

# TBA120S

## LIMITING IF AMPLIFIER/FM DETECTOR

The TBA120S is a symmetrical 8-stage limiting amplifier with a symmetrical coincidence demodulator and remote DC volume control. The circuit is especially suited for the sound IF section of TV receivers and for FM/IF amplification/demodulation in FM radio receivers.

An auxiliary circuit, consisting of a transistor with free base and collector and a 12V Zener diode, is also incorporated on the chip. The transistor can be used as an AF preamplifier ( $I_C < 5\text{mA}$ ) or as a bass/treble switch using voltage-controlled on/off switching of an R-C circuit.

The Zener diode can be used to stabilize the chip supply voltage or that of other circuits in the system ( $I_Z < 15\text{mA}$ ).

The TBA120S is supplied in two group variants, with volume as the parameter. A decrease in volume of 30 dB requires a resistor between pin 5 and earth with a value depending on the group number as shown in the following table. The group number is printed on the package.

Group	III	IV
$R_5$ (k $\Omega$ )	2.1-2.5	2.4-2.9

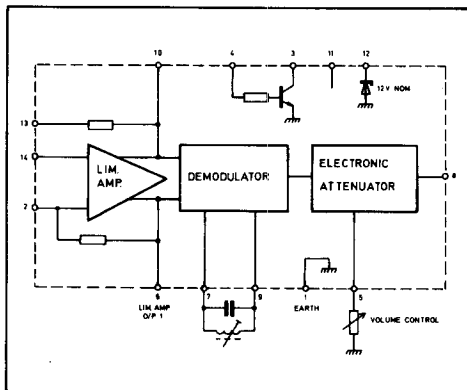


Fig.2 TBA120S block diagram

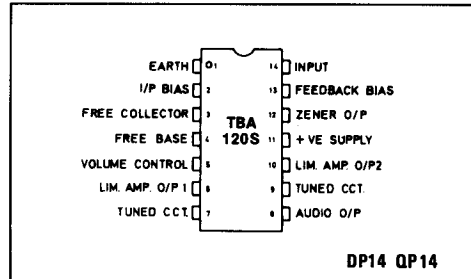


Fig. 1 Pin connections

### FEATURES

- Outstanding Limiting Qualities
- High AM Suppression
- Wide Supply Voltage Range
- Low External Component Count

### APPLICATIONS

- TV Sound Systems
- FM Radio Receivers
- FM Tuners

### QUICK REFERENCE DATA

- Supply Voltage: +12V (Typ.)
- Operating Frequency: Up to 12MHz
- Current Consumption: 14mA (Typ.)
- IF Voltage Gain: 68dB (Typ.)
- AF Output Voltage: 1.1V r.m.s. (Typ.)
- Volume Control Range: 70dB (Typ.)
- Second Source Availability

**ELECTRICAL CHARACTERISTICS**

Test Conditions (unless otherwise stated):

- V<sub>CC</sub> = +12V
- T<sub>A</sub> = +25°C
- f = 5.5MHz
- Δf = ±50kHz
- f<sub>mod</sub> = 1kHz

Characteristics	Symbol	Value			Units	Conditions
		Min.	Typ.	Max.		
<b>Amplifier/demodulator</b>						
Frequency range	f	0		12	MHz	
IF voltage gain V <sub>6</sub> /V <sub>14</sub>	G <sub>V</sub>		68		dB	
IF output voltage	V <sub>opp</sub>		250		mV	Limiting each output V <sub>i</sub> =10mV, Q=45, K=4% V <sub>i</sub> =10mV, Q=20, K=1% Q=45
AF output voltage	V <sub>AF</sub>		1.1		V r.m.s.	
			0.55		V r.m.s.	
Input voltage at start of limiting	V <sub>lim</sub>		30	60	μV	
Input impedance	Z <sub>i</sub>	15/6	40/4.5		kΩ/pF	
Output resistance (pin 8)	R <sub>O</sub>		2.6		kΩ	
Volume control range	$\frac{V_{AF \max}}{V_{AF \min}}$		70		dB	
DC component of o/p signal	V <sub>B</sub>		7.3		V	V <sub>i</sub> =0
AM suppression	a <sub>AM</sub>	45	55		dB	V <sub>i</sub> =500μV, m=30%
Potentiometer resistance	R <sub>5</sub>					
-1dB down			3.7	4.7	kΩ	
-70dB down		1.0	1.4		kΩ	
Control voltage	V <sub>5</sub>					
-1dB down			2.4	2.6	V	
-70dB down			1.3		V	
Total current requirement	I <sub>cc</sub>	10	14	18	mA	R <sub>5</sub> = ∞
		12	16	20	mA	R <sub>5</sub> = 0
<b>Auxiliary circuit</b>						
Zener voltage	V <sub>12</sub>	12.5	13.5	14.5	V	I <sub>12</sub> = 5mA
Zener resistance	R <sub>z</sub>		30		Ω	
Transistor breakdown voltage	BV <sub>CEO</sub>	13			V	I <sub>4</sub> =0, I <sub>3</sub> =500μA
Current gain	h <sub>FE</sub>	30			-	I <sub>3</sub> =1mA

**ABSOLUTE MAXIMUM RATINGS**

- Supply voltage V<sub>CC</sub>: 18V
- Operating temperature: -10°C to +70°C
- Storage temperature: -25°C to +125°C
- Total power dissipation, P<sub>tot</sub>:
  - Continous: 400mW
  - Max. 1 min: 500mW

- Zener current, I<sub>12</sub>:
  - Continous: 15mA
  - Max. 1 min: 20mA
- Volume control voltage, V<sub>5</sub>: 4V
- Collector current, I<sub>3</sub>: 5mA
- Current I<sub>4</sub>: 2mA
- Shunt resistance R<sub>13/14</sub>: ≤ 1kΩ

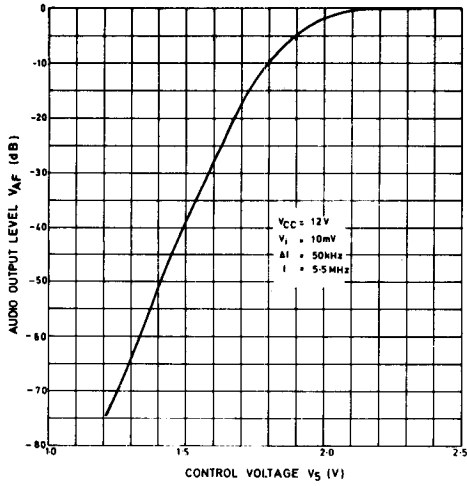


Fig. 3 Volume control voltage characteristic

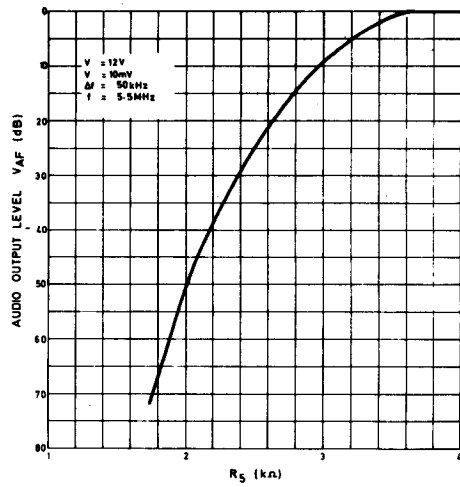


Fig. 4 Volume control resistance characteristic

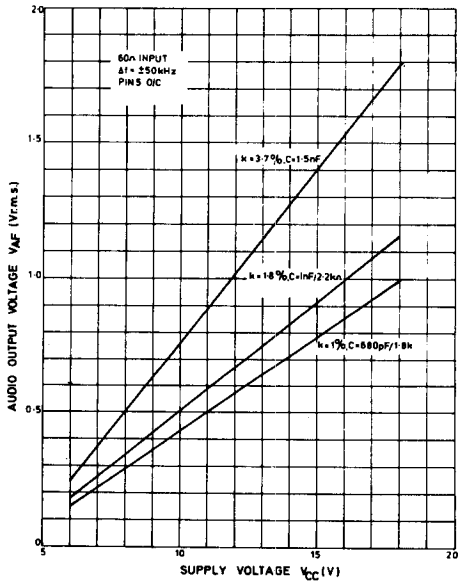


Fig. 5 Audio output v. supply voltage

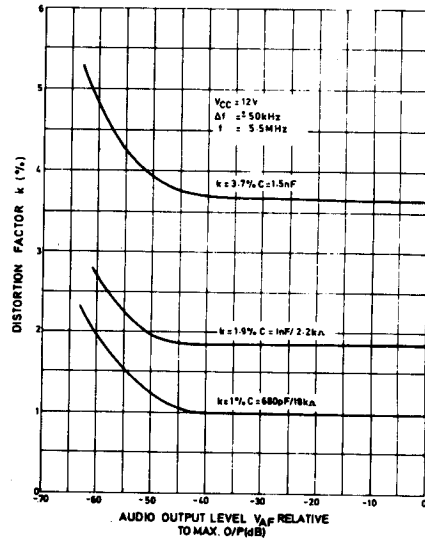


Fig. 6 Distortion factor (k) as a function of audio output voltage VAF

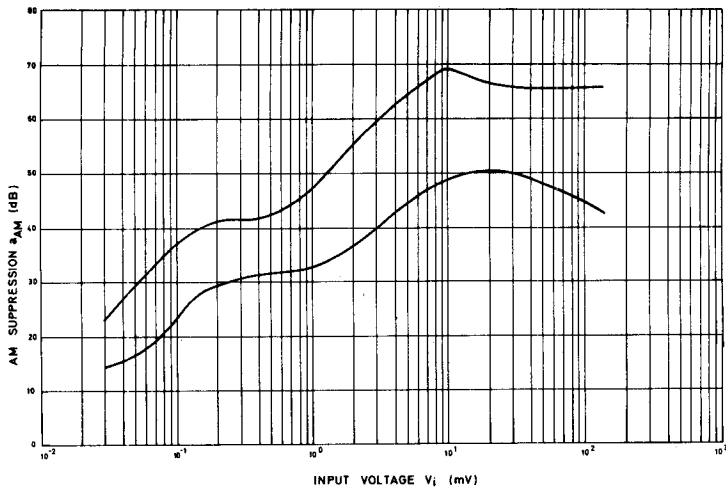


Fig. 7 AM suppression characteristics

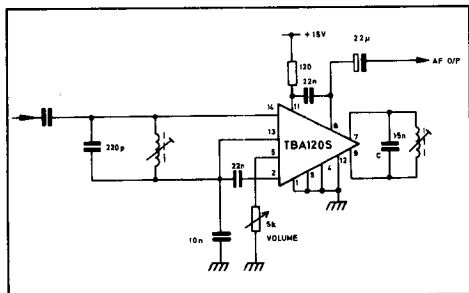


Fig. 8 Recommended application circuit, 5.5MHz

Fig. 9 Application circuit using ceramic filter. (For good selectivity, the ceramic filter should be combined with an LC circuit.)

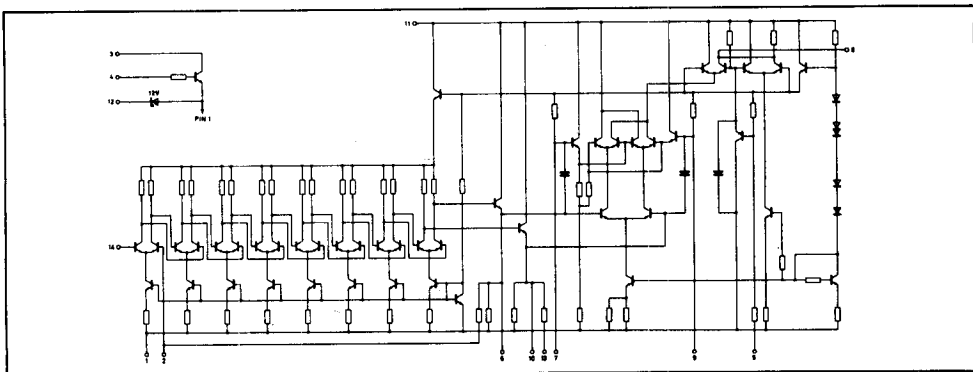
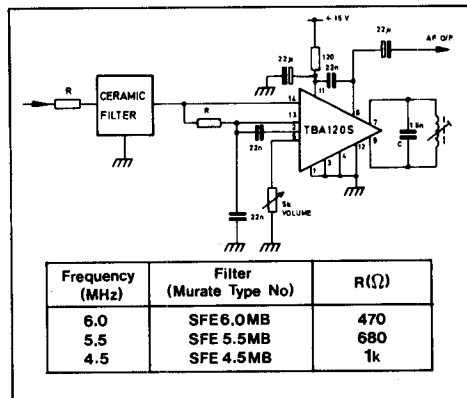


Fig. 10 Circuit diagram