

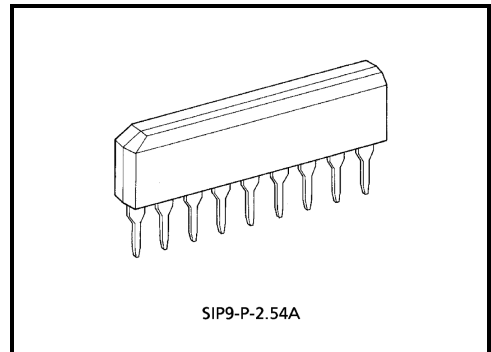
TA7376P

Audio Power Amplifier

The TA7376P is dual audio power amplifier for portable products.

Features

- Low operating supply voltage: $V_{CC} = 1.8\sim 6V$ ($T_a = 25^\circ C$)
- Low quiescent current: $I_{CCQ} = 5.3mA$
($V_{CC} = 4.5V$)
- Including ripple filter circuit: $RR = -42dB$
($CRIP = 10\mu F, f_r = 100Hz$)
- Voltage gain: $G_V = 39.5dB$ (typ.)
- Very few external parts and small package. (SIP-9pin)

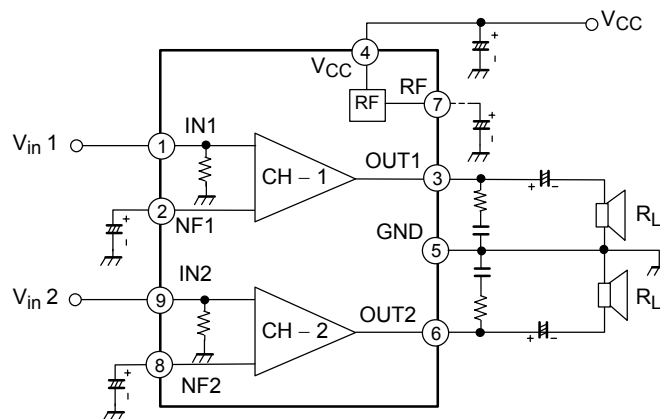


Weight: 0.92g (typ.)

Output Power Table (THD = 10%, f = 1kHz, Stereo, Typ. value)

V_{CC} \ Load	$R_L = 32\Omega$	$R_L = 16\Omega$	$R_L = 8\Omega$	$R_L = 4\Omega$
3V	21mW	38mW	65mW	100mW
4.5V	56mW	100mW	180mW	300mW
6V	120mW	230mW	400mW	—

Block Diagram



Application Note

1. Input stage

The input stage of power amplifier (equivalent circuit) is comprised of a PNP differential pair (Q2 and Q3) preceded by a PNP emitter follower (Q1) which allows DC referencing of the source signal to ground.

This eliminates the need for an input coupling capacitor.

However, in case the brush noise of volume becomes a problem, provide serially a coupling capacitor to the input side.

2. Adjustment of voltage gain

The voltage gain is fixed at $G_V \cong 40\text{dB}$ by the resistors (R1 and R2) in IC, however, its reduction is possible through adding Rf as shown in Fig.2.

In this case, the voltage gain is obtained by the following equation.

$$G_V \cong 20 \log \frac{R_1 + R_2 + R_f}{R_1 + R_f}$$

It is recommended to use this IC with the voltage gain of $G_V \cong 30\text{dB}$ or over.

3. Ripple rejection ratio (RR)

If the TA7376P does not have the ripple filter condenser (CRIP), the ripple rejection ratio is as follow.

$$RR = -25\text{dB (typ.)}$$

$$\text{(CNF} = 22\mu\text{F, } f_r = 100\text{Hz)}$$

$$RR = -34\text{dB (typ.)}$$

$$\text{(CNF} = 100\mu\text{F, } f_r = 100\text{Hz)}$$

If the ripple filter condenser is connected to the pin(7), the ripple rejection ratio is improved as following the DATA (RR-f_r).

4. Pop sound

It must be connected the condenser (CRIP) from pin(7) to GND, if the "Pop" sound is harshness.

In this case, the value is 10μF something.

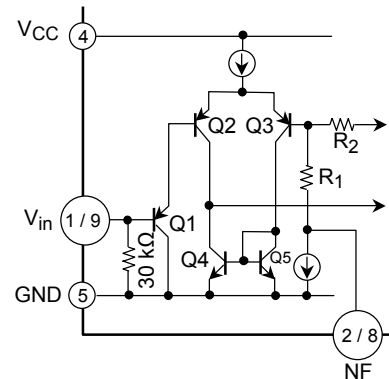


Fig.1

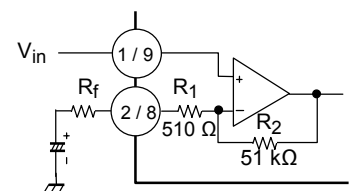


Fig.2

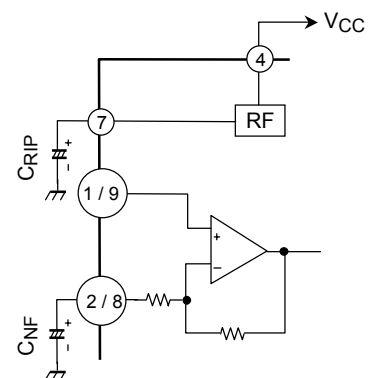


Fig.3

5. Phase-compensation

The purpose of condenser C₁ is to prevent oscillation.

These condenser need to be small temperature coefficient and excellent frequency characteristic. So ceramic condenser is unsuitable.

Condenser C₂ is rather large value than 10μF and GND line is better to short and wide lay-out so that the some common impedance are decreased.

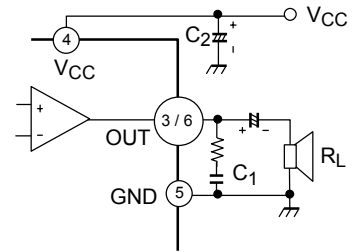


Fig.4

Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Supply voltage	V _{CC}	8	V
Power dissipation	P _D (Note)	950	mW
Operation temperature	T _{opr}	-25~75	°C
Storage temperature	T _{stg}	-55~150	°C

(Note) Derated above Ta = 25°C in the proportion of 7.6mW / °C.

Electrical Characteristics

(unless otherwise specified, V_{CC} = 4.5V, f = 1kHz, R_g = 600Ω, R_L = 4Ω, Ta = 25°C)

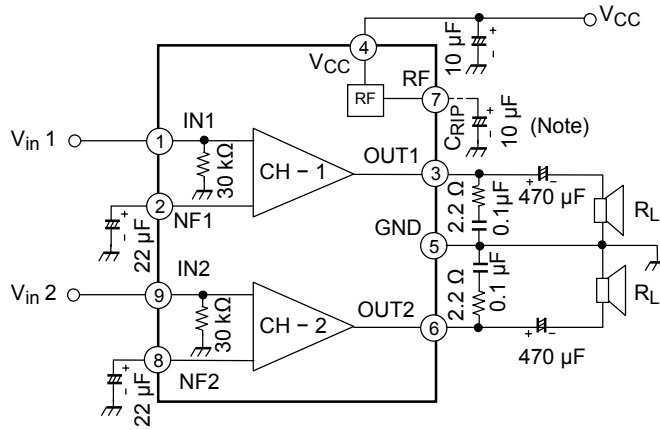
Characteristic	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Quiescent current	I _{CCQ}	—	V _{in} = 0, V _{CC} = 3V	—	4.9	8.0	mA
			V _{in} = 0	—	5.3	10.0	
			V _{in} = 0, V _{CC} = 6V	—	5.7	14.0	
Output power	P _{out}	—	V _{CC} = 3V, R _L = 4Ω, THD = 10%	84	100	—	mW
			V _{CC} = 3V, R _L = 32Ω, THD = 10%	—	21	—	
			V _{CC} = 4.5V, R _L = 4Ω, THD = 10%	250	300	—	
			V _{CC} = 4.5V, R _L = 8Ω, THD = 10%	—	180	—	
			V _{CC} = 6V, R _L = 8Ω, THD = 10%	—	400	—	
Total harmonic distortion	THD	—	P _{out} = 100mW	—	0.11	1.0	%
Voltage gain	G _V	—	V _{out} = 0.775V _{rms}	37.5	39.5	41.5	dB
Output noise voltage	V _{no}	—	R _g = 10Ω, BPF = 20Hz~20kHz	—	0.21	0.7	mV _{rms}
Ripple rejection ratio	RR	—	C _{RIP} = 10μF, C _{NF} = 22μF f _r = 100Hz, V _r = 0.38V _{rms}	—	-42	-30	dB
			C _{RIP} = OPEN, C _{NF} = 100μF f _r = 100Hz, V _r = 0.38V _{rms}	—	-34	—	
Cross talk	CT	—	V _{out} = 0.775 V _{rms}	—	-60	-40	dB
Input resistance	R _{IN}	—	—	—	30	—	kΩ

Quiescent Terminal DC Voltage (V_{CC} = 4.5V, Ta = 25°C, typ. value)

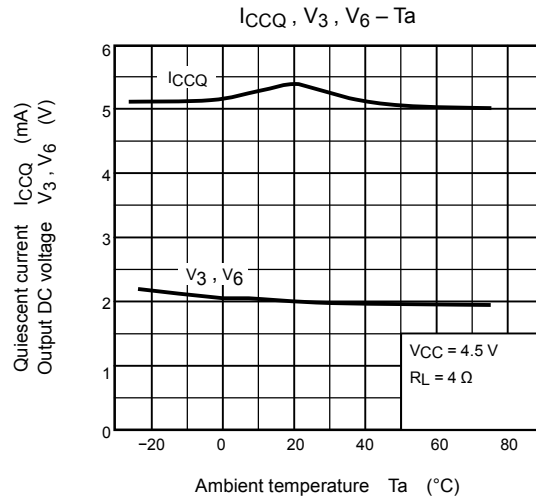
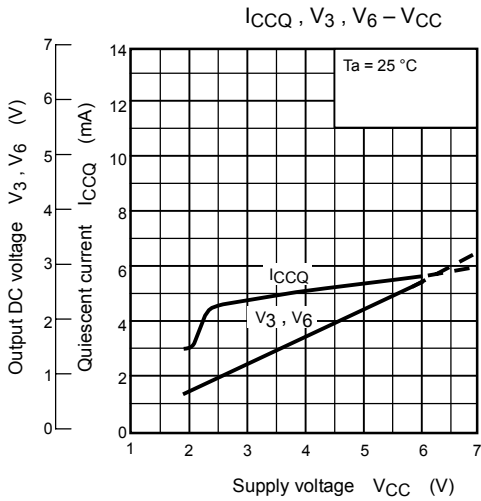
[Unit: V]

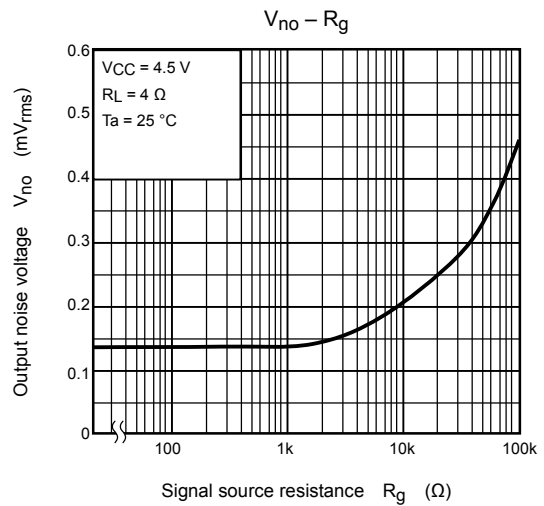
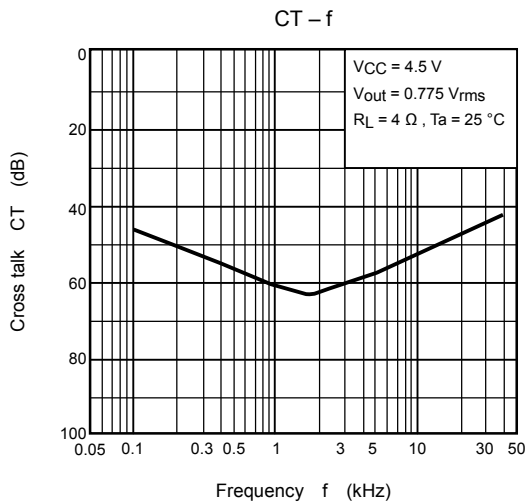
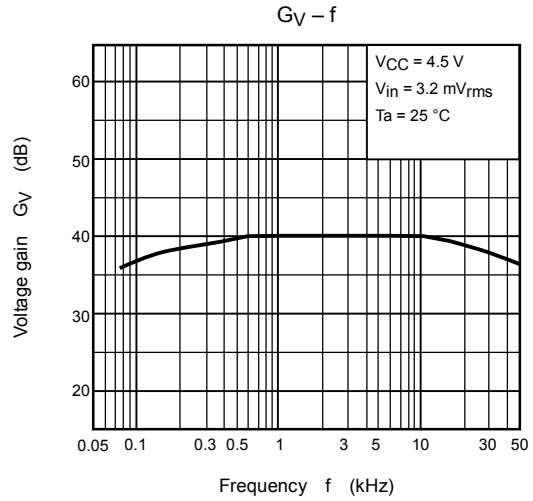
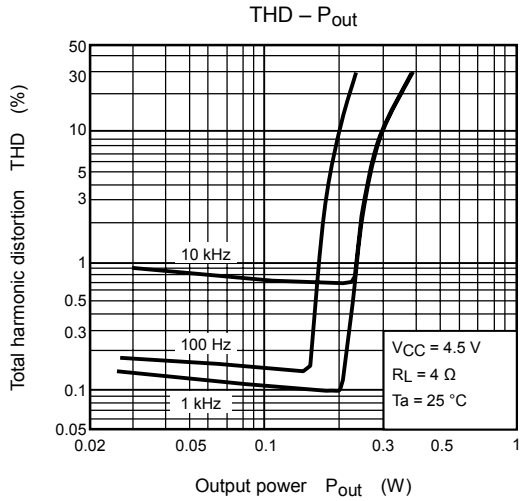
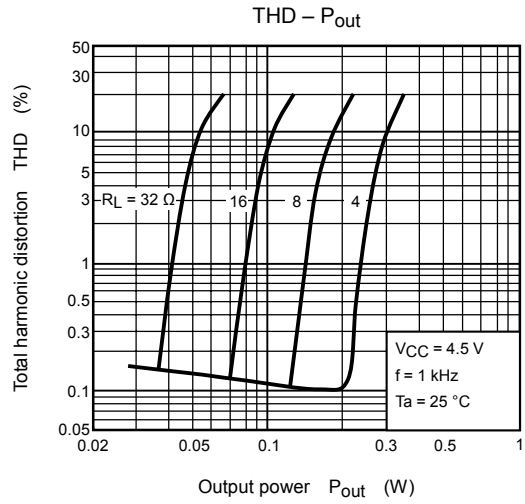
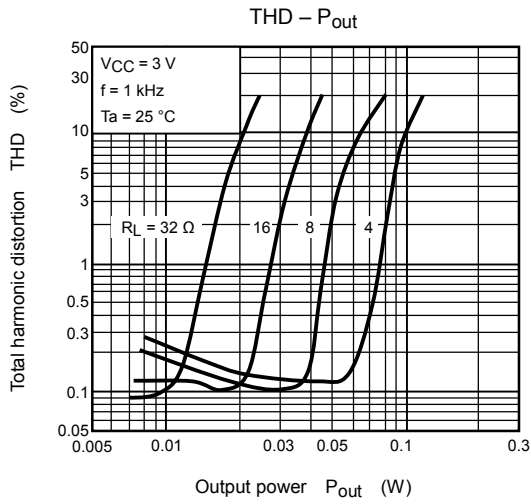
Terminal	1	2	3	4	5	6	7	8	9
Voltage (V)	0.003	0.59	1.98	4.5	0	1.98	1.28	0.59	0.003

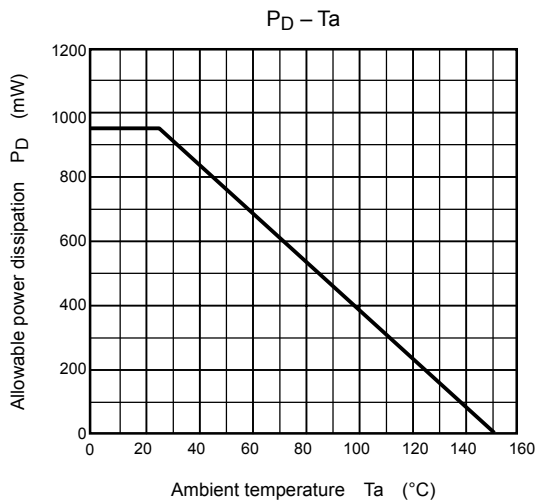
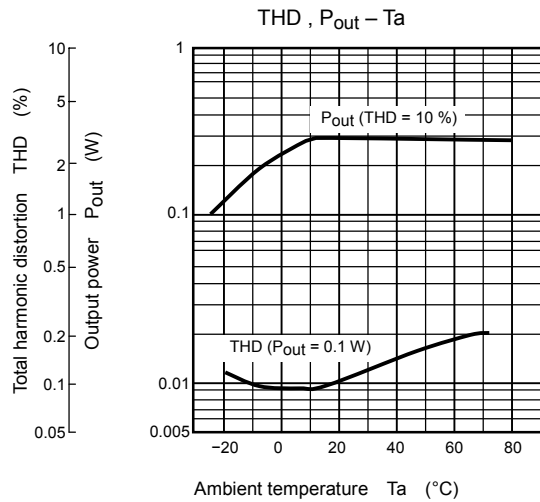
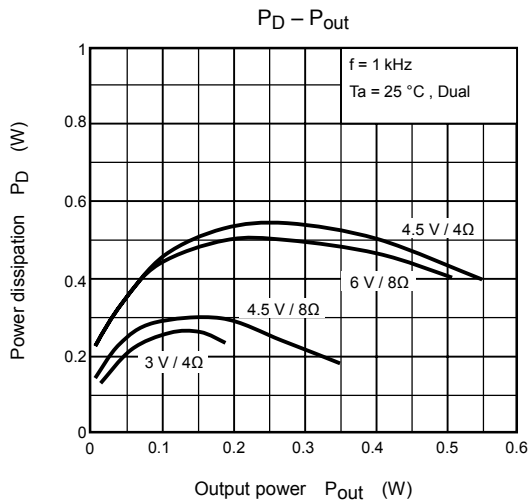
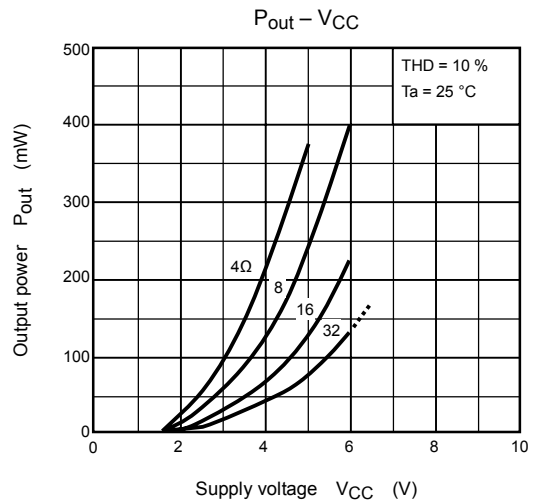
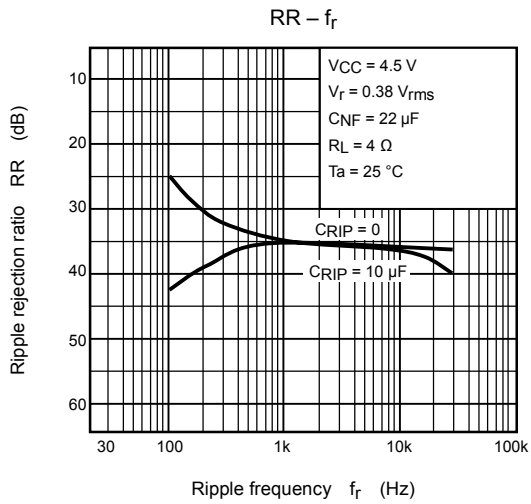
Test circuit



(Note) C_{RIP} is shown in item 3 and 4 of Application Note.



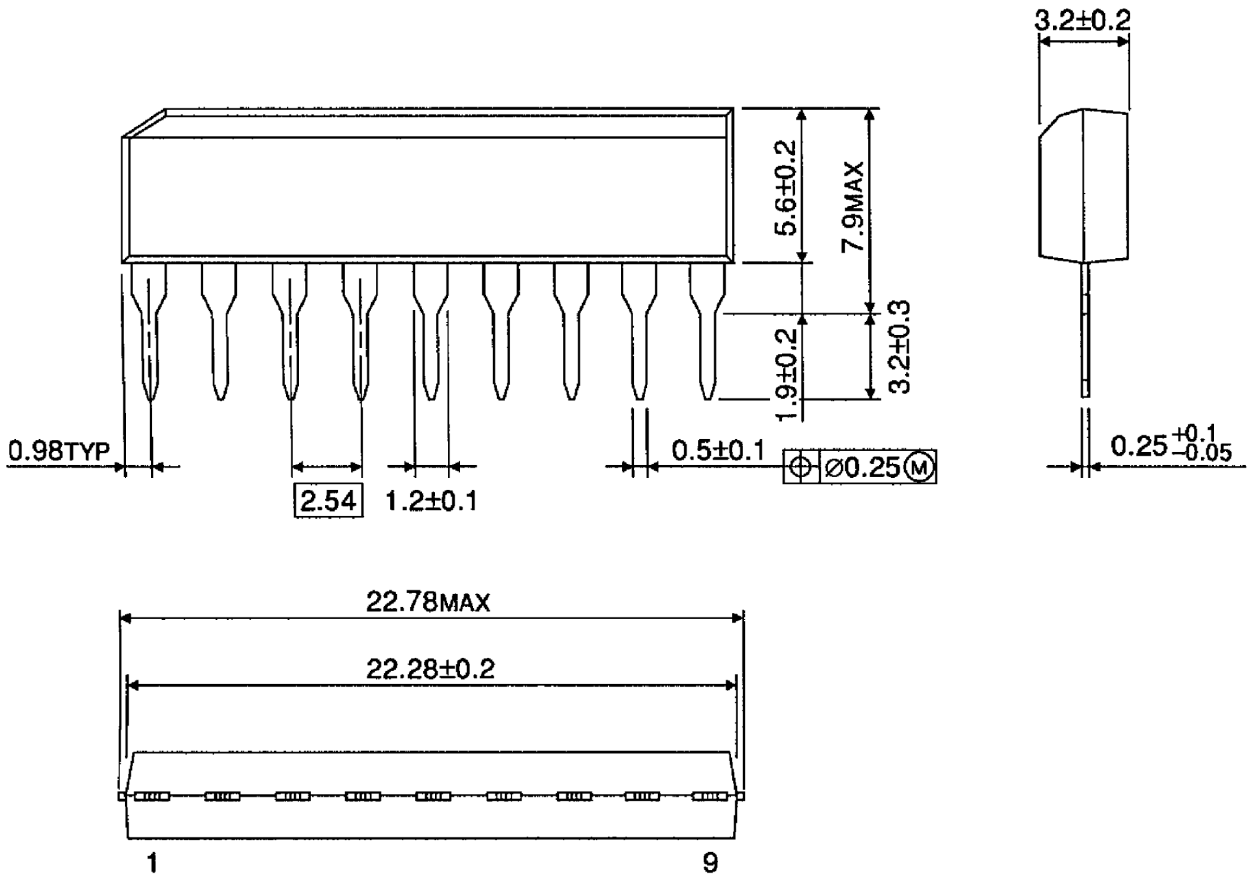




Package Dimensions

SIP9-P-2.54A

Unit : mm



Weight: 0.92g (typ.)

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