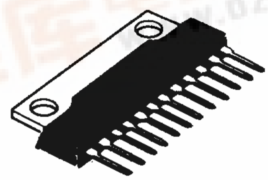
# HA1377

## Dual 5.8W Audio Power Amplifiers

This audio power IC is specifically designed for car stereo amplifiers encapsulated in 12-lead single-in-line plastic package.
This IC provides an output power of 5.8 watts per channel under the condition of 4 ohm loaded,10 percent distortion and 13.2 volt power supply.



(SP-12T)

### ■ FEATURES

- Easy to mount a chassis by heat-sink, due to the single-in-line package with no electrical isolation.
- Overvoltage handling capability up to 50 volts for 200 msec pulse duration.
- Thermal shut-down circuit included.
- Less number of external components.

### ■ABSOLUTE MAXIMUM RATINGS ($Ta=25$℃)

| Item | Symbol | Ratings | Unit | Notes |
|---|---|---|---|---|
| Operating Supply Voltage | $V_{CC}$ | 18 | V | |
| DC Supply Voltage | $V_{CC(DC)}$ | 26 | V | 1 |
| Peak Supply Voltage | $V_{CC(peak)}$ | 50 | V | |
| Output Current per Channel | $I_O$ | 4 | A | |
| Power Dissiation | $P_T$ | 15 | W | 2 |
| Thermal Resistance (Junction-Case) | $\theta_{j-c}$ | 3 | ℃/W | |
| Junction Temperature | $T_j$ | 150 | ℃ | |
| Operating Temperature | $T_{opr}$ | −20 to +70 | ℃ | |
| Storage Temperature | $T_{stg}$ | −55 to +125 | ℃ | |

Notes: 1. Value at 30sec 2. Pulse Width = 200ms, $t_r \geq 1$ms

### ■ELECTRICAL CHARACTERISTICS ($Ta=25$℃, $V_{CC}=13.2$V, $f=1$kHz, $R_L=4\Omega$)

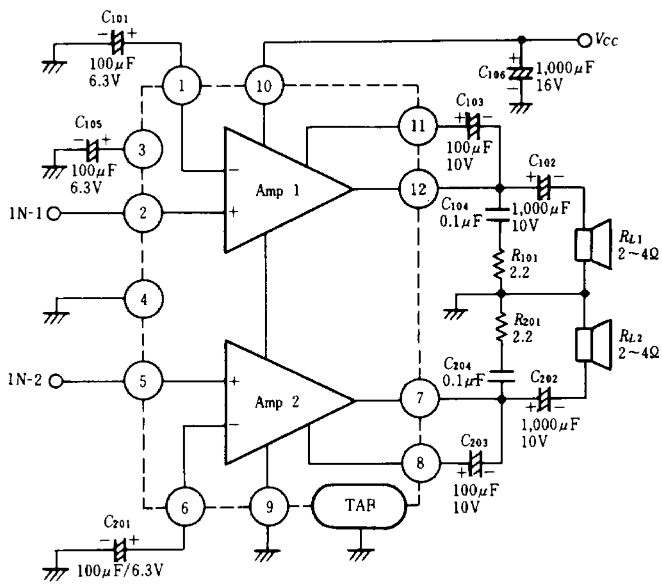
#### ●ONE-HALF OPERATION

| Item | Symbol | Test Condition | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Quiescent Current | $I_Q$ | $Vi=0$ | | — | 80 | 160 | mA |
| Input Bias Voltage | $V_B$ | $Vi=0$ | | — | — | 40 | mV |
| Voltage Gain | $G_V$ | $Vi=2.45$mV | | 53 | 55 | 57 | dB |
| Difference of Voltage Gain | $\triangle G_V$ | $Vi=2.45$mV | | — | — | ±1.5 | dB |
| Output Power per Channel | $P_{out}$ | $R_L=4\Omega$ | $V_{CC}=13.2$V | 5.0 | 5.8 | — | W |
| | | $THD=10\%$ | $V_{CC}=14.4$V | — | 7.0 | — | |
| Total Harmonic Distortion | $THD$ | $P_{out}=0.5$W | | — | 0.15 | 1.0 | % |
| Noise Output | $WBN$ | $R_g=10\text{k}\Omega$, $BW=20$Hz to 20kHz | | — | 1.0 | 2.0 | mV |
| Supply Voltage Rejection Ratio | $SVR$ | $R_g=600\Omega$, $f=500$Hz | | 30 | 40 | — | dB |
| Input Resistance | $R_{in}$ | $f=1$kHz | | — | 30 | — | kΩ |
| Rolloff Frequency | $f_L$ | $G_V=-3$dB from | Low | — | 40 | — | Hz |
| | $f_H$ | $f=1$kHz Ref. | High | — | 25 | — | kHz |
| Cross-talk | $CT$ | $f=500$Hz, $R_g=600\Omega$ | | 40 | 58 | — | dB |

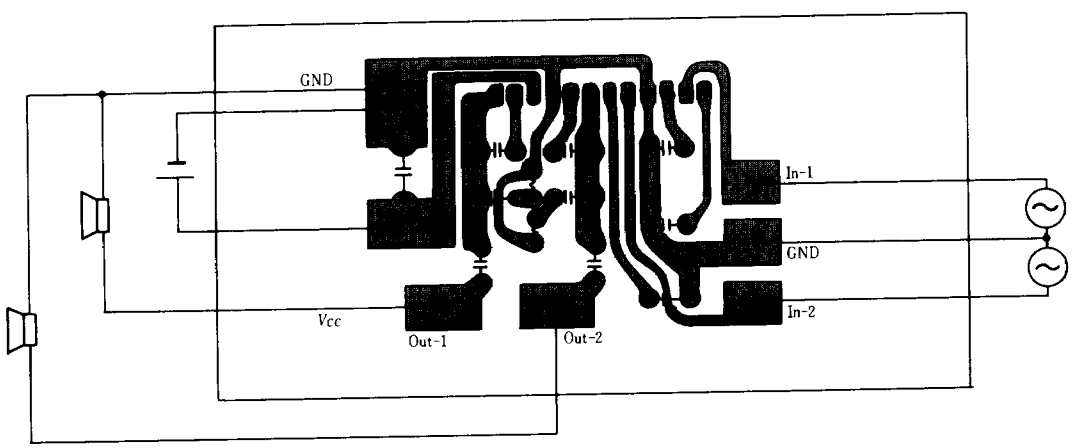
#### ●DUAL OPERATION

| | | | | | | |
|---|---|---|---|---|---|---|
| Output Power per Channel | $P_{out}$ | $THD=10\%$, $R_L=4\Omega$ | — | 5.6 | — | W |
| Total Harmonic Distortion | $THD$ | $P_{out}=0.5$W | — | 0.15 | — | % |

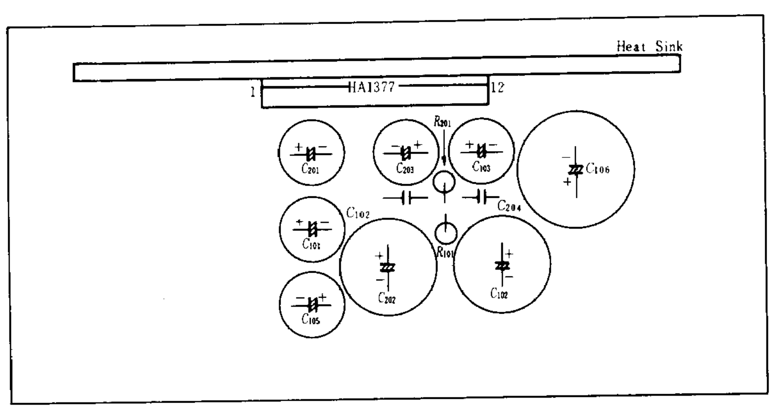
## ■TYPICAL APPLICATION




## ■PC-BOARD LAYOUT PATTERN




Bottom View

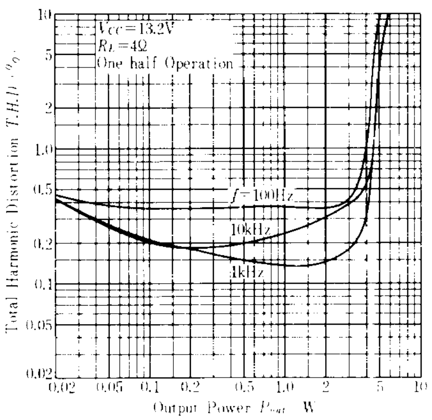



Top View

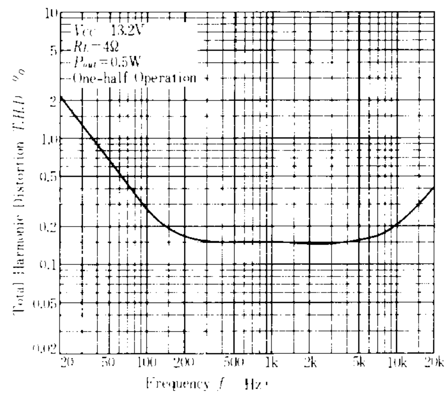
## ■EXTERNAL COMPONENTS

| Parts No. | Recommended value | Purpose | Larger than recommended value | Smaller than recommended value |
|---|---|---|---|---|
| $C_{101}$, $C_{201}$ | 100μF | Inverting DC decoupling | | Higher low frequency rolloff |
| $C_{102}$, $C_{202}$ | 1000μF | Output coupling to load | Danger of burn-out | Higher low frequecy rolloff |
| $C_{103}$, $C_{203}$ | 100μF | Boot strap | Danger ot burn-out at load dump surge | Smaller power bandwidth |
| $C_{104}$, $C_{204}$ | 0.1μF | Frequency stability | Increase of drain current at high frequency | Danger of oscillation |
| $C_{105}$ | 100μF | Ripple rejection | | Pop sound at switch-on |
| $C_{106}$ | 1000μF | Supply bypassing | | Danger of oscillation |
| $R_{101}$, $R_{201}$ | 2.2Ω | Frequency stability | Danger of oscillation | Danger of oscillation |

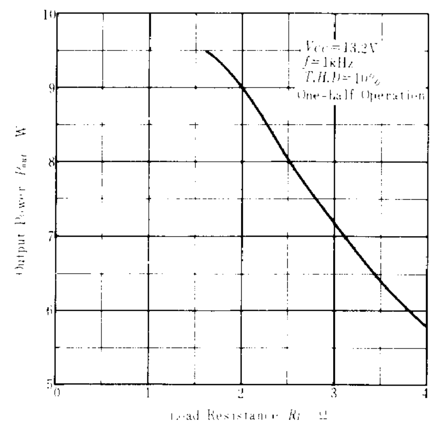
## TOTAL HARMONIC DISTORTION VS. OUTPUT POWER



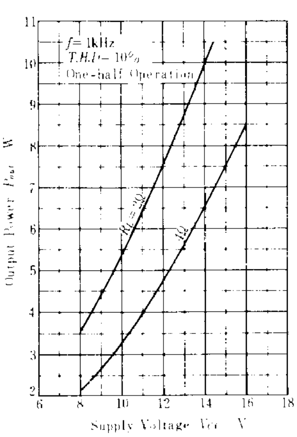

## TOTAL HARMONIC DISTORTION VS. FREQUENCY



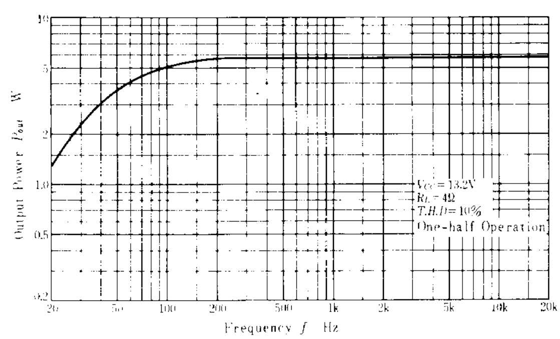

## OUTPUT POWER VS. LOAD RESISTANCE



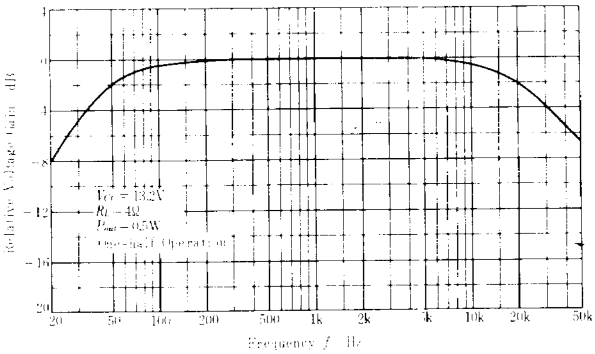

## OUTPUT POWER VS. SUPPLY VOLTAGE



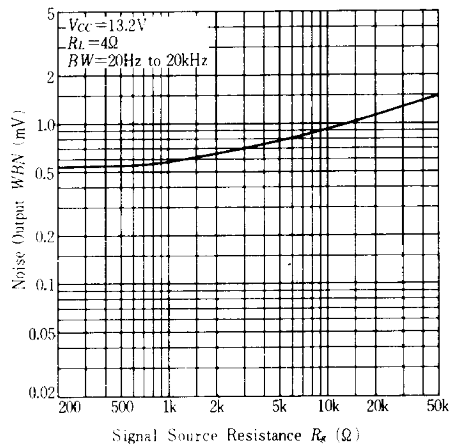

## OUTPUT POWER VS. FREQUENCY



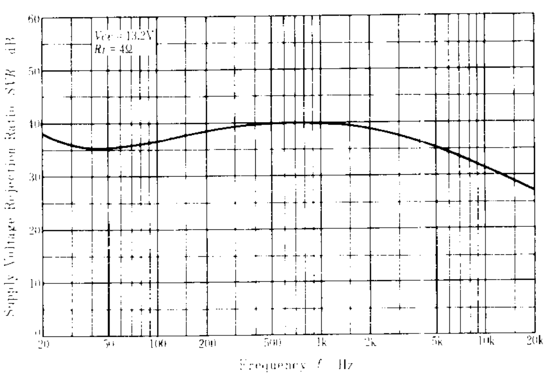
### RELATIVE VOLTAGE GAIN VS. FREQUENCY



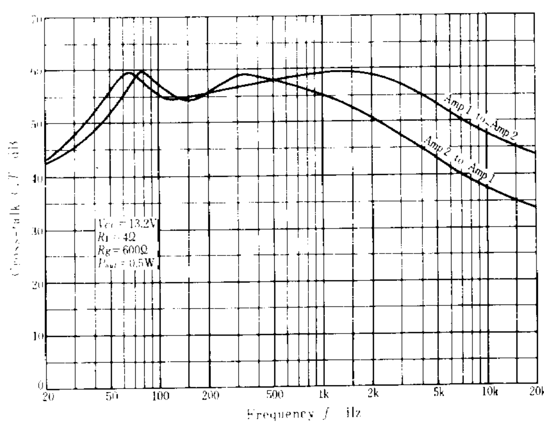

### NOISE OUTPUT VS. SIGNAL SOURCE RESISTANCE



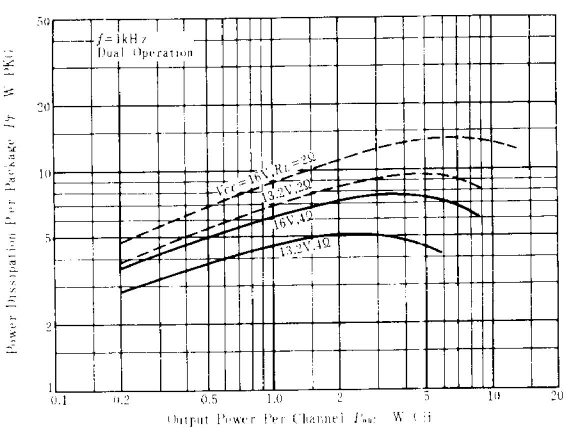

### SUPPLY VOLTAGE REJECTION RATIO VS. FREQUENCY




### CROSS-TALK VS. FREQUENCY




### POWER DISSIPATION VS. OUTPUT POWER




### QUIESCENT CURRENT VS. SUPPLY VOLTAGE