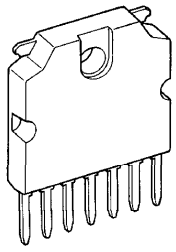
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

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.



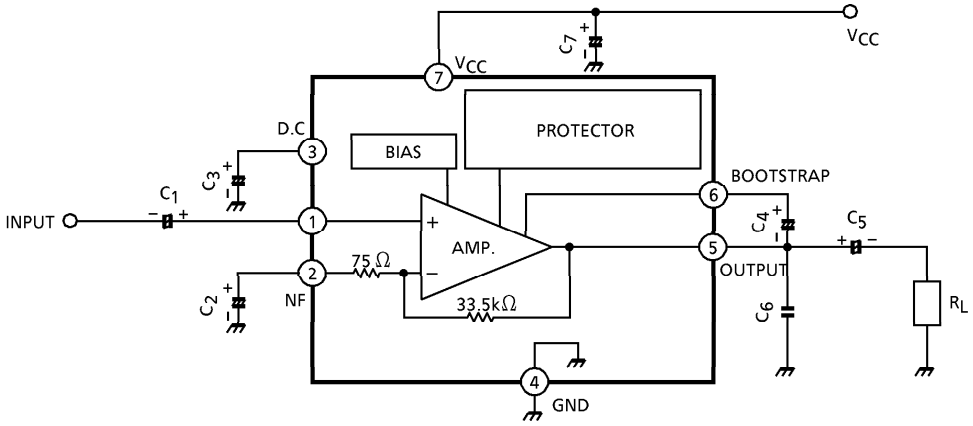
HSIP7-P-2.54A

Weight : 2.15 g (Typ.)

FEATURES

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

BLOCK DIAGRAM



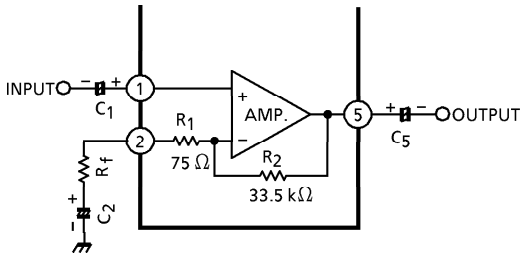
APPLICATION INFORMATION

1. Voltage gain adjustment

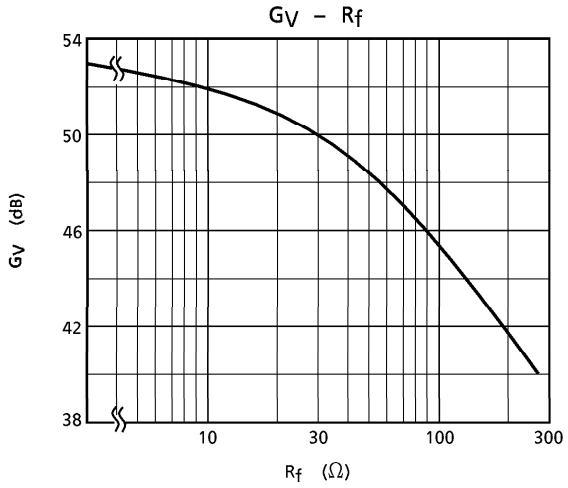
The closed loop voltage gain (G_V) is determined by R_1, R_2 and R_f.

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

When $R_f = 0$, $G_V = 53$ dB (Typ.) is given.



(Fig.1)



(Fig.2)

The recommended voltage gain is more than 40 dB.

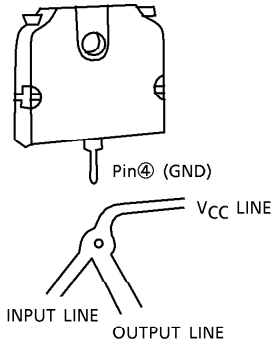
2. Measures against oscillation

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

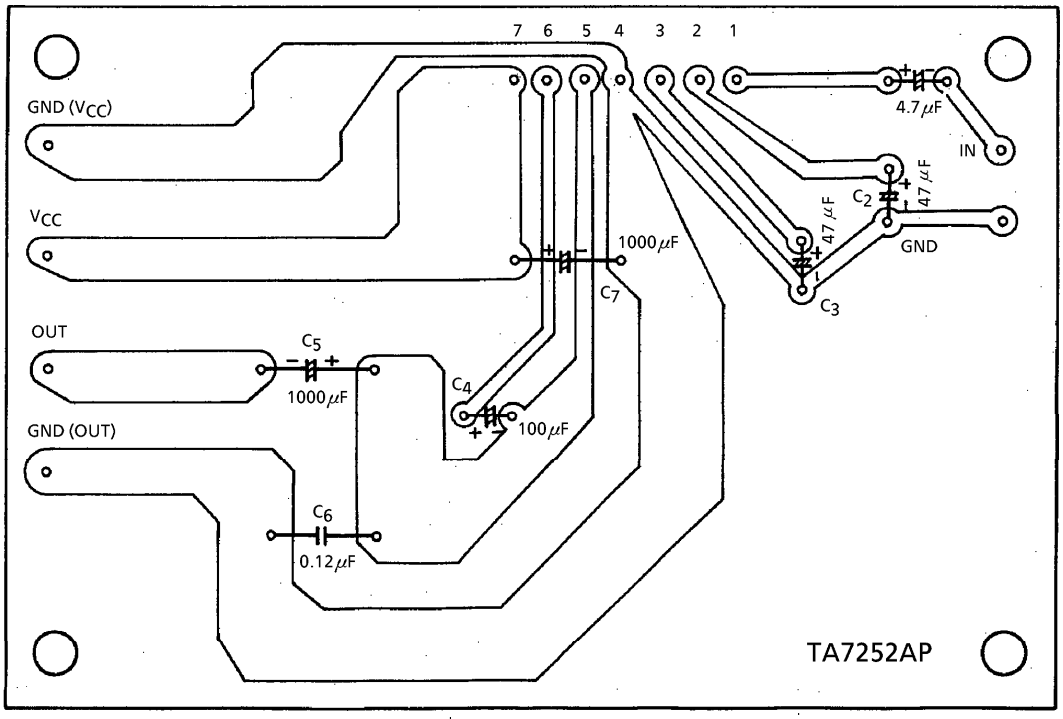
The GND pin is only one in this IC.
When there is some common impedance between the input side GND and the output side GND, electrical characteristics as THD degrade.
3 GND lines (input, output and V_{CC} sides) should be branched at the pin④ as shown (Fig.3).



(Fig.3)

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

STANDARD P.C.B.



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Peak Supply Voltage (0.2 s)	$V_{CC\ (surge)}$	48	V
DC Supply Voltage	$V_{CC\ (DC)}$	25	V
Operating Supply Voltage	$V_{CC\ (opr)}$	18	V
Output Current (Peak)	$I_{O\ (peak)}$	4.5	A
Power Dissipation	P_D	15	W
Operating Temperature	T_{opr}	−30~75	°C
Storage Temperature	T_{stg}	−55~150	°C

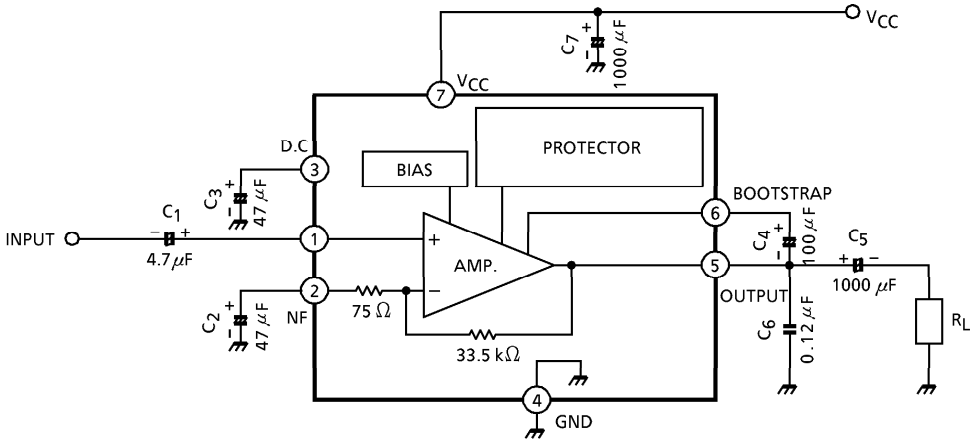
ELECTRICAL CHARACTERISTICS
(Unless otherwise specified, V_{CC} = 13.2 V, R_L = 4 Ω, R_g = 600 Ω, f = 1 kHz, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	—	V_{IN} = 0	—	35	3.5	mA
Output Power	$P_{OUT\ (1)}$	—	THD = 10%	5.0	5.9	—	W
	$P_{OUT\ (2)}$	—	THD = 10%, R_L = 2 Ω	—	9.6	—	
Total Harmonic Distortion	THD (1)	—	P_{OUT} = 0.5 W	—	0.07	0.5	%
	THD (2)	—	P_{OUT} = 1 W, R_L = 2 Ω	—	0.10	—	
Output Noise Voltage	$V_{NO\ (1)}$	—	R_g = 10 kΩ, G_V = 53 dB BW = 20 Hz~20 kHz	—	0.7	1.8	mV_{rms}
	$V_{NO\ (2)}$	—	R_g = 0, G_V = 53 dB DIN noise (DIN45405) filter	—	0.4	—	
Voltage Gain	G_V	—	V_{IN} = 0.5 mV_{rms}	51	53	55	dB
Ripple Rejection Ratio	R.R.	—	R_g = 0, f_{ripple} = 100 Hz V_{ripple} = 0.775 V_{rms} (0 dBm)	—	−62	−50	dB
Input Resistance	R_{IN}	—	f = 1 kHz	—	30	—	kΩ

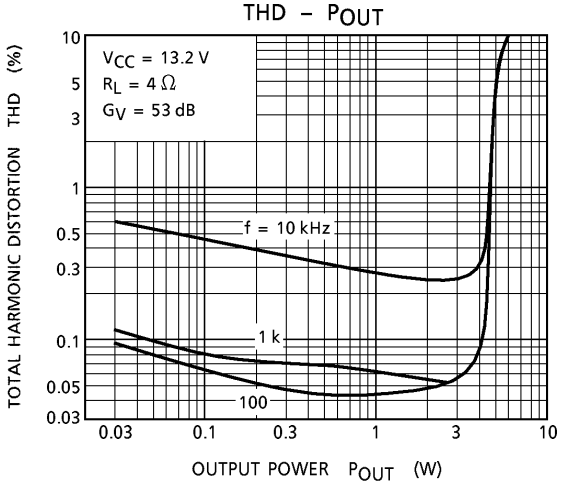
TYP. DC VOLTAGE OF EACH TERMINAL
(V_{CC} = 13.2 V, Ta = 25°C)

TERMINAL No.	1	2	3	4	5	6	7
DC Voltage (V)	1.5	1.5	6.6	GND	6.6	12.6	V_{CC}

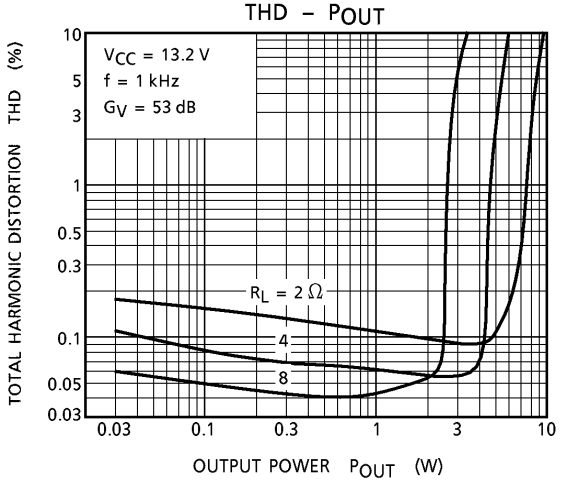
TEST CIRCUIT



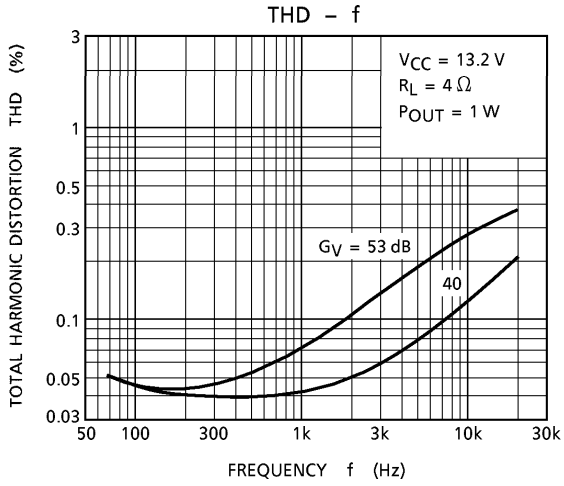
THD – P_{OUT}



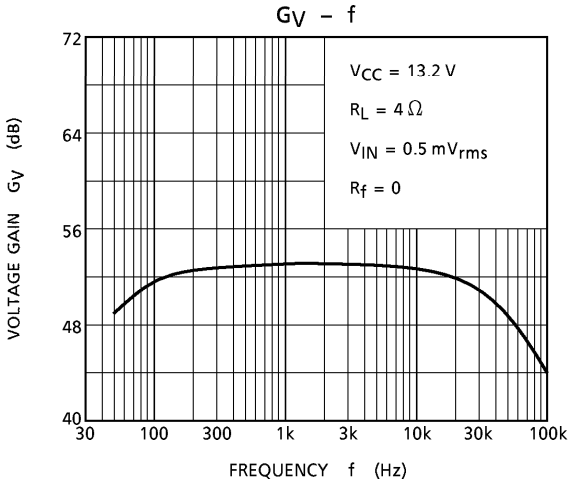
THD – P_{OUT}



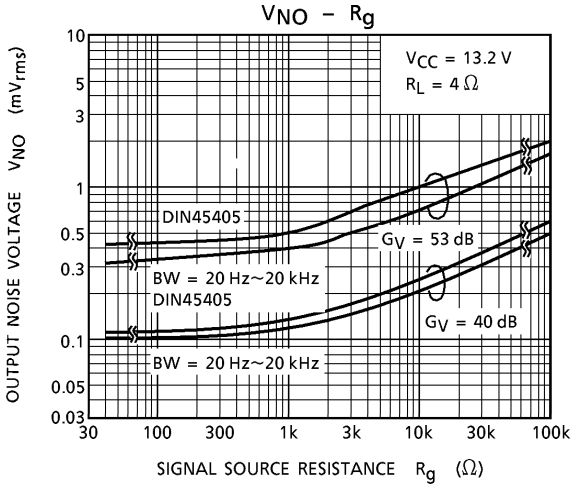
THD – f



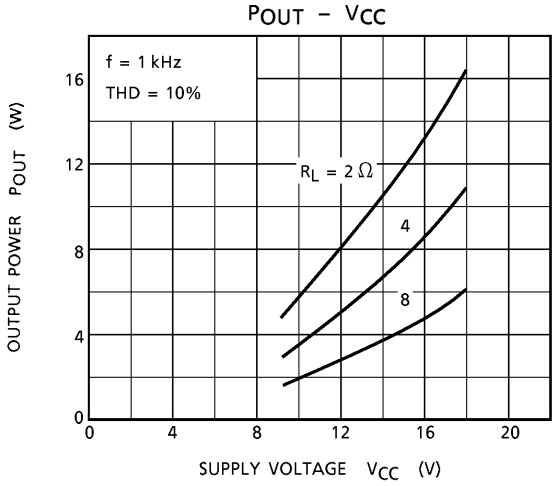
G_V – f



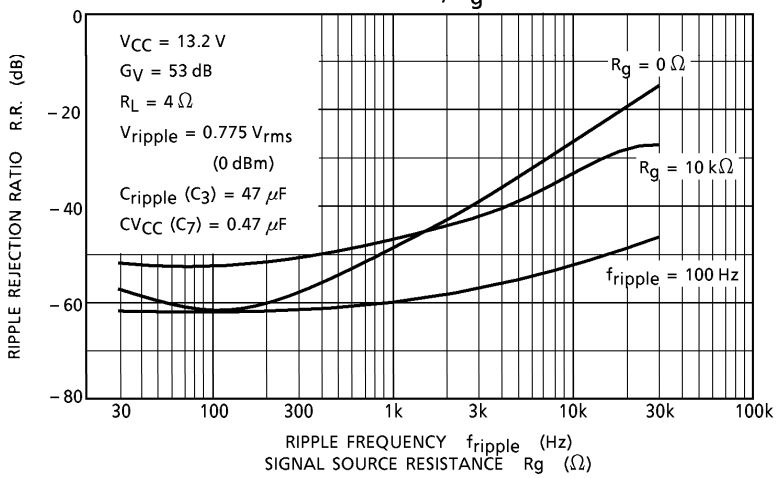
V_{NO} – R_g



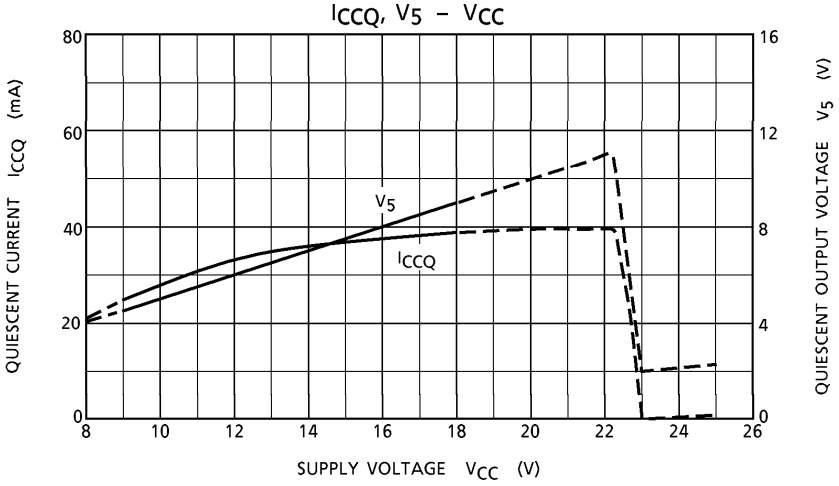
P_{OUT} – V_{CC}



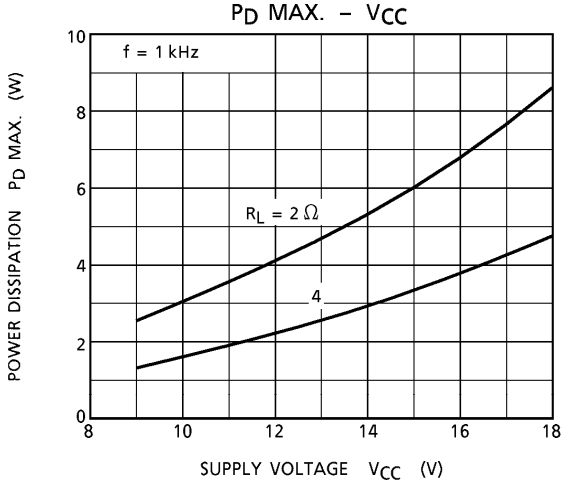
R.R. – f, R_g



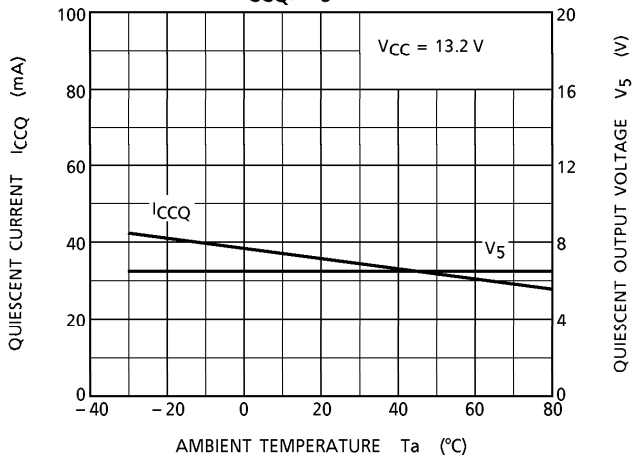
I_{CCQ}, V_5 – V_{CC}



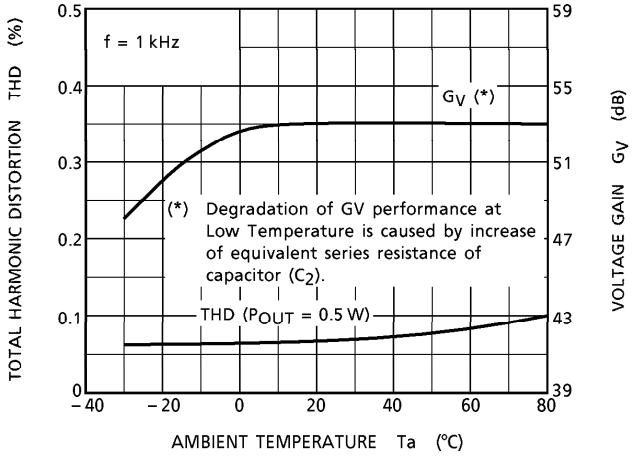
P_D MAX. – V_{CC}



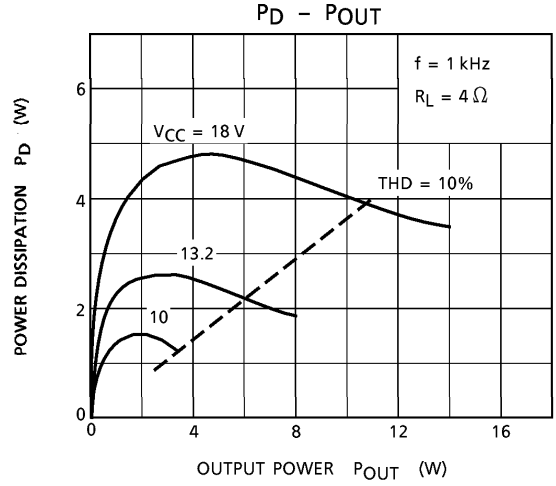
I_{CCQ}, V_5 – Ta



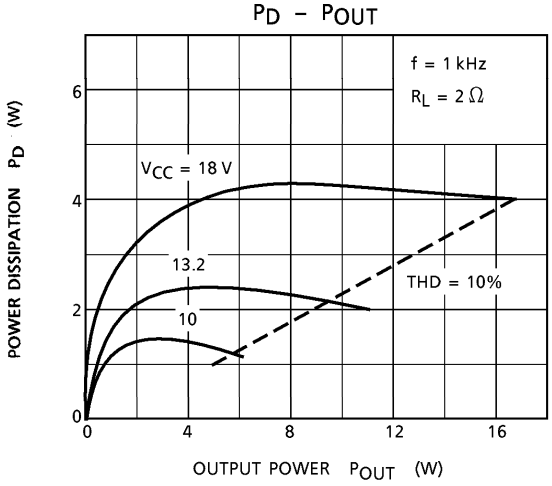
THD, G_V – Ta



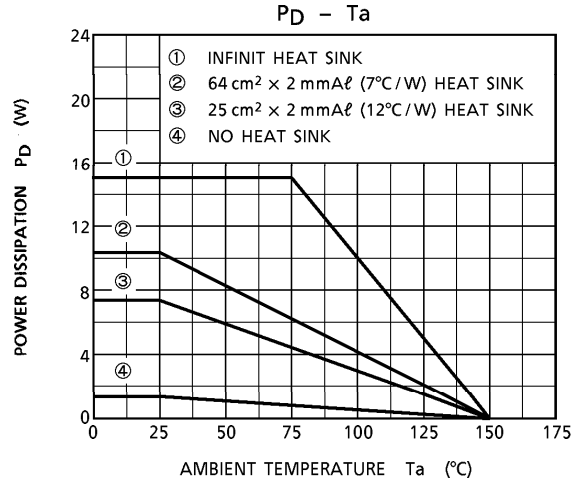
P_D – P_{OUT}



P_D – P_{OUT}



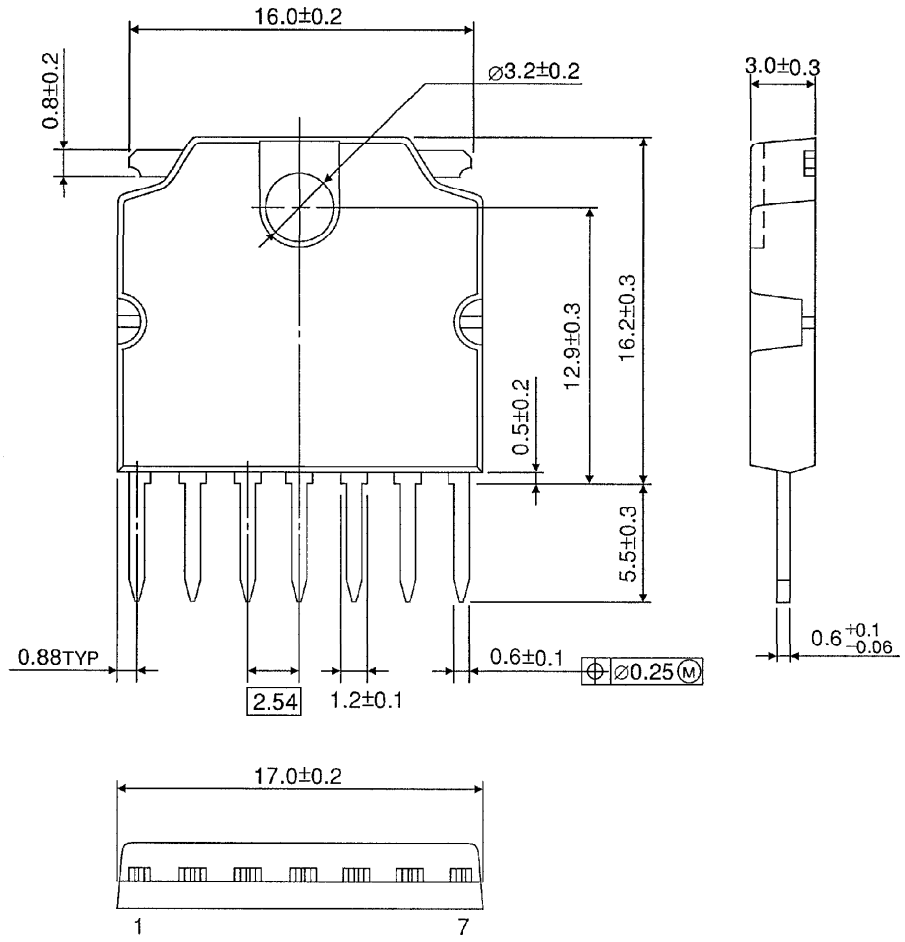
P_D – Ta



PACKAGE DIMENSIONS

HSIP7-P-2.54A

Unit : mm



Weight : 2.15 g (Typ.)