# HA13116

## 20 W BTL Audio Power Amplifier

The HA13116 is a high output and low distortion power IC designed for component car stereo amplifiers. At 13.2 V to 4 Ω load, this power IC provides an output power of 16 W with 1 % distortion and 20 W with 10 % distortion. It is easy to design as this IC employs internal each protection circuit and the new small package.

### Features

- Low external components count
- Small outline package, easy to mount
- Internal each protection circuits
  - Surge protection circuit
  - Thermal shut-down circuit
  - Ground fault protection circuit

### Ordering Information

| Type No. | Package |
|---|---|
| HA13116 | SP-15 |

**Table 1 Absolute Maximum Ratings (Ta = 25 °C)**

| Item | Symbol | Rating | Unit | Note |
|---|---|---|---|---|
| Operating supply voltage | Vcc | 18 | V | |
| DC supply voltage | Vcc (DC) | 26 | V | 1 |
| Peak supply voltage | Vcc (peak) | 50 | V | 2 |
| Output current | Io (peak) | 4 | A | |
| Power dissipation | PT | 15 | W | |
| Thermal resistance | θj – c | 3.5 | °C/W | |
| Junction temperature | Tj | 150 | °C | |
| Operating temperature | Topr | –30 to +80 | °C | |
| Storage temperature | Tstg | –55 to +125 | °C | |

Notes: 1. Value at t = 30 sec.
2. Value at width tw = 200 ms and rise time tr = 1 ms.

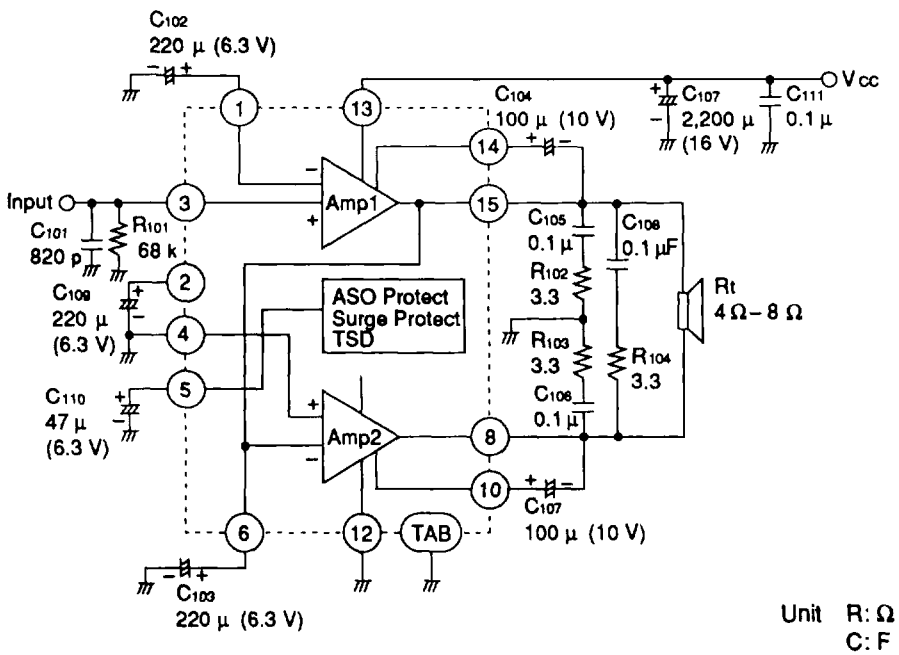
**Table 2 Electrical Characteristics (Vcc = 13.2 V, f = 1 kHz, RL = 4 Ω, Ta = 25 °C)**

| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|---|---|---|---|---|---|---|
| Quiescent current | IQ | 40 | 80 | 180 | mA | Vin = 0 |
| Input bias voltage | VB | — | 20 | 70 | mV | Vin = 0 |
| Output offset voltage | ΔVQ | — | — | +330 | mV | Vin = 0 |
| Voltage gain | GV | 37.5 | 40 | 42.5 | dB | Vin = –30 dBm |

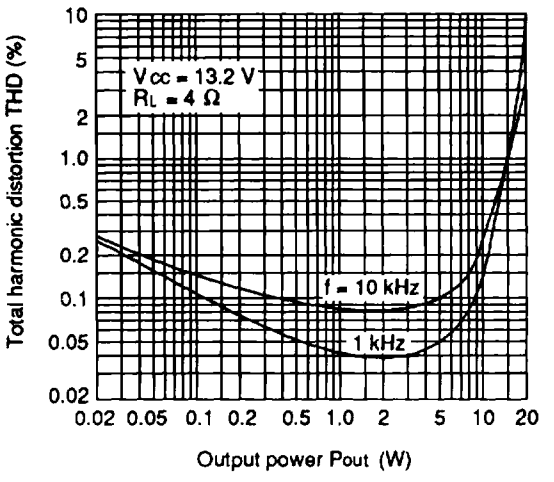
**Electrical Characteristics** ($V_{CC}$ = 13.2 V, f = 1 kHz, $R_L$ = 4 Ω, Ta = 25 °C) (cont)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Output power | Pout | 10 | 16 | — | W | THD = 1 % | |
| | | — | 20 | — | | THD = 10 % | |
| Total harmonic distortion | THD | — | 0.05 | 0.12 | % | Pout = 1.5 W | |
| Output noise voltage | WBN | — | 0.25 | 0.5 | mV | Rg = 10 kΩ, BW = 20 Hz 20 kHz | |
| Supply voltage rejection ratio | SVR | 40 | 50 | — | dB | f = 500 Hz, Rg = 4.7 kΩ | |
| Input resistance | Rin | — | 68 | — | kΩ | | |
| Rolloff frequency | fL | — | 5 | — | Hz | ΔGv = −3 dB from | Low |
| | fH | 40 | 70 | 120 | kHz | f = 1 kHz Ref. | High |

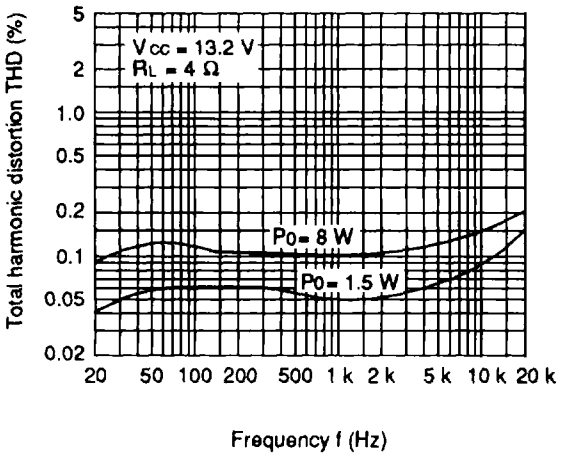
## Typical Application Circuit



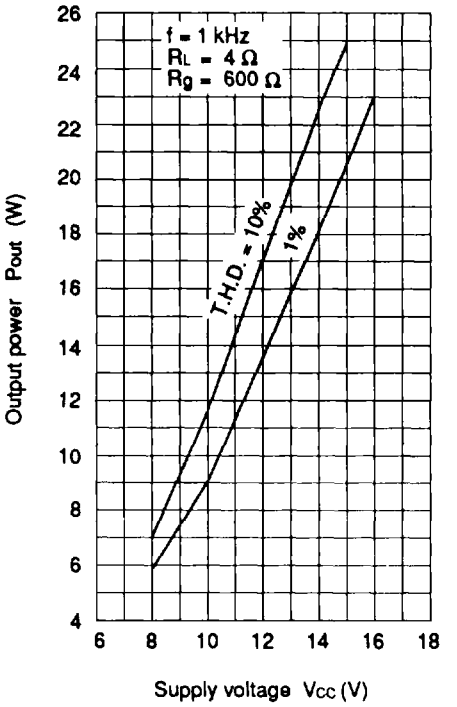

Note: $C_{105}$, $C_{106}$, $C_{108}$ must be used non secondary resonance type (non inductive) polyester film capacitor for keeping stability.



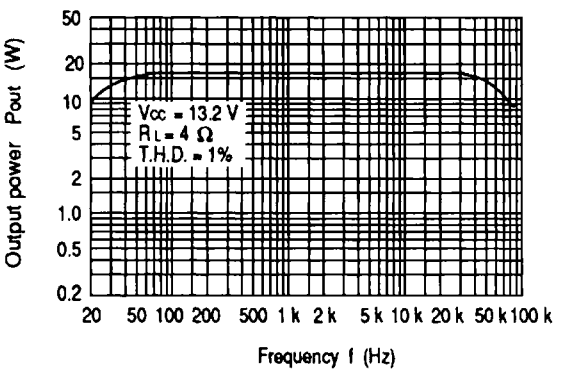

**Total Harmonic Distortion vs. Output Power**



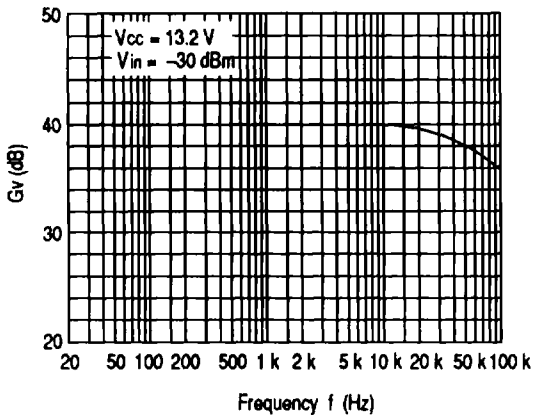

**Total Harmonic Distortion vs. Frequency**



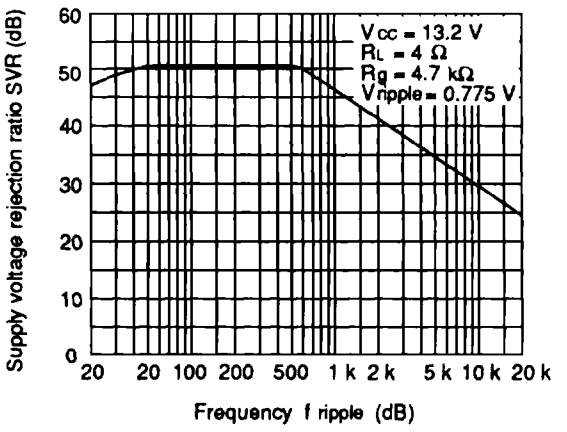

**Output Power vs. Supply Voltage**



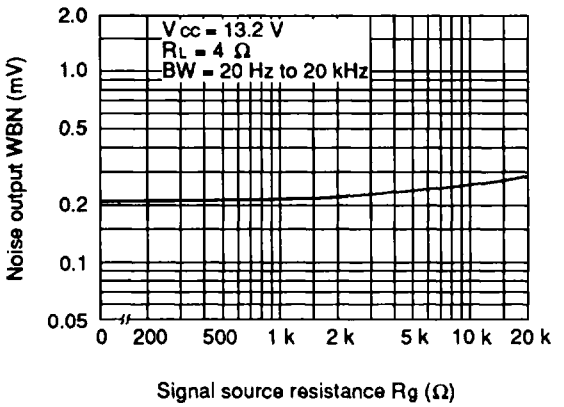

**Output Power vs. Frequency**



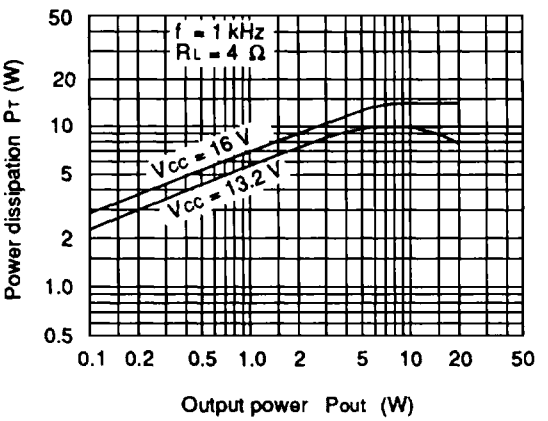

**Voltage Gain vs. Frequency**



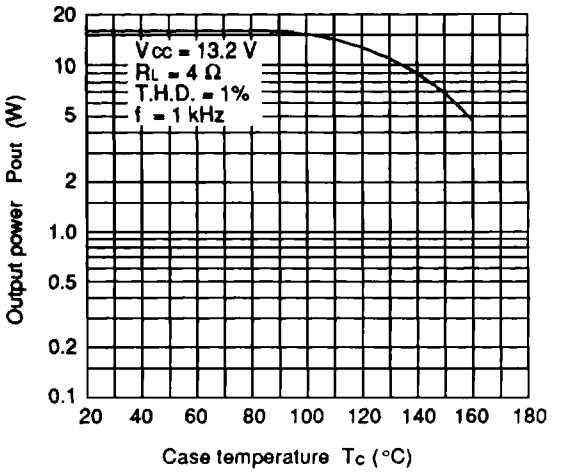

**Supply Voltage Rejection Ratio vs. Frequency**




**Noise Output vs. Signal Source Resistance**




**Power Dissipation vs. Output Power**




**Output Power vs. Case Temperature**