

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

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.

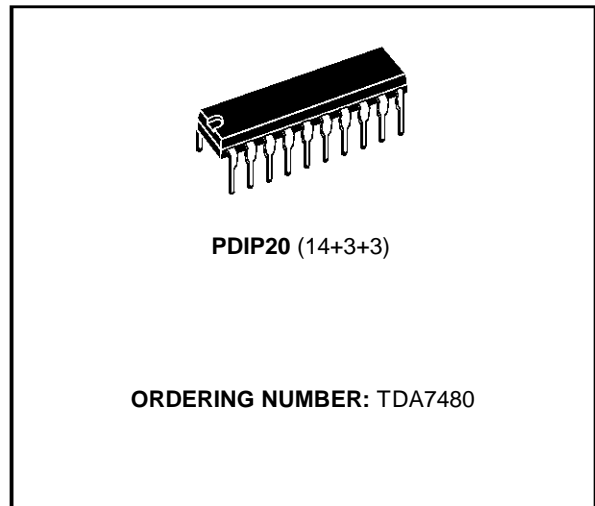
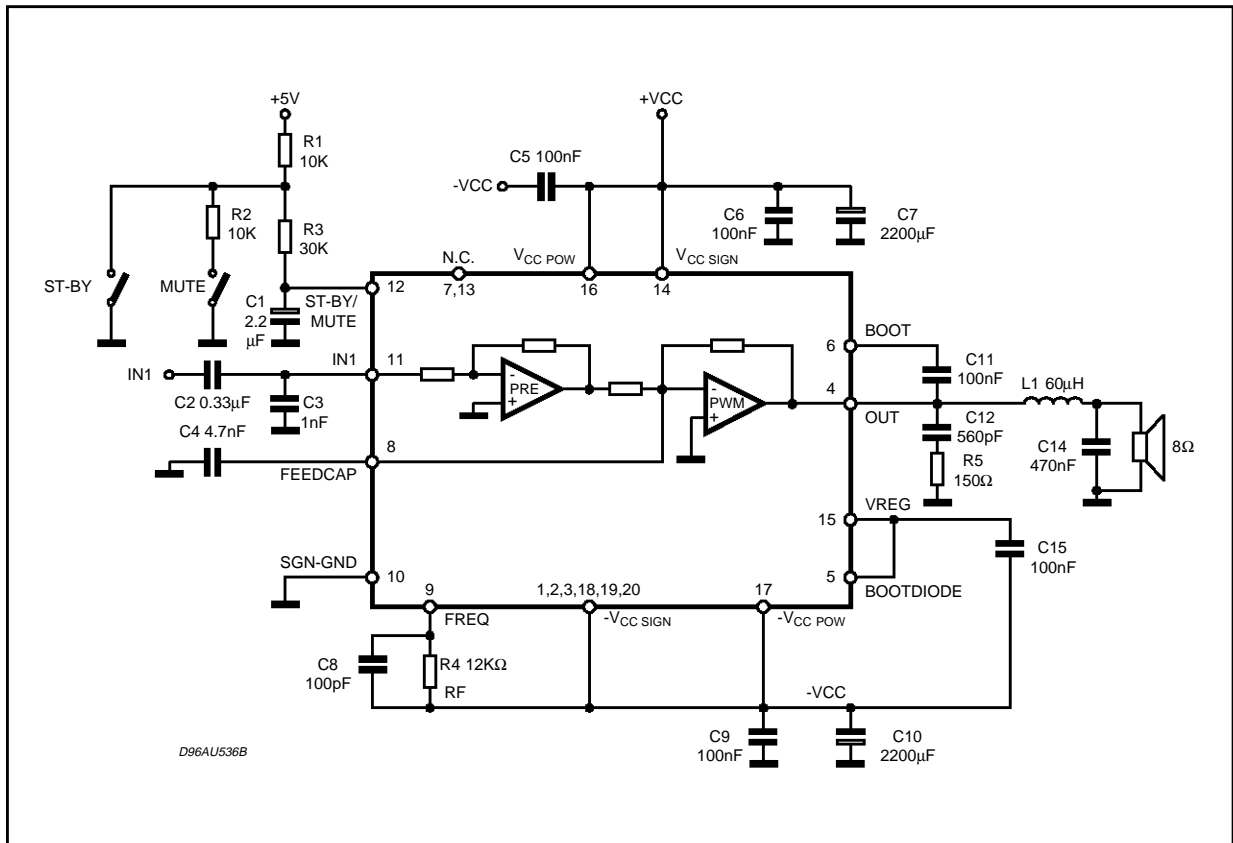


Figure 1: Test and Application Circuit.

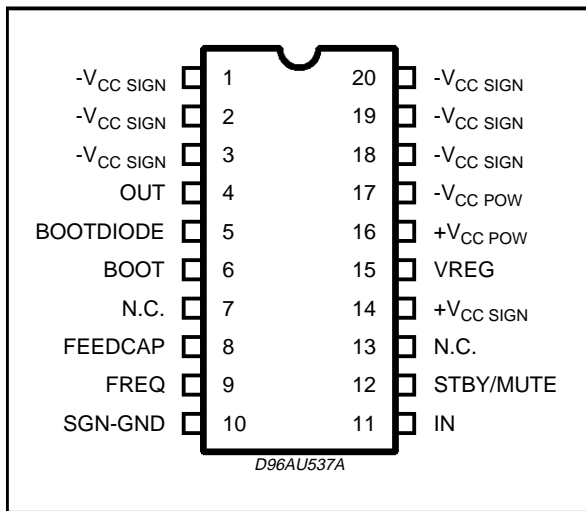


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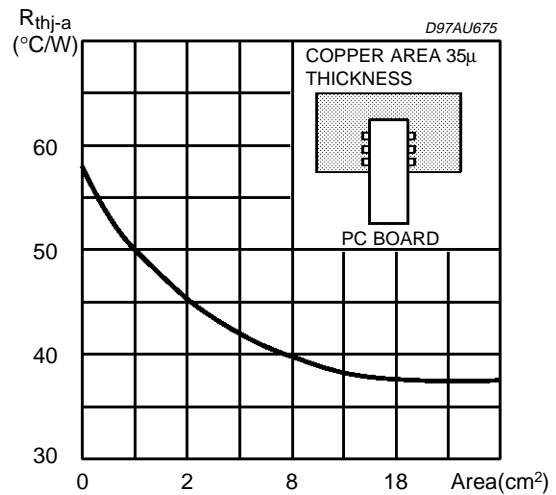
ABSOLUTE MAXIMUM RATINGS

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

PIN CONNECTION (Top view)



R_{th} 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} 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, $V_{CC} = \pm 13V$; $R_L = 8\Omega$; $R_S = 50\Omega$; $R_{f1} = 12K\Omega$; 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		± 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
		$R_L = 4\Omega$ $V_{CC} = \pm 10V$ THD = 10% THD = 1%		10 6.5		W W
P_d (*)	Dissipated Power at 1W Output Power	$V_{CC} = \pm 13V$; $R_L = 8\Omega$; $R_f = 12K\Omega$ $P_O = 1W$		1		W
P_{DMAX}	Maximum Dissipated Power	$V_{CC} = \pm 13V$; $R_L = 8\Omega$; $R_f = 12K\Omega$ $P_O = 10W$ THD 10% $R_{th-j-amb} = 38^\circ C/W$ (Area $12cm^2$)		1.8		W
η	Efficiency $\equiv \frac{P_O}{P_O + P_D} \equiv \frac{P_O}{P_I}$ (**)	$V_{CC} = \pm 13V$; $R_L = 8\Omega$; $R_f = 12K\Omega$ $P_O \geq 10W$ THD 10% $R_{th-j-amb} = 38^\circ C/W$ (Area $12cm^2$)		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			30		dB
e_N	Total Input Noise	A Curve $f = 20Hz$ to $22KHz$		7 12		μV μV
R_i	Input Resistance			30		$k\Omega$
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 (***)			1.4×10^9		Hz Ω
R_F	Frequency Controller Resistor Range (****)		7	12	14	K Ω
MUTE & STAND-BY FUNCTIONS						
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_{MUTE}	Mute Attenuation			60		dB
I_{qST-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 useful consider the dissipated power in this condition for thermal dimensioning.

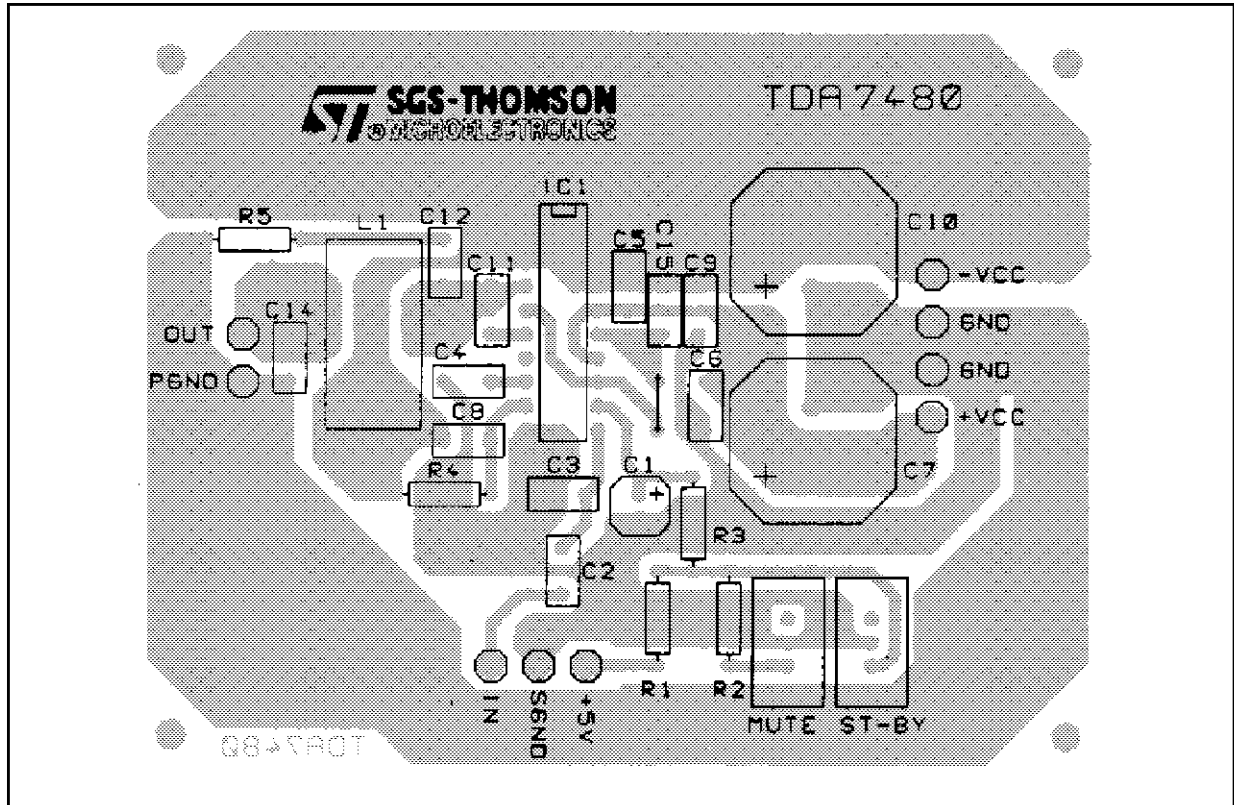
**: P_O = measured across the load using the following inductor:
COIL 58120 MPPA2 (magnetics) TURNS: 28 \varnothing 1mm
COIL77120 KOOL M μ (magnetics) TURNS: 28 \varnothing 1mm

***: 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.

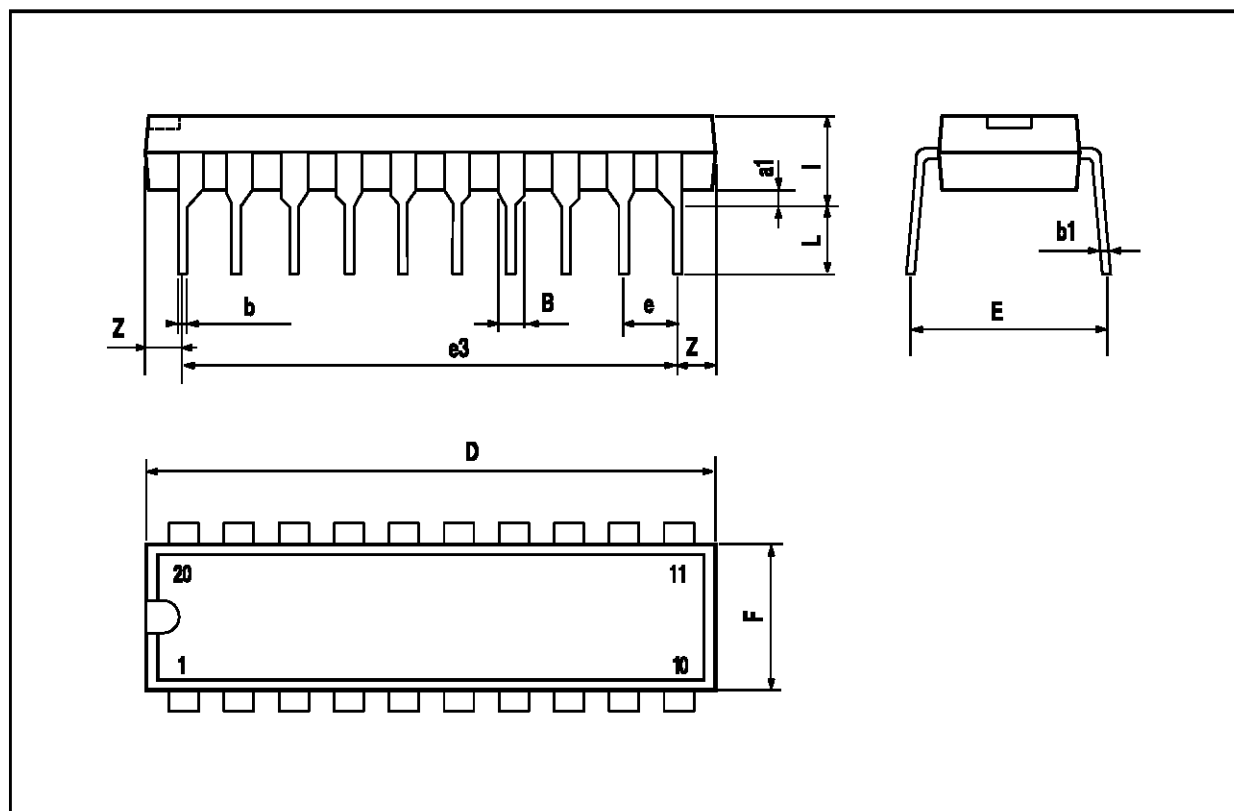
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Figure 2: P.C. Board and Component Layout of the Circuit of Figure1 (1.25:1 scale).



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



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