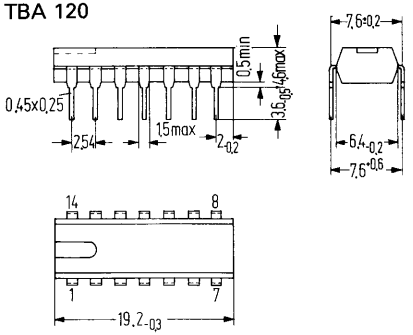
Symmetrical six-stage amplifier with symmetrical coincidence demodulator for the amplification, limiting and demodulation of frequency-modulated signals. Especially suited for radio receivers and the sound-IF units in TV sets. These circuits are applicable as limiter amplifiers, as controlled demodulators or modulators or as mixers with excellent suppression of the input frequency.

- Outstanding limiting
- Very good frequency stability of the converter characteristic
- Wide range of operation (5 to 15 V)
- Very few external components (i.e. for hum suppression)

Type	Ordering codes
TBA 120	Q67000-A151
TBA 120A	Q67000-A175

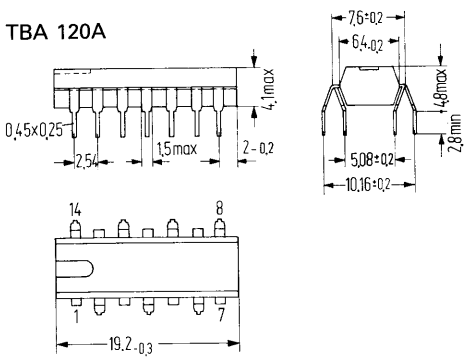
Package outlines

TBA 120



Plastic plug-in package
20 A 14 DIN 41866
14 pins, dual-in-line
Weight approx. 1.1 g

TBA 120A



Plastic plug-in package
20 A 14 DIN 41866
14 pins, quad-in-line
Weight approx. 1.1 g

Dimensions in mm

Absolute maximum ratings

Supply voltage	V_{cc}	15	V
Storage temperature	T_s	–40 to +125	°C
Junction temperature	T_j	150	°C
Thermal resistance (system-air)	R_{thsa}	120	K/W

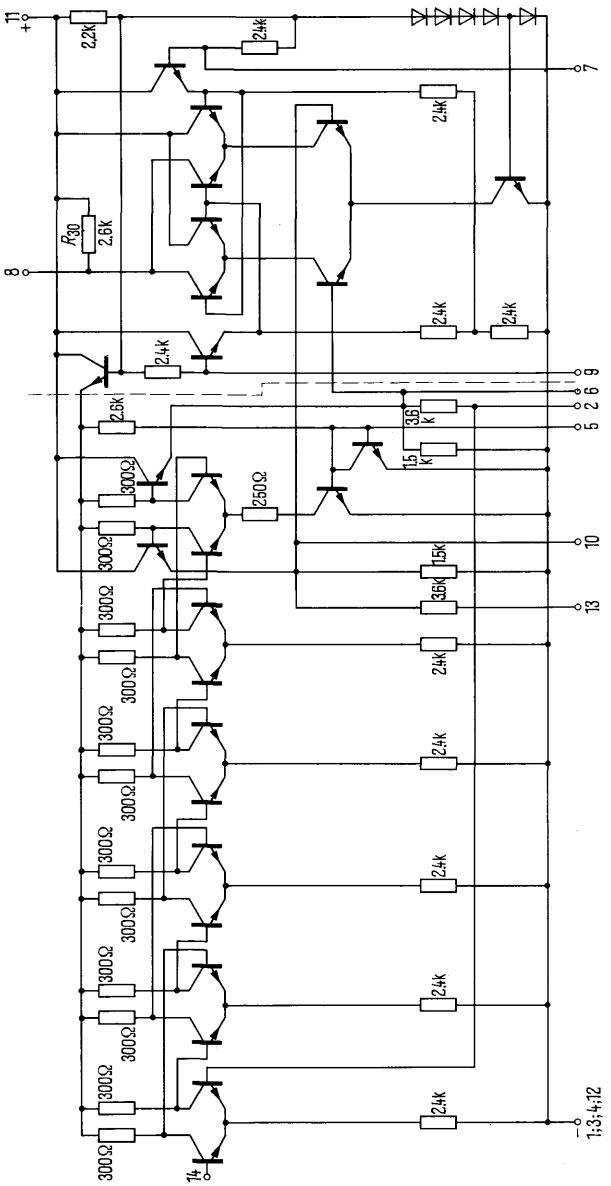
Range of operation

Supply voltage	V_{cc}	5 to 15	V
Ambient temperature in operating	T_{amb}	–15 to +70	°C
Frequency range	f	0 to 35	MHz

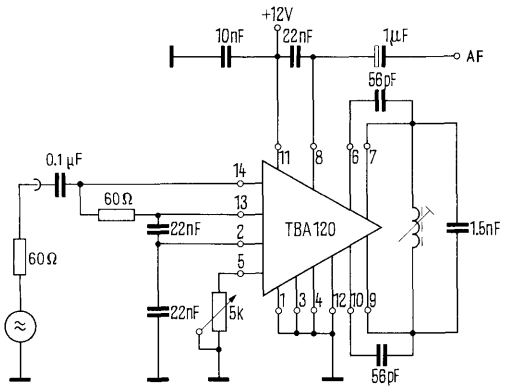
Electrical characteristics (T_{amb} = 25 °C, V_{cc} = 12 V)

		min	typ	max	
Total current consumption	I_{cc}	12.5	16.5	20.5	mA
IF voltage gain (f = 5.5 MHz)	G_v		60		dB
IF output voltage at limiting each output	V_{qpp}		240		mV
AF output voltage (f_{IF} = 5.5 MHz, Δf = ±25 kHz, V_i = 10 mV, f_{mod} = 1 kHz, $Q_B \approx 45$)	V_{AFeff}	.6	.85		V
AF output voltage (f_{IF} = 5.5 MHz, Δf = ±50 kHz, V_i = 10 mV, f_{mod} = 1 kHz, $Q_B \approx 45$)	V_{AFeff}	1.2	1.7		V
Harmonic distortion (f_{IF} = 5.5 MHz, Δf = ±25 kHz, V_i = 10 mV, f_{mod} = 1 kHz, $Q_B \approx 45$)	k		1.8	3	%
Input voltage for limiting (f_{IF} = 5.5 MHz, Δf = ±50 kHz, f_{mod} = 1 kHz, $Q_B \approx 45$)	$V_{i\ lim}$		50	100	µV
Input impedance f_{IF} = 5.5 MHz	Z_i		15/7.8		kΩ/pF
Input impedance f_{IF} = 10.7 MHz	Z_i		7.2/6.2		kΩ/pF
Output impedance (pin 8)	R_q	1.9	2.6	3.3	kΩ
Range of volume control	$\frac{V_{AFmax}}{V_{AFmin}}$		60		dB
DC level of output signal (V_i = 0)	V_8	6.1	7.3	8.6	V
AM suppression (f_{IF} = 5.5 MHz, V_i = 10 mV, m = 30%, f_{mod} = 1 kHz, Δf = ±50 kHz)	a_{AM}		55		dB

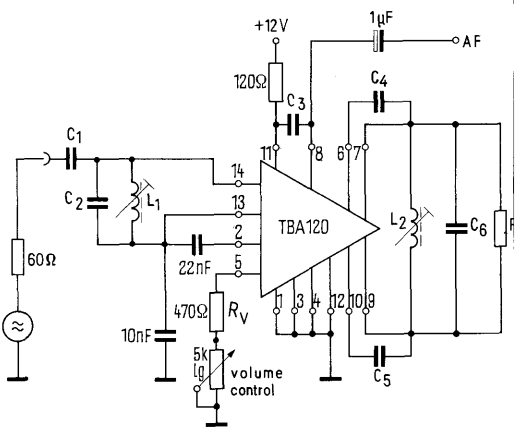
Circuit diagram for TBA 120 and TBA 120A



Test circuit



Recommended application circuit



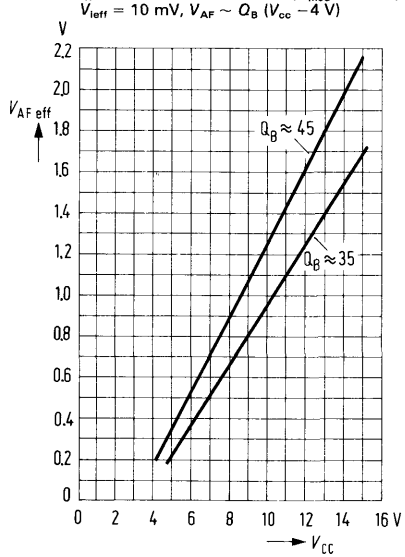
Component data for various applications

	Sound IF in TV sets	FM-IF in radio sets	
	5.5 MHz	10.7 MHz Mono	10.7 MHz Stereo
C_1	47 pF	27 pF	47 pF
C_2	220 pF	120 pF	150 pF
C_3	22 nF	22 nF	470 pF
C_4	56 pF	27 pF	30 pF
C_5	56 pF	27 pF	30 pF
C_6	1.5 nF	470 pF	330 pF
L_1	20 turns	20 turns	15 turns
L_2	8 turns	8 turns	12 turns
R_1	∞	∞	1 k

A capacitive decoupling of supply voltage input 11 is not necessary. The 22 nF capacitor between pins 8 and 11, together with the integrated resistor R 30, constitutes the de-emphasis and may be reduced if required.
The distance of the peaks on the S-curve can be adjusted with the Q_B of the phase-shifting circuit. Zero crossing corresponds to resonance frequency. The two coupling capacitors of equal size connected between pins 6/7 and 9/10 should be dimensioned to produce approx. 250 mV_{pp} at the tank circuit at resonance.

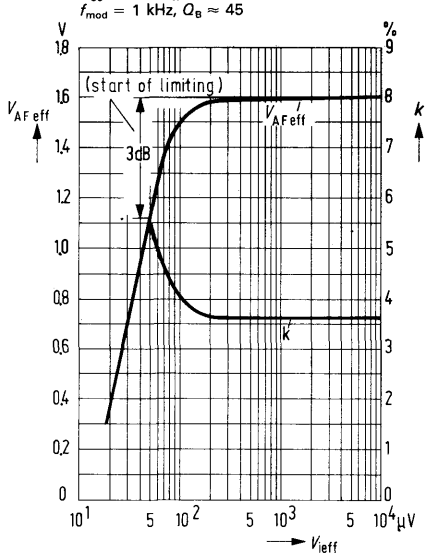
AF output voltage versus supply voltage

f_{IF} = 5.5 MHz, Δf = ±50 kHz, f_{mod} = 1 kHz,
V_{ieff} = 10 mV, $V_{AF} \sim Q_B$ (V_{cc} −4 V)



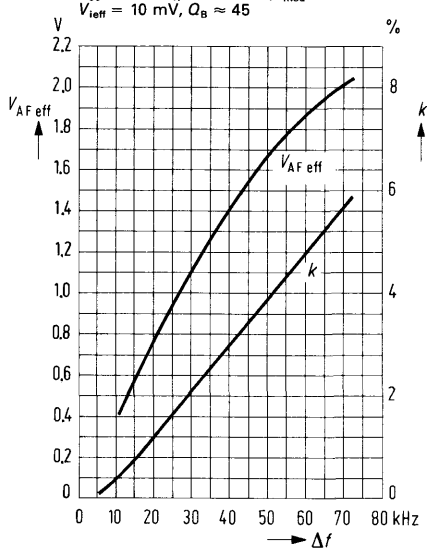
AF output voltage and harmonic distortion v. input voltage

V_{cc} = 12 V, f_{IF} = 5.5 MHz, Δf = ±50 kHz,
f_{mod} = 1 kHz, $Q_B \approx 45$



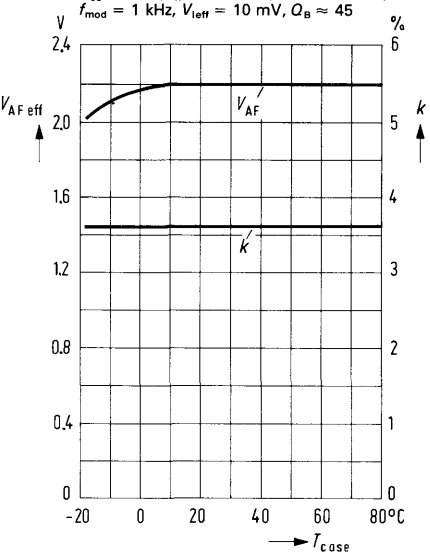
AF output voltage and harmonic distortion versus frequency deviation

V_{cc} = 12 V, f_{IF} = 5.5 MHz, f_{mod} = 1 kHz,
V_{ieff} = 10 mV, $Q_B \approx 45$

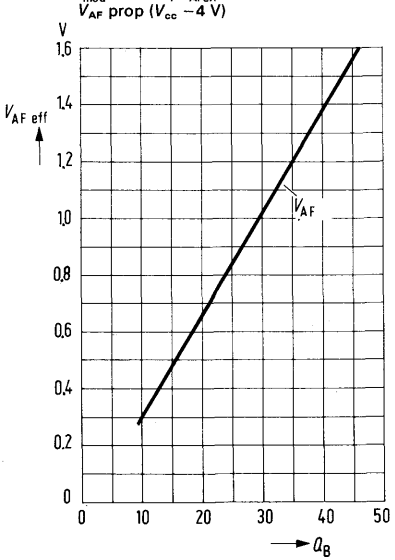


AF output voltage and harmonic distortion versus temperature of case

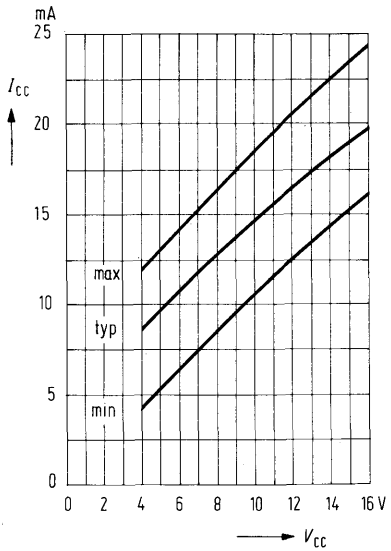
V_{cc} = 15 V, f_{IF} = 5.5 MHz, Δf = ±50 kHz,
f_{mod} = 1 kHz, V_{ieff} = 10 mV, $Q_B \approx 45$



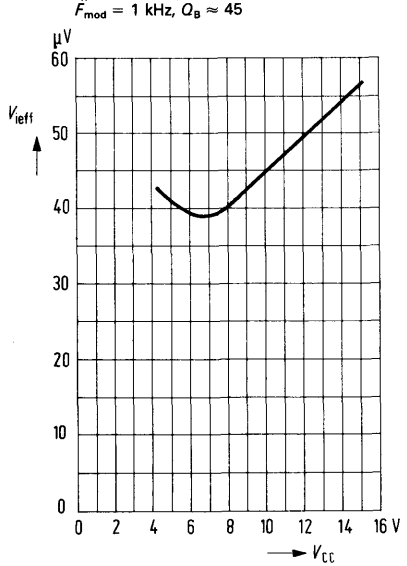
AF output voltage v. Q_B-factor
V_{cc} = 12 V, f_{IF} = 5.5 MHz, Δf = ±50 kHz,
f_{mod} = 1 kHz, V_{AFeff} = 10 mV
V_{AF} prop (V_{cc} −4 V)



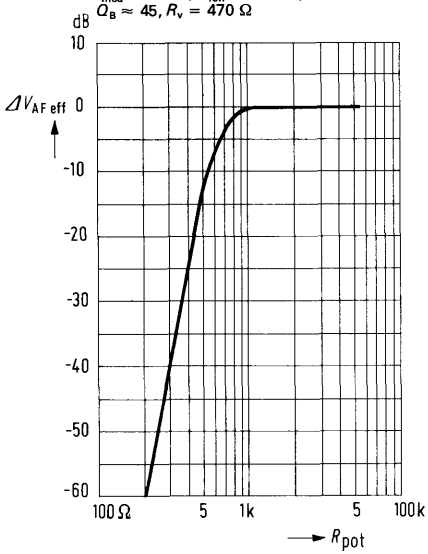
Current consumption versus supply voltage



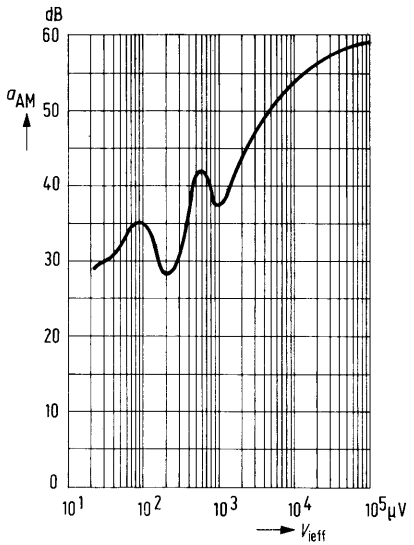
Input voltage for -3dB limiting versus supply voltage
f_{IF} = 5.5 MHz, Δf = ±50 kHz,
F_{mod} = 1 kHz, $Q_B \approx 45$



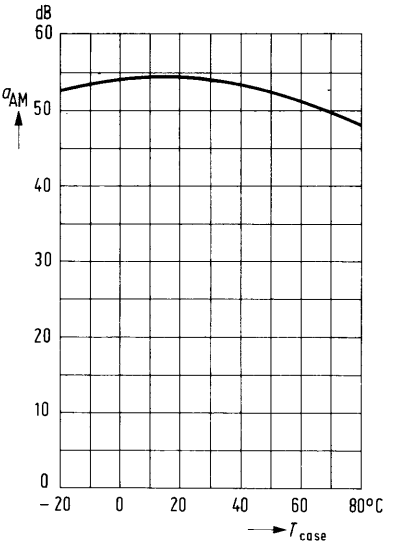
Volume control versus potentiometer resistance
V_{cc} = 12 V, f_{IF} = 5.5 MHz, Δf = ±50 kHz,
f_{mod} = 1 kHz, V_{Ieff} = 10 mV,
$Q_B \approx 45$, R_v = 470 Ω



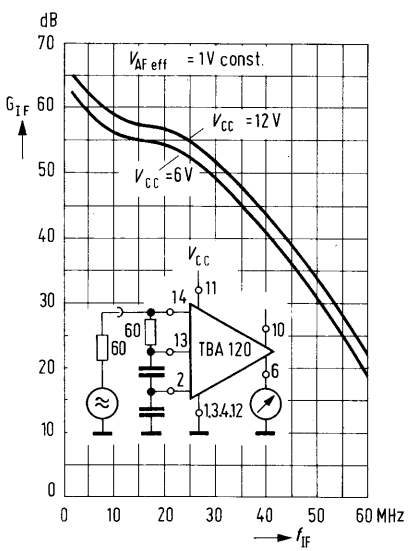
AM suppression versus input voltage
V_{cc} = 12 V, f_{IF} = 5.5 MHz, Δf = ±50 kHz,
f_{mod} = 1 kHz, m = 30%, $Q_B \approx 45$



AM suppression versus temperature of case
V_{cc} = 12 V, f_{IF} = 5.5 MHz, f_{mod} = 1 kHz,
m = 30%, V_{ieff} = 10 mV, $Q_B \approx 45$



IF amplification versus IF frequency



Harmonic distortion v. Q_B-factor
V_{cc} = 12 V, f_{IF} = 5.5 MHz, Δf = ±50 kHz,
f_{mod} = 1 kHz, V_{ieff} = 10 mV