

# TBA 780

## LINEAR INTEGRATED CIRCUIT

### WIDE-BAND AMPLIFIER, FM DETECTOR, AUDIO PREAMPLIFIER/DRIVER

The TBA 780 provides, in a single monolithic silicon chip, a major subsystem for the sound section of TV receivers in a 14-lead quad in-line or dual in-line plastic package. As shown in the schematic diagram the TBA 780 contains a multistage wide-band IF amplifier/limiter section, active filter, an FM-detector stage, electronic attenuator, a Zener diode regulated power supply section and AF amplifier section specifically designed to directly drive an NPN power transistor or high-transconductance tube. In the TBA 780, the demodulation can be effected by a single tuned discriminator coil (differential peak detector).

Because of the circuit being so inclusive, a minimum number of external components is required. A particular feature of the TBA 780 is the electronic attenuator, which performs the conventional volume control function.

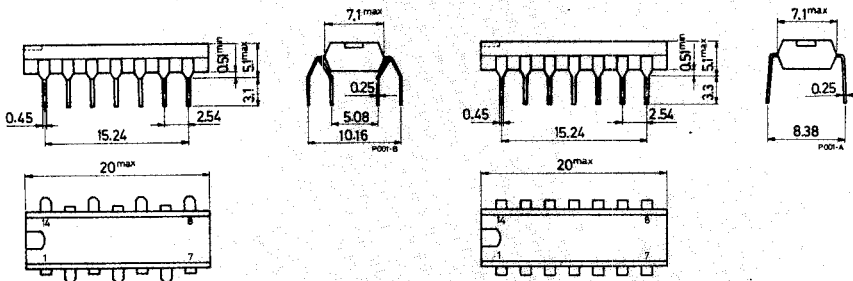
### ABSOLUTE MAXIMUM RATINGS

$I_s$	Supply current (pin 5)	50 mA
$I_o$	Output current (pin 12)	6 mA
$V_i$	Input-signal voltage (between pins 1 and 2)	$\pm 3$ V
$P_{tot}$	Total power dissipation: at $T_{amb} \leq 25^\circ\text{C}$	850 mW
$T_{stg}$	Storage temperature	-25 to 150 $^\circ\text{C}$
$T_{op}$	Operating temperature	0 to 85 $^\circ\text{C}$

**ORDERING NUMBERS:** TBA 780 X2 for quad in-line plastic package  
TBA 780 X7 for dual in-line plastic package

### MECHANICAL DATA

Dimensions in mm



TBA 780 X2

TBA 780 X7

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**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , DC volume control  $P_2 = 0$  and  $V_S = +30\text{ V}$  applied to terminal 5 through a  $620\text{ }\Omega$  resistor, unless otherwise specified)

Parameter	Test conditions	Min.	Typ.	Max.	Unit	Fig.
$I_5$ Supply current	$V_S = 9\text{ V}$ (applied direct. to pin 5)	10	16	24	mA	—
$V_{i(\text{threshold})}$ Input limiting voltage (pin 2)	$f = 5.5\text{ MHz}$ $f_m = 1\text{ kHz}$ $\Delta f = \pm 50\text{ kHz}$		200	400	$\mu\text{V}$	—
$V_o$ Recovered audio voltage (pin 8)	$V_i = 100\text{ mV}$ $f = 5.5\text{ MHz}$ $f_m = 1\text{ kHz}$ $\Delta f = \pm 50\text{ kHz}$	0.5	0.75		$V_{rms}$	3
d Distortion (pin 8)			0.9	2	%	
$V_o$ Audio output voltage (pin 12)	d = 5% f = 1 kHz	2	2.5		$V_{rms}$	4
$V_o$ DC output voltage (pin 12)		8.5		11.75	V	—
DC volume control range	$P_2 = \infty$	60	80		dB	3
Max. play-through voltage			0.075	1	mV	
$R_i$ Input resistance (pin 2)	f = 5.5 MHz		17		$\text{k}\Omega$	—
$R_o$ Output resistance (pin 9)			3.25		$\text{k}\Omega$	

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## ELECTRICAL CHARACTERISTICS (continued)

Parameter		Test conditions	Min.	Typ.	Max.	Unit	Fig.
$R_o$	Output resistance (pin 12)	$f = 1 \text{ kHz}$	270			$\Omega$	—
$R_o$	Output resistance (pin 7)		7.5			$k\Omega$	
$R_o$	Output resistance (pin 8)		300			$\Omega$	
$C_i$	Input capacitance (pin 2)	$f = 5.5 \text{ MHz}$	4			pF	—
$C_o$	Output capacitance (pin 9)		7.5			pF	
$G_v$	Audio voltage gain	$f = 1 \text{ kHz}$ $V_i = 0.1 \text{ V}$	17.5	20		dB	4
$P_{tot}$	Total power dissipation		343	370	400	mW	—
AMR	Amplitude modulation rejection	$f = 5.5 \text{ MHz}$	40	50		dB	3

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## SCHEMATIC DIAGRAM

Fig. 1

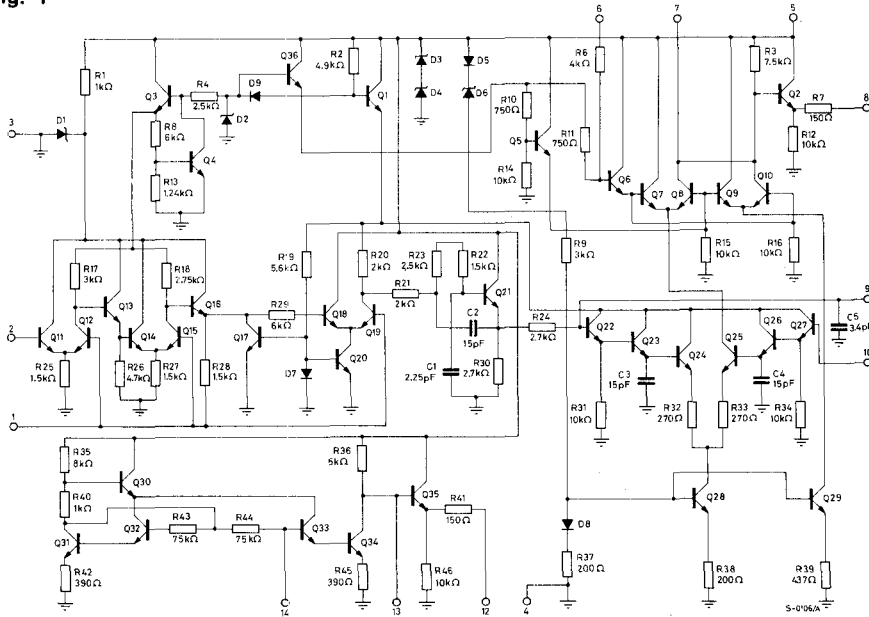
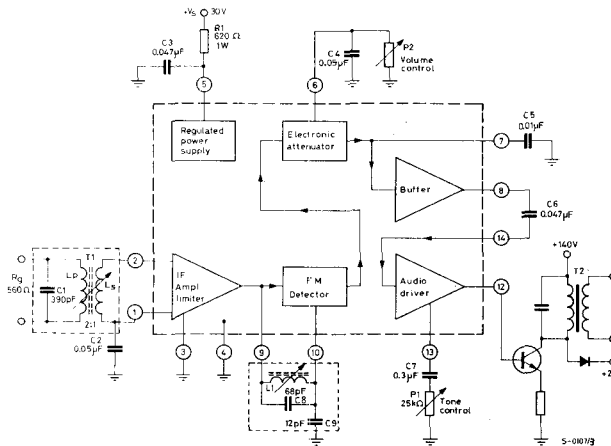


Fig. 2 - Typical application using TBA 780 and class A output transistor



1)  $T_1 = 5.5 \text{ MHz transformer}$

$L_p = 5.5 \mu\text{H}; Q_0=80; 19 \text{ turns}$   
 $\varnothing 0.15 \text{ mm silk-covered copper wire with powdered-iron core}$

$L_s = 9 \text{ turns } \varnothing 0.15 \text{ mm}$

2)  $T_2 = \text{Audio output transformer:}$

The dimensions of the transformer and of the circuit parameters are to be evaluated on the basis of the output power desired and of the load to be used

3)  $L_1 = \text{Single tuned discriminator coil: } 12 \mu\text{H}; Q_0=50$   
 $(58 \text{ turns } \varnothing 0.08 \text{ mm with powdered-iron core})$

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Fig. 3 - Input limiting voltage, AM rejection, recovered audio, total harmonic distortion, maximum attenuation, maximum "play-through" test circuit

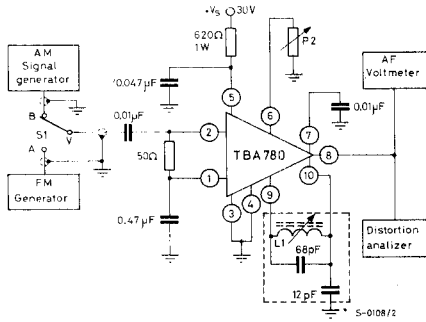


Fig. 4 - Audio voltage gain (undistorted output) test circuit

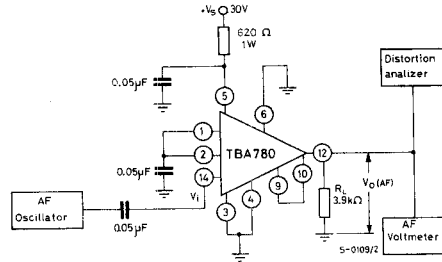
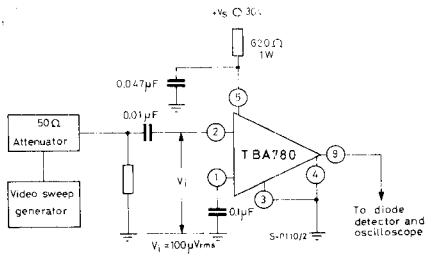


Fig. 5 - IF amplifier voltage gain test circuit



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Fig. 6 - Typical IF amplifier voltage gain

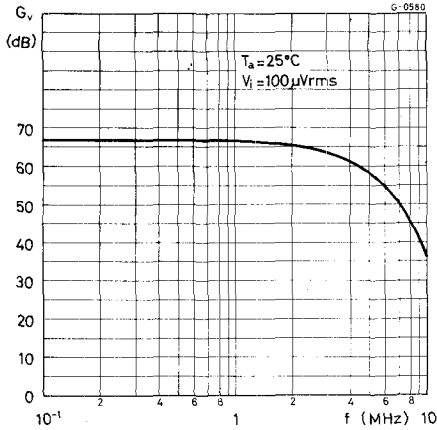


Fig. 7 - Typical AF amplifier voltage gain

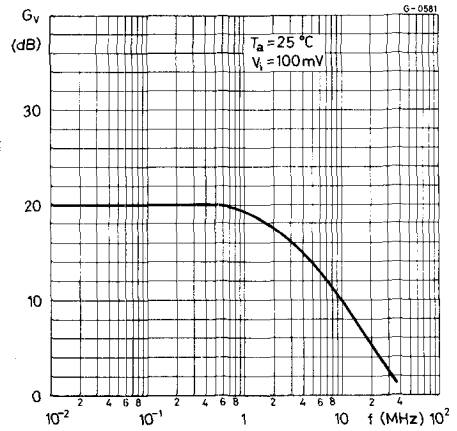


Fig. 8 - Typical FM detector output voltage versus input voltage

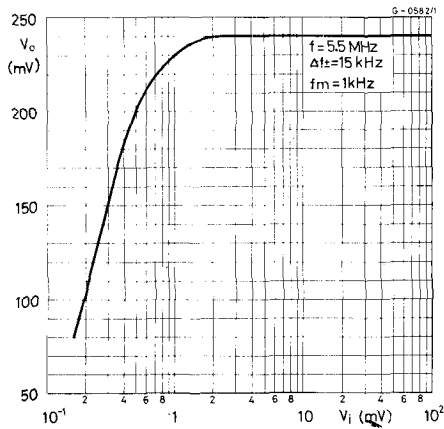
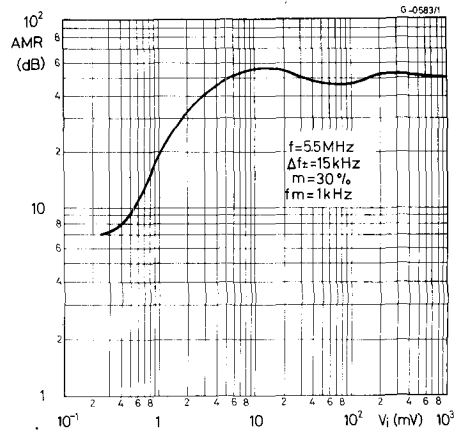


Fig. 9 - Typical amplitude-modulation rejection versus input voltage



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Fig. 10 - Typical gain reduction versus resistance (P2) (terminal 6 to gnd)

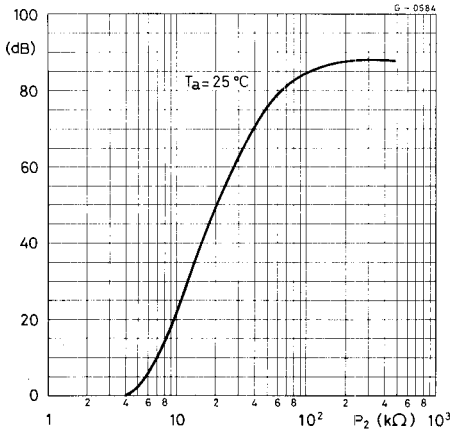


Fig. 11 - P.C. board layout, 1:1 scale (fig. 2 circuit)

