

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

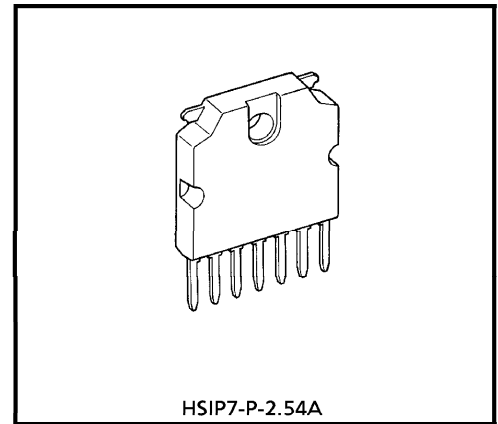
# TA7252AP

## 5.9 W AUDIO POWER AMPLIFIER

The TA7252AP is audio power amplifier for consumer applications. It is designed for high power, low distortion and low noise. Since the package is a 7 pin SIP (Single Inline Package), it greatly simplifies construction of a power amplifier both in design and assembly. It is suitable for car radio power amplifier.

### FEATURES

- Very Few External Parts
- High Power
  - :  $P_{OUT} (1) = 5.9 \text{ W (Typ.)}$   
( $V_{CC} = 13.2 \text{ V}$ ,  $f = 1 \text{ kHz}$ ,  $THD = 10\%$ ,  $R_L = 4 \Omega$ )
  - $P_{OUT} (2) = 9.6 \text{ W (Typ.)}$   
( $V_{CC} = 13.2 \text{ V}$ ,  $f = 1 \text{ kHz}$ ,  $THD = 10\%$ ,  $R_L = 2 \Omega$ )
- Low Distortion
  - :  $THD = 0.07\% \text{ (Typ.)}$   
( $V_{CC} = 13.2 \text{ V}$ ,  $f = 1 \text{ kHz}$ ,  $P_{OUT} = 0.5 \text{ W}$ ,  $R_L = 4 \Omega$ )
- Low Noise
  - :  $V_{NO} (1) = 0.7 \text{ mV}_{rms} \text{ (Typ.)}$   
( $V_{CC} = 13.2 \text{ V}$ ,  $R_L = 4 \Omega$ ,  $G_V = 53 \text{ dB}$ ,  $R_G = 10 \text{ k}\Omega$ ,  $BW = 20 \text{ Hz} \sim 20 \text{ kHz}$ )
  - $V_{NO} (2) = 0.4 \text{ mV}_{rms} \text{ (Typ.)}$   
( $V_{CC} = 13.2 \text{ V}$ ,  $R_L = 4 \Omega$ ,  $G_V = 53 \text{ dB}$ ,  $R_G = 0$ ,  $DIN \text{ Noise} : DIN45405$ )
- Protector : Thermal Shut Down, Over Voltage Protection, Short Protection
- Operating Supply Voltage Range :  $V_{CC} (opr.) = 9 \sim 18 \text{ V}$



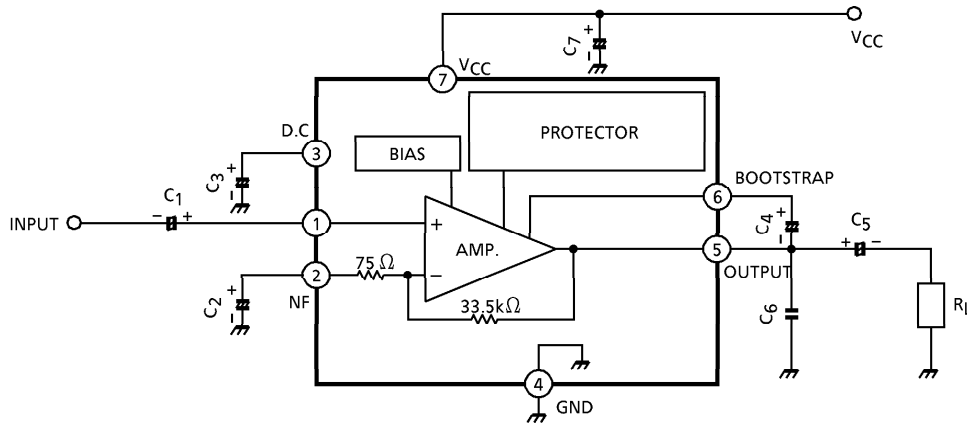
HSIP7-P-2.54A

Weight : 2.15 g (Typ.)

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BLOCK DIAGRAM



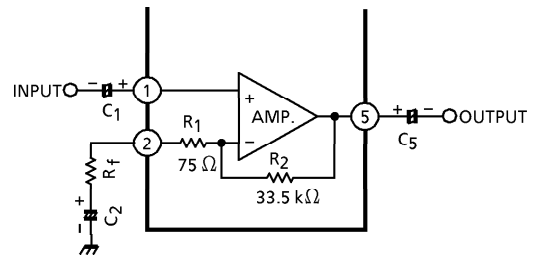
APPLICATION INFORMATION

1. Voltage gain adjustment

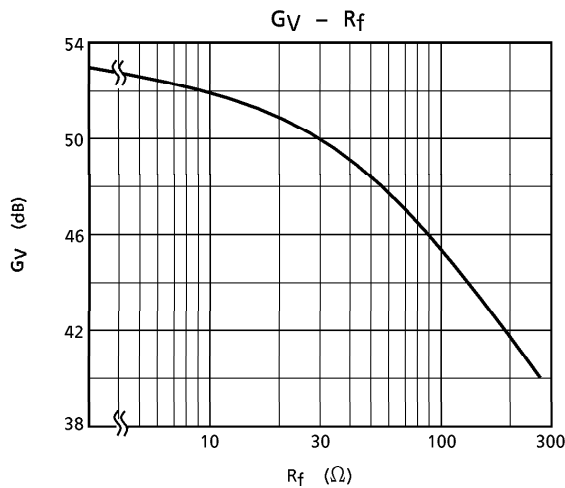
The closed loop voltage gain ( $G_V$ ) is determined by  $R_1$ ,  $R_2$  and  $R_f$ .

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

When  $R_f = 0$ ,  $G_V = 53 \text{ dB}$  (Typ.) is given.



(Fig.1)



(Fig.2)

The recommended voltage gain is more than 40 dB.

2. Measures against oscillation

The purpose of capacitor :  $C_6$  is to prevent oscillation.

This capacitor needs to be small temperature coefficient.

So ceramic capacitor is unsuitable.

A voltage gain less than 40 dB results occasionally in a plastic oscillation.

3. Precaution at print board design

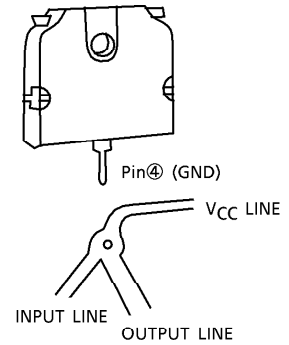
(1) GND line

The GND pin is only one in this IC.

When there is some common impedance between the input side GND and the output side GND, electrical characteristics as THD degrade.

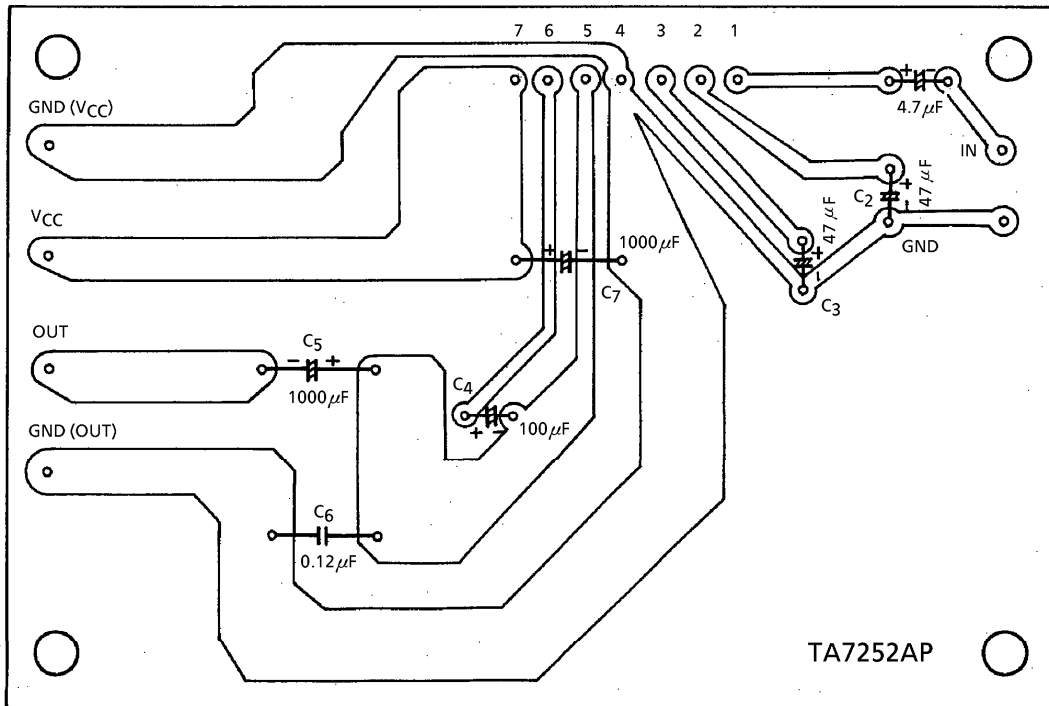
3 GND lines (input, output and  $V_{CC}$  sides) should be branched at the pin④ as shown (Fig.3).

(2) It is recommended to refer the standard print board.



(Fig.3)

STANDARD P.C.B.



## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Peak Supply Voltage (0.2 s)	V <sub>CC</sub> (surge)	48	V
DC Supply Voltage	V <sub>CC</sub> (DC)	25	V
Operating Supply Voltage	V <sub>CC</sub> (opr)	18	V
Output Current (Peak)	I <sub>O</sub> (peak)	4.5	A
Power Dissipation	P <sub>D</sub>	15	W
Operating Temperature	T <sub>opr</sub>	-30~75	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°C

## ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V<sub>CC</sub> = 13.2 V, R<sub>L</sub> = 4 Ω, R<sub>g</sub> = 600 Ω, f = 1 kHz, Ta = 25°C)

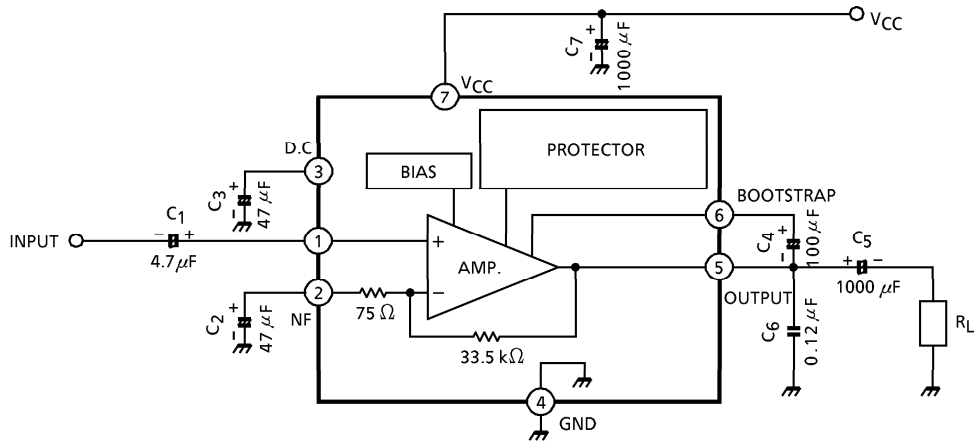
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I <sub>CCQ</sub>	—	V <sub>IN</sub> = 0	—	35	3.5	mA
Output Power	P <sub>OUT</sub> (1)	—	THD = 10%	5.0	5.9	—	W
	P <sub>OUT</sub> (2)	—	THD = 10%, R <sub>L</sub> = 2 Ω	—	9.6	—	
Total Harmonic Distortion	THD (1)	—	P <sub>OUT</sub> = 0.5 W	—	0.07	0.5	%
	THD (2)	—	P <sub>OUT</sub> = 1 W, R <sub>L</sub> = 2 Ω	—	0.10	—	
Output Noise Voltage	V <sub>NO</sub> (1)	—	R <sub>g</sub> = 10 kΩ, G <sub>V</sub> = 53 dB BW = 20 Hz~20 kHz	—	0.7	1.8	mV <sub>rms</sub>
	V <sub>NO</sub> (2)	—	R <sub>g</sub> = 0, G <sub>V</sub> = 53 dB DIN noise (DIN45405) filter	—	0.4	—	
Voltage Gain	G <sub>V</sub>	—	V <sub>IN</sub> = 0.5 mV <sub>rms</sub>	51	53	55	dB
Ripple Rejection Ratio	R.R.	—	R <sub>g</sub> = 0, f <sub>ripple</sub> = 100 Hz V <sub>ripple</sub> = 0.775 V <sub>rms</sub> (0 dBm)	—	-62	-50	dB
Input Resistance	R <sub>IN</sub>	—	f = 1 kHz	—	30	—	kΩ

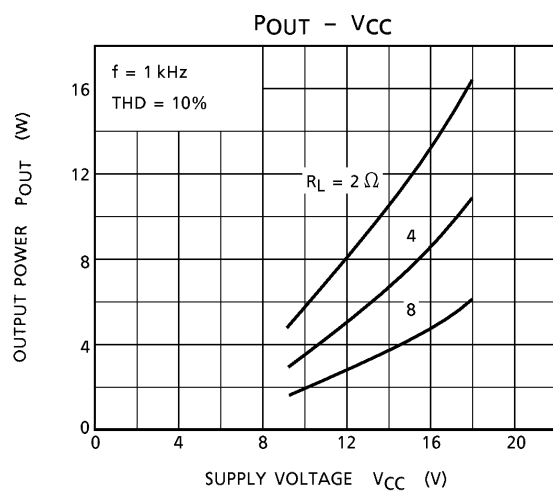
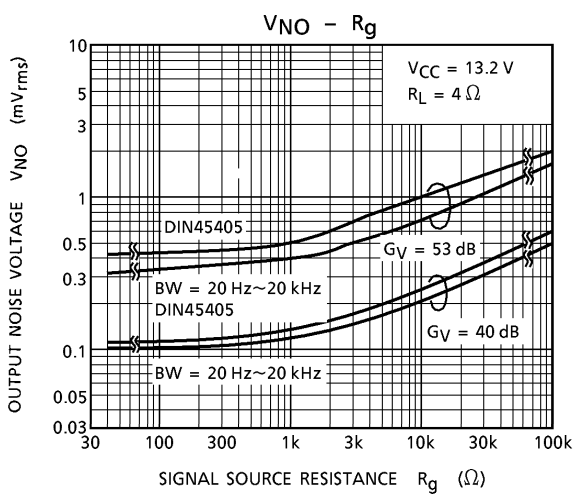
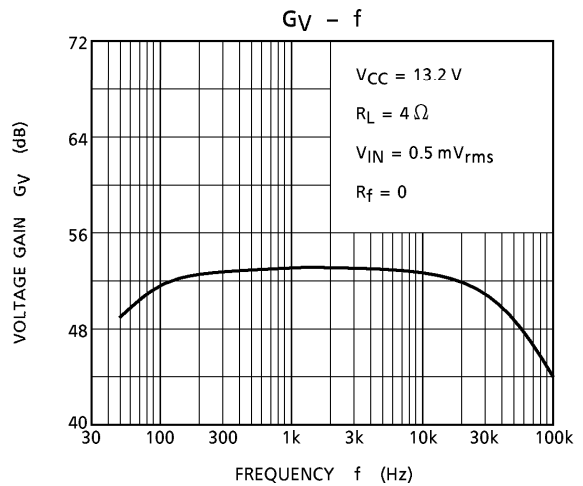
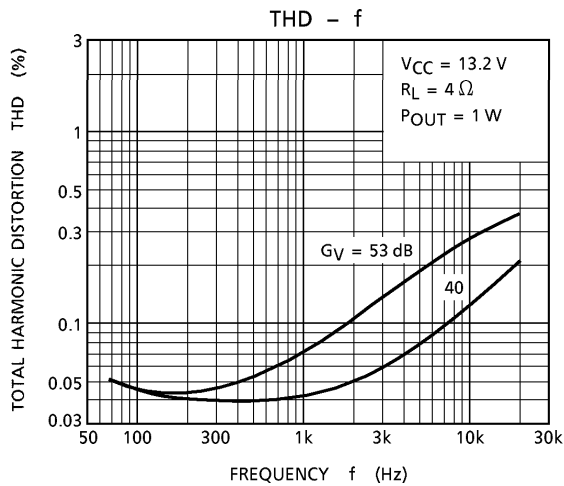
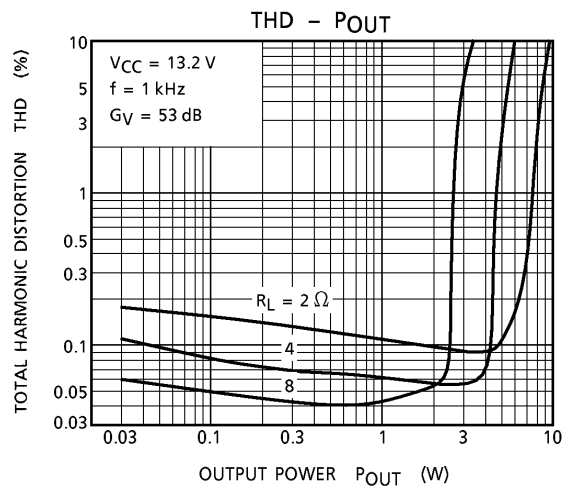
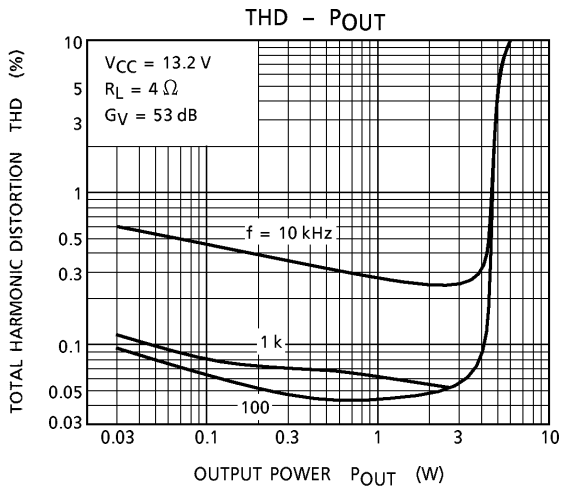
## TYP. DC VOLTAGE OF EACH TERMINAL

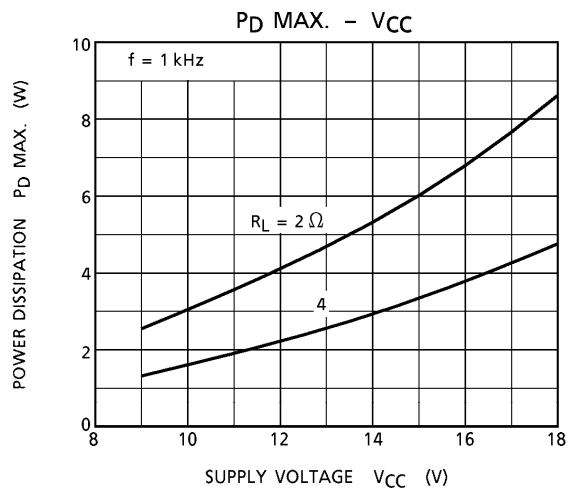
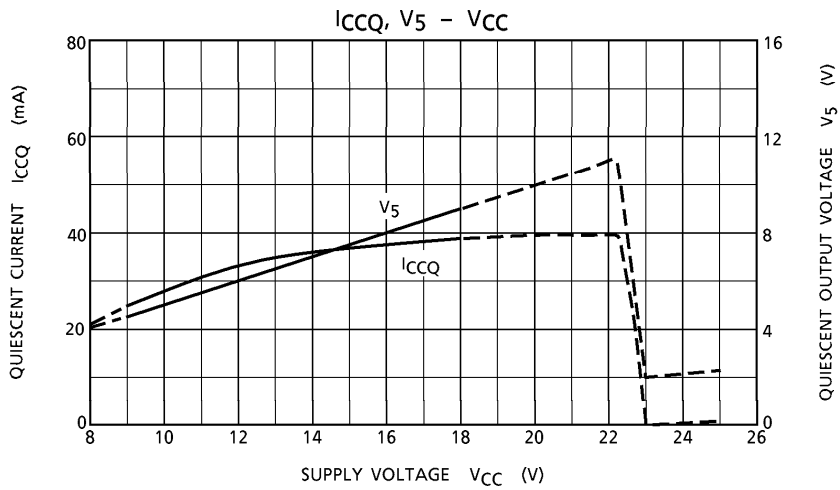
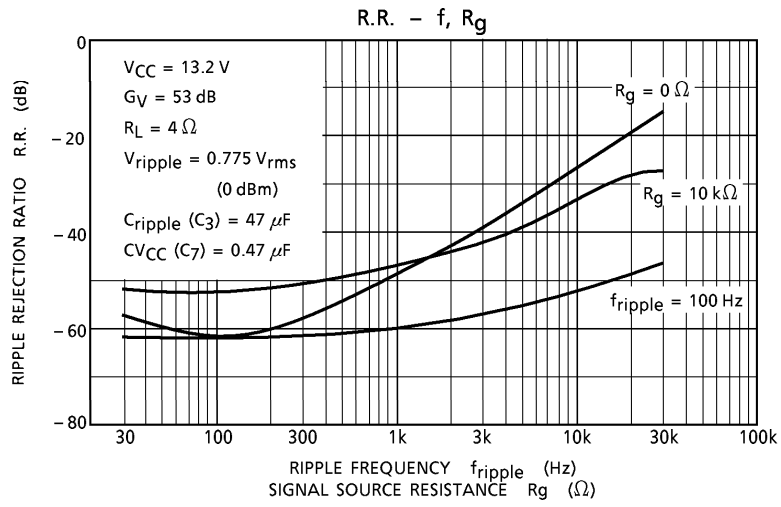
(V<sub>CC</sub> = 13.2 V, Ta = 25°C)

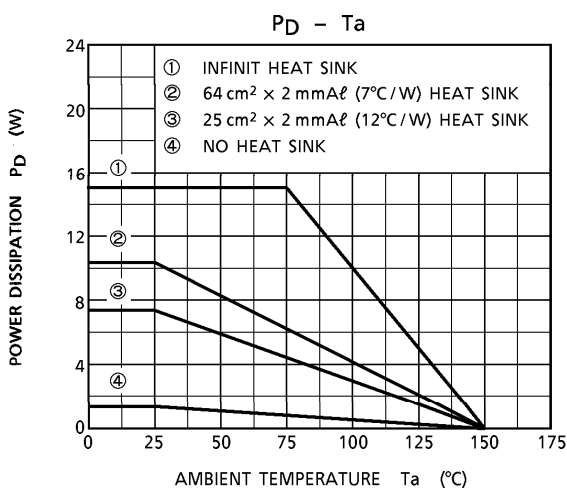
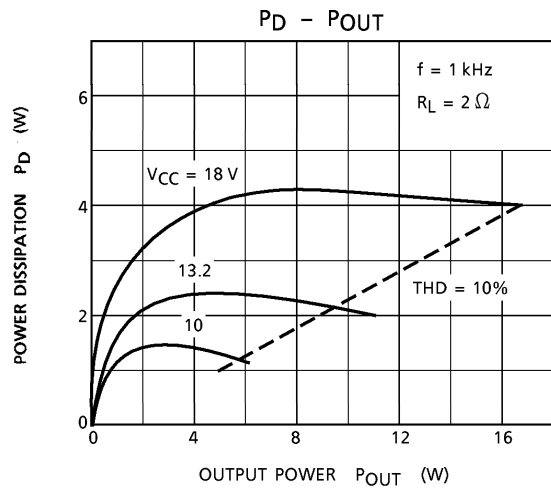
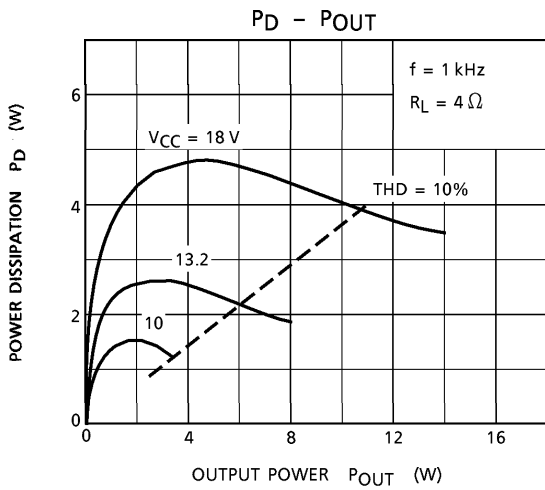
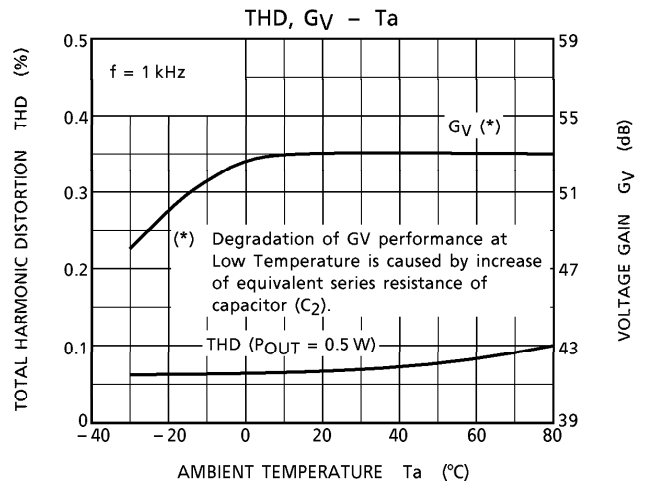
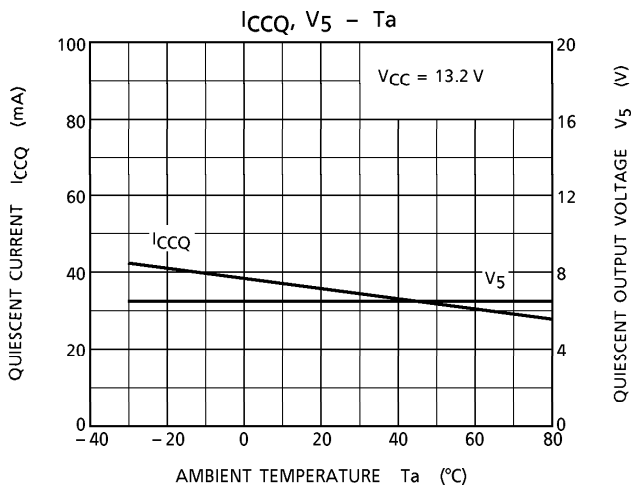
TERMINAL No.	1	2	3	4	5	6	7
DC Voltage (V)	1.5	1.5	6.6	GND	6.6	12.6	V <sub>CC</sub>

TEST CIRCUIT





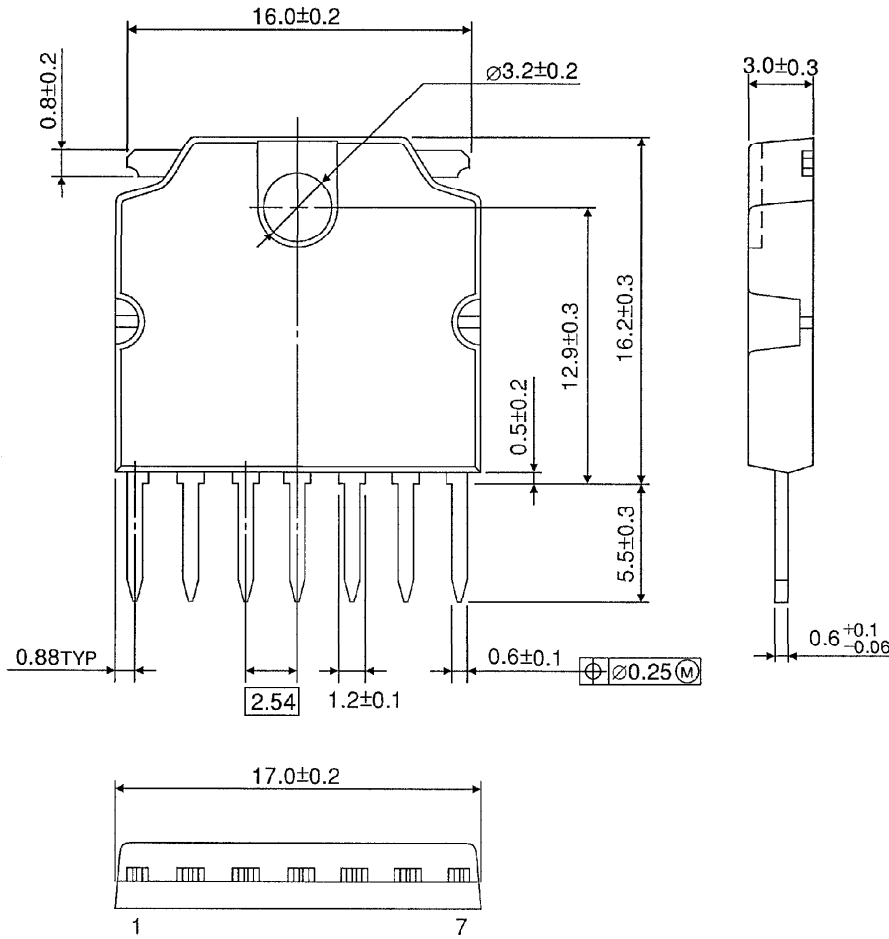






PACKAGE DIMENSIONS  
HSIP7-P-2.54A

Unit : mm



Weight : 2.15 g (Typ.)