

## Pre-Power Amplifier for Pocketable Stereo Cassette Player

### Description

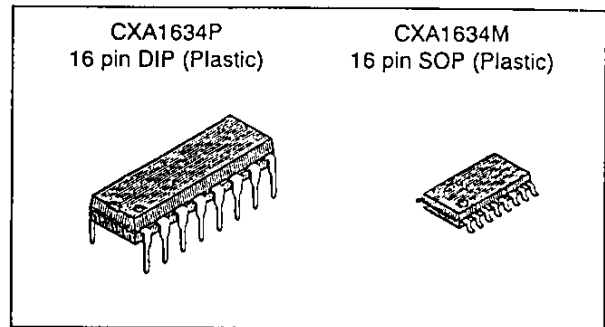
The CXA1634P/M is a bipolar IC designed for headphone stereos. It provides such functions as pre-amplifier, DC volume control, bass boost, headphone driver and others:

### Features

- Pre-amplifier, volume control, headphone driver
- Bass boost function
- Wide operating voltage (1.8 to 6.5V)
- Few external parts

### Application

Headphone stereo



### Structure

Bipolar silicon monolithic IC

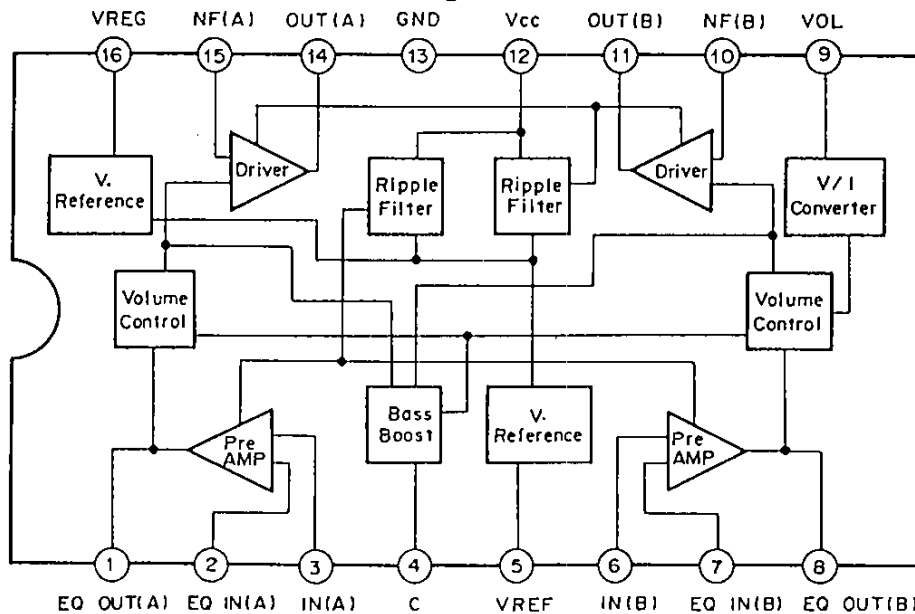
### Absolute Maximum Ratings (Ta=25°C)

- |                               |                  |            |               |
|-------------------------------|------------------|------------|---------------|
| • Supply voltage              | V <sub>cc</sub>  | 7          | V             |
| • Operating temperature       | T <sub>opr</sub> | -20 to +75 | °C            |
| • Storage temperature         | T <sub>stg</sub> | -65 to +10 | °C            |
| • Allowable power dissipation | P <sub>D</sub>   | 730        | mW (CXA1634P) |
|                               |                  | 500        | mW (CXA1634M) |

### Recommended Operating Condition

- |                |                 |            |   |
|----------------|-----------------|------------|---|
| Supply voltage | V <sub>cc</sub> | 1.8 to 6.5 | V |
|----------------|-----------------|------------|---|

### Block Diagram and Pin Configuration



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Pin Description

(Pin voltage is  $V_{CC}=3.0V$ , at no signal)

| Pin No. | Symbol                   | Pin voltage (Typ.) | Equivalent circuit | Description   |
|---------|--------------------------|--------------------|--------------------|---|
| 1<br>8  | EQ OUT (A)<br>EQ OUT (B) | 1.6V               |                    | Pre-amplifier output and equalizer circuit connection |
| 2<br>7  | EQ IN (A)<br>EQ IN (B)   | 1.5V               |                    | Equalizer circuit input                               |
| 3<br>6  | IN (A)<br>IN (B)         | 1.5V               |                    | Pre-amplifier output                                  |
| 4       | C                        | 1.5V               |                    | Bass boost time constant                              |

| Pin No.  | Symbol             | Pin voltage (Typ.) | Equivalent circuit | Description               |
|----------|--------------------|--------------------|--------------------|---------------------------|
| 5        | VREF               | 1.5V               |                    | Reference bias voltage    |
| 9        | VoL IN             | 1.5V               |                    | VoL control voltage input |
| 10<br>15 | NF (A)<br>NF (B)   | 1.1V               |                    | Filter time constant      |
| 11<br>14 | OUT (A)<br>OUT (B) | 1.1V               |                    | Headphone driver output   |

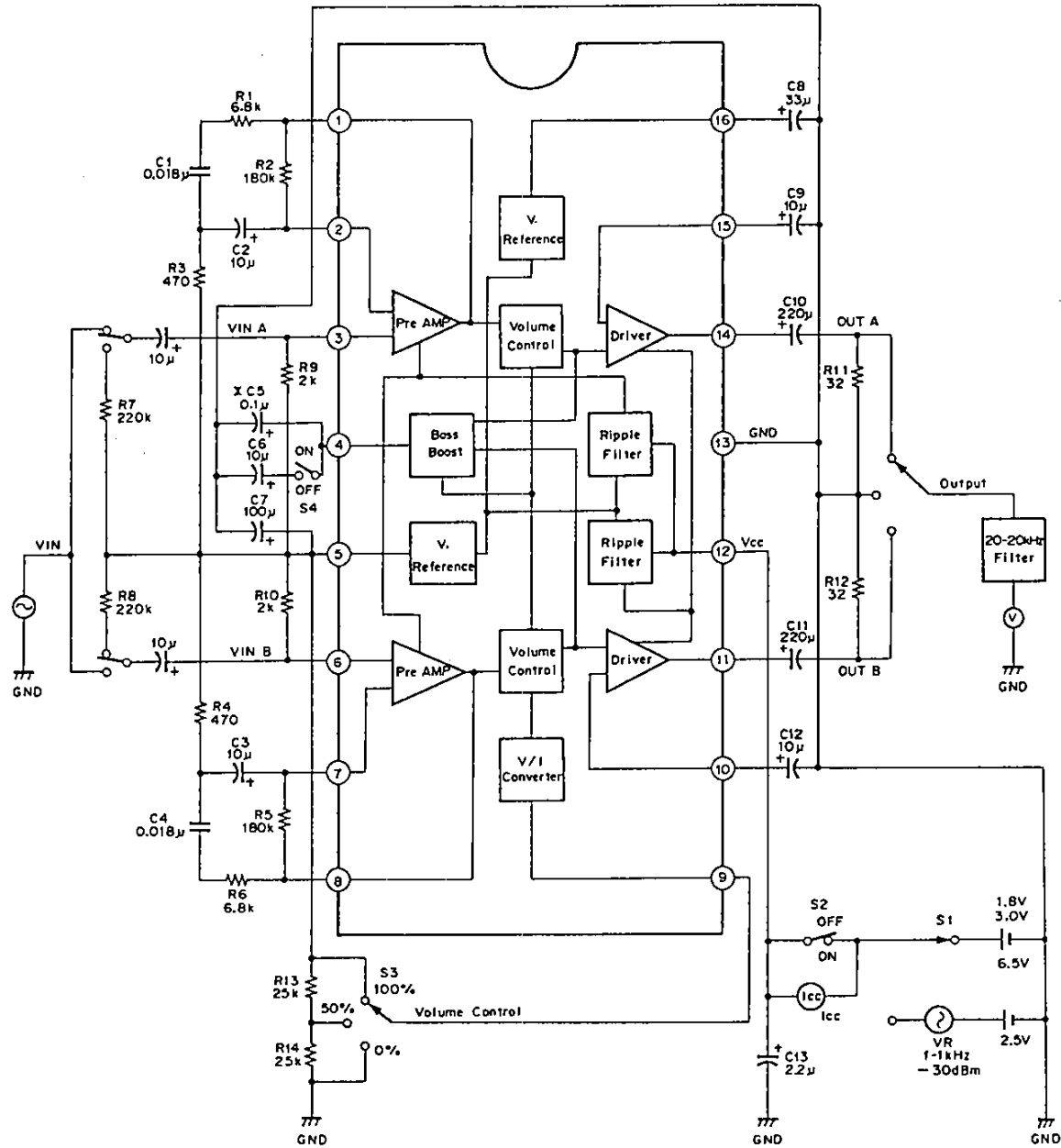
| Pin No. | Symbol | Pin voltage (Typ.) | Equivalent circuit | Description          |
|---------|--------|--------------------|--------------------|----------------------|
| 12      | Vcc    | 3.0V               |                    | Supply voltage input |
| 13      | GND    | 0V                 |                    | GND                  |
| 16      | VREG   | 2.76V              |                    | Power supply filter  |

## Electrical Characteristics

(Ta=25°C, Vcc=3.0V, fo=1kHz, volume 100% unless noted otherwise)

| Item                       | Symbol            | SW conditions |     |    |    | Input point     | Conditions   | Test point       | Min. | Typ. | Max. | Unit |
|----------------------------|-------------------|---------------|-----|----|----|-----------------|--|------------------|------|------|------|------|
|                            |                   | S1            | S2  | S3 | S4 |                 |  |                  |      |      |      |      |
| Circuit current            | I <sub>CC</sub>   | 2             | OFF | 1  | 2  | —               | No signal  | I <sub>CC</sub>  | 7    | 10   | 15   | mA   |
| Voltage gain 1             | GV1               | 1             | ON  | ↓  | ↓  | V <sub>IN</sub> | V <sub>IN</sub> =-75dBm  | V <sub>OUT</sub> | 62   | 65   | 68   | dB   |
| Voltage gain 2             | GV2               | ↓             | ↓   | 2  | ↓  | V <sub>IN</sub> | V <sub>IN</sub> =-75dBm, vol=50%                                       | V <sub>OUT</sub> | 51   | 54   | 58   | dB   |
| Voltage gain 3             | GV3               | ↓             | ↓   | 1  | 1  | V <sub>IN</sub> | V <sub>IN</sub> =-75dBm, B.B. ON                                       | V <sub>OUT</sub> | 64   | 67   | 69   | dB   |
| Channel balance 1          | Δ GV1             |               |     |    |    | —               |  | —                | -1.5 | 0    | 1.5  | dB   |
| Channel balance 2          | Δ GV2             |               |     |    |    | —               |  | —                | -1.5 | 0    | 1.5  | dB   |
| Channel balance 3          | Δ GV3             |               |     |    |    | —               |  | —                | -1.5 | 0    | 1.5  | dB   |
| Volume maximum attenuation | V <sub>MIN</sub>  | 1             | ON  | 3  | 1  | V <sub>IN</sub> | V <sub>IN</sub> =-65dBm  | V <sub>OUT</sub> | 51   | —    | —    | dB   |
| Maximum output             | P <sub>OMAX</sub> |               |     | 1  |    | V <sub>IN</sub> | R <sub>L</sub> =32Ω, THD=10%   | V <sub>OUT</sub> | 25   | 30   |      | mW   |
| Distortion factor 1        | THD1              |               |     | ↓  |    | V <sub>IN</sub> | V <sub>IN</sub> =-70dBm  | V <sub>OUT</sub> | —    | 0.7  | 1.2  | %    |
| Distortion factor 2        | THD2              |               |     | 2  |    | V <sub>IN</sub> | V <sub>IN</sub> =-60dBm, vol=50%                                       | V <sub>OUT</sub> | —    | 0.5  | 1.0  | %    |
| Noise output               | V <sub>ND</sub>   |               |     | 1  |    | —               | V <sub>IN</sub> is R <sub>g</sub> =2kΩ termination                     | V <sub>OUT</sub> | —    | —    | -47  | dBm  |
| Ripple output              | V <sub>R</sub>    |               |     |    |    | V <sub>CC</sub> | V <sub>CC</sub> =2.5V, ΔV <sub>R</sub> =-30dBm                         | V <sub>OUT</sub> | —    | —    | -44  | dBm  |
| Cross talk A → B           | V <sub>CT1</sub>  | ↓             | ↓   | ↓  | ↓  | V <sub>IN</sub> | A: V <sub>IN</sub> =-65dBm<br>B: V <sub>IN</sub> =R <sub>g</sub> · 2kΩ | V <sub>OUT</sub> | —    | —    | -43  | dBm  |

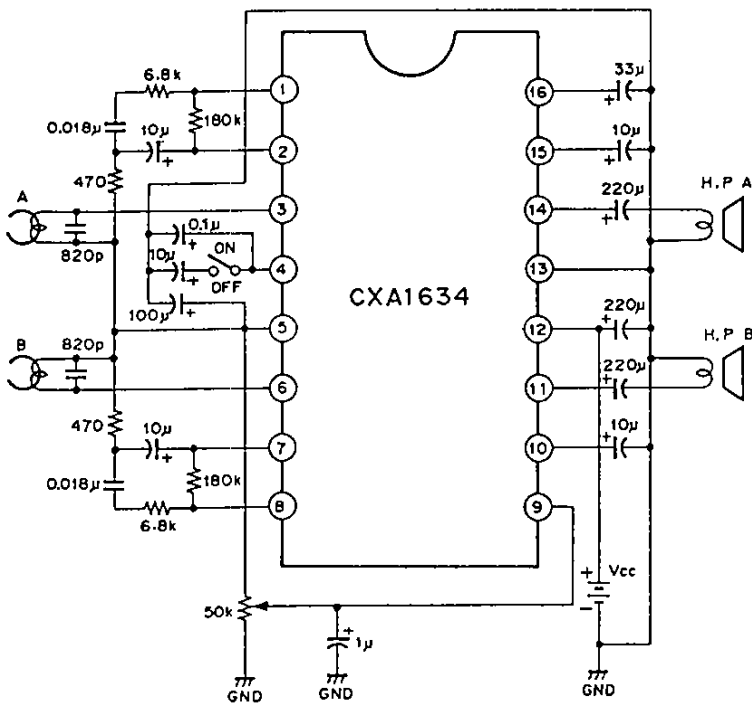
Electrical Characteristics Test Circuit



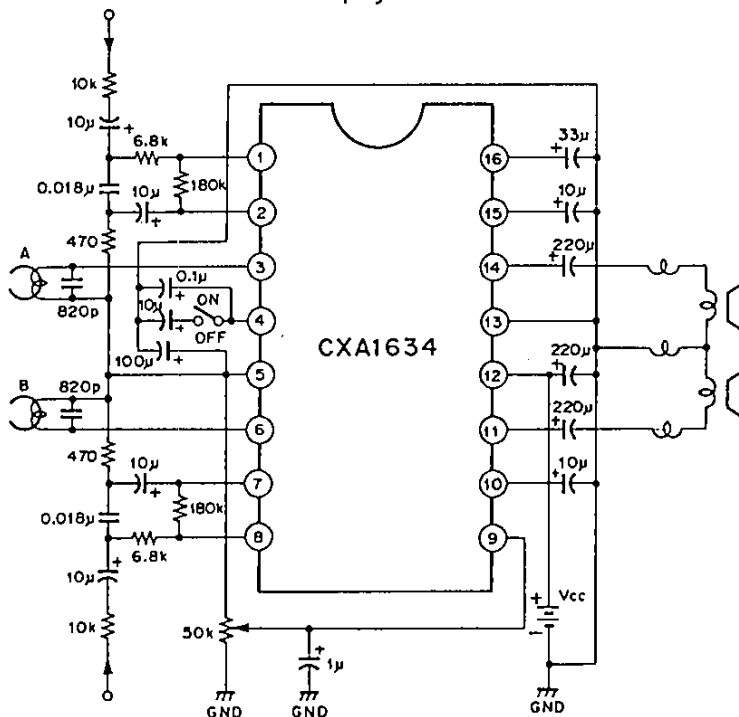
\* The external capacitance C5 of Pin 4 determines the time constant of bass boost function. An L.P.F. with cut-off is formed at 100Hz when C5 is 0.1  $\mu$ F and at 1kHz when it is 0.01  $\mu$ F.

Application Circuit

Pocketable stereo cassette player

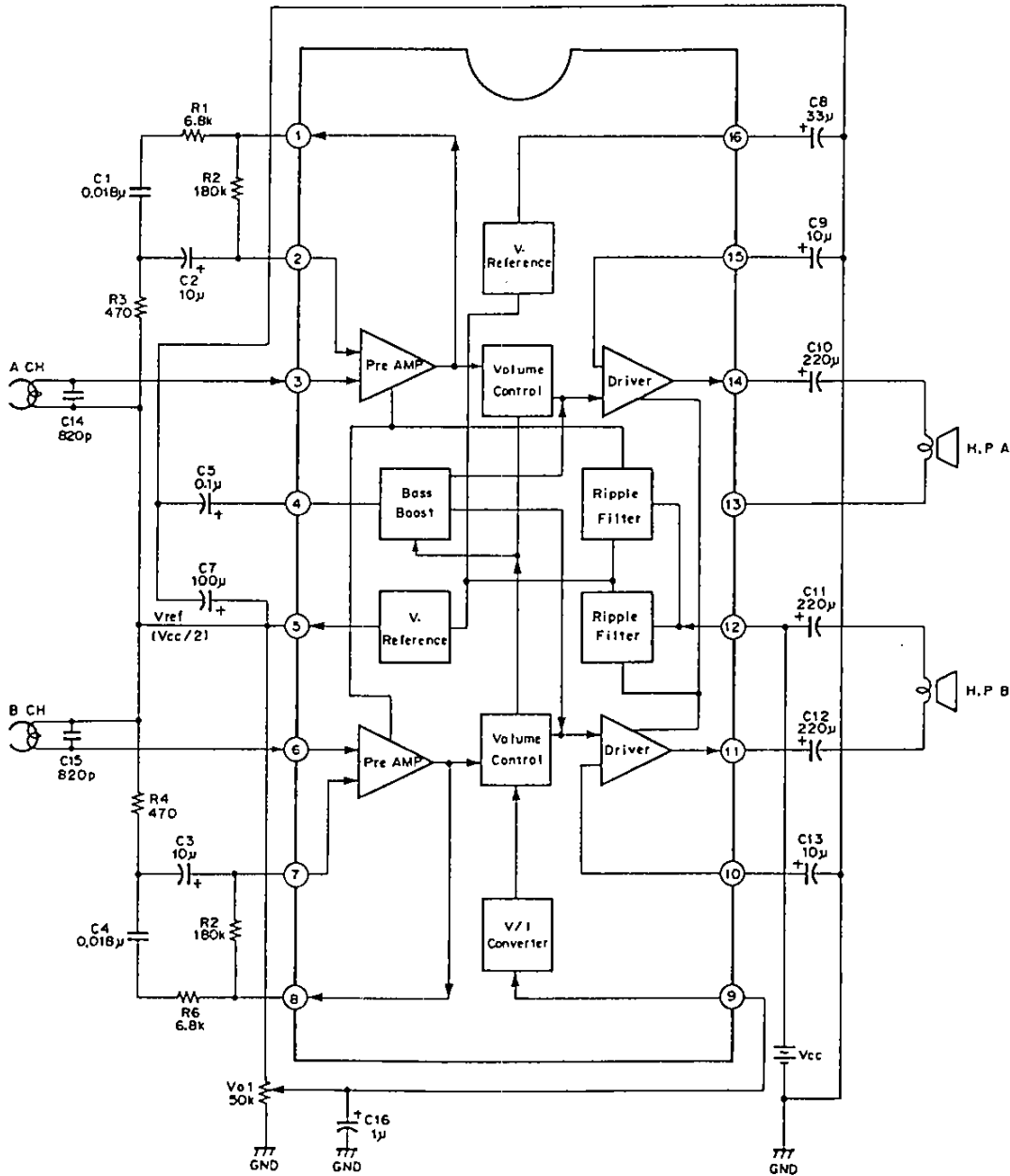


Pocketable stereo cassette player with radio



Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

Description of Operation

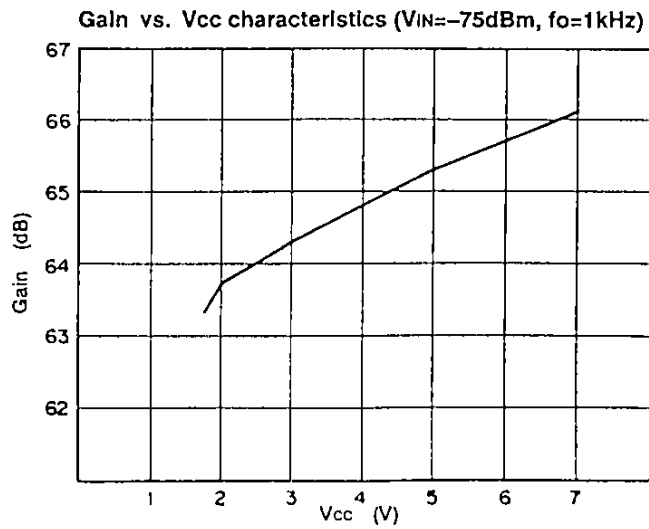
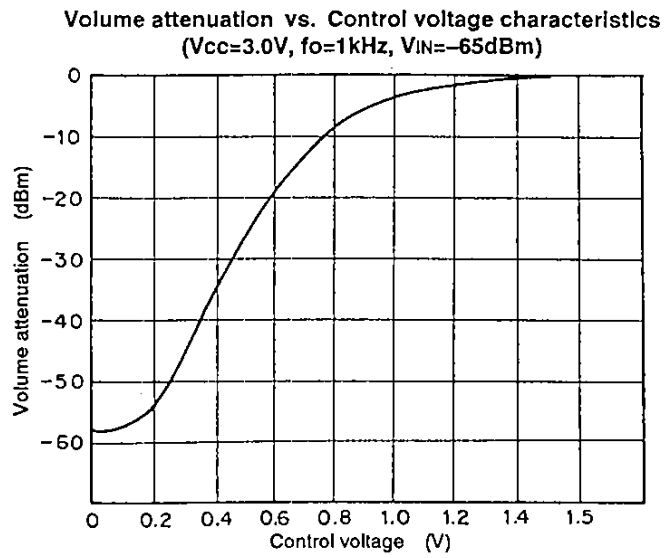
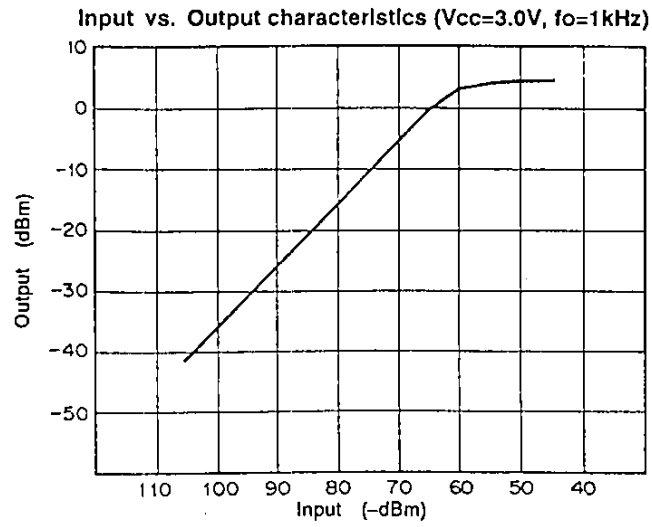


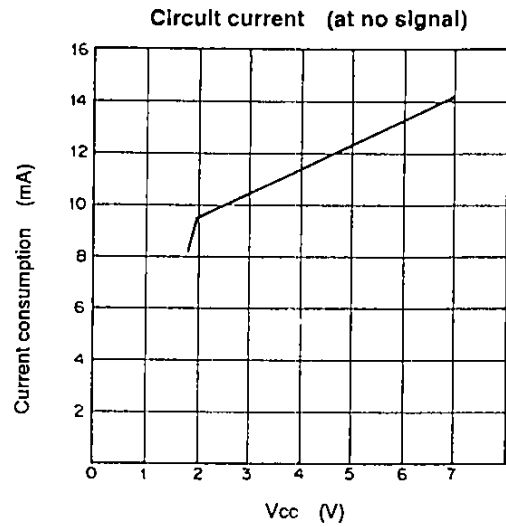
The signal from the playback head is input from Pins 3 and 6 (input) to obtain approximately 30dB (1kHz) signal amplification at the pre-amplifier stage and NAB equivalent characteristic through the low frequency correction circuit. The DC control voltage from Pin 9 is converted to current and control the volume control circuit. The low frequency component is amplified by approximately 7dB (50Hz) through the bass boost circuit according to the time constant determined by Pin 4. The headphone driver circuit provides approximately 30dB signal amplification and sufficient driving power.

Pin 5 ( $V_{REF}$ ) is floating at approximately  $V_{CC}/2$  to provide a wide operating range (1.8 to 6.5V). C16 is for absorbing volume sliding noise.

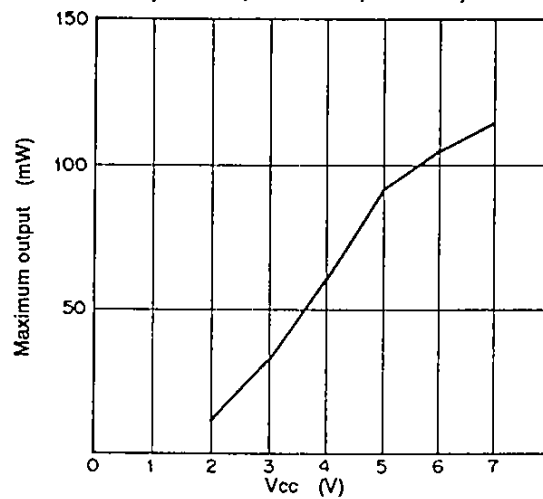


Example of Representative Characteristics

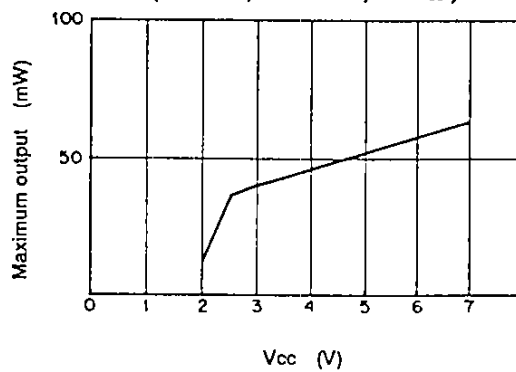




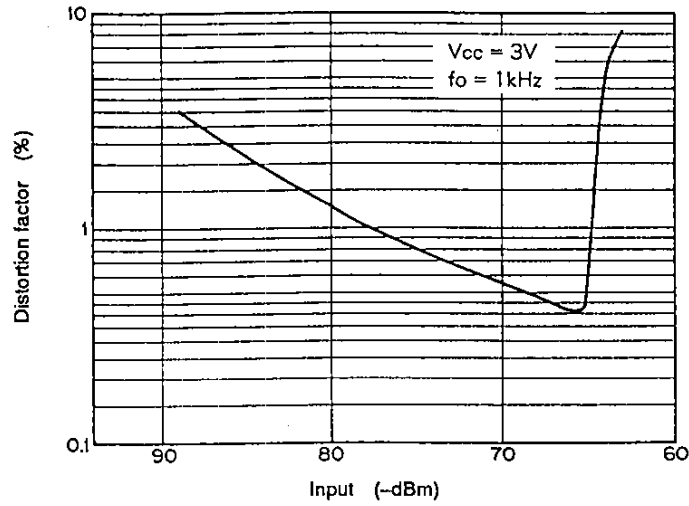
**Maximum output vs. Vcc characteristics (32Ω load)**  
 (fo=1kHz, THD=10%, RL=32Ω)



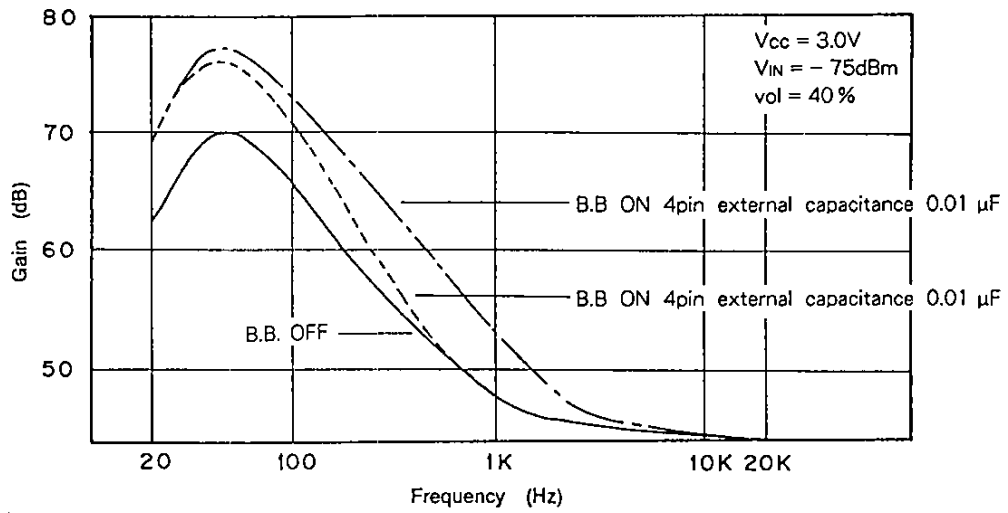
**Maximum output vs. Vcc characteristics (8Ω load)**  
 (fo=1kHz, THD=10%, RL=8Ω)



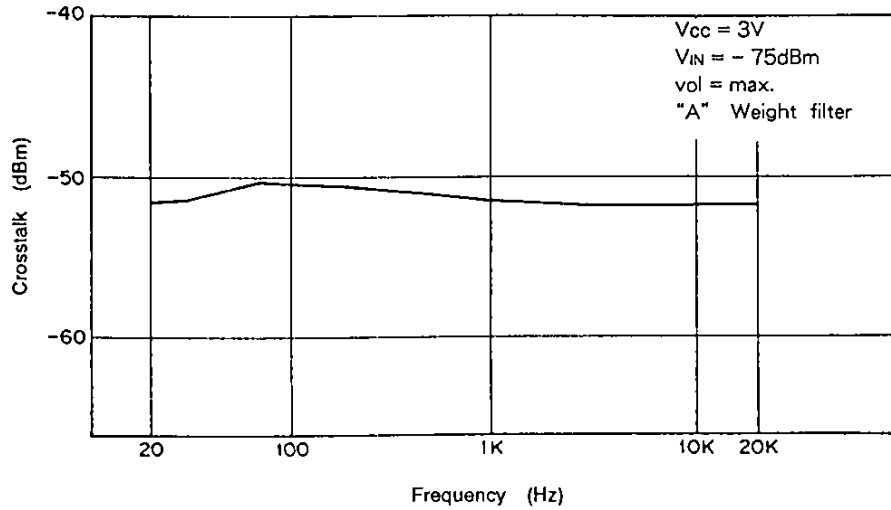
Distortion factor vs. Input characteristics



Frequency characteristics

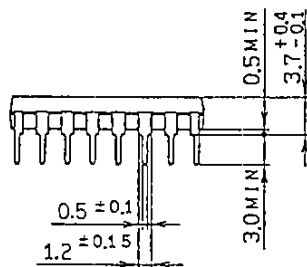
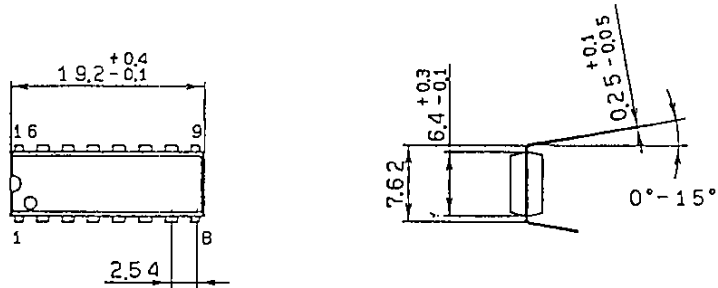


Inter-channel cross talk vs. Frequency characteristics



Package Outline Unit : mm

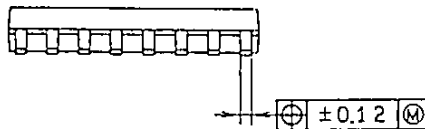
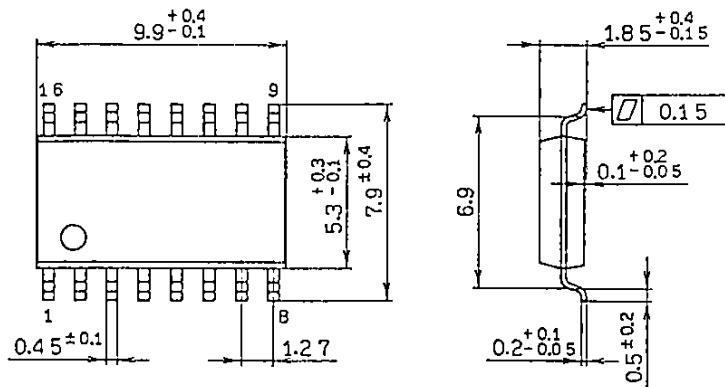
CXA1634P 16pin DIP (Plastic) 300mil 1.0g



|            |                  |
|------------|------------------|
| SONY NAME  | DIP-16P-01       |
| EIAJ NAME  | *DIP016-P-0300-A |
| JEDEC CODE | MO-001-AE *      |

\* (Similar)

CXA1634M 16pin SOP (Plastic) 300mil 0.2g



|            |                  |
|------------|------------------|
| SONY NAME  | SOP-16P-L01      |
| EIAJ NAME  | *SOP016-P-0300-A |
| JEDEC CODE | _____            |