AF AMPLIFIER

The TBA820 is a monolithic integrated audio power amplifier. Its main features:
- working with supply voltages from 3 to 16 volts,
- low idle current (4 mA typ.),
- high efficiency,
make it especially suitable for mobile, battery operated equipments.

Other features include:
- output power up to 2W without any external heat sink,
- high input impedance, low bias current,
- high ripple rejection,
- no thermal runaway,
- no cross-over distortion,
- few external components required.

The TBA820 is supplied in a quad-in-line, 14 leads package.
ABSOLUTE RATINGS (LIMITING VALUES)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>V_{CC}</td>
<td>16</td>
<td>V</td>
</tr>
<tr>
<td>Output peak current</td>
<td>I_{O}</td>
<td>1.5</td>
<td>A</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>T_{stg}</td>
<td>-40, +150</td>
<td>°C</td>
</tr>
<tr>
<td>Junction temperature</td>
<td>T_{j}</td>
<td>+150</td>
<td>°C</td>
</tr>
</tbody>
</table>

THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junction-ambient thermal resistance</td>
<td>R_{th(j - a)}</td>
<td>80</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

SCHEMATIC DIAGRAM
## ELECTRICAL CHARACTERISTICS

*\( T_{\text{amb}} = 25^\circ \text{C} \) (note 1)  

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>( V_{\text{CC}} )</td>
<td>3</td>
<td>—</td>
<td>16</td>
<td>V</td>
</tr>
<tr>
<td>Quiescent output voltage</td>
<td>( V_O )</td>
<td>4</td>
<td>4.5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td><strong>( V_{\text{CC}} = 9 \text{ V} )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quiescent drain current</td>
<td>( I_{\text{CC}} )</td>
<td>—</td>
<td>4</td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td><strong>( V_{\text{CC}} = 9 \text{ V} )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bias current</td>
<td>( I )</td>
<td>—</td>
<td>0.1</td>
<td>—</td>
<td>( \mu\text{A} )</td>
</tr>
<tr>
<td><strong>( V_{\text{CC}} = 9 \text{ V} )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output power</td>
<td>( P_O )</td>
<td>—</td>
<td>2</td>
<td>—</td>
<td>W</td>
</tr>
<tr>
<td><strong>( V_{\text{CC}} )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( V_{\text{CC}} = 12 \text{ V} ); ( R_L = 8 \Omega ); ( R_f = 120 \Omega ); ( d = 10% ); ( f = 1 \text{ kHz} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( V_{\text{CC}} = 9 \text{ V} ); ( R_L = 4 \Omega ); ( R_f = 120 \Omega ); ( d = 10% ); ( f = 1 \text{ kHz} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( V_{\text{CC}} = 9 \text{ V} ); ( R_L = 8 \Omega ); ( R_f = 120 \Omega ); ( d = 10% ); ( f = 1 \text{ kHz} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( V_{\text{CC}} = 6 \text{ V} ); ( R_L = 4 \Omega ); ( R_f = 120 \Omega ); ( d = 10% ); ( f = 1 \text{ kHz} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input sensitivity</td>
<td>( S )</td>
<td>—</td>
<td>16</td>
<td>—</td>
<td>mV</td>
</tr>
<tr>
<td><strong>( V_{\text{CC}} )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( V_{\text{CC}} = 9 \text{ V} ); ( P_O = 1.2 \text{ W} ); ( R_L = 8 \Omega ); ( R_f = 33 \Omega ); ( f = 1 \text{ kHz} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency response (at 3 dB)</td>
<td>( B )</td>
<td>25</td>
<td>7000</td>
<td></td>
<td>Hz</td>
</tr>
<tr>
<td><strong>( V_{\text{CC}} )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( V_{\text{CC}} = 9 \text{ V} ); ( R_L = 8 \Omega ); ( R_f = 120 \Omega ); ( C_B = 680 \text{ pF} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>( V_{\text{CC}} )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distortion</td>
<td>( d )</td>
<td>0.8</td>
<td>—</td>
<td>—</td>
<td>%</td>
</tr>
<tr>
<td><strong>( V_{\text{CC}} )</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage gain (open loop)</td>
<td>( A_{V} )</td>
<td>—</td>
<td>75</td>
<td>—</td>
<td>dB</td>
</tr>
<tr>
<td>Voltage gain (closed loop)</td>
<td>( A_{V} )</td>
<td>—</td>
<td>45</td>
<td>—</td>
<td>dB</td>
</tr>
<tr>
<td>Input noise voltage</td>
<td>( V_n )</td>
<td>—</td>
<td>3</td>
<td>—</td>
<td>( \mu \text{V}_{\text{eff}} )</td>
</tr>
<tr>
<td>Input noise current</td>
<td>( I_n )</td>
<td>—</td>
<td>0.4</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Signal to noise ratio</td>
<td>( V_{\text{CC}} = 9 \text{ V} ); ( R_L = 8 \Omega ); ( R_f = 120 \Omega ); ( R_1 = 100 \text{ k}\Omega )</td>
<td>70</td>
<td>—</td>
<td>—</td>
<td>dB</td>
</tr>
<tr>
<td>Supply voltage rejection (see fig. 2)</td>
<td>( \text{SVR} )</td>
<td>—</td>
<td>42</td>
<td>—</td>
<td>dB</td>
</tr>
</tbody>
</table>

Note 1: The characteristics above were obtained using the circuit shown in fig. 1.
TEST AND APPLICATION CIRCUITS

FIGURE 1 – LOAD CONNECTED TO THE SUPPLY VOLTAGE

FIGURE 2 – LOAD CONNECTED TO GROUND

*Must be used when high ripple rejection is requested.
TYPICAL CHARACTERISTICS

POWER OUTPUT

\[ P_O \ (\text{W}) \]

\[ V_{CC} \ (\text{V}) \]

- \( R_T = 120 \ \Omega \)
- \( \Delta = 10\% \)
- \( f = 1 \ \text{kHz} \)

- \( R_L = 4 \ \Omega \)
- \( 8 \ \Omega \)
- \( 16 \ \Omega \)

POWER DISSIPATION AND EFFICIENCY

\[ \eta \ (\%) \]

\[ P_{\text{tot}} \ (\text{W}) \]

- \( V_{CC} = 9 \ \text{V} \)
- \( R_L = 8 \ \Omega \)
- \( f = 1 \ \text{kHz} \)

MAXIMUM POWER DISSIPATION

\[ P_{\text{tot}} \ (\text{max}) \ (\text{W}) \]

- \( t_{amb} = 50^\circ \text{C} \)
- \( R_L = 4 \ \Omega \)
- \( R_L = 8 \ \Omega \)

POWER RATING CHART

\[ t_{amb} \ (^\circ \text{C}) \]

- \( R_{\text{th}} \)

0 4 8 12

0 4 8 12

0 0.5 1 2 3 4

0 1 2 3 4 5

0 0.5 1 1.5

0 50 100

0 0.5 1 1.5

-50 0 50 100

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433
TYPICAL CHARACTERISTICS

SENSITIVITY

\[ V_{CC} = 9 \text{ V} \]
\[ R_L = 8 \text{ } \Omega \]
\[ f = 1 \text{ kHz} \]

\[ V_I \text{ (mV)} \]

\[ V_I \text{ (mV)} \]

\[ P_O = 50 \text{ mW} \]

\[ P_O = 10 \text{ mW} \]

\[ R_T (\Omega) \]

\[ A_V \text{ (dB)} \]

\[ V_{CC} = 9 \text{ V} \]
\[ R_L = 8 \text{ } \Omega \]
\[ f = 1 \text{ kHz} \]

DISTORTION

\[ V_{CC} = 9 \text{ V} \]
\[ R_L = 8 \text{ } \Omega \]
\[ f = 1 \text{ kHz} \]

\[ d \text{ (%)} \]

\[ V_{CC} \text{ = 9 V} \]
\[ R_L = 8 \Omega \]

\[ P_O = 50 \text{ mW} \]

\[ f \text{ (Hz)} \]

\[ P_O = 500 \text{ mW} \]

\[ 10^1 \text{ to } 5^5 \]
TYPICAL CHARACTERISTICS

TYPICAL VALUE OF $C_D$ VERSUS $R_f$ AND $B$

- $V_{CC} = 9$ V
- $R_L = 6$ Ω
- $B_{max} = 5$ kHz
- $B_{max} = 10$ kHz
- $B_{max} = 20$ kHz

QUIESCENT OUTPUT VOLTAGE AT PIN 12

QUIESCENT CURRENT

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CASE CB-21

PLASTIC PACKAGE

These specifications are subject to change without notice. Please inquire with our sales offices about the availability of the different packages.
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Datasheets for electronic components.