

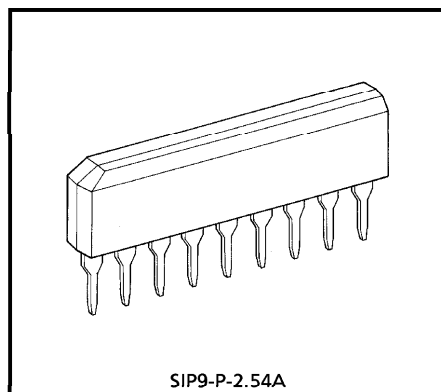
TA7376P

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 : $RR = -42dB$ ($C_{RIP} = 10\mu F, f_r = 100Hz$)
- Voltage gain : $G_V = 39.5dB$ (Typ.)
- Very few external parts and small package. (SIP-9PIN)

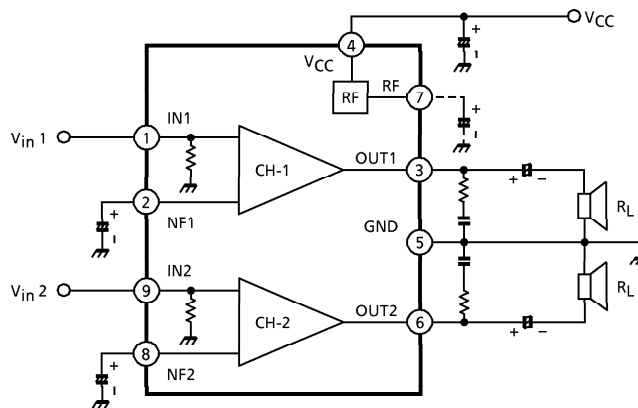


Weight : 0.92g (Typ.)

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



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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 condenser. However, in case the brush noise of volume becomes a problem, provide serially a coupling condenser 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 R_f 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 (C_{RIIP}), the ripple rejection ratio is as follow.

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

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

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

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

If the ripple filter condenser is connected to the pin⑦, the ripple rejection ratio is improved as following the DATA (RR - f_r).

4. Pop sound

It must be connected the condenser (C_{RIIP}) from pin⑦ to GND, if the "Pop" sound is harshness.

In this case, the value is 10μF something.

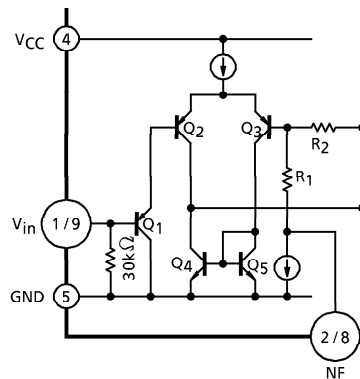


Fig.1

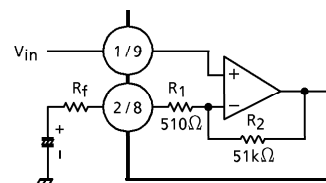


Fig.2

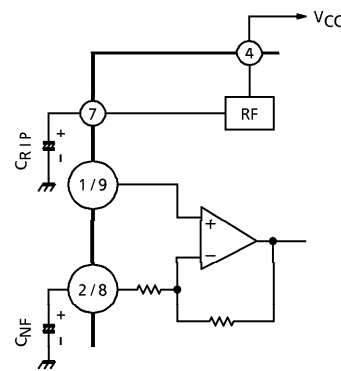


Fig.3

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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.

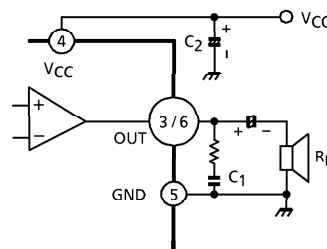


Fig.4

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)

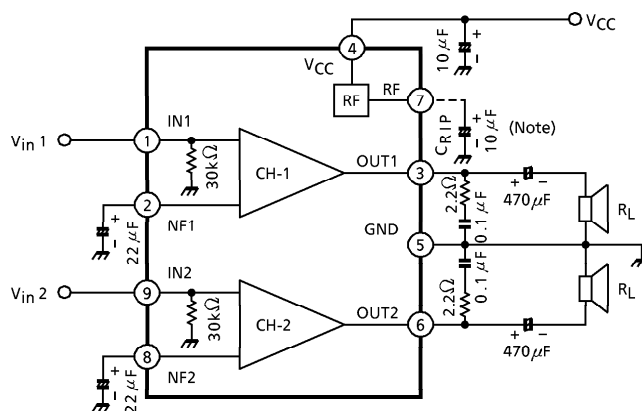
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I _{CCQ}	—	V _{in} = 0, V _{CC} = 3V	—	4.9	8.0	mA
			V _{in} = 0	—	5.3	10.0	
			V _{in} = 0, V _{CC} = 6V	—	5.7	14.0	
Output Power	P _{out}	—	V _{CC} = 3V, R _L = 4Ω, THD = 10%	84	100	—	mW
			V _{CC} = 3V, R _L = 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 = 10kΩ, 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} = 0.775V _{rms}	—	- 60	- 40	dB
Input Resistance	R _{IN}	—	—	—	30	—	kΩ

QUIESCENT TERMINAL DC VOLTAGE (V_{CC} = 4.5V, Ta = 25°C, Typ. value)

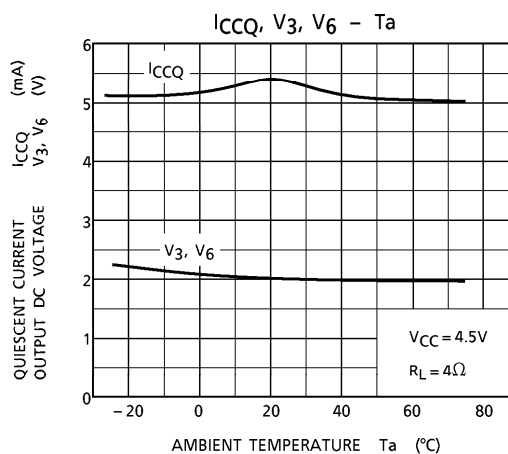
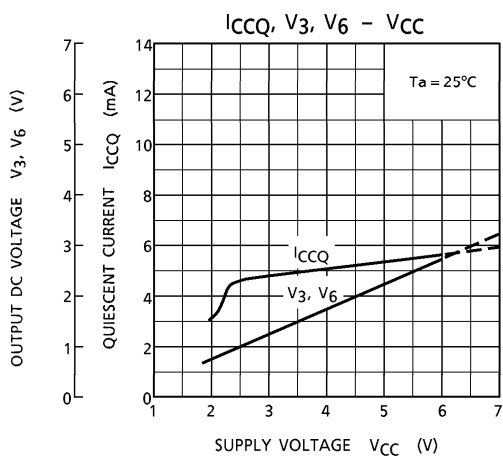
(UNIT : V)

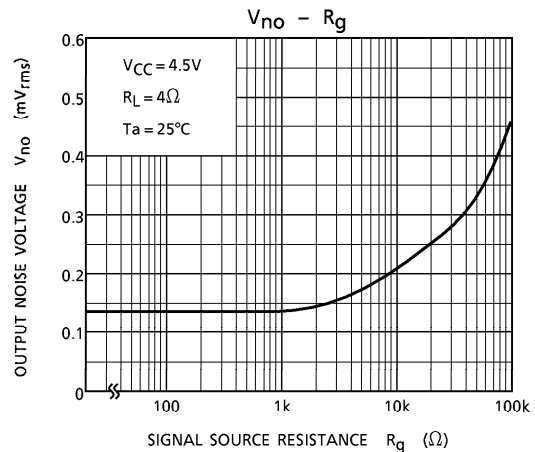
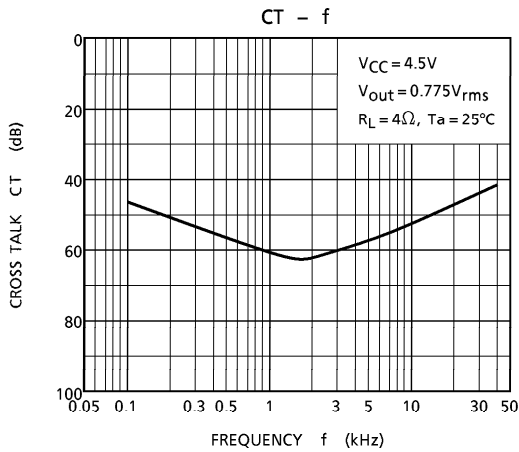
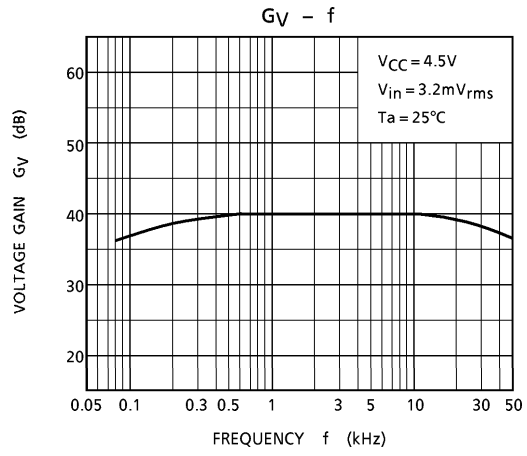
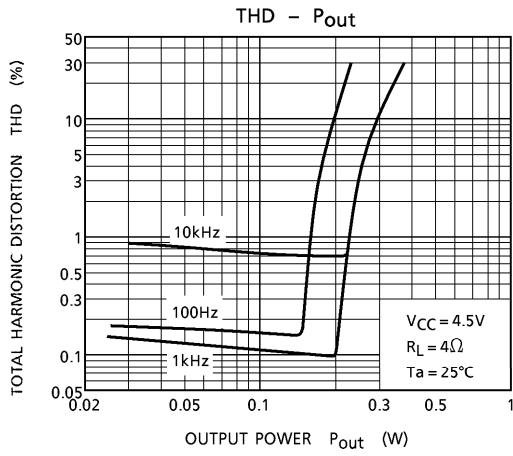
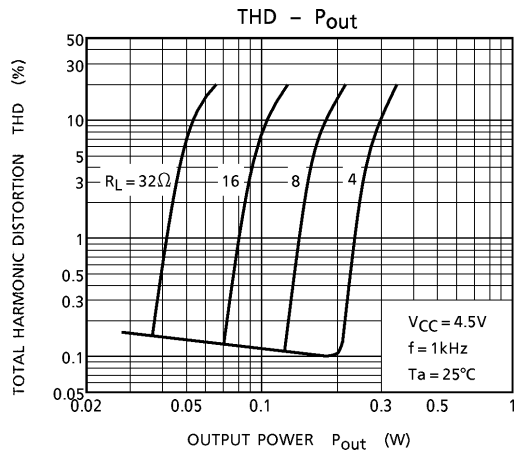
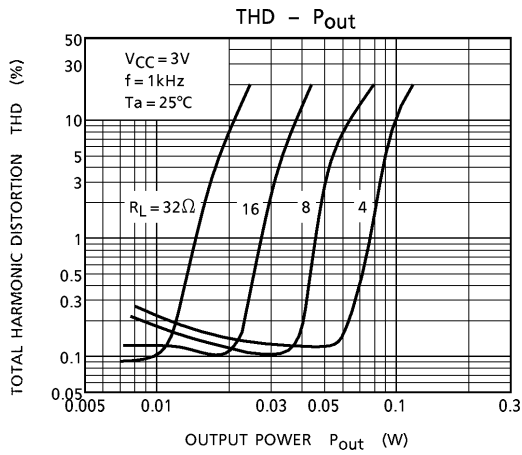
TERMINAL	1	2	3	4	5	6	7	8	9
VOLTAGE (V)	0.003	0.59	1.98	4.5	0	1.98	1.28	0.59	0.003

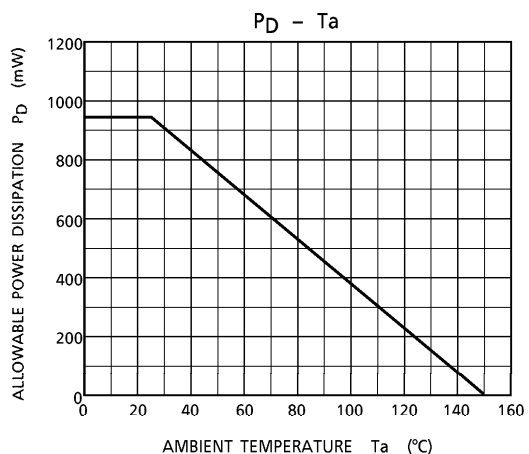
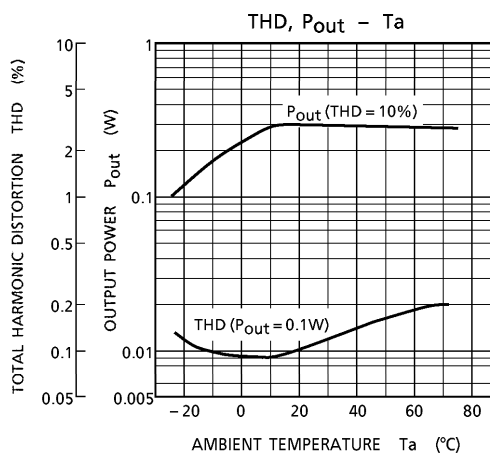
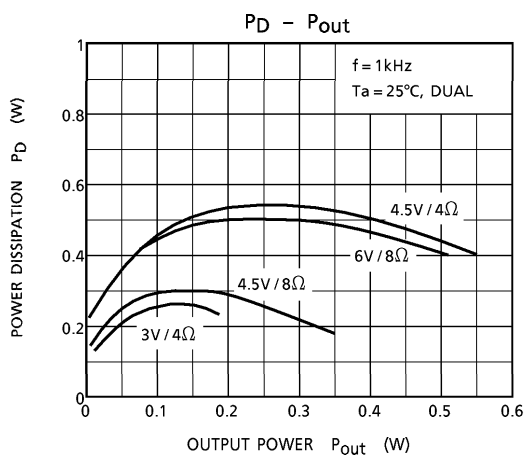
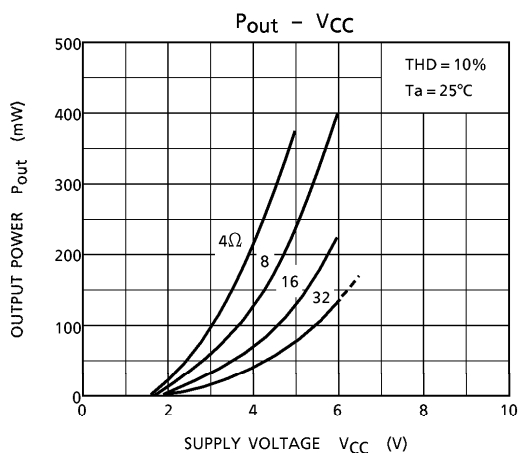
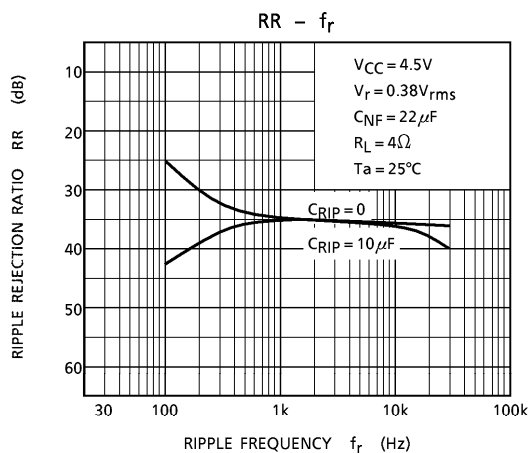
TEST CIRCUIT



(Note) CRIP is shown in item 3 and 4 of APPLICATION NOTE.

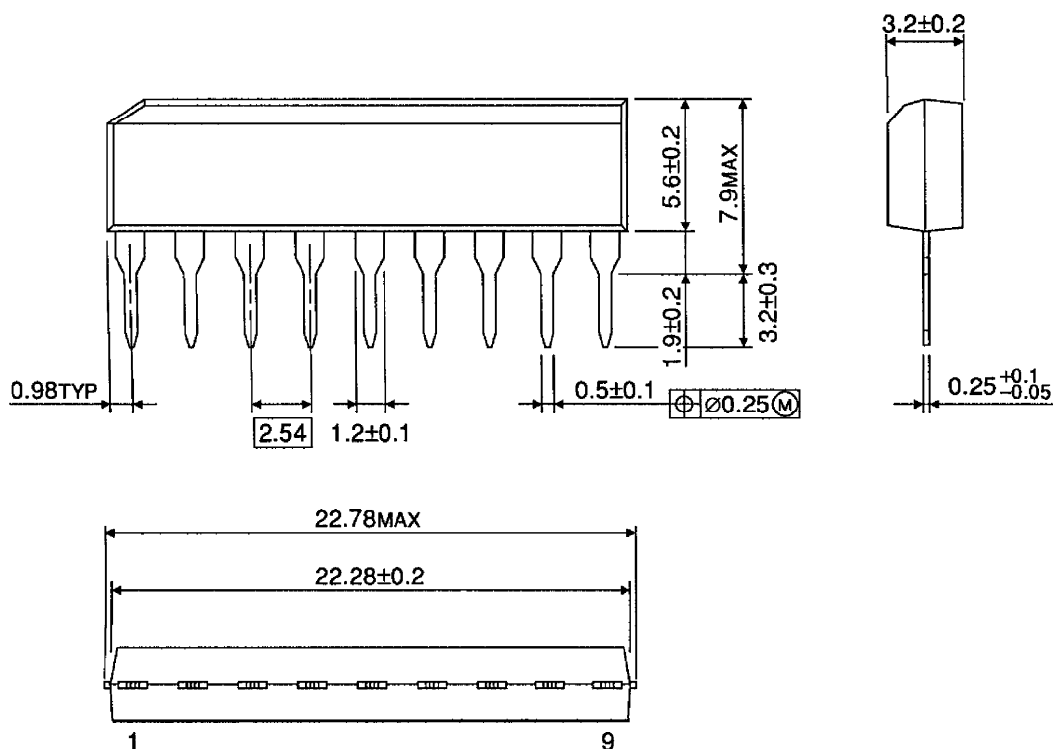






OUTLINE DRAWING
SIP9-P-2.54A

Unit : mm



Weight : 0.92g (Typ.)