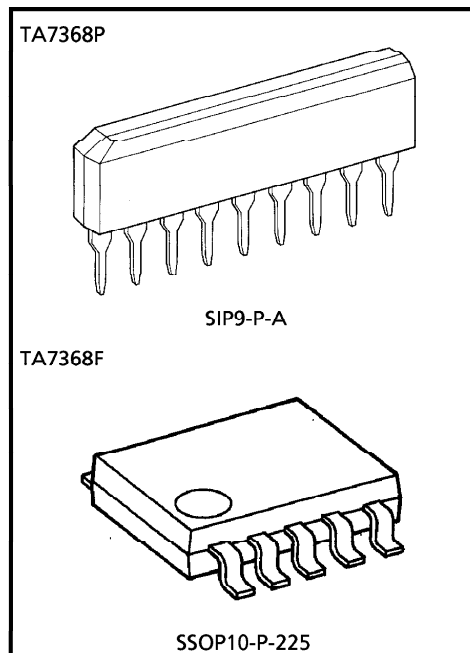


AUDIO POWER AMPLIFIER

The TA7368P and TA7368F are suitable for the audio power amplifier of portable cassette tape recorder and radio.

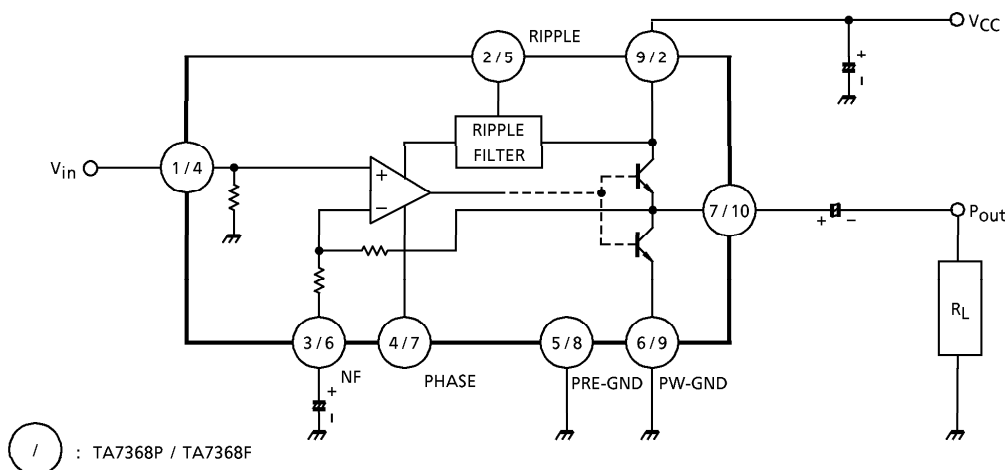
FEATURES

- Very few external parts (Only three capacitors)
- Low quiescent current : $I_{CCQ} = 6.6\text{mA}$ (Typ.) ($V_{CC} = 6\text{V}$)
- Output Power
 TA7368P
 : $P_{out} = 720\text{mW}$ (Typ.) ($V_{CC} = 6\text{V}$, $R_L = 4\Omega$, THD = 10%)
 TA7368P/F
 : $P_{out} = 450\text{mW}$ (Typ.) ($V_{CC} = 6\text{V}$, $R_L = 8\Omega$, THD = 10%)
- Voltage gain : $G_V = 40\text{dB}$ (Typ.)
- Operating supply voltage range : $V_{CC} = 2 \sim 10\text{V}$ ($T_a = 25^\circ\text{C}$)



Weight SIP9-P-A : 0.92g (Typ.)
 SSOP10-P-225 : 0.09g (Typ.)

BLOCK DIAGRAM



PRECAUTION FOR USE AND APPLICATION

1. Input stage

The input stage of power amplifier (Equivalent circuit) is comprised of a PNP differential pair (Q_2 and Q_3) preceded by a PNP emitter follower (Q_1) which allows DC referencing of the source signal to ground. This eliminated 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 $G_V \approx 40\text{dB}$ by the resistors (R_4 and R_5) in IC, however, its reduction is possible through adding R_f as shown in Figure 2. In this case, the voltage gain is obtained by the following equation.

$$G_V = 20 \log \frac{R_5 + R_4 + R_f}{R_4 + R_f}$$

It is recommended to use this IC with the voltage gain of $G_V = 28\text{dB}$ or over.

3. Ripple rejection ratio

Adding C_{RIP} to ripple terminal 2 as shown in Figure 3, the ripple rejection ratio is improved from -25dB Typ. to -45dB Typ.

4. Power dissipation

Care should be taken to use this IC below maximum power dissipation. Because it may over maximum rating depending on operating condition.

- TA7368P $P_D = 900\text{mW}$ ($T_a = 25^\circ\text{C}$)
- TA7368F $P_D = 400\text{mW}$ ($T_a = 25^\circ\text{C}$)

5. Phase-compensation

Small temperature coefficient and excellent frequency characteristic is needed by capacitors below.

- Oscillation preventing capacitors for power amplifier output
- Bypass capacitor for ripple filter
- Capacitor between V_{CC} and GND

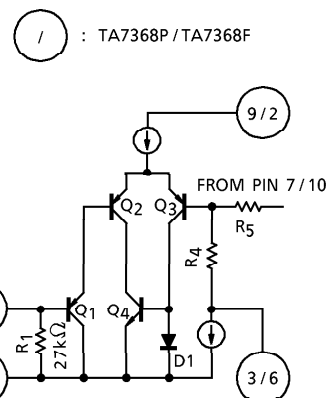


Fig.1

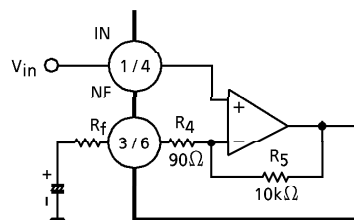


Fig.2

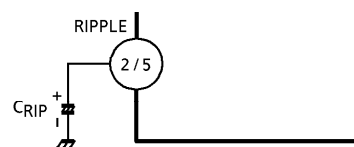


Fig.3

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	14	V
Power Dissipation	P _D (Note)	900	mW
		400	
Operating Temperature	T _{opr}	– 25~75	°C
Storage Temperature	T _{stg}	– 55~150	°C

(Note) Derated above Ta = 25°C in the proportion of 7.2mW/°C for TA7368P and of 3.2mW/°C for TA7368F.

ELECTRICAL CHARACTERISTICS FOR TA7368P

(Unless otherwise specified, V_{CC} = 6V, 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 _{CC} = 3V, V _{in} = 0	—	5.5	—	mA
			V _{CC} = 6V, V _{in} = 0	—	6.6	15	
			V _{CC} = 9V, V _{in} = 0	—	7.5	18	
Output Power	P _{out}	—	V _{CC} = 3V, R _L = 4Ω, THD = 10%	—	120	—	mW
			V _{CC} = 6V, R _L = 4Ω, THD = 10%	500	720	—	
			V _{CC} = 6V, R _L = 8Ω, THD = 10%	300	450	—	
			V _{CC} = 9V, R _L = 8Ω, THD = 10%	800	1100	—	
			V _{CC} = 9V, R _L = 16Ω, THD = 10%	450	610	—	
Total Harmonic Distortion	THD	—	P _{out} = 100mW	—	0.3	1.0	%
Voltage Gain	G _V	—	V _{in} = 0.5mV _{rms}	37	40	43	dB
Output Noise Voltage	V _{no}	—	R _g = 10kΩ, BPF = 20Hz~20kHz	—	0.2	0.5	mV _{rms}
Ripple Rejection Ratio	RR	—	f _r = 100Hz, V _r = 0.3V _{rms} Without C _{RIP}	—	25	—	dB
Input Resistance	R _{IN}	—	—	—	27	—	kΩ

TERMINAL VOLTAGE FOR TA7368P

Typical terminal voltage at no signal with test circuit. (V_{CC} = 6V, Ta = 25°C)

[Unit : V]

Terminal No.	1	2	3	4	5	6	7	8	9
DC Voltage (V)	0	2.40	0.62	0.64	0	0	2.61	NC	6.0

ELECTRICAL CHARACTERISTICS FOR TA7368F

(Unless otherwise specified, $V_{CC} = 6V$, $f = 1kHz$, $R_g = 600\Omega$, $R_L = 8\Omega$, $T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	—	$V_{CC} = 3V, V_{in} = 0$	—	5.5	—	mA
			$V_{CC} = 6V, V_{in} = 0$	—	6.6	15	
			$V_{CC} = 9V, V_{in} = 0$	—	7.5	18	
Output Power	P_{out}	—	$V_{CC} = 3V, R_L = 4\Omega, THD = 10\%$	—	120	—	mW
			$V_{CC} = 6V, R_L = 8\Omega, THD = 10\%$	300	450	—	
			$V_{CC} = 9V, R_L = 16\Omega, THD = 10\%$	450	610	—	
Total Harmonic Distortion	THD	—	$P_{out} = 100mW$	—	0.3	1.0	%
Voltage Gain	G_V	—	$V_{in} = 0.5mV_{rms}$	37	40	43	dB
Output Noise Voltage	V_{no}	—	$R_g = 10k\Omega, BPF = 20Hz \sim 20kHz$	—	0.2	0.5	mV_{rms}
Ripple Rejection Ratio	RR	—	$f_r = 100Hz, V_r = 0.3V_{rms}$, Without C_{RIP}	—	25	—	dB
Input Resistance	R_{IN}	—	—	—	27	—	$k\Omega$

TERMINAL VOLTAGE FOR TA7368F

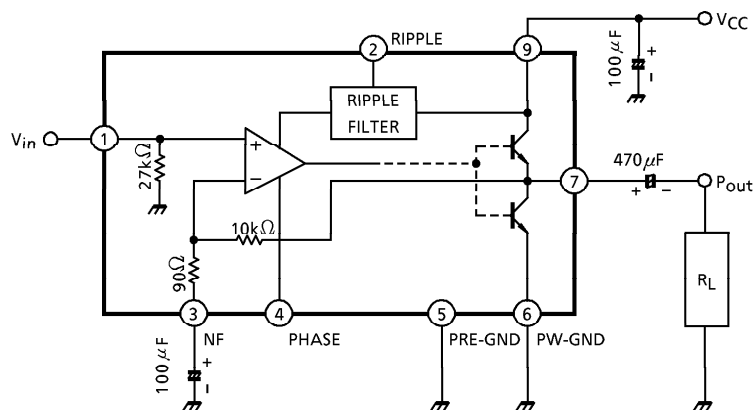
Typical terminal voltage at no signal with test circuit. ($V_{CC} = 6V$, $T_a = 25^\circ C$)

[Unit : V]

Terminal No.	1	2	3	4	5	6	7	8	9	10
DC Voltage (V)	NC	6.0	NC	0	2.40	0.62	0.64	0	0	2.61

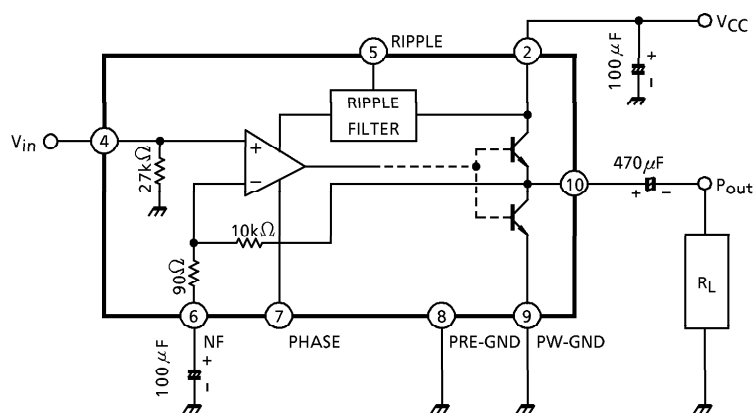
TEST CIRCUIT

TA7368P

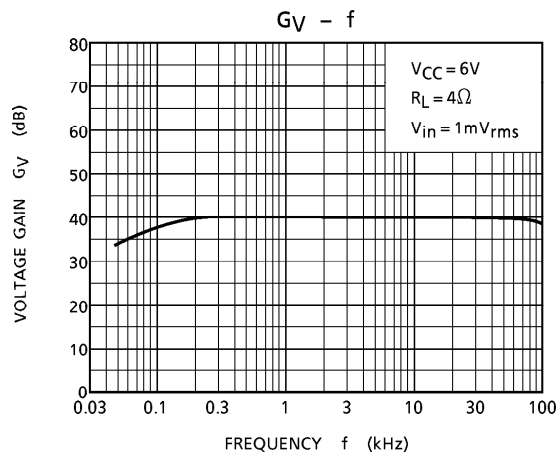
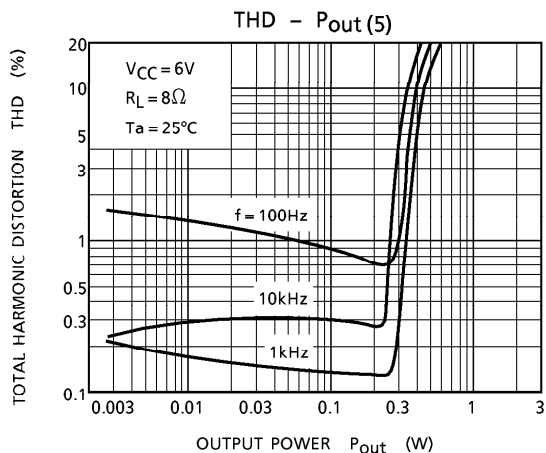
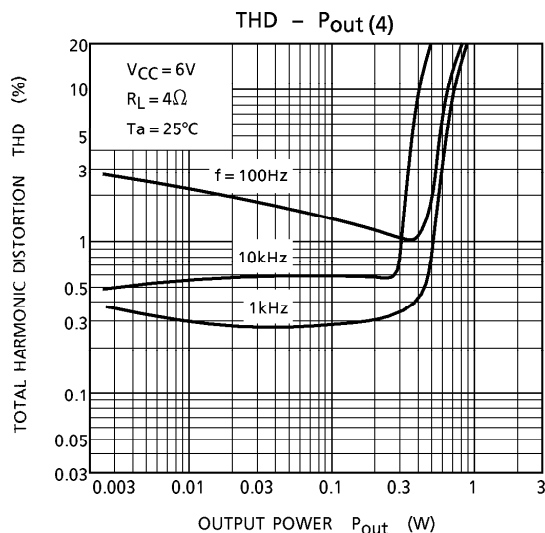
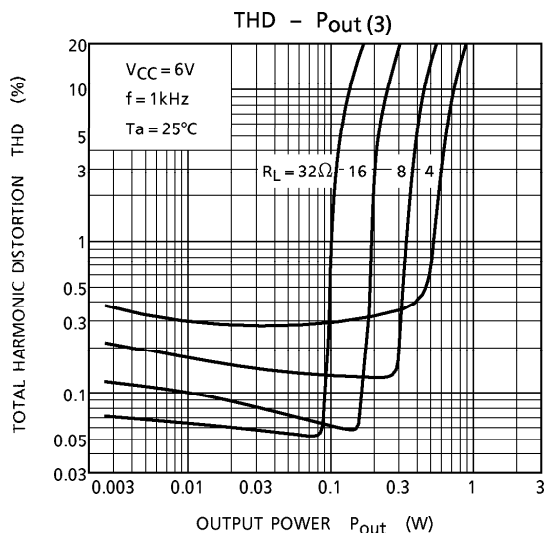
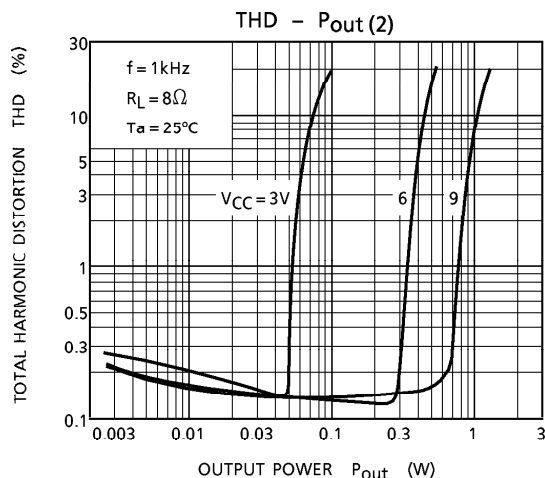
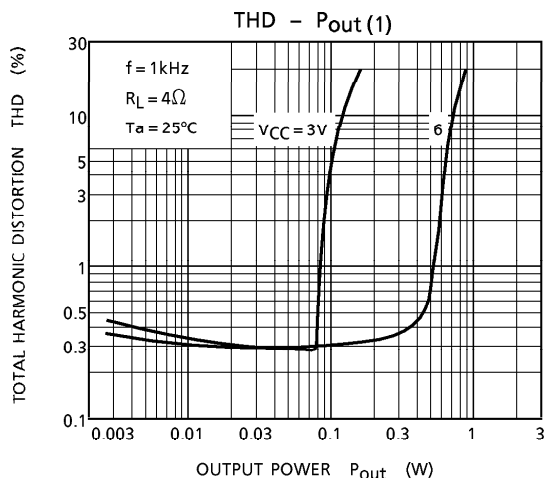


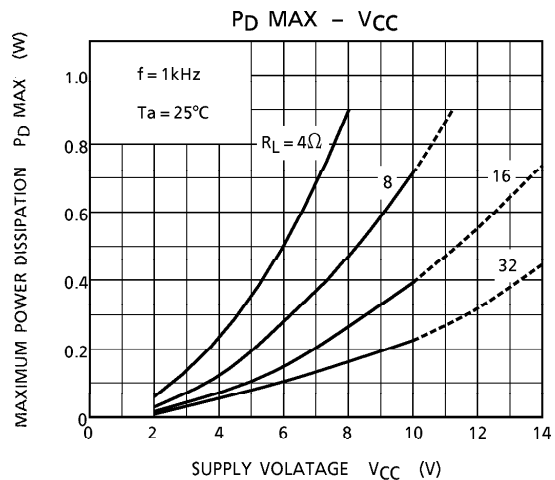
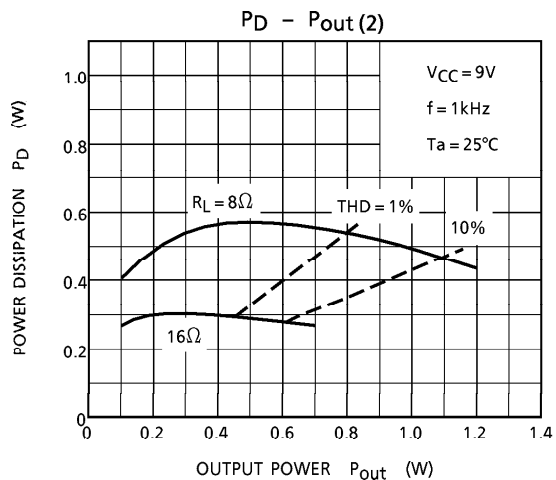
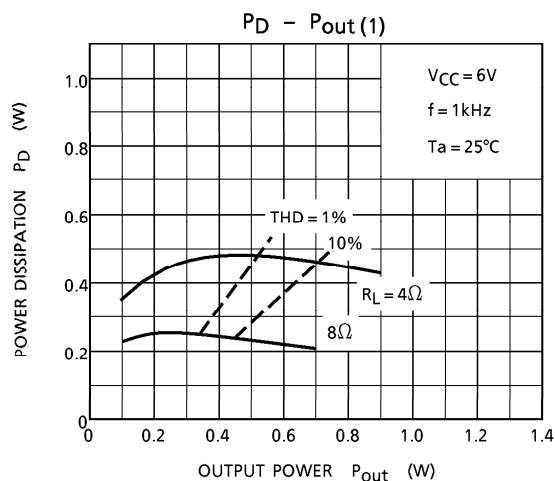
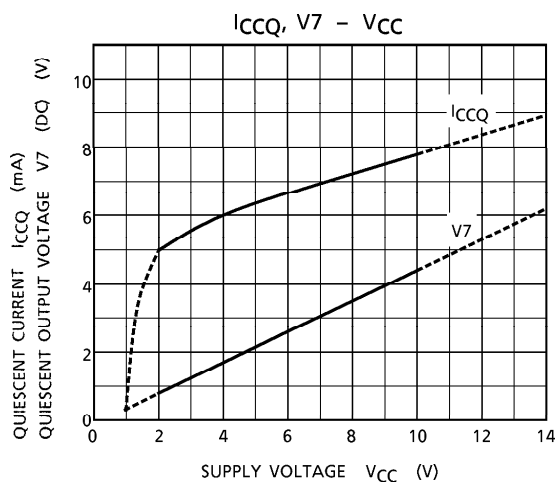
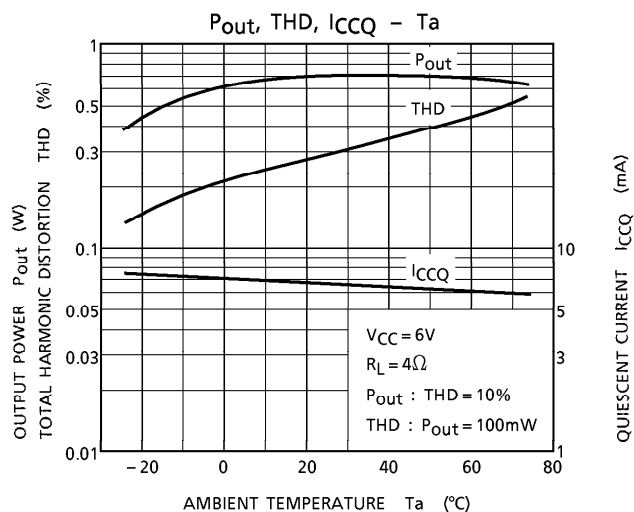
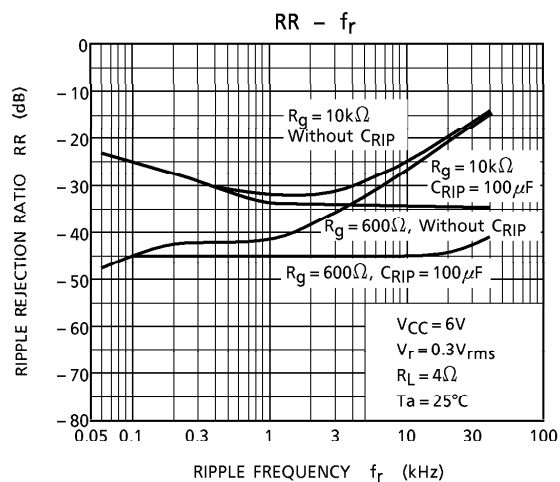
※ Pin⑧ : Non-connection

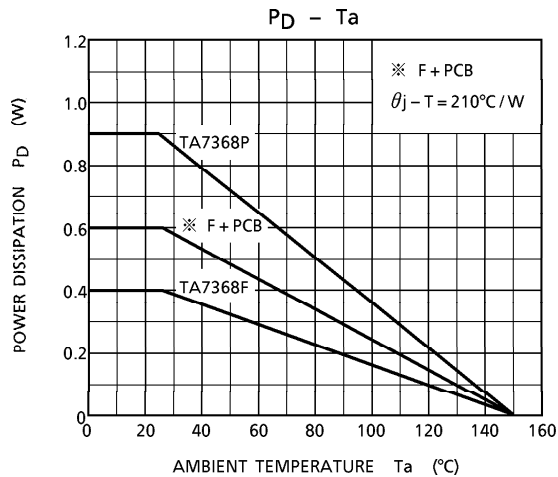
TA7368F



※ Pin①, ③ : Non-connection







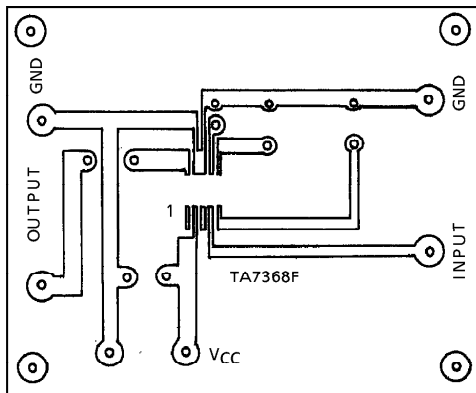
※ F + PCB

By being mounted on certain PCB's, flat packages increase the heat dissipating efficiency.

Data shown on the left is resulted from the measurement on the PCB recommended by Toshiba.

($\theta_j - T$: Thermal resistance)

Printed circuit board



60 x 47.5 (mm)

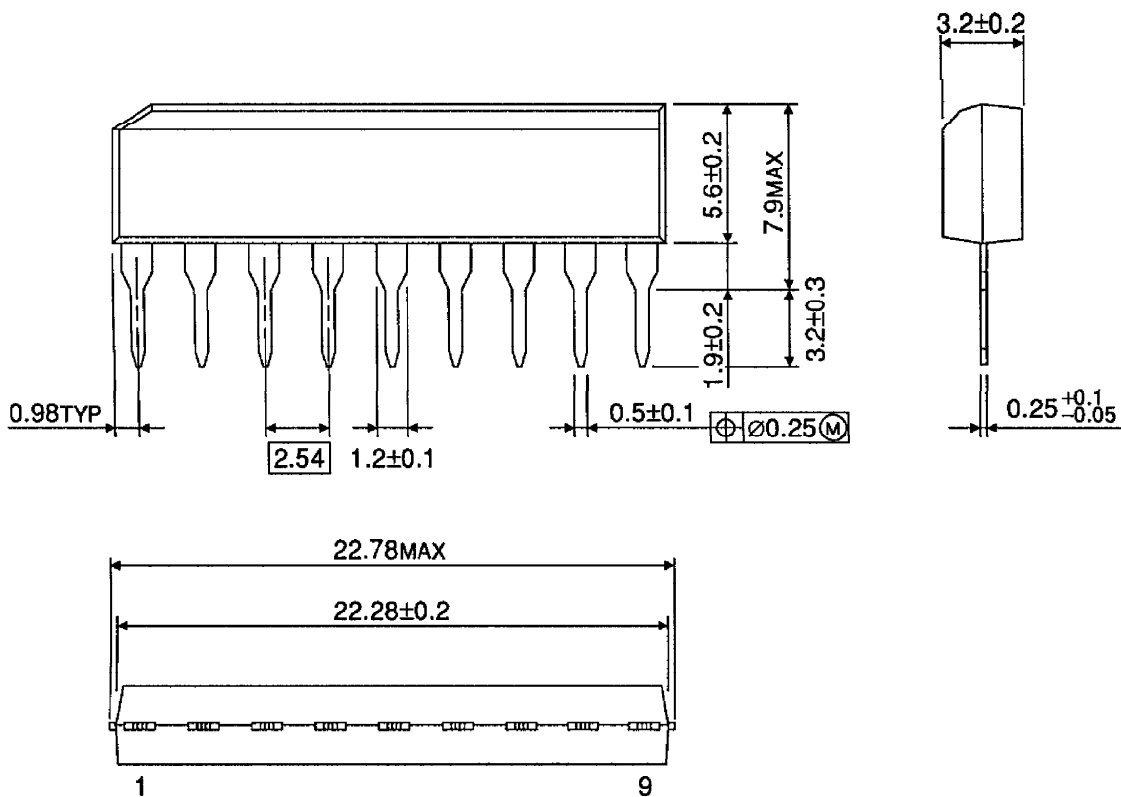
Material : Phenol resin

Thickness of copper leaf: 35 μm

Plate thickness : 1.6mm

OUTLINE DRAWING
 SIP9-P-A

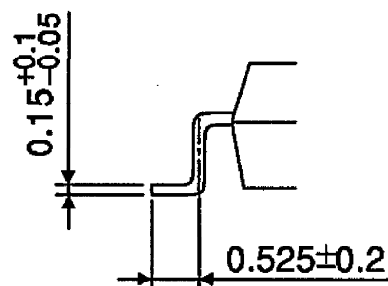
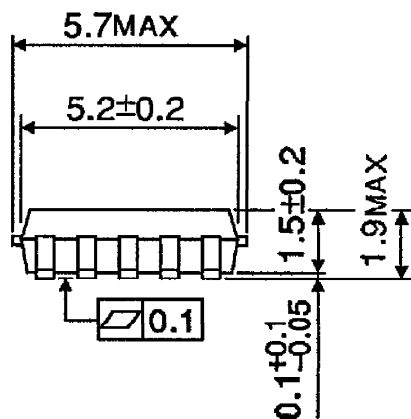
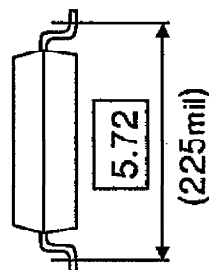
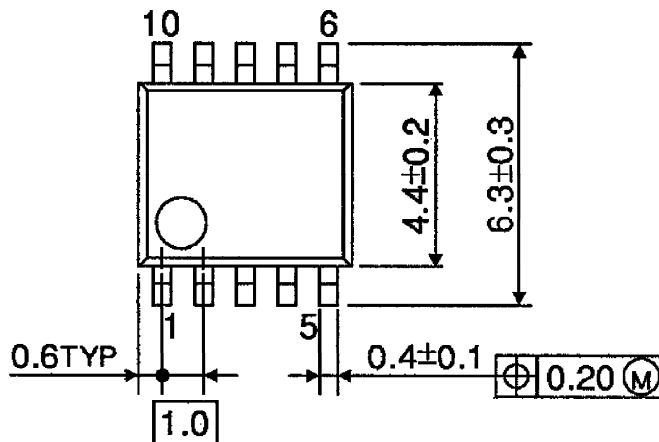
Unit : mm



Weight : 0.92g (Typ.)

OUTLINE DRAWING
SSOP10-P-225

Unit : mm



Weight : 0.10g (Typ.)