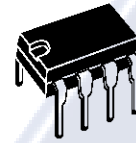


## 1.2W AUDIO AMPLIFIER

### DESCRIPTION

The TBA820M is a monolithic integrated audio amplifier in a 8 lead dual in-line plastic package. It is intended for use as low frequency class B power amplifier with wide range of supply voltage: 3 to 16V, in portable radios, cassette recorders and players etc. Main features are: minimum working supply voltage of 3V, low quiescent current, low number of external components, good ripple rejection, no cross-over distortion, low power dissipation.

Output power:  $P_o = 2W$  at  $12V/8\Omega$ ,  $1.6W$  at  $9V/4\Omega$  and  $1.2W$  at  $9V/8\Omega$ .



Minidip

ORDERING NUMBER: TBA820M

### ABSOLUTE MAXIMUM RATINGS

| Symbol         | Parameter                                   | Value      | Unit       |
|----------------|---------------------------------------------|------------|------------|
| $V_s$          | Supply voltage                              | 16         | V          |
| $I_o$          | Output peak current                         | 1.5        | A          |
| $P_{tot}$      | Power dissipation at $T_{amb} = 50^\circ C$ | 1          | W          |
| $T_{stg}, T_j$ | Storage and junction temperature            | -40 to 150 | $^\circ C$ |

### TEST AND APPLICATION CIRCUITS

Figure 1. Circuit diagram with load connected to the supply voltage

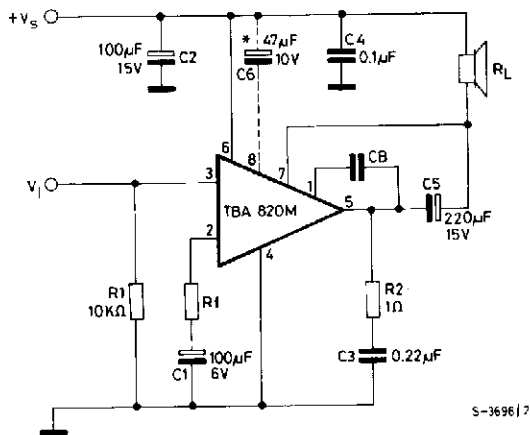
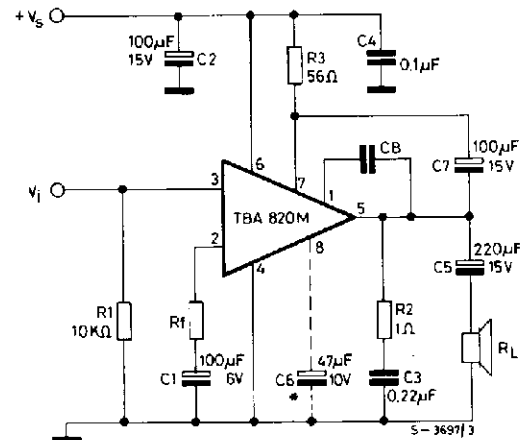


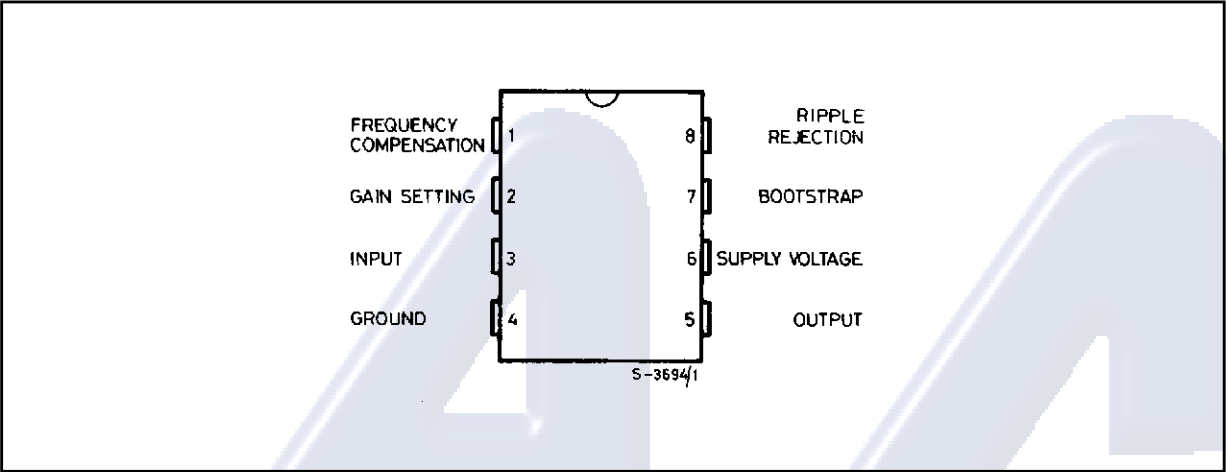
Figure 2. Circuit diagram with load connected to ground



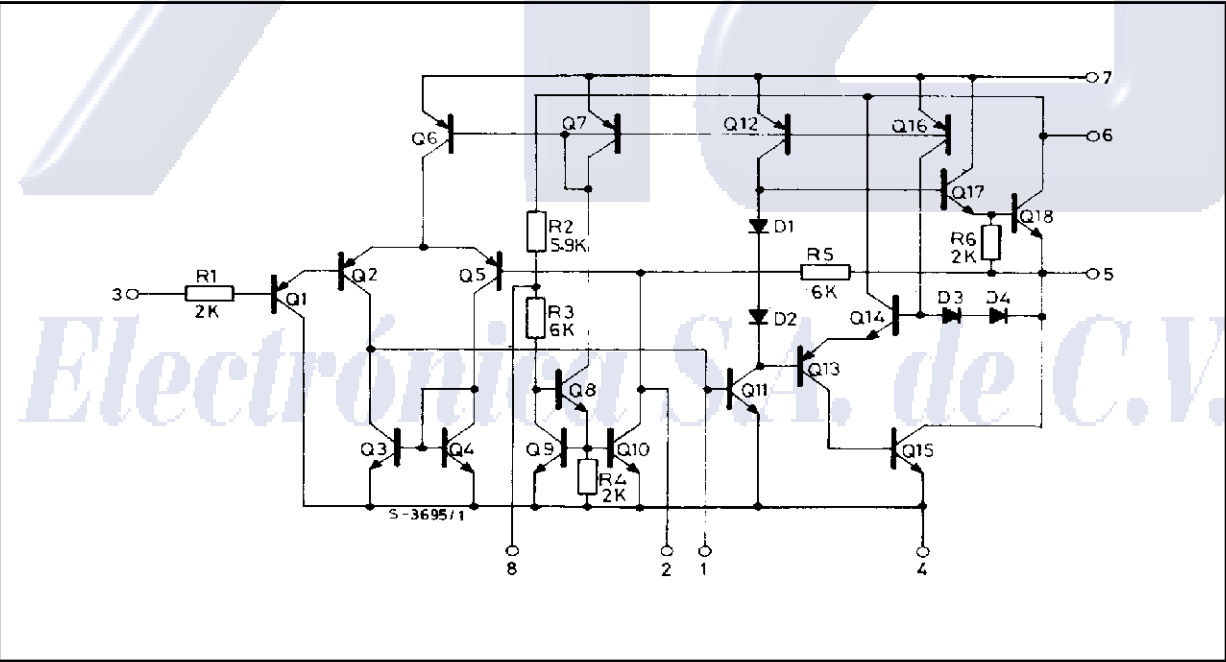
\* Capacitor C6 must be used when high ripple rejection is requested.

TBA820M

PIN CONNECTION (top view)



SCHEMATIC DIAGRAM



THERMAL DATA

| Symbol                | Parameter                           | Value   | Unit |
|-----------------------|-------------------------------------|---------|------|
| R <sub>th-j-amb</sub> | Thermal resistance junction-ambient | max 100 | °C/W |

## TBA820M

**ELECTRICAL CHARACTERISTICS** (Refer to the test circuits  $V_s = 9V$ ,  $T_{amb} = 25^\circ C$  unless otherwise specified)

| Symbol          | Parameter                                         | Test conditions                                                                                                                                        |                                                                                                                              | Min.         | Typ.                            | Max. | Unit                  |
|-----------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------|------|-----------------------|
| V <sub>s</sub>  | Supply voltage                                    |                                                                                                                                                        |                                                                                                                              | 3            |                                 | 16   | V                     |
| V <sub>o</sub>  | Quiescent output voltage (pin 5)                  |                                                                                                                                                        |                                                                                                                              | 4            | 4.5                             | 5    | V                     |
| I <sub>d</sub>  | Quiescent drain current                           |                                                                                                                                                        |                                                                                                                              |              | 4                               | 12   | mA                    |
| I <sub>b</sub>  | Bias current (pin 3)                              |                                                                                                                                                        |                                                                                                                              |              | 0.1                             |      | μA                    |
| P <sub>o</sub>  | Output power                                      | d = 10%<br>R <sub>f</sub> = 120Ω<br>V <sub>s</sub> = 12V<br>V <sub>s</sub> = 9V<br>V <sub>s</sub> = 9V<br>V <sub>s</sub> = 6V<br>V <sub>s</sub> = 3.5V | f = 1 kHz<br>R <sub>L</sub> = 8Ω<br>R <sub>L</sub> = 4Ω<br>R <sub>L</sub> = 8Ω<br>R <sub>L</sub> = 4Ω<br>R <sub>L</sub> = 4Ω | 0.9          | 2<br>1.6<br>1.2<br>0.75<br>0.25 |      | W<br>W<br>W<br>W<br>W |
| R <sub>i</sub>  | Input resistance (pin 3)                          | f = 1 kHz                                                                                                                                              |                                                                                                                              |              | 5                               |      | MΩ                    |
| B               | Frequency response (-3 dB)                        | R <sub>L</sub> = 8Ω<br>C <sub>5</sub> = 1000 μF<br>R <sub>f</sub> = 120Ω                                                                               | C <sub>B</sub> = 680 pF                                                                                                      | 25 to 7,000  |                                 |      | Hz                    |
|                 |                                                   |                                                                                                                                                        | C <sub>B</sub> = 220 pF                                                                                                      | 25 to 20,000 |                                 |      |                       |
| d               | Distortion                                        | P <sub>o</sub> = 500 mW<br>R <sub>L</sub> = 8Ω<br>f = 1 kHz                                                                                            | R <sub>f</sub> = 33Ω                                                                                                         |              | 0.8                             |      | %                     |
|                 |                                                   |                                                                                                                                                        | R <sub>f</sub> = 120Ω                                                                                                        |              | 0.4                             |      |                       |
| G <sub>v</sub>  | Voltage gain (open loop)                          | f = 1 kHz                                                                                                                                              | R <sub>L</sub> = 8Ω                                                                                                          |              | 75                              |      | dB                    |
| G <sub>v</sub>  | Voltage gain (closed loop)                        | R <sub>L</sub> = 8Ω                                                                                                                                    | R <sub>f</sub> = 33Ω                                                                                                         |              | 45                              |      | dB                    |
|                 |                                                   | f = 1 kHz                                                                                                                                              | R <sub>f</sub> = 120Ω                                                                                                        |              | 34                              |      |                       |
| e <sub>N</sub>  | Input noise voltage (*)                           |                                                                                                                                                        |                                                                                                                              |              | 3                               |      | μV                    |
| i <sub>N</sub>  | Input noise current (*)                           |                                                                                                                                                        |                                                                                                                              |              | 0.4                             |      | nA                    |
| $\frac{S+N}{N}$ | Signal to noise ratio (*)                         | P <sub>o</sub> = 1.2W<br>R <sub>L</sub> = 8Ω<br>G <sub>v</sub> = 34 dB                                                                                 | R1 = 10KΩ                                                                                                                    |              | 80                              |      | dB                    |
|                 |                                                   |                                                                                                                                                        | R1 = 50 kΩ                                                                                                                   |              | 70                              |      |                       |
| SVR             | Supply voltage rejection (test circuit of fig. 2) | R <sub>L</sub> = 8Ω<br>f <sub>(ripple)</sub> = 100 Hz<br>C6 = 47 μF<br>R <sub>f</sub> = 120Ω                                                           |                                                                                                                              |              | 42                              |      | dB                    |

(\*) B = 22 Hz to 22 KHz

## TBA820M

Figure 3. Output power vs. supply voltage

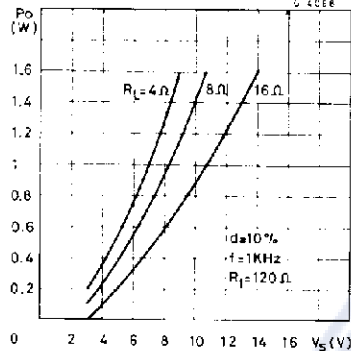


Figure 4. Harmonic distortion vs. output power

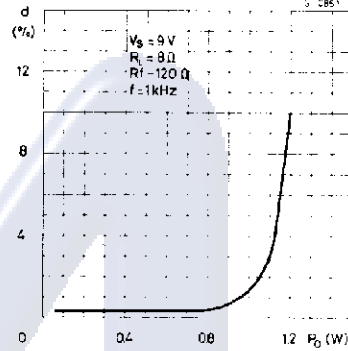


Figure 5. Power dissipation and efficiency vs. output power

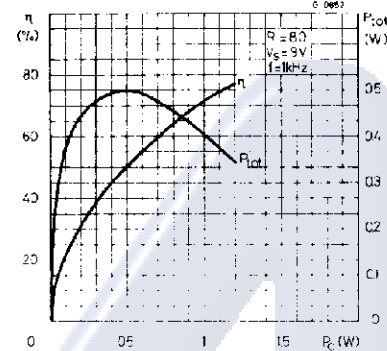


Figure 6. Maximum power dissipation (sine wave operation)

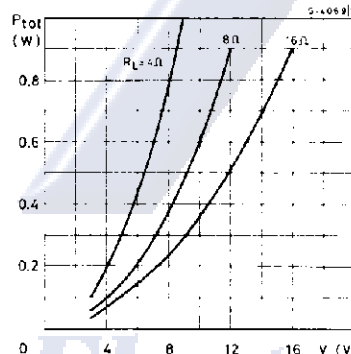


Figure 7. Suggested value of CB vs. RL

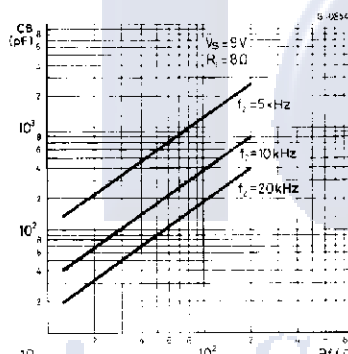


Figure 8. Frequency response

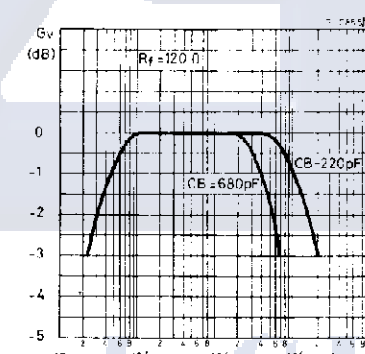


Figure 9. Harmonic distortion vs. frequency

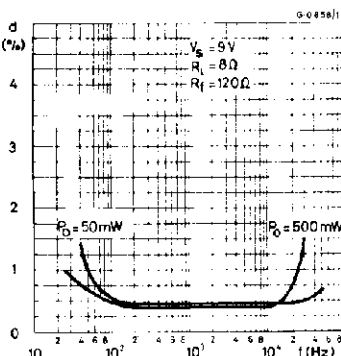


Figure 10. Supply voltage rejection (Fig. 2 circuit)

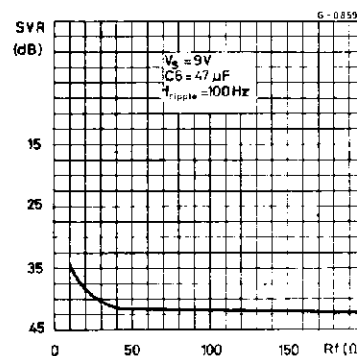
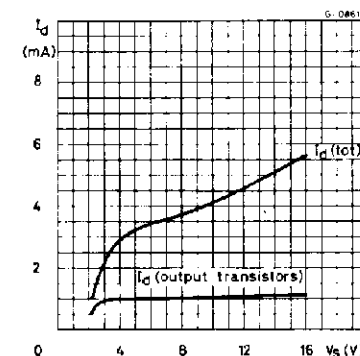


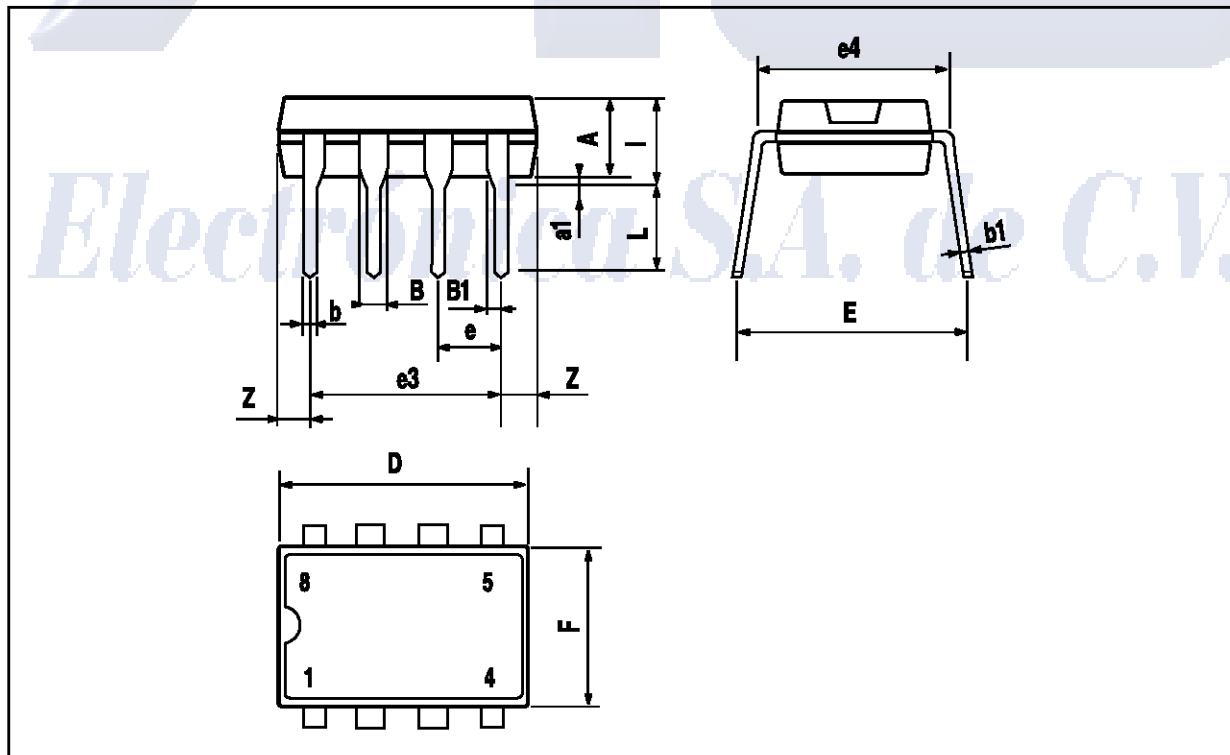
Figure 11. Quiescent current vs. supply voltage



## TBA820M

### MINIDIP PACKAGE MECHANICAL DATA

| DIM. | mm    |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    |       | 3.32 |       |       | 0.131 |       |
| a1   | 0.51  |      |       | 0.020 |       |       |
| B    | 1.15  |      | 1.65  | 0.045 |       | 0.065 |
| b    | 0.356 |      | 0.55  | 0.014 |       | 0.022 |
| b1   | 0.204 |      | 0.304 | 0.008 |       | 0.012 |
| D    |       |      | 10.92 |       |       | 0.430 |
| E    | 7.95  |      | 9.75  | 0.313 |       | 0.384 |
| e    |       | 2.54 |       |       | 0.100 |       |
| e3   |       | 7.62 |       |       | 0.300 |       |
| e4   |       | 7.62 |       |       | 0.300 |       |
| F    |       |      | 6.6   |       |       | 0.260 |
| I    |       |      | 5.08  |       |       | 0.200 |
| L    | 3.18  |      | 3.81  | 0.125 |       | 0.150 |
| Z    |       |      | 1.52  |       |       | 0.060 |



## TBA820M

---



*Electrónica S.A. de C.V.*

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.