

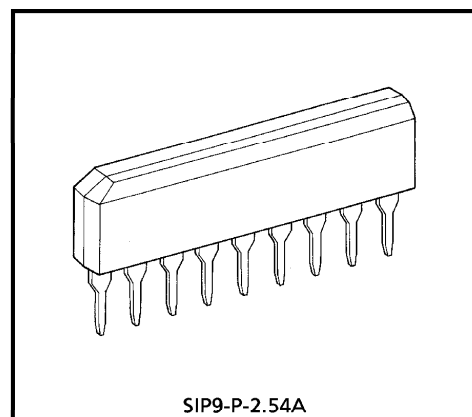
# TA7376P

## 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)

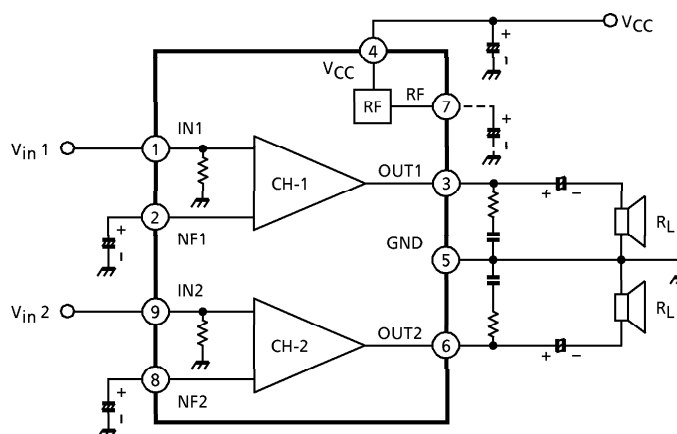


Weight : 0.92g (Typ.)

### 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 (Q<sub>2</sub> and Q<sub>3</sub>) preceded by a PNP emitter follower (Q<sub>1</sub>) 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<sub>V</sub>≒40dB by the resistors (R<sub>1</sub> and R<sub>2</sub>) in IC, however, its reduction is possible through adding R<sub>f</sub> as shown in Fig.2.

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

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

It is recommended to use this IC with the voltage gain of G<sub>V</sub>≒30dB or over.

**3. Ripple rejection ratio (RR)**

If the TA7376P does not have the ripple filter condenser (C<sub>RIP</sub>), 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<sub>r</sub>).

**4. Pop sound**

It must be connected the condenser (C<sub>RIP</sub>) from pin⑦ to GND, if the "Pop" sound is harshness.

In this case, the value is 10μF something.

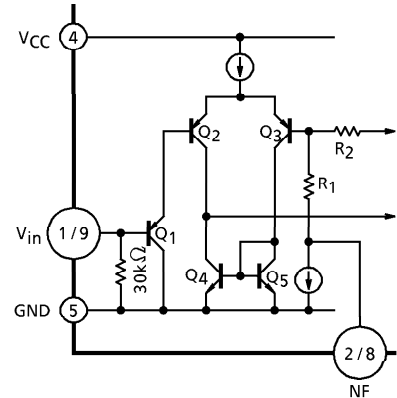


Fig.1

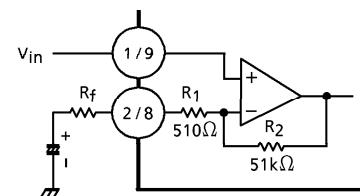


Fig.2

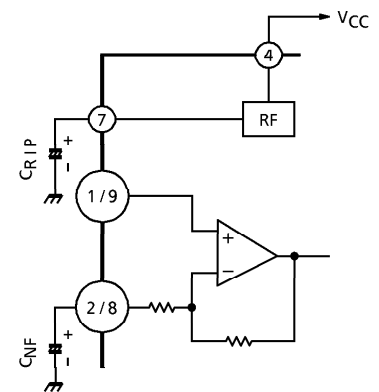


Fig.3

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5. Phase-compensation

The purpose of condenser  $C_1$  is to prevent oscillation.

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

Condenser  $C_2$  is rather large value than  $10\mu\text{F}$  and GND line is better to short and wide lay-out so that the some common impedance are decreased.

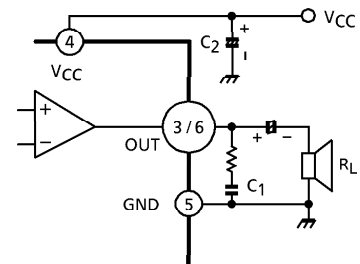


Fig.4

**MAXIMUM RATINGS** ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$V_{CC}$	8	V
Power Dissipation	$P_D$ (Note)	950	mW
Operation Temperature	$T_{opr}$	-25~75	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55~150	$^\circ\text{C}$

(Note) Derated above  $T_a = 25^\circ\text{C}$  in the proportion of  $7.6\text{mW}/^\circ\text{C}$ .

**ELECTRICAL CHARACTERISTICS**

(Unless otherwise specified,  $V_{CC} = 4.5\text{V}$ ,  $f = 1\text{kHz}$ ,  $R_g = 600\Omega$ ,  $R_L = 4\Omega$ ,  $T_a = 25^\circ\text{C}$ )

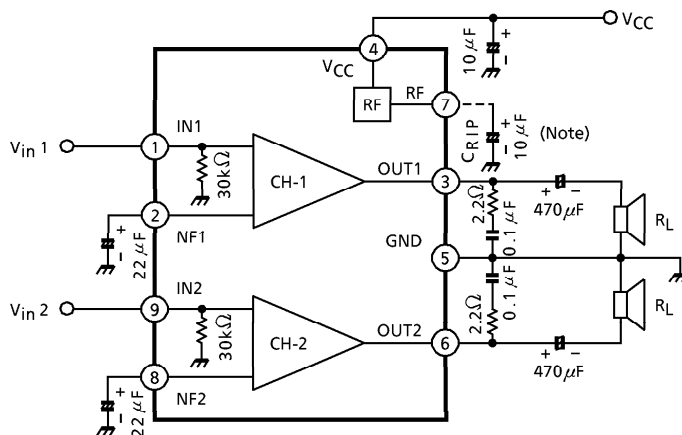
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	$I_{CCQ}$	—	$V_{in} = 0, V_{CC} = 3\text{V}$	—	4.9	8.0	mA
			$V_{in} = 0$	—	5.3	10.0	
			$V_{in} = 0, V_{CC} = 6\text{V}$	—	5.7	14.0	
Output Power	$P_{out}$	—	$V_{CC} = 3\text{V}, R_L = 4\Omega, \text{THD} = 10\%$	84	100	—	mW
			$V_{CC} = 3\text{V}, R_L = 32\Omega, \text{THD} = 10\%$	—	21	—	
			$V_{CC} = 4.5\text{V}, R_L = 4\Omega, \text{THD} = 10\%$	250	300	—	
			$V_{CC} = 4.5\text{V}, R_L = 8\Omega, \text{THD} = 10\%$	—	180	—	
			$V_{CC} = 6\text{V}, R_L = 8\Omega, \text{THD} = 10\%$	—	400	—	
Total Harmonic Distortion	THD	—	$P_{out} = 100\text{mW}$	—	0.11	1.0	%
Voltage Gain	$G_V$	—	$V_{out} = 0.775V_{rms}$	37.5	39.5	41.5	dB
Output Noise Voltage	$V_{no}$	—	$R_g = 10\text{k}\Omega, \text{BPF} = 20\text{Hz} \sim 20\text{kHz}$	—	0.21	0.7	$\text{mV}_{rms}$
Ripple Rejection Ratio	RR	—	$C_{RIP} = 10\mu\text{F}, C_{NF} = 22\mu\text{F}$ $f_r = 100\text{Hz}, V_r = 0.38V_{rms}$	—	-42	-30	dB
			$C_{RIP} = \text{OPEN}, C_{NF} = 100\mu\text{F}$ $f_r = 100\text{Hz}, V_r = 0.38V_{rms}$	—	-34	—	
Cross Talk	CT	—	$V_{out} = 0.775V_{rms}$	—	-60	-40	dB
Input Resistance	$R_{iN}$	—	—	—	30	—	$\text{k}\Omega$

**QUIESCENT TERMINAL DC VOLTAGE** ( $V_{CC} = 4.5\text{V}$ ,  $T_a = 25^\circ\text{C}$ , Typ. value)

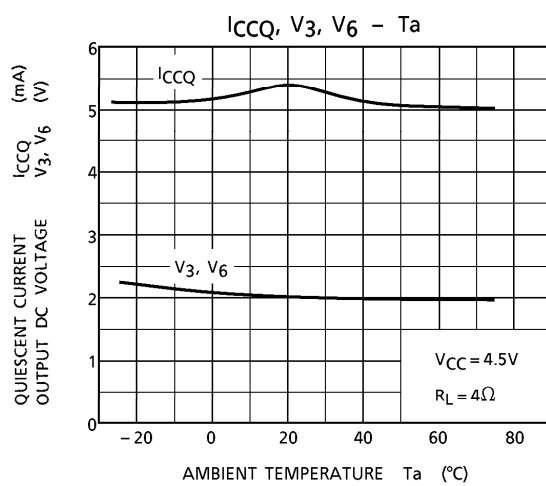
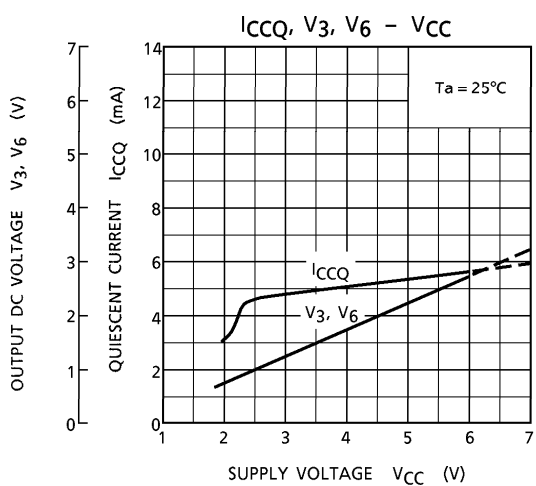
(UNIT : V)

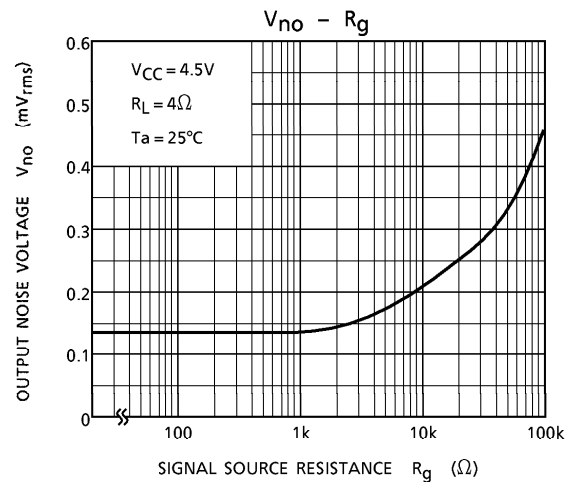
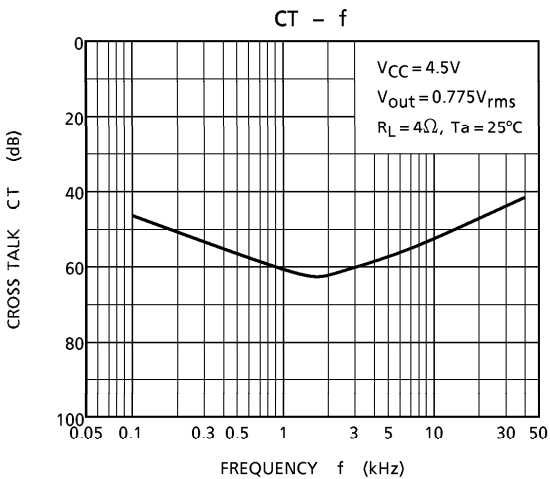
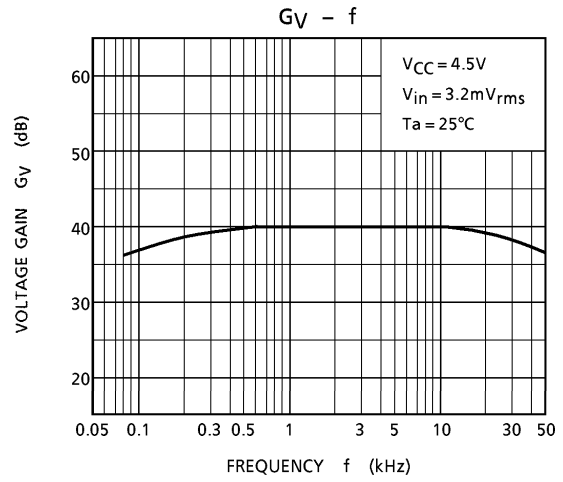
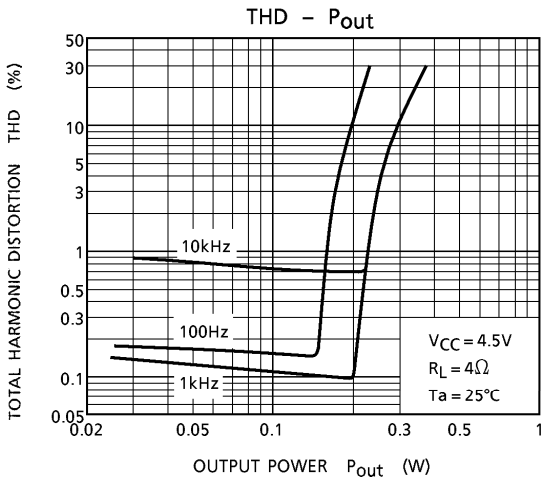
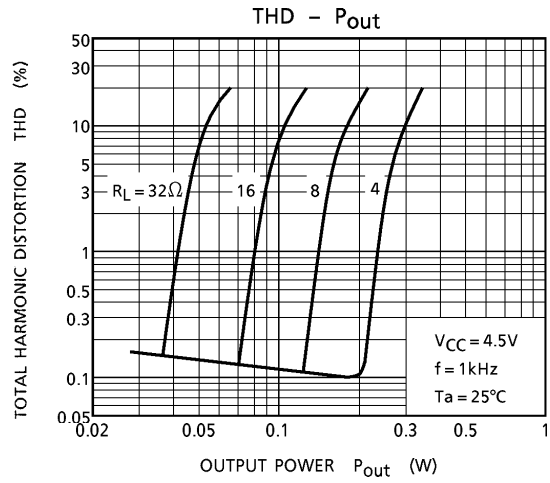
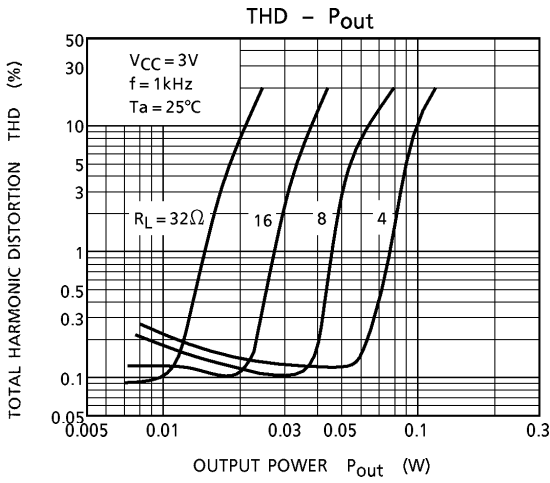
TERMINAL	1	2	3	4	5	6	7	8	9
VOLTAGE (V)	0.003	0.59	1.98	4.5	0	1.98	1.28	0.59	0.003

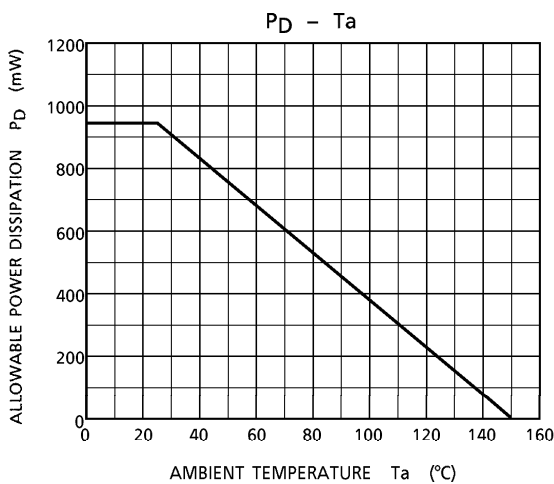
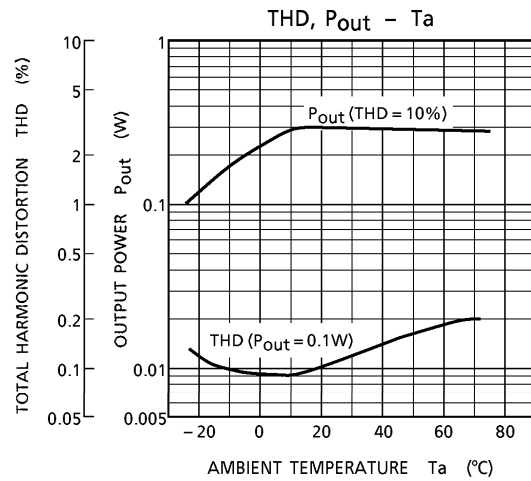
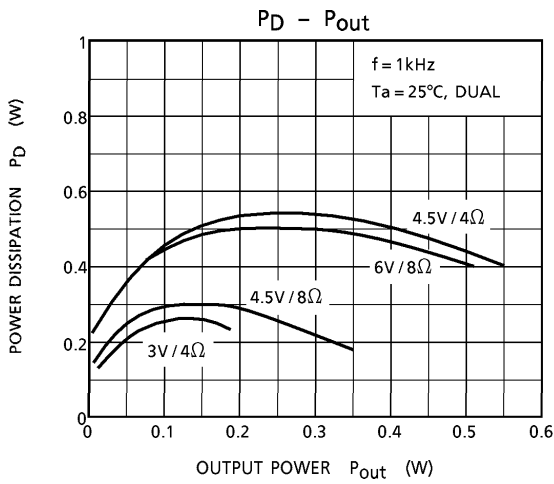
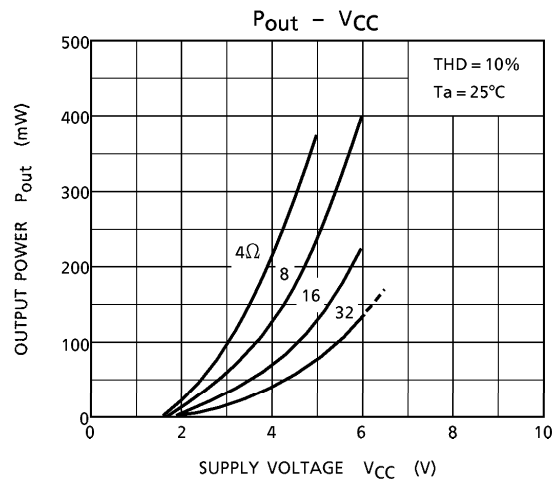
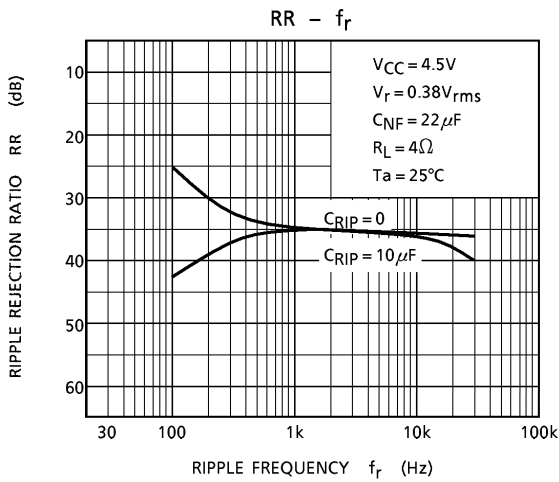
TEST CIRCUIT



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

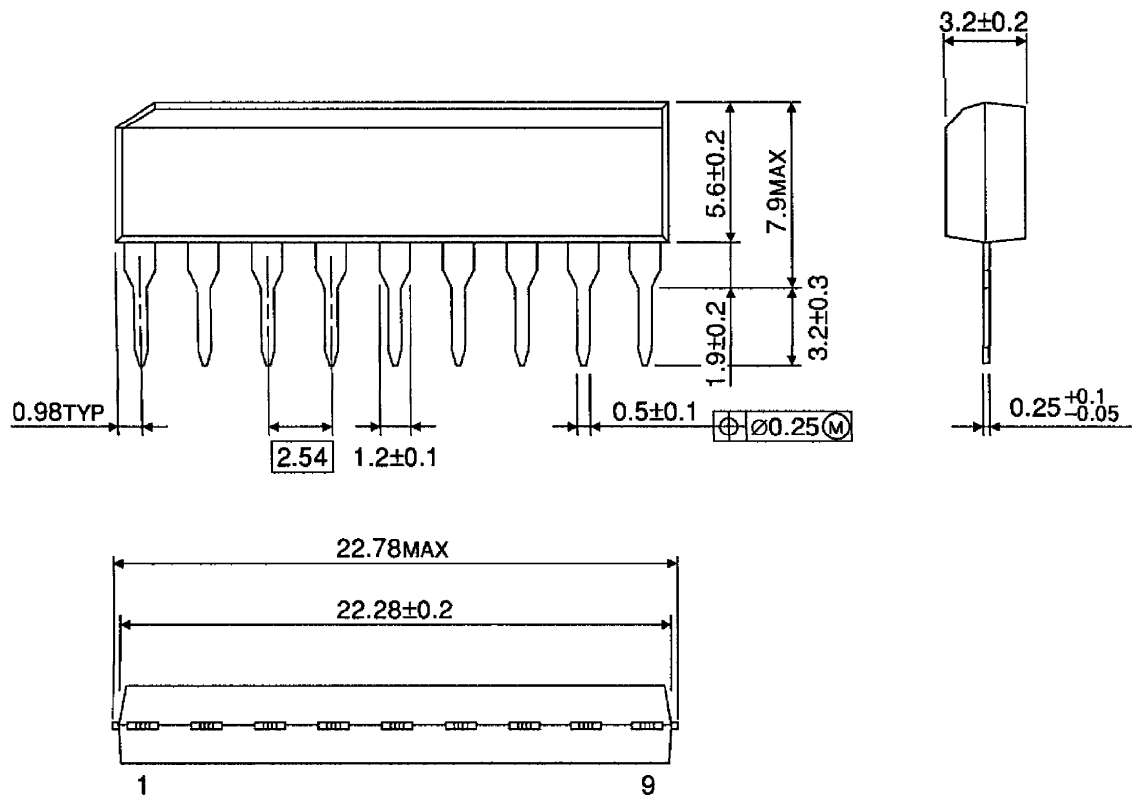






OUTLINE DRAWING  
SIP9-P-2.54A

Unit : mm



Weight : 0.92g (Typ.)