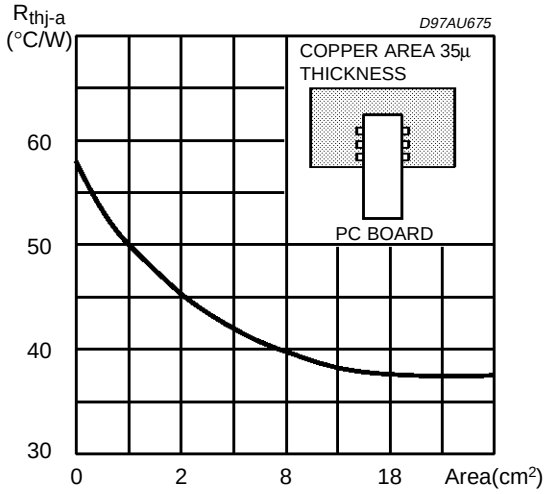
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage	±20	V
T_{stg}, T_j	Storage and Junction Temperature	–40 to 150	°C
V_{RFmax}	Maximum Voltage Across RF	8	V
T_{op}	Operating Temperature Range	0 to 70	°C

PIN CONNECTION (Top view)



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



THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction to ambient		80	°C/W
$R_{th\ j\text{-}pin}$	Thermal Resistance Junction to Pin	Max.	12	°C/W

PIN FUNCTIONS

N.	Name	Function
1	-V_{CC} SIGN	SIGNAL NEGATIVE SUPPLY.
2	-V_{CC} SIGN	SIGNAL NEGATIVE SUPPLY.
3	-V_{CC} SIGN	SIGNAL 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	CONTROL STATE 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} POW	NEGATIVE POWER SUPPLY
18	-V_{CC} SIGN	NEGATIVE SIGNAL SUPPLY
19	-V_{CC} SIGN	NEGATIVE SIGNAL SUPPLY
20	-V_{CC} SIGN	NEGATIVE SIGNAL SUPPLY

ELECTRICAL CHARACTERISTICS (Refer to the test circuit, V_{CC} = ±13V; R_L = 8Ω; R_S = 50Ω; R_{f1} = 12KΩ; Demod.. filter L = 60µH, C = 470nF; f = 1KHz; T_{amb} = 25°C unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_S	Supply Range		±10		±13	V
I_q	Total Quiescent Current	$R_L = \infty$		30		mA
V_{OS}	Output Offset Voltage		–50		+50	mV
P_O	Output Power	THD = 10% THD = 1%		10 6.5		W W
		R_L = 4Ω V_{CC} = ±10V THD = 10% THD = 1%		 10 6.5		 W W
P_d (*)	Dissipated Power at 1W Output Power	V_{CC} = ±13V; R_L = 8Ω; R_f = 12KΩ P_O = 1W		1		W
P_{DMAX}	Maximum Dissipated Power	V_{CC} = ±13V; R_L = 8Ω; R_f = 12KΩ P_O = 10W THD 10% $R_{th\text{-}j\text{-}amb}$ = 38°C/W (Area 12cm^2)		1.8		W
η	Efficiency ≡ $\frac{P_O}{P_O + P_D} \equiv \frac{P_O}{P_I}$ (**)	V_{CC} = ±13V; R_L = 8Ω; R_f = 12KΩ P_O ≥10W THD 10% $R_{th\text{-}j\text{-}amb}$ = 38°C/W (Area 12cm^2)		85		%
THD	Total Harmonic Distortion	R_L = 8Ω; 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		°C
G_V	Closed Loop Gain			30		dB
e_N	Total Input Noise	A Curve f = 20Hz to 22KHz		7 12		µV µV
R_i	Input Resistance			30		kΩ
SVR	Supply Voltage Rejection	f = 100Hz; V_r = 0.5		60		dB
T_r, T_f	Rising and Falling Time			50		ns
R_{DSON}	Power Transistor on Resistance			0.4		Ω
F_{SW}	Switching Frequency Range		100		200	KHz
B_F	Zero Signal Frequency Constant (***)			1.4x10^9		HzΩ
R_F	Frequency Controller Resistor Range (****)		7	12	14	KΩ
MUTE & STAND-BY FUNCTIONS						
$V_{ST\text{-}BY}$	Stand-by range		0		0.7	V
V_{MUTE}	Mute Range		1.7		2.5	V
V_{PLAY}	Play Range		4		5	V
A_{MUTE}	Mute Attenuation			60		dB
$I_{qST\text{-}BY}$	Quiescent Current @ Stand-by			3		mA

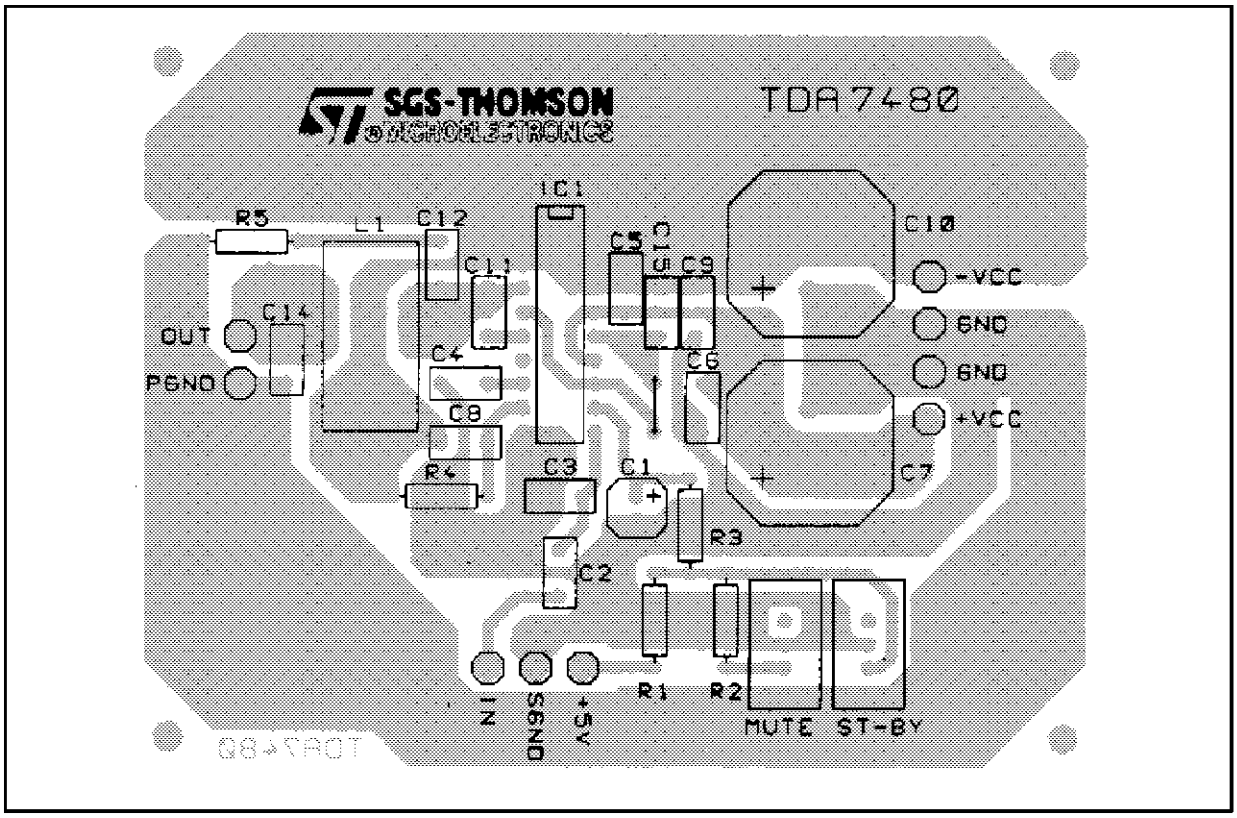
*: The output average power when the amplifier is playing music can be considered roughly 1/10 of the maximum output power. So it is usefull consider the disssipated power in this condition for thermal dimensioning.

**: P_O = measured across the load using the following inductor:
COIL 58120 MPPA2 (magnetics) TURNS: 28 ∅ 1mm
COIL77120 KOOL Mµ (magnetics) TURNS: 28 ∅ 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.

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



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
I			5.10			0.201
L		3.30			0.130	
Z			1.27			0.050