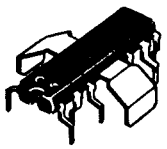
TBA810SH/AS

7W AUDIO POWER AMPLIFIER

■ FEATURES

- Low Noise
  1.7μV typ, 3.3μV max, total input noise.
  (V_{CC} = 15V, Rg = 7.7 kΩ, see test circuit)
  where Rg: Signal Source Resistance for IC
- High Output Power
  7W typ (V_{CC} = 16V, R_L = 4Ω T.H.D = 10%)
  6W typ (V_{CC} = 14.4V, R_L = 4Ω, T.H.D. = 10%)
  2.5W typ (V_{CC} = 9V, R_L = 4Ω, T.H.D. = 10%)
  1W typ (V_{CC} = 6V, R_L = 4Ω, T.H.D = 10%)
  where V_{CC}: Supply Voltage, R_L: Load Resistance, T.H.D: Total Harmonic Distortion
- Wide Range of Supply Voltage — from 4 to 20V
- High Output Current — up to 2.5A
- High Efficiency — 75% at 6W Output
- Very Low Harmonic and Crossover Distortion
- TBA810S•H is provided with a thermal limiting circuit which fundamentally changes the criteria normally used in determining size of the heat sink.

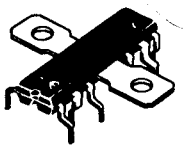
TBA810SH



65.2

(QP-12T)

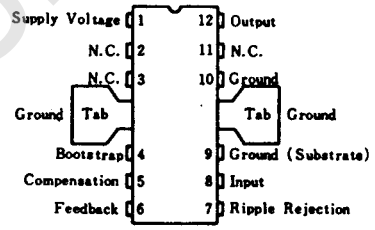
TBA810AS



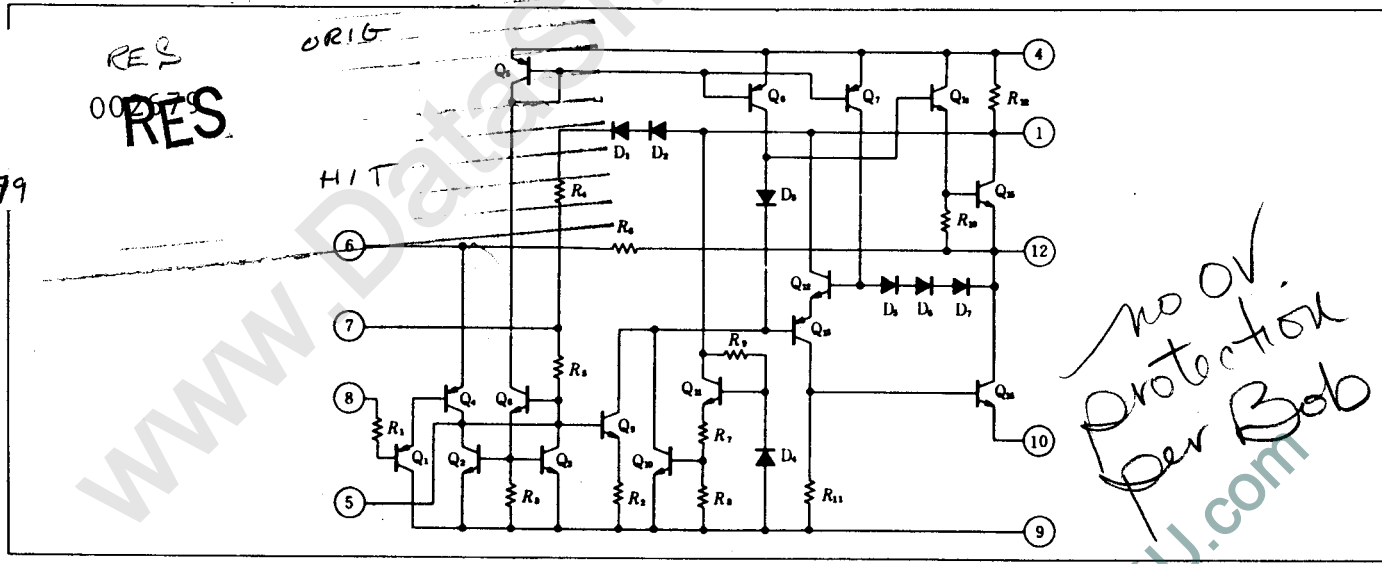
65.7

(QP-12TA)

■ PIN CONNECTION (Top View)



■ CIRCUIT SCHEMATIC



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Item		Symbol	Rating	Unit
Supply Voltage		V_{CC}	20	V
Output Peak Current (nonrepetitive)		$I_{O(peak)}$	3.5	A
Output Current (repetitive)		I_O	2.5	A
Power Dissipation	when Ta=80°C	P_T	1	W
	when T_{tab}=100°C		5	W
Storage and Junction Temperature		T_{stg}, T_j	−40 to +150	°C
Thermal Resistance (Junction-to-tab (max))		θ_{j-tab}	10	°C/W
Thermal Resistance (Junction-to-ambient (max))		θ_{j-a}*	70	°C/W

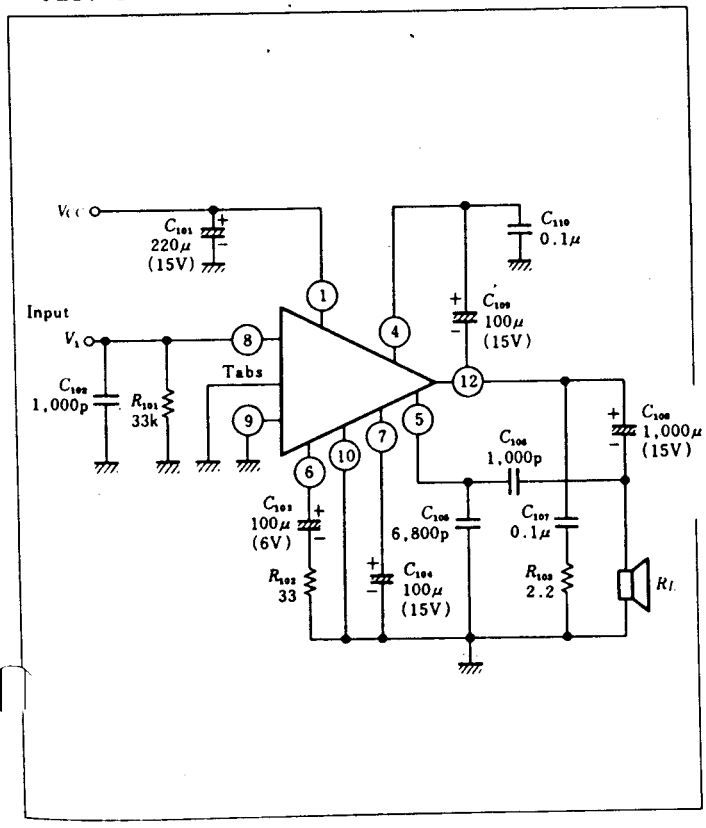
*Obtained with tabs soldered to printed circuit with minimized copper area.

ELECTRICAL CHARACTERISTICS (Ta=25°C)

Parameter	Symbol	Test Condition		min	typ	max	Unit
Supply Voltage (pin 1)	V_{CC}	V_{CC}=14.4V		4	—	20	V
Quiescent Output Voltage (pin 12)	V_{out}			6.4	7.2	8.0	V
Quiescent Total Current Drain	I_T			—	12	20	mA
Bias Current (pin 8)	I_b			—	0.4	—	μA
Output Power	P_{out}	T.H.D=10%, R_L=4Ω, f=1kHz	V_{CC}=16V	—	7	—	W
			V_{CC}=14.4V	—	6	—	
			V_{CC}=12V	3.6	4.2	—	
			V_{CC}=9V	—	2.5	—	
			V_{CC}=6V	—	1	—	
Input Voltage	V_{in}			—	—	220	mVrms
Input Sensitivity	V_i	P_{out}=6W, V_{CC}=14.4V, R_L=4Ω, f=1kHz	R_f=56Ω	—	80	—	mV
			R_f=22Ω	—	35	—	
Input Resistance (pin 8)	R_{in}			—	5	—	MΩ
Frequency Response (−3dB)	B	V_{CC}=14.4V, R_L=4Ω, R_f=33Ω, C_3=1000pF 1)		50 to 10,000			Hz
Total Harmonic Distortion	T.H.D	P_{out}=0.5W, V_{CC}=14.4V, R_L=4Ω, f=1kHz		—	0.3	—	%
Voltage Gain (open loop)	G_V	V_{CC}=14.4V, R_L=4Ω, f=1kHz		—	80	—	dB
Voltage Gain (closed loop)	G_V	V_{CC}=14.4V, R_L=4Ω, f=1kHz		38.7	41.7	44.7	dB
Input Noise Voltage	e_N	V_{CC}=14.4V, R_g=0 2)		—	1.2	—	μV
Output Noise Voltage		V_{CC}=15.0V, R_g=7.7kΩ 3)		—	200	1,000	μV
Efficiency	η	P_{out}=5W, V_{CC}=14.4V, R_L=4Ω, f=1kHz		—	70	—	%
Hum Reiection	HR	V_{CC}=14.4V, R_L=4Ω, f=100Hz		—	46	—	dB

Notes : 1. When C_3=820pF, C_1=500μF, R_f=56Ω, B=40 to 20,000Hz
2. B(−3dB) of IC : 40 to 20,000 Hz, B(−3dB) of Test equipment : 20 to 20,000Hz
3. B(−3dB) of IC : 50 to 10,000Hz, B(−3dB) of Test equipment : 10 to 100,000Hz, 10kΩ is additionally connected at input terminals.

■ TEST CIRCUIT



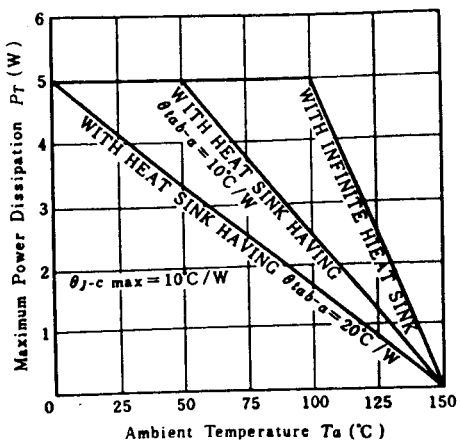
■ MOUNTING INSTRUCTIONS

The tabs on the TBA810 can be used to detract the heat generated in the integrated circuit so that the junction temperature does not exceed the permissible maximum (150°C).

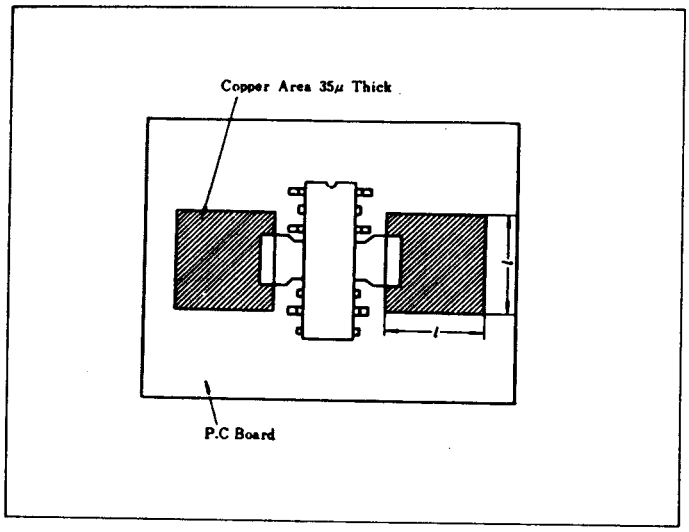
This may be done by connecting tabs to an external heat sink, or by soldering them to a suitable copper area of the printed circuit board.

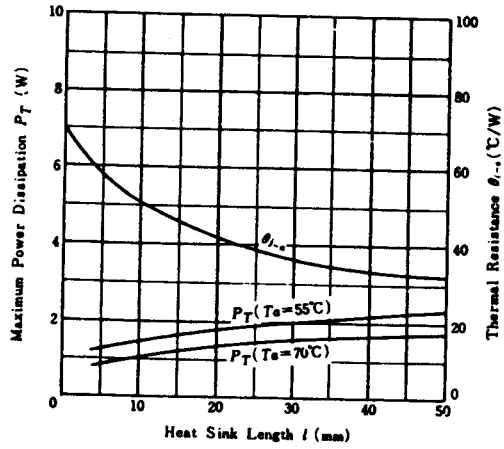
External heat sink or printed circuit copper area must be connected to electrical ground.

POWER RATING CHARACTERISTICS

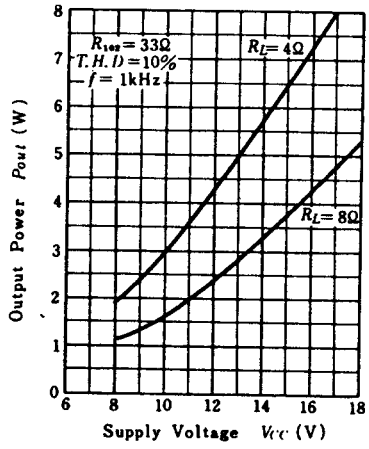


MAXIMUM POWER DISSIPATION VS. COPPER AREA OF P.C. BOARD

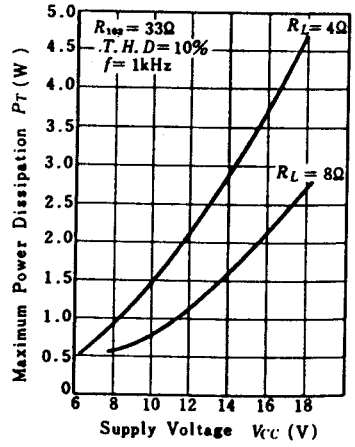




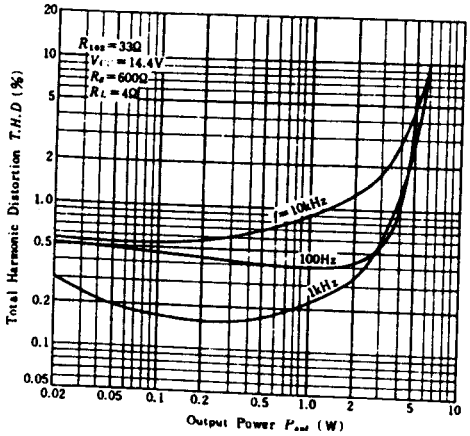
OUTPUT POWER VS. SUPPLY VOLTAGE



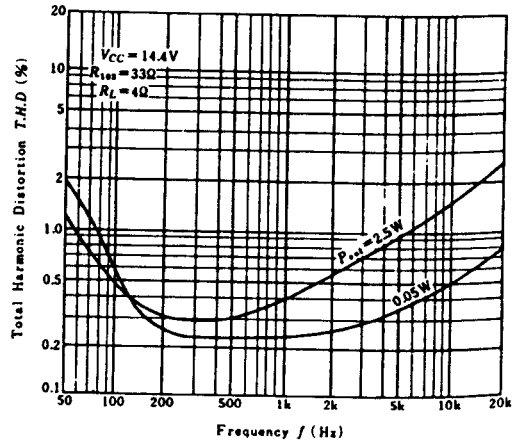
MAXIMUM POWER DISSIPATION VS. SUPPLY VOLTAGE



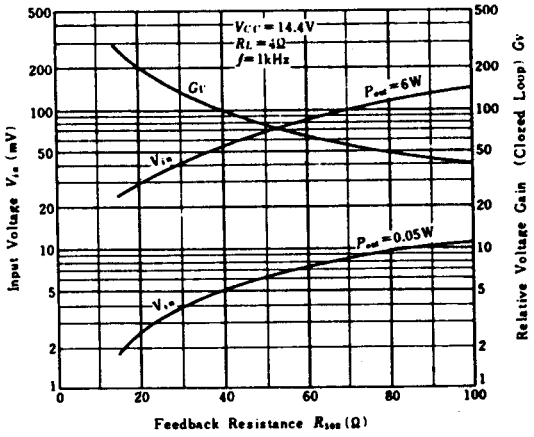
TOTAL HARMINIC DISTORTION VS. OUTPUT POWER



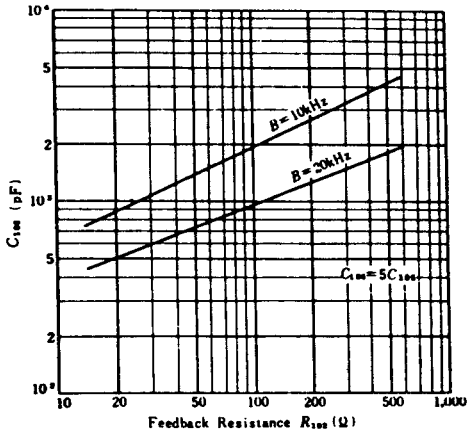
TOTAL HARMINIC DISTORTION VS. FREQUENCY



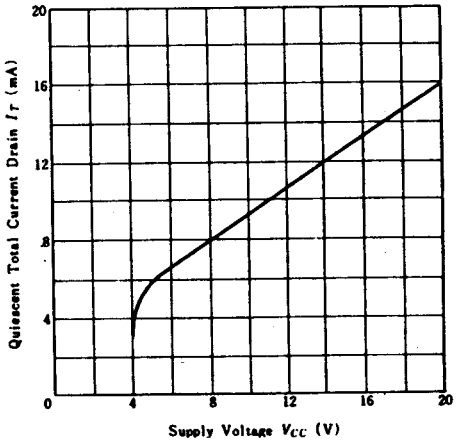
RELATIVE VOLTAGE GAIN AND INPUT VOLTAGE VS. FEEDBACK RESISTANCE



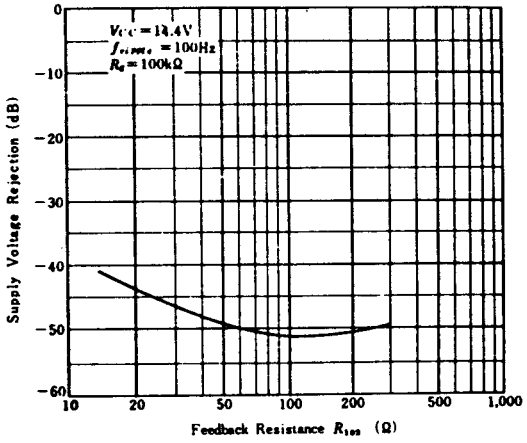
VALUE OF C_{106} VS. R_{102} FOR VARIOUS VALUE OF B



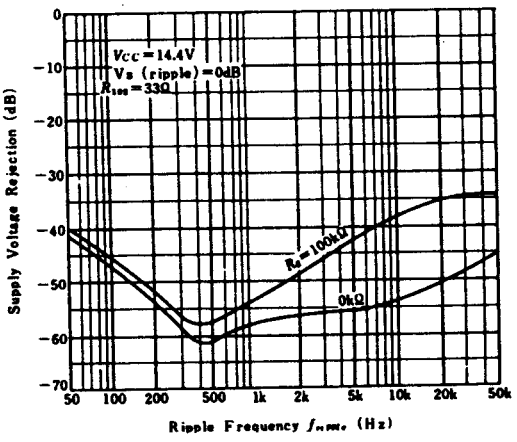
QUIESCENT TOTAL CURRENT DRAIN VS. SUPPLY VOLTAGE



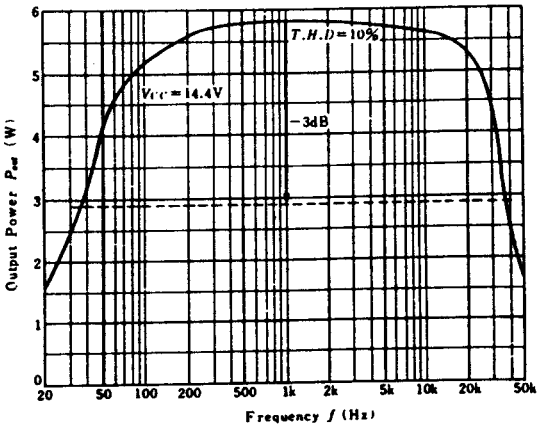
TYPICAL SUPPLY VOLTAGE REJECTION VS. FEEDBACK RESISTANCE



SUPPLY VOLTAGE REJECTION VS. RIPPLE FREQUENCY



POWER BANDWIDTH CHARACTERISTICS

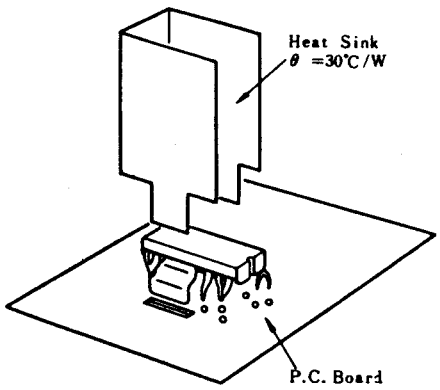


■ EXTERNAL COMPONENTS

Parts No.	Recommended Value	Purpose	Influence		Remarks
			Larger than recommended Value	Smaller than recommended Value	
R_{101}	33kΩ	Determination of Input impedance	——	——	——
R_{102}	33Ω	Determination of Gv	All Characteristics are influenced	Oscillation	$Gv = \frac{4000}{R_{102}\,(\Omega)}$
R_{103}	2.2Ω (When $C_{107} = 0.1\mu F$)	Prevention of Oscillation	Oscillation	Oscillation	——
C_{103}	100μF (When $R_{102} = 33\Omega$)	Feedback Capacitor	f_L decreases	f_L increases	$f_L = \frac{1}{2\pi C_{103} R_{102}}$ (Low cut-off frequency)
C_{105} C_{106} C_{107} C_{110}	6,800pF 1,000pF 0.1μF 0.1μF	Prevention of Oscillation	Oscillation	Oscillation	——
C_{108}	1,000μF	Output Coupling Capacitor	Breakdown at Overload	Poor low-frequency characteristics	$f_L = \frac{1}{2\pi C_{108} R_L}$

The following figure illustrates a method of mounting the TBA810 that is satisfactory both from the heat dissipation viewpoint and from mechanical consideration.

TBA810S·H



TBA810AS