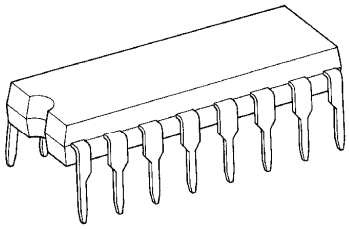
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# TA7784P

## DUAL PREAMPLIFIER FOR AUTOREVERSE

The TA7784P is dual preamplifier for autoreverse type and W-cassette type tape player.
This IC contains dual preamplifier, forward / reverse control switches and metal / normal tape equalizer control switches.



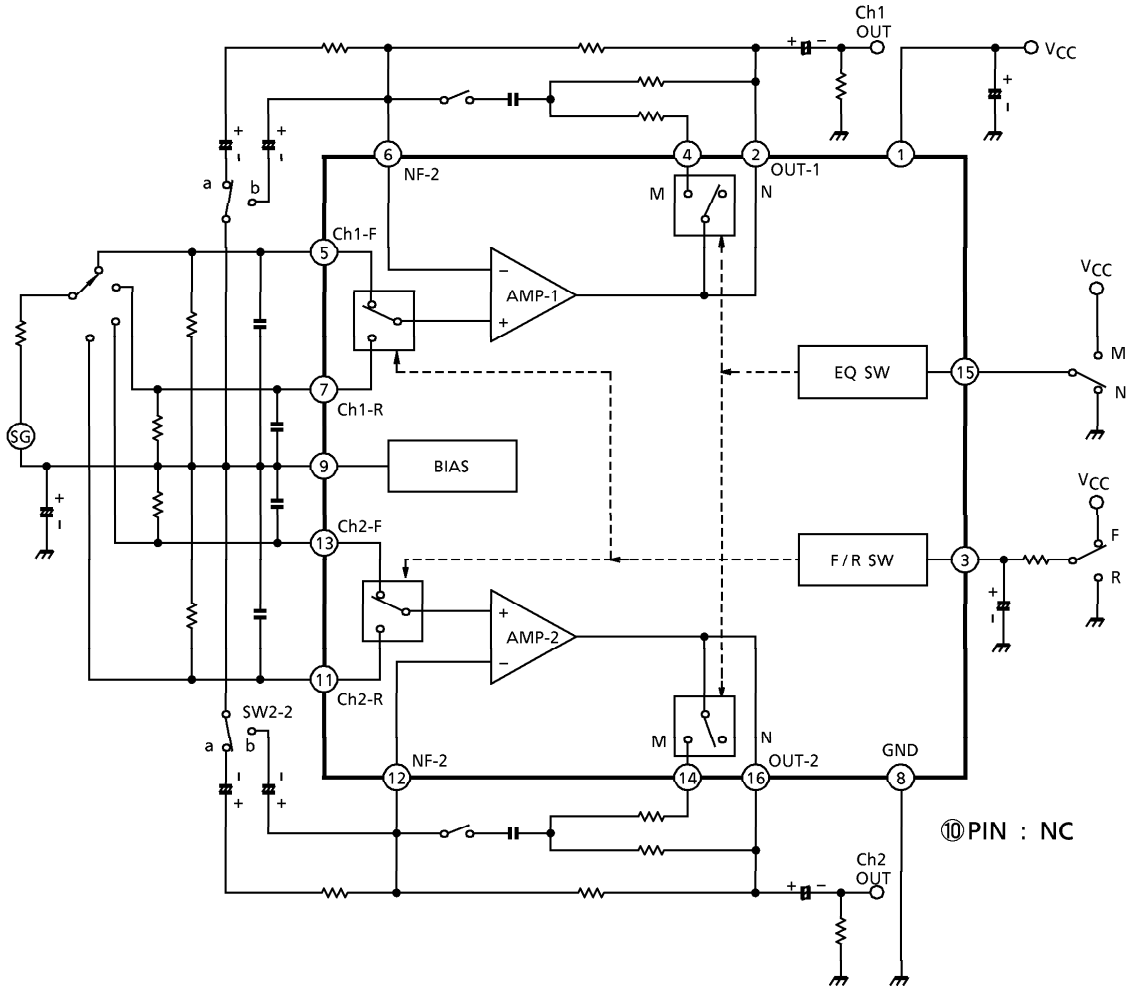
DIP16-P-300-2.54A

Weight : 1.00g (Typ.)

### FEATURES

- Built-in Forward / Reverse (TAPE1 / TAPE2) Control Switches.
- Built-in Metal / Normal Tape Equalizer Control Switches.
- High Voltage Gain
  : $G_{vo}$ = 95dB (Typ.) ($V_{CC}$ = 6V, f = 1kHz)
- Operating Supply Voltage Range
  : $V_{CC\ (opr)}$ = 3.5~15V (Ta = 25°C)
- Input Coupling Capacitor Less
- Low Noise (Equivalent Input Noise Voltage)
  : $V_{ni}$ = 1.0$\mu V_{rms}$ (Typ.)
  ($R_g$ = 600Ω, BW = 20~20kHz, NAB EQ)

## BLOCK DIAGRAM



**APPLICATION INFORMATION**

(1) Forward / reverse select switch

① Threshold voltage

Pin③ is coupled to the base of Q1 (PNP-Tr) as shown Fig.1.
Threshold voltage

| | |
|---|---|
| REVERSE | 0~0.3V |
| FORWARD | 1.1~$V_{CC}$ |

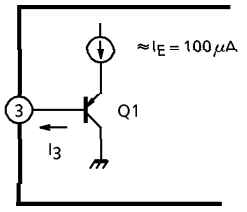



Fig.1

② The recommended forward / reverse select circuit is shown in Fig.2.

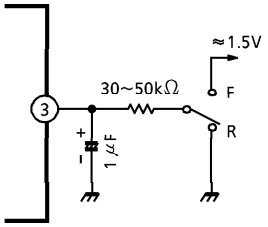



Fig.2

③ $I_3$ (In Fig.1)

$I_3$ = 12μA (Max.) (Ta = 25°C)

(2) Equalizer control switch

Pin⑮ is coupled to the base of Q2 (PNP-Tr) as shown Fig.3.
The emitter potential of Q2 is 2.6Vdc.
Threshold voltage

| | |
|---|---|
| METAL | 2.1~$V_{CC}$ |
| NORMAL | 0~1.2V |

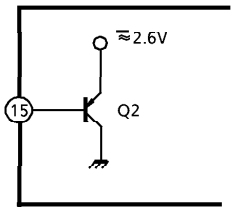



Fig.3

(3) C2~C5

Capacitor C2~C5 may be required for preventing a instability caused by the pattern layout or interference of external high frequency signal.

**MAXIMUM RATINGS** (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | 16 | V |
| Power Dissipation | $P_D$ (Note) | 750 | mW |
| Operating Temperature | $T_{opr}$ | −30~75 | °C |
| Storage Temperature | $T_{stg}$ | −55~150 | °C |

(Note) Derated above Ta = 25°C in the proportion of 6mW / °C.

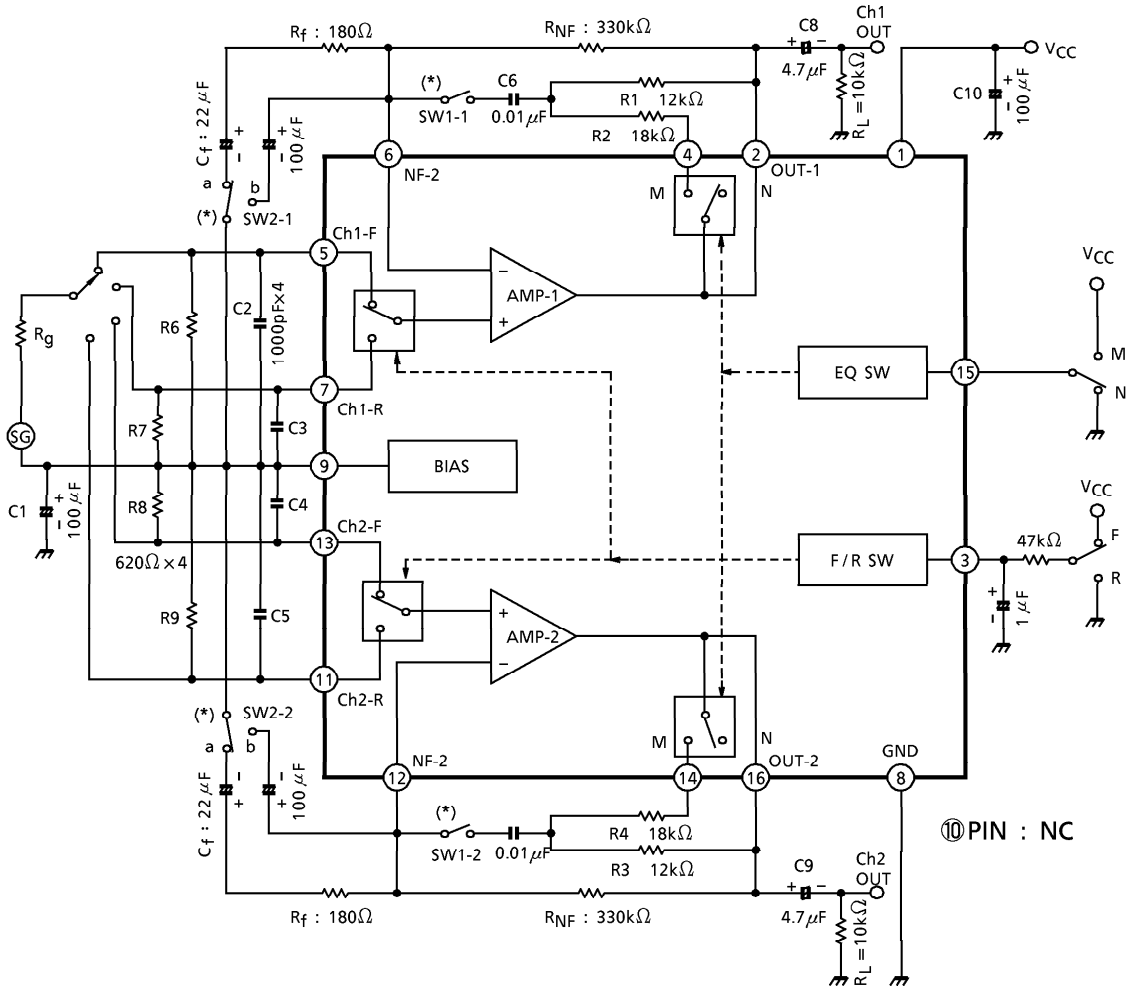
**ELECTRICAL CHARACTERISTICS**
(Unless otherwise specified, $V_{CC}$ = 6V, f = 1kHz, $R_L$ = 10kΩ, $R_g$ = 600Ω, Ta = 25°C, metal EQ)

| CHARACTERISTIC | SYMBOL | TEST CIR-CUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Quiescent Current | $I_{CCQ}$ (1) | — | $V_{in}$ = 0, NORMAL EQ | — | 5.5 | — | mA |
| | $I_{CCQ}$ (2) | — | $V_{in}$ = 0, METAL EQ | — | 7.0 | 11 | |
| Open Loop Voltage Gain | $G_{vo}$ | — | $C_f$ = 100μF, $R_f$ = 0 | — | 95 | — | dB |
| Maximum Output Voltage | $V_{om}$ | — | THD = 0.5% | 1.1 | 1.5 | — | $V_{rms}$ |
| Total Harmonic Distortion | THD | — | $V_{out}$ = 0.5$V_{rms}$ | — | 0.035 | 0.12 | % |
| Equivalent Input Noise Voltage | $V_{in}$ | — | $R_g$ = 620Ω, NAB<br>BW = 20Hz~20kHz, Nor. EQ | — | 1.0 | 1.7 | μ$V_{rms}$ |
| Ripple Rejection | R.R. | — | $f_{ripple}$ = 100Hz, $V_{in}$ = 1$V_{rms}$ | — | 55 | — | dB |
| Cross Talk | C.T. | — | $V_{out}$ = 0.775$V_{rms}$ (0dBm) | 50 | 60 | — | dB |
| Forward / Reverse Cross Talk | C.T. (F / R) | — | $V_{out}$ = 0.775$V_{rms}$ (0dBm) | 60 | 70 | — | dB |

**TYPICAL DC VOLTAGE OF EACH TERMINAL** ($V_{CC}$ = 6V, Ta = 25°C, dual mode test circuit)

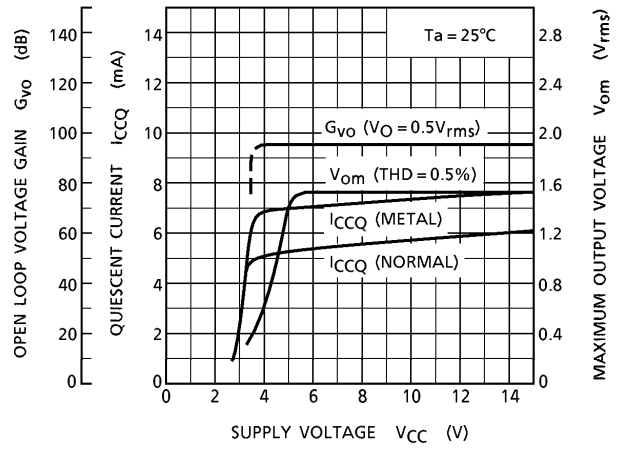
| TERMINAL No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DC-VOLTAGE (V) | $V_{CC}$ | 2.3 | $V_{CC}$ / GND | 2.2 | 2.2 | 2.2 | 2.2 | GND | 2.2 | NC | 2.2 | 2.2 | 2.2 | 2.2 | $V_{CC}$ / GND | 2.2 |

**TEST CIRCUIT**

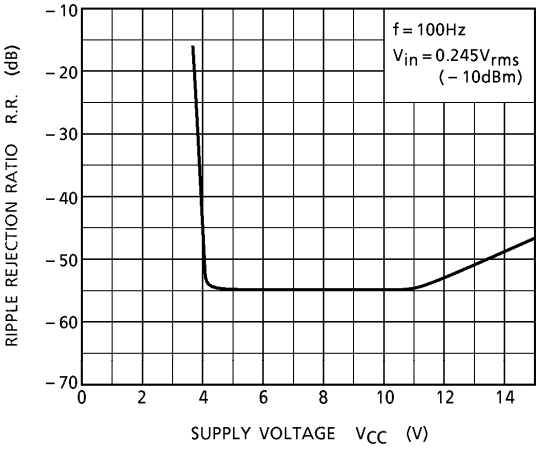



(*) $G_{VO}$ TEST : SW1-1, 2-OFF, SW2-1, 2-b

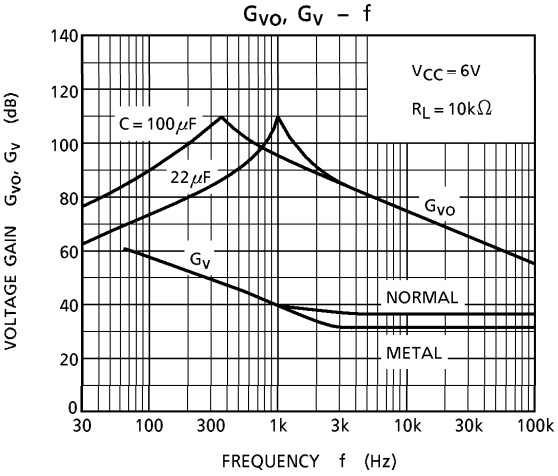
$I_{CCQ}$, $G_{vo}$, $V_{om}$ – $V_{CC}$



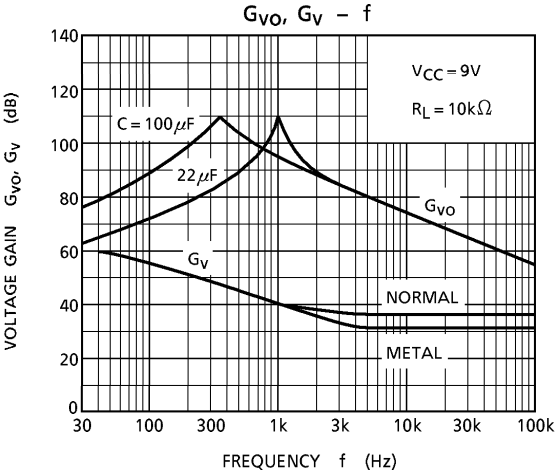

R.R. – $V_{CC}$



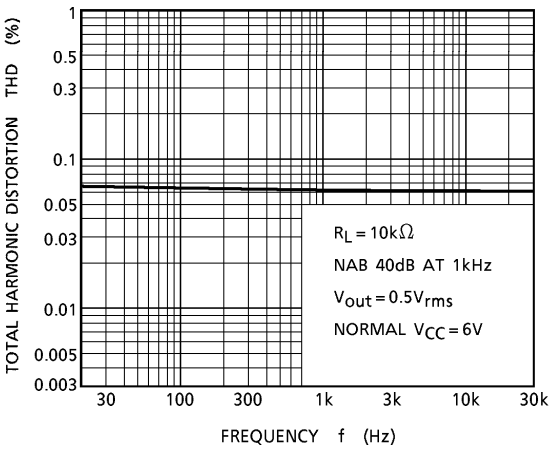

$G_{VO}$, $G_V$ – f



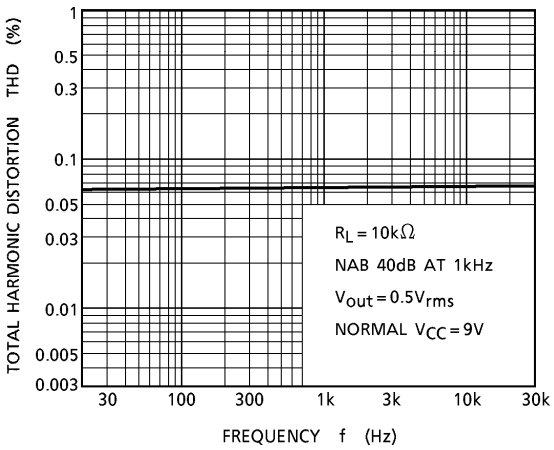

$G_{VO}$, $G_V$ – f



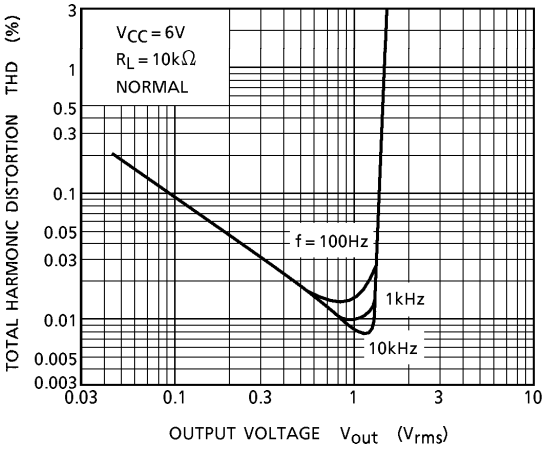

THD – f



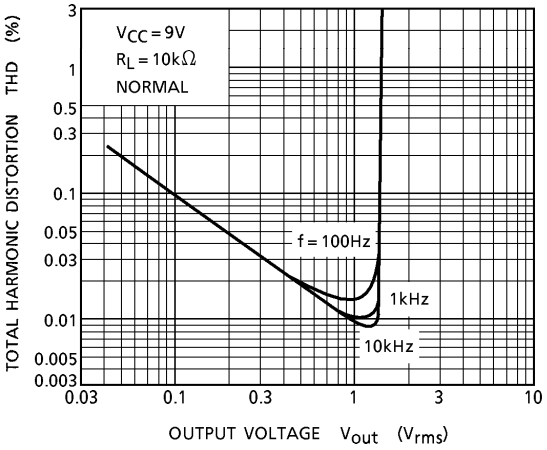

THD – f



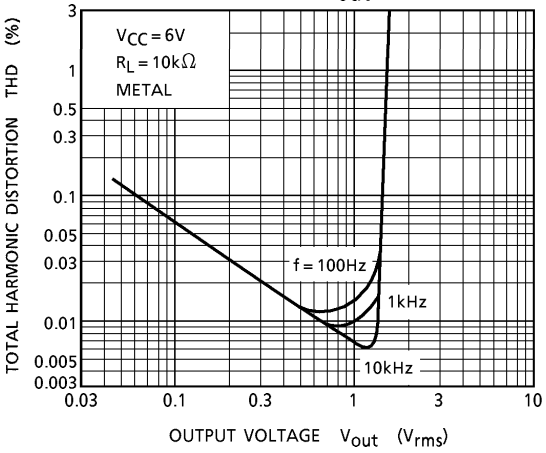
THD – $V_{out}$



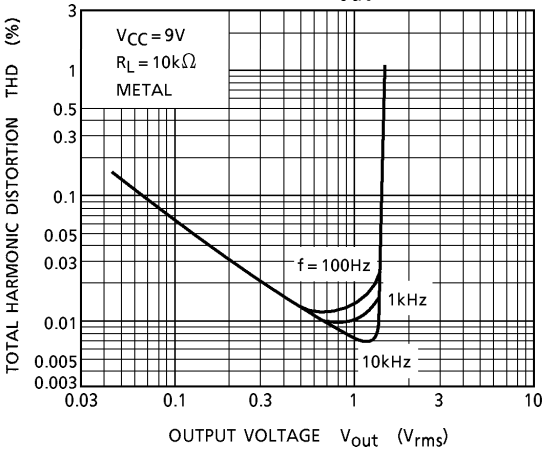

THD – $V_{out}$



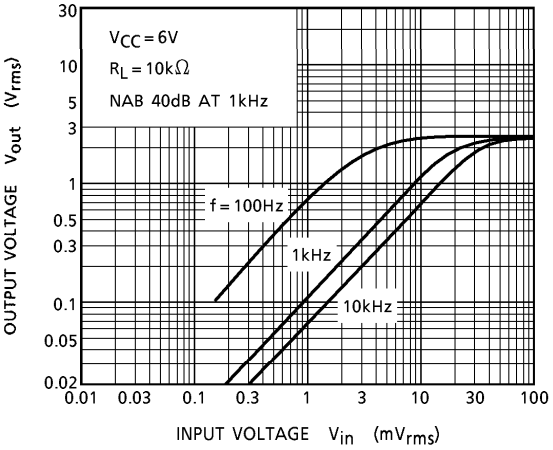

THD – $V_{out}$



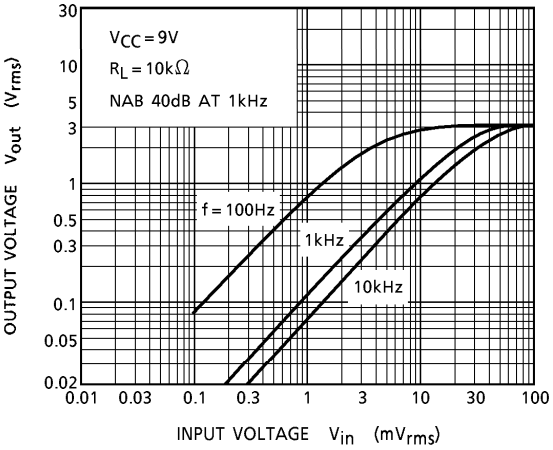

THD – $V_{out}$



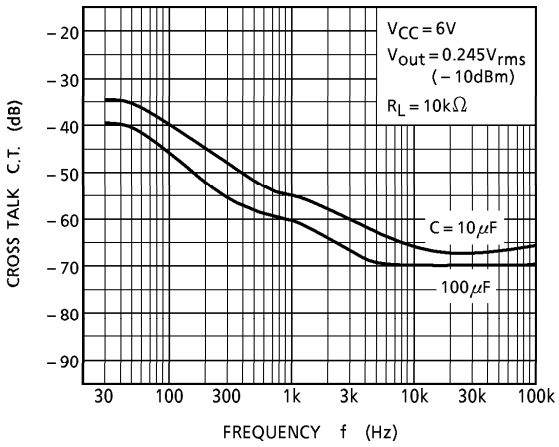

$V_{out}$ – $V_{in}$



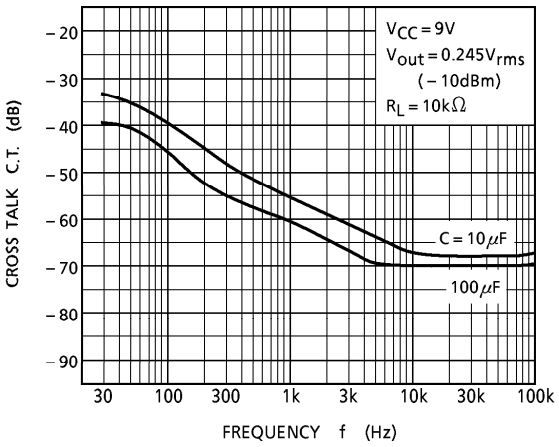

$V_{out}$ – $V_{in}$



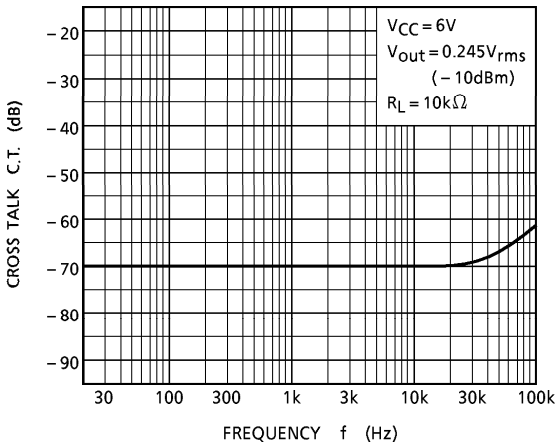
C.T. – f



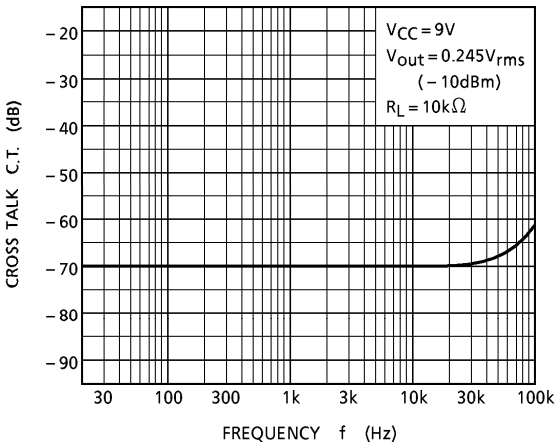

C.T. – f



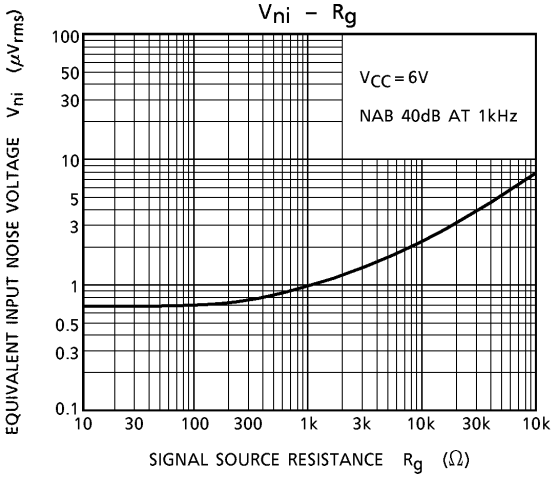

C.T. (F⇆R) – f



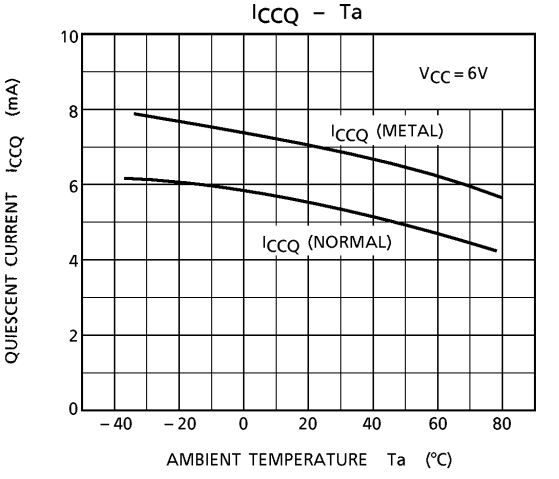

C.T. (F⇆R) – f

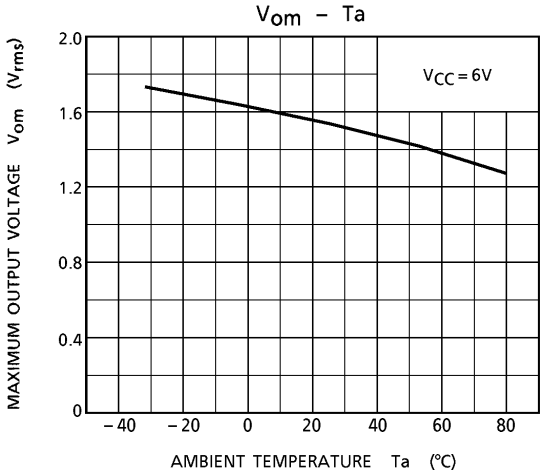


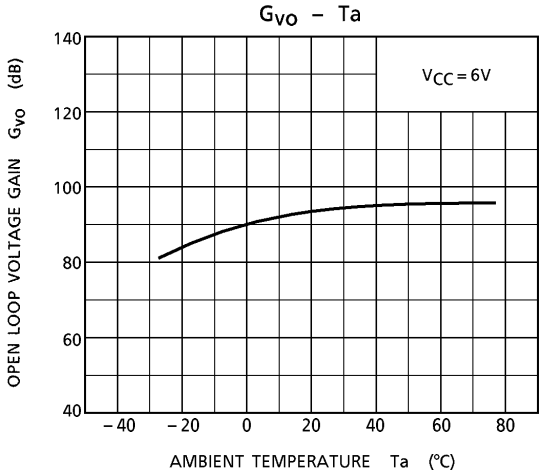

$V_{ni}$ – $R_g$



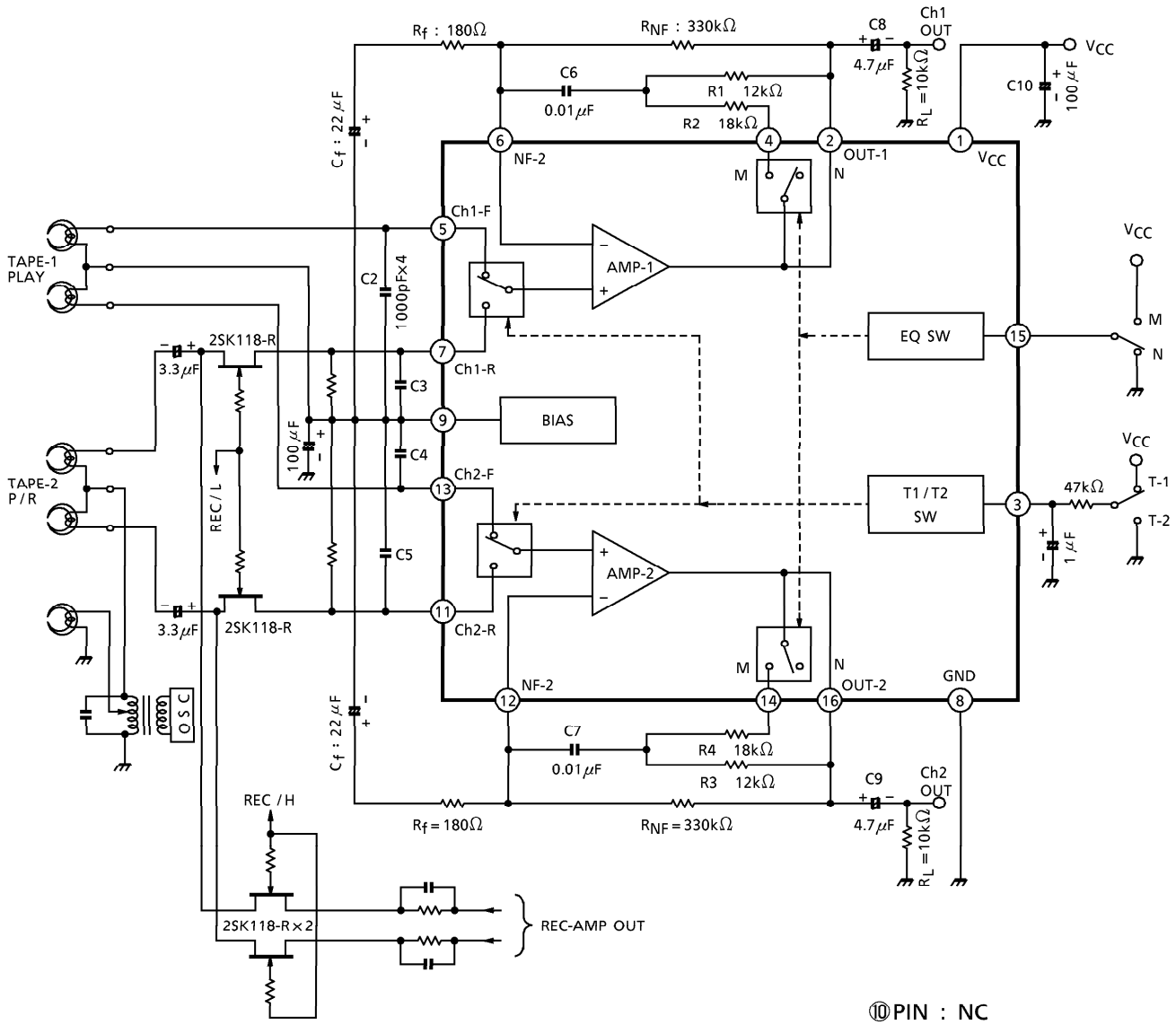

$I_{CCQ}$ – Ta




$V_{om}$ – Ta
MAXIMUM OUTPUT VOLTAGE $V_{om}$ ($V_{rms}$)
2.0
1.6
1.2
0.8
0.4
0
$V_{CC}$ = 6V
– 40
– 20
0
20
40
60
80
AMBIENT TEMPERATURE Ta (°C)

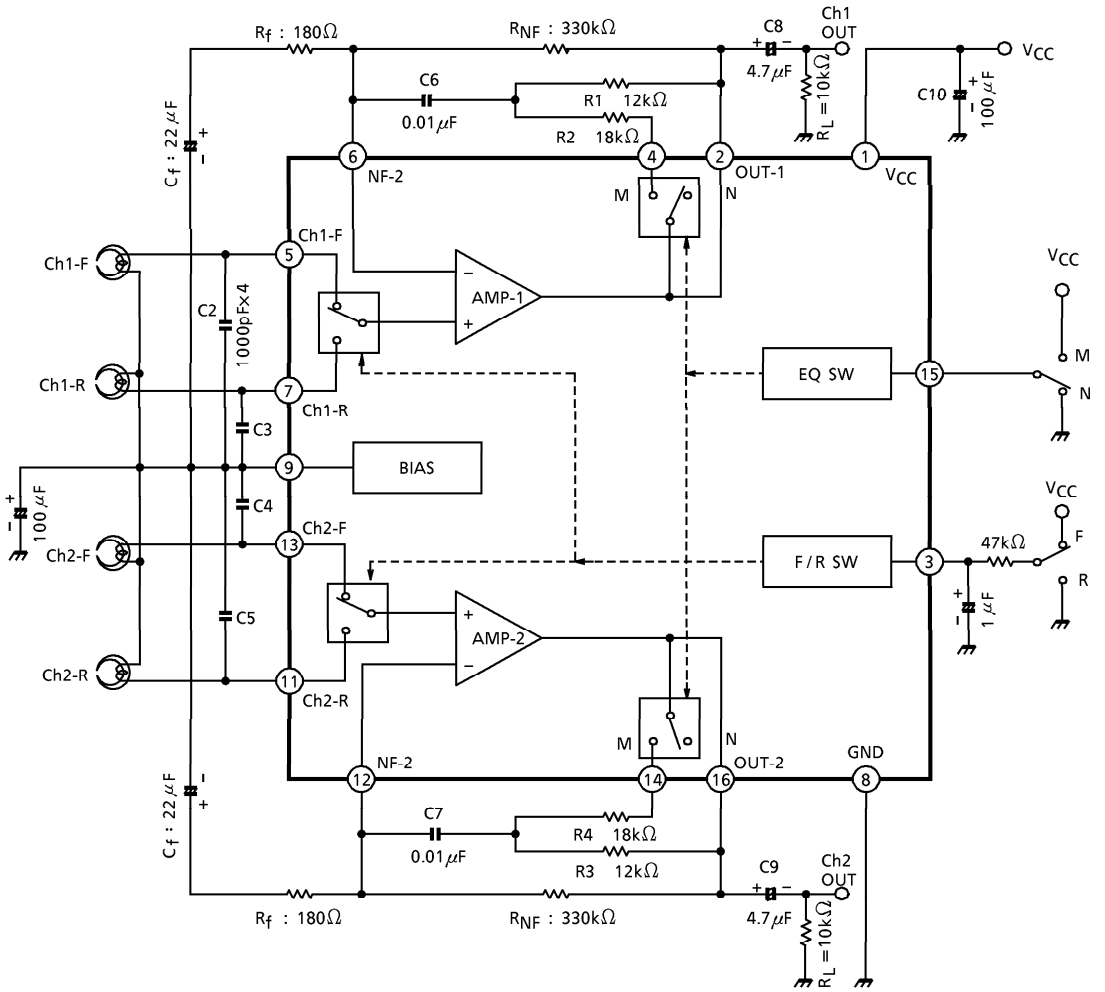

$G_{vo}$ – Ta
OPEN LOOP VOLTAGE GAIN $G_{vo}$ (dB)
140
120
100
80
60
40
$V_{CC}$ = 6V
– 40
– 20
0
20
40
60
80
AMBIENT TEMPERATURE Ta (°C)

**APPLICATION 1** (Double cassette player)




⑩PIN : NC

**APPLICATION 2** (Autoreverse)

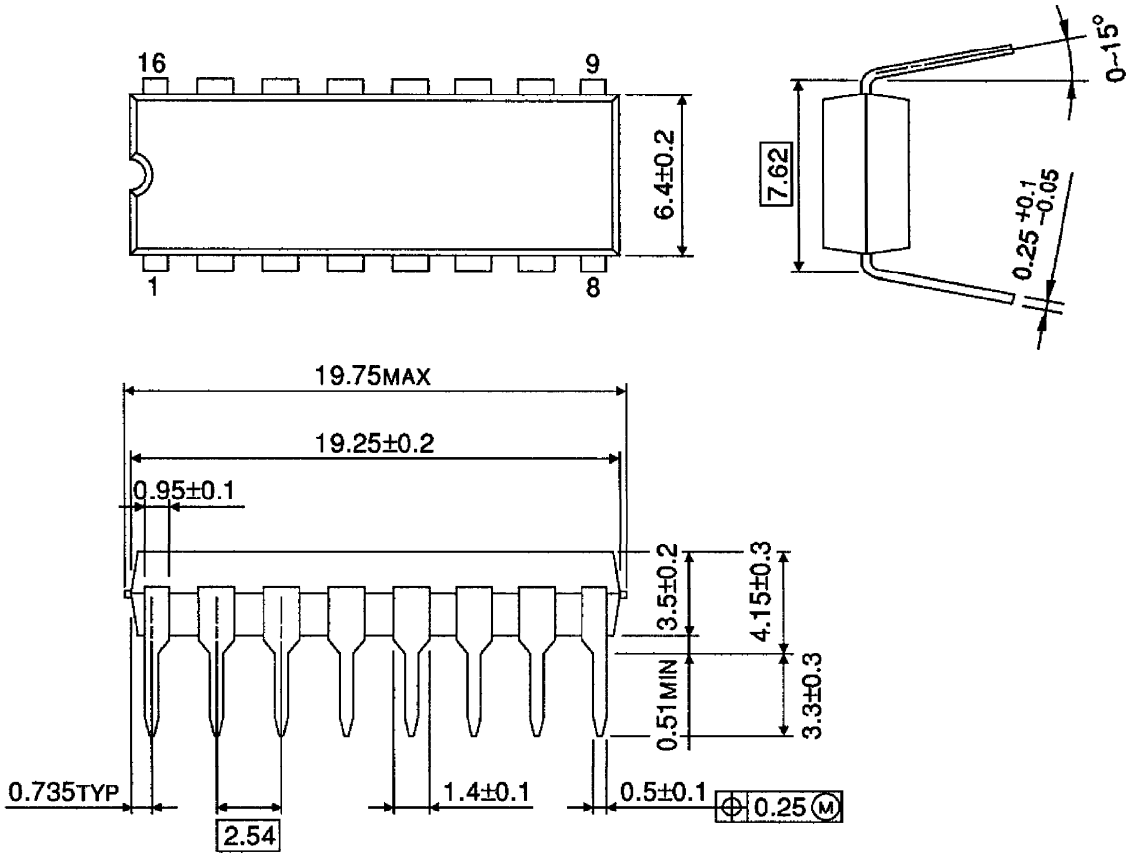



⑩PIN : NC

**OUTLINE DRAWING**

DIP16-P-300-2.54A

Unit : mm




Weight : 1.00g (Typ.)