5.9 W AUDIO POWER AMPLIFIER

The TA7252AP is audio power amplifier for consumer applications. It is designed for high power, low distortion and low noise. 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 is suitable for car radio power amplifier.

FEATURES

● Very Few External Parts
● High Power
  : $P_{\text{OUT (1)}} = 5.9 \text{ W (Typ.)}$
  $\left( V_{\text{CC}} = 13.2 \text{ V, } f = 1 \text{ kHz, THD = 10\%, } R_L = 4 \Omega \right)$
  $P_{\text{OUT (2)}} = 9.6 \text{ W (Typ.)}$
  $\left( V_{\text{CC}} = 13.2 \text{ V, } f = 1 \text{ kHz, THD = 10\%, } R_L = 2 \Omega \right)$
● Low Distortion
  : THD = 0.07\% (Typ.)
  $\left( V_{\text{CC}} = 13.2 \text{ V, } f = 1 \text{ kHz, } P_{\text{OUT}} = 0.5 \text{ W, } R_L = 4 \Omega \right)$
● Low Noise
  : $V_{\text{NO (1)}} = 0.7 \text{ mV}_{\text{rms}}$ (Typ.)
  $\left( V_{\text{CC}} = 13.2 \text{ V, } R_L = 4 \Omega, G_V = 53 \text{ dB, } R_g = 10 \text{ k}\Omega, BW = 20 \text{ Hz} \sim 20 \text{ kHz} \right)$
  $V_{\text{NO (2)}} = 0.4 \text{ mV}_{\text{rms}}$ (Typ.)
  $\left( V_{\text{CC}} = 13.2 \text{ V, } R_L = 4 \Omega, G_V = 53 \text{ dB, } R_g = 0, \text{ DIN Noise : DIN45405} \right)$
● Protecor
  : Thermal Shout Down, Over Voltage Protection, Short Protection
● Operating Supply Voltage Range : $V_{\text{CC (opr.)}} = 9 \sim 18 \text{ V}$

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2000-07-19 1/9
APPLICATION INFORMATION

1. Voltage gain adjustment

The closed loop voltage gain \( G_V \) is determined by \( R_1, R_2 \) and \( R_f \).

\[
G_V = 20 \log \left( \frac{R_1 + R_f + R_2}{R_1 + R_f} \right)
\]

When \( R_f = 0 \), \( G_V = 53 \text{ dB} \) (Typ.) is given.

(Fig.1)

(Fig.2)

The recommended voltage gain is more than 40 dB.
2. Measures against oscillation

   The purpose of capacitor: $C_6$ is to prevent oscillation.
   This capacitor needs to be small temperature coefficient.
   So ceramic capacitor is unsuitable.
   A voltage gain less than 40 dB results occasionally in a plastic oscillation.

3. Precaution at print board design

   (1) GND line
   The GND pin is only one in this $I_C$.
   When there is some common impedance between the input side
   GND and the output side GND, electrical characteristics as THD
   degrade.
   3 GND lines (input, output and $V_{CC}$ sides) should be branched at
   the pin(4) as shown (Fig. 3).

   (2) It is recommended to refer the standard print board.

![Diagram of a standard P.C.B.](image)
**MAXIMUM RATINGS** (Ta = 25°C)

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>SYMBOL</th>
<th>RATING</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Supply Voltage (0.2 s)</td>
<td>( V_{CC} ) (surge)</td>
<td>48</td>
<td>V</td>
</tr>
<tr>
<td>DC Supply Voltage</td>
<td>( V_{CC} ) (DC)</td>
<td>25</td>
<td>V</td>
</tr>
<tr>
<td>Operating Supply Voltage</td>
<td>( V_{CC} ) (opr)</td>
<td>18</td>
<td>V</td>
</tr>
<tr>
<td>Output Current (Peak)</td>
<td>( I_O ) (peak)</td>
<td>4.5</td>
<td>A</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>( P_D )</td>
<td>15</td>
<td>W</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>( T_{opr} )</td>
<td>–30~75</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>( T_{stg} )</td>
<td>–55~150</td>
<td>°C</td>
</tr>
</tbody>
</table>

**ELECTRICAL CHARACTERISTICS**
(Unless otherwise specified, \( V_{CC} = 13.2 \) V, \( R_L = 4 \) Ω, \( R_g = 600 \) Ω, \( f = 1 \) kHz, Ta = 25°C)

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>SYMBOL</th>
<th>TEST CIRCUIT</th>
<th>TEST CONDITION</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiescent Current</td>
<td>( I_{CCQ} )</td>
<td>—</td>
<td>( V_{IN} = 0 )</td>
<td>—</td>
<td>35</td>
<td>3.5</td>
<td>mA</td>
</tr>
<tr>
<td>Output Power</td>
<td>( P_{OUT} ) (1)</td>
<td>—</td>
<td>THD = 10%</td>
<td>5.0</td>
<td>5.9</td>
<td>—</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td>( P_{OUT} ) (2)</td>
<td>—</td>
<td>THD = 10%, ( R_L = 2 ) Ω</td>
<td>—</td>
<td>9.6</td>
<td>—</td>
<td>W</td>
</tr>
<tr>
<td>Total Harmonic Distortion</td>
<td>THD (1)</td>
<td>—</td>
<td>( P_{OUT} = 0.5 ) W</td>
<td>—</td>
<td>0.07</td>
<td>0.5</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>THD (2)</td>
<td>—</td>
<td>( P_{OUT} = 1 ) W, ( R_L = 2 ) Ω</td>
<td>—</td>
<td>0.10</td>
<td>—</td>
<td>%</td>
</tr>
<tr>
<td>Output Noise Voltage</td>
<td>( V_{NO} ) (1)</td>
<td>—</td>
<td>( R_g = 10 ) kΩ, ( G_V = 53 ) dB</td>
<td>—</td>
<td>0.7</td>
<td>1.8</td>
<td>mVrms</td>
</tr>
<tr>
<td></td>
<td>( V_{NO} ) (2)</td>
<td>—</td>
<td>( R_g = 0 ), ( G_V = 53 ) dB</td>
<td>—</td>
<td>0.4</td>
<td>—</td>
<td>mVrms</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
<td>DIN noise (DIN45405) filter</td>
<td>—</td>
<td>0.4</td>
<td>—</td>
<td>mVrms</td>
</tr>
<tr>
<td>Voltage Gain</td>
<td>( G_V )</td>
<td>—</td>
<td>( V_{IN} = 0.5 ) mVrms</td>
<td>—</td>
<td>51</td>
<td>53</td>
<td>55</td>
</tr>
<tr>
<td>Ripple Rejection Ratio</td>
<td>R.R.</td>
<td>—</td>
<td>( R_g = 0 ), ripple = 100 Hz ( V_{ripple} = 0.775 ) Vrms (0 dBm)</td>
<td>—</td>
<td>–62</td>
<td>–50</td>
<td>dB</td>
</tr>
<tr>
<td>Input Resistance</td>
<td>( R_{IN} )</td>
<td>—</td>
<td>( f = 1 ) kHz</td>
<td>—</td>
<td>30</td>
<td>—</td>
<td>kΩ</td>
</tr>
</tbody>
</table>

**TYP. DC VOLTAGE OF EACH TERMINAL**
(\( V_{CC} = 13.2 \) V, Ta = 25°C)

<table>
<thead>
<tr>
<th>TERMINAL No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Voltage (V)</td>
<td>1.5</td>
<td>1.5</td>
<td>6.6</td>
<td>GND</td>
<td>6.6</td>
<td>12.6</td>
<td>( V_{CC} )</td>
</tr>
</tbody>
</table>
TEST CIRCUIT
PACKAGE DIMENSIONS

HSIP7-P-2.54A

Unit: mm

Weight: 2.15 g (Typ.)