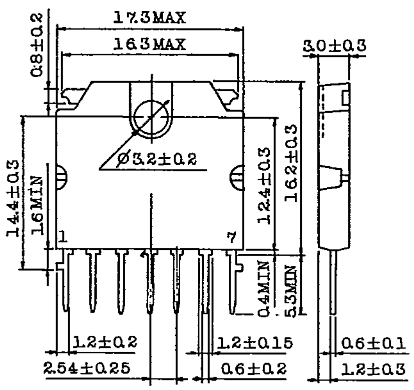
TA7274P

12W BTL AUDIO POWER AMPLIFIER

The TA7274P is audio power amplifier for consumer application.
This IC is applying BTL system in which output couppling condenser and bootstrap condenser are not necessary and output 12W (V_{CC}=13.2V, R_L=4Ω, THD=10%) can be obtained.
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 also contains various kind of protector.
It is suitable for car-audio power amplifier with high performance.

Unit in mm



JEDEC	—
TOSHIBA	87EP-P

Weight : 2.19g (TYP.)

- High Power : P_{OUT}=12W(Typ.)
  (V_{CC}=13.2V, f=1kHz, THD=10%, R_L=4Ω)
- Built in Protector Circuit
  Thermal Shut Down, Over Voltage Protector (Typ. V_{CC}=24V)
  ASO Protector (R_L Short, Out to GND, Out to V_{CC})
- Operating Supply Voltage Range : V_{CC}=9 ~ 18V

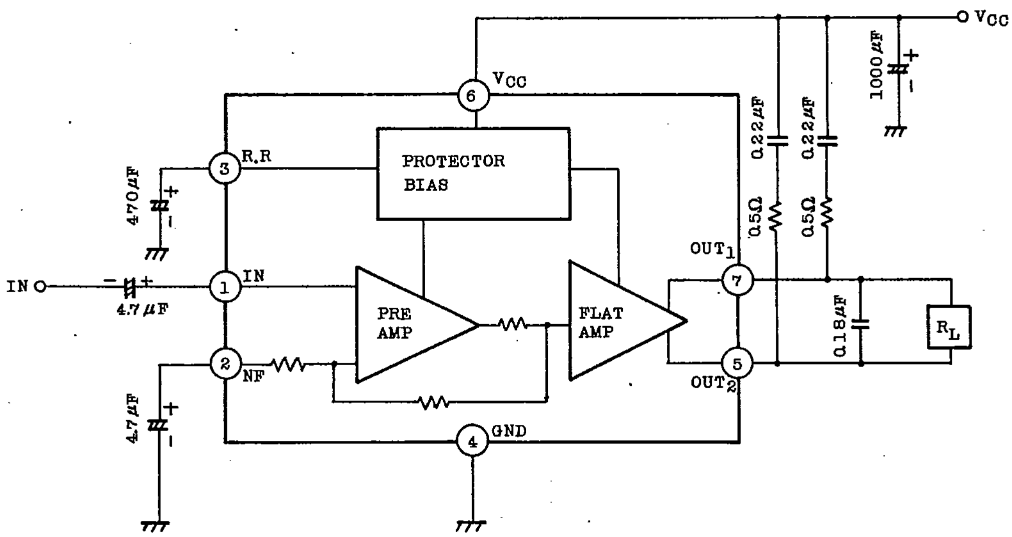
MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Peak Supply Voltage (0.2 sec)	$V_{CC\ surge}$	45	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	Topr	-30 ~ 85	°C
Storage Temperature	Tstg	-55 ~ 150	°C

TA7274P

T-74-05-01

TEST CIRCUIT/APPLICATION CIRCUIT



ELECTRICAL CHARACTERISTICS

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

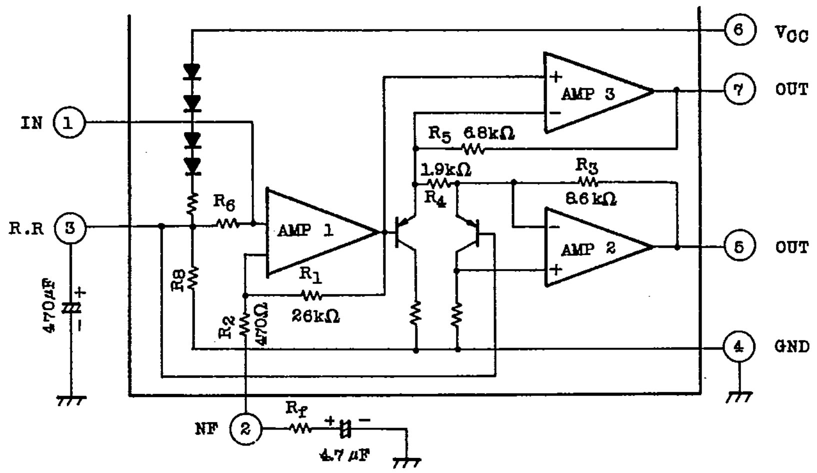
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	-	V_{IN}=0	-	65	110	mA
Output Power	P_{OUT}	-	THD=10%	10	12	-	W
Total Harmonic Distortion	THD	-	P_{OUT}=5W	-	0.4	1	%
Voltage Gain	G_V	-	R_f=0Ω	51	53	55	dB
Output Noise Voltage	V_{NO}	-	R_g=10kΩ, BW=20Hz ~ 20kHz	-	0.9	2.0	mVrms
Ripple Rejection Ratio	R.R	-	f_{ripple}=100Hz, R_g=600Ω	40	50	-	dB
Input Resistance	R_{IN}	-	f=1kHz	-	30	-	kΩ
Output Offset Voltage	V_{offset}	-	V_{IN}=0	-	0	0.3	V

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

TERMINAL No.		1	2	3	4	5	6	7
DC Voltage (V)	TA7274P	5.4	5.4	5.4	GND	6.6	V_{CC}	6.6

TA7274P

DIRECTIONS FOR USE AND APPLICATION METHOD



(Fig. 1)

1. VOLTAGE GAIN ADJUSTMENT

In (Fig. 1), let closed loop voltage gain of initial stage AMP: Amp 1 be G_{V1}, then

$$G_{V1} \fallingdotseq 20\ell og \frac{R1}{R2+R_f} \text{ (dB)} \qquad (R1>>R2+R_f)$$

Also, let closed loop voltage gains of non-inverted AMP: Amp 2 and inverted AMP: Amp 3 be G_{V2} and G_{V3}, respectively, then,

$$G_{V2} = 20\ell og \frac{R3}{R4}, \quad G_{V3} = 20\ell og \frac{R4+R5}{R4} \doteqdot 13\text{(dB)} \ (G_{V2} \doteqdot G_{V3}).$$

Hence, the total closed circuit voltage gain G_V is given by BTL connection as follows:

$$G_V=G_{V1}+G_{V2}+6=G_{V1}+19\text{(dB)}.$$

For instance, in the case of $R_f=0$, $G_V=54$(dB) setting can be made.

When the dead short detecting circuit has operated, a lock condition is realized and the power transistor is protected.

(2) V_{CC}-FAULT PROTECTIVE CIRCUIT (Circuit between OUT and V_{CC} is shorted.)

Block diagram of V_{CC}-fault Protective Circuit is shown in (Fig. -3).
This circuit makes a similar operation to the GND-fault protective circuit.
In the case of half-short, the dead-short detecting circuit operates by the rise of output terminal up to V_{CC} level, and protects the power transistor.

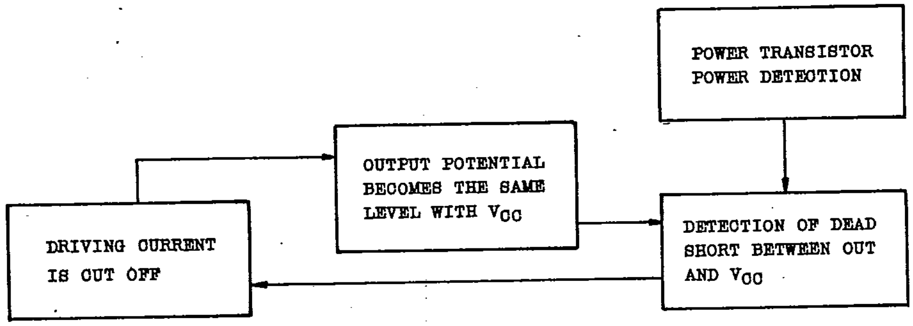


Fig. 3 V_{CC} FAULT PROTECTIVE CIRCUIT

(3) R_L SHORT PROTECTIVE CIRCUIT (Circuit between OUT and OUT is shorted.)

It cuts off driving current by the power transistor power detecting circuit of GND-fault and V_{CC} fault, protective circuit, and protects the power transistor.

3. OSCILLATION PREVENTION

In this IC, GND pin [(4) pin] has only one terminal, and the inside of IC is divided by into Pre-GND and Power-GND. For this reason, pay attention to the following points in making design.

(1) Install the chemical condenser between V_{CC} and GND near IC pin as much as possible.

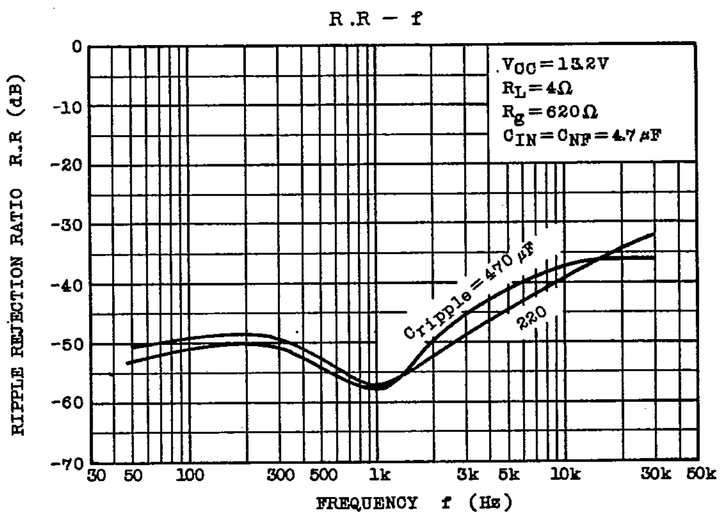
(2) Drop heat sink to (④ Pin) GND. (To prevent the deterioration of distortion.)

(3) Use oscillation preventive condenser between output V_{CC}, characteristic of which is not so much affected by temperature. When using ceramic condenser, adopt the value larger than the recommended value, as the characteristic of ceramic condenser is apt to be changed by temperature.
In this case, never fail to execute temperature test and check oscillation allowance.

Recommended oscillation stopping condenser capacity and series resistance value is 0.22μF and 0.5Ω, respectively.
Before using, fully examine the type and mounting position of condenser.
There is a possibility of oscillation when contact resistance is produced by the use of IC socket.

(4) CAPACITY VALUE OF CHEMICAL CONDENSER

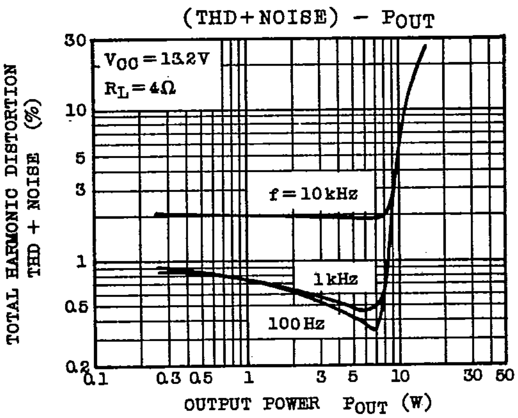
When the values of input coupling and NF condenser are different, pop Noise is produce. Therefore, it is recommended, to equalize the capacity values and adopt 4.7μF.
(Fig. -5) shows the characteristic when the capacity of ripple condenser is varied.

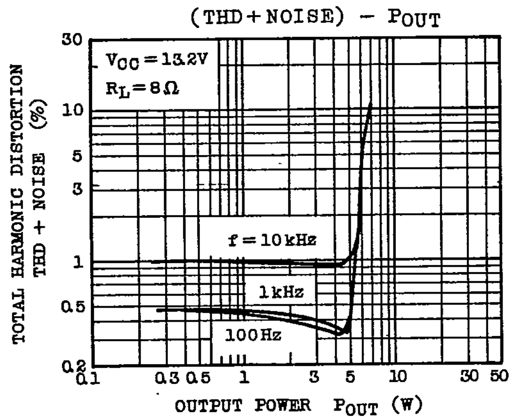


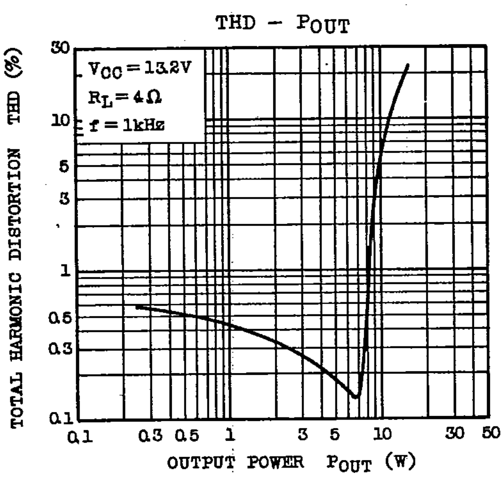
(Fig.-5) R.R – f

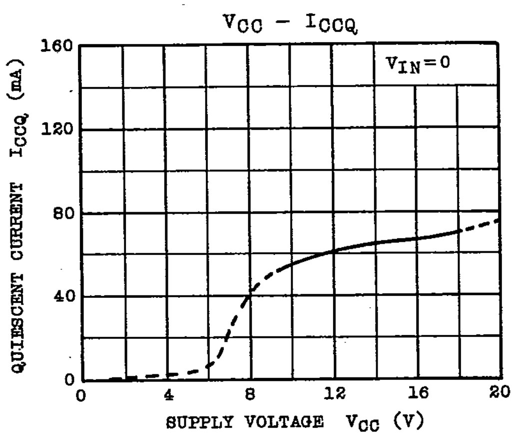
TA7274P

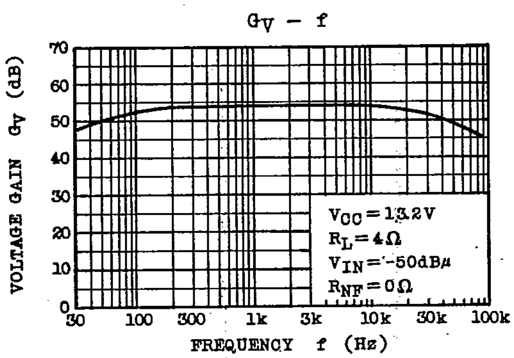
T-74-05-01

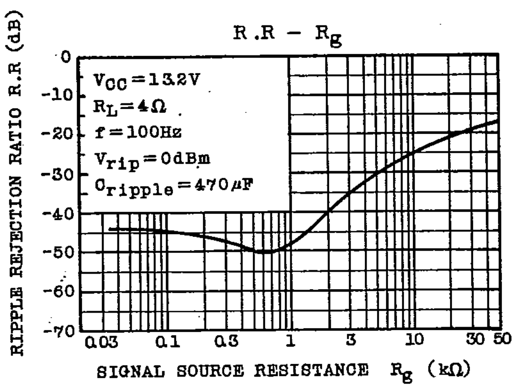






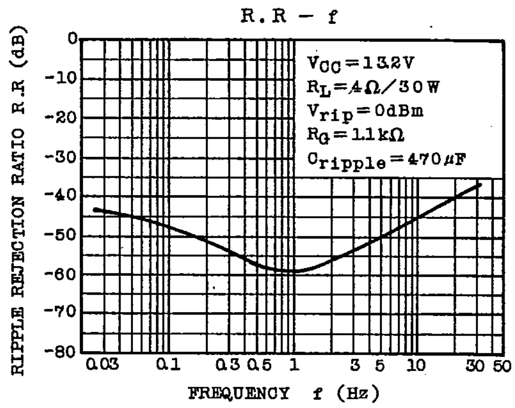


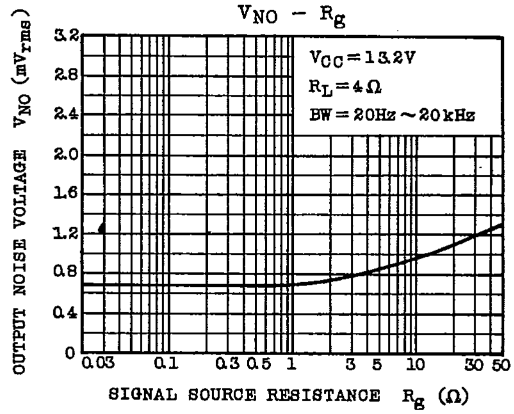


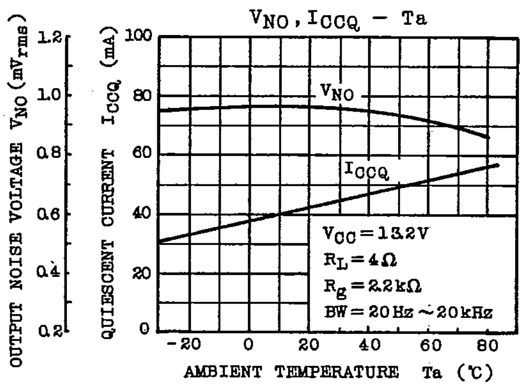


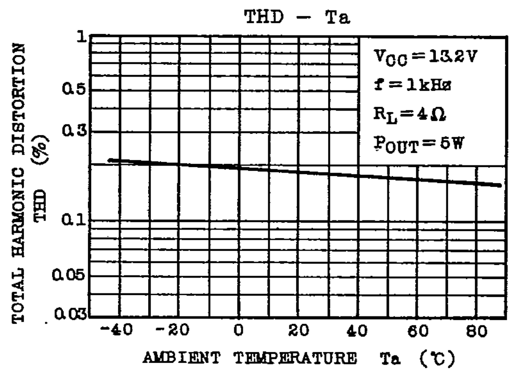
TA7274P

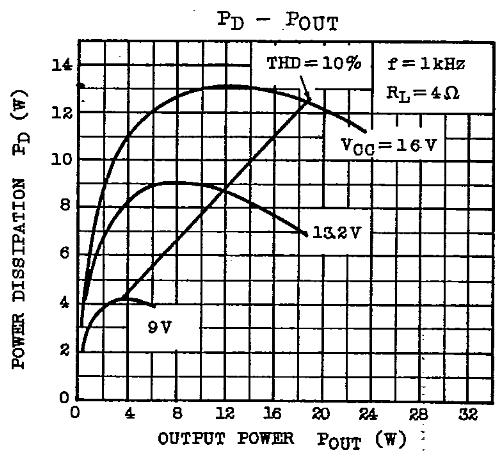
T-74-05-01

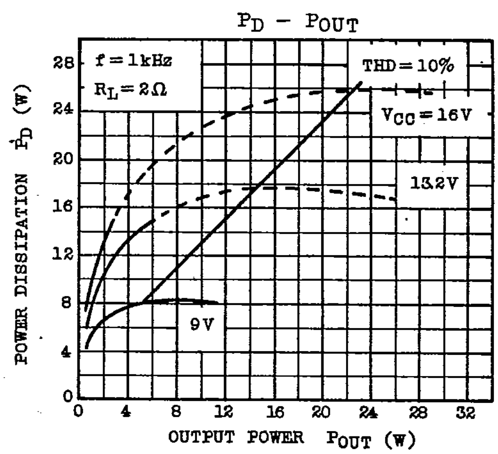












TA7274P

T-74-05-01