

## 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

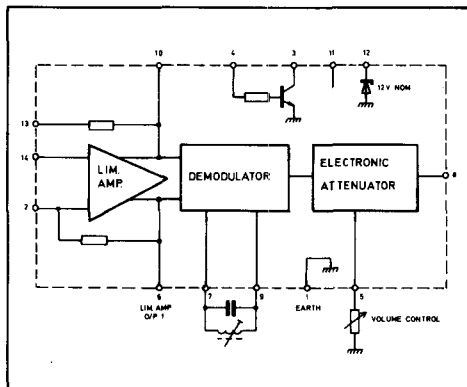


Fig.2 TBA120S block diagram

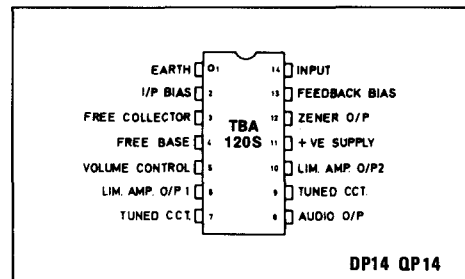


Fig. 1 Pin connections

#### 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

**TBA120S**

**ELECTRICAL CHARACTERISTICS**

Test Conditions (unless otherwise stated):

$V_{CC} = +12V$   
 $T_A = +25^\circ C$   
 $f = 5.5MHz$   
 $\Delta f = \pm 50kHz$   
 $f_{mod} = 1kHz$

Characteristics	Symbol	Value			Units	Conditions
		Min.	Typ.	Max.		
<b>Amplifier/demodulator</b>						
Frequency range	f	0		12	MHz	
IF voltage gain $V_6/V_{14}$	$G_V$		68		dB	
IF output voltage	$V_{opp}$		250		mV	Limiting each output
AF output voltage	$V_{AF}$		1.1		V r.m.s.	$V_i=10mV, Q=45, K=4\%$
			0.55		V r.m.s.	$V_i=10mV, Q=20, K=1\%$
Input voltage at start of limiting	$V_{lim}$		30	60	$\mu V$	$Q=45$
Input impedance	$Z_i$	15/6	40/4.5		$k\Omega/pF$	
Output resistance (pin 8)	$R_O$		2.6		$k\Omega$	
Volume control range	$V_{AF max}$		70		dB	
	$V_{AF min}$					
DC component of o/p signal	$V_B$		7.3		V	$V_i=0$
AM suppression	$\alpha_{AM}$	45	55		dB	$V_i=500\mu V, m=30\%$
Potentiometer resistance	$R_5$					
-1dB down			3.7	4.7	$k\Omega$	
-70dB down		1.0	1.4		$k\Omega$	
Control voltage	$V_5$					
-1dB down			2.4	2.6	V	
-70dB down			1.3		V	
Total current requirement	$I_{cc}$	10	14	18	mA	$R_5 = \infty$
		12	16	20	mA	$R_5 = 0$
<b>Auxiliary circuit</b>						
Zener voltage	$V_{12}$	12.5	13.5	14.5	V	$I_{12} = 5mA$
Zener resistance	$R_z$		30		$\Omega$	
Transistor breakdown voltage	$BV_{CEO}$	13			V	$I_4=0, I_3=500\mu A$
Current gain	$h_{FE}$	30			-	$I_3=1mA$

**ABSOLUTE MAXIMUM RATINGS**

Supply voltage  $V_{CC}$ : 18V  
 Operating temperature:  $-10^\circ C$  to  $+70^\circ C$   
 Storage temperature:  $-25^\circ C$  to  $+125^\circ C$   
 Total power dissipation,  $P_{tot}$   
 Continuous: 400mW  
 Max. 1 min: 500mW

Zener current,  $I_{12}$   
 Continuous: 15mA  
 Max. 1 min: 20mA  
 Volume control voltage,  $V_5$ : 4V  
 Collector current,  $I_3$ : 5mA  
 Current  $I_4$ : 2mA  
 Shunt resistance  $R_{13/14}$ :  $\leq 1k\Omega$

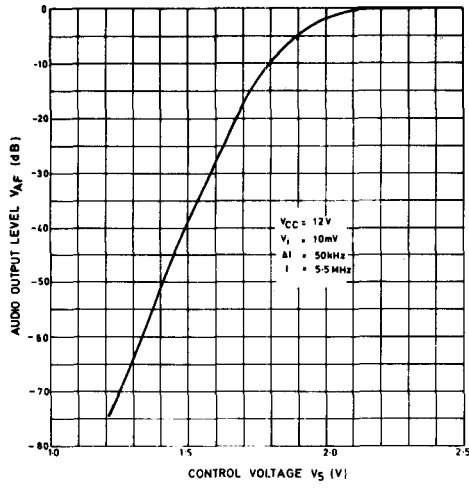


Fig. 3 Volume control voltage characteristic

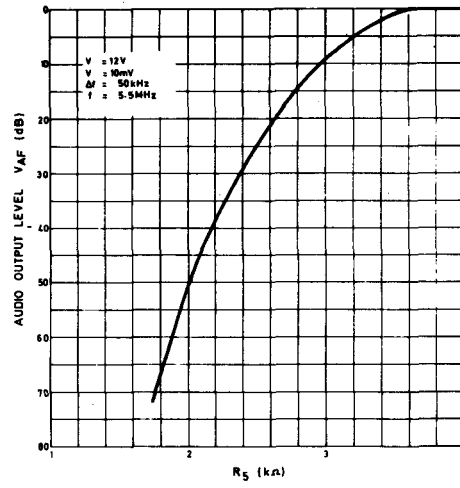


Fig. 4 Volume control resistance characteristic

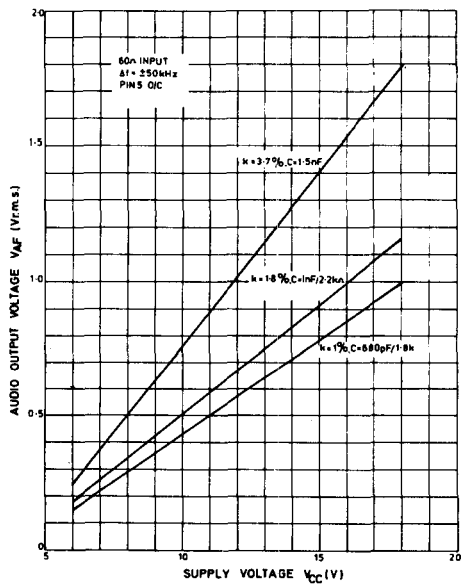


Fig. 5 Audio output v. supply voltage

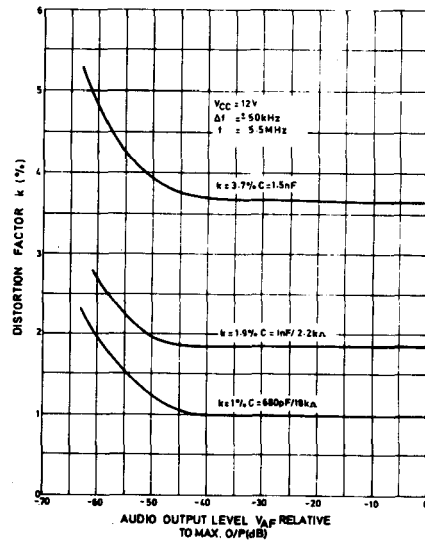


Fig. 6 Distortion factor (k) as a function of audio output voltage VAF

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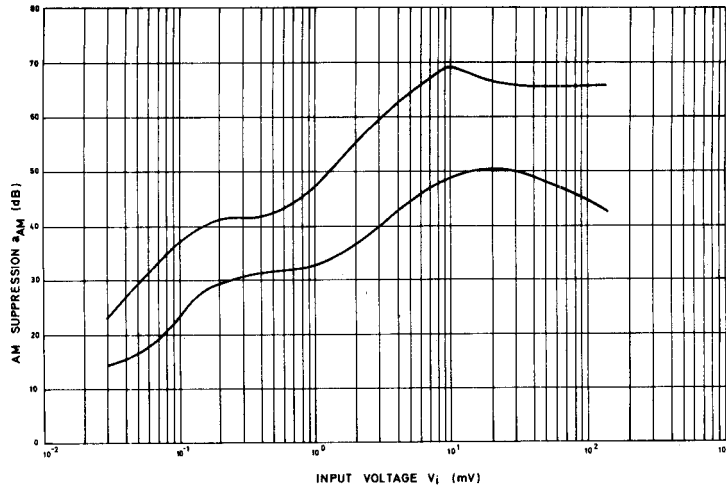


Fig. 7 AM suppression characteristics

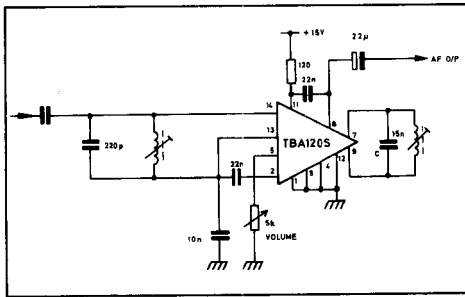


Fig. 8 Recommended application circuit, 5.5MHz

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

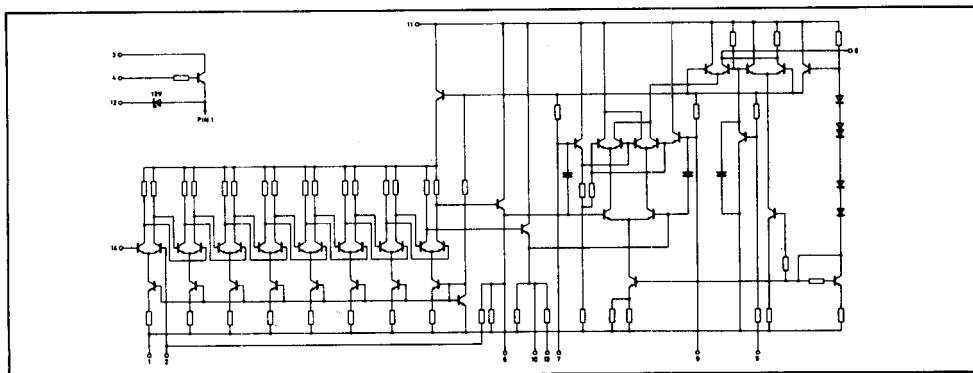
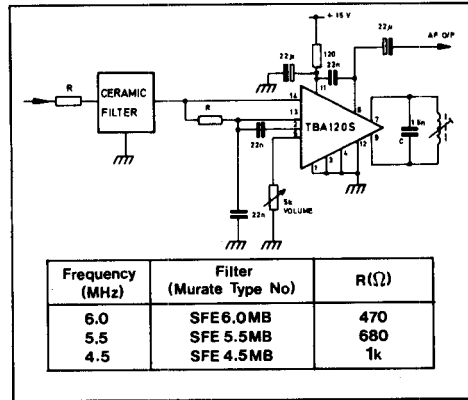


Fig. 10 Circuit diagram