LINEAR INTEGRATED CIRCUIT

SGS **TBA810P**

7W AUDIO AMPLIFIER

The TBA 810P is an improvement of TBA 810S.

It offers:
- Higher output power ($R_L = 4\Omega$ and 2Ω)
- Lower noise
- Polarity inversion protection
- Fortuitous open ground protection
- Higher supply voltage rejection (40 dB min.)

The TBA 810P is a monolithic integrated circuit in a 12-lead quad in-line plastic package, intended for use as a low frequency class B amplifier.
The TBA 810 P provides 7-W output power at 16V/4Ω; 7-W at 14.4V/2Ω.
It gives high output current (up to 3A), high efficiency (75% at 6W output), very low harmonic and crossover distortion. The circuit is provided with a thermal limiting circuit and can withstand a short-circuit on the load for supply voltages up to 15V.
The TBA 810AP has the same electrical characteristics as the TBA 810P, but its cooling tabs are flat and pierced so that an external heatsink can easily be attached.

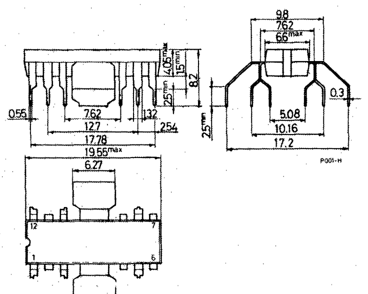
ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage	20	V
I_o	Output peak current (non repetitive)	4	A
I_o	Output peak current (repetitive)	3	A
P_{tot}	Power dissipation at $T_{amb} \leq 80°C$ (for **TBA 810P**)	1	W
	$T_{tab} \leq 100°C$ (for **TBA 810AP**)	5	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

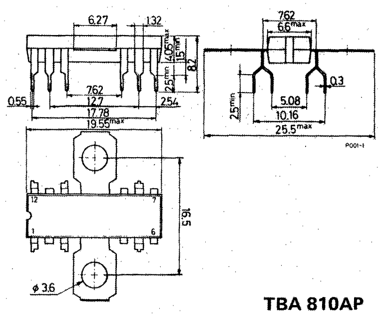
ORDERING NUMBERS: TBA 810P
TBA 810AP

MECHANICAL DATA

Dimensions in mm



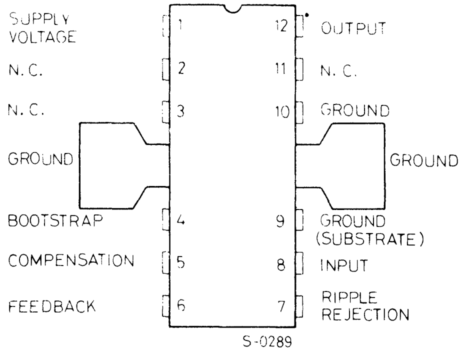
TBA 810P



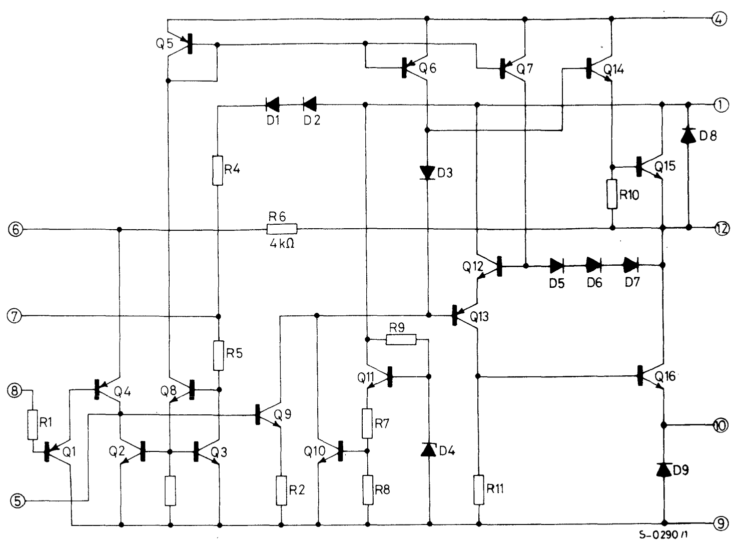
TBA 810AP

TBA810P

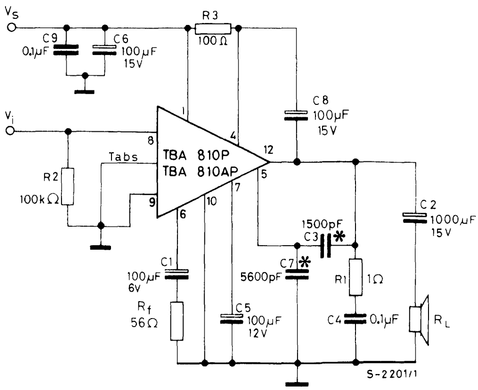
CONNECTION DIAGRAM (top view)



SCHEMATIC DIAGRAM



TEST AND APPLICATION CIRCUIT



*C3, C7 SEE FIG.6

THERMAL DATA

			TBA 810P	TBA 810AP
$R_{th\ j\text{-}tab}$	Thermal resistance junction-tab	max	12°C/W	10°C/W
$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	70*°C/W	80°C/W

* Obtained with tabs soldered to printed circuit with minimized copper area

ELECTRICAL CHARACTERISTICS

(Refer to the test circuit; $V_s = 14.4V$, $T_{amb} = 25°C$ unless otherwise specified)

	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_s	Supply voltage (pin 1)		4		20	V
V_o	Quiescent output voltage (pin 12)		6.4	7.2	8	V
I_d	Quiescent drain current			12	20	mA
I_b	Input bias current			0.4		μA
P_o	Output power	d = 10% f = 1 kHz $R_L = 4\Omega$ $R_L = 2\Omega$	 5.5 5.5	 6 7		 W W
$V_{i(rms)}$	Input saturation voltage		220			mV

ELECTRICAL CHARACTERISTICS (continued)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
V_i	Input sensitivity	f = 1 kHz P_o = 6W R_L = 4Ω R_f = 56Ω R_f = 22Ω P_o = 7W R_L = 2Ω R_f = 56Ω R_f = 22Ω		 75 30 55 20		 mV mV mV mV
R_i	Input resistance (pin 8)			5		MΩ
B	Frequency response (-3 dB)	R_L = 4Ω/2Ω C_3 = 820 pF C_3 = 1500 pF		 40 to 20 000 40 to 10 000		 Hz Hz
d	Distortion	P_o = 50 mW to 2.5W R_L = 4Ω/2Ω f = 1 kHz		0.3		%
G_v	Voltage gain (open loop)	R_L = 4Ω f = 1 kHz		80		dB
G_v	Voltage gain (closed loop)	R_L = 4Ω/2Ω f = 1 kHz	34	37	40	dB
e_N	Input noise voltage	V_s = 16V B (-3 dB) = 40 to 15 000 Hz		2		μV
i_N	Input noise current			80		pA
η	Efficiency	P_o = 6W R_L = 4Ω f = 1 kHz		75		%
SVR	Supply voltage rejection	R_L = 4Ω V_{ripple} = 1V_{rms} f_{ripple} = 100 Hz	40	48		dB
I_d	Drain current	P_o = 6W R_L = 4Ω		600		mA

Fig. 1 - Output power vs. supply voltage

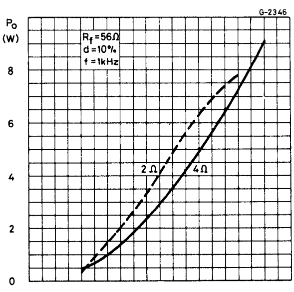


Fig. 2 - Maximum power dissipation vs. supply voltage (sine wave operation)

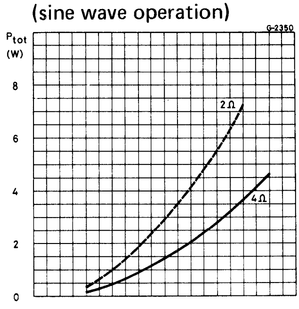


Fig. 3 - Distortion vs. frequency (R_L = 4Ω)

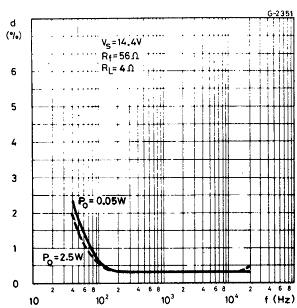


Fig. 4 - Distortion vs. frequency ($R_L = 2\Omega$)

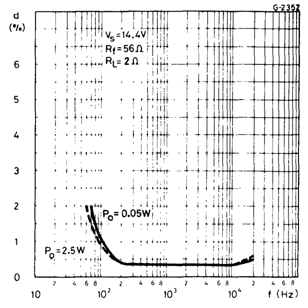


Fig. 5 - Distortion vs. output power

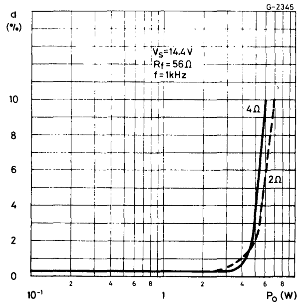


Fig. 6 - Value of C3 vs. feedback resistance for various values of B

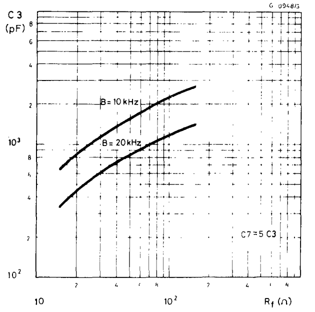


Fig. 7 - Relative voltage gain (closed loop) and input voltage vs. feedback resistance

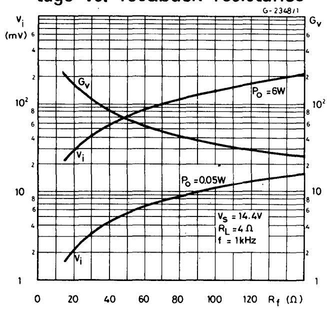


Fig. 8 - Relative voltage gain (closed loop) and input voltage vs. feedback resistance

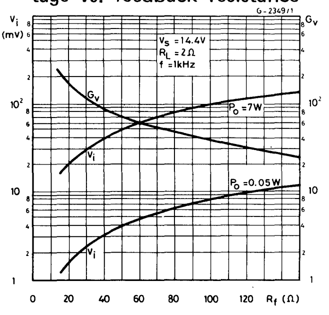


Fig. 9 - Total power dissipation and efficiency vs. output power

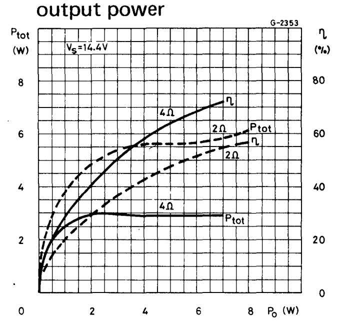


Fig. 10 - Quiescent output voltage (pin 12) vs. supply voltage

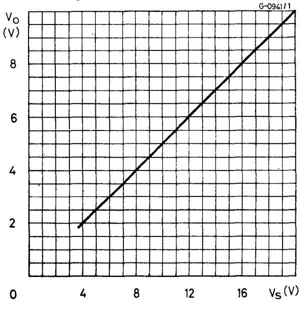


Fig. 11 - Quiescent drain current vs. supply voltage

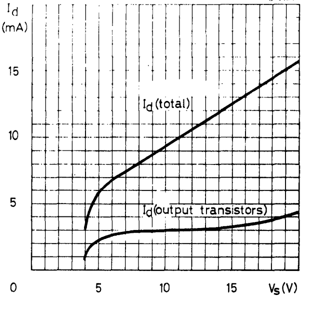
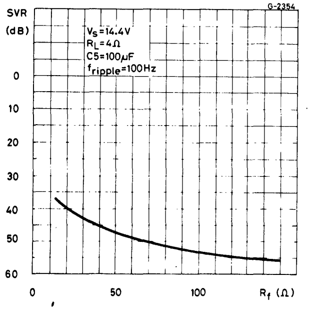


Fig. 12 - Supply voltage rejection vs. feedback resitance



MOUNTING INSTRUCTIONS

The thermal power dissipated in the circuit may be removed by connecting the tabs to an external heatsink (TBA 810 AP see figs. 13 and 14), or by soldering them to an area of copper on the printed circuit board (TBA 810P see fig. 15). During soldering, tab temperature must not exceed 260°C and the soldering time must not be longer than 12 seconds.

Fig. 13 - Maximum power dissipation vs. ambient temperature (TBA810AP only)

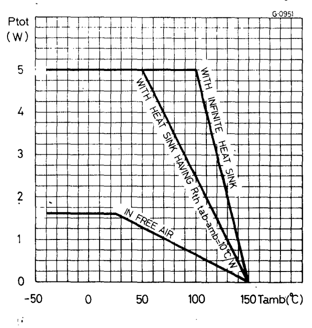


Fig. 14 - Mounting example of the TBA 810 AP

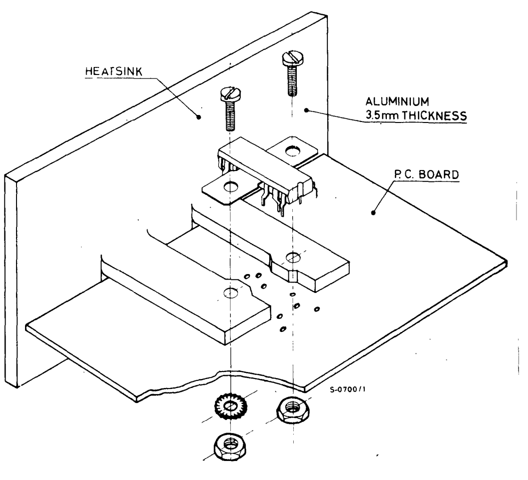
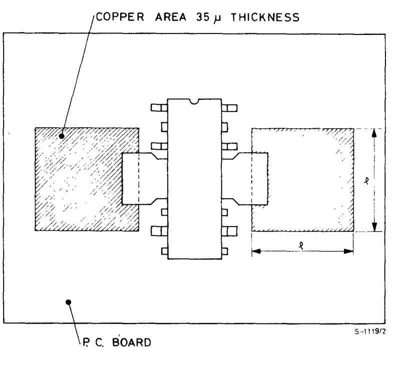
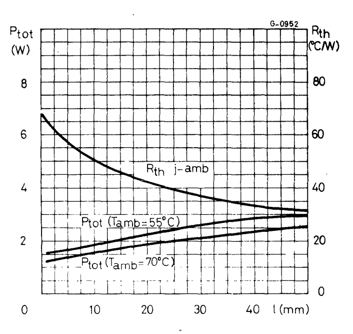


Fig. 15 - Maximum power dissipation vs. cooper area of the P.C. board (TBA 810P only)





THERMAL SHUTDOWN

The presence of a thermal limiting circuit offers the following advantages:

1) An overload on the output (even if it is permanent), or an above-limit ambient temperature can be easily withstood.
2) The heatsink can have a smaller factor of safety compared with that of a conventional circuit. There is no device damage in the event of excessive junction temperature: all that happens is that P_o, (and therefore P_{tot}) are reduced.

Fig. 16 - Output power and drain current vs. package temperature

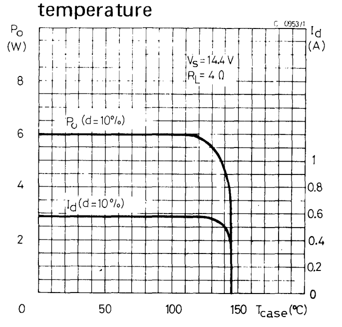


Fig. 17 - P.C. board and component layout for the test and application circuit (1:1 scale)