

Type	Ordering Code	Package
TBB 469	Q67000–A2025	P-DIP-22

The TBB 469 is an FM narrowband IC particularly intended for radio receivers. It is suited for the conversion, limiting, demodulation, and AF processing of an FM-modulated signal. The input signal is routed via an RF amplifier to a crystal-controlled mixer. The IF signal is routed via an external selection to an adjustable limiter amplifier followed by a coincidence demodulator. The AF signal is routed via a lowpass to an AF amplifier. Gain and frequency response of the first amplifier can be set externally. The second amplifier contains the volume control and a muting input for additional field strength-dependent regulation.

Absolute Maximum Ratings

$T_A = -40^{\circ}\text{C}$ to 85°C

Parameter	Symbol	Values		Unit
		min.	max.	
Supply voltage	V_S	0	15	V
Load current of V_{stab}	I_{stab}	0	50	μA
Junction temperature	T_j		125	$^{\circ}\text{C}$
Storage temperature	T_{stg}	–55	125	$^{\circ}\text{C}$
Thermal resistance (system-air)	R_{thSA}		70	K/W

Operating Range

Supply voltage	V_S	3	12	V
Ambient temperature	T_A	–30	80	$^{\circ}\text{C}$

Characteristics
 $V_S = 4.5 \text{ V}; T_A = -30^\circ\text{C to } 60^\circ\text{C}$

Parameter	Symbol	Values			Unit	Test Conditions
		min.	typ.	max.		
Supply current	I_S		3.0	5.0	mA	
Reference voltage	V_{stab}	1.9	2.2	2.5	V	

RF Prestage

Voltage gain	G_V	36	42	48	dB	$f_{IF} = 10 \dots 50 \text{ MHz}^{(1)}$ (-3 dB)
Input impedance	Z_i		10//3		k Ω //pF	
Noise figure	NF		6		dB	

IF Limiter Amplifier at $\Delta f = \pm 2.8 \text{ kHz}$, $f_{IF} = 455 \text{ kHz}$
 $f_{mod} = 1 \text{ kHz}$, $V_{IF rms} = 10 \text{ mV}$; Q factor approx. 15:

Parameter	Symbol	Values			Unit	Test Conditions
		min.	typ.	max.		
Input resistance	R_i		20		k Ω	
IF bandwidth	B_{IF}	500			kHz	$V_{QAF1} = -3 \text{ dB}$
Limiter threshold	$V_{lim rms}$		10	20	μV	
Setting range of the limiter threshold	ΔV_{lim}	14	20	22	dB	$V_{10} = 0 \text{ V}/V_{stab}$
AM suppression	AMS	40			dB	$m = 30\%$
Signal-to-noise	$a_{S/N}$		40		dB	
Field strength	V_{10} V_{10}	0.8	1.2	100	mV V	$V_{IF} = 0 \text{ V}$ $V_{IF} = 10 \text{ mV}$
AF output voltage	V_{QAF1}	30	60		mV	
Min. load resistance	R_{q1}	300			Ω	
AF bandwidth	B_{AF}	20	35		kHz	$V_{QAF1} = -3 \text{ dB}$
Total harmonic distortion	THD		1	2	%	

AF Amplifier 2

Voltage gain	G_V	31	37	43	dB	$V_{IF} = 1 \text{ mV}$
Min. load resistance	R_{q2}	1			k Ω	
Input impedance	R_i	10			k Ω	
Signal-to-noise	$a_{S/N}$		40		dB	
Total harmonic distortion ²⁾	THD		2		%	

¹⁾ dependent on external components

²⁾ AQL = 2.5

IF Limiter Amplifier at $f = \pm 2.8 \text{ kHz}$, $f_{\text{IF}} = 455 \text{ kHz}$

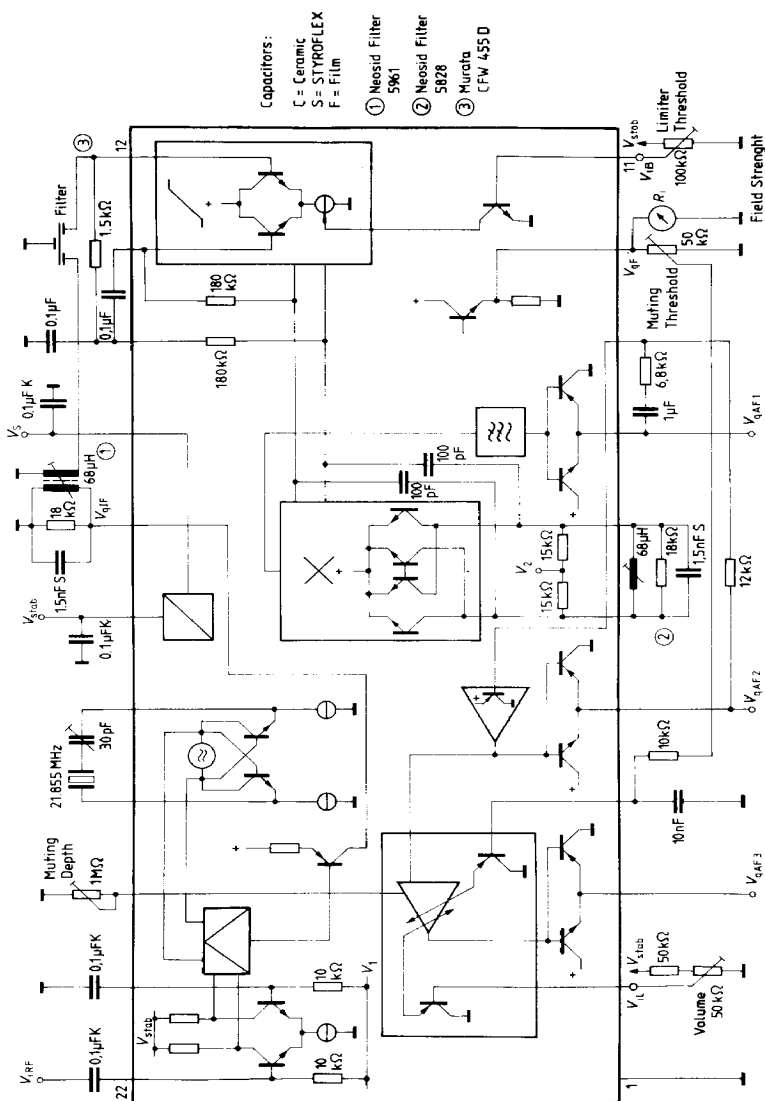
$f_{\text{mod}} = 1 \text{ kHz}$, $V_{\text{IF rms}} = 10 \text{ mV}$; Q factor approx. 15:

Parameter	Symbol	Values			Unit	Test Conditions
		min.	typ.	max.		
Voltage gain	G_V		10		dB	$V_2 = 0 \text{ V}$, $V_{11} = 1 \text{ V}$
Max. output voltage	$V_{\text{qAF3 rms}}$			300	mV	$THD = 10\%$
Min. load resistance	R_{q3}	5			k Ω	
Total harmonic distortion	THD		2		%	
Volume control range	ΔG_{Vol}		80		dB	
Muting depth	M	3	6	10	dB	$V_4 = 0 \text{ V}/1 \text{ V}$ $R_{\text{mute}} = \infty$ $R_{\text{mute}} = 0$
		20	26	40	dB	
Disturbance voltage in acc. with DIN 45405 ²⁾	V_d		30		$\mu\text{V}_{0\text{s}}$	$V_2 = 1/2 V_{\text{stab}}$

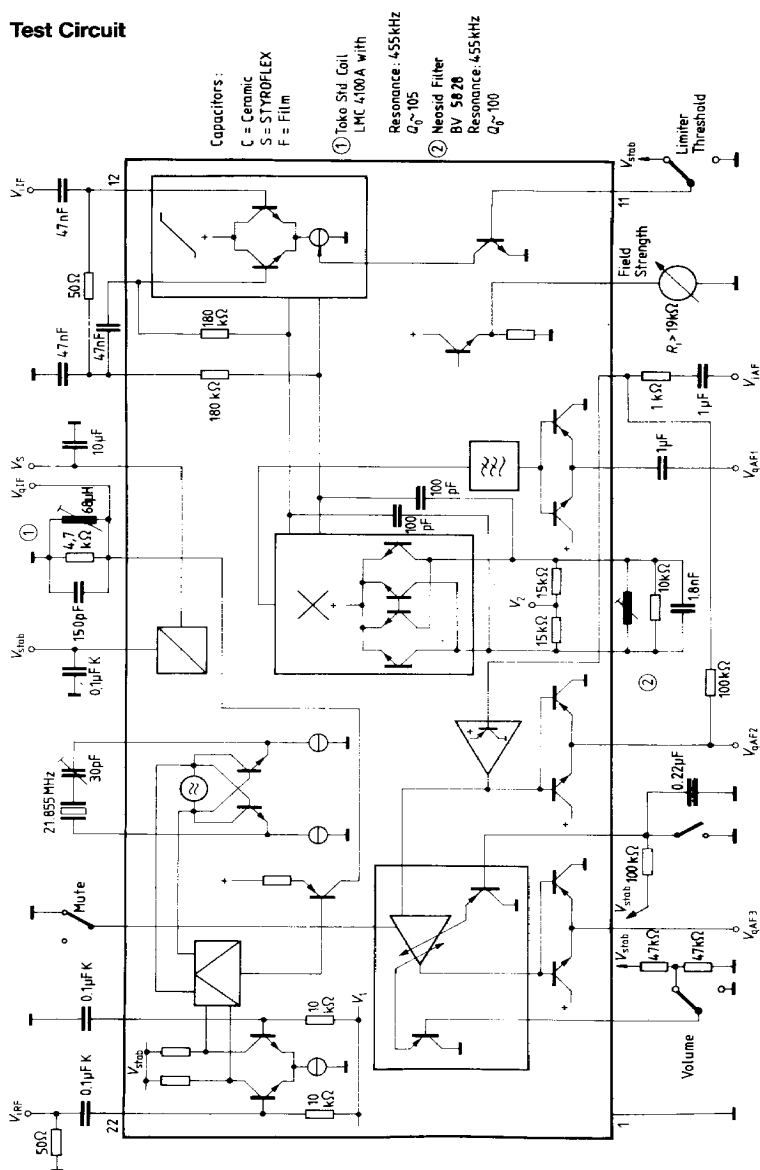
¹⁾ dependent on external components

²⁾ AQL = 2.5

Application Circuit

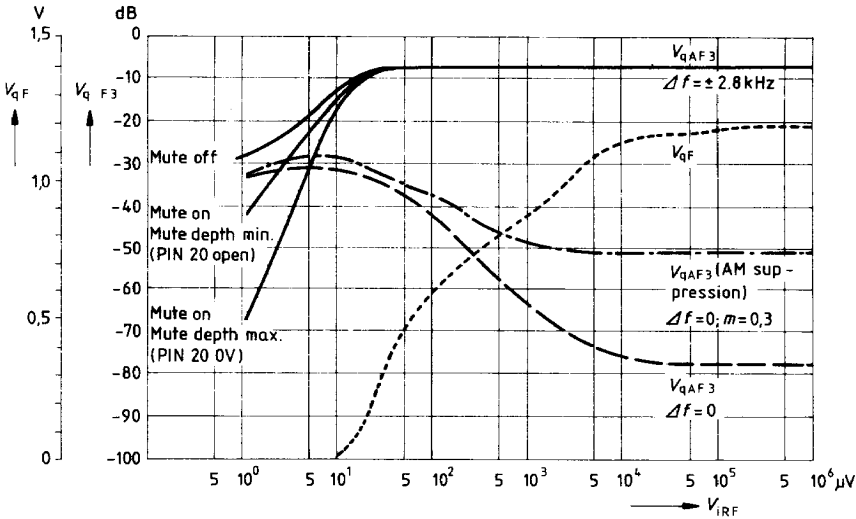


Test Circuit



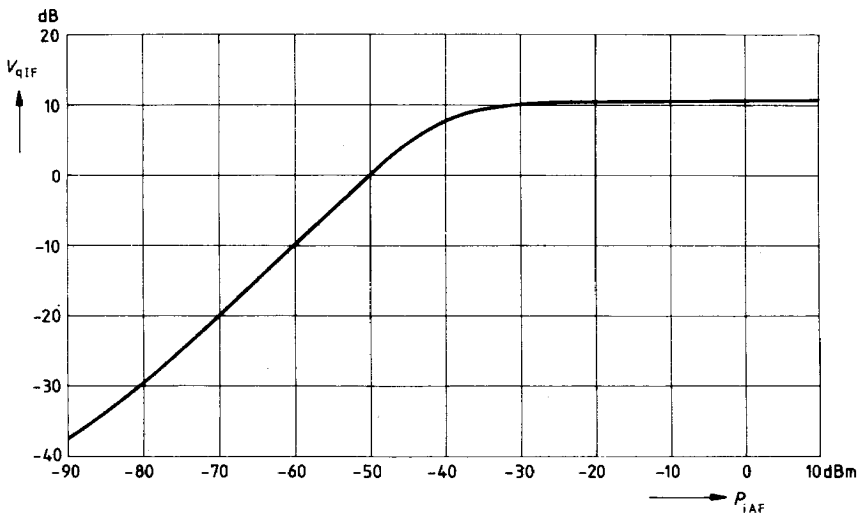
AF Output Voltage V_{qAF3} with Reference to 775 mV_{rms} and Field Strength Output Voltage V_{qF} versus Input Voltage V_{iRF}

$V_S = 4.5 \text{ V}$, $f_{mod} = 1 \text{ kHz}$



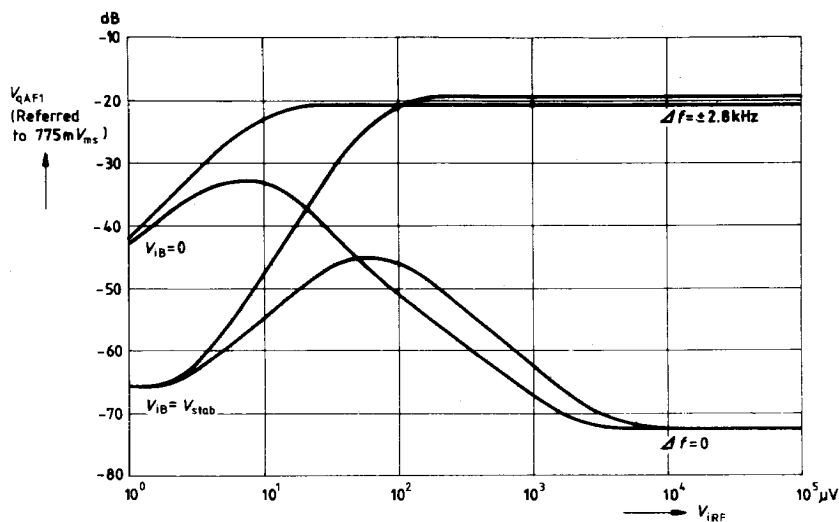
Mixer Output Voltage V_{qIF} with Reference to 775 mV_{rms} at 18 k Ω versus Input Level P_{iRF}

$V_S = 4.5 \text{ V}$



IF Limiter Characteristic

$V_S = 4.5 \text{ V}$, $f_{\text{mod}} = 1 \text{ kHz}$

**AF Output Voltage V_{qAF3} with Reference to $775 \text{ mV}_{\text{rms}}$ versus Control Voltage V_{IL}**

$V_S = 4.5 \text{ V}$, $f_{\text{mod}} = 1 \text{ kHz}$

