| 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

$T_A = -40\,°C$ 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 | °C |
| Storage temperature | $T_{stg}$ | −55 | 125 | °C |
| Thermal resistance (system-air) | $R_{th\,SA}$ | | 70 | K/W |

### Operating Range

| | | | | |
|---|---|---|---|---|
| Supply voltage | $V_S$ | 3 | 12 | V |
| Ambient temperature | $T_A$ | −30 | 80 | °C |

## Characteristics

$V_S = 4.5$ V; $T_A = -30$ °C to 60 °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 | $f_I = 10...50$ MHz[1] (−3 dB) |
| Input impedance | $Z_i$ | | 10//3 | | kΩ//pF | |
| Noise figure | $NF$ | | 6 | | dB | |

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

| Parameter | Symbol | Values | | | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| Input resistance | $R_I$ | | 20 | | kΩ | |
| IF bandwidth | $B_{IF}$ | 500 | | | kHz | $V_{qAF1} = -3$ dB |
| Limiter threshold | $V_{lim\,rms}$ | | 10 | 20 | µV | |
| Setting range of the limiter threshold | $\Delta V_{lim}$ | 14 | 20 | 22 | dB | $V_{10} = 0$ V/$V_{stab}$ |
| AM suppression | $AMS$ | 40 | | | dB | $m = 30\%$ |
| Signal-to-noise | $a_{S/N}$ | | 40 | | dB | |
| Field strength | $V_{10}$<br>$V_{10}$ | <br>0.8 | <br>1.2 | 100 | mV<br>V | $V_{i\,IF} = 0$ V<br>$V_{i\,IF} = 10$ mV |
| AF output voltage | $V_{QAF1}$ | 30 | 60 | | mV | |
| Min. load resistance | $R_{q1}$ | 300 | | | Ω | |
| AF bandwidth | $B_{AF}$ | 20 | 35 | | kHz | $V_{qAF1} = -3$ dB |
| Total harmonic distortion | $THD$ | | 1 | 2 | % | |
| **AF Amplifier 2** | | | | | | |
| Voltage gain | $G_V$ | 31 | 37 | 43 | dB | $V_{i\,AF} = 1$ mV |
| Min. load resistance | $R_{q2}$ | 1 | | | kΩ | |
| Input impedance | $R_I$ | 10 | | | kΩ | |
| Signal-to-noise | $a_{S/N}$ | | 40 | | dB | |
| Total harmonic distortion[2] | $THD$ | | 2 | | % | |

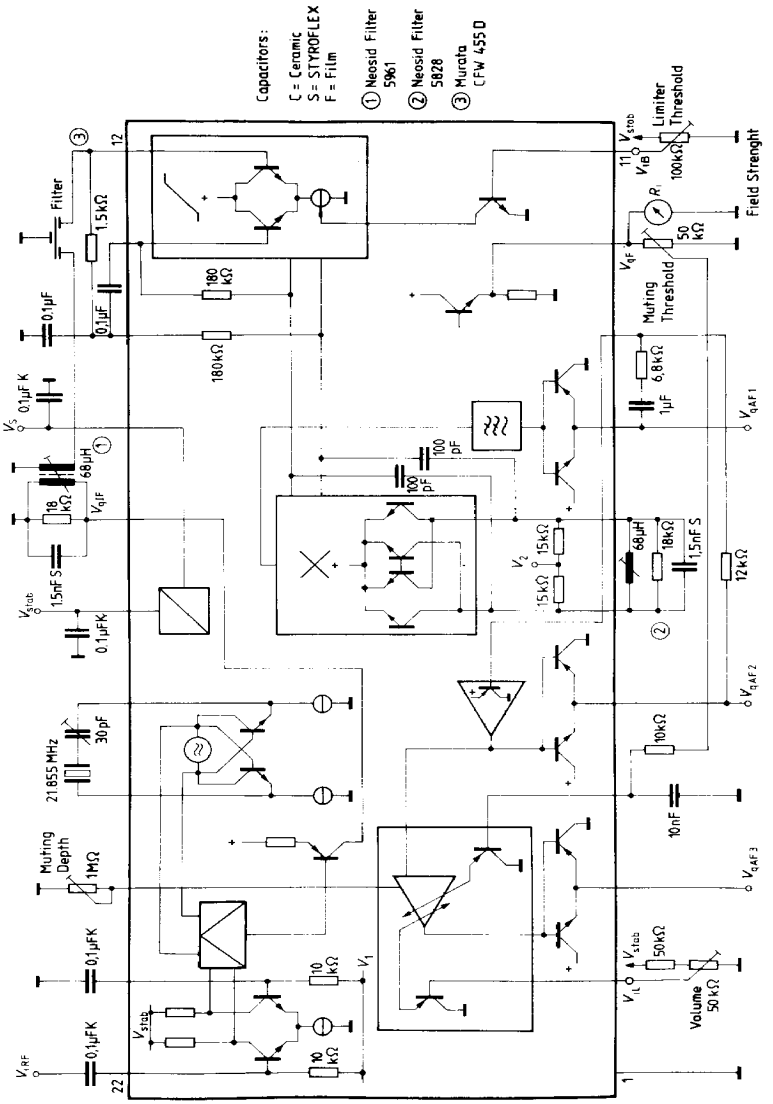
[1] dependent on external components
[2] AQL = 2.5

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

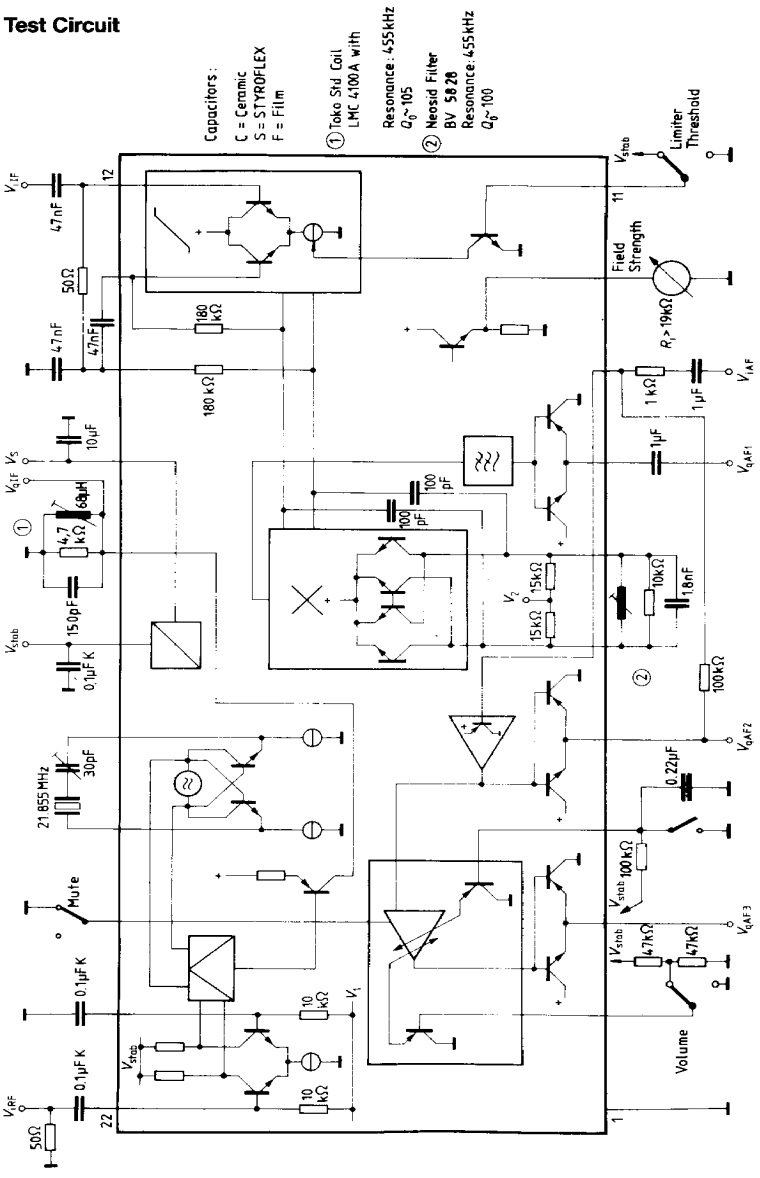
| Parameter | Symbol | Values | | | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| Voltage gain | $G_V$ | | 10 | | dB | $V_2 = 0$ V, $V_{11} = 1$ V |
| Max. output voltage | $V_{qAF3\,rms}$ | | | 300 | mV | $THD = 10\%$ |
| Min. load resistance | $R_{q3}$ | 5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

[1]) dependent on external components
[2]) AQL = 2.5

**Application Circuit**

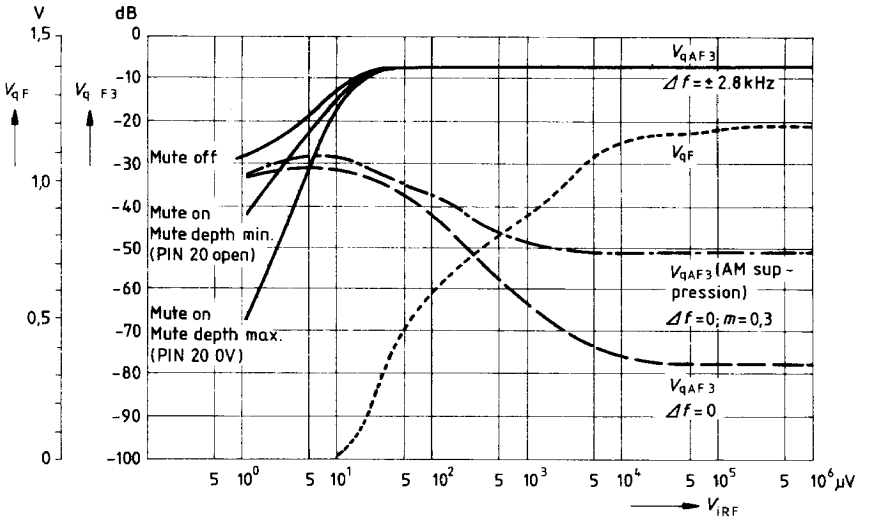


## Test Circuit



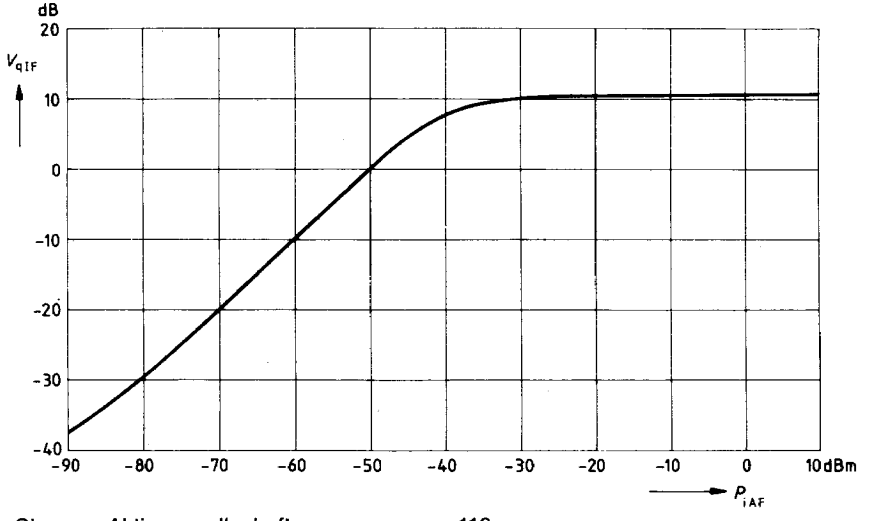
**AF Output Voltage $V_{q\,AF3}$ with Reference to 775 $mV_{rms}$ and Field Strength Output Voltage $V_{qF}$ versus Input Voltage $V_{i\,RF}$**

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



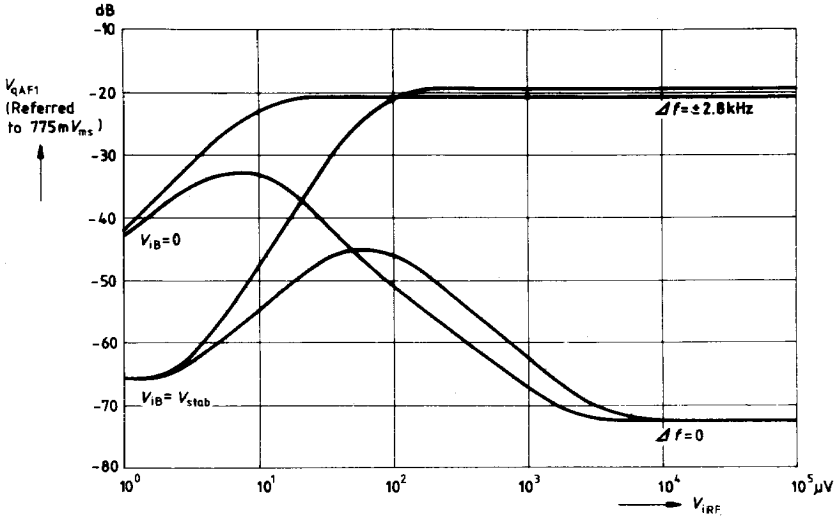

**Mixer Output Voltage $V_{q\,IF}$ with Reference to 775 $mV_{rms}$ at 18 kΩ versus Input Level $P_{RF}$**

$V_S = 4.5$ V



**IF Limiter Characteristic**

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




**AF Output Voltage $V_{q\,AF3}$ with Reference to 775 $mV_{rms}$ versus Control Voltage $V_{IL}$**

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