

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

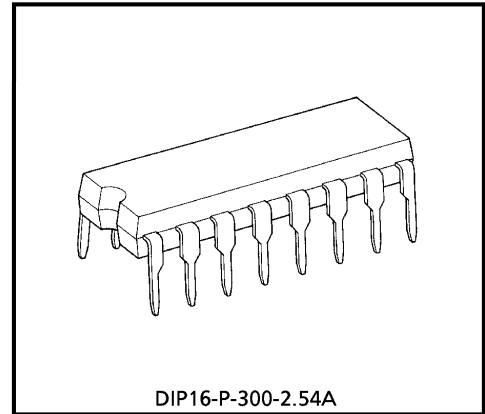
TA7628P, TA7628HP

AMPLIFIER SYSTEM FOR CASSETTE TAPE RECORDER

TA7628P and TA7628HP are Pre + Power amplifier system designed for cassette tape recorder.

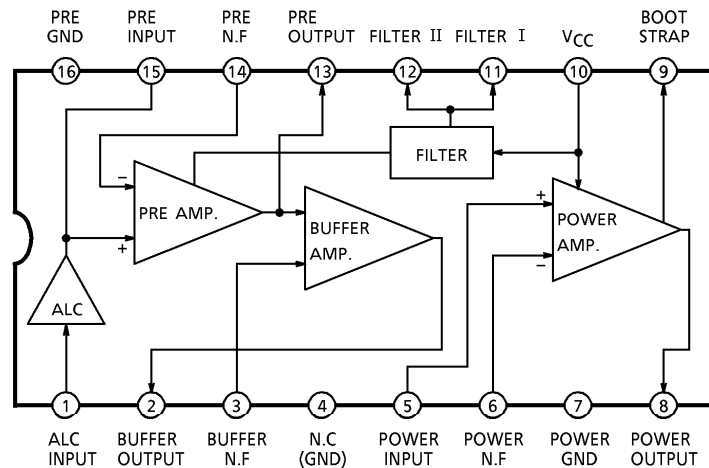
FEATURES

- Recording Playback for Pre Amplifier
- Buffer Amplifier (Recording Amplifier)
- Power Amplifier
- ALC Detector Circuit
- Muting Circuit
- Maximum Output Power ($V_{CC} = 6V, f = 1kHz, THD = 10\%$)
 - : $P_{out} = 0.6W$ (Typ.) ($R_L = 8\Omega$) : TA7628P
 - : $P_{out} = 0.96W$ (Typ.) ($R_L = 4\Omega$) : TA7628HP
- Low Distortion and Wide Dynamic Range
- Without Turn-on "POP" for Muting Circuit
- Operating Supply Voltage Range
 - : $V_{CC} (opr) = 3.5 \sim 9V$ ($T_a = 25^\circ C$)



DIP16-P-300-2.54A
Weight : 1.00g (Typ.)

BLOCK DIAGRAM



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SWITCH OVER

TEST ITEM	SW ₁	SW ₂	SW ₃	SW ₄	SW ₅	SW ₆
G _{vo1}	1	1	ON	OFF	OFF	OFF
G _{v1}	1	1	OFF	OFF	OFF	OFF
V _{out1}	1	1	OFF	OFF	OFF	OFF
G _{v2}	1	3	OFF	OFF	OFF	OFF
V _{out2}	1	3	OFF	OFF	OFF	OFF
V _{no2}	1	3	OFF	OFF	ON	OFF
ALC	1	2	OFF	OFF	OFF	OFF
G _{vo3}	2	1	OFF	ON	OFF	OFF
G _{v3}	2	1	OFF	OFF	OFF	OFF
P _{out}	2	1	OFF	OFF	OFF	OFF
V _{no3}	2	1	OFF	OFF	OFF	ON

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PRECAUTION FOR USE**1. Precaution of GND line**

The GND points of input side GND and N.F side GND in each amplifier must be arranged at the preamplifier side. (Fig.1)
The input side GND point and the N.F side GND point must be arranged near each other to have no impedance.

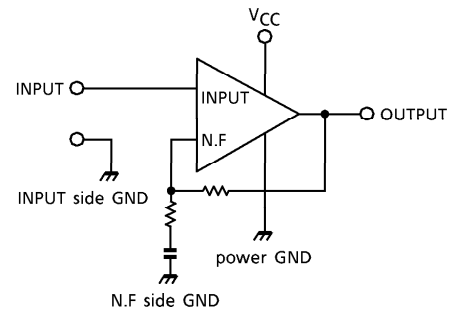


Fig.1

2. About radiation

- 1) The capacitance between the output and GND in preamplifier, buffer amplifier and power amplifier must be arranged near to this IC. The radiation loop must be as small as possible.
- 2) The voltage gain of high frequency in each amplifier must be reduced to reduce the noise with high frequency component. (In the application circuit, the feed back capacitor is used)
A 1000pF or same order capacitor must be connected from the input terminal of preamplifier and power amplifier to GND to prevent the interference of radiation.
- 3) It is better for this IC to separate adequately from the antenna in the radio cassette tape recorder applications.
- 4) The electrolytic capacitance $100\mu\text{F}\sim 220\mu\text{F}$ between V_{CC} and GND must be arranged near to this IC.

3. To prevent the oscillation

- 1) The output terminal of preamplifier must be terminated to GND by the capacitance more than 5600pF.
(The recommended value : $C = 0.01\mu\text{F}$)
- 2) The output terminal of buffer amplifier must be terminated to GND by the capacitance more than $0.01\mu\text{F}$.
(The recommended value : $C = 0.01\mu\text{F}$)
- 3) The output terminal of power amplifier must be terminated to GND by the good temperature characteristic capacitance of $1\sim 2.2\mu\text{F}$. The bootstrap terminal must be terminated to GND with the capacitance more than $0.47\mu\text{F}$.

4. Precaution of preamplifier

- 1) It is better that the coupling capacitor between the volume and the output of preamplifier is small.
Recommended value : $C = 0.47\mu\text{F}$
- 2) In recording mode, the signal source resistance must be more than $1\text{k}\Omega$ for ALC (Automatic Level Control) operation. When this resistance is small, the ALC range becomes narrow.

ELECTRICAL CHARACTERISTICS (TA7628P) (Unless otherwise specified, $V_{CC} = 6V$, $f = 1kHz$, $T_a = 25^\circ C$)
TOTAL

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	$I_{CCQ(1)}$	—	$V_{CC} = 3.5V$	7	—	—	mA
Quiescent Current	$I_{CCQ(2)}$	—	$V_{CC} = 6V$	9	—	36	mA

PRE AMP.

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Open Loop Voltage Gain	G_{vo1}	—	—	55	70	—	dB
Closed Loop Voltage Gain	G_{v1}	—	—	—	40	—	dB
Maximum Output Voltage	V_{out1}	—	THD = 1%	—	0.7	—	V_{rms}
Input Resistance	R_{IN1}	—	—	24	30	—	$k\Omega$
Equivalent Input Noise Voltage	V_{ni}	—	$R_g = 0$	—	1.4	2.5	μV_{rms}

PRE AMP. + BUFFER AMP.

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Closed Loop Voltage Gain	G_{v2}	—	Pre amp. $G_v = 40dB$ Buffer amp. $G_v = 20dB$	—	60	—	dB
Maximum Output Voltage	V_{out2}	—	THD = 3%	1.5	1.7	—	V_{rms}
Output Noise Voltage	V_{no2}	—	$R_g = 0$, $G_{v2} = 60dB$	—	1.2	2.5	mV_{rms}
ALC Effect	ALC1	—	$V_{in} = 0.775mV_{rms} (-60dBm)$ $\sim 0.0775V_{rms} (-20dBm)$	—	2	—	dB
ALC Range	ALC2	—	Range of THD $\leq 1\%$	—	60	—	dB

POWER AMP.

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Open Loop Voltage Gain	G_{vo3}	—	—	60	70	—	dB
Closed Loop Voltage Gain	G_{v3}	—	—	—	40	—	dB
Output Power	P_{out}	—	$R_L = 8\Omega$, THD = 10%	0.5	0.6	—	W
Output Noise Voltage	V_{no3}	—	$R_g = 0$, $G_v = 40dB$	—	0.3	1.0	mV_{rms}

ELECTRICAL CHARACTERISTICS (TA7628HP) (Unless otherwise specified, $V_{CC} = 6V$, $f = 1kHz$, $T_a = 25^\circ C$)
TOTAL

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	$I_{CCQ(1)}$	—	$V_{CC} = 3.5V$	7.5	—	—	mA
Quiescent Current	$I_{CCQ(2)}$	—	$V_{CC} = 6V$	11	—	35	mA

PRE AMP.

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Open Loop Voltage Gain	G_{vo1}	—	—	55	70	—	dB
Closed Loop Voltage Gain	G_{v1}	—	—	—	40	—	dB
Maximum Output Voltage	V_{out1}	—	THD = 1%	—	0.7	—	V_{rms}
Input Resistance	R_{IN1}	—	—	—	30	—	$k\Omega$
Equivalent Input Noise Voltage	V_{ni}	—	$R_g = 0$	—	1.4	2.5	μV_{rms}

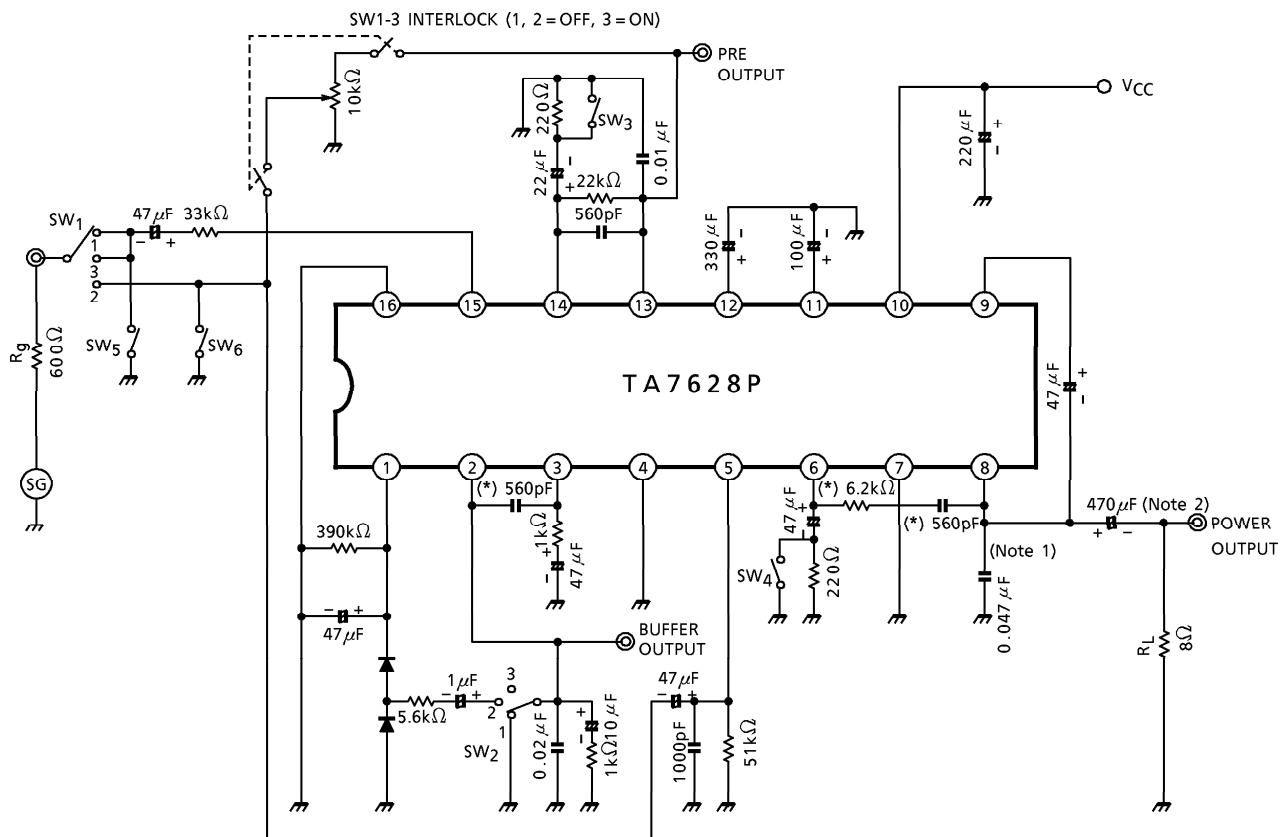
PRE AMP. + BUFFER AMP.

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Closed Loop Voltage Gain	G_{v2}	—	Pre amp. $G_v = 40dB$ Buffer amp. $G_v = 20dB$	—	60	—	dB
Maximum Output Voltage	V_{out2}	—	THD = 3%	1.5	1.7	—	V_{rms}
Output Noise Voltage	V_{no2}	—	$R_g = 0$, $G_{v2} = 60dB$	—	1.2	2.5	mV_{rms}
ALC Effect	ALC1	—	$V_{in} = 0.775mV_{rms}$ (- 60dBm) $\sim 0.0775V_{rms}$ (- 20dBm)	—	2	—	dB
ALC Range	ALC2	—	Range of THD $\leq 1\%$	—	60	—	dB

POWER AMP.

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Open Loop Voltage Gain	G_{vo3}	—	—	60	70	—	dB
Closed Loop Voltage Gain	G_{v3}	—	—	—	40	—	dB
Output Power	P_{out}	—	$R_L = 4\Omega$, THD = 10% $V_{CC} = 9V$, $R_L = 8\Omega$, THD = 10%	0.8	0.96	—	W
Output Noise Voltage	V_{no3}	—	$R_g = 0$, $G_v = 40dB$	—	0.3	1.0	mV_{rms}

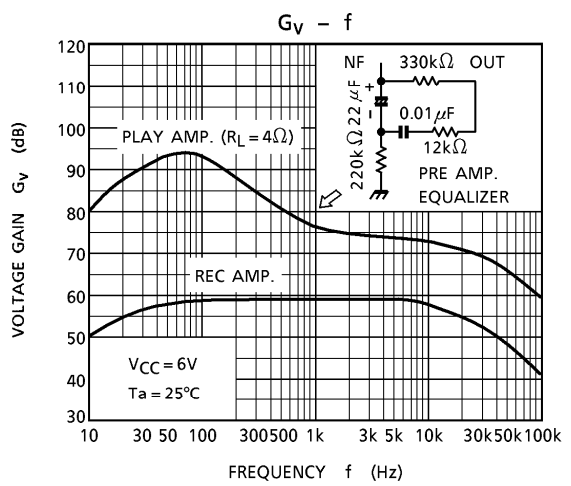
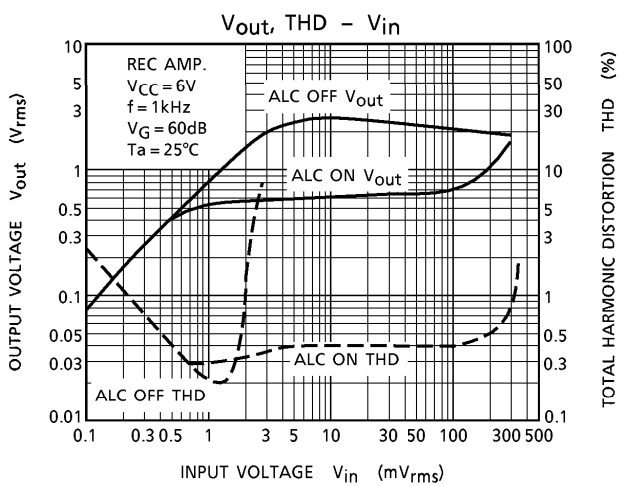
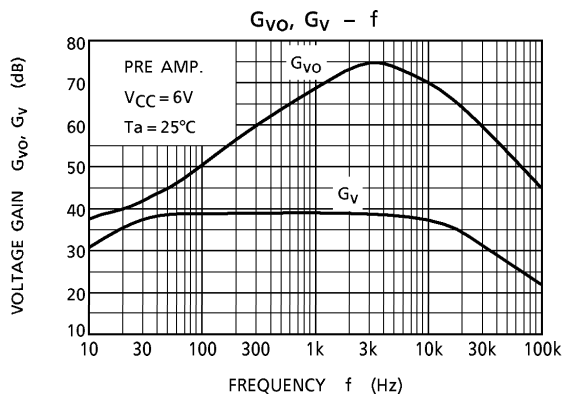
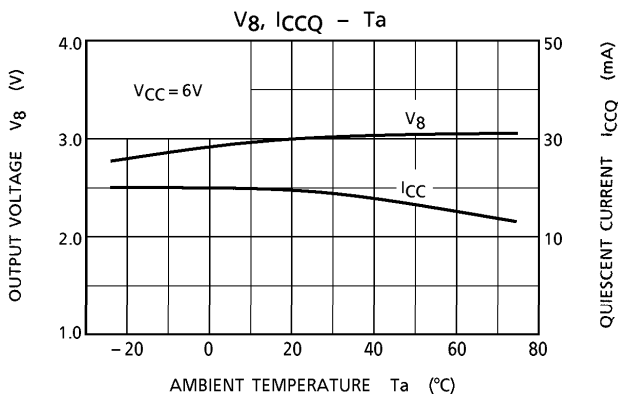
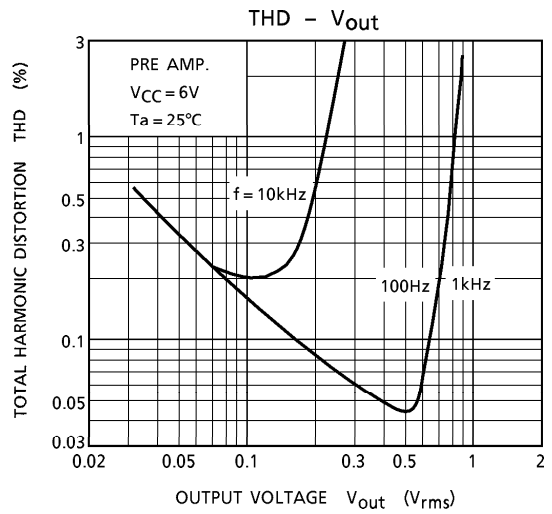
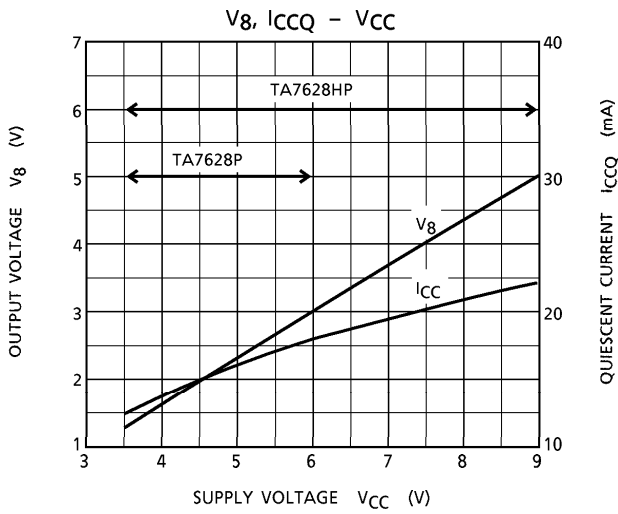
TEST CIRCUIT

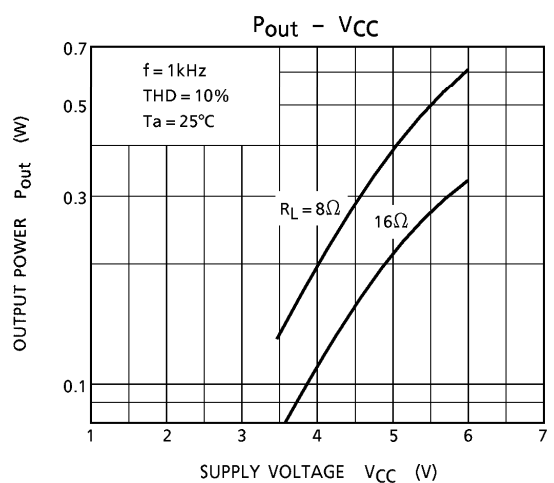
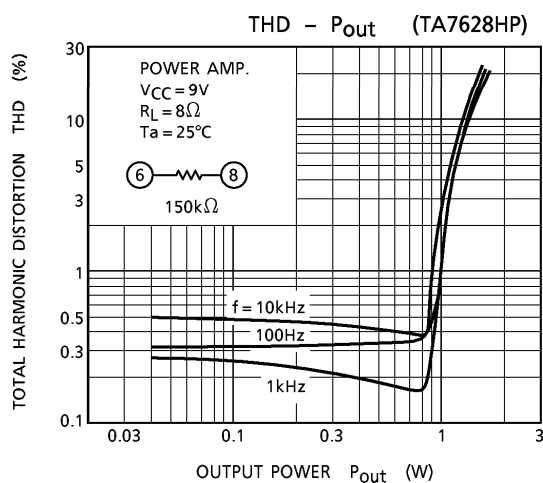
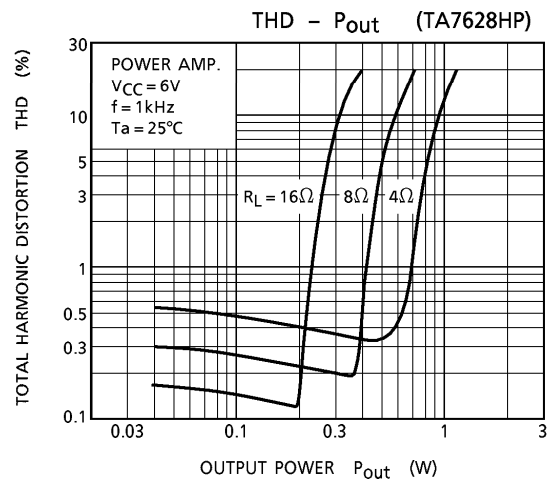
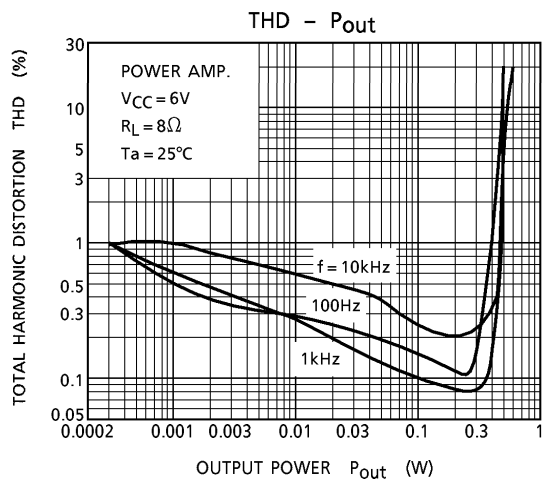
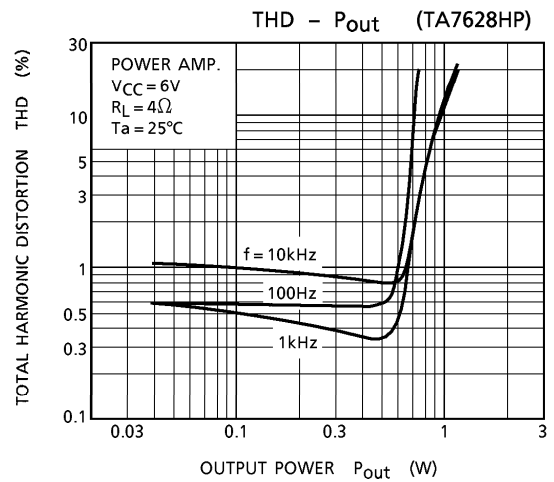
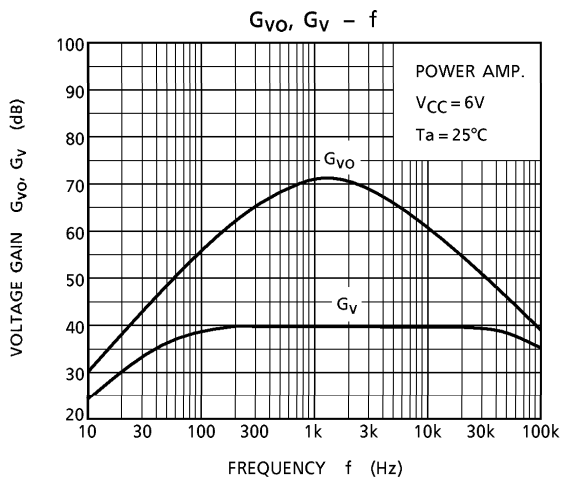


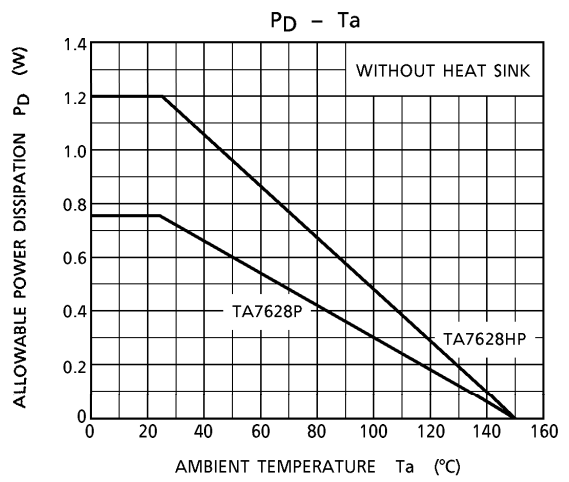
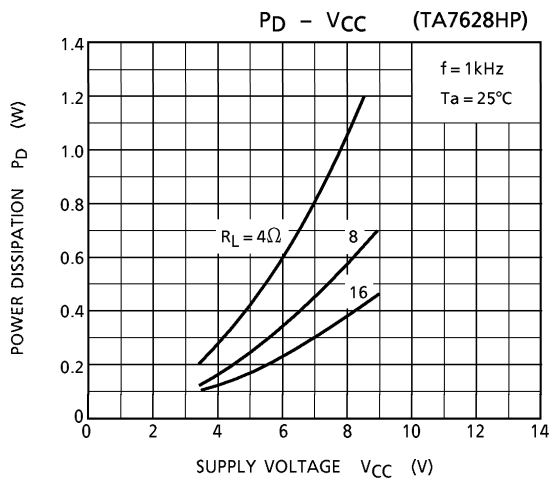
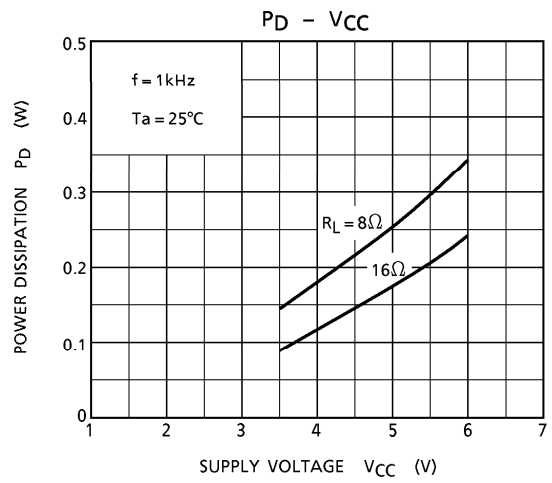
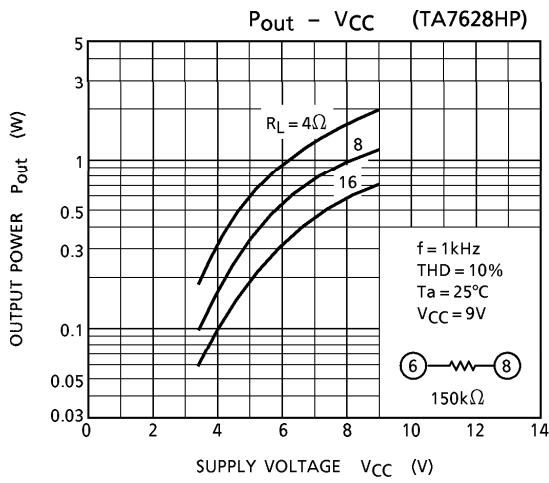
(*) Use in measuring the output noise voltage.

(Note 1) TA7628HP : $0.047\mu\text{F} \rightarrow 0.068\mu\text{F}$

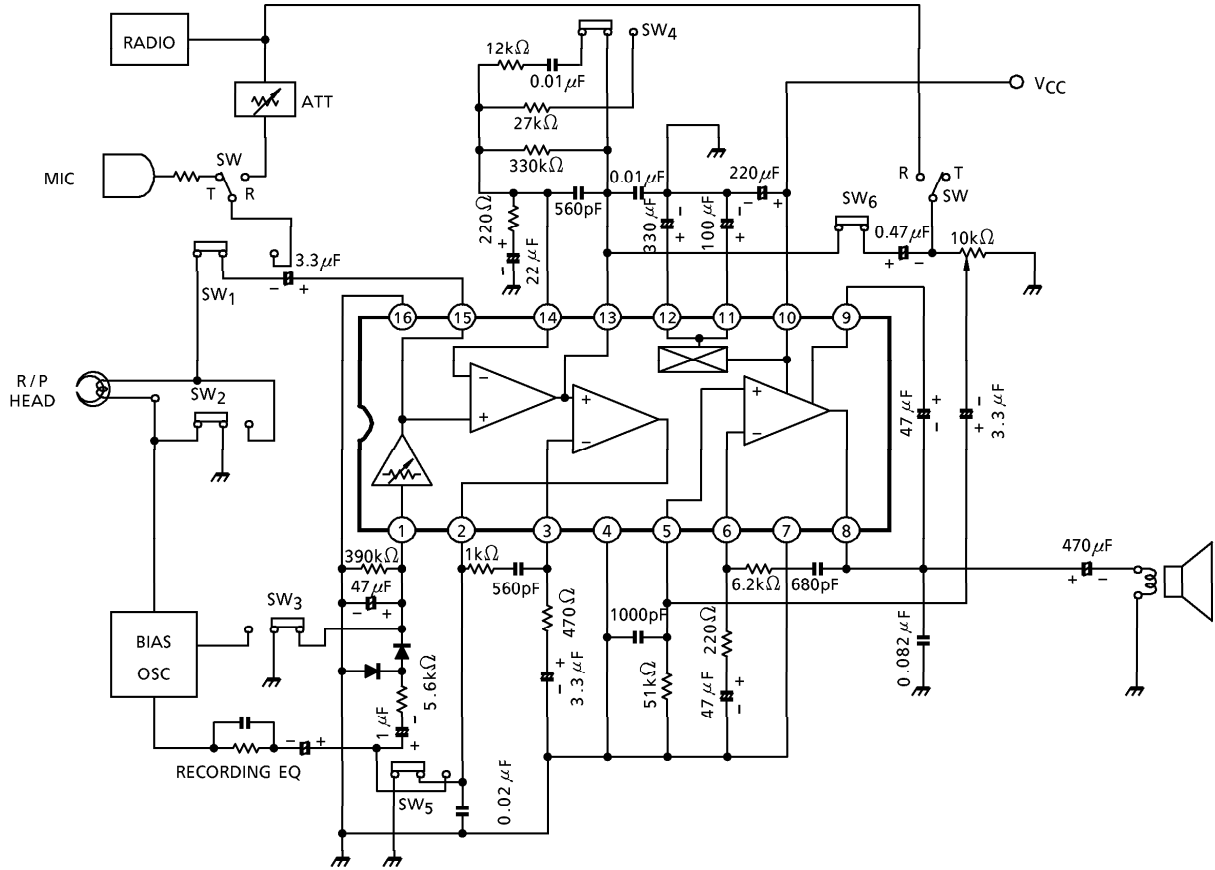
(Note 2) TA7628HP : $470\mu\text{F} \rightarrow 1000\mu\text{F}$







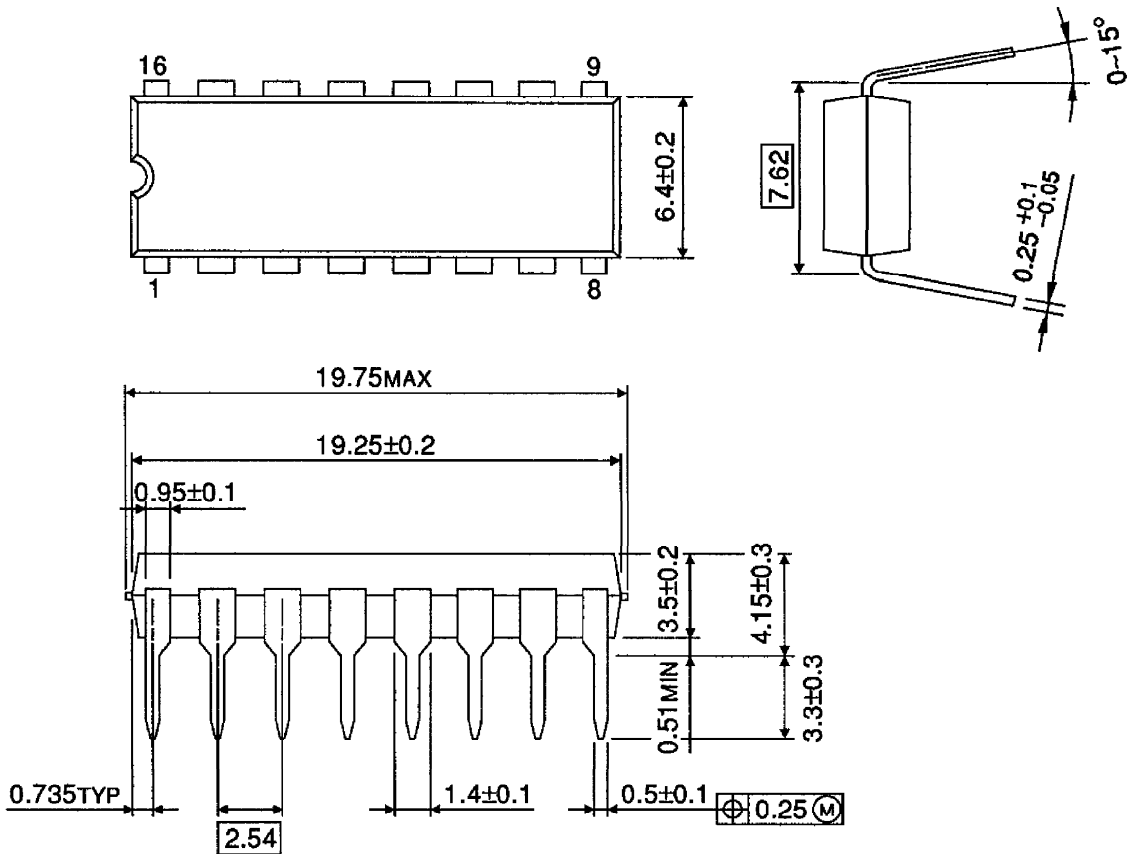
APPLICATION CIRCUIT



SW₁~SW₆ are set for play back.
SW Functions.

OUTLINE DRAWING
DIP16-P-300-2.54A

Unit : mm



Weight : 1.00g (Typ.)