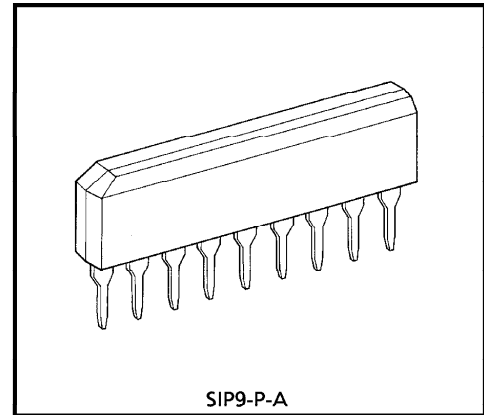


AUDIO POWER AMPLIFIER

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)

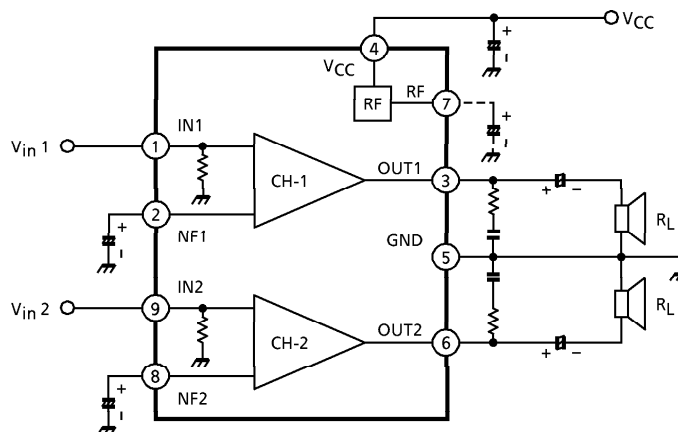


Weight : 0.92g (Typ.)

OUTPUT POWER TABLE (THD = 10%, f = 1kHz, Stereo, Typ. value)

LOAD V_{CC}	$R_L = 32\Omega$	$R_L = 16\Omega$	$R_L = 8\Omega$	$R_L = 4\Omega$
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_{RF}), 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_{RF}) from pin⑦ to GND, if the "Pop" sound is harshness.

In this case, the value is 10μF something.

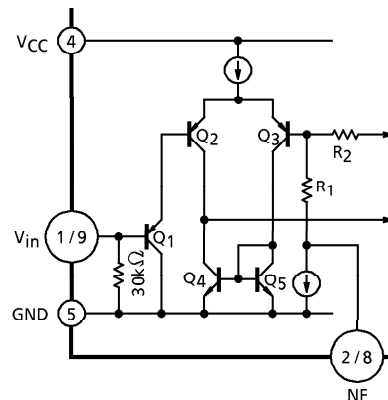


Fig.1

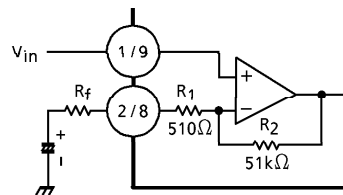


Fig.2

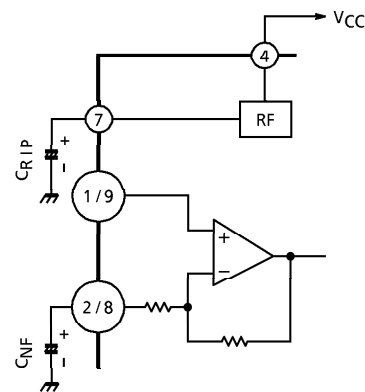


Fig.3

5. Phase-compensation

The purpose of condenser 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.

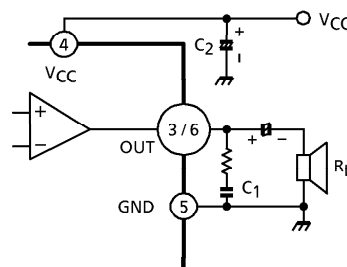


Fig.4

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

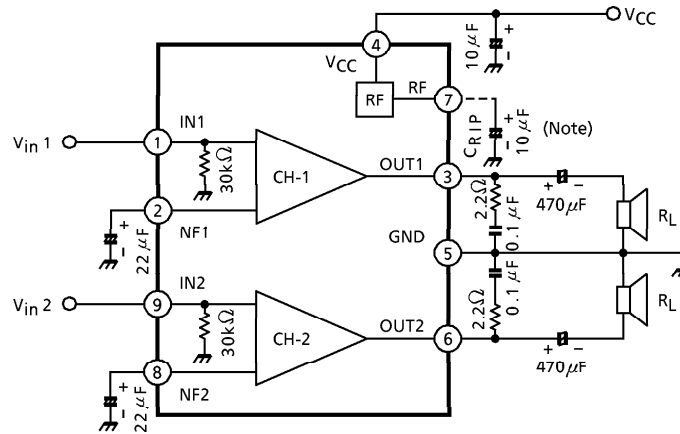
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	—	$V_{in} = 0, V_{CC} = 3\text{V}$	—	4.9	8.0	mA
			$V_{in} = 0$	—	5.3	10.0	
			$V_{in} = 0, V_{CC} = 6\text{V}$	—	5.7	14.0	
Output Power	P_{out}	—	$V_{CC} = 3\text{V}, R_L = 4\Omega, \text{THD} = 10\%$	84	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	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)

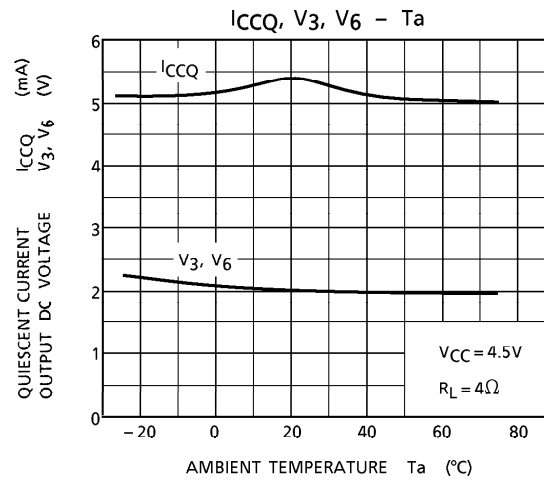
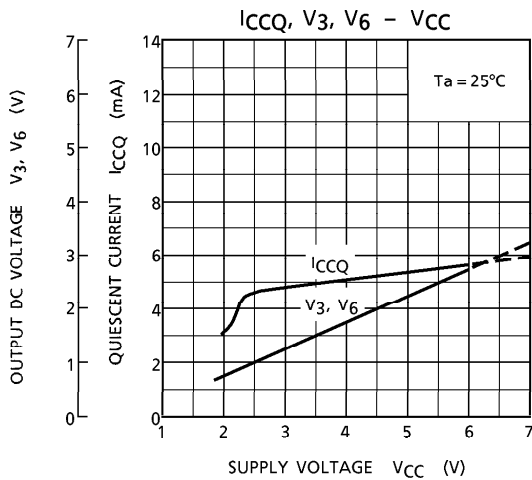
{ UNIT : V }

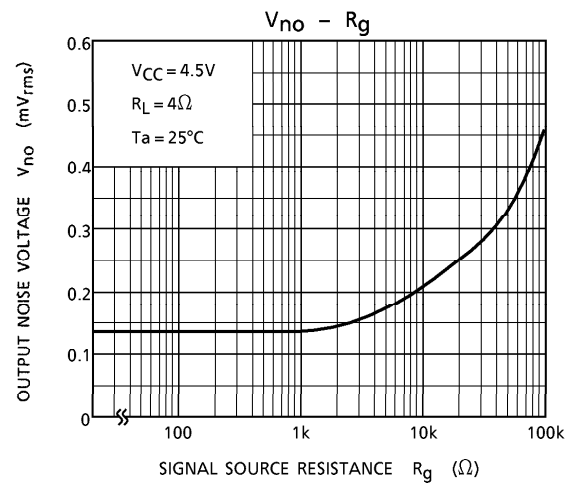
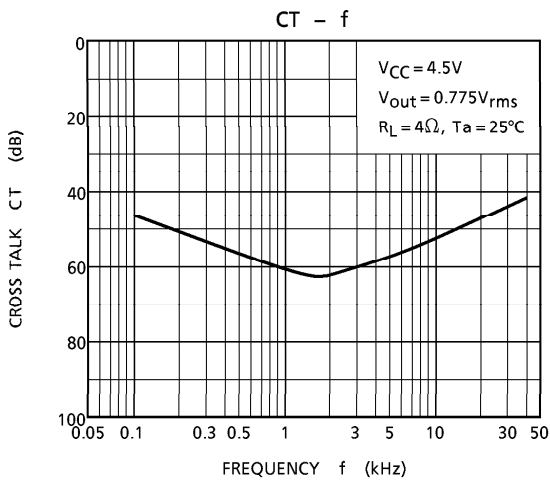
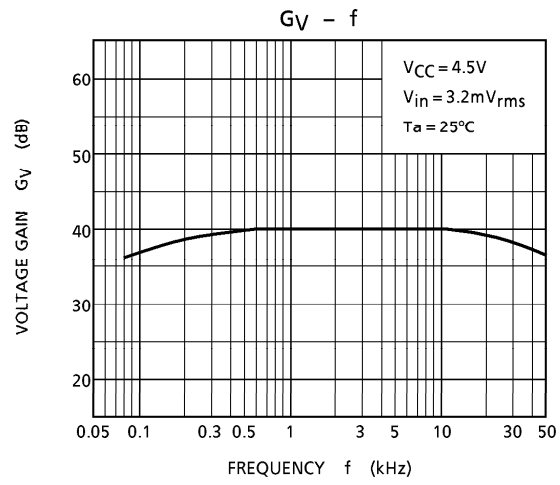
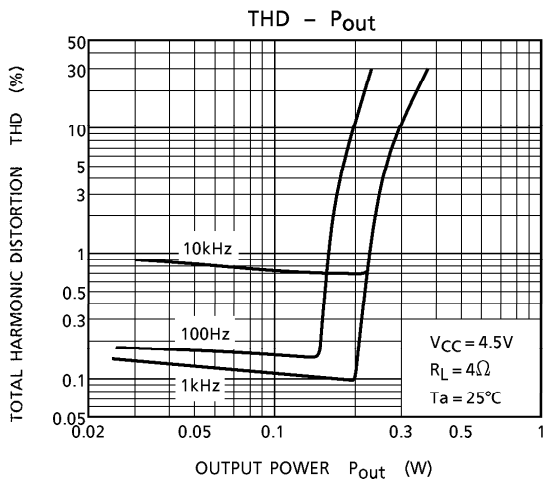
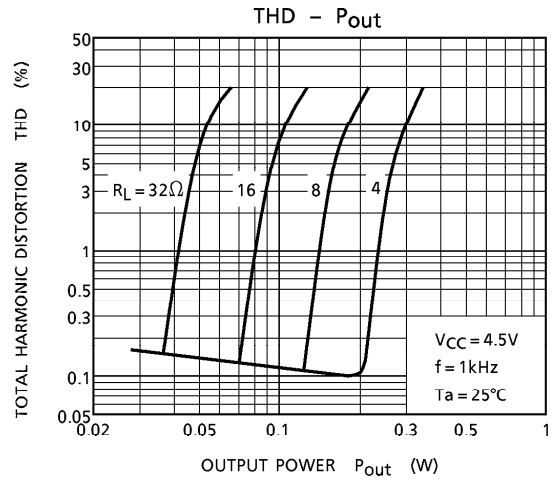
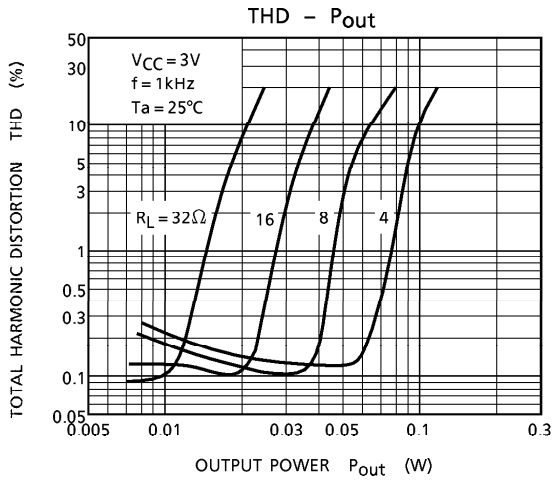
TERMINAL	1	2	3	4	5	6	7	8	9
VOLTAGE (V)	0.003	0.59	1.98	4.5	0	1.98	1.28	0.59	0.003

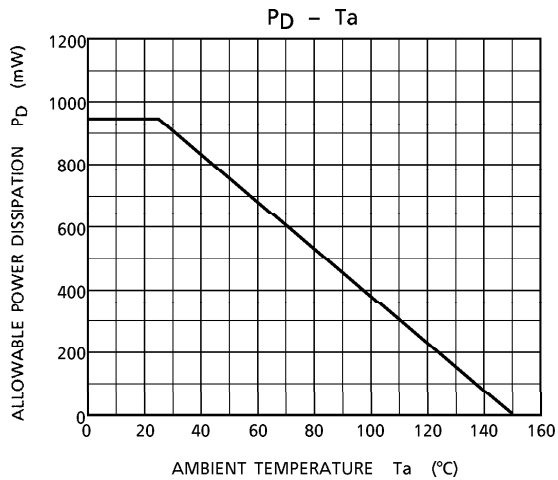
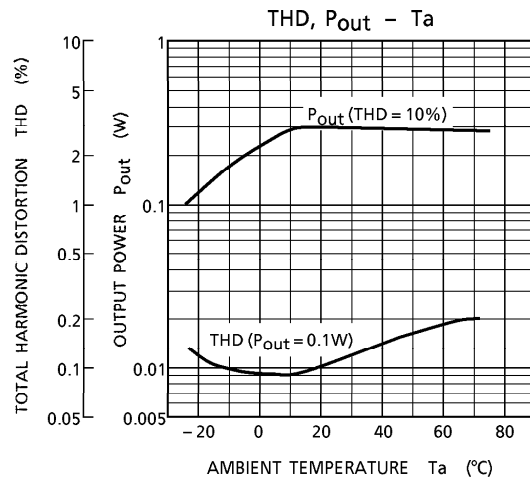
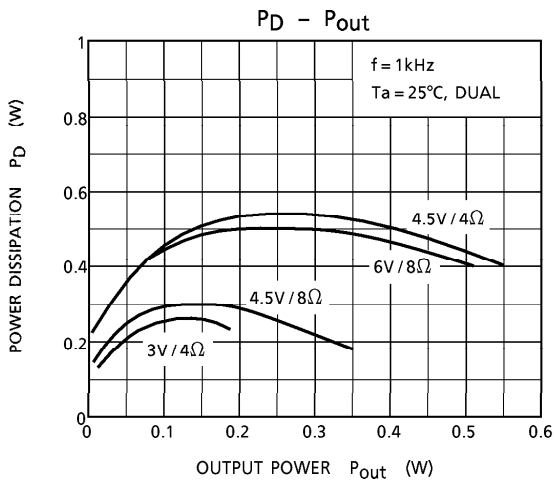
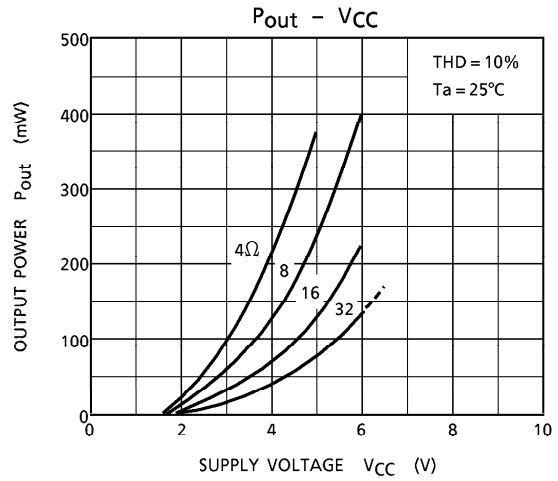
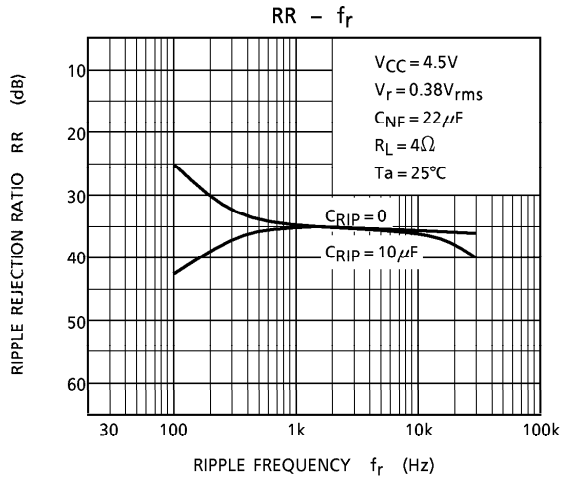
TEST CIRCUIT



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

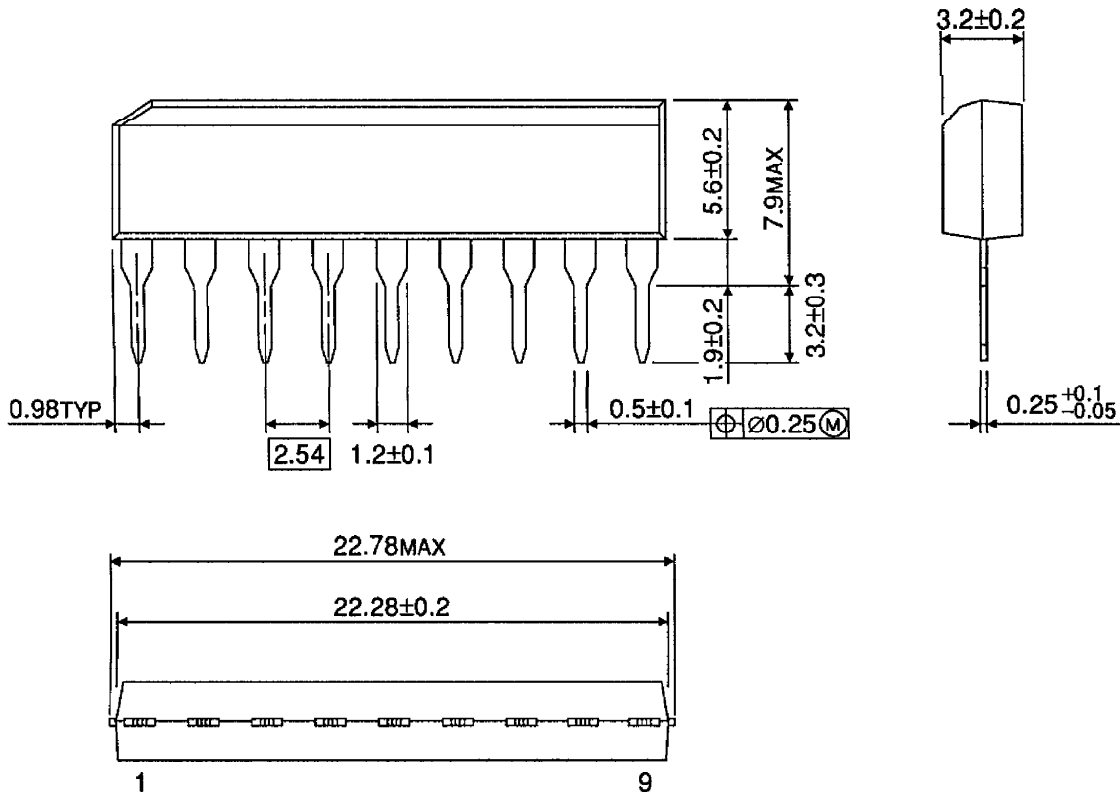






OUTLINE DRAWING
SIP9-P-A

Unit : mm



Weight : 0.92g (Typ.)