

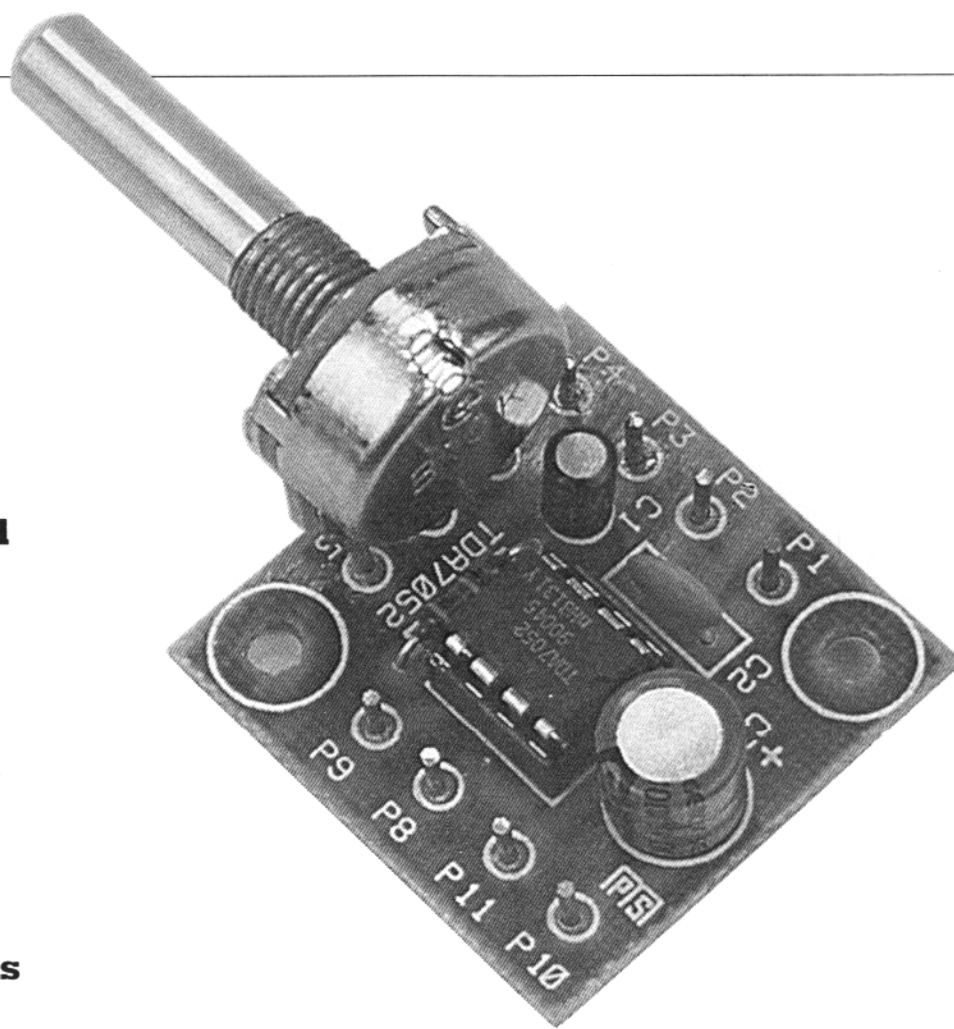
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TDA7052

1 WATT POWER AMPLIFIER

- ★ **Low Component Count**
- ★ **Low Power Consumption**
- ★ **Short Circuit Protected**
- ★ **No External Heatsink Needed**
- ★ **Kit Available**

- ★ **Radio Receivers**
- ★ **Cassette Recorders**
- ★ **Intercoms**
- ★ **Baby Alarms**
- ★ **Speech Synthesis Systems**



by **Gavin Cheeseman**

Introduction

The TDA7052 is a 1 watt mono amplifier which is ideal for use in low power battery operated or similar equipment. Because it requires very little in the way of external components to function, the device is ideal for use in portable apparatus. Figure 1 shows the IC pinout and Table 1 lists some typical electrical characteristics for the device. A block diagram of the IC is shown in Figure 2.

IC Description

The device makes use of the 'Bridge Tied Load' principle allowing relatively high power to be developed into an 8Ω load at low voltages. Using this method it is possible to achieve output powers up to 1.2W into 8Ω at 6V with 10% distortion. In addition to power supply voltage, temperature also plays an important part in setting the maximum power limit for the device. The package is capable of dissipating higher power at

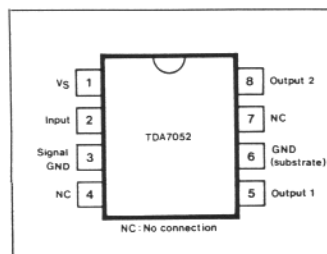


Figure 1. IC Pinout.

lower temperatures and this is illustrated by the power derating curve shown in Figure 3. Amplifier gain is internally set to approximately 40dB making the device suitable for

direct amplification of comparatively small signals to a suitable level to drive a loudspeaker directly. Input impedance is typically around $100k\Omega$, so input attenuators are fairly easy to implement.

IC Power Supply Requirements

The TDA7052 will operate over a wide range of power supply voltages between 3V and 15V. As with all amplifiers, it is important that the power

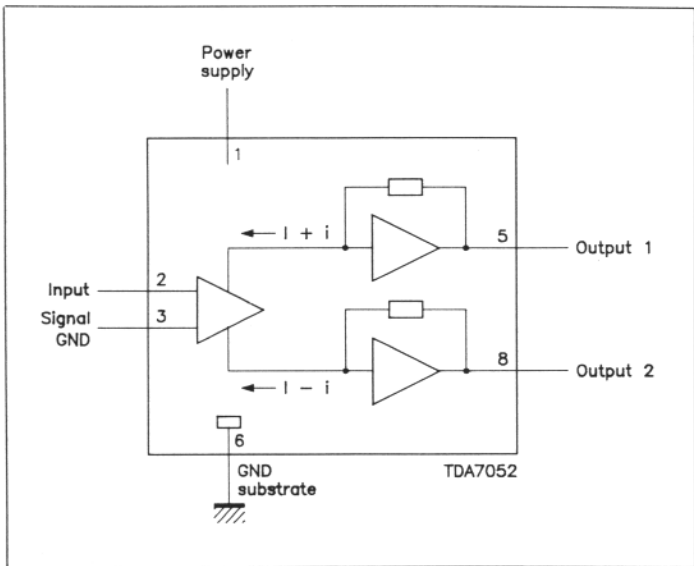


Figure 2. IC Block Diagram.

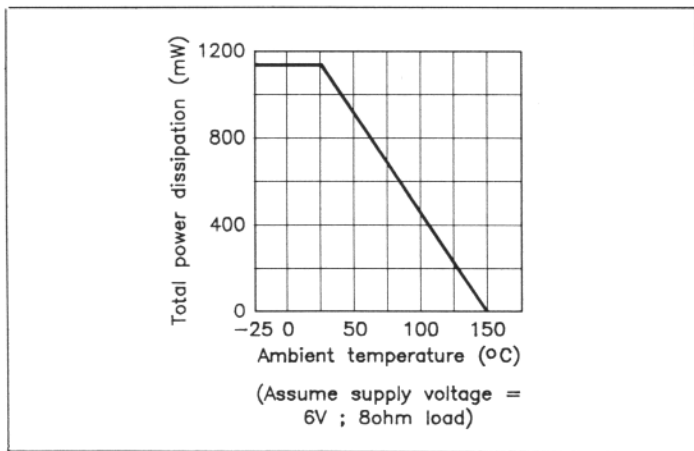


Figure 3. Power Derating Curve.

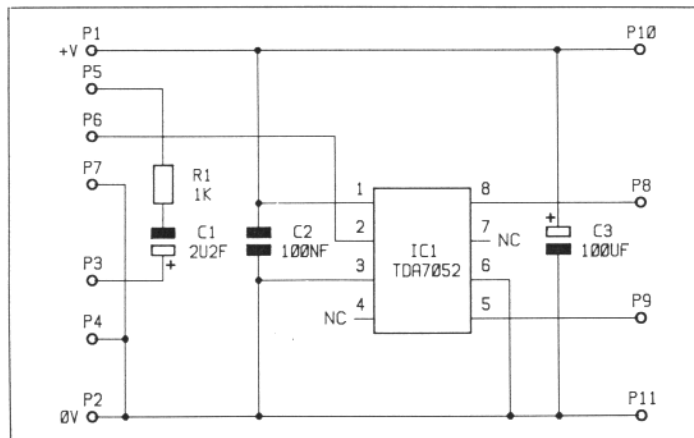


Figure 4. Circuit Diagram.

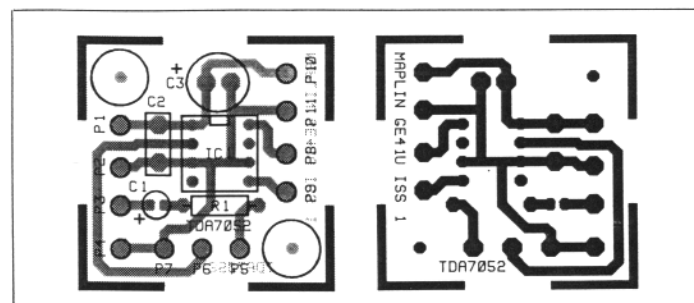


Figure 5. PCB Layout.

supply is properly de-coupled at both high and low frequencies; this prevents any mains derived noise being introduced into the system and also helps to reduce the possibility of instability. IC current consumption is dependent on the load being driven and the amount of power developed. The quiescent current is typically around 4mA. Low voltage operation and the requirement of very few external components makes the TDA7052 ideal for battery operated equipment. The type of battery used will be determined by the maximum current consumption under full load and also of course by the size of the equipment into which the amplifier is to be incorporated.

TDA7052 kit

A kit of parts including a high quality fibreglass PCB is available as an aid to constructors, for a simple application circuit using the TDA7052. Figure 4 shows the circuit diagram of the module and Figure 5 shows the PCB layout.

For wiring information refer to Figure 6. PCB pins, P5, P6 and P7 provide for the connection of a rotary potentiometer volume control (RV1) and this component may either be soldered directly to the pins or connected by a short run of cable as appropriate. Long lengths of cable should not be used for this purpose because the amplifier has a high input

impedance and the use of long leads at the input could cause instability problems.

A 3V to 15V power supply that is capable of delivering at least 400mA is required to power the circuit. If a mains derived DC power supply is used it is important that this is adequately de-coupled to prevent the introduction of low frequency noise (mains hum) into the system. Power supply connections are made to P1(+V) and P2(0V).

It is a good idea to use screened lead for input connections to the amplifier module as this helps prevent pickup of external noise and reduces any stray coupling between the input and output; this is particularly important where low level signals are involved. Input signals are applied to P3 (i/p) and P4 (0V) and output (loudspeaker) connections are made to P8 and P9. PCB pins P10 (+V) and P11 (0V) are provided for additional power supply connections to auxiliary

The overall gain of the module is set by the values of R1 and RV1 which act as a potential divider network, attenuating the input signal. With the component values supplied in the kit, the gain of the circuit with RV1 set at maximum is approximately 39dB. Optimum performance and maximum power is achieved when the amplifier is operating into an 8Ω load; however, higher impedance loads may be used with a reduction in output power. A suitable loudspeaker for general purpose use is Maplin stock code YT25C.

Parameter	Conditions	Min	Typ	Max
Supply Voltage		3V	6V	15V
Supply Current	Quiescent, Load Disconnected	4mA		8mA
Output Power	THD = 10%, 8Ω Load		1.2W	
Voltage Gain		39dB	40dB	41dB
Total Harmonic Distortion (THD)	Output Power = 0.1W		0.2%	1.0%
Frequency Response		20Hz		20kHz
Output Offset Voltage	Source Impedance (Rs) = 5kΩ		100mV	
Input Impedance			100kΩ	
Input Bias Current			100nA	300nA
Storage Temperature		-65°C		+150°C

The above specification applies to: power supply = 6V, output load = 8Ω, signal frequency = 1kHz, ambient temperature = 25°C unless otherwise noted.

Table 1. TDA7052 Typical Electrical Characteristics.

Applications

Being a general purpose module, the TDA7052 1 Watt Power Amplifier is suitable for use in many different applications where simple but

effective audio power amplification is needed. Typical uses for the module could include low power audio amplification in portable radios, cassette recorders and related devices. Also, the high

gain capability of the circuit makes it ideal for use in intercoms and baby alarms, where the module may be used to amplify signals from a microphone with very little pre-amplification to a suitable

level to drive a loudspeaker directly. Finally, Table 2 shows the specification of the prototype TDA7052 1 Watt Power Amplifier Module.

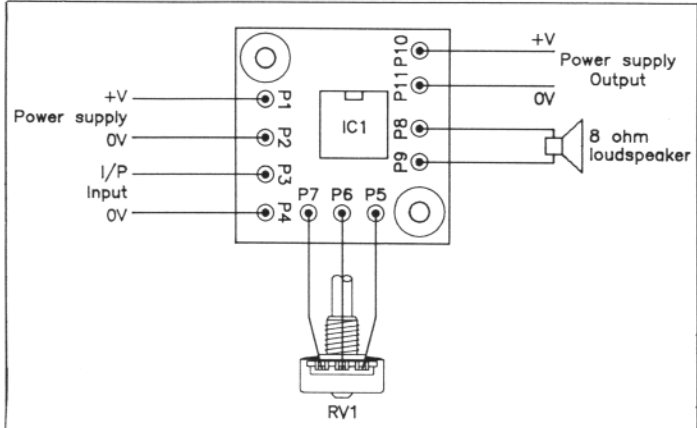


Figure 6. Wiring Diagram.

Power Supply Voltage Range	3V - 15V
Power Supply Current (Quiescent)	4mA at 6V
Power Supply Current (Maximum)	340mA at 6V (For output power = 1W into 8Ω load)
Total Harmonic Distortion (at 1kHz)	0.7% at 0.1W
Output Power (Maximum)	1W RMS at 6V
Voltage Gain (1kHz)	39dB
PCB Size Approximately	32mm x 32mm

Table 2. Specification of Prototype TDA7052 1W Amplifier.

TDA7052 1 WATT POWER AMPLIFIER PARTS LIST

Resistors: All 1% 0.6W Metal Film

R1	1k	1	(M1K)
RV1	10k Log. Min. Pot.	1	(JM77)

Capacitors

C1	2μ2F 63V Minelect	1	(YY32K)
C2	100nF Ceramic	1	(YR75S)
C3	100μF 16V Minelect	1	(RA55K)

Semiconductors

IC1	TDA7052	1	(UK79L)
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Miscellaneous

P1 - 11	Pins 2145	11	(FL24B)
	DIL Socket 8-Pin	1	(BL17T)
	PC Board	1	(GE41U)
	Constructors Guide	1	(XH79L)

A complete kit of parts is available:
Order As LP16S (TDA7052 1W Amp Kit)



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